

# MAPPING KONA'S FUTURE

## *Kona Community Development Plan*

### Volume 2

### *Background Information*

September 2008

**FINAL**



Volume 2:  
Background Information

Mapping the Future

KONA COMMUNITY DEVELOPMENT PLAN

The ideas presented in these reports were used as input into the planning process. Some of these ideas have been incorporated into the plan and others were not. These reports have no legal basis and are for information purposes only.

Prepared for:  
County of Hawai'i Planning Department

Prepared by:  
Wilson Okamoto Corporation

May 2008



**VOLUME 2**  
**Background Information**

1. Public Involvement Summary: Process and Results, ACP-Visioning & Planning, Ltd. and The Environmental Simulation Center, November 23, 2006
2. Working Groups Objectives & Actions, ACP-Visioning & Planning, Ltd., December 12, 2006
3. Demographic Characteristics of North & South Kona, Wilson Okamoto Corporation, January 2007
4. Kona Regional Profile, Wilson Okamoto Corporation, January 2007
5. Land Use Strategies, The Environmental Simulation Center, July 2007
6. Green Infrastructure Technical Report, The Conservation Fund, February 28, 2007
7. Kona Affordable Housing Economic Analysis, David Paul Rosen & Associates, October 23, 2006
8. Grey Infrastructure Report, Wilson Okamoto Corporation, March 2007

Cover: "Map of the Island of Hawai'i" Hawaii Territory Survey, Walter E. Wall, Surveyor, December 1928. Provided by the Kona Historical Society.



**PUBLIC INVOLVEMENT SUMMARY:  
PROCESS AND RESULTS**

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ACP-Visioning & Planning, Ltd. and  
The Environmental Simulation Center  
November 30, 2006

# Kona Community Development Plan

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PUBLIC INVOLVEMENT SUMMARY:  
PROCESS AND RESULTS



**PREPARED BY**  
ACP-VISIONING & PLANNING, LTD.  
THE ENVIRONMENTAL SIMULATION CENTER

NOVEMBER 30, 2006

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# Table of Contents

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1. Introduction	1.1
2. The Public Involvement Process	2.1
3. The Vision for the Future of Kona	3.1

## Appendices

A. Summary of Ideas	A.1
B. Critical Questions Results Summary	B.1
C. Respected Areas and Protected Areas Results Summary	C.1
D. Mapping the Future Exercise Results Summary	D.1
E. How Do We Grow? Part 1 – Review of Scenarios	E.1
F. Building Block Preference Survey Results	F.1



# 1. Introduction

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The Kona Community Development Plan (CDP) is built upon a foundation of ideas generated by the public. Opportunities to gain public input were integrated in the planning process from initiation through project's completion. The ideas brought in by the public were used to shape development principles as well as the policy framework for the Community Development Plan. Those ideas have given shape to the community's vision of the future, have helped address issues related to policy and public investments, and have defined how the community wants to grow in the future.

ACP – Visioning & Planning designed the public process described in this report and worked closely with the Environmental Simulation Center (ESC) that provided technical analysis and visualizations used throughout the process. The Wilson Okamoto Corporation, based in Honolulu, and the lead consultant for the CDP provided logistic support.

The public involvement process was designed and conducted so that the results of each activity informed the content of succeeding ones. This ensured that the public was involved in making all critical decisions for the CDP. Great emphasis was placed on visualizing options and on using images to engage the public in making informed choices. These methods were particularly important because a large part of the public process was dedicated to the issue of future growth of the community.

Visualizations allow participants to a public process to make informed decisions and to understand the implication of choices.



The following chapters summarize the public involvement activities conducted as part of Community Development Plan and the results of the process:

2. The Public Involvement Process
3. The Vision for the Future of Kona

An appendix is attached, which includes six documents referenced in the text as well as a fullest of maps used in the Mapping the Future workshop.

The report is presented as a free standing report and will be integrated later into the CDP.



KONA COMMUNITY  
DEVELOPMENT PLAN

## 2. The Public Involvement Process

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### **Public Involvement Activities:**

Structured Interviews  
Public Meetings  
Mapping the Future Workshop  
How do we grow? Charrette Part I  
How do we grow? Charrette Part II

Residents of Kona responded with great enthusiasm to the opportunity to become involved in formulating the Community Development Plan, a critical policy document affecting the future of Kona. Formal structured interviews and informal conversations with participants revealed a yearning for extensive, transparent, and meaningful involvement—for a variety of important reasons. The Plan provided an opportunity for the Kona region to spell out its own vision and priorities in the framework of countywide decision-making. The Plan focused on North and South Kona as one regional reality. The CDP promised to address in specific terms how Kona should grow in the future, an issue capable of generating great passion among all interest groups. Finally, the process presented residents with the unique opportunity to provide input before the plan was formulated in a proactive and creative way rather than the more customary comment process after a plan has been developed. Extensive participation became a hallmark of the process, involving well over 1,000 participants.

The involvement of residents in the CDP was organized in four phases:

**Phase 1: Gathering Ideas** – to create the foundation of ideas upon which all subsequent activities were based (this phase included Structured Interviews and Public Meetings and lasted from September 2005 to February 2006).

**Phase 2: Mapping the Future** – to address critical questions and identify where future growth should occur (The Mapping the Future workshop was held in February 2006).

**Phase 3: How Do We Grow? Charrette Part 1 and 2** – to identify preferred development patterns (this phase consisted of two charrettes held in March and June 2006).

**Phase 4: The Working Groups** – to identify objectives and actions for inclusion in the specific elements of the CDP.

An extensive outreach effort was established to ensure that residents heard about the public involvement activities and were invited to participate. Outreach included involving local networks and special interest groups, the development of an extensive mailing list of participants, and the distribution of flyers and invitations.

The four phases are described in detail below.

## Phase 1: Gathering Ideas

### 1. Focus Group Interviews

In September 2005, the consultant team conducted a series of focus group structured interviews with stakeholder groups that included special interest groups, representatives of the tourism industry, businesses, representatives of the development community, large and small property owners, native Hawaiians, long-term residents, and newcomers. These interviews were structured to expose perceptions and attitudes on issues. Seven key perception that emerged from the interview are listed below:

1. Land use – low density gated development patterns inconsistent with the area’s culture and character;
2. Transportation – heavy congestion due to lack of North South and East West connectivity and limited choices in transportation alternatives;
3. Housing affordability – due to the high price of land and a lack of affordable housing products in the vicinity of where jobs are;
4. Demographics – with population getting older and the income gap between newcomers and residents getting wider;
5. Environmental degradation – through deforestation, increased occurrence of flash floods, water and air quality deterioration, and lack of controls on slope development;
6. Cultural preservation – with widening conflict between the protection of ancestral lands from use and development; and
7. Governance – with concerns about fairness of revenue reinvestments in Kona.

#### Introducing the CDP process:

Two meetings were held in September 2005 to present to residents the proposed process for the CDP, to announce the schedule of future events, and to gain an understanding of the public’s expectations for the Plan. The meetings were held at the Kealakehe and Konawaena high schools. A key outcome of these meetings was the decision to structure the Gathering Ideas phase of the project as an open ended and on-demand set of small meetings with residents and special interest groups to be conducted in all parts of the region. This format ensured broader participation, easier access to the process, and a degree of informality that enabled frank and open discussion of ideas and issues.

These perceptions were further explored with the general public as part of public meetings and workshops and are addressed in the elements of the CDP.

**2. Public Meetings**

One hundred and nine individual public meetings were held throughout Kona from November 2005 through January 2006. These meetings were offered on-demand, were scheduled throughout Kona, and were targeted to ensure balanced demographic and geographic participation of residents. Over 800 residents participated in the individual meetings.

Meetings consisted of two activities: general brainstorming on what would make Kona best fulfill its potential and addressing critical questions by participants. A large cadre of trained volunteer facilitators conducted each meeting to ensure consistency in the results, and fairness and transparency in the process.

The 3,496 ideas gathered during these meetings were databased and sorted into 18 categories. The categories were used by the CDP Steering Committee to develop a set of goals based on the ideas for each category. The goals capture a desired outcome for the future of Kona. They were also used by the Working Groups (see below) as the material upon which to develop objectives and strategies for the elements of the CDP. (See Appendix A: Summary of Ideas.)

**Number of Ideas and Percentages**

Transportation	511	14.6%
Alternative	118	3.4%
Public	141	4.0%
Vehicular	252	7.2%
Government and Governance	354	10.1%
Planning	332	9.5%
Social Issues	327	9.4%
Environment	273	7.8%
Infrastructure	242	6.9%
Economic		
Prosperity	191	5.5%
Public Facilities	188	5.4%
Housing	186	5.3%
Land Use	178	5.1%
Community		
Character	178	5.1%
Education	152	4.3%
Parks, Recreation, and Open Space	126	3.6%
Agriculture	98	2.8%
Culture	85	2.4%
Energy	69	2.0%



The first public meeting of the Kona Community Development Plan.

**Phase 2: Mapping the Future**

The Mapping the Future Workshop was conducted on February 18, 2006. The workshop consisted of two segments:

1. Critical Questions – to address “Critical Questions” related to policy and implementation issues as raised by the structured interviews and ideas generated at the public meetings; and
2. Mapping the Future – to initiate a dialogue on regional character, cultural priorities, environmental protection issues, and preferred locations for future growth.

The workshop was a four-hour activity attended by over 350 residents organized in 32 facilitated small groups.

During the critical questions segment of the workshop small groups were randomly assigned to address one of 12 topics. Topics included: housing choice, housing affordability, agriculture, transportation and land use, congestion, parks, recreation, and open space, protection of the environment, hazard mitigation, protection of ancestral and historic sites, community character, retail, and tourism. The critical questions represented the start of a discussion of policy issues for the CDP. They dealt with big picture questions to frame and inform the more specific deliberations of the CDP. (See Appendix B: Critical Questions Results Summary.)

The Mapping the Future segment of the workshop asked participants to address three issues:

- To define criteria for the protection of ancestral and historic sites,
- To define criteria for the protection of land for environmental and open space reasons; and
- To address the issue of land consumption in Kona.

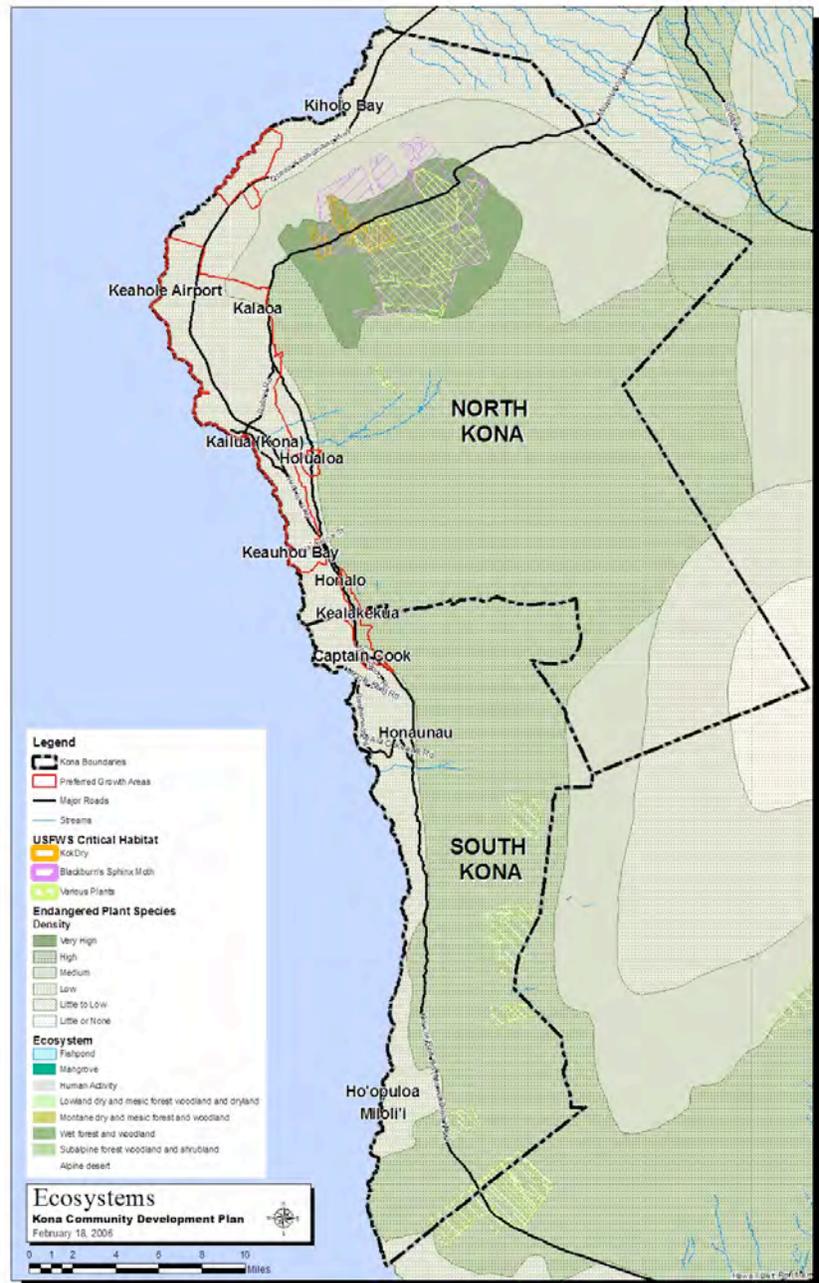


Top, registration of the participants to the Mapping the Future workshop. Right, the start of the small group activities.



Participants first considered and mapped historic sites and specific geographical and environmental features that should be protected. Then, they recommended appropriate locations where future growth could occur based on cultural and geographic constraints and based on land available within areas defined by the County General Plan as expansion areas. The Mapping the Future segment enabled participants to begin to deal with the issue of future growth—balancing future growth with the imperative of respecting ancestral cultural resources and protecting the unique environmental features of the Kona region. (See Appendix C: Respected areas and Protected Areas Results Summary, and Appendix D Mapping the Future Exercise Results Summary.)

The map below shows Ecosystems in Kona. It is one of eight descriptive maps provided to the workshop participants. Other maps included Cultural Resources, Aquifers, Existing Land use, General Land Use, Infrastructure, Natural Resources, and Ownership.



The outcomes of the Mapping the Future workshop were critical to the reminder of the public process. Answers to the critical questions were synthesized into ten development principles while the results of the Mapping the Future segment were used to develop four probable development scenarios. Both became the basis for public input and review in the course of the How Do We Grow? Charrette, Part 1.

Phase 3: How Do We Grow? Charrette Part 1 and 2

The exploration of where future growth should be best located was a prelude to a public dialogue on the quality of such future growth. To define a desired way for future growth to perform, the CDP included a two part charrette process.

A charrette is a planning technique that has been widely applied throughout the world. It is an effort that brings together—in a compressed period of time—the talents and energies of consultants, staff, and residents to address specific planning and design issues. It provides a series of feedback opportunities so that decisions can be made and the process can move forward with the support of the public.

The two How Do We Grow? charrettes are described below.



Participants evaluate one of four development scenarios during the public meeting of How Do We Grow? Charrette Part 1.

**How Do We Grow? Charrette Part 1**

“How Do We Grow? Part 1” was conducted over a period of four days from March 27 to March 30, 2006. It consisted of a number of activities that included a Public Meeting on March 28, an Open House on March 29, and a meeting of the Steering Committee on March 30 to summarize the results. Interspersed with these activities there were meetings with stakeholders and County staff dealing with issues of infrastructure and transportation investments.

The purpose of the Public Meeting was to initiate a process to determine how future growth will occur in Kona. It consisted of the following activities: summarizing the results of the Mapping the Future workshop; reviewing and rating development principles; introducing indicators; evaluating alternative growth scenarios; and selecting a preferred growth scenario.

The Open House allowed participants to review the results of the Public meeting and to comment on the preferred development scenarios while relating the scenario to environmental and cultural constraints.



The Open House was held on March 29, 2006. It provided an opportunity for the public to see their ideas being applied to the Kona region.

The How Do We Grow? Charrette Part 1 confirmed the strong degree of public support for the ten development principles and produced agreement on a preferred development scenario.

For the development principles ratings see Chapter 3, Section A.1, and for a description of the preferred development scenario see Appendix E, How Do We Grow? Part 1 – Review of Scenarios.



Participants comment on the development scenarios.



### How Do We Grow? Charrette Part 2

“How Do We Grow? Charrette Part 2” was also a three-day event conducted between June 20 and June 23, 2006. It started with a public meeting conducted on June 20 designed to refine the preferred scenario. It also included an Open House to present the results of the Public Meeting activities. Three-dimensional illustrations of possible development patterns were presented and rated during the Open House. At the end of the charrette, a second public meeting was held to present the results and gain final feedback from the public. (See Appendix F, Building Block Preference Survey Results.)

The second charrette provided closure to the set of linked meetings that began with the Mapping the Future workshop.

### Phase 4: The Working Groups

The Kona citizens’ Working Groups were created to

- Expand on the CDP public involvement process;
- Maintain transparency and sustain community involvement in the Plan’s development; and
- Create a mechanism that allows for citizen input in the more technical phase of the Plan while the chapters of the Plan are being drafted.

The Working Group process was structured to last five to six months. A facilitator was assigned to each group to help guide the process. There was, at a minimum, one member from the CDP Steering Committee in each group to function as a liaison and keep the Steering Committee up to date on the Working Group process. A total of 12 Working Groups were created to address the following topics:

#### LIST OF WORKING GROUPS BY TOPIC

Topic	Description
1 Social Issues	Public safety, health care, education, etc.
2 Government	Governmental structure, accountability, leadership, fiscal management, and community participation
3 Land Use	Land conservation, open space, development patterns, connectivity, agricultural lands, land use planning practices
4 Transportation	Vehicular transportation and the road network; public transportation (bus, light rail, etc.); alternative transportation (biking, walking, etc.)
5 Housing	Housing availability, affordability, locations
6 Natural Resources	Environmental and natural resources, wildlife, waste reduction
7 Cultural Resources	Diversity, history, culture, Kona character
8 Recreation	Parks and recreational opportunities
9 Public Facilities	Diverse facility needs
10 Public Utilities	Infrastructure systems
11 Economy, Energy	Local industries, business development, economic sustainability, alternative and renewable energy
12 Flooding & Natural Hazards	Watershed management, flood control, hazard preparedness, etc.

Working Groups started their activities on May 13<sup>th</sup>, 2006 and concluded the majority of their work at the end of September 2006. They met at least once every month, and often more than that. They conducted a variety of tasks following a general set of instructions, including: reviewing ideas and identifying major themes for their assigned topic(s); using the major themes to develop preliminary objectives that will help accomplish the goal for their topic; and beginning the process of identifying specific and concrete actions.

The Working Group report has been submitted separately and is currently being reviewed by the Steering Committee. It is expected that the recommendations of the Working Groups will be integrated in the Goals, Objectives, and Implementation Action section of each element of the Plan.



At the Open House participants could review summaries of interviews conducted by the consultant team during the charrette



### 3. The Vision for the Future of Kona

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The vision set forth by the public and articulated in this document is multifaceted, complex, and requires a profound rethinking of the way land will be used in the Kona region in the future. The vision suggests a dramatic shift in emphasis from growth by disconnected and often gated subdivisions to the creation of integrated villages and neighborhoods that are linked, walkable, and offer mixed-uses and buildings of different types and cost. It calls for celebrating the native culture, while respecting the ancestral places that are sacred to the native culture. It calls for considering all aspects of the natural environment—from the mauka to the makai lands, to agriculturally profitable areas, and places for recreation—to create a connected green infrastructure that defines and shapes the built environment. It demands a strong focus on affordable housing, not just as an issue of social equity, but as a way to reduce congestion and workforce commuting distance. It requires establishing a new rigorous set of development regulations to enable the implementation of the vision. And, finally, it will require innovative partnerships of private, public, and civic interests committed to implementing the vision over the long term.

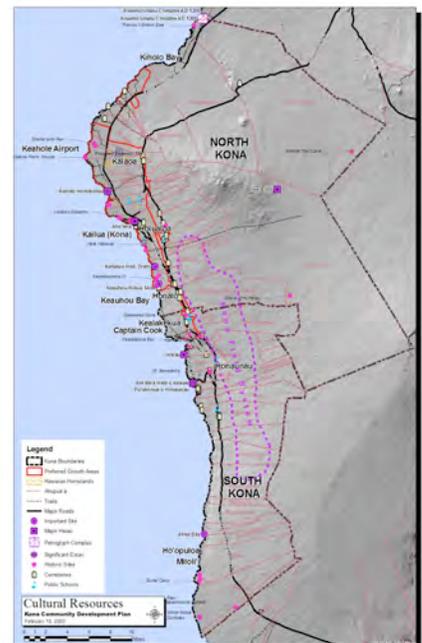
These are some of the key challenges that have emerged from public input. The full extent of the vision, however, is expressed through development principles, goals, objectives, actions, and through the land use recommendations derived from the How Do We Grow? charrettes.

Even though the vision for the future of Kona is the result of public input, it is also the result of technical analysis that was integrated throughout the public process. The melding of the intuitive knowledge brought to the table by the public and the technical analysis contributed by the consultant team ensured that the participants made informed and technically sound decisions while pursuing a vision for the region consistent with their values and expectations.

This chapter is divided in the following sections and subsections:

- A. The Vision for Kona
  - A.1 Development Principles
  - A.2 Community Development Plan Goals
  - A.3 Objectives and Actions
- B. The Way to Grow
  - B.1 Where to Grow
  - B.2 Mapping the Future
  - B.3 Growth Opportunity Areas
  - B.4 How to Grow: the Preferred Land Use Scenario and Development Patterns
  - B.5 Visualization of Building Blocks
  - B.6 Connecting Future Development with Cultural and Open Space Resources
  - B.7 The Vision for the Future of Kona

The first section summarizes development principles, goals, objectives and actions.<sup>1</sup> The second focuses on the preferred scenario for future development in Kona. Sections and subsections are explained in detail on the next page.



The Natural (left) and Cultural Resources maps on the right are few of the many analytical tools used in the CDP planning process.

<sup>1</sup> Objectives and actions have been developed through the Working Group process and have been submitted in a separate document.

A. The Vision for Kona

**A.1 Development Principles**

Ten development principles were created taking into consideration comments made by the public during the Mapping the Future workshop. At the workshop, participants first addressed critical questions that emerged from a review of the 3,496 ideas collected from the 109 public small group meetings. Following that, they defined criteria for the protection of ancestral and historic sites and criteria for the protection of land, and they addressed the issue of land consumption in Kona. Summary reports for each of the phases of the Mapping the Future workshop are included in the appendix.

The public rated development principles individually during the public meeting during the How Do We Grow? Charrette Part 1. Participants were asked to consider how important each principle would be to the future of Kona. They rated the principles on a scale of 1 to 5 (where 1 indicated that a principle was not important and 5 indicated that a principle was very important). The Average Score (in parenthesis) represents the general level of importance for each principle as expressed by the public. A higher score indicates a greater level of importance.

The ten principles, listed in order of importance, include:

1. The coastline, watershed areas, flood plains, important agricultural land, open space, and areas mauka of Mamalahoa Highway should be protected both inside and outside of the urban expansion area. (4.53)
2. Future growth should connect with other communities and offer alternatives on how to move around. (4.42)
3. Future growth should offer a broad range of housing choices that are affordable and available close to places of work. (4.35)
4. Future growth should provide more parks. (4.34)
5. Future growth should occur in the form of compact villages that offer increased density and a mix of homes, shops, and places to work. (4.02)
6. Density in South Kona should be kept low and the character should remain rural. (3.95)
7. Future growth should occur where and when infrastructure (roads and utilities) is already in place. (3.93)
8. The majority of future growth should be directed north of Kailua Kona. (3.74)
9. Most future growth in South Kona should occur around existing villages, such as Honaunau, Captain Cook, and Kealakekua. (3.45)
10. Some future growth should be directed to the Keauhou area. (2.69)



The protection of the coastline, important agricultural land, and open space were a high priority for participants to the Mapping the Future workshop when those topics were discussed.

The principles focus on the location and type of development, and provide guidance for policies affecting the whole range of the elements of the CDP including: Land Use and Planning (principles 5, 6, 8, 9, and 10); Environment (principle 1); Agriculture (principle 6); Transportation

(principle 2); Housing (principle 3); and Public Facilities and Programming and Recreation (principle 4)

Participants in the How Do We Grow? Charrette Part 1 public meeting considered these principles in evaluating four development scenarios and in selecting a preferred development scenario.

## A.2 Community Development Plan Goals

Goals indicate a desired outcome for the Community Development Plan. They indicate what the community aspires to achieve and expects, and provide a conceptual framework for the planning process. Together with the objectives and actions developed by the citizens' Working Groups they provide a roadmap for future decisions.

The Goals for the Community Development plan were created using the ideas generated through the 109 public meetings. After the ideas had been sorted into categories, the Steering Committee reviewed the ideas in each category and developed a set of draft goals. The draft goals were subsequently reviewed by the Working Groups using the same methodology and were in some cases revised.

The goals are still a work in progress and will be edited for consistency at the completion of the Working Groups activities. The 17 goals for the future of Kona include:

1. **Agriculture:** Agricultural lands are preserved in a manner that supports small family farms, ecotourism, and a self-sufficient agricultural economy that encourages the local use of local products.
2. **Community Character:** Diversity, history, and the host culture are celebrated in manageably-sized neighborhoods and communities that incorporate beautification, architectural continuity, and respect for the natural environment in order to maintain Kona character and Hawaii Island style.
3. **Culture:** Multi-ethnic Hawaiian culture is preserved, protected, and restored in a manner that perpetuates all aspects of the aloha spirit.
4. **Economy:** Diverse and sustainable industries (such as ecotourism, agriculture, aquaculture, technology, and health, among others) are enhanced, expanded, and marketed to take full advantage of Kona's unique environmental assets and accommodate the needs of employees; small businesses, local business districts, and higher education are also supported and enhanced.
5. **Energy:** Establish Kona District as a model for sustainability and energy self-sufficiency in Hawaii County.
6. **Environment:** Guided by a principle of respect for the land, Kona's environment and natural resources are preserved and protected to ensure clean air and water, thriving native species, conservation of shorelines and open space, improvements in watershed management and flood control, and reductions in solid waste.

7. **Facilities:** A wide variety of high-quality accessible facilities meet diverse cultural, economic, and environmental needs.
8. **Social Issues:** A social environment that encourages health, safety, and welfare for all Kona residents, by providing for social needs (including health care and education), and resolving social problems (such as drug use).
9. **Government:** An effective and accountable government manages the impacts of growth and meets the needs of the Kona community by encouraging cooperation among public, private, and civic partners, ensuring equitable distribution of resources, and instituting policies and regulations in a predictable and consistent manner.
10. **Housing:** Truly affordable rental and ownership housing close to places of employment is available for all residents (including low income workers, first-time buyers, and seasonal farm workers), in walkable neighborhoods that are developed concurrently with infrastructure and offer mixed uses, mixed housing types, appropriate densities that allow for open space, and that accommodate needy populations (including seniors, disabled persons, and the homeless).
11. **Land Use:** Land use policies and practices make responsible use of limited land resources by protecting shorelines, conserving open space, promoting mixed-use village style development, providing for connectivity, encouraging affordable housing development, and protecting environmentally sensitive lands such as floodplains.
12. **Planning:** Planning practices engage the public, reflect community values, and protect cultural and environmental resources.
13. **Infrastructure:** Quality infrastructure systems are regularly maintained, improved, and expanded concurrently with new development to meet the needs of Kona residents and businesses.
14. **Parks and Recreation:** Extensive recreation opportunities exist, consisting of large and small parks that are easily accessible, well-maintained, attractive, accommodate family use, and provide for hiking, walking, camping, and increased ocean access.
15. **Alternative Transportation:** Widespread alternative transportation options (including sidewalks, trails, and bike lanes) meet the needs of all residents and visitors and offer extensive opportunities for getting around without a car.
16. **Public Transportation:** An efficient public transportation system meets the transportation needs of residents, commuters, and tourists through comfortable and frequent bus and light rail service to key destinations, along prominent commuter routes, and at transfer points that offer connections to alternative [and vehicular] transportation modes.
17. **Vehicular Transportation:** A well-planned, well-maintained, and well-managed road system provides safe, economical, and efficient

transport of goods and people between and within existing and future industrial, commercial, resort, residential and recreational areas.

These goals express a bold vision for the future of Kona. It is a vision that capitalizes on the region's most valued assets and that resolutely addresses the region's weaknesses. The goals, together with objectives and actions developed by the Working Groups, will form the policy framework of the CDP.

### **A.3 Objectives and Actions**

The objectives and actions developed by the Working Groups have been forwarded as a separate report. They have been reviewed by the working groups and by the Steering Committee. They will be finalized and integrated in the appropriate element of the Community Development Plan.

## **B. The Way to Grow**

Land use is the most critical element in the Community Development Plan and accounted for the greatest portion of the public involvement process. Discussions on land use started with developing criteria for respecting and protecting ancestral lands and special environmental assets. Discussion then moved swiftly to the most appropriate locations for future growth to occur. Growth Opportunity Areas identified through the public process within the designated Urban Expansion Areas of the County's General Plan embody the intent of the vision for Kona and provide a catalyst for regulatory and infrastructure development.

This segment of the public process required a strong interface between public input and technical work. The latter consisted of extensive GIS-based existing conditions analysis of the Kona region. The existing conditions analysis was conducted prior to the Mapping the Future workshop to provide factual mapped information on a number of conditions ranging from cultural and natural resources to aquifers and ecosystems. These GIS-based maps were produced by the Environmental Simulation Center and used throughout the public process.

As the meeting focus shifted from where future growth should occur to how it should occur, visualizations of possible alternatives were introduced and rated by the public.

This section of the report presents initial assumptions and results of the public involvement process as it related to how Kona should grow.

### **B.1 Where to Grow**

Growth is a catalytic factor in the Kona region. Growth affects the entire gamut of issues germane to the CDP, from quality of life and cultural issues, to infrastructure investments.

Population growth in Kona has been robust, going from a population of 29,942 residents in 1990 to an estimated population of 41,941 in 2005. The rate of growth of North Kona has been more than two times of that of South Kona. Using the middle forecast, as suggested by the General Plan, the projected total population for the year 2020 is 56,367, 14,426 more residents than the estimated population in 2005. Population numbers, as important as they are, only tell part of the story, however. Growth in Kona has been fueled by construction of second homes whose residents are counted in their primary place of residence as part of the decennial census.

Growth in housing units provides a more realistic picture of growth in Kona. In the period between 1990 and 2000 the number of new housing units increased at a rate more than twice the population increase, from 7,947 housing units in 1990 to 13,330 in 2000. This asymmetrical increase creates greater, disproportionate land consumption and infrastructure needs.



Land in Kona is being developed at a rate that is nearly 4 times population growth and almost 2 times housing unit growth.

The trend of disproportionate land consumption has continued to the present. In the period between 1995 and 2005, the amount of developed land increased by 3,582 acres<sup>2</sup> at a rate of over 350 acres annually. Developed land increased at a rate of 9% annually, while population increased at a rate of 2.4% annually, and housing units increased at a rate of 5.5% annually. Land in Kona is being developed at a rate that is nearly 4 times population growth and almost 2 times housing unit growth.

The question of whether the current land consumption trends are sustainable and what is the best way to accommodate future growth in Kona was at the core of the Mapping the Future workshop.

<sup>2</sup> Developed Land: Environmental Simulation Center, (2006) Based on Parcel/TMK maps from the County of Hawaii (2005). Additional data provided by the County of Hawaii tax assessors office. Includes all parcels where the primary use is either “Residential”, “Apartment”, “Commercial”, “Industrial”, and “Hotel and Resort” (PITT codes of 100-400, and 700). “Conservation” areas (PITT code 600) are excluded unless they have secondary land use with another PITT code, in which case the secondary land use is used. “Agricultural and Rural” areas and “Unimproved Residential” (PITT code 500 and 800) are considered undeveloped, EXCEPT if the lot size is less than 5 acres AND the improvement values on the property exceed \$30,000 per acre.

## B.2 Mapping the Future

### Rules of the “Game”

Listed below are the instructions given to participants to indicate the location of future growth during the Mapping the Future exercise.

Chips do not indicate a specific land use, but a measure of land consumption.

Chips can go anywhere except on those areas that are protected from development or on water.

Chips can be placed on any unprotected land, including open land, agricultural land, and agricultural lands of significance.

Chips can be placed on developed land indicating a desire for redevelopment, infill development, or increasing intensity of development in existing communities.

Chips can be placed on approved development indicating a desire to pursue development of the proposed communities.

Chips can be placed on top of one another, doubled, tripled, etc. indicating the desire to increase intensity of development and use less land.

The Mapping the Future exercise consisted of an intuitive simulation of the process of land consumption and growth in Kona over the next 15 years. In this “game” participants, working in small groups of 10, were given a number of “chips” each representing an area of 40 acres. The total number of chips (139) represent the amount of land needed to accommodate expected population growth if current development trends were to continue (5,521 additional acres). The amount of land needed for future development was projected based on actual land consumption for the period 1995 to 2005. It therefore takes into account the second home phenomenon and assumes that the trend will continue.



Participants engaged in the Mapping the Future exercise.

The results of the simulation indicated strong consensus on a number of areas within the General Plan’s designated Urban Expansion Area. These preferred sites de-facto directed the majority of future development toward the most urbanized area of North Kona, limiting development in South Kona to infill and redevelopment. The exercise revealed that a percentage of the participants did not believe there should be any growth at all in Kona. 662 chips (out of a total of 3,728 chips distributed) were not used. From the table reporting sessions it became clear that many of the missing chips had been withheld to express a no-growth position.

Once agreement was reached on where future growth should occur, the focus of the public process shifted to how future development should occur. The public selected a preferred scenario out of four possible alternatives and then focused on development practices best suited for future development in Kona.

### B.3 Growth Opportunity Areas

The Growth Opportunity Areas (GOAs) represent a distinctive element of future land use within Kona. The genesis of the GOAs is in the Mapping the Future workshop. All the maps generated by the public were digitized to gain an understanding of the public's preferences. The composite maps generated to summarize the results disclosed an initial set of preferred growth locations. These locations indicated areas selected by 10 to 13 different groups out of the 20 groups that focused on future development inside the Urban Expansion Areas. A preliminary schematic location map was developed using these selected areas.

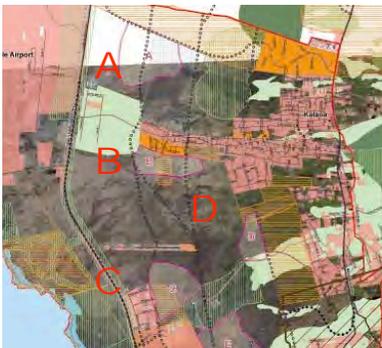


At the Open House the proposed Growth Opportunity Areas were represented schematically as circles

During the Open House segment of the How Do We Grow? Charrette Part 1, participants were asked to review those locations on a large-scale map and to comment on their appropriateness based on their knowledge of the terrain, information about existing and proposed roads, environmental constraints, and on the relationship of selected areas to existing and proposed developments.

Finally, in preparation for the second charrette, the areas were mapped (up to that point that areas had been diagrammatically represented as circles). In doing so, everything was kept within a 1/4 mile of existing roads wherever possible, and protected areas and steep slopes were avoided.

The new alignments were presented again to the participants of the first public meeting of the How Do We Grow? Charrette Part 2 for final refinements. The public expanded some of them, combined others and identified open spaces and open space mauka-makai connections through or around them. See B.6 below, for more detail on this activity.



Participants were asked to determine if the location of the GOA were consistent with the development principles defined earlier in the CDP process?

The Environmental Simulation Center generated a development suitability analysis to determine a rough approximation of how much land could actually be developed within those areas. The analysis was based on the following criteria:

- Slopes less than 12%,
- Not in a flood zone,
- Land not already developed,
- Land not already approved for development,
- Land that is not Important Agricultural lands, and
- Not overlapping the habitat of a rare or endangered species with global rank of 3.

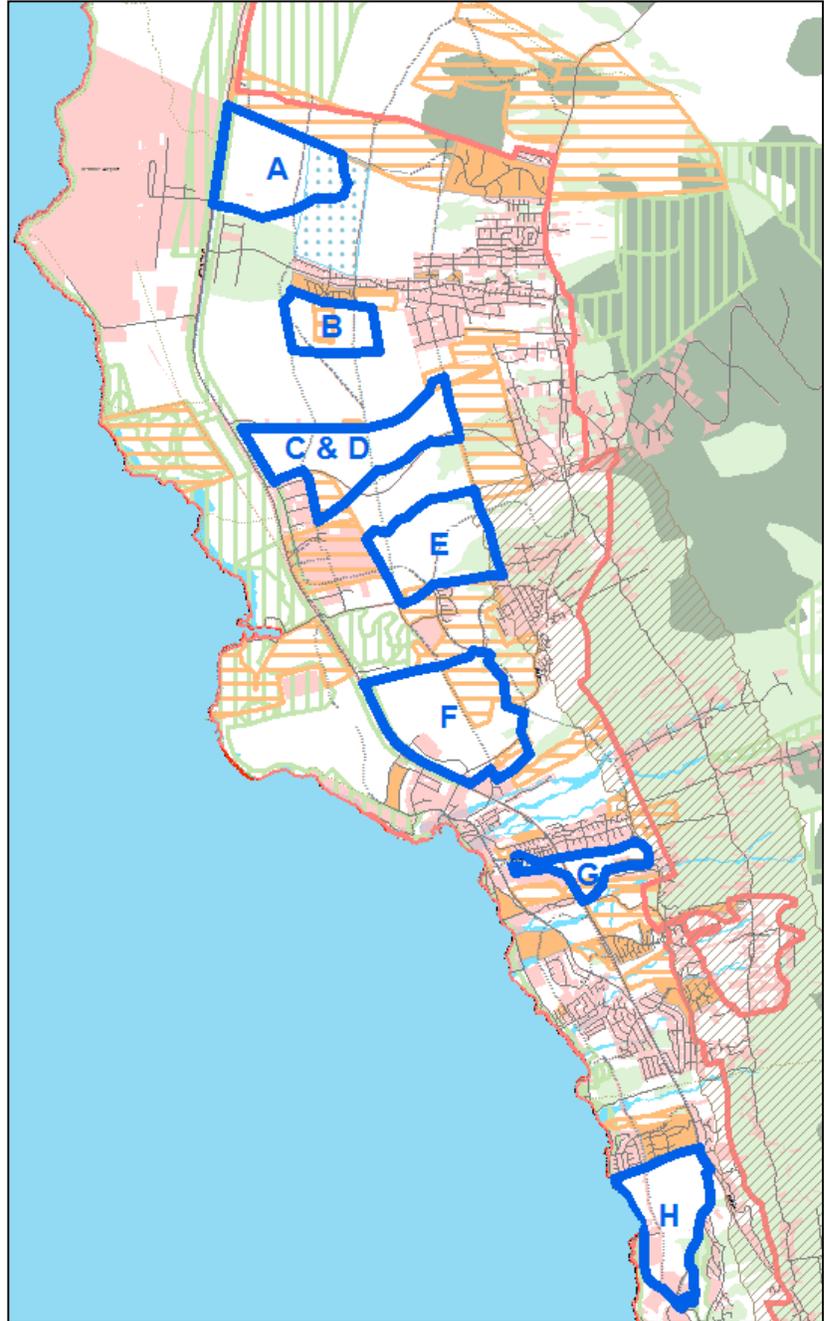
The analysis revealed that the GOAs have a total area of 3,936 acres, of which 3,093 acres (79%) are buildable and 843 (21%) are variously constrained. Based on the preferred development scenario identified in the How Do We Grow? Charrette Part 2, the GOAs' buildable land provides a supply of land to accommodate forecast growth. The excess is important because land within the GOAs may not become available for development or might become available at different times over the next 15 years.

Within the context of the General Plan and of the CDP, it is important to recognize that the GOAs' boundaries do not represent a second layer of growth boundaries within the designated Urban Expansion Area. Rather, the GOAs are areas where incentives should be used to stimulate development. Incentives could include expediting the permitting process or providing infrastructure using the County's bonding capacity for water supply, wastewater, district wide drainage, and roads. A parallel set of disincentives could be developed for land outside the GOAs by promoting the retention of open spaces and working lands, by adopting tools to compensate landowners such as TDR, or by the County acquiring land inside the expansion areas for open space protection.

In the spirit of the CDP development principles and goals, the GOAs should be zoned for higher densities and mixed-uses (including residential mixed-uses), and should have form-based or performance type of zoning to ensure that density is created through quality design features.

The GOAs provide an opportunity to rationalize the development context in Kona so that development happens in a coherent fashion and through the creation of villages and neighborhoods as opposed to individual and disconnected subdivision type of development.

The map below indicated the final positioning of the GOAs setermind after the public's review in the first public meeting of the Where Do We Grow? Charrette Part 2. It is important to reiterate that the GOAs' boundaries do not represent a second layer of growth boundaries within the designated Urban Expansion Area. Rather, they indicate general areas where incentives should be used to stimulate development.



**B.4 How to Grow: the Preferred Land Use Scenario and Development Patterns**

During the How Do We Grow? Charrette Part 1 public meeting held on March 28, 2006, participants reviewed four future development scenarios for the purpose of identifying a preferred way for Kona to accommodate future growth. Each scenario simulated what would happen to the GOAs if future growth would be accommodated at four different densities.

The scenarios were built as follows:

- Each scenario used the schematic positioning of the GOAs as the starting points to accommodate future growth.
- The forecast population increase of 14,426 new persons by the year 2020 was translated into households. The calculation yielded 4,007 units needed by 2020. To arrive at that number the total population was first divided between people likely to settle in urbanized areas (75%) versus people living in rural areas (25%)<sup>3</sup>. The resulting number of 10,820 persons likely to settle in urbanized areas was then converted into housing units by dividing it by the average household size of 2.7.
- The number of 4,007 units was multiplied by a factor of 1.22 to account for the high vacancy rate in Kona due to second homes. That raised the needed number of units to 4,889 (see box on the left and Table 3.1)
- The number of units at various stages of the approval process within the Urban Expansion Area was calculated (see Table 3.2) and then subtracted from the total number of units (see Table 3.3) to yield a total of 2,872 units remaining to be distributed in the Urban Expansion Area.

**Developments in the approval process**

The amount of future growth that can be absorbed through developments at different stages of the approval process is critical as Kona has many such developments. Some are at the very early stages while others are already under construction.

In order to make the maps less complicated for the general public, developments were divided into 2 categories: "Approved Development A, B, C" and "Approved Development D, E, F". The former included developments partially completed, under construction, or that already have a building permit issued. The latter included developments ranging from those with subdivision approval (tentative or final) to ones at the very early stages of the approval process.

The breaking point between the two categories was chosen because developments in the D, E, and F categories might still consider adjusting their plans to work with the overall goals of the CDP.

**TABLE 3.1 – POPULATION AND HOUSING UNITS**

Projected population to 2020	14,426	Persons
Population likely reside in urban areas	10,820	Persons
Divided by 2.7 (average persons per household)	4,007	Units
Multiplied by a vacancy rate of 1.22	x1.22	
Housing Units to accommodate population growth	<b>4,889</b>	Units

**TABLE 3.2 – UNITS IN THE APPROVAL PROCESS**

Total approved units in Expansion Area	3,988	Units
75% units assumed completed by 2020	2,991	Units
Less units already developed	974	Units
Approved units remaining for Expansion Area	<b>2,017</b>	Units

**TABLE 3.3 – TOTAL HOUSING UNITS**

Housing Units to accommodate population growth	<b>4,889</b>	Units
Less approved units in Expansion Area	2,017	Units
Total remaining units	<b>2,872</b>	Units

Source: The Environmental Simulation Center

<sup>3</sup> The same assumption was used in the General Plan’s population forecasts and in the allocation of “chips” in the Mapping the Future workshop.

The four scenarios were constructed as follows.

- In **Scenario A** development was distributed by using current zoning densities.
- In **Scenario B** development was distributed at the average density of current trends.
- In **Scenario C** development was distributed at a density of 5 dwelling units per acre which represents approximately the maximum density (for RS-7.5 lots), under current zoning.
- In **Scenario D** development was distributed at 8 dwelling units per acre.

The scenarios offer dramatically different land consumption values and impacts within the Urban Expansion Area. In Scenario A the amount of land needed to accommodate future growth is 9,265 acres, in Scenario B, 1,492 acres, in Scenario C, 990 acres, and in Scenario D, 611 acres.<sup>4</sup>

With the aim of stimulating discussion and to arrive at a qualitative choice among scenarios, participants were free to discuss one or more scenarios. Scenario A was selected and discussed in five groups, Scenario B was also selected and discussed in five groups, Scenario C was selected and discussed in 15 groups, and Scenario D was selected and discussed in 18 groups. The groups responded to specific questions, listed their concerns, and provided recommendations for the scenarios they preferred. The results are summarized in Appendix E.

The public's preferences were strongly toward the higher density scenarios, somewhere between scenarios C and D with an average net residential density between 5 and 8 net units per acre. As a result, the amount of land required to allocate future growth declined dramatically while a more complex mix of land uses and development patterns became possible. This is consistent with development principle 5: "Future growth should occur in the form of compact villages that offer increased density and a mix of homes, shops, and places to work."

The process leading to the identification of the development scenario was not designed to provide quantitative results. Rather it was designed to elicit a qualitative picture of what Kona could be like in the future. The intense table discussion identified cross-cutting themes that were related to the preferences being expressed and include: the importance of parks and open space as densities increase; the need to use more efficient use of land to enable the creation of affordable housing; the imperative for adequate infrastructure to support development; the protection of natural and cultural

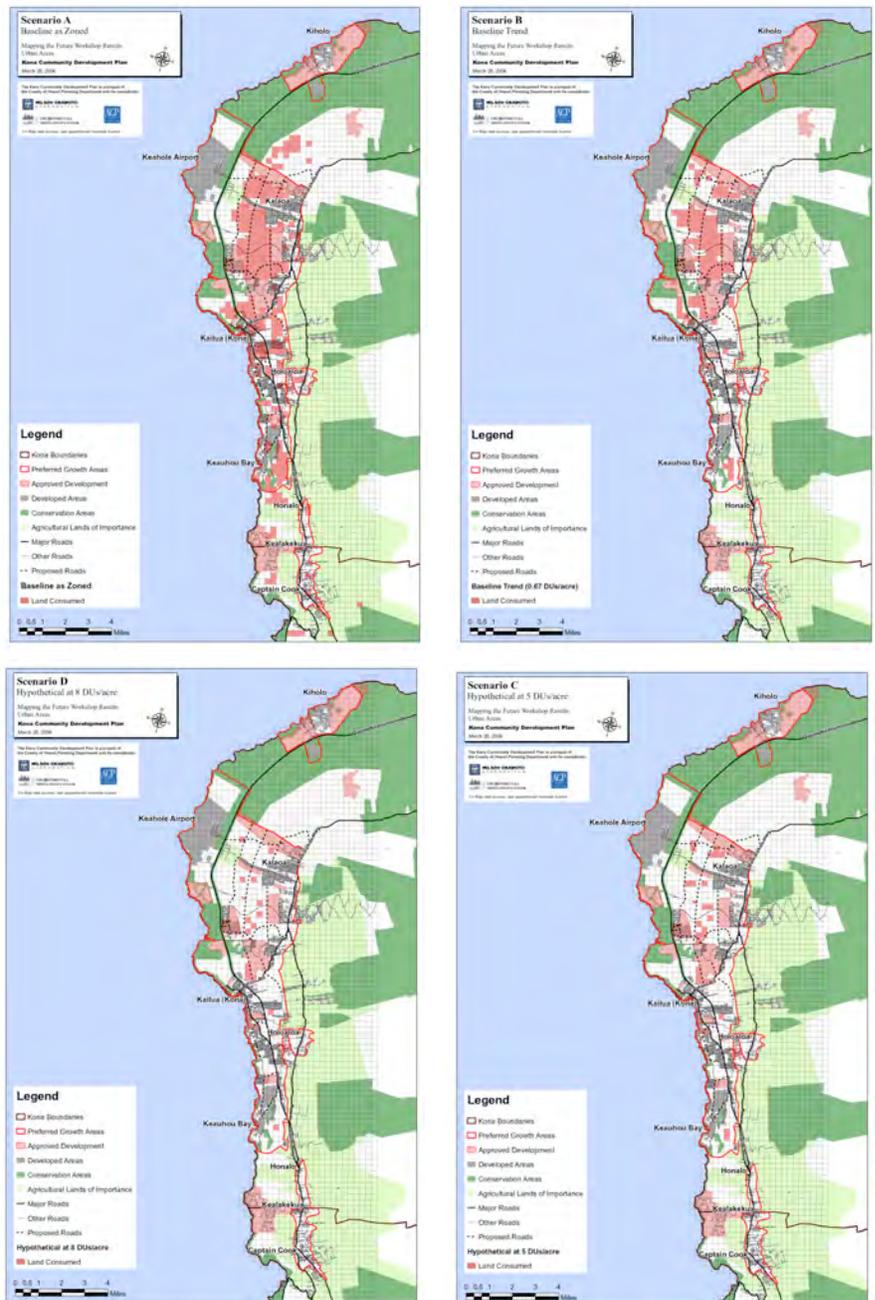
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<sup>4</sup> The land consumption figures include a percentage allowance for non residential land use. The ratio was identified through GIS analysis of the entire Kona area and is: Residential including single family and apartments 58%; Non-Residential including roads and infrastructure, commercial, industrial, and hotel and resort 42%. This represents the breakdown of the total developed land or 13,484 acres.

resources; the need for interconnectivity and diverse transportation options; and the importance of maintaining Kona identity and quality of life.

Concerns were also raised. They included fear that density might create places that are not consistent with the unique character of Kona, that codes might engender uniformity “one size fits all,” and that the villages and neighborhoods created within the GOAs might lack the diversity of scale from quiet single family neighborhoods to bustling mixed use neighborhoods and village centers. In fact participants indicated that to achieve the average density of the preferred scenario a combination of conditions might best meet the needs of local communities throughout the region.

The four maps to the right show the four scenarios presented to the public at the public meeting of the Where Do We Grow? Charrette Part 1. The maps vividly represent the dramatic difference in land consumption among the four scenarios.



### B.5 Visualization of Building Blocks

A total of 17 visualizations – building blocks – were created to illustrate conditions likely to be created under the average 5 to 8 net units per acre in preferred scenario and a continuum of conditions from neighborhoods to village centers. They were also created to address residents’ concerns about uniformity and scale.

The building blocks were presented and rated during the Open House segment of the How Do We Grow? Charrette Part 2. The results of the rating are summarized in Appendix F.

The results of the rating exercises indicated a preference for communities with well-defined centers that have parking in the back and create a walkable and social environment. They indicate a preference for neighborhoods that offer varied housing types, setbacks, and lots while they express a dislike for conditions associated with conventional subdivision developments, e.g. uniform lots and housing sizes and lack of sidewalks.



The preferences expressed by the public favor the creation of diverse places that mix the size of the building as well as their uses.

The responses to the building blocks provide critical information to be used in the development of regulatory tools to implement the compact neighborhoods and village vision expressed through the preferred development scenario.

### B.6 Connecting Future Development with Cultural and Open Space Resources

The How Do We Grow? Charrette Part 2 focused on linking and reconnecting the land use preferences expressed in the How Do We Grow?

Charrette Part 1 with open space, cultural, and natural environment resources.

During the first of two public meetings held during the Charrette Part 2 participants were asked to:

- Review the position of the GOAs for consistency with the development principles defined earlier in the CDP process, particularly in relation to access to roads, adjacency to existing and proposed development, and connection to infrastructure.
- Adjust the GOAs boundaries a final time using their knowledge of the land and of significant cultural and environmental features within or around them.
- Identify areas that should be protected from development and preserved as open space.
- Identify mauka-makai open space connections to be created within the boundaries of the Urban Expansion Area.
- Identify special vistas and places of unique value to be protected, and celebrated within the open space areas and the mauka-makai open space connections.

This exercise gave participants an opportunity to focus on the critical cultural and natural resources of Kona integrating them with the land use choices made in the previous public meeting.

The exercises resulted in the general expansion of GOAs, strong support for setting aside open space inside the Urban Expansion Area, less agreement on the specific location, size, and type of parks, and strong support for the creation of open space mauka-makai connections using historic trail and floodways, and expanding the system by adding coastal and north to south trails.

### **B.7 The Vision for the Future of Kona**

There are two distinctive visions that emerged from the extensive public process described in Chapter 2 and 3 of this report: one for the urbanized areas within the Urban Expansion Area of the General Plan, and the other for the rural areas both in North and South Kona. The two visions complement one another.

The vision for the urbanized areas is one that encourages future development to occur within Growth Opportunity Areas in the form of villages and neighborhoods with residential and commercial uses mixed together whenever possible. This preferred type of future development dramatically reduces land consumption and enables the preservation of cultural resources and open space inside the Urban Expansion Area of the General Plan.

The CDP confirms the role of Kailua Kona as the core around which future villages and neighborhoods can develop, with a smaller concentration around the Keauhou area.



The vision for the rural areas both in North and South Kona is one that makes it a priority to keep densities low and to maintain the rural character of those areas, and reinforces the traditional historic village pattern by encouraging infill and development.

The rural villages of South Kona represents models of ways to maintain low densities and rural character.



The tools to implement those complementary visions have been developed through the Working Group process and through the housing and green and gray infrastructure studies developed as part of the CDP. The two must now be integrated to create not only a bold vision for the future of Kona, but one that can be implemented.

# Appendix

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# Appendix A: Summary of Ideas

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This document provides a brief summary of the main themes that emerged from over 3,000 ideas generated at 109 public meetings held between November 2005 and February 2006. All of the ideas were entered verbatim into a database and sorted by appropriate themes. This summary was distributed to participants at the Mapping the Future workshop.

## **Agriculture**

Participants emphasized the value of preserving agricultural lands and diversifying agricultural activity to promote local self-sufficiency and sustainability. Some participants suggested that specialty crops should be enhanced and supported for their export potential. Ideas generated revealed opposition to genetically modified plants and animals.

## **Community Character**

Kona residents want to preserve their unique communities and create a welcoming, attractive environment for residents and visitors alike. They support the conservation of natural and historic areas, parks, and cultural sites. They would like to maintain small-town flavor and rural character, particularly in South Kona. Revitalization of downtown Kailua Village is also important. Participants expressed that they would like Kona communities to be more walkable and more integrated - accommodating residents of diverse incomes and demographic backgrounds. Ideas also revealed broad support for landscaping, beautification, and litter control efforts.

## **Culture**

Participants expressed a strong desire to celebrate diversity and promote cultural awareness. Ideas included suggestions for community cultural centers, multilingual signs, cultural festivals, and other activities that would promote cultural interaction. Increasing awareness and respect for Native Hawaiian traditions, culture, and language was a top priority for many participants. Several residents noted the importance of Hawaiian architecture and design. Others mentioned that efforts should be made to help newcomers learn about traditional values and Hawaiian culture.

## **Economic Prosperity**

In pursuit of economic prosperity, participants noted that the Kona region should find ways to capitalize on its local advantages in terms of climate, location, and natural resources. They would like to see increased agricultural diversity as well as investments in aquaculture. They expressed support for high tech industries, as well as higher education and research initiatives. Ideas generated at the meetings also focused on creating a favorable business climate, and mentioned that government policies and tax incentives should be used to promote large, small, and home-based businesses. In terms of shopping, residents would like to see core business and shopping districts that are welcoming and accessible to pedestrians and cyclists.

## **Education**

Kona residents would like to see excellent schools, high education standards, and quality educational opportunities available to all members of the community. Participants expressed widespread support for a university in West Hawaii. They would also like to see more vocational and continuing education opportunities for adults. Ideas demonstrated interest in expanding preschool, child care, and early childhood education programs. Other educational themes included: decentralization of schools to establish more local control, recruitment of better qualified teachers, and provision of adequate materials and supplies for classrooms.

## **Energy**

Participants would like to see the Kona region maximize its self-sufficiency in terms of energy consumption. They emphasized the importance of developing alternative energy sources, including solar, wind, hydro, bio fuels, and waste-to-energy systems. Promotion and expansion of recycling programs was also widely noted throughout the ideas.

## **Environment**

Kona residents are very interested in preserving the natural beauty of their region. They would like to protect the shoreline and limit the negative impacts of cruise ships, while maintaining public access to the ocean. They want to protect watersheds and freshwater resources, while ensuring effective water distribution throughout the region. Several participants mentioned that more conservation areas should be established to protect natural habitats, and that efforts should be taken to prevent and/or remove invasive plant and animal species. Hazard mitigation was another key concern. Participants pointed to the need for comprehensive flood management, as well as disaster planning and preparation for potential tsunamis or volcanic eruptions.

## **Government**

Improving local government decision-making capabilities and ensuring more effective resource allocation were top priorities for the meeting participants. They would like to see more transparency in government activities, and better communication among all levels of government and the communities they serve. Several participants want to see more equitable distribution of County funds; others mentioned that the County government could be divided into East and West. From a planning perspective, residents would like to see more planning decisions made at the local level, as well as uniform enforcement of zoning and development ordinances. Many feel the government should facilitate the expansion of services and infrastructure to existing developments, while undertaking measures to more strictly control future growth.

## **Historical Resources**

See Community Character.

## **Housing**

Affordable housing is a key concern for Kona residents. Many participants suggested that the government should do more to support affordable housing through policies and development procedures such as affordability requirements, impact fees, fees-in-lieu, etc. Participants would like to see housing and jobs in close proximity, and they would prefer neighborhoods to be more integrated, offering a full spectrum of housing types and costs, including rental housing. Several ideas supported the use of solar energy to create more energy efficient housing. Participants also mentioned the need for more housing for the elderly, such as assisted living facilities.

## **Infrastructure**

Participants discussed a wide variety of infrastructure issues. One frequently expressed concern is that development should follow principles of concurrency, so that infrastructure is in place before new neighborhoods are built. Participants also mentioned the need for more sidewalks, more streetlights, and more public parking. They would like to see utility lines placed underground. Ideas generated at the meetings also suggested the need for improvements in water distribution, wastewater management, and solid waste disposal. Other suggestions involve improvements to piers and harbors to enhance marine and boating access.

## **Land Use**

Kona residents would like to see land use policies that foster stewardship of the environment. They are interested in protecting environmental corridors, preserving agricultural lands, and setting aside land for parks, trails, and open space. They would like to restrict development on the coast by establishing mandatory setbacks from the ocean. In terms of development, many participants supported a better mix of land uses, so that housing, jobs, shopping, schools, and other services are integrated within communities.

## **Natural Resources**

See Environment.

## **Parks, Recreation, and Open Space**

Kona residents would like to beautify and maintain existing park facilities, and develop more parks, green spaces, and recreational facilities. They support enhanced beach access and boating access, and would also like to see more hiking trails. Several ideas suggested that Kona should pursue more eco tourism opportunities.

## **Planning**

Kona residents support greater community involvement in planning processes, and suggested a variety of ideas relating to planning and development issues. Several participants expressed that State and County codes and development decisions should be fair, predictable, and cost effective. Some mentioned the need for streamlining development approval processes, while others emphasized that developers must be held accountable for providing necessary infrastructure, roads, and affordable housing.

Regarding types of development, many ideas related to curbing sprawl and preserving open space, suggesting cluster development, mixed use zoning, and higher density, more walkable community centers. Participants would like to see zoning codes that encourage diverse housing types and economically integrated communities, and they are generally opposed to the development of gated communities. Several participants expressed an interest in restricting building heights and preserving visual site planes.

## **Public facilities**

Participants would like to see more civic and cultural centers throughout Kona, particularly community centers that offer activities and services for teens and seniors, and meeting spaces for the general public. Recreation is important, and various ideas mentioned the desire for more recreational facilities such as pools, public golf courses, and sports complexes or stadiums. Several ideas also pointed to the importance of enhancing harbors and boating facilities.

## **Social issues**

A number of common themes surfaced relating to social issues. Kona residents are concerned about drug problems in their communities, particularly ice (methamphetamine). They would like to see more services and activities for young people, as well as improved services for the elderly. Better health care is a top priority, and participants encouraged the development of a new hospital or additional community health centers. They also expressed the need for increased police and fire protection, as well as additional schools and improved education. Several ideas also revealed the need to deal with an increasing homeless population.

### **Transportation – Alternative**

Meeting participants expressed a strong preference for creating more opportunities for getting around without a car. They would like to see more sidewalks, bike paths, and hiking trails. Several ideas expressed the desire for paths between subdivisions, and paths along the oceanfront.

### **Transportation – Public**

Participants support the development of an affordable public transportation system with defined stops and times. They mentioned a variety of transportation modes, including light rail, ferry service, and bus lines. Ideas suggested the importance of having park and ride facilities near transit centers. In general, residents would like to see multi-modal transportation corridors that can accommodate everyone – including pedestrians, bikes, buses, light rail, and cars.

### **Transportation – Vehicular**

Kona residents strongly emphasized the need for a well-planned, interconnected road system that can resolve congestion problems. They offered a variety of suggestions, including: overpasses and roundabouts, more Mauka-Makai roads, synchronized traffic lights, connection of roads to eliminate dead ends, wider streets, and the creation of a four-lane highway, among others.

# Appendix B: Critical Questions Results Summary

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Summarized below are the results of the Critical Questions activity of the Mapping the Future workshop. Each table at the workshop answered a critical question related to one of 12 randomly assigned topics. The results are organized by topic.

- For each topic, one or more draft principles are presented. These draft principles were developed by reviewing the specific recommendations generated for each topic and then distilling the groups' discussions into key statements. These draft principles are for discussion.
- The draft principles are followed by the specific recommendations generated by the groups. These are verbatim results of the activity and have not been edited.

## Agriculture

### Principles

- Agriculture is an essential component of the character of Kona.
- Agriculture is an economic resource consistent with our history and lifestyle.
- Agricultural areas are only converted to other uses openly, judiciously, and deliberately.

### Specific Recommendations

- Support agricultural zoning with substantive data
- Provide incentives for markets, diversity, small productive farms, ranches, ag use
- Provide education through market studies, extension services, high schools, PBARC
- Any ag subdivision must be develop to farm - clear, plant, cultivate before sale of lots
- Prevent introduction of invasive species and diseases
- Change zoning to allow ag tourism, farm worker housing, value added product development and separate residential from ag land explicitly
- Support new agricultural products, e.g. aquaculture, medicine, finished products form coffee, exportable products
- Support and educate farmers to be successful in agricultural locations, including tax relief, farmers markets, research and development, natural resource preservation (water)

## Community Character

### Principles

- Development outside of the growth areas is explicitly rural.
- The individual character of communities and neighborhoods is created, maintained, or enhanced.

### Specific Recommendations

- Access and preservation of natural resources, both mauka and makai
- Protect and support the people who live here
- Keep Kona Country - where country still exists
- With urban expansion identify and retain individual community character
- Environmentally friendly (natural, cultural, spiritual)
- Planning and development
- develop urban area following "smart growth" precepts to build a health community. Pedestrian safety is of high importance
- Community gathering places
- Preserve mauka ag lands

- To keep Kona's unique community character we need to preserve our rural character by protecting our beaches, coastline, reefs, plants and historical sites. By opening accessibility by creating new bike and hiking trails and using historic trails (Mauka-Makai) separate from existing roadways.
- Various agencies need coordinated effort of groups/agencies to work together - resolutions, move forward, avoid wasting time and money
- Ag cannot spot and rezone - protect ag industry
- Promote ag tourism - tourism = agriculture; increase value of ag to be economic resource
- Education available at High School (Kealahou) - protect natural resources; programs and projects; inter relate with environment and agriculture (OTEC); and related to every day life
- Tax incentives
- Prevent pesticide use. Protect land.

## Environment

### Principles

- Environmental quality is protected and/or enhanced.
- Open spaces and natural areas are preserved or restored.
- Ground water is well-managed to ensure safe and sustainable resources for industrial and residential uses.

### Specific recommendations

- Incentive based approach to address (i.e. zoning, tax incentives, tdr programs, environmentally based commodity programs, education, affordability for residents)
- Water - coastal, ground, flood, desalinated (we should sell it here), develop state water at mauka areas for makai use/industries
- Land - preservation/restoration of historical/cultural lands/productive ag lands, beaches for public use; tropical rain forest recovery (per congressional act); open space/reforestation preservation; implementation of intense recycling and water disposal
- Air - volcanic vs. auto pollution research/studies needed; open space/reforestation
- Use zoning and tax laws with public input to develop mauka and makai open spaces. Parks and community centers with planned public and private vehicular and non-vehicular access to the natural environment with preservation and education for the protection of the coastline, ocean and forests

## Hazard Mitigation

### Principles

- Hazard mitigation considerations are a precondition to development.

### Specific recommendations

- Three primary - responsible development; emergency planning by community, adequate transportation corridors
- Responsible development - respect natural flood channels; streams; runoff and shoreline; construction methods to withstand natural/manmade hazards; new and retrofit existing structures. Update current flood maps and update infrastructure such as sewer line, plan developments around potential high risk areas and include evacuation planning into new development
- Emergency planning by Communities - convene community meetings just like this one to identify past experiences and develop community based disaster readiness plans; educate community about individuals preparedness
- Transportation Corridors: Connect existing road works mauka-makai, mid level access; plan future development with emergency evacuation routes

- Other: getting community consensus on roads; enforcement of development agreements; with fines for non compliance. Increase cost of development/permitting to cover cost of planning and enforcement
- Get good accurate info about existing conditions e.g., flooding, fire, hazardous waste
- Code review and enforcement
- Make owners/developers responsible for impacts of their property on community
- Emergency plan and public education
- Develop criteria and guidelines needed to identify all the sites. Learn to work with them. Educate people, residents, tourists about the living culture Hawaiian host culture and others

## Housing Affordability

### Principles

- Affordable housing (rental and for sale) is distributed throughout the community.
- Affordable housing is located near jobs, schools, and towns.

### Specific recommendations

- Goal - Affordable Housing (rental and for sale) distributed through out community near jobs and schools
- Proposal - Government providing low cost long term land leases
- proposal - Land trusts
- Proposal - Private sector incentives
- Proposal - Public and private partnerships
- Did not get consensus on the following:
- #5 Revisited Ohana Housing
- #11 Using affordable housing money to repair and not new housing construction
- #9 Not sure if agree or disagree to make State and Kamehameha School lands available for housing
- Build affordable housing near schools and town with roads (connectivity)
- Redefine affordability for young, local qualifications
- Provide low interest loans/financing for qualified families
- Enforcement of building/constructing affordable housing with developers. Give back to the community
- Affordable home ownership = happy family = happy, strong community

## Housing Choice

### Principles

- Communities include different ages, ethnicities, and income levels.
- Communities include a mix of uses.
- Communities include diverse housing choices (e.g. type, size, cost, rent, own, assisted living, etc.).

### Specific recommendations

- "Village concept" of planning that includes: cluster planning, open space, services, recreation, schools, shopping, local transportation, community gardens, to facilitate and ensure a mixed, blended community, inclusive of all ages, ethnicities, income levels
- Provide diversity of housing stock (types of housing), size, rentals, assisted living, community housing built/developed near work sites, town houses.
- Housing not near oceans, with the exception of communities whose cultures are based on ocean/ag
- Respect the ag lands
- Economic transitional housing - to provide opportunity for folks to move from affordable housing to housing with necessary services

- Do the additional planning: rezoning of categories that will expedite and promote, and encourage the above, housing mixes and options
- This village concept fosters sense of family, safety, home, community, a sense of aloha
- Mixed and integrated communities of service and facility and people
- Homes and apartment together with pedestrian and bicycle friendly
- Some communities can be upgraded (future mandate can include)
- County encourage mixed use development
- Bike and walking path - is it infrastructure or housing?
- Affordable, worker housing near jobs. Continuum - rental to rent to own to ownership both ag and urban land
- Village concept - nodes of growth (housing, commercial) with open space, green space between, mixed use, interconnected
- Require adequate, expandable infrastructure before housing is built, including currency permitted projects

## Parks, Recreation, and Open Space

### Principles

- Parks and open spaces are provided in communities.
- The public has access to parks, trails, open spaces, natural areas, and the coastline.

### Specific Recommendations

- Developers must create park infrastructure before building
- Pinpoint bus scheduling to recreation sites
- More accessible trails with parking lots
- Adequate funding for staffing and upkeep of all public parks and natural areas and volunteer docents
- Planning to ensure preservation of ocean resources
- County is neglecting their role in care taking of public land
- Area of difference: Don't just focus on shoreline access, but mountain access also
- Allow responses are important enough to be separate issues (cannot consolidate the list)
- Improve the security of all public areas; by property authorities (as long as the County is contracting)  
Private may alienate some from the land
- Improve access both by vehicle and pedestrian, as by decent roads and trails
- Ensure adequate public access to public lands
- Open spaces are important and should be preserved
- Maintain existing parks, beaches, recreation areas
- Planning - designate open spaces and use thereof; finances to maintain and improve; encourage private and public cooperation; and planned access
- Diverse use of recreational areas - mountain and ocean areas
- Use our parks to teach a sense of place

## Protection of Ancestral/Historic Sites

### Principles

- Planning and development are compatible with cultural integrity and local cultures.

### Specific Recommendations

- Education (i.e. cultural centers) is top priority (developers, visitors, landowners, citizens, etc). This will lead to protection and preservation

- Must deal with the conflict that exists between good planning and good solutions that are compatible with cultural integrity (must define "good planning" and "good solutions")
- There must be non-negotiable in cultural imperatives (must identify negotiables/non-negotiables/guidelines) culturally sensitive (i.e. don't build on sacred grounds)
- Island not mainland ecosystem - no -- like Easter Island (Rapa Nui)
- Shoreline protection against environmental hazards and for public use (local issue of resorts restricting and modifying access)
- Unique coffee belt ag heritage and its role in protecting from dangerous floods makai areas
- Updated grub/grad ordinances and flood maps
- Impact of cruise ships discharge into water - endangers health for swimmers
- Protection of watershed and water (fresh) from leakage into ocean due to blasting of harbors, etc.
- Multi-ethnic elders need to be consulted, also these who are respected and knowledgeable of material, spiritual, cultural
- Localized decision making - ahupuaa based
- Need a way to find out what you can or can't do
- Lack of consistency, need clear system (statewide) and standards
- Legal entities need to get their act together
- Personnel needed so that a clear answer can be obtained. More promptly, also need personnel locally based

## Retail

### Principles

- Communities include mixed-use shopping areas.
- Shopping areas are accessible by foot, car, and public transit.

### Specific Recommendations

- Mixed Use - walkable, compatible, 24-hour, new and existing
- Capitalize on what is unique to this place. Local - local dollars, cultural identity, branding, environmentally friendly
- Transportation - centralized parking; shopping centers and transit hubs; connectivity to get in and out
- New retail development with respect to views, character of area, encourage developers to brainstorm with community (i.e. Henry Street)

## Tourism

### Principles

- Tourism impacts are mitigated.
- Tourism initiatives benefit both visitors and residents.

### Specific Recommendations

- Not affect small businesses negatively
- Creation of career opportunities
- Promote small businesses
- Require infrastructure before more development
- Clean - non polluting
- Controlled to protect local residents
- Public amenities attractive, protection of our Class AA ocean waters and its ecosystem
- Dedicated park/corridor "green" (with not enough infrastructure)

- Take existing parks, beaches and expand a corridor that extends to the harbor. Add sidewalks, museum, walking , bike paths, with information paths
- Traffic issues - free buses, increase use, more alternative roads
- More public open space to include floodways, parks, large regional parks, and ocean access
- World class park with exceptional maintenance and amenities and landscaping
- Low impact educational eco-tourism that connects with the community as opposed to mass tourism that builds appreciation for Hawaii culture, historical uniqueness
- Within corridor the opportunity for diversified transit that is separate form the road.
- Utility corridor, recreation, backbone of development to grow around, equestrian

## **Traffic Congestion**

### **Principles**

- Alternative modes of transportation are interconnected and available throughout Kona.
- Connectivity and capacity are preconditions to development.
- Housing is located near jobs. (Also see housing.)

### **Specific Recommendations**

- Create sustainable communities with business district, parks, cultural centers, medical, shopping, drug stores, strip centers, professional buildings, banks, schools
- Interconnect the individual connector communities with public transportation, bikeways, walk lanes
- Intelligent traffic engineering, synchronized lights, over and under passes, left turn lanes, bike paths, more frequent bus stops where people need to go
- Infrastructure to support expected population - water, sewer, power, transportation, including public restrooms, solid waste transfer, disposal, recycle, gray water, before building commences
- Hotels supply places for employees to live , not plantation housing, but condos, studios, livable homes, also for middle income families
- Improve existing roadways (connectivity, widening, dead ends)
- Reduce vehicular volume by increasing mass/alternative transit options and staggered work hours
- Affordable housing and rentals closer to job centers
- Reduce growth

## Transportation and Land Use

### **Principles**

- Communities are mixed use.
- Communities are clustered with access to regional centers with services, jobs, etc.
- There is connectivity between mauka/makai.

### **Specific recommendations**

- Mixed Use Zoning - government/private developer partnerships; cluster communities; commercial mixed use with residential; multi income housing
- Increasing flow on existing roads by : connectivity of subdivisions; overpass/underpass/roundabouts on Queen K; not freeways; more mid level roads; more mauka/makai connections from shoreline to Mamalahoa
- Smart growth (small community centers with mixed use/residential). Mixed housing for different economic levels in these communities. Resale of affordable housing should be restricted like Hawaiian Home Lands. Connect these communities with public transportation. Having mixed use communities should alleviate traffic because stores, banks, etc would be nearby. Infrastructure must be included with

sidewalks, parks, thru roads. Connect communities with roads too. Must have setbacks to allow for widening roads in the future.

- We agree to develop regional nodes of commercial, housing, employment
- We agree about traffic solutions. Five lanes instead of two, including a lane for bikes, roller blading, pedestrians, with concrete divider separating 5th lane from vehicular traffic
- We agree about park and ride lots, carpool. Public transportation expansion, roundabouts, by passes, overhead crosswalks
- Correct the engineering of all new roads, roads to address problems such as the weight of large trucks
- Housing subsidized by employers for their employees
- Stagger work hours, with parents with children having priority

# Appendix C: Respected Areas and Protected Areas Results Summary

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This document summarizes the results of the Respected Areas and Protected Areas activities that were conducted during the Mapping the Future Workshop, which consisted of three steps: Respected Areas, Protected Areas, and Mapping the Future exercise. The Mapping the Future exercise is summarized in a separate document.

## Respected Areas Results Summary

During Respected Areas, the participants generated responses to a brainstorming question (see below). Their responses were reviewed to identify emerging themes. These themes are organized into three categories for the purposes of this summary: guidelines for designation, areas for designation consideration, and other concerns.

### Brainstorming Question

Ancestral and historic sites are reminders of Kona's deep culture and rich heritage. Some of these are indicated on our map. There are challenges and opportunities in protecting those sites as well as others and in celebrating their value among area residents and visitors.

What criteria should be used to guide the designation, use, or accessibility of places of cultural significance in Kona?

### Guidelines for designation of respected areas

- Differentiate between sites (influential versus commoner) or rate them on native importance (e.g. ahupuaa)
- Find ways to mitigate site, not totally off limits to development (e.g. relocating burial sites, etc.); Balance development and preservation
- Create appropriate mechanism for designating sites; Criteria that reduce conflict
- Respect for elders and consult with them in process
- Involve land owners
- Community driven and based on consensus
- Accurate and comprehensive inventory of sites and document historical relevance
- Map the sites
- Identify appropriate uses (passive, active, educational, etc.)
- Support cultural lifestyle (gathering rights, fishing, religious practices)
- Integration with surrounding uses
- Respect for ancestors
- Emphasize relationship between god, spirit, nature, and man
- Utilize Hawaiian place names
- Signage
- Provide security and protection
- Accessibility
- Limited or not access to extremely sensitive sites
- Preservation, restoration, and maintenance

### Recommendations for places that should be considered for designation

- Burial sites, graves, and group cemeteries (recognition that this may have too much impact on development)
- Historic sites

- Coffee belt
- Watershed
- Water
- Shoreline
- Sacred areas (recognize that it is unclear how this is defined)
- Mauka native forests
- Trails
- Community gathering place / Cultural center
- Buffer zones between development and culturally significant sites
- Seal caves
- Archaeological sites
- Based on native beliefs all areas should be “respected”
- Ceremonial sites
- 18<sup>th</sup> century home sites and ag lands
- Historic sites
- Multi-cultural sites; not just Hawaiian
- Significant buildings
- Ancient trees
- Churches
- Town and village character
- Unique sites
- Family sites and community sites
- Building facades

#### Other Concerns

- Increase cultural understanding and promote history and culture of Kona (education)
- Promote appropriate behavior
- Celebrate cultural significant days
- Importance of oral histories

## Protected Areas Results Summary

During Protected Areas, the participants generated responses to a brainstorming question (see below). Their responses were reviewed to identify emerging themes. These themes are organized into three categories for the purposes of this summary: criteria for protection, areas for protection, accessible areas, and other concerns.

### Brainstorming Question

Think about the criteria you would recommend to protect areas from future development for reasons other than cultural or historic significance. Look over the map and consider whether you believe other areas should be protected from development. Think about where these areas are located. Think about why it is important to protect these areas from development.

What criteria should be used to guide the identification of areas for protection?

### Criteria for protection

- Scenic vistas and ocean views are preserved.
- The coastline and beaches are protected from development and accessible to the public. (See also Parks, Recreation, and Open Space.)
- Land for future infrastructure needs is protected from development (e.g. road right-of-ways, land along roads for widening, land for future road connectivity, etc.).
- Land for walkways and biking trails is provided.
- Near shore waters, the reef, and fishing grounds are protected.
- Hunting and gathering areas are protected and public access is provided.

### Areas for protection

- Natural areas (e.g. critical habitats, forests, ecosystems, wild areas, areas with endangered species (flora and fauna), places of natural beauty, etc.)
- Scenic vistas and ocean views
- Watersheds and the aquifer
- Mountains
- Conservation lands
- Prime agricultural lands
- Coffee farms
- Good soils
- Flood zones/tsunami hazard areas
- Future road corridors
- Future infrastructure needs (utilities, ROW, land along roadways to allow for widening, etc.)
- Areas that will allow for road connectivity
- Trails (walking and biking)
- Walkways
- Community gathering and recreation areas
- Parks and open spaces (community and regional)
- Small scale development not just large scale development
- Coastline and beaches
- Near shore waters, the reef, and fishing grounds
- Archaeological sites

#### Accessible areas

- Coastline and beaches
- Parks and open space
- Hunting and gathering areas
- Mountains

#### Other concerns

- Maintain or improve environmental quality
- Protect long term sustainability
- Protect potable water

# Appendix D: Mapping the Future Exercise Results Summary

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This document summarizes the results of the Mapping the Future exercise that was conducted during the Mapping the Future Workshop, which consisted of three steps: Respected Areas, Protected Areas, and Accommodating Future Growth. The other two steps are summarized in separate documents.

During the Mapping the Future exercise, participants were asked to place chips on a map indicating where future growth should take place. Some tables worked on an urban map and others on a rural map; the mapping topics were randomly assigned. After placing their chips on the map, the groups then summarized the mapping exercise.

In this document, the summaries of individual tables are included. They are documented verbatim and organized by topic: urban and rural. The summaries are being analyzed to identify emerging themes. These themes will create a set of principles that will be reviewed during the public meeting of the “How Do We Grow?” charrette on March 28, 2006.

## URBAN MAPS

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Table Number: 1                      Topic: Urban

### Summary Recommendations

- Direct development (bulk of) North of Kailua0Kona (concentrated development for cluster plan/village community development); between Queen Kaahumanu Highway and Mamalahoa Highway; and concentrations around University Heights. Not in watersheds (protect)
- No development acres not on map: moratorium restrictions (minimize) on 2nd homes
- Do not exceed the carrying capacity of the natural resources with development
- Schools and human infrastructure and services to receive consideration with concentration of development.

Table Number: 2                      Topic: Urban

### Summary Recommendations

- Some infill development in Captain Cook, Kainaliu, Holualoa, Honalo, Kealakehe to increase intensity in existing villages without overloading (without forcing vertical development)
- Validated Hokulia
- Some growth s. Kona (out of preferred) to alleviate pressure in Kailua-Kona and N. Kona
- More development in Keauhou area
- New village (University Town)
- New towns with higher densities, mixed use

Table Number: 4                      Topic: Urban

### Summary Recommendations

- Some chips placed indicating desire for no growth
- Central Kona chips cluster high density where already zoned/scheduled for development
- Infill of already urban zoned
- Utilities already underground and in place in Costco area, therefore more growth there
- Infill in S. Kona/Captain Cook - cluster high density to increase available low cost housing
- New roads added with interconnectivity and roundabouts
- 2 new cluster communities above Hualalai to enable service of already scheduled development.

Table Number: 5                      Topic: Urban

**Summary Recommendations**

- Areas to the north of Kailua, areas that already have connector roads
- Area near schools would have higher densities
- Prior to development, all infrastructure in place
- Kealakea-Hina Lani intersection - Shopping area, super market, saves people living there from driving to Kailua
- Dorms and apartments near the proposed university
- No building along the coastline
- Mauka-makai access
- Road to connect Palani to Kaiminani
- Apartments and condos for hotel workers
- Refused to use all chips.

Table Number: 7                      Topic: Urban

**Summary Recommendations**

- Growth should be concentrated in high density areas.
- Growth should be concentrated on existing transportation and utility corridors
- More growth in N. Kona
- Town growth should be taken away from highways
- Preserve existing open spaces
- Need for connector roads
- Consider multi-story buildings to preserve land
- Inadequate infrastructure even more pronounced concurrency issue
- Need for bypass roads and highways.

Table Number: 8                      Topic: Urban

**Summary Recommendations**

- Growth in north Kona to match job sites/locations
- Create multi-family, higher density
- Hiluhilu, UH West Hawaii increase density and build out
- Fix infrastructure before allowing future development
- Infill development to decrease pressure on roads
- New concrete on existing concrete - redevelopment
- Protecting ag land
- Develop what we all ready have bulldozed
- Existing permits without development started should have time limits - don't make is so easy to develop
- Did not place 79 chips or about 50% of chips -until infrastructure is in place; use non-used chip to the north portion of Kona; preserve ag lands in S. Kona
- Need "fix it" chips'.

Table Number: 10                      Topic: Urban

**Summary Recommendations**

- Develop around existing infrastructure
- Centralize/higher density in smart growth manner - protect open spaces

- Public/Private partnerships to meet public --- agreement for expanding Honolulu Harbor with mixed use development including resort, commercial uses including aquaculture school
- Student and facility housing above university
- Around North Airport - industrial development with housing and noise abatement laws for aircraft
- Infill development (high density) to take advantages of existing infrastructure. Low impact on environment
- See notations on map

Table Number: 11                      Topic: Urban

**Summary Recommendations**

- Integrated community in proximity to proposed University of Hawaii II
- Keep future developments Mauka of Queen Kaahumanu
- Consider responsible housing development on Ag land for farmers and farm workers
- Cluster development along future mauka North-South corridor(s) to provide connectivity, e.g. Hienaloli Extension
- Direct to entitled areas II. Priority to areas with infrastructure, secondarily entitled areas without infrastructure
- Redevelop under utilized or confusing areas, e.g. old Industrial area, Lanihau Shopping Center
- Inject more residential to Kailua Village
- Note: concerned expressed regarding representation of landowner "stacking" future growth in areas owned, e.g. Kaloko.

Table Number: 13                      Topic: Urban

**Summary Recommendations**

- No growth on shoreline
- High density on north of Kailua Village area
- No growth on any agricultural land
- Most growth in preferred growth area
- Holualoa stays rural and Kealakekua
- Between Palisades - flat are on growth, possibly less congestion
- No chip on already developed area
- Existing infrastructure area if near it
- Adding affordable housing on resort area
- Water, electricity, sewage - can we handle the growth
- Congestion, traffic, more people
- Pollution, environmental degradation
- More waste and garbage
- Social separation - rich and poor
- More gated communities
- School crunch, overbearing of infrastructure
- Developers should pay their way
- Increase of golf courses

Table Number: 14                      Topic: Urban

**Summary Recommendations**

- Build in areas where there is infrastructure to support the development
- More neighborhood parks in growth areas
- Promote small local businesses to prevent sprawl

- Infill existing areas before designating new areas
- Build or widen road and add bike and walkways

Table Number: 16                      Topic: Urban

**Summary Recommendations**

- Wants more density in Four Seasons area, with affordable housing
- Want development between two existing roads, to connect roads and develop smart growth between Hinalani and Kaiminani
- Increase densities at the mauka nodes of Kealakekua and Captain Cook
- Increase density in Central Kailua
- Make housing in old industrial area (Queen Lilioukalani trust lands)
- Higher density in Hokulia away from shore
- Put smart growth affordable community just north of airport on mauka side of Queen Kaahumanu
- Summary - have high density communities using smart growth model near existing roads, but have to have more connectors. No more mauka development.

Table Number: 17                      Topic: Urban

**Summary Recommendations**

- Keep development away from ag land
- Utilize marginal lands (lava flows, barren) for residential development
- Utilization of existing infrastructure and future connectivity
- Staying away (condemnation) from flood plains
- Limitation of the projected growth
- Consensus with general plan
- Avoid development around coastlines and habitats.

Table Number: 19                      Topic: Urban

**Summary Recommendations**

- Urban growth North of Honokohau
- No growth mauka of Mamalahoa
- Infrastructure - connecting roads, no subdivision permits without infrastructure
- Urban growth to include parks and recreational and supported (parking/maintenance).

Table Number: 20                      Topic: Urban

**Summary Recommendations**

- Concentrated development between Palisades to Costco, infrastructure if possible
- Need cut-through roads in this area
- Need schools, parks, etc. to form nice community
- Placements to promote mixed-use (near airport area for retail)
- Note: 6 people placed dots.

Table Number: 22                      Topic: Urban

**Summary Recommendations**

- Housing next to employee's jobs

- Develop college town
- Build apartments next to hotels and downtown
- If you create jobs you need to create housing
- Affordable housing close to employers creating jobs
- Large employees should provide infrastructure, for workers, (one hotel has a preschool)
- All new development should include infrastructure such as medical facility, grocery store
- Second hospital by airport region
- Connectivity between "old subdivision"
- Queen Kaahumanu Highway should be 4 lanes, where growth should happen
- If you build \$2 million homes, can we require developer to donate some money to our community for better schools and parks??
- No more gated communities
- Jitty service for transportation

Table Number: 24                      Topic: Urban

**Summary Recommendations**

- Expanded need for infrastructure outside of urban development
- Recreation
- Police and fire station
- Road from Mamalahoa Highway to Queen Kaahumanu, north of airport, south of Kukio
- S. Kona needs commercial and residential
- Big Island ----- needs commercial
- Parks and public facilities
- Growth in Puuhonua area
- Hookena, fire police and recreational areas
- Honalo junction needs improvements
- Parks in Kona Palisades
- More information on maps
- Honokohau Recreational Park
- Keauhou needs better harbor
- Kailua Bay better
- Need connector roads
- Hospitals, clinics, emergency.

Table Number: 25                      Topic: Urban

**Summary Recommendations**

- Development should take place primarily where already approved vs. approving more new areas
- Mauka-Makai connectors as well as laterals connectors
- Cultural (coastal) Park (preserve) at Keauhou
- Concurrency required, ---currently approved development
- Develop north to accommodate workers where jobs are.

Table Number: 26                      Topic: Urban

**Summary Recommendations**

- Add connecting roads, extensions as marked on map

- Feasibility study for four lane highway from Keahole to Keauhou
- Clustered growth to preserve open space, view, recreation within existing infrastructure
- Growth clustered around future hospitals, university
- Increase density to make emergency vehicles, services more efficient
- More public transportation (hele on, bullet train) - free, organized, consistent, carpools/small vans/shuttle
- More public facilities - theaters
- Integrate greenways, open space, belts with growth
- Small vans going mauka, feed into collectors
- Safe, convenient park and ride lots tied into transportation system.

Table Number: 28                      Topic: Urban

**Summary Recommendations**

- Table focused on supporting the them of mixed land use communities or hubs. We'd like to see what's already developed improved on. We support the concept of creating small villages/communities to avoid urban sprawl.

Table Number: 31                      Topic: Urban

**Summary Recommendations**

- Roads before development, transportation, no movement of traffic - no development
- New mid-level road between Palisades Road and junction of Henry and Palani Road
- Ag stays Ag, unless legally rezoned
- Maintain view corridors - view plane
- Create fresh water infrastructure prior to development
- Utilities underground
- New town center above airport in planned pedestrian concept
- Planning biking, jogging, walking trails
- Discourage coastal development, but create open space and parks
- Protect ocean environment from pollution of cruise ships
- No dumping from ships
- 193 acre municipal golf course be amended to regional park like Hilo's with constructed wetlands for endangered bird habitat plant trees, amphitheatre
- Serious cultural arts center in Keauhou.

Table Number: 34                      Topic: Urban

**Summary Recommendations**

- Maintain coastline corridor
- Maintain viewplanes
- Maintain recreational areas
- Develop corridors mauka of proposed Roadways
- Redevelop north of DP line for recreational areas
- University community growth
- North side of Kona plan roads to expand
- North Kona mauka of Highway open for proper/adequate development.
- Maintain coastal view plane and agricultural no growth in south Kona
- Replant current roads and infrastructure in higher density areas
- Development of coastal recreational and mountain recreation areas

## RURAL MAPS

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Table Number: 3                      Topic: Rural

### **Summary Recommendations**

- Develop where infrastructure is already in place where it is outside of growth area
- Build infrastructure to support transportation given critical mass (park and ride, etc.)
- More development closer to Waikoloa to support people working there
- Complete Hokulia (1diss--)

Table Number: 6                      Topic: Rural

### **Summary Recommendations**

- Areas will need their own infrastructure
- Place new development near what is in place - increase density- Honaunau, Captain Cook, Kealahou
- Low density, isolated community to accommodate different lifestyle- above Honalo
- Keeping open space between developed areas - North of Kailua Town.

Table Number: 9                      Topic: Rural

### **Summary Recommendations**

- Keep the growth where the growth is where existing infrastructure and contribute to the existing infrastructure (cost effectiveness)
- Expansion will help sustain the rural communities. Helps relieve infrastructure congestion and costs.

Table Number: 12                      Topic: Rural

### **Summary Recommendations**

- Growth should occur northwards or urban area with eventual connection
- Growth far north to service developing resort areas, takes traffic away from urban area
- Growth far north, away from Mamalahou
- Chips in pink, growth in rural areas kept to absolute minimum
- North of urban area to support growing northern resort node
- No growth in rural areas until infrastructure is in place, no chips on map
- Growth above Milolii to reduce southern traffic into north.

Table Number: 15                      Topic: Rural

### **Summary Recommendations**

- Need parks in south Kona
- Concentrate development where existing roads can be widened
- Place residential housing for hotel/resort workers to avoid traffic through downtown Kona
- Place affordable housing near hotels
- Place development where there are roads (expandable) and water
- Add infrastructure (proper) where development is already approved
- Ensure AG-5 village projects to promote agricultural tourism
- Add subsidized housing near hotels
- Add ferry connection between south Kona housing development in Kailua-Kona.

Table Number: 18                      Topic: Rural

### **Summary Recommendations**

- Stay within preferred growth areas and/or connect to them, with the hope that increased density will fuel infrastructure - do not open new lands
- By increasing density we'll decrease traffic problems
- Our Motto "Reverse the trend "sprawl""
- We're hoping this will create mixed-use density, live, work, play areas
- By increasing density we'll decrease traffic problems and would force solutions to many of our problems.

Table Number: 21                      Topic: Rural

**Summary Recommendations**

- See growth stopped in North and South Kona
- More community development plans with different types of housing
- More infrastructure for S. Kona
- Choose people and lifestyle over money
- Protect ag land
- What growth comes controlled?

Table Number: 27                      Topic: Rural

**Summary Recommendations**

- Anticipation of completion of Hokulia
- Increased development around present Nanea golf course
- Anticipation of increased growth in Captain Cook area
- Negative - importance of developing roads/water, infrastructure
- Possible extension/increased growth in Honaunau due to anticipated completion of Hokulia
- Development of "healthy community" with best practices

Table Number: 30                      Topic: Rural

**Summary Recommendations**

- Growth near planned or current shopping areas
- Favor going north - Keahole to Keauhou corridor
- Keauhou should be growth corridor
- Congregate higher density to preserve open areas

Table Number: 33                      Topic: Rural

**Summary Recommendations**

- Between Kailua Village's Old Kona Airport - good area because of proximity to work, play, schools
- Mauka of town is already meant to be an urban area
- Using slopes around Hina Lani Street - good views
- Need to move more north closer to resort and employment
- Kept everything where growth already present - promotes pedestrian, bicycle transportation. Keep urban center
- Affordable housing by resorts and Kailua
- Bike paths along highway
- Infill urban areas where infrastructure can be concentrated.

# Appendix E: How Do We Grow? Part 1– Review of Scenarios

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## Introduction

During the Charrette workshop held on March 28, 2006, participants had the opportunity to review four potential future development scenarios. These four scenarios are:

**Scenario A:** Development as currently zoned

**Scenario B:** Development as currently practiced (trend)

**Scenario C:** Hypothetical Scenario at 5 DUs/acre with approved development distributed first and the remainder of development distributed at a density of 5 DUs/acre using the workshop locational preferences as a guide (max density for RS-7.5 lots under current zoning)

**Scenario D:** Hypothetical Scenario at 8 DUs/acre with approved development distributed first and the remainder of development distributed at a density of 8 DUs/acre using the workshop locational preferences as a guide.

The participants were randomly assigned to 20 small groups of about 10 people each. These groups freely selected one or more scenarios to discuss. Some groups selected only one or two scenarios, which they discussed in great detail. Other groups selected three or four scenarios and provided a varying range of detail in their recommendations. In total, Scenario A was selected and discussed in five groups, Scenario B was also selected and discussed in five groups, Scenario C was selected and discussed in 15 groups, and Scenario D was selected and discussed in 18 groups. The groups responded to specific questions, listed their concerns, and provided recommendations for the scenarios they had chosen. All responses were recorded on reporting sheets.

The following section summarizes the strengths, weaknesses/concerns, and recommendations for each scenario, based upon the input provided by the small groups.

## Scenario A

**Strengths:** No specific strengths were cited for Scenario A.

**Weaknesses / Concerns:** The groups that reviewed this scenario found that it offered inadequate parks and open space, and well as insufficient connectivity. They noted that such development was unsustainable due to the limited land available. Lack of affordable housing and infrastructure expense were also cited as concerns. One group mentioned that this type of development limits flexibility for managing long-term future growth.

**Recommendations:** Participants offered a range of recommendations for Scenario A. These include: saving the coastline from becoming private, developing a new highway, building at higher densities in the downtown core, promoting mixed use villages, and addressing community health needs.

## Scenario B

**Strengths:** No specific strengths were cited for Scenario B.

**Weaknesses / Concerns:** The groups that examined this scenario expressed concerns similar to those mentioned for Scenario A. They noted that affordable housing and infrastructure needs are at a crisis level, and are not adequately dealt with in Scenario B. The destruction of Native Hawaiian burial and cultural sites was another concern.

**Recommendations:** Several recommendations for this scenario dealt with infrastructure needs. Groups noted that roads, water, electricity, and sewage must be provided concurrently with development, and that developers should bear some responsibility for ensuring adequate infrastructure. Participants would like to see this scenario provide for affordable housing. They recommended the elimination of gated communities. Participants also noted the importance

of long-term planning (up to 100 years out), and mentioned that action must be taken today to preserve large areas of parkland and open space.

### Scenario C

**Strengths:** Participants expressed support for the village development concept. They noted that absence of strip malls as a strength. Some participants liked the higher densities, and noted that the scenario still maintained a rural flavor.

**Weaknesses / Concerns:** Appropriate density was a key concern, and groups expressed a variety of opinions about what the intensity of development should be. Some groups found Scenario C to be too dense, and felt that it would detract from quality of life and a Kona sense of place. They were concerned about the provision of sufficient services (police, schools, etc) for higher density settlements, and also noted that higher densities may come at the expense of environmental health. Other groups found that the densities shown in this scenario might be insufficient for supporting infrastructure, services, housing, etc. in a cost-effective, economically viable manner. They noted that without somewhat higher densities, such development might be unable to support affordable housing and small businesses. A lack of parks was a common concern, and groups were uncertain that open space buffer zones would be adequately protected from future development.

**Recommendations:** Participants provided numerous recommendations about how development should occur under Scenario C. They approved of the village development concept, and are interested in seeing self-sustaining communities that are socioeconomically diverse, walkable, offer a mix of uses and services, provide for affordable housing and senior housing, and are well-connected to neighboring villages.

Participants emphasized that development should be tailored to specific places, and should maintain a sense of place rather than being “one size fits all.” Cultural and historic resources should be protected. Open space and parks should be accessible to all, and “people places” like community gardens, civic spaces and plazas should be designed to promote neighborhood interaction. The groups emphasized aesthetics, and noted that efforts should be made to ensure that new developments have quality architecture, landscaping, and adequate trees.

Participants would like to see that infrastructure is in place before more development occurs. They expressed a preference for underground utility lines, underground parking, and sufficient connector roads, sidewalks, trails, and public transit. In terms of public transportation, participants would like to see diverse options including buses and rail.

Natural resource protection was important for these groups. They would like to update existing environmental laws, protect the watershed, and define all valuable lands so that these can be preserved immediately. Native plant and animal species should be closely studied and evaluated so that there are no more extinctions.

On the matter of density, participants would prefer to keep higher densities in the urban core and near employment, with a transition to lower density to the south and mauka. Some groups are interested in seeing taller buildings and multi-family units. They noted that it is important to maintain a healthy ratio of density to open space, so that environmental, recreational, cultural, and agricultural needs can be met.

The groups also provided a number of recommendations related to the government’s role in planning and development. They suggested that the government should be more supportive of the development process, and play a bigger role in providing for affordable housing. Other recommendations included: modifying existing zoning to accommodate village / cluster developments, keeping development within growth areas, and collecting impact fees from developers.

### Scenario D

**Strengths:** As mentioned in Scenario C, participants were supportive of the village development concept and felt that higher densities could help to preserve rural character, open space, and agricultural lands. Participants also expressed support for the transportation provisions outlined in Scenario D.

**Weaknesses:** Participants felt that Scenario D would be too dense, and spark development that is too rapid. They expressed concern about noise and other social infractions that might be associated with more intensive developments. They were also concerned about the provision of infrastructure and services to support a denser population. Some groups expressed opposition to high-rise housing, and felt that this scenario did not maintain the Kona lifestyle. One group mentioned that while Scenario D may be suitable for North Kona, it is not appropriate for South Kona. Participants also noted that this high-density approach has the potential for eventual unwanted infill development in open spaces. As mentioned for each of the other scenarios, inadequate park space and affordable housing continues to be a concern.

**Recommendations:** The recommendations provided for Scenario D were very similar to those discussed for Scenario C. Participants supported the development of mixed use neighborhoods and villages that offer diverse housing choices, local shopping and services, employment opportunities, parks, schools, community centers, medical facilities, and public transportation options. Socioeconomic diversity is important, as is walkability and interconnectivity between villages. Participants mentioned that housing affordability must be a priority, and that strict laws should be in place to ensure provision of affordable housing. Loopholes should be eliminated and resale restrictions should be implemented. Particular attention should be paid to the needs of seniors.

Again, participants emphasized that development should be tailored to specific places, and should maintain a sense of place rather than being “one size fits all.” Environmentally-friendly architecture was encouraged, as was the preservation of cultural and historic resources. While groups had differing opinions on whether or not high rises would be suitable, for the most part they agreed that the look of new development should have an island character rather than being too “mainland”. Some groups suggested a height limit on buildings – typically at about 3 stories.

Infrastructure was again a key concern, and groups emphasized that all infrastructure must be provided in concert with development. Participants noted that at the densities recommended for Scenario D, provision of a county sewer system would be mandatory. Utilities should be placed underground. Diverse transportation options should also be provided, including sidewalks, bikeways, and public transit (bus and rail).

Groups emphasized the protection of natural and cultural resources. Participants would like to see permanent protection of watershed and flood channels, and they recommended that all development should occur with respect for cultural sites and the local ecology. They would like to see measures for prohibiting infill of open space, greenways, and agricultural lands, so that the open spaces achieved through higher density development may be preserved in perpetuity. Participants also noted that parks and open space must be accessible for all residents.

Regarding density, participants suggested that higher densities should be reserved for urban areas, employment centers, and commercial centers. They suggested the use of green buffers to lessen noise.

In terms of planning and development, participants emphasized the need for accountability in the county government and planning department. They want to trust that open space will remain as open space; they support adherence to the general plan and oppose the use of variances. Groups noted that planning efforts must account for second homes and part-time residents. Other recommendations touched upon a variety of topics, including: smart growth, keeping development within the growth area, and incorporating settlements as cities in order to gain more local control.

### Cross-cutting Themes

A number of key cross-cutting themes surfaced among the groups’ discussions. These themes include: the importance of parks and open space; the need for affordable housing; the need for adequate infrastructure to support development; the interest in mixed use and village-scale development; the protection of natural and cultural resources; the need for interconnectivity and diverse transportation options; and the importance of maintaining Kona identity and quality of life. Regardless of the specific scenario, future development in Kona should account for these key themes. In

fact, several groups noted that future development should not be “one size fits all”, but that a combination of scenarios might best meet the needs of local communities throughout the region.

# Appendix F: Building Blocks Preference Survey

This document provides the results of the Building Blocks Preference Survey conducted as part of the How Do We Grow? Charrette Part 2. Participants were asked to rate a series of images on a scale of one to five, where one is the least preferred and five is the most preferred. Higher average scores therefore indicate a higher level of preference.

### 1. Streets without sidewalks and curbs

2.13



### 2. Streets with sidewalks on one side

2.31



### 3. Streets with sidewalks on both sides

3.96



**4. Streets with curb cuts for driveways**



3.25

**5. Off-street parking**



3.90

**6. On-street parking**



2.71

**7. Garages at the rear of houses**



3.80

**8. Garages at the front of houses**



2.68

**9. Wide, uniform house lots**



2.43

### 10. Varied housing lots



4.0

### 11. Uniform setbacks



2.76

### 12. Varied setbacks



2.74

### 13. Uniform housing types



2.01

### 14. Varied housing types



4.15

### 15. Parking in front of buildings



2.24

**16. Parking behind buildings 4.33**



4.33

**17. On-street parking**



3.21

## **WORKING GROUPS OBJECTIVES & ACTIONS**

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ACP-Visioning & Planning, Ltd.  
December 12, 2006

# **WORKING GROUPS OBJECTIVES & ACTIONS**

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## **KONA COMMUNITY DEVELOPMENT PLAN**



**Prepared for:**  
County of Hawaii  
Department of Planning

**Prepared by:**  
ACP Planning & Visioning

**December 12, 2006**



# Working Group: Agriculture

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Agriculture Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### A. Implement programs, policies, and land use regulations that protect agricultural lands and preserve farming as a way of life.

1. Implement programs, policies, and land use regulations that recognize the importance of agricultural lands, protect the watershed, and ensure that adequate water resources are available for agriculture.
2. Support market research for potential export crops in North and South Kona.
3. Offer more effective language assistance to enable non-English speaking farmers to market their crops.
4. Establish a Kona agriculture enterprise zone.
5. Implement land use policies and provide incentives to encourage agricultural diversification at various elevations.
6. Establish buffers for Kona's agricultural lands.
7. Reform the Real Property Tax structure in favor of agriculture.
8. Protect Kona Coffee Belt as Important Agricultural lands, as delineated in the General Plan.
9. Strengthen the County's Grubbing and Grading ordinance.
10. Strengthen the Kona Soil and Water Conservation District's (KSWCD) presence and involvement, and fund staff positions.
11. Develop a program to provide agricultural industry training and education to Hawaii residents, including current farmers training new farmers.

12. Develop high-elevation sources of surface water for agricultural uses in Kona.
13. Designate appropriate lands owned by the State of Hawaii as Important Agricultural Lands.

**B. Create a self-sufficient and sustainable agricultural economy in which more local products are grown for local consumption.**

1. Encourage the establishment of processing facilities in order for farmers to increase opportunities to develop value-added products.
2. Establish a permanent location for the Kona Farmers' Market.
3. Require local institutions (e.g., school cafeterias) to purchase locally produced food.
4. Create "crop incubator" projects.
5. Create a centralized data center to serve as a clearinghouse for information on available Kona agricultural products, services, and markets.
6. Establish a "Made on the Hawaii Island" marketing program.
7. Establish a revolving credit fund to support crop research and development.
8. Conduct information campaigns (such as "Farming is Our Future" and "Grow Local Buy Local") in order to market Kona products and educate the public about the importance of supporting agriculture in Kona.
9. Establish a commercial kitchen and drying facility to encourage increased diversity in value-added products.
10. Expand the County's "green waste" nutrients recycling program and purchase a tub grinder for the Kona Green Waste Processing Facility.

**C. Support small family farms and community gardens through regulations and financial incentives.**

1. Require new subdivisions to allocate land for community gardening activities.
2. Establish real property tax breaks for farms based on the farm's gross sales and legally-hired farm labor.
3. Establish a County-funded Production Credit Program.
4. Adopt an ordinance that provides for cluster developments on agricultural lands.

**D. Enhance agricultural education and research programs.**

1. Establish and finance County educational programs to support and promote agriculture in Kona.

**E. Expand agricultural tourism and events in Kona.**

1. Create and adopt a county Agricultural Tourism program/policy.
2. Support the establishment an annual Kona Food and Flower festival.
3. Establish and fund an annual Kona "AWA" Festival.

**F. Protect our agriculture industries.**

1. Enhance current and future agricultural opportunities in Kona through training, internships, development of workers' housing, new crop and market support, and full staffing of agricultural positions in the county.
2. Adopt a resolution establishing the "Precautionary Principle" for all agricultural commodities coming into the County, including GMOs.
3. Designate land within the Natural Energy Lab (NELHA) as Important Agricultural Lands to encourage the continued development of the aquaculture industry and the alternative energy industry within the site.
4. Establish a Kona Agriculture Coordinator position serving to enhance agricultural activities and opportunities.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- **Additional Action for Consideration:** *Get people farming the land through training and programs to encourage acquisition of land for farming. (This action was suggested by the Working Group but never sufficiently clarified for inclusion in the final plan.)*

**Objective B**

- *Action 2: County should work with the Farm Bureau to establish a permanent location for the Kona Farmers' Market. (Recommended location: County property at intersection of Henry Street and Palani.)*
- *Action 3: Urge approval of state legislation. Staff Kona position to coordinate the program.*
- *Action 7: Provide financial support for crop development from grants provided by the Research and Development Department. Establish a county-funded revolving credit fund administered by Research and Development.*

**Objective F**

- *Action 2: Precautionary Principle - "Consider it unsafe until proven safe". This is needed due to the past and potentially future negative agricultural impacts upon Hawaii's ecosystem from introduced species and crops. EXAMPLE: Apple snail has ruined taro crops*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective A, Action 9.** Note on grubbing and grading: Grubbing and grading is a topic that surfaces frequently throughout several of the Working Group reports. This material should be consolidated and placed in the most appropriate section of the CDP, such as Land Use and Planning or Environment.



# Working Group: Cultural Resources

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Cultural Resources Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Note from the Consultant Team:** The Cultural Resources Working Group submitted its draft actions late in the process. Therefore, this material did not undergo the same in-depth review as the work done by the other Working Groups. However, the Working Group submitted a very thorough, detailed account of their actions, and their complete input can be found under Supplemental Information.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
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## Objectives and Actions

**Special note from the Working Group:** In the Hawaiian language, Kona means yours and ours; it is a moku (district), not just a place, and it is part of our being. In tradition and custom, its great beauty and many resources have been entrusted to the people by Akua (our Creator), and inherent in this trust comes kuleana (responsibility/obligation) to malama (care for) all that gives ke ola (life), so that it may hoomau (be perpetuated). Today, this means to honor what has gone before, be responsible for the present, and plan for the future. In recent times, valued places, traditional customs and vital resources have been nalo wale (lost or significantly diminished) and pilika (trouble) has ensued. Although, as in the past, present generations of Hawaiians understand this kuleana is to makaala (be vigilant) and kupaa (be loyal) to that which has transcended time, it has become increasingly difficult.

The Working Group feels strongly that the future well-being of all who live and visit this special place is directly dependent on (1) a clear understanding of the relationship between cultural resources and the natural environment and (2) the urgent need to ensure their protection very early in the land use planning process. Necessarily, this must involve commitments by citizens who have knowledge of these resources and by government representatives who have a direct

role in the land use planning process itself, including those who charged with proper implementation and enforcement of laws designed to protect these resources.

The Working Group also believes the time is now for our community to stand up for this wonderful district -- its past, present, and future, especially as it relates to protecting these irreplaceable and valued cultural resources. Toward that end, we submit the following proposed vision, objectives, and action plans to restore Kona nei (all of Kona) once again as a model of sustainability, and we thank all who contributed to this effort, me ka haahaa a me ka oia io (with all humility and sincerity).

**WORKING GROUP GOAL / VISION STATEMENT: Malama Ka Aina Kona Nei (Keep Kona, Kona) by honoring and protecting Kona's diverse cultural heritage and resources -- its sense of place. In doing so, we honor and respect the legacy left to us, to control our own destiny, and provide opportunities for present and future generations, all the while ensuring that our state motto: Ua mau ke ea o ka aina i ka pono (the life of the land is perpetuated in righteousness) is an integral part of each of our lives and the community in which we live, work, recreate and from which we ultimately will be buried.**

**A. Protect and preserve Kona's valued cultural sites, resources and landscape.**

1. Revise, implement, and enforce county policies/laws to prevent loss of resources.
2. Ensure long-term protection/management of watersheds.
3. Ensure long-term protection/management of marine resources.
4. Protect and implement ahupuaa land use model.
5. Protect, re-establish, and preserve use of all public trails.
6. Establish/update inventory of cultural resources by ahupuaa.
7. Protect further loss of mea kanu (native plants).
8. Identify and protect the cultural landscape.
9. Ensure perpetual protection, care, and maintenance of resources.

**B. Educate and inform residents and visitors alike about Kona's rich cultural diversity, history, values, customs, and traditions.**

1. Pursue community education initiatives about cultural traditions, values and rights.
2. Undertake information campaigns to enable better understanding of local culture.
3. Develop cultural and community centers for residents and visitors.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action I- Revise, implement and enforce county policies/laws to prevent loss of resources*
  - a. Revise County Grubbing & Grading Ordinance ASAP*
    - i. Identify and protect resources prior to issuance of any permits*
      - aa. All burials, heiau, trails and other significant sites*
      - bb. Use descendants and independent 3rd parties to evaluate*
      - cc. Require Cultural Impact Assessment with application*
    - ii. Coordinate any permitting between agencies*
      - aa. Within County, especially Public Works*
      - bb. Within State, especially SHPD*
      - cc. No documents, signatures, no permits/approvals*
    - iii. Institute educational program for applicants*
    - iv. No land alteration without prior approval/permit*
    - v. Require/use/compensate kamaaina cultural monitors*
    - vi. Improve accountability*
      - aa. Require prior documentation/site inspection*
      - bb. Approvals lost for failure to comply*
      - cc. Require protections upfront, not after fact*
      - dd. Establish adequate enforcement*
      - ee. Increase penalties for non-compliance*  
*-commensurate with damage done*
      - ff. Institute time limits/sunset provisions on land approvals*
  - b. Revise County Zoning/Subdivision Ordinances ASAP*
    - i. Ensure resource ID/protection before issuance of any approvals*
      - aa. Require Cultural Impact Assessment with application*
    - ii. Coordinate any permitting between agencies*
      - aa. Within County, especially Public Works*
      - bb. Within State, especially SHPD*
      - cc. No documents, signatures, no permits/approvals*
    - iii. Institute educational program for applicants*
    - iv. Improve accountability*
      - aa. Require prior documentation/site inspection*
      - bb. Approvals lost for failure to comply*
      - cc. Require protections upfront, not after fact*
      - dd. Establish adequate enforcement*
      - ee. Increase penalties for non-compliance*
      - ff. Institute time limits/sunset provisions if no action*

- c. *Create County Cultural Resource Commissions*
      - i. *One for each moku (district), total of five*
      - ii. *Kamaaina membership from each moku*
        - aa. *Recognized for knowledge of local resources*
      - iii. *Decision-making authority, not just advisory*
      - iv. *Look to Maui County model*
    - d. *Adopt county policies, including administrative rules, as necessary*
      - i. *Strengthen cultural resource protection*
        - aa. *Identify and utilize knowledgeable kamaaina*
      - ii. *Recognize inherent and primary value of host culture*
      - iii. *Ensure compliance with constitutional mandates*
        - aa. *Public Trust Doctrine*
        - bb. *Resource protection*
        - cc. *Hawaiian rights*
      - iv. *Ensure consistent application of public policies and laws*
      - v. *Require use of traditional Hawaiian places names*
- *Action 2 - Ensure long-term protection/management of watersheds*
  - a. *Identify and coordinate with all land use planning*
  - b. *Develop long-term management strategies/plans*
  - c. *Minimize development in watersheds*
    - i. *Prohibit development in flood zones*
      - aa. *Use for open space, greenways, wilderness parks*
  - c. *Implement policies/improved incentives*
    - i. *Protect mauka forest areas and reserves*
      - aa. *Encourage conservation*
    - ii. *Protect integrity of underground aquifers*
    - iii. *Ensure supply sustainability*
    - iv. *Encourage recycling and reuse*
    - v. *Encourage/incentivize reforestation*
      - aa. *Utilize endemic/indigenous tree species*
  - c. *Increase coordination and funding with Kona SWCD*
- *Action 3 - Ensure long-term protection/management of marine resources*
  - a. *Develop policies to address/minimize non-point source pollution*
    - 1. *Address impacts of impermeable surfaces*
    - 2. *Minimize impacts of chemical runoff*
  - b. *Develop policies to protect water quality and uphold standards*
  - b. *Protect shoreline against further encroachment and development*
    - i. *Increase shoreline setbacks, greater in low-lying areas*
    - ii. *Permit no further development on the makai side of Alii Drive*
  - c. *Require all coastal development to monitor/protect water quality*
  - d. *Ensure open public access to all shoreline areas*
- *Action 4- Protect/implement ahupuaa land use model*

- a. *Protect and restore iwi aina (boundary walls)*
    - i. *Implement ordinance to protect/re-establish walls*
  - b. *Establish coordinated roadway signage program for each*
  - c. *Utilize mauka-makai roadway connections to preserve landforms*
  - d. *Restrict large-scale land alteration*
- *Action 5 - Protect, re-establish and preserve use of all public trails*
  - a. *Identify all public trails on land use maps*
    - i. *Obtain information from knowledgeable kamaaina*
  - b. *Coordinate and establish an inventory with Na Ala Hele*
  - c. *Keep trails open for traditional and customary practice and use*
  - c. *Establish policies and programs for perpetual care and maintenance*
- *Action 6 - Establish/update inventory/register of cultural resources by ahupuaa*
  - a. *Establish initiatives to preserve more Kona oral histories ASAP*
  - b. *Assemble/collate existing inventories (from Hawaiian perspective)*
- *Action 7 - Protect further loss of mea kanu (native plants)*
  - a. *Coordinate efforts with other agencies*
    - i. *Implement policies to protect critical habitat areas*
  - b. *Encourage propagation and use of endemic species*
    - i. *Develop incentives*
    - ii. *Support and encourage educational programs*
    - iii. *Require percentage use in all projects*
    - iv. *Empower County Aborist Committee to assist*
- *Action 8 - Identify and protect the cultural landscape*
  - a. *Consider the psychographics of aina (land)*
  - b. *Minimize development impacts on aina*
    - aa. *Maintain low building heights*
    - bb. *Restrict large-scale grading to minimize landform alteration*
  - c. *Encourage preservation of open space*
  - d. *Identify and protect scenic view planes, corridors and special places*
  - e. *Ensure and protect access to natural areas, both mauka and makai*
  - f. *Continue to promote and implement heritage corridors*
  - g. *Provide incentives so kamaaina can live and maintain their lands here*
  - h. *Protect rural, small town, country character/atmosphere*
    - aa. *Promote green infrastructure, prevent urban sprawl*
    - bb. *Promote safe living environment*
    - cc. *Maintain warmth and friendliness of community*
  - i. *Promote respect for one another and our diversity*
  - j. *Restore quality of life, enforce laws*
- *Action 9 - Ensure perpetual protection, care and maintenance of resources*
  - a. *Require culturally appropriate buffers*
  - b. *Use preservation easements/transfer of development rights*

*c. Establish public/private funding mechanisms to implement*

**Objective B**

- *Action 1 - Pursue community education initiatives about cultural traditions, values and rights.*
  - a. Utilize local community resources to develop such initiatives*
  - b. Promote use of traditional place names*
  - c. Encourage and promote the practice traditional values*
  - d. Use native plants more*
  
- *Action 2 - Undertake information campaigns to enable better understanding of local culture.*
  - a. Utilize traditional and customary protocol*
  - b. Involve knowledgeable kamaaina and kumu (teachers)*
  - c. Promote use of Hawaiian language in combination with English*
  - d. Develop ahupuaa and site signage, as appropriate*
  - e. Encourage and fund more cultural festivals in Kona*
  - f. Enhance visitors understanding and experience*
  
- *Action 3 - Develop cultural and community centers for residents and visitors.*
  - a. Involve kupuna (elders) and other knowledgeable kamaaina*
  - b. Explore/support funding for construction and maintenance*

**Some Final Quotes:**

*“In any culturally sensitive discussion on land use in Hawaii, one must understand that Hawaiian culture evolved in close partnership with its natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture ends and nature begins. In a traditional Hawaiian context, nature and culture are one and the same, there is no division between the two.” (Kepa Maly, 2001)*

*“The historic preservation and cultural value of archaeological sites is more than just their excavation or information potential, and archaeologists should recognize that Hawaiian sites are cultural resources with spiritual and heritage values.” (Buddy Neller, 1998)*

*“Preserving Hawaii’s historic buildings, landscapes and communities is more than a feel good exercise, more than an economic development strategy and ore than a marketing approach for the tourism industry. It is central to who we are as a society and the value that we place on the people, paces and events that shaped our present communities.” (Linda Delaney, 1990)*

*“It is important for contemporary readers to know that in the Hawaiian mind all aspects of the land—all natural and cultural resources are interrelated, and that all are culturally significant” (Kepa Maly, 2001)*

Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective A - Protect and preserve Kona’s valued cultural sites, resources and landscape.** Many of the actions found under this objective can be incorporated into Environment portion of the CDP.



# Working Group: Energy

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Energy Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
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## Objectives and Actions

**WORKING GROUP GOAL: Establish Kona District as a model for sustainability and energy self-sufficiency in Hawaii County.**

**A. Diversify energy sources beyond fossil fuels, and increase the amount of energy generated through alternative and renewable sources.**

1. Research the opportunities to convert County facility energy sources to solar, landfill gas, and/or methane.
2. Encourage the Department of Water Supply to convert to renewable energy sources, such as in-line Hydro-generation and solar energy.
3. Encourage the development of ocean power from power buoys.
4. Encourage the Natural Energy Lab of Hawaii Authority (NELHA) to continue the development of alternative energy products and energy storage systems.

**B. Support additional education, research & development related to energy technologies.**

1. Prepare an annual energy report to evaluate residential and commercial energy consumption in Kona.

2. Develop an education program to inform various consumer classes about alternative energy opportunities.

**C. Encourage more energy-efficient transportation.**

1. Mandate the gradual transition of all public and private transportation fleets to hybrid/alternative fuels.
2. Expand public transportation systems and park and ride programs.
3. Dedicate a percentage of County Fair Share Assessments or Impact Fees to be invested to expand non-vehicular transportation alternatives such as bicycle lanes, public buses, bus stops, etc.
4. Implement land use policies that lead to a decrease in vehicular travel.
5. Increase the number of alternative refueling stations.

**D. Identify methods for reducing energy costs.**

1. Implement State Energy Bill requiring that priority is given to energy efficient projects, i.e. LEED, Energy Star, Green Globes.

**E. Promote energy conservation strategies throughout Kona.**

1. Support efforts at the Public Utilities Commission (PUC) to expand and increase the effectiveness of energy efficiency programs.
2. Expand the scope of utility energy rebate programs.
3. Require energy efficiency certification for the issuance of all new building permits (i.e., LEED, Energy Star, Green Globes), and provide incentives to retrofit existing buildings.
4. Create Energy Zone in Kona to be used for renewable energy or bio-crops.
5. Update the Model Energy Code (MEC) to elevate standards for new residential and commercial development.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action 4: Encourage the State of Hawaii to continue to support the Natural Energy Lab of Hawaii Authority's (NELHA) development of alternative energy products and distribute energy resources combined with energy storage systems to increase energy delivery efficiencies.*

**Objective C**

- *Action 1: Mandate the transition of all public transportation fleets and encourage the transition of private fleets to hybrid/alternative fuels at 10% per year by 2016 through combination of regulation and incentives.*

**Objective E**

- *Action 5: Update Model Energy Code (MEC) to include:*
  - *Update MEC for commercial and residential development in Kona.*
  - *Expand residential energy code to include all new residential construction in Kona.*
  - *Residential energy code in Kona should follow ASHRAE 19.1 – 1999 standards and should include radiative barriers or R-19 equivalent in roofs and R-11 in walls.*
  - *Commercial energy code in Kona should follow ASHRAE 90.1 – 2004 standards.*
  - *Upon completion of DBEDT's study of a Tropical Energy Code, the County should evaluate the code for adoption and continue studies of new energy codes for possible adoption on an ongoing basis.*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **None identified for Energy at this time.**



# Working Group: Environment

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Environment Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group. Environment objectives and actions are organized under three subheadings: Environmental Quality, Natural Resources and Shoreline, and Natural Beauty.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### Environmental Quality

#### A. Protect air and water quality.

1. Establish stringent industrial and agricultural emissions standards for the County of Hawaii, which exceed federal and state standards.
2. Establish and enforce stringent standards for vehicle emissions.
3. Install desalination plants for brackish water wells for drinking water desalination.
4. Mandate the use of environmentally sound pesticide and herbicide alternatives.
5. Encourage the use of catchment systems, even where county water is supplied / delivered.
6. Require the use of best management practices to prevent pollution and conserve water and soil resources.
7. Create legislation that permits and encourages private gray-water recycling (currently not allowed by state law.)
8. Review, clarify, and simplify permitting processes for the use of composting toilets, and provide incentives to encourage their use in private homes.
9. Enforce existing laws governing the protection of air and water quality.
10. Require cluster septic systems for smaller subdivisions, (e.g. five homes).

11. Require the use of wastewater treatment systems for larger subdivisions, (e.g. 150+ homes).
12. Develop a Kona drainage system plan to minimize non-point source pollution, including alternatives to drywells.
13. Discontinue the use of cesspools in new building permits in Kona.
14. Map existing sewer and septic systems and implement a monitoring program for all public and private systems.
15. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee environmental quality issues.
16. Phase out the use of phosphate-containing detergents.
17. Develop and implement a comprehensive ground water testing and monitoring program in Kona.
18. Develop a program for resorts to use non-potable water for irrigation purposes.

**B. Institute programs and strategies to promote sustainable waste management.**

1. Adopt green procurement/purchasing practices at the County level, including minimum packaging standards.
2. Require shipping companies that deliver mainland products to the island to use the empty containers to transport recyclables off the island.
3. Require that biodegradable materials be used for bulk goods packaging.
4. Require county/state parks and public places to provide separate containers for recyclables.
5. Mandate the immediate implementation of a grease trap interceptor ordinance.
6. Develop a composting facility in Pu'uana'hulu to improve green waste mulching, control invasive plant species, and reduce the amount of waste going to landfills.
7. Develop a bio-fuel production facility to process used cooking oil, fats, greases, and bio-solids.
8. Expand existing county impound yard(s) for abandoned vehicles.
9. Create a weekend pilot project in Kona to pick up abandoned cars.
10. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee waste management issues on a regional and county basis.

**C. Promote recycling and expand recycling programs.**

1. Amend subdivision codes to require subdivisions of 10 residences or more to provide curbside trash and recycling pick up.
2. Remediate the Kealakehe solid waste baseyard facility and convert it into a recycling processing center.
3. Require proof of proper disposal for all demolitions.
4. Adopt a resolution requiring County government to use 100% recycled paper.
5. Develop a landfill diversion program to collect used non-vehicle batteries.
6. Create a Kona Recycling Coordinator position.
7. Establish a hotel tax to provide funding for Kona's recycling program.
8. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee recycling issues on a regional and county basis.

**D. Expand and enhance watershed management and protection efforts.**

1. Develop a Kona Watershed Management Plan.
2. Create Kona Watershed Advisory Group(s).
3. Use ahupua'a system concepts as a basis for watershed management along waterways, in order to increase awareness of responsibility to neighbors (ohana), and to improve water quality mauka to makai.
4. Assign a county engineer to Kona to focus on watershed management and development.

5. Create a Kona Water Roundtable group of resource people (similar to Waimea).
6. Overhaul the County Board of Water Supply in order to make it more accountable to the public.
7. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee watershed management and protection efforts on a regional and county basis.

**E. Ensure rigorous enforcement of environmental regulations.**

1. Create a position or entity to oversee and monitor enforcement within the County of Hawaii Department of Environmental Management for the District of Kona.
2. Create a system of fines/penalties for violations. Penalties and fines should be sufficiently high to be a major deterrent, and should be strictly enforced by the County.
3. Create incentives to encourage developers to work with existing land contours and natural terrain in order to minimize grading.
4. Update and strengthen the current grubbing and grading regulations.
5. Initiate revenue generation necessary to provide adequate staffing and resources to ensure enforcement and oversight of standards.
6. Collect data, establish a baseline, and monitor environmental quality on an ongoing basis.
7. Review, update, and enforce the County sound ordinance.
8. Establish community-based monitoring and enforcement associations to work with local authorities (e.g., “WEC Protects”).
9. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee the enforcement of environmental regulations on a regional and county basis.

**F. Develop information campaigns and educational programs to teach residents, visitors, and students about environmental issues in Kona, and incorporate this wisdom into County plans.**

1. A new County Department of Environmental Management (with a newly expanded scope of responsibilities beyond wastewater and solid waste management), will work in conjunction with nonprofit and community groups on comprehensive education programs.
2. Recognize and utilize long-time stewards of the land – generational ohanas, kupunas, and residents – as resources and sources of information for the public and visitors to County areas.
3. Create and place interpretive, informational signs that teach and provide instructions for proper use of County resources and public spaces.
4. Establish budgetary line items to fund comprehensive environmental education programs for all schoolchildren, and facilitate opportunities for them to become directly involved in field projects (e.g., reforestation and adopt-a-beach).
5. Develop partnerships with private enterprises for developing informational programs.
6. Create an outreach program for new residents to foster and share environmental consciousness.
7. Identify and evaluate existing educational programs in order to support and enhance what is working, e.g. Coast Watch, Quest.
8. Use the building permit process as an avenue for distributing educational materials related to local environmental issues (e.g., use of soil and water conservation techniques, approved recycling and waste management practices, terrain protection, energy conservation techniques, protection and planting of native species, etc.)
9. Broaden the authority, staffing, and funding of the County Department of Environmental Management to oversee the development of information campaigns and educational programs on a regional and county basis.

## Natural Resources and Shoreline

### G. Ensure the protection of Kona's shoreline, reef, and ocean waters.

1. Establish a minimum shoreline setback for all structures, and uphold larger setbacks if there is an existing precedent, or if a larger setback is necessary to protect vulnerable natural features. (Recommended 1000-foot minimum).
2. Levy surtax on all products identified as environmentally harmful.
3. Establish procedures for developing gray water re-use systems, and provide incentives for using gray water.
4. Create and utilize County of Hawaii Best Management Practices.
5. Prohibit cigarette smoking at shorelines at public beach parks.
6. Require snorkel concessionaires to offer information and education on protecting the reef environment.
7. Develop a program to monitor, evaluate, and mitigate non-point source pollution and to monitor the effects of submarine groundwater discharge and seepage using land-based test wells.
8. Adopt a Critical Areas Ordinance to ensure that each permitted development will not cause a net loss of ecological function.
9. Enforce the "Precautionary Principle" in the preparation of Environmental Assessments and Environmental Impact Statements.
10. Require all Environmental Assessments (EA) and Environmental Impact Statements (EIS) to be prepared by independent reviewers and made publicly accessible on the Internet.
11. Revise codes so that entitlements that have been granted but not acted upon, such as variances and Special Management Area permits, shall be terminated when property is sold.
12. Develop standardized permit applications and environmental report guidelines for new developments in Kona, with specific requirements for development in the coastal zone.
13. Develop a County coastal monitoring program using Hawaii Department of Health water quality standards to monitor long-term changes in water quality.
14. Establish a "Developers' checklist" that outlines monitoring requirements for developers, in order to help maintain environmental integrity during development projects.
15. Undertake an aggressive campaign to educate the public and the development community about pollution prevention practices and environmentally friendly fertilizing techniques.
16. Develop a program to map, monitor, manage, and protect anchialine ponds along the Kona Coast, and implement a "no net loss" policy countywide.
17. Require coastal sampling and ongoing monitoring for all development permits in the coastal zone.
18. Conduct a study to determine the coastal and reef impacts of the proposed Honokohau Harbor expansion.

### H. Monitor and protect native plant and animal species, and expand efforts to eradicate alien species.

1. Encourage the use of native plant species in landscaping, as described in the Kona-Kohala Chamber of Commerce "Use of Native Species" program.
2. Encourage the use of compost rather than mulch in order to reduce viable seeds in invasive species.
3. Re-vegetate disturbed areas with native plants when possible.
4. Require certification of nurseries countywide, and require product certifications for inter- and intra- island shipments.
5. Require the identification of endangered and rare species prior to issuing grubbing and grading permits for all lots.
6. Establish / update the county Tree Ordinance to set parameters for tree removal.

**Natural Beauty**

**I. Undertake measures to preserve open space.**

1. Adopt a Kona Open Space Plan.

**J. Identify areas of “special natural beauty”, and protect these areas through incentives and land use regulations.**

1. Adopt and utilize a scenic overlay zoning program to preserve areas of special natural beauty
2. Develop and utilize TDRs, PDRs, “bundle of rights” programs to protect areas of natural beauty.

**K. Establish and protect scenic and heritage corridors.**

1. Identify and preserve scenic corridors.
2. Continue the existing heritage corridor program in mauka Kona, and use this as a model for similar programs countywide.

**L. Minimize the visual impacts of development on the natural landscape.**

1. Encourage the use of landscaping for visual screening.
2. Limit grading and other forms of land alteration in areas of natural beauty, as defined in the General Plan and the KCDP.
3. Review and update the county zoning code building height restrictions for optimal development.
4. Encourage placement of utilities to minimize visual impacts, to include, but not limited to, placing lines underground.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective B**

- *Action 2: This action refers to recyclables, not trash. Transport of recyclables should be done at the shipping companies' own expense.*
- *Action 9: Neighborhood Watch could assist with this pilot project.*

**Objective C**

- *Action 3: Department of Environmental Management shall require proof of proper disposal for all demolitions. Implementation: Create an ordinance to require a deposit be paid for demolitions, to be returned after proof of proper disposal. At time of demolition permit approval, deposit fee equal to landfill tipping fee to be paid based on standard estimates of debris to be generated. Standard estimates of debris to be laid out in Department of Environmental Management Administrative Rules. When appropriate invoices or bills are submitted showing proof of alternate disposal, deposit to be returned in full. Half of deposit will be returned for 50% or more alternate disposal, with proof. (Ex. 60% alternate disposal = 1/2 of their deposit returned).*
- *Action 5: To reduce toxic waste and its eventual entry into the water table, develop a landfill diversion program to collect used non-vehicle batteries (schools, nonprofits could assist).*

**Objective F**

- *Action 3: When possible these signs should include place names and cultural and historical information.*
- *Action 8: The granting of any building permit should be contingent on the acknowledgment and signed consent by the applicant of these materials.*

**Objective G**

- *Action 1: Require a minimum 1000-foot (one thousand-foot) shoreline setback for all Kona shoreline structures. Shoreline setbacks may exceed 1000 feet for County approval of new structures in order to:
 
  - Protect existing natural features such as anchialine ponds.*
  - Uphold larger setbacks based on an existing precedent.*
  - Actual rates of erosion and subsidize determined by regional erosion study along the coastline.*
 (P.A. S. H. – Supreme Court ruling. Subsidize studies by experts: Chip Fletcher or Sea Grant student referred by Sara Peck who is currently working with Maui).  
 (Non-point Source Pollution (Chuck's Statistics) An independent, well-funded study is needed.)*
- *Action 6: Funding can come from existing concessionaire's permit fees.*
- *Action 8: Adapt the principles of the "WEC Checklist for Reviewing Development Regulations to Protect Fish and Wildlife Habitat", source, Washington [state] Environmental Council Habitat Protection Tool Kit.*
- *Action 10: Developer permit fees can supply funding for this action.*

- *Action 11: Entitlements include variances, SMAs, permits, EAs, and EIAs.*
- *Much of the language within following Actions was taken from A Review of Coastal Monitoring Data for Developments in West Hawai'i, a findings report of a study the Marine Science Department of University of Hawaii conducted on behalf of the County of Hawaii, April 2006. (8-21-06) The WG wishes to keep the text as it appears in that report. However, for the purpose of the CDP the Actions above have been simplified. All of the original text is captured below.*

Action 12:

- *County shall “develop standardized permit application and environmental report guidelines. These new guidelines should be specific to requirements/monitoring for new developments” in Kona. (see details in report, pg 65, 66 and 67 of A Review of Coastal Monitoring Data for Developments in West Hawai'i)*
- *“As a requirement of all permits submitted for developments in the coastal zone, complete characterization of conditions should be required in adjacent and potentially impacted areas.” Pg. 65 of A Review of Coastal Monitoring Data for Developments in West Hawai'i*
- *Hawaii County needs to develop a manual of concise guidelines for the environmental report to provide each developer prior to permit application. Pg. 65 of A Review of Coastal Monitoring Data for Developments in West Hawai'i*

Action 13:

- *Develop a Hawai'i County coastal monitoring program using HDOH water quality standards to monitor long-term changes in water quality to include (but not limited to) monitoring of the following parameters: water quality, benthic substrate, biological parameters, microbiological parameters, oceanographic parameters, sediments, and anchialine ponds. (All resorts would pay into fund established for this program). Pg. 65 of A Review of Coastal Monitoring Data for Developments in West Hawai'i*
- *Hawaii County shall develop a manual of concise guidelines for monitoring all development in the coastal zone. Monitoring shall minimally include a parameters outlined in the “Monitoring Protocol Guidelines”, provided by the West Hawaii Coastal Monitoring Task Force in 1992. These Guidelines shall be updated as needed. Pg. 66 of A Review of Coastal Monitoring Data for Developments in West Hawai'i*

Action 14:

- *Hawaii County needs to develop a checklist of requirements for monitoring for developers; to ensure that all of the specified parameters are measured during monitoring of projects, (including GIS coordinates). Pg. 66 of A Review of Coastal Monitoring Data for Developments in West Hawai'i*

- *Action 15: The Department of Environmental Management should develop the campaign. Funding for this program should come from additional permit fees.*
- *Action 16: The County Department of Environmental Management should design and implement the program.*
- *Action 18: Permit Honokohau Harbor expansion only after conducting study to determine the impacts of increased fresh water flow. Approval for Harbor expansion must be also based on the condition that no additional alteration of the shoreline would occur. (to prevent destruction of the reef).*

- **Additional Action for Consideration:** Amend County Code to establish “sunshine limits” on permits such as variances, SMA’s, permits, EA’s, and EIA’s.

### **Objective H**

- **Action 6:** Ordinance should include the following conditions:
  - No cuttings of any tree(s) until inspected, or, if going to cut, apply for review and approval, or create mechanism to enforce existing laws we have. Have inspection outsourced to outside community groups, i.e., Kona Outdoor Circle, Kona Historical Society.*
  - Survey and maintain findings of review required in (i) keeping track of our endangered trees and vegetation.*
  - Establish thresholds for limits of removal.*
  - Review grubbing and grading permit fees, adjust if low, and have punitive fines for violations.*

### **Deleted Objective**

*At one point, the following objective was part of the Working Group’s preliminary action plan. However, since no clear actions were developed by the Working Group to address this objective, it has been removed from the final plan. It is included here for reference. In most cases the themes found in these additional objectives are adequately captured in the remaining work done by this, as well as other Working Groups.*

- **Ensure public access to natural areas.**

### Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective E, Action 4 and Objective H, Action 5.** Note on grubbing and grading: Grubbing and grading is a topic that surfaces frequently throughout several of the Working Group reports. This material should be consolidated and placed in the most appropriate section of the CDP, such as Land Use and Planning or Environment.
- **General note:** This report should be carefully reviewed and compared to the output of the Flooding and Natural Hazards Working Group, in order to eliminate any policy inconsistencies and consolidate actions where necessary.

# Working Group: Public Facilities and Programs

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Public Facilities and Programs Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

**Special Note from the Working Group:** The Public Facilities and Programs Working Group consists primarily of people working in the social services industry. Therefore, facilities and services such as police and fire still need to be addressed. The Working Group feels strongly that the KCDP should include an independent section on social issues / community services, in addition to the current Public Facilities element.

The central recommendation of the Working Group is the development of integrated Community Services Facilities in North and South Kona that meet the needs of all ages in order to reduce existing fragmentation of public services. (See B.1) **The development of such facilities will serve to address many of the Objectives below.**

### **WORKING GROUP GOAL: Strive to build a safer community for Kona.**

#### **A. Ensure the ongoing maintenance of all public facilities.**

1. Hire local contractors to maintain parks and public facilities in remote areas, such as Miolii.
2. Amend the current county Adopt-A-Park program to provide for more comprehensive responsibility and allow the adopters to oversee all park maintenance and operations.
3. Maintain Kona's Headstart facilities.
4. Allocate a share of impact fees for the maintenance of public facilities.

5. Create a program in Kona in which a set percent of real estate closing costs will be used for public facilities maintenance.
6. Pursue opportunities for public/private partnerships intended to increase ongoing maintenance of public facilities.
7. Develop a strategic management plan for upgrading facilities at Kahaluu Beach Park and Hale Halawai.

**B. Provide community centers that meet the needs of residents of all ages, including youth, teens, people with disabilities, and seniors.**

1. Develop integrated Community Services Facilities in North and South Kona that meet the needs of all ages and reduce existing fragmentation of public services. [\*Note: this is the priority recommendation of the Working Group. Please see Supplemental Information for further details.]
2. Secure location and funding for the Elderly Services Center in Kailua-Kona.
3. Expand childcare programs and facilities in Kona.
4. Provide for more community centers, cultural centers, and public spaces for community gatherings.

**C. Provide for a variety of recreational and sporting facilities.**

1. Adopt an impact fee ordinance to provide increased funding for new recreational and sporting facilities in Kona.
2. Improve Kona's harbors and public boating facilities.

**D. Create a Kona performing arts center.**

1. Develop a performing arts center to be part of the new County Civic Center. This Center should include room for workshops and classrooms.
2. Encourage the State of Hawaii to develop a performing arts center at Kealakehe High School

**E. Provide for more public restrooms.**

1. Increase outside lighting at public restrooms.
2. Open existing public restrooms that are currently closed (e.g. Kainaliu), and provide for more public restrooms in strategic locations (e.g. Hale Halewai, pier in Kailua).

**F. Improve police and fire protection to enhance public safety throughout Kona.**

1. Increase "Aloha Patrol" in Kailua.
2. Expand the mobile Neighborhood Watch program in Kona.
3. Develop an internship program for high school students wishing to patrol Kailua as guides.
4. Provide students with school credits to participate in Kona's Neighborhood Watch Programs.
5. Increase salaries and benefits for Kona's police officers.

**G. Ensure adequate health care facilities and services to meet the needs of all residents.**

**[Working Group notes that health care should be top priority for County government.]**

1. Expand partnerships among healthcare providers and improve coordination and integration of services.
2. Develop incentives and provide suitable housing opportunities in order to recruit and retain health care professionals in Kona.

**H. Implement programs and policies to reduce illegal drug use and provide drug and alcohol treatment services.**

1. Increase transportation options, especially small vans, in order to reduce rural isolation and increase access to programs, jobs, and activities.
2. Increase demand-response transportation through the use of small vans in order to increase accessibility to drug and alcohol treatment and programs.
3. Increase the number of therapeutic living programs and facilities.
4. Develop a de-tox program in Kona.
5. Establish a youth intake center to provide more immediate intervention for youth in Kona.
6. Expand partnerships among substance abuse treatment providers and improve coordination and integration of services.

**I. Increase the number of educational facilities and ensure high-quality educational opportunities, including more after-school programs.**

1. Support the development and ongoing operation of charter schools, “continuation schools,” and alternative high schools.

**J. Improve special needs and assisted living services, including programs for elderly, disabled, and homeless persons.**

1. Provide demand-response transportation (e.g. small vans) for the elderly, youth, and disabled.
2. Expand partnerships among providers and improve coordination and integration of services for residents with disabilities or special needs.
3. Establish shelters for the homeless, people with disabilities, runaway youth, and abused or neglected elders.

**K. Develop policies to enhance social infrastructure in Kona.**

1. Create an additional element within Kona CDP to address social infrastructure.
2. Adopt an ordinance to apply impact fees to social infrastructure (as described in Objectives A through J).

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective B**

- *Action 1: The Working Group strongly supports the need for the development of integrated Community Services Facilities in North and South Kona that meet the needs of all ages in order to reduce existing fragmentation of public services. The WG explained that the development of such facilities would serve to address many of the WG Objectives. Important elements are:*
  - *Establish programs to encourage stakeholder involvement in the planning, design, operation, and maintenance of community centers.*
  - *Create Kona Community Services Coordinator position*
  - *Create Kona Council for Health and Community Services.*
  - *Build these facilities for co-location of community services, including education and the arts. These facilities need to be located in a number of locations within the Kona District. Suggested locations are: Costco area of North Kona, Wakefield Gardens in South Kona, Kainaliu town*
  - *Access for disabled must be part of Community Services Facility design.*
  - *Seeks a combination of public and private funding sources to build, maintain, and services there Facilities such as providing incentives for developers; County infrastructure financing; Impact revenue; creation of a real estate re-sale fund to generate revenue.*

**Objective F**

- *Action 1: Aloha Patrol is a volunteer program where people walk Kailua-Kona area to provide assistance and directions for visitors and deter crime. Contact Alice Daniels, Community Justice Center]*
- *Action 3: Contact school “Interact Club”.*

**Objective H**

- *Action 1: This action pertains to the objective because remote rural areas isolate communities, leaving people more vulnerable to drug and alcohol abuse.*
- **Additional Action for Consideration:** *Support legislative change that will amend “custody of minors” laws. (This action was suggested by the Working Group but never sufficiently clarified for inclusion in the final plan.)*

**Objective I**

- **Additional Action for Consideration:** *Create “Parents and Kids” program. (This action was suggested by the Working Group but never sufficiently clarified for inclusion in the final plan.)*

**Re-Assigned Objectives**

*At one point the following objectives were part of the Working Group’s preliminary action plan. However, no clear actions were developed by the Working Group to address these objectives. These objectives have been reassigned as actions to support other objectives within this report.*

## Final Actions

- **Provide for more community centers, cultural centers, and public spaces for community gatherings.** (*Objective B, Action 4*)
- **Improve Kona's harbors and public boating facilities.** (*Objective C, Action 2*)
- **Create additional element within KCDP to address social infrastructure.** (*Objective K, Action 1*)
- **Adopt an ordinance to apply impact fees to social infrastructure as described in Objectives and Actions A through M.** (*Objective K, Action 2*)

### Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective C - Provide for a variety of recreational and sporting facilities.** This objective and associated actions could be integrated into the Recreation portion of the CDP.



# Working Groups: Flooding and Natural Hazards

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Flooding and Natural Hazards Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### A. Identify, map, and effectively manage and protect floodways in Kona.

1. Map all waterways and related features in North and South Kona, including streams, floodways, watersheds, historic runs, lava tubes, and sheet flows.
2. Map, manage, and protect watersheds and floodways using the ahupua'a model (Heinaloli, Waiaha, Holuloa Horse Shoe Bend, Kaumalumu, Hokukunu, Kaawaloa, etc.)
3. Create a position within the Kona Soil and Water Conservation District to coordinate mapping of yearly flood damage, and create a database working with the county to reflect the history of flood occurrences.
4. Use the 100-year flood standard when mapping floodways.

### B. Pursue growth management strategies and protocols for existing and future development that preserve the region's watersheds and restrict development in environmentally sensitive areas.

1. Encourage grassroots activities and committees to help protect the region's watersheds.
2. Identify federal, state, and county sources to fund watershed needs specific to North and South Kona.
3. Develop, codify, adopt and encourage a series of Best Management Practices (BMPs) that account for Kona's unique geography and landscapes.

4. Establish and enforce rigorous guidelines for grading and grubbing and storm water retention procedures. Review and update all relevant ordinances.
5. Revise and codify the Storm Drainage Master Plan for Hawaii County with specific attention to special needs areas in North and South Kona.
6. Provide annual incentives to private property owners who maintain the watershed and keep floodways clear.
7. Create new land use definitions for Kona (e.g. Watersheds, Floodways, Coastal Setbacks, etc.)
8. With community input, develop recommended ratios of open space to developed land in Kona District.
9. Establish a Transfer of Development Rights Program and tax credits in order to provide a mechanism for protecting environmentally sensitive areas.
10. Establish mitigation processes for silt, agricultural chemicals, waste, and sewage to protect fresh and salt water quality.
11. Encourage the County to adopt standards consistent with state law regarding the mitigation of run-off from development.
12. Establish incentives to encourage the use of permeable surfaces for driveways, parking lots, and road shoulders in line with NEMO guidelines (Non-point Education for Municipal Officials).
13. Implement standardized monitoring protocols (including the West Hawaii Coastal Monitoring Program and the National Park Service protocols) in order to monitor nearshore coastal waters, groundwater quality, and non point source pollution.
14. Develop water quality and pollution mitigation standards that meet or exceed EPA standards.
15. As a means of reducing runoff, create incentives for the development of roof catchment systems to collect water for irrigation use.
16. Maximize the retention of existing trees and vegetation in new development projects.
17. Require developers to use the West Hawaii Coastal Monitoring Program Monitoring Protocols Guidelines.

**C. Complete disaster plans that address a variety of potential natural hazards, including hurricanes, earthquakes, volcanic eruptions, tsunamis, landslides, etc.**

1. Define terms of reference for rainfall using the extremes with potential to cause the most environmental damage. Aquifer volumes will be based on the driest recorded years; flood zones will be based upon the heaviest rainfall years recorded.
2. Prohibit development and land alteration within 100-year flood zones.
3. Develop guidelines that restrict the redevelopment of structures destroyed by high surf or tsunami.
4. Require high surf, flood, and tsunami hazard disclosure for all relevant property sales; educate realtors accordingly.
5. Upgrade evacuation shelters to withstand Category 3 winds (111-130 miles per hour).
6. Identify and improve sections of roads prone to flooding.
7. Review and update North and South Kona's Civil Defense Plans.
8. Educate neighborhood and community networks on disaster response procedures, including emergency first responder education.
9. Create community-based disaster response networks and train them to respond to natural disasters. (Include emergency first responder education.)

**D. Undertake initiatives to educate public officials about the importance of flood control, hazard mitigation planning, and disaster preparedness.**

1. Encourage dialogue between public officials and citizens, and establish ongoing public education programs related to flooding and natural hazards.

**E. Adopt Grubbing and Grading Policies that include BMPs.**

1. Identify Best Management Practices for grubbing and grading for the unique geological and topographical aspects of North and South Kona, and ensure rigorous enforcement of regulations.
2. Make education and publications about the BMPs available to the public, contractors and equipment operators.
3. Set fees and fines high enough to provide the county with funding for more enforcement positions.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action 1: Tools to use for mapping should include LIDAR (Light Detection and Ranging) and interviewing local long time residents. Tools should include 2 foot topographic maps for both North and South Kona from the most mauka edge of watershed to the sea.*

**Objective B**

- *Action 4: Licensed heavy equipment operators will be provided with instructions related to storm water retention. Operators and their employers found not licensed or operating on property lacking a valid grubbing/grading permit will be fined and/or equipment impounded.*
- *Action 13: Original language is as follows: Hawaii County must contract the development of monitoring standards that include the West Hawaii Coastal Monitoring Program Monitoring Protocol Guidelines and the National Park Service protocols including sediment collection and analysis. A baseline data set will be established from which to compare future data. [Nearshore coastal water as well as ground water quality in order to evaluate management of non point source pollution.]*

**Objective D**

- ***Additional Action for Consideration:*** *Using NEMO-type resources, create seminars to develop mitigation/issues pertinent to Hawaii Island's disasters. (This action was suggested by the Working Group but never sufficiently clarified for inclusion in the final plan.)*

**Objective E**

- *Action 1: Grubbing and Grading Enforcement should entail:*
  - *Complete the Grubbing and Grading Ordinance Revision*
  - *Increase Grubbing and Grading fees to levels equivalent to other states*
  - *Increase fines. Align fines to the number of acres grubbed and/or environmental damage*
  - *Fines will be levied on the company and/or owner of the equipment and the land owner*
  - *Equipment will be impounded in addition to fines*
  - *Fees and fines will be high enough to provide the county with funding for more enforcement positions*

**Deleted Objectives**

*At one point, the following objectives were part of the Working Group's preliminary action plan. However, since no clear actions were developed by the Working Group to address these objectives, they have been removed from the final plan. They are included here for reference. In most cases the themes found in these objectives are adequately captured in the remaining work done by this, as well as other Working Groups.*

- ***Expand and enhance initiatives for watershed protection, enhancement, and management.***
- ***Ensure rigorous enforcement of environmental regulations.***

### Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective B, Action 4 and Objective E - Adopt Grubbing and Grading Policies that include BMPs.** Note on grubbing and grading: Grubbing and grading is a topic that surfaces frequently throughout several of the Working Group reports. This material should be consolidated and placed in the most appropriate section of the CDP, such as Land Use and Planning or Environment.
- **General note:** This report should be carefully reviewed and compared to the output of the Environment Working Group, in order to eliminate any policy inconsistencies and consolidate actions where necessary.



# Working Group: Government

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Government Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

**Special note from the Working Group:** The Working Group on Government presents a series of preliminary activities designed to change the government structure that currently prevents the Kona Community from realizing its objectives. The current government structure was not designed to accommodate the growth and development that has occurred; nor does this structure adequately deal with the geographic diversity and size of Hawaii Island. The problem is not “bad people”; it is outdated design.

Hundreds of comments collected through the small group meetings show that residents understand the problem. In addition, many Working Groups have come to understand that they cannot realize their aspirations unless the Kona Community gets control of the decisions that affect it. The Working Group on Government focused on governmental changes that would help other groups to implement their plans.

Working Group on Government Themes also address characteristics of government—ethical, accountable, competent, and with transparent activities. These characteristics will be achieved when the government bureaucracy understands that its top priority is to serve its customers—the residents of the area.

### **A. Undertake measures to encourage a competent, ethical, accountable, and transparent system of governance for Kona.**

1. Create a Kona District Planning Commission with independent decision-making authority.

2. Establish Kona District Offices for all County Departments, and ensure Kona representation on all relevant commissions and advisory boards.
3. Collect, aggregate, and analyze all data collected by the County on a district-by-district basis.
4. Develop and implement a transparent, reliable county records management system that is accessible to the public and provides information on government activities that impact Kona District. [\*This is a top priority for the Working Group.]
5. Ensure by ordinance that the County Council and countywide boards and commissions meet in Kona on a regular basis.

**B. Develop local governments with revenue authority.**

1. Initiate County and State actions to permit the formation of political subdivisions (e.g. municipalities, cities, townships).
2. Implement a strong impact fee ordinance.
3. Consider the use of District Revenue Bonds.
4. Consider the development of a Kona District tourist tax.

**C. Encourage more intergovernmental coordination and cooperation.**

1. Develop a clear system for inter and intra-departmental coordination in County government, with timeframes and procedures that allow projects to move forward in a timely, transparent, and predictable manner.
2. Identify opportunities for federal, State and Local governments to coordinate and collaborate so as to minimize unnecessary impacts on residents; wherever possible, similar activities being conducted by differing levels of government should be consolidated.
3. Provide Kona District Offices with staff and other resources to coordinate and collaborate as mandated in C.1 and C.2.

**D. Ensure the equitable generation and distribution of public resources.**

1. Enact an ordinance requiring that a minimum percentage of revenues collected in Kona be returned to Kona District. [Recommended 50% minimum]
2. Require each County Department to prepare District budgets; annual budgets presented to the County Council should show the District-by-District expenditures.
3. Redress obvious inequities in property tax rates.

**E. Ensure the rigorous enforcement of new and existing laws related to development regulations.**

1. Develop and implement a schedule of penalties serving to deter violations of laws and regulations – for example, withdraw permit approvals if there is non-compliance with conditions; restrict licenses of persons who do not obey applicable laws.
2. Establish special enforcement officers who identify violations and enforce laws and regulations.
3. Significantly increase penalties in order to deter violations.
4. Require timely compliance with conditions of approvals; require bonding.
5. Perform an annual review of existing approvals and notify approval holders of timeliness requirements.
6. Adopt sunset clauses on County approvals such as SMA permits, special permits, variances, subdivision approvals, and, in some cases, re-zonings, so that they expire at a fixed time if no activity to utilize the approval has occurred.

**F. Initiate Smart Growth strategies to effectively manage development in Kona.**

1. Establish a program of “benchmarks” and/or performance indicators for the Kona Community Development Plan based on Smart Growth Principles.
2. Require an update of the Kona Community Development Plan every five years, and review all proposed amendments based on a pre-established schedule. All proposed amendments must demonstrate that they are consistent with Smart Growth Principles, apply regulations consistently, and are in the public interest.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action 1: Amend the County Charter to permit the creation of a District-specific Planning Commission (comprised of Kona residents) representing the Kona District, with the independent decision-making authority now exercised by the Hawaii County Planning Commission, to include such elements as plan approval, collection of impact fees, subdivision approval, and other authorities, based on District needs. The Kona Planning Commission will also serve to monitor the implementation of the KCDP.*
- *Action 2: Establish Kona District Offices for all County Departments with District staff that has the capacity and authority to make all decisions for its geographic area. If the Department is advised by a Board/Commission, the District Office will be advised by a Board/Commission comprised of residents from the Kona geographic area.*
- *Action 4: As a top priority, develop and implement a transparent, reliable, integrated county records management system that is accessible to the public and provides information on government activities that impact the Kona District. Resources need to be committed immediately to initiate this project and funds identified so that the system's on-going maintenance and reliability are assured.*

**Objective C**

- *Action 1: As an example, in many places a system of inter-departmental check-offs is used, with tight time frames and public access to information about the status of any project as it proceeds through the system.*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **None identified for Government at this time.**

# Working Group: Housing

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Housing Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
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- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

**Special Note from the Working Group:** the Housing Working Group provided an extraordinary level of detail in their actions. While the level of specificity seen in some of these actions is well beyond the scope of a Community Development Plan, these details can be used to inform future legislation. The Working Group adamantly emphasized the need for policies to develop housing that is truly inclusionary, and would like to see the following concerns addressed:

- The quickly expanding residential resort character that is dominating Kona's real estate development makes the need for a strong, implementable inclusionary housing policy much more critical.
- New developments must include the construction of affordable housing units (fee simple, lease, and rental).
- Housing must be truly affordable to Kona's residents, based on local cost of living and wages.
- Businesses employing large numbers of workers, such as hotels, must provide on-site worker housing.
- The lack of farm working housing in rural areas is a critical issue, and a policy to create farm worker housing must be adopted.
- Affordable housing is needed in more rural areas of Kona.
- Affordable units must remain in the affordable housing inventory.

- A. Undertake programs and policies to help ensure that housing is truly affordable for all segments of the population, including low-income workers, first time homebuyers, and farm workers.**
1. Adopt a new Inclusionary Housing Program for the Kona District.
  2. Define Owner/Occupant so that owner must occupy home 75 percent of the days per year.
  3. Permit and encourage the development of legal farm worker housing on Kona farms; ensure that such housing is reserved for farm workers.
  4. Establish a Kona Affordable Housing Council with enforcement powers; Council will regularly review and propose updates to the County Housing Policy, at least every five years.
  5. Eliminate existing policy loopholes that allow developers to refrain from providing affordable, inclusionary housing (e.g., infrastructure options, “in lieu fee” options, etc.)
  6. Establish new standards for affordable housing in Kona based on local cost of living and wages, and accounting for local poverty levels.
  7. Permit and encourage developers to contribute a proportionate number of finished lots for the development of affordable housing via self-help programs.
  8. Conduct ongoing search for Federal, State, County, private, and non-profit opportunities to increase Kona’s inventory of affordable housing.
  9. Adopt an increase in County Real Property Tax Rates directed specifically to discourage the construction of very large homes on Agriculture lots in Kona.
  10. Adopt policies to keep affordable housing as affordable in perpetuity.
  11. Develop a fair, equitable, point-based system for allocating affordable housing.
- B. Facilitate affordable housing development through regulations, incentives, and land contributions.**
1. Offer substantial density bonuses for developers that provide affordable housing.
  2. Develop a target affordability ratio for development projects (e.g. 1/3 affordable), and provide incentives to achieve this target.
  3. Change zoning to allow increased densities within Kona’s Urban Expansion District and other targeted areas.
  4. Encourage large land trusts to sell or make 100-year leases for truly low income housing.
  5. Provide tax abatements and exemptions for inclusionary and assisted living housing developments.
  6. Remove or greatly reduce impact fees or fair share assessments for developers of affordable housing.
  7. Base Impact Fee rates on the square footage of individual residential units.
  8. Develop a program to involve housing developers to assist buyers in the financing of affordable housing within new developments.
- C. Encourage public-private partnerships to increase affordable housing development.**
1. Research and identify all funding opportunities that may be available through County, State, Federal, private, and non-profit organization sources.
  2. Develop partnerships with nonprofit organizations such as Habitat for Humanity and like organizations, learn from their experience, and determine how to work together to build more affordable housing.
  3. Establish, by ordinance, a Kona Housing trust fund (KHTF) as a distinct fund serving to dedicate and manage sources of revenue to support affordable housing.
  4. Develop a public-private partnership program to fund home renovation for low-income homeowners.
- D. Develop more assisted living facilities to accommodate the needs of elderly and disabled persons.**
1. Adopt an Inclusionary Housing Policy with programs that address housing needs of elderly and disabled.
  2. Determine how federal and state funds can be used to subsidize housing for disabled and elderly.

3. Develop clear eligibility standards to determine who is entitled to assisted living housing for disabled and needy elderly.
4. Research private and charity-sponsored assisted living facilities (e.g. Mennonite, Lutheran) and develop models for best practices.
5. Develop a public-private partnership program to provide funding for repairs to homes owned and occupied by the elderly.

**E. Provide more transitional housing and homeless shelters to accommodate the homeless and those at risk of homelessness.**

1. Research private and charity-sponsored shelters and transitional housing facilities and develop models for best practices.
2. Support non-profits and charities that provide temporary housing for the homeless (e.g. Catholic Charities), through positive local publicity, respect, and County assistance when needed (e.g. social worker input).
3. Develop policies and procedures for moving families from homeless shelters into permanent housing.
4. Seek public and private funding for programs such as Section 8.
5. Establish a policy to provide clean, safe housing for individuals impacted by alcohol and chemical dependency.

**F. Provide for a diverse mix of ownership and rental housing in socio-economically integrated neighborhoods.**

1. Mandate that subdivision approvals must require housing diversity in proportion to demographics of the Kona community.
2. Adopt an Inclusionary Housing Policy to require diversity of housing sizes within developments, in proportion to current demographic information for the District of Kona.
3. Change zoning laws as needed to facilitate the development of inclusionary housing.
4. Encourage local developers and contractors to undertake inclusionary housing projects.
5. Require that any new developments consisting of units intended for rent or lease shall provide a percentage of affordable rental units.
6. Require that a specific percentage of all residential units built in the District of Kona shall consist of rental units offered to existing residents of the county.
7. Require that a percentage of all new subdivisions (consisting of 25 units or more) be developed as rental units offered to residents of the county.
8. Restrict the use of covenants, conditions, and restrictions (CC&Rs) that result in reducing housing affordability (such as requiring minimum housing square footage greater than that required by the Hawaii County building code.)

**G. Create more walkable, mixed-use neighborhoods.**

1. Adopt land use policies that call for a mix of uses as well as a variety of integrated, inclusionary housing.

**H. Develop higher density housing that preserves open space.**

1. Develop policies and incentives to encourage cluster developments.

**I. Ensure that new housing developments are built concurrently with necessary infrastructure and services.**

1. Adopt concurrency legislation, including affordable housing requirements.

**J. Provide for suitable housing options near places of employment.**

1. Require resorts to provide on-site employee housing.
2. Encourage increased use of government-owned land located within the Urban Expansion District or other targeted areas for the development of inclusionary housing.
3. Survey hotels, resorts, and other large employers to identify potential opportunities for developing on-site employee housing.
4. Establish a clear urban growth plan with necessary zoning changes that balances proximity of commercial housing and industrial components and livability.
5. Encourage hotels and resorts to provide temporary employee quarters so that employees can live on-site during the work week.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action 3: Agricultural land. Provide legal opportunity to establish employee housing on large farms in Kona. The legal opportunity must include strong enforcement ability to prevent housing being rented to individuals other than farm workers. Redefine "Farm Dwelling". Adopt standards to establish legal Farm Worker Housing close to existing farm dwelling on small farms in South Kona.*
- *Action 5: Specifics - Amend Section 11.5A7 of the Hawaii County Code in order to discontinue permitting developers to provide infrastructure instead of housing. Amend Section 11.5.A to eliminate the "in lieu fee" option. Amend Section 11.33. Remove option to build affordable housing fifteen miles from new developments (unless housing is created within "within 1/2mile" of existing jobs, services)*
- *Action 6: Original Language - Determine median income for Kona, determine low income for Kona based on 2005-06 statistics, establish a reasonable standard for affordable housing in Kona based on the incomes of those families or individuals who earn less than a certain percentage of federal poverty guidelines.*
- *Action 7: Amend Section 1.52 of the Hawaii County Code. In a subdivision consisting of developer-built homes, the developer may contribute two finished lots on site for each single-built units otherwise required to meet affordable housing requirements. This 2 for 1 ratio may be increased, but not decreased by the Kona Affordable Housing Authority. The intention is to provide lots for homes built with the support of self-help programs.*
- *Action 10: Resale price shall be limited to purchase price plus cost of living increase and cost of reasonable improvements. (For example, resale price can not include cost of swimming pool construction)*
- *Action 11: For applicants who meet income requirements for affordable housing, preference shall be given to applicants for affordable housing based on the following point system such as the following. If there are multiple applicants with equal qualifying points, the application with the earliest date of receipt shall be accepted, with 2 or more equally qualified applicants, a lottery shall be held.*

<i>Table</i>	
<i>Qualification</i>	<i>Point Value</i>
<i>Current Kona Resident</i>	<i>1</i>
<i>Former Kona resident, more than ten years total</i>	<i>1</i>
<i>Born in Kona</i>	<i>1</i>
<i>Kona resident over 65 years of age</i>	<i>1</i>
<i>Physician verified physically or mentally handicapped</i>	<i>1</i>
<i>Hawaii County employee more than 36 months</i>	<i>1</i>
<i>Hawaii D.O.E. employee more than 36 months</i>	<i>1</i>

**Objective B**

- *Action 2: Make laws that require developers to include a minimum of 33% of total project as affordable housing plus inclusionary housing, reflected in community demographics.*
- *Action 5: Provide real property taxes exemptions for owners of properties used by non profits providing assisted living housing or 50% inclusionary housing on their fee simple or lease land.*

**Objective H**

- *Action 1: Adopt clustered development policy that would serve to encourage ranchers and large landowners not to sell all their land by adopting an incentive that permits clustered development on part of the property. Additional increased density would be provided in exchange for affordable housing.*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **None identified for Housing at this time.**

# Working Group: Land Use and Planning

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Land Use and Planning Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group. The objectives and actions for Land Use and Planning are organized under three subheadings: Inside the Urban Expansion Area, Outside the Urban Expansion Area, and General Planning Issues.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### Inside the Urban Expansion Area

#### A. Identify distinct urban boundaries and adjust zoning codes in order to accommodate a growing population within those boundaries.

1. Bring in planning professionals to ensure that boundaries are appropriate.
2. Review and update the zoning code to permit and encourage a variety of mixed use development patterns, including the mixed use village concept.
3. Encourage high density, mixed use, smart growth development in an expanded commercial and civic area.
4. Create a master plan and vernacular design guidelines.

#### B. Restore existing communities by promoting infill development.

1. Identify and inventory areas that should be prioritized for infill development.
2. Look for what needs to be added to restore or revitalize.
3. Encourage redevelopment that meets a full range of community needs, such as beautification, sidewalks, etc., and provides for attractive public spaces.

4. Establish special districts and economic incentives to encourage infill and redevelopment.
5. Encourage contextual development that creates a sense of cohesion between old and new structures.

**C. Encourage mixed use, village-style development that accommodates social and economic diversity.**

1. Identify and correct existing regulatory obstacles to mixed-use village development.
2. Create incentives to encourage the establishment and viability of small business in village areas.
3. Develop and implement design standards that can accommodate a range of densities and retain village character.
4. Restrict exclusionary developments such as gated communities and private golf courses.

**D. Institute land use policies that promote the development of inclusionary affordable housing, with particular emphasis on increasing such housing stock near major employment centers.**

1. Create ordinance to incentivize landowners to create 100% affordable housing (15 acres or less.)
2. Develop incentives to promote the development of more affordable housing.
3. Create and enforce policies that keep affordable housing affordable.

**E. Acquire necessary rights of way to meet the needs of planned future development.**

1. Strengthen partnerships between government and developers in order to jointly determine the need for future roads and public rights of way.
2. Prevent stub-outs on public rights-of-way.
3. Use impact fees to purchase rights-of-way.
4. Ensure that all roads within Growth Opportunity Areas are publicly dedicated.

**F. Set aside parkland and open space, and encourage clustering and planned unit developments (PUDs) in order to preserve natural beauty within urban areas.**

1. Preserve floodplains within the urban core and consider them for park development.
2. Fund acquisition and maintenance of urban open space, using the 2% Open Space Fund or similar tools.
3. Establish and enforce a formula for parks in PUD's based on density.
4. Amend CFD (Community Facility Districts) ordinance to allow funds to be used for park operations and maintenance.
5. Allow increased density in exchange for more open space (e.g. clustering.)
6. Create a policy to encourage the development of small, urban "pocket parks".

**G. Identify and protect significant viewplanes.**

1. Encourage the underground placement of utilities around significant viewplanes.
2. Restrict building mass along significant view corridors.
3. Establish criteria for identifying significant viewplanes and view corridors.
4. Design highways and roadways with attention to natural landscapes and viewplanes.
5. Create a Scenic Corridor program for Kona.

**Outside the Urban Expansion Area**

**H. Implement rural zoning and land use policies that maintain the character of South Kona. (26, 31)**

1. Adopt incentives, taxes, and credits that support rural uses. (e.g. eco-service incentives, TDR programs that identify sending and receiving areas.)
2. Implement policies to retain natural land contours and vegetation.
3. Create incentives to protect larger areas of forest reserves.

4. Designate buffer zones between agricultural and rural areas.
5. Implement and enforce design standards and reviews. [e.g., sidewalk and road width, building design.]
6. Develop consistent land use and zoning regulations through collaborative efforts with the State, County, and the public.
7. Create a program to place ahupua'a boundary signs along the highways.
8. Identify, review, and implement alternatives to existing zoning.
9. Define "Rural" in the County codes and create a policy for rural zoning, including density.
10. Ensure consistency between State and County land use policies.
11. Create County Conservation Zone and Greenbelt Zone land use designations.
12. Implement growth management policies that limit unplanned growth and reduce urban sprawl.
13. Create a policy for clustered development in rural areas, using smart growth principles.
14. Review and update rural and agricultural lands policies for the State and County.

**I. Explore techniques for slowing growth outside the Urban Expansion Area.**

1. Research growth management programs in other communities/states. (Let's not reinvent the wheel!)
2. Commit public funds toward the development of public infrastructure at an appropriate rural development level.
3. Identify and implement impact fees and other funding mechanisms.

**J. Conserve open space, protect natural resources, and promote ecological sustainability while ensuring public access to the natural environment.**

1. Promote the ahupua'a model as a key conservation/development approach.
2. Regulate public access to natural areas, including customary gathering rights.
3. Protect forests and shoreline through regulations, policies, programs and incentives.
4. Identify, map and protect existing trails through State, County, and private collaboration.

**K. Undertake measures to restrict development along the coast and protect Kona's shoreline while maintaining public access.**

1. Restore original shoreline, where needed.
2. Identify and implement Best Management Practices for shoreline management.

**L. Implement land use policies that protect agricultural lands from development pressures.**

1. Define "Farm Dwelling" in order to establish a legal distinction between true farm dwellings and residential developments on agricultural lands.

**General Planning Issues**

**M. Establish an integrated, island-wide planning structure.**

1. Integrate regional development plan results to recognize differences and commonalities.
2. Establish a regional oversight group in Kona, using Community Development Plan boundaries.
3. Establish District planning commissions with decision-making authority.

**N. Rigorously enforce regulations under a fair and predictable system for land use and development.**

1. Clarify existing regulations.
2. Scrutinize deed restrictions and CAPs in relation to existing laws and regulations.
3. Improve consistency in enforcing regulations within and among agencies.
4. Employ more inspectors to adequately enforce laws and regulations.

5. Develop incentives to encourage adherence to regulations.
6. Enhance communication, cooperation, and policy consistency between state and county agencies.
7. Establish concurrency requirements to ensure adequate infrastructure provision for new and existing developments.

**O. Ensure the accountability of developers and government agencies in adhering to planning policies.**

1. Create a clear, straightforward information system that includes a checklist for all building and development applications, with a flow chart, policies and procedures, and time lines for each step.
2. Create a centralized, publicly accessible database that contains all Hilo and Kona files.
3. Identify which planning and development regulations are most frequently violated; create a set of penalties and incentives to encourage compliance.

**P. Promote ongoing community involvement in planning processes to ensure consideration for local residents' needs.**

1. Establish community involvement guidelines for the Kona District Planning Commission.
2. Encourage more outreach programs to meet the needs of all segments of the community in understanding planning and land use information and processes.
3. Develop vernacular design guidelines that promote local architectural styles and materials and enhance Kona's strong sense of place.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective E**

- ***Additional Action for Consideration:*** *Identify rights-of-way - corridors, roadways (vehicular and non-vehicular.) Consider the levels of knowledge (detail). (This action was suggested by the Working Group but never sufficiently clarified for inclusion in the final plan.)*
- *Action 4: "County should be more proactive in acquiring rights-of-way." Suggestion: require roads within UEA's GOAs to be dedicated to the County*

**Objective F**

- *Action 2: The 2% Open Space Fund is a Ballot Initiative that, if approved by County voters, will dedicate 2% of the Real Property Tax Revenue to purchase and/or protection of open space.*

**Objective H**

- *Action 3: "Plan, Protect, Preserve". Replanting trees is a long-term investment.*
- *Action 10: Hawaii Revised Statutes 205, address relationship to County. State land use policy and County land use policy are many times not consistent with each other.*
- *Action 14: (Resource: "Developing the Lands In Between" Jackie Hoover)*

**Objective J**

- *Action 3: Concern over unregulated access to sensitive areas. [Resources: Hannah Springer, Na Ala Hele, Ala Ka Ha Kai, and Peter Simmons]*

**Objective K**

- *Action 1: (Integrate efforts with State/Federal)*
- *Action 2: (Resources: Contact CZM folks as information source.)*

**Re-Assigned Objectives**

*At one point the following objectives were part of the Working Group's preliminary action plan. However, no clear actions were developed by the Working Group to address these objectives. These objectives have been reassigned as Actions to support other objectives within this report.*

- ***Restrict exclusionary developments such as gated communities and private golf courses.*** *(Now Action 4 under Objective C).*
- ***Develop vernacular design guidelines that promote local architectural styles and materials and enhance Kona's strong sense of place.*** *(Now Action 3 under Objective P.)*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective D - Institute land use policies that promote the development of inclusionary affordable housing, with particular emphasis on increasing such housing stock near major employment centers.** This objective and associated actions could be integrated into the Housing portion of the CDP.
- **Objective F - Set aside parkland and open space, and encourage clustering and planned unit developments (PUDs) in order to preserve natural beauty within urban areas.** This objective and associated actions could be integrated into the Recreation portion of the CDP.
- **Objective G - Identify and protect significant viewplanes.** This objective and associated actions could be integrated into the Environment portion of the CDP (see Natural Beauty subheading).
- **Objective J - Conserve open space, protect natural resources, and promote ecological sustainability while ensuring public access to the natural environment.** This objective and associated actions could be integrated into various sections of the Environment portion of the CDP.
- **Objective L - Implement land use policies that protect agricultural lands from development pressures.** This objective and associated action could be integrated into the Agriculture portion of the CDP.

# Working Group: Recreation

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Recreation Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### **A. Increase parkland in Kona, with attention to larger parks that preserve open space and wilderness areas.**

1. Use the 2% Fund to increase parks in Kona.
2. Develop a state/county/community partnership to expand the use of Hawaii Information Telecom Systems (HITS) for the purpose of parkland planning and coordination.
3. Dedicate flood corridors and floodplains to be used as public parklands.

### **B. Increase parkland in Kona, with attention to community parks and playgrounds that meet the active and passive recreational needs of all residents.**

1. Establish minimum standards for the provision of community parks and playground.
2. Require new developments to include adequate park facilities, and discontinue “fees in lieu” options
3. Establish a Kona District Park Fund to support park development and maintenance.
4. Reduce existing barriers to providing neighborhood parks, such as parking, lot size requirements, and restroom facilities.
5. Expand and encourage the use of Adopt-a-Park programs to encourage community support of local parks.
6. Develop an updated Recreation Plan for the Districts of Kona.

7. Create a Kona District Recreation Advisory Committee.
8. Establish a County program for acquisition of strategic parklands, including tax delinquent properties

**C. Preserve view planes and provide for more public access along shorelines and beaches.**

1. Implement zoning changes to mandate wider side yard setbacks. Existing properties should modify side yards to improve beach access and ocean views.
2. Implement zoning changes to ban fences and landscaping higher than 6 feet.
3. Implement zoning changes to ensure smaller second story square footage.
4. Identify, clean up, and maintain county rights-of-way along the shoreline.
5. Increase the number of parking spaces at public beaches in order to accommodate anticipated future use.

**D. Promote ongoing parks maintenance efforts, and ensure that recreational facilities are well maintained and renovated as necessary.**

1. Improve Honokohau Harbor and expand the number of boat slips and small, public boat launches
2. Establish a Kona District Park Fund to support park development and maintenance.

**E. Provide recreation opportunities for all age groups, with special attention to facilities for youth and teens.**

1. Increase the use of Hale Halawai.
2. Develop a music/dance venue for large gatherings.
3. Encourage the development of a motor sport park in North Kona
4. Reinstate the Police Bicycle Patrol.
5. Build an outdoor skateboard area.

**F. Establish more pet-friendly parks.**

1. Establish leashed dog walking areas with appropriate facilities.
2. Set aside a minimum percentage of parkland for pet activities.

**G. Provide for better hiking and trail access in the mountains and wilderness areas.**

1. Create a network of hiking/walking trails by converting abandoned railroad corridors, government roads, and historic horse and carriage trails to a useable trail system.
2. Establish hiking trails along floodplains / flood corridors, and ensure that trails are integrated into future development plans. –OK
3. Provide a network of walking paths to be integrated into and between future development projects

**H. Provide for more camping opportunities.**

1. Research and develop camping opportunities on mauka lands.

**I. Create a Master Plan for expansion and improvement of the Old Airport**

1. Form a Community Task Force to collaborate with the Department of Parks and Recreation in developing a Master Plan for the Old Airport Park

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

**Objective A**

- *Action 1: There is an initiative on the Nov 2006 ballot which requests 2% of property taxes to be set aside annually in the Public Access, Open Space, and Natural Resources Fund. There would be a minimum of \$250,000 and a maximum of \$5 million set aside annually for use island wide.*
- *Action 2: The Hawaii College System uses Hawaii Information Telecom Systems to conduct inter-island classes live. Use of this system would greatly enhance the ability of community and government groups to meet regarding recreation issues without the expense of travel. The HITS system is available to others for use.*

**Objective B**

- *Action 3: Establish a specific Kona District Park Fund separate from the General Fund which individual builders and developers would pay into based on an assessment. This fund would be for development and maintenance of parks located within the Kona Districts both urban and rural. Provide funding for this by including assessment on projects approved but not yet built.*

**Objective C**

- *Action 1: Negotiate more setbacks with individual homes with beach access at time of remodeling or reselling. Properties with inadequate side yard width do not allow beach access or view of ocean. As properties request permits or new zoning there should be a requirement to modify side yards based on a maximum distance from other beach access areas, and/or maximum allowed restriction of view plane.*
- *Action 2: Zoning changes to disallow 6 foot fences. Zoning changes to disallow tall landscaping.*

**Objective E**

- *Action 1: This is a county facility in downtown Kailua which is underused. It has kitchen facilities, meeting rooms, a large gathering area and large outdoor area for booths and activities. The county does not staff it so the parking lot is always closed except on special occasions.*
- *Action 4: The Police Bicycle Patrol encourages interaction of skaters, bicyclists, joggers, kayakers, and surfers with authority. It has been a friendly way to enforce the law, keep tourists out of danger, monitor the use of our parks, assist lifeguards, prevent "territorial" behavior and create goodwill. It is sorely missed.*

### Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective C - Preserve view planes and provide for more public access along shorelines and beaches.** While public access to shorelines and beaches belongs under Recreation, the actions specifically related to view planes could be consolidated into one section of the CDP. (Suggestion – see Natural Beauty subheading, found in the Environment report).

# Working Group: Transportation

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## Introduction

**Summary of the Process:** The Working Groups were responsible for formulating objectives and actions for the Kona Community Development Plan. Each Working Group met regularly over a six-month period between May and November, 2006. Throughout the course of the process there was ongoing feedback between the Working Groups and the Consultant team. By June the Working Groups had identified key themes and worked with the Consultant to create draft objectives. Between June and November several iterations of the actions were developed. All of the material originated with the Working Groups, while the Consultant conducted reviews, recommended specific changes, and requested more information where necessary in order to improve clarity and achieve a level of consistency among all of the Working Groups.

This report represents the final product of the Transportation Working Group. The objectives and actions found below will be reviewed by the Steering Committee and incorporated into the final Community Development Plan.

**Contents of this Report:** Following the Introduction, this report is divided into the following sections.

- **Objectives and Actions** – This section should be carefully reviewed by the Steering Committee for inclusion in the CDP. In some cases this section is prefaced with special notes from the Working Group. The objectives and actions for Transportation are organized under three subheadings: Alternative Transportation, Public Transportation, and Vehicular Transportation.
- **Supplemental Information** – This section provides additional details about specific actions, including recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.
- **Flags for Redundancy** – Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more groups might best be consolidated before inclusion in the final Plan.

## Objectives and Actions

### Alternative Transportation

#### A. Increase the number of bike paths and walking trails in Kona

1. Implement Bike Plan Hawaii priorities for Kona as outlined by the State Dept of Transportation (see their website).
2. Develop and regularly update a Pedestrian and Bicycle Manual for use island-wide.
3. Ensure the safety of alternative transportation routes by clearly separating bike and pedestrian lanes from roadway traffic.
4. Implement Recommended Actions related to bike and pedestrian lanes found in the State Department of Transportation plan.
5. Permit some trails to remain “outdoor recreation trails”, so that they meet US Forest Service guidelines but are not required to be ADA compliant.

#### B. Improve sidewalks in Kona.

1. Make all sidewalks ADA compliant where topography allows.

2. Require appropriate bike and pedestrian facilities to be included in ALL maintenance and capital improvement projects.

**C. Target key areas for alternative transportation enhancements.**

1. Plant shade trees and improve walking paths along the shoreline in accordance with the Kailua Kona Master Plan.
2. Create a shoreline access trail between the airport and Kailua town.
3. Develop park and ride facilities and walking paths to encourage downtown pedestrian accessibility to Kailua Village.
4. Create walking paths to improve pedestrian connectivity between ALL subdivisions and developments, including includes condos, planned unit developments (PUDs), etc.

**D. Encourage walkable, mixed use development patterns that place neighborhood amenities within easy walking distance of residents.**

1. Mandate the provision of pedestrian facilities including paved sidewalks in all new developments, according to the specifications of the Department of Transportation.
2. Mandate the provision of bikeways and bicycle facilities in accordance with all roadway maintenance, construction, and repaving projects.
3. Encourage a minimum percentage of commercial zoning within residential developments.

**E. Create public information campaigns to help establish walking and biking as viable transportation alternatives**

1. Inform the public about the economic advantages of bicycling to work.
2. Develop a public education plan to promote safety in walking/ biking.

**Public Transportation**

**F. Develop safe and convenient bus service with attention to key commuter routes and tourist attractions.**

1. Assess the feasibility of establishing regular bus stops along Alii Drive, key commuter routes, and major tourist routes.
2. Identify key tourist attraction stops.
3. Implement the planned 20 new bus stops for Kona area which are on the Hawaii County Mass Transit Plan.
4. Incorporate mass transit needs into subdivision and public facilities planning

**G. Create Park and Ride facilities at major, multi-modal transfer points.**

1. Establish a Park and Ride at Old Airport.
2. Establish a Park and Ride near King Kam Hotel and incorporate walking paths and bike trails.

**H. Assess the feasibility of a light rail system / tram system.**

1. Examine existing studies and information related to light rail, but rapid transit, trams, and shuttle services to determine suitability for Kona.
2. Establish a long-term plan to provide a major corridor within Kailua Village that will accommodate utilities and all current and future modes of transportation, from light rail to multi-use pedestrian paths.

**I. Improve transportation facilities and ensure accessibility for all residents, including elderly and disabled persons.**

1. Implement para-transit vans for door to door pickup.
2. Create incentives for private taxi companies to resume the Share-a-Ride program.

**J. Encourage the use of alternative fuels among public transportation providers.**

1. Purchase “alternatively fueled” buses as old buses come out of service so as to have a fully alternatively fueled fleet by 2020.

**Vehicular Transportation**

**K. Implement strategic expansion and improvement of existing roadways, with attention to connectivity, road widening, and the need for additional lanes.**

1. Consolidate all previous road plans into one concise plan.
2. Implement road improvements and expansion based on priority and feasibility.

**L. Plan for the construction of new roads to meet future transportation needs.**

1. Develop ordinances to incorporate features such as sidewalks, aesthetics, and traffic control into the county guidelines.
2. Establish a strong, consistently applied public process to involve the community in planning for new roads.
3. Create minimum, achievable roadway standards to promote roadway consistency.

**M. Ensure adequate Mauka/Makai roadway connectivity to allow for emergency access.**

1. Convert the current temporary use of Kalawa St. into a permanent parallel connector with traffic calming devices in place.
2. Fully enforce subdivision codes in order to require connectivity among developments, without the option for administrative overrides.

**N. Provide for ongoing road maintenance and road safety programs.**

1. Privatize road work to improve efficiency and number of miles completed per year.
2. Implement traffic calming policies to improve road safety without the need for stop lights.
3. Establish standards for the use of landscaping and median strips.

**O. Initiate strategies for reducing traffic congestion.**

1. Develop Park and Ride facilities to encourage car pooling, walking, and the use of public transportation.
2. Develop a parking and traffic management plan for downtown Kailua-Kona.
3. Improve intersections using a variety of techniques, including synchronized stoplights, roundabouts, overpasses, underpasses, and Intelligent Transit Systems (ITS).
4. Perform a noise forecast before adding stop signs in residential neighborhoods when speed limits and/or traffic calming measures would suffice.

## Supplemental Information

This section provides additional details about specific objectives and actions, including alternative phrasing, background information, recommended timeframes, responsible agencies, and other implementation concerns. This material comes directly from the Working Groups, and has received minimal editing from the Consultant. Where possible, this detailed information should be incorporated into the final Plan. All supplemental information is italicized in order to distinguish it from the final objectives and actions.

### *Objective A*

- *Action 2: Require development of a Pedestrian and Bicycle Manual for use island wide within six months of enabling state legislation with mandatory revisions every five years.*

### *Objective D*

- *Various Actions: Follow the recommendations in Chapter 4 on page 4-4 in the DOT plan.*
  1. *All new residential construction must provide pedestrian facilities which include paved sidewalks not less than 5ft in width with not less than 1 foot additional free of vertical obstruction on each side.*
  2. *All new commercial construction must provide pedestrian facilities which include paved sidewalks not less than 8 feet in width with not less than 1 ft additional free of vertical obstructions on either side.*
  3. *If it is to be a shared use paved path then not less than 10ft wide with not less than 2 ft additional free of vertical obstructions*
  4. *all maintenance, reconstruction, and repaving in North and South Kona must provide bicycle facilities as required by new construction or a shoulder bikeway not less than 5 ft in width.*
  5. *a percentage of commercial zoning to be included in developments to allow employment centers, shopping, teleconferencing facilities, and branch offices.*

### *Re-assigned Objectives*

*At one point the following objectives were part of the Working Group's preliminary action plan. However, no clear actions were developed by the Working Group to address these objectives. These objectives have been reassigned as Actions to support other objectives within this report.*

- *Ensure the safety of alternative transportation routes by clearly separating bike and pedestrian lanes from roadway traffic. (Now Action 3 under Objective A)*
- *Improve intersections using a variety of techniques, including synchronized stoplights, roundabouts, overpasses, and underpasses. (Now Action 3 under Objective O)*

## Flags for Redundancy

Due to the nature of the process and the broad interests of the Working Group members, several Groups ended up addressing similar themes or offering similar actions. This section attempts to highlight areas of potential overlap, where work from two or more Working Groups might best be consolidated before inclusion in the final Plan. Each flag denotes specific objectives and/or actions found in this report that could be integrated, in whole or in part, into the work of another Group.

- **Objective J - Encourage the use of alternative fuels among public transportation providers.** This objective and associated action could be integrated into the Energy portion of the CDP.

**DEMOGRAPHIC CHARACTERISTICS OF  
NORTH & SOUTH KONA**

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Wilson Okamoto Corporation  
January 2007

# DEMOGRPAHIC CHARACTERISTICS OF NORTH AND SOUTH KONA ON THE ISLAND OF HAWAII

## KONA COMMUNITY DEVELOPMENT PLAN

Submitted to:



County of Hawaii  
Department of Planning

January 2007



**WILSON OKAMOTO**  
CORPORATION



**Demographic Characteristics of  
North and South Kona on the  
Island of Hawai'i**

**Prepared for:  
County of Hawaii  
Planning Department  
250 South High Street  
Wailuku, Hawai'i 96793**

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**January 2007**



**TABLE OF CONTENTS**

**1. General Demographics ..... 1**

    1.1. Population..... 1

    1.2. Gender.....3

    1.3. Age .....3

    1.4. Race and Ethnicity.....6

**2. Economy ..... 11**

    2.1. Employment..... 12

    2.2. Tourism and Visitors .....20

    2.3. Income Distribution .....24

    2.4. Housing .....30

**3. Land Use ..... 37**

    3.1. State Land Use Districts .....37

    3.2. County of Hawaii Zoning.....39

**4. References ..... 44**

**CHARTS**

	<u>Page</u>
Chart 1: Residential Population Comparison of the County of Hawaii and Kona District.....	1
Chart 2: Rate of the Residential Population Growth.....	2
Chart 3: Population Density, 1970 to 2000.....	2
Chart 4: Residential Population by Sex, 2000.....	3
Chart 5: Residential Population by Age, 2000 and 2005.....	4
Chart 6: Race and Ethnicity by Race Alone, 2000 and 2005.....	7
Chart 7: Kona Residential Population by Race Alone, 2000.....	7
Chart 8: Employment by Major Economic Sector in the County of Hawaii, 1960 to 1997.....	13
Chart 9: Average Daily Visitor Census, by Counties.....	21
Chart 10: Total Number of Passengers (Enplaned and Deplaned) at Kona International Airport.....	22
Chart 11: Domestic Visitors to Kona, 1990 to 2004.....	22
Chart 12: Accommodation Characteristics of Visitors to Kona, 2004.....	23
Chart 13: Per Capita Income Rate of Change, 1990 to 2000.....	25
Chart 14: Percent Change of Housing Units.....	31
Chart 15: Housing Occupancy, 1990 and 2000.....	35
Chart 16: Number of Households.....	35
Chart 17: State Land Use Districts.....	38
Chart 18: Proportion of State Land Use Districts within Kona.....	39
Chart 19: Zoning Classification by District.....	41
Chart 20: Zoning Classification by District Excluding Agricultural and Open Zoning.....	41

**FIGURES**

	<u>Page</u>
Figure 1 Age, 2000 CDP.....	5
Figure 2 Race Alone, 2000 CDP.....	8
Figure 3 Race Alone, 1990 to 2000 CDP Comparison.....	9
Figure 4 Labor Force, 1990 to 2000 CDP Comparison.....	15
Figure 5 Civilian Labor Force, 2000 CDP .....	16
Figure 6 Class of Workers, 2000 CDP .....	17
Figure 7 Occupations, 1990 to 2000 CDP Comparison .....	18
Figure 8 Occupations, 2000 CDP .....	19
Figure 9 Income, 1990 to 2000 CDP Comparison.....	26
Figure 10 Income, 2000 CDP .....	27
Figure 11 Income Comparison, 1990 to 2000 CDP Comparison .....	28
Figure 12 Poverty, 1990 to 2000 CDP Comparison .....	29
Figure 13 Housing Tenure, 2000 CDP.....	32
Figure 14 Housing Tenure, 1990 to 2000 CDP Comparison.....	33
Figure 15 Housing Occupancy, 2000 CDP .....	34

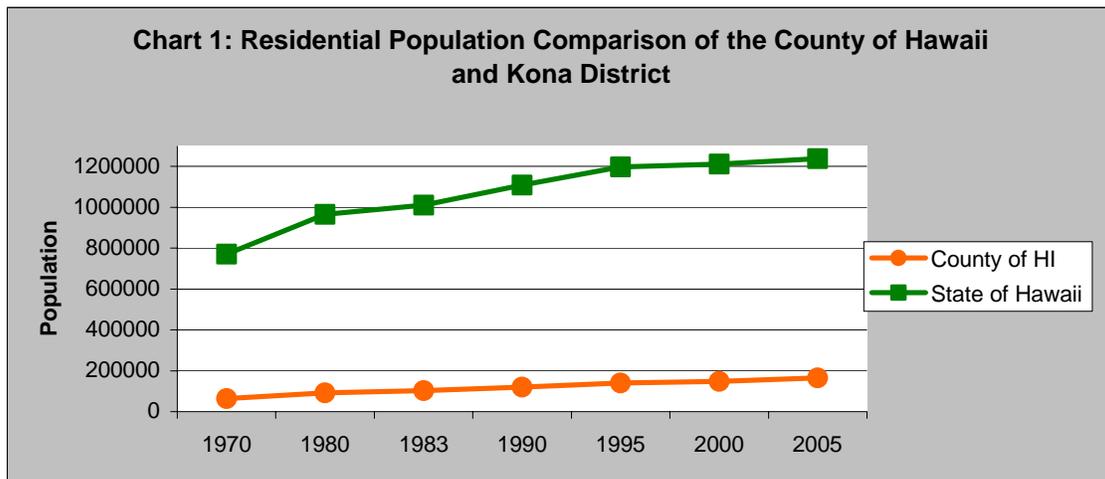
## 1. General Demographics

### 1.1. Population

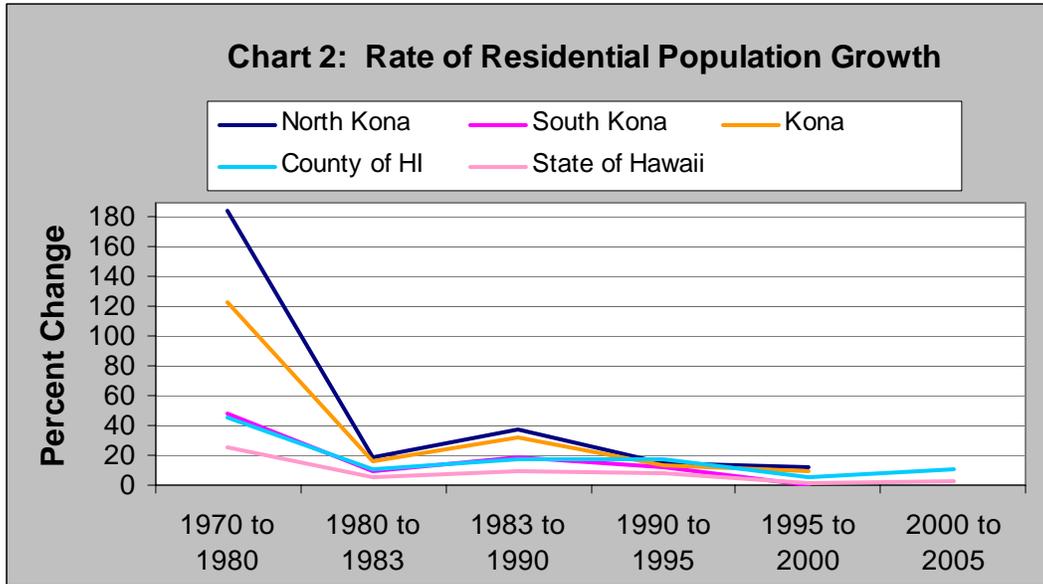
Refer to Charts: (1) Residential Population Comparison of the County of Hawaii and Kona; (2) Rate of Residential Population Growth; and (3) Population Density, 1970 to 2000.

According to the U.S. Census Bureau, the State of Hawaii residential population reached 1,275,194 in 2005. In 2005, thirteen percent, (167,293) of the state population resided in the County of Hawaii. In 2000, 25 percent of the 2000 County population was living in the Kona District (37,132 people).

In 1970, the population in the County of Hawaii numbered 63,468 and was the first to show an increase, albeit small, since 1930 when the population peaked at 73,325, largely a result of the importation of labor for the sugar industry. The population decline between 1930 and the 1960s was primarily due to the increasing mechanization of the sugar plantation, limited job opportunities in other economic sectors, and the out-migration of residents. This decline was reversed during the 1960s with a modest growth of 2,140 residents between the 1960 and 1970 census. Since 1970, the County's population has continued to grow as the largest population increase occurred during the 1970's in North Kona. The 1980 census registered a Hawaii island-wide resident population of 92,053 people representing a 45 percent increase over the 1970 census. In Kona, the 1980 census population increased 122.5 percent over the 1970 census.

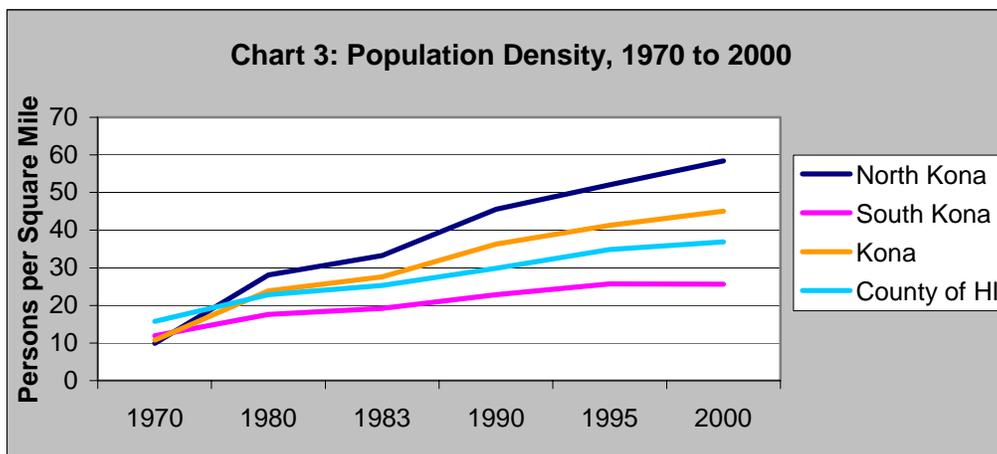


Source: *The State of Hawaii Data Book, 1984, 1990, 1998, 2004 and 2005*



Source: *The State of Hawaii Data Book, 1984, 1990, 1998, and 2004.*

Between 1980 and 1990, the North Kona population growth rate began to slow, yet was still higher than South Kona, the County of Hawaii, and the State of Hawaii. The 1990 census revealed a Kona resident population of 29,942 residents, or an increase of 52 percent over the 1980 Kona resident population. The census registered 37,132 Kona residents in 2000, a 24 percent increase over the 1990 resident population. According to the population data from 1990 and 1995, the population growth rate of North Kona, South Kona, and the County of Hawaii grew at a comparable rate ranging from approximately 12 to 14 percent. The growth of the South Kona residential population slightly declined between 1995 and 2000. About 65 percent of the county population growth between 1990 and 2000 came from net in-migration (people moving to the island from elsewhere) (Planning Department, 2005). From 1970 to 2000, the North Kona population has grown 490 percent, whereas both the County of Hawaii and South Kona populations have only increased 134 and 115 percent, respectively.



Source: *The State of Hawaii Data Book, 1984, 1990, 1998, and 2004.*

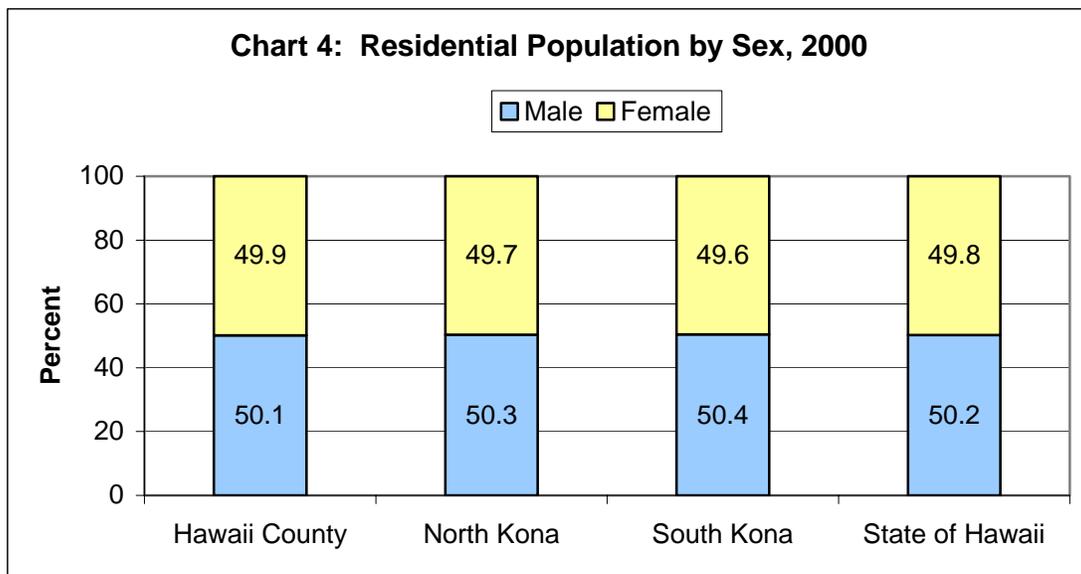
Comparing population density after 1970 up until 2000, North Kona consistently exhibits a significantly higher population density than both South Kona and the County of Hawaii. When the North Kona population boomed, South Kona and the County of Hawaii demonstrated a much smaller increase in population density.

The County anticipates that the island resident population will grow at an annual rate of 2.04 percent between 2005 and 2010, and 2.1 percent between 2010 and 2020. Projected estimates for 2020 indicate an island resident population of 217,718, or an increase of 46 percent over the estimated 2000 population of 148,677.

**1.2. Gender**

*Refer to Chart: (4) Percentage of Residential Population by Sex, 2000.*

For every 100 females in the State of Hawaii there are 101.0 males. A similar proportion is found in the City and County of Honolulu (101.1 males per 100 females) and the County of Hawaii (100.4 males per 100 females). Typically, the County of Hawaii and the Kona districts male to female ratio is insignificantly different than the rest of the state.

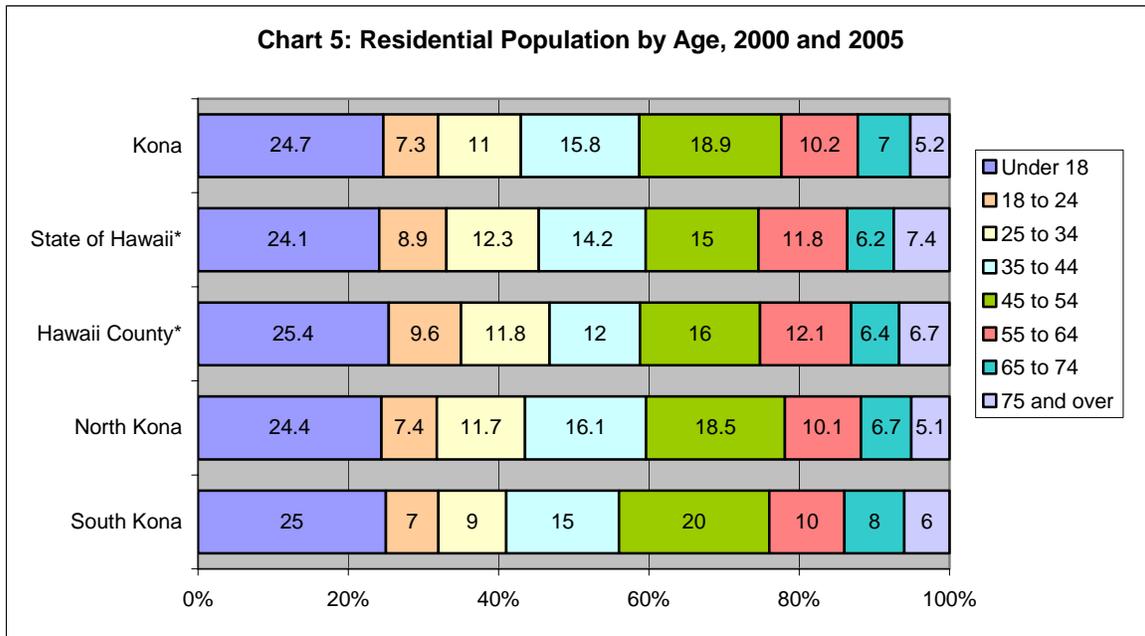


Source: U.S. Census Bureau, Census 2000 Summary File 1

**1.3. Age**

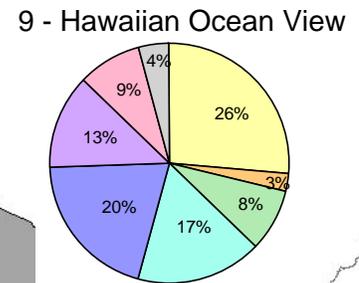
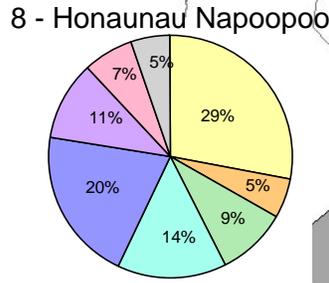
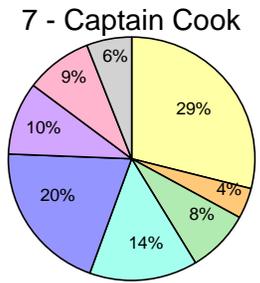
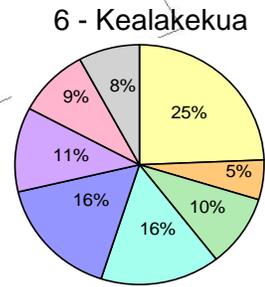
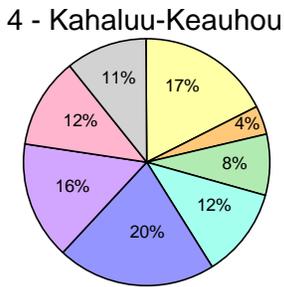
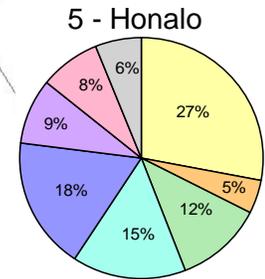
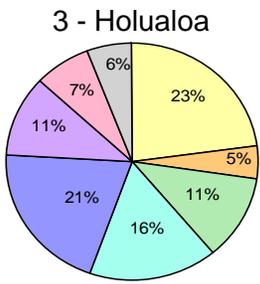
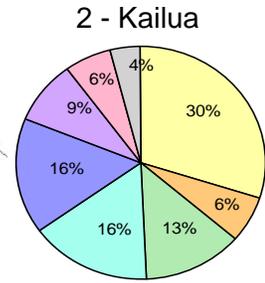
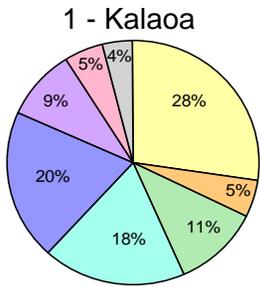
*Refer to Charts: (5) Residential Population by Age, 2000 and 2005. Refer to Figure: (1) Age, 2000 CDP.*

The 2000 median age within the State of Hawaii and the City and County of Honolulu was 36.2 and 35.7 years, respectively. Compared to Honolulu and the State, the County of Hawaii is somewhat older with a median age of 38 years. The median age in Kona is more similar to the County of Hawaii at 38.5 years. Of the Kona Census Designated Places (CDP), in 2000, Kailua had the youngest median age at 35.5. Kailua also has the highest percent (49 percent) of residents under the age of 35, whereas Kahaluu-Keauhou has the lowest proportion (39 percent) of residents under 35 years and highest proportion of residents over the age of 54 (39 percent) (Figure 1). South Kona is slightly older than North Kona as the median age of residents is 40.4. Although Kona is one of the fastest growing districts in the State, it is typically made up of an older population. Not only does this raise concern over economic issues related to long-term growth, but an older population also puts greater emphasis on retirement and elderly programs and assistance, which refocuses attention away from youth-related programs.



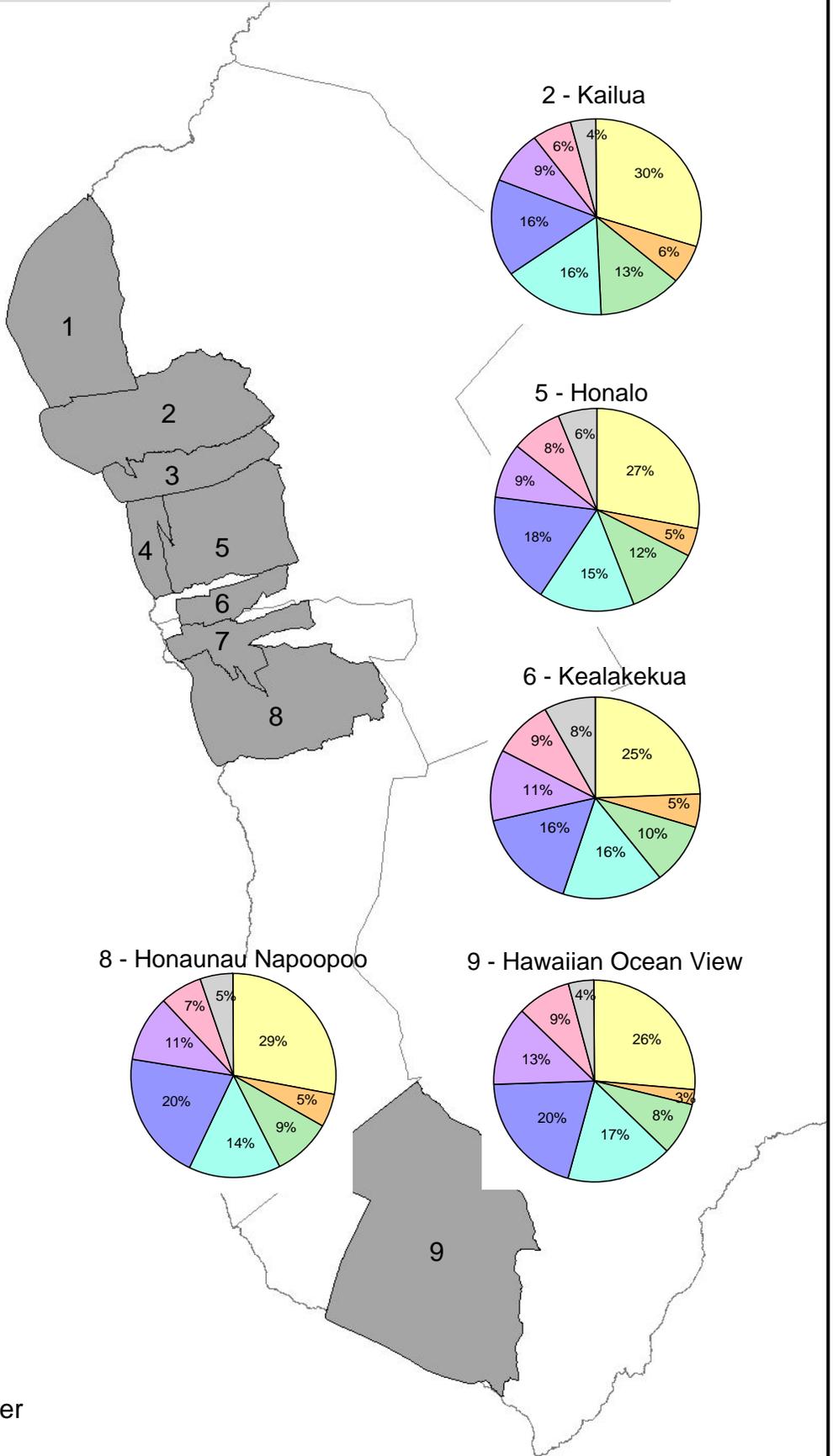
Source: U.S. Census Bureau, Census 2000 Summary File 1 and 2005 and \*2005 American Community Survey

# Figure 1: Age, 2000 CDP



**Legend**

- |          |             |
|----------|-------------|
| Under 19 | 45 to 54    |
| 20 to 24 | 55 to 64    |
| 25 to 34 | 65 to 74    |
| 35 to 44 | 75 or older |



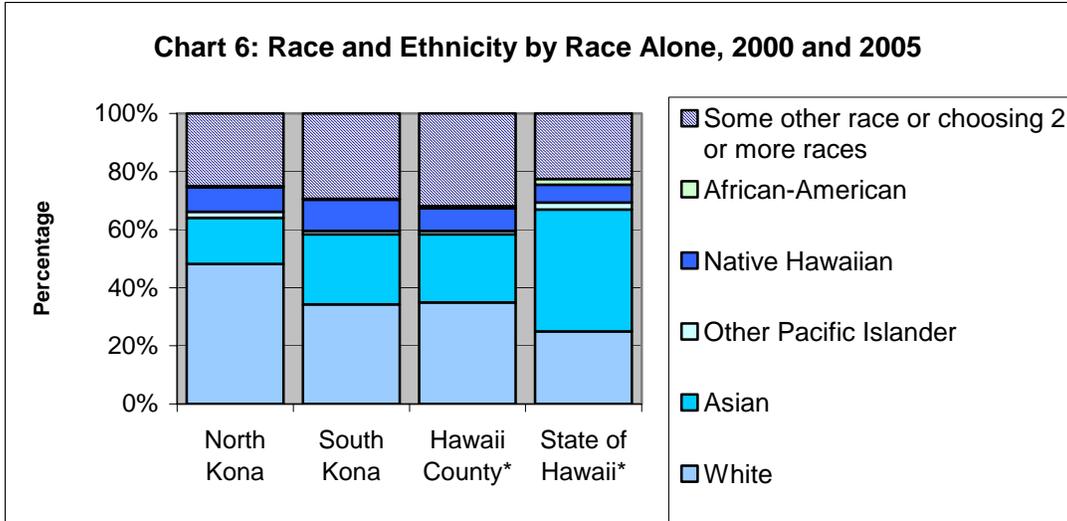
#### **1.4. Race and Ethnicity**

*Refer to Charts: (6) Race and Ethnicity by race alone, 2000 and 2005, and (7) Kona Residential Population by Race Alone, 2000. Refer to Figures: (2) Race Alone, 2000 CDP, and (3) Race Alone, 1990 to 2000 CDP Comparison.*

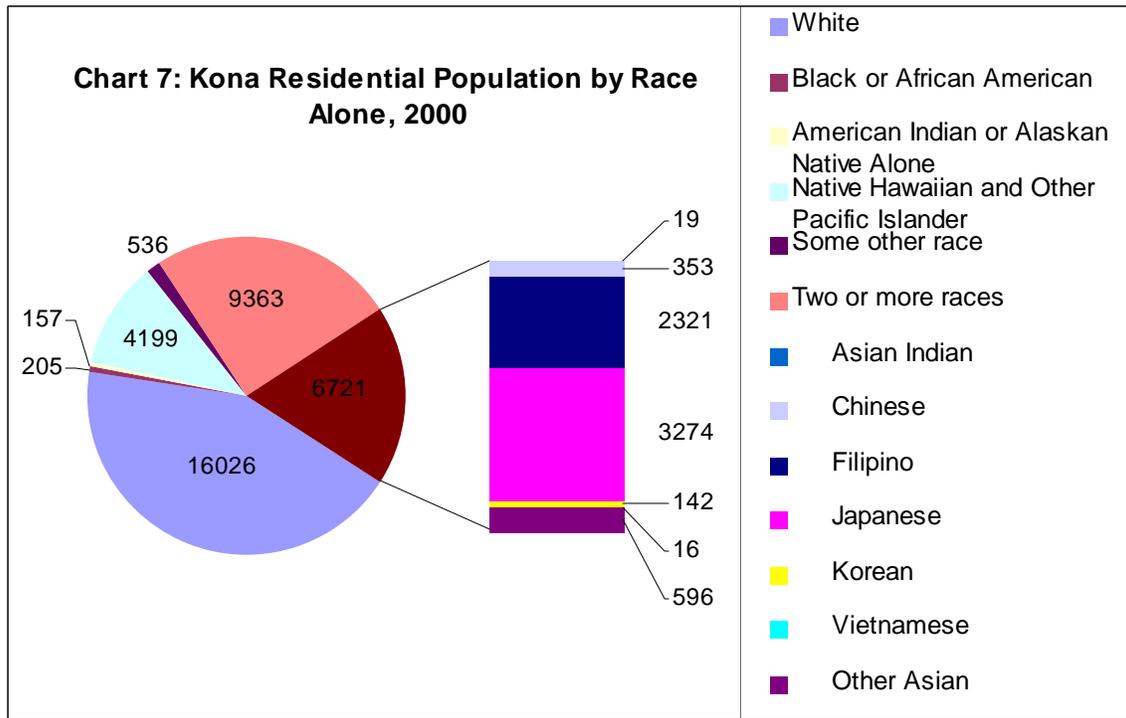
The State of Hawaii has one of the most ethnically diverse populations in the nation. Compiling data categorized as Residential Population, Race Alone, published by the 2005 American Community Survey, approximately 79.0 percent of the State of Hawaii chose to be described as only one race. Of those that chose one race, approximately 42.0 percent of the state population as a whole consider themselves Asian, 24.9 percent Caucasian, and 6.1 percent Native Hawaiian. Within the County of Hawaii, 70.4 percent of the population chose to be identified as only one race. Compared to the entire population, approximately 34.9 percent of the residents consider themselves to be Caucasian, 23.5 percent Asian, and 7.8 percent Native Hawaiian. The County of Hawaii has a much higher proportion of Caucasians and a lower proportion of Asians than the rest of the state. There is also a slightly higher proportion of Native Hawaiians in Kona than the State, and a higher proportion of Hawaiian's living in South Kona than North Kona.

Examining the break down of ethnicity from the State, County, District to sub-District levels, there are greater similarities in the proportion of race and ethnicity between South Kona and the County of Hawaii, than found in North Kona. North Kona has a larger Caucasian population and smaller Asian population than other areas throughout the state, which can be attributed to the changing economic interests of the region. With the weakening agricultural industry, laborers who were of both Asian and Caucasian decent moved away, and the visitor industry began to grow, creating the demographic transitions that we see today.

Each of the nine CDPs delineated in the Kona region has a higher proportion of Caucasian residents than the State of Hawaii (Figure 2), Kahuluu-Keauhou has the highest proportion (66 percent) and Kealakekua has the lowest (25 percent). The Kealakekua population has the highest percentage (36 percent) of Asians in Kona. The greatest proportion of Native Hawaiians and Pacific islanders reside in Honaunau-Napoopoo (14 percent) and Kailua (13 percent). The 2000 Census Data was the first time that persons could identify themselves as two or more races. This change in data reporting has created discrepancies when comparing race and ethnicity between 1990 and 2000 as the percentiles of each race declined and the category for two or more races increased (Figure 3). The greatest race and ethnicity differences between 1990 and 2000 occur for persons of Asian ethnicity.

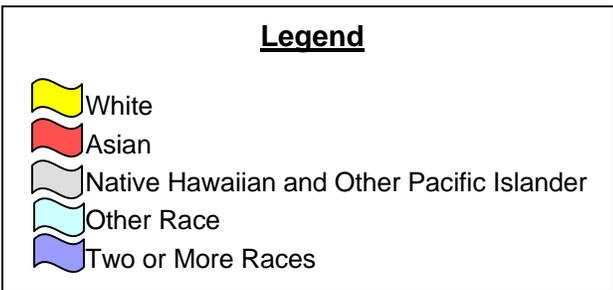
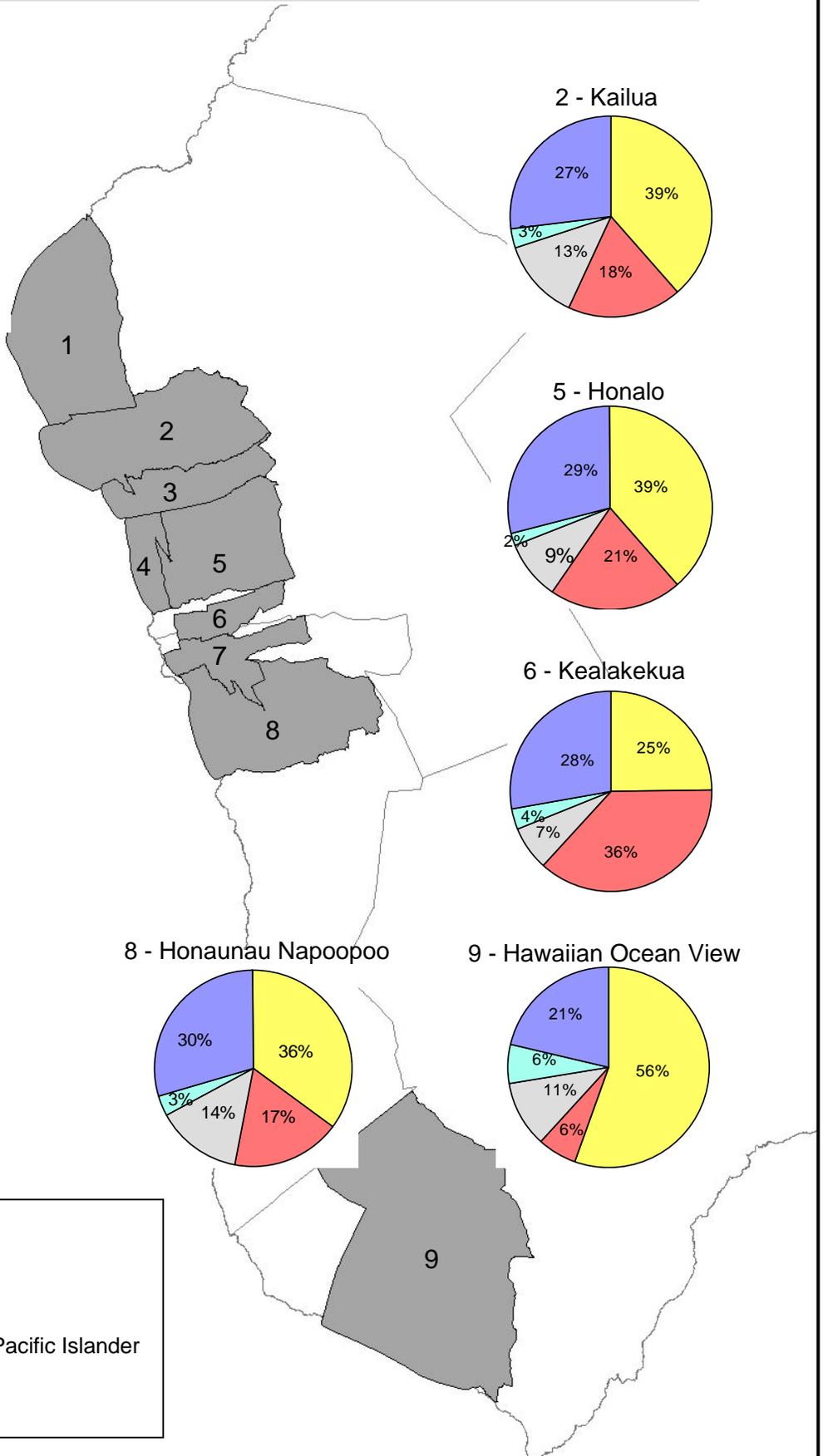
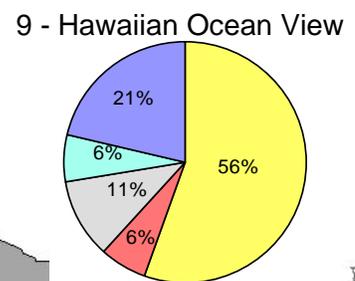
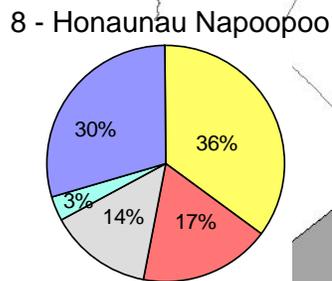
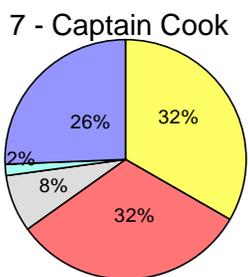
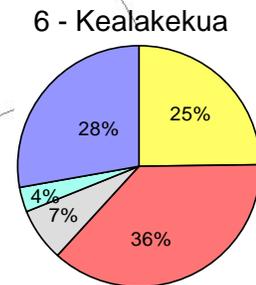
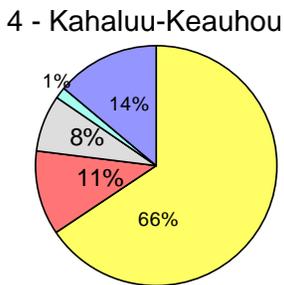
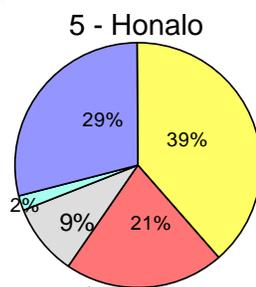
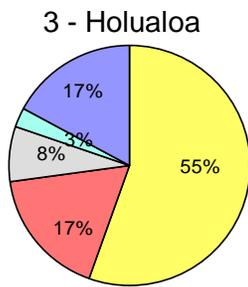
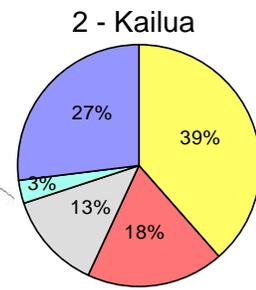
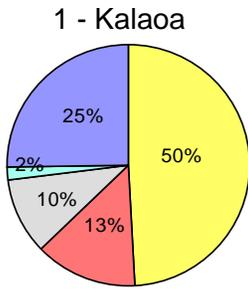


Source: U.S. Census Bureau, Census 2000 and \*2005 American Community Survey

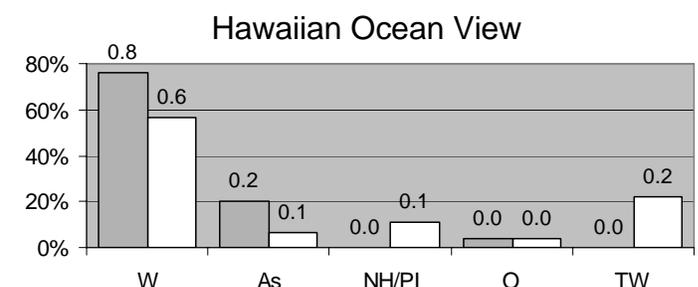
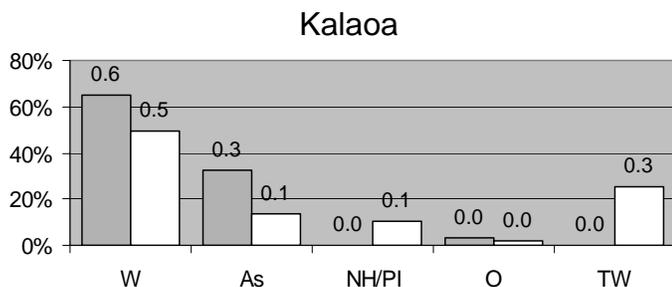
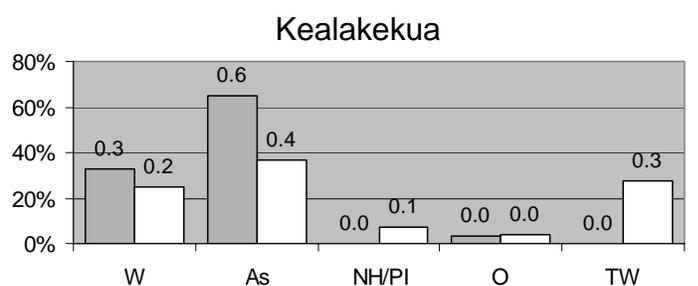
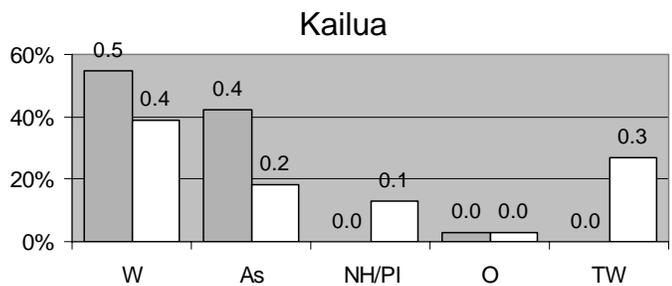
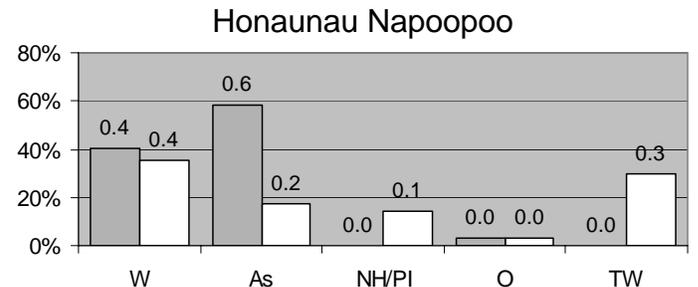
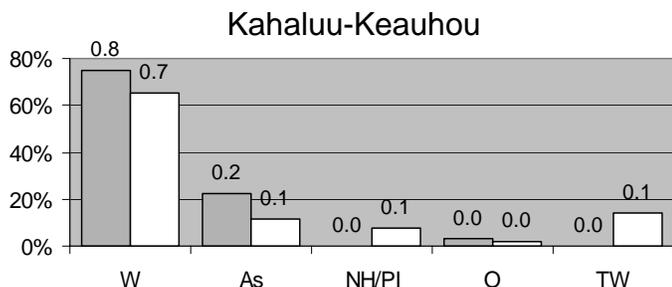
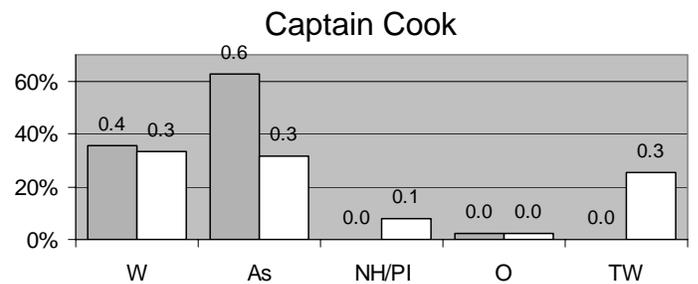
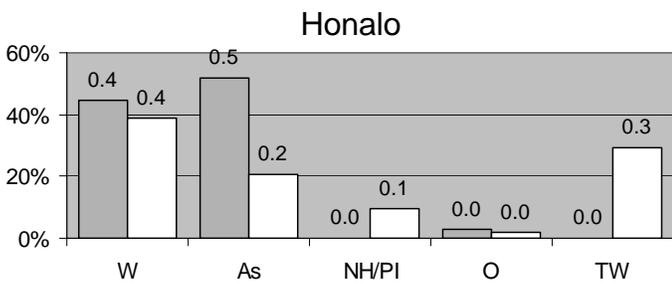
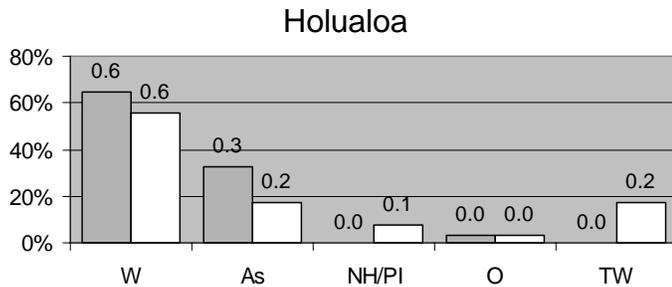
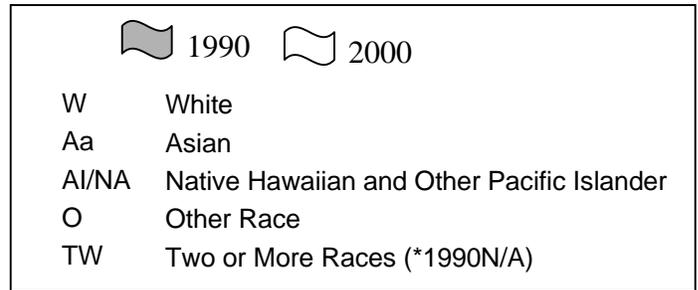


Source: County of Hawaii Data Book, 2004

# Figure 2: Race Alone, 2000 CDP



# Figure 3: Race alone, 1990-2000 CDP Comparison



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## 2. Economy

The economy of the County of Hawaii has experienced significant changes over the past three decades. Sugar cultivation was the leading agricultural activity during the 1970s and early 1980s. However, during the latter half of the 1980s and throughout the 1990s, the industry declined and eventually saw its demise. Tourism replaced sugar as the County's primary economic generator during the mid-1980s and saw its peak visitor arrival numbers in 1989 and 2005. Since 1990, external factors such as the Asian economic crisis, the Persian Gulf War, and a brief economic downturn in the U.S. Mainland after 9/11 have contributed toward the State's protracted economic doldrum. Nevertheless, the County successfully attracts several world-class events such as the Ironman World Championship in Kailua, PGA Seniors MasterCard Tournament of Champions at the Hualalai Resort and Golf Course in North Kona, and Hawaiian International Billfish Tournament in Kailua. The county also saw the completion of several major projects and renovations including the 243-room Four Seasons Hualalai Resort in North Kona and its second championship golf course (County of Hawaii, 2005: 2-2). In 2006, Travel and Leisure Magazine voted the Four Seasons Hualalai Resort as one of the top 500 greatest hotels of the year. To maintain its facilities, Hualalai Resort employs a total of approximately 1,700 part- and full-time employees, many of who live in North and South Kona (Personal Communication, HR, 2006).

Hawaii's economy is healthy, which is demonstrated through the state's low unemployment rate, visitor industry growth, high hotel occupancy and busy construction industry. Throughout 2006, Hawaii County continued to share in the statewide economic expansion. Taxable value in the County has risen a remarkable 14.5 percent per year since fiscal 2001 (Honolulu Advertiser, 2006). University of Hawaii Economic Research Organization (UHERO) forecasts five percent inflation in 2006--DBEDT predicts a 4.8 percent and 3.4 percent inflation in 2007 (Pacific Business News, 2006). However, for the first time in a decade, 2006 is showed signs of a slowing construction industry. UHERO predicts that in 2007, construction employment will be flat and decline slightly in 2008 (Pacific Business News, 2006).

Tourism continues to be healthy, especially in the cruise ship market and the labor market (First Hawaiian Bank, 2006). Within the past forty years, tourism has emerged as the primary economic activity on the island of Hawaii. Employment opportunities spurred by the growth of this industry has been the catalyst for economic growth in the County. As tourism became the primary economic generator during the 1980s, a shift in employment from the non-service to the service industry sector was evident. From 1982 to 1990, visitor arrivals grew at an average annual rate of 5.66 per cent (County of Hawaii, 2005: 2-6). The following decade, between 1990 and 2000, visitor arrivals increased 29 percent (Hawaii County Data Book, 2004 & Department of Research and

Development). The dramatic increase can be attributed to the start of direct international flights to Kona International Airport in 1996 and a rise in the frequency of direct domestic flights. Up to that time, all international visitors transferred through Oahu, thus, were counted as international visitors to the City and County of Honolulu. From 2000 and 2005, visitor arrival in the County of Hawaii increased 20 percent with the all time high visitor arrival count in 2005 (DBEDT, 2005).

Hawaii County showed positive wage and salary job growth from 2005 to the third quarter of 2006, the highest growth among all counties (DBEDT, 2006). While there are opportunities for expansion into new and existing industries such as astronomy, high technology, renewable energy, health and wellness, agricultural and eco-tourism, and diversified agriculture and aquaculture, external factors such as the world economies impact the County economy. However, the State and County's continuing support of research and development of emerging fields will ensure a promising future for the island's economy and its residents (County of Hawaii, 2005: 1-7).

## **2.1. Employment**

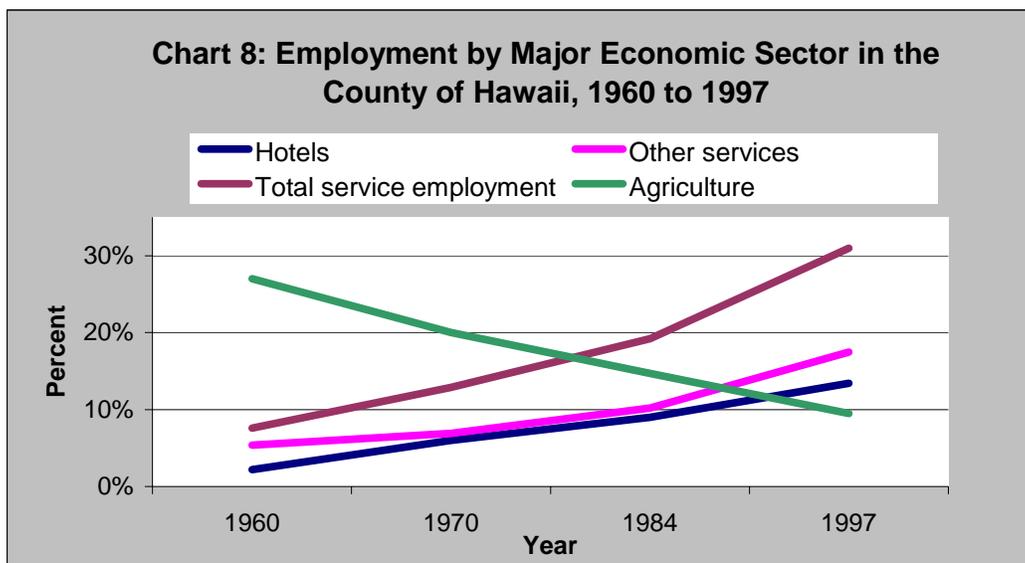
*Refer to Chart: (8) Employment by Major Economic Sector in the County of Hawaii, 1960 to 1997. Refer to Figures: (4) Labor Force, 1990 to 2000 CDP Comparison, (5) Civilian Labor Force, 2000 CDP, (6) Class of Workers, 2000 CDP, (7) Occupations, 1990 to 2000 CDP Comparison, and (8) Occupations, 2000 CDP,*

The growth of Hawaii County in terms of employment, population, income and economic activity during recent years has been more closely tied to the visitor industry than any other sector of the economy. Employment opportunities spurred by the growth of this industry has been the catalyst for economic growth in the County. According to statistics from the State Department of Labor and Industrial Relations, employment trends in the County of Hawaii have shifted from the non-service industry to a dominant service industry. Employment opportunities on the Island have increased by over 22,700 jobs from 1970 through 1997. The 1980s saw employment grow at an annual compounded rate of three percent as service industries (wholesale/retail trade, finance, hotels, etc.) accounted for approximately 61 percent of the private industry workforce and 49 percent of the total wages earned. In 1980, employment within the County totaled 40,850 on a population base of 92,053 residents. In 1990, employment increased to 55,200 on a population base of 120,317. From 1990 to 1997, employment grew at an annual compounded rate of only 1.61 percent, a reflection of the County's recessionary economy during this period.

Employment in secondary industries also expanded, while the largest employment decrease was in the sugar industry as the last sugar processing facility closed in 1997. By 1997, the service industries dominated the private industry, accounting for approximately 79 percent of the total workforce and 74 percent of the total wages earned. Comparing the 1990 and 2000 civilian labor

force, there has been a general decline in the proportion of person 16 years and older in the labor force (Figure 4). The 2005 Hawaii County population was 164,437 with an employment base of 79,218 (2005 American Community Survey, Hawaii County). Total employment on the island has risen an average of 3.1 percent from 1995 to 2005 (Honolulu Advertiser, 2006).

Employment levels continue the strong growth, which began in 2005 at rates not seen since 1990. From 2005 to the third quarter of 2006, all counties showed positive wage and salary job growth with Hawaii County having the highest growth (DBEDT, 2006), expanding jobs by four percent (UHERO, 2006). In the third quarter of 2006, 635,950 people were employed in the state, an increase of 2.6 percent from the third quarter of 2005. During this same period, Hawaii County also added two thousand wage and salary jobs, a 3.1 percent increase from the third quarter of 2005. The tourism-related sectors, Retail Trade and Food Services and Drinking Places added four hundred and three hundred jobs, respectively. Natural Resources, Mining and Construction and Government each added three hundred jobs, while Agriculture lost 150 jobs (DBEDT, 2006).



Source: County of Hawaii General Plan, 2005.

Unemployment rates dropped drastically from 1980 to 1990 (6.2 percent to 3.8 percent, respectively) due to the County's strong economy during this period. As the economy slowed during the 1990s, unemployment peaked at 10.2 percent by 1997 (County of Hawaii, 2005: 1-9). As the global economy and tourism began to improve, so did unemployment. The 2000 unemployment rate for the County declined to 4.9 percent. During this time, Holualoa and Kalaoa CDP had the highest employment rates (98 percent), while Hawaiian Ocean View Estates' unemployment rate was significantly higher than the other Kona CDPs (Figure 5). Over half of those residing in the Kona CDP are private wage and salary workers. The greatest proportion of government workers is found in Kealahou and Captain Cook CDP and the greatest proportion of self-employed workers

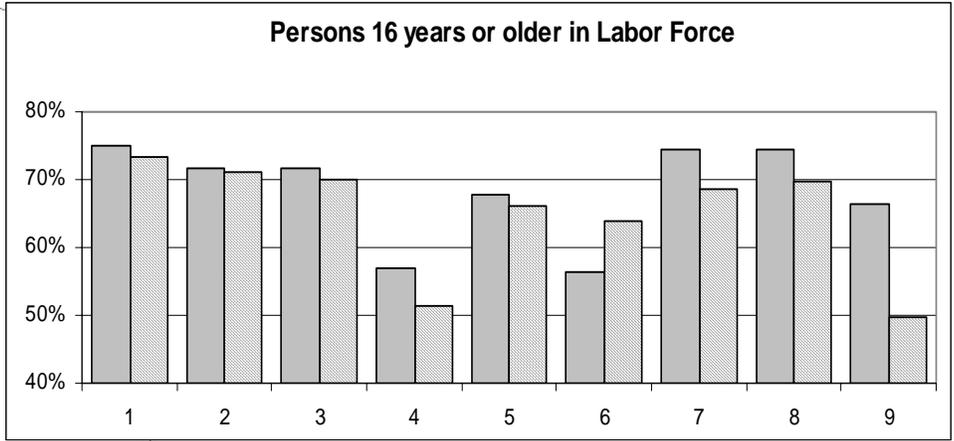
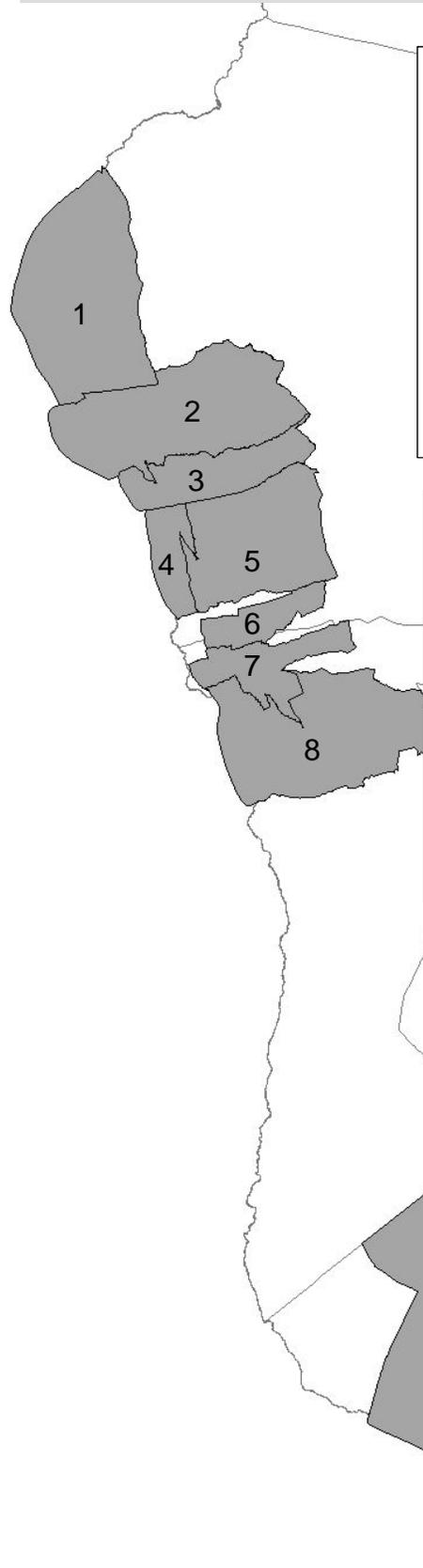
reside in Kahaluu-Keauhou (20 percent) (Figure 6), an area with the highest median incomes and most seasonal and recreational housing unit vacancies. In 2005, the unemployment rate was slightly less at 4.6 percent (2005 American Community Survey).

Since the mid-1980s, the County of Hawaii has seen a dramatic shift in its agricultural employment profile. Since the demise of the sugar industry in 1997, the island of Hawaii has since established itself as the center of diversified agriculture production, scientific research, and education in the State. Agricultural employment will increase significantly as former sugarcane lands are brought into production with import replacement, export and value added crops and products. Additional employment will be derived from expanding agro-tourism enterprises. The expansion of the industry will be facilitated by the establishment of a new air cargo distribution center and post-harvest processing facilities that will allow for significant increases in the volume and types of products exported to the continental United States and foreign countries.

The shift in employment trends has significantly changed the economic make-up of the County as workers have in-migrated to meet the demands of employment growth in the service industry, which is primarily fueled by the tourism sector. Additionally, non-service industry workers, primarily in agriculture, adjusted and shifted to new employment opportunities in the service industries as agricultural jobs dwindled. From 1990 to 2000, management, professional, sales and office occupations in Kona CDPs have generally increased, service occupations have significantly risen, while farming, fishing and forestry occupations have declined except in Kealahou and Hawaiian Ocean View Estates (Figure 7). Approximately seventy-five percent or more of the population residing in Kona CDPs are employed by Management, professional, service, sales and office occupations. Hawaiian Ocean View Estates and Honaunau-Napoopoo are the exception with slightly more than a quarter of residents in labor-related occupations (Figure 8).

Upon completing high school, an increasing proportion of the County's youth have pursued higher education. Despite this trend, there is still scarcity of employment opportunities for the college-educated that desire to return to the island. In the year 2020, the Planning Department anticipates a population of 217,718 with an employment base of 106,492 or 49 percent. Average annual employment growth rates are anticipated at 2.11 percent between 2005 and 2010, and 2.16 percent between 2010 and 2020. These employment projections are below the robust 3.05 percent average annual employment growth rates during the 1980s, but above the 1.61 percent average annual growth rate during the 1990s. (County of Hawaii, 2005: 1-9 and 2-11)

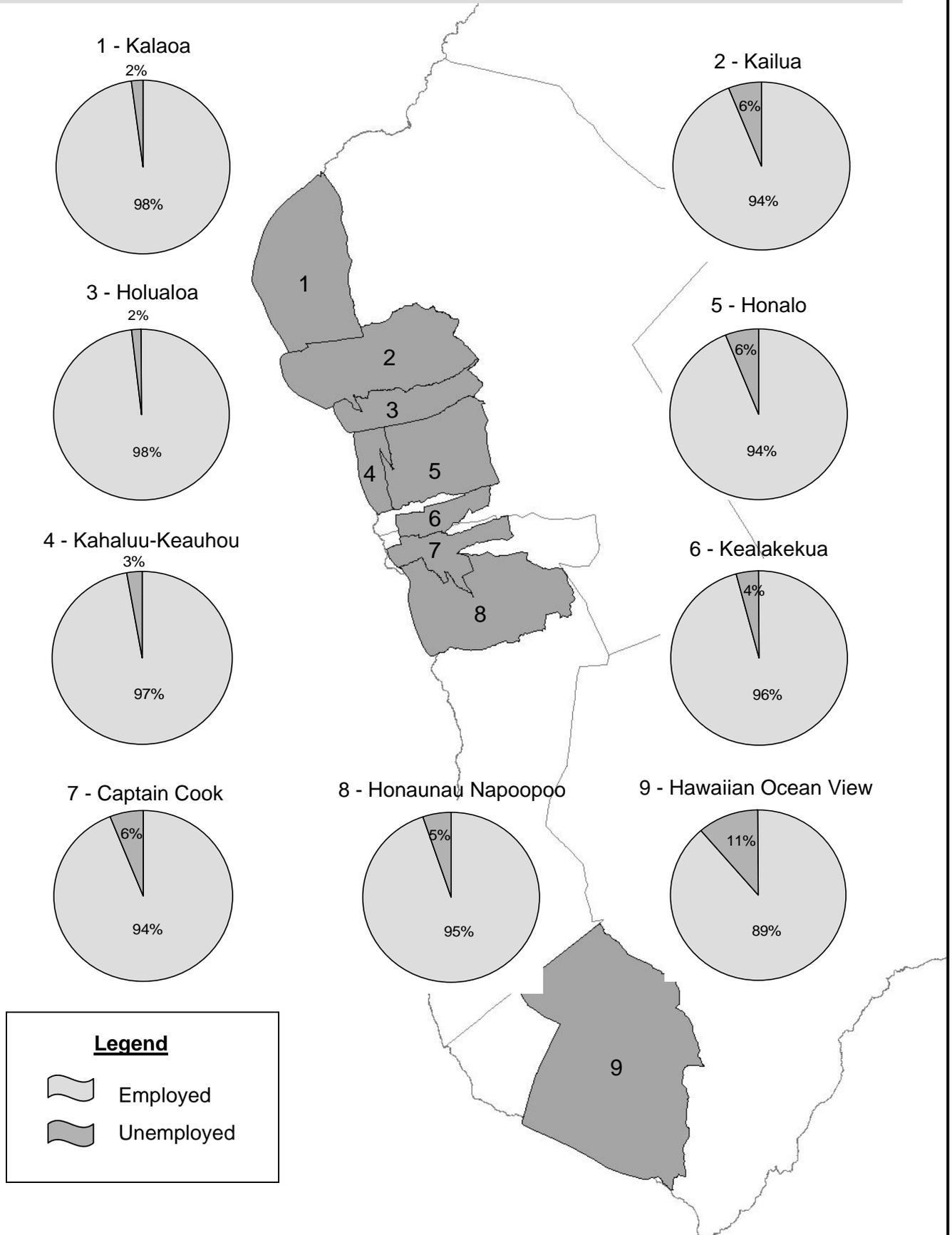
# Figure 4: Labor Force, 1990-2000 CDP Comparison



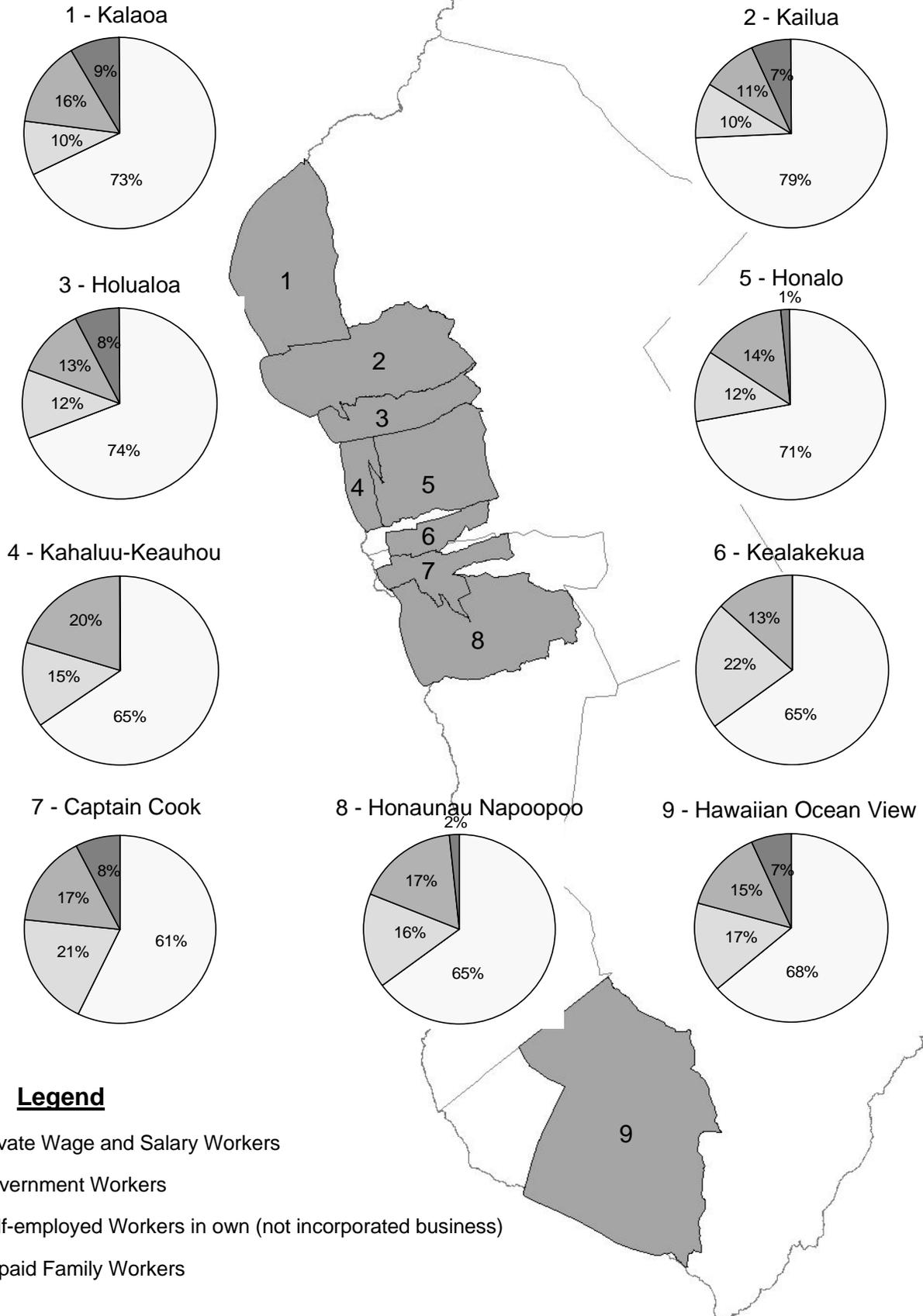
### Legend

- 1990
  - 2000
- |   |                       |
|---|-----------------------|
| 1 | Kalaoa                |
| 2 | Kailua                |
| 3 | Holualoa              |
| 4 | Kahaluu-Keauhou       |
| 5 | Honalo                |
| 6 | Kealahou              |
| 7 | Captain Cook Hawaiian |
| 8 | Honaunau Napoopoo     |
| 9 | Hawaiian Ocean View   |

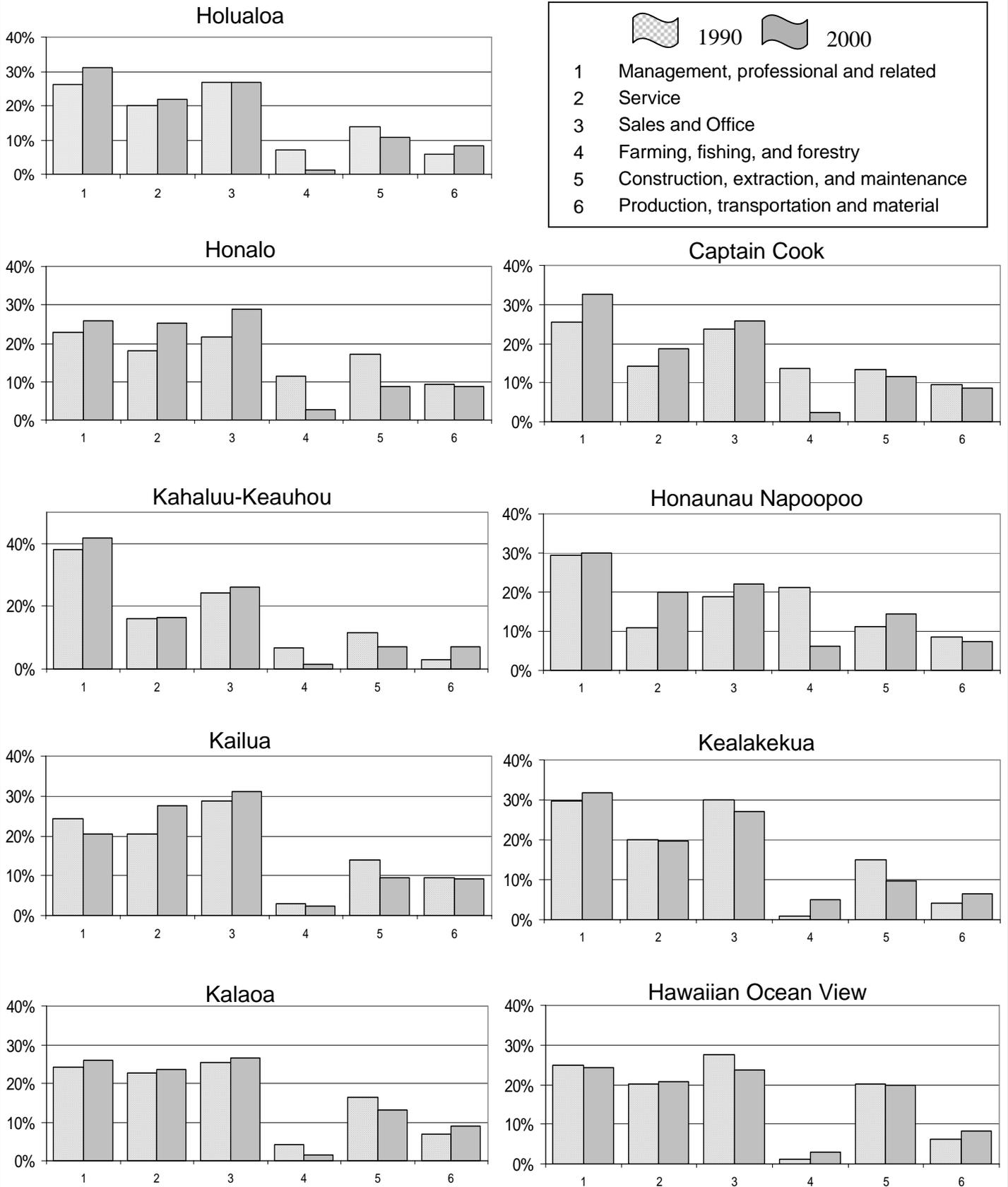
# Figure 5: Civilian Labor Force, 2000 CDP



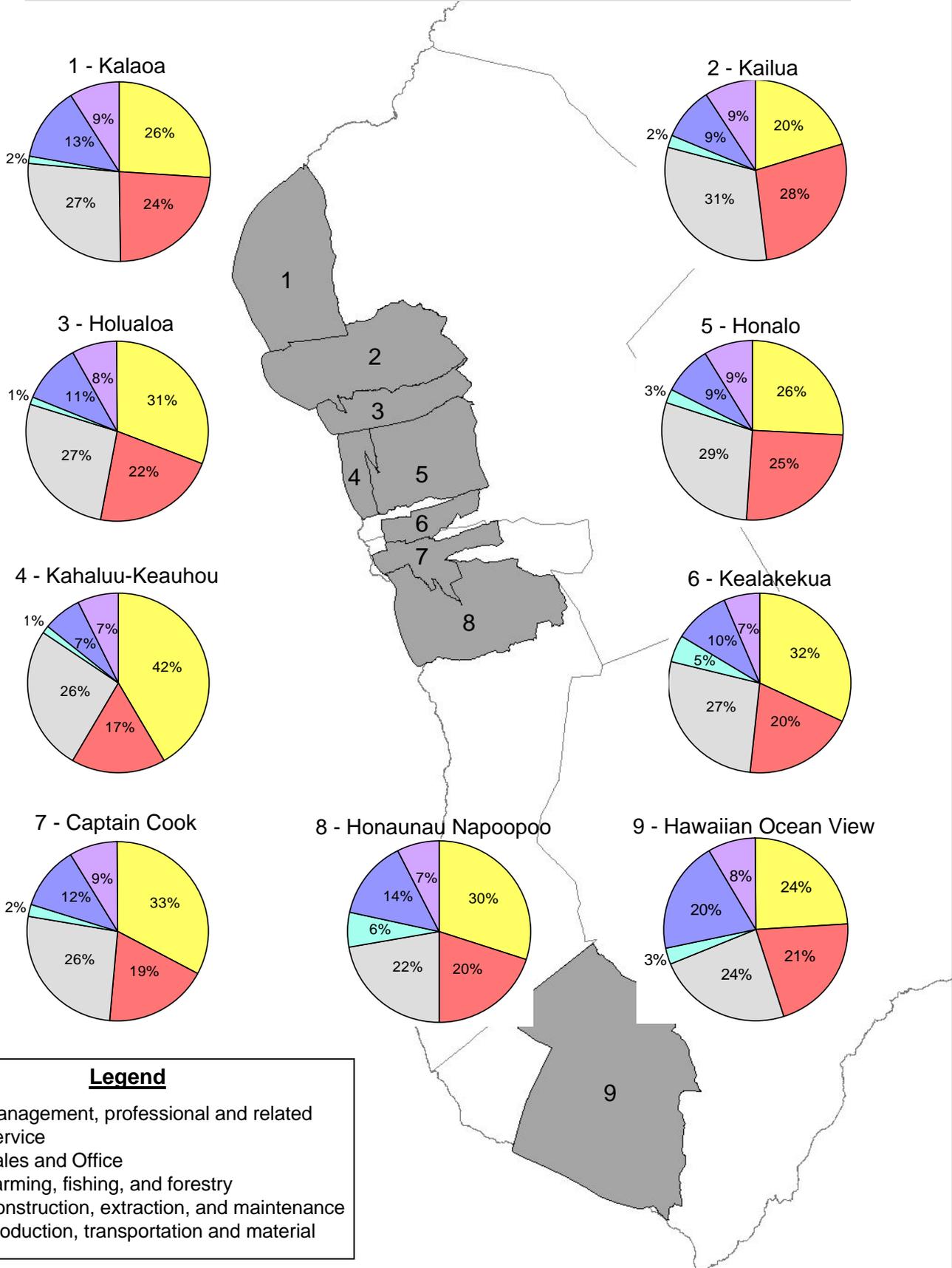
# Figure 6: Class of Workers, 2000 CDP



# Figure 7: Occupation, 1990-2000 CDP Comparison



# Figure 8: Occupation, 2000 CDP

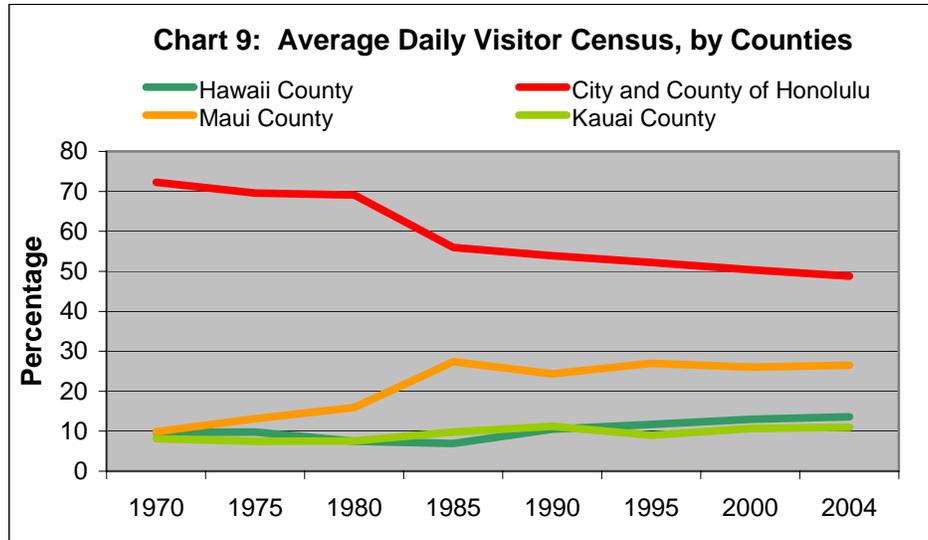


## **2.2. Tourism and Visitors**

*Refer to Charts: (9) Average Daily Visitor Census, by Counties; (10) Total Number of Passengers (Enplaned and Deplaned) at Kona International Airport; (11) Domestic Visitors to Kona, 1990 to 2004, and (12) Accommodation Characteristics of Visitors to Kona, 2004.*

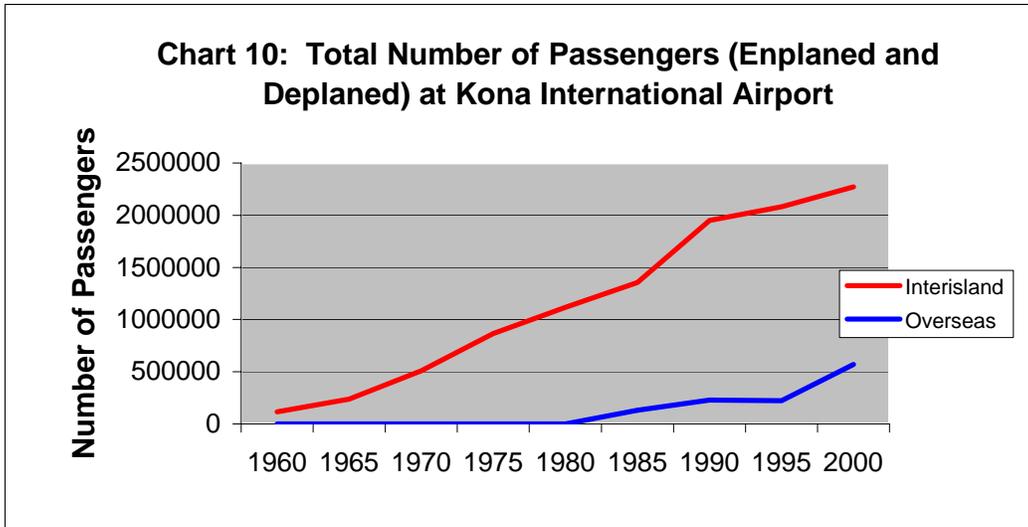
During the 1970s, the majority of visitors to Hawaii traveled to Oahu. This visitor pattern began to shift beginning 1980, as visitors began making their way to the island of Maui. The number of visitors to other neighbor islands have not caught up to Maui or Oahu, yet, the proportion of visitors to the Island of Hawaii during the last 20 years have steadily increased with less than a ten percent fluctuation at any given time. In recent years, total visitor growth has steadied, reaching a more normal range. In the first nine months of 2006, after 2005's surge of 16 percent, visitor growth increased approximately 5.8 percent for Hawaii County (First Hawaiian Bank, 2006). Between 2005 and 2006, the number of domestic visitors to the island increased 2.4 percent, while international visitor arrivals increased 6.2 percent (Department of Research and Development, 2006). During 2005, total visitor spending grew almost 17 percent. The state's strength is still concentrated on the U.S. domestic side, which is up 2.2 in the first ten months of 2006, while international visitors are down 5.4 percent (First Hawaiian Bank, 2006). The October 2006 earthquake had only a short-term impact on visitor activity for that month. Numbers suggest visitors who were unable to fly on the day of the earthquake as planned flew to Hawaii later in the week (Pacific Business News, 2006). According to the statistics, more tourists traveled to and spent money in the neighbor islands during the month of October. During that month, visitor spending in Hawaii County rose 15.9 percent compared to October 2005. Thus, the visitor industry is optimistic that the tourism economy will continue to remain strong.

The principal visitor destination area of the Island of Hawaii is the South Kohala-North Kona region with the single most popular attraction being Hawaii Volcanoes National Park. The island continues to attract substantial investor interest in the visitor industry. Various resort and resort-residential complexes are planned for construction or currently under construction, while several hotels have changed hands recently, with the potential for future upgrades. Most of these developments are concentrated in West Hawaii, which continues to accommodate the majority of the visitor market within the County. (County of Hawaii, 2005: 2-6)

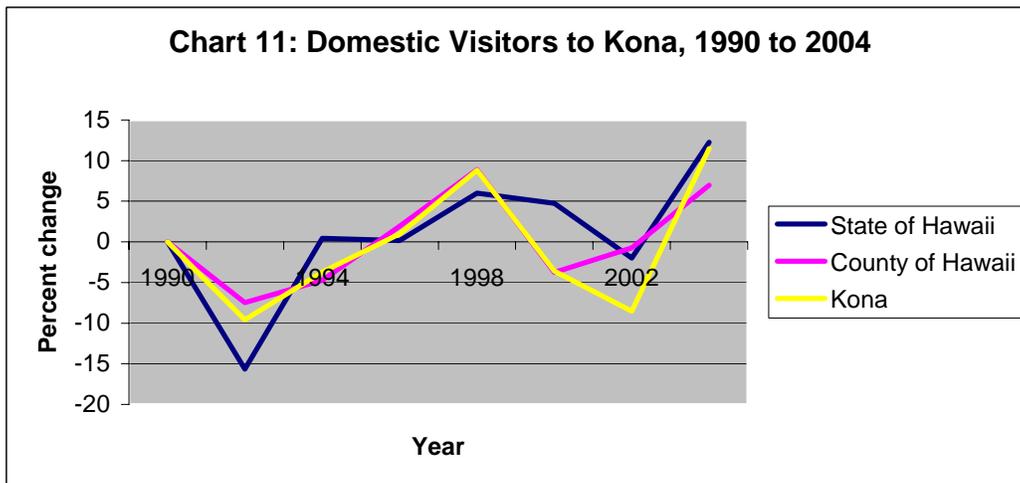


Source: County of Hawaii Data Book, 1984, 1998, and 2004

The annual number of visitors to the island is dependent on several factors ranging from the state of the economy, vacation trends affected by the promotion of Hawaii and other international destinations, to issues of national security. The number of domestic visitors to the State, County of Hawaii, and Kona has dramatically fluctuated throughout the last 15 years. The visitor rates were also affected by the weakening Japanese market, 9/11, the Severe Acute Respiratory Syndrome (SARS) epidemic, and a slowing U.S. economy. Domestic visitor arrivals to Hawaii County increased 8.8 percent from 1995 to 2000. During the same period, due to the start of direct international flights in 1996, international visitor arrivals increased 40.8 percent (County of Hawaii Data Book, 2004). Between 2000 and 2004, both domestic and international arrivals leveled, increasing at a more sustainable rate of 5.4 and 11.4 percent, respectively. However, 2005 had the greatest visitor arrival as 1,285,248 visitors arrived at Kona International Airport, a 19.8 percent difference from 2004 (State Data Book, 2005). The number of private jets landing at Kona International Airport has been rising steadily since 2001, increasing 71 percent between 2001 and 2005 with 1,173 private jets landing in Kona in 2005 (Nedd, 2006). In 2006, higher-than-expected crude petroleum prices undermined earlier forecasts of tourism growth. However, Big Isle tourism remains healthy. The first eight months of 2006 shows Hawaii Island's arrival rates up 5.8 percent, compared to the 18.8 percent surge in 2005 (First Hawaiian Bank, 2006).



Source: County of Hawaii Data Book, 2004

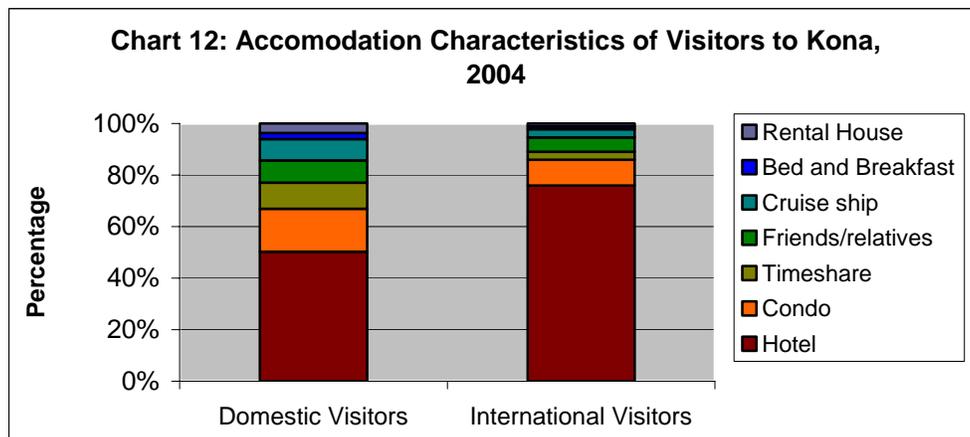


Source: County of Hawaii Data Book, 2004

Historically, the County records the lowest visitor unit occupancy rates of all the major Hawaiian Islands. Bed and breakfast units, although not a significant part of the total visitor unit count for the County, have been the fastest growing segment of the industry, growing from 55 units in 1990 to 171 units in 1998. Only in 1998 did the County’s occupancy rate finally surpass that of Kauai (County of Hawaii, 2005: 2-7). During the period of 1980 to 1998, six new resort properties were developed for a total of 900 visitor units, including the completion of the 243-unit Hualalai Resort at Kaupulehu in North Kona and the 263-time share unit Kona Coast Resort in Keauhou. North Kona now accounts for over 45 percent of total hotel rooms on the island. As of 2004, visitor accommodation units within Kona totaled 4,144 units in 2004, up from 4,004 units in 1999. More recently, between 2005 and 2006, there was a 0.7 percent decline in hotel/condominium resort occupancy in the County, while the occupancy rate in Kona remained the same. More recently, DBEDT has announced that Hawaii Island attracts the

largest proportion of high-income visitors in the state as 24.7 percent of visitors hold incomes exceeding \$150,000 (Nedd, 2006). Once the major visitor industry area on the island, the North Kona district now shares this distinction with the South Kohala district. The visitor industry in North Kona is expected to grow at a moderate rate. Unlike the North Kona area, the South Kona district has limited accommodations for overnight visitors. There are approximately 88 units located at Captain Cook (Manago Hotel), catering primarily to local business travelers and agricultural workers. Hokulia, a 665-unit agricultural-residential and golf course community with 168 affordable homes is being developed north of Kealahou Bay in South Kona. This development will cater primarily to out-of-state second homebuyers. (County of Hawaii, 2005: 2-29)

Of those visiting Kona from the mainland and overseas, the majority seek hotel accommodations, while approximately 10 to 15 percent prefer condos, which could be attributed to longer stays. Seventy-five percent of international visitors book their stay at hotels, while domestic visitor accommodations vary. Approximately thirty percent of domestic visitors are split between timeshare, friends/relative, or cruise ship accommodations.



Source: County of Hawaii Data Book, 2004

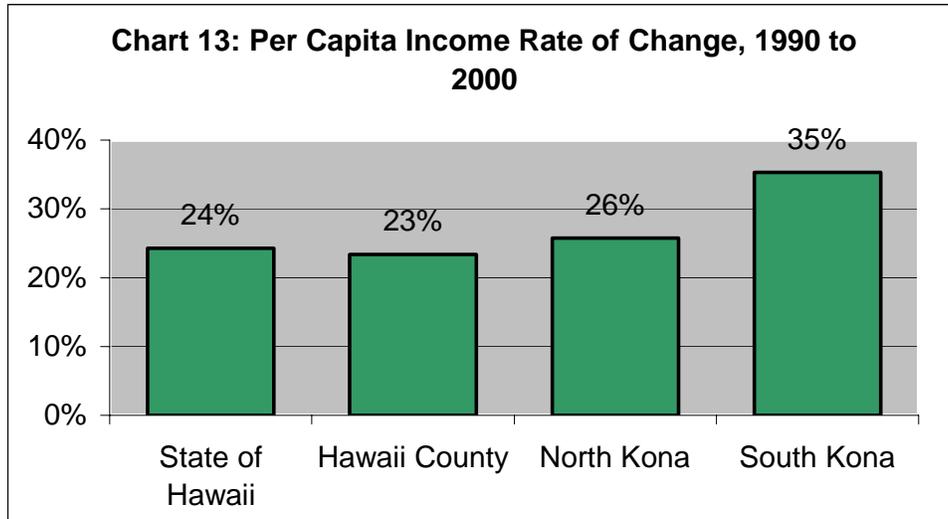
The County’s natural beauty, historical and cultural attributes and its numerous educational institutions and programs create conditions for new niche markets to develop and flourish. Niche markets for the County’s visitor industry, such as eco-tourism, health and wellness tourism and educational tourism, have growth potential. The health and fitness resources of the various luxury hotels look towards health and wellness tourism as one of its target markets. The expansion of tourism should include careful planning to identify, promote and preserve the island’s unique resources. (County of Hawaii, 2005: 1-8)

### **2.3. Income Distribution**

*Refer to Chart: (13) Per Capita Income Rate of Change, 1990 to 2000. Refer to Figures: (9) Income, 1990 to 2000 CDP Comparison, (10) Income, 2000 CDP, (11) Income Comparison, 1990 to 2000 CDP Comparison, and (12) Poverty, 1990 to 2000 CDP Comparison.*

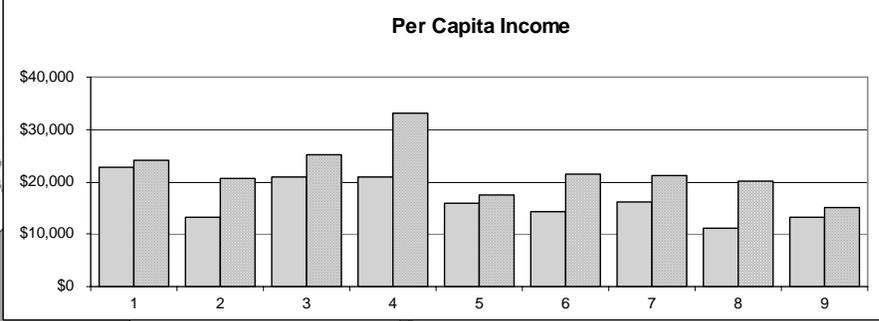
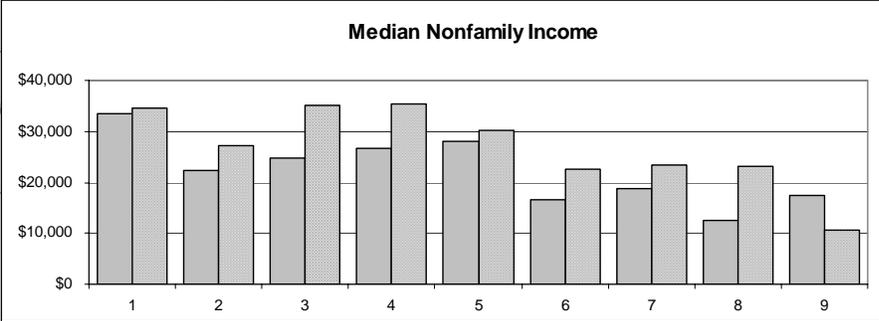
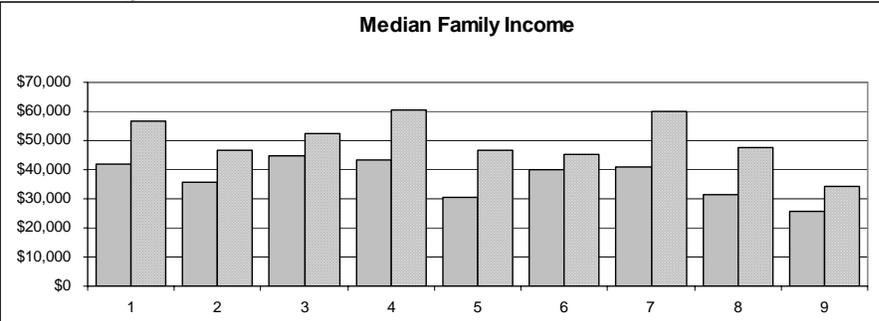
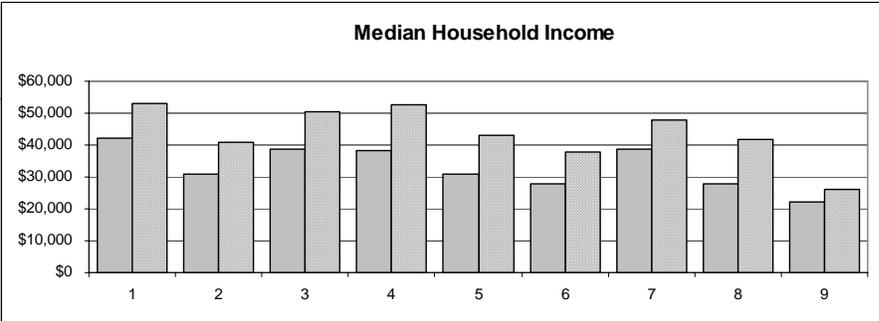
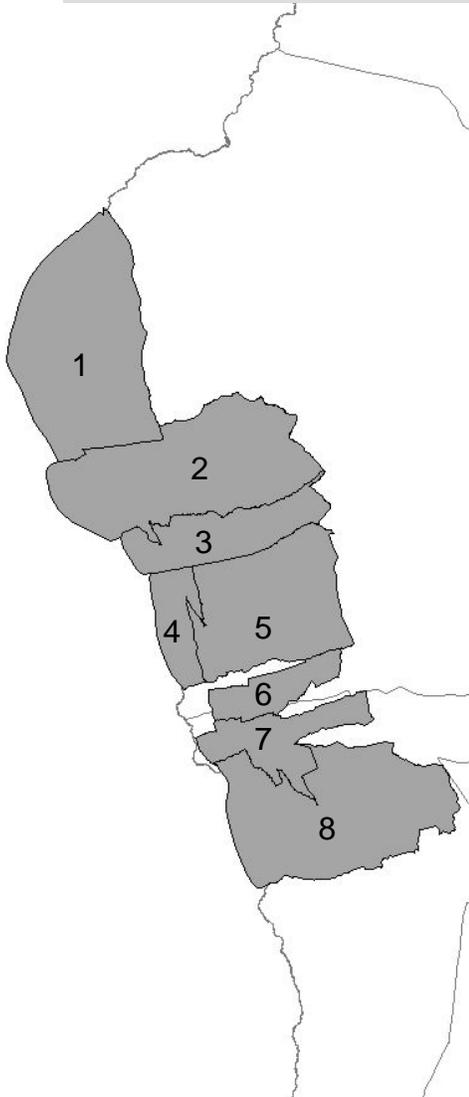
Per capita income in the County grew at an annual compounded rate of 5.18 percent during the 1980s and 2.91 percent through 1996. The increase during the 1980s are reflective of the strong economic conditions that existed at the time with a corresponding decrease in per capita income growth during the recessionary periods of the 1990s. Over a ten-year span, from the 1990 to 2000 census, the per capita rate of the State, County, and Kona districts increased 27 percent. Between 2000 and 2005, the per capita income of the County of Hawaii increased 12.8 percent to \$21,174. Median household income also increased at a healthy rate from 1980 to 1990, increasing at an annual compounded rate of 5.76 percent. Without taking into account inflation, the median household income from 1990 to 2000 increased 33.9 percent. And from 2000 to 2005, the median household income continued to increase at 21.9 percent. (County of Hawaii, 2005: 2-11 and 2005 American Community Survey)

Between 1990 and 2000, each of the nine Kona CDPs reported an increase in median household, family, and per capita incomes (Figure 9). In 2000, Kalaoa, Holualoa, and Kahaluu-Keahou each reported an approximate nineteen percent increase of the population generating incomes greater than a hundred thousand, the highest proportion in Kona (Figure 10). These three CDPs also had the highest median household incomes and median nonfamily incomes of all Kona CDPs. With the exception of Captain Cook and Hawaiian Ocean View Estates, which experienced an increase of incomes less than ten thousand dollars, Kona CDPs experienced a decline of incomes less than fifty thousand, and an increase of higher incomes (Figure 11). Nearly half of all incomes from residents living in Hawaiian Ocean View Estates and slightly over thirty percent of income earners in Honalo and Kealahou generate less than 25 thousand dollars. Between 1990 and 2000, the number of families living in poverty increased for all CDPs except those found in the upper portions of North Kona (Figure 12). The greatest increase of family poverty occurred in areas such as Honalo and Hawaiian Ocean View Estates.



Source: *County of Hawaii Data Book, 2004*

# Figure 9: Income, 1990-2000 CDP Comparison

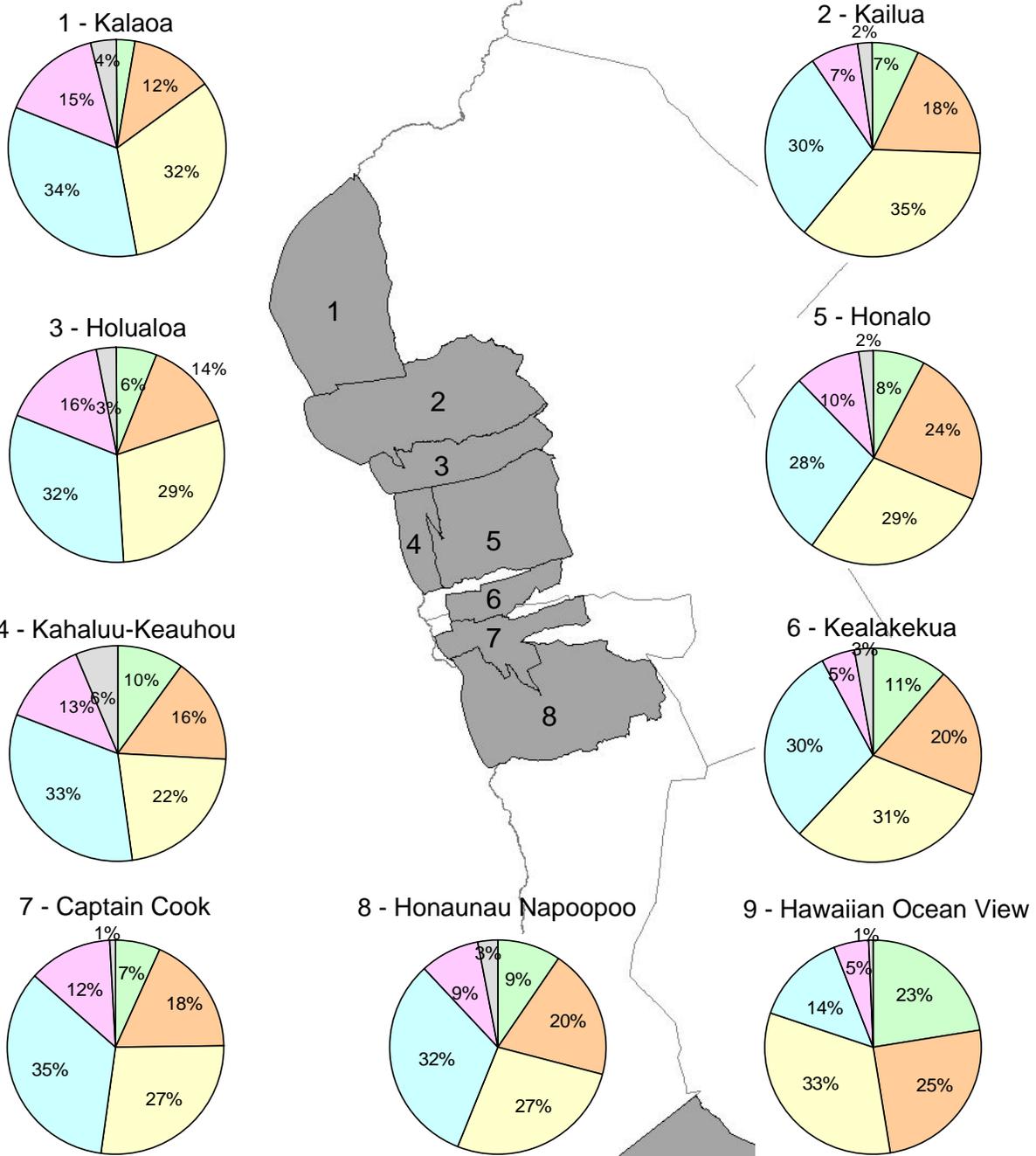


**Legend**

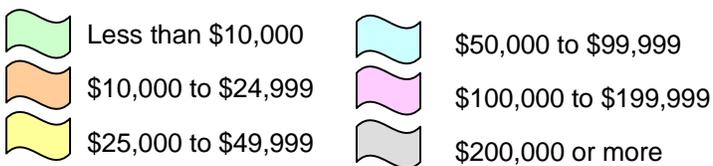
- 1990
- 2000

- 1 Kalaoa
- 2 Kailua
- 3 Holualoa
- 4 Kahaluu-Keauhou
- 5 Honalo
- 6 Kealakekua
- 7 Captain Cook Hawaiian
- 8 Honaunau Napoopoo
- 9 Hawaiian Ocean View

# Figure 10: Income, 2000 CDP

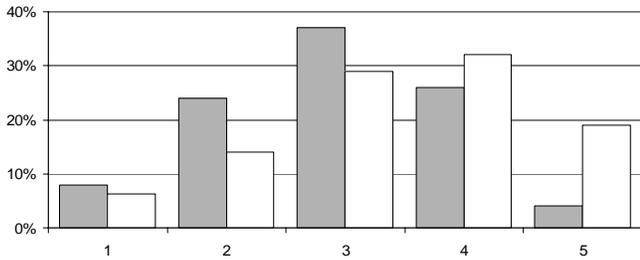


**Legend**



# Figure 11: CDP Income Comparison, 1990-2000

Holualoa

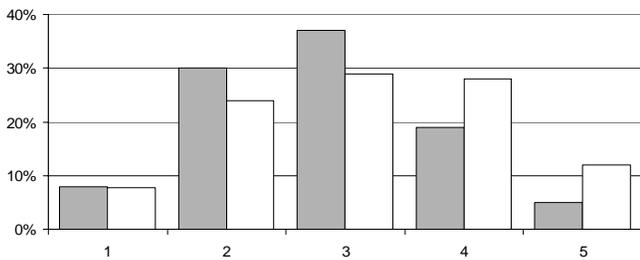


**Legend**

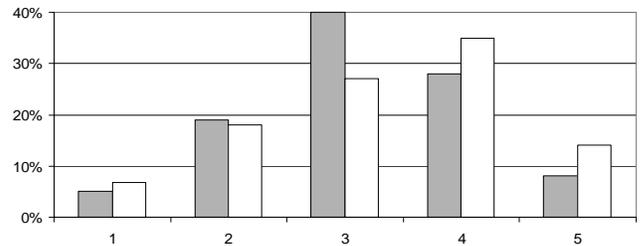
- 1 Less than \$10,000
- 2 \$10,000 to \$24,999
- 3 \$25,000 to \$49,999
- 4 \$50,000 to \$99,999
- 5 \$100,000 and over

1990  
 2000

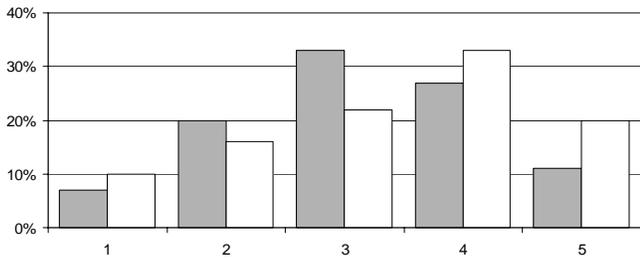
Honalo



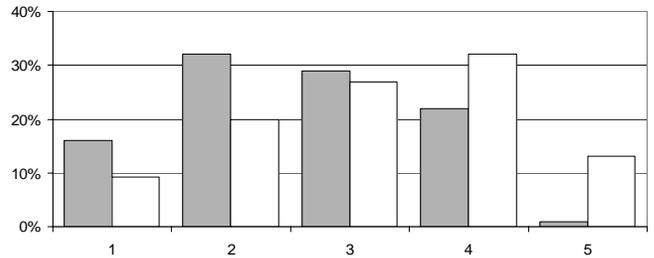
Captain Cook



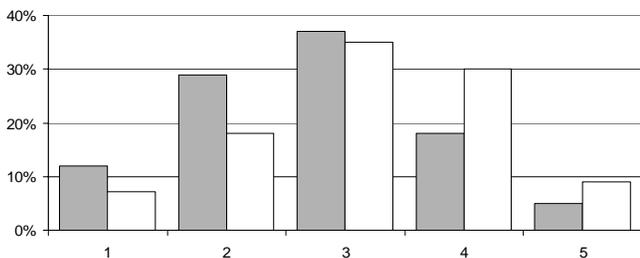
Kahaluu-Keauhou



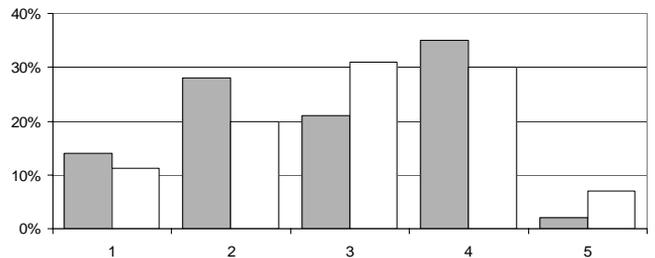
Honaunau Napoopoo



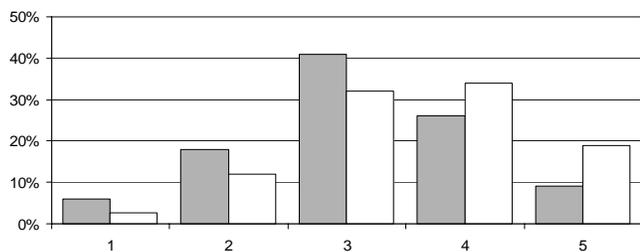
Kailua



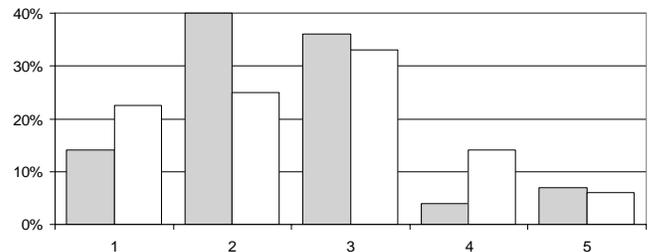
Kealakekua



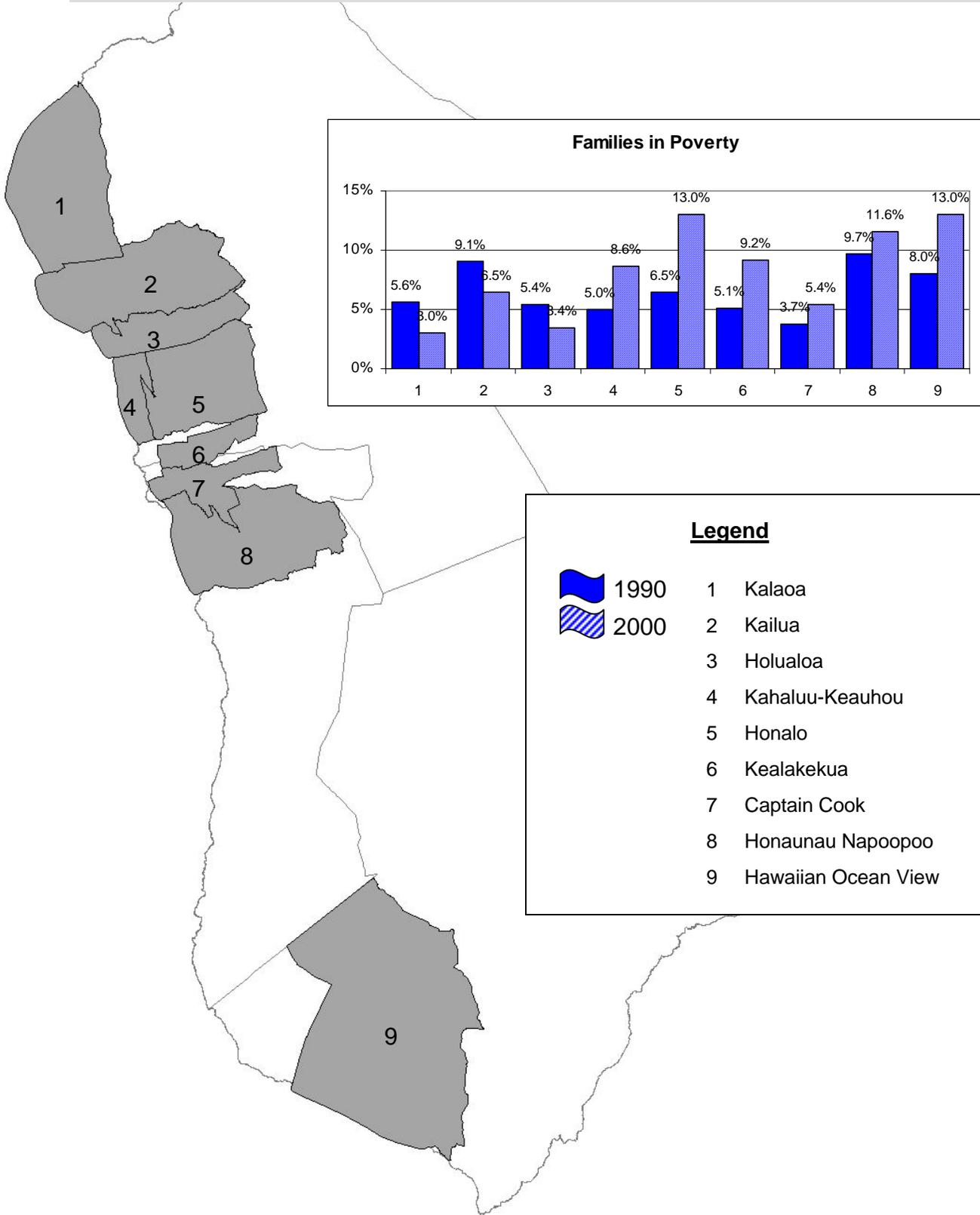
Kalaoa



Hawaiian Ocean View



# Figure 12: Poverty, 1990-2000 CDP Comparison



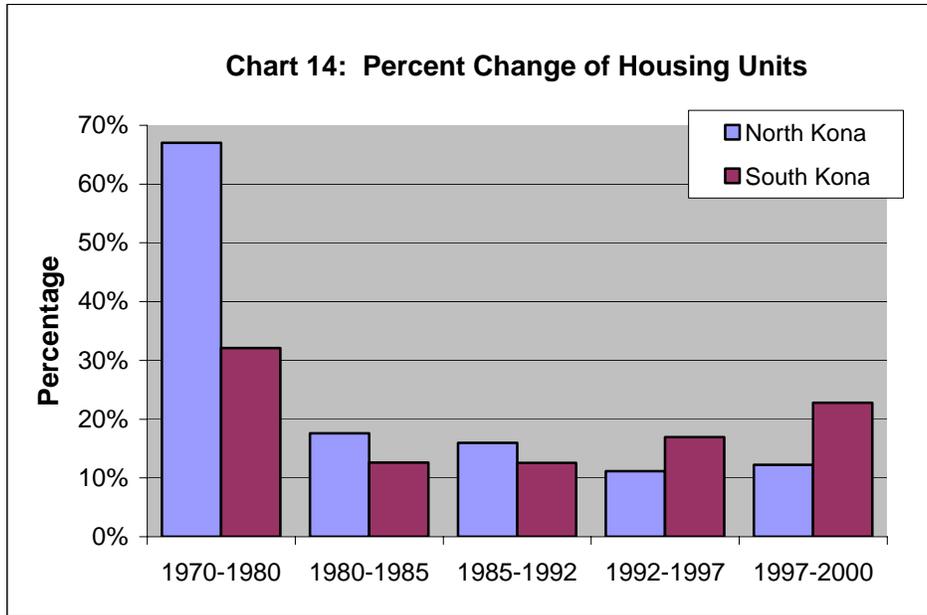
## 2.4. Housing

*Refer to Charts: (14) The Percent Change of Housing Units, (15) Housing Occupancy, 1990 and 2000, and (16) Number of Households. Refer to Figures: (13) Housing Tenure, 2000 CDP, (14) Housing Tenure, 1990 to 2000 CDP Comparison, and (15) Housing Occupancy, 2000 CDP.*

A person's home is not only a place of security and comfort, but allows a person to express his/her individual living styles by providing a place where one can seek a psychological, sociological, economic and aesthetic balance. If the various functions that take place in the home do not meet the individual's needs, a housing problem may exist. (County of Hawaii General Plan, 2005: 9-1)

Several major issues and problems faced by Hawaii County continue to involve housing. Rapid population growth in some areas has not been accompanied by parallel growth in affordable residential housing construction. The increasing rate of land prices, the cost of construction and the growth of earning power contribute to the lack of affordable housing opportunities. Thus, proportionately fewer residents are able to afford purchasing a home. In 1997, SMS Research & Marketing Services and Locations, Inc., in cooperation with the State Housing Finance and Development Corporation (HFDC) and the various Counties' housing agencies, prepared the Hawaii Housing Policy Study Update 1997 that reviewed various housing issues throughout the State of Hawaii. According to the study, a family with a median annual income of approximately \$30,300 would qualify for an "affordable" home priced in the neighborhood of \$140,000, in which case, approximately 36 percent of the total households on the island of Hawaii fall below the median annual income. (County of Hawaii General Plan, 2005: 9-4)

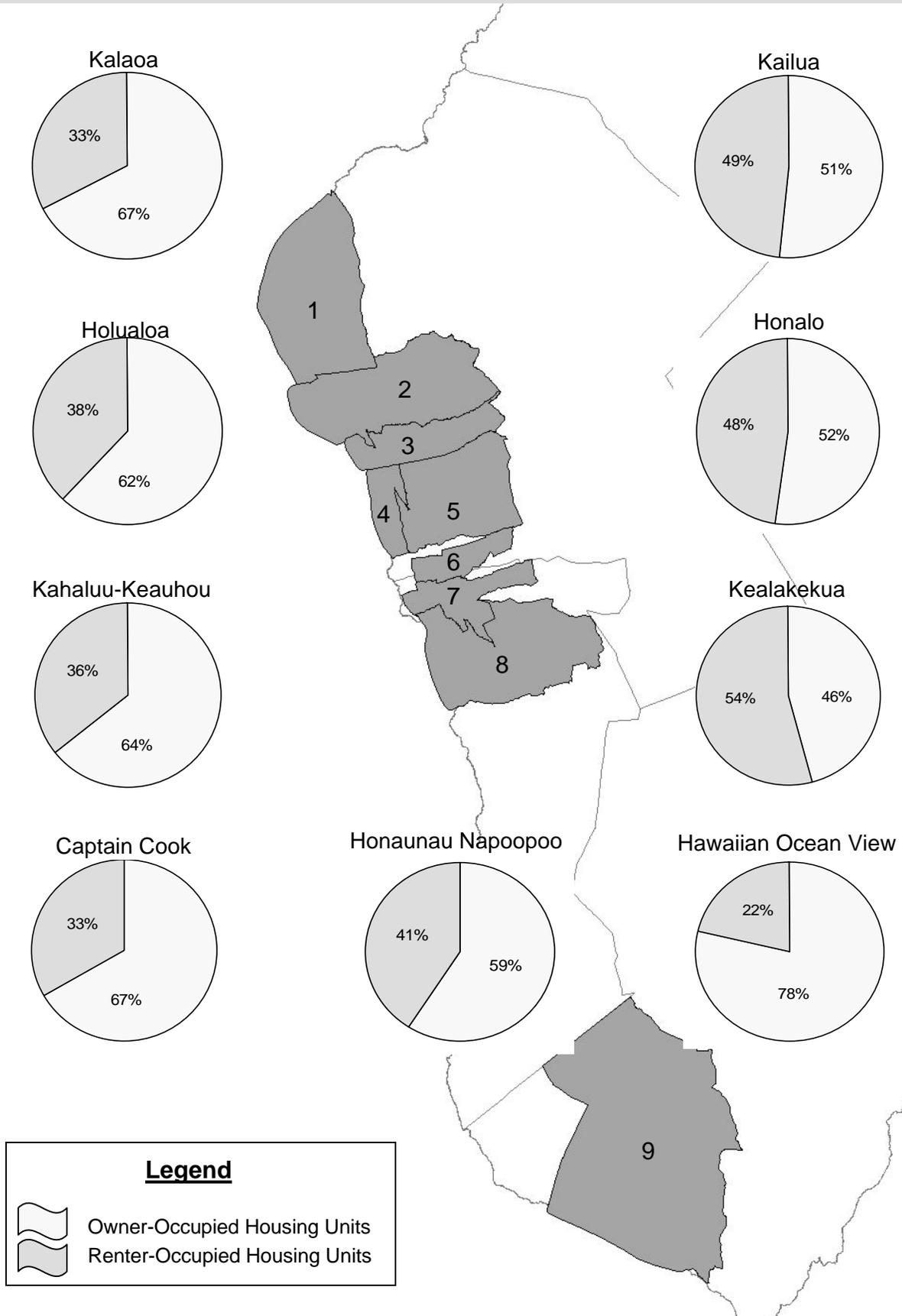
The number of housing units between North and South Kona vary dramatically. In 1990, 70 percent of housing units in the Kona district were located in North Kona, and in 2000, the number grew to 75 percent. Yet, this is proportional to the population as 77 percent of the 2000 population in Kona resided in North Kona. Housing units in North Kona have increased from 9,150 in 1985 to 12,254 in 1997, representing an annual growth rate of approximately 2.8 percent. In spite of continuing moderate growth of subdivision activity and housing construction in the North Kona district, housing problems for the low and moderate-income groups have been particularly acute. In 1990, approximately seven percent of all households within the district reported incomes below the poverty level. Many of these families compete with the visitor market for rental of apartment and condominium units. (County of Hawaii, 2005: 9-24)



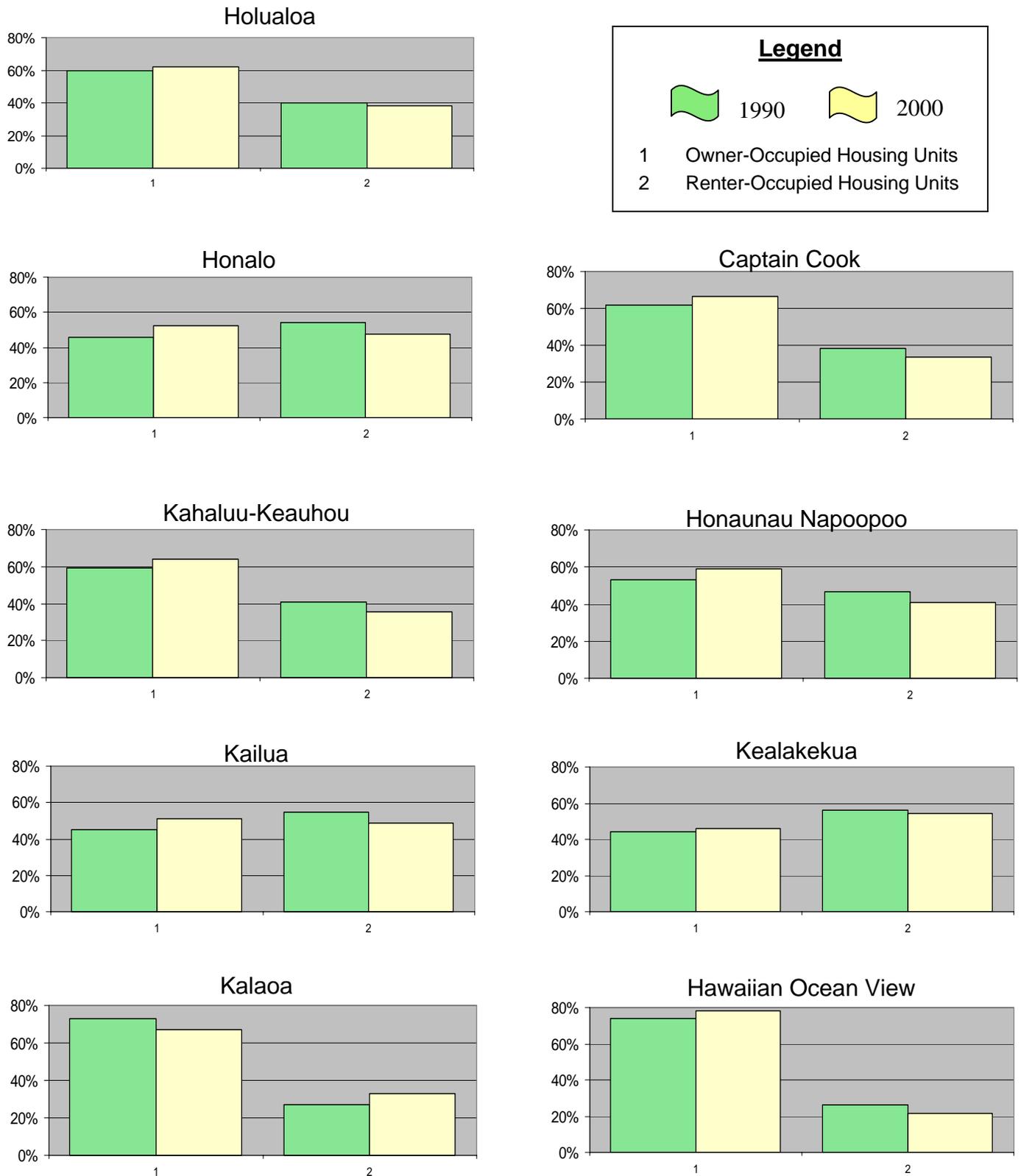
Source: County of Hawaii General Plan, 2005

Home ownership rate in North Kona has remained steady at 43 to 44 percent of housing units, whereas South Kona’s homeownership rate increased from 49 to 55 percent during the 1990s. With the exception of Kalaoa, the Kona CDPs demonstrate a consistent growth of owner-occupied housing units and decline of renter-occupied units between 1990 and 2000 (Figure 13 and 14). Although a significantly greater number of housing units exist in North Kona, South Kona demonstrates greater population stability and a higher rate of homeownership. In the last decade, South Kona’s housing vacancy rate remained around 11 percent, while North Kona’s vacancy rate ranged from 21 to 25 percent. Kahaluu-Keauhou has the highest vacancy of housing units (57 percent), as approximately thirty percent of the vacancies are due to the units used as seasonal, recreational, or occasional use (Figure 15). Unlike Hawaiian Ocean View Estates with over a quarter of the housing units vacant, Kahaluu-Keauhou’s vacancy is attributed to housing units primarily used as a second home. Based on housing units alone, North Kona has been developed to support greater populations than South Kona; yet, North Kona’s housing problem can be attributed to the high real estate prices. South Kona demonstrates a population with little to no growth, where residents are able to invest in home ownership.

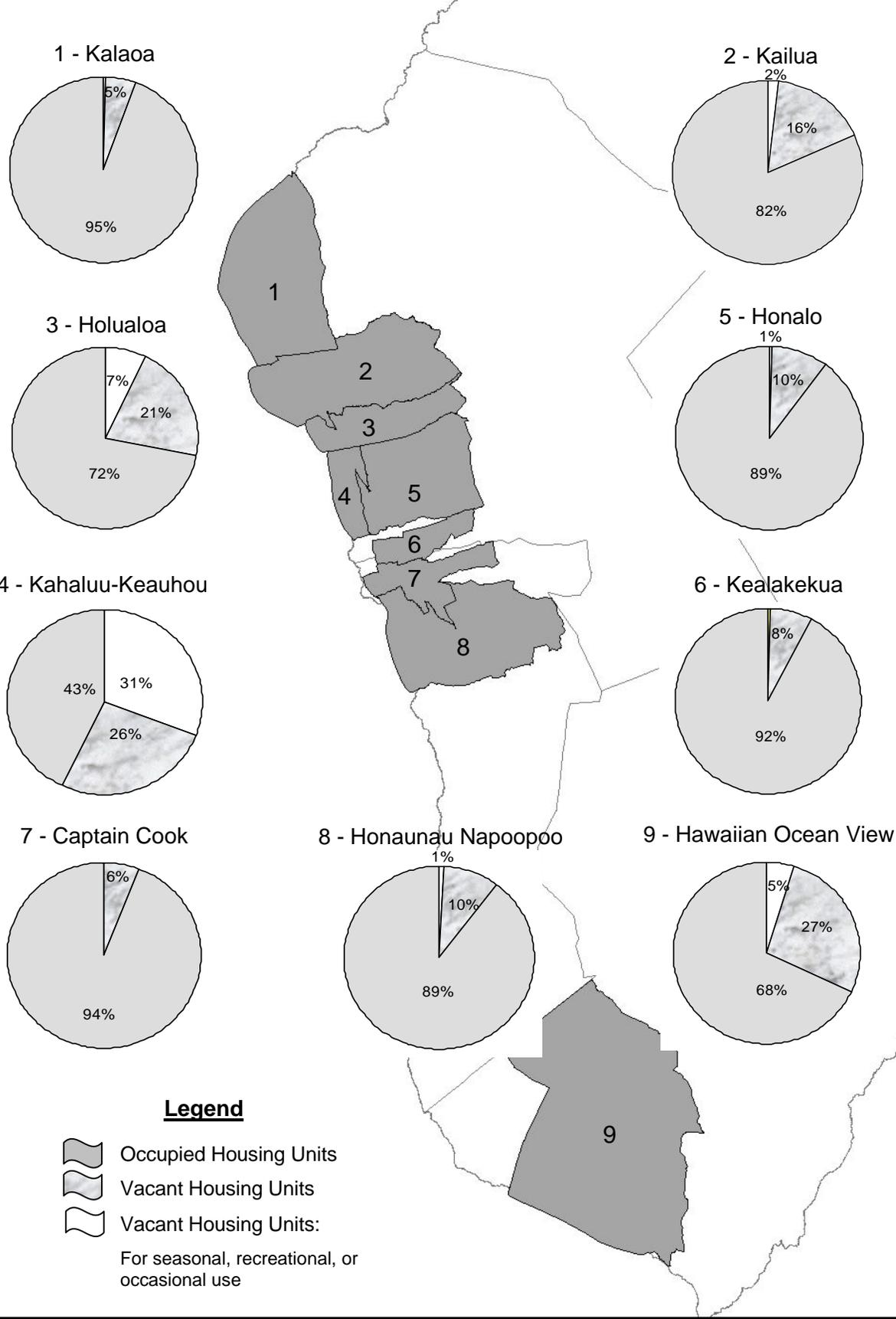
# Figure 13: Housing Tenure, 2000 CDP

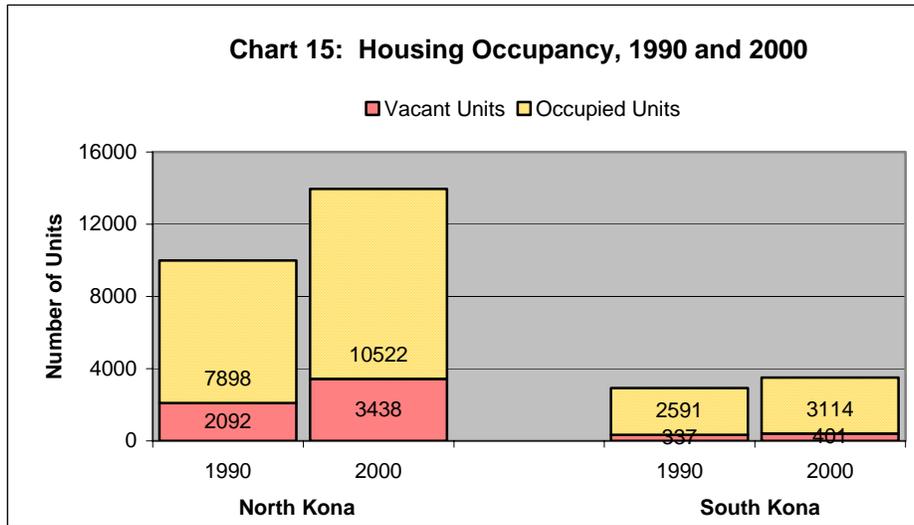


# Figure 14: Housing Tenure, 1990-2000 CDP Comparison



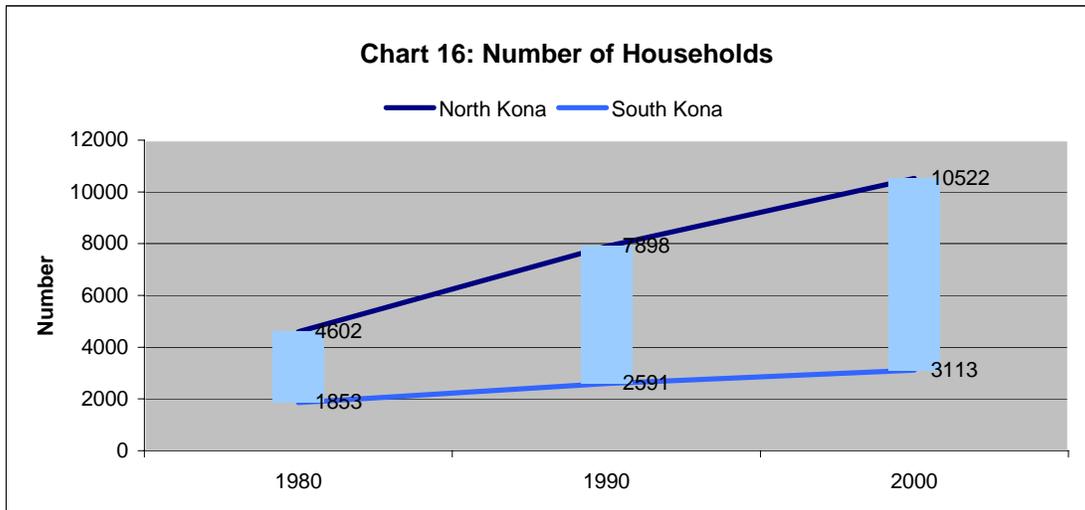
# Figure 15: Housing Occupancy, 2000 CDP





Source: County of Hawaii Data Book, 2004

According to the 2000 U.S. Census Bureau, the proportion of households in North Kona increased 72 percent between 1980 and 1990 and then another 38 percent during 1990 to 2000. South Kona households grew 40 percent between 1980 and 1990 and then 20 percent between 1990 and 2000. In 2000, North Kona had more than twice the number of households than South Kona.



Source: U.S. Census Bureau, DP-1, 2000

Moderate growth in both population and housing construction has occurred in the district of South Kona. Although the district is still dependent upon agriculture, some of the growth has been the direct result of the urban and resort growth in North Kona. This is reflected in an even distribution of new housing construction in sections from Kealahou town to Captain Cook. Subdivision activity has not occurred at equal rates to housing construction suggesting an in-fill of existing agricultural and rural parcels. In North Kona, it is anticipated that the rate of in-

migration into the North Kona district will continue, as will the need for housing for residents. Rezoning actions for large scale residential subdivisions have occurred in the area between Kailua and Keauhou. When subdivided, additional lands will be provided for residential use. Nevertheless, land costs and market prices that have been influenced by investor and resort/residential markets may preclude purchase of house and lot packages by many households in the district. (County of Hawaii, 2005: 9-25 and 9-26)

The county has determined the best strategies for North and South Kona would be to (1) Encourage the use of innovative types of housing developments, such as cluster and planned unit developments, that take advantage of the steep topographic conditions, (2) Increase affordable housing opportunities in the Kailua-Kona area, and for North Kona, and (3) Require developments that create a demand for employee housing provide for that need. (County of Hawaii, 2005: 9-26).

### **3. Land Use**

The total area of the island of Hawaii is approximately 2.5 million acres or 4,028 square miles: 4,023 square miles of land and 4.4 square miles of inland water. All of these lands are divided into approximately 125,000 parcels.

The land use element sets forth goals, policies, and standards to guide the location and density, and building intensities of land uses in particular areas. Regional and/or Community Development Plans are intended to implement the broad goals within the General Plan on a regional basis. They serve to designate and coordinate detailed development patterns and infrastructure needs throughout the County. The Plans detail land use policies and infrastructure priorities, transportation, recreation and other major land use policies within each area, and must be developed with participation by the affected communities and adopted by ordinance by the County Council. (County of Hawaii, 2005: 14-1)

#### **3.1. State Land Use Districts**

*Refer to Charts: (17) State Land Use Districts and (18) Proportion of State Land Use Districts within Kona.*

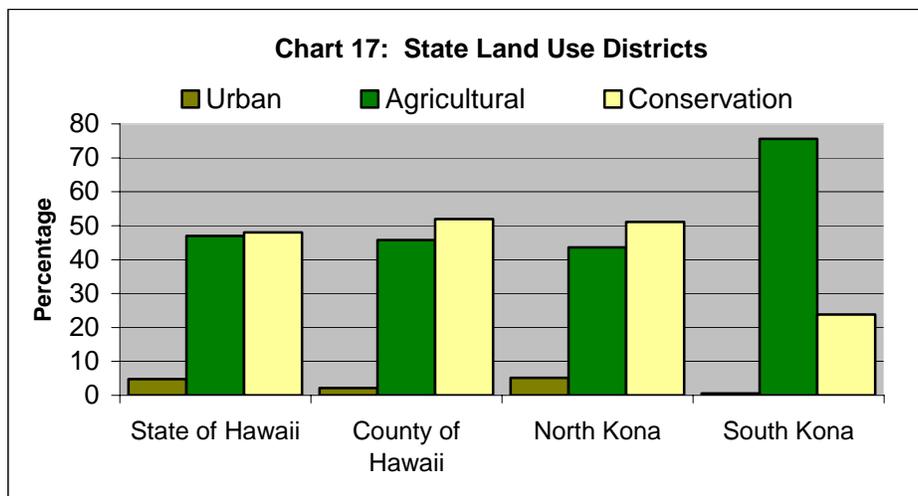
Hawaii was the first state to implement a State Land Use Law. Today, Hawaii remains unique among the fifty states with respect to the extent of control that the State exercises in land use regulation. Some of the actions leading to the passage of the State Land Use Law resulted from concerns and discussions predating World War II. In the post-World War II period, there was a perception that government action to control land uses was desirable because of the very limited area of the islands. It was also perceived that development of land for urban uses in many cases tended to occur in areas where it was uneconomical for public agencies to provide proper and adequate service facilities, and that there was a consequent lag in the provisions of such facilities. Further, there was a perception that development of land for urban uses in many cases occurred on land having a higher capacity for contributing to the basic economy of the State, namely agriculture, than the uses that were developed thereon. (County of Hawaii, 2005: 14-2)

The passage of the Land Use Law in 1961 established the State Land Use Commission. It called for the classification of all lands in the State and authorized the adoption of rules of practice and procedures and regulations for land use within the various State land use districts. The four land use districts: Urban, Rural, Agricultural, and Conservation, created by the State Land Use Commission provide the basic legal framework for land uses in the State of Hawaii. The Urban District is generally defined as lands in urban use with sufficient reserve to accommodate foreseeable growth. In the Kona Districts this Urban district is comprised of approximately 19,525 acres or 3.8 percent of the

Kona Districts total land area. Rural Districts are defined as lands comprised of small farms mixed with low-density residential lots that have a minimum lot size of one-half acre under the State Land Use Law. Of the four districts, this is the smallest, with approximately 552 acres of the Kona Districts total land area. The Agricultural District includes lands with a high capacity for intensive cultivation as well as those with low capacity. The minimum lot size in this district under the State Land Use Law is one acre. In the Kona District, the Agricultural District has the largest land area with approximately 270,424 acres, or slightly over 52.8 percent of the total land area of the Kona District. Conservation Districts are primarily those lands in the existing forest and water reserve zones. This Kona district approximately 221,580 acres or 43.3 percent of the total land area of the Kona Districts.

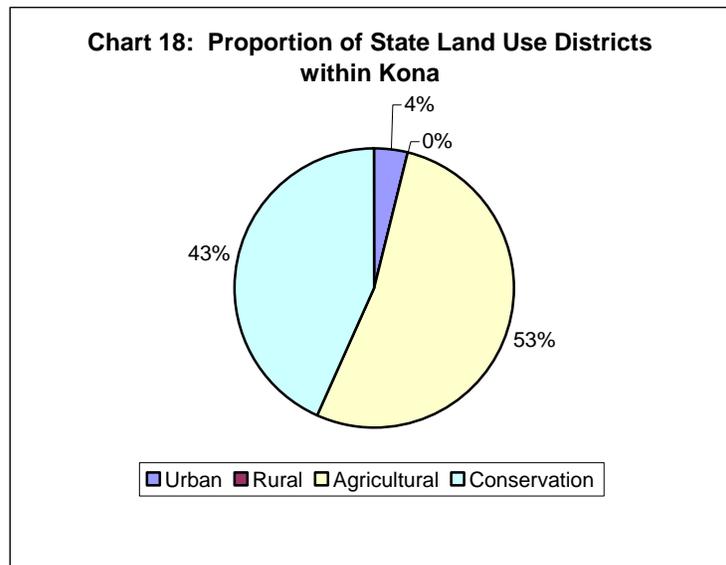
Land uses within the Urban Districts are administered exclusively by the counties. The State Land Use Commission establishes regulated uses for Agricultural and Rural Districts and each county is responsible for their administration. The counties, however, may adopt more stringent controls than those imposed by the State within these two districts. (County of Hawaii, 2005: 14-2)

The composition of State Land Use Districts for North Kona is distinctively different from South Kona as South Kona focuses on its agricultural industry. North Kona has the highest proportion of urban land, followed closely by the State of Hawaii with 5.12 and 4.79 percent, respectively. North Kona, County of Hawaii, and the State of Hawaii have a proportionately insignificant difference of Agricultural land as each has approximately 44 to 46 percent of land dedicated to Agriculture compared to South Kona, in which 76 percent of South Kona land use is designated Agricultural.



*\*\*Rural Districts not included, insignificant percentage of State Land Use.  
Source: County of Hawaii Data Book, 2004*

The pie chart illustrates the proportion of State Land Use Districts found within the Kona districts. The chart emphasizes the presence and potential of the agricultural industry as over half of the Land Use Districts are classified as Agricultural and 43 percent of the land is designated Conservation. A larger proportion of the conservation lands is found in North Kona. The 1961 State Land Use Law (Act 187) vested the Department of Land and Natural Resources with jurisdiction over the Conservation District. Subzones were formulated within the Conservation District in order to regulate land uses and activities therein. The Conservation District has five subzones: Protective, Limited, Resource, General and Special. Omitting the Special subzone, the four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to the least sensitive (General); the Special subzone is applied in special cases specifically to allow a unique land use on a specific site.



Source: County of Hawaii Data Book, 2004

### 3.2. County of Hawaii Zoning

*Refer to graphs: (19) Zoning Classification by District and (20) Zoning Classification by District excluding Agricultural and Open Zoning.*

The Zoning Code for the County of Hawaii is the legal instrument that regulates the use of land. The Zoning Code implements the General Plan and is a document dealing with existing conditions and shorter range needs. The Zoning Code is the County’s primary land use control. The Zoning Code implements the General Plan. It deals with existing conditions and shorter range needs. The Zoning Code sets out the various types of zoning districts and the allowable uses for each. Zoning maps, established by ordinance, set out the zoning for the island on a parcel-by-parcel basis. (County of Hawaii General Plan, 2005: 14-3)

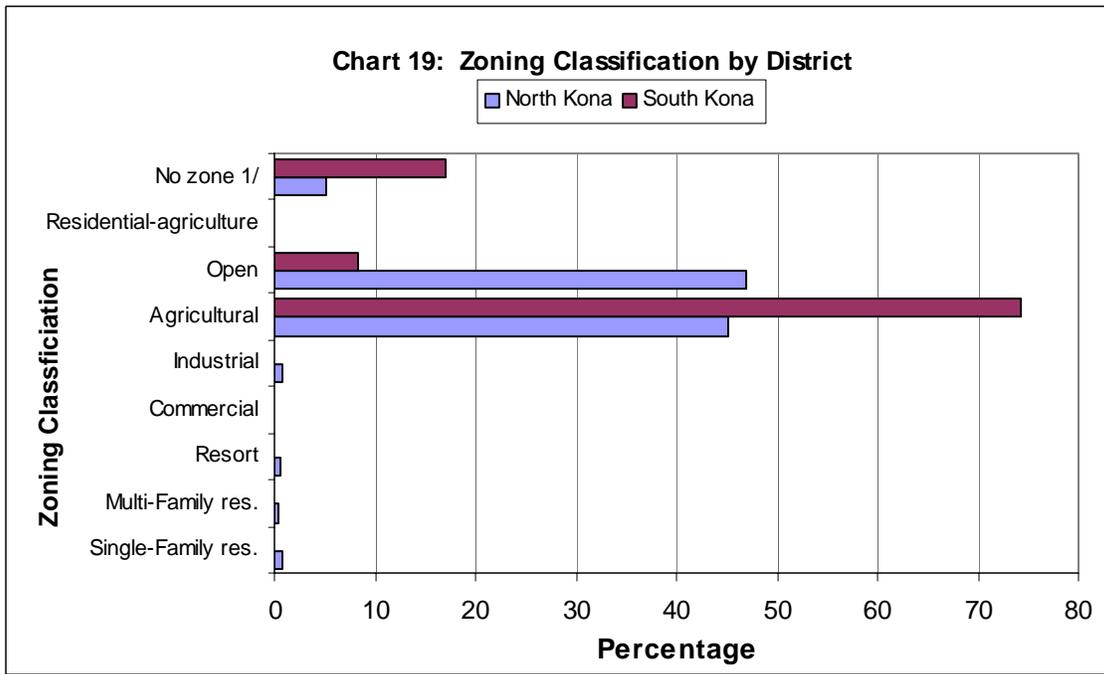
The following graphs demonstrate the proportion of each zoning classification within North and South Kona. The data illustrates that three-fourths of South Kona land is designated for Agriculture, while slightly less than half of the land in North Kona is zoned Agricultural. 47 percent of North Kona land is designated Open, whereas only 8.3 percent of the land in South Kona is zoned Open. As part of the 1996 amendments to the Zoning Code Agricultural zoned land can also include lands transferred from Unplanned to Agriculture. In the last six years, rezoning has primarily occurred in the urban core of Kailua-Kona and is also consistent with the General Plan (Planning Department, 2006). The many small rezoning actions do not add much new potential growth, even taken collectively, have not rezoned much agricultural land, and have not changed the basic growth patterns that are built into prior zoning (Planning Department, 2006).

The latter chart removes Agricultural and Open zoned land in order to focus on other zoning classifications. As of August 2005, North Kona identified approximately 2,300 acres as resort zoning, while South Kona zoned 15 acres as resort. Less than one percent of the land in North Kona and 0.25 percent in South Kona are zoned for single-family residence. Approximately 3,000 acres of land in North Kona is zoned for Industrial use in North Kona, whereas there is no land set aside for industrial uses in South Kona.

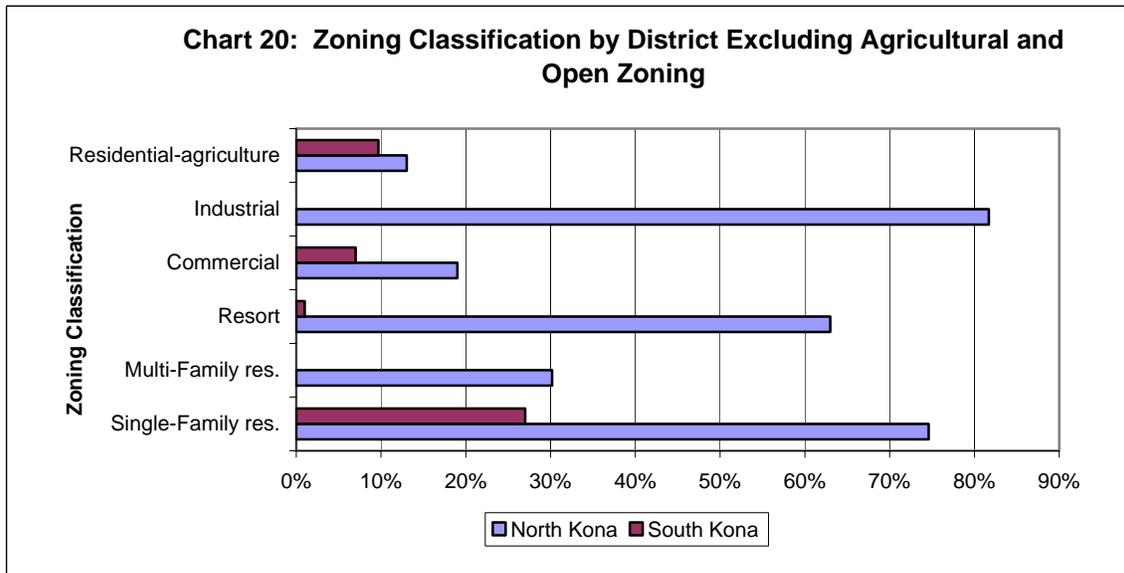
Most of Kona's industrial development is service oriented and located in the northern portion of the North Kona district from Kailua to the Kona International Airport at Keahole. Quarrying operations for building materials are conducted in North Kona. The Old Kailua Industrial Area and the Kaloko Industrial Area provide the largest concentration of industrial activities within West Hawaii. The Kona Industrial Subdivision in Kailua-Kona has transformed into a mixed-use industrial-commercial area over the years. Newer industrial areas, including the Kaloko Industrial subdivision, are being developed to the north of Kailua-Kona. The industrial activities within these newer areas include warehousing, lumber storage yards, auto body shops, wholesaling and other service oriented activities. The energy and aquaculture activities at the Natural Energy Laboratory of Hawaii at Keahole have become major employment generators in the district. Though located in industrial zoned districts, these alternate energy and aquaculture activities are not traditional uses typically found in industrial areas. These industrial areas in North Kona accommodate a wide range of manufacturing, service, wholesale and retail activities. (County of Hawaii, 2005: 2-26 and 14-39)

There are no Industrial zoned lands in the South Kona district. The agricultural sector is more important to Hawaii County than any other county in the state. The major export activity is coffee and macadamia nut milling and roasting. There are approximately 650 farms cultivating coffee on the western slopes of Mauna Loa and Hualalai mountains in the Kona district. Approximately, 3,500 acres of land is utilized for Kona coffee farming, producing about 3.8 million pounds a year, valued at about \$14 million (County of Hawaii, 2006). Other

activities include slaughterhouses, fish packing and processing and ancillary agricultural services. Many of these industrial activities are located on Agricultural zoned lands and approved through the issuance of Special Permits. Other service related industrial uses such as warehousing, garages and auto body shops are located in pockets along the Mamalahoa Highway. Because of its topographic condition, however, level land necessary for development in South Kona is limited in the mauka areas. (County of Hawaii, 2005: 14-39)



Source: County of Hawaii Data Book, 2004



Source: County of Hawaii Data Book, 2004

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# **KONA REGIONAL PROFILE**

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**Wilson Okamoto Corporation**

**January 2007**

# KONA REGIONAL PROFILE

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## KONA COMMUNITY DEVELOPMENT PLAN

Submitted to:



County of Hawaii  
Department of Planning

January 2007



**WILSON OKAMOTO**  
CORPORATION



**KONA  
REGIONAL PROFILE**

Kona Community Development Plan

Prepared for  
Planning Department  
County of Hawaii

Prepared by  
Wilson Okamoto Corporation  
1907 S. Beretania Street, Suite 400  
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January 2007



**TABLE OF CONTENTS**

	<b><u>Page</u></b>
<b>1 PLANNING FOR KONA .....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 What is the General Plan?.....	1
1.3 What is the Kona Community Development Plan?.....	2
1.4 Previous Plans .....	3
1.4.1 A Plan For Kona (1960).....	3
1.4.2 Kealakehe Development Plan (1968).....	4
1.4.3 Kona Regional Plan (1982).....	4
1.4.4 Kailua Village Design Plan (1988) .....	5
1.4.5 Keahole to Kailua Development Plan (1991) .....	5
1.4.6 Master Plan for Kailua-Kona (1994) .....	6
1.4.7 Keahole to Kailua Development Plan Revised Roadway Plan (1997) .....	8
1.4.8 Keahole to Kailua Roadway Master Plan (2001) .....	8
1.4.9 Keahole to Honaunau Regional Circulation Plan (2003) .....	9
<b>2 COMMUNITY PROFILE.....</b>	<b>11</b>
2.1 Kona Region.....	11
2.1.1 Population.....	15
2.1.2 Ethnicity .....	17
2.1.3 Economy.....	18
2.1.3.1 Economic History.....	18
2.1.3.2 Major Industries .....	21
2.1.3.2.1 Visitor Industry .....	21
2.1.3.2.2 Agriculture .....	23
2.1.3.2.3 Construction Industry.....	23
2.1.3.2.4 Natural Energy Laboratory of Hawaii Authority.....	25
2.1.3.3 Employment .....	25
2.1.3.4 Housing .....	27
2.1.3.5 Income Distribution.....	29
<b>3 ENVIRONMENTAL SETTING .....</b>	<b>31</b>
3.1 Geology and Topography .....	31
3.2 Climate .....	31
3.3 Regional Soils .....	31
3.4 Natural Resources.....	33
3.5 Water Resources.....	35
3.6 Natural Hazards .....	36
3.7 History .....	36
<b>4 REFERENCES.....</b>	<b>43</b>

**List of Figures**

		<b><u>Page</u></b>
Figure 1	Planning Area .....	12
Figure 2	Land Cover .....	13
Figure 3	Rainfall and Topography .....	32
Figure 4	Natural Resources .....	34
Figure 5	Island of Hawaii Aquifer System and Sector Areas .....	35

**List of Tables**

Table 1	List of Previous Plans for North and South Kona Districts .....	3
Table 2	Total Visitors .....	21
Table 3	2006 New Residential Permits (Up to End of November) .....	25
Table 4	Number of Building Permits .....	24

**List of Charts**

Chart 1	Resident Population .....	15
Chart 2	Rate of the Residential Population Growth, 1970 to 2000 .....	16
Chart 3	Population Density, 1970 to 2000 .....	16
Chart 4	Race and Ethnicity by Race alone, 2000 and 2005 .....	17
Chart 5	Employment by Major Economic Sector in the County of Hawaii, 1960 to 1997 .....	26
Chart 6	The Percent Change of Housing Units .....	28
Chart 7	Number of Households .....	29
Chart 8	Per Capita Income Rate of Change, 1990 to 2000 .....	29

## 1 PLANNING FOR KONA

### 1.1 Introduction

Planning for Kona ranges from the comprehensive Hawaii County General Plan, which provides the planning framework for the North and South Kona districts within the context of the entire County, to urban design planning specific to Kailua-Kona. The range of plans overlap in geography and time frame, reflecting the goals, aspirations and community's perception and understanding of issues and concerns as the Kona region has grown.

### 1.2 What is the General Plan?

General Plan studies in the County were initiated in the late 1950's and were limited to certain regions of the island such as Kona, Hilo, Kohala, Hamakua and Puna districts. These initial documents lacked a comprehensive, coordinated and integrated overview of the entire County. These regional plans were adopted by Ordinance 317 in July 1965, as the General Plan for the County of Hawaii. The Kau District was the only area not covered by this plan.

With the adoption and ratification of the County Charter in 1968, the General Plan emerged as the main policy document. The major planning guide for the County of Hawaii, the General Plan, was adopted in 1971 as Ordinance 439. The 1971 General Plan provided a long-range comprehensive framework for the island of Hawaii and includes goals, policies and standards to guide the development of the island.

The County Charter requires that a review of the General Plan be initiated every ten years. The County Council approved the most recent update of the Plan in February of 2005.

The General Plan is the County's long range planning policy document. Organized into 13 Elements, the Plan identifies broad Goals, Policies, and Standards relating to land use, conservation and protection of natural and historical resources, transportation, and public infrastructure on the Island of Hawaii. The purposes of the 2005 General Plan are to:

- *Guide the pattern of future development in this County based on long-term goals;*
- *Identify the visions, values, and priorities important to the people of this County;*
- *Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs;*
- *Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient.*

- *Promote and safeguard the public interest and interest of the County as a whole.*
- *Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources.*
- *Effect political and technical coordination in community improvement and development*
- *Inject long-range considerations into the determination of short-range actions and implementation.*

### **1.3 What is the Kona Community Development Plan?**

In 1973, consultants began preparing the Kona Community Development Plan (CDP) to fulfill the 1971 General Plan. The CDP provided the public and private sector guidance on a 15-year strategy for improving economic, social, and environmental conditions in Kona. In 1975, a draft was submitted for review by the public, however, the draft plan was never adopted by the County.

Decades later, the County of Hawaii offers a program for regional planning. The County Council approved the update of the General Plan on February 9, 2005 as Ordinance 05-025 in compliance with Hawaii County Charter. Under the General Plan, each judicial district will have a community development plan (CDP) prepared that further defines long-range goals and policies for that district. Through the creation of CDPs, communities are invited to participate in creating policies as well as to determine implementing actions designed for their specific region of the County.

The Kona CDP is the first to be enacted under the General Plan and is designed to be a model for CDPs to be prepared for other regions of the island. It translates the broad goals and policies of the County's General Plan, into specific actions and priorities for specific geographic areas in the districts of North and South Kona. The CDP gives detail to the elements addressed by the General Plan, such as the economy, energy, environmental quality, flooding and other natural hazards, historic sites, natural beauty, natural resources and shoreline, housing, public facilities, public utilities, recreation, transportation, and land use. Emphasized are elements most relevant to the issues and conditions in the Kona planning area.

The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee, appointed by the Mayor and confirmed by the Council on February 1, 2006, provides guidance, assists in the preparation of the plan, and recommend the plan's approval to the Planning Commission. See Appendix A for a list of the Steering Committee Members.

The General Plan requires CDPs be adopted by the County Council as an "ordinance", giving the plans force of law. This is in contrast to plans created in past years that were adopted by "resolution" and hence, served only as guidelines or reference documents for decision-makers.

**1.4 Previous Plans**

Various plans addressing issues such as land use, infrastructure and urban design have been prepared over the years. The following sections briefly discuss these plans and Table 1-1 lists them by chronologically:

Date	Name of Plan	Type of Document		
		Land Use	Infrastructure	Urban Design
1960	A Plan for Kona	X		X
1968	Kealakehe Development Plan	X	X	
1971	General Plan	X	X	
1975	Kona Community Development Plan	X	X	
1982	Kona Regional Plan	X	X	
1988	Kailua Village Design Plan			X
1991	Keahole to Kailua Development Plan	X	X	
1994	Master Plan for Kailua-Kona	X	X	X
1997	Keahole to Kailua Development Plan Revised Roadway Plan Implementation Strategy		X	
2001	Keahole to Kailua Roadway Master Plan		X	
2003	Keahole to Honaunau Regional Circulation Plan		X	
2005	General Plan	X	X	
2007	Kona Community Development Plan	X	X	X

**1.4.1 A Plan For Kona (1960)**

“A Plan for Kona” (Harland Bartholomew and Associates, March 1960) was prepared for the State Office of Planning and was one of the first studies prepared for North and South Kona. At that time, the need for guiding and coordinating development in the region was recognized. This plan examined the issues and opportunities facing Kona, as well as Kona’s economic, environmental and community resources. The study area included the Kona shoreline up to an elevation of 4,000 feet, from Makalawena in the north to Hookena in the south.

The planning objectives of the Plan were to:

1. *Preserve the unique attractions of the “Kona Way of Life.”*
2. *Conserve and enhance the striking natural beauty of the region.*
3. *Establish a healthy and efficient pattern of land use to promote the general well being of the community.*
4. *Provide for a safe and efficient transportation of people and goods within Kona, recognizing a need for local roads designed for leisurely sightseeing.*

5. *Advance Kona's position as a potential tourist destination area.*
6. *Coordinate land use planning with the development of an economical water system.*
7. *Foster continuation of a health agricultural enterprise.*
8. *Create attractive residential neighborhoods with a full range of facilities of urban living.*

A *Plan for Kona* recommended that Kailua-Kona expand into a series of destination resort centers. Additional resort centers, each laid out to make use of a particular shoreline resources were established at:

1. Kaloko Fishpond area.
2. Honokohau Fishpond area.
3. Airport Bay (small bay at the northerly end at the present day Old Kona Airport)
4. Holualoa Beach, extending south to Disappearing Beach
5. Kahaluu Bay Village, extending south to surround Kahaluu Bay park
6. Kainaliu Beach
7. South shore of Limukoko Point
8. Kealia Beach north of Hookena

Kailua-Kona is the major resort center in this Plan. A major element of this plan is the creation of pedestrian squares or malls. The Plan also proposed locations for marinas, recreation areas and the need for community facilities, infrastructure and a Kona Regional Center for Federal, State, and County offices.

#### **1.4.2 Kealakehe Development Plan (1968)**

The State of Hawaii Department of Land & Natural Resources contracted Charles Yoon & Associates, Inc. to prepare the Kealakehe Development Plan (1968), a comprehensive planning, engineering, and economic plan to determine the potential for development and supporting facilities necessary to enhance Honokohau Harbor. The purpose of the plan was to recommend an appropriate development program adaptable to approximately 1,600 acres comprising the Kealakehe Lands in North Kona owned by the State of Hawaii. The study area extended from the Kona Airport in the north to Keauhou Bay in the south and Kona coastline up to Mamalahoa Highway.

The report sets forth specific findings, conclusions and recommendations, relative to development potentials, area allocations, and pertinent design criteria. The development plan included a marina, golf course, hotels, recreational resources, and housing and vacation homes.

#### **1.4.3 Kona Regional Plan (1982)**

As mentioned previously, the Draft Kona Community Development Plan (1975) was submitted for review but never adopted by the County.

During the preparation of the Kona CDP, Kona experienced rapid development as a result of the booming industry. Growth consumed land of various residential, commercial, industrial, and resort uses.

In late 1979, the Planning Department started work on the “*Kona Regional Plan*” (County of Hawaii Planning Department, 1982) that covered North and South Kona districts. The objective of the plan was to provide the Planning Department and the Commission with a land use document by which evaluations of changes in land use could be made on a consistent basis. This plan identified urban areas and an overall pattern of development in the Kona region. The Kona Regional Plan was initiated to serve as a guide for land use actions by the public and private sector.

The following are the Kona Regional Plan’s Planning Principles:

1. *Adequate land area should be designated for each respective land use.*
2. *Designation of land area for the differing uses should be sufficient to allow for low and moderate density development.*
3. *Spatial separation of resort and residential uses.*
4. *Infrastructure capacities such as roads and water supplies must be adequate to handle the loads generated by new development.*
5. *Protect groundwater resources.*
6. *Those areas not necessary for urban development should be kept in open type uses and maintained in large lot sizes.*

#### **1.4.4 Kailua Village Design Plan (1988)**

In 1960, the Plan for Kona first described a series of urban design suggestions for the village of Kona. The County of Hawaii adopted the Kailua Village Design Plan in 1976 that reiterated many of the concepts and principals of the 1960 *Plan for Kona*. An update program was conducted to re-examine the design guidelines in the 1976 plan and to recommend new strategies. The 1988 update plan was not formally adopted.

The Kailua Village area includes the northern side of Palani Road (north), the area makai of the Queen Kaahumanu Highway (east), Kona Hillcrest (south) and the shoreline including the strip makai of the Old Kona Airport (west).

The Kailua Village Design Plan was prepared to guide the Kailua Village Design Commission, the Planning Department, the Planning Commission, the County Council and other governmental agencies in addressing urban design issues for Kailua Village.

#### **1.4.5 Keahole to Kailua Development Plan (1991)**

The Keahole to Kailua Development Plan (K to K Plan), adopted by the Hawaii County Council on April 3, 1991, represents an ongoing effort by the County of Hawaii to prepare for the future urbanization of the region to meet the growing needs of West Hawaii. The K to K Plan encompasses the area from Kona International

Airport at Keahole (Kau Ahupuaa) to Kailua-Kona (Palani Road), and from the shoreline mauka towards Mamalahoa Highway.

The K to K Plan addresses land use, infrastructure, and provides cost estimates for infrastructure in order to address future development in the region. The plan included a land use plan, infrastructure plan, and financing and implementation plan for the next 20 years that provide a framework for future development of the Keahole to Kailua area.

The preferred concept plan that emerged incorporates ideas from several of the alternative concept plans. The preferred plan was shaped by a development themes or concepts. These themes are summarized below:

A. Three Major Development Zones

The plan organized land uses into three zones corresponding with identified physiographic/ecological/historical zones. The coastal zone would provide recreational opportunities. The zone just mauka of Queen Kaahumanu Highway would be planned for denser urban uses, such as industrial uses, new civic center, retail and commercial development. The upland zone is planned for residential development, including schools, parks and village centers.

B. New Government and Business Center

Civic and commercial uses would be located on the mauka side of Queen Kaahumanu Highway, a couple of miles north of Kailua Village.

C. Major New Roadways

New north-south and mauka-makai roads were proposed to connect the planned developments.

D. Regional Greenbelt System

To complement the proposed road system, landscaping, bicycle/jogging/walking paths would be located along roadways. The greenbelts would serve a number of purposes, including providing greenery and shade, visually screening urban uses, providing recreation uses, and defining different land uses.

**1.4.6 Master Plan for Kailua-Kona (1994)**

The planning area boundary of the *Master Plan for Kailua-Kona* are defined by the Kailua Village Special District (Hawaii County Ordinance §25-7-1). The area extends north to include the northern side of Palani Road, east to include the area makai of the Queen Kaahumanu Highway (east), south to include Kona Hillcrest and the shoreline strip makai of the Old Kona Airport.

The Master Plan for Kailua-Kona is a comprehensive plan that conveys the opportunities and constraints concerning:

- Land development controls including, land use options, special design treatment areas, physical design treatment and design criteria guidelines;
- Pedestrian and vehicular circulation patterns;
- Other infrastructure assessments, including energy, communication requirements, public and private community facilities;
- Historic and cultural sites;
- Significant natural land forms and water features, views and vistas; and
- Basic concepts of environmental character including architectural design goals.

The Master Plan discusses planning concepts for various development components, including village image, development patterns (resort, commercial, residential), historic sites, public/community facilities, open space/recreation, circulation and the pier/seawall area. The Master Plan emphasizes the “Village core”, with the intense uses being centralized and densities decreasing progressively away from the core.

The following are the recommendations for each of the development components:

A. Village Image

- Maintain low scale structures with height limits.
- Provide community design guidelines.
- Provide village entries and landscape features.

B. Development Patterns

- Limit strip malls.
- Utilize The Great Wall of Kuakini as transition element.
- Reinforce village and development standards.
- Create pedestrian scale.

C. Resorts

- Limit resorts to areas makai of Kuakini Highway.
- Provide for appropriate commercial uses within resort areas.

D. Commercial

- Limit strip malls.
- Provide small office and neighborhood convenience commercial.

E. Residential

- Provide variety of residential types and densities.
- Cluster to increase open space.
- Reinforce village core .
- Reduce densities away from core.
- Provide incentives to encourage cluster developments
- Allow small scale convenience commercial.

F. Historic Sites

- Preserve remaining portions of the Great Wall of Kuakini
- Develop a brochure regarding historic sites in the Village for distribution to visitors.
- Develop action plans for preservation and maintenance of historic sites.

G. Public/Community Facilities

- Create a civic park(s) along Alii Drive.

H. Open Space/Recreation

- Increase neighborhood parks and open space.
- Utilize area adjacent to the Great Wall of Kuakini as linear park.

I. Pier/Seawall

- Relocate parking from pier.
- Create a pedestrian environment.
- Improve streetscape along seawall.
- Repair plan for seawall.

The Master Plan also provided evaluation mechanisms and an implementation time table.

**1.4.7 Keahole to Kailua Development Plan Revised Roadway Plan (1997)**

Since the preparation of the K to K Plan, development was progressing quickly and the need for a more in-depth roadway analysis became apparent. Townscape Inc. was retained by the Hawaii County Planning Department to expand on presented concepts from the 1991 K to K Plan. A detailed roadway plan and implementation strategy for the major roadways within the K to K planning area was needed. Implementation was phased over three time periods, 2005, 2020, and 2050. The development of this detailed plan involved updating the status of various projects planned within the region and identifying roadway corridors that would be needed to accommodate future traffic.

The Roadway Plan recommended improvements to Queen Kaahumanu Highway, Palani Road, Kealakehe Parkway, Makala Road, and Hina Lani Drive; the construction of North-South Roads, including Waena Drive and Kealakaa Street, Mid-Level Road and University Drive.

**1.4.8 Keahole to Kailua Roadway Master Plan (2001)**

The following is a summary from Keahole to Honaunau Regional Circulation Plan (2001).

This study revised the Keahole to Kailua Roadway Plan to accommodate developments planned or constructed since the 1997 publication. The study reviewed development plans affecting Mid-Level Road and Waena Drive. It also

assessed the feasibility of alternative realignments for these roads and identified potential traffic impacts. The plan recommended the following:

- Realign Mid-Level Road mauka of Kohanaiki Business Park to the Waena Drive alignment as it crosses Kaiminani Drive.
- Terminate Waena Drive at its intersection with Kealakehe Parkway.
- Increase the Mid-Level Road right-of-way requirements from 120 feet to 150 feet. The increase accounts for future widening of the road which would offset the elimination of Waena Drive.
- Designate existing Mid-Level alignment as Main Street increasing right-of-way from 60 feet to 80 feet to account for loss of Waena Drive.

#### **1.4.9 Keahole to Honaunau Regional Circulation Plan (2003)**

This regional transportation plan was initiated to address the peak hour traffic congestion on the region's arterial roadways during peak hours through parts of North and South Kona. According to the plan, urban sprawl, population growth, uncoordinated development, and resulting traffic congestion are severely affecting the quality of life and character of the Kona region.

The plan identified needs for new roadways and/or expansion of existing roadways for commercial vehicles, bicycle, pedestrian, and transit systems. Three types of recommendations were presented:

1. Corridor Management programmatic recommendations.
  - County Council Resolution on Transportation Corridor Management
  - Zoning and Subdivision Regulations
2. Proposed short term projects and long range concepts that address transportation needs for the next 20 years.
  - Ke Ala O Keauhou and Mamalahoa Highway Bypass – Traffic Access Management
  - Hienaloli Road/Keanalehu Road and Kealakehe Street/Kealakehe Parkway – Extension Projects
  - Bikeways and Paths – Improvements Projects
  - Mass Transit – Improvement Projects
  - Fixed Rail Mass Transit
  - Future North-South Corridors
3. Projects and programs that require further study were identified.
  - County Historic Preservation Policies
  - Community Character Benchmarks
  - Green Open Space
  - Heritage Corridor
  - General Plan Update
  - Regional Development Plan

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## **2 COMMUNITY PROFILE**

West Hawaii is known for its great weather, beautiful waters and amazing scenery. Both residents and visitors recognize and appreciate Kona's unique qualities that contribute to the "Kona way of life". During the past 25 years, the population of Kailua-Kona has more than doubled. Resort development boomed in the 1970s and has grown steadily since, evolving and diversifying into forms such as time-shares and vacation homes, vacation rentals and bed and breakfast businesses.

Significant changes in the North and South Kona are occurring as a result of expanding resort and residential development. Traffic congestion, affordability of housing, loss of open space are among concerns voiced by residents regarding the "quality of life" and the ability of the government sector to serve residents. The County's 2005 General Plan and the on-going preparation of Community Development Plans (CDPs) are intended to guide future development and coordinate governmental facilities and services needed to support a growing community.

For the first time, the County of Hawaii offers a program for regional planning under the legal umbrella of the General Plan. Through the creation of CDPs, communities are invited to participate in creating policies as well as to formulate implementing actions designed for their specific region of the County.

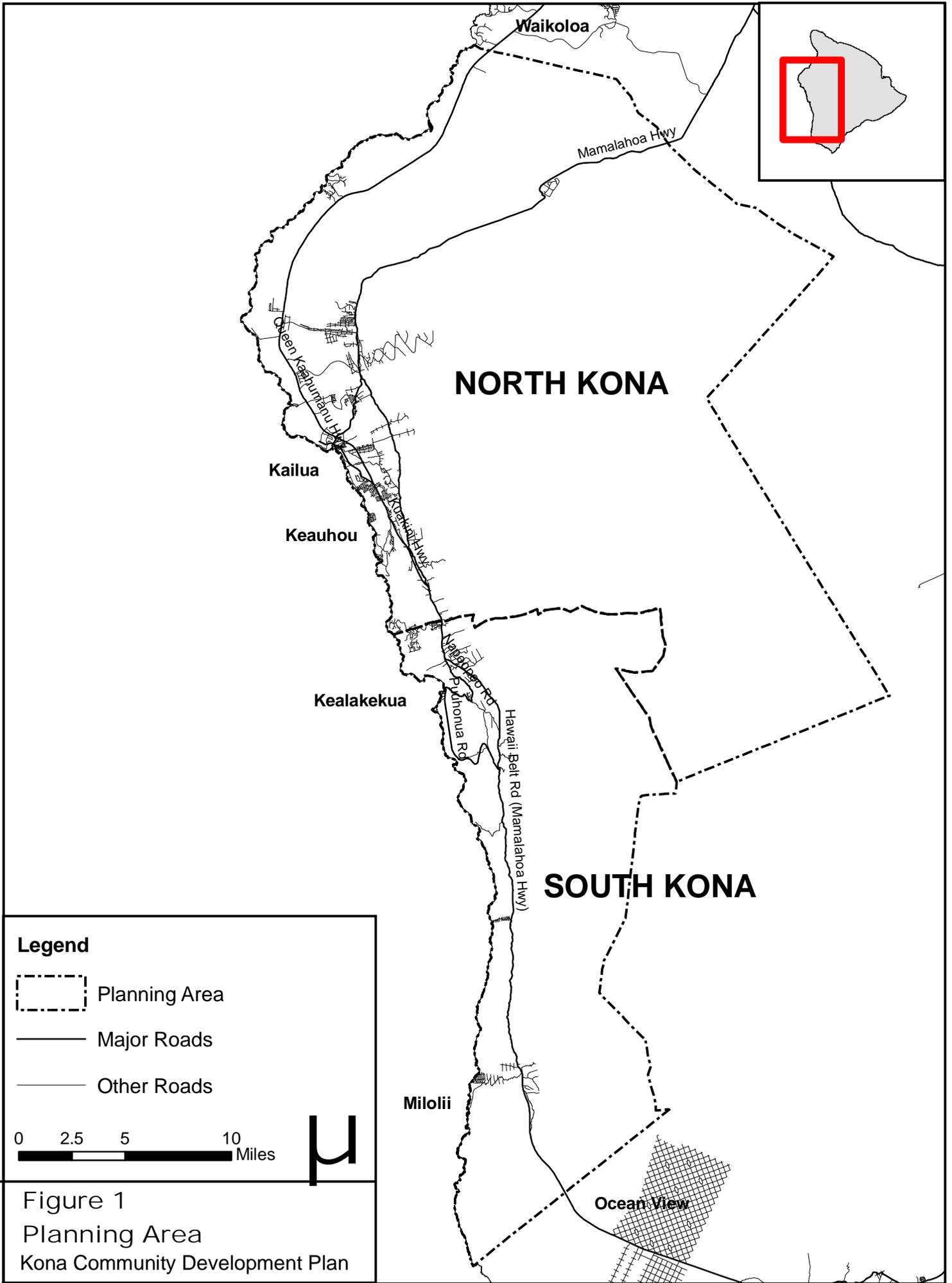
The General Plan requires CDPs be adopted by the County Council as an "ordinance", giving the plans force of law. This is in contrast to plans created in past years that were adopted by "resolution" and hence, served only as guidelines or reference documents for decision-makers.

### **2.1 Kona Region**

The Island of Hawaii has a land area of 4,030 square miles, making it the largest County in the State with a land area exceeding that of all the other islands combined. The 800 square miles of land area comprising the North and South Kona districts is about 20% of the total land area of the Island of Hawaii (see Figure 1).

Kona is characterized by vast open spaces offering varied landscapes (see Figure 2). These landscapes ranged from barren lava plains and rugged coastline interspersed by white sand beaches, and dense native forests, transitioning from dryland forests to leeward rainforests on the slopes of Hualalai and Mauna Loa.

Kailua-Kona in North Kona is the heart of the visitor industry on the island. The original resort destination on the west side of the island has attracted retailers, shopping centers, residential and vacation home development as well as industrial uses fueled by development. South of Kailua-Kona is the Keauhou resort area.



**Legend**

-  Planning Area
-  Major Roads
-  Other Roads

0 2.5 5 10 Miles



Figure 1  
 Planning Area  
 Kona Community Development Plan

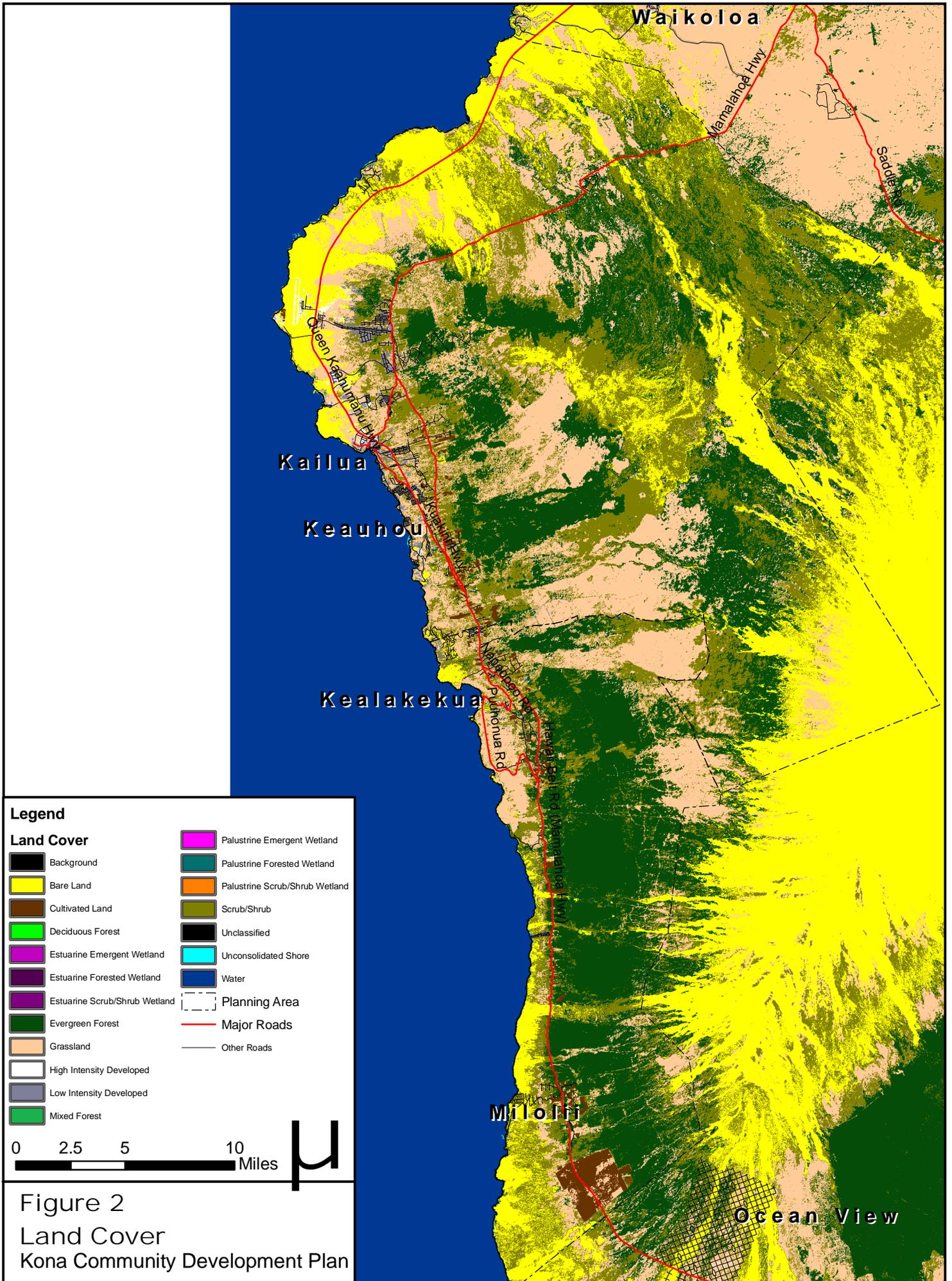


Figure 2  
 Land Cover  
 Kona Community Development Plan

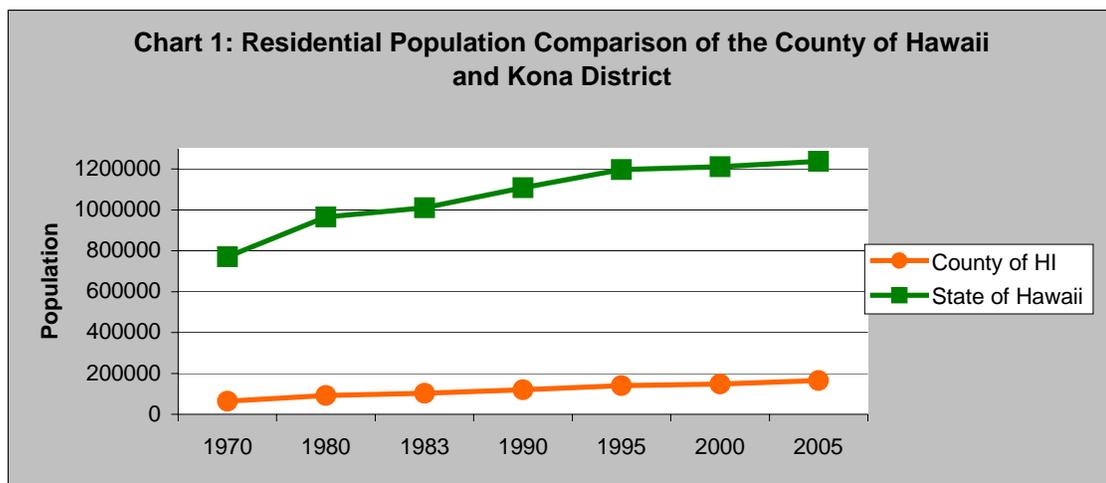
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South Kona is home to the Kona Coffee Belt, located above Kealahou. The coffee belt runs parallel to the ocean from 700 feet above sea level to 2,000 feet elevation. The majority of South Kona is zoned agriculture and many residents are farmers growing coffee, macadamia nuts, avocado, and a variety of fruits and vegetables.

### 2.1.1 Population

According to the U.S. Census Bureau, the State of Hawaii residential population reached 1,275,194 in 2005. In 2005, thirteen percent, (167,293) of the state population resided in the County of Hawaii. Within the County, 25 percent of the 2000 County population was living in the Kona District (37,132 people).

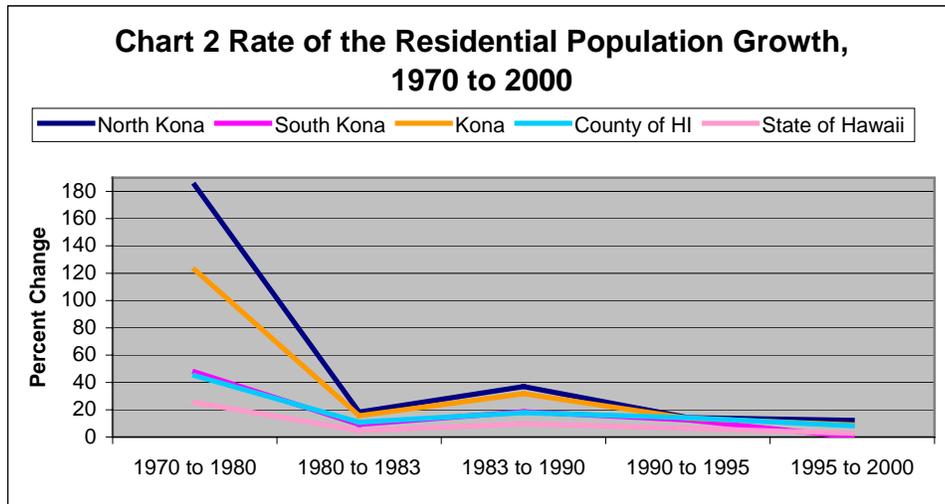
In 1970, the population in the County of Hawaii numbered 63,468 and was the first to show an increase, albeit small, since 1930 when the population peaked at 73,325, largely as a result of the importation of labor for the sugar industry. The population decline between 1930 and the 1960s was primarily due to the increasing mechanization of the sugar plantation, limited job opportunities in other economic sectors, and the out-migration of residents. This decline was reversed during the 1960s with a modest growth of 2,140 residents between the 1960 and 1970 census. Since 1970, the County's population has continued to grow, with the largest population increase occurring during the 1970's in North Kona (see Chart 1). The 1980 census registered a Hawaii island-wide resident population of 92,053 people representing a 45 percent increase over the 1970 census. In the North and South Kona Districts, the 1980 census total population of both areas increased 122.5 percent over the 1970 census.



Source: *The State of Hawaii Data Book, 1984, 1990, 1998, 2004, and 2005*

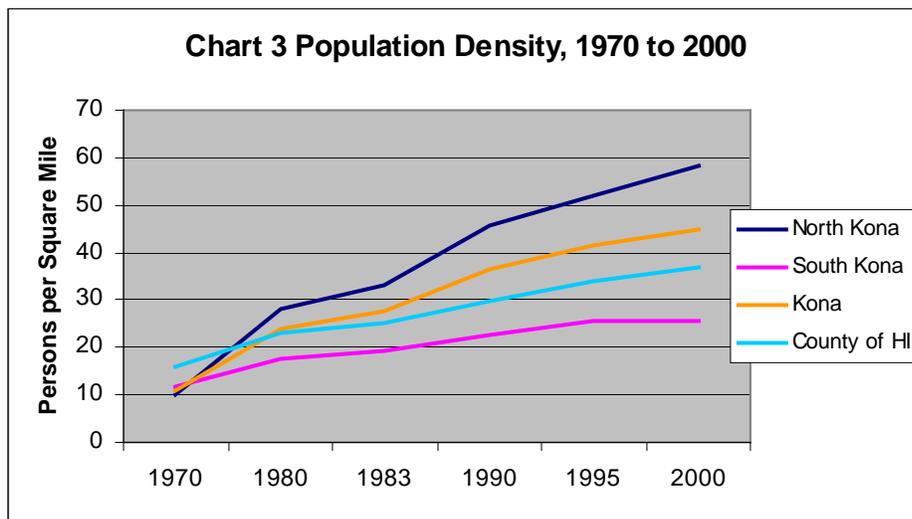
Between 1980 and 1990, the North Kona population growth rate began to slow, yet was still higher than South Kona, the County of Hawaii, and the State of Hawaii (see Chart 2). The 1990 census revealed a Kona resident population of 29,942 residents, or an increase of 52 percent over the 1980 Kona resident population. The census registered 37,132 Kona residents in 2000, a 24 percent increase over the 1990 resident population. About 65 percent of the county population growth during this

period came from net in-migration (people moving to the island from elsewhere) (Planning Department, 2005). According to the population data from 1990 and 1995, the population growth rate of North Kona, South Kona, and the County of Hawaii grew at a comparable rate ranging from approximately 12 to 14 percent. The growth of the South Kona residential population slightly declined between 1995 and 2000. From 1970 to 2000, the North Kona population has grown 490 percent. By contrast, the County of Hawaii and South Kona populations increased 134 and 115 percent, respectively.



Source: *The State of Hawaii Data Book, 1984, 1990, 1998, and 2004.*

Comparing population density after 1970 up until 2000, North Kona consistently exhibits a significantly higher population density than both South Kona and the County of Hawaii (see Chart 3). When the North Kona population boomed, the denser population reflects urbanization while South Kona’s lower population density reflects a rural character.

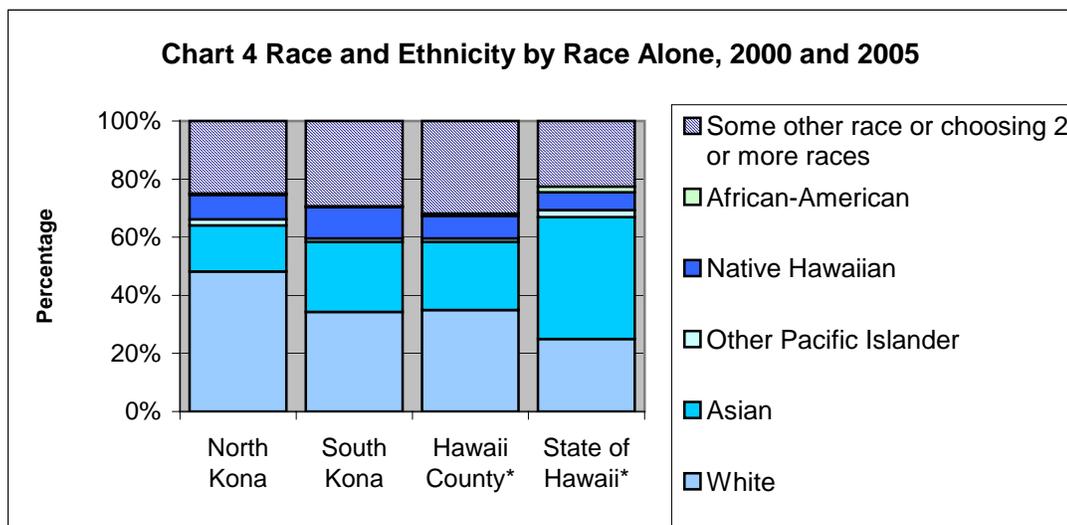


Source: *The State of Hawaii Data Book, 1984, 1990, 1998, and 2004.*

### 2.1.2 Ethnicity

The State of Hawaii has one of the most ethnically diverse populations in the nation. Compiling data categorized as Residential Population, Race Alone, published by the 2005 American Community Survey, approximately 79.0 percent of the State of Hawaii chose to be described as only one race. Of those that chose one race, approximately 42.0 percent of the state population as a whole consider themselves Asian, 24.9 percent Caucasian, and 6.1 percent Native Hawaiian. Within the County of Hawaii, 70.4 percent of the population chose to be identified as only one race. Compared to the entire population, approximately 34.9 percent of the residents consider themselves to be Caucasian, 23.5 percent Asian, and 7.8 percent Native Hawaiian. The County of Hawaii has a much higher proportion of Caucasians and a lower proportion of Asians than the rest of the state. There is also a slightly higher proportion of Native Hawaiians in Kona than the State, and a higher proportion of Hawaiian’s living in South Kona than North Kona.

Detailing the break down of race from the State, County, District to sub-District levels, there are greater similarities in the proportion of race and ethnicity between South Kona and the County of Hawaii, than found in North Kona (see chart 4). North Kona has a larger Caucasian population and smaller Asian population, which can be attributed to the changing economic interests of the region. With the weakening agricultural industry, laborers who were primarily of Asian decent moved away, and the visitor industry began to grow, creating the demographic transitions seen today.



Source: U.S. Census Bureau, Census 2000 and \*2005 American Community Survey

## 2.1.3 Economy

### 2.1.3.1 Economic History

The following is an updated summary initially presented in from the *Kona Regional Plan (1982)*:

#### 1950-1960

During the 1950s primary basis of the Kona economy was agriculture. In 1950, 52 percent of the employed persons in Kona listed farm laborer, farm manager or farmer as their occupation, and were involved in coffee, cattle, and other smaller agricultural endeavors. The remainder of the employed persons where in various occupations such as professions/technical workers, managers, clerical, sales, and construction providing the private and governmental services for agricultural activities and the resident population. Total employment at that time was 2,420 workers which supported a population of 7,330 persons.

Between 1950 and 1960 the coffee market improved and higher prices were paid. The opportunity provided by these price increases attracted people into the Kona area where total employment reached 3,859 in 1960 with a resident population of 8,743 persons. However, as the basis for this growth was agriculture, the structure of the economy, i.e. the types of jobs available in Kona, did not change dramatically. The visitor industry at that time was comparatively small consisting of 400 units centered around Kailua, and it was estimated that there were 291 workers employed in the hotels, as compared with 1,449 persons in agriculture.

#### 1960-1970

By 1970s the relative roles of the visitor industry and agriculture were completely reverse. The 1970 census reported that there were 333 agricultural employees in Kona, a decrease of 1,116 workers since the 1960 census count. Meanwhile, the number of persons in the visitor industry increased by a large amount. In 1970, the number of people in the personal service sector, which includes hotels, was 659 compared to the 344 in 1960. Similarly, there were significant increases in the transportation and retail sectors, and, substantially more persons engaged in construction, which is also related to the development of the visitor industry. By 1970 there were 1,449 visitor accommodation units in Kona, more than three times the units which were in-place ten years earlier.

Between 1960 and 1970 there was another kind of economic change occurring. The “urban service” sector which included finance, insurance, real estate, and business and repair services, health, education, professional services and communication increased, reflecting an expanding array of services to the resident population and businesses.

Thus, from 1960 to 1970 the structure of the Kona economy changed from a relative dominance of the agricultural sector to the dominance of the visitor industry. However, the combined increases in the visitor industry, construction industry, and

“urban service” were offset by the decline in agriculture, thus both in terms of total employment and population there was little overall change in Kona. By 1970, there were only 27 more employed persons and 93 more residents in Kona than there were in 1960.

#### 1970-1980

The 1980 population for North and South Kona was approximately 20,000 people based 1980 census. This amounted to a growth of approximately 11,000 over the 1970 count or a 10-year increase more than doubling the population. This rapid growth rate had not been matched in Kona over the preceding 80 years.

The economic changes that have spurred and supported this growth were largely in the visitor industry. From 1970 to 1979 visitor activity in Kona, as measured by occupied visitor units grow, from 978 and 2,324 occupied rooms. This growth resulted in more hotel employees along with increases in the retail and transportation services which are also part of the visitor industry. The tourism created demand for more hotels and spurred a dramatic increase in resort condominium construction. Both the visitor industry employee and construction employee growth added income from outside sources to the Kona economy and provided increased opportunities for businesses serving these industries and residents.

While not directly comparable to the 1970 census data there was a definite increase in construction sector, manufacturing, communications and utilities, wholesale/retail trade, and finance/insurance/real estate sectors. Interestingly, the agricultural sector also showed considerable expansion even though the traditional commodities of cattle and coffee appear to have remained stable or declined in output. The estimate employment growth in agriculture may have be due to several factors including: 1) while the farmers and farm workers often work the land on a part time basis newer entries to the field maybe more likely to consider themselves as agricultural workers primarily, 2) expansion in other crop types such as macadamia nuts, greenhouse culture and illicit marijuana cultivation.

While most, if not at all, sectors had increases during the 1970 – 1980 period, the principal basis for this expansion was in the export sectors of agriculture and tourism.

#### 1980-1990

In the 1980s there was a dramatic slowdown in the growth of Kona coincident with a national economic recession. Construction activity for condominiums, retail facilities, housing and industrial development slowed. The visitor industry was flat and experienced downturns in 1980 and 1982, something which is contrary to Kona’s historic growth trends. Meanwhile, the coffee industry has been undergoing a revitalization with the increase in coffee prices and the introduction of additional wholesale buyers.

1990-2000

Tourism replaced sugar as the County's primary economic generator during the mid-1980s and saw its peak visitor arrival numbers in 1989 and later in 2005. Since 1990, external factors such as the Asian economic crisis, the Persian Gulf War, and a brief economic downturn in the U.S. Mainland have contributed toward the State's protracted economic doldrum. In 1990, employment increased to 55,200 on a population base of 120,317. From 1990 to 1997, employment grew at an annual compounded rate of only 1.61 percent, a reflection of the County's recessionary economy during this period. Nevertheless, the County successfully attracted several world-class events such as the Ironman World Championship, PGA Seniors MasterCard Tournament of Champions at the Hualalai Resort and Golf Course, and Hawaiian International Billfish Tournament and saw the completion of the 243-room Hualalai Resort and its second championship golf course. Kona Airport also began to increase the number of direct national and international flights to Kona, which can be attributed to the 29 percent increased of visitors between 1990 and 2000. (County of Hawaii, 2005: 2-2)

The County's overall economic outlook remained mixed due to the County's dependence on the condition of the State's economy. Since 1990, the State's economy has been in a period of decline and only in recent years has shown improvement. While there are opportunities for expansion into new and existing industries such as astronomy, high technology, renewable energy, health and wellness, agricultural and eco-tourism, and diversified agriculture and aquaculture, external factors such as the world economies impact the County economy. However, the State and County's continuing support of research and development of emerging fields will ensure a promising future for the island's economy and its residents. (County of Hawaii, 2005: 1-7)

2000-2005

Hawaii's economy is healthy, which is demonstrated through the state's low unemployment rate, visitor industry growth, high hotel occupancy and busy construction industry. Tourism continues to be healthy, especially in the cruise ship market (First Hawaiian Bank, 2006). From 2000 and 2005, visitor arrival in the County of Hawaii increased 20 percent with the all time high visitor arrival count in 2005 (DEBT, 2005). Throughout 2006, Hawaii County continued to share in the statewide economic expansion. Taxable value in the County has risen a remarkable 14.5 percent per year since fiscal 2001 (Honolulu Advertiser, 2006). Hawaii County showed positive wage and salary job growth from 2005 to the third quarter of 2006; the highest growth among all counties (DBEDT, 2006).

The agricultural sector is more important to Hawaii County than any other county in the state. The major industrial export activity is coffee and macadamia nut milling and roasting. There are about 650 farms cultivating coffee on the western slopes of Mauna Loa and Hualalai mountains in the Kona district. Approximately, 3,500 acres of land is utilized for Kona coffee farming, producing about 3.8 million pounds a year, valued at about \$14 million (County of Hawaii, 2006).

The Natural Energy Laboratory of Hawaii Authority (NELHA) located south of Kona International Airport at Keahole was established to research the potential of ocean thermal energy conversion (OTEC) processes and related technologies. Today, over thirty tenants utilize the deep seawater for business ventures, generating approximately \$30 to \$40 million per year and providing over 200 jobs (NELHA, 2006).

The University of Hawaii Economic Research Organization (UHERO) forecasts five percent inflation in 2006--DBEDT predicts a 4.8 percent, and 3.4 percent inflation in 2007 (Pacific Business News, 2006). However, for the first time in a decade, 2006 is showing signs of a slowing construction industry. The University of Hawaii Economic Research Organization (UHERO) predicts that in 2007, construction employment will be flat and decline slightly in 2008 (Pacific Business News, 2006).

### 2.1.3.2 Major Industries

#### 2.1.3.2.1 Visitor Industry

West Hawaii, especially the North Kona and South Kohala Districts have emerged as the County's principal visitor destination, making the visitor industry the major source of economic activity for the County. Employment opportunities have flourished by the growth of the visitor industry. As tourism became the primary economic generator during the 1980s, a shift in employment from the non-service to service industry sector was apparent. In 1980, the service industry accounted for approximately 60.6 percent of average employment, rising to 71.3 percent in 1990 and 78.5 percent in 1997 (County of Hawaii, February 2005).

	2005	2004	% change
Statewide	7,416,574	6,912,094	7.3
Big Island	1,521,537	1,281,159	18.8
Kona	1,285,248	1,072,933	19.8

*Source: DBEDT, 2005.*

In 2004, the average daily census for Kona visitors was 189,577 and 21,940 in 2005, an 18.1 percent increase. In 2005, Kona had a total of 1,285,248 visitors, a 19.8 percent increase from 2004 (see Table 2). The hotel occupancy rate for the Big Island increased by 2.2 percent in 2005. Historically, the County records the lowest visitor unit occupancy rates of all the major Hawaiian Islands. Bed and breakfast units, although not a significant part of the total visitor unit count for the County, have been the fastest growing segment of the industry, growing from 55 units in 1990 to 171 units in 1998. Only in 1998 did the County's occupancy rate finally surpass that of Kauai (County of Hawaii, 2005: 2-7). During the period of 1980 to 1998, six new resort properties were developed for a total of 900 visitor units, including the

completion of the 243-unit Hualalai Resort at Kaupulehu in North Kona and the 263-time share unit Kona Coast Resort in Keauhou. North Kona now accounts for over 45 percent of total hotel rooms on the island. As of 2004, visitor accommodation units within Kona totaled 4,144 units in 2004, up from 4,004 units in 1999. More recently, between 2005 and 2006, there was a 0.7 percent decline in hotel/condominium resort occupancy in the County, while the occupancy rate in Kona remained the same. More recently, DBEDT has announced that Hawaii Island attracts the largest proportion of high-income visitors in the state as 24.7 percent of visitors hold incomes exceeding \$150,000 (Nedd, 2006). Visitor expenditures in 2005 for the State were \$11,904 million, in which 14.0 percent was spent on the Hawaii Island.

Tourism continues to be healthy, especially in the cruise ship and labor market. The cruise ship industry has contributed to the growth of the County. In 2005, 317,602 passengers visited the Big Island. On shore spending for cruise passengers per person per day was \$75.50.

#### **2.1.3.2.1 Ironman Triathlon**

What began as a challenge between fifteen Oahu runners and swimmers in 1978 has become a competition hosting up to 1,800 of the world's top tri-athletes chosen from among 50,000 athletes competing to qualify. The Hawaii Visitors and Convention Bureau estimates the event attracts seven to ten thousand visitors (Lynch, 2000). There were 1,727 entries in 2004, 1,743 entries in 2005, and an estimated 1,649 athletes from 50 countries scheduled to participate in 2006.

The Department of Business Economic Development and Tourism (DBEDT) economic impact study found that the Ironman competition generates approximately \$20 million in direct sales. With a multiplier effect, which takes into account periphery revenues such as additional food and retail sales and money being re-spent, the race may generate \$26.2 million, resulting in \$2.5 million in tax revenues.

The economic impact of the Ironman athletes and their friends and families spans over 17 days, benefiting island businesses and promoting the island economy. DBEDT economic impact study found around half of the participants have an income of over \$75,000, and on average, spend \$1,187 on lodging (Thompson, 1998). For the locals, the competition provides a fluctuation of revenue not typically seen throughout the year. Hotels such as King Kamehameha's Kona Beach Hotel, the headquarters of the Ironman, must temporarily employ an additional 60 people to assist with the increased demands. According to King Kamehameha's Kona Beach Hotel corporate director of hotel operations, Mark McGufie, the Ironman accounts for at least a ten percent increase in hotel occupancy for hotels, condominiums, vacation rentals and bed and breakfasts in Kailua-Kona (HIEDB, accessed: 2006). Many local businesses appreciate the added revenue as the Ironman has the power to keep local people employed and provide added income for island families.

#### **2.1.3.2.1 International Billfish Tournament**

Renowned for its blue marlin, Kona has hosted the annual Hawaiian International Billfish Tournament (HIBT) since 1959. Founded by Peter S. Fithian, the International Billfish Tournament is a symbol of big-game fishing tournaments. Anglers come from around the world to compete in this invitational tournament known for its prestige, location, and big catches. The 2006 International Billfish Tournament was comprised of 28 teams: 130 anglers from eight countries, 45 family members, and 75 captain and crewmembers.

The 1998 University of Hawaii at Hilo's economic study determined an anglers competing in the Billfish Tournament spend on average \$8,000 throughout the competition. The study also found that the 224 anglers competing in the 1998 Tournament spent approximately \$1.8 million. Taking into consideration the multiplier effect, which accounts for periphery revenues such as money being re-spent, the estimated spending as a result of the tournament totaled \$3.7 million.

A record eighty teams have competed in the tournament. However, during the Nineties, the number of teams dropped to record lows. In recent years, the numbers of teams competing has steadily risen. There were 25 teams in 2005, 28 teams in 2006, and Billfish Tournament Officials expect at least 30 teams to participate in 2007.

#### **2.1.3.2.2 Agriculture**

The agricultural sector is more important to Hawaii County than any other county in the state. The major export activity is coffee and macadamia nut milling and roasting. The coffee belt is a narrow belt of land approximately 2 miles wide running parallel to the Kona coast from 700 feet elevation to 2,000-foot elevation. South Kona produces the bulk of the island's coffee crop. There are about 650 farms cultivating coffee on the western slopes of Mauna Loa and Hualalai mountains. The Kona district produces about 3.8 million pounds a year, valued at approximately \$14 million (County of Hawaii, 2006).

Macadamia nuts may not be as highly recognized as kona coffee, but it is an important agricultural product to South Kona. The district is home to MacFarms of Hawaii and Kapua Orchards, the primary producers of macadamia nuts. During the 2003 and 2004 growing season, Hawaii produced 53 million pounds of macadamia nuts with a significant amount coming from South Kona (Kona-Kohala Chamber of Commerce, 2005).

Other agricultural activities such as fruits, plants and flower, and specialty and diversified food crops are also expanding the agricultural base in Kona.

#### **2.1.3.2.3 Construction Industry**

Data from the 2000 U.S. Census show the island of Hawaii gained more than 28,000 residents between 1990 and 2000. Thus, the Kona districts experienced a building boom in residential construction due to the increase in newcomers attracted

to living here in Kona. The locations of residential building permits in the County are extremely significant as most are in the private subdivisions approved in the 1950s and 1960s. Hawaiian Ocean View Estates/Hawaiian Ranchos was one of the major areas with older subdivisions and many new building permits. Between 2004 and 2005, building permits allowed 422 new homes in this area (Planning Department, 2006). Construction has been strong due to retirees and large population of baby boomers are moving to Kona for the weather and the lifestyle. There are many subdivisions, condominium, and resort-residential projects under construction in Kona. However, for the first time in a decade, 2006 has showed signs of a slowing construction industry. The University of Hawaii Economic Research Organization (UHERO) predicts that in 2007, construction employment will be flat and decline slightly in 2008 (Pacific Business News, 2006). Since 2005, building permits in North Kona has declined from the very high levels during the previous two years (Planning Department, 2006). The following table presents the number of residential building permits in the Kona region by tax map key zones:

Table 3  
2006 New Residential Permits (Up to End of November)

North Kona	2006 Permits (Jan-Nov)	South Kona	2006 Permits (Jan-Nov)
Kiholo	1	Captain Cook	18
Kaupulehu	52	Napoopoo	6
Kukio-Hualalai-Kalaoa	91	Keei	2
Kealakehe	6	Honaunau	1
Kailua-Kona	106	Kiilae	1
Royal Poinciana Drive	16	Hookena	2
Holualoa-Magic Sands	23	Opihi Hale	14
Keauhou	15	Papa Bay	20
Kainaliu-Kealakekua	3	Milolii	2

\* Planning Department, 2006

According to the 2006 First Hawaiian Bank's Economic Forecast for the Island of Hawaii, previously permitted construction projects are being built, which are contributing to the continuing construction boom. However, companies connected to the industry recognize emerging signs of cooling. Building permit values in the state slowed in the third quarter of 2006 and although construction jobs continued to increase the pace of growth has slowed from the rapid growth of the eighteen months (State of Hawaii, DBEDT, 2006). Economist Dr. Leroy Laney believes in 2006, the state will set a new record for construction completed in current dollar terms. Yet, the decline in private building permits suggests an upcoming slowdown in the industry (First Hawaiian Bank, 2006). Table 4 demonstrates the increase of building permits since 1980 up until 2004:

Location	1980	1985	1990	1995	2000	2004
Hawaii State	22,771	23,332	27,689	17,231	19,074	22,043 <sup>1</sup>
Hawaii County	3,732	2,933	4,720	2,707	3,254	4,321
North Kona	n/a	n/a	n/a	767	1,139	1,338 (2003)
South Kona	n/a	n/a	n/a	150	144	213 (2003)

Source: Data Book 1984, 1987, 1996, 1997, 2004, and 2005; County of Hawaii Data Book 2004  
<sup>1</sup> Kauai County total includes residential data only.

#### 2.1.3.2.4 Natural Energy Laboratory of Hawaii Authority

The Hawaii State Legislature established the Natural Energy Laboratory of Hawaii Authority (NELHA) in 1974. Located on 322 acres of land at Keahole Point on the coastline south of Kona International Airport at Keahole, NELHA was originally established to research the potential of ocean thermal energy conversion (OTEC) processes and its related technologies to produce alternative energy through the use of the temperature difference between deep sea water and surface water. In 1998, legislation approved the expansion of NLHA to include business activities that enhance economic development and generate additional revenues to support the growing park. Today, a variety of tenants utilize the deep seawater for business ventures. Uses for the deep seawater include cultivating seaweed, abalone, microalgae, lobster, black pearls, shellfish, strawberries, and the production of drinking water mandated in Japan as a health supplement.

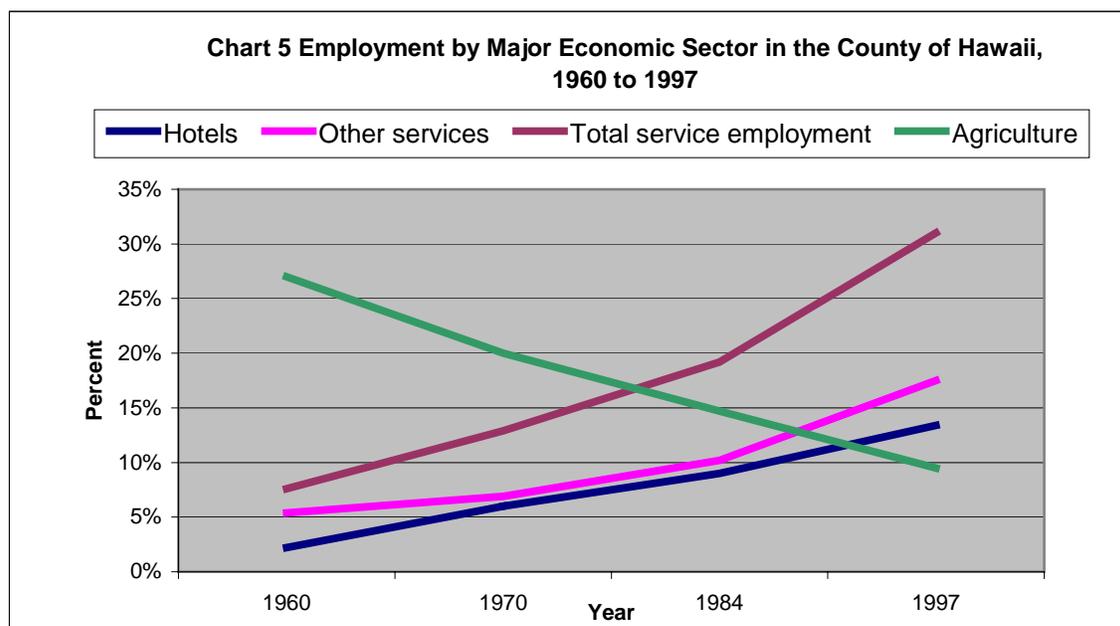
Today, NELHA is the home to 30 successful enterprises which generate about \$30 to 40 million per year in total economic impacts, including tax revenues, over 200 jobs, construction activity and high value product exports (NELHA, 2006).

#### 2.1.3.3 Employment

Within the past forty years, the growth of Hawaii County in terms of employment, population, income and economic activity has become more closely tied to the visitor industry than any other sector of the economy. Employment opportunities spurred by the growth of this industry has been the catalyst for economic growth in the North and South Kona Districts. As tourism became the primary economic generator during the 1980s, a shift in employment from the non-service to the service industry sector became unparalleled.

Employment opportunities on the Island have increased by over 22,700 jobs from 1970 through 1997. The 1980s saw employment grow at an annual compounded rate of three percent as service industries (wholesale/retail trade, finance, hotels, etc.) accounted for approximately 61 percent of the private industry workforce and 49 percent of the total wages earned (see Chart 5). In 1980, employment within the County totaled 40,850 on a population base of 92,053 residents. In 1990,

employment increased to 55,200 on a population base of 120,317. From 1990 to 1997, employment grew at an annual compounded rate of only 1.61 percent, a reflection of the County's recessionary economy during this period. Employment in secondary industries also expanded, while the largest employment decrease was in the sugar industry as the last sugar processing facility closed in 1997. By 1997, the service industries dominated private industry, accounting for approximately 79 percent of the total workforce and 74 percent of the total wages earned. The 2000 population was 148,677 with an employment base of 69,937 (County of Hawaii, 2005: 1-9 and 2-11). Employment levels continue the strong growth, and in 2005 employment levels peaked at a rate not seen since 1990. During the third quarter of 2006, 635,950 people were employed in the state, an increase of 16,400 people or 2.6 percent from the third quarter of 2005. Also in the third quarter of 2006, Professional and Business Services added the most jobs, an increase of 3,350 jobs or 4.5 percent, as compared to the third quarter of 2005. Natural Resources, Mining and Construction sector and the Visitor-related industries also did well (DBEDT, 2006).



Source: County of Hawaii General Plan

Unemployment rates during the 1980s and 1990s followed a similar trend as employment rates. Unemployment rates dropped drastically from 1980 to 1990 (6.2 percent to 3.8 percent, respectively) due to the County's strong economy during this period. As the economy slowed during the 1990s, by 1997, unemployment peaked at 10.2 percent (County of Hawaii, 2005: 1-9). As the global economy and tourism began to improve, so did unemployment. The 2000 unemployment rate for the County declined to 4.9 percent. During this time, Holualoa and Kalaoa CDP had the highest employment rates (98 percent), while Hawaiian Ocean View Estates' unemployment rate was significantly higher than the other Kona CDPs. Over half of those residing in the Kona CDP are private wage and salary workers. The County of

Hawaii unemployment rate in 2005 was slightly less at 4.6 percent (2005 American Community Survey).

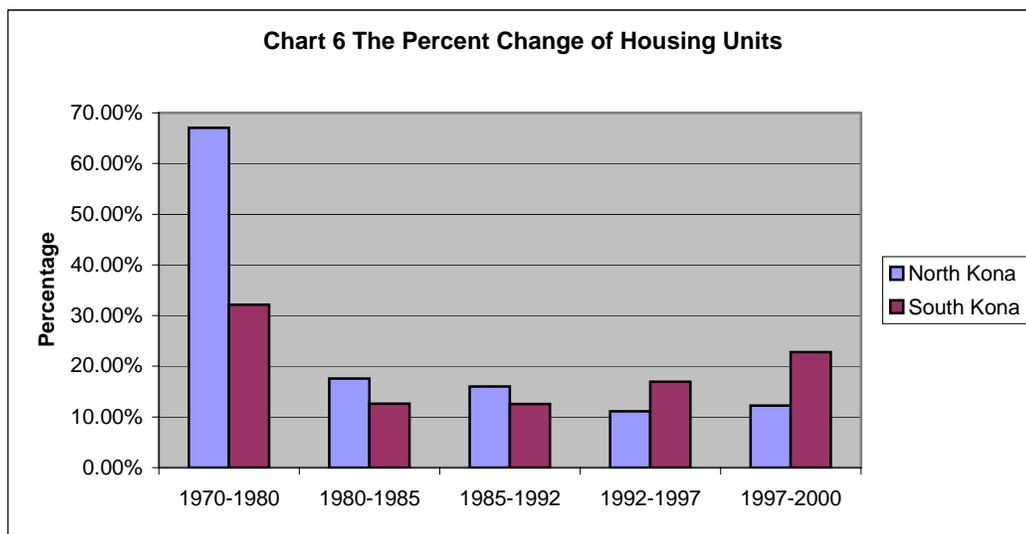
Since the mid-1980s, the County of Hawaii has seen a dramatic shift in its agricultural employment profile. Since the demise of the sugar industry in 1997, the island of Hawaii has since established itself as the center of diversified agriculture production, scientific research, and education in the State. Agricultural employment will increase significantly as former sugarcane lands are brought into production with import replacement, export and value added crops and products. Additional employment will be derived from expanding agro-tourism enterprises. The expansion of the industry will be facilitated by the establishment of a new air cargo distribution center and post-harvest processing facilities that will allow for significant increases in the volume and types of products exported to the continental United States and foreign countries.

The shift in employment trends has significantly changed the economic make-up of the County as workers have in-migrated to meet the demands of employment growth in the service industry, which is primarily fueled by the tourism sector. Additionally, non-service industry workers, primarily in agriculture, adjusted and shifted to new employment opportunities in the service industries as agricultural jobs dwindled. Upon completing high school, an increasing proportion of the County's youth have pursued higher education. Despite this trend, there is still scarcity of employment opportunities for the college-educated that desire to return to the island. In the year 2020, the Planning Department anticipates a population of 217,718 with an employment base of 106,492 or 49 percent. Average annual employment growth rates are anticipated at 2.11 percent between 2005 and 2010, and 2.16 percent between 2010 and 2020. These employment projections are below the robust 3.05 percent average annual employment growth rates during the 1980s, but above the 1.61 percent average annual growth rate during the 1990s. (County of Hawaii, 2005: 1-9 and 2-11)

#### **2.1.3.4 Housing**

Several major issues and problems faced by Hawaii County continue to involve housing. Rapid population growth in some areas has not been accompanied by parallel growth in affordable residential housing construction. The increasing rate of land prices, the cost of construction and the growth of earning power contribute to the lack of affordable housing opportunities. Thus, proportionately fewer residents are able to afford purchasing a home. In 1997, SMS Research & Marketing Services and Locations, Inc., in cooperation with the State Housing Finance and Development Corporation (HFDC) and the various Counties' housing agencies, prepared the Hawaii Housing Policy Study Update 1997 that reviewed various housing issues throughout the State of Hawaii. According to the study, a family with a median annual income of approximately \$30,300 would qualify for an "affordable" home priced in the neighborhood of \$140,000, in which case, approximately 36 percent of the total households on the island of Hawaii fall below the median annual income (County of Hawaii General Plan, 2005: 9-4).

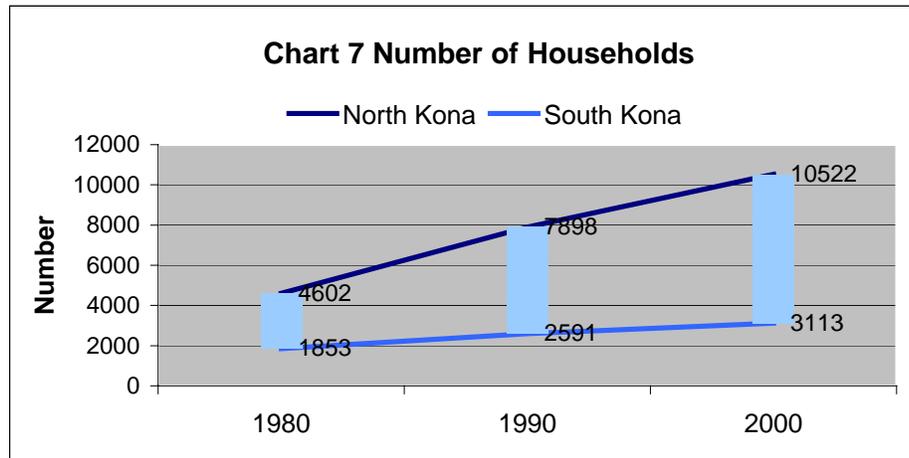
The number of housing units between North and South Kona vary dramatically. In 1990, 70 percent of housing units in Kona were located in North Kona, and in 2000, the number grew to 75 percent (see Chart 6). Yet, this is proportional to the population as 77 percent of the 2000 population in Kona resided in North Kona. Housing units in North Kona have increased from 9,150 in 1985 to 12,254 in 1997, representing an annual growth rate of approximately 2.8 percent. In spite of continuing moderate growth of subdivision activity and housing construction in the North Kona district, housing problems for the low and moderate-income groups have been particularly acute. In 1990, approximately seven percent of all households within the district reported incomes below the poverty level. Many of these families compete with the visitor market for rental of apartment and condominium units (County of Hawaii, 2005: 9-24).



Source: County of Hawaii General Plan, 2005

Home ownership rate in North Kona has remained steady at 43 to 44 percent of housing units, whereas South Kona’s homeownership rate increased from 49 to 55 percent during the 1990s. Although a significantly greater number of housing units exist in North Kona, South Kona demonstrates greater population stability and a higher rate of homeownership. In the last decade, South Kona’s housing vacancy rate remained around 11 percent, while North Kona’s vacancy rate ranged from 21 to 25 percent. Based on housing units alone, North Kona has been developed to support greater populations than South Kona, yet, North Kona’s housing problem can be attributed to the high real estate prices. South Kona demonstrates a population with little to no growth, where residents are able to invest home ownership.

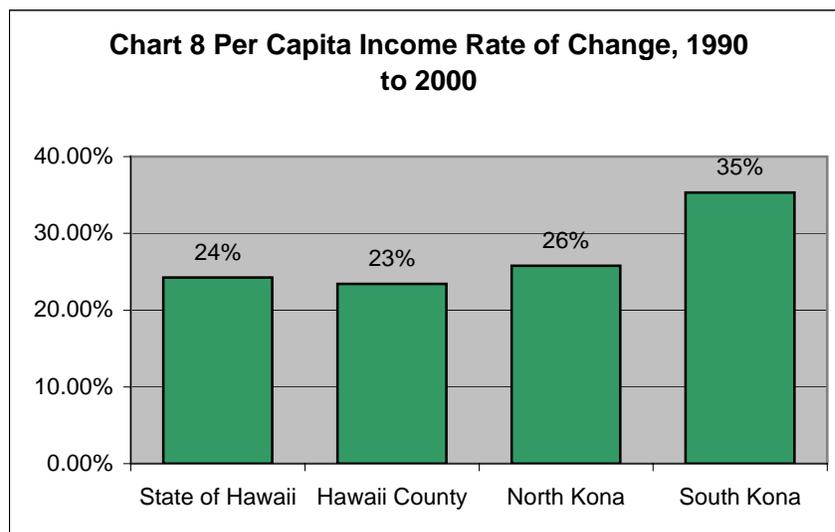
According to the 2000 U.S. Census Bureau, the proportion of households in North Kona increased 72 percent between 1980 and 1990 and then another 38 percent during 1990 to 2000 (see Chart 7). South Kona households grew 40 percent between 1980 and 1990 and then 20 percent between 1990 and 2000. In 2000, North Kona had more than twice the number of households than South Kona.



Source: U.S. Census Bureau, DP-1, 2000

### 2.1.3.5 Income Distribution

Per capita income in the County grew at an annual compounded rate of 5.18 percent during the 1980s and 2.91 percent through 1996. The increase during the 1980s are reflective of the strong economic conditions that existed at the time with a corresponding decrease in per capita income growth during the recessionary periods of the 1990s. Over a ten-year span, from the 1990 census to the 2000 census, the per capita rate of the State, County, and Kona districts increased an average of 27 percent (see Chart 8). Between 2000 and 2005, the per capita income of the County of Hawaii increased 12.8 percent to \$21,174. Median household income also increased at a healthy rate from 1980 to 1990, increasing from \$16,975 to \$29,712 at an annual compounded rate of 5.76 per cent. Without taking into account inflation, the median household income from 1990 to 2000 increased 33.9 percent. And from 2000 to 2005, the median household income continued to increase at 21.9 percent. (County of Hawaii, 2005: 2-11 and 2005 American Community Survey)



Source: County of Hawaii Data Book 2004

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### **3 ENVIRONMENTAL SETTING**

#### **3.1 Geology and Topography**

The island of Hawaii is composed of five volcanoes – Kohala, Mauna Kea, Mauna Loa, Hualalai, and Kilauea. Of these five volcanoes, only three (Hualalai, Mauna Loa, and Kilauea) remain active within historical times (late 1700's). Further only Mauna Loa and Kilauea have erupted in recent years.

Kona is situated along the western slopes of both Hualalai and Mauna Loa volcanoes, and is geologically quite young, being covered by recent prehistoric and historic lavas. Kona has not experienced extensive erosion and lacks streams or well-defined drainage channels due to the climate of the region.

The Kona area has ground elevations ranging from 40 feet along the coast to 13,000 feet at the top of Mauna Loa. The coastal areas are characterized by lava fields with mixed shrub and grass. In North Kona, between Queen Kaahumanu Highway and Mamalahoa Highway the land experiences a steady increase in elevation (slope of about 8 – 10%). Individual sections, fairly large in area have slopes above 10% and present considerable difficulties for urban development. In South Kona, the land is steep. Upland forests are found above Mamalahoa Highway due to increase rainfall. The prime agricultural belt runs parallel to the coast at 700 – 2,000 feet. The Kona region is unique due to the wide range of climatic conditions in a relatively small distance. Kona provides different physical environments from the coastline to high elevations.

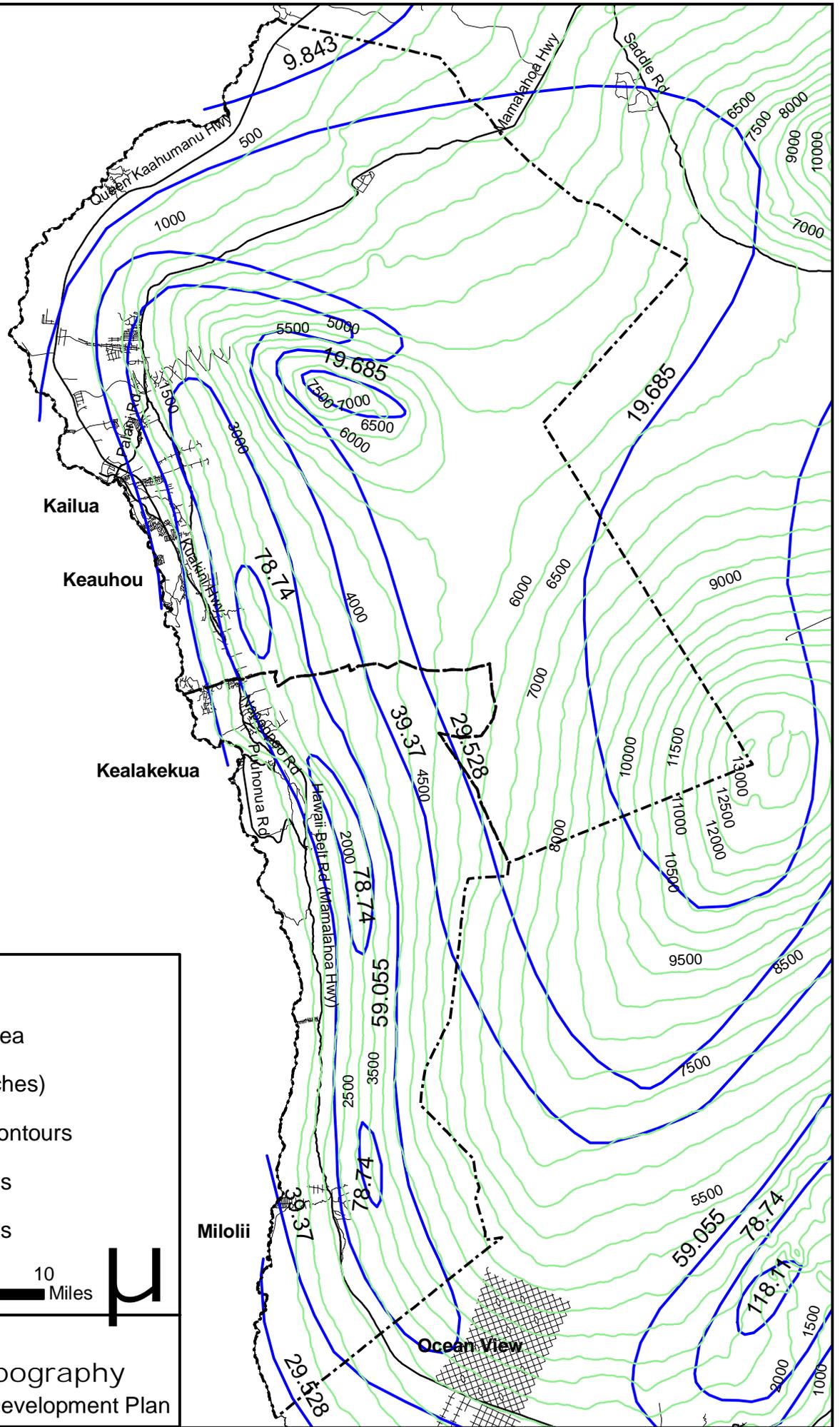
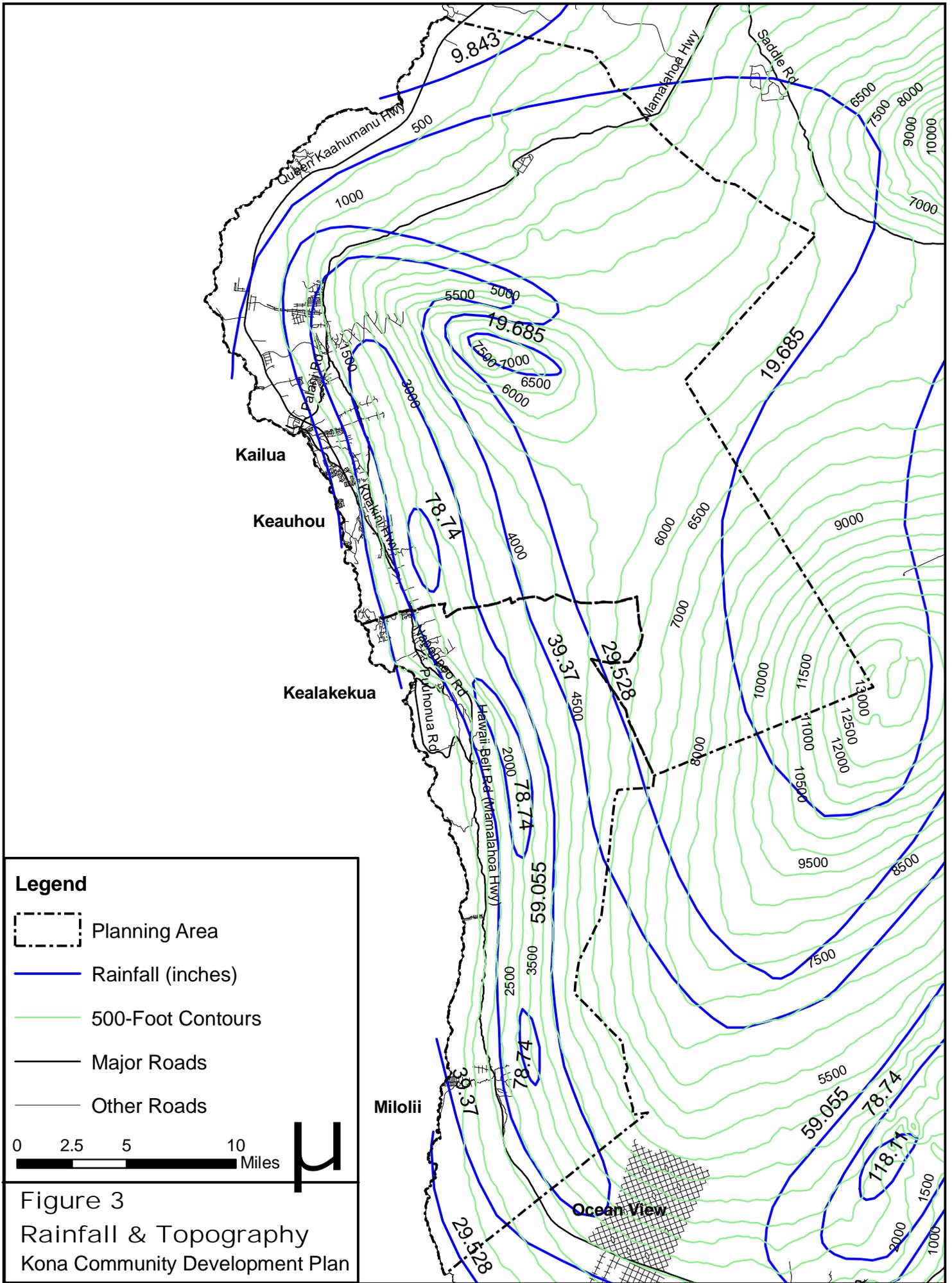
#### **3.2 Climate**

The high central mass of the Island shelters the Kona district from the strong prevailing pattern of the northeast trades. Instead, the Kona coast has an alternating land-sea system of air circulation resulting from the differential heating of the land and water mass. On-shore breezes prevail in the morning and early afternoon, while offshore breezes develop in the late afternoon and evening. The average rainfall varies from 30 inches along the coast to more than 100 inches on the mountain slopes above the prime agricultural belt, then proceeding mauka drops to 50 inches at an elevation of 5,000 feet (see Figure 3). In summary, the coastal areas of Kona are characterized by almost ideal climatic conditions of bright sunshine and steady breezes with occasional light afternoon showers.

Kona climate is warm and humid. Temperatures range from the 70s in the winter to the 90s in the summer. Inland at the higher elevations are usually cooler than the coast.

#### **3.3 Regional Soils**

According to the U.S. Soil Conservation Services (1977), 36 soil types are identified in North and South Kona. Major soils series include:



- Apakuie
- Beaches
- Hanipoe
- Honaunau
- Honuaulu
- Kainaliu
- Kealakekua
- Manahaa
- Puukala
- Puu Pa
- Rough Broken Land
- Waiaha
- Cinder Land
- Huikau
- Kahaluu
- Kaimu
- Keei
- Kekake
- Kiloa
- Kona
- Lalaau
- Lava flows, aa and pahoehoe
- Mawae
- Puna
- Puanahulu
- Rock Land and Very Stony Land

Soils in the region supports crops, including macadamia nuts and coffee. Soils are also ideal for pasture and wildlife habitats.

The Agricultural Lands of Importance in the State of Hawaii (ALISH) Map, prepared by the State Department of Agriculture, classifies agricultural lands into three categories: 1) prime agricultural land, 2) unique agricultural land, and 3) other important agricultural land. Unique and other important agricultural land are found within the North and South Kona districts.

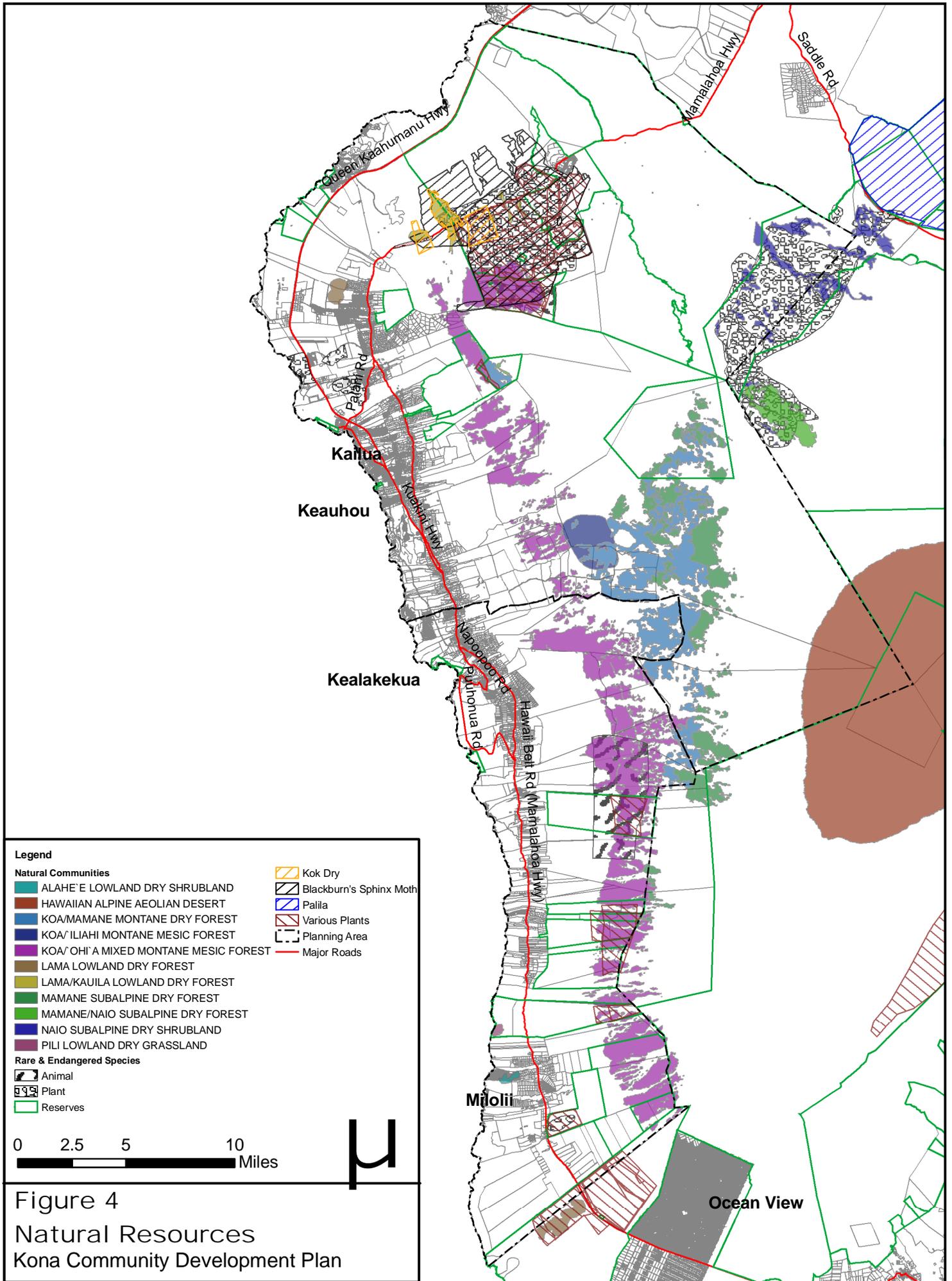
### **3.4 Natural Resources**

Differences in climate, topography, and soils have resulted in unique natural ecosystems. The classification of terrestrial ecosystems is based on the elevation at which they occur. Before human settlement the North and South Kona districts were made up of the following ecosystems:

- Subalpine forest, woodland, and shrubland
- Montane dry and mesic forest and woodland
- Wet forest and woodland
- Lowland and dry and mesic forest, woodland, and shrubland
- Lowland dry shrubland and grassland

In the past several hundred years of human habitation the size of natural ecosystems have diminished. Human activity and introduction of non-native plants and animals have displaced these natural communities. Today, lowland dry shrubland and grassland and lowland dry and mesic forests have decreased (see Figure 4).

Human habitation not only has affected natural ecosystems, but also the plants and animals inhabiting those ecosystems. A few areas in Kona are remaining habitat for rare and endangered species and are protected.



### 3.5 Water Resources

Water resources in the Kona area are associated with groundwater reserves. The North and South Kona districts overlies the Hualalai and Southwest Mauna Loa Aquifers. Figure 5 shows the aquifer system area boundaries for the Island of Hawaii. As illustrated on the map, hydrologically related aquifer system areas are grouped into aquifer sectors.

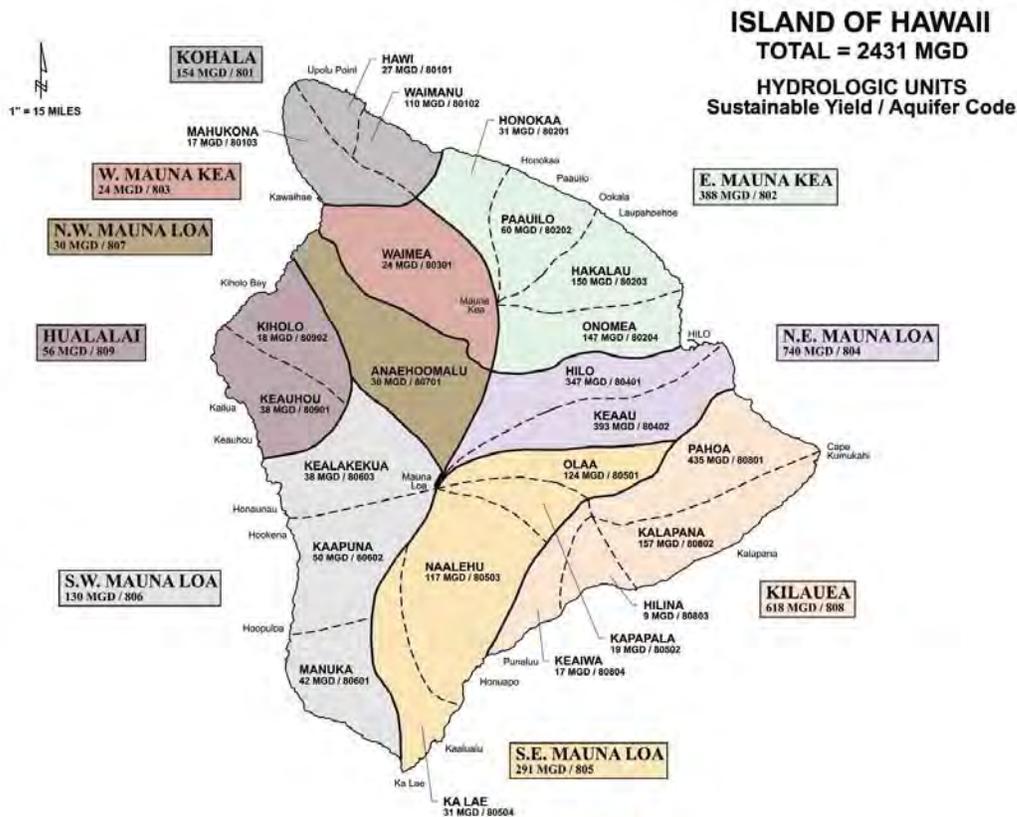


Figure 5: Island of Hawaii Aquifer System and Sector Areas. The aquifer system code and ground water sustainable yield for each aquifer system and sector area are as noted in the figure. Source: State Commission on Water Resource Management (<http://www.hawaii.gov/dlnr/cwrm/data/gwhawaii.pdf>)

There are no perennial streams in the Kona area. However, several well defined drainage channels or watercourses are found within the high rainfall areas situated on the slopes of Mauna Loa and Hualalai. Kona streams are significantly affected by the seasonal rainfall pattern and geologic character of the region which tend to limit the existence and frequency of actual flow.

The marine waters off of West Hawaii are designated “Class AA”, these waters are to remain in their natural pristine state with minimum pollution or alteration of water quality from any human-caused source or actions.

Watersheds within North and South Kona Districts:

- Kiholo
- Keahole
- Honokohau
- Waiaha
- Kealakekua
- Kilae
- Kauna
- Pohakuloa

### **3.6 Natural Hazards**

The U.S. Geological Survey prepared maps to determine the history and severity of volcanic hazards on the island of Hawaii. The island is divided into 9 zones based on past coverage of lava flows, Zone 1 being the most hazardous and Zone 9 being the least hazardous. Lava flow zones 1 – 4 are located within the North and South Kona districts.

The Kona region has experienced several earthquakes between 1929 and 1993, of magnitude 5 or greater (Juvik and Juvik, 1998). Earthquakes are a result of the movement of magma within Kilauea and Mauna Loa or movements along fault.

The entire coastline of North and South Kona is subject to inundation due to high seas and swells caused by hurricanes and storms. Coastal areas have received damage to roads, harbor facilities and oceanfront buildings. The shoreline areas are also subject to tsunami activity. Tsunami runup has been recorded in two locations along the South Kona shoreline, in Milolii and Hookena. Kailua and Keauhou have also recorded run up and damage from tsunami activity in the past.

Being geologically young, North and South Kona lack well-defined drainage features characteristic of the older islands in the Hawaiian archipelago. Nevertheless, erosion has formed numerous drainage-ways and water courses leading towards the ocean. Drainage-ways that have been identified as potential flood zones extend mauka from the coastline between Kailua Bay to the north and Kauhako Bay, south of Hookena. These water courses generally are non-flowing except in times of heavy and extended rainfall. Most rainfall runoff sheet flows and percolates into the ground. Surface runoff occurs during high intensity rainfall of long duration.

### **3.7 History**

The following is a summary from the *Kona Regional Plan*:

#### Pre-History

Kona's tradition for the later part of the pre-historic period are tied to the ruling chiefs, more so than other districts on the Island of Hawaii. Here according to accounts of native scholars, alii and moi from the 15<sup>th</sup> century to the 19<sup>th</sup> century

resided in Kona. Prior to the 15<sup>th</sup> century, other than district chiefs, indications are that the residences of the senior lines were maintained in the Hamakua District.

Tradition as a cohesive body begins for the Kona district with mention of Ehukaimalino, a Kona district chief in the 14<sup>th</sup> century. As second in seniority to the titular Island sovereign, Liloa, he sent his son to Waipio Valley as a steward.

Upon the death of Liloa, his rule was passed to his sons Hakau, of chiefly rank and Umi, of lesser rank. Umi ultimately gained sole control of his father's jurisdiction and moved the seat of government from Waipio Valley to Kona.

Sources indicate that both North and South Kona was probably the most populated area on the Island of Hawaii at the time of contact. Archaeological evidence and remains are suggestive of the large population. Numerous habitation sites and shelters are strung along the coast. In addition, there are numerous religious structures and burial platforms which occur within a mile of the coastline. The indications through radio-carbon and basaltic glass dating techniques are that Kona has been occupied at least as early as the 12<sup>th</sup> century.

The coastal remains are indicative not only of the residential pattern but also the utilization of a rich marine environment. Food sources from this environment were not only utilized, but also cultivated in fishponds such as those at Kahaluu, Honokohau, and Kaloko.

In addition to the productivity of the sea, the availability of agriculturally productive lands within a short distance from the coast contributed to the settlement of Kona. While much of the population lived along the coast, ethnographic material indicate that others lived in dispersed clusters among the upland farms.

The early agriculturally productive areas have been described as stretching from mauka Honokohau Harbor southward to mauka Kealia. Agricultural crops planted were wauke (paper mulberry), sweet potatoes, breadfruit, dry land taro, ti, sugarcane and bananas.

If the marine and land environments provided a bountiful food resource, other aspects of the natural environment placed some constraints on the location and size of the population. One which appears repeatedly in the early accounts is water. The native culture resolved part of this limitation through the use of brackish water from wells and springs along the coast. Other sources which were utilized were drippings from ground seepage through caves and high elevation springs.

#### 1778 – 1850

The period and the changes for Kona began in 1779 with the visit and subsequent death of the English discoverer of the Hawaiian Islands, Captain James Cook, at Kealakekua Bay. Within four years of the discover by Captain James Cook,

Kalaniopuu then ruling chief of the Island of Hawaii died, leaving the jurisdiction of the land to his son Kiwalao and his new nephew Kamehameha.

At the battle of Mokuohai, in 1782, Kiwalao met his death. It took Kamehameha the next nine years to once again reconsolidate the Island under the jurisdiction of his rule.

During this period, Hawaii was visited by many foreign ships, particularly those of the British fur trading companies. The first of the trading ships arrived in 1785 and other continued to find anchor and replenishment for their voyages to the Pacific Northwest Coast. By 1790, Kamehameha managed to acquire guns and cannons from two English seaman, Isaac Davis and John Young, who became counselors in the use of foreign arms and war tactics.

Having consolidated the rule of the Island of Hawaii in 1791, Kamehameha then proceeded to establish control over the rest of the island chain. By 1796, the islands of Maui, Molokai and Oahu were under his domain. This conquest was also accomplished with the use of foreign arms and advice.

Vancouver, a British explorer, affected the Hawaiian Islands in a lasting way. During his second visit, he presented to Kamehameha a gift of cattle and sheep, together with plantings of grapes, vegetable seeds and other produce.

With the unification of Hawaii, Maui and Oahu, Kamehameha returned to reside at Kailua. The move from Oahu to Kona was a deliberate attempts by Kamehameha to isolate and control his contacts, hence the government's contacts, with foreigners, since by this time Honolulu was becoming an active commercial center as foreign ships found it a better anchorage than elsewhere in the islands.

This move to seat the capital of government in Kona had the effect of maintaining Kona within the stream of political activity and part of the scene of rapid cultural change.

It was at Kailua, at Kamakahonu that Kamehameha died in 1819. Like his uncle Kalaniopuu, ruling chief before him, Kamehameha passed the care of the kingdom and land to his son, Liholiho and the care of the god Kukailimoku to his nephew, Kekuaokalani. His favorite wife Kaahumanu, he established as regent and chief counselor.

After the death of Kamehameha, his heir Liholiho, in concert with Kaahumanu, his mother Keopuolani and others of the royal court, in an act of eating with women, nullified the old kapu system. This act of invalidating the eating tabu had the profound effect of hastening the adoption of changing conditions and the forsaking of the traditional culture and religion.

In 1820, American Christian missionaries arrived in Kailua to petition the ruling chief Liholiho for permission to establish mission stations in the islands. Permission was granted and the missionaries established a station just outside of Kailua.

In that year, also, Liholiho and the counsel of chiefs advising him moved the capitol of the Hawaiian islands to the new trading centers of Honolulu and Lahaina, however the governorship of the Island of Hawaii remained in Kailua.

It is during this period, beginning immediately with the discovery of Hawaii, that foreign economies and markets were introduced.

As first the barter was water, food and fuel with the fur traders who gathered their cargos in the West Coast of North America and stopped in Hawaii on their voyages to and from China. These were needed not only to provision ships, but also to supply the needs of the Russians, Americans, Spanish and British colonies along the Pacific Northwest Coast as well as the China Market.

Trade export items which developed during this period included native products such as salt, sandalwood, pork and rope (sennit). As exotic items were introduced and grown here, the list grew to include cattle for food and hide, sheep, sheepskin, vegetables oranges and melons.

In addition to the traditional agricultural zones, the discovery and exportation of sandalwood extended the utilization of the land into the forest areas.

During the lifetime of Kamehameha, control of the sandalwood logging was under his sole authority. Upon his death, however, the monopoly on this trade item was divided among the chiefs. This led to the intensification of the logging to the extent that within a period of thirty years the resource was essentially depleted for commercial purposes.

Once Liholiho removed the capitol of the kingdom first to Lahaina then to Honolulu, the pace of change slowed for Kona. Nevertheless, events and increased foreign economic activities occurring principally in Honolulu made themselves felt in the Kona districts.

Indirectly the effects felt in the Kona district were 1) a shift in agricultural products from growing traditional items for subsistence to that of growing produce for trade 2) interest in lands by foreigners. During this period opportunities to engage in trade with shipping agents and other foreigners were limited to the chiefs. The economic system was a juxtaposition of the traditional Hawaiian system along with western economic system.

The traditional economic system operated by barter or exchange of goods by the maka-ainana within an ahupuaa on one level. The collection of goods by the higher ranking konohiki and in turn the still higher alii were supported through a system of

produce and labor taxes. In this, the ohana (extended family) of the maka-ainana (commoner) exchanged goods; those living at the shore and engaged in exploitation of the marine resources exchanged these with family members engaged in agriculture in the upland.

This economic system was closely tied to the system of land holding in Hawaii.

Each of the islands in the Hawaiian chain were divided into districts or moku. Each moku was further divided into units of land running from the shore to mountain slope. These were called ahupuaa and functioned as the basic land holding unit. Rights to the use, resources and management of these units went to the chiefs. Interest in the land however was not in fee, nor necessarily hereditary. At the death of the chief, the land was reallocated. During times of a consolidated rule such as that of Kamehameha, the authority to reallocate land rested with this ruler.

This combined system of land holding and economic units continued to operate during this period in tandem with the market and economic system of the foreigners.

As foreigners came to reside in the island, either as missionaries, traders, shipping agents, or farmers, western land holding concepts of fee simple, lease, and transfers by individual owners of land came into conflict with the native concepts. The misunderstandings which occurred led ultimately to a series of agreements in 1848 between Kamehameha III and the Council of Chiefs regarding land rights. The agreements were collectively known as the Great Mahele.

With this agreement, Kamehameha III gave up the right of the ruling alii of perpetual stewardship of all lands, he retained for himself as the ruling alii, lands called “crown lands” and recognized the interest of the existing chiefs in certain lands, likewise the tenants. The Mahele also recognized the government of the kingdom as separate from the person of the ruling alii and set aside “government lands”. These divisions and allocation to chiefs and tenants were later validated by a series of Land Commission Awards and patents.

#### 1850 –1900

Between the years of 1850 and 1900, the Hawaiian nation passed through the reign of 6 sovereigns, Kamehameha III, IV, V, Lunalilo, Kalakaua, and Liliuokalani. Moreover, the overthrow of Hawaiian constitutional monarchy occurred in 1898, with American citizens establishing first the Republic of Hawaii, a provisional government. Then finally to close the century, Hawaii was annexed to the United States.

External events occurring on an international scale affected the commerce and population in Hawaii. On continental North American, the settling of California and Oregon, the Gold Rush, the Civil War all had the effect of encouraging the exportation of items produced in Hawaii. The successful marketing of products such

as sugar in turn encouraged the importation of laborers from multi-national sources, and changed irrevocably the population and culture of the Hawaiian Islands.

All indications are that while the Hawaiian nation underwent the series of major changes in government, commerce, and population; Kona moved at much slower pace, seemingly unaffected by the major shifts. In part, the nature and geography of Kona prevented the wholesale shift of the area into the “modern world”.

Still, the series of governmental actions changing the old system of land holding or stewardship by the alii to one of the simple interest was of major consequence for Kona during the period between 1850 and 1900.

In addition to the division and subsequent awarding of land to government, alii and commoner, the changes included provisions for the sale of government lands, authorized in 1850 by both the monarchy and legislature. Within this fifty year period some 253 Hawaiians purchased approximately 33,150 acres of government lands in both North and South Kona. Within the same period some 70 or so foreigners also purchased 21,648 acres of land.

While these purchases effectively removed some 54,798 acres of generally agriculturally desirable lands from government ownership, it also allowed the establishment of a variety of diversified agricultural ventures.

Kona remained basically supported by agriculture in the form of diversified truck crops, coffee, and ranching. During this period and well into 1950, nearly every commercial agricultural experiment conceivable in Hawaii was tried in Kona. These have included growing oranges, potato (white, sweet and yams), sugar, squash, bananas, avocados, tobacco, rubber, timber and raising of sheep and turkey. Of the many commercial ventures, none (except coffee and ranching) have proved to have had lasting or widespread success.

Coffee had adapted to the Kona environment and has since 1850 provided an economic support for the district. The industry has greatly influenced the economic and human geography. It is well therefore to capsulize the history of the industry to 1900.

The collapse of the world coffee market in 1899 when prices dropped to six cents per pound was only one of many economic crises which have rocked the coffee industry and which seemed then to mark its end in Kona, as it actually did in other parts of the Islands. One of the significant changes in the Kona coffee industry following this crises was the shift from plantation cultivation under the control of Haoles, to individual or family operation with Japanese occupying most of the land as independent tenants or owners. The influx of Japanese to Kona as workers on the coffee plantations is reflected in the census returns of eight in 1890, followed by 888 just six years later, and mounting to 1,718 in 1900.”

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## FIGURES – DATA SOURCES

### All Figures

1. State of Hawaii, Office of Elections. *Major and Other Roads* (January 2002). Rectified by County of Hawaii Planning Department, December 2003. Updated: February 13, 2004.
2. State of Hawaii Planning Office. *Kona boundaries*. Judicial Districts, 1983.

### Figure 1: Planning Area

1. See “All Figures”

### Figure 2 Land Cover

1. NOAA Coastal Services Center. *Land Cover*. [www.csc.noaa.gov/crs/lca/hawaii.html](http://www.csc.noaa.gov/crs/lca/hawaii.html) via State of Hawaii Planning Office, 2000.\*

\*This project was accomplished through the assistance of the Hawaii Department of Land & Natural Resources, the Hawaii Coastal Zone Management Program, other agencies associated with the Hawaii Gap Analysis Program (U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, University of Hawaii, Bernice Pauahi Bishop Museum, The Nature Conservancy of Hawaii, Hawaii Natural Heritage Program), and the U.S. Geological Survey EROS Data Center.

### Figure 3 Rainfall

1. State of Hawaii Planning Office. *Rainfall*. 1986.
2. State of Hawaii Planning Office. *Elevation Contours 500-Foot Contours*. 1983.

### Figure 4 Natural Resources

1. State of Hawaii Planning Office. *Reserves*. 2004. \*
2. U.S. Fish & Wildlife Service Critical Habitat: U.S.F.W.S, Pacific Islands Office, 2004. \*\*

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\* Compiled 2002 by SOH, DLNR, DOFAW from various sources including the data provided by DSP and the C&C parcel boundaries with input from State foresters and other familiar with the reserve boundaries. The boundaries in these coverages are not final; they are updated frequently. Updated 11/6/03 – Added addition to Volcano National park. Updated December 2004 – edits to Molokai.

\*\* Includes KokDry, Blackburn's Sphinx Moth, and Various Plant Species.

## **Appendix A**

### **Steering Committee Members**



Search:

Go!

District of  
**Kona**  
Steering Committee  
**KONA COMMUNITY DEVELOPMENT PLAN STEERING COMMITTEE**

In accordance with the Hawaii County General **Plan**, Mayor Harry Kim has appointed the **Kona Community Plan Steering Committee** in the winter of 2006. The SC assists in the preparation of the **plan** and recommends approval to the Planning Commission, which in turn reviews and forwards it recommendation to the Council.

The SC is to:

- Identify stakeholder interests
- Review work products for clarity

- Encourage **community** participation
  - Work constructively towards effective and acceptable conflict resolution
  - Monitors process and suggest improvements
  - Recommend approval/denial to the Planning Commission
1. **Roger P. Dilts, Jr.** is a 7-year resident of **Kona** and is owner and operator of the Aloha Farms, which is a bed and breakfast operation and a coffee and macadamia nut farm. He is currently a board member on the **Kona** Soil and Water Conservation District Council, is a member of the **Kona-Kohala** Chamber of Commerce - **Committee** of Environment and Natural Resources, **Plan** to Protect, and **Kona** Farmer's Alliance. Roger states that he has a love for the aina and the **community** and a respect for those who came before us.
  2. **JoAnn Farnsworth** is a 25-year resident of **Kona** and is self employed as a consultant for non-profit management focusing on children and family policy. She is presently Vice President for the Habitat for Humanity-**Kona** and Treasurer of the Neighborhood Place of **Kona**. JoAnn states that she truly believes it is important to engage as broad a segment of the **community** as possible to find solutions and build our future. She has a deep compassion for the challenges we face and continues to work in linking grassroots issues and effective public policy.
  3. **Maralyn (Marni) Herkes** is a 52-year resident of **Kona** and owns an Organizational and **Community Development** consulting business. She is presently a board member of the Kohala Center and Pulama Ia **Kona** Historical Corridor. Marni states that she has a broad knowledge of many facets of the **Kona community** and has much to learn. She has lots of energy, loves **Kona** and wants it to thrive and feel proud of itself.
  4. **Thomas Hickcox** is a 30 year resident of **Kona** and is a retired Assistant Police Chief formerly with the County of Hawaii Police Department. He has served as Vice President of the West Hawaii Hawaiian Men's Golf Club and the West-Hawaii Crime Prevention **Committee**. Thomas states that his family has roots here that date back for more than 5 generations. He cares about his **community** and wants to be a part of an organization that will assure that growth in his **community** is done correctly.
  5. **Kate Jacobson** is a 4-year resident of **Kona**. She is a self-employed professional ceramic artist and is currently contracted by Innovations Public Charter School as the Capital Campaign Director. She has experience working with **community** involvement projects and non-profit organizations in the State of Washington and Hawaii. Kate states that she would eagerly participate in exploring the highest potential for balance between the economic social, environmental and cultural assets of our island. Public partnerships, collaboration and long-term planning is important to her.

6. **Gretchen Lawson** is a 10-year resident of **Kona** and is presently the President/CEO of The Arc of **Kona**, formerly **Kona** Crafts. She is also the Vice President of the **Kona**-Kohala Chamber of Commerce. Gretchen states that during her residency in **Kona**, both her profession and private experience has helped her to develop relationships with many people who have enriched her life. She would like to return the favor by participating on this **steering committee**.
7. **Lydia Mahi** has been a resident of **Kona** for more than 40 years and is presently West Hawaii District Manager of Hawaii County Economic Opportunity Council. She has spent more than 30 years working as an educator, outreach counselor and facilitator in **Kona**. She is also on the board of Directors for the West Hawaii **Community** Health Center and the Na Kokua Kaloko-Honokohau. Lydia states that she learned how to jump off the cliff at Ka Lae, and hung on to an ahi tied to the boat so that she could rest before swimming back to the cliff...she has had a wonderful life growing up!
8. **Stacy Mandaguit** is a 13-year resident of **Kona** who is presently employed by the Family Support Services of West Hawaii. She is presently a coach with the AYSO, Assistant Coach of the Kealakehe High Varsity Soccer Team, and a member of the Kahakai PTSA. Stacy states that being on this **committee** is her attempt to be part of the solution to the inevitable growth in **Kona**. She believes we owe this to our youth/children of **Kona** who will be calling **Kona** their home.
9. **Michael Matsukawa** is a 27-year resident of **Kona**, and is self-employed as an Attorney. He is a past member of the Central **Kona** Union Church Council, **Kona** Adult Day Center Board and Hawaii Conference Foundation Board. Mike states that his knowledge of land use law, the **community** and leadership skills and abilities would make him a valuable **steering committee** member.
10. **Ken Melrose** is a 4-year resident of **Kona** and is presently Project Manager of Paahana Enterprises, LLC, a land use project management firm. He is chairman of the Hawaii Leeward Planning Council and a member of the Big Island Soccer Referees Association. Ken states that he brings a career in real estate **development** & land use and experience in **community** organization. He is willing to work with others of varying backgrounds to balance public and private interests.
11. **Janice Palma-Glennie** is a 22-year resident of **Kona** and is self employed as a Horticulturalist/Landscape Designer. She is a core group member of the Kohanaiki Ohana, a task force member of Kekaha Kai State Park and a board member of the Sierra Club. Janice states that her experience working with diverse groups, including keiki and kupuna, has taught her that **community** planning needs to be inclusive because it affects everyone's quality of life.

12. **Ed Rapoza** is a life long resident of **Kona** and is presently self-employed as a realtor and developer. He was involved in the collaborative effort between the County of Hawaii which resulted in the purchase of Honi's Beach for the County. Ed states that he is a native Big Island resident who grew up in **Kona** and is raising his family here. He is interested in seeing diversified quality growth for our **community**.

13. **Curtis J. Tyler III** is a 59-year resident of **Kona** and is presently self-employed as a Cultural Resource Consultant and was a member/vice chair of the Hawaii County Council. He is presently a member of the U.S. Army Cultural Advisory **Committee**, Pohakuloa Training Area. Curtis states that he brings substantial experience in land use planning, sustainable **development** and watershed management. He is a problem-solver who appreciates challenges, enjoys meeting new people and has a good sense of humor.

14. **Chrystal Yamasaki** is a 26-year resident of **Kona** and is presently Chief Land Surveyor and President of West Thomas Associates. She is also treasurer of the Hawaii Society of Professional Engineers-**Kona** Kohala Chapter. Chrystal states that with good planning and enforcement we can have a **community** we want and so desperately need and deserve. Her background and perspectives are wide ranging and she wants to be a part of shaping the future of **Kona**.

15. **Anne Irene Young** is a 30-year resident of **Kona** and is currently retired. She was formerly employed by the **Kona** Family YMCA as Executive Assistant. She is a board member of the Hawaii Island YMCA, **Kona** Outdoor Circle and **Kona** Historical Society. Annie states that it was her dad that taught her to listen to all sides and help to facilitate when arguments arise. She has a love for the land as well as the ocean.

| **CDP Home** | **CDP Overview** | **North Kona** | **North Kohala** | **South Kona** | **South Kohala** | **Puna** | **Hamakua** | **North Hilo** | **South Hilo** | **Ka'u** | **Kona CDP** |

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## **LAND USE STRATEGIES**

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**The Environmental Simulation Center**

**July 2007**



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## **A. Land Use Strategies for Kona Introduction**

### ***Results of the Public Involvement Process***

The land-use strategies recommended in this section build on the outcomes of the extensive public involvement process, including two well attended public workshops and charettes “Mapping the Future” and “How Do We Grow” (2006). The process was done in series of iterations beginning with focus group interviews to identify key issues and development patterns that were deemed inconsistent with Kona’s distinctive built and landscape character. Next, 3,400 ideas were collected through 109 public meetings. These ideas were distilled into Ten Principles which were presented, tested and ranked during the “Mapping the Future” workshop.

The Ten Principles, listed in order of importance, include:

1. The coastline, watershed areas, flood plains, important agricultural land, open space, and areas mauka of Mamalahoa Highway should be protected both inside and outside of the Urban Expansion Area.
2. Future growth should connect with other communities and offer alternatives on how to move around.
3. Future growth should offer a broad range of housing choices that are affordable and close to places of work.
4. Future growth should provide more parks.
5. Future growth should occur in the form of compact villages that offer increased density and a mix of homes, shops, and places to work.
6. Density in South Kona should be kept low and the character should remain rural
7. Future growth should occur where and when infrastructure (roads and utilities) is already in place.
8. The majority of future growth should be directed north of Kailua Kona.
9. Most future growth in South Kona should occur around existing villages, such as Honaunau, Captain Cook, and Kealakekua.
10. Some future growth should be directed to the Kealakekua area.

At the workshop, the Ten Principles were concretized by the participants who recommended where growth should go. The workshop concluded that growth should be directed toward North Kona and be concentrated in new compact higher

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density mixed use Transit-Oriented Urban Villages or North Kona Growth Opportunity Areas (GOAs) that were spatially located on a GIS map of Existing Conditions overlaid with constraints. Recommendations for South Kona focused on retaining the rural character of the area by directing most of the anticipated growth to existing villages, hamlets and compact PUDs, and providing for the retention of agriculture, a defining characteristic of South Kona.

The subsequent “Way to Grow” workshop addressed the density and character of future development with the focus on the Transit-Oriented Urban Villages (GOAs). In order to both conserve land and promote a Kona character of development, the workshop participants reached consensus that the density of future development should be greater than the average density of current trends—agreeing on an average density of 5 to 8 dwelling units per acre. The design and character of communities was important, preferring well-defined centers that leave parking in the back and create a walkable and social environment, neighborhoods that offer varied lot sizes, house types, and setbacks that are characteristic of Kona’s communities that have grown organically.

Finally at subsequent public meetings participants linked land-use preferences to open space, cultural, and natural environmental resources (Green Infrastructure) including the identification of areas that should be protected from development and preserved as open space and mauka-makai open space connections.

Visions emerged for North and South Kona. In North Kona future growth is to be directed toward the Urban Expansion Area—specifically the Transit-Oriented Urban Villages (GOAs) where concentrated, connected and serviced development in the form of villages and neighborhoods would reduce the land consumption, conserve open space and cultural resources. In South Kona, the vision recommended that the rural character be conserved by directing new development to existing villages, hamlets and compact PUDs on non-agricultural land, the continued support of agriculture and the conservation of agricultural lands, and the stewardship of South Kona’s natural landscape and ecosystem (see Green Infrastructure Report).

### *Structure of the Land-Use Strategies*

The land-use strategies are organized by the geography of the strategy. For example, regulatory strategies dealing with vesting and entitlement rights, apply to all of Kona while those focusing on the GOAs apply to the Urban Expansion Area in North Kona.



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The land-use strategies are organized as follows:

A. Strategies that Apply to Both North and South Kona	B. Strategies to Protect Rural Area and Quality of Life in Kona	C. Strategies for Expansion in Urban Expansion Area
<ol style="list-style-type: none"> <li>1. Address Entitlements and Vesting Rights</li> <li>2. Create Overlay Districts</li> <li>3. Establish Kona Community Planning Board</li> <li>4. Adopt Performance Evaluation Framework and Annual “Report Card”</li> <li>5. Formulate a Zoning Framework that Directs Growth to Preferred Locations</li> <li>6. Require Connectivity and Concurrence</li> <li>7. Develop a TDR Program</li> <li>8. Protect Natural Features and Cultural Resources</li> <li>9. Provide Open Space, Parks and Recreation</li> <li>10. Provide Affordable Housing</li> <li>11. Financing</li> <li>12. Establish a Kona Design Center</li> </ol>	<ol style="list-style-type: none"> <li>1. Create a Zoning and Regulatory Climate that is Collaborative</li> <li>2. Guide Future Growth toward existing settlements</li> <li>3. Formulate Urban Design Guidelines</li> <li>4. TDR’s and other mechanisms to conserve Agricultural Land</li> <li>5. Provide Affordable and Agricultural Worker Housing</li> <li>6. Support Public Access to Private Land</li> <li>7. Funding Mechanisms</li> </ol>	<ol style="list-style-type: none"> <li>1. Create Incentives for Infill Development</li> <li>2. Create Transit-Oriented Urban Villages (GOAs)</li> <li>3. Formulate Urban Design Guidelines.</li> </ol>

Because land-use does not exist in a vacuum other sections and reports of the CDP are referenced e.g., Transportation, Affordable Housing Report and The Green Infrastructure Technical Report. Typically, each strategy is discussed in terms of the issues it is addressing followed by recommendations, where appropriate.

**A. Strategies that apply to both North and South Kona**

Both regulatory and non-regulatory strategies determine how land is used. When orchestrated, they can provide the appropriate mix of incentives (directing growth to desired locations) and disincentives (permitting growth but making it less desirable in non-preferred locations). These strategies have been formulated to achieve a balance between the goals and objectives of the CDP and individual property rights by making the property owner “whole” to the degree possible. Each of the sections that follow discuss land-use strategies at different geographic scales from Kona to the Transit-Oriented Development (TOD) Urban Villages (referred to in the workshops discussed above as Growth Opportunity Areas or GOAs).



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### ***1. Entitlement and Vesting Rights***

“Vestment rights” or “entitlements” are a significant policy issue. There appear to be two issues around vesting rights and entitlements that need to be addressed if the goals and objectives of the CDP are to be realized.

- The first is the vesting of zoning changes and approvals, that in most instances do not sunset or expire after a certain period of time if not acted upon.
- The second addresses the future and has three parts. Should there be a time limit on an approved action (e.g., site plan) that has not been acted upon, if so what should that time limit be, and should the approval needed to be updated or refreshed?

The first entitlement issue is a conundrum because, as participants during the public involvement process noted, it appears that a significant amount of future development that is already accounted for is not in areas where the CDP would like to direct growth nor is it consistent with the CDP urban design guidelines. In general policies regarding “entitlements” that have not been acted upon for an extended period of time should be re-evaluated. The second will require clarifying current rules and procedures.



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To achieve consistency with the CDP we recommend the following:

Developments or Zoning Changes that are already approved	New Developments and Zoning Changes
<ol style="list-style-type: none"> <li>1. <i>All properties with zoning changes but without an approved site plan would expire</i> after a period of time to be determined and the zoning revert to current zoning which would then apply.</li> <li>2. All developments with site plan approval that have exhausted all approved extensions would expire and the zoning revert to the current zonings which would then apply.</li> <li>3. <i>All developments with site plan approvals that are requesting an extension of the approval would, within a period of time to be determined need to refresh the terms of approval.</i> (e.g., Environmental Assessment Statement). Before permits are issued, if deemed appropriate, the site plan is revised to reflect current conditions and policies (e.g., CDP)</li> <li>4. Development approvals and zoning changes that are renewed and “refreshed” become subject to the New Development Vesting Rules</li> </ol>	<ol style="list-style-type: none"> <li>1. <i>All zoning changes should be linked to the development</i> e.g., if the development does not happen the zoning reverts back to the original zoning designation.</li> <li>2. <i>Approvals and zoning changes should have a time limit</i> that, on application, would be granted an extension for a total of up to 10 years.</li> <li>3. Extensions on approvals and zoning changes should be “refreshed” because the context has changed and assumptions made at the time of the approval may no longer be applicable (e.g., Environmental Assessment Statement)</li> <li>4. <i>Establish a clear vesting point.</i> For example many locations recognize developments as vested when foundations are completed. If a development is not vested, changes in zoning that implement the CDP would then apply to the development.</li> </ol>

***2. Create a Kona District and North and South Kona Subdistrict Overlay districts***

Currently, zoning is county-wide so that changes to the generic “one-size-fits-all” zoning regulations affect places as disparate as Hilo and Kona. In order to make the zoning place-based and responsive to the goals and objectives of the Kona CDP, a series of overlay districts should be created that recognize the unique climate, geophysical, ecological and settlement patterns that collectively make Kona and the Big Island unique. This process would begin with Kona followed by each of the regions formulating CDPs.



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The Kona District would be an overlay zone with two subdistricts: North Kona Subdistrict and South Kona Subdistrict. The current county-wide “generic” regulations would be the base on which Kona specific regulations would be overlaid and become a subset of the county-wide regulations. The county-wide zoning regulations would be applicable unless superceded by the Kona District and Subdistrict zoning regulations and include administrative processes and reviews that are particular to Kona.

We also envision additional overlay districts, e.g., TDR “receiving” and “sending” areas, Transit-Oriented Urban Villages, etc.

### ***3. Establish a Local Kona Community Planning Board***

The public involvement workshops demonstrated a strong interest in the planning of Kona’s future. A Local Kona Community Planning Board could be created that would potentially perform a number of functions. The board would be advisory and function similarly to the way local community boards on the mainland function; reviewing plans and applications, holding public hearings, commenting, and making non-binding recommendations to the decision making entity. The Local Kona Community Planning Board could also assume a ministerial role reviewing plans for compliance with CDP freeing up Planning Department staff time, similar to the way in which states alienate or devolve powers to municipalities or counties. In addition, the Local Kona Community Planning Board could also issue the annual Kona “Report Card” using information in the Performance Evaluation Framework (discussed below) that would evaluate the performance of the past year’s development activities against the goals and objectives of the CDP and baseline and provide transparency and accountability, including periodic reassessment of the CDP over time.

### ***4. Adopt the Performance Evaluation Framework and Annual Report Card***

As described in the County’s RFP, the *Community Profile and Indicators Catalog* “...would compile existing demographic and social data from census and other sources, and analyze trends. The data would be collected and organized with the objective of using the data not only to profile the community, but to also derive a catalog of measurable indicators that relate to community goals and objective.” This has been expanded into the *Kona CDP Performance Evaluation Framework*. The *Kona CDP Performance Evaluation Framework* (PEF) is a scalable tool that is designed to track change over time, measure the performance of the CDP, and evaluate how well the Kona approved developments are performing against expectations—the Ten Principles that guide the Land-Use Strategies and the CDP. It will also provide a degree of accountability for those who participated in its formulation that the CDP is being implemented and working. It is a dynamic tool: as new projects are approved they are added to the existing conditions, which then becomes the new baseline.

The PEF incorporates the Ten Principles that emerged from the community workshops and charettes. It has two levels of evaluation, one area-wide



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corresponding to the “Map of the Future” workshops and the other corresponding to the “How Do We Grow” workshops which focused on physical development and design issues. The PEF would be a profile of Kona at a moment in time, (the baseline) and record changes on an annual basis, track changes and identify trends. The evaluation component would consist of benchmarks and indicators where benchmarks are goals to be achieved and indicators that evaluate the level of performance. The simplified PEF (see earlier Nov. 2006 Draft PDF) would be easy to administer and useful in project site plan review. The “Mapping the Future” component would have simplified measures indicating the degree to which a Principle (or component of a Principle) is satisfied. For example, the goal for affordable housing units would be measured in the number of units produced and the degree to which the number of units met expectations. The “How Do We Grow” component is essentially performance-based development design guidelines e.g., the number of developments that have exceeded the basic connectivity index which has been used in communities on the mainland to great effect against a recognized connectivity index.

It would also be useful in development reviews not only to evaluate connectivity but the urban design preferences that emerged from the “How Do We Grow” (see Public Involvement Process: Appendix). An urban design example would be setbacks. e.g., houses should not align but be offset from the adjoining houses by no more than 10 ft. and no less than 5 ft. The site plan submitted by the developer would show compliance with the goal which could be satisfied in more than one way. (See Urban Design Guidelines).

### ***5. Zoning Framework***

The focus of the land-use strategies is directing growth to preferred locations in North and South Kona, the form that the growth takes, and the tools to implement that strategy including leveraging public investment in new transportation, infrastructure, and open space and parks.

The zoning framework outlines the implementation strategy for the changes to existing county-wide generic zoning required to implement the Kona CDP. We do not recommend replacing the existing county-wide zoning but rather *localizing* zoning to Kona by introducing a series of overlay districts that would encourage development implementing the CDP’s vision for the future. In the Kona Overlay District, North and South Kona subdistricts we envision a series of subarea overlay districts and plans and the Urban Village Design Guidelines, many of which are in the complimentary Green Infrastructure Technical Report recommending a series of overlay districts such as the Open Space Plan.



In order to achieve the primary goal of directing growth to preferred locations in North and South Kona two policies are recommended:

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- Minimize the approval of the zoning district changes, amendments and variances unless they are consistent with the goals and objectives of the CDP.
- Adopt the recommended vesting and entitlement rules.

*“Carrots and Sticks”*

While zoning has traditionally been a system of preventing harm, the zoning framework recommends an approach that is oriented toward creating a good by orchestrating an array of incentives (“carrots”) and disincentives (“sticks”). It does not preclude development outside of the preferred growth areas in the Urban Expansion Area (but rather assumes that development will take place in those areas).

The intent is to distinguish between individuals and relatively small developments and large developments in the Urban Expansion Area and Kona. To achieve the goal of directing growth to preferred locations we propose a series of incentives, including public investment in roads and infrastructure that will make it less desirable to develop outside of the preferred growth areas in North and South Kona. The incentives include density bonuses, TDR’s, site planning flexibility, waivers of fees, and preferred administrative review process. The disincentive is the lack of these incentives in locations where growth is not preferred. In general the recommended approach is to reverse the traditional administrative process in which as-of-right subdivisions have the least administrative friction while what is desired typically must go through a lengthy discretionary review process. This objective, we believe, can be achieved within the as-of-right ministerial review process.

To achieve this re-ordering of the review process we recommend a two-tier system. The first tier is the *Development Evaluation Punchlist* and the second tier is a *Performance Evaluation and/or Form-Based Development Code* or a combination of the two.

***The Development Evaluation Punchlist***

*The Development Evaluation Punchlist* would have two purposes. The first would be to ensure that the proposed development passes a basic threshold allowing it to go through a ministerial rather than a lengthy discretionary review by permitting the developer to use the *Performance Evaluation and/or Form-Based Development Code* discussed below. A complying development would also pass an initial threshold qualifying it for density bonuses, TDR’s, waivers of fees, and other incentives that would not be available to developments that are as-of-right or are going through a discretionary review.



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*The Development Evaluation Punchlist* is a scoring system where the higher the score the greater the eligibility to utilize the incentives listed above. It is designed to evaluate the degree to which a development leverages public investment in transportation and other infrastructures. The punchlist below is not meant to be exhaustive but representative of the kind of thresholds, benchmarks and indicators that would be used to evaluate a development's compliance and performance with a threshold. In the example below, we have also applied importance factors giving greater value to some factors and less weight to others. A simpler version would have all indicators be equal.

<b><i>Development Evaluation Punchlist*</i></b>
<p>A. Within the Five Transit Villages            Measure: Yes=1.0, No= 0.0            Importance Factor: 5.0</p>
<p>B. Proximity to Transportation            B.1. Proximity to Mid-Level Road            Measure: ½ Mile = 1.0, &gt; ½ Mile = 0.5            Importance Factor: 4.0            B.2. Proximity to Public Transportation Stop            Measure: ¼ Mile = 1.0, ½ Mile = 0.5            Importance Factor: 4.5</p>
<p>C. Proximity to Neighborhood Shopping            Measure: 5 Minute Walk (¼ Mile) = 1.0, &gt; 5 Minute Walk = 0.5            Importance Factor: 4.0</p>
<p>D. Proximity to Existing Parks and Publicly Accessible Open Space            Measure: 1 Mile = 1.0, &gt; Mile = 0.5            Importance Factor: 2.0</p>
<p>E. Provision of Public Open Space On-Site            Measure: Preferred Ratio of DU's to Open Space = 1.0 &lt; than Preferred            Ration of DU's to Open Space            Importance Factor: 3.5</p>
<p>F. Protection and Preservation of Environmental Features and Cultural Resources            F.1. Protection of Flood Plains            Measure: Yes = 1.0, Partial = 0.5, No = 0.0            Importance Factor: 3.0            F.2. Preservation of Cultural Features            Measure: Yes = 1.0, Partial = 0.5, No = 0.0            Importance Factor = 3.0</p>
<p>G. Proximity to Employment Center            Measure: 5 Miles = 1.0, 7.5 Miles = 0.5, &gt; 7.5 Miles = 0.0            Importance Factor = 3.0</p>
<p>H. Provision of Affordable Housing On-Site            Measure: 20% of Total DU's <u>1.0</u>, 15.0% <u>0.75</u> &lt; 15% = 0.25 none = 0.0            Importance Factor 4.5</p>



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\*Connectivity and the Provision of Infrastructure Concurrency with the Development is mandatory.

We expect there to be some need for flexibility evaluating a development based on demonstrated site constraints e.g., Flood Plains. *The Development Evaluation Punchlist* would provide both transparency and accountability in compliance with the Kona CDP.

***Performance Evaluation and Form-Based Development Codes***

In a performance system, it is assumed that full compliance is not always achievable, that there are trade-offs between performance goals leaving room for choice by the developer and architect, and that partial compliance with a goal is acceptable. Further, performance assumes that there are multiple “right answers,” because performance sets out the problem to be solved, rather than solving the problem. The passing score is the sum of the performance evaluation.

Performance-based zoning clearly states the goal to be achieved, how it is to be evaluated or a program, a formula for measuring, and an importance factor that recognizes that some goals are more important than others and that some aspects of the site design process are easier to accomplish than others.

For example:

<b><i>Goal:</i></b> To create a more diverse place, building setbacks should not be uniform.
<b><i>Program:</i></b> Front yard building setbacks should not align with each other and be no greater than 10 ft. and no less than 5 ft. from adjoining building setbacks.
<b><i>Compliance:</i></b> The total number of lots that comply divided by the total number of lots in the development.
<b><i>Importance Factor:</i></b> 1.25

As an alternative, form-based codes (a form of “pattern book”) accomplish the same goals but in a more prescriptive way. Because they are prescriptive and pre-design the solution they are sometimes preferable but have certain inherent drawbacks. Performance-based development codes are self-adapting to a multiplicity of situations, locations, and development programs, because they do not prescribe a solution but rather describe the design problem to be solved, while form-based development codes typically are written for a specific situation and location. In the case of the Transit-Oriented Urban Villages (GOAs) this would necessarily require a different form-based code for each Village if the desired end is to create a specific identity for each Village.

The third way would be to combine both approaches using the *Form-Based Development Code* as “building blocks” which can be assembled in different patterns and evaluated by the *Performance Evaluation Development Code*. Either way, a discretionary process would be replaced by a ministerial review.



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Incentives are discussed in the context of the North and South Kona subdistricts.

### **6. Connectivity and Concurrence**

Connectivity: An interconnected transportation system and its relationship to land-use strategies is addressed in KCDP Transportation Chapter \_\_. The sections that focus on connectivity are abstracted and follow below:

#### **Objective T-2 A system of interconnected roads in Kona shall provide direct transportation routes for automobiles, pedestrians, bicycles and public transit.**

##### **Overview:**

A highly connected transportation system within Kona's UEA serves to:

- (a.) provide choices for drivers, bicyclists, and pedestrians;
- (b.) promote walking and bicycling;
- (c.) connect neighborhoods to each other and to destinations, such as employment centers and workplaces, schools, parks and cultural sites, shopping, libraries and post offices among others;
- (d.) provide new and existing affordable housing easy access to transportation opportunities;
- (e.) provide opportunities for residents to increase their level of physical activity each day by creating walkable neighborhoods with adequate connections to destinations;
- (f.) reduce vehicle miles traveled and travel time to improve air quality and mitigate the effects of auto emissions on the health of residents;
- (g.) reduce emergency response times;
- (h.) increase effectiveness of municipal delivery service; and
- (i.) restore arterial street capacity to better service regional long-distance travel needs.
- (j.) provide increased emergency evacuation opportunities

Policy T-2.1a Roadway systems in Kona shall be designed and improved to be interconnected.

##### **Strategy T-2.1a**

Proposals for new development within Kona's UEA shall provide a roadway system based on the Kona's Connectivity Standards. Kona's Connectivity Standards are:

- (1) A proposed development shall provide multiple direct connections (connectivity) in its local street system to and between local destinations, such as employment centers and workplaces including resorts, parks, schools and shopping, without requiring the use of arterial streets. The spacing criteria used for providing connections are as follows:



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- Every 300 to 500 foot grid for pedestrians and bicycles
  - Every 500 to 800 foot grid for automobiles.
- (2) Each development shall incorporate and continue all collector or local streets stubbed to the boundary of the development plan by previously approved but unbuilt development or existing development.
  - (3) Gated street entryways into residential developments are prohibited
  - (4) Cul-de-sacs and permanent closed-end streets shall be prohibited except where construction of a through street is found to be impracticable. When cul-de-sacs or closed-end streets are allowed under subsection, they shall be limited to 200 feet and shall serve no more than 25 dwellings.
  - (5) Where new streets end at areas that are undeveloped, a street stub out with a temporary turnaround is required in which only pedestrians and cyclists would have access. Cul-de-sacs and adjacent to public land would be prohibited.

#### Policy T-2.2

Connectivity shall be improved within and between existing developments.

##### Strategy T-2.2a

The County shall study, identify, and prioritize existing roads that shall be connected, including both North-South, as well as Mauka-Makai corridors.

##### Strategy T-2.2b

The County shall work with the community to identify opportunities to increase pedestrian and bicycle route connectivity, including options such as easements linking existing cul-de-sacs with adjacent roads (Policy T-2.1a(5))

#### Policy T-2.3

Road plans for new Urban and Rural subdivision shall provide a minimum of two corridor connections to the adjacent road(s).

#### Policy T-2.4

Establish goals and benchmarks to measure progress towards road connectivity and increased pedestrian and transit facilities (Performance Evaluation Framework and Annual Report Card)

#### Policy T-2.5

Connect streets between existing and new communities.

When new developments are not well connected with existing neighborhoods they contribute more cars and create greater traffic congestion on collector roads.

When developers are compelled to integrate new neighborhoods into existing street patterns, and provide a variety of choices for movement in and out of the neighborhood, new developments can actually increase connectivity within the region.



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### **7. Develop a TDR Program**

The concept of TDRs is based on compensating a property for participating in the creation of a public good such the preservation of open space and natural habitats, aquifer protection, preservation of historic buildings and sites, etc. There is a substantial literature on TDRs system and their assets and problems. That is well summarized in a paper prepared for the Conservation Fund in 2006 and can be found in Appendix # 6 in the Green Infrastructure Technical Report.

We recommend that the TDR mechanism be adopted by Kona and be applicable in both North and South Kona. They would be voluntary, obviating much of the “takings” issue. In addition, in some situations it will also make sense to leave residual development rights that the “sender” can use on their property, particularly in South Kona. Other components of a successful TDR program include:

- Ensure that there are more development rights than there are buyers to create a market in development rights. The design and calibration of the TDR system should be the subject of a separate study based on the particulars of Hawaii enabling legislation, the delineation of “sending” areas (the “receiving” areas are discussed in the land-use strategies for North and South Kona), the potential market and transaction costs.
- “receiving” and “sending” areas should be clearly delineated by overlay districts,
- the purchase of TDR’s should be mandated as part of the CDP’s program of incentives. These recommendations are discussed in the context of the Transit-Oriented Urban Villages and directing growth in South Kona to existing villages and hamlets, and cluster development.

North and South Kona should probably have separate TDR programs that address and reflect the needs, interests, and economics of each subdistrict, notwithstanding whether having one Kona District rather than having two “sending” districts (North and South Kona subdistricts) is valid on its merits, economics, etc. There is still the nexus issue. For example, transferring development rights from South Kona to North Kona raises the issue of impact and benefit, e.g., the impacts will be fast in North Kona while the benefit is miles away in South Kona. Further, transferring development rights from North to South Kona inherently does not make sense if one of the primary reasons for TDR in South Kona is supporting the rural character and agricultural economy of South Kona and making property owners “whole” for preserving its rural character and ecosystem.

### **8. Protect Natural Features and Cultural Resources (See: Green Infrastructure Technical Report, Conservation Fund, February 2007)**



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***9. Open Space, Parks and Recreation (See Green Infrastructure Technical Report, Conservation Fund, February 2007)***

***10. Provide Affordable Housing and Workplace and Agricultural Housing***  
Zoning density bonuses are discussed in B. Strategies to Protect Rural Areas and Quality of Life in South Kona and C. Strategies for the North Kona Urban Expansion Area and the Affordable Housing Report (David Rosen and Assoc.)

***11. Financing- TBD.***

***12. Design Center-TBD.***



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## **B. Strategies to Protect Rural Areas and Quality of Life in South Kona**

### **1. Create Zoning Regulatory Climate that is Collaborative**

(See Green Infrastructure Technical Report/Nature Conservancy: February 2002 Leadership Forums and Appendix #1 Working Groups, Appendix #3 Mauka Land Group, Appendix #4 Olaa-Kilauea and Three Mountain Partnerships, and Appendix #5 Convening Leadership Forums.)

### **2. Guide Future Growth Toward Existing Settlements**

#### ***Infill and PUDs.***

#### ***Infill Development***

The concept of infill development is to connect two or more pre-existing developments, and infill in existing villages or hamlets, and should not be confused with extending an existing development, village or hamlet into a “greenfields,” or beyond the village or hamlet boundaries. By definition infill is associated with small scale developments of approximately 10 acres or less that have been leapfrogged by the surrounding or adjacent developments and occur in areas that are already urbanized or developed but not built-out.

The South Kona Infill Development Policy can be a powerful tool accommodating a portion of the anticipated residual growth that does not occur in North Kona by directing it toward South Kona’s existing villages: Kealahou, Captain Cook, Honaunau and Ho’opuloa/Miloli’i, hamlets, existing subdivisions and agricultural workers housing on existing working agriculture farms, orchards and coffee plantations. (We have assumed a portion of the anticipated growth will also go to unbuilt lots in existing subdivisions.)

Infill Development would:

- Preserve existing open space, prime agricultural land, forests and coastline areas;
- Tap into existing infrastructures;
- Be a catalyst to build-out existing villages and hamlets and make them more complete places;
- Implement zoning incentives to encourage infill development, and to the degree possible, affordable housing, in and around existing villages and hamlets and discourage “greenfields” development (Strategy T-1-4c)
- Provide opportunities for affordable housing; and
- Increase connectivity by providing connections to existing roads, pedestrian walkways and bicycle paths (see KCDP Transportation Opportunities and Challenges)

A series of incentives are proposed to encourage infill rather than “greenfields” development (Note: the disincentive to “greenfields” development in South Kona is that it is subject to the base zoning as a matter of CDP policy). In addition,



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zoning district changes, variances and incentives would not be available outside of preferred growth areas (See A. Strategies that Apply to Both North and South Kona)

The infill development incentive program would be voluntary. It would be a two-tier system; a variation on the one proposed in the Zoning Framework section described in A. Strategies that Apply to both North and South Kona. The first tier would be a qualification threshold punchlist to determine whether the proposed infill development qualifies as infill for the infill incentives. The second tier would be a subset of the *Performance Evaluation Development Code* for Infill Developments.

*The Infill Development Evaluation Punchlist* would have two purposes. The first would be to ensure that the proposed infill development qualifies as an Infill Development that would allow it to go through an expedited ministerial review process by permitting the development to use *The Performance Evaluation Code: Infill Development*. The complying infill development would then qualify for TDRs and affordable housing bonuses, change of use (e.g., residential to mixed-use), waivers of fees, site planning flexibility and reduction of lot sizes that would not be available to as-of-right developments. Site planning (e.g., road, block and lot layouts, lot sizes and configurations, yards, setbacks, etc.) is of considerable value when trying to fit a new development into an existing context to:

- Provide for road, pedestrian and bicycle connectivity;
- Create publicly accessible and dedicated open space such as connecting two portions of Open Space Network

*Infill Development Evaluation Punchlist*

To qualify the infill development must have a positive response to each element of the punchlist:

<b>Infill Development Evaluation Punchlist</b>		
A. Within the Urban Expansion Area:	Yes _____	No _____
B. Does Not Exceed 10 Acres:	Yes _____	No _____
C. Does Not Develop In:		
C1. Flood Plains	Yes _____	No _____
C2. Agricultural Land	Yes _____	No _____
C3. Designated Open Space Network	Yes _____	No _____
C4. Protected Natural Areas and Habitats	Yes _____	No _____
C5. Coastline Protection Area	Yes _____	No _____
D. The Site Plan complies with the minimum Connectivity Index (See Performance Evaluation Framework in Index):	Yes _____	No _____
E. Taps into and/or expands or improves existing infrastructure.	Yes _____	No _____
* Connectivity and the provision of Infrastructure concurrent with the development would be mandatory.		



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We expect there to be some needed ministerial flexibility in evaluating an Infill Development based on demonstrated site constraints (e.g., Flood Plains).

### ***Performance Evaluation Development Code: Infill Development***

Because each infill site will be different in configuration and built and natural context posing different challenges, a zoning system that self-adapts to a multiplicity of site conditions is recommended. The *Infill Development Performance Evaluation* or a variation that utilizes a *Form-Based Development Code* as “building blocks” (See Zoning Framework A. Strategies that Apply to Both North and South Kona) that can be assembled in different patterns and be evaluated by the *Performance Evaluation Development Code: Infill Development* is recommended. Either way a discretionary site plan review process would be replaced by a ministerial review with the applicant demonstrating compliance.

Not all of the *Performance Evaluation Development Code* measures and indicators would be applicable to Infill Developments in South Kona. They would be, where appropriate, modified to reflect the rural character of South Kona. The exception would be Captain Cook, whose character and development pattern is similar to villages and hamlets in the North Kona Urban Expansion Area. (Examples of the performance measures and indicators and how they would work can be found in the Transit-Oriented Urban Villages section of Strategies for the North Kona Urban Expansion Area).

### ***Incentives***

The incentive system begins with the existing underlying zoning district’s use, density, lot coverage, yard and building height regulations as the base. An analysis of the current zoning districts in South Kona reveals that the predominant district is low-density agricultural. This is good, since it provides the low-density base for the incentives without significant down-zoning, which is often required to make the incentives work without dramatic changes in the scale, building type, and character of development.

The incentive system for *South Kona Infill Development* would be tiered as is proposed for the *North Kona Infill Development* and the *North Kona Urban Villages*, with each tier fine tuned to its development program and location. Assuming the Infill Development satisfied the Punchlist thresholds it would avail itself of the incentives only in the following order, beginning with the base zoning:

1. **Base Zoning:** The property may elect to use the underlying zoning regulations or the *Infill Development Regulations*. In either case, *Connectivity and Concurrence of Infrastructure* with the construction and occupancy of the development would be mandated.
2. **Site Planning:** Infill developments would have site planning flexibility by allowing density to be distributed on an area-wide rather than lot by lot basis. It would encourage a mix of lots and



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building types, on a development parcel. For example, higher density may result in one portion of the parcel and lower density on another which in total would equal the maximum base density under current zoning. (This is illustrated by the ESC's block density analysis done to visualize density bonuses for Affordable Housing in the Transit-Oriented Urban Villages). Other areas of flexibility would include lot sizes and configurations, reductions in yards and uniform setbacks to adjust to site conditions and connectivity requirements. A maximum height limit of 35 ft. would govern.

3. **TDR:** There would be two ways to increase density in South Kona: TDRs from designated Open Space (see Open Space Plan in Green Infrastructure Report) or the "sender." The maximum density would be 20% on top of the base zoning districts maximum allowable density.
4. **Affordable Housing:** Could be located on or off-site within a limited area. The preference would be on-site so as not to concentrate affordable housing in a few locations but rather disperse and integrate it within existing and/or emerging neighborhoods creating a diversity of housing choices and mixed-income communities. The amount of the bonus would be done on a sliding scale beginning at 15% for all affordable housing off-site to 25% (this would need to be tested) for affordable housing located on-site. Affordable housing would have a height limit of 35 ft. and reduced parking requirements if within ¼ mile or a 5 minute walk to public transportation. Off-site affordable housing would need to be located within 5 miles of the Infill Development and also located within an Infill Development Area or an existing Village or Hamlet. Greenfields locations would be prohibited.

Layering the Affordable Housing Bonus on top of the TDRs would be permitted. The effect of a density increase by 35%-45% and its effect on scale and character would need to be studied during the implementation of the CDP in zoning regulations.

#### *Planned Unit Developments (P.U.D)*

The existing P.U.D regulations [Article 6: Division 1. Planned Unit Develop-(P.U.D)] would be applicable in South Kona. An alternative which the developer could elect would be *The South Kona Punchlist and Performance Evaluation Development Code*, a variation of the general Code, but modified in recognition of South Kona's rural character and scale.

### **3. Urban Design Guidelines**

(See separate document)

### **4. TDRs and other mechanisms to conserve agricultural land**



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(See Green Infrastructure *Technical Report* Nature Conservancy, February 2007. Particularly *Agricultural Lands and Natural Lands*, Appendix #1, *Agricultural Working Group*, *Land-Use and Planning Working Group*, and Appendix #6 *Transferable Development Rights Programs: An Economic Framework for Success*)

### **5. Provide Affordable and Agriculture Worker Housing**

(See Affordable Housing Report, David Rosen and Associates)

### **6. Support Public Access to Private Land**

(See Green Infrastructure Technical Report, Conservation Fund, February 2007 *Forum on Public Recreation in Upper Mauka Kona*, Appendix #1 *Recreation Working Group*)

### **7. Funding Mechanisms**

(See Green Infrastructure Technical Report, Conservation Fund, February 2007, Appendix #3 *Mauka Land Group*).



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## C. Strategies for North Kona Urban Expansion Area

### 1. *Infill Development*

The concept of infill is to connect two or more pre-existing developments, and infill in existing villages or hamlets, and should not be confused with extending an existing development, village or hamlet into a “greenfields,” or beyond the village and hamlet boundaries. By definition infill is associated with small scale developments of approximately 10 acres or less that have been leapfrogged by the surrounding or adjacent developments and occur in areas that are already urbanized and are within the North Kona Urban Expansion Area.

An infill development policy can be a powerful tool accommodating a portion of anticipated growth by directing it toward preferred locations within the Urban Expansion Area including the Urban Villages (GOAs). Specifically it would:

- Increase connectivity by providing connections to existing roads, pedestrian walkways and bicycle paths (see section 1: KCDP Transportation Opportunities and Challenges);
- Implement zoning incentives to encourage infill development, and to the degree possible affordable housing, in and around existing villages and hamlets to discourage “greenfields” development, particularly on prime agricultural lands (Strategy T-1-4c);
- Locate infill development where there is existing infrastructure that can be tapped into;
- Provide opportunities for affordable housing;
- Be a catalyst to integrate series of subdivisions into a walkable, pedestrian oriented neighborhood;
- Be a catalyst to build-out existing villages and hamlets making them more complete places; and
- Become, in specific locations, mixed use neighborhood centers.

A series of incentives are proposed to encourage infill rather than “greenfields” development (Note: the disincentive to “greenfields” development in the Urban Expansion Area is that it is subject to the base zoning as a matter of CDP policy which generally has lower densities than advocated in the county’s Land-Use Plan/Urban Expansion Area). In addition, zoning district changes, variances and incentives would not be available outside of preferred growth areas. (See A. Strategies that Apply to Both North and South Kona)

The infill development incentive program would be voluntary. It would be a two-tier system; a variation on the one proposed in the Zoning Framework section described in A. Strategies that Apply to Both North and South Kona. The first tier would be a qualification threshold punchlist to determine whether the proposed infill development qualifies as infill and the infill incentives. The second tier would be a subset of the *Performance Evaluation Development Code* for Infill Developments.



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*The Infill Development Evaluation Punchlist* would have two purposes. The first would be to ensure that the proposed infill development qualifies as an Infill Development that allowing it to go through an expedited ministerial review process by permitting the development to use *The Performance Evaluation Development Code: Infill Development*. The complying infill development would then qualify for density bonuses and affordable housing bonuses, change of use (e.g., residential to mixed-use), waivers of fees, site planning flexibility and reduction of lot sizes that would not be available to as-of-right developments. Site planning (e.g., road, block, and lot layouts, lot sizes and configurations, yards, setbacks, etc.) and use flexibility are of considerable value when trying to fit a new development into an existing context, to:

- provide for road, pedestrian and bicycle connectivity;
- create publicly accessible and dedicated open space such as connecting two portions of the Open Space Network; and
- the development of a neighborhood-scale mixed-use center.

#### *Infill Development Evaluation Punchlist*

To qualify the infill development must have a positive response to each element of the punchlist:

<b>Infill Development Evaluation Punchlist</b>		
A. Within the Urban Expansion Area:	Yes _____	No _____
B. Does Not Exceed 10 Acres:	Yes _____	No _____
C. Does Not Develop In:		
C1. Flood Plains	Yes _____	No _____
C2. Agricultural Land	Yes _____	No _____
C3. Designated Open Space Network	Yes _____	No _____
C4. Protected Natural Areas and Habitats	Yes _____	No _____
C5. Coastline Protection Area	Yes _____	No _____
D. The Site Plan complies with the minimum Connectivity Index (See Performance Evaluation Framework in Index):	Yes _____	No _____
E. Demonstrated need for Local Retail and Services and Community Facilities:	Yes _____	No _____
* Connectivity and the provision of Infrastructure concurrent with the development would be mandatory.		

We expect there to be some needed ministerial flexibility in evaluating an Infill Development based on demonstrated site constraints (e.g., Flood Plains).

#### ***Performance Evaluation Development Code: Infill Development***

Because each infill site will be different in configuration and built and natural context posing different challenges, a zoning system that self-adapts to a multiplicity of site conditions is recommended. The *Infill Development Performance Evaluation* or a variation that utilizes a *Form-Based Development*



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*Code* as “building blocks” (See Zoning Framework A. Strategies that Apply to Both North and South Kona) that can be assembled in different patterns and be evaluated by the *Performance Evaluation Development Code: Infill Development* is recommended. Either way a discretionary site plan review process would be replaced by a ministerial review with the applicant demonstrating compliance.

Not all of the *Performance Evaluation Development Code* measures and indicators would be applicable to Infill Developments. For example, height limits would be different as would those for a neighborhood center versus a Village Center. The examples of the performance measures and indicators and how they would work can be found in the Transit-Oriented Urban Villages section of Strategies for the North Kona Urban Expansion Area.

### ***Incentives***

The incentive system begins with the existing underlying zoning district’s use, density, lot coverage, yard and building height regulations as the base. An analysis overlaying the General Land Use Plan’s Urban Expansion Area over current zoning districts reveals that most zoned areas within the Urban Expansion Area have lower densities than those proposed for the Urban Expansion Area. Therefore, in most cases—the exception being the nodes of Low, Medium, and High Density—most of the area within the Urban Expansion Area is underzoned. This is good, since it provides the basis for the incentives without significant down-zoning, which is often required to make the incentives work without dramatic changes in the scale, building type, and character of development.

The incentive system for *North Kona Infill Development* would be tiered as is proposed for the *South Kona Infill Development* and the *North Kona Urban Villages*, with each fine tuned to its development program and location. Assuming the Infill Development satisfied the Punchlist thresholds it would avail itself of the incentives only in the following order, beginning with the base zoning:

5. **Base Zoning:** The property may elect to use the underlying zoning regulations or the *Infill Development Regulations*. In either case, *Connectivity and Concurrence of Infrastructure* with the construction and occupancy of the development would be mandated.
6. **Site Planning:** Infill developments would have site planning flexibility by allowing density to be distributed on an area-wide rather than lot by lot basis. It would encourage a mix of lots, building types, and mix of uses (e.g., a neighborhood center) on a block. For example, higher density may result in one block and lower density on another which in total would equal the maximum base density under current zoning. (This is illustrated by the ESC’s block density analysis done to visualize density bonuses for Affordable Housing). Other areas of flexibility would include lot sizes and configurations, reductions in yards and uniform setbacks to adjust to site conditions and connectivity requirements. A maximum height limit of 35 ft. would govern.



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7. **Density Bonus:** For either adjacency to the Mid and High Level Collector Road and public transportation (in which case the parking requirement would be reduced) or the provision of dedicated open space. It would be based on a formula relating the number of DU's to an open space requirement. The bonus would be pro-rated by the amount of open space provided up to the preferred amount with a cap of 10%.
8. **Affordable Housing:** Could be located on or off-site within a limited area. The preference would be on-site so as not to concentrate affordable housing in a few locations but rather disperse and integrate it within existing and/or emerging neighborhoods creating a diversity of housing choices and mixed-income communities. The amount of the bonus would be done on a sliding scale beginning at 15% for all affordable housing off-site to 25% (this would need to be tested) for affordable housing located on-site. Affordable housing would have a height limit of 35 ft. and reduced parking requirements if within ¼ mile or a 5 minute walk to public transportation. Off-site affordable housing would need to be located within 2 miles of the Infill Development and also located within an Infill Development Area or an existing Village or Hamlet. Greenfields locations would be prohibited.

TDR would not be available in Infill Developments which is reserved for the North Kona Urban Villages.

## ***2. Create Transit-Oriented Urban Villages (Growth Opportunity Areas or GOAs)***

### *Concept*

The concept of The Growth Opportunity Areas (GOAs) emerged from the Mapping the Future workshop (see Public Involvement Summary: Process and Results, Draft Report, ACP-Visioning and Planning and the Environmental Simulation Center, Ltd. for a discussion of the public process that identified the initial location of the Growth Opportunity Areas or GOAs).

Of the developable land that resulted from the Environmental Simulation Center's development suitability analysis, almost 4,000 acres were identified as being within the GOAs, the areas identified by the workshop participants as the preferred locations for future growth within the Urban Expansion Area. Of the 4,000 acres approximately 80% are buildable and 20% are constrained by factors such as flood zones, land already developed and steep slopes. This amount of land at the proposed average density of between 5 to 8 DU's per acre provided more than enough land to accommodate forecast growth. This excess is critical to the concept of the GOAs that were projected to be developed over a period of 15 years during which time land might become available at different times. They are uniquely suited to the land assemblage and development process and Kona's



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regulatory environment, needing neither the county's assistance to assemble land nor requiring eminent to be realized. As concerned the GOAs are not a second layer of growth boundaries with delineated boundaries within the Urban Expansion Area. Rather, they indicate general areas where market-based centers would be used to stimulate development. How they would be developed would be guided by either performance or form-based zoning regulations in ensure that increased density would result in villages, each with distinctive well-designed character consistent with the Ten Principles that emerged from the public involvement process.

During subsequent public workshops and charettes, the GOAs were in some cases expanded or combined and open space and mauka-makai connections identified that went either through or around them. Seven GOAs were mutually delineated and subsequently reduced to five Transit-Oriented Urban Villages by the steering committee and the county working with WOA. The catalyst for the development of the Transit-Oriented Urban Villages is the provision of publicly funded infrastructure improvements, the most important of which are the projected mid-level road and a commitment to public transit along the new road.

It is envisioned that the Village Centers would function as Public Transit Hubs to maximize the use of public transit and be pedestrian and cyclist-oriented and be implemented by Transit-Oriented Development Special Area Plans. The Urban Village that would evolve around the village center would be a walkable community (e.g. approximately a ¼ mile walk to the village center) with a mix of housing types and uses that is fully integrated with the Green Infrastructure and topography. The projected transit stops would be located in the mixed use village center, Main Street. The Main Street and the Mid-Level Road should not be coincident because the Mid-Level Road is designed as a collector road and would not be conducive to pedestrians and would be out of scale with the Village Center Main Street (see images of the Village Center and Main Street taken from the 3D Model of a prototypical Urban Village). Instead, the Village Center would be connected to the Mid-Level Road by a spur or local road which, circumstances permitting, would also connect to adjoining Village Centers creating a secondary road network (see Diagram of Mid-Level Road Urban Villages and Village Centers). The Village Center Main Street should run parallel or near parallel with the topographic contours to make it walkable for people of all ages, while the residential neighborhood streets could be steeper with slopes generally in the range of 5% to 8%.

The integration of the Urban Villages with the Green Infrastructure and landscape of Kona is a distinctive feature of the Villages. For example, a mauka-makai connection using a flood zone is visually simulated in the 3D model of a prototypical Village Center. It runs through the center of the Village, adjoins the mixed-use Village Center, and functions as both a flood zone and linear park integrating the Village with Open Space Network (see Green Infrastructure Technical Report).



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The average density of the Villages would be between 5 and 8 DUs per acre. Densities may range from approximately 3 to 4 DUs per acre to 40 DUs per acre with highest densities located closest to the Village Center and Transit Hub and the lowest densities farther from the Village Center (see ESC: Illustrated Densities Example, Figure 1-6 as examples of density range). In addition, each neighborhood would have as its focus, a park around which community uses such as churches and day care centers could be located.

### ***Implementing the Urban Villages***

*The Development Evaluation Punchlist* and *Development Codes* would be adopted and be specific to the North Kona Subdistrict and Urban Village Subarea.

A series of incentives are proposed to encourage development in the Urban Villages. The disincentive to “greenfields” developments in other locations or out of the Urban Expansion Area, with the exception of qualifying Infill Development, is that it would be subject to the existing base zoning which is considerably less than what would be allowed in Urban Villages. Further, zoning district changes, variances and incentives would not, as a matter of CDP policy, be available outside of the Urban Villages and qualifying Infill Development.

The Urban Village incentive program would be voluntary. It would be a two-tier system, similar to the one proposed in the Zoning Framework and Infill Development sections. The first tier is the *Development Evaluation Punchlist* and the second tier is a *Performance Evaluation* and/or *Form-Based Development Code* or a combination of the two. So that this section can be read fluidly (and be a stand-alone document), aspects of the Zoning Framework section are repeated as they apply to the Urban Villages.

The Urban Villages would be self-defining and not require an overlay district (a fuzzy boundary as reference would suffice), because once the Village Center and Transit Hub are mapped (Transit-Oriented Development and Special Area Plans) the *Development Evaluation Punchlist* will determine whether the parcel qualifies as an Urban Village parcel. The character of the qualifying development would then be subject to the *Performance Evaluation* and/or *Form-Based Development Code*.

### ***The Development Evaluation Punchlist***

*The Development Evaluation Punchlist* would have two purposes. The first would be to ensure that the proposed development passes a basic threshold allowing it to go through a ministerial rather than a lengthy discretionary review by permitting the developer to use the *Performance Evaluation* and/or *Form-Based Development Code* discussed below. A complying development would also pass an initial threshold qualifying it for density bonuses, TDR’s, waivers of fees, and other incentives that would not be available to developments that are as-of-right or are going through a discretionary review outside of the Urban Villages and in the Urban Expansion Area.



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*The Development Evaluation Punchlist* is a scoring system where the higher the score the greater the eligibility to utilize the incentives listed above. It is designed to evaluate the degree to which a development leverages public investment in transportation, other infrastructures, investments and implements the CDP. The punchlist below is not meant to be exhaustive but representative of the kind of thresholds, benchmarks and indicators that would be used to evaluate a development's compliance and performance with a threshold. In the example below, we have also applied importance factors giving greater value to some factors and less weight to others. A simpler version could have all the indicators be equal. We do not recommend this. Ranking the indicators would give clarity to what is considered really important and reward a development accordingly based on its performance.

<b><i>Development Evaluation Punchlist*</i></b>
A. Within the Five Transit Villages (fuzzy boundary) Measure: Yes=1.0, No= 0.0 Importance Factor: 5.0
B. Proximity to Transportation B.1. Proximity to Mid-Level Road Measure: ½ Mile = 1.0, > ½ Mile = 0.5 Importance Factor: 4.0 B.2. Proximity to Village Center Transit Hub Measure: ¼ Mile = 1.0, ½ Mile = 0.5 Importance Factor: 4.5
C. Proximity to Village Center Measure: 5 Minute Walk (¼ Mile) = 1.0, > 5 Minute Walk = 0.5 Importance Factor: 4.0
D. Proximity to Parks and Open Space Network Measure: 1 Mile = 1.0, > Mile = 0.5 Importance Factor: 2.0
E. Provision of Public Open Space On-Site Measure: Preferred Ratio of DU's to Open Space = 1.0 < than Preferred Ratio of DU's to Open Space Importance Factor: 3.5
F. Protection and Preservation of Environmental Features and Cultural Resources F.1. Protection of Flood Plains Measure: Yes = 1.0, Partial = 0.5, No = 0.0 Importance Factor: 3.0 F.2. Preservation of Cultural Features Measure: Yes = 1.0, Partial = 0.5, No = 0.0 Importance Factor = 3.0
G. Proximity to other Employment Centers (excluding Village Center) Measure: 5 Miles = 1.0, 7.5 Miles = 0.5, > 7.5 Miles = 0.0 Importance Factor = 3.0
H. Provision of Affordable Housing On-Site Measure: 20% of Total DU's <u>1.0</u> , 15.0% <u>0.75</u> < 15% = 0.25 none = 0.0 Importance Factor 4.5



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\*Connectivity and the Provision of Infrastructure Concurrency with the Development is mandatory.

We expect there to be some need for flexibility evaluating a development based on demonstrated site constraints e.g., Flood Plains. *The Development Evaluation Punchlist* would provide both transparency and accountability in compliance with the Kona CDP.

### ***Performance Evaluation and Form-Based Development Codes***

In a performance system, it is assumed that full compliance is not always achievable, that there are trade-offs between performance goals leaving room for choice by the developer and architect, and partial compliance with a goal is acceptable. Further, performance assumes that there are multiple “right answers,” because performance sets out the problem to be solved, rather than solving the problem. The passing score is the sum of the performance evaluation.

Performance-based zoning clearly states the goal to be achieved, how it is to be evaluated or a program, a formula for measuring, and an importance factor that recognizes that some goals are more important than others and that some aspects of the site design process are easier to accomplish than others. The following is an example taken from 3. *Urban Design Guidelines*.

<b><i>Goal:</i></b> To Create a more diverse place, building setbacks should not be uniform.
<b><i>Program:</i></b> Front yard building setbacks should not align with each other and be no greater than 10 ft. and no less than 5 ft. from adjoining building setbacks.
<b><i>Compliance:</i></b> The total number of lots that comply divided by the total number of lots in the development.
<b><i>Importance Factor:</i></b> 1.25

As an alternative, form-based codes (a form of “pattern book”) accomplish the same goals but in a more prescriptive way. Because they are prescriptive and pre-design the solution they are sometimes preferable but have certain inherent drawbacks. Performance-based development codes are self-adapting to a multiplicity of situations, locations, and development programs, because they do not prescribe a solution but rather describe the design problem to be solved. While form-based development codes typically are written for a specific situation and location. In the case of the Transit Oriented Urban Villages (GOAs) this would necessarily require a different form-based code for each Village if the desired end is to create a specific identity for each Village.

The third way would be to combine both approaches using the *Form-Based Development Code* as “building blocks” which can be assembled in different patterns and evaluated by the *Performance Evaluation Development Code*. Either way, a discretionary process would be replaced by a ministerial review.



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### ***Incentives***

The incentive system begins with the existing underlying zoning district's density. An analysis overlaying the General Land Use Plan's Urban Expansion Area over the current zoning districts reveals that most zoned areas within the Urban Expansion Area have lower densities than those proposed for the Urban Expansion Area (see Comparative GIS Maps of North Kona). Therefore, in most cases—the exception being the nodes of Low, Medium, and High Density—most of the area within the Urban Expansion Area, including the Urban Villages, is underzoned, providing the base for the application of incentives.

Assuming the proposed Urban Village development could satisfy the Punchlist thresholds, it could avail itself of the Urban Village Subarea incentives.

There are two types of incentives—those that are inherent to the Urban Villages and those that the development earns. The *inherent incentives* include:

- The Mid-Level Road by the county;
- County-initiated grey infrastructure investments, e.g., water and waste water;
- A quality public transit system with designated transit hubs located in the Urban Village's mixed-use center; and
- Waivers of development fees

These are all costs, that with the exception of public transit, are typically borne by the developer.

The *earned* incentives are zoning-related and include bonuses, review procedures and site planning flexibility. They include:

- The transfer of development rights TDR to increase density and preserve open space;
- The creation of publicly accessible open space on-site for the residents;
- The construction of drainage ponds and other forms of natural waste and storm water management;
- Provision of on-site affordable housing; and the
- Preservation of cultural features

The incentive bonus system would begin with the existing underlying zoning density as the base. The total amount of density would be calibrated with the score that the development achieved in the *Performance Evaluation Code*. We recommend two bonuses be mandatory for all developments in the Urban Village because they are fundamental to the CDP—the conservation of open space and the creation of mixed-use, mixed-income communities.



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They are:

<p><b>TDR:</b></p>	<p>All developments would be required to purchase a threshold amount of TDRs from open space “sending” areas delineated by the Open Space Network. The “sending” locations should be generally categorized as to their strategic, ecological and/or cultural significance. Density rewards would be calibrated to the strategic importance of the “sending.” (how much TBD) than TDRs from secondary or tertiary locations. Developments would be allowed to increase the purchase of TDRs beyond only if after the development has provided a threshold of affordable housing. Once it has met that threshold it may purchase additional TDRs up to a maximum to be determined.</p>
<p><b>Affordable Housing:</b></p>	<p>All developments would be required to provide affordable housing on-site with a threshold amount specified as a percentage of the total number of units and receive a density bonus. To meet the goal of a mixed-income community, the affordable housing units would be required to be dispersed throughout the developments (side by side on the same block would be acceptable). Bonuses beyond the threshold would be encouraged.</p>
<p><b>On-Site Open Space, Natural Waste and Storm Water Management and Preservation of Natural Features</b></p>	<p>They all require the dedication of on-site open space to achieve their purpose. All would be required e.g., a minimum of neighborhood open space per dwelling units. In addition to permitting increased density on the development’s remaining area, we recommend that incremental bonuses be available commensurate with quality and size of the open space contributed beyond the threshold.</p>



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Other incentives would include:

<b>Site-Planning Flexibility:</b>	This would be made possible by adopting the <i>Performance Evaluation Development</i> or in combination with the <i>Form-Based</i> “building blocks”: A straight <i>Form-Based Development Code</i> , by definition is predictable because it is prescriptive. Moreover, we believe it is not as well suited to the way in which the Urban Villages are expected to develop. The performance-based approach allows for flexibility—“more than right answers” and is well suited to the contingent manner in which the Urban Villages will organically be realized over the next 15 years.
<b>Ministerial Review:</b>	Both types of development should support a ministerial versus discretionary review. This is made possible by each of the two development codes, an objective scoring system in the case of the <i>Performance Evaluation</i> (see example of setbacks) or the highly prescriptive <i>Form-Based Code</i>

Examples are fleshed out in the next section: “Urban Design Guidelines”



## Urban Design Guidelines (Performance Evaluation Development Code)

### *Application*

*The Performance Evaluation Development Code* (“The Code”), whether combined with Formed-Based Code “building blocks” or not only those, is intended to be adopted by the county as the zoning regulations that would apply to developments that qualify (see *Development Evaluation Punchlist*) as:

- South Kona; Infill Development;
- Urban Expansion Area: Infill Development;
- Transit-Oriented Urban Villages (Village Center and Neighborhood) ; and
- P.U.D. in South Kona

The Code would not be applicable to any development outside of the Urban Expansion Area and South Kona exclusive of Infill Development in Captain Cook, Kaelakekua, Honaunau, and Milolii. The Code would provide a number of incentives and density. Among the most important process-related ones discussed in prior sections, is expedited processing through an objective ministerial employing the Code rather than a discretionary review process that a may employ non-statutory guidelines. The ministerial review would focus on reviewing the compliance application, site plan, and other information that fully explains the development prepared by the developer and consultants in the Code. Small developments of a few lots would be distinguished from larger scale developments and would be subject to far fewer Code performance measures as many would not pertain at that size of development.

A primary function of the Design Center would be to advise developers and consultants in the use of the Code, how to get the most out of its flexibility and adaptability including site planning assistance, and assist in the preparation of The Code compliance application. In addition the Design Center would publish best practices briefs and examples from other places that have historically figured out interesting and efficient solutions to building on steep slopes (e.g. Switzerland).

### *Performance Evaluation Development Code* (“the Code”)

The Code is designed to evaluate how well a development performs against expectations which are typically referred to as performance measures, benchmarks, and thresholds. They have been formulated to address both a quantitative and qualitative aspects of a proposed development and are derived from the Ten Principles. A typical Code element would state the goal to be achieved, the program “or how it would be achieved, a way to evaluate its importance, and special conditions that might occur. As illustrated in the prior example of front setbacks partial compliance is allowed assuming a minimum threshold has been met, because a design problem is about balancing and making choices in the context of the end to be achieved, rather than the aggregate optimization of each part. In other words – “there are many right answers none of them are “perfect” although they may be of equivalent quality, and a passing score, rather than a perfect score is required.

The Code has been organized to generally reflect the order of the design decision – making process, where first order decisions tend to exclude a whole host of

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possibilities – a winnowing process, if you will. An example of a Code’s Table of Contents follows. It is not meant to be inclusive but representational.

*A. Respect the land*

1. Work with the site’s topography e.g. minimize the use of cut and fill, “pads”, and retaining walls
2. Retain existing flora
3. Work with natural systems
4. Protect cultural resources and sites

*B. Create Networks*

1. Provide connectivity to the Public open Space Network
2. Provide habitat connectivity
3. Connect communities by vehicular, pedestrian, and cyclist circulation system

*C. Create Places at all Scales*

1. Transit-Orient Urban Villages
  - a) The Village Center
    - 1) The Pedestrians and Cyclists Experience
      - Walkability and Accessibility
      - “Main Street should have minimum slope
      - Minimize driveway curb cuts
      - Provide easy connectivity and accessibility to and from neighborhoods
      - Buildings should front and be accessible on/from the sidewalk
      - Shade and seating
      - Walkable block lengths
      - Provide a “Public Commons” (e.g. multi-use space for farmers market)
      - Integrate/provide access to Open Space Network
    - 2) Achieve an intensity of development to support a vibrant Village Center and public transit
      - Achieve a minimum residential density
      - Provide for a variety of housing types, tenures, and affordability
    - 3) Quality of Place: Scale and Character
      - To create an organic sense of place and variety of experience, provide;
        - a range of lot sizes and frontages
        - maximum building lengths (e.g. the dominant building should be the Transit Hub)
        - range of front setbacks
        - shared parking at the rear



- varied building heights
- mixed use

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## b) The Neighborhood

### 1) The Pedestrians and Cyclists Experience: Walkability and Accessibility

- Provide sidewalks and bikepaths
- Minimize impacts of slopes on pedestrian walkability and the use of retaining walls
- Minimize driveway curb cuts and parking pads
- Provide connections to the Open Space Network
- Provide shade and landscaping
- Provide walkable block lengths
- Provide a “neighborhood commons”

### 2) Achieve an intensity of development to create a vibrant Urban Village and to support public transit

- Achieve a minimum average residential density (e.g. through TDR and Affordable Housing bonus)
- Achieve an average density gradient
- Provide for a variety of housing types, tenures and affordability
- Provide small neighborhood centers with convenience shopping

### 3) Quality of Place: Scale and Character

- To create an organic sense of place and variety of experience provide:
  - a range of lot sizes and frontages on a block
  - a variety of front setbacks
  - varied heights
  - alternative off-street parking solutions (e.g. alleys with housing above garage, shared driveways, garage on side, in, back)

## D. Infill Development: North and South Kona

Note: Infill Development is a subset because it:

- a) must fit successfully into an existing context – often mediating between two different developments, or
- b) it occurs in existing villages and hamlets each with a different character, scale, topography and landscape

While many of the performance measures described for the Transit-Oriented Urban Village may be applicable to a). above, most may not be applicable to b). Instead, the performance measures will be derived from the existing context with



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the intent that the Infill Development enhance the village or hamlet by completing it – rather than by changing it dramatically.

Deriving the performance measures from the existing context is an Urban-Design analysis using GIS and other available data. For example, the following would be derived from the existing context (and combine Neighborhood's The Pedestrian Experience, Walkability and Accessibility and Quality of Place: Scale and Character).

1) Goal: Support and enhance the character of the village/hamlet

1a) *Front setbacks*

Program: Work within the range of front setbacks in the immediate context of the Infill Development

Performance Measure:

A. Preferred Front setback (Based on existing) : total of existing setbacks  
weighted by lot frontage

B. Proposed Front Setback : total of proposed setbacks  
weighted by lot frontage

Compliance =  $B/A \times \text{Importance Factor}$

1b) *Lot sizes and Frontages*

Program: Work within the range of lot sizes and frontages in the immediate context of the Infill Development

Performance Measures

A. Preferred Range of lot frontages and frequency

B. Proposed Range of lot frontages and frequency

Compliance =  $B/A \times \text{Importance Factor}$

1c) Building Height (Similar)

1d) Building Types (Similar)

1e) Building Uses (Similar)

Other examples of performance measures, benchmarks, and capacities that would be based on the context would include, for example, sidewalks – if there are none and none are planned, none should be required of an Infill Development, and so on. In the case of Infill Development, consideration should be given to selecting those performance measures that apply and that will enhance the character of the place. It is also assumed that the character of places evolves over time, so that Infill Development may be of higher density, and by adding itself to the village or hamlet context becomes part of the new Infill Development context, thereby accommodating both change and growth.

While performance-based zoning systems may take more time, care and resources to create they will also have a much longer shelf-life because they are based on responding to a desired end without pre-designing it in advance. Further, any prescriptive system is always a Procrustean bed fitting reality into a series of over-determined pre-cooked “solutions”. Finally, performance is optimistic – it leaves open the possibility of the “good one couldn’t think of”.

# **GREEN INFRASTRUCTURE TECHNICAL REPORT**

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**The Conservation Fund**

**February 28, 2007**

# **GREEN INFRASTRUCTURE TECHNICAL REPORT**

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## **KONA COMMUNITY DEVELOPMENT PLAN**



**Prepared for:**  
County of Hawaii  
Department of Planning

**Prepared by:**  
Will Allen, Conservation Fund

**February 28, 2007**



# Kona Community Development Plan Green Infrastructure Technical Report

February 2007

Prepared by Will Allen, The Conservation Fund

Purpose: The Green Infrastructure Technical Report is intended to supplement the strategic conservation information incorporated into the Kona Community Development Plan (CDP). The Technical Report and the CDP utilize the concepts outlined in the book *Green Infrastructure: Linking Landscapes and Communities* to provide a strategic framework for guiding future land development and land conservation decisions within the North Kona and South Kona planning districts.

## Report Outline

- ❖ **What is Green Infrastructure?**
  - Definitions
  - The Green Infrastructure Network
    - Map – Land Cover (15-Class – Hawai'i GAP Analysis Program)
- ❖ **Tailoring Green Infrastructure Concepts to Kona**
  - Ahupua'a
  - Mauka Lands
    - Map – Elevation
- ❖ **Guidance for Protecting Kona's Green Infrastructure**
  - CDP Principles, Objectives, and Preliminary Actions
  - Leadership Forums
- ❖ **Green Infrastructure Network Design for Kona**
  - Managed Lands Inventory
    - Map – Managed Lands
  - Green Infrastructure Opportunities
    - Map – Green Infrastructure Opportunities
  - Agricultural Lands and Native Vegetation
    - Map – LUPAG & Native Vegetation
- ❖ **Appendices**
  - 1 – Kona CDP Principles, Objectives and Preliminary Actions
  - 2 – Green Infrastructure Keys to Success and Principles
  - 3 – Convening Leadership Forums: Southeast Regional Partnership for Planning and Sustainability (SERPPAS)
  - 4 – Olaa-Kilauea and Three Mountain Partnership
  - 5 – Mauka Land Group: Kona Mauka Land Vision, Guidelines, and Principles
  - 6 – Transferable Development Rights Programs: An Economic Framework for Success
  - 7 – Special Use Permit Guidelines – Green Infrastructure Resource Protection in LUPAG Agricultural Classifications
  - 8 – Acknowledgements and Author Information

## WHAT IS GREEN INFRASTRUCTURE?

### Definitions

Green infrastructure is our natural life-support system – an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife.<sup>1</sup> Green infrastructure also describes a process that promotes a systematic and strategic approach to land conservation, encouraging land use planning and practices that are beneficial to nature and people. Taking a green infrastructure approach provides benefits both as a concept and as a process. As a concept, the planning and management of a green infrastructure network can guide the creation of an open space system that supports multiple objectives. As a process, the approach provides a mechanism for diverse interests to come together to identify priority lands for protection. Green infrastructure provides a framework that can be used to guide future land development and land conservation decisions to accommodate population growth and protect and preserve community assets and natural resources.

According to Webster's New World Dictionary, Infrastructure is defined as - "the substructure or underlying foundation, especially the basic installations and facilities on which the continuance and growth of a community or state depends". When we think of infrastructure we think of built infrastructure such as roads, electric power lines and water systems as well as social infrastructure such as schools, hospitals and libraries. However, the concept of Green Infrastructure elevates air, land, and water to an equal footing with built infrastructure and transforms open space from "nice to have" to "must have." Protecting and restoring our natural life-support system is a necessity, not an amenity. What gives the term Green Infrastructure its staying power is its ability to invoke images of planned networks of green spaces that benefit wildlife and people, link urban settings to rural ones and, like other infrastructure, forms an integral part of government budgets and programs.

### The Green Infrastructure Network

Green infrastructure encompasses natural and restored native ecosystems, including conserved natural areas and wildlife habitat; public and private conservation lands such as national and state parks, nature preserves, and wildlife corridors; working lands of conservation value such as farms, forests and ranches; and other protected open space such as parks, scenic resources, and greenways. While protection of natural systems and biodiversity is an important goal of green infrastructure, green infrastructure networks can include a wide diversity of elements that may not be related to this goal. Greenways and trails that provide recreational and health values<sup>2</sup>; historical, cultural, and archaeological sites that are valued as community resources; and farms, orchards, ranches, and forests that provide people with important economic yields also are elements of green infrastructure.<sup>3</sup>

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<sup>1</sup> Benedict, Mark A. and Edward T. McMahon. *Green Infrastructure: Linking Landscapes and Communities*, 2006, Island Press. (<http://www.islandpress.org>)

<sup>2</sup> McMahon and Benedict. 2004. How Cities Use Parks for Green Infrastructure. American Planning Association (<http://www.planning.org/cpf/pdf/greeninfrastructure.pdf>)

<sup>3</sup> For more information on green infrastructure, please see <http://www.greeninfrastructure.net>.

# Land Cover

## Kona Community Development Plan Green Infrastructure Technical Report

The Kona Community Development plan is a project of the  
County of Hawaii Planning Department and its consultants:

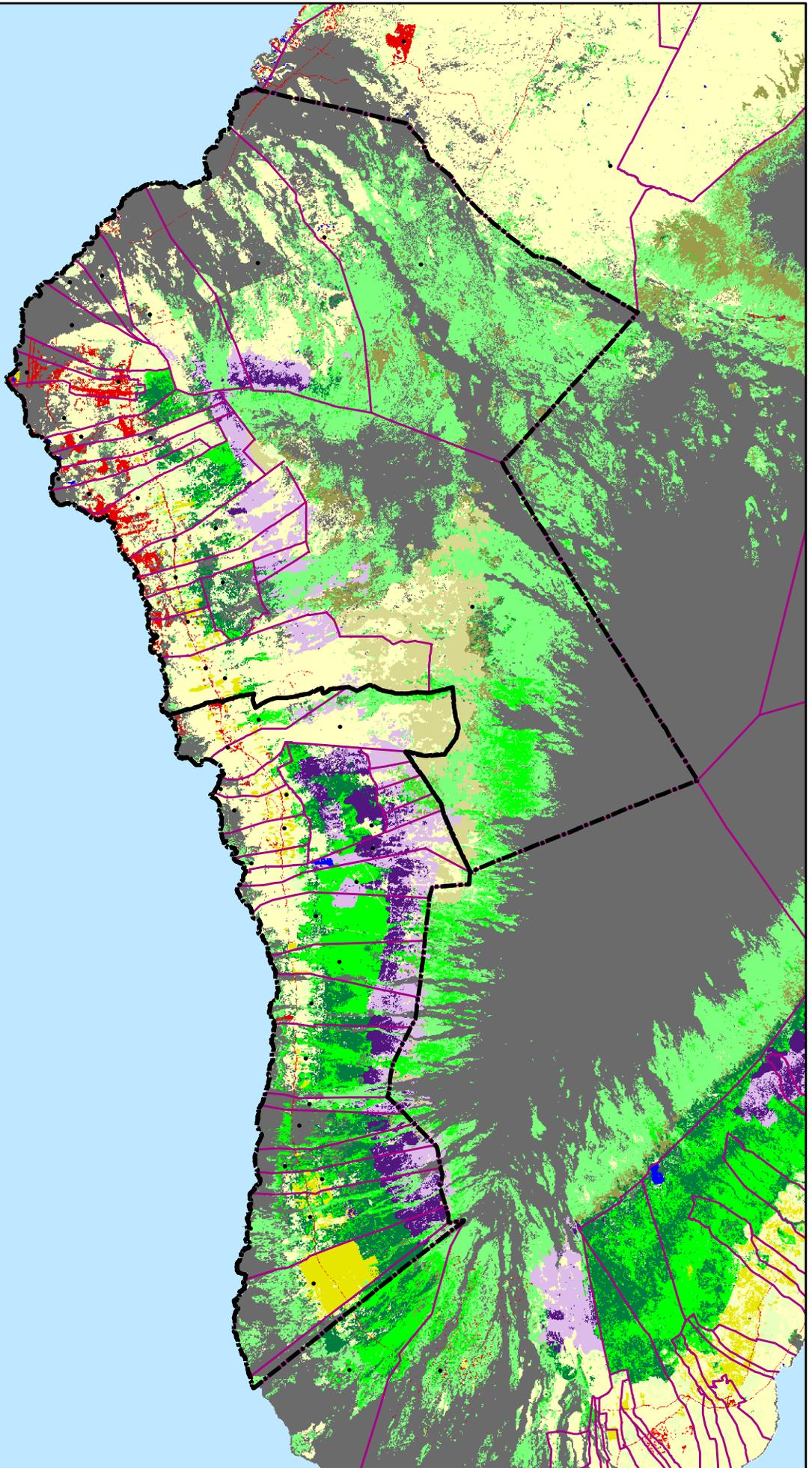


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### Legend

Kona Boundaries

Ahupua'a

### Hawaii GAP Land Cover

- Non-Native Forest
- Native Shrubland, Sparse Ohia
- Native Wet Cliff Vegetation
- Closed Koa-Ohia Forest
- Closed Ohia Forest
- Mamane, Naio, Native Trees
- Open Koa-Mamane Forest
- Open Koa-Ohia Forest
- Open Ohia Forest
- Water, Wetland Vegetation
- Agriculture
- Developed
- Non-Native Grass and Shrubland
- Sparse Vegetation, Unvegetated

For map data sources, please see supplemental materials booklet.

1:400,000

0 3 6 Miles



## TAILORING GREEN INFRASTRUCTURE CONCEPTS TO KONA

Given the physical and cultural context of the Hawaii Islands, the concept of a green infrastructure network has been tailored to the unique geography of Kona. The Technical Report utilizes two watershed-based concepts for its planning framework.

### Ahupua'a

Hawai'i has the tradition of the Ahupua'a, the ancient Hawaiian land division "from the mountain to the sea" that supported a self-contained community working with the spirit of cooperation of caring and revering the land to meet the needs of all<sup>4</sup>. Traditionally, Hawaiians managed these areas as whole units. The Ahupua'a management system recognizes that what happens at the headwaters affects ecosystems throughout the watershed and coastal waters. Given the linkages between land uses, fresh and coastal water quality, and the physical characteristics of Hawaii's watersheds, the Department of Health and the State Office of Planning have established non-point source pollution programs based on the management principles of cooperation, coordination, communication, and holistic approaches – concepts that form the basis of Ahupua'a management systems.

Ahupua'a boundaries are depicted on all maps and can serve as a framework to guide future land use planning and management strategies within the CDP. In addition, the Technical Report has identified lands that have the potential to retain the Ahupua'a mountain-to-sea connections that link the shoreline with higher elevation lands.

### Mauka Lands

Kona's Mauka Lands, literally meaning "up the mountain", refer to Watershed lands at higher elevations. The importance of these lands was highlighted in the *Kona / Kohala Natural Resources Roundtable* in 1995. The most important areas to recharge Kona's high-level and basal water resources come from the high rainfall / fog drip belt in mauka Kona. In addition to groundwater recharge, these lands are also home to native plant habitat, important ranch lands, and public lands with open space and recreational benefits. Over the years, many private landowners in mauka Kona have been interested in innovative techniques for the management and stewardship of these lands while also obtaining an economic return on their land investments.

In an effort to address Watershed issues in the CDP, the County of Hawaii's Department of Planning convened the Mauka Land Group in an effort to establish a vision, guidelines, and principles for Mauka Kona. While the Mauka Land Group was not designated an official CDP working group, the participation of landowners with significant upper mauka land holdings in these meetings made them important stakeholders to provide insight on Watershed issues. The Technical Report has identified upper Mauka lands suitable for future ecosystem services pilot projects where payments and incentives could be provided for land management practices that protect water quality, provide recreational opportunities, mitigate flood hazards, preserve cultural resources, and other public benefits.

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<sup>4</sup> <http://www.k12.hi.us/~ahupuaa/>, <http://www.savecourseas.org/MAINPAGES/aboutAhupaa.htm>

# Elevation

## Kona Community Development Plan Green Infrastructure Technical Report

The Kona Community Development plan is a project of the County of Hawaii Planning Department and its consultants:



**Legend**

- Kona Preferred Growth Areas
- Kona Boundaries
- Ahupua'a
- Major Roads
- Growth Opportunity Areas

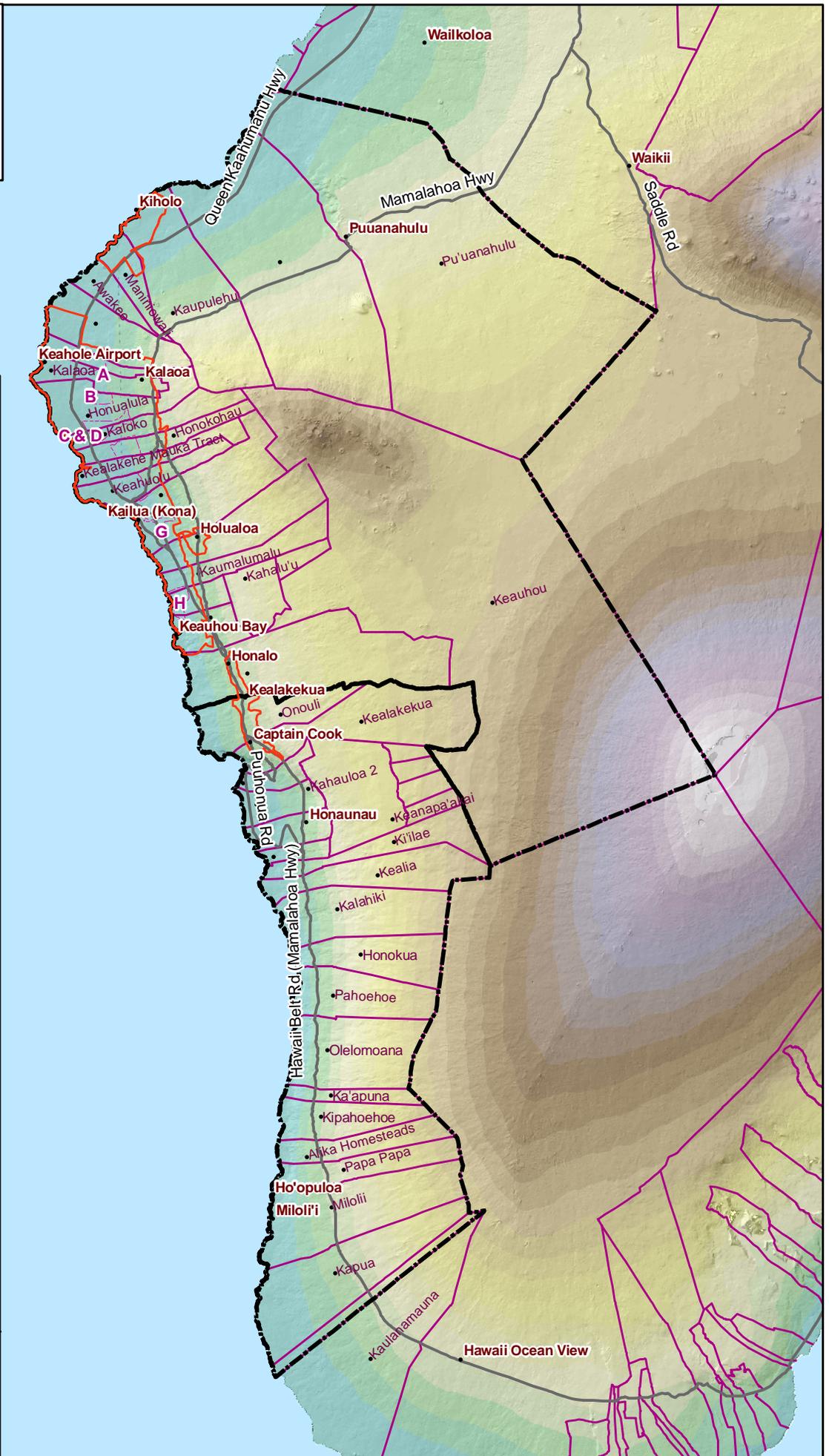
**Elevation Ranges**

	100 - 500
	501 - 1000
	1001 - 1500
	1501 - 2000
	2001 - 2500
	2501 - 3000
	3001 - 3500
	3501 - 4000
	4001 - 4500
	4501 - 5000
	5001 - 5500
	5501 - 6000
	6001 - 6500
	6501 - 7000
	7001 - 7500
	7501 - 8000
	8001 - 8500
	8501 - 9000
	9001 - 9500
	9501 - 10000
	10001 - 10500
	10501 - 11000
	11001 - 11500
	11501 - 12000
	12001 - 12500
	12501 - 13000
	13001 - 13500

For map data sources, please see supplemental materials booklet.

1:400,000

0 3 6 Miles



## GUIDANCE FOR PROTECTING KONA'S GREEN INFRASTRUCTURE

### CDP Principles, Objectives and Preliminary Actions

The Kona CDP planning process has provided an initial framework for implementing strategies that protect and enhance Kona's green infrastructure.<sup>5</sup> The CDP planning principles most relevant to green infrastructure include:

- *The coast line, watershed areas, flood plains, important agricultural land, open space, and areas mauka of Mamalahoa Highway should be protected inside and outside of the urban expansion area.*
- *Future growth should provide more parks.*
- *Density in South Kona should be kept low and the character should be kept rural.*

Based these principles, CDP Objectives and Preliminary Actions, and concepts outlined in *Green Infrastructure: Linking Landscapes and Communities*,<sup>6</sup> the following principles for protecting Kona's green infrastructure have been developed:

**Use development as a tool for protecting green infrastructure:** Development should provide an opportunity to create more parks and protected open space in desired locations (e.g. utilizing floodplains for parks and trails). Incentive programs can be developed that: (1) provide density bonuses for site designs with higher open space ratios, (2) allow fast-track application review when meeting desired open space ratios, and/or (3) reduce permit fees when applicants provide payments that match all or part of the 2% real property tax allocated for open space purposes.

**Finance green infrastructure as a primary public investment just like gray infrastructure:** The design and development of a parks and open space network should be funded just like transportation, water, sewer, electricity, telecommunications and other essential community support systems. In addition to the 2% of real property tax allocated for open space purposes, other potential sources might include: Bond issues for parks and open space purchases and maintenance, real estate transfer taxes, and inclusion of parks and open space purchases into the Capital Improvements Program (CIP).

**Evaluate and monitor progress towards achieving green infrastructure planning objectives:** It is important to determine if development and other land use change is moving Kona towards or away from the goals outlined in the CDP. The Kona CDP Performance Evaluation Framework is intended to assist with this assessment through the creation of indicators at the project and context level.

**Integrate green infrastructure into the planning processes of other Federal, State, local, and community efforts:** While most of the actions recommended in the CDP focus on what the County of Hawai'i and the community of Kona can do, significant time and energy should be invested in establishing collaborative land use partnerships at a variety of

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<sup>5</sup> See Appendix 1 - CDP Planning Principles, Objectives, and Preliminary Actions – for a complete list.

<sup>6</sup> See Appendix 2 - Green Infrastructure Keys to Success and Principles for more information.

scales to support green infrastructure planning efforts. Initiatives such as the Three Mountain Partnership and the Mauka Land Group should be incorporated into the land use decision making process that will result from the CDP process.

### Leadership Forums

The CDP public workshops recommended protection of areas mauka of Mamalahoa Highway (i.e. Kona's Watershed lands). These lands are located on the slopes of Hualalai and Mauna Loa, generally mauka of the area that has been subdivided into smaller agricultural lots. Depending on the area, these smaller lots (except in the Kaloko Mauka subdivision) end at about 1800' to 2200' in elevation. Above that area, the land is owned by a handful of private owners, and by the State or Federal governments. Kona's Watershed lands provide an array of benefits and services to the economy and to residents in Kona.

As a result, a Mauka Land Group was convened by the County to examine the unique circumstances of land ownership and use in Kona's Watershed areas. The Mauka Land Group convened meetings in July 2006 and September 2006 and collaborated on the development of a document entitled *Kona Mauka Land Vision, Guidelines and Principles*.<sup>7</sup> The document initially built upon the statements of agreement outlined in the *Kona/Kobala Natural Resources Roundtable* in 1995 and was refined through a review of the CDP planning process as well as rights of landowners, issues of concerns and economic realities.

#### VISION STATEMENT FOR MAUKA KONA (September 2006)

*A well managed landscape of publicly and privately owned lands collectively committed to maximizing the region's ecosystem service value while generating sufficient income for its owners to ensure sustainable resource management and stable tenure over the long term.*

The hope also is that the Mauka Land Group, or a similar partnership, can continue to serve as a collaborative land use planning entity that critiques and helps implement incentives and regulations that promote green infrastructure in land use planning and decision making.

In addition to the Mauka Land Group, the Olaa-Kilauea Partnership provides a mechanism for addressing conservation issues in Kona's mauka lands.<sup>8</sup> Partners in this effort have pooled their staff expertise and funding to significantly reduce the threats of feral ungulates and noxious weeds on Federal, State, and private lands. They now recognize the compelling need to expand watershed protection and management efforts across the slopes of Mauna Loa, Kilauea, and Hualalai as part of a "Three Mountain Partnership." A Memorandum of Understanding has been drafted to govern the Partnership, and it will initially focus on three of the most significant management challenges or threats to the integrity of the forested landscape: invasive weeds, feral cattle, and wildlife prevention and response.

One of the keys to successful green infrastructure efforts outlined *Green Infrastructure: Linking Landscapes and Communities* is to develop a leadership group to guide the implementation of planning objectives. The purpose of the leadership group is to convene stakeholders in a

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<sup>7</sup> See Appendix #3 - Mauka Land Group – for more information.

<sup>8</sup> See Appendix #4 – Olaa-Kilauea and Three Mountain Partnership

non-confrontational environment, develop a clear vision and mission based on consensus, and identify appropriate mechanisms for achieving the vision and mission. A series of leadership forums should be considered to formally convene on particular issues of concern following the conclusion of the official CDP planning process. These forums should be convened based on principles adapted from an ongoing effort called the Southeast Partnership for Planning and Sustainability (SERPPAS).<sup>9</sup>

**Kona Watershed Forum:** The Kona CDP Environment Working Group has recommended the expansion of watershed management and protection efforts through establishment of a Kona Watershed Advisory Group and a Kona Watershed Roundtable. Multiple CDP working groups have recommended that floodplains be utilized as parks and open space and that ahupua'a be utilized as an organizing principle for watersheds. The Mauka Land Group acknowledges the role that Kona's Watershed plays in transporting water to the basal aquifer and that there are a variety of land management practices in mauka and makai lands that can exacerbate flooding and sedimentation problems. In addition, the partners in the Olaa-Kilauea Partnership recognize the need for watershed protection and management efforts across a regional scale. ***A unified vision and mission for watershed management and protection needs to be articulated for Kona and the land encompassed by the Three Mountain Partnership that drain into North and South Kona.*** While this forum could be coordinated by the County initially, representatives from the CDP Working Group, Mauka Land Group, and Three Mountain Partnership would guide the process for formulation of a vision and mission statement.

**Forum on Public Recreation in Upper Mauka Kona:** The CDP Recreation Working Group expressed an interest in better hiking and trail access in mountain and wilderness areas. The Mauka Land Group acknowledges that both public and private lands in upper mauka Kona are virtually inaccessible to the general public for hiking, ecotourism, and related recreation, in part because of perceived concerns about landowner liability. And while public access to public lands should be increased, public access to private lands should only occur where deemed compatible by the landowner. ***In addition to development of a unified vision and mission for public recreation in upper mauka Kona, the first order of business should be to address landowner concerns about landowner liability of the Hawaii Recreation Use Statute. The forum also could identify priorities for mauka-makai trail connections and an equitable fee-based system for public recreation on privately owned upper mauka lands to support trail maintenance and enhancement.***

**Upper Mauka Land Issues:** ***Some combination of the Mauka Land Group and the Three Mountain Partnership are the appropriate forums for continuing to deal with land management and economic issues primarily relevant to upper mauka Kona.*** These issues are outlined in the *Kona Mauka Land Vision, Guidelines and Principles* and focus on day-to-day land management issues (such as invasive species management) and identifying innovative strategies for continued economic viability of Kona's upper mauka lands. These innovative strategies might include ecosystem service payments for carbon sequestration, koa forestry, or biodiversity. In addition, these forums could work with the County to advocate for changes in State regulations that limit flexibility on land management practices

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<sup>9</sup> See Appendix #5 – Convening Leadership Forums - for more information.

and ability to develop ecotourism infrastructure and to facilitate the leverage of State and Federal landowner assistance programs and initiatives.

**Forum on Parks, Open Space, and Recreation for the Kona District:** The CDP Environment Working Group suggests adoption of a Kona Open Space Plan while also suggesting development and enhancement of planning tools that promote protection of critical areas and scenic/heritage corridors. The CDP Recreation Working Group suggests an updated recreation plan while also recommending development of planning tools that strategically acquire parkland and utilize floodplains as open space. A variety of park and open space financing options also are suggested. ***A forum is needed to develop a detailed parks, open space, and recreation plan focused on areas inside the preferred growth areas and, in particular, the growth opportunity areas.*** This plan should be coordinated with the efforts to develop performance indicators for protected lands, parks and trails per resident, open space ratios based on development density, and open space connectivity. It should consider the findings of the *Hawaii County Public Access, Open Space, and Natural Resources Preservation Commission* report from April 2006 and also could refine the transfer of development rights (TDR) sending areas<sup>10</sup> and establish reasonable density bonuses for protection of important open space resources.

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<sup>10</sup> For more information on transfer of development rights programs, please see Appendix #6.

## GREEN INFRASTRUCTURE NETWORK DESIGN FOR KONA

### Managed Lands Inventory

Lands managed primarily for conservation, wildlife habitat, recreational and open space purposes serve as an initial building block for a green infrastructure network. While these lands vary in their level of legal protection, their ownership status and/or current management plans make them suitable to be classified as hubs and sites within a green infrastructure network. Managed lands encompass between approximately 170,000 and 175,000 acres (33-34%) of the 513,280 acres within the North Kona and South Kona planning jurisdictions.<sup>11</sup>

<u>TYPE</u>	<u>NAME</u>
National Parks	Hawaii Volcanoes National Park Puu Honau O Honaunau National Historical Park
National Wildlife Refuge	Hakalau Forest National Wildlife Refuge
State Bird Sanctuaries	Keauhou Ii (Hualalai) Cooperative Nene Sanctuary Kipuka Ainahou Nene Sanctuary Puu Waawaa Forest Bird Sanctuary
State Forest Reserves	Honuaula Forest Reserve Kapapala Forest Reserve Kau Forest Reserve Mauna Kea Forest Reserve Mauna Loa Forest Reserve South Kona Forest Reserve Waiaha Springs Forest Reserve
State Game Management Areas	Kaohe Game Management Area Kapapala Cooperative Game Management Area Mauna Kea Game Management Area Pohakuloa Training Area Game Management Area Puu Anahulu Game Management Area Puu Waawaa Cooperative Game Management Area
State Natural Area Reserves	Kipahoe Natural Area Reserve Manuka Natural Area Reserve Mauna Kea Ice Age Natural Area Reserve
State Parks	Kealakekua Bay State Historical Park Kekaha Kai State Park Keolonahihi State Historical Park-Keakealaniwahine
State Recreation Areas	Manuka State Wayside Mauna Kea State Recreation Area Old Kona Airport State Recreation Area
Other State Owned Natural Lands	Makaula-Ooma Mauka Tract Honuaula Tracts Honomalino Tract
Private Nature Preserve	Kona Hema Preserve (The Nature Conservancy)

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<sup>11</sup> A range is provided here since the managed lands encompass an array of institutional arrangements, including unencumbered state lands, private lands registered with the State without an easement, etc.



## Green Infrastructure Opportunities

In addition to managed lands, there are a series of other lands that have been classified as opportunities to enhance Kona's green infrastructure network. These include: (1) public lands not classified as managed but with the potential to serve as part of the green infrastructure network with sound land management practices, (2) private lands that serve important ecosystem management functions and support growth areas through provision of ecosystem services, and (3) private lands that provide opportunities for "mountain to sea" linkages between the shoreline and mauka lands.

Institutional: These are additional lands owned by Federal and State agencies that are not included in the managed lands inventory but can provide the functions and services of a green infrastructure network through management for conservation and open space purposes. These lands, when combined with public and private managed lands, have been classified as Institutional.<sup>12</sup> Institutional lands encompass approximately 190,380 acres. Green infrastructure protection strategies for these lands primarily focus on stewardship and land management techniques (e.g. invasive species management) employed by Federal and State agencies in accordance with adopted management plans.

Ecosystem Services: These are lands that encompass the large private ownerships mauka of Mamalahoa Highway that appear to be suitable locations for pilot projects where payments and incentives could be provided for land management practices that maintain and enhance ecosystem services. The Mauka Land Group has identified an array of potential ecosystem service opportunities, including water supply for domestic, agricultural, and industrial uses; flood control, recreation, carbon sequestration, biodiversity preservation, and cultural resource protection.<sup>13</sup> Ecosystem Service Area lands encompass approximately 239,100 acres. Green infrastructure protection strategies for these lands range from landowner assistance programs (e.g. USDA Farm Bill), conservation easements, transfer of development rights, sustainable forestry certification, and carbon credit programs.

Potential Ahupua'a Connections: These are lands that provide opportunities for "mountain to sea" linkages between the shoreline and lands mauka of Mamalahoa Highway. Often, these properties are extensions of ownerships in the Ecosystem Service Area and simply fall makai of Mamalahoa Highway in South Kona. Outside of these areas and the Institutional lands along the shoreline, there are not many opportunities to retain Ahupua'a connections due to fragmentation of open lands, subdivision of large ownerships, and designated preferred growth areas. These lands encompass an approximately 5,700 acres. Green infrastructure protection strategies for these lands are the similar to those in the Ecosystem Services Area but also may include environmentally sensitive site design techniques that preserve important resource features and retain a recreational trail connection to mauka lands if these properties are proposed for development in the future.

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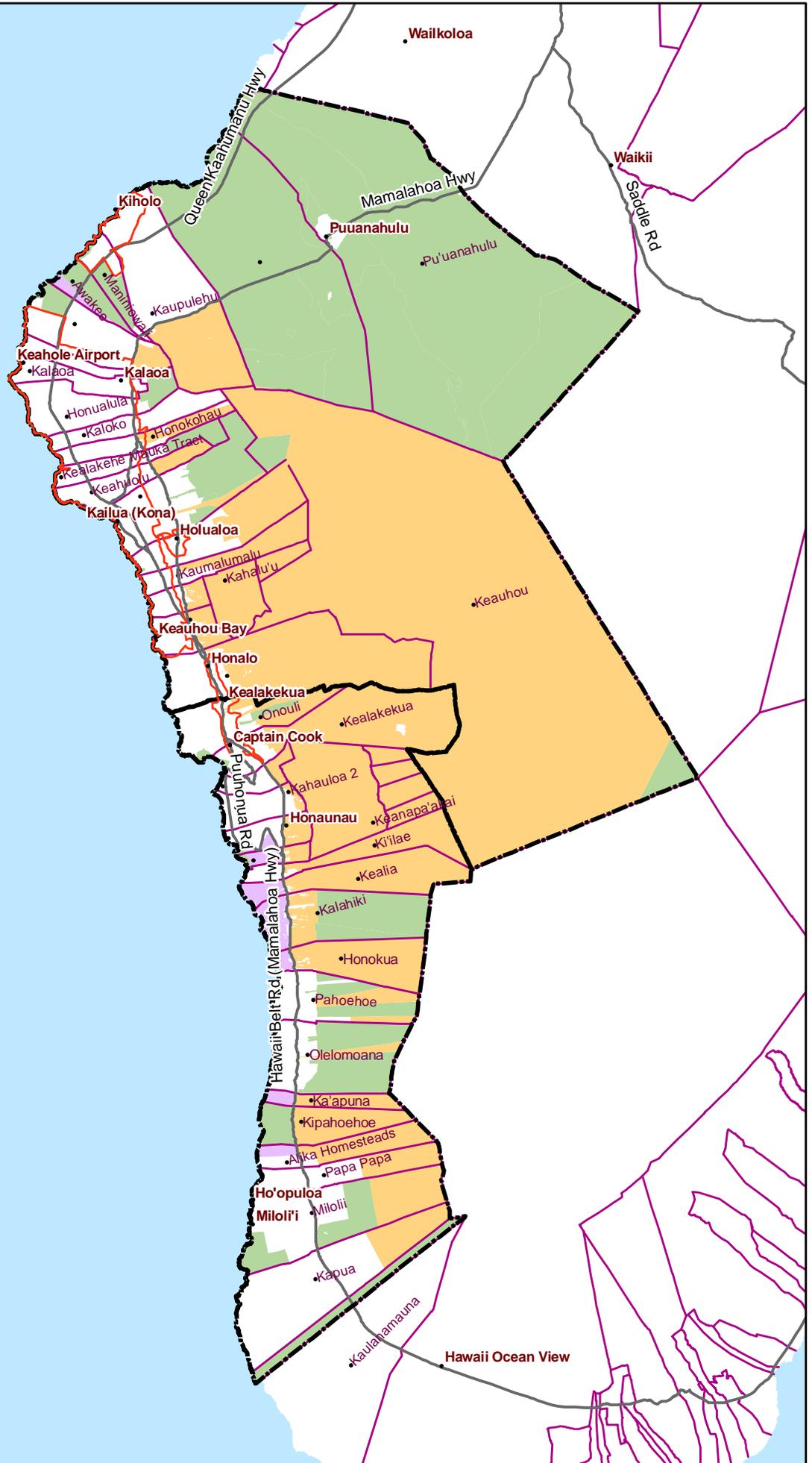
<sup>12</sup> Institutional and Managed Lands are not mutually exclusive. Some lands are included in both categories, such as the State Bird Sanctuary land that is owned by King Kamehameha Schools and The Nature Conservancy's Kona Hema Preserve.

<sup>13</sup> For cartographic purposes, the Ecosystem Services Area is drawn on top of private Institutional lands since they would be eligible for ecosystem service payments and incentives. Please see Appendix #3 - Mauka Land Group – for more information on ecosystem services.

# GI Opportunities

## Kona Community Development Plan Green Infrastructure Technical Report

The Kona Community Development plan is a project of the County of Hawaii Planning Department and its consultants:



### Legend

- Ecosystem Services Area
- Institutional
- Potential Ahupua'a Connections
- Kona Preferred Growth Areas
- Kona Boundaries
- Ahupua'a
- Major Roads

For map data sources, please see supplemental materials booklet.

1:400,000



## Agricultural Lands and Native Vegetation

Lands designated for agricultural activities are an integral part of the green infrastructure network, and many of these working landscapes are within the Ecosystem Services Area. In addition, a Coffee Belt designation has been created to delineate areas most suitable for coffee production.<sup>14</sup> Outside of the Coffee Belt, there are lands classified as agricultural outside the Coffee Belt that contain a significant amount of native forest not suitable for conversion to intensive agricultural or development purposes. As a result, a set of development principles and guidelines for special use permits need to be crafted to ensure maintaining and enhancing Kona's green infrastructure.

The objective of this set of guidelines is to encourage suitable land use activities within lands classified as Extensive Agriculture and Important Agricultural Land in the State's 2005 Land Use Pattern Allocation Guide (LUPAG).<sup>15</sup> While agricultural activities are encouraged within these areas, much of this area contains important native vegetation and other natural features. These resources need to be protected while also accommodating suitable agricultural activities, limited residential development, and other environmentally sensitive economic development activities.

The long-range goal for lands classified as Extensive Agriculture and Important Agricultural Land is to maintain and encourage predominantly agricultural and rural economic uses with limited residential to support economic activities and protection of significant native vegetation and other important natural resource features.<sup>16</sup> The objectives of development guidelines in these areas are essentially:

- Make it easy to develop land uses that are fundamental to the rural economy and support rural character through resource protection.
- Make it more difficult to establish uses that have the potential to negatively affect the rural economy and character.
- Prohibit uses that are detrimental to the rural economy and character.

Basic agricultural uses and agricultural support uses should be allowed by right subject to performance standards necessary to mitigate adverse impacts and protect important natural features. Recreational uses that support nature-based tourism also should be allowed by right subject to performance standards.

Any residential development must be primarily to support nearby economic activities and be consistent with conservation subdivision principles, i.e. clustered lots the rural landscape and include significant amounts of open space and maintenance of natural features on the site, supported by infrastructure that is consistent with the rural landscape. Non-tourism related residential development should be designed primarily to provide agricultural workforce housing on the permit site or adjacent agricultural lands.

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<sup>14</sup> [http://www.hawaii-county.com/general\\_plan\\_rev/revision/Land%20Use%20-%20Agriculture.pdf](http://www.hawaii-county.com/general_plan_rev/revision/Land%20Use%20-%20Agriculture.pdf)

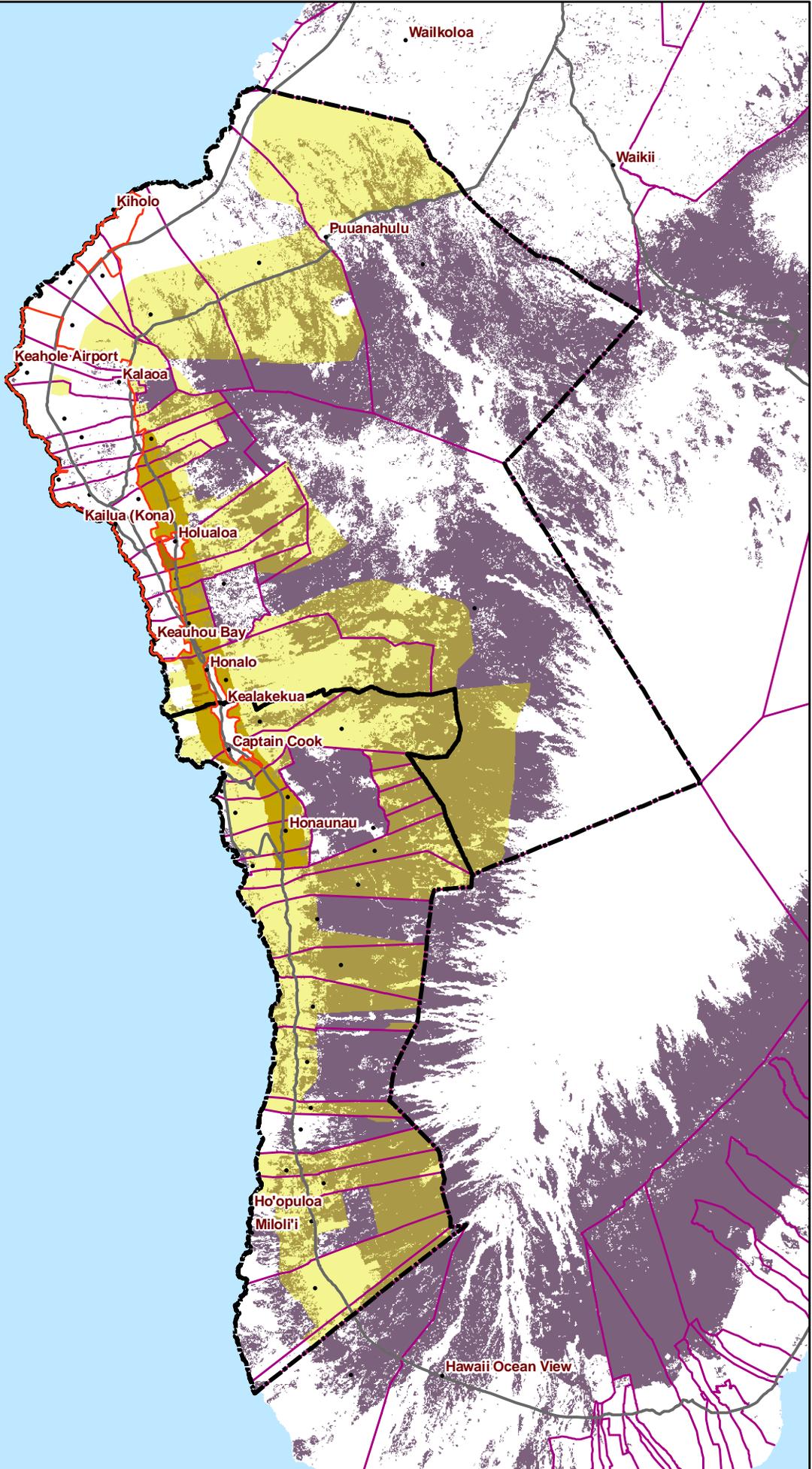
<sup>15</sup> <http://www.hawaii-county.com/la/gp/2005/MapsLUPAG.pdf>

<sup>16</sup> For more information, see Appendix #7 - Special Use Permit Guidelines – Green Infrastructure Resource Protection in LUPAG Agricultural Classifications.

# LUPAG & Native Vegetation

## Kona Community Development Plan Green Infrastructure Technical Report

The Kona Community Development plan is a project of the County of Hawaii Planning Department and its consultants:



### Legend

- LUPAG Agricultural Lands
- Primarily Native Vegetation
- Coffee Belt
- Kona Preferred Growth Areas
- Kona Boundaries
- Ahupua'a
- Major Roads

For map data sources, please see supplemental materials booklet.

1:400,000

0 3 6 Miles





## APPENDICES

### Appendix #1 CDP Planning Principles, Objectives and Preliminary Actions

#### Kona CDP Planning Principles

1. *The majority of growth should be directed north of Kailua Kona.*
2. *Some the of the growth should be directed to the Keauhou area*
3. *Most future growth in South Kona should occur around existing villages, such as Honaunau, Captain Cook, and Kealahou.*
4. *Density in South Kona should be kept low and the character should be kept rural.*
5. *Future growth should occur in the form of compact villages which offer increased density and a mix of homes, shops, and places to work.*
6. *Future growth should occur where and when infrastructure (roads and utilities) is already in place.*
7. *Future growth should connect with other communities and offer alternatives on how to move around.*
8. *Future growth should offer a broad range of housing choices that are affordable and available close to places of work.*
9. *The coast line, watershed areas, flood plains, important agricultural land, open space, and areas mauka of Mamalahou Highway should be protected inside and outside of the urban expansion area.*
10. *Future growth should provide more parks.*

#### Kona CDP Objectives and Preliminary Actions (Draft from 9/22/06 with suggested edits from consultant team)

##### Agriculture Working Group

- Implement programs, policies, and land use regulations that protect agricultural lands and preserve farming as a way of life.
  - Implement policies to protect the watershed to ensure that adequate water resources are available for agriculture.
  - Establish a Kona agriculture enterprise zone.
  - Establish buffers for Kona's agricultural lands.
  - Protect Kona Coffee Belt as Important Agricultural Lands, as designated in the General Plan.
- Support small family farms and community gardens through regulations and financial incentives.
  - Adopt an ordinance that provides for cluster developments on agricultural lands.

##### Environment Working Group

- Expand and enhance watershed management and protection efforts.
  - Create Kona Watershed Advisory Group(s).
  - Create a Kona Water Roundtable.
- Ensure the protection of Kona's shoreline, reef, and ocean waters.

- Update the Critical Areas Ordinance to ensure that habitats and ecological systems are adequately protected.
- Undertake measures to preserve open space.
  - Adopt a Kona Open Space Plan.
- Identify areas of special natural beauty and protect these areas through incentives and land use regulations.
  - Adopt and utilize a scenic overlay zoning program.
  - Develop and utilize TDRs and PDRs.
- Establish and protect scenic and heritage corridors.

#### Flooding and Natural Hazards Working Group

- Pursue growth management strategies and development protocols that preserve the region's watersheds and restrict development in environmentally sensitive areas.
  - With community input, develop recommended ratios of open space to developed land.

#### Housing Working Group

- Undertake programs and policies to help ensure that housing is truly affordable for all segments of the population, including low-income workers, first-time homebuyers, and farm workers.
  - Permit and encourage the development of farm worker housing on Kona farms.

#### Land Use and Planning Working Group (Inside the Urban Expansion Area)

- Set aside parkland and open space, and encourage clustering and planned unit development (PUDs) in order to preserve natural beauty within urban areas.
  - Preserve floodplains within the urban core and consider them for park development.
  - Use “2% open space” to fund acquisition and maintenance of urban open space.
  - Establish and enforce a formula for parks in PUDs based on density.
  - Allow increased density and reduced height limitations in exchange for more open space.
  - Create a policy to encourage the development of small, urban “pocket parks”.
- Identify and protect significant viewplanes
  - Create a Scenic Corridor program for Kona.

#### Land Use and Planning Working Group (Outside the Urban Expansion Area)

- Implement rural zoning and land use policies that maintain the character of South Kona.
  - Adopt incentives, taxes, and credits that support rural uses (e.g. ecosystem services incentives, transfer of development rights programs)
  - Create incentives to protect larger areas of forest reserves.
  - Designate buffer zones between agricultural and rural areas.
  - Create a program to place ahupua'a boundary signs along the highways.

- Define “Rural” in County codes and create a policy for rural zoning, including density.
- Create a County Conservation Zone and Greenbelt Zone land use designation.
- Adopt a policy for clustered development in rural areas.
- Review and update rural and agricultural lands policies.
- Conserve open space, protect natural resources, and promote ecological sustainability while ensuring public access to the natural environment.
  - Promote the ahupua’a model as a key conservation approach.
  - Promote public access to natural areas, including customary gathering rights.
  - Protect forests and shoreline through policies, programs, and incentives.
  - Identify and map existing trails.
- Implement land use policies that protect agricultural lands from development pressures.

#### Recreation Working Group

- Increase parkland in Kona, with attention to larger parks that preserve open space and wilderness areas.
  - Use the “2% fund” to increase parks in Kona.
  - Develop flood corridors and floodplains to be used as public parklands.
- Increase parkland in Kona, with attention to community parks and playgrounds that meet the active and passive recreational needs of all residents.
  - Establish minimum standards for the provision of community parks and playground.
  - Require new developments to include adequate park facilities and discontinue “fees in lieu” options.
  - Establish a Kona District Park Fund to support park development and maintenance.
  - Develop an updated Recreation Plan for Kona Districts.
  - Create a Kona Districts Recreation Advisory Committee.
  - Establish a County program for the strategic acquisition of parklands.
- Provide for better hiking and trail access in the mountains and wilderness areas.
  - Establish hiking trails along floodplains / flood corridors, and ensure that trails are integrated into future development plans.
  - Work with public land managers and private landowners to explore appropriate hiking and trail access in mauka-makai lands.



## Appendix #2

### Green Infrastructure Keys to Success and Principles

Source: Benedict and McMahon, *Green Infrastructure: Linking Landscapes and Communities*

#### Green Infrastructure Keys to Success

- Create a leadership group to guide the green infrastructure initiative.
- Design a green infrastructure network to link green space components across scales and political boundaries.
- Develop an implementation plan to make the network design a reality.
- Prepare a management and stewardship plan that meets the restoration and maintenance needs of all green infrastructure components.
- Inform and seek public input from the public on the green infrastructure network design and plan.
- Integrate green infrastructure into the planning processes of local, state, and federal agencies and other community and regional planning efforts.
- Sell the public on the benefits of green infrastructure and the need for a green infrastructure network design.
- Build partnerships with the people and organizations that can help support and sustain the green infrastructure initiative.

#### Principles of Green Infrastructure

- Connectivity is key.
- Context matters.
- Green infrastructure should be grounded in sound science and land-use planning theory and practice.
- Green infrastructure can and should function as a framework for conservation and development.
- Green infrastructure should be planned and protected before development.
- Green infrastructure is a critical public investment that should be funded up front.
- Green infrastructure affords benefits to nature and people.
- Green infrastructure respects the needs and desires of landowners and other stakeholders.
- Green infrastructure requires making connections to activities within and beyond the community.
- Green infrastructure requires long-term commitment.

**Appendix #3**  
**Mauka Land Group**

***Kona Mauka Land Vision, Guidelines and Principles***  
***(Draft 9/14/06)***

**Vision:** A well managed landscape of publicly and privately owned lands collectively committed to maximizing the region's ecosystem service value while generating sufficient income for its owners to ensure sustainable resource management and stable tenure over the long term.

**Guidelines and Principles**

1. Payments for Ecosystem Services: Mauka lands provide a variety of “ecosystem services” that are critical to the economy and quality of life on Hawai`i Island. Mauka landowners should be compensated for land management practices that provide these services through direct payments and incentives.
2. Other Funding Sources: The high cost of land management projects which promote forest conservation prevents landowners from adopting these practices. Access to alternative funding sources is needed. This may include State and Federal landowner assistance programs, conservation easements, transfer of development rights, forest banking and related initiatives.
3. Economic Return: Effective resource management and long term, low cost basis tenure are to be encouraged but are costly to maintain. All economic opportunities consistent with sound ecosystem service management practices should be encouraged, including conservation real estate and limited residential projects.
4. Development: Existing zoning densities on mauka lands should be acknowledged and respected. Reconfiguration to densities more consistent with land conservation objectives should be encouraged, through density transfers within commonly owned parcels and through the transfer of development rights to non-contiguous receiving areas.
5. Regulatory climate: Some policies and regulations may stifle innovation and creativity among mauka landowners wishing to implement management practices that would enhance conservation and sustainable use of mauka lands. Regulations should be modified to address this problem.
6. Water Catchment: Mauka lands capture and transport water to the basal aquifer, where it is accessible for domestic, agricultural and industrial use. Land management practices that facilitate this process should be encouraged.
7. Carbon: Growing vegetation sequesters atmospheric carbon, thereby mitigating the adverse effects of carbon dioxide on global warming. Policies, regulations and funding strategies that maintain and restore forest cover should be encouraged. Collaborative approaches to sell carbon credits should be encouraged as well.

8. Biological Diversity: More than 10,000 species of plants and animals are unique to Hawai`i. Yet, these islands are the endangered species capital of the US. Of more than 100 varieties of birds endemic to Hawai`i, more than 2/3 are extinct and 80% of those which remain are in danger of extinction. Many plant species have been lost as well. Aggressive action, supported by major new incentives, is needed on both public and private lands to protect remaining high quality habitat and to restore native forest on key sites in the Kona landscape. In addition, investment in certain ecosystem services – like high-quality pasture with abundant trees; carbon sequestration and storage; flood control; and groundwater recharge – may enhance biodiversity as a co-benefit, and should be recognized and especially rewarded for doing so.

9. Invasive Species: A growing list of invasive weeds, insects and other animals has adversely impacted the integrity of native ecosystems and the economic development of Hawai`i island, including mauka Kona. Collaborative action is needed to stem this tide.

10. Cultural Resource Protection: Many culturally significant sites are found on both private and public lands in this region. Steps should be taken to ensure that cultural sites are protected from disturbance. Where these sites occur on public land, or on private lands accessible to the public, the cultural significance of these sites should be effectively interpreted. In addition, the historic and cultural patterns of land use and the “living” cultural significance of mauka lands should be recognized and fully considered in regional planning.

11. Recreation: Both public and private lands in mauka Kona are virtually inaccessible to the general public for hiking, ecotourism and related recreation, in part because of concerns about landowner liability. Action is needed to amend the Hawaii Recreational Use Statute to address the liability issue. In addition, public access should be increased onto public lands. Public access onto private lands should only occur where deemed compatible by the landowner.

12. Property Rights: More than 70% of the mauka Kona lands between Ocean View and Hualalai are in private ownership. Any proposals affecting the management of these lands should involve the private landowner and should respect the landowner’s property rights.

13. Working Landscapes: With the majority of mauka Kona lands in private ownership, conservation objectives can best be accomplished by encouraging economic investment and financial return sufficient to stabilize ownership, fund proactive resource management and sustain critical ecosystem services.

14. Industry: Mauka Kona landowners considering diversification or a transition from a ranching-based land management strategy must be able to pursue alternative sources of income. This may include the compatible and sustainable use of forest products.

15. Floodwater Management: Flooding and sedimentation problems in makai Kona communities are often attributed to land management practices in mauka Kona, even when the severity of the problems is exacerbated by poor planning and limited capacity of low elevation floodways. Collaboration and access to additional funding are needed to address this problem.

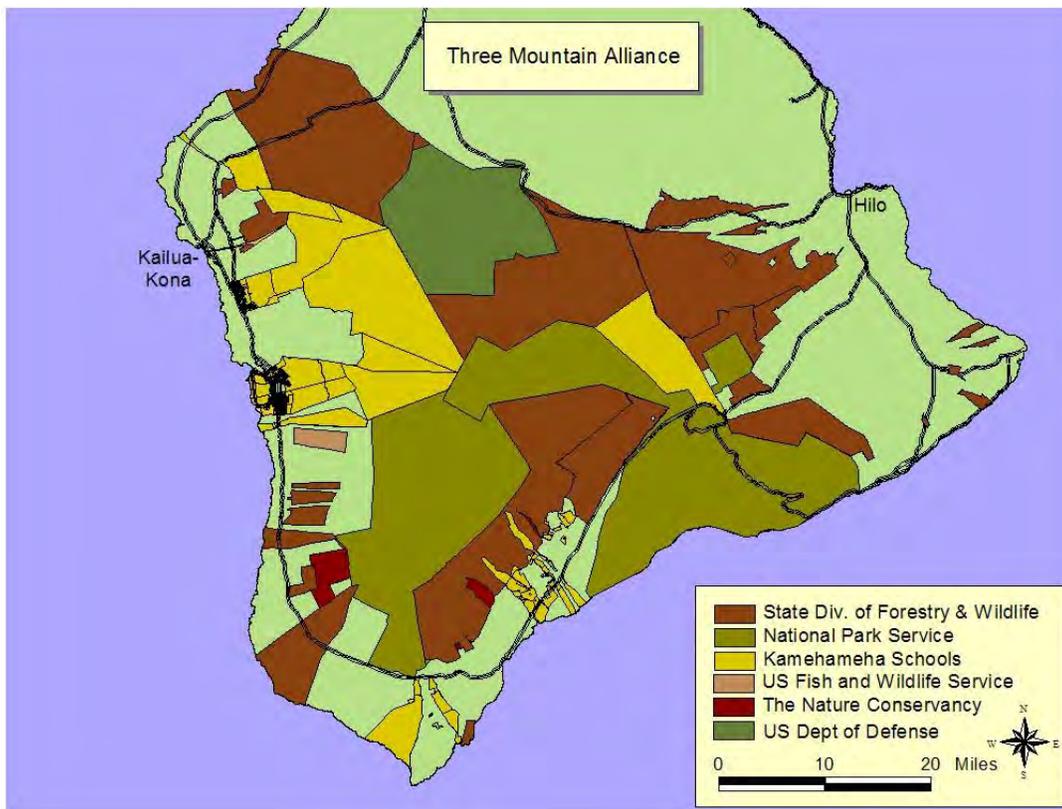
16. Integrated, Landscape-Level Planning: Many of the factors that affect the condition and integrity of mauka Kona lands can be effectively managed only at a landscape scale, with close collaboration between public and private landowners. Examples include management of invasive species and wildfire. Similarly, numerous and diverse policies – from zoning and taxation to the federal Farm Bill and emerging institutional support for new ecosystem service payments – come into play in land-use decisions. Finally, ecosystem services are highly interdependent, such that investment in one may greatly enhance (or potentially diminish) the supply of others. For these reasons, it is important that a clear, coherent vision for mauka lands be supported by integrated policy approaches, and by analyses showing where the greatest net payoff would result from given investments.

17. Mauka Land Group Forum: A key to effective implementation of the vision, guidelines, and principles outlined above is the formal establishment of a permanent forum that allows ongoing collaboration on mauka issues. This will provide an essential framework for helping to identify the appropriate mix of appropriate institutions, agencies, and landowners to implement effective strategies.

## Appendix #4 Olaa-Kilauea and Three Mountain Partnerships

Source: The Nature Conservancy

The Olaa-Kilauea (OK) Partnership has been highly successful in addressing conservation challenges within a 30,000 acre area, centered around the Olaa Tract of Hawaii Volcanoes National Park. Partners include the State of Hawaii (Division of Forestry and Wildlife, Department of Public Safety), National Park Service, Fish and Wildlife Service, U.S. Geological Survey, Kamehameha Schools, U.S.D.A Forest Service and The Nature Conservancy. For more than a decade, these partners have pooled their staff expertise and their funding to significantly reduce the threats of feral ungulates and noxious weeds on Federal, State and private lands. The Partnership expanded in 2001 to include Keauhou Ranch (owned by Kamehameha Schools) and the rest of Hawaii Volcanoes National Park and again in 2003 to include Kamehameha Schools lands in Kau and Kona. The current partnership acreage is now approximately 420,000 acres.



OK partners now recognize the compelling need to expand watershed protection and management efforts across the slopes of Mauna Loa, Kilauea and Hualalai as part of a “Three Mountain Partnership.” Coordinated management of these watershed lands is critical to sustain adequate quality and quantity of water. In addition, these lands provide important habitat for a wide diversity of native plants and animals, including endangered species. Even in the absence of a formal partnership, private and public landowners in this region have recognized the value in collaboration to address shared management challenges. Examples include invasive weed control, rare plant propagation, sheep management, commercial

forestry, habitat restoration, biological research, cultural resource protection and public use management.

A Memorandum of Understanding has been drafted to govern the operation of the Three Mountain Partnership. The seven OK partners will be signatories to the initial MOU. In addition, other public agencies with a management interest in the larger landscape will be invited to join the Partnership. They include Hawaii County Department of Water Supply, US Army (Pohakuloa Training Area), Natural Resources Conservation Service and the State Department of Hawaiian Home Lands. Also, nearly a dozen private ranchers with significant land ownership in this landscape will be invited to join the Partnership or, if they choose, to participate only in collaborative efforts addressing specific management challenges.

Partners have elected to focus their collaborative efforts on three of the most significant management challenges or threats to the integrity of the forested landscape: invasive weeds (with emphasis on the forest/agricultural land interface in Kau), feral cattle and wildfire prevention and response. Partners and outside cooperators with an interest in these management challenges will develop project plans that will guide collaborative efforts.

## Appendix #5 Convening Leadership Forums

### Southeast Regional Partnership for Planning and Sustainability (SERPPAS)

SERPPAS<sup>17</sup> is a partnership formed between the Office of the Secretary of Defense (OSD), the military services (Army, Navy, Air Force, Marines), and environmental and natural resource agency officials of the southeastern United States (North Carolina, South Carolina, Georgia, Alabama, and Florida). Collectively, SERPPAS has agreed to focus on developing tools for more effective regional planning that are critical to sustaining environmental, natural, military test and training, and economic resources in the southeast region for now and in the future. The SERPPAS mission is to seize opportunities and solve problems in value-adding ways that provide mutual and multiple benefits to the Partners, and that sustain the mission and secure the future for all the Partners, the region, and the nation. The SERPPAS and its mission exist to meet a common vision of a group of state, federal, and military Partners tapping the power of an effective working relationship, partnership, innovation, leadership, teamwork, and networks to achieve the mission of the partnership. The Conservation Fund believes that the SERPPAS vision, mission, and values can be adapted as a foundation for Kona's green infrastructure leadership forums. Below are some suggested adaptations from the SERPPAS charter for convening leadership forums in Kona.

**Vision:** A group of landowners, government officials, and interested citizens tap the power of an effective working relationship, partnership, innovation, leadership, teamwork, and networks to achieve the mission of the leadership forum.

**Mission:** To seize opportunities and solve problems in value-adding ways that provide mutual and multiple benefits to the partners, and that sustain the mission and secure the future for all partners and the region.

**Values:**

1. Develop and sustain an effective working relationship among the partners that enables the partnership to: (1) identify and seize opportunities for mutual gain, (2) deal well with differences, and (3) solve problems.
2. Be unconditionally constructive; that is each partner:
  - does only those things that are both good for the relationship and good for that partner, whether or not the other partners reciprocate
  - does everything it reasonably can to:
    - balance reason and emotion
    - understand each other's interests
    - communicate openly and effectively
    - consult before deciding
    - use persuasion rather than coercion
    - accept each other as someone worth dealing with

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<sup>17</sup> For more information, see <http://www.serppas.org>.



## Appendix #6

### **Transferable Development Rights Programs: An Economic Framework for Success**

Kent D. Messer, Ph.D.  
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Cornell University

#### **ABSTRACT**

The inviting promise of Transferable Development Rights programs redirecting money from developers to conservation projects has largely been unfulfilled. This paper summarizes the basic foundations of these programs and outlines an economic framework from which clear suggestions for improvement arise. This framework suggests that for a transferable development rights program to be successful, sufficient demand for development rights needs to be stimulated, opportunities for developers to circumvent the market by seeking variances and zoning changes need to be limited, and an efficient and transparent market structure needs to be established.

#### **INTRODUCTION**

Despite the optimism of 1980s and 1990s in the land conservation community about “making money out of thin air” by using Transfer of Development Rights (TDR) programs, their limited success suggests that these programs generally failed to live up to their initial promise. As of 2000, only 30% of the 50 total TDR programs had preserved more than 100 acres (Table 1). In fact, half of these programs had either been revoked or managed to protect no acres (American Farmland Trust, 2001). Yet, in aggregate, TDR programs have preserved approximately 120,000 acres in the United States, worth an estimated \$240 million. In fact, a handful of TDR programs have been quite successful. This research finds that abandonment of this approach is not warranted. Instead it seeks to outline an economic framework from which to consider the successes and failures of TDR programs and offers clear suggestions on how the design of TDR programs can be improved to yield future conservation benefits.

The key conservation advantage to a TDR program is its financial engine. TDR programs provide a legal framework that can create beneficial situations where the economic pressures for development are directly tapped to provide monetary support to efforts to protect areas of conservation value. These programs work through the transference of potential development rights from one piece of property in the “sending” area to another piece of property in the “receiving” area. Once the development rights are transferred, the sending area loses its rights to develop and the land is permanently preserved. The receiving areas (the areas targeted for development) are often designated by the government to have special tax incentives to encourage development or are within designated growth boundaries.

Interest in TDR programs is not a recent development. New York City is credited with the first TDR legislated in 1916, which allowed the transfer of unused air rights to other lots (Johnston and Madison). Despite this early use, it was not until the 1970s that TDR

programs became widely adopted. Nine programs were established in the 1970s, 15 were established in the 1980s, and 28 more programs were established in the 1990s.

TDR programs have been used for a variety of goals, including protection of farmland, conservation of environmentally sensitive areas, sprawl prevention, preservation of historic landmarks, development of compact urban areas, and the promotion of downtown commercial growth. Ideally, the government just sets up the TDR program and the money for conservation comes from the developers (and ultimately the future homeowners or consumers of the good produced at these projects). In addition, TDR programs can offset concerns about the environmental impact of development as the money for conservation can be viewed as a reasonable environmental re-payment for the large public investment into expensive infrastructure that often accompanies for-profit development. Furthermore, TDR programs allow landowners in the sending areas to retain land ownership while also protecting their land from development. This private ownership can be politically advantageous when dealing with working landscapes such as agricultural and forested lands.

This paper is structured to examine several main economic issues related to TDR programs. First, this paper highlights the similarities between TDR programs and tradable permit systems that have become increasingly popular market-based approaches to environmental issues. Then it outlines the economic framework necessary for a successful TDR program: (i) a ready supply of development rights, (ii) a significant demand for the development rights, and (iii) a transparent and low transaction-cost market structure. Finally, the paper discusses the ecological and development impact of TDR programs and offers concluding suggestions on how to improve the conditions necessary to make TDR programs successful tools for conservation.

## **TDR PROGRAMS AS A MARKETABLE PERMIT SYSTEM**

At its most basic level, TDR programs are the conservation community's attempt to adapt market-based Tradable Permit Systems to the context of land conservation. Most of the environmental examples of tradable permit systems arise from air pollution reduction, where governments have successfully used them to reduce levels of air pollution in a manner that has dramatically reduced the costs relative to traditional "command-and-control" pollution reduction policies. The most famous example is the federal sulfur dioxide (SO<sub>2</sub>) pollution program which was enacted in 1990 as an amendment to the Clean Air Act. As of 2000, the SO<sub>2</sub> program had reduced sulfur dioxide by 50% and the EPA estimated the value of the benefits at \$110 billion. Best yet, the program's annual cost of \$1 billion per year has been dramatically lower than the original \$10 billion per year estimate – approximately half of the lowest cost estimates prior to the start of the program. Additionally, a variety of other tradable permit systems have been developed, such as the tradable permit system in Telluride, Colorado, which seeks to reduce air pollution by issuing tradable permits for fireplaces.

Tradable permit systems work by first establishing an overall goal for reducing the undesirable activity (i.e. air pollution or rural development). Next, the government assigns a limited number of permits or 'rights' to entities (i.e. polluting firms or landowners) currently involved in the undesirable activity so to achieve the established goal. Finally, a market is established and firms are allowed to trade these permits. In the context of land

conservation, the undesirable activity is development in areas identified for conservation value, and the government's goal is to set a cap of permissible levels of development rights and then to allow trade.

## **SUPPLY OF DEVELOPMENT RIGHTS**

In order for a TDR program to make significant contributions to conservation, ideally, there would be a large market for the development rights, including many buyers and many sellers, all with a sufficient amount of information regarding the prices and opportunities available to them. In general, achieving a sufficient supply of potential sellers has been the easiest task for TDR programs to achieve. In fact, economic theory suggests that, with proper financial incentives, an ample supply of tradable development rights will be available for sale until all of the available rights are exhausted.

Due to the economic advantages that can arise to landowners in the sending zones when the price is sufficiently high, most TDR programs on the supply side have been voluntary. A voluntary program retains the original zoning in the sending area, but allows for the transfer of the development rights in the sending area to the receiving area. The voluntary system has the advantage of avoiding “takings” challenges, where landowners object to potential loss (or reduction in value) of their development rights (Bredin, 2000). Theoretically, a strong demand for permits will lead to a relatively high market price that should provide ample incentive for voluntary participation from landowners.

Mandatory TDR programs also have been used; such that, landowners are forced – via zoning policy – to not subdivide their properties and instead are issued transferable ‘rights’ of development to subsequently sell these rights whenever they decide the market price is sufficient. In general, this mandatory approach will generate a large supply of permits and, assuming a corresponding level of demand, will ensure that essentially all parcels in the sending area will be protected. An alternative structure, which may have the advantage of avoiding some of the “takings” issues, is a hybrid (or partial) approach, where the zoning can be reduced on parts of a sending area, leaving some development rights in tact or available for transfer as part of a voluntary TDR program.

## **DEMAND FOR DEVELOPMENT RIGHTS**

The most challenging element of TDR programs appears to be generating sufficient demand for the development permits. In locations where development pressure is minimal or non-existent, even the perfectly designed TDR program will have no activity and thus protect no land of conservation value. However, even in the presence of development pressure, demand will only exist if the TDR program is seen by developers as the *lowest cost* alternative to achieving their development objectives.

Most TDR programs have been set up as voluntary for potential developers. In a voluntary context, if the receiving area is zoned to allow development at market capacity without needing a TDR, then there will be little demand for the TDR programs. To generate sufficient demand, TDR programs must exist within a planning structure that is relatively rigid and explicitly seeks to reduce the level of development. If zoning can be readily changed or variances are easily given then savvy developers can obtain the extra density

through traditional means, and thus, have little incentive to purchase the rights (Lawrence, 1998). Furthermore, sufficient allowable density in the receiving area is necessary, and governments must adhere to TDR density bonuses and not permit re-zonings and variances, which can undermine the program by reducing the demand for permits (New Jersey Pinelands Commission, 2005). The importance of having TDR programs being complemented with strong planning and zoning ordinances can not be understated – otherwise demand for tradable development rights may never materialize.

Uniform standards for what constitutes a development right, preferably based on quantifiable measures (such as density, area, floor-area-ratio, height) should be used to determine what development right is being transferred (Bredin, 2000). The geographic scope of the TDR program must be also sufficiently large to ensure that developers cannot easily avoid the reach of the TDR program by simply moving their development projects to locations outside of the TDR. Furthermore, there must be consistency between the location of sending and receiving areas and the policies of the local comprehensive plan, including the future land-use plan map. The same goes for government jurisdictional issues, especially when the receiving and sending areas cross municipal, county, and/or state lines (Bredin, 2000; New Jersey Pinelands Commission, 2005).

Complexity is one of the most widely acknowledged drawbacks of TDR programs. Because the concept of a TDR can be confusing at first and most people do not have personal experience with a marketable permit system, an extensive public education campaign is generally required to explain the operation of the TDR program. For example, Beaufort County, South Carolina, proposed a program that was developed by a Chicago-based consulting firm and was well received by local advocacy groups and county councilmen. Unfortunately, the community found the program too complex and has withdrawn its initial efforts at a TDR program (Blacklocke, 1999).

To stimulate demand, governments should consider mandating that large developers acquire a minimal number of permits for all projects. Note that this would be similar to the EPA's initial requirement that all firms participate at a minimal level in the SO<sub>2</sub> marketable permit program. By making the program partially mandatory, a higher level of demand will be achieved and developers will be forced to learn about the TDR program. Over time, developers may come to view the TDR program as a preferred route of achieving their development requirements that might otherwise involve lengthy (and thus costly) variances and zoning changes. Thus, it should come as no surprise that the two TDR programs that have conserved the most acres both involve mandatory participation: Montgomery County, Maryland (40,583 acres) and the New Jersey Pinelands, New Jersey (44,000 acres) (Table 1). These two programs represent more than 70% of all of the acres preserved by all TDR programs.

Alternatively, programs may want to explore the potential advantages of having a non-profit organization facilitate the development right transfers. If the tax-deductible status of the non-profit organization can be used to help stimulate demand, then the conservation objectives of the program will be furthered. However, as discussed below, the involvement of the non-profit organization should be limited as much as possible to facilitate market transparency and speed.

## **MARKET STRUCTURE, TRANSPARENCY, AND TRANSACTION COSTS**

In their theoretical paper on TDR programs, Field and Conrad (1975) argue that the benefits of a TDR program will occur only if there is a “well organized auction” where the transaction costs between the buyers and sellers are as low as possible. High transaction costs lower the incentives for both buyers and sellers to participate and thus increases the cost of preservation. Furthermore, trades need to happen in a timely manner. Unfortunately, TDR programs have not often involved ideal methods for connecting potential sellers and buyers. For example, some programs have required direct communication and negotiation between land owners and developers, which can lead to lengthy discussions and high search/information costs. Other programs have put government staff members directly in the coordination role. These types of market structures can lead to reduced market activity due both to high transaction costs and a lack of information on previous prices (McConnell, Kopits, Wall, 2003). As an example, the TDR program in Calvert County, Maryland, initially had a few transactions but later became more successful once information for buyers and sellers became more ample.

Ideally, the government’s role should be limited to the planning efforts and in designating the sending and receiving zones. The market-system should take over once the market and its rules are established. A market structure that achieves the objective of a ‘well organized auction’ is to use a double-auction mechanism that is an information rich environment that can easily accessed by buyers and sellers with minimal government involvement (for more information about double-auctions see Davis and Holt, 1993; Smith and Williams, 1983). This process can be readily adapted to a web based “eBay-like” format that could ensure low transaction costs and to speedy transactions.

## **DISCUSSION**

Several concerns have been raised about TDR programs. For example, questions have been raised that TDR programs can result in more development than under a standard zoning policy. This could result from an adverse selection problem, where some of the property owners of the sending areas may not have intended or been willing to sell their land (at least within some time period), but are nevertheless granted TDR programs, which are then traded and used for development that would have otherwise not occurred (Levinson, 1997). If identified, this problem can be alleviated with a local government purchasing program to take TDR programs off the market. The New Jersey Pinelands project achieved this solution. However, given the low levels of historical success of these programs, conservation planners should not be overly concerned about this issue, especially since the primary problem with this program is not access supply, but instead a lack of demand.

Additionally, a recent study of the TDR programs in Calvert, Howard, and Montgomery counties in Maryland suggests that voluntary TDR programs have generally done a worse job at protecting the areas with the highest agricultural value than do Purchase of Development Rights (PDR) programs which can be more targeted (Lynch & Musser, 2001). A primary reason is that in these counties, the number of acres has been used as the sole metric determinant defining a development right. Without considering quality (as opposed to quantity) of acres, it turns out that, not surprisingly, the least valuable agricultural land actually gets preserved in TDR programs as the sending owners most likely sell development

rights with lowest development value – and thus would be most enticed by the financial incentives associated with TDR programs. Of course, if the goal is simply to maximize acres protected, then using farm size as the sole metric is fine. Note that to respond to this problem, Montgomery County set up a PDR program, in addition to its TDR program, to specifically acquire the higher valued agricultural land (12,801 acres) that was not protected by its TDR program.

Finally, concerns about establishing a robust market led the Town of Berthoud, Colorado, to avoid a TDR program and opt instead for a density transfer fee, where the proceeds from the fee are used to purchase existing development rights from areas that were desired for protection (Pelletier, 2001). This type of alternative mechanism may be particularly attractive in situations where a PDR program already exists, the number of likely market participants is low, and the complexity of issues (whether legal or inter-jurisdictional) are high.

## **CONCLUSION**

The logic of transferring development rights from an area in need of protection to one desiring more development remains strong. Yet real world examples show that problems typically plague the programs and limit their success. These problems, however, are not insurmountable and this document outlines an economic framework from which several recommendations are evident. First, an ample supply of development rights can be achieved from either a voluntary or mandatory program, assuming a robust level of demand and an efficient market structure. Voluntary programs have the desirable characteristic of avoiding concerns related to takings, while mandatory programs are better at ensuring that the most critical lands are actually protected. To ensure sufficient demand, TDR programs must be developed to coordinate closely with existing government planning efforts, which are relatively rigid and do not allow for easy re-zoning or variances. Additionally, a program involving mandatory purchase of a minimum number of development rights by large developers is likely needed to encourage sufficient demand, at least in the initial stages. Finally, the TDR market structure needs to ensure low transaction costs and the transactions must be conducted in a transparent, expeditious, and information rich setting.

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**TABLE 1 Examples of TDR Programs, Starting Year, and Acres Preserved.**

<b>Location (State, County, Township/City)</b>	<b>Year Initiated</b>	<b>Mandatory Participation</b>	<b>Acres Protected</b>
<i>California</i>			
Marin County	1981	No	670
San Mateo County	1986	No	40
San Luis Obispo County	1996	No	NA
<i>Colorado</i>			
Boulder County	1995	No	3,200
<i>Connecticut</i>			
Windsor	1993	No	NA
<i>Florida</i>			
Hillsborough County	1985	No	NA
Palm Beach County	1992	No	6,573
<i>Idaho</i>			
Fremont County	1991	No	200
<i>Maine</i>			
Cape Elizabeth	1982	No	NA
<i>Maryland</i>			
Calvert County	1978	No	14,808
Caroline County	1989	No	NA
Charles County	1992	No	1,183
Harford County	1992	No	NA
Howard County	1992	No	1,350
Montgomery County	1980	Yes	40,583
Queen Anne's County	1987	No	2,417
St. Mary's County	1990	No	6
Talbot County	1989	No	580
<i>Massachusetts</i>			
Groton	1980	No	22
Hadley	2000	No	NA
Sunderland	1974	No	NA
Townsend	1989	No	NA
<i>Minnesota</i>			
Blue Earth County	1977	No	3,000
<i>Montana</i>			
Gallatin County	1992	No	200

<i>New Jersey</i>			
Burlington County			
Chesterfield Township	1998	No	NA
Lumberton Township	1996	No	563
Somerset County			
Hillsborough Township	1975	No	NA
New Jersey Pinelands	1981	Yes	44,000
<i>New York</i>			
Eden	1977	No	NA
Perinton	1993	No	NA
Central Pine Barrens Long Island	1995	Yes	NA
Southhampton	1972	No	NA
<i>Pennsylvania</i>			
Bucks County			
Buckingham Township	1975	No	NA
Warrington Township	1985	No	NA
Berks County			
Washington Township	1994	No	NA
Chester County			
Birmingham Township	1978	No	NA
East Nantmeal Township	1994	No	NA
London Grove Township	1995	No	NA
Lancaster County			
Manheim Township	1991	No	
Revoked			
York County			
Chanceford Township	1979	No	NA
Codorus Township	1990	No	
Revoked			
East Hopewell Township	1984	No	NA
Hopewell Township	1988	No	NA
Lower Chanceford Twp	1990	No	NA
Shrewsbury Township	1991	No	NA
Springfield Township	1996	No	NA
<i>Utah</i>			
Tooele	1995	No	NA
<i>Vermont</i>			
Jericho	1992	Yes	NA
South Burlington	1992	No	NA
Williston	1990	No	NA
<i>Virginia</i>			
Blacksburg	1996	No	NA

*Washington*

Island County 1984

No

Revoked

Thurston County

1995

Yes

NA

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Primary Source: American Farmland Trust 2001



## Appendix #7

### Special Use Permit Guidelines Green Infrastructure Resource Protection in LUPAG Agricultural Classifications

Primary Source: Clarion Associates

#### Agricultural and Recreational Uses

Basic agricultural uses (e.g. crops, livestock, and nurseries) and agricultural support uses should be allowed by right subject to performance standards (e.g. access/traffic, setbacks, height, noise, and lighting) necessary to mitigate adverse impacts and protect important natural features. Agricultural support uses are support businesses (repair, service, retail, and related uses) related to the basic agricultural uses and activities. The support businesses are further divided into those that are directly associated with an on-going basic agricultural activity, and located on the same property, versus a support business that is off-site. Off-site support businesses should be small-scale in nature, and may include such uses as farm product sales, farm machinery repair and leasing. Demonstration farms, heritage and rural tourism destinations, and small residential facilities (e.g. bed and breakfasts) that support agricultural tourism also should be considered off-site support businesses. Recreational uses also should be allowed by right, including rustic overnight lodges, shelters and restroom facilities, parking or staging areas for hikers. As the CDP is implemented, a comprehensive list of permitted uses should be developed for compatible, rural agricultural and recreational uses.

#### Residential Uses / Conservation Subdivision

Conservation subdivisions permit residential development with reductions in lot area and setback standards, in return for the landowner setting aside a large portion of the site in open space. Generally, a conservation subdivision has three primary characteristics: smaller building lots; more open space; and protection of natural features. The rules for site development emphasize setting aside and conserving the most sensitive areas of a site, with the development of building lots on the remaining less sensitive areas. In most cases, by locating development on smaller lots and maintaining open space, a landowner can achieve similar densities as with a conventional subdivision. The actual process of designing a conservation subdivision in Kona would involve the following four basic steps:

1. Resource Survey: A site survey by the applicant documents the significant natural and cultural resources on the site, including native vegetation, wetlands, floodplains, steep slopes, wildlife habitat, and other important features. The applicant also produces a map showing resources and open space on neighboring parcels.
2. Site Visit and County Review: County staff and the applicant visit the development site to see first hand where resources exist and to understand the lay of the land and what areas might be suitable for development sites. The relationship to surrounding parcels is also examined. Prior to the visit, the County overlays the GAP Analysis land cover GIS layer and other useful layers onto the parcel boundary and surrounding areas to target field survey work.

3. Delineation of Conservation and Development Areas: The applicant produces a map that depicts conservation areas and open space as well as areas suitable for development. The applicant also may identify locations where restoration or enhancement of native vegetation and other resource features may be appropriate.
4. Submission of Conservation Design Plat: The applicant submits a conservation subdivision plat showing conservation areas, open space, and restoration areas on the site, along with the development sites where the cluster lots would be located. Areas suitable for development are specifically delineated as well as other areas that will be disturbed for accessory structures and uses, septic fields, roads, trails, and utilities. Where applicable, lot lines would be shown on the conservation subdivision plat. The full development density permitted by the zoning district for the entire site would be allowed within the development delineation area.

## Appendix #8

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**KONA AFFORDABLE HOUSING  
ECONOMIC ANALYSIS**

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David Paul Rosen & Associates  
October 23, 2006



DAVID PAUL ROSEN & ASSOCIATES

## **KONA AFFORDABLE HOUSING ECONOMIC ANALYSIS**

### **KONA COMMUNITY DEVELOPMENT PLAN COUNTY OF HAWAII**

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October 23, 2006



**Table of Contents**  
**Kona Affordable Housing**  
**Economic Analysis**

	PAGE
Summary of Findings and Recommendations.....	ES-1
A. Methodology and Data Sources.....	1
B. Development Costs of Housing Prototypes .....	2
1. Housing Prototypes.....	2
2. Land Costs.....	2
3. Hard Construction Costs .....	5
4. Development Impact and Processing Fees .....	5
5. Soft (Indirect) Costs.....	5
6. Financing Costs .....	6
7. Total Development Costs.....	6
C. Chapter 11 Affordable Housing Requirements .....	12
D. Estimated Costs of Chapter 11 Affordable Housing Requirements .....	15
1. Financing Scenario .....	15
2. Occupancy Standards.....	15
3. Definition of Affordable Housing Expense.....	16
4. Utility Allowances .....	17
5. Prototype Affordability Gaps Under Chapter 11 .....	19
6. In Lieu Fees .....	29
E. Economic Impact of Chapter 11 Requirements .....	32
1. Land Residual Analysis Methodology.....	32
2. Assumptions .....	33
3. Findings: Indicated Residual Land Values .....	34
F. Estimated Value of Potential Economic Incentives .....	39
1. Density Bonus .....	39
2. Reduction in Parking Requirements .....	40
3. Reduction in Residential Street Widths.....	40
4. Development Fee Deferrals .....	40
5. Affordable Unit Comparability Standards.....	41
6. Summary of Cost Savings and Economic Impact of Incentives.....	41
G. Policy Issues for Affordable Housing Requirements.....	68
1. Enforcement of Affordability Restrictions.....	68
2. Alternative Compliance Options.....	69
3. In Lieu Fees .....	71
4. Off-Site Compliance .....	72



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**Table of Contents  
Kona Affordable Housing  
Economic Analysis  
(Continued)**

Appendices

Appendix A: List of Developer Contacts

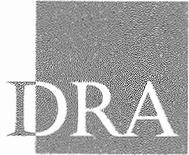
Appendix C: Per Unit Development Cost Estimates by Bedroom Count

Appendix B: Chapter 11



**List of Tables  
Kona Affordable Housing  
Economic Analysis**

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
1	Per Unit Affordability Gaps, Housing Prototype Projects, Kona Affordable Housing Analysis, 2006.....	ES-3
2	Residual Land Value Per Square Foot Site Area, Owner Housing Prototype Projects, Kona Affordable Housing Analysis.....	ES-4
3	Residual Land Value Per Square Foot Site Area, Owner Housing Prototype Projects, Kona Affordable Housing Analysis.....	ES-5
4	Owner Housing Prototype Projects.....	3
5	Renter Housing Prototype Projects.....	4
6	Development and Financing Cost Assumptions, Owner Housing Prototypes .....	8
7	Development and Financing Cost Assumptions, Rental Housing Prototypes.....	9
8	Estimated Prototype Development Costs, Renter Housing Prototypes.....	10
9	Estimated Prototype Development Costs, Owner Housing Prototypes .....	11
10	Income Limits, County of Hawaii, 2006.....	13
11	Chapter 11 Affordable Housing Credit System, Construction of Completed Dwelling Units, Renter and Owner Housing.....	14
12	Renter Affordable Monthly Housing Expense, 2006 .....	16
13	Owner Affordable Monthly Housing Expense, 2006 .....	17
14	Current HUD-Approved Monthly Utility Allowances, County of Hawaii, 2006 .....	18
15	Chapter 11 Affordable Sales Price Guidelines, Owner Housing Prototypes, 2006 .....	20
16	Per Unit Affordability "Gap to Cost", Owner Housing Prototypes .....	21



**List of Tables  
Kona Affordable Housing  
Economic Analysis**

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
17	Affordability "Gap to Cost" Under Chapter 11 by Income Level, Owner Housing Prototypes .....	22
18	Per Unit Affordability "Gap to Price", Owner Housing Prototypes .....	23
19	Affordability "Gap to Price" Under Chapter 11 by Income Level.....	24
20	Rent, Utility Allowance and Affordable Rent Assumptions .....	26
21	Affordability Gap Per Unit, Rental Housing Prototypes .....	27
22	Affordability "Gap to Cost" Under Chapter 11 by Income Level, Renter Housing Prototypes .....	28
23	In Lieu Fee Calculation Per Chapter 11, Owner Housing Prototypes .....	30
24	In Lieu Fee Calculation Per Chapter 11, Renter Housing Prototypes.....	31
25	Estimated Market Rents for Rental Prototypes.....	33
26	Estimated Market Home Sales Prices, Owner Housing Prototypes.....	34
27	Land Residual Analysis, 100% Market-Rate Housing, Owner Prototypes .....	35
28	Land Residual Analysis, 100% Market-Rate Housing, Renter Prototypes .....	36
29	Land Residual Analysis with Chapter 11 Requirements, Owner Prototypes .....	37
30	Land Residual Analysis with Chapter 11 Requirements, Renter Prototypes .....	38
31	Owner Housing Prototypes with 10% Density Bonus .....	39
32	Rental Housing Prototypes with 10% Density Bonus .....	40
33	Development Cost and Financing Cost Assumptions, Owner Housing Prototypes with 10% Density Bonus .....	41
34	Development Cost and Financing Cost Assumptions, Renter Housing Prototypes with 10% Density Bonus .....	42



**List of Tables  
Kona Affordable Housing  
Economic Analysis**

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
35	Estimated Prototype Development Costs with 10% Density Bonus, Owner Housing Prototypes .....	43
36	Estimated Prototype Development Costs with 10% Density Bonus, Renter Housing Prototypes .....	44
37	Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus, Owner Housing Prototypes .....	45
38	Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus, Renter Housing Prototypes.....	46
39	Estimated Cost Savings from Reduced Parking Requirements, Owner Housing Prototypes .....	47
40	Estimated Cost Savings from Reduced Parking Requirements, Rental Housing Prototypes .....	48
41	Estimated Potential Cost Savings from Reduced Street Width, Owner Housing Prototypes .....	49
42	Estimated Potential Cost Savings from Development Fee Deferrals, Owner Housing Prototypes .....	50
43	Estimated Potential Cost Savings from Development Fee Deferrals, Renter Housing Prototypes .....	51
44	Cost Savings from Reduction in Affordable Unit Sizes, Owner Housing Prototypes .....	52
45	Cost Savings from Reduction in Affordable Unit Sizes, Renter Housing Prototypes .....	53
46	Cost Savings from Reduction in Affordable Unit Bathroom Count, Owner Housing Prototypes .....	54
47	Cost Savings from Reduction in Affordable Unit Bathroom Count, Renter Housing Prototypes .....	55



**List of Tables  
Kona Affordable Housing  
Economic Analysis**

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
48	Cost Savings from Reduction in Affordable Unit Interior Finish Quality, Owner Housing Prototypes.....	56
49	Cost Savings from Reduction in Affordable Unit Interior Finish Quality, Renter Housing Prototypes .....	57
50	Estimated Potential Cost Savings from Alternative Product Type, Provision of Duplex or Bungalows for Single-Family Detached Units on 10,000 Square Foot Lots.....	58
51	Total Economic Value of Incentives, Owner Housing Prototypes .....	59
52	Total Economic Value of Incentives, Owner Housing Prototypes .....	60
53	Land Residual Analysis, Owner Housing Prototypes with 10% Density Bonus, Fee Deferral and Affordable Unit Design Modifications.....	61
54	Land Residual Analysis, Renter Housing Prototypes with 10% Density Bonus, Fee Deferral and Affordable Unit Design Modifications.....	62
55	Residual Land Value Per Square Foot Site Area, Owner Housing Prototypes .....	63
56	Residual Land Value Per Square Foot Site Area, Renter Housing Prototypes.....	64
57	Summary of Strengths and Weaknesses of Alternative Compliance Measures .....	70



## **Kona Affordable Housing Economic Analysis Kona Community Development Plan County of Hawai'i**

### **Summary of Findings and Recommendations**

#### **Background**

In response to the pressing affordable housing needs facing the North-South Kona Community Development Plan (CDP) and the County of Hawai'i, David Paul Rosen & Associates (DRA) was retained to provide an economic analysis of the cost of making housing affordable in Kona and the County of Hawai'i and the requirements of Chapter 11 of the Hawai'i County Code. DRA also estimated the potential value of economic incentives that may be offered to offset the costs of complying with Chapter 11 affordable housing requirements.

DRA is part of the Wilson Okamoto team retained by the County to develop the CDP.

Every housing development has its unique economic circumstances. Nevertheless, residential development is governed by clear market forces, economic, financial and underwriting norms. It is these norms that DRA has modeled, based on its substantial development experience and interviews with local developers active in the County of Hawai'i. So while individual economic assumptions may vary somewhat deal by deal, the analysis contained in the report is representative of the economic and financial conditions surrounding owner and renter housing development in the County of Hawaii in 2006.

Chapter 11 of the Hawaii County Code applies affordable housing requirements to all new rezonings that may create residential uses<sup>1</sup>. The affordable housing requirements also apply to all new rezonings to resort uses<sup>2</sup>, and to industrial districts<sup>3</sup>. The requirements apply to residential developments of five or more units or lots, including time-share units. They also apply to resort and hotel uses generating more than 100 full-time equivalent employees. DRA's analysis focuses on the economic impact of applying the requirements to residential uses.

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<sup>1</sup> Including rezonings to RS, RD, RM, RCS, RA and FA districts, and APD zonings where lot sizes are less than five acres, and CG, CV, CN and PD districts when residential uses are established in those districts.

<sup>2</sup> Including hotels established in V, CV, CG, CDH or PD districts.

<sup>3</sup> ML, MG and MCX districts.



DRA's analysis will assist the County in evaluating the implications of the Chapter 11 requirements, and in assessing measures to revise and/or expand these requirements to all residential developments. The County is particularly interested in assessing the effectiveness of current Chapter 11 provisions, considering additional regulatory and incentive tools to boost production of affordable units in the urban core area, and additional recommendations to ensure a diversity of housing choices.

## Key Findings

1. The results of DRA's economic analysis indicate that the least costly option for developers of owner housing to comply with the affordability requirements of Chapter 11 is to build 10 percent of units at 80 percent of area median income. For developers of rental housing, the least costly option to comply with the requirements of Chapter 11 is to build 10 percent of units at 60 percent of area median income.
2. New construction of 100 percent market-rate rental housing is currently not economically feasible at the development costs and rental rates modeled in our analysis. This is consistent with the fact that market-rate rental housing is not currently developed in the County.
3. Construction of new owner housing complying with the affordability requirements of Chapter 11 is economically feasible at the development costs and sales prices modeled in our analysis. The analysis demonstrates that a higher percentage of units affordable at 80 percent of area median income could be supported for owner housing.
4. The in-lieu fee formula in Chapter 11 provides for an in lieu fee that is more costly than providing affordable units on site. This provides an incentive to build on-site.
5. Incentives that can be offered to developers of owner housing, including the 10 percent density bonus provided under Chapter 11 and design modifications to the affordable units, come close to offsetting the reduction in land value created by the Chapter 11 affordability requirements.

## Recommendations

1. The County should select income levels it wants to target with Chapter 11 based on existing housing needs in the County and limit the compliance options under Chapter 11 to those housing targets.
2. DRA recommends keeping the existing in lieu fee structure to maintain the incentive for developers to build affordable units on site rather than pay the in lieu fee.



3. Increased density is the single most valuable incentive that can be provided to housing developers to offset the costs of providing affordable housing. In DRA's national experience, a 10 percent density bonus is a modest incentive. We recommend considering and evaluating a density bonus of at least 25 percent, particularly for projects within the urbanizing area of the County.
4. Alternative compliance options to providing on-site affordable units that are identical to the market-rate units help housing developers to offset the costs of providing affordable housing. These incentives can also be used when the density bonus cannot be accommodated in a housing development. We recommend amending Chapter 11 to provide incentives such as allowing developers to provide alternative product types for the affordable units. This may include allowing developers of detached single-family homes to provide affordable for-sale townhome units or affordable rental units.
5. We view the land dedication provisions of Chapter 11 as problematic. The per unit affordability gap on rental and owner housing is greater than the per unit land costs. This means that when the County receives land instead of affordable units, the County will still need financial subsidies to develop the affordable housing units. If the County continues to allow land dedication as an option, it should develop standards for land to be dedicated. These standards should address the availability of infrastructure and roads, residential densities, proximity to schools and services, and environmental, archeological and biological conditions.
6. The County should prepare a commercial development impact fee nexus study documenting the link between the development of commercial and industrial uses and the need for affordable housing in the County.
7. The County should consider creation of a Housing Trust Fund as an ongoing, renewable source of revenue for affordable housing, capitalized with sources such as the commercial development linkage fees and in lieu fees.
8. Chapter 11 should continue to provide for the transfer of affordable housing credits. We view this as an efficient mechanism for experienced affordable housing developers to generate funds for the development of affordable units and for market-rate developers who do not desire to develop affordable housing directly to meet their affordable housing requirements.
9. Chapter 11 should address the term of affordability for rental and owner units. We recommend permanent or very long-term affordability (not less than 55 years) for the rental units and affordable resale restrictions and term of at least 30 years for owner units.



10. The County should retain professional assistance to assist in development of underwriting standards, alternative compliance options, developer negotiations and financing for affordable housing, as well as crafting documents to record the County's long-term rent and resale restrictions.
11. The County should develop professional asset management practices to ensure long-term compliance for the affordable units.
12. The County should work collaboratively with State agencies to develop affordable housing on key sites, such as the state-owned site near Palani Road.
13. In conjunction with the other recommended changes to Chapter 11, the County should analyze the affects of larger density bonuses and larger set-asides for owner housing.

### **Approach and Results of the Economic Analysis**

**Table 1** summarizes the estimated per unit affordability gap for seven housing prototypes developed and analyzed in collaboration with County officials and residential developers currently active on the County of Hawaii. A "gap" analysis approach is used to measure the difference between what households of different income levels can afford to pay for renter and ownership housing and what it costs to develop (and, in the case of renter housing, operate) such housing on the County of Hawaii. This gap represents the "affordability cost" to the private developer of meeting the requirements of Chapter 11. The per unit gaps shown in Table 1 are averaged across all units for the prototype, not just the affordable units.

Assumptions for the development cost estimates were developed through consultation with developers active in the County of Hawaii and DRA's own extensive experience with residential development. Total development costs include land, infrastructure, hard costs, development impact fees, soft costs and a "threshold" level of developer overhead and profit estimated at 16 percent of other development costs, based on interviews with local developers and DRA's own extensive development experience.) Variations in per unit costs and the affordability gap result from differences in density, construction type and assumed unit sizes. The affordability gap will also vary based on the income level targeted. The 2006 HUD Area Median Income (AMI) for a family of four in the County is \$55,300.

Based on Chapter 11 income targeting requirements, DRA modeled renter affordability gaps for households at 60 percent (\$35,940), 80 percent (\$47,900) and 100 percent of AMI; and owner affordability gaps at 80 percent (\$47,900), 100 percent (\$55,300), 120 percent (\$66,360), and 140 percent (\$77,420) of AMI. All figures are for households of four persons. Income limits and affordable housing expense are adjusted by household size, using HUD family size adjustment factors.



The results of the analysis indicate that the affordability gaps are high, due to the high cost of developing housing in the County. The affordability gaps alone, however, do not indicate the economic impact of the Chapter 11 affordable housing requirements on housing development. They must be viewed in relation to the market and development economics in the County.

**Table 1  
Per Unit Affordability Gaps<sup>4</sup>  
Under Chapter 11 Requirements  
Housing Prototype Projects  
Kona Affordable Housing Analysis  
2006**

<b>Owner #1 Vertical Duplex</b>	<b>Owner #2 Single-Family Detached Bungalows</b>	<b>Owner #3 Single-Family Detached</b>		
\$35,200	\$30,100	\$46,700		
<b>Renter #1 Rental Eightplex Flats</b>	<b>Renter #2 Rental Townhomes</b>	<b>Renter #3 Mixed-Use with Ground Floor Retail</b>	<b>Renter #4 Vertical Duplex</b>	
\$27,400	\$28,500	\$31,500	\$28,800	

Source: David Paul Rosen & Associates.

DRA used a land residual analysis methodology to evaluate the potential economic effect of Chapter 11 affordable housing requirements on residential development in Kona and the County of Hawaii. Land residual analysis calculates the value attributed to land from proposed development on that site. It is commonly used by real estate developers, lenders and investors to evaluate development financial feasibility and select among alternative uses for a piece of property.

<sup>4</sup> Represents average per unit "gap to cost" across all units in the prototype, not just the affordable units. Assumes the developer provides units affordable at 60 percent of area median income for renters and at 70 percent of area median income for owners. This is the least costly way for the developer to provide the affordable credits required under Chapter 11 according to DRA's analysis.



The land residual methodology calculates the value of a development based on its income potential and subtracts the costs of development and developer profit to yield the underlying value of the land. When evaluating alternative land uses, the alternative that generates the highest value to a site is considered its highest and best use. An alternative that generates a negative value to the land is not financially feasible. Similarly, an alternative that generates a value to the land substantially below comparable market prices for similar parcels is likely not feasible, as landowners will likely be unwilling to sell their land at the prices developers can afford to pay.

**Tables 2 and 3** summarize the estimated residual land values for the three owner housing prototype projects and four renter projects, respectively, based on assumptions regarding market rents and sales prices and incorporating the development cost estimates described above. The land residual value was calculated with and without Chapter 11 affordability requirements, and with a 10 percent density bonus and affordable unit design modifications. Affordable rents and sales prices for the Chapter 11 requirements were estimated based on 2006 income limits and definitions of affordable housing expense used by the County of Hawaii Office of Housing and Community Development.

The residual land values for the various alternatives are compared against the estimated market prices for the land for each prototype. If an alternative generates a value that is comparable to or higher than the market land acquisition price, it indicates that the alternative is financially feasible. If an alternative generates a land value that is substantially lower than the market price, it indicates that the alternative is not financially feasible.

An important factor to bear in mind is that land values always fluctuate in response to a wide range of market factors, such as interest rates, construction costs, development impact fees, competitive supply of housing, cap rates, the rate of household formation, employment, wages, and other factors. In any given year, land values may fluctuate 10 percent or more absent any local government action. Therefore, if the net effect of a jurisdiction's zoning action, such as affordable housing requirements, falls within this range, or price elasticity, it may be received as non-disruptive to housing development cycles. Moreover, a jurisdiction can moderate, and in some cases eliminate, any negative effect on land value with development incentives and alternative compliance measures.

The results of the land residual analysis indicate that the owner prototypes generate positive land values that are comparable to or higher than the estimated market land cost. This suggests that the owner prototypes are feasible, even with the Chapter 11 affordability requirements.

For the renter prototypes, only the stacked flats (Prototype #1) generate a land residual that is comparable to estimated market land prices, and only with 100 percent market rate units.



**Table 2**  
**Residual Land Value Per Square Foot Site Area**  
**Owner Housing Prototype Projects**  
**Kona Affordable Housing Analysis**  
**2006**

Scenario	Owner #1	Owner #2	Owner #3
	Vertical Duplex	Single-Family Detached Bungalows	Single-Family Detached
100% Market Rate Units	\$54	\$31	\$15
With Chapter 11 Requirement	\$42	\$22	\$10
With Chapter 11 Requirement and 10% Density Bonus	\$47	\$21	\$7
With Chapter 11 Requirement and Incentive Package <sup>5</sup>	\$52	\$27	\$14
Estimated Market Land Price Per Square Foot	\$20	\$20	\$7.50

<sup>5</sup> Incentive package includes 10 percent density bonus, deferral of fair share assessments and modification of affordable unit design standards (reduced unit sizes and reduction in interior finish quality).



**Table 3**  
**Residual Land Value Per Square Foot Site Area**  
**Renter Housing Prototype Projects**  
**Kona Affordable Housing Analysis**  
**2006**

	<b>Renter #1</b>	<b>Renter #2</b>	<b>Renter #3</b>	<b>Renter #4</b>
	<b>Rental Eightplex Flats</b>	<b>Rental Townhomes</b>	<b>Mixed-Use with Ground Floor Retail</b>	<b>Vertical Duplex</b>
100% Market Rate Units	\$5.68	(\$10.05)	(\$72.67)	(\$13.92)
With Chapter 11 Requirement	(\$10.98)	(\$50.25)	(\$166.09)	(\$41.65)
With Chapter 11 Requirement and 10% Density Bonus	(\$11.03)	(\$53.09)	(\$175.83)	(\$44.84)
With Chapter 11 Requirement and Incentive Package <sup>6</sup>	(\$10.19)	(\$48.09)	(\$167.54)	(\$41.06)
Estimated Market Land Price Per Square Foot	\$7.50	\$12.40	\$40.00	\$8.00

Source: David Paul Rosen & Associates.

<sup>6</sup> Incentive package includes 10 percent density bonus, deferral of fair share assessments and modification of affordable unit design standards (reduced unit sizes and reduction in interior finish quality).

## **A. Methodology and Data Sources**

DRA bases its affordable housing and land residual economic analysis on how market housing is developed in the County today, and in the near future as contemplated by the CDP, and what the cost of developing, financing and operating that housing is in 2006.

This market-based economic analysis assures policy makers and stakeholders alike that affordable housing policies, financing and development recommendations are grounded in real world economics.

The methodology for the affordable housing economic analysis uses seven housing prototypes, four rental and three ownership, to estimate the costs to private developers of providing affordable units of various housing types as part of their market-rate housing developments. Chapter 11 provides a range of options for meeting the affordable housing requirements, representing alternative percentages of housing affordable to alternative income levels.

A "gap" analysis approach is used to measure the difference between what households of different income levels can afford to pay for renter and ownership housing and what it costs to produce such housing in the County of Hawai'i. This gap represents the "affordability cost" to the private developer of meeting the requirements of Chapter 11.

With rental developments, the economic cost to developers of providing an affordable unit on-site is the affordability "gap to cost." The affordability "gap to cost" is the difference between the total development cost of the unit and the amount of mortgage that the net cash flow from an affordable unit can support. . Net cash flow is equal to rent revenues less operating expenses and any set-asides for operating and replacement reserves. This is the affordability "gap to cost."

With ownership units, the true opportunity cost to the developer of providing an affordable unit on-site is the difference between the market price of the units and the amount of mortgage and downpayment that a targeted household can afford. This is the affordability "gap to price." For owners, we have calculated both the "gap to cost" and the "gap to price."

We first estimated baseline development costs for the seven housing prototypes. These "baseline" costs assume the prototypes are built to County code. Second, we used these baseline development costs to determine the costs to the developer of complying with Chapter 11 under the various on-site development options provided by the statute.

Development and land costs for the housing prototypes were estimated with the assistance of local developers and County and State housing and planning officials.

## **B. Development Costs of Housing Prototypes**

DRA estimated the total development costs for the housing prototypes, including land; hard construction costs; "fair share" assessments for roads, parks, fire police and solid waste facilities; soft or indirect costs; water and sewer connection fees; sales/marketing costs; developer profit and overhead; and financing costs as described below.

### **1. Housing Prototypes**

Seven prototypical housing projects have been selected for the development cost analysis in consultation with County staff, developers and the consulting team for the Kona Community Development Plan. The prototypes include four rental projects and three ownership projects. The prototypes are intended to represent a range of typical market-rate housing products that are currently built in the County of Hawai'i or are being contemplated under proposals for the Kona CDP. DRA consulted with residential developers active in the County of Hawai'i to refine the prototypes for consistency with projects currently being developed or proposed in the County. The bedroom mix and unit size assumptions are intended to illustrate potential market-rate products. The prototypes are consistent with existing zoning.

Renter Prototype #3 represents the housing portion only of a higher-density mixed-use development with ground floor retail. Based on a mixed-use concept for the urban core prepared by consulting team for the Kona CDP, parking for this prototype is provided off-site as part of a public parking structure, with spaces reserved for the residential uses in the evenings. DRA has not evaluated the market feasibility of this concept.

The three owner housing prototypes are described in **Table 4** with respect to number of housing units, product and construction characteristics, density, bedroom mix and unit size, and parking. **Table 5** similarly describes the four renter housing prototypes.

### **2. Land Costs**

Based on interviews with local developers, we estimate land costs for entitled, but unimproved, vacant residential land at \$30,000 per unit for multifamily rental housing and \$75,000 for ownership housing. Infrastructure and utility costs are subsumed in the hard construction cost figures.

**Table 4**  
**Owner Housing Prototype Projects**  
**Kona CDP Affordability Gap Analysis**

<b>PROTOTYPE</b>	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Zoning</b>	RD	RD	RS
<b>FAR</b>	3,750 SF/Lot	3,750 SF/Lot	10,000 SF/Lot
<b>Product Type</b>	Hillside Duplex 2 Stories	Single-Family Det. 1 Story	Single-Family Det. 1 Story
<b>Density (DU's/Acre)</b>	11.6	11.6	4.4
<b>Slope</b>	Steep Slope	0 - 5%	0 - 15%
<b>Net Site Area (Acres)</b>	8.621 Acres	8.621 Acres	22.727 Acres
<b>Units by BR Count</b>			
<b>Two Bedroom/2 Bath</b>	50	50	0
<b>Three Bedroom</b>	50	50	50
<b>Four Bedroom</b>	0	0	50
<b>Unit Size (Net SF)</b>			
<b>Two Bedroom/2 Bath</b>	1,200	900	0
<b>Three Bedroom</b>	1,500	1,200	1,450
<b>Four Bedroom</b>	0	0	1,750
<b>Average</b>	<i>1,350</i>	<i>1,050</i>	<i>1,600</i>
<b>Building Square Feet</b>			
<b>Net Living Area</b>	135,000	105,000	160,000
<b>Type of Parking</b>	Carport	Detached Garage	Attached Garage
	45,000 300 SF/Space	45,000 300 SF/Space	60,000 300 SF/Space
<b>No. of Parking Spaces</b>			
<b>Residential Units</b>	150	150	200
<b>Guest Parking</b>	0	0	0
<b>Total Spaces</b>	<u>150</u>	<u>150</u>	<u>200</u>

Source: David Paul Rosen & Associates.

**Table 5  
Rental Housing Prototype Projects  
Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	<b>Renter 1</b> Rental Eightplex Flats	<b>Renter 2</b> Rental Townhomes	<b>Renter 3</b> Mixed-Use GF/Retail	<b>Renter 4</b> Vertical Duplex
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Zoning</b>	RM - 4		RM - .75	RD
<b>FAR</b>	4000 SF Lot	2420 SF Lot	750 SF Lot	3750 SF Lot
<b>Product Type</b>	2 Story Apt. Flats Eightplex Bldgs.	2 Story Apt. Townhomes	3 Story Apt. Over Ground Floor Retail	2 Story Duplex on Hillside
<b>Density (DU's/Acre)</b>	10.9	18.0	58.1	11.6
<b>Slope</b>	0 - 5%	0 - 5%	0 - 5%	Steep Slope
<b>Land Area (Acres)</b>	11.009 Acres	5.556 Acres	0.620 Acres	8.621 Acres
<b>Units by BR Count</b>				
<b>One Bedroom</b>	54	0	0	0
<b>Two Bedroom/2 Bath</b>	54	80	36	50
<b>Three Bedroom</b>	12	20	0	50
<b>Manager's (2 BR/2 BA)</b>	0	0	0	0
<b>Unit Size (Net SF)</b>				
<b>One Bedroom</b>	625	0	0	0
<b>Two Bedroom/2 Bath</b>	835	1,150	875	1,200
<b>Three Bedroom</b>	945	1,250	0	1,500
<b>Average</b>	752	1,170	875	1,350
<b>Building Square Feet</b>				
<b>Net Living Area</b>	90,180	117,000	31,500	135,000
<b>No. of Parking Spaces</b>	210	175	45	200
<b>Type of Parking</b>	Carport/Open	Garage/Open	Offsite/Open (1)	Carport/Open

(1) Assumes parking for this prototype is provided off-site in a shared parking garage with spaces reserved for residents at night.

Source: David Paul Rosen & Associates

### **3. Hard Construction Costs**

Hard construction costs were estimated for the seven housing prototypes based on interviews with developers active in the County. A list of developers contacted during the course of this study is contained in **Appendix A**. Infrastructure and site improvement costs are combined and shown as both a cost per unit and a cost per net square foot of building area, which is how they are commonly expressed by local developers. Unit construction costs include residential and parking area hard costs expressed per net square foot of residential building area, which is the most common way these costs were expressed by the developers interviewed.

### **4. Development Impact and Processing Fees**

Since the early 1990s, the County of Hawai'i has imposed "fair share assessments" on applicants for new residential (including agricultural zoning allowing lots one acre or less in size) and hotel zoning. The fees, which are imposed as a condition of zoning approval, are collected prior to securing final subdivision approval for new residential lots or prior to obtaining final plan approval for multi-family or hotel development. The fees, which are adjusted annually for inflation, currently total \$9,761 per single-family unit for roads, parks, fire, police and solid waste facilities.

The County is currently considering replacing its fair share assessments with a true development impact fee system that follows the requirements for the State of Hawai'i's impact fee enabling act. Unlike the current assessments, impact fees would be assessed on all new development, including nonresidential development and residential development in areas with existing zoning.

Other development impact fees, including sewer and water connection fees, are included in the infrastructure/site improvements budget line item.

### **5. Soft (Indirect) Development Costs**

Soft or indirect costs were estimated based on DRA's experience with residential development nationwide and interviews with developers active in the County of Hawai'i. Estimated soft costs include:

- Architectural, engineering and design fees;
- Legal and closing costs;
- Taxes and insurance (during the construction period);
- Interest during construction (land and construction loans);
- Financing fees;
- Marketing and leasing (for the rental prototypes);
- Marketing and sales costs (for the owner prototypes)

Construction interest calculations assume loan to value ratios of 75 percent for the rental prototypes and 85 percent for the owner prototypes, based on DRA's experience and developer interviews. Actual loan to value ratios vary depending upon the developer, the project and the lender.

## **6. Financing Costs**

Financing costs vary according to the amount of equity invested, the term of the loan, the annual interest, and, in the case of ownership projects, mortgage insurance rates. For purposes of this gap analysis, the amount of the first mortgage for the rental prototypes is assumed to be the amortized debt that may be supported by tenant net affordable rents. The balance of project financing is the affordability cost or gap.

With all prototypes, we assume a conventional construction loan during construction. For the owner prototypes, the maximum supportable construction loan is calculated based on a loan-to-cost ratio of 85 percent and an average loan balance of 60 percent. Current construction loan interest rates are typically prime plus 25 basis points, or 8.5 percent today, with a 1.0 percent construction loan fee. The construction and sales period is assumed at 12 months for the owner prototypes.

The construction loan for the rental prototypes is calculated based on a loan-to-cost ratio of 75 percent and an average loan balance of 60 percent. DRA has assumed an 8.5 percent construction interest and a 1.0 percent construction loan fee. The construction and lease-up period is assumed at 15 months for the renter prototypes.

## **7. Total Development Costs**

Total development costs, as defined for the purposes of this report, equal the sum of the above categories of development costs plus developer overhead and profit. Minimum developer profit is estimated at 12 percent of development costs, based on input from developers and DRA's experience nationwide. This level is considered a baseline profit or "hurdle rate," representing the minimum necessary for the deal to proceed. Developer overhead is estimated at 4 percent of total development costs. Developer overhead cost line items typically represent a larger percentage of costs on small projects than larger projects. A more accurate estimate of actual overhead costs would specify line items charged to "overhead" but not included in "developer fee."

DRA considers a total of 16 percent for developer profit and overhead as conservative as a threshold minimum. In DRA's experience, developers have proceeded with half this amount of profit and overhead. DRA's approach to the affordable housing analysis is to model accurate market conditions, erring on the side of conservatism. Therefore, we have chosen to use a 16 percent developer profit and overhead assumption for the purposes of this analysis, which is consistent with the targets provided by the local developers we interviewed.

**Table 6** summarizes the development cost and financing assumptions for the owner housing prototypes. **Table 7** summarizes the development cost and financing assumptions for the ownership housing prototypes.

**Table 8** presents the estimated total development costs for the owner housing prototypes. **Table 9** presents the estimated total development costs for the ownership housing prototypes.

The total development costs for each prototype are translated into per unit development costs by bedroom count. These calculations are contained in **Appendix B**.

**Table 6**  
**Development and Financing Cost Assumptions**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
<b>Land Cost Per Unit</b>	\$75,000	\$75,000	\$75,000
Per Square Foot Site Area	\$20.00	\$20.00	\$7.50
<b>Development Cost Assumptions</b>			
Hard Construction Costs			
Infrastructure/Site Improve. Costs Per Unit	\$80,000	\$77,000	\$117,000
Per Net SF Building Area	\$59.26	\$73.33	\$73.13
Unit Construction Costs per Net SF	\$130.00	\$145.00	\$145.00
Hard Cost Contingency (% of Unit Hard Costs)	5%	5%	5%
Architectural/Engineering (% of Unit Hard Construction Costs)	7%	3%	3%
Property Taxes During Construction (% of Unit Hard Costs)	4.05%	4.05%	4.05%
Insurance (% TDC)	2.00%	2.00%	2.00%
Selling/Closing Costs (% TDC)	5.00%	5.00%	5.00%
Sales Commissions (% TDC)	1.00%	1.00%	1.00%
Developer Overhead/Sales Costs (% TDC)	4.00%	4.00%	4.00%
Developer Profit (% TDC Exclud. Land)	12.00%	12.00%	12.00%
<b>Fees</b>			
Fair Share Assessments (Per Unit)	\$9,761	\$9,761	\$9,761
Sewer Connection Fees (Per Unit)	\$1,000	\$1,000	\$1,000
Water Connection Fees (Per Unit)	\$5,000	\$5,000	\$5,000
<b>Construction Loan</b>			
Construction Loan % of TDC	85.00%	85.00%	85.00%
Constr. Loan Amt.	\$35,985,764	\$31,656,048	\$47,183,252
Interest Rate	8.50%	8.50%	8.50%
Loan Fees	1.00%	1.00%	1.00%
Average Loan Balance--Construction	60.00%	60.00%	60.00%
Construction Loan Term	12 Months	12 Months	12 Months
Construction Loan Interest	\$1,835,274	\$1,614,458	\$2,406,346
Construction Loan Points	\$359,858	\$316,560	\$471,833

Source: David Paul Rosen & Associates.

**Table 7**  
**Development and Financing Cost Assumptions**  
**Rental Prototypes**  
**Kona Affordability Gap Analysis**

	<b>Renter 1 Rental Eightplex Flats</b>	<b>Renter 2 Rental Townhomes</b>	<b>Renter 3 Mixed-Use GF/Retail</b>	<b>Renter 4 Vertical Duplex</b>
<b>Land Acquisition Cost Per Unit</b>	\$30,000	\$30,000	\$30,000	\$30,000
Land Cost Per SF	\$7.51	\$12.40	\$39.99	\$7.99
<b>Development Cost Assumptions</b>				
Infrastructure/Site Improve. Costs Per Unit	\$60,000	\$75,000	\$70,000	\$75,000
Per Net SF Building Area	\$79.84	\$64.10	\$80.00	\$55.56
Hard Construction Costs (Incl. GC Fee)				
Unit Construction Costs per Net SF	\$130.00	\$130.00	\$160.00	\$130.00
Hard Cost Contingency (% Site Improvement and Unit Hard Costs)	5.00%	5.00%	5.00%	5.00%
Architectural/Engineering (% Unit Hard Construction Costs)	7.00%	7.00%	7.00%	7.00%
Property Taxes During Construction (% Unit Hard Costs Per Year)	4.05%	4.05%	4.05%	4.05%
Insurance During Construction (% TDC)	2.00%	2.00%	2.00%	2.00%
Marketing/Leasing/Start-Up (Per Unit)	\$1,000	\$1,000	\$1,000	\$1,000
Developer Overhead (% TDC)	4.00%	4.00%	4.00%	4.00%
Developer Profit (% TDC)	12.00%	12.00%	12.00%	12.00%
<b>Fees</b>				
Fair Share Assessments (Per Unit)	\$9,761	\$9,761	\$9,761	\$9,761
Sewer Connection Fees (Per Unit)	\$5,000	\$5,000	\$5,000	\$5,000
Water Connection Fees (Per Unit)	\$1,000	\$1,000	\$1,000	\$1,000
<b>Construction Loan</b>				
Construction Loan As a % of TDC	75.00%	75.00%	75.00%	75.00%
Construction Loan Amount	\$22,661,242	\$26,629,806	\$9,016,768	\$29,316,455
Interest Rate	8.50%	8.50%	8.50%	8.50%
Loan Fees	1.00% \$226,612	\$266,298	\$90,168	\$293,165
Average Loan Balance (Constr/Lease-Up)	60.00%	60.00%	60.00%	60.00%
Construction Period	12 Months	12 Months	12 Months	12 Months
Lease-Up Period	3 Months	3 Months	3 Months	3 Months
Total Construction Loan Term	15 Months	15 Months	15 Months	15 Months
Construction Loan Interest	\$1,444,654	\$1,697,650	\$574,819	\$1,868,924
<b>Permanent Loan</b>				
Debt Coverage Ratio	1.25	1.25	1.25	1.25
Mortgage Term	30 years	30 years	30 years	30 years
Interest Rate	8.00%	8.00%	8.00%	8.00%

Source: David Paul Rosen & Associates

**Table 8**  
**Estimated Prototype Development Costs**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
Site Area (Acres)	8.621	8.621	22.727
No. of Units	100	100	100
Net Square Feet Living Area	135,000	105,000	160,000
INFRASTRUCTURE/SITE IMPROVE.	\$8,000,000	\$7,700,000	\$11,700,000
UNIT CONSTR. HARD COSTS/G.C. FEE	\$17,550,000	\$15,225,000	\$23,200,000
HARD COST CONTINGENCY	\$877,500	\$761,250	\$1,160,000
ARCH./ENG./CONSTR. SUPERVISION	\$1,228,500	\$456,750	\$696,000
FAIR SHARE ASSESSMENTS (1)	\$976,100	\$976,100	\$976,100
SEWER CONNECTION FEES	\$100,000	\$100,000	\$100,000
WATER CONNECTION FEES	\$500,000	\$500,000	\$500,000
CONSTRUCTION LOAN FEES	\$359,858	\$316,560	\$471,833
CONSTRUCTION INTEREST	\$1,835,274	\$1,614,458	\$2,406,346
ENVIRONMENTAL PHASE I	\$7,500	\$7,500	\$7,500
SOILS TESTING	\$30,000	\$30,000	\$30,000
PROPERTY TAXES	\$710,775	\$616,613	\$939,600
INSURANCE	\$846,724	\$744,848	\$1,110,194
SALES COMMISSIONS	\$423,362	\$372,424	\$555,097
SELLING/CLOSING COSTS	\$2,116,810	\$1,862,120	\$2,775,485
DEVELOPER OVERHEAD	\$1,693,448	\$1,489,696	\$2,220,388
DEVELOPER PROFIT	\$5,080,343	\$4,469,089	\$6,661,165
<b>TOTAL DEVELOP. COST W/O LAND</b>	<b>\$42,336,193</b>	<b>\$37,242,410</b>	<b>\$55,509,708</b>
PER UNIT	\$423,362	\$372,424	\$555,097
PER SF	\$313.60	\$354.69	\$346.94
<b>LAND ACQUISITION COSTS</b>	<b>\$7,500,000</b>	<b>\$7,500,000</b>	<b>\$7,500,000</b>
<b>TOTAL PROJECT COSTS W/ LAND</b>	<b>\$49,836,193</b>	<b>\$44,742,410</b>	<b>\$63,009,708</b>
Cost Per Unit	\$498,362	\$447,424	\$630,097

(1) Includes fees for roads, parks, fire, police and solid waste facilities. Imposed as a condition of new residential zoning approval.

Source: David Paul Rosen & Associates

**Table 9**  
**Estimated Prototype Development Costs**  
**Rental Housing Prototypes**  
**Kona Affordability Gap Analysis**

	<b>Renter 1 Rental Eightplex Flats</b>	<b>Renter 2 Rental Townhomes</b>	<b>Renter 3 Mixed-Use GF/Retail</b>	<b>Renter 4 Vertical Duplex</b>
Acres	11.009	5.556	0.620	8.621
Number of Units	120	100	36	100
Net Square Feet Living Area	90,180	117,000	31,500	135,000
BACKBONE INFRASTRUCTURE	\$7,200,000	\$7,500,000	\$2,520,000	\$7,500,000
UNIT HARD CONSTR. COSTS/GC FEES	\$11,723,400	\$15,210,000	\$5,040,000	\$17,550,000
HARD COST CONTINGENCY	\$586,170	\$760,500	\$252,000	\$877,500
ARCH./ENG./CONSTR. SUPERVISION	\$820,638	\$1,064,700	\$352,800	\$1,228,500
FAIR SHARE ASSESSMENTS (1)	\$1,171,320	\$976,100	\$351,396	\$976,100
SEWER CONNECTION FEES	\$600,000	\$500,000	\$180,000	\$500,000
WATER CONNECTION FEES	\$120,000	\$100,000	\$36,000	\$100,000
ALTA SURVEY	\$7,500	\$7,500	\$7,500	\$7,500
ENVIRONMENTAL PHASE I	\$7,500	\$7,500	\$7,500	\$7,500
SOILS TESTING	\$30,000	\$30,000	\$30,000	\$30,000
CONSTRUCTION LOAN FEES	\$226,612	\$266,298	\$90,168	\$293,165
CONSTRUCTION/LEASE-UP INTEREST	\$1,444,654	\$1,697,650	\$574,819	\$1,868,924
PROPERTY INSURANCE	\$604,300	\$710,128	\$240,447	\$781,772
PROPERTY TAXES DURING CONSTR.	\$593,497	\$770,006	\$255,150	\$888,469
CONSTR. LOAN TITLE AND CLOSING	\$30,000	\$30,000	\$30,000	\$30,000
APPRAISAL FEES	\$10,000	\$10,000	\$10,000	\$10,000
LEGAL	\$60,000	\$60,000	\$60,000	\$60,000
MARKET STUDY/CONSULTING	\$25,000	\$25,000	\$25,000	\$25,000
MARKETING/LEASE-UP/START-UP	\$120,000	\$100,000	\$36,000	\$100,000
DEVELOPER OVERHEAD	\$1,208,600	\$1,420,256	\$480,894	\$1,563,544
DEVELOPER PROFIT	\$3,625,799	\$4,260,769	\$1,442,683	\$4,690,633
<b>TOTAL PROJECT COSTS W/O LAND</b>	<b>\$30,214,990</b>	<b>\$35,506,408</b>	<b>\$12,022,357</b>	<b>\$39,088,606</b>
TOTAL COST PER UNIT	\$251,792	\$355,064	\$333,954	\$390,886
TOTAL COST PER GROSS SQUARE FOOT	\$335.05	\$303.47	\$381.66	\$289.55
<b>LAND ACQUISITION</b>	<b>\$3,600,000</b>	<b>\$3,000,000</b>	<b>\$1,080,000</b>	<b>\$3,000,000</b>
<b>TOTAL PROJECT COSTS W/ LAND</b>	<b>\$33,814,990</b>	<b>\$38,506,408</b>	<b>\$13,102,357</b>	<b>\$42,088,606</b>
Cost Per Unit	\$281,792	\$385,064	\$363,954	\$420,886

(1) Includes fees for roads, parks, fire, police and solid waste facilities. Imposed as a condition of new residential zoning approval.

Source: David Paul Rosen & Associates

## C. Chapter 11 Affordable Housing Requirements

Under Chapter 11 requirements for residential units, the applicant must earn affordable housing credits equal to 20 percent of the number of units or lots (rounded to the nearest 0.5 unit). Developers may earn these credits by doing any of the following:

- Constructing affordable for-sale units on-site or off-site within a 15-mile radius of the project site;
- Constructing affordable rental units on-site or off-site within a 15-mile radius of the project site;
- Constructing affordable finished lots on-site, if the project consists of finished lots;
- Paying in-lieu fees to the Agency;
- Providing infrastructure directly related to the future provision of affordable housing or developable land (with the value determined by an appraisal) within a 15-mile radius of the project site to be credited against the in-lieu fee.
- Obtaining excess credits from another developer.

Developers may obtain credits by providing varying percentages of affordable units at alternative income levels. For renter units, credits may be obtained for units affordable to households earning up to 100% of area median income. For owner units, credits may be obtained for units affordable to households earning up to 140% of area median income.

HUD reports a median family income of \$55,300 for the County of Hawai'i for 2006. In establishing its income limits, HUD begins by calculating very low income limits as 50 percent of area median income. However, in high housing cost areas, the very low income limit is increased based on a formula incorporating Section 8 fair market rents for a two-bedroom unit. This adjusts income limits upward for areas where rental housing costs are unusually high in relation to the median income. This is what occurred in the County of Hawai'i in 2006. HUD's 2006 very low income limit in the County of Hawai'i for a family of four is \$29,950.

**Table 10** shows the income limits for households earning between 60% and 140% of area median income for the County of Hawai'i in 2006, adjusted for household size using HUD family size adjustment factors.

**Table 10  
Income Limits  
County of Hawai'i  
2006**

<b>Household Size</b>	<b>Income Category (% of Median Income)</b>				
	<b>60%</b>	<b>80%</b>	<b>100%</b>	<b>120%</b>	<b>140%</b>
1 Person	\$25,140	\$33,550	\$38,710	\$46,450	\$54,190
2 Persons	\$28,740	\$38,300	\$44,240	\$53,090	\$61,940
3 Persons	\$32,340	\$43,100	\$49,770	\$59,720	\$69,680
4 Persons	\$35,940	\$47,900	\$55,300	\$66,360	\$77,420
5 Persons	\$38,820	\$51,750	\$59,720	\$71,670	\$83,610
6 Persons	\$41,700	\$55,550	\$64,150	\$76,980	\$89,810
7 Persons	\$44,580	\$59,400	\$68,570	\$82,290	\$96,000
8 Persons	\$47,460	\$63,250	\$73,000	\$87,600	\$102,190

Source: County of Hawai'i Office of Housing and Community Development; David Paul Rosen & Associates

**Table 11** summarizes the number of credits developers receive for the provision of affordable renter and owner units.

**Table 11**  
**Chapter 11 Affordable Housing Credit System**  
**Construction of Completed Dwelling Units**  
**Renter and Owner Housing**

Income Level (% Area Median Income)	Rental Units		Owner Units	
	Credit Per Unit	% of Units Required <sup>1</sup>	Credit Per Unit	% of Units Required <sup>1</sup>
Less than 60% AMI	2.0	10.00%	2.0	10.00%
60% to 80% AMI	1.5	13.33%	2.0	10.00%
80% to 100% AMI	1.0	20.00%	1.5	13.33%
100% to 120% AMI	N/A	N/A	1.0	20.00%
120% to 140% AMI	N/A	N/A	0.5	40.00%

Source: Hawai'i County Code, Chapter 11, Section 11-5.

The text of Chapter 11 is attached as **Appendix C**.

<sup>1</sup> Percent of total units in the development required to be affordable at the specified income level in order to achieve credits equal to 20% of total units as required under Chapter 11 based on the credit per unit by income level.

## **D. Estimated Costs of Chapter 11 Affordable Housing Requirements**

DRA estimated the cost to developers of the Chapter 11 affordable housing requirements described above using the seven housing prototypes. A "gap" analysis approach was used to measure the difference between what households at different income levels can afford to pay for renter and ownership housing and the costs of producing such housing in the County of Hawai'i. This gap represents the "affordability gap" to the private developer of providing affordable units in compliance with Chapter 11 requirements.

The gap analysis contains three main steps:

1. define affordability standards for the affordable units;
2. estimate housing development costs;
3. determine the "gap" between the costs household incomes can support and the total cost of developing the housing.

In the analysis, the number of units required to meet the affordability requirement is rounded down to the nearest whole number of units. Therefore, the affordability gap is slightly understated or overstated in instances where direct application of the set-aside would result in a 0.5 fractional unit requirement.

### **1. Financing Scenario**

Affordable housing development is often financed with assistance from public sources of funding that assist in leveraging the mortgages that are supportable from affordable rents or sales prices. DRA modeled the rental and owner housing prototypes under financing scenarios that do not incorporate leverage from alternative sources of public subsidy for affordable housing. Because of the limited availability of affordable housing subsidies, it is not possible to predict the ability of any particular affordable housing development to secure such subsidies. This analysis determines the net cost of any of compliance, without public subsidies, incentives and alternative compliance options the County may offer.

### **2. Occupancy Standards**

Because income definitions for affordable housing assistance programs vary by household size, calculation of affordable sales prices and rents requires the definition of occupancy standards (the number of persons per unit) for each unit size. For the purposes of this analysis, affordable housing expense is calculated based on the occupancy standards used by OHCD. For renter households, the standard is 1.5 persons per bedroom, consistent with the IRS standard used for the Low Income Housing Tax Credit Program. For owner households, the occupancy standard used is one person per bedroom plus one.

### 3. Definition of Affordable Housing Expense

Chapter 11 requires OHCD to publish annually affordable rents and affordable sales price for various household sizes using the Housing and Community Development Corporation of Hawai'i guidelines. DRA has incorporated the definitions of affordable housing expense for renter and owners used by the State and OHCD in the economic analysis. For renters, affordable housing expense is defined by OHCD at 30 percent of gross income, including rent plus utilities. Most state and federal affordability standards for renters are established at 30 percent.

Affordable housing expense for owners is defined by OHCD, for the purposes of determining affordable housing sales price guidelines, at 28 percent of gross income for mortgage principal and interest. There is a much wider variation in the definition of affordable housing expense for owners nationwide. Where such a standard is not already established, DRA generally recommends that affordable housing cost be defined at 35 percent of gross income, including mortgage principal and interest, loan insurance (PMI), property taxes, fire and casualty insurance, and homeowner association fees, with no allowance made for utilities.

The County calculates affordable home price at the midpoint of the income range. Otherwise, the home is affordable only to a household at the top of the income range.

**Table 12** shows affordable monthly housing expense for renters for one-, two- and three-bedroom units. **Table 13** shows affordable monthly housing expense for owners for two-, three- and four-bedroom units based on the definitions described above.

**Table 12**  
**Renter Affordable Monthly Housing Expense <sup>1</sup>**  
**Kona Affordable Housing Study**  
**2006**

<u>Percent of Area Median Income</u>	<u>One Bedroom</u>	<u>Two Bedroom</u>	<u>Three Bedroom</u>
60%	\$673	\$808	\$934
80%	\$898	\$1,078	\$1,245
100%	\$1,036	\$1,244	\$1,437

Source: County of Hawai'i Office of Housing and Community Development; David Paul Rosen & Associates.

<sup>1</sup> Renter affordable housing expense defined at 30% of gross income for rent plus utilities; assumes occupancy of 1.5 persons per bedroom per OHCD guidelines.

**Table 13**  
**Owner Affordable Monthly Housing Expense<sup>1</sup>**  
**Kona Affordable Housing Study**  
**2006**

Income Limit <sup>2</sup> (% of Area Median)	<u>Two Bedroom</u>	<u>Three Bedroom</u>	<u>Four Bedroom</u>
80%	\$880	\$978	\$1,057
100%	\$1,132	\$1,258	\$1,359
120%	\$1,277	\$1,419	\$1,533
140%	\$1,510	\$1,677	\$1,812

Source: County of Hawai'i Office of Housing and Community Development; David Paul Rosen & Associates.

#### 4. Utility Allowances

As noted above in the definition of affordable housing expense, allowable affordable net rents are calculated by subtracting allowances for the utilities paid directly by the tenants from the gross rent (or affordable housing expense).

For purposes of the gap analysis, we incorporated January 2006 utility allowances provided by OHCD, summarized in **Table 14** below. The rental gap analysis assumes that the resident pays utilities for gas cooking and water heating and for basic electricity, assuming the landlord pays for trash, water and sewer.

Actual utility allowances depend upon a variety of factors, including the utilities that are paid by the residents (e.g. water, gas, electricity, sewer, trash), the type of appliances and

<sup>1</sup> Based on 2006 median income of \$55,300 for the County of Hawai'i. For income levels below 100% AMI, HUD adjusts income limits upwards based on a formula incorporating Section 8 fair market rents because the County of Hawai'i is a high housing cost area.

<sup>2</sup> Affordable housing expense is calculated at 70%, 90%, 110% and 130% of area median income, respectively, adjusted for household size of 1 person per bedroom plus one. Assumes 28% of gross income for mortgage principal and interest.

heating units incorporated in the units, and whether appliances and heating units require electricity or gas.

**Table 14**  
**Current HUD-Approved Monthly Utility Allowances**  
**County of Hawai'i**  
**January, 2006**

<u>Bedroom Size</u>	<u>Utility Allowance<sup>1</sup></u>
1 Bedroom	\$51
2 Bedroom	\$91
3 Bedroom	\$143

Source: County of Hawai'i, Office of Housing and Community Development, effective January, 2006.

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<sup>1</sup> For renters, includes gas heating, cooking, water heating and basic electricity. Assumes landlord pays trash, water and sewer.

## 5. Prototype Affordability Gaps Under Chapter 11

### a. Owner Housing Prototypes

**Table 15** presents the calculation of affordable sales price guidelines under Chapter 11 based on the definitions and assumptions described above. For owners, affordable sales prices are determined by adding the mortgage supportable from affordable housing expense at a 6% fixed interest rate, 30-year mortgage plus a 5 percent downpayment, based on the guidelines for 2006 used by OHCD. Affordable sales prices range from a low of \$176,600 for a two-bedroom unit at 80% of area median income to a high of \$342,500 for a four-bedroom unit at 140% of area median income.

**Table 16** shows the estimated per unit affordability “gap to cost” for the owner prototypes at income levels ranging from 80% of area median income to 140% of area median income. For owners, the gap to cost is calculated by subtracting the affordable sales price by unit bedroom count and income level from per unit total development costs.

**Table 17** shows the estimated affordability “gap to cost” of complying with the affordable housing requirements under Chapter 11 for the owner housing prototypes. We use the per unit gap to cost for each prototype, unit bedroom count and income level and apply the number of affordable units necessary to meet the 20% credit requirement under Chapter 11. We assume a pro-rata distribution of affordable units by bedroom count compared to the market-rate units. This analysis indicates that providing units at 80% of area median income is the least costly way for developers to comply with the Chapter 11 requirements on owner units based on the current credit system.

**Table 18** shows the estimated per unit “gap to price” for the owner prototypes, calculated by deducting the affordable sales price by unit bedroom count and income level from the total development cost of the unit.

**Table 19** shows the estimated affordability “gap to price” of complying with the affordable housing requirements under Chapter 11 for the owner housing prototypes. This analysis indicates that providing units at 80% of area median income is the least costly way for developers to comply with the Chapter 11 requirements on owner units based on the current credit system using the gap to price methodology as well.

**Table 15**  
**Chapter 11 Affordable Sales Price Guidelines (1)**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**  
**2006**

**ASSUMPTIONS**

2006 HUD Median Income, County of Hawaii					\$55,300
Affordable Housing Cost As a % of Income					
Affordable Housing Cost As a % of Income for Mortgage Payment					28%
No. of Bedrooms	<b>1 Bedroom</b>	<b>2 Bedroom</b>	<b>3 Bedroom</b>	<b>4 Bedroom</b>	
Household Size, Health and Safety Code	2 Persons	3 Persons	4 Persons	5 Persons	
Household Size Income Adjust. Factor	80%	90%	100%	108%	
Mortgage Interest Rate	6.00%				
Term (Years)	30				

**AFFORDABLE HOUSING PAYMENT (PITI) (2)**

		<b>1 Bedroom</b>	<b>2 Bedroom</b>	<b>3 Bedroom</b>	<b>4 Bedroom</b>
<u>70% AMI (3)</u>					
Annual Gross Income		\$33,540	\$37,730	\$41,930	\$45,290
Affordable Monthly Mortgage Payment	28%	\$783	\$880	\$978	\$1,057
Supportable Mortgage		\$130,598	\$146,777	\$163,122	\$176,299
Afford. Sales Price w/ Downpmt. @	5.00%	\$137,400	\$154,600	\$171,800	\$185,500
<u>90% AMI</u>					
Annual Gross Income		\$43,120	\$48,519	\$53,910	\$58,223
Affordable Monthly Mortgage Payment	28%	\$1,006	\$1,132	\$1,258	\$1,359
Supportable Mortgage		\$167,792	\$188,808	\$209,824	\$226,670
Afford. Sales Price w/ Downpmt. @	5.00%	\$176,600	\$198,700	\$220,800	\$238,500
<u>110% AMI</u>					
Annual Gross Income		\$48,664	\$54,747	\$60,830	\$65,696
Affordable Monthly Mortgage Payment	28%	\$1,135	\$1,277	\$1,419	\$1,533
Supportable Mortgage		\$189,308	\$212,993	\$236,677	\$255,692
Afford. Sales Price w/ Downpmt. @	5.00%	\$199,300	\$224,300	\$249,200	\$269,100
<u>130% AMI</u>					
Annual Gross Income		\$57,512	\$64,701	\$71,890	\$77,641
Affordable Monthly Mortgage Payment	28%	\$1,342	\$1,510	\$1,677	\$1,812
Supportable Mortgage		\$223,834	\$251,855	\$279,710	\$302,226
Afford. Sales Price w/ Downpmt. @	5.00%	\$235,600	\$265,100	\$294,500	\$318,100

(1) Affordable sales prices are rounded to match County guidelines for 2006.

(2) Chapter 11 allows developers to provide housing affordable to households with incomes at 80%, 100%, 120% and 140% of area median household income. The County defines affordability at 70%, 90%, 110% and 130% AMI.

(3) Income limits at 80% of area median income and below are adjusted upwards by HUD from a straight percentage of area median income because Hawaii is considered a high-cost area.

Source: County of Hawaii Office of Housing and Community Development; David Paul Rosen & Associates.

**Table 16**  
**Affordability "Gap to Cost" Per Affordable Unit**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

<b>Prototype</b>	<b>Owner 1</b>	<b>Owner 2</b>	<b>Owner 3</b>
	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units</b>	100	100	100
<b>Per Unit Development Cost</b>			
Two Bedroom	\$475,148	\$421,531	N/A
Three Bedroom	\$521,576	\$473,317	\$604,204
Four Bedroom	N/A	N/A	\$655,990
<b>Per Unit Affordable Home Price</b>			
<u>70% of Median</u>			
Two Bedroom	\$137,400	\$137,400	\$137,400
Three Bedroom	\$154,600	\$154,600	\$154,600
Four Bedroom	\$171,800	\$171,800	\$171,800
<u>90% of Median</u>			
Two Bedroom	\$176,600	\$176,600	\$176,600
Three Bedroom	\$198,700	\$198,700	\$198,700
Four Bedroom	\$220,800	\$220,800	\$220,800
<u>110% of Median</u>			
Two Bedroom	\$199,300	\$199,300	\$199,300
Three Bedroom	\$224,300	\$224,300	\$224,300
Four Bedroom	\$249,200	\$249,200	\$249,200
<u>130% of Median</u>			
Two Bedroom	\$235,600	\$235,600	\$235,600
Three Bedroom	\$265,100	\$265,100	\$265,100
Four Bedroom	\$294,500	\$294,500	\$294,500
<b>Affordability "Gap to Cost" Per Unit</b>			
<u>70% of Median</u>			
Two Bedroom	\$337,748	\$284,131	N/A
Three Bedroom	\$366,976	\$318,717	\$449,604
Four Bedroom	N/A	N/A	\$484,190
Weighted Average	\$352,362	\$301,424	\$466,897
<u>90% of Median</u>			
Two Bedroom	\$298,548	\$244,931	N/A
Three Bedroom	\$322,876	\$274,617	\$405,504
Four Bedroom	N/A	N/A	\$435,190
Weighted Average	\$310,712	\$259,774	\$420,347
<u>110% of Median</u>			
Two Bedroom	\$275,848	\$222,231	N/A
Three Bedroom	\$297,276	\$249,017	\$379,904
Four Bedroom	N/A	N/A	\$406,790
Weighted Average	\$286,562	\$235,624	\$393,347
<u>130% of Median</u>			
Two Bedroom	\$239,548	\$185,931	N/A
Three Bedroom	\$256,476	\$208,217	\$339,104
Four Bedroom	N/A	N/A	\$361,490
Weighted Average	\$248,012	\$197,074	\$350,297

Source: David Paul Rosen & Associates.

**Table 17**  
**Affordability "Gap to Cost" Under Chapter 11 By Income Level**  
**Owner Housing Prototypes**

	Owner 1	Owner 2	Owner 3
Prototype:	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units:</b>	100	100	100
<b>Total Units by Bedroom Count</b>			
<b>Two Bedroom/2 Bath</b>	50	50	0
<b>Three Bedroom</b>	50	50	50
<b>Four Bedroom</b>	0	0	50
<b>Affordable Units by BR Count &amp; Income (1)</b>			
<b>% Affordable Units</b>			
<b>70% of Median</b>	<b>10.0%</b>		
Two Bedroom/2 Bath	10	10	10
Three Bedroom	5	5	0
Four Bedroom	5	5	5
Four Bedroom	0	0	5
<b>90% of Median</b>	<b>13.3%</b>		
Two Bedroom/2 Bath	14	14	14
Three Bedroom	7	7	0
Four Bedroom	7	7	7
Four Bedroom	0	0	7
<b>110% of Median</b>	<b>20.0%</b>		
Two Bedroom/2 Bath	20	20	20
Three Bedroom	10	10	0
Four Bedroom	10	10	10
Four Bedroom	0	0	10
<b>130% of Median</b>	<b>40.0%</b>		
Two Bedroom/2 Bath	40	40	40
Three Bedroom	20	20	0
Four Bedroom	20	20	20
Four Bedroom	0	0	20
<b>Total Affordability Gap By Income Level</b>			
<b>70% of Median</b>			
Two Bedroom/2 Bath	\$1,688,740	\$1,420,655	N/A
Three Bedroom	\$1,834,880	\$1,593,585	\$2,248,020
Four Bedroom	N/A	N/A	\$2,420,950
Total	\$3,523,620	\$3,014,240	\$4,668,970
<b>90% of Median</b>			
Two Bedroom/2 Bath	\$2,089,836	\$1,714,517	N/A
Three Bedroom	\$2,260,132	\$1,922,319	\$2,838,528
Four Bedroom	N/A	N/A	\$3,046,330
Total	\$4,349,968	\$3,636,836	\$5,884,858
<b>110% of Median</b>			
Two Bedroom/2 Bath	\$2,758,480	\$2,222,310	N/A
Three Bedroom	\$2,972,760	\$2,490,170	\$3,799,040
Four Bedroom	N/A	N/A	\$4,067,900
Total	\$5,731,240	\$4,712,480	\$7,866,940
<b>130% of Median</b>			
Two Bedroom/2 Bath	\$4,790,960	\$3,718,620	N/A
Three Bedroom	\$5,129,520	\$4,164,340	\$6,782,080
Four Bedroom	N/A	N/A	\$7,229,800
Total	\$9,920,480	\$7,882,960	\$14,011,880
<b>Total Per Unit Affordability Gap (2)</b>			
<b>70% of Median</b>	\$35,236	\$30,142	\$46,690
<b>90% of Median</b>	\$43,500	\$36,368	\$58,849
<b>110% of Median</b>	\$57,312	\$47,125	\$78,669
<b>130% of Median</b>	\$99,205	\$78,830	\$140,119

(1) Chapter 11 requires affordable housing credits equal to 20% of the number of units or lots; the number of credits per affordable unit equals 2.0 for units at 80% AMI; 1.5 for units at 100% AMI; 1.0 for units at 120% AMI and 0.5 for units at 140% AMI for owner housing.

(2) Represents the average gap per unit across all units in the prototype, not just the affordable units.

Source: David Paul Rosen & Associates.

**Table 18**  
**Per Unit Affordability "Gap to Price"**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

<b>Prototype</b>	<b>Owner 1</b> Vertical Duplex	<b>Owner 2</b> Single-Family Detached Bungalows	<b>Owner 3</b> Single Family Detached
<b>Total Units</b>	100	100	100
<b>Per Unit Market Price</b>			
Two Bedroom	\$564,000	\$423,000	N/A
Three Bedroom	\$690,000	\$552,000	\$667,000
Four Bedroom	N/A	N/A	\$744,000
<b>Per Unit Affordable Home Price</b>			
<u>70% of Median</u>			
Two Bedroom	\$137,400	\$137,400	\$137,400
Three Bedroom	\$154,600	\$154,600	\$154,600
Four Bedroom	\$171,800	\$171,800	\$171,800
<u>90% of Median</u>			
Two Bedroom	\$198,700	\$198,700	\$198,700
Three Bedroom	\$220,800	\$220,800	\$220,800
Four Bedroom	\$238,500	\$238,500	\$238,500
<u>110% of Median</u>			
Two Bedroom	\$224,300	\$224,300	\$224,300
Three Bedroom	\$249,200	\$249,200	\$249,200
Four Bedroom	\$269,100	\$269,100	\$269,100
<u>130% of Median</u>			
Two Bedroom	\$235,600	\$235,600	\$235,600
Three Bedroom	\$265,100	\$265,100	\$265,100
Four Bedroom	\$294,500	\$294,500	\$294,500
<b>Affordability "Gap to Price" Per Unit</b>			
<u>70% of Median</u>			
Two Bedroom	\$426,600	\$285,600	N/A
Three Bedroom	\$535,400	\$397,400	\$512,400
Four Bedroom	N/A	N/A	\$572,200
Weighted Average	\$481,000	\$341,500	\$542,300
<u>90% of Median</u>			
Two Bedroom	\$365,300	\$224,300	N/A
Three Bedroom	\$469,200	\$331,200	\$446,200
Four Bedroom	N/A	N/A	\$505,500
Weighted Average	\$417,250	\$277,750	\$475,850
<u>110% of Median</u>			
Two Bedroom	\$339,700	\$198,700	N/A
Three Bedroom	\$440,800	\$302,800	\$417,800
Four Bedroom	N/A	N/A	\$474,900
Weighted Average	\$390,250	\$250,750	\$446,350
<u>130% of Median</u>			
Two Bedroom	\$328,400	\$187,400	N/A
Three Bedroom	\$424,900	\$286,900	\$401,900
Four Bedroom	N/A	N/A	\$449,500
Weighted Average	\$376,650	\$237,150	\$425,700

Source: David Paul Rosen & Associates.



## b. Renter Housing Prototypes

**Table 20** summarizes the affordable net rent calculations for the renter housing prototypes using the assumptions described above. Utility allowances are deducted from affordable gross rents to yield affordable net rents. Affordable monthly net rents range from \$546 for a one-bedroom unit affordable at 60% of area median income to \$1,235 for a three-bedroom unit at 100% of area median income.

**Table 21** shows the estimated per unit affordability “gap to cost” for the renter prototypes by unit bedroom count and income level. The gap is calculated by subtracting total development costs for the affordable units from the supportable mortgage for these units. Affordable rents are based on the income limits and affordable housing expense less current HUD utility allowances from OHCD, as described above.

Net operating income from the affordable units is calculated assuming general annual operating costs of \$3,600 per unit for the rental prototypes, excluding property taxes. These operating costs are consistent with the developer interviews. DRA calculated annual property taxes at the current 8.01 percent residential tax rate for the County of Hawai‘i, with properties assessed at their market value, assumed to equal development costs for this analysis. A vacancy allowance of five percent is deducted from rental income to compensate for the landlord’s potential loss of rental income when units become unoccupied, particularly when tenants move before a new tenant is found.

The per unit affordable mortgage is calculated from net operating income based on a debt coverage ratio of 1.25, 30-year term, and mortgage interest rate of 8.0 percent.

**Table 22** shows the estimated affordability “gap to cost” of complying with the affordable housing requirements under Chapter 11 for the renter housing prototypes. We use the per unit gap to cost for each prototype, unit bedroom count and income level and apply the number of affordable units necessary to meet the 20% credit requirement under Chapter 11. We assume a pro-rata distribution of affordable units by bedroom count compared to the market-rate units. This analysis indicates that providing units at 60% of area median income is the least costly way for developers to comply with the Chapter 11 requirements on rental units based on the current credit system.

**Table 20**  
**Rent, Utility Allowance and Affordable Rent Assumptions**  
**Kona Affordability Gap Analysis**

**Assumptions**

2006 HUD Median Income, County of Hawaii, Family of Four	\$55,300
2006 HUD Income Limit, 50% AMI, Family of Four	\$29,950
Affordable Housing Cost As a % of Income	30%

No. of Bedrooms	<b>1 Bedroom</b>	<b>2 Bedroom</b>	<b>3 Bedroom</b>	<b>4 Bedroom</b>
Household Size	1.5 Persons	3 Persons	4.5 Persons	6 Persons
Household Size Income Adjust. Factor	75%	90%	104%	116%
Renter Utility Allowance (1)	\$127	\$175	\$202	\$233

**Affordable Rents by Income Level**

60% of Median

Annual Gross Income	\$26,955	\$32,346	\$37,378	\$41,690
Affordable Monthly Housing Cost	\$673	\$808	\$934	\$1,042
Less: Monthly Utility Allowance	(\$127)	(\$175)	(\$202)	(\$233)
Affordable Monthly Rent	\$546	\$633	\$732	\$809

80% of Median

Annual Gross Income	\$35,940	\$43,128	\$49,837	\$55,587
Affordable Monthly Housing Cost	\$898	\$1,078	\$1,245	\$1,389
Less: Monthly Utility Allowance	(\$127)	(\$175)	(\$202)	(\$233)
Affordable Monthly Rent	\$771	\$903	\$1,043	\$1,156

100% of Median

Annual Gross Income	\$41,475	\$49,770	\$57,512	\$64,148
Affordable Monthly Housing Cost	\$1,036	\$1,244	\$1,437	\$1,603
Less: Monthly Utility Allowance	(\$127)	(\$175)	(\$202)	(\$233)
Affordable Monthly Rent	\$909	\$1,069	\$1,235	\$1,370

(1) County of Hawai'i utility allowances for gas cooking and water heating, and other electric.

Source: Office of Housing and Community Development, County of Hawai'i; David Paul Rosen & Associates

**Table 21  
Affordability Gap Per Affordable Unit  
Rental Housing Prototypes  
Kona Affordability Gap Analysis**

<b>Prototype</b>	<b>Renter 1 Rental Eightplex Flats</b>	<b>Renter 2 Rental Townhomes</b>	<b>Renter 3 Mixed-Use GF/Retail</b>	<b>Renter 4 Vertical Duplex</b>
<b>Per Unit Development Cost</b>				
One Bedroom	\$262,214	N/A	N/A	N/A
Two Bedroom/2 Bath	\$294,714	\$381,969	\$363,954	\$397,672
Three Bedroom	\$311,738	\$397,445	N/A	\$444,100
<b>Affordable Monthly Rent By Income</b>				
<u>60% of Median</u>				
One Bedroom	\$546	\$546	\$546	\$546
Two Bedroom/2 Bath	\$633	\$633	\$633	\$633
Three Bedroom	\$732	\$732	\$732	\$732
<u>80% of Median</u>				
One Bedroom	\$771	\$771	\$771	\$771
Two Bedroom/2 Bath	\$903	\$903	\$903	\$903
Three Bedroom	\$1,043	\$1,043	\$1,043	\$1,043
<u>100% of Median</u>				
One Bedroom	\$909	\$909	\$909	\$909
Two Bedroom/2 Bath	\$1,069	\$1,069	\$1,069	\$1,069
Three Bedroom	\$1,235	\$1,235	\$1,235	\$1,235
<b>Monthly Vacancy/Operating Costs/Unit (1) (2)</b>				
One Bedroom	\$477	N/A	N/A	N/A
Two Bedroom/2 Bath	\$499	\$558	\$546	\$568
Three Bedroom	\$510	\$568	N/A	\$600
<b>Monthly Net Operating Income/Unit (3)</b>				
<u>60% of Median</u>				
One Bedroom	\$42	N/A	N/A	N/A
Two Bedroom/2 Bath	\$102	\$44	\$56	\$33
Three Bedroom	\$185	\$127	N/A	\$96
<u>80% of Median</u>				
One Bedroom	\$255	N/A	N/A	N/A
Two Bedroom/2 Bath	\$359	\$300	\$312	\$289
Three Bedroom	\$480	\$423	N/A	\$422
<u>100% of Median</u>				
One Bedroom	\$387	N/A	N/A	N/A
Two Bedroom/2 Bath	\$517	\$458	\$470	\$447
Three Bedroom	\$663	\$605	N/A	\$573
<b>Supportable Mortgage/Unit</b>				
<u>60% of Median</u>				
One Bedroom	\$4,579	N/A	N/A	N/A
Two Bedroom/2 Bath	\$11,121	\$4,797	\$6,106	\$3,598
Three Bedroom	\$20,170	\$13,846	N/A	\$10,467
<u>80% of Median</u>				
One Bedroom	\$27,802	N/A	N/A	N/A
Two Bedroom/2 Bath	\$39,141	\$32,708	\$34,016	\$31,509
Three Bedroom	\$52,333	\$46,118	N/A	\$46,009
<u>100% of Median</u>				
One Bedroom	\$42,193	N/A	N/A	N/A
Two Bedroom/2 Bath	\$56,367	\$49,934	\$51,243	\$48,735
Three Bedroom	\$72,285	\$65,961	N/A	\$62,472
<b>Affordability Gap/Unit</b>				
<u>60% of Median</u>				
One Bedroom	\$257,635	N/A	N/A	N/A
Two Bedroom/2 Bath	\$283,593	\$377,172	\$357,848	\$394,074
Three Bedroom	\$291,568	\$383,599	N/A	\$433,633
<u>80% of Median</u>				
One Bedroom	\$234,412	N/A	N/A	N/A
Two Bedroom/2 Bath	\$255,573	\$349,261	\$329,938	\$366,163
Three Bedroom	\$259,405	\$351,327	N/A	\$398,091
<u>100% of Median</u>				
One Bedroom	\$220,021	N/A	N/A	N/A
Two Bedroom/2 Bath	\$238,347	\$332,035	\$312,711	\$348,937
Three Bedroom	\$239,453	\$331,484	N/A	\$335,200

(1) Monthly operating costs/unit: \$300

(2) Monthly property taxes/unit: 0.0675% of development cost. Based on 2006 annual tax rate of \$8.10 per \$1,000 valuation in the County of Hawai'i, with assessed valuation equal to market value, assumed to equal development cost.

(3) Equals affordable monthly rent by income category less vacancy at 5.00% less operating costs.

Source: Hawai'i County Code; Hawai'i County Real Property Tax Office; developer interviews; David Paul Rosen & Associates.

**Table 22**  
**Affordability "Gap to Cost" Under Chapter 11 By Income Level**  
**Renter Housing Prototypes**

	Renter 1	Renter 2	Renter 3	Renter 4
<b>Prototype:</b>	Rental Eightplex Flats	Rental Townhomes	Mixed-Use GF/Retail	Vertical Duplex
<b>Total Units:</b>	120	100	36	100
<b>Total Units by Bedroom Count</b>				
One Bedroom	54	0	0	0
Three Bedroom	54	80	36	50
Three Bedroom	12	20	0	50
<b>Affordable Units by BR Count &amp; Income (1)</b>				
<b>% Affordable Units</b>				
<b>60% of Median</b>	<b>10.0%</b>			
One Bedroom	12	10	4	10
One Bedroom	5	0	0	0
Three Bedroom	5	8	4	5
Three Bedroom	2	2	0	5
<b>80% of Median</b>	<b>13.3%</b>			
One Bedroom	16	14	5	14
One Bedroom	7	0	0	0
Three Bedroom	7	11	5	7
Three Bedroom	2	3	0	7
<b>100% of Median</b>	<b>20.0%</b>			
One Bedroom	24	20	7	20
One Bedroom	11	0	0	0
Three Bedroom	11	16	7	10
Three Bedroom	2	4	0	10
<b>Total Affordability Gap By Income Level</b>				
<b>60% of Median</b>				
One Bedroom	\$1,288,174	\$0	\$0	\$0
Three Bedroom	\$1,417,966	\$2,268,746	\$1,134,373	\$1,417,966
Three Bedroom	\$583,136	\$583,136	\$0	\$1,457,840
Total	\$3,289,277	\$2,851,882	\$1,134,373	\$2,875,807
<b>80% of Median</b>				
One Bedroom	\$1,640,885	N/A	N/A	N/A
Three Bedroom	\$1,789,014	\$3,841,871	\$1,649,688	\$2,563,143
Three Bedroom	\$518,810	\$1,053,980	N/A	\$2,786,635
Total	\$3,948,709	\$4,895,851	\$1,649,688	\$5,349,778
<b>100% of Median</b>				
One Bedroom	\$2,420,231	N/A	N/A	N/A
Three Bedroom	\$2,621,817	\$5,312,560	\$2,188,977	\$3,489,370
Three Bedroom	\$478,906	\$1,325,936	N/A	\$3,352,000
Total	\$5,520,954	\$6,638,496	\$2,188,977	\$6,841,370
<b>Total Per Unit Affordability Gap (2)</b>				
<b>60% of Median</b>	\$27,411	\$28,519	\$31,510	\$28,758
<b>80% of Median</b>	\$32,906	\$48,959	\$45,825	\$53,498
<b>100% of Median</b>	\$46,008	\$66,385	\$60,805	\$68,414

(1) Chapter 11 requires affordable housing credits equal to 20% of the number of units or lots; the number of credits per affordable unit equals 2.0 for units at 60% AMI; 1.5 for units at 80% AMI; 1.0 for units at 100% AMI and for renter housing.

(2) Represents the average gap per unit across all units in the prototype, not just the affordable units.

Source: David Paul Rosen & Associates.

## 6. In Lieu Fees

Chapter 11 also provides for the payment of in lieu fees. The in lieu fee for a completed for-sale unit is 25% of the actual sales price of the unit minus the affordable price for households earning 120% of area median income. For rental units that are not offered for rent, the in lieu fee is 25% of the median sales price for a single-family home in the tax map zone containing the project in the previous calendar year, minus the affordable price for households earning 120% of the area median income.

**Table 23** calculates the per unit owner in lieu fee, based on estimated market sales prices for the owner prototype units.

**Table 24** calculates the per unit renter in lieu fee, based on the median sales prices for homes on the Island of Hawai'i in June, 2006 from Hawaii Information Service.

Based on the formula in Chapter 11, measured across all units in the project, the in lieu fee per market rate unit exceeds the estimated affordability gap per unit to produce the required affordable rental or owner units. We support the County's policy, which provides an incentive for developers to provide the unit onsite rather than pay the fee. Otherwise, when developers opt to pay the fee, the County will find itself short of the capital necessary to assist in financing the production of affordable units through its selected affordable housing developer partners.

**Table 23**  
**Chapter 11 In Lieu Fee Calculation (1)**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

<b>Prototype</b>	<b>Owner 1</b>	<b>Owner 2</b>	<b>Owner 3</b>
	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units</b>	100	100	100
<b>Market Sales Price</b>			
<b>Two Bedroom</b>	\$564,000	\$423,000	N/A
<b>Three Bedroom</b>	\$690,000	\$552,000	\$667,000
<b>Four Bedroom</b>	N/A	N/A	\$744,000
<b>Affordable Sales Price @ 120% of Median (2)</b>			
<b>Two Bedroom/2 Bath</b>	\$217,500	\$217,500	\$217,500
<b>Three Bedroom</b>	\$244,700	\$244,700	\$244,700
<b>Four Bedroom</b>	\$271,900	\$271,900	\$271,900
<b>Difference Between Median and Affordable Price</b>			
<b>Two Bedroom/2 Bath</b>	\$346,500	\$205,500	N/A
<b>Three Bedroom</b>	\$445,300	\$307,300	\$422,300
<b>Four Bedroom</b>	N/A	N/A	\$472,100
<b>In-Lieu Fee Per Unit @ 25% of Difference</b>			
<b>Two Bedroom/2 Bath</b>	\$86,625	\$51,375	N/A
<b>Three Bedroom</b>	\$111,325	\$76,825	\$105,575
<b>Four Bedroom</b>	N/A	N/A	\$118,025

(1) Chapter 11 specifies that the in lieu fee for a completed for-sale housing unit equals 25% of the actual sales price for the unit minus the affordable price for households earning 120% of the median.

(2) From County of Hawai'i Office of Housing and Community Development. Prices assume a 6% interest rate for 2006, per County guidelines. Based on a household size of 2 persons for a one-bedroom unit; 3 person for a two-bedroom unit; 4 person for three-bedroom unit and 5 persons for a four-bedroom unit.

Source: David Paul Rosen & Associates

**Table 24**  
**In Lieu Fee Calculation Per Chapter 11 (1)**  
**Rental Housing Prototypes**  
**Kona Affordability Gap Analysis**

<b>Prototype</b>	<b>Renter 1 Rental Eightplex Flats</b>	<b>Renter 2 Rental Townhomes</b>	<b>Renter 3 Mixed-Use GF/Retail</b>	<b>Renter 4 Vertical Duplex</b>
<b>Total Units</b>	120	100	36	100
<b>Median Sales Price (2)</b>	\$444,500	\$444,500	\$444,500	\$444,500
<b>Affordable Sales Price @ 120% of Median (3)</b>				
<b>One Bedroom</b>	\$217,500	\$217,500	\$217,500	\$217,500
<b>Two Bedroom</b>	\$244,700	\$244,700	\$244,700	\$244,700
<b>Three Bedroom</b>	\$271,900	\$271,900	\$271,900	\$271,900
<b>Difference Between Median and Affordable Price</b>				
<b>One Bedroom</b>	\$227,000	\$227,000	\$227,000	\$227,000
<b>Two Bedroom</b>	\$199,800	\$199,800	\$199,800	\$199,800
<b>Three Bedroom</b>	\$172,600	\$172,600	\$172,600	\$172,600
<b>In-Lieu Fee Per Unit @ 25% of Difference</b>				
<b>One Bedroom</b>	\$56,750	\$56,750	\$56,750	\$56,750
<b>Two Bedroom</b>	\$49,950	\$49,950	\$49,950	\$49,950
<b>Three Bedroom</b>	\$43,150	\$43,150	\$43,150	\$43,150

- (1) Chapter 11 specifies that the in lieu fee for a rental unit equals 25% of the median sales price for a single-family home in the tax map zone containing the project in the previous calendar year, minus the affordable price for households earning 120% of the median.
- (2) Median sales prices for homes on the Island of Hawai'i in June, 2006 from Hawaii Information Service.
- (3) From County of Hawaii Office of Housing and Community Development. Assumes 6% interest rate. Assumes family of 2 for a one-bedroom; family of 3 for a two-bedroom, family of 4 for three-bedroom and family of 5 for a four-bedroom

Source: David Paul Rosen & Associates

## **E. Economic Impact of Chapter 11 Requirements**

The section assesses the potential economic impact of Chapter 11 affordable housing requirements on residential development in the County of Hawai'i.

### **1. Land Residual Analysis Methodology**

DRA used a land residual analysis methodology to model the potential economic impact of Chapter 11 affordable housing requirements on residential development in Kona and the County of Hawai'i. Land residual analysis calculates the value attributed to land from proposed development on that site. It is commonly used by real estate developers, lenders and investors to evaluate development financial feasibility and select among alternative uses for a piece of property.

The land residual methodology calculates the value of a development based on its income potential and subtracts the costs of development and developer profit to yield the underlying value of the land. When evaluating alternative land uses, the alternative that generates the highest value to a site is considered its highest and best use. An alternative that generates a negative value to the land that is negative is not financially feasible. Similarly, an alternative that generates a value to the land substantially below comparable market prices for similar parcels is likely not feasible, as landowners will likely be unwilling to sell their land at the prices developers can afford to pay.

For the rental prototypes, DRA calculated net operating income from each prototype based on estimated market and affordable rents. Net operating income is capitalized at an assumed capitalization rate of 5.0 percent.<sup>1</sup> The capitalization rate is the ratio of net operating income to project fair market value, or sales price, exhibited in the market and reflects the rate of return required by investors in rental property. Total development costs are then subtracted from the capitalized value to yield the estimated residual land value.

For the owner prototypes, DRA estimated gross sales revenues based on review of market sales data and development interviews and subtracted total development costs (which include selling costs, sales commissions, developer overhead and profit), to derive the residual value to the land.

DRA applied a land residual analysis to each of the seven renter and owner prototypes using assumed market rents and sales prices for the units. The residual land value was calculated assuming all market-rate units to determine the basic financial feasibility of the prototype given the economic assumptions employed. The land residual analysis was then calculated again incorporating the Chapter 11 affordable housing requirements to evaluate the effect of these requirements on land values.

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<sup>1</sup> Based on estimated Hawai'i multifamily capitalization rate of 4.5% to 5.5% from Colliers Monroe Friedlander, "Investment Market Report," 2006.

## 2. Assumptions

### a. Rents and Operating Costs

Rent assumptions for the rental prototypes were developed from rental listings by bedroom/bathroom count for the Kailua-Kona area. We have assumed the market rents summarized in **Table 25**.

**Table 25**  
**Estimated Market Rents for Rental Prototypes**  
**County of Hawai'i**  
**2006**

<u>Bedroom Size</u>	<u>Rent</u>
1 Bedroom/1 Bath	\$1,400
2 Bedroom/2 Bath	\$1,600 to \$1,700
3 Bedroom/2 Bath	\$1,700 to \$1,800

As in the gap analysis, we have assumed annual operating costs based on developer interviews of \$3,600 per unit, property taxes at 8.01%, and vacancy rates of 3 percent for the affordable units and 5 percent for the market-rate units.

### b. Market Home Sales Prices

Market sales prices for the owner prototypes were estimated based review of sales data for homes and condominium units sold in the North Kona area in 2006 from Hawai'i Information Service. Sales price assumptions used in the economic analysis are shown in **Table 26**.

**Table 26**  
**Estimated Market Home Sales Prices**  
**Owner Housing Prototypes**  
**Kona Affordable Housing Study**  
**2006**

Bedroom/Bath Count	Owner #1 Vertical Duplex	Owner #2 Single-Family Detached Bungalow	Owner #3 Single-Family Detached
2 BR/2 BA	\$564,000	\$423,000	N/A
3 BR	\$690,000	\$552,000	\$667,000
4 BR	N/A	N/A	\$744,000

Source: Review of sales data and prices per square foot; Hawaii Information System; David Paul Rosen & Associates.

### 3. Findings: Indicated Residual Land Values

DRA first calculated residual land values for the rental and owner housing prototypes assuming all market-rate units. The findings of the land residual analysis of 100% market-rate development are summarized in **Table 27** for the owner prototypes and in **Table 28** for the renter prototypes.

DRA then re-calculated the residual land values assuming on-site compliance with Chapter 11 affordable housing requirements. We assumed the developers complied with Chapter 11 by providing owner units at 80% of area median income and renter units at 60% of area median income. The affordability gap analysis determined that this was the lowest-cost alternative for developers to meet the Chapter 11 requirements. The findings of the land residual analysis incorporating the Chapter 11 affordability requirements are summarized in **Table 29** for the owner prototypes and in **Table 30** for the renter prototypes.

**Table 27**  
**Kona Affordability Gap Analysis**  
**Land Residual Analysis**  
**Owner Housing Prototypes**  
**100% Market Sales Prices**

	Owner 1	Owner 2	Owner 3
<b>Prototype:</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units:</b>	100	100	100
<b>Site Area (Acres)</b>	8.621	8.621	22.727
<b>Units by Bedroom Count</b>			
Two Bedroom/2 Bath	50	50	0
Three Bedroom	50	50	50
Four Bedroom	0	0	50
<b>Unit Square Footages</b>			
Two Bedroom/2 Bath	1200	900	0
Three Bedroom	1500	1200	1450
Four Bedroom	0	0	1750
<b>Per SF Market Sales Prices</b>			
Two Bedroom/2 Bath	\$470	\$470	N/A
Three Bedroom	\$460	\$460	\$460
Four Bedroom	N/A	N/A	\$425
<b>Per Unit Market Sales Prices</b>			
Two Bedroom/2 Bath	\$564,000	\$423,000	N/A
Three Bedroom	\$690,000	\$552,000	\$667,000
Four Bedroom	N/A	N/A	\$744,000
<b>Total Market Sales Income</b>			
One Bedroom	N/A	N/A	N/A
Two Bedroom/2 Bath	\$28,200,000	\$21,150,000	N/A
Three Bedroom	\$34,500,000	\$27,600,000	\$33,350,000
Four Bedroom	N/A	N/A	\$37,200,000
<b>Total Gross Sales Income</b>	\$62,700,000	\$48,750,000	\$70,550,000
<b>Commissions/Sales Costs</b> #	\$0	\$0	\$0
<b>Net Sales Proceeds</b>	\$62,700,000	\$48,750,000	\$70,550,000
<b>Total Direct Cost (1)</b>	\$42,336,193	\$37,242,410	\$55,509,708
<b>Residual Land Value</b>	\$20,363,807	\$11,507,590	\$15,040,292
<b>Land Value Per Unit</b>	\$203,638	\$115,076	\$150,403
<b>Land Value Per Square Foot</b>	\$54.23	\$30.64	\$15.19

(1) Includes sales commissions and selling/closing costs, excludes land.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service; David Paul Rosen & Associates.

**Table 28  
Kona Affordability Gap Analysis  
Land Residual Analysis, 100% Market Rate Housing  
Rental Prototypes**

	Renter 1	Renter 2	Renter 3	Renter 4
<b>Prototype</b>	Eightplex Flats	Townhomes	Mixed-Use	Vertical Duplex
<b>Units by Bedroom Count</b>				
<b>Total</b>	120	100	36	100
<b>One Bedroom</b>	54	0	0	0
<b>Two Bedroom/2 Bath</b>	54	80	36	50
<b>Three Bedroom</b>	12	20	0	50
<b>Site Area (Acres)</b>	11.009	5.556	0.620	8.621
<b>Per Unit Monthly Market Rent</b>				
<b>Monthly Rent Per Square Foot</b>				
One Bedroom	\$2.56	N/A	N/A	N/A
Two Bedroom/2 Bath	\$2.16	\$1.74	\$2.06	\$1.67
Three Bedroom	\$2.01	\$1.76	N/A	\$1.47
<b>Monthly Rent Per Unit</b>				
One Bedroom	\$1,600	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,800	\$2,000	\$1,800	\$2,000
Three Bedroom	\$1,900	\$2,200	N/A	\$2,200
<b>Monthly Operating Costs/Unit (1) (2)</b>				
One Bedroom	\$477	N/A	N/A	N/A
Two Bedroom/2 Bath	\$499	\$558	\$546	\$568
Three Bedroom	\$510	\$568	N/A	\$600
<b>Monthly Net Operating Income/Unit (3)</b>				
One Bedroom	\$1,043	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,211	\$1,342	\$1,164	\$1,332
Three Bedroom	\$1,295	\$1,522	N/A	\$1,490
<b>Total Annual Net Operating Income</b>				
<b>One Bedroom</b>	\$675,868	N/A	N/A	N/A
<b>Two Bedroom/2 Bath</b>	\$784,772	\$1,288,484	\$502,991	\$798,943
<b>Three Bedroom</b>	\$186,419	\$365,214	N/A	\$894,140
<b>Total Annual Net Operating Income</b>	\$1,647,059	\$1,653,698	\$502,991	\$1,693,082
<b>Capitalized Value @ 5.00%</b>	\$32,941,175	\$33,073,960	\$10,059,820	\$33,861,647
<b>Total Direct Cost (Except Land)</b>	\$30,214,990	\$35,506,408	\$12,022,357	\$39,088,606
<b>Indicated Land Value</b>	\$2,726,185	(\$2,432,448)	(\$1,962,537)	(\$5,226,960)
<b>Indicated Land Value Per Unit</b>	\$22,718	(\$24,324)	(\$54,515)	(\$52,270)
<b>Indicated Land Value Per Square Foot</b>	\$5.68	(\$10.05)	(\$72.67)	(\$13.92)

- (1) Monthly operating costs/unit: \$300  
(2) Monthly property taxes/unit: 0.0675% of development cost. Based on 2006 annual property tax rate of \$8.10 per \$1,000 valuation in the County of Hawaii, with assessed valuation equal to market value, assumed to equal development cost.  
(3) Equals affordable monthly rent by income category less 5.00% vacancy rates less operating costs.

Source: Hawai'i County Code; Hawai'i County Real Property Tax Office; developer interviews; David Paul Rosen & Associates

**Table 29**  
**Kona Affordability Gap Analysis**  
**Land Residual Analysis with Chapter 11 Requirements**  
**Owner Housing Prototypes**

	Owner 1	Owner 2	Owner 3
Prototype:	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
Site Area (Acres)	8.621	8.621	22.727
Total Units Before Density Bonus	100	100	100
Total Unist With Density Bonus	110	110	110
<b>Total Units by Bedroom Count</b>			
Two Bedroom/2 Bath	50	50	0
Three Bedroom	50	50	50
Four Bedroom	0	0	50
<b>Affordable Units By Bedroom Count</b>			
70% AMI 10.0%			
Two Bedroom/2 Bath	5	5	0
Three Bedroom	5	5	5
Four Bedroom	0	0	5
<b>Unit Square Footages</b>			
One Bedroom	0	0	0
Two Bedroom/2 Bath	1200	900	0
Three Bedroom	1500	1200	1450
Four Bedroom	0	0	1750
<b>Per SF Market Sales Prices</b>			
Two Bedroom/2 Bath	\$470	\$470	N/A
Three Bedroom	\$460	\$460	\$460
Four Bedroom	N/A	N/A	\$425
<b>Per Unit Market Sales Prices</b>			
Two Bedroom/2 Bath	\$564,000	\$423,000	N/A
Three Bedroom	\$690,000	\$552,000	\$667,000
Four Bedroom	N/A	N/A	\$744,000
<b>Sales Income: Market Units</b>			
Two Bedroom/2 Bath	\$25,380,000	\$19,035,000	N/A
Three Bedroom	\$31,050,000	\$24,840,000	\$30,015,000
Four Bedroom	N/A	N/A	\$33,480,000
<b>Subtotal Sales Income: Market Units</b>	<u>\$56,430,000</u>	<u>\$43,875,000</u>	<u>\$63,495,000</u>
<b>Sales Income: Affordable Units</b>			
Two Bedroom/2 Bath	\$773,000	\$773,000	\$0
Three Bedroom	\$859,000	\$859,000	\$859,000
Four Bedroom	\$0	\$0	\$927,500
<b>Subtotal Sales Income: Afford. Units</b>	<u>\$1,632,000</u>	<u>\$1,632,000</u>	<u>\$1,786,500</u>
<b>Total Sales Income</b>	\$58,062,000	\$45,507,000	\$65,281,500
<b>Total Direct Cost (1)</b>	\$42,336,193	\$37,242,410	\$55,509,708
<b>Residual Land Value</b>	\$15,725,807	\$8,264,590	\$9,771,792
<b>Land Value Per Unit</b>	\$157,258	\$82,646	\$97,718
<b>Land Value Per Square Foot</b>	\$41.88	\$22.01	\$9.87

(1) Includes sales commissions and selling/closing costs, excludes land.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service; David Paul Rosen & Associates.

**Table 30  
Kona Affordability Gap Analysis  
Land Residual Analysis with Chapter 11 Requirements  
Rental Prototypes**

	Renter 1	Renter 2	Renter 3	Renter 4
<b>Prototype</b>	<b>Eightplex Flats</b>	<b>Townhomes</b>	<b>Mixed-Use</b>	<b>Vertical Duplex</b>
<b>Site Area (Acres)</b>	11.009	5.556	0.620	8.621
<b>Total Units by Bedroom Count</b>	120	100	36	100
One Bedroom	54	0	0	0
Two Bedroom/2 Bath	54	80	36	50
Three Bedroom	12	20	0	50
<b>Affordable Units by Bedroom Count</b>				
<b>60% of Median</b> <b>10.0%</b>	12	10	4	10
One Bedroom	5	0	0	0
Two Bedroom/2 Bath	5	8	4	5
Three Bedroom	2	2	0	5
<b>Per Unit Monthly Market Rent</b>				
<b>Monthly Rent Per Unit</b>				
One Bedroom	\$1,400	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,600	\$1,700	\$1,600	\$1,700
Three Bedroom	\$1,700	\$1,800	N/A	\$1,800
<b>Monthly Operating Costs/Unit (1) (2)</b>				
One Bedroom	\$477	N/A	N/A	N/A
Two Bedroom/2 Bath	\$499	\$558	\$546	\$568
Three Bedroom	\$510	\$568	N/A	\$600
<b>Monthly Net Operating Income/Unit (3)</b>				
One Bedroom	\$853	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,021	\$1,057	\$974	\$1,047
Three Bedroom	\$1,105	\$1,142	N/A	\$1,110
<b>Annual Net Operating Income</b>				
<b>Market Rate Units</b>				
One Bedroom	\$501,567	N/A	N/A	N/A
Two Bedroom/2 Bath	\$600,388	\$913,396	\$374,143	\$565,149
Three Bedroom	\$132,549	\$246,613	N/A	\$599,526
<b>Total NOI: Market-Rate Units</b>	<b>\$1,234,504</b>	<b>\$1,160,008</b>	<b>\$374,143</b>	<b>\$1,164,674</b>
<b>Affordable Units</b>				
One Bedroom	\$2,520	N/A	N/A	N/A
Two Bedroom/2 Bath	\$6,120	\$4,224	\$2,688	\$1,980
Three Bedroom	\$4,440	\$3,048	N/A	\$5,760
<b>Total NOI: Affordable Units</b>	<b>\$13,080</b>	<b>\$7,272</b>	<b>\$2,688</b>	<b>\$7,740</b>
<b>Total Annual Net Operating Income</b>	<b>\$1,247,584</b>	<b>\$1,167,280</b>	<b>\$376,831</b>	<b>\$1,172,414</b>
<b>Capitalized Value @ 5.00%</b>	<b>\$24,951,690</b>	<b>\$23,345,604</b>	<b>\$7,536,622</b>	<b>\$23,448,282</b>
<b>Total Direct Cost (Except Land)</b>	<b>\$30,214,990</b>	<b>\$35,506,408</b>	<b>\$12,022,357</b>	<b>\$39,088,606</b>
<b>Indicated Land Value</b>	<b>(\$5,263,300)</b>	<b>(\$12,160,804)</b>	<b>(\$4,485,734)</b>	<b>(\$15,640,324)</b>
<b>Indicated Land Value Per Unit</b>	<b>(\$43,861)</b>	<b>(\$121,608)</b>	<b>(\$124,604)</b>	<b>(\$156,403)</b>
<b>Indicated Land Value Per Square Foot</b>	<b>(\$10.98)</b>	<b>(\$50.25)</b>	<b>(\$166.09)</b>	<b>(\$41.65)</b>

- (1) Monthly operating costs/unit: \$300  
(2) Monthly property taxes/unit: 0.0675% of development cost. Based on 2006 annual property tax rate of \$8.10 per \$1,000 valuation in the County of Hawaii, with assessed valuation equal to market value.  
(3) Equals affordable monthly rent by income category less 5.00% vacancy rates less operating costs.

Source: Hawaii County Code; Hawaii County Real Property Tax Office; developer interviews; David Paul Rosen & Associates.

## F. Estimated Value of Potential Economic Incentives

DRA estimated the potential value of economic incentives that may be offered to offset the costs of complying with affordable housing requirements. The potential cost savings from the following incentives is calculated for the seven housing prototypes, as appropriate:

- Density bonus;
- Reduction in parking requirements;
- Reduction in residential street widths;
- Fee deferrals;
- Reduction in processing time;
- Affordable unit comparability standards.

For each incentive, cost savings have been measured as a total dollar amount, per building square foot and per dwelling unit for each prototype. Per square foot and per unit measures are calculated across all of the dwelling units in the project (not just the affordable units).

We also recalculate the land residual analysis, incorporating the cost savings from the above incentives, to evaluate the economic impact of the incentives on the housing prototypes.

### 1. Density Bonus

Under Chapter 11, any project that fulfills its affordable housing requirement by constructing affordable dwelling units for sale or rent is entitled to a density bonus increasing the total number of residential units that may be constructed on the site by 10% and decreasing the minimum lot size by 10%, compared to the allowable number of units and minimum lot size established by the zoning code. By spreading the costs of land acquisition over a larger number of units, the density bonus can reduce per unit total development costs of the residential units.

The estimated development cost savings that could be achieved through the 10% density bonus for the housing prototypes were estimated by subtracting the estimated development cost for the projects with the density bonus from the costs for the baseline prototype,

**Tables 31** and **32** describe the owner and renter housing prototypes, respectively, with the 10% density bonus.

**Tables 33** and **34** summarize the development cost and financing cost assumptions for the owner and renter housing prototypes, respectively, with the 10% density bonus.

**Table 31  
Owner Housing Prototype Projects With 10% Density Bonus  
Kona Affordability Gap Analysis**

	Owner 1	Owner 2	Owner 3
<b>PROTOTYPE</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Density Bonus Percent:</b>	<b>10%</b>	<b>10%</b>	<b>10%</b>
<b>Total Unit Count</b>			
<b>Original</b>	100 Units	100 Units	100 Units
<b>With Density Bonus</b>	110 Units	110 Units	110 Units
<b>Product Type</b>			
<b>Original</b>	Hillside Duplex 2 Stories	Single-Family Det. 1 Story	Single-Family Det. 1 Story
<b>With Density Bonus</b>	Hillside Duplex 2 Stories	Single-Family Det. 1 Story	Single-Family Det. 1 Story
<b>Construction Type</b>			
<b>Original</b>	Type V	Type V	Type V
<b>With Density Bonus</b>	Type V	Type V	Type V
<b>Density (DU's/Acre)</b>			
<b>Original</b>	11.6	11.6	4.4
<b>With Density Bonus</b>	12.8	12.8	4.8
<b>Land Area (Acres)</b>	8.621 Acres	8.621 Acres	22.727 Acres
<b>BR Count w/ Dens. Bon.</b>			
<b>Lofts</b>	0	0	0
<b>One Bedroom</b>	0	0	0
<b>Two Bedroom/2 Bath</b>	55	55	0
<b>Three Bedroom</b>	55	55	55
<b>Four Bedroom</b>	0	0	55
<b>Unit Size (Net SF)</b>			
<b>One Bedroom</b>	0	0	0
<b>Two Bedroom/2 Bath</b>	1,200	900	0
<b>Three Bedroom</b>	1,500	1,200	1,450
<b>Four Bedroom</b>	0	0	1,750
<b>Ave. (Exclud. Mgr's)</b>	1,350	1,050	1,600
<b>Total Net Bldg. Sq. Feet</b>			
<b>Original</b>	135,000	105,000	160,000
<b>With Density Bonus</b>	148,500	115,500	176,000
<b>Type of Parking</b>	Carport	Detached Garage	Attached Garage
<b>No. of Parking Spaces</b>			
<b>Original</b>	150	150	200
<b>With Density Bonus</b>	165	165	220

Source: David Paul Rosen & Associates.

**Table 32**  
**Rental Housing Prototype Projects With 10% Density Bonus**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	<b>Renter 1</b> Rental Eightplex Flats	<b>Renter 2</b> Rental Townhomes	<b>Renter 3</b> Mixed-Use GF/Retail	<b>Renter 4</b> Vertical Duplex
<b>Density Bonus Percent:</b>	<b>10%</b>	<b>10%</b>	<b>10%</b>	<b>10%</b>
<b>Total Unit Count</b>				
<b>Original</b>	120 Units	100 Units	36 Units	100 Units
<b>With Density Bonus</b>	132 Units	110 Units	40 Units	110 Units
<b>Density (DU's/Acre)</b>				
<b>Original</b>	10.9	18.0	58.1	11.6
<b>With Density Bonus</b>	12.0	19.8	64.5	12.8
<b>Land Area (Acres)</b>	11.009 Acres	5.556 Acres	0.620 Acres	8.621 Acres
<b>BR Count w/ Dens. Bon.</b>				
<b>One Bedroom</b>	59	0	0	0
<b>Two Bedroom/2 Bath</b>	59	88	40	55
<b>Three Bedroom</b>	14	22	0	55
<b>Unit Size (Net SF)</b>				
<b>One Bedroom</b>	625	0	0	0
<b>Two Bedroom/2 Bath</b>	835	1,150	875	1,200
<b>Three Bedroom</b>	945	1,250	0	1,500
<b>Average</b>	752	1,170	875	1,360
<b>Total Net Bldg. Sq. Feet</b>				
<b>Original</b>	90,180	117,000	31,500	136,000
<b>With Density Bonus</b>	99,370	128,700	35,000	149,500
<b>No. of Parking Spaces</b>				
<b>Original</b>	210	175	45	200
<b>With Density Bonus</b>	231	193	50	220

Source: David Paul Rosen & Associates

**Table 33**  
**Development and Financing Cost Assumptions**  
**Owner Housing Prototypes with Density Bonus**  
**Kona Affordability Gap Analysis**

	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
<b>Development Cost Assumptions</b>			
Infrastructure/Site Improve. Costs (Cost Per Unit)	\$80,000	\$77,000	\$117,000
<b>Hard Construction Costs</b>			
Unit Construction Costs per Net SF	\$130.00	\$145.00	\$145.00
Total Hard Constr. Cost per Net SF	\$130.00	\$145.00	\$145.00
Hard Cost Contingency (% of Site Improvement and Unit Hard Costs)	5%	5%	5%
Architectural/Engineering (% of Unit Hard Construction Costs)	7%	3%	3%
Property Taxes During Construction (% of Unit Hard Costs)	4.05%	4.05%	4.05%
Insurance (% TDC)	2.00%	2.00%	2.00%
Selling/Closing Costs (% TDC)	5.00%	5.00%	5.00%
Sales Commissions (% TDC)	1.00%	1.00%	1.00%
Developer Overhead/General Conditions (% TDC)	4.00%	4.00%	4.00%
Developer Profit (% TDC Exclud. Land)	12.00%	12.00%	12.00%
<b>Fees</b>			
Fair Share Assessments (Per Unit)	\$9,761	\$9,761	\$9,761
Sewer Connection Fees (Per Unit)	\$1,000	\$1,000	\$1,000
Water Connection Fees (Per Unit)	\$5,000	\$5,000	\$5,000
<b>Construction Loan</b>			
Construction Loan % of TDC	85.00%	85.00%	85.00%
Constr. Loan Amt.	\$39,555,833	\$34,793,146	\$51,873,070
Interest Rate	8.50%	8.50%	8.50%
Loan Fees	1.00%	1.00%	1.00%
Average Loan Balance--Construction	60.00%	60.00%	60.00%
Development Period	12 Months	12 Months	12 Months
Total Construction Loan Term	12 Months	12 Months	12 Months
Construction Loan Interest	\$2,017,347	\$1,774,450	\$2,645,527
Construction Loan Points	\$395,558	\$347,931	\$518,731

Source: David Paul Rosen & Associates.

**Table 34**  
**Development and Financing Cost Assumptions**  
**Rental Prototypes with 10% Density Bonus**  
**Kona Affordability Gap Analysis**

	<b>Renter 1 Rental Eightplex Flats</b>	<b>Renter 2 Rental Townhomes</b>	<b>Renter 3 Mixed-Use GF/Retail</b>	<b>Renter 4 Vertical Duplex</b>
<b>Development Cost Assumptions</b>				
Infrastructure/Site Improve. Costs Per Unit	\$60,000	\$75,000	\$70,000	\$75,000
Hard Construction Costs (Incl. GC Fee)				
Unit Construction Costs per Net SF	\$130.00	\$130.00	\$160.00	\$130.00
Hard Cost Contingency (% Site Improvement and Unit Hard Costs)	5.00%	5.00%	5.00%	5.00%
Architectural/Engineering (% Unit Hard Construction Costs)	7.00%	7.00%	7.00%	7.00%
Property Taxes During Construction (% Unit Hard Costs)	4.05%	4.05%	4.05%	4.05%
Insurance During Construction (% TDC)	2.00%	2.00%	2.00%	2.00%
Marketing/Leasing/Start-Up (Per Unit)	\$1,000	\$1,000	\$1,000	\$1,000
Developer Overhead (% TDC)	4.00%	4.00%	4.00%	4.00%
Developer Profit (% TDC)	12.00%	12.00%	12.00%	12.00%
<b>Fees</b>				
Fair Share Assessments (Per Unit)	\$9,761	\$9,761	\$9,761	\$9,761
Sewer Connection Fees (Per Unit)	\$5,000	\$5,000	\$5,000	\$5,000
Water Connection Fees (Per Unit)	\$1,000	\$1,000	\$1,000	\$1,000
<b>Construction Loan</b>				
Construction Loan As a % of TDC	75.00%	75.00%	75.00%	75.00%
Construction Loan Amount	\$24,764,606	\$29,079,316	\$9,915,482	\$32,155,697
Interest Rate	8.50%	8.50%	8.50%	8.50%
Loan Fees	1.00%	1.00%	1.00%	1.00%
Average Loan Balance (Constr/Lease-Up)	\$247,646	\$290,793	\$99,155	\$321,557
Construction Period	60.00%	60.00%	60.00%	60.00%
Lease-Up Period	12 Months	12 Months	12 Months	12 Months
Total Construction Loan Term	3 Months	3 Months	3 Months	3 Months
Construction Loan Interest	15 Months	15 Months	15 Months	15 Months
	\$1,578,744	\$1,853,806	\$632,112	\$2,049,926
<b>Permanent Loan</b>				
Debt Coverage Ratio	1.25	1.25	1.25	1.25
Mortgage Term	30 years	30 years	30 years	30 years
Interest Rate	8.00%	8.00%	8.00%	8.00%

Source: David Paul Rosen & Associates

**Table 35**  
**Estimated Prototype Development Costs with 10% Density Bonus**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
Site Area (Acres)	8.621	8.621	22.727
No. of Units	110	110	110
Net Square Feet Living Area	148,500	115,500	176,000
INFRASTRUCTURE/SITE IMPROVE.	\$8,800,000	\$8,470,000	\$12,870,000
UNIT CONSTR. HARD COSTS/G.C. FEE	\$19,305,000	\$16,747,500	\$25,520,000
HARD COST CONTINGENCY	\$965,250	\$837,375	\$1,276,000
ARCH./ENG./CONSTR. SUPERVISION	\$1,351,350	\$502,425	\$765,600
FAIR SHARE ASSESSMENTS (1)	\$1,073,710	\$1,073,710	\$1,073,710
SEWER CONNECTION FEES	\$110,000	\$110,000	\$110,000
WATER CONNECTION FEES	\$550,000	\$550,000	\$550,000
CONSTRUCTION LOAN FEES	\$395,558	\$347,931	\$518,731
CONSTRUCTION INTEREST	\$2,017,347	\$1,774,450	\$2,645,527
ENVIRONMENTAL PHASE I	\$7,500	\$7,500	\$7,500
SOILS TESTING	\$10,000	\$10,000	\$10,000
PROPERTY TAXES	\$781,853	\$678,274	\$1,033,560
INSURANCE	\$930,725	\$818,662	\$1,220,543
SALES COMMISSIONS	\$465,363	\$409,331	\$610,271
SELLING/CLOSING COSTS	\$2,326,814	\$2,046,656	\$3,051,357
DEVELOPER OVERHEAD	\$1,861,451	\$1,637,325	\$2,441,086
DEVELOPER PROFIT	\$5,584,353	\$4,911,974	\$7,323,257
<b>TOTAL DEVELOP. COST W/O LAND</b>	<b>\$46,536,274</b>	<b>\$40,933,113</b>	<b>\$61,027,141</b>
PER UNIT	\$423,057	\$372,119	\$554,792
PER SF	\$313.38	\$354.40	\$346.75
<b>LAND ACQUISITION COSTS</b>	<b>\$7,500,000</b>	<b>\$7,500,000</b>	<b>\$7,500,000</b>
<b>TOTAL PROJECT COSTS W/ LAND</b>	<b>\$54,036,274</b>	<b>\$48,433,113</b>	<b>\$68,527,141</b>
<b>COST PER UNIT WITH DENSITY BONUS</b>	<b>\$491,239</b>	<b>\$440,301</b>	<b>\$622,974</b>
<b>COST PER UNIT WITHOUT DENSITY BONUS</b>	<b>\$498,362</b>	<b>\$447,424</b>	<b>\$630,097</b>
<b>COSTS SAVINGS FROM DENSITY BONUS</b>	<b>\$7,123</b>	<b>\$7,123</b>	<b>\$7,123</b>

Source: David Paul Rosen & Associates

**Table 36**  
**Estimated Prototype Development Costs**  
**Rental Housing Prototypes with 10% Density Bonus**  
**Kona Affordability Gap Analysis**

	Renter 1 Rental Eightplex Flats	Renter 2 Rental Townhomes	Renter 3 Mixed-Use GF/Retail	Renter 4 Vertical Duplex
Acres	11.009	5.556	0.620	8.621
Number of Units with Density Bonus	132	110	40	110
Net Square Feet Living Area	99,370	128,700	35,000	149,500
BACKBONE INFRASTRUCTURE	\$7,920,000	\$8,250,000	\$2,800,000	\$8,250,000
UNIT HARD CONSTR. COSTS/GC FEES	\$12,918,100	\$16,731,000	\$5,600,000	\$19,435,000
HARD COST CONTINGENCY	\$645,905	\$836,550	\$280,000	\$971,750
ARCH./ENG./CONSTR. SUPERVISION	\$904,267	\$1,171,170	\$392,000	\$1,360,450
FAIR SHARE ASSESSMENTS (1)	\$1,288,452	\$1,073,710	\$390,440	\$1,073,710
SEWER CONNECTION FEES	\$660,000	\$550,000	\$200,000	\$550,000
WATER CONNECTION FEES	\$132,000	\$110,000	\$40,000	\$110,000
ALTA SURVEY	\$7,500	\$7,500	\$7,500	\$7,500
ENVIRONMENTAL PHASE I	\$7,500	\$7,500	\$7,500	\$7,500
SOILS TESTING	\$10,000	\$10,000	\$10,000	\$10,000
CONSTRUCTION LOAN FEES	\$226,612	\$266,298	\$90,168	\$293,165
CONSTRUCTION/LEASE-UP INTEREST	\$1,444,654	\$1,697,650	\$574,819	\$1,868,924
PROPERTY INSURANCE	\$660,389	\$775,448	\$264,413	\$857,485
PROPERTY TAXES DURING CONSTR.	\$653,979	\$847,007	\$283,500	\$983,897
CONSTR. LOAN TITLE AND CLOSING	\$30,000	\$30,000	\$30,000	\$30,000
APPRAISAL FEES	\$10,000	\$10,000	\$10,000	\$10,000
LEGAL	\$60,000	\$60,000	\$60,000	\$60,000
MARKET STUDY/CONSULTING	\$25,000	\$25,000	\$25,000	\$25,000
MARKETING/LEASE-UP/START-UP	\$132,000	\$110,000	\$40,000	\$110,000
DEVELOPER OVERHEAD	\$1,320,779	\$1,550,897	\$528,826	\$1,714,971
DEVELOPER PROFIT	\$3,962,337	\$4,652,690	\$1,586,477	\$5,144,912
<b>TOTAL PROJECT COSTS W/O LAND</b>	<b>\$33,019,475</b>	<b>\$38,772,421</b>	<b>\$13,220,642</b>	<b>\$42,874,263</b>
TOTAL COST PER UNIT	\$250,148	\$352,477	\$330,516	\$389,766
TOTAL COST PER GROSS SQUARE FOOT	\$332.29	\$301.26	\$377.73	\$286.78
<b>LAND ACQUISITION</b>	<b>\$3,600,000</b>	<b>\$3,000,000</b>	<b>\$1,080,000</b>	<b>\$3,000,000</b>
<b>TOTAL PROJECT COSTS W/ LAND</b>	<b>\$36,619,475</b>	<b>\$41,772,421</b>	<b>\$14,300,642</b>	<b>\$45,874,263</b>
<b>COST PER UNIT WITH DENSITY BONUS</b>	<b>\$277,420</b>	<b>\$379,749</b>	<b>\$357,516</b>	<b>\$417,039</b>
<b>COST PER UNIT WITHOUT DENSITY BONUS</b>	<b>\$281,792</b>	<b>\$385,064</b>	<b>\$363,954</b>	<b>\$420,886</b>
<b>COSTS SAVINGS FROM DENSITY BONUS</b>	<b>\$4,371</b>	<b>\$5,315</b>	<b>\$6,438</b>	<b>\$3,847</b>

Source: David Paul Rosen & Associates

**Table 37**  
**Kona Affordability Gap Analysis**  
**Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus**  
**Owner Housing Prototypes**

	Owner 1	Owner 2	Owner 3
Prototype:	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
Site Area (Acres)	8.621	8.621	22.727
Total Units Before Density Bonus	100	100	100
Total Unist With Density Bonus	110	110	110
<b>Total Units by Bedroom Count</b>			
Two Bedroom/2 Bath	55	55	0
Three Bedroom	55	55	55
Four Bedroom	0	0	55
<b>Affordable Units By Bedroom Count</b>			
80% AMI			
Two Bedroom/2 Bath	5	5	0
Three Bedroom	5	5	5
Four Bedroom	0	0	5
<b>Unit Square Footages</b>			
One Bedroom	0	0	0
Two Bedroom/2 Bath	1200	900	0
Three Bedroom	1500	1200	1450
Four Bedroom	0	0	1750
<b>Per SF Market Sales Prices</b>			
Two Bedroom/2 Bath	\$480	\$470	N/A
Three Bedroom	\$470	\$460	\$460
Four Bedroom	N/A	N/A	\$400
<b>Per Unit Market Sales Prices</b>			
Two Bedroom/2 Bath	\$576,000	\$423,000	N/A
Three Bedroom	\$705,000	\$552,000	\$667,000
Four Bedroom	N/A	N/A	\$700,000
<b>Sales Income: Market Units</b>			
Two Bedroom/2 Bath	\$28,800,000	\$21,150,000	N/A
Three Bedroom	\$35,250,000	\$27,600,000	\$33,350,000
Four Bedroom	N/A	N/A	\$35,000,000
<b>Subtotal Sales Income: Market Units</b>	<b>\$64,050,000</b>	<b>\$48,750,000</b>	<b>\$68,350,000</b>
<b>Sales Income: Affordable Units</b>			
Two Bedroom/2 Bath	\$773,000	\$773,000	\$0
Three Bedroom	\$859,000	\$859,000	\$859,000
Four Bedroom	\$0	\$0	\$927,500
<b>Subtotal Sales Income: Afford. Units</b>	<b>\$1,632,000</b>	<b>\$1,632,000</b>	<b>\$1,786,500</b>
<b>Total Sales Income</b>	<b>\$65,682,000</b>	<b>\$50,382,000</b>	<b>\$70,136,500</b>
<b>Total Direct Cost (1)</b>	<b>\$46,536,274</b>	<b>\$40,933,113</b>	<b>\$61,027,141</b>
<b>Residual Land Value</b>	<b>\$17,513,726</b>	<b>\$7,816,887</b>	<b>\$7,322,859</b>
<b>Land Value Per Unit</b>	<b>\$175,137</b>	<b>\$78,169</b>	<b>\$73,229</b>
<b>Land Value Per Square Foot</b>	<b>\$46.64</b>	<b>\$20.82</b>	<b>\$7.40</b>

(1) Includes sales commissions and selling/closing costs, excludes land.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service;

**Table 38**  
**Kona Affordability Gap Analysis**  
**Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus**  
**Rental Prototypes**

	Renter 1	Renter 2	Renter 3	Renter 4
Prototype	Eightplex Flats	Townhomes	Mixed-Use	Vertical Duplex
<b>Site Area (Acres)</b>	11.009	5.556	0.620	8.621
<b>Total Units Before Density Bonus</b>	120	100	36	100
<b>Total Units with 10% Density Bonus</b>	132	110	40	110
One Bedroom	59	0	0	0
Two Bedroom/2 Bath	59	88	40	55
Three Bedroom	14	22	0	55
<b>Affordable Units by Bedroom Count</b>				
<b>60% of Median</b> <b>10.0%</b>	12	10	4	10
One Bedroom	5	0	0	0
Two Bedroom/2 Bath	5	8	4	5
Three Bedroom	2	2	0	5
<b>Per Unit Monthly Market Rent</b>				
<b>Monthly Rent Per Unit</b>				
One Bedroom	\$1,400	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,600	\$1,700	\$1,600	\$1,700
Three Bedroom	\$1,700	\$1,800	N/A	\$1,800
<b>Monthly Operating Costs/Unit (1) (2)</b>				
One Bedroom	\$477	N/A	N/A	N/A
Two Bedroom/2 Bath	\$499	\$558	\$546	\$568
Three Bedroom	\$510	\$568	N/A	\$600
<b>Monthly Net Operating Income/Unit (3)</b>				
One Bedroom	\$853	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,021	\$1,057	\$974	\$1,047
Three Bedroom	\$1,105	\$1,142	N/A	\$1,110
<b>Annual Net Operating Income</b>				
<b>Market Rate Units</b>				
One Bedroom	\$552,748	N/A	N/A	N/A
Two Bedroom/2 Bath	\$661,652	\$1,014,884	\$420,911	\$627,943
Three Bedroom	\$159,059	\$274,014	N/A	\$666,140
<b>Total NOI: Market-Rate Units</b>	<b>\$1,373,459</b>	<b>\$1,288,898</b>	<b>\$420,911</b>	<b>\$1,294,082</b>
<b>Affordable Units</b>				
One Bedroom	\$2,520	N/A	N/A	N/A
Two Bedroom/2 Bath	\$6,120	\$4,224	\$2,688	\$1,980
Three Bedroom	\$4,440	\$3,048	N/A	\$5,760
<b>Total NOI: Affordable Units</b>	<b>\$13,080</b>	<b>\$7,272</b>	<b>\$2,688</b>	<b>\$7,740</b>
<b>Total Annual Net Operating Income</b>	<b>\$1,386,539</b>	<b>\$1,296,170</b>	<b>\$423,599</b>	<b>\$1,301,822</b>
<b>Capitalized Value @ 5.00%</b>	<b>\$27,730,775</b>	<b>\$25,923,400</b>	<b>\$8,471,980</b>	<b>\$26,036,447</b>
<b>Total Direct Cost (Except Land)</b>	<b>\$33,019,475</b>	<b>\$38,772,421</b>	<b>\$13,220,642</b>	<b>\$42,874,263</b>
<b>Indicated Land Value</b>	<b>(\$5,288,700)</b>	<b>(\$12,849,021)</b>	<b>(\$4,748,662)</b>	<b>(\$16,837,816)</b>
<b>Indicated Land Value Per Unit</b>	<b>(\$40,066)</b>	<b>(\$116,809)</b>	<b>(\$118,717)</b>	<b>(\$153,071)</b>
<b>Indicated Land Value Per Square Foot</b>	<b>(\$11.03)</b>	<b>(\$53.09)</b>	<b>(\$175.83)</b>	<b>(\$44.84)</b>

(1) Monthly operating costs/unit: \$300  
(2) Monthly property taxes/unit: 0.0675% of development cost. Based on current annual property tax rate of \$8.10 per \$1,000 valuation in the County of Hawaii, with assessed valuation equal to market value.  
(3) Equals affordable monthly rent by income category less 5.00% vacancy rates less operating costs.

**Table 39**  
**Estimated Cost Savings from Reduced Parking Requirements**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	<b>Owner 1</b>	<b>Owner 2</b>	<b>Owner 3</b>
	<b>Vertical Duplex</b>	<b>Single-Family Detached Bungalows</b>	<b>Single Family Detached</b>
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Units by BR Count</b>			
<b>One Bedroom</b>	0	0	0
<b>Two Bedroom/2 Bath</b>	50	50	0
<b>Three Bedroom</b>	50	50	50
<b>Four Bedroom</b>	0	0	50
<b>Existing Parking Requirements (Spaces Per Unit)</b>			
<b>One Bedroom</b>	2	2	2
<b>Two Bedroom/2 Bath</b>	2	2	2
<b>Three Bedroom</b>	2	2	2
<b>Four Bedroom</b>	2	2	2
<b>Reduced Parking Requirements (Spaces Per Unit)</b>			
<b>One Bedroom</b>	1	1	1
<b>Two Bedroom/2 Bath</b>	1	1	1
<b>Three Bedroom</b>	2	2	2
<b>Four Bedroom</b>	2	2	2
<b>Parking Savings (Total Spaces)</b>	50	50	0
<b>One Bedroom</b>	0	0	0
<b>Two Bedroom/2 Bath</b>	50	50	0
<b>Three Bedroom</b>	0	0	0
<b>Four Bedroom</b>	0	0	0
<b>Parking Type</b>	Carport	Detached Garage	Attached Garage
<b>Construction Cost Per Space</b>	\$1,000	\$10,000	\$8,000
<b>Total Constr. Cost Savings</b>	\$50,000	\$500,000	\$0
Savings Per Unit	\$500	\$5,000	\$0

Source: David Paul Rosen & Associates.

**Table 40**  
**Estimated Cost Savings from Reduced Parking Requirements**  
**Rental Housing Prototypes**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	<b>Renter 1</b> Rental Eightplex Flats	<b>Renter 2</b> Rental Townhomes	<b>Renter 3</b> Mixed-Use GF/Retail	<b>Renter 4</b> Vertical Duplex
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Units by BR Count</b>				
<b>One Bedroom</b>	54	0	0	0
<b>Two Bedroom/1 Bath</b>	0	0	0	0
<b>Two Bedroom/2 Bath</b>	54	80	36	50
<b>Three Bedroom</b>	12	20	0	50
<b>Existing Parking Requirements</b> (Spaces Per Unit)				
<b>Lofts</b>	1.25	1.25	1.25	1.25
<b>One Bedroom</b>	1.25	1.25	1.25	1.25
<b>Two Bedroom/1 Bath</b>	1.25	1.25	1.25	1.25
<b>Two Bedroom/2 Bath</b>	1.25	1.25	1.25	1.25
<b>Three Bedroom</b>	1.25	1.25	1.25	1.25
<b>Reduced Parking Requirements</b> (Spaces Per Unit)				
<b>Lofts</b>	1	1	1	1
<b>One Bedroom</b>	1	1	1	1
<b>Two Bedroom/1 Bath</b>	1	1	1	1
<b>Two Bedroom/2 Bath</b>	1	1	1	1
<b>Three Bedroom</b>	1	1	1	1
<b>Parking Savings (Total Spaces)</b>	31	25	0	26
<b>One Bedroom</b>	14	0	0	0
<b>Two Bedroom/1 Bath</b>	0	0	0	0
<b>Two Bedroom/2 Bath</b>	14	20	0	13
<b>Three Bedroom</b>	3	5	0	13
<b>Parking Type</b>	Open	Garage	Open	Open
<b>Construction Cost Per Space</b>	\$1,000	\$5,000	\$1,000	\$1,000
<b>Land Area Saved Per Space (SF)</b>	320	320	320	320
<b>Land Cost Per SF</b>	\$7.51	\$12.40	\$39.99	\$7.99
<b>Construction Cost Savings</b>	\$31,000	\$125,000	\$0	\$26,000
<b>Land Cost Savings</b>	\$74,469	\$99,166	\$0	\$66,466
<b>Total Cost Savings</b>	\$105,469	\$224,166	\$0	\$92,466
Savings Per Unit	\$879	\$2,242	\$0	\$925

Source: David Paul Rosen & Associates

**Table 41**  
**Estimated Potential Cost Savings from Reduced Street Width**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	Owner 2 Single-Family Detached Bungalows	Owner 3 Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units
<b>Assumed Street Width Reduction (Linear Feet)</b>	10	10
<b>Street Width Reduction Per Lot (Linear Feet)</b>	5	5
<b>Assumed Average Lot Width (Linear Feet)</b>	60	60
<b>Total Savings in Paved Area (Square Feet)</b>	30,000	30,000
<b>Street Paving Cost Per Square Foot</b>	\$3.25	\$3.25
<b>Total Cost Savings</b>	\$97,500	\$97,500
Savings Per Unit	\$975	\$975

Source: David Paul Rosen & Associates.

**Tables 35 and 36** estimate the total development costs for the owner and renter housing prototypes, respectively, with the 10% density bonus, and shows the per unit cost savings from the bonus.

**Tables 37 and 38** present the land residual analysis of the prototypes with the 10% density bonus for the owner and renter housing prototypes, respectively.

## **2. Reduction in Parking Requirements**

DRA prepared estimates of the cost savings that could be achieved in three areas of zoning code items thought to influence the cost of housing development. The development cost requires owner housing to provide 2 parking spaces per unit and renter housing to provide 1.25 parking spaces per unit. For the owner prototypes, we estimated the cost savings from reducing the required number of parking spaces from two spaces per unit to one space per unit on the one- and two-bedroom units only. For the renter prototypes, we estimated the cost savings from reducing the required number of parking spaces from 1.25 spaces per unit to 1 space per unit for all unit sizes.

It should be noted that, due to marketing considerations, developers might not want to incorporate parking reductions. In fact, the rental housing prototypes are modeled with a greater number of parking spaces than required based on interviews with local developers as to the parking ratios they use in developing rental housing. For the single-family detached prototypes, parking reductions may not provide an economic advantage, unless they permit a reduction of lot size and increase in density.

**Tables 39 and 40** show the estimated cost savings from reduced parking requirements for the owner and renter prototypes, respectively.

## **3. Reduction in Residential Street Widths**

DRA estimated the cost savings from reducing residential street widths by 10 feet for Owner Prototype #4, single-family detached homes on 10,000 square foot lots. Estimated cost savings for this prototype are presented in **Table 41**.

## **4. Development Fee Deferrals**

**Tables 42 and 43** present the estimated cost savings for the owner and renter prototypes, respectively, from the deferral of fair share assessments from the time of building permit to certificate of occupancy based on the reduction in interest carry over the construction period.

## 5. Affordable Unit Comparability Standards

One way to reduce the costs of providing affordable units is to allow certain differences between the affordable units and market-rate units, keeping the outside design of the units indistinguishable. The estimated cost savings achieved through allowing differences between the affordable and market-rate units include the following items:

- Reduction in the size of affordable units to minimum unit sizes. The square footage of affordable units is assumed to be reduced from market unit sizes to minimums of 540 square feet for a one-bedroom; 750 square feet for a two-bedroom; 1,000 square feet for a three-bedroom; and 1,100 square feet for a four-bedroom. **Tables 44** and **45** show estimated cost savings from reduction in affordable unit sizes for the owner and renter prototypes, respectively.
- Reduction of the number of bathrooms in the affordable units. The number of bathrooms is assumed to be reduced by one (from two baths to one bath) in two-bedroom/two-bath and three-bedroom units. **Tables 46** and **47** display the estimated cost savings for the owner and renter prototypes, respectively.
- Reduction in the quality of interior finishes in the affordable units. DRA has modeled a \$10 per square foot reduction in development costs in the affordable units due to an assumed lower grade of interior finishes. This assumption is based on the estimated cost difference in (modest) owner and renter finishes provided through developer interviews. **Tables 48** and **49** estimate the cost savings for the owner and renter prototypes, respectively.
- Alternative product types for the affordable units. Substituting higher density product types can reduce the cost of providing affordable units, especially for low-density market rate product types. DRA has modeled the potential cost savings from providing either vertical duplex units (Prototype #1) or single-family detached bungalows (Prototype #2) instead of the affordable units required for the single-family detached homes on 10,000 square foot lots (Prototype #3). **Table 50** estimates the cost savings.

## 6. Summary of Cost Savings and Economic Impact of Incentives

**Tables 51** and **52** summarize the cost savings from offsets and incentives, including the 10% density bonus, for the owner and renter prototypes, respectively.

**Tables 53** and **54** recalculate the land residual analysis for the owner and renter prototypes, respectively, from a combination of potential cost savings measures including a 10% density bonus, reduction in affordable unit sizes and interior finish quality, and deferral of fair share assessments.

**Tables 55** and **56** summarize the results of the land residual analysis for the owner and renter prototypes, respectively, under a range of different scenarios, including 100% market-rate units, compliance with Chapter 11 requirements, and with incentives.

**Table 43**  
**Estimated Potential Cost Savings from Development Fee Deferrals**  
**Rental Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

	Renter 1	Renter 2	Renter 3	Renter 4
<b>PROTOTYPE</b>	Rental Eightplex Flats	Rental Townhomes	Mixed-Use GF/Retail	Vertical Duplex
<b>BASELINE PROTOTYPES</b>				
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Est. Development Impact Fees to be Deferred (Fair Share Assess.)</b>	\$1,171,320	\$976,100	\$351,396	\$976,100
<b>Current Fee Payment Schedule</b>	Building Permit	Building Permit	Building Permit	Building Permit
<b>Deferred Payment Schedule</b>	Certificate of Occupancy	Certificate of Occupancy	Certificate of Occupancy	Certificate of Occupancy
<b>Length of Deferral</b>	15 Months	15 Months	15 Months	15 Months
<b>Construction Loan Interest Rate</b>	8.50%	8.50%	8.50%	8.50%
<b>Interest Savings from Deferral Savings Per Unit</b>	\$124,453 \$1,037	\$103,711 \$1,037	\$37,336 \$1,037	\$103,711 \$1,037
<b>PROTOTYPES WITH 10% DENSITY BONUS</b>				
<b>Total Unit Count</b>	132 Units	110 Units	40 Units	110 Units
<b>Est. Development Impact Fees to be Deferred</b>	\$1,288,452	\$1,073,710	\$390,440	\$1,073,710
<b>Current Fee Payment Schedule</b>	Building Permit	Building Permit	Building Permit	Building Permit
<b>Deferred Payment Schedule</b>	Certificate of Occupancy	Certificate of Occupancy	Certificate of Occupancy	Certificate of Occupancy
<b>Length of Deferral</b>	15 Months	15 Months	15 Months	15 Months
<b>Construction Loan Interest Rate</b>	8.50%	8.50%	8.50%	8.50%
<b>Interest Savings from Deferral Savings Per Unit</b>	\$136,898 \$1,037	\$114,082 \$1,037	\$41,484 \$1,037	\$114,082 \$1,037

Source: David Paul Rosen & Associates

**Table 42**  
**Estimated Potential Cost Savings from Development Fee Deferrals**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

	Owner 1	Owner 2	Owner 3
<b>PROTOTYPE</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Est. Development Impact Fees to be Deferred (Fair Share Assess.)</b>	\$976,100	\$976,100	\$976,100
<b>Current Fee Payment Schedule</b>	Building Permit	Building Permit	Building Permit
<b>Deferred Payment Schedule</b>	Certificate of Occupancy	Certificate of Occupancy	Certificate of Occupancy
<b>Length of Deferral</b>	12 Months	12 Months	12 Months
<b>Construction Loan Interest Rate</b>	8.50%	8.50%	8.50%
<b>Interest Savings from Deferral</b>	\$82,969	\$82,969	\$82,969
Savings Per Unit	\$830	\$830	\$830

Source: David Paul Rosen & Associates.

## 5. Affordable Unit Comparability Standards

One way to reduce the costs of providing affordable units is to allow certain differences between the affordable units and market-rate units, keeping the outside design of the units indistinguishable. The estimated cost savings achieved through allowing differences between the affordable and market-rate units include the following items:

- Reduction in the size of affordable units to minimum unit sizes. The square footage of affordable units is assumed to be reduced from market unit sizes to minimums of 540 square feet for a one-bedroom; 750 square feet for a two-bedroom; 1,000 square feet for a three-bedroom; and 1,100 square feet for a four-bedroom. **Tables 44** and **45** show estimated cost savings from reduction in affordable unit sizes for the owner and renter prototypes, respectively.
- Reduction of the number of bathrooms in the affordable units. The number of bathrooms is assumed to be reduced by one (from two baths to one bath) in two-bedroom/two-bath and three-bedroom units. **Tables 46** and **47** display the estimated cost savings for the owner and renter prototypes, respectively.
- Reduction in the quality of interior finishes in the affordable units. DRA has modeled a \$10 per square foot reduction in development costs in the affordable units due to an assumed lower grade of interior finishes. This assumption is based on the estimated cost difference in (modest) owner and renter finishes provided through developer interviews. **Tables 48** and **49** estimate the cost savings for the owner and renter prototypes, respectively.
- Alternative product types for the affordable units. Substituting higher density product types can reduce the cost of providing affordable units, especially for low-density market rate product types. DRA has modeled the potential cost savings from providing either vertical duplex units (Prototype #1) or single-family detached bungalows (Prototype #2) instead of the affordable units required for the single-family detached homes on 10,000 square foot lots (Prototype #3). **Table 50** estimates the cost savings.

## 6. Summary of Cost Savings and Economic Impact of Incentives

**Tables 51** and **52** summarize the cost savings from offsets and incentives, including the 10% density bonus, for the owner and renter prototypes, respectively.

**Tables 53** and **54** recalculate the land residual analysis for the owner and renter prototypes, respectively, from a combination of potential cost savings measures including a 10% density bonus, reduction in affordable unit sizes and interior finish quality, and deferral of fair share assessments.

**Table 44**  
**Cost Savings from Reduction in Affordable Unit Sizes**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

	Owner 1	Owner 2	Owner 3
<b>PROTOTYPE</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Market Unit (Net SF)</b>			
<b>Two Bedroom</b>	1,200	900	N/A
<b>Three Bedroom</b>	1,500	1,200	1,450
<b>Four Bedroom</b>	N/A	N/A	1,750
<b>BMR Unit Min. (Net SF)</b>			
<b>Two Bedroom</b>	725	725	725
<b>Three Bedroom</b>	1,000	1,000	1,000
<b>Four Bedroom</b>	1,100	1,100	1,100
<b>Total Development Costs</b>	\$279	\$261	\$256
<b>Less Fixed Costs Per SF (1)</b>			
<b><u>Chapter 11 Requirements: 80% AMI</u></b>			
<b>Total Affordable Units</b>	10	10	10
<b>Two Bedroom</b>	5	5	0
<b>Three Bedroom</b>	5	5	5
<b>Four Bedroom</b>	0	0	5
<b>Net Savings--Sq. Feet</b>	4,875	1,875	5,500
<b>Total Cost Savings</b>	\$1,357,815	\$488,496	\$1,410,146
<b>Cost Savings Per Unit</b>	\$13,578	\$4,885	\$14,101

(1) Excludes fixed costs that do not vary based on square footage or total development costs, such as environmental Phase I, soils testing, water and sewer fees.

Source: David Paul Rosen & Associates.

**Table 45**  
**Cost Savings from Reduction in Affordable Unit Sizes**  
**Rental Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	Renter 1 Rental Eightplex Flats	Renter 2 Rental Townhomes	Renter 3 Mixed-Use GF/Retail	Renter 4 Vertical Duplex
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Market Unit (Net SF)</b>				
<b>One Bedroom</b>	625	0	0	0
<b>Two Bedroom/2 Bath</b>	835	1,150	875	1,200
<b>Three Bedroom</b>	945	1,250	0	1,500
<b>BMR Unit Min. (Net SF)</b>				
<b>One Bedroom</b>	540	540	540	540
<b>Two Bedroom/2 Bath</b>	725	725	725	725
<b>Three Bedroom</b>	900	900	900	900
<b>Total Development Costs Less Fixed Costs Per SF (1)</b>	\$291.47	\$266.43	\$313.02	\$238.87
<b><u>Chapter 11 Requirements: 60% AMI</u></b>				
<b>Total Affordable Units</b>	12	10	4	10
<b>One Bedroom</b>	5	0	0	0
<b>Two Bedroom/2 Bath</b>	5	8	4	5
<b>Three Bedroom</b>	2	2	0	5
<b>Net Savings--Sq. Feet</b>	1,065	4,100	600	5,375
<b>Total Cost Savings</b>	\$310,412	\$1,092,379	\$187,814	\$1,283,906
<b>Cost Savings Per Unit</b>	\$2,587	\$10,924	\$5,217	\$12,839

(1) Excludes fixed costs that do not vary based on square footage or total development costs, including environmental, legal, marketing, audit, closing, water and sewer fees.

Source: David Paul Rosen & Associates

**Table 46**  
**Cost Savings from Reduction in Affordable Unit Bathroom Count**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

	Owner 1	Owner 2	Owner 3
<b>PROTOTYPE</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Sq. Feet Per Bathroom</b>	75	75	75
<b>Total Development Costs Less Fixed Costs Per SF (1)</b>	\$278.53	\$260.53	\$256.39
<b>Chapter 11 Requirements: 80% AMI</b>			
<b>Total Affordable Units</b>	10	10	10
<b>One Bedroom</b>	0	0	0
<b>Two Bedroom</b>	5	5	0
<b>Three Bedroom</b>	5	5	5
<b>Four Bedroom</b>	0	0	5
<b>Total Cost Savings (2)</b>	\$208,895	\$195,398	\$96,146
<b>Cost Savings Per Unit (All Units)</b>	\$2,089	\$1,954	\$961

- (1) Excludes fixed costs that do not vary based on square footage or total development costs, such as environmental Phase I, soils testing, sewer and park fees.
- (2) Assumes number of bathrooms may be reduced by one (from two baths to one bath) in two-bedroom and three-bedroom affordable units.

Source: David Paul Rosen & Associates.

**Table 47**  
**Cost Savings from Reduction in Affordable Unit Bathroom Count**  
**Rental Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	Renter 1 Rental Eightplex Flats	Renter 2 Rental Townhomes	Renter 3 Mixed-Use GF/Retail	Renter 4 Vertical Duplex
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Sq. Feet Per Bathroom</b>	50	50	50	50
<b>Total Development Costs Less Fixed Costs Per SF (1)</b>	\$291.47	\$266.43	\$313.02	\$238.87
<b><u>Chapter 11 Requirements: 60% AMI</u></b>				
<b>Total Affordable Units</b>	12	10	4	10
<b>One Bedroom</b>	5	0	0	0
<b>Two Bedroom/2 Bath</b>	5	8	4	5
<b>Three Bedroom</b>	2	2	0	5
<b>Reduction in Bathrooms in Affordable Units</b>	7	10	4	10
<b>Two Bedroom/2 Bath</b>	5	8	4	5
<b>Three Bedroom</b>	2	2	0	5
<b>Total Cost Savings (2)</b>	\$102,013	\$133,217	\$62,605	\$119,433
<b>Cost Savings Per Unit (All Units)</b>	\$850	\$1,332	\$1,739	\$1,194

(1) Excludes fixed costs that do not vary directly with square footage, including environmental, legal, marketing, audit, closing, and sewer fees.

(2) Assumes number of bathrooms may be reduced by one (from two baths to one bath) in two-bedroom/two-bath and three-bedroom affordable units.

Source: David Paul Rosen & Associates.

**Table 48**  
**Cost Savings from Reduction in Affordable Unit Interior Finish Quality**  
**Owner Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

	Owner 1	Owner 2	Owner 3
<b>PROTOTYPE</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units	100 Units
<b>Est. Red. In Interior Finish Costs Per SF</b>	\$10.00	\$10.00	\$10.00
<b><u>Chapter 11 Requirements: 80% AMI</u></b>			
<b>Total Affordable Units</b>	10	10	10
<b>Two Bedroom</b>	5	5	0
<b>Three Bedroom</b>	5	5	5
<b>Four Bedroom</b>	0	0	5
<b>Unit Size (SF)</b>			
<b>Two Bedroom</b>	1,200	900	0
<b>Three Bedroom</b>	1,500	1,200	1,450
<b>Four Bedroom</b>	0	0	1,750
<b>Total SF of Affordable Units</b>			
<b>Two Bedroom</b>	6,000	4,500	0
<b>Three Bedroom</b>	7,500	6,000	7,250
<b>Four Bedroom</b>	0	0	8,750
<b>Total SF</b>	13,500	10,500	16,000
<b>Total Cost Savings</b>	\$135,000	\$105,000	\$160,000
<b>Cost Savings Per Unit</b>	\$1,350	\$1,050	\$1,600

Source: David Paul Rosen & Associates.

**Table 49**  
**Cost Savings from Reduction in Affordable Interior Finish Quality**  
**Rental Housing Prototype Projects**  
**Kona Affordability Gap Analysis**

<b>PROTOTYPE</b>	Renter 1 Rental Eightplex Flats	Renter 2 Rental Townhomes	Renter 3 Mixed-Use GF/Retail	Renter 4 Vertical Duplex
<b>Total Unit Count</b>	120 Units	100 Units	36 Units	100 Units
<b>Est. Red. In Interior Finish Costs Per SF</b>	\$10.00	\$10.00	\$10.00	\$10.00
<b><u>Chapter 11 Requirements: 60% AMI</u></b>				
<b>Total Affordable Units</b>	12	10	4	10
<b>One Bedroom</b>	5	0	0	0
<b>Two Bedroom/2 Bath</b>	5	8	4	5
<b>Three Bedroom</b>	2	2	0	5
<b>Square Feet Per Unit</b>				
<b>One Bedroom</b>	625	0	0	0
<b>Two Bedroom/2 Bath</b>	835	1,150	875	1,200
<b>Three Bedroom</b>	945	1,250	0	1,500
<b>Total SF of Afford. Units</b>				
<b>One Bedroom</b>	3,125	0	0	0
<b>Two Bedroom/2 Bath</b>	4,175	9,200	3,500	6,000
<b>Three Bedroom</b>	1,890	2,500	0	7,500
<b>Total SF</b>	9,190	11,700	3,500	13,500
<b>Total Cost Savings</b>	\$91,900	\$117,000	\$35,000	\$135,000
<b>Cost Savings Per Unit</b>	\$766	\$1,170	\$972	\$1,350

Source: Developer interviews; David Paul Rosen & Associates

**Table 50**  
**Estimated Potential Cost Savings from Alternative Product Type**  
**Provision of Duplex or Bungalows for Single-Family Detached on 10,000 SF Lots**  
**Kona Affordability Gap Analysis**

<b>ORIGINAL PROTOTYPE:</b>	Owner 3 Single Family Detached	Owner 3 Single Family Detached
<b>Total Unit Count</b>	100 Units	100 Units
<b>Affordable Units Required Under Chapter 11</b> <u>70% AMI</u> <span style="float: right;"><b>10.00%</b></span>		
Two Bedroom/2 Bath	0	0
Three Bedroom	5	5
Four Bedroom	5	5
<b>Total Development Cost Per Unit</b>		
Two Bedroom/2 Bath	N/A	N/A
Three Bedroom	\$604,204	\$604,204
Four Bedroom	\$655,990	\$655,990
<b>ALTERNATIVE COMPLIANCE PROTOTYPE:</b>	Owner 1 Vertical Duplex	Owner 2 Single-Family Detached Bungalows
<b>Total Development Cost Per Unit</b>		
Two Bedroom/2 Bath	\$475,148	\$421,531
Three Bedroom	\$521,576	\$473,317
Four Bedroom	N/A	N/A
<b>COST SAVINGS FROM ALTERNATIVE PRODUCT TYPE</b>		
<b>Assumed Affordable Units Provided</b>		
Two Bedroom/2 Bath	0	0
Three Bedroom	10	10
Four Bedroom	N/A	N/A
<b>Per Unit Development Cost Savings</b>		
Two Bedroom/2 Bath	N/A	N/A
Three Bedroom	\$82,628	\$130,887
Four Bedroom	N/A	N/A
<b>TOTAL COST SAVINGS FROM ALTERNATIVE PRODUCT TYPE</b>		
Two Bedroom/2 Bath	N/A	N/A
Three Bedroom	\$826,280	\$1,308,870
Four Bedroom	N/A	N/A
Total	<u>\$826,280</u>	<u>\$1,308,870</u>
<b>PER UNIT COST SAVINGS (ALL UNITS)</b>	\$8,263	\$13,089

Source: David Paul Rosen & Associates.

**Table 51**  
**Total Economic Value of Incentives**  
**Owner Housing Prototypes**  
**Kona Affordability Gap Analysis**

	<b>Owner 1 Vertical Duplex</b>	<b>Owner 2 Single-Family Detached Bungalows</b>	<b>Owner 3 Single Family Detached</b>
Acres	8.621	8.621	22.727
Number of Units (Baseline)	100	100	100
Net Square Feet Living Area	135,000	105,000	160,000
<b>POTENTIAL COST SAVINGS FROM DENSITY BONUS</b>			
Total Development Cost Per Unit without Density Bonus	\$498,362	\$447,424	\$630,097
Total Development Cost Per Unit with Density Bonus	\$491,239	\$440,301	\$622,974
Cost Savings Per Unit	\$7,123	\$7,123	\$7,123
Total Cost Savings from Density Bonus	<b>\$712,307</b>	<b>\$712,307</b>	<b>\$712,307</b>
<b>POTENTIAL COST SAVINGS FROM OTHER INCENTIVES</b>			
Reduction in Affordable Unit Sizes (1)	\$1,357,815	\$488,496	\$1,410,146
Reduction in Affordable Unit Bathroom Count (2)	\$208,895	\$195,398	\$96,146
Reduction in Affordable Interior Finish Quality (3)	\$135,000	\$105,000	\$160,000
Reduced Parking Requirements (4)	\$50,000	\$500,000	\$0
Fee Deferral (5)	\$82,969	\$82,969	\$82,969
<b>Total</b>	<b>\$1,834,678</b>	<b>\$1,371,863</b>	<b>\$1,749,261</b>
<b>Per Unit (All Units)</b>	<b>\$18,347</b>	<b>\$13,719</b>	<b>\$17,493</b>
<b>POTENTIAL TOTAL COST SAVINGS</b>			
<b>(DENSITY BONUS PLUS OTHER INCENTIVES)</b>	<b>\$2,546,985</b>	<b>\$2,084,170</b>	<b>\$2,461,568</b>
<b>Per Unit (All Units)</b>	<b>\$25,470</b>	<b>\$20,842</b>	<b>\$24,616</b>

(1) Based on reduction in unit sizes of affordable units to the following minimum unit sizes: one-bedroom--540 SF two-bedroom--725 SF; three-bedroom--1,000 SF.

(2) Assumes number of bathrooms may be reduced by one (from two baths to one bath) in two-bedroom/two-bath three-bedroom affordable units.

(3) Assumes \$10.00 per square foot reduction in interior finish costs.

(4) Assumes reduction in the parking requirement of 1 space per unit on one- and two-bedroom units.

(5) Assumes deferral of development impact fee payment from start of construction to certificate of occupancy.

Source: David Paul Rosen & Associates

**Table 52**  
**Total Economic Value of Incentives**  
**Rental Housing Prototypes**  
**Kona Affordability Gap Analysis**

	<b>Renter 1</b>	<b>Renter 2</b>	<b>Renter 3</b>	<b>Renter 4</b>
	<b>Eightplex Flats</b>	<b>Townhomes</b>	<b>GF/Retail</b>	<b>Duplex</b>
Acres	11.009	5.556	0.620	8.621
Number of Units (Baseline)	120	100	36	100
Net Square Feet Living Area	90,180	117,000	31,500	135,000
Total Gross Square Feet	100,200	130,000	37,059	160,000
<b>POTENTIAL COST SAVINGS FROM DENSITY BONUS</b>				
Total Development Cost Per Unit without Density Bonus	\$281,792	\$385,064	\$363,954	\$420,886
Total Development Cost Per Unit with Density Bonus	\$277,420	\$379,749	\$357,516	\$417,039
Cost Savings Per Unit	\$4,371	\$5,315	\$6,438	\$3,847
Total Cost Savings from Density Bonus	<b>\$524,558</b>	<b>\$531,480</b>	<b>\$231,779</b>	<b>\$384,731</b>
<b>POTENTIAL COST SAVINGS FROM OTHER INCENTIVES</b>				
Reduction in Affordable Unit Sizes (1)	\$310,412	\$1,092,379	\$187,814	\$1,283,906
Reduction in Affordable Unit Bathroom Count (2)	\$102,013	\$133,217	\$62,605	\$119,433
Reduction in Affordable Interior Finish Quality (3)	\$91,900	\$117,000	\$35,000	\$135,000
Reduction in Parking Requirements (4)	\$105,469	\$224,166	\$0	\$92,466
Deferral of Fees (5)	\$124,453	\$103,711	\$37,336	\$103,711
<b>Total Savings</b>	<b>\$734,248</b>	<b>\$1,670,472</b>	<b>\$322,755</b>	<b>\$1,734,516</b>
<b>Total Savings Per Unit (All Units)</b>	<b>\$6,119</b>	<b>\$16,705</b>	<b>\$8,965</b>	<b>\$17,345</b>
<b>POTENTIAL TOTAL COST SAVINGS</b>				
<b>(DENSITY BONUS PLUS OTHER INCENTIVES)</b>	<b>\$1,258,806</b>	<b>\$2,201,952</b>	<b>\$554,534</b>	<b>\$2,119,247</b>
<b>Per Unit (All Units)</b>	<b>\$10,490</b>	<b>\$22,020</b>	<b>\$15,404</b>	<b>\$21,192</b>

(1) Based on reduction in unit sizes of affordable units to the following minimum unit sizes: one-bedroom--540 SF; two-bedroom--725 SF; three-bedroom--1,000 SF.

(2) Assumes number of bathrooms may be reduced by one (from two baths to one bath) in two-bedroom/two-bath and three-bedroom affordable units.

(3) Assumes \$10.00 per square foot reduction in interior finish costs.

(4) Assumes reduction in the parking requirement of 0.25 spaces per unit.

(5) Assumes deferral of development impact fee payment from start of construction to certificate of occupancy. Represents a deferral of 15 months.

Source: David Paul Rosen & Associates

**Table 53  
Land Residual Analysis  
Owner Housing Prototypes with 10% Density Bonus, Fee Deferral and Affordable Unit Design Modifications  
Chapter 11 Requirements Met with Units Affordable @ 80% AMI**

	Owner 1	Owner 2	Owner 3
<b>Prototype:</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units:</b>	110	110	110
<b>Inclusionary Units:</b> 70% AMI	10.0%	10	10
<b>Per Unit Market Sales Prices</b>			
Two Bedroom/2 Bath	\$564,000	\$423,000	N/A
Three Bedroom	\$690,000	\$552,000	\$667,000
Four Bedroom	N/A	N/A	\$744,000
<b>Total Units by Bedroom Count with 10% Density Bonus</b>			
Two Bedroom/2 Bath	55	55	0
Three Bedroom	55	55	55
Four Bedroom	0	0	55
<b>Affordable Units By Bedroom Count</b> 70% AMI	10.0%		
Two Bedroom/2 Bath	5	5	0
Three Bedroom	5	5	5
Four Bedroom	0	0	5
<b>Total Market Sales Prices with Density Bonus</b>			
Two Bedroom/2 Bath	\$28,200,000	\$21,150,000	\$0
Three Bedroom	\$34,500,000	\$27,600,000	\$33,350,000
Four Bedroom	\$0	\$0	\$37,200,000
Gross Sales Income, Market Units	\$62,700,000	\$48,750,000	\$70,550,000
Gross Sales Income, Inclusionary Units (1)	\$1,632,000	\$1,632,000	\$1,786,500
<b>Total Gross Sales</b>	\$64,332,000	\$50,382,000	\$72,336,500
<b>Total Direct Cost Except Land with Density Bonus (2)</b>	\$46,536,274	\$40,933,113	\$61,027,141
<b>Less: Fee Deferral Cost Savings</b>	\$82,969	\$82,969	\$82,969
<b>Less: Afford. Unit Design Modif. Savings (3)</b>	\$1,492,815	\$593,496	\$1,570,146
<b>Less: Cost Savings from Alternative Product Type (4)</b>	N/A	N/A	\$1,308,870
<b>Net Direct Cost Except Land</b>	\$44,960,491	\$40,256,648	\$58,065,156
<b>Residual Land Value</b>	\$19,371,509	\$10,125,352	\$14,271,344
<b>Land Value Per Unit</b>	\$176,105	\$92,049	\$129,739
<b>Land Value Per Square Foot</b>	\$51.58	\$26.96	\$14.42

(1) Assumes inclusionary units are sold at an affordable housing cost (including mortgage principal interest, taxes, insurance, homeowners association dues and utilities) to a household earning 80% of area median , adjusted for household size.

(2) Includes sales commissions and selling/closing costs.

(3) Includes reduction in affordable unit square footages and grade of interior finishes.

(4) Assumes the affordable units are three-bedroom single-family detached bungalows.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service; David Paul Rosen & Associates.

**Table 54**  
**Land Residual Analysis**  
**Rental Housing Prototypes with Chapter 11 Requirements**  
**10% Density Bonus, Fee Deferral and Affordable Unit Design Modifications**  
**Chapter 11 Requirements Met with Units Affordable @ 60% AMI**

	Renter 1	Renter 2	Renter 3	Renter 4
Prototype	Eightplex Flats	Townhomes	Mixed-Use	Vertical Duplex
<b>Site Area (Acres)</b>	11.009	5.556	0.620	8.621
<b>Total Units Before Density Bonus</b>	120	100	36	100
<b>Total Units with 10% Density Bonus</b>	132	110	40	110
One Bedroom	59	0	0	0
Two Bedroom/2 Bath	59	88	40	55
Three Bedroom	14	22	0	55
<b>Affordable Units by Bedroom Count</b>				
<b>60% of Median</b> 10.0%	12	10	4	10
One Bedroom	5	0	0	0
Two Bedroom/2 Bath	5	8	4	5
Three Bedroom	2	2	0	5
<b>Per Unit Monthly Market Rent</b>				
<b>Monthly Rent Per Unit</b>				
One Bedroom	\$1,400	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,600	\$1,700	\$1,600	\$1,700
Three Bedroom	\$1,700	\$1,800	N/A	\$1,800
<b>Monthly Operating Costs/Unit (1) (2)</b>				
One Bedroom	\$477	N/A	N/A	N/A
Two Bedroom/2 Bath	\$499	\$558	\$546	\$568
Three Bedroom	\$510	\$568	N/A	\$600
<b>Monthly Net Operating Income/Unit (3)</b>				
One Bedroom	\$853	N/A	N/A	N/A
Two Bedroom/2 Bath	\$1,021	\$1,057	\$974	\$1,047
Three Bedroom	\$1,105	\$1,142	N/A	\$1,110
<b>Annual Net Operating Income</b>				
<b>Market Rate Units</b>				
One Bedroom	\$552,748	N/A	N/A	N/A
Two Bedroom/2 Bath	\$661,652	\$1,014,884	\$420,911	\$627,943
Three Bedroom	\$159,059	\$274,014	N/A	\$666,140
<b>Total NOI: Market-Rate Units</b>	<b>\$1,373,459</b>	<b>\$1,288,898</b>	<b>\$420,911</b>	<b>\$1,294,082</b>
<b>Affordable Units</b>				
One Bedroom	\$2,520	N/A	N/A	N/A
Two Bedroom/2 Bath	\$6,120	\$4,224	\$2,688	\$1,980
Three Bedroom	\$4,440	\$3,048	N/A	\$5,760
<b>Total NOI: Affordable Units</b>	<b>\$13,080</b>	<b>\$7,272</b>	<b>\$2,688</b>	<b>\$7,740</b>
<b>Total Annual Net Operating Income</b>	<b>\$1,386,539</b>	<b>\$1,296,170</b>	<b>\$423,599</b>	<b>\$1,301,822</b>
<b>Capitalized Value @ 5.00%</b>	<b>\$27,730,775</b>	<b>\$25,923,400</b>	<b>\$8,471,980</b>	<b>\$26,036,447</b>
<b>Total Direct Cost (Except Land)</b>	<b>\$33,019,475</b>	<b>\$38,772,421</b>	<b>\$13,220,642</b>	<b>\$42,874,263</b>
<b>Less: Fee Deferral Cost Savings</b>	<b>\$1,037</b>	<b>\$1,037</b>	<b>\$1,037</b>	<b>\$1,037</b>
<b>Less: Afford. Unit Design Modif. Savings (4)</b>	<b>\$402,312</b>	<b>\$1,209,379</b>	<b>\$222,814</b>	<b>\$1,418,906</b>
<b>Net Direct Cost Except Land</b>	<b>\$32,616,126</b>	<b>\$37,562,005</b>	<b>\$12,996,791</b>	<b>\$41,454,319</b>
<b>Indicated Land Value</b>	<b>(\$4,885,350)</b>	<b>(\$11,638,605)</b>	<b>(\$4,524,810)</b>	<b>(\$15,417,872)</b>
<b>Indicated Land Value Per Unit</b>	<b>(\$37,010)</b>	<b>(\$105,805)</b>	<b>(\$113,120)</b>	<b>(\$140,162)</b>
<b>Indicated Land Value Per Square Foot</b>	<b>(\$10.19)</b>	<b>(\$48.09)</b>	<b>(\$167.54)</b>	<b>(\$41.06)</b>

(1) Monthly operating costs/unit: \$300  
(2) Monthly property taxes/unit: 0.0675% of development cost. Based on current annual property tax rate of \$8.10 per \$1,000 valuation in the County of Hawaii, with assessed valuation equal to market value.  
(3) Equals affordable monthly rent by income category less 5.00% vacancy rates less operating costs.  
(4) Includes reduction in affordable unit square footages and grade of interior finishes.  
Source: Hawai'i County Code; Hawai'i County Real Property Tax Office; developer interviews; David Paul Rosen & Associates.

**Table 55**  
**Kona Affordability Gap Analysis**  
**Residual Land Value Per Square Foot Site Area**  
**Owner Housing Prototypes**

	Owner 1	Owner 2	Owner 3
<b>Prototype:</b>	Vertical Duplex	Single-Family Detached Bungalows	Single Family Detached
<b>Total Units:</b>	100	100	100
<b>100% Market-Rate Units</b>	\$54	\$31	\$15
<b>Land Residual Analysis with Chapter 11 Requirements</b> <u>70% AMI</u>	\$42	\$22	\$10
<b>Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus</b> <u>70% AMI</u>	\$47	\$21	\$7
<b>Land Residual Analysis with Chapter 11 Requirements, 10% Density Bonus, Fee Deferrals and Affordable Unit Design Modifications (1)</b> <u>70% AMI</u>	\$52	\$27	\$14

(1) Affordable unit design modifications include reduction in unit sizes of affordable units to the following minimum unit sizes: one-bedroom--540 SF; two-bedroom--725 SF; three-bedroom--1,000 SF and 10% reduction in cost per square foot. Fee deferrals refers to deferral of fair share assessments from building permit to certificate of occupancy.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service;

**Table 56**  
**Kona Affordability Gap Analysis**  
**Residual Land Value Per Square Foot Site Area**  
**Rental Prototypes**

	Renter 1	Renter 2	Renter 3	Renter 4
<b>Prototype:</b>	Rental Eightplex Flats	Rental Townhomes	Mixed-Use GF/Retail	Vertical Duplex
<b>Total Units:</b>	120	100	36	100
<b>100% Market-Rate Units</b>	\$5.68	(\$10.05)	(\$72.67)	(\$13.92)
<b>Land Residual Analysis with Chapter 11 Requirements</b> <u>60% AMI</u>	(\$10.98)	(\$50.25)	(\$166.09)	(\$41.65)
<b>Land Residual Analysis with Chapter 11 Requirements and 10% Density Bonus</b> <u>60% AMI</u>	(\$11.03)	(\$53.09)	(\$175.83)	(\$44.84)
<b>Land Residual Analysis with Chapter 11 Requirements, Fee Deferrals, 10% Density Bonus and Affordable Unit Design Modifications (1)</b> <u>60% AMI</u>	(\$10.19)	(\$48.09)	(\$167.54)	(\$41.06)

(1) Affordable unit design modifications include reduction in unit sizes of affordable units to the following minimum unit sizes: one-bedroom--540 SF; two-bedroom--725 SF; three-bedroom--1,000 SF and 10% reduction in cost per square foot. Fee deferrals refers to deferral of fair share assessments from building permit to certificate of occupancy.

Source: Interviews with developers active in the County of Hawai'i; Hawaii Information Service;

## **G. Policy Issues for Affordable Housing Requirements**

This section reviews policies and program options that the County should consider in implementation of Chapter 11 requirements and/or revisions to the statute.

Major policy issues include:

- methods of preserving the affordability of rental and owner affordable units for the required term of affordability;
- options for developers to comply with affordable housing requirements.

### **1. Enforcement of Affordability Restrictions**

Chapter 11 requires the establishment of resale restrictions to ensure that affordable units created under the statute remain affordable. Such restrictions may include buy-back, shared appreciation, and other restrictions.

Affordability requirements for rental developments are typically evidenced by recorded regulatory agreements. Chapter 11 requires that the rental prices on affordable units be controlled for no less than 20 years after initial occupancy. DRA recommends permanent affordability of rental units, which from a legal perspective may need to be associated with a time period such as 55 or 99 years.

With owner developments, resale restrictions are typically used to preserve the affordability of restricted-price units. There are alternative ways of structuring resale restrictions. One method is to require resale of the unit at a "maximum sales price" which permits increases in the sales price of the affordable unit based on increases in median income or the Consumer Price Index. Another alternative is equity share, whereby the homebuyer and the County share in the market appreciation of the unit. By restricting the resale of these homes, the County will ensure that these homebuyers do not experience windfalls by purchasing homes at restricted prices and selling them at market prices.

Local agencies enforce resale restrictions by incorporating these restrictions in the deed. With each sale of the property, unless the owner has held the property for longer than term or affordability, a new resale restriction period is imposed.

Another issue is whether the resale "clock" is reset upon sale or transfer (with possible exceptions for transfers upon death to a spouse or child). Upon sale or transfer, the resale restrictions may stay in force only for the remainder of the original term of affordability, or may "reset" to the full term of affordability. DRA recommends a term of affordability of at least 55 years for owner units if the "clock" does not reset upon transfer, 30 years if it does.

Additionally, local agencies may impose occupancy requirements on buyers of affordable units. This requirement ensures that the use of the property meets the original intention, which is providing a low or moderate-income person an affordable home. This policy also avoids any potential issues with absentee owners of rental properties.

Finally, local agencies often hold a first right of refusal to purchase a property if it is sold prior to expiration of the resale restricted period. By exercising the right to purchase, the local agency has the opportunity to provide this unit to another qualifying household.

With the imposition of affordability restrictions, local agencies must develop appropriate asset management systems to ensure that developers are meeting their obligations. An asset management system should enable the agency to determine if developers are renting their units at affordable rates, units are occupied by targeted income groups, homes are sold to targeted income groups, and resale restrictions are managed properly.

## **2. Alternative Compliance Options**

The ultimate goal of affordable housing requirements is to produce housing units affordable to very low, low, and/or moderate income persons. The simplest method is to require developers to build affordable units on the same site and at the same time as the market rate units. However, developers face a variety of circumstances where a local agency may wish to consider alternatives to on-site compliance of affordable unit requirements.

One important consideration is the need to create incentives to ensure that a jurisdiction's public policy goals for its affordable housing requirements are met. To achieve this goal, jurisdictions can design alternative compliance measures to provide developers with an incentive to build affordable units on-site. For example, as under Chapter 11, a jurisdiction may allow developers to dedicate land to the jurisdiction or a nonprofit housing developer rather than provide affordable housing units on the same site as the market rate development. The value of the dedicated land, determined by appraisal, is credited against the in lieu fee. Since the current in lieu fee is insufficient to fill the gap on the affordable units, the dedication of land will also be insufficient to fill the gap.

As an incentive for developers to provide affordable units on the same site as the market rate development, the jurisdiction may require that the value of the land dedicated by a developer exceed the cost of providing the affordable units on-site. In this context, the affordability gap analysis can be used to develop alternative compliance measures that provide developers with an incentive to construct affordable units on-site because the gap analysis quantifies the cost of providing affordable units.

Most jurisdictions offer alternative compliance options as part of their affordable housing programs. Alternative compliance measures offer developers opportunities to reduce development costs by allowing developers to meet their affordable housing requirements through methods other than on-site construction of units comparable to market rate units.

**Table 57** summarizes the strengths and weaknesses of two alternative compliance measures, discussed further in the following sections.

- in-lieu fees: payment of fees to a jurisdiction in lieu of constructing affordable housing units;
- off-site compliance: construction of affordable units at a site other than the market rate development.

**Table 57**  
**Summary of Strengths and Weaknesses**  
**of Alternative Compliance Measures**  
**Kona Affordable Housing Study**

Alternative Compliance Option	Strengths	Weaknesses
In-lieu Fee	<ul style="list-style-type: none"> <li>• easy to administer</li> <li>• can be used when affordable unit requirements result in fractions of units</li> <li>• jurisdiction can target uses of funds to meet a variety of affordable housing policy goals</li> </ul>	<ul style="list-style-type: none"> <li>• unless fees are comparable to affordability gap, fees may result in development of fewer affordable units</li> <li>• affordable units may not be constructed in a defined time frame</li> <li>• affordable units not provided on-site --no mix of incomes</li> <li>•</li> </ul>
Off-Site Compliance	<ul style="list-style-type: none"> <li>• may lower costs of compliance</li> <li>• can result in development of more affordable units with additional subsidies</li> <li>• allows for partnerships between market rate and affordable housing developers</li> </ul>	<ul style="list-style-type: none"> <li>• difficult to enforce construction of units</li> <li>• affordable units not provided on-site/--no mix of incomes</li> <li>• completion of affordable units may be delayed</li> <li>• potential neighborhood opposition issues</li> <li>•</li> </ul>

### **3. In-Lieu Fees**

#### **a. Advantages of In-Lieu Fee Option**

Most local agencies offer the payment of in lieu fees as an alternative compliance measure. In practice, an in lieu fee option is simple to administer. Once a schedule of in lieu fees is developed (based on factors such as a jurisdiction's affordability requirements, target household incomes, size of units, rental or ownership housing), then it is a simple matter to assess the fee.

In lieu fees are especially useful with jurisdictions that choose to apply affordable housing requirements to very small developments. When affordable housing requirements result in fractional units, developers can pay fees in lieu of building an affordable unit

In lieu fees also provide a jurisdiction with an added degree of flexibility with its affordable housing production. With in lieu fees, a jurisdiction decides how it will use the funds (e.g. downpayment and mortgage assistance for first-time homebuyers, constructing rental housing for very low income households, etc.). In contrast, requiring on-site compliance usually means that the affordable housing product type will be similar to the market rate housing product.

#### **b. Disadvantages**

Generally, jurisdictions seek construction of affordable housing units rather than payment of in lieu fees for three reasons. First, unless in lieu fees are set at a level that matches the affordability gap (the amount of capital required to develop housing affordable to very low, low, and/or moderate income households), fewer affordable units may be constructed when compared to on-site compliance. In order to create incentive for developers to provide affordable units on-site, in lieu fees would have to be set at a level comparable to the affordability gap.

Second, on-site compliance means that affordable housing units will be constructed within a defined time frame (generally, jurisdictions require affordable units to be built concurrently with market rate units). With in lieu fees, the timing of development of affordable housing units depends on several factors, such as availability of land, identifying appropriate developers, and securing any additional subsidies to leverage in lieu fees (if necessary). Therefore, it is impossible to know exactly when affordable units will be constructed with in lieu fees, but it certainly will be substantially later than the market rate units that generated the affordable housing obligation.

Third, an important public policy purpose of an affordable housing program is to provide a mix of housing affordability levels at a single development. In other words, one benefit of an affordable housing program is to encourage developments that accommodate a mix of household income levels. Payment of in lieu fees means that a developer does not provide affordable units on-site.

### **c. In Lieu Fee Amounts**

Most jurisdictions prefer that developers construct affordable housing units on-site rather than pay in lieu fees. To ensure that developers do not have an incentive to pay in lieu fees rather than build affordable units, in lieu fees must be set at the economic equivalency of providing affordable unit on-site. If in lieu fees are set at amounts lower than this economic equivalency, then developers have a financial incentive to pay fees rather than build affordable units.

With rental developments, the economic equivalent of providing an affordable unit on-site is the affordability gap. The renter affordability gap is the difference between the total development cost of the unit and the amount of mortgage that the net cash flow an affordable unit can produce. Net cash flow is equal to rent revenues less operating expenses and any set-asides for operating and replacement reserves. This is the affordability "gap to cost."

With ownership units, the economic equivalent of providing an affordable unit on-site is the difference between the market price of the units in a development and the amount of mortgage and downpayment that a targeted household can afford. This is the affordability "gap to price."

## **4. Off-Site Compliance**

Developers may satisfy the affordable housing requirements of Chapter 11, owner and renter, by constructing affordable units off-site within a 15-mile radius of the project site.

### **a. Advantages of Off-Site Compliance Option**

A developer may seek off-site compliance for two reasons. First, the cost of developing the affordable units on-site may be more expensive than the development of off-site units if the housing product-type of the market rate development is expensive. To maintain a consistent "character" for a project and to maintain its perceived attractiveness, a developer may feel the need to build an affordable unit that is comparable in size and quality to a market rate unit. In this case, off-site construction may be less expensive because the developer can build less expensive units in the off-site affordable housing development (by developing smaller units, using less expensive interior finishes, or constructing a higher density development).

Second, off-site compliance may provide a developer an opportunity to take advantage of lower land costs at a separate location.

Under certain circumstances, a greater number of affordable units may be built under an off-site compliance option. For example, developers building market rate developments at high per unit total development costs (e.g. luxury homes) may agree to build a greater number of affordable units if the developer is allowed to build the affordable units off-site.

Second, off-site compliance allows developers to partner with nonprofit affordable housing developers to construct units off-site. The market rate and non-profit developers can act as joint partners in an off-site affordable housing development.

From the local agency's perspective, partnerships with nonprofit developers can be beneficial because of nonprofit developers' expertise in developing affordable units and their long-term interest in maintaining quality affordable housing developments.

**b. Disadvantages**

Off-site compliance may be considered an unattractive alternative compliance measure for several reasons. First, as we stated with payment of in lieu fees, a public policy purpose of an affordable housing program is to provide a mix of housing affordability levels at a single development.

Second, off-site compliance can be problematic to enforce. Most jurisdictions with off-site compliance options require construction of affordable units either before or concurrently with the construction of the market rate units. In practice, this requirement may be difficult to enforce. Because of the complexities of the development process (including potential community opposition to an affordable housing project), it is difficult for a developer to synchronize the construction of two projects. A developer has more economic incentive to complete the market rate units than the affordable units. A jurisdiction may not have any effective methods to enforce compliance with the affordable housing requirement once the market rate units have started construction.

**Appendix A**  
**List of Developer Contacts**

## Developer Interview List

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**Appendix B**  
**Per Unit Development Cost Estimates**  
**By Bedroom Count**

**Table B-1**  
**PER UNIT PROTOTYPE DEVELOPMENT COSTS BY BEDROOM COUNT**  
**OWNER PROTOTYPE #1**

Prototype Description: Total Number of Units:	Duplex 100 Units	TYPE AND SIZE OF UNIT	
		2BD/2BA 1,200 Net S.F.	3BD/2BA 1,500 Net S.F.
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$80,000 /DU	\$80,000	\$80,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$130.00/ Net S.F.	\$156,000	\$195,000
<b>Total Hard Costs</b>		\$236,000	\$275,000
<b>Fees</b>			
Fair Share	\$9,761 /DU	\$9,761	\$9,761
Sewer	\$1,000 /DU	\$1,000	\$1,000
Water	\$5,000 /DU	\$5,000	\$5,000
<b>Subtotal</b>		\$15,761	\$15,761
<b>Indirect/Soft Costs</b>	\$84,363 /DU	\$84,363	\$84,363
<b>Total Direct Costs (Except Land)</b>		\$336,124	\$375,124
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$64,024	\$71,452
<b>Subtotal--Develop. Costs (Except Land)</b>		\$400,148	\$446,576
<b>Land Costs</b>	\$75,000 /DU	\$75,000	\$75,000
<b>Total Project Costs</b>		\$475,148	\$521,576

Source: David Paul Rosen & Associates.

**Table B-1**  
**PER UNIT PROTOTYPE DEVELOPMENT COSTS BY BEDROOM COUNT**  
**OWNER PROTOTYPE #1**

Prototype Description: Total Number of Units:	Duplex 100 Units	TYPE AND SIZE OF UNIT	
		2BD/2BA 1,200 Net S.F.	3BD/2BA 1,500 Net S.F.
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$80,000 /DU	\$80,000	\$80,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$130.00/ Net S.F.	\$156,000	\$195,000
<b>Total Hard Costs</b>		<u>\$236,000</u>	<u>\$275,000</u>
<b>Fees</b>			
Fair Share	\$9,761 /DU	\$9,761	\$9,761
Sewer	\$1,000 /DU	\$1,000	\$1,000
Water	\$5,000 /DU	\$5,000	\$5,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$84,363 /DU	\$84,363	\$84,363
<b>Total Direct Costs (Except Land)</b>		\$336,124	\$375,124
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$64,024	\$71,452
<b>Subtotal--Develop. Costs (Except Land)</b>		\$400,148	\$446,576
<b>Land Costs</b>	\$75,000 /DU	\$75,000	\$75,000
<b>Total Project Costs</b>		\$475,148	\$521,576

Source: David Paul Rosen & Associates.

**Table B-2**  
**PER UNIT PROTOTYPE DEVELOPMENT COSTS BY BEDROOM COUNT**  
**OWNER PROTOTYPE #2**

Prototype Description: Total Number of Units:	Detached Bungalows 100 Units	TYPE AND SIZE OF UNIT	
		2BD/2BA 900 Net S.F.	3BD/2BA 1,200 Net S.F.
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$77,000 /DU	\$77,000	\$77,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$145.00/ Net S.F.	\$130,500	\$174,000
<b>Total Hard Costs</b>		<u>\$207,500</u>	<u>\$251,000</u>
<b>Fees</b>			
Fair Share	\$9,761 /DU	\$9,761	\$9,761
Sewer	\$1,000 /DU	\$1,000	\$1,000
Water	\$5,000 /DU	\$5,000	\$5,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$67,825 /DU	\$67,825	\$67,825
<b>Total Direct Costs (Except Land)</b>		\$291,086	\$334,586
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$55,445	\$63,731
<b>Subtotal--Develop. Costs (Except Land)</b>		\$346,531	\$398,317
<b>Land Costs</b>	\$75,000 /DU	\$75,000	\$75,000
<b>Total Project Costs</b>		\$421,531	\$473,317

Source: David Paul Rosen & Associates.

**Table B-3**  
**PER UNIT PROTOTYPE DEVELOPMENT COSTS BY BEDROOM COUNT**  
**OWNER PROTOTYPE #3**

<b>Prototype Description:</b>	<b>Detached</b>		
<b>Total Number of Units:</b>	<b>100 Units</b>	<b>3BD/2BA</b> 1,450 Net S.F.	<b>4BD/2BA</b> 1,750 Net S.F.
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$117,000 /DU	\$117,000	\$117,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$145.00/ Net S.F.	\$210,250	\$253,750
<b>Total Hard Costs</b>		<u>\$327,250</u>	<u>\$370,750</u>
<b>Fees</b>			
Fair Share	\$9,761 /DU	\$9,761	\$9,761
Sewer	\$1,000 /DU	\$1,000	\$1,000
Water	\$5,000 /DU	\$5,000	\$5,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$101,521 /DU	\$101,521	\$101,521
<b>Total Direct Costs (Except Land)</b>		\$444,532	\$488,032
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$84,673	\$92,958
<b>Subtotal--Develop. Costs (Except Land)</b>		\$529,204	\$580,990
<b>Land Costs</b>	\$75,000 /DU	\$75,000	\$75,000
<b>Total Project Costs</b>		\$604,204	\$655,990

Source: David Paul Rosen & Associates.

**Table B-4**  
**Per Unit Development Costs By Unit Bedroom Count**  
**Renter Prototype #1**  
**Kona Affordability Gap Analysis**  
**Cost to Housing Authority**

Prototype Description: Total Number of Units:	Eightplex Flats 120 Units	TYPE AND SIZE OF UNIT		
		1BD/1BA 625 Net S.F. 625 Total S.F. (1)	2BD/2BA 835 Net S.F. 835 Total S.F. (1)	3BD/2BA 945 Net S.F. 945 Total S.F. (1)
<b>Hard Construction Costs</b>				
Infrastructure/Site Improve.	\$60,000 /DU	\$60,000	\$60,000	\$60,000
Site Improvements	\$0 /DU	\$0	\$0	\$0
Unit Construction Costs	\$130.00/ Net S.F.	\$81,250	\$108,550	\$122,850
<b>Total Hard Costs</b>		<u>\$141,250</u>	<u>\$168,550</u>	<u>\$182,850</u>
<b>Fees</b>				
Fair Share	\$9,761 /DU	\$9,761	\$9,761	\$9,761
Sewer	\$5,000 /DU	\$5,000	\$5,000	\$5,000
Water	\$1,000 /DU	\$1,000	\$1,000	\$1,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$38,049 /DU	\$38,049	\$38,049	\$38,049
<b>Total Direct Costs (Except Land)</b>		\$195,060	\$222,360	\$236,660
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$37,154	\$42,354	\$45,078
<b>Subtotal--Develop. Costs (Except Land)</b>		\$232,214	\$264,714	\$281,738
<b>Land Costs</b>		\$30,000	\$30,000	\$30,000
<b>Total Project Costs</b>		\$262,214	\$294,714	\$311,738

Source: David Paul Rosen & Associates

Table B-5  
Per Unit Development Costs By Unit Bedroom Count  
Renter Prototype #2  
Kona Affordability Gap Analysis  
Cost to Housing Authority

Prototype Description: Total Number of Units:	Townhomes 100 Units	TYPE AND SIZE OF UNIT	
		2BD/2BA 1,150 Net S.F. 1,150 Total S.F. (1)	3BD/2BA 1250 1,250 Total S.F. (1)
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$75,000 /DU	\$75,000	\$75,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$130.00/ Net S.F.	\$149,500	\$162,500
<b>Total Hard Costs</b>		<u>\$224,500</u>	<u>\$237,500</u>
<b>Fees</b>			
Building Permit	\$9,761 /DU	\$9,761	\$9,761
School Fees	\$5,000 /DU	\$5,000	\$5,000
Sewer Fees	\$1,000 /DU	\$1,000	\$1,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$55,393 /DU	\$55,393	\$55,393
<b>Total Development Costs</b>		\$295,654	\$308,654
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$56,315	\$58,791
<b>Subtotal--Develop. Costs (Except Land)</b>		\$351,969	\$367,445
<b>Land Costs</b>		\$30,000	\$30,000
<b>Total Project Costs</b>		\$381,969	\$397,445

Source: David Paul Rosen & Associates

Table B-6  
 Per Unit Development Costs By Unit Bedroom Count  
 Renter Prototype #3  
 Kona Affordability Gap Analysis  
 Cost to Housing Authority

Prototype Description: Total Number of Units:	GF/Retail 36 Units	TYPE AND SIZE OF UNIT 2BD/2BA 875 Net S.F. 875 Total S.F. (1)
<b>Hard Construction Costs</b>		
Infrastructure/Site Improve.	\$70,000 /DU	\$70,000
Site Improvements	\$0 /DU	\$0
Unit Construction Costs	\$160.00/ Net S.F.	\$140,000
<b>Total Hard Costs</b>		<u>\$210,000</u>
<b>Fees</b>		
Fair Share	\$9,761 /DU	\$9,761
Sewer	\$5,000 /DU	\$5,000
Water	\$1,000 /DU	\$1,000
<b>Subtotal</b>		<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$54,761 /DU	\$54,761
<b>Total Development Costs</b>		\$280,522
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$53,433
<b>Land Costs</b>		\$30,000
<b>Total Project Costs</b>		\$363,954

Source: David Paul Rosen & Associates

**Table B-7**  
**Per Unit Development Costs By Unit Bedroom Count**  
**Renter Prototype #4**  
**Kona Affordability Gap Analysis**

Prototype Description: Total Number of Units:	Duplex 100 Units	2BD/2BA 1200 1,200 Total S.F. (1)	3BD/2BA 1500 1,500 Total S.F. (1)
<b>Hard Construction Costs</b>			
Infrastructure/Site Improve.	\$75,000 /DU	\$75,000	\$75,000
Site Improvements	\$0 /DU	\$0	\$0
Unit Construction Costs	\$130.00 Per SF	\$156,000	\$195,000
<b>Total Hard Costs</b>		<u>\$231,000</u>	<u>\$270,000</u>
<b>Fees</b>			
Fair Share	\$9,761 /DU	\$9,761	\$9,761
Sewer	\$5,000 /DU	\$5,000	\$5,000
Water	\$1,000 /DU	\$1,000	\$1,000
<b>Subtotal</b>		<u>\$15,761</u>	<u>\$15,761</u>
<b>Indirect/Soft Costs</b>	\$62,083 /DU	\$62,083	\$62,083
<b>Total Development Costs</b>		\$308,844	\$347,844
<b>Dev. Fee/Profit &amp; Overhead</b>	16%	\$58,827	\$66,256
<b>Land Costs</b>		\$30,000	\$30,000
<b>Total Project Costs</b>		\$397,672	\$444,100

(1) Assumes efficiency ratio (net/gross SF) of:  
Plus pro rata (per unit) share of 0  
Source: David Paul Rosen & Associates

**Appendix C**  
**Chapter 11**

## Chapter 11

### HOUSING

#### Article 1. Affordable Housing.

Section 11-1.	Title.
Section 11-2.	Objectives.
Section 11-3.	Definitions.
Section 11-4.	Affordable housing requirements.
Section 11-5.	Satisfaction of affordable housing requirements.
Section 11-6.	Calculation of in-lieu fee.
Section 11-7.	Calculation of affordable sales price.
Section 11-8.	Density bonus.
Section 11-9.	Sale of lots and units.
Section 11-10.	Buyer of finished lots.
Section 11-11.	Rental units.
Section 11-12.	Use of in-lieu fees.
Section 11-13.	Eligibility.
Section 11-14.	Resale restrictions.
Section 11-15.	Transfer of excess credits.
Section 11-16.	Section 201G projects.
Section 11-17.	Effect on existing requirements.
Section 11-18.	Adoption of rules.
Section 11-19.	Reports by administrator.

\* **Editor's Note:** Chapter 11, "Housing," was repealed by Ordinance 96-162, section 21, and replaced with "Affordable Housing," pursuant to Ordinance 98-1.

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**Chapter 11****HOUSING****Article 1. Affordable Housing.****Section 11-1. Title.**

This article shall be referred to as the County of Hawai'i affordable housing policy. (1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2.)

**Section 11-2. Objectives.**

The objectives of this affordable housing policy are to:

- (1) Implement goals and policies of the general plan;
- (2) Promote and assist private development of housing for senior citizens, persons with disabilities and qualified households;
- (3) Use available governmental grants and funds in the development of affordable housing and increase the capabilities of qualified households to obtain affordable housing;
- (4) Support innovative, lower-cost approaches which may be used in the development of affordable housing;
- (5) Require large resort and industrial enterprises to address related affordable housing needs as a condition of rezoning approvals, based upon current economic and housing conditions;
- (6) Require residential developers to include affordable housing in their projects or contribute to affordable housing off-site.

(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2.)

**Section 11-3. Definitions.**

The following words and phrases, unless the context otherwise requires, are defined as follows:

- (1) "Affordable housing" means dwelling units which may be rented or purchased at cost levels which can be afforded by persons or families who are within the definition of "qualified households," as provided herein;
- (2) "Affordable housing income guidelines" means those household income levels which shall be published annually by the Office of Housing and Community Development and as described further herein;
- (3) "Fifteen mile radius" means the distance from the site in question as measured in a straight line from the boundary of the parcel being rezoned;
- (4) "Qualified households" mean an individual or two or more related by blood, state-sanctioned adoption, foster parentage, guardianship, or marriage, occupying a dwelling unit and whose total household income is within the affordable housing income guidelines or who would otherwise qualify in a state or federal affordable housing program;
- (5) "Affordable unit" or "affordable housing unit" means a lot or dwelling unit for sale or lease which is affordable to qualified households earning no more than the percentages of the median income in the County of Hawai'i as stated in this chapter;
- (6) "Eligible buyer" means a person who meets eligibility requirements, including income limitations, as established by rule.

(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2; Am. 2005, Ord. No. 05-111, sec. 1.)

**Section 11-4. Affordable housing requirements.**

- (a) The affordable housing requirements shall apply to:
- (1) All new rezonings that may create additional residential uses, including rezonings, to RS, RD, RM, RCX, RA and FA districts, and APD rezonings where lot sizes are less than five acres, and CG, CV, CN and PD districts when residential uses are established in those districts;
  - (2) All new rezonings to resort, including hotels established in V, CV, CG, CDH or PD districts;
  - (3) All new rezonings to ML, MG, and MCX districts;
  - (4) All prior rezoning actions which contain affordable housing conditions that have not been satisfied as of the effective date of this ordinance, or to which the County has not agreed previously as to the specific means of satisfying the requirements.
- (b) Requirements for residential uses.
- (1) Four or fewer residential units or lots: no requirement;
  - (2) Five or more residential units or lots: the applicant must earn affordable housing credits equal to twenty percent of the number of units or lots (rounded to the nearest .5);
  - (3) Time share units shall be considered as residential units.
- (c) Requirement for resort and hotel uses.  
Resort and hotel uses generating more than one hundred employees on a full-time equivalent basis must earn one affordable housing credit for every four full-time equivalent jobs created.
- (d) Requirements for industrial uses.  
The industrial uses that must fulfill the affordable housing requirements are any uses allowed as of right in an ML or MG district, except for home improvement centers, and any uses that are also allowed as of right in a CG district. Individual industrial enterprises generating more than one hundred employees on a full-time equivalent basis must earn one affordable housing credit for every four full-time equivalent jobs created.

(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2; Am. 2005, Ord. No. 05-111, sec. 2.)

**Section 11-5. Satisfaction of affordable housing requirements.**

- (a) The developer may satisfy the affordable housing requirements by doing any of the following:
- (1) Construct affordable for-sale units on-site;
  - (2) Construct affordable finished lots on-site, but only if the entire project consists of finished lots;
  - (3) Construct affordable for-sale units off-site, but within a fifteen-mile radius of the project site;
  - (4) Construct affordable rental units on-site, or off-site, within a fifteen-mile radius of the project site;
  - (5) Pay in-lieu fees to the Agency;
  - (6) Provide developable land, within a fifteen-mile radius of the project site, with a value determined by appraisal, that shall be credited against the in-lieu fee;
  - (7) Provide infrastructure, within a fifteen-mile radius of the project site, that shall be credited against the in-lieu fee. Any infrastructure provided must be directly related to the future provision of affordable housing;
  - (8) With the approval of the administrator, construct housing on-site or off-site, that addresses a critical regional housing need, at least equivalent to satisfying the requirements of any sub-sections (1)-(4) above, provided that the project must be located within the allowable areas for in-lieu fees under sec. 11-12;
  - (9) Obtain excess credits from another developer pursuant to sec. 11-15.
- (b) The affordable unit or finished lot shall be completed with road access, drainage, water, electricity, sewer lines, if required, and telephone, and, in the case of finished lots, shall not have unusual site conditions that make it difficult to build a home.
- (c) Affordable housing credits.  
The developer shall earn affordable housing credits as follows:
- (1) Sale of completed dwelling units affordable for qualified households earning 120-140% of median: 0.5 credits per unit;

- (2) Sale of completed dwelling units affordable for qualified households earning 100-120% of median: 1.0 credits per unit;
- (3) Sale of completed dwelling units affordable for qualified households earning 80-100% of median: 1.5 credits per unit;
- (4) Sale of completed dwelling units affordable for qualified households earning less than 80% of median: 2.0 credits per unit;
- (5) Construction of rental units affordable for qualified households earning 80-100% of median: 1.0 credits per unit;
- (6) Construction of rental units affordable for qualified households earning 60-80% of median: 1.5 credits per unit;
- (7) Construction of rental units affordable for qualified households earning less than 60% of median: 2.0 credits per unit;
- (8) Sale of finished lots affordable for qualified households earning no more than 100% of median: 0.5 credit per lot;
- (9) Sale of finished lot affordable for qualified households earning no more than 80% of the median: 1.0 credit per lot.
- (10) Donation of land to a nonprofit corporation or governmental agency for construction of for-sale housing units affordable for qualified households earning no more than 80% of the median, or construction of for-rent housing units affordable for qualified households earning no more than 60% of the median, subject to the approval of the administrator of the feasibility, location, and type of project. After the approval of the administrator, the credits are earned upon the donation of the land: 1.0 credit per unit.

(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2; Am. 2005, Ord. No. 05-111, sec. 3.)

**Section 11-6. Calculation of in-lieu fee.**

- (a) The in-lieu fee for a completed dwelling unit shall be twenty-five percent of: the actual sales price of the unit minus the affordable price for households earning one hundred twenty percent of the median.
- (b) The in-lieu fee for a finished lot shall be twenty-five percent of: the actual sales price of the lot minus the affordable price for households earning one hundred percent of the median.
- (c) The in-lieu fee for each required affordable dwelling unit for resort, hotel, and industrial uses shall be twenty five percent of: the median sales price for a single-family home in the tax map zone containing the project, in the previous calendar year, minus the affordable price for households earning one hundred twenty-percent of the median.
- (d) The in-lieu fee for each completed dwelling unit not offered for sale (such as units offered for rent) shall be twenty-five percent of: the median sales price for a single-family home in the tax map zone containing the project in the previous calendar year, minus the affordable price for households earning one hundred twenty percent of the median.

(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2.)

**Section 11-7. Calculation of affordable sales price.**

- (a) The OHCD shall calculate the affordable sales price for various household sizes annually. The affordable sales price for completed units shall be the price that is affordable to households earning the stated percentages of the median income for the County of Hawai'i, using the Housing and Community Development Corporation of Hawai'i guidelines, and the most current annual average interest rate for a thirty-year conventional fixed mortgage, not seasonally adjusted, for the twelve months ending in the previous year, as published by the Federal Home Loan Mortgage Corp. For 2005, the affordable sales price for a household of four persons earning one hundred percent of median shall be \$203,400 less any adjustments due to association fees or similar fees.

- (b) The affordable sales price for finished lots shall be the affordable sales price for a completed unit for a household of four persons, earning one hundred percent of the median income in the County of Hawai'i, less the cost to build a single-family home of 1,100 square feet in the general area, as estimated by OHCD. In 2005, the affordable sales price for a finished lot shall be \$95,000.  
(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2.)

**Section 11-8. Density bonus.**

- (a) Any project subject to an affordable housing requirement under this chapter that fulfills its housing requirement by constructing affordable dwelling units for sale or rent shall be entitled to a density bonus increasing the total number of residential units that may be constructed on the site by ten percent, and decreasing the minimum lot size by ten percent, compared to the number of units otherwise allowable and the minimum lot size as established by the zoning code.
- (b) If a project fulfills its affordable housing requirement off-site, the density bonus can be used on the non-affordable site, or the affordable housing site, or divided between the two sites.
- (c) The density bonus may not be used in the State Land Use Agricultural District or Rural Districts to create lots less than the minimum lot sizes required in those districts.  
(1998, Ord. No. 98-1, sec. 2; Am. 2005, Ord. No. 05-23, sec. 2.)

**Section 11-9. Sale of lots and units.**

- (a) Before obtaining final subdivision approval or plan approval for any for-sale residential project subject to the affordable housing requirements, the applicant shall enter into an agreement with the County that the required number of homes or lots will be sold at the required affordable sales price, or that the required number of rental units will be offered for rent at the affordable rental price, or that the in-lieu fee will be paid upon the sale of each for-sale dwelling unit or lot, or that the applicant will obtain excess credits sufficient to satisfy its requirements.
- (b) Before obtaining final plan approval for any resort, hotel, or industrial project, or not-for-sale residential project subject to the affordable housing requirements, the applicant shall enter into an agreement with the County that the affordable housing requirements will be met before the issuance of a certificate of occupancy for the project.
- (c) All agreements shall be recorded against the property, and that the in-lieu fee, if applicable, shall be a lien payable upon the closing of sale of each unit or lot or prior to the issuance of a certificate of occupancy under subsection (b).
- (d) All for-sale affordable units and lots shall be sold only to eligible buyers during a ninety-day preferential marketing period.
- (e) If the developer cannot sell the units or lots to eligible buyers during the ninety-day preferential marketing period, the units shall be offered for sale to persons who are otherwise eligible, but have previously owned a residence, for an additional period of thirty days. If a unit or lot cannot be sold after the one hundred twenty-day period, the developer may sell the unit or lot to any person at the affordable sales price. The Agency may also purchase the unit or lot after the ninety-day preferential marketing period at the affordable sales price.  
(2005, Ord. No. 05-23, sec. 2.)

**Section 11-10. Buyer of finished lots.**

The purchaser of a finished lot that is used to fulfill an affordable housing requirement, and that is sold during the preferential marketing period, shall enter into a binding contract for the construction of a residence on the lot within two years of the date of sale, and complete construction within three years of the date of sale, or, if the purchaser is an owner-builder, shall commence construction within two years and complete construction within three years of the date of sale. During this three-year period, the purchaser may sell only to eligible buyers, as determined by the administrator, and the sales price shall not exceed the original purchase price, plus an inflation factor based on the increase in the Consumer Price Index for Honolulu, and reasonable compensation for improvements, if any, made by the purchaser. If the purchaser does not meet

these time limits, the purchaser shall offer to sell the lot to the Agency, or, at the election of the administrator, to eligible buyers, at a price that does not exceed the original purchase price, plus an inflation factor based on the Consumer Price Index for Honolulu, plus reasonable compensation for improvements, if any, made by the purchaser.

(2005, Ord. No. 05-23, sec. 2.)

**Section 11-11. Rental units.**

- (a) The Agency shall determine the affordable rental price for units of various sizes annually.
- (b) The developer shall enter into an agreement with the County that the rental prices on the units shall be controlled for no less than twenty years after initial occupancy.

(2005, Ord. No. 05-23, sec. 2.)

**Section 11-12. Use of in-lieu fees.**

The in-lieu fee shall be used to support affordable housing located no more than twenty-five miles, as measured on a straight line, from the project that generated the in-lieu fee provided that the Agency can authorize use outside of this distance restriction if it determines that the project is necessary to satisfy a critical housing need.

(2005, Ord. No. 05-23, sec. 2.)

**Section 11-13. Eligibility.**

The administrator shall establish eligibility criteria by rule. Eligibility criteria shall include residency requirements to the extent permitted by law. The administrator may allow households with incomes up to twenty percent greater than the income on which the maximum sales price was based to be qualified to purchase a unit.

(2005, Ord. No. 05-23, sec. 2.)

**Section 11-14. Resale restrictions.**

The Agency shall establish resale restrictions by rule to ensure that units created under this policy remain affordable. Such rules may include, but not be limited to, buy-back, shared appreciation, and other restrictions. The administrator may be delegated the authority to select the resale restriction applicable to a particular project.

(2005, Ord. No. 05-23, sec. 2.)

**Section 11-15. Transfer of excess credits.**

- (a) Developers who construct new affordable housing units in excess of any requirements imposed under this chapter or any other requirement may earn "excess credits" which they may transfer to other developers.
- (b) The developer shall earn the excess credits pursuant to section 11-5(c).
- (c) To qualify for excess credits, units must be sold or rented to qualified households. The developer shall apply to the administrator for approval of the excess credits.
- (d) After approval of the excess credits, the developer may transfer the excess credits to any other project that is within the distance established in section 11-5(a)(3), to fulfill part or all of the affordable housing requirements of the other project.
- (e) If the project applying for the excess credits was developed with a direct subsidy from the federal, state, or county governments, the administrator shall either (1) discount the excess credits earned by the value of the subsidy, or (2) require that the Agency or other public entity subsidizing the project share equitably in the proceeds from the transfer of the excess credits. If the project was developed by a nonprofit corporation and sold to qualified households earning not more than 80% of the median, or rented to qualified households earning not more than 60% of the median, the discount shall not exceed 50% of the credits. The administrator may waive these requirements if the project earning the excess credits addresses a critical housing need and the excess credits, in addition to the direct subsidy, are or were a

necessary inducement to the construction of the project, or if the excess credits are earned by a nonprofit entity that will use the proceeds for the construction of more affordable housing.

- (f) For the purposes of this section, a “direct financial subsidy” includes the provision of land at below market value, or governmental construction of infrastructure necessary for a housing project, but does not include density bonuses, zoning or other permitting exemptions under section 201G-118, Hawai‘i Revised Statutes, or federal or state tax credits for the construction of rental housing.  
(2005, Ord. No. 05-23, sec. 2; Am. 2005, Ord. No. 05-111, sec. 4.)

**Section 11-16. Section 201G projects.**

The County’s exemption authority, as contained in chapter 201G, Hawai‘i Revised Statutes, may be utilized to expedite change of zone requests, subdivision applications, and plan review as well as the consideration of reduced development standards.  
(2005, Ord. No. 05-23, sec. 2.)

**Section 11-17. Effect on existing requirements.**

This policy supersedes all previous affordable housing requirements and Hawai‘i County Housing Agency Resolution 65 dated May 2, 1990 and Ordinance 98-1. Any affordable housing condition or portion thereof in any prior rezoning ordinance which has not been fully satisfied as of the effective date of this policy shall be reassessed pursuant to this policy unless the County has previously agreed as to the specific means of satisfying the requirements, in which case, this amended policy shall apply only to the extent it is not inconsistent with the agreement. In no event shall the County of Hawai‘i reimburse or be obligated to reimburse any person or entity for the partial or full satisfaction of an affordable housing condition in any ordinance which became effective prior to the effective date of this policy.  
(2005, Ord. No. 05-23, sec. 2.)

**Section 11-18. Adoption of rules.**

The Housing Administrator is authorized to adopt such rules pursuant to Chapter 91, Hawai‘i Revised Statutes, as are necessary to carry out this ordinance.  
(2005, Ord. No. 05-23, sec. 2.)

**Section 11-19. Reports by administrator.**

The administrator shall make timely periodic reports to the Agency of all significant actions taken under authority of this chapter, including but not limited to the approval of excess credits, the acceptance of transferred credits, and the choice of resale restrictions.  
(2005, Ord. No. 05-23, sec. 2.)

# **GREY INFRASTRUCTURE REPORT**

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**Wilson Okamoto Corporation**

**March 2007**

# GREY INFRASTRUCTURE REPORT

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## KONA COMMUNITY DEVELOPMENT PLAN

Submitted to:



County of Hawaii  
Department of Planning

March 2007



**WILSON OKAMOTO**  
CORPORATION



# **Grey Infrastructure Report**

## **Kona Community Development Plan**

Prepared for  
County of Hawaii  
Planning Department

Prepared by  
Wilson Okamoto Corporation

March 2007



**TABLE OF CONTENTS**

	<u>Page</u>
<b>1 WATER .....</b>	<b>1-1</b>
1.1 Nature, Occurrence, and Availability of Ground-Water Resources .....	1-1
1.1.1 Ground-Water Occurrence .....	1-1
1.1.2 Estimated Ground-Water Availability.....	1-1
1.1.3 Kona Area Ground-Water Development Issues .....	1-5
1.2 County Water Planning Context.....	1-6
1.2.1 Water Legislation and Water Planning Requirements.....	1-7
1.2.2 The County Water Use and Development Plan and Status of Current Update .....	1-7
1.2.2.1 State Water Code Requirements .....	1-7
1.2.2.2 HWP Framework Requirements .....	1-9
1.2.3 Status of County WUDP Update .....	1-10
1.3 Existing and Projected Use of Ground-Water Resources .....	1-10
1.3.1 Current Ground-Water Withdrawals by Aquifer System Area.....	1-11
1.3.2 Projected Ground-Water Use .....	1-11
1.4 Existing Water Infrastructure and Service Areas.....	1-14
1.4.1 North Kona Water System.....	1-14
1.4.2 South Kona Water System .....	1-15
1.4.3 Non-Service Areas .....	1-16
1.5 Historical and Projected Municipal Water System Demands .....	1-17
1.5.1 Historical Municipal System Water Demands.....	1-17
1.5.2 Projected Municipal System Water Demands .....	1-19
1.6 Municipal Water System Analysis .....	1-21
1.6.1 Transmission and Distribution System Analysis.....	1-21
1.6.2 Storage Analysis .....	1-22
1.7 Municipal Water System Capital Improvement Program.....	1-23
1.7.1 North Kona Water System Planned Capital Improvements.....	1-24
1.7.2 South Kona Water System Planned Capital Improvements .....	1-25
1.8 Wastewater Reuse, Water Conservation, and Drought Mitigation .....	1-26
1.8.1 Wastewater Reuse .....	1-26
1.8.2 Water Conservation .....	1-29
1.8.3 Drought Mitigation .....	1-30
 <b>2 WASTEWATER .....</b>	 <b>2-1</b>
2.1 Sewered Areas .....	2-1
2.1.1 Municipal Sewerage – Kealakehe WWRF.....	2-1
2.1.2 Private Sewerage – Heeia WWRF .....	2-3
2.2 Unsewered Areas .....	2-4
2.2.1 Critical Wastewater Disposal Areas .....	2-4
2.2.2 Large Capacity Cesspools .....	2-5
2.2.3 Septic Systems .....	2-5
2.2.4 Individual Wastewater Treatment Systems .....	2-7

**TABLE OF CONTENTS (continued)**

	<u>Page</u>
2.2.5	Underground Injection Control ..... 2-7
2.3	Potential Impacts on Coastal Water Quality ..... 2-8
2.3.1	West Hawaii Coastal Monitoring Task Force..... 2-8
2.3.2	Department of Health Water Sampling..... 2-9
<b>3</b>	<b>FLOOD HAZARD..... 3-1</b>
3.1	Previous Studies ..... 3-1
3.1.1	North Kona Flood Hazard Analysis ..... 3-1
3.1.2	South Kona Flood Hazard Analyses ..... 3-3
3.1.3	County of Hawaii Multi-Hazard Mitigation Plan ..... 3-4
3.1.4	U.S. Army Corps of Engineer ..... 3-6
3.2	Flood Occurrences..... 3-7
3.3	Flood Insurance Rate Maps ..... 3-7
3.3.1	Letter of Map Revisions (LOMR)..... 3-11
3.3.2	Conditional Letter of Map Revisions (CLOMR) ..... 3-11
3.4	Mauka Lands Management and Development..... 3-13
3.5	Adequacy of Drainage Standards ..... 3-14
3.5.1	Storm Drainage Standard, Department of Public Works, County of Hawaii, October 1970..... 3-14
3.5.2	Chapter 27, Flood Control - Hawaii County Code ..... 3-14
3.5.3	Chapter 10, Erosion and Sedimentation Control, Hawaii County Code ..... 3-14
3.6	Proposed Measures ..... 3-14
<b>4</b>	<b>TRANSPORTATION ..... 4-1</b>
4.1	Existing Roadway Network ..... 4-1
4.2	Previous Plans ..... 4-4
4.2.1	Hawaii Long Range Land Transportation Plan (HLRLTP) 1998.... 4-4
4.2.2	Keahole to Kailua Development Plan (1991)..... 4-4
4.2.3	Keahole to Kailua Development Plan Revised Roadway Plan (1997) 4-5
4.2.4	Keahole to Kailua Roadway Master Plan (2001)..... 4-5
4.2.5	Keahole to Honaunau Regional Circulation Plan (2003) ..... 4-5
4.2.6	State Transportation Improvement Program/Capital Improvement Projects ..... 4-6
4.3	Congestion ..... 4-8
4.4	Transportation Needs..... 4-9
4.4.1	Shortcomings ..... 4-9
4.4.2	Solutions ..... 4-10
4.4.3	Public Transit Needs ..... 4-13
4.4.4	Pedestrian/Bikeway Needs ..... 4-14
4.5	Connectivity ..... 4-14

**TABLE OF CONTENTS (continued)**

	<u>Page</u>
4.5.1 Connectivity Concept and Standards .....	4-15
4.5.1.1 Residential Districts.....	4-15
4.5.1.2 Commercial Districts .....	4-16
4.6 Pedestrian/Bicycle Circulation.....	4-17
4.6.1 Bike Designations .....	4-17
4.6.2 Existing Pedestrian/Bicycle Plans .....	4-17
4.6.2.1 Bike Plan Hawaii .....	4-17
4.7 Relationship of residences to jobs .....	4-22
4.8 Transportation Demand Management Strategies .....	4-22
4.9 Parking.....	4-23
4.9.1 Centralized Parking.....	4-23
4.9.2 Park-and-Ride Facilities .....	4-23
<b>5 PARKS.....</b>	<b>5-1</b>
5.1 Existing Conditions.....	5-1
5.2 After School Programs .....	5-7
5.3 Funding .....	5-7
5.4 Public Access to Shoreline and Mountains .....	5-8
5.5 Needs.....	5-8
<b>6 EMERGENCY SERVICES .....</b>	<b>6-1</b>
6.1 Police .....	6-1
6.1.1 Existing Conditions.....	6-1
6.1.2 Proposed improvements .....	6-1
6.1.3 Issues and Recommendations:.....	6-1
6.2 Fire.....	6-3
6.2.1 Existing Conditions.....	6-3
6.2.2 Proposed Improvements .....	6-4
6.3 Medical.....	6-4
<b>7 SCHOOLS.....</b>	<b>7-1</b>
7.1 Existing Conditions.....	7-1
7.1.1 Public School System .....	7-1
7.1.2 Private Schools .....	7-3
7.2 Expansion Plans .....	7-3
<b>8 SOLID WASTE.....</b>	<b>8-1</b>
<b>9 REFERENCES .....</b>	<b>9-1</b>

## TABLE OF CONTENTS (continued)

### LIST OF FIGURES

		<u>Page</u>
Figure 1-1	Island of Hawaii Ground-Water Hydrologic Unit Boundaries With Respect To The North and South Kona Judicial District Boundaries. ....	1-2
Figure 2-1	Wastewater Service Areas.....	2-2
Figure 2-2	Critical Wastewater Disposal Area.....	2-6
Figure 2-3	Island of Hawaii Underground Injection Control Areas. ....	2-8
Figure 3-1	Flood & Drainage - North Kona.....	3-2
Figure 3-2	Flood & Drainage - South Kona.....	3-5
Figure 3-3	Flood Occurrence .....	3-8
Figure 4-1	Existing Roadway Network .....	4-2
Figure 4-2	Existing and Proposed Bikeways.....	4-19
Figure 5-1	Parks.....	5-2
Figure 6-1	Emergency Facilities.....	6-2
Figure 7-1	Schools & Libraries.....	7-2

### LIST OF TABLES

Table 1-2	Reported Ground-Water Withdrawals, North and South Kona.....	1-11
Table 1-3	DWS Water Use Projections, 2005 to 2025.....	1-12
Table 1-4	Hawaii County Projected Water Use 2005 to 2025 (MGD) by Water Use Category.....	1-13
Table 1-5	North Kona Water System Summary.....	1-15
Table 1-6	South Kona Water System Summary .....	1-16
Table 1-7	Estimated Average Day Historical Water Production for the North and South Kona Water Systems.....	1-17
Table 1-8	Potable Water Consumption by Agricultural Customers in the North and South Kona Municipal Water Systems.....	1-18
Table 1-9	Projected 2005 to 2025 Average Day Water Demand for the North and South Kona Water Systems.....	1-19
Table 1-10	Historical and Projected Average Day Water Demand for the North and South Kona Water Systems, 2001 to 2025.....	1-20
Table 1-11	Storage Surplus/Deficit for 2005 to 2025 for the North and South Kona Water Systems .....	1-23
Table 1-12	Recommended Storage Capacity Improvements for the North and South Kona Water Systems .....	1-23
Table 1-13	County of Hawaii DWS 2007-2026 CIP and Improvement Program Projects.....	1-24
Table 1-14	North Kona District CIP and Improvement Program Project Costs .....	1-25
Table 1-15	South Kona District CIP and Improvement Program Project Costs .....	1-26
Table 2-1	Department of Health Clean Water Branch Water Quality Monitoring Stations.....	2-9
Table 3-1	Drainage Way Acres Inundated and Length .....	3-3

**TABLE OF CONTENTS (continued)**

	<b><u>Page</u></b>
Table 3-2	Historical Flood Incidents in Kona..... 3-9
Table 3-3	Flood Insurance Rate Maps (FIRM)..... 3-10
Table 3-4	Updated Letter of Map Revisions (LOMR)..... 3-12
Table 3-5	Updated Conditional Letters of Map Revisions (CLOMR)..... 3-12
Table 4-1	Transportation Improvement Projects Already Funded..... 4-7
Table 4-2	Existing Bike Facilities ..... 4-18
Table 4-3	Bike Plan Hawaii Proposed Projects..... 4-20
Table 5-1	Existing Conditions of Parks Within the County of Hawaii Kona District . 5-3
Table 5-2	General Activities occurring within DOE Facilities ..... 5-7
Table 6-1	Offenses and Complaints Known to Police ..... 6-3
Table 7-1	Projected and Current Enrollment of the DOE West Hawaii Complex Schools ..... 7-3
Table 7-1	Private Schools in West Hawaii ..... 7-4
Table 8-1	Quantities of Solid Waste from Transfer Stations For Year 2000 ..... 8-2

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## 1 WATER

### 1.1 Nature, Occurrence, and Availability of Ground-Water<sup>1</sup> Resources

In 1987, the Fourteenth Legislature enacted the State Water Code to establish programs for the development, protection, conservation, control, and regulation of the use of Hawaii's water resources for the benefit of the people of the State. The State Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM) is responsible for administering the State Water Code.

One of the primary objectives of the State Water Code is the development of a program of comprehensive water resource planning to address the problems of supply and conservation of water (HRS §174C-2). Pursuant to this mandate, the CWRM inventories and assesses water resources statewide. This is particularly important with regard to the development of ground water sources for municipal water supply.

#### 1.1.1 Ground-Water Occurrence

Ground-water resources in Hawaii vary considerably in setting and hydrologic characteristics. Aquifers can be limited or of considerable extent, isolated or subject to influence from one or more adjacent aquifers. Ground water can occur in sedimentary deposits, perched settings, or basal lenses resting on seawater.

In order to protect and monitor ground-water resources, a consistent scheme of classification and nomenclature for the aquifers of the State of Hawaii was created based on aquifer and groundwater parameters and hydrographic divisions. Aquifer system boundaries do not typically coincide with topographic or political boundaries as they are delineated according to subsurface features and ground-water behavior. Figure 1-1 shows the aquifer system area boundaries for the North and South Kona areas. As illustrated on the map, hydrologically related aquifer system areas are grouped into aquifer sectors.

#### 1.1.2 Estimated Ground-Water Availability

The planning area for the Kona CDP spans portions of the Northwest Mauna Loa Aquifer Sector Area and the Southwest Mauna Loa Aquifer Sector Area, as well as the entire Hualalai Aquifer Sector Area. Figure 1-1 illustrates the coincidence of the North and South Kona districts and the ground-water hydrologic unit boundaries. The aquifer system areas included within these sector areas are listed below in Table 1-1 with their respective estimated sustainable yields in millions of gallons per day (mgd).

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<sup>1</sup> The convention used by the US Geological Survey and the State of Hawaii Department of Land and Natural Resources is to hyphenate the terms "ground-water" and "surface-water" when used as compound adjectives (e.g., ground-water monitoring; ground-water quality; surface-water discharge; etc.). The nouns "ground water" and "surface water" are not hyphenated.

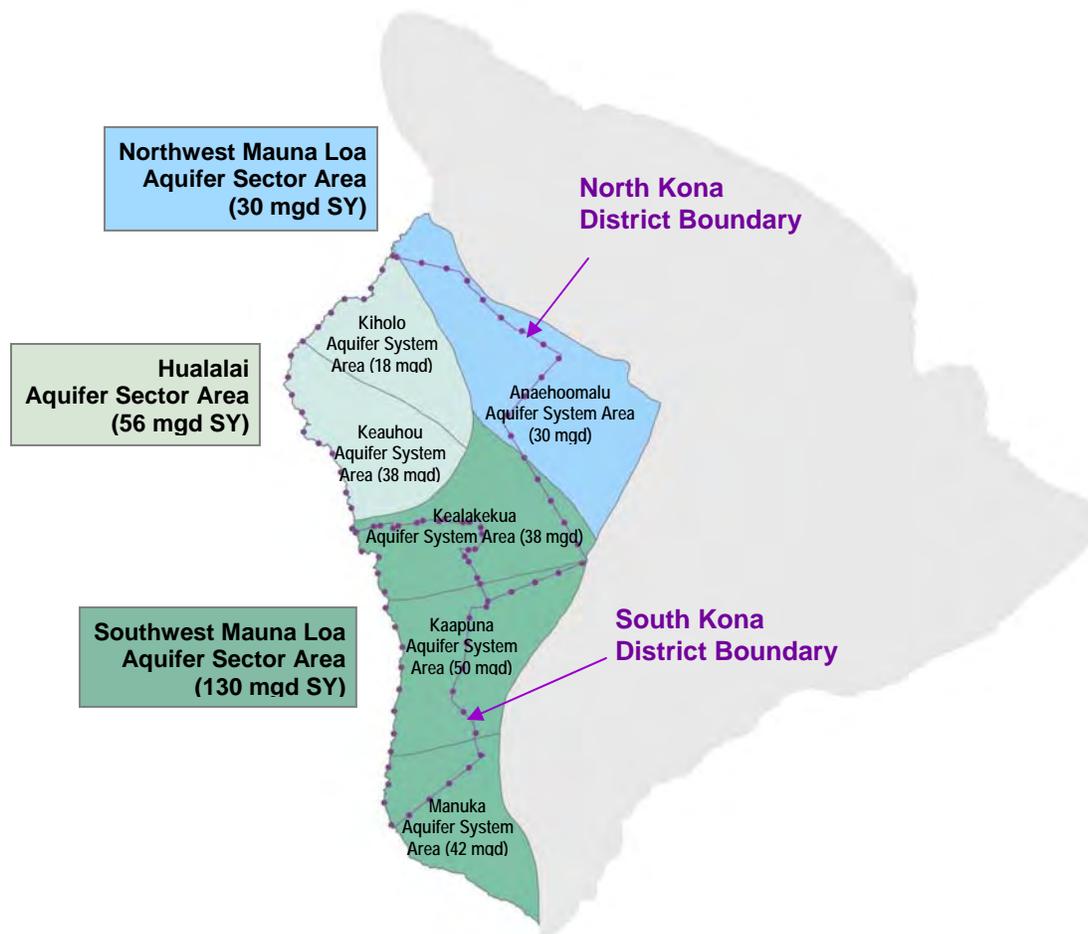


Figure 1-1: Island of Hawaii Ground-Water Hydrologic Unit Boundaries with respect to the North and South Kona Judicial District Boundaries. The aquifer sector area names and aquifer system area names, along with ground water sustainable yields are as noted in the figure.

Table 1-1: Planning Area Aquifer System Sustainable Yield Estimates		
Aquifer Sector and System Area	Sustainable Yield (MGD)	Reliability of SY Estimate
<b>Northwest Mauna Loa Aquifer Sector Area</b>		
Anaehoomalu Aquifer System Area	30	Not reliable (includes brackish)
<b>Southwest Mauna Loa Aquifer Sector Area</b>		
Mauka Aquifer System Area	42	Not reliable (includes brackish)
Kaapuna Aquifer System Area	50	Not reliable (includes brackish)
Kealakekua Aquifer System Area	38	Poor (includes brackish)
<b>Hualalai Aquifer Sector Area</b>		
Keauhou Aquifer System Area	38	Poor (includes brackish)
Kiholo Aquifer System Area	18	Fair
<b>Total:</b>	<b>216</b>	

Source: *Water Resources Protection Plan, Volume I*, State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management, Honolulu: June 1990.

The aquifer sustainable yields that have been adopted by the State Commission on Water Resource Management and published in the 1990 *Water Resources Protection Plan* (WRPP) are *estimates*. Sustainable yield cannot be equated to the amount of developable groundwater. The estimates are constrained by very limited data and do not consider the feasibility of actually developing the groundwater. Estimates of sustainable yield are determined by using standardizations assigned to components of a water balance equation to solve a basic balance algorithm that is applicable, with some allowance for local conditions, to all Aquifer Systems. The fundamental water balance equation includes expressions of precipitation, stream runoff, evapotranspiration, and infiltration. Each of these variables is qualified by their own extensive set of assumptions, and therefore, each variable contributes to the unreliability of the estimated sustainable yield. The sustainable yield estimates do not include high-level or perched water bodies, but the estimates may include brackish water components. The WRPP further comments on the determination of sustainable yields with the following:

*To establish the sustainable yield of an aquifer, the dynamic and equilibrium states of the aquifer must be understood. The history of the response of an aquifer to exploitation by means of wells and infiltration galleries, augmented by pumping tests to determine the characteristics of the aquifer medium, allows the dynamics of groundwater behavior to be completely described and future behavior to be predicted. This type of fundamental knowledge, however, is available for only a few aquifer systems in the State, in particular in Oahu and West Maui. Elsewhere, the record of aquifer response over time is sporadic and fragmentary (emphasis added).*

In the West Hawaii area, ground water flow patterns and an extensive ground-water anomaly have long perturbed hydrologists and contribute to the uncertainties regarding development of ground water. The following sections are excerpted from the 1990 WRPP descriptions of the planning area aquifer sectors and systems, with notes on the reliability of sustainable yield estimates:

#### **NORTHWEST MAUNA LOA AQUIFER SECTOR AREA**

Anaehoomalu Aquifer System Area: The surface is covered by Kau volcanics, but these Mauna Loa lava flows cover Hualalai volcanics to the south and Mauna Kea volcanics to the north. Basal groundwater occurs in highly permeable aquifers for at least five miles inland. At approximately ten or more miles from the coast high level water may occur at great depth. Lack of caprock at the coast prevents the buildup of a thick lens.

It is not possible to develop potable water where the lens is thin, as it is in most accessible places. About five miles inland a discontinuity disrupts the smooth curve of the water table, causing head to rise several feet higher than expected.

The estimated sustainable yield of 30 mgd assumes that all recharge taking place in the System discharges at the coast between Anaehoomalu and Puako. This may not be so. A significant portion of estimated sustainable yield is probably brackish. The estimate is not reliable.

### **HUALALAI SECTOR AREA**

Kiholo Aquifer System: Basal groundwater occurs in Hualalai volcanics for at least five miles inland. At about four miles inland a hydrologic discontinuity apparently causes the head to rise several feet more than expected. The lens is not protected by caprock at the coast. This is the condition throughout the young island of Hawaii. High-level groundwater lies at considerable depth in the rift zones, including the Puu Waa Waa rift.

The estimated sustainable yield of 18 mgd would be potable if all of it were developed more than five miles inland where elevations normally exceed 1500 feet. The estimate is fair.

Keauhou Aquifer System: Basal groundwater in aquifers of Hualalai volcanics is known to extend at least four miles inland to Mamalahoa Highway. Beyond about five miles high-level groundwater may exist in one of the Hualalai rift zones.

The sustainable yield of 38 mgd is not developable only as potable water. The estimate is poor.

### **SOUTHWEST MAUNA LOA SECTOR AREA**

Kealakekua Aquifer System Area: As in the Manuka and Kaapuna Systems, the Kau volcanic series covers the whole region. Its extremely high permeability coupled with the absence of coastal caprock prevents the buildup of a thick basal lens. High level groundwater may occur far inland.

The estimated sustainable yield of 38 mgd would be difficult to develop entirely as potable water. The estimate is poor, but unquestionably a considerable volume of potable groundwater is developable.

Kaapuna Aquifer System Area: Permeable Kau volcanics cover the entire System. Basal groundwater extends at least six miles inland. It is not protected by caprock. High level water may be found at great depth toward the boundary of the System along the southwest rift of Mauna Loa.

The basal lens is thin and difficult to exploit because of the high permeability of the Kau basalts. The estimated sustainable yield of 50 mgd refers to extractions made more than several miles inland. It is not a good estimate and includes brackish water.

Manuka Aquifer System Area: Highly permeable basalt of the Kau series carries basal water over a distance at least six miles inland. The lens is thin and difficult to develop for potable water. It is not protected by caprock at the coast. Far inland high level dike water lies at great depth.

Exploratory drilling has demonstrated that the basal lens is brackish inland to the belt highway. The estimated sustainable yield of 42 mgd includes brackish and potable water. It is not a reliable estimate.

### **1.1.3 Kona Area Ground-Water Development Issues**

Questions and concerns regarding the amount of developable ground water in West Hawaii are not new. During the 1980's through the early 1990's Kailua-Kona experienced tremendous growth. The growth patterns of the early 1990's triggered high demands on water supplies and competition among large landowners/developers for new sources of water. As more and more wells were drilled, new and interesting geological and hydrological information began to emerge that spurred additional wells at higher elevations, and at greater cost.

Because of competition for well site locations and concerns by the Commission on Water Resource Management about proper planning, well placement, and associated problems of well interference, CWRM began a series of meetings in North Kona and South Kohala Districts among the major landowners, developers, engineers, and hydrologic consultants in order to come to agreement as to the proper development of the groundwater resource. Two ad hoc groups were formed: the Hualalai Users Group focused on problems near Kailua-Kona and the North Kona District, while the Lalamilo Users Group centered on problems related to the South Kohala District. The group meetings provided an avenue to diffuse any disputes and to forestall the designation of the West Hawaii region as a ground-water management area. Through the group discussions, it became clear that a deficit of good baseline ground-water data existed and that major decisions were being made using incomplete knowledge of the resource. It was for this reason that CWRM began monitoring ground-water levels in West Hawaii.

From 1991 to 2002, the CWRM collected ground-water elevation measurements in 40 public and private wells and test holes throughout the North and South Kona and South Kohala Districts of West Hawaii. In September 2003, the CWRM published the findings and conclusions of Kona area monitoring activities in a report titled "A Study of the Ground-Water Conditions in North and South Kona and South Kohala Districts, Island of Hawaii, 1991-2002." The results of the Kona ground-water modeling project compliment other studies of the area performed by the U.S. Geological Survey.

Major findings and conclusions are listed below and are based upon 171 individual water level measurements in the high-level wells and 636 measurements in the basal wells, and are summarized from CWRM's 2003 report:

1. The data strongly suggest a slow decline of water levels in some of the high-level wells and an apparent relationship to water level decline and climatic conditions as recorded in the Lanihau and Huehue Ranch rain gages. Future wells drilled into this resource should be used, prior to pump installation, as observation wells to verify these trends.
2. The data suggest that the high-level wells tap interconnected, though bounded, aquifers whose rate of water level decline is inversely proportional to its volume. Future well drilling for high-level potable sources must include accurate, well-designed aquifer tests that will aid in the determination of geologic boundaries to provide information on the geometry of the aquifer.
3. The data suggest that there may be more than a geological mechanism that created the high-level aquifer.
4. The data suggest that there is a water level pattern observed in the high-level wells with Keopu being the “drain” for the ground-water flow system. The ground-water flux south of Keopu is to the north, and north of Keopu, the ground-water flow is to the south.
5. Some high-level wells do exhibit quasi-stable water levels, and show little variation over time. Use of long-term water level transducers in these wells should continue in conjunction with long-term water level transducers in those wells that show water level decline. Real time correlation between water levels in the wells with climatic conditions measured at Lanihau Rain Gage will provide better insight into the behavior of the potable high-level aquifers.
6. The data suggest the influence of climate (drought conditions) over long-term trends in the basal aquifers.
7. The strong correlation between well pairs will aid in predicting a water level if only one of the wells can be measured.
8. The data suggest the variability of the ground-water flow direction in a shallow basal lens system, as can be seen at the West Hawaii Landfill, is translatable to other areas.
9. The low ground-water gradients suggest a highly permeable basal coastal aquifer where basaltic lavas comprise the aquifer, and this finding is supported by tidal analysis. The composition of the lava flows determines its permeability, and in turn, the ground-water gradient.
10. These data will become calibration targets for future numerical and analytical ground-water models and will aid in the site selection for new wells.

## **1.2 County Water Planning Context**

The following sections describe the planning context and existing controls that provide a framework for water planning in Hawaii. It should be noted that the legislative mandate provided by the State Water Code, §174C Hawaii Revised Statutes, emphasizes water planning at the local level that is inclusive of all existing and projected water use, public and private, that is located or planned for development within the county boundaries. The sections below were written in consultation with the State Department of Land and Natural Resources, Commission on Water Resource Management (CWRM) <sup>2</sup>. The

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<sup>2</sup> Fujii, Neal. State DLNR, CWRM. Personal communication, May 19, 2006.

information presented is consistent with the State Water Code and the forthcoming update to the statewide *Water Resources Protection Plan*.

### **1.2.1 Water Legislation and Water Planning Requirements**

As noted earlier, one of the primary objectives of the State Water Code is the development of a program of comprehensive water resource planning to address the problems of supply and conservation of water (HRS §174C-2). A major component of this program is the Water Use and Development Plan (WUDP) that must be prepared by each county (HRS §174C-31). The Water Code also provides for planning consistency across government levels by requiring the County WUDPs to be adopted by CWRM and integrated into the Hawaii Water Plan, as initially occurred in 1990.

### **1.2.2 The County Water Use and Development Plan and Status of Current Update**

The State Water Code requires each county to prepare and regularly update a County Water Use and Development Plan to address the County's future water demands, "setting forth the allocation of water to land use in that county" (HRS §174C-31(a)(2)). The WUDP is the instrument by which all other Water Code planning components are integrated and used to implement comprehensive water resource planning at the county level.

The County WUDP objectives include the following activities:

- Assess existing and future land uses and associated municipal water demands;
- Incorporate agriculture, military, private, State, and other non-municipal water demand projections; and
- Evaluate the cost and adequacy of proposed development plans and identify preferred and alternative water development plans to meet projected demands.

Requirements, recommendations, and guidance for preparing the County WUDPs are found in the State Water Code, the Hawaii Administrative Rules, and in the *Statewide Framework for Updating the Hawaii Water Plan* (CWRM, 2000). The pertinent sections of the Water Code and the Framework document are summarized below.

#### **1.2.2.1 State Water Code Requirements**

The purpose of the County Water Use and Development Plans is to inventory all projected water demands and ensure that the future water needs of the county are met. The plan also provides additional guidance to state-level decision-making on water use and water reservation requests. Most importantly, the key outcome of the County WUDP is the allocation of water to land use.

The State Water Code mandates that each county's WUDP "shall be consistent with the respective county land use plans and policies including general plan and zoning as determined by each respective county" (HRS §174C-31(b)(2)). The code also specifies that WUDPs must be adopted by county ordinance.

HRS §174C-31(f) states that the County WUDPs must include, but are not limited to the following information:

- (1) *Status of water and related land development including an inventory of existing water uses for domestic, municipal, and industrial users, agriculture, aquaculture, hydropower development, drainage, reuse, reclamation, recharge, and resulting problems and constraints;*
- (2) *Future land uses and related water needs; and*
- (3) *Regional plans for water developments including recommended and alternative plans, costs, adequacy of plans, and relationship to the water resource protection and water quality plans.*

HRS §174C-31(o) mandates interagency coordination as follows:

- (o) *In formulating or revising the plans, each county and the commission shall consult with and carefully evaluate the recommendations of concerned federal, state, and county agencies.*

Finally, HRS §174C-31 concludes with the following directive:

*Each county shall update and modify its water use and development plans as necessary to maintain consistency with its zoning and land use policies.*

### **Requirements of the Hawaii Administrative Rules**

Hawaii Administrative Rules §13-170-32 provides additional guidelines for preparation of the County WUDPs as follows:

- (b) *All water use and development plans shall be prepared in a manner consistent with the following conditions:*
  - (1) *Each water use and development plan shall be consistent with the water resource protection plan and the water quality plan.*
  - (2) *Each water use and development plan and the state water projects plan shall be consistent with the respective county land use plans and policies, including general plan and zoning as determined by each respective county.*
  - (3) *Each water use and development plan shall consider a twenty-year projection period for analysis purposes.*

- (4) *The water use and development plan for each county shall also be consistent with the state land use classification and policies.*

#### **1.2.2.2 HWP Framework Requirements**

The *Statewide Framework for Updating the Hawaii Water Plan* is a guidance document adopted by the CWRM to help agencies integrate and update their respective components of the Hawaii Water Plan. With regard to the County WUDPs, several key objectives from the Framework document are listed below:

- To achieve integration of land use and water planning efforts that are undertaken by federal, state, county, and private entities so that a consistent and coordinated plan for the protection, conservation and management of our water resources is achieved;
- To recommend guidelines for the HWP update so that the plan and its component parts are useful to the CWRM, other state agencies, the counties, and the general public;
- To develop a dynamic planning process that results in a “living document” for each component of the HWP which will provide county and state decision-makers with well formulated options and strategies for addressing future water resource management and development issues;
- To better define roles and responsibilities of all state and county agencies with respect to the development and updating of the HWP components; and
- To describe and outline the techniques and methodologies of integrated resource planning as the basic approach that should be utilized in developing and updating the County WUDPs.

The County WUDPs respond to the need for integration of resource development strategies at the county level. It is emphasized that the County WUDPs are required to encompass all water usage and water development plans projected throughout the county. Since the various State agencies ultimately build their projects within one of the four counties, State agency water use demands and proposals for development of various resources to meet those demands must be factored into the overall water demands and development strategies of each of the counties. The responsibility for preparation of the County WUDP rests with the specific entities charged with water planning within that county, as may be enumerated by county ordinance.

As provided by the HWP Framework document, to initiate the County WUDP update process a County-Specific Project Description is to be prepared by each county. The WUDP Project Description should present specific issues, planning activities, project scope, and objectives to be met by the county in its planned update of the County WUDP. It should also include the roles and responsibilities of the various county agencies involved in the development and preparation of the WUDP and the specific steps and projected timetable for updating and

adopting the WUDP. The Project Description should be submitted for review and approval by CWRM prior to the county's undertaking of the update process.

### **1.2.3 Status of County WUDP Update**

All four counties are at various stages of their WUDP update process. In 1992, the counties briefed the Commission on prepared updates to the WUDPs, however, the adoption of the plans was deferred pending plan refinement and the inclusion of additional information. In 2000, more guidance to the counties was provided through the adoption of the *Statewide Framework for Updating the Hawaii Water Plan* and through the Hawaii Supreme Court's decision in the Waiahole Ditch Combined Contested Case, which imparted and reaffirmed the application of the public trust doctrine and the precautionary principle in Hawaii's water resource planning efforts.

Within this planning context, the Hawaii County DWS kicked off their County Water Use and Development Plan (WUDP) effort in September 2005 by presenting to the CWRM the County's project description and technical approach for updating the Hawaii County WUDP. In the project description, the County proposed to accomplish the following tasks through the technical approach:

- Inventory of existing sources;
- Inventory of existing uses;
- Identification of existing water systems;
- Assess land use plans and policies;
- Project future water demands;
- Identify supply side & demand side options; and
- Encourage public and stakeholder participation.

The relationship between land use plans/policies and infrastructure/resource availability will be addressed with respect to the County General Plan and County zoning ordinance. The sustainability of current land use policies will be addressed by modeling the "infill" of un-developed or under-developed lands and calculating water demands. Three scenarios for water demands will be evaluated: low growth, medium growth and high growth. Incremental water needs at 5-, 10-, 15- and 20-year intervals will be based on population and growth rate projections for the next 20 years.

According to the project description provided by Hawaii County, the DWS expects the Hawaii WUDP update to be completed by the end of 2006. The County is currently developing a long-range Water Master Plan and an implementation strategy for infrastructure upgrades that also includes a financial plan and, a five- and twenty-year CIP program.

### **1.3 Existing and Projected Use of Ground-Water Resources**

The sections below describe current ground-water withdrawals, and existing and projected water use. The ground-water withdrawal information represents the information reported to the Commission on Water Resource Management by well permit holders. The information on historic and projected ground-water use was determined by

the County of Hawaii DWS through planning efforts in support of the forthcoming County Water Use and Development Plan and the forthcoming 20-Year Water Master Plan.

### 1.3.1 Current Ground-Water Withdrawals by Aquifer System Area

For the Island of Hawaii, current pumpage from all aquifer systems is at less than 40%. The CWRM uses a twelve-month moving average to assess water use, and depends upon data from monthly reports received from water use permit holders, including the Hawaii County DWS, to monitor ground-water demand. Table 1-2 describes the ground-water withdrawals reported for aquifer system areas that underlie the North and South Kona Districts. The municipal system does not cover large parts of the island, and there are many private domestic wells that serve residential needs. These uses are generally not reflected in Table 1-2 below. It is emphasized that the aquifer system areas do not correspond to municipal water service areas, and that the aquifer boundaries extend beyond the North and South Kona Planning Districts.

Table 1-2: Reported Ground-Water Withdrawals, North and South Kona						
Aquifer System Area	Sustainable Yield (MGD)	Total Existing Water Use 12 MAV July 2005 (MGD)	Existing County DWS Water Use 12 MAV July 2005 (MGD)		Existing Private Water Use 12 MAV July 2005 (MGD)	
			Pumpage	# of wells	Pumpage	# of wells
Northwest Mauna Loa Aquifer Sector Area						
Anaehoomalu	30	4.983	0.000	0	4.983	22
Total	30	4.983	0.000	0	4.983	22
Southwest Mauna Loa Aquifer Sector Area						
Manuka	42	0.079	0.000	0	0.079	1
Kaapuna	50	0.008	0.000	0	0.008	1
Kealakekua	38	2.057	1.541	5	0.516	2
Total	130	2.144	1.541	5	0.603	4
Hualalai Aquifer Sector Area						
Kiholo	18	3.703	0.000	0	3.703	19
Keauhou	38	10.723	9.965	11	0.758	9
Total	56	14.426	9.965	11	4.461	28

Source: State Commission on Water Resources Management reported water use based on 12 month moving average as of July 2005

### 1.3.2 Projected Ground-Water Use

The Hawaii County DWS, through its current update of the County Water Use and Development Plan, has projected future total water use for geographic areas that correspond to subsurface aquifer sector area boundaries. It should be noted that, although water use was projected per aquifer sector area, the DWS has indicated that the agency is looking to meet portions of non-potable demand through alternative water sources and to decrease potable demand through water conservation efforts. The Kona

CDP planning area completely or partially spans three aquifer sector areas, as listed in Table 1-3. Water use projections reflect information provided by the DWS in March 2006. For purposes of general comparison, the sustainable yield estimates, and total reported current water use are provided for each aquifer system.

The table is intended only to provide perspective on resource availability with respect to anticipated water use, and does not equate to anticipated aquifer withdrawals or to projected demands upon the municipal system. Again, it should be noted that aquifer system areas do not correspond to municipal water service areas, and that the aquifer boundaries extend beyond the North and South Kona Planning Districts (see Figure 1-1).

Aquifer Sector	Sustainable Yield (MGD)	Existing Water Use 12 MAV July 2005 (MGD)	DWS Projected Water Use (MGD)				
			2005	2010	2015	2020	2025
NW Mauna Loa	30	4.983	7.76	9.01	10.45	12.11	14.03
Hualalai	56	14.426	16.19	18.09	20.16	22.47	25.05
SW Mauna Loa	130	2.144	5.13	5.70	6.31	7.00	7.75
<b>TOTAL</b>	<b>216</b>	<b>21.387</b>	<b>29.08</b>	<b>32.80</b>	<b>36.92</b>	<b>41.58</b>	<b>46.83</b>

The DWS also projected water use in terms of use categories (see Table 1-4). Again, the DWS does not intend to meet projected demand entirely through ground-water development.

The projected demands above must be qualified with several caveats:

- Data on agricultural water use and demand is sparse. Agricultural demand projections will be further refined as the State Department of Agriculture completes the *Agricultural Water Use and Development Plan*, as mandated by the State Water Code. The initial phase of the plan, which inventoried a handful of State agricultural water systems, was completed in 2004. The next phase of the plan is underway. Ultimately, the plan is to account for and project all agricultural water use statewide from both public and private systems.
- The *State Water Projects Plan*, most recently updated in 2003, includes projections of State agency water demands through 2020. The next update of the plan will provide input to refine projections for the year 2025 and beyond.
- The Department of Hawaiian Home Lands (DHHL) determines the uses permitted upon its land holdings, which are not subject to County zoning designations. Currently, most DHHL lands are designated for agriculture. As the DHHL plans for future development, the County must update demand projections appropriately.

Water Use Category	Aquifer Sector Area			Hawaii County
	NW Mauna Loa	Hualalai	SW Mauna Loa	
<b>2005 Total</b>	7.76	16.19	5.13	122.61
Domestic	0.00	0.25	0.32	2.99
Industrial	0.00	0.07	0.00	45.93
Irrigation	5.80	3.61	0.71	11.39
Agriculture	0.18	0.68	2.99	28.61
Military	0.03	0.00	0.00	0.03
Municipal	1.75	11.58	1.12	33.66
<b>2010 Total</b>	<b>9.01</b>	<b>18.09</b>	<b>5.70</b>	<b>133.85</b>
Domestic	0.00	0.28	0.35	3.40
Industrial	0.00	0.08	0.00	47.93
Irrigation	6.74	4.03	0.79	13.02
Agriculture	0.21	0.76	3.31	31.80
Military	0.03	0.00	0.00	0.03
Municipal	2.03	12.93	1.24	37.67
<b>2015 Total</b>	<b>10.45</b>	<b>20.16</b>	<b>6.31</b>	<b>146.31</b>
Domestic	0.00	0.32	0.39	3.87
Industrial	0.00	0.09	0.00	50.02
Irrigation	7.81	4.49	0.87	14.86
Agriculture	0.25	0.85	3.67	35.37
Military	0.04	0.00	0.00	0.04
Municipal	2.35	14.41	1.38	42.17
<b>2020 Total</b>	<b>12.11</b>	<b>22.47</b>	<b>7.00</b>	<b>160.50</b>
Domestic	0.00	0.35	0.43	4.41
Industrial	0.00	0.10	0.00	52.32
Irrigation	9.05	5.01	0.97	16.96
Agriculture	0.29	0.94	4.07	39.45
Military	0.05	0.00	0.00	0.05
Municipal	2.72	16.07	1.53	47.31
<b>2025 Total</b>	<b>14.03</b>	<b>25.05</b>	<b>7.75</b>	<b>176.43</b>
Domestic	0.00	0.39	0.48	5.03
Industrial	0.00	0.11	0.00	54.74
Irrigation	10.49	5.58	1.07	19.37
Agriculture	0.33	1.05	4.51	44.09
Military	0.05	0.00	0.00	0.05
Municipal	3.16	17.91	1.69	53.14

- Data is needed to quantify federal and private water system use and projected demand. Such information should be acquired and integrated into County WUDP demand projections.
- Based on past consumption, the DWS has developed and proposed updated average day water use unit rates for single-family residential units. These unit rates result in higher water demand projections as compared to the Water System Standard (2002) unit rates, and are considered more realistic.

## 1.4 Existing Water Infrastructure and Service Areas

The Department of Water Supply services approximately 35,000 customers countywide with about 8.5 billion gallons of water annually. The DWS operates 24 public water systems and 66 water sources throughout the County. According to the Environmental Protection Agency, a public water system is defined as a system that provides water to the public for human consumption through pipes or other constructed conveyances and supports at least 15 service connections or regularly serves at least 25 individuals. County water systems in the more densely populated districts of South Hilo and Kona are interconnected. The DWS's water rates are designed to encourage conservation through an inverted block rate structure, which charges higher unit costs for heavy water users.

The DWS has designated four water operations districts to manage the systems and service areas; Kona (District III) includes the North Kona water system and the South Kona water system. While the DWS operates and maintains these systems, funding considerations and the rapid development of Kona have typically enabled system expansions through improvements funded by private development. The following sections describe the North and South Kona public municipal water systems.

### 1.4.1 North Kona Water System

The North Kona water system produces the second highest volume of water and supplies the second highest number of water service connections countywide. According to DWS historic consumption records, however, the North Kona Water System has the highest metered water consumption in Hawaii County. This high rate of consumption is attributed to residential irrigation, and community and resort use. The average system production (2003) is 9.8 mgd with service to 8,950 connections (2003).

The North Kona distribution system is generally located between Mamalahoa Highway and the ocean from Keahole Airport to just beyond the intersection of Mamalahoa Highway and Kuakini Highway. The system serves elevations ranging from sea level to 5,013 feet and has a closed connection that can allow water to be exported to the South Kona water system. The upper service area extends from Kealakehe School in the north to the connection with the South Kona system in the Honalo area. The lower service area is fed by gravity from the Kahaluu reservoirs. The system extends from Keahole Airport to Keauhou Bay. The average consumption is 3.56 mgd. The lower service area can be roughly divided into three sections: 1) Keahole Airport to Kailua (Casa De Emdeko); 2) Casa De Emdeko to Kahaluu Bay; and 3) the Keauhou Bay area.

General system infrastructure includes the following:

- Source. The system is supplied by 13 ground-water sources: Kahaluu Shaft Wells (1 through 4), Kahaluu Wells (A through D), Holualoa Well, Keahuolu (QLT) Well, Kalaoa Well, Honokohau Well, and Hualalai Well. Two additional wells, the Waiaha Well and the Makalei No. 1 Well, are anticipated to come on-line in the near future.

- **Booster Pumps.** A total of 26 booster pump stations are located throughout the system.
- **Storage.** Currently, 53 storage tanks are in use. The DWS anticipates restoring one other tank to service soon.
- **Distribution Lines.** The system includes approximately 197 miles (1,039,509 ft) of pipe ranging in diameter from 1 inch to 24 inches.

There are three important issues related to the operation of the North Kona water system:

1. Rapid growth and development requires careful planning to ensure that the DWS can meet water demands, water quality standards, operational requirements, and ongoing maintenance needs.
2. Potential water quality issues may arise with the overuse of the Kahaluu shaft-based water sources.
3. There is a need to develop new sources of supply in mauka areas to access upper-level aquifers.

Table 1-5 below summarizes basic information on the North Kona Water system.

<b>Table 1-5 North Kona Water System Summary</b>	
<b>Operations District:</b>	Kona (District III)
<b>Average Production (2003):</b>	9.8 mgd
<b>Service Connections (2003):</b>	8,950 connections
<b>Water Treatment Method:</b>	Disinfection
<b>Sources:</b>	4 shaft wells, 11 wells
<b>Storage:</b>	53 tanks
<b>Booster Pumps:</b>	26 stations
<b>Pressure-Reducing Valves:</b>	84 valves
<b>Distribution Lines:</b>	197 miles of pipe

**1.4.2 South Kona Water System**

The South Kona water system is one of the DWS’s larger systems, and it is located immediately south of the North Kona water system. A connection exists between the two systems. Although it normally remains closed, it can be opened to provide additional supply to the South Kona system. The average system production (2003) is 1.9 mgd with service to 2,131 connections (2003).

The South Kona system is generally located along the corridor of Hawaii Belt Road from St. Paul Road near North Kona to Hookena Beach Road. The system serves the communities of Captain Cook, Keokea, Kealia, Hookena, Napoopoo, and Honaunau, and the service area ranges from Kealakekua in the north to Hookena School in the south, spanning elevations from sea level to 1,747 feet.

General system infrastructure includes the following:

- **Source.** The system is supplied by five ground-water sources: Keei Wells (A through D) and Halekii Well. The primary source wells are the Keei Well D and the Halekii Well, while the remaining wells are stand-by sources.
- **Booster Pumps.** The South Kona system has eight booster pump stations, although two stations are stand-by and not typically in use.
- **Storage.** There are nine storage tanks within the system.
- **Distribution Lines.** The system includes approximately 40 miles (209,652 feet) of pipe ranging in diameter from two inches to 12 inches.

When the Halekii Well is off-line, the DWS imports water from the North Kona water system.

Table 1-6 below summarizes basic information on the South Kona Water system.

<b>Table 1-6 South Kona Water System Summary</b>	
<b>Operations District:</b>	Kona (District III)
<b>Average Production (2003):</b>	1.9 mgd
<b>Service Connections (2003):</b>	2,131 connections
<b>Water Treatment Method:</b>	Disinfection
<b>Sources:</b>	5 wells
<b>Storage:</b>	9 tanks
<b>Booster Pumps:</b>	8 stations
<b>Pressure-Reducing Valves:</b>	21 valves
<b>Distribution Lines:</b>	40 miles of pipe

### 1.4.3 Non-Service Areas

Areas without County DWS or private water service are assumed to be on water catchment systems. Unfortunately, many areas without water service coincide with areas of low rainfall and high drought frequency, as these areas occur primarily throughout West Hawaii.

According to a March 2006 public notice from the DWS<sup>3</sup>, Approximately 40,000 to 50,000 residents on the Island of Hawaii presently use water catchment systems for their household water supply, and must go outside of their homes to acquire potable water. The DWS estimates that 1,264 households (41%) in S. Kona and 2,899 households (28%) in North Kona are without municipal water. <sup>4</sup>Many of these residents obtain their drinking water from public water spigot facilities provided by the DWS. At the time of the public notice, there were 15 spigot locations on the island. Many of the existing spigots are located in areas that are unsafe (close to high speed roadways), are in need of maintenance, lack adequate vehicle parking and Americans with Disability

<sup>3</sup> Notice of Availability of a Draft EA and FONSI – Drinking Water Spigot Project. Published in The Hawaii Tribune Herald and West Hawaii Today, March 6 and 8, 2006.

<sup>4</sup> Notice of availability of NEPA Final EA and FONSI for Construction of Islandwide Water Spigots Facilities, The Environmental Notice, Office of Environmental Quality Control, April 23, 2006.

Act (ADA) access. The County identified the greatest need for improvements and/or additional spigot locations in the Puna, Kau, and South Kona Districts of the Island of Hawaii.

In addition to domestic water supply issues, areas without water service also increase certain risks to public health and safety. Regarding public health, regulations for the design and construction of catchment systems are lacking. Poor design, maintenance, and choice of construction materials can compromise water quality and lead to contamination of the system. As for public safety, agricultural areas, which are also highly dependent upon rainfall, are also prominent along the dry Kona Coast. The juxtaposition of agricultural and wildland areas with developed urban areas increases the risk of wildland fire, especially when dry periods or drought conditions cause grasslands and scrub areas to turn into fuel. In Hawaii County, a total of 40 of the 48 fires in Hawaii County from 1953 to 2001 occurred in low rainfall zones. Most of these fires can be attributed to human negligence or arson due to the location of the burn areas and the wildland-urban interface zone.

**1.5 Historical and Projected Municipal Water System Demands**

This section summarizes the results of DWS demand analysis and projection efforts undertaken in support of the forthcoming 20-Year Water Master Plan.

**1.5.1 Historical Municipal System Water Demands**

The table below shows historical water production data for the North and South Kona water systems with respect to total water production countywide, as determined by the County DWS.

<b>Table 1-7 Estimated Average Day Historical Water Production for the North and South Kona Water Systems</b>			
<b>Water System</b>	<b>Water Production for Fiscal Year Ending June 30</b>		
	<b>2001 (mgd)</b>	<b>2002 (mgd)</b>	<b>2003 (mgd)</b>
DWS Total for County	29.430	31.370	32.251
North Kona	9.618	9.295	9.788
South Kona	1.496	1.318	1.875

DWS also examined seasonal variation in water production. By comparing monthly production data from 2001 to 2004, it was determined that there are no large seasonal changes.

Total water demand includes two components:

- Metered water consumption; and
- Non-Revenue water

In order to characterize historical demand, both consumption and non-revenue water must be quantified.

### Historical Water Consumption

The DWS estimated the number of water service connections for fiscal year 2003. These estimates include all DWS customers, including residential, commercial, industrial, resort, and agricultural customers. The North Kona water system was estimated to serve 8,950 connections, while 2,131 connections were estimated in the South Kona system. Therefore, the service connections within the planning district represent 28.67% of the total 38,653 DWS connections countywide.

In contrast, the 2003 water consumption in North and South Kona, respectively, was 9.571 mgd and 1.576 mgd. This represents 43.64% of the total DWS consumption of 25.542 mgd. DWS also found that the top 20 customer accounts with the highest average daily water consumption in 2003 were all located in either North Kona water system or the Lalamilo water system, which is located immediately north of the Community Development Plan Area. These accounts are responsible for 13% of the total 2003 water consumption. Ten of the top 20 water consumers are located within the North Kona District, including the account with the highest overall consumption of 0.415 mgd.

It should be noted that a considerable portion of water consumption is attributed to agricultural uses. Although agricultural uses such as irrigation do not require potable water, alternative water sources are not readily available to farmers in the North and South Kona area. Agricultural water consumption is summarized in Table 1-8 below.

<b>Table 1-8 Potable Water Consumption by Agricultural Customers in the North and South Kona Municipal Water Systems</b>				
<b>Water System</b>	<b>2003 Agriculture Consumption (mgd)</b>	<b>Number of Agriculture Customers</b>	<b>Total 2003 Consumption for Water System</b>	<b>Agricultural Consumption as % of Total System Consumption</b>
North Kona	1.012	231	9.571	11%
South Kona	0.275	168	1.576	17%

### Historical Non-Revenue Water

Non-revenue water is the difference between the amount of water that is produced and the amount of water sold to consumers, and is characterized as either “accounted-for” non-revenue water or “unaccounted-for” non-revenue water, as described below:

“Accounted-For” Non-Revenue Water:

- Water main flushing at hydrants
- Fire-fighting measured at hydrants
- Metered reservoir overflows

“Unaccounted-For” Non-Revenue Water:

- Water main leaks
- Water meter inaccuracies

- Production source meter inaccuracies
- Unmetered water main flushing, fire-fighting, and reservoir overflows
- Inaccuracies in billing system
- Unmetered withdrawals from the system

The largest portion of non-revenue water is usually attributable to water main leaks and meter inaccuracies.

From 2001 to 2003, the DWS estimated that 20% to 23% of the volume of water produced countywide became non-revenue water. For the North and South Kona water systems, non-revenue water was less than 10%. This 10% estimate accounts for instances where water is produced in one system but consumed in another, specifically, the small portion of the North Kona system that is supplied by water produced by the South Kona system’s Helekii well.

Although there is no industry standard that defines the maximum acceptable amount of non-revenue water for a system, ten percent or less is a very common goal among water utilities. Often, utilities with non-revenue water exceeding 10 to 15 percent begin efforts to reduce non-revenue water. DWS expects to use the non-revenue water data to assist with prioritization of control and reduction efforts.

**1.5.2 Projected Municipal System Water Demands**

In preparing the forthcoming 20-Year Water Master Plan, the DWS projected system water demands for FY 2005, 2010, and 2025 (see Table 1-9). The projected water demand is the sum of projected water consumption and projected non-revenue water. It is also equal to the projected water production.

<b>Table 1-9 Projected 2005 to 2025 Average Day Water Demand for the North and South Kona Water Systems</b>					
<b>Water System</b>	<b>Projected Water Demand (mgd)</b>			<b>Average Annual % Increase</b>	
	<b>2005</b>	<b>2010</b>	<b>2025</b>	<b>Consumption</b>	<b>Demand</b>
DWS Total for County	34.490	37.991	50.625	2.9%	1.9%
North Kona	10.802	13.491	21.585	3.5%	3.5%
South Kona	1.606	1.800	2.451	2.1%	2.1%

Table 1-10 below compares the historic municipal demand data with the projected municipal demand for 2005 to 2025.

Water System	Historical Water Production (mgd)			Projected Water Demand (mgd)		
	2001	2002	2003	2005	2010	2025
DWS Total for County	29.430	31.370	32.251	34.490	37.991	50.625
North Kona	9.618	9.295	9.788	10.802	13.491	21.585
South Kona	1.496	1.318	1.875	1.606	1.800	2.451

Projected Water Consumption

Projected water consumption for FY 2005 was influenced more by historical data from 2001 through 2003, while projected consumption for FY 2010 and 2025 were based on population growth rates published for each district in the Hawaii County Revised General Plan and information on planned developments for which construction should be completed over the next 20 years.

For the North Kona District, the projected annual growth rate for 2005 to 2025, according to the Revised General Plan, is 2.2%. However, the anticipated major development projects in the district have water demands that exceed the 2.2% demand growth predicted by the Plan. Additionally, the DWS has issued water commitments for other smaller developments in the district. Therefore, the projected 2005 to 2025 annual consumption growth rate used to calculate demand is adjusted to 3.5%.

The water demands of major developments that are addressed within the 3.5% consumption growth rate include the following projects:

- Hiluhilu (mixed use)
- The Shores at Kohanaiki (mixed use)
- Kona Kai Ola (mixed use)
- Host Park (NELHA related)
- HELCO (utility)
- Five separate residential projects
- Gamlon
- Kahakai-Kona LLC
- Westpro (a.k.a. Lohiki) (residential)
- Kohanaiki Business Park, Phase 2 (commercial)
- Kaloko Industrial Park, Phases 3 & 4 (light industrial)
- Queen Liliuokalani Trust (light industrial & other)
- Haseko (residential)
- YO Ltd. Partnership (residential)
- Villages of Lai Opua (DHHL)
- Bencorp (multifamily residential)
- Kona Plantation
- OLT Estate
- D-Bar Ranch, LLC.
- Kamehameha Investment Corp.
- McClab Enterprises (multifamily residential)
- Puaa Development Corp. (multifamily residential)
- Pacific Basin (a.k.a. Kona Hawaiian) (multifamily residential)
- Sunstone Realty Partners (multifamily residential)

The DWS notes that, particularly in the North Kona District, the high volume of planned developments increases the difficulty of projecting water demands. Additionally, schedules and project details change rapidly and often. The 3.5% consumption growth

rate does not include the following projects, for which no information was available at the time of analysis:

- |   |   |
|---|---|
| - DHHL Airport Mauka Properties                           | - Cliftos Ooma  |
| - DHHL Keahoulu (if not part of the Villages of Lai Opua) | - UH Center West Hawaii (if not part of Hiluhilu development) |
| - DLNR development at Honokohau                           |   |

For the South Kona District, the Revised General Plan projected annual growth rate for 2005 to 2025 is 2.14%. The development of the Hokulia project in South Kona will create an increase demand at one point of the system while having the overall effect of decreasing the average annual growth rate across the system. Therefore, the projected 2005 to 2025 annual consumption growth rate used to calculate demand is adjusted to 2.1%.

#### Projected Non-Revenue Water

For non-revenue water, DWS assumed a volume of 10% for planning purposes. This is likely to be a conservative assumption for the North and South Kona systems, as 2003 non-revenue water was estimated to be less than 10%.

### **1.6 Municipal Water System Analysis**

In light of the results of the water demand projections for 2005 to 2025 summarized in the previous section, the DWS conducted system evaluations to determine infrastructure needs and deficits that should be addressed to meet future demands. The water systems were evaluated with respect to DWS service and design criteria, including water system polices and standards, pipeline criteria, storage criteria, peaking factors, and federal regulations. The following sections summarize the results of the water system analysis that are relevant to the North and South Kona Community Development Plan area.

#### **1.6.1 Transmission and Distribution System Analysis**

Hydraulic analysis models were used to evaluate distribution and transmission capacity for existing and future demand conditions. The hydraulic models are useful in sizing and verifying size requirements for distribution and transmission mains, pump stations, and reservoirs.

The North Kona system transmission and distribution analysis found that most of the service area meets the service criteria during both the 2005 and 2025 peak hour demands. Under both existing and future demand conditions, there are areas of high pressure and high velocity. In the 2025 scenario, there are several areas of low pressure. Fireflows did not meet the required criteria for approximately one-half of the locations analyzed. The recommended system improvements for the North Kona water system may be summarized as follows:

- Install larger transmission and distribution pipelines in corridors, both east/west and north/south. There are several areas with transmission and

- distribution corridors that have insufficient capacity due to smaller diameter mains (6-inch and 8-inch). There are also outlying areas and ends of the distribution systems with pipes less than 6 inches in diameter that should be replaced.
- There is insufficient east/west capacity in the industrial/commercial/resort area between Queen Kaahumanu Highway and Kuakini Highway. Pipelines along Kaiwi Street and Palani Road should be upsized, as well as the 6-inch line along Alii Drive.
  - In the Kilohana Kai, Alii Kai, and Komohana Kai areas between Kuakini Highway and Alii Drive, additional east/west capacity is needed to meet peak demands and satisfy DWS service criteria.
  - Along Palani Road, the 8-inch mains should be replaced with minimum 12- to 16-inch diameter mains.
  - To meet planned future development in the Kalaoa area, additional transmission and distribution capacity will be needed along the Kaiminani Drive corridor.
  - There are some storage tanks that have undersized inlet/outlet pipes, such as the Holmes and Lanes tanks that are served by 8-inch mains. These should be upsized.

The South Kona water system analysis showed that both existing and future conditions would result in some low-pressure areas and some high velocity areas. The recommended system improvements for the South Kona water system may be summarized as follows:

- Replace 6-inch pipeline on inlet side of Halekii Tank with 8-inch main.
- Replace 8-inch main from Halekii Tank down along Mamalahoa Highway to Konawaena Road with a 12-inch main.
- Replace 8-inch main south from Keei No. 3 Tank along the Mamalahoa Highway with a 12-inch main.
- Replace all pipelines that are less than 6 inches with minimum 6-inch mains.
- Provide new storage south of Keei No. 3 Tank along Mamalahoa Highway and near junction between Mamalahoa Highway and Ke Ala O Keawe Road.

### **1.6.2 Storage Analysis**

The storage analysis showed that both the North Kona and South Kona water systems have storage deficits under 2005 conditions and 2025 conditions. With the additional capacity of planned storage improvements to be constructed from 2006 to 2010, the deficit is mitigated to some extent, but significant deficits still exist. The results of the analysis are summarized in Table 1-11.

Water System	Storage Surplus/Deficit (mg)					
	2005		2010		2025	
	Existing Storage Only	With Planned Storage	Existing Storage Only	With Planned Storage	Existing Storage Only	With Planned Storage
North Kona	-8.30	-4.95	-10.49	-6.69	-19.62	-13.84
South Kona	-1.11	-0.42	-1.58	-0.50	-2.33	-0.72
Total	-9.41	-5.37	-12.07	-7.19	-21.95	-14.56

The recommended storage improvements for the North and South Kona water systems are summarized in Table 1-12, however, it is further recommended that the available and required storage be reevaluated every few years in order to account for changing water use, demands, and the possibility for using other alternatives for storage requirements on a case-by-case basis.

Water System	Storage Facility Volume	Additional Capacity Provided
North Kona	13.1	13.1
South Kona	3.6	3.1
Total:	16.7	16.2

**1.7 Municipal Water System Capital Improvement Program**

As part of the forthcoming 20-Year Water Master Plan for the municipal water system, the DWS has developed a prioritized capital improvement program (CIP) that includes projects expected to be required during the 2007 to 2026 planning period. These projects include new construction and replacement of old or undersized facilities and will enable DWS to accomplish the following:

- Continue to provide quality water service to customers;
- Upgrade service where necessary to meet DWS standards and regulatory requirements; and
- Serve anticipated growth within DWS’s water systems by constructing new water system facilities

The DWS has prioritized projects in a 5-year CIP (Phase 1) and a 20-year improvement program (Phases 2 and 3) for the County. The prioritization process evaluated CIP projects in terms of the following criteria: health and safety; DWS service criteria; regulatory requirements; operation and maintenance; coordination among other utilities; financing; and DWS strategic direction.

Table 1-13 summarizes the 2007 to 2026 CIP and Improvement Program Projects cost in 2005 dollars.

<b>Table 1-13 County of Hawaii DWS 2007-2026 CIP and Improvement Program Projects (2005 dollars, \$ millions)</b>									
Cost Item	Phase 1 (5-Year CIP)						20-Year Improvement Program		2007 to 2026 CIP Total
	2007	2008	2009	2010	2011	Phase 1 Total	Phase 2 2012-2016	Phase 3 2017-2026	
<b>DWS CIP</b>									
DWS-Funded Projects	14.50	8.25	5.30	14.75	8.50	51.30	22.18	49.82	123.30
Grant- & Loan-Funded Projects	3.30	6.50	3.00	3.30	--	16.10	16.10	16.00	48.20
Subtotal	17.80	14.75	8.30	18.05	8.50	67.40	38.28	65.82	171.50
Indirect Costs <sup>1</sup>	5.34	4.43	2.49	5.42	2.55	20.22	11.48	19.74	51.45
Subtotal	23.14	19.18	10.79	23.47	11.05	87.62	49.76	85.56	222.94
Renewals & Replacements	4.35	6.75	6.75	6.85	6.85	31.55	26.25	67.60	125.40
<b>Total DWS CIP</b>	<b>27.49</b>	<b>25.93</b>	<b>17.54</b>	<b>30.32</b>	<b>17.90</b>	<b>119.17</b>	<b>76.01</b>	<b>153.16</b>	<b>348.34</b>
<b>OTHER CIP</b>									
Developer-Funded Projects	4.10	4.00	1.70	3.00	3.00	15.80	4.12	1.55	21.47

<sup>1</sup> Indirect costs include engineering, legal, administrative, and construction contingency, assumed equal to 30% of construction costs.

The projects will be funded by DWS through various sources including CIP reserves, rate revenues, Drinking Water State Revolving Fund loans, and long-term bonds. Additionally, some projects may be funded through grants or by developers. The sections below summarize the CIP elements that are relevant to the North and South Kona water systems.

### 1.7.1 North Kona Water System Planned Capital Improvements

Table 1-14 lists the prioritized CIP projects planned for the North Kona water system. The projects are listed by phase, then by the CIP priority ranking number (the ranking number resulted from the countywide prioritization process). Specific implementation year information was not provided for Phase 2 and Phase 3 projects. All CIP projects are located within the existing North Kona Water System boundary.

<b>Table 1-14 North Kona District CIP and Improvement Program Project Costs (2005 dollars)</b>						
<b>CIP No.</b>	<b>Project Name &amp; CIP Year (if available)</b>	<b>New or Replacement</b>	<b>Estimated Cost (\$millions)</b>	<b>Funding Source &amp; Amount (\$millions)</b>		
				<b>DWS</b>	<b>Developer</b>	<b>Grant, Loan, or Other</b>
<b>Phase 1 (2007-2011)</b>						
20	Palani Rd. QLT Transmission – 2011	New	8.50	8.50	--	--
42	Keopu-Puuhonua 1.0 MG Reservoir – 2008	New	1.00	1.00	--	--
43	Keopu-Puuhonua Production Well – 2008	New	2.50	2.50	--	--
65	Hina Lani 1.0 MG Reservoir – 2008	New	2.00	2.00	--	--
66	Hina Lani Transmission Main – 2008	New	1.00	1.00	--	--
<b>Phase 1 Total</b>			<b>17.00</b>	<b>17.00</b>	<b>--</b>	<b>--</b>
<b>Phases 2 &amp; 3 (2012-2026)</b>						
19	Palani Rd. QLT Reservoir (1.0 MG) – 2010	New	2.00	2.00	--	--
44	Waiaha Makai 2.0 MG Reservoir (325'OF)	Replacement	2.00	2.00	--	--
45	Waiaha Water System Improvements	New	8.60	--	--	8.60
64	Hina Lani Mauka Tank	New	2.00	--	2.00	--
67	Kuakini No. 2 Tank	Replacement	0.60	0.60	--	--
68	Mamalahoa Highway Water System Improvements, Ph. 2	New	(no info provided)	0.00	--	--
69	Ooma Well Development, Ph. 1	New	1.00	1.00	--	--
70	Ooma Well Development, Ph. 2	New	2.00	2.00	--	--
71	Ooma Well Development, Ph. 2, 1.0 MG Reservoir	New	2.00	2.00	--	--
72	Waiaha Standby Well	New	2.00	--	--	2.00
85	Kahaluu Shaft Water Quality Enhancement, Part 2	New	2.00	2.00	--	--
92	Kahaluu Shaft Booster	New	0.10	0.10	--	--
118	Hiluhilu Water System Improvements	New	3.00	--	3.00	--
119	Kau No. 1 Production Well & Supporting Facilities	New	1.00	--	1.00	--
120	Keauhou Water System Improvements	New	4.00	--	4.00	--
121	Kona Baseyard Beautification	Replacement	0.10	0.10	--	--
122	Kohanaiki Tank (0.3 MG)	New	0.80	--	0.80	--
<b>Phases 2 &amp; 3 Total</b>			<b>31.20</b>	<b>9.80</b>	<b>10.80</b>	<b>10.60</b>

### 1.7.2 South Kona Water System Planned Capital Improvements

Table 1-15 lists the prioritized CIP projects planned for the South Kona water system. All South Kona system CIP projects are programmed for Phase 2 and Phase 3 implementation. The projects are listed by the CIP priority ranking number (the ranking number resulted from the countywide prioritization process). Specific implementation

year information was not provided for Phase 2 and Phase 3 projects. All CIP projects are located within the existing South Kona Water System boundary.

<b>Table 1-15 South Kona District CIP and Improvement Program Project Costs (2005 dollars)</b>						
<b>CIP No.</b>	<b>Project Name &amp; CIP Year (if available)</b>	<b>New or Replacement</b>	<b>Estimated Cost (\$millions)</b>	<b>Funding Source &amp; Amount (\$millions)</b>		
				<b>DWS</b>	<b>Developer</b>	<b>Grant, Loan, or Other</b>
<b>Phase 1 (2007-2011)</b>						
	(No Phase I projects in South Kona)					
<b>Phase 1 Total</b>			<b>0.00</b>			
<b>Phases 2 &amp; 3 (2012-2026)</b>						
46	Helekii Well No. 2, Ph. 1	New	1.00	1.00	--	--
47	Helekii Well No. 2, Ph. 2	New	1.75	1.75	--	--
48	Helekii Well No. 2, Ph. 2, 1.0 MG Reservoir	New	1.75	1.75	--	--
49	Replace Kahauloa (Ciriako) Tank (0.1 MG)	Replacement	0.50	0.50	--	--
73	Keeki No. 3 Reservoir (1.0 MG)	Replacement	2.00	2.00	--	--
86	Waipunaula Reservoir (1.0 MG)	Replacement	2.00	2.00	--	--
100	City of Refuge Waterline	New	1.00	1.00	--	--
101	Hookena Standpipe	New	0.32	0.32	--	--
123	Keeki No. 4 Reservoir	New	0.30	0.30	--	--
124	Keokea – Hookena Pipeline Replacement	Replacement	1.80	1.80	--	--
125	Keokea 0.3 MG Reservoir	New	0.50	0.50	--	--
<b>Phases 2 &amp; 3 Total</b>			<b>12.92</b>	<b>12.92</b>	--	--

Three pipeline replacement projects are also programmed for the South Kona water system, however, these are considered part of the renewal and replacement program and are not listed in the CIP table above. All three projects are estimated to cost less than \$500,000 each.

## **1.8 Wastewater Reuse, Water Conservation, and Drought Mitigation**

### **1.8.1 Wastewater Reuse**

Recently, the CWRM completed the *2004 Hawaii Water Reuse Survey and Report* as the initial step in the development of a statewide wastewater reuse program. The report inventories and describes existing reuse projects in the State, and more importantly, identifies opportunities for future reuse projects throughout the State. As presented in the *2004 Hawaii Water Reuse Survey and Report*, the inventory of reuse projects in Hawaii County is included below:

#### **Current Wastewater Reuse Applications:**

Water reuse on the Big Island is mainly taking place at private resort developments where wastewater is treated at resort owned wastewater reclamation facilities and then blended with other water sources and reused for irrigation of the resorts' golf courses. Other projects include the State Department

of Transportation's Keahole International Airport where R-1 water is used for irrigation of the airport's landscaping and at Parker Ranch where R-3 water is used for pasture irrigation.

The County of Hawaii has not developed a water reuse program and currently provides R-2 recycled water to only one project, the Swing Zone Golf Practice Facility in Kona. In this case, the owner of the Swing Zone installed the recycled water distribution system from the County's Kealakehe WWRF to the practice facility at his own expense. The County's Wastewater Division is contemplating developing a distribution system which will provide recycled water from its Kealakehe WWRF to a number of irrigation projects including parks and future golf courses. Lack of available funding however has delayed implementation of these ideas. Technical planning assistance has been provided to the County of Hawaii by the Bureau of Reclamation for the planning and design of a proposed constructed wetlands system that will utilize recycled water from the Kealakehe WWRF. Federal authorization is being pursued in Congress for funding of this project, along with two other county water reclamation projects (on Maui and Oahu). Federal funding shall be subject to authorization and subsequent Congressional approval for appropriation of funds on a cost-shared basis.

#### Kealakehe WWRF

Wastewater is treated to R-2 quality at the Kealakehe WWRF using five aerated facultative lagoons in series and chlorine disinfection. Recycled water is provided at no cost to the Swing Zone, a golf practice facility located in the Kona area of west Hawaii. The owner of Swing Zone installed a recycled water transmission system at his own expense from the County of Hawaii's Kealakehe WWRF to convey 0.06 mgd of R-2 water to the Swing Zone property where it is used to irrigate the facility's turf grass.

The County of Hawaii's Department of Environmental Management (DEM) was in the planning stages of developing a recycled water distribution system that would utilize recycled water from the Kealakehe WWRF. Phase 1 and 2 has now been put on hold. Phase 1, which would have satisfied the requirement of a consent decree for the county to use recycled water, involved the construction of a pipeline that would have delivered recycled water to the Honokohau Harbor where it would be used for landscape irrigation. This phase could have also served a future development by the Department of Hawaiian Home Lands (DHHL). Phase 2 involved the development of a pipeline and reservoir system that could deliver recycled water to a possible future golf course as well as a future development. The DEM has issued a letter to the Department of Health requesting that the Consent Order requiring irrigation water to be provided to Honokohau Harbor be revised to allow replacement of alternate Environmentally Beneficial Projects since plans by the Jacoby Development group indicates that major changes to the area are planned. The DEM will continue to attempt to obtain federal funding for a constructed wetlands system that will be used to upgrade the Kealakehe WWRF recycled water to a R-1 quality system.

### Heeia WWRF

The Heeia WWRF in the Keauhou Resort Community is owned and operated by the Kamehameha Investment Corporation. It produces 0.5 mgd of R-2 water. The recycled water is pumped to reservoirs located mauka on the Alii Course and blended with brackish water. The blended water is used for irrigation and in water features at the Kona and Alii Country Clubs.

### Kona International Airport

The Kona International Airport is located in west Hawaii and is the only project on the Big Island that utilizes R-1 water for irrigation purposes. The State Department of Transportation completed construction of the Kona International Airport WWRF in 2001. The daily flow of 0.03 mgd is blended at the treatment plant with an equal volume of potable water in a mixing basin and used to irrigate the airport's landscaping.

### Kona and Alii Country Clubs

The Kona and Alii Country Clubs are located in the Keauhou area of west Hawaii. R-2 recycled water has been used for irrigation and in water features at the golf courses since 1981. Currently, R-2 water is blended with brackish water and used to irrigate the front nine holes of the Kona Country Club course where there are few fairway homes present. Golf course maintenance personnel have the ability to utilize the recycled water throughout both courses if the need arises. The Heeia WWRF produces 0.5 mgd of R-2 water using activated sludge in the sequencing batch reactor (SBR) mode and chlorine disinfection.

The Heeia WWRF is reimbursed for the electrical costs associated with pumping the R-2 water to the reservoirs. The blended water is then directed to the Kona (makai) course's irrigation system. The driving factor for water reuse at this project is water supply. Potable water is too expensive to use and brackish water in the area is high in total chlorides (3400 mg/L). A challenge for this project is that the recycled water is also high in salinity with a total chlorides concentration of 2800 mg/L thus the blended water results in salt build up in the courses' soils. During periods of reduced rainfall, the courses' turf has a noticeable yellow appearance due to the high salt content of the irrigation water. This challenge has been addressed by adding gypsum to the courses but this is an expensive remedy that costs approximately \$75,000 per year. The main benefit of the recycled water according to the golf course superintendent is that it is "available and wet". No noticeable fertilizer benefit of the recycled water was reported but it is believed that the use of high salinity water for irrigation is hiding this potential benefit.

### Swing Zone, LLC

The Swing Zone is a golf practice facility located in the Kona area of west Hawaii. This is somewhat of a unique project because the owner of Swing Zone installed a recycled water transmission system at his own expense from the County of

Hawaii's Kealakehe WWRF to convey 0.06 mgd of R-2 water to the Swing Zone property where it is used to irrigate the facility's turf grass. Since buffer zones are required when using R-2 water via spray irrigation, potable water is still used to irrigate sections of the facility, which are close to roads and adjacent properties. R-2 water is blended with high salinity brackish water in a 3,000-gallon tank located at the practice facility.

Wastewater is treated to R-2 quality at the Kealakehe WWRF using five aerated facultative lagoons in series and chlorine disinfection. The driving factor for this project is water supply as the high cost of potable water prompted the owner to construct the recycled water transmission system. Recycled water is provided at no cost to the Swing Zone at this time although the County is considering charging \$1.00 per thousand gallons at some point in the future. The main benefits at this project include cost savings and dilution of the salinity level of the brackish water. A challenge is that the sprinkler head screens tend to clog with fish parts as mosquito fish are present both in the lagoons at the Kealakehe WWRF and in the storage tank at the Swing Zone.

### **Opportunities for Expanding Wastewater Reuse:**

The County of Hawaii's Wastewater Division is in the planning stages of developing a recycled water distribution system that will utilize recycled water from the Kealakehe WWRF. Phase 1, which will satisfy the requirement of a consent decree for the county to use recycled water, involves the construction of a pipeline that will deliver recycled water to the Honakahau Harbor where it will be used for landscape irrigation. This phase is expected to be completed by June 2005 and could also serve a future development by the Department of Hawaiian Home Lands (DHHL). Phase 2 is in the preliminary design stage and involves the development of a pipeline and reservoir system that could deliver recycled water to a possible future golf course as well as a future development. The Wastewater Division will continue to attempt to obtain federal funding for a constructed wetlands system that will be used to upgrade the Kealakehe WWRF recycled water to a R-1 quality system.

### **1.8.2 Water Conservation**

Generally, water conservation measures may be described in four categories:

- Resource conservation;
- Water system conservation;
- Consumer conservation; and
- Public education programs.

Resource conservation and water system conservation are primarily the functions of a water utility. The utility should also promote consumer conservation and incorporate a significant public education component in their water conservation program.

Under its water conservation program, the County DWS issues water conservation notices for voluntary water use reductions of 10% and limited water use for agricultural irrigation only between the hours of 8 p.m. and 6 a.m. Notices include tips to reduce water to meet 10% goal. If consequent water use reductions are not sufficient, DWS then issues a notice for mandatory use reductions. Also, the DWS water rates are designed to encourage conservation through an inverted block rate structure, which charges higher unit costs for heavy water users. The forthcoming County WUDP will incorporate conservation measures into demand-side management.

### **1.8.3 Drought Mitigation**

As part of a statewide effort to address and mitigate the effects of drought through the Hawaii Drought Program, which is coordinated by the State Commission on Water Resource Management (CWRM), the County of Hawaii Drought Committee and the CWRM held a series of workshops in 2004 to compile an inventory of existing drought mitigation programs, identify data gaps, identify drought risk areas, and recommend and prioritize drought mitigation projects. The workshops and the resulting report, *County of Hawaii Drought Mitigation Strategies*, were funded through a Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Planning Grant. The County can choose to seek funding for the drought mitigation projects identified in the report through FEMA or other sources. The project was completed with support and cooperation from the State of Hawaii Department of Defense, Civil Defense Division.

The Hawaii County Drought Committee includes volunteer participation from key government agencies, quasi-public organizations, and major landowners with interest in drought-related issues. During the planning workshops, the committee shared local knowledge and information about current drought conditions and past experiences coping with drought. Through facilitated discussion, the group collectively developed local and regional drought mitigation strategies to minimize the effects of drought upon domestic and municipal water supplies, fire suppression activities, agricultural water use, and the environment. The drought mitigation projects identified by the committee are prioritized and listed with cost estimates and other recommended actions in the *Drought Mitigation Strategies Report*. It is recommended that the drought mitigation projects and other follow-on actions be considered for implementation by the County of Hawaii and the Hawaii County Drought Committee.

## **2 WASTEWATER**

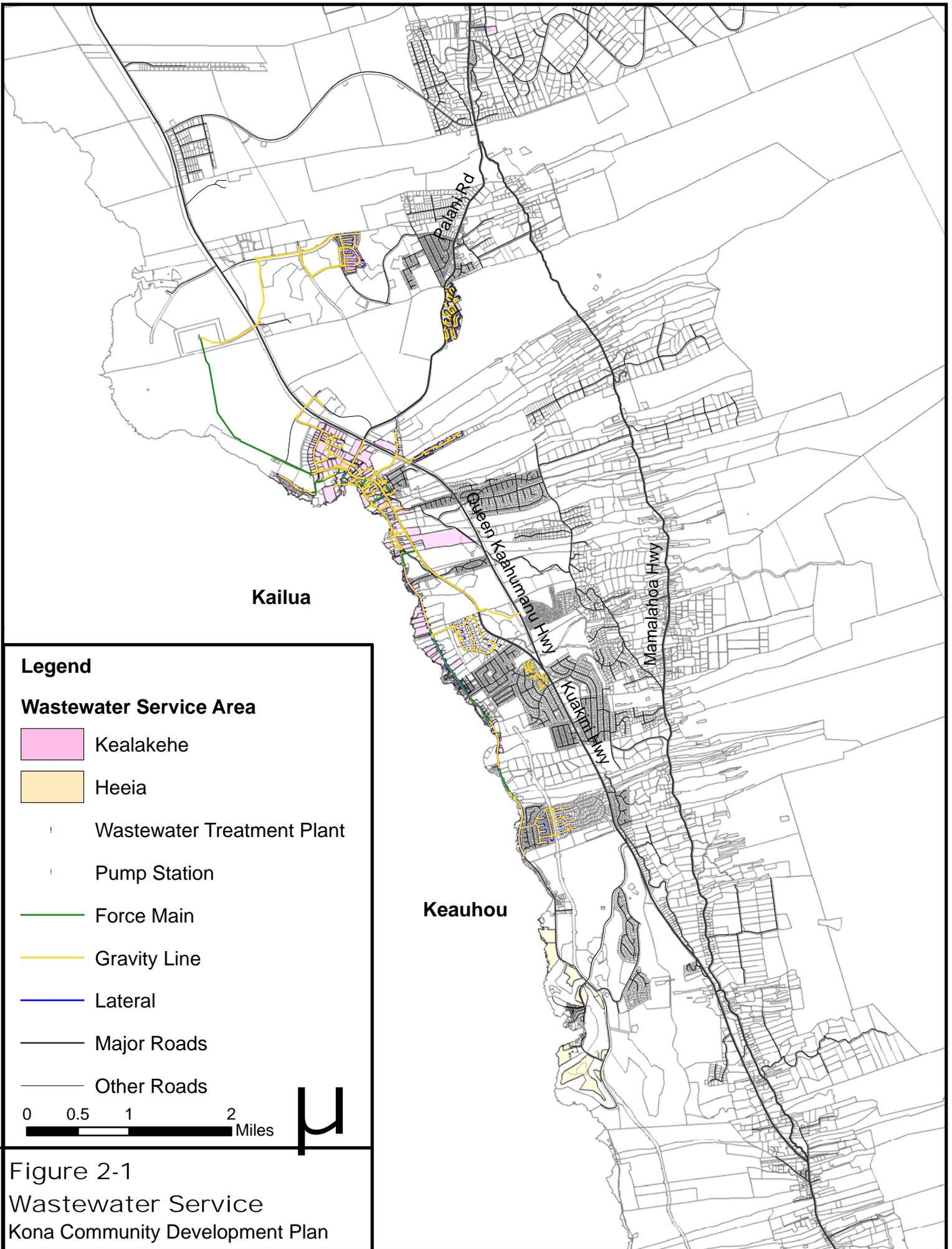
Wastewater facilities in North and South Kona range from individual cesspools and septic systems to public and private wastewater collection, treatment and disposal systems, including wastewater reuse. Older developments are primarily served by cesspools while many newer developments have been required to provide individual septic systems or privately operated treatment plants. The County of Hawaii operates the only municipal sewer system that collects wastewater for treatment, disposal and reuse at its Kealakehe Wastewater Reclamation Facility (WWRF).

### **2.1 Sewered Areas**

#### **2.1.1 Municipal Sewerage – Kealakehe WWRF**

There is only one municipal sewerage district in North and South Kona. Areas between Royal Sea Cliff in the south, Kailua-Kona, and Kealakehe High School in the east are serviced by the County's Kealakehe Wastewater Reclamation Facility (WWRF) (See Figure 2-1). The WWRF is presently designed to treat approximately 5.3 million gallons per day (mgd) and is presently treating approximately 1.0 mgd of wastewater. Wastewater is treated to R-2 reuse quality at the Kealakehe WWRF using five aerated facultative lagoons in series and chlorine disinfection. The County of Hawaii Department of Public Works constructed the Kealakehe Wastewater Reclamation Facility (WWRF) near Kailua-Kona with the intent of reusing effluent from the plant to irrigate the proposed Kealakehe Golf Course, which, due to a variety of factors, was never constructed. As a result, since 1993, the primary method of disposal for the R-2 quality effluent produced at the plant has been into a temporary sump located in the lava fields east or mauka of Queen Kaahumanu Highway, about 2,000 feet northeast of the WWTP. Only a small portion of the effluent (approximately 0.06 mgd) is used to irrigate the Swing Zone golf practice facility.

The County of Hawaii's Department of Environmental Management (DEM) was in the planning stages of developing a recycled water distribution system that would utilize recycled water from the Kealakehe WWRF. Phase 1 and 2 has now been put on hold. Phase 1, which would have satisfied the requirement of a consent decree for the county to use recycled water, involved the construction of a pipeline that would have delivered recycled water to the Honokohau Harbor where it would be used for landscape irrigation. This phase could have also served a future development by the Department of Hawaiian Home Lands (DHHL). Phase 2 involved the development of a pipeline and reservoir system that could deliver recycled water to a possible future golf course as well as a future development. The DEM has issued a letter to the Department of Health requesting that the Consent Order requiring irrigation water to be provided to Honokohau Harbor be revised to allow replacement of alternate Environmentally Beneficial Projects since plans by the Jacoby Development group indicates that major changes to the area are planned. The DEM will continue to attempt to obtain federal funding for a constructed wetlands system that will be used to upgrade the Kealakehe WWRF recycled water to a R-1 quality system.



**Legend**

**Wastewater Service Area**

- Kealakehe
- Heeia
- Wastewater Treatment Plant
- Pump Station
- Force Main
- Gravity Line
- Lateral
- Major Roads
- Other Roads

0 0.5 1 2 Miles



Figure 2-1  
Wastewater Service  
Kona Community Development Plan

The County of Hawaii Department of Environmental Management is in the process of preparing a Sewer Master Plan for the North Kona Improvement District, which would be served by the Kealakehe WWRF. A draft report dated April 2006 describes the potential expansion of the sewerage district to include approximately 5,600 acres of land identified as the “project area.” The project area extends from the shoreline between Kaiwi Point, near the Kealakehe WWRF, north approximately 3.75 miles to Puhili Point and mauka up to Palani Road and Mamalahoa Highway. The study year for the master plan is 2025. The first phase of the study will develop a sewer master plan identifying system improvements needed to accommodate a projected future flow. The second phase of the study will develop an implementation plan identifying proposed sewer improvements and recommending a method for financing the improvements. The implementation plan will be transmitted to the County Council for establishing the North Kona Improvement District pursuant to Resolution 129-03.

The draft report states that the basis for its projected future wastewater flow is the eventual full build-out of the project area, which is designated “Urban Expansion” on the County General Plan Land Use Pattern Allocation Guide (LUPAG). Wastewater flows are projected on a capita per acre (cpa) value for future land uses in the project area. Future wastewater flows for the project area were estimated for the years 2015, 2020, 2025 and Total Build Out based on:

- current land uses;
- current land use entitlements;
- major landowners’ and developers’ plans for future development;
- assumptions for average, maximum and peak flows, infiltration and inflow;
- real estate market conditions; and;
- various government planning policies for the region, including the LUPAG.

The 2025 Future Land Use Map depicts the estimated land used pattern for the project area. Alternative collection system improvements are presented to serve the projected development pattern, as well as for the distribution of reclaimed water. Notably, the projected average daily flow for 2015 is 8.98 mgd, which is well above the current 5.3 mgd design capacity for the Kealakehe WWRF. The average daily flow for the total build-out scenario is 13.25 mgd. Facility improvements for the Kealakehe WWRF are not part of the Sewer Master Plan, but the draft report recommends that planning for such improvements be considered as soon as possible.

Recently, the developers of the Shores of Kohanaiki project announced its interest in using the effluent from the Kealakehe WWRF to irrigate the golf course in that development, if the County would upgrade treatment to produce R-1 quality effluent.

### **2.1.2 Private Sewerage – Heeia WWRF**

The Keauhou Resort community is served by a privately owned and operated sewerage system that collects and treats wastewater at the Heeia Wastewater Reclamation Facility (WWRF). The system is owned and operated by Keauhou Community Services Inc., a subsidiary of Kamehameha Investment Corporation. Heeia WWRF was placed

in service in February 1994 in conjunction with the resort community development at Keauhou. Wastewater from the Keauhou Resort community service area is collected and conveyed to the Heeia WWRF facility for treatment and subsequent reuse as irrigation water for the Keauhou Resort golf courses. The wastewater collection system consists of a network of sewer lines and five pump stations (Kahaluu, Keauhou Bay, Kona Lagoon, Hoei and Heeia). The Heeia WWRF is a 1.8 mgd secondary sewage treatment plant that presently treats and produces approximately 0.5 mgd of R-2 quality effluent reused at the Kona and Alii Country Club golf courses (2004 Hawaii Water Reuse Survey and Report). The effluent is pumped to reservoirs mauka of the Kona Country Club, where it is blended with brackish water and used to irrigate portions of the golf courses.

The Heeia WWRF is projected to eventually accommodate 3.6 mgd as the Keauhou Resort community is built-out.

## **2.2 Unsewered Areas**

The vast majority of North and South Kona is unsewered and served by individual wastewater systems, comprised mostly of cesspools. These areas include most of South Kona and older residential developments in North Kona. Due to the potential adverse impacts of cesspool disposal on the quality of groundwater, storm-water runoff and coastal water quality, both the U.S. Environmental Protection Agency (EPA) and the State Department of Health have promulgated rules and regulations regarding the use of cesspools and other individual wastewater systems, as discussed below:

### **2.2.1 Critical Wastewater Disposal Areas**

In August 1991, the State Department of Health (DOH) adopted rules that prohibit the use of cesspools in critical wastewater disposal areas and intends to promulgate rules in the future that will prohibit any new cesspools to be constructed in the County of Hawaii.

Critical Wastewater Disposal Area (CWDA) is a geographic designation where the disposal of wastewater has or may cause adverse effects on human health or the environment due to existing hydrogeological conditions. CWDA are established based on one or more of the following concerns (Chapter 11-62 HAR):

- High water table;
- Impermeable soil or rock formation;
- Steep terrain;
- Flood Zone;
- Protection of coastal waters and inland surface waters;
- High rate of cesspool failures; and
- Protection of groundwater resources.

CWDA are divided into the following categories:

- CWDA, No cesspools allowed

- Cesspool 5, Cesspools are not allowed for lots less than 5 acres
- Cesspool 1, Cesspools are not allowed for lots less than 1 acre
- Non-CWDA, cesspools allowed, except large capacity cesspools

According to the DOH's CWDA map, the North and South Kona District includes CWDA, Cesspool 5, and Non-CWDA designations (see Figure 2-2).

If, based on these designations, a new cesspool would not be allowed, an alternative method of wastewater disposal would need to be provided. Depending upon other restrictions that may apply, these could include use of septic systems, construction or connection to a privately operated treatment system or connection to a public wastewater treatment system.

While no new cesspools are allowed in the CWDA, existing cesspools are continuing concern with regard to impacts on coastal water quality.

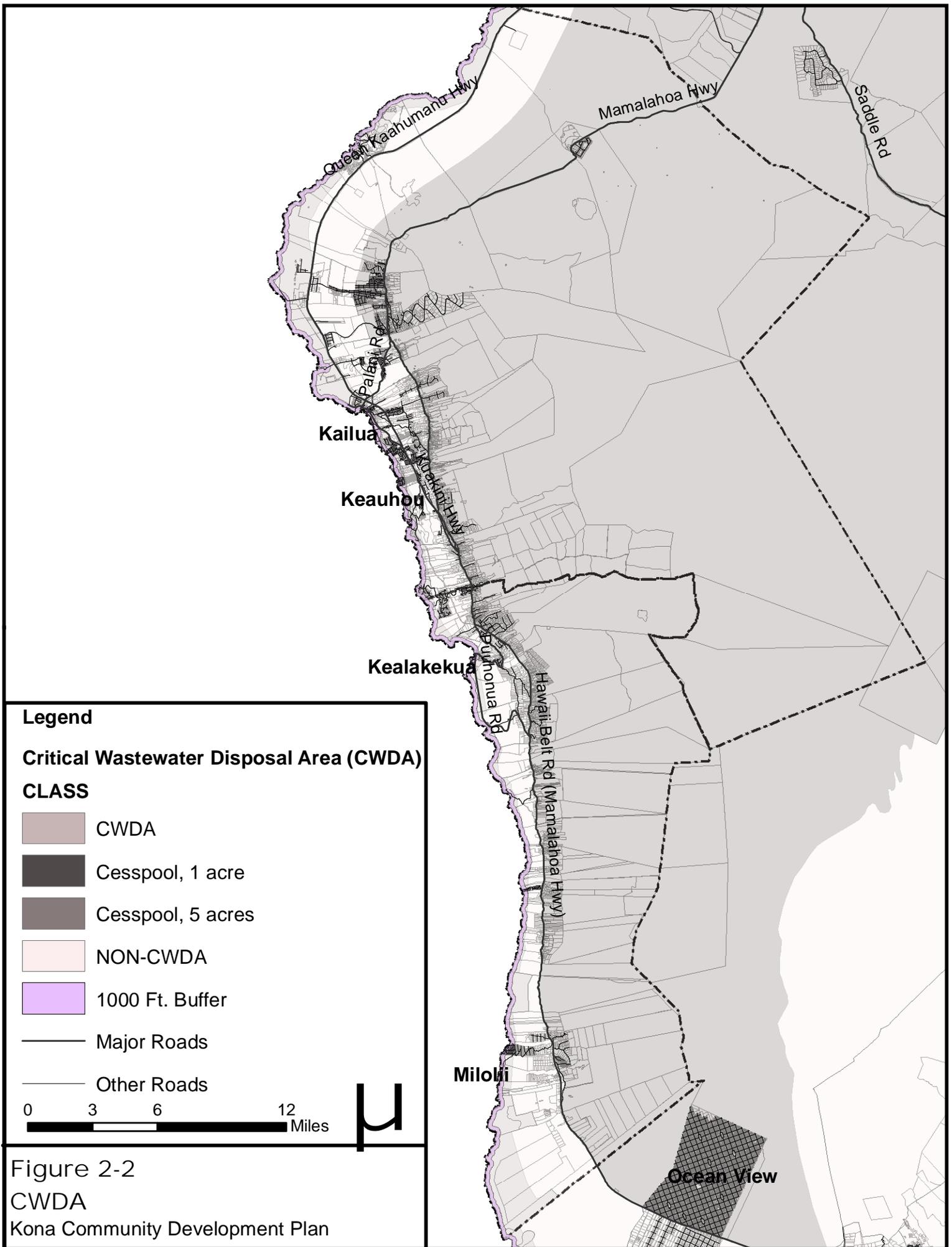
### **2.2.2 Large Capacity Cesspools**

In December, 1999, the U.S. Environmental Protection Agency (EPA promulgated Underground Injection Control (UIC) regulations which prohibit the construction of new large capacity cesspools (LCC) or the use of existing LCC as of April 5, 2000. An LCC is a cesspool serving two or more dwellings or a building or business generating wastewater from 20 or more persons a day. This restriction virtually prohibits any new cesspools other than for individual single-family residences within the County. Moreover, it requires any existing cesspools falling under the LCC definition to be replaced or abandoned in favor of an alternative wastewater disposal system. According to the County's GIS database, there are 25 LCC s in the Kona CDP area. Depending upon other restrictions that may apply, these LCC could be replaced by septic systems, construction or connection to a privately operated treatment system or connection to a public wastewater treatment system.

### **2.2.3 Septic Systems**

Septic systems are individual wastewater systems that collect and hold effluent, allowing it to separate and biodegrade before liquid components are canted by overflow for disposal, typically into a drainfield. Septic systems may be allowed for use where cesspools are prohibited, but the State Department of Health (DOH) regulates their use.

Pursuant to Section 11-62-31, Hawaii Administrative Rules (HAR), a septic system may be used for an individual single-family lot at least 10,000 square feet in area. Such individual septic systems, however, are not allowed for developments comprised of more than 50 dwelling units unless the individual lots are greater than one acre. Each system is further restricted to a flow not to exceed 1,000 gallons per day and cannot serve more than five bedrooms. Where septic systems are allowed, the size of the drainfield required for each system depends on the rate at which effluent is generated and on soil conditions determining how fast the effluent can percolate into the ground. The more rapid the percolation rate, the smaller the required drainfield size for a similar volume of effluent flow. Likewise, the lesser the calculated effluent flow, based on the



number of bedrooms or an equivalent of 200 gallons per day per bedroom, the lesser the required drainfield size under similar soil conditions. For buildings other than dwellings, the lot size must be greater than 10,000 square feet since each wastewater system serving the building(s) on the lot requires a minimum usable land area of 10,000 square feet per wastewater system, excluding the area under buildings. The total wastewater flow of a development cannot exceed 15,000 gallons per day and cannot exceed 1,000 gallons per day into each individual wastewater system. Thus, a development generating the maximum 15,000 gallons per day would require 15 individual wastewater systems, each with a usable land area of 10,000 square feet, for a total of 150,000 square feet (3.4 acres), excluding the area under buildings. The required size of the drainfield for each wastewater system is determined based on the rate of wastewater flow and soil conditions, similar to that for dwellings. Septic systems are subject to approval by the DOH.

#### **2.2.4 Individual Wastewater Treatment Systems**

Individual wastewater treatment systems may be the preferred alternative if other means of wastewater disposal are prohibited or otherwise not cost-effective. For new developments this may mean that they are prohibited from using large capacity cesspools, cannot meet minimum lot size requirements for septic systems, or cannot feasibly connect into a municipal wastewater treatment system or an existing private wastewater treatment system. Individual wastewater treatment systems provide a higher level of treatment than septic systems and can be based on a variety of treatment technologies. Depending on the quality of effluent produced, it may be suitable for reuse as irrigation, disposal over a drainfield or injected into a well, as discussed below. Ocean disposal is also possible but current permitting requirements are generally prohibitive. The treatment and disposal system plan is subject to review and approval by the DOH.

#### **2.2.5 Underground Injection Control**

As discussed previously, the disposal of treated effluent from a septic system or private wastewater treatment facility may be done over a drainfield. The size of the field, however, may be extensive, depending on the rate of wastewater flow and soil conditions. A disposal alternative that requires less area for effluent disposal is the use of injection wells discharging effluent deep into the ground. The use of injection wells for wastewater effluent disposal is governed by the State's Underground Injection Control (UIC) Program, set forth in the State of Hawaii Department of Health Administrative Rules, Title 11, Chapter 23, Underground Injection Control. The purpose of Chapter 23 is to establish an UIC program to protect the quality of the State's underground sources of drinking water from pollution by the subsurface disposal of fluids. An underground source of drinking water is defined as an aquifer that supplies any public or private drinking water system or contains a sufficient quantity of groundwater to supply a public water system.

According to Chapter 23, unless expressly exempted, all aquifers are considered to be underground sources of drinking water. Chapter 23 exempts lands located seaward of a geographically delineated UIC line from the definition of an underground source of drinking water. The UIC line is used as a guideline below which injection wells discharging treated wastewater effluent would more likely be allowed under a UIC permit (see Figure 2-3).

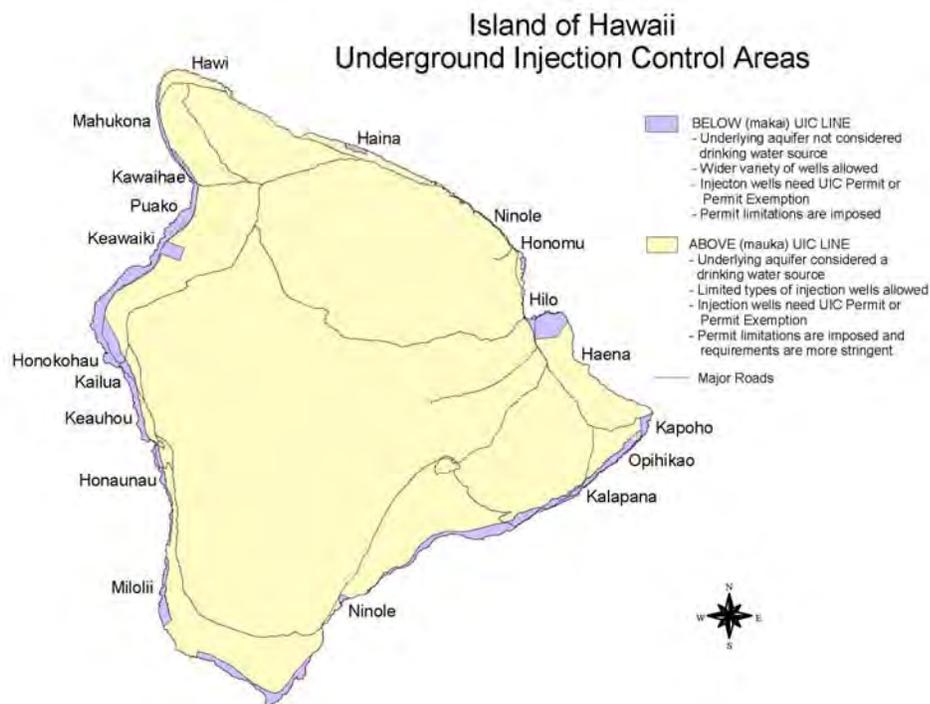


Figure 2-3: Island of Hawaii Underground Injection Control Areas. Source: State Department of Health (<http://www.hawaii.gov/health/environmental/water/sdwb/uic/pdf/hawuic.pdf>)

## 2.3 Potential Impacts on Coastal Water Quality

### 2.3.1 West Hawaii Coastal Monitoring Task Force

The west coast of Hawaii is a major tourist destination. Over the past two decades, the population and resort/residential development have increased rapidly. In 1990, the West Hawaii Coastal Monitoring Task Force was established to create coastal monitoring guidelines for West Hawaii. In 1992, these guidelines were published and intended to provide developers, government agencies, and other interest groups with a coastal monitoring program.

In 2004, the Marine Science Department at the University of Hawaii at Hilo was contracted by the County of Hawaii to evaluate water quality monitoring data from development projects in West Hawaii. Monitoring reports from thirteen development projects were reviewed to evaluate water quality, microbiological, biological, geological, and physical data. Only three development projects, Waikoloa, NELHA and Hokulia, contained enough water quality data to evaluate. The data from these three

development projects were used to evaluate the effects of resort/residential development on coastal waters in West Hawaii.

Four classes of waters (groundwater, anchialine pools, coastal waters, and oceanic waters) were sampled for water quality parameters (chlorophyll, turbidity, fecal coliform, enterococci, nitrate, ammonium, total nitrogen, phosphate and total phosphorous).

Nutrient parameters (total nitrogen, ammonia, nitrate, total phosphorous, phosphate) sampled at Waikoloa, NELHA and Hokulia were out of compliance with Hawaii Department of Health (HDOH) standards.

The report (University of Hawaii at Hilo, April 2006) concluded that the West Hawaii Coastal Monitoring Task Force Guidelines were not adequately implemented and development monitoring projects were not scientifically evaluated. The following recommendations were made to the County of Hawaii:

1. Guidelines from the West Hawaii Coastal Monitoring Task Force (1992) need to be revised, amplified, enhanced and adhered to, and enforced.
2. A county-wide coastal water monitoring program needs to be developed to monitor long-term environmental changes at existing and future developments, as well as, other identified sites in West Hawaii
3. Hawaii County needs to develop an anchialine pond protection/management program.

**2.3.2 Department of Health Water Sampling**

The Department of Health Clean Water Branch gathers water quality data throughout the state. Table 2-1 lists several water quality monitoring stations along the Kona coast. These stations are part of the Coastal Monitoring Program. DOH monitors for enterococcus, clostridium, temperature, dissolved oxygen, salinity, turbidity, pH, and percent saturation. The coastal monitoring program stopped a few years ago and resumed in Summer 2006.

<b>Table 2-1                      Department of Health Clean Water Branch                      Water Quality Monitoring Stations</b>	
<ul style="list-style-type: none"> <li>▪ Honaunau Bay (City of Refuge), 1201</li> <li>▪ Kahaluu Beach, 1203</li> <li>▪ Kailua Pier Station A, 1204</li> <li>▪ Kailua Pier Station A-1, 1205</li> <li>▪ Kailua Pier Station B, 1206</li> <li>▪ Kailua Pier Station C, 1207</li> <li>▪ Kailua Pier Station D, 1208</li> <li>▪ Kauhoku Bay – Hookena, 1209</li> <li>▪ Kealakekua Bay – Off Lei Stand, 1211</li> <li>▪ Kealakekua Bay – Off Canoe Landing, 1212</li> <li>▪ Keauhou Bay, 1213</li> <li>▪ Kona Hilton Shoreline, 1214</li> <li>▪ Magic Sands Beach, 1214</li> </ul>	<ul style="list-style-type: none"> <li>▪ Milolii, 1220</li> <li>▪ Honaunau Bay Embayment, 1229</li> <li>▪ Kealakekua Bay Embayment, 1230</li> <li>▪ Keauhou Bay Embayment, 1231</li> <li>▪ Kailua Bay Embayment, 1232</li> <li>▪ Honokohau Boat Harbor Embayment, 1233</li> <li>▪ Keahole Point Embayment, 1234</li> <li>▪ Banyan’s Surfing Area, 1235</li> <li>▪ OTEC, 1237</li> <li>▪ Honokohau Harbor, 1239</li> <li>▪ Kealakekua Bay, 1240</li> <li>▪ Kona Coast Beach Park, 1241</li> <li>▪ Kona Bay Estates, 1242</li> </ul>
<p>Source: <a href="http://emdweb.doh.Hawaii.gov/cleanwaterbranch/indesallsites.asp">http://emdweb.doh.Hawaii.gov/cleanwaterbranch/indesallsites.asp</a></p>	

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### 3 FLOOD HAZARD

The North and South Kona districts lie over the western slopes of Mount Hualalai and Mauna Loa. As relatively recent geological formations, both volcanoes retained their “shield” configurations, which lack well-defined drainage features characteristic of the older islands in the Hawaiian archipelago. Nevertheless, erosion has formed numerous narrow drainage-ways and water courses leading towards the ocean. Drainage-ways that have been identified as potential flood zones extend mauka from the coastline between Kailua Bay to the north and Kauhako Bay, south of Hookena. These watercourses generally are non-flowing except in times of heavy and extended rainfall. Most rainfall runoff sheet flows and percolates into the ground.

#### 3.1 Previous Studies

##### 3.1.1 North Kona Flood Hazard Analysis

The North Kona district was studied as part of the “*North Kona Flood Plain Management Study*” (1984) by the U.S. Soil Conservation Service (SCS, presently Natural Resources Conservation Service). North Kona has steep slopes, shallow soils, frequent high intensity rains, and lacks well-defined drainage ways making this area susceptible to flooding and overland flows. The mean annual rainfall ranges from about 20 inches along the coast to 100 inches at an elevation of 3,000 feet with gradual decrease thereafter to 20 inches at the peak of Hualalai (See Figure 3-1). The Study identifies three types of soils: volcanic ash soils; organic soils; and young, unweathered lava.

According to the “*North Kona Flood Plain Management Study*”, areas along the coffee belt region with Kainaliu, Holualoa and Kailua Village experienced flood water and sediment damage. The study identified seven intermittent drainage ways totaling 30 miles in length as having flood hazard potential. They included Kainaliu, Kawainui/Lehuula, Kaumalumalu, Holualoa/Horeshoe Bend, Waiaha, Hienaloli and Keopu drainage ways (See Figure 3-1).

The Study also calculated the acres inundated by along the seven drainage ways for the 100-year and 500-year storm (See Table 3-1).

The Study proposed the following alternatives for flood plain management:

##### Non-Structural Measures:

1. Preserve and maintain the conservation and agriculture land use districts above Mamalahoa Highway.
2. Establish and maintain appropriate vegetative cover in high rainfall, sediment and debris-producing areas.
3. Enforce county grading ordinance to reduce erosion and sedimentation.
4. Enforce land use zoning to restrict future development within identified flood plain areas.

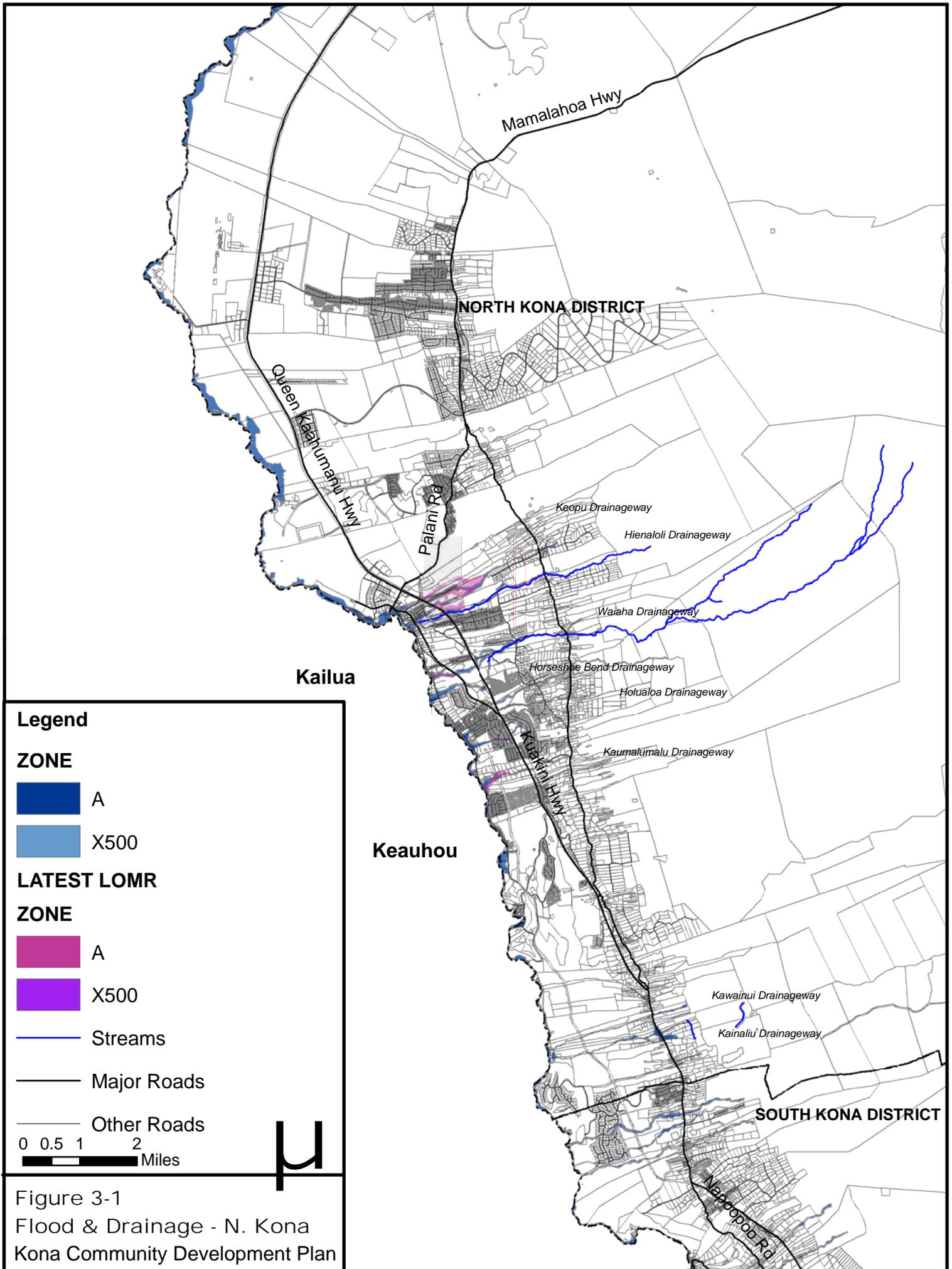


Figure 3-1  
 Flood & Drainage - N. Kona  
 Kona Community Development Plan

<b>Table 3-1 Drainage Way Acres Inundated and Length</b>			
<b>Drainage Way</b>	<b>Acres Inundated</b>		<b>Length (miles)</b>
	<b>100 - Year</b>	<b>500 - Year</b>	
Keopu	112	155	5.4
Hienaloli	54	69	3.8
Waiaha	125	172	6.0
Holualoa/Horseshoe Bend	68	107	5.6
Kaumalumaulu	71	99	3.9
Kawainui/Lehuula	47	66	2.8
Kainaliu	65	85	2.5
Total	545	753	30.0
<i>Source: U.S. Department of Agriculture Soil Conservation Service, North Kona Flood Plain Management. December 1984.</i>			

5. Initiate state/county tax incentives for keeping flood plain areas in recreational and/or open space use by:
  - a. Reducing tax rate for these designated areas.
  - b. Allowing tax deductions to landowners for donation of these areas to state or county.
6. Install flood warning system tied in to stream or rain gauges in the upper reaches of the drainage ways.

**Structural:**

1. Require all new developments to dispose of their runoff (up to the 10-year storm) on site.
2. Relocate or floodproof buildings within flood plain areas.
3. Improve road culverts and bridges to carry a larger discharge and provide additional ones where needed. Improve entrance design of culverts to prevent clogging by rocks, sediment and debris.
4. Provide a 100-year level of protection by installing diversions, channels, culverts and debris basins for the Keopu/Hienaloli, Waiaha and Kaumalumalu drainage ways in accordance with SCS design criteria.

**3.1.2 South Kona Flood Hazard Analyses**

The South Kona district was studied as part of the South Kona Flood Hazard Analysis (1977), by the U.S. Soil Conservation Service (SCS, presently Natural Resources Conservation Service). Rainfall is unique in this area in that summer months are wet while winter months are dry. This is due to the daytime sea breezes that push moist air over the land mass. The mean annual rainfall ranges from approximately 40 inches at sea level to about 80 inches at 3,000 feet elevation (See Figure 3-2). The Study describes South Kona as having well-drained, very shallow soils formed over lava. The drainage area above 6,000 feet elevation appears not to contribute to surface runoff. This area includes nearly barren lava, volcanic ash, pumice, and cinders.

According to the *South Kona Flood Analyses*, flooding problems have been largely due to localized high intensity rainfall from 1,000 feet elevation to 5,000 feet elevation. The Hawaii County Multi-Hazard Mitigation Plan (February 2005) contains a record of minor flooding events, including those at Kiialea, South Keokea, Honaunau and Wailapa Streams, as well as the Belt Highway in the area of 1950 lava flows and at Hookena Road. The Study identified twenty-five watercourses as having flood hazard potential (See Figure 3-2). Watercourses within South Kona are intermittent.

The Study proposed the following alternatives for flood plain management:

Non-Structural Measures:

1. Preserve the conservation and agricultural land use districts above Mamalahoa Highway.
2. Establish and maintain appropriate vegetative cover on sediment and debris producing areas that are subject to heavy runoff damages from sediment and rubble on lower areas.
3. Enforce county grading ordinance to reduce erosion and sedimentation.
4. Implement land use zoning to restrict future development within identified flood plains or require proper structural design to prevent floodwater damages from the 100-year event.
5. Purchase flood insurance on all buildings and mobile homes, especially those within the flood hazard areas delineated on the maps and those in areas subject to shallow alluvial-type flooding.

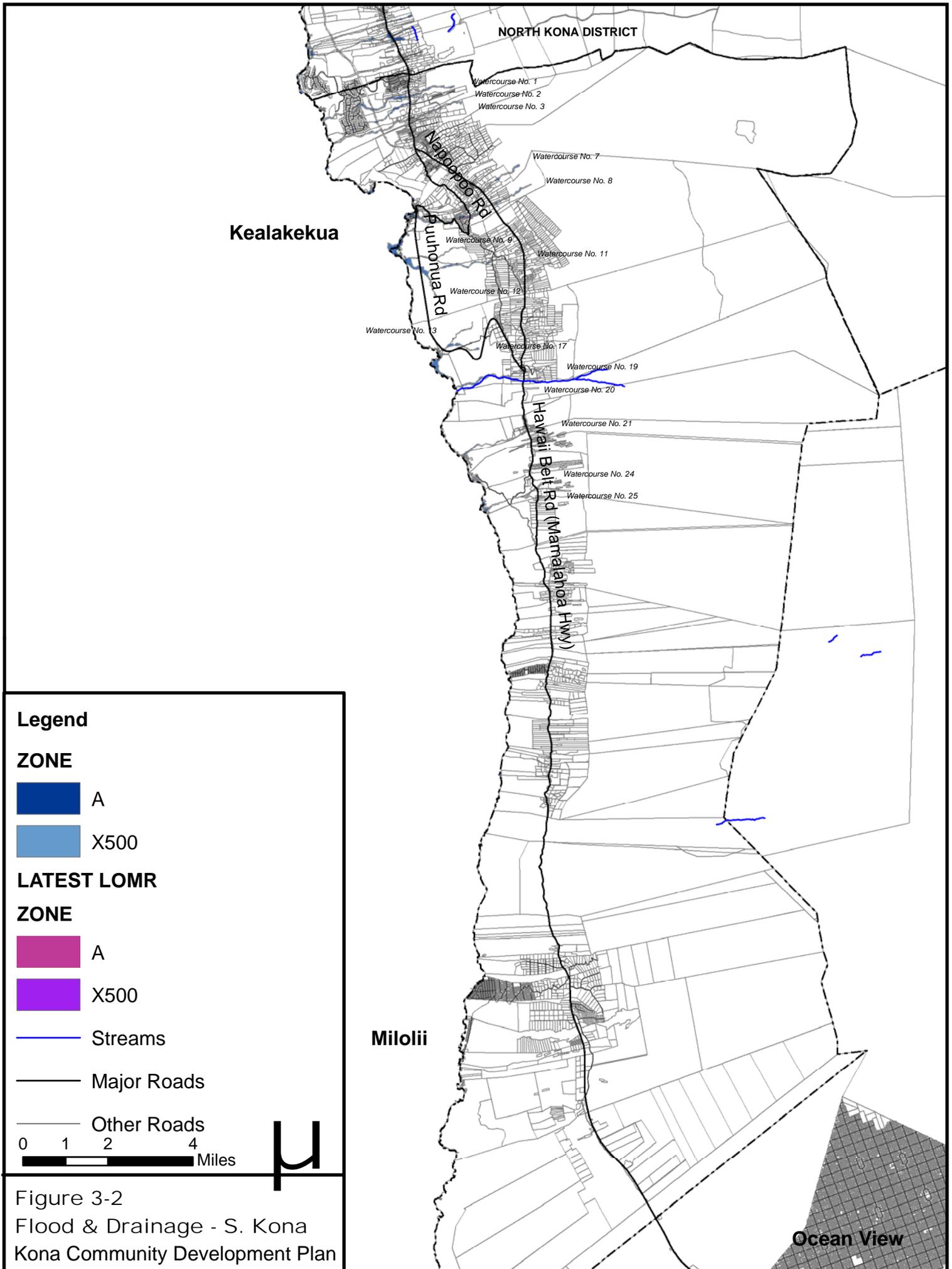
Structural:

1. Relocated or floodproof buildings within flood-prone area.
2. Improve road culverts and bridges to carry a larger discharge and provide additional ones where needed. Improve entrance design of culverts to prevent clogging by rocks, sediment, and debris.
3. Develop a system of diversions, using lava tubes and natural catchments to reduce the peak discharges at the highway.
4. Require all structural or land improvements to compensate for increased runoff and prevent this increased runoff from affecting adjacent lands.

**3.1.3 County of Hawaii Multi-Hazard Mitigation Plan**

The purpose of the County's *"Multi-Hazard Mitigation Plan: County of Hawaii"* (February 2005) is to provide a strategy to reduce loss of life or property caused by natural hazard events. The Plan focuses on natural hazards such as tsunamis, floods, hurricanes, drought, lava flow, wildfires, and earthquakes. The Plan studied existing conditions and existing available data. The Plan recommends the following:

1. Initiate State/County tax incentives for keeping flood plain areas in recreation and/or open space use by:
  - a. Reducing the tax rate for these designated areas.
  - b. Allowing tax deductions to land owners for donation of these areas to the State or County.



Tax incentives will not only provide financial compensation to the property owners, but the additional recreation and/or open space will also enhance the environment of the community which maybe incorporated into the green-belt concept of the community.

2. Improve warning and public education systems.

Install flood warning system tied in to stream or rain gauges in the upper reaches of the drainage ways. Flood warning system tied in to stream or rain gauges provides an early warning system of potential flooding to the community, improve the preparedness of the people of the coming hazardous events.

3. Improve accuracy and complete flood zone mapping.

**3.1.4 U.S. Army Corps of Engineer**

The U.S. Army Corps of Engineers has prepared other flood studies for the Kona area and are described below (U.S. Army Corps of Engineers [www.poh.usace.army.mil/CW/CWProjects.htm](http://www.poh.usace.army.mil/CW/CWProjects.htm)):

1. Holualoa Drainageway

Holualoa drainageway flows only during intense rainfall and flows through a rural residential community consisting of single and multi family-residential homes and agricultural farm lots. As a result of a flooding condition in the Holualoa Drainageway on March 1998, the County of Hawaii requested the Corps of Engineer (COE), Honolulu District, to conduct a study to verify the 100- and 500-year flood plain limits and stream flow paths of the Holualoa Drainageway. In August 2003, the COE submitted final flood maps to the County of Hawaii.

2. Keopu-Hienaloli Streams Flood Damage Reduction, Hawaii Study

The Keopu and Hienaloli watersheds are located above Kailua-Kona. Inadequately defined channels, accumulation of debris and vegetation, steep slopes, and under-sized channel and culvert capacities has caused flooding problems within the Keopu-Hienaloli basins. Repeated problems and records of historical floods in this Kailua area date back to 1955.

In December 2004, a walk-through inspection of this non-Federal Keopu Stream Flood Project was conducted by COE and County of Hawaii representatives. Based on the Continuing Eligibility Inspection (CEI) Report for Flood Control Project subsequent to the inspection, the project was rated “marginally satisfactory”, its condition “minimally acceptable” and its status is “active”.

The COE, Honolulu District, initiated a cost-shared feasibility study which is still on-going.

Prior studies for the Keopu-Hienaloli watersheds prepared by the U.S. Department of Agricultural Soil Conservation Service, include:

- a. The “Kona Watershed Plan, Island of Hawaii,” completed in December 1965,
- b. The “North Kona Flood Plain Management Study,” completed in December 1984,
- c. The “Keopu-Hienaloli Flood Control study, Hydrology and Flood Plain Analysis,” completed in August 1987, and
- d. The “Reconnaissance Report for Flood Damage Reduction, Keopu-Hienaloli Streams, North Kona, Island of Hawaii,” completed in February 1988.

### **3.2 Flood Occurrences**

The Highway Division, Department of Public Works, County of Hawaii maintains a record of localized drainage problems and complaints, mainly along streets and roadways in the Kona CDP area (County of Hawaii GIS). According to the information provided, there are approximately 30 locations in the Kona CDP area that have reported localized flood or drainage problems (see Figure 3-3). While the nature or causes of the problems are not provided, their location suggests that they occur at low points of roadways that may have inadequately designed or inadequately maintained drainage facilities.

Table 3-2 lists historical flood incidents that have occurred in Kona.

### **3.3 Flood Insurance Rate Maps**

The Flood Insurance Study (FIS) administered by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program (NFIP) of 1968, identified and assessed the severity of flood hazards in various areas on the island of Hawaii. This study, which included the Kona area, developed flood risk and flood plain data for the community to establish flood insurance rates and to assist the community in its efforts to promote flood plain management. Most of the flooding analyses for the North and South Kona areas were performed by former U.S. Department of Agriculture, Soil Conservation Services (presently, the Natural Resources Conservation Service) in the “1984 North Kona Flood Plain Management Study” and the “1977 South Kona Flood Hazard Analyses” report. Other analyses were also performed by the U.S. Army Corps of Engineers (USACE), Pacific Ocean Division for FEMA.

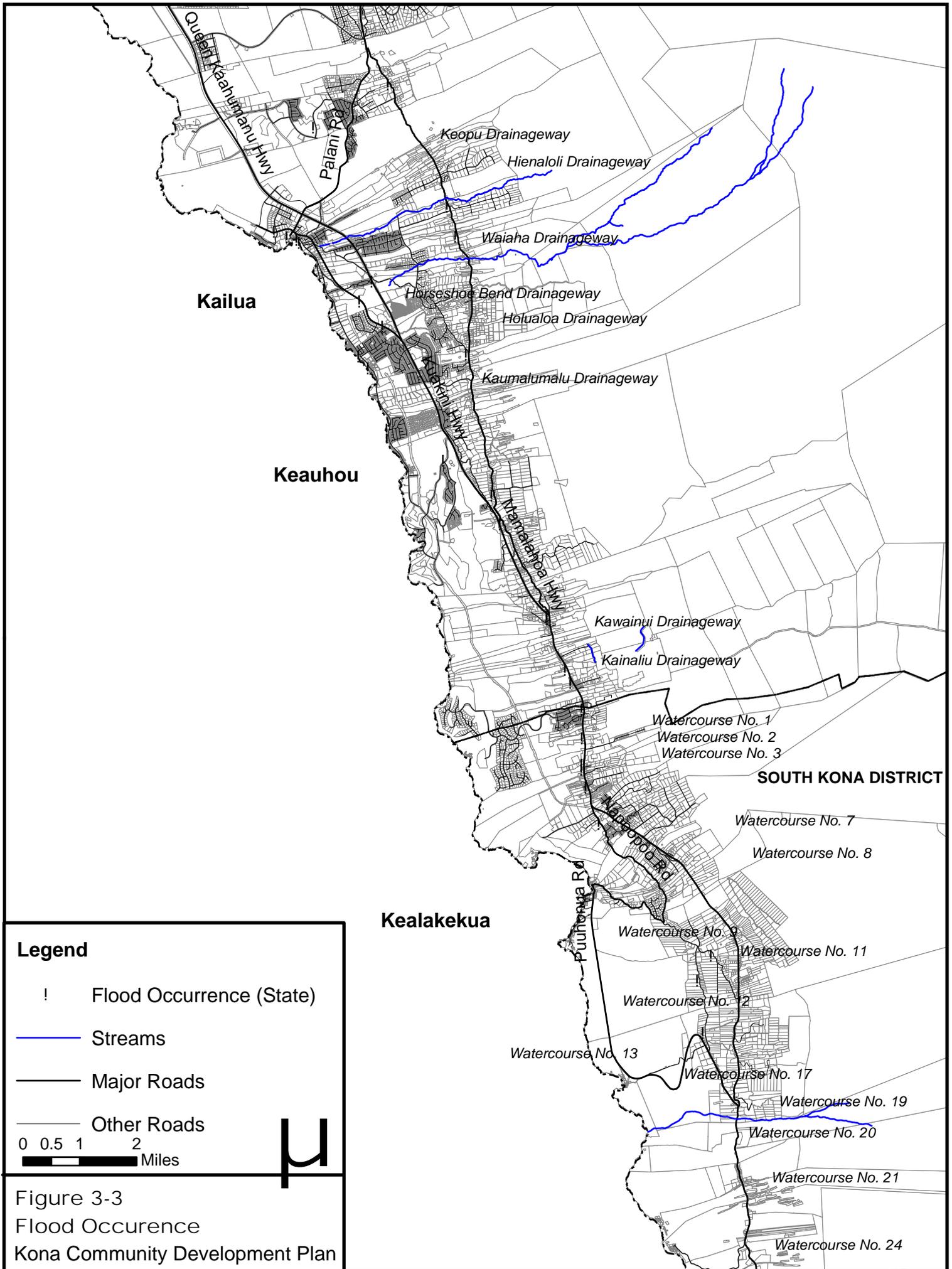


Figure 3-3  
 Flood Occurrence  
 Kona Community Development Plan

<b>Date</b>	<b>Location</b>
April 8, 1918	Flash flood at Kona Sugar Mill
October 22, 1922	Flash floods at South Kona
January 25, 1930	Holualoa Reservoir burst flash flood
October 30, 1961	Flash floods in South Kona.
April 29, 1963	Flash floods at Kainaliu
September 25, 1966	Captain Cook Kainaliu
October 12, 1967	Overland flow at Honokaa
October 24, 1967	North Kona
July 17, 1968	Localized flooding at Kaaakawa
October 3, 1968	Flash flood in North Kona
October 15, 1974	Flooding from Kaloko to Honaunau, 4.5" in 7 hours
April 29, 1976	Flash flooding in Honaunau
May 17, 1982	Minor flooding at Kona
September 29, 1986	Flash flooding from Captain Cook to Kealakekua
November 19, 1985	--
February 16, 1986	Localized flooding at North Kona
February 2 – 5, 1980	Flash flooding at South Kona
September 17, 1982	Heavy thunderstorms, minor flooding
January 22, 1986	2.1" in 1 hour, widespread flooding
January 5, 1987	Widespread floods. Captain Cook to Kona

*Source: County of Hawaii, Multi-Hazard Mitigation Plan, February 2005.*

Flood Insurance Rate Maps (FIRMs) generally provide information on magnitude of flood risk in communities. The FIRMs provides the basis for the County to regulate development within flood hazard areas through its permit process as set forth in the Hawaii County Code. While the process has helped to prevent or mitigate additional flood damage in the Kona area, flooding problems persist in some older developments that were constructed without adequate drainage and flood control improvements. Drainage ways and watercourses in the Kona CDP area identified on the Federal Emergency Management Agency (FEMA), FIRMs are listed in Table 3-3 and shown in Figures 3-1 and 3-2.

Drainage ways and watercourses in the Kona CDP area (Figures 3-1 and 3-2) shown on the FIRM generally are:

- Zone AE, special flood hazard areas inundated by 100-year flood with base flood elevations determined
- Zone X, areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.
- Zone X, Other areas determined to be outside 500-year flood plain.

Table 3-3 Flood Insurance Rate Maps (FIRM)	
Name of Stream	Community – Panel Number
North Kona	
Keopu Drainage-way	155166 0712C, 0713D
Hienaloli Drainage-way.	155166 0714C, 0713D
Waiaha Drainage-way.	155166 0714C, 0713D
Holualoa Drainage-way.	155166 0927D, 0926E
Horseshoe Bend Drainage-way.	155166 0927D, 0926E
Kaunalumalu Drainage-way.	155166 0926E, 0927D
Kainaliu Drainage-way.	155166 0937C, 0941C
Kawanui-Lehuula Drainage-way.	155166 0937C, 0941C
Kawanui Drainage-way.	155166 0937C, 0941C
Lehuula Drainage-way.	155166 0937C, 0941C
Kaunalumalu Drainage-way Tributaries 1, 2, and 3.	155166 0926E, 0927D
South Kona	
South Kona Watercourses Nos. 1,3,7,8,19,20,24, and 25.	155166 0939C, 0943C, 0944C, et al.

Areas located between Queen Kaahumanu Highway and Mamalahoa Highway, and areas above Mamalahoa Highway are all in “Zone X”.

In addition to the *North Kona Flood Plain Management Study and the South Kona Flood Hazard Analyses*, the coastlines of the Kona area were studied for wave action inundation which delineates the inundation limits of wave hazards which generally are in “Zone AE” and “Zone VE”:

- Zone AE, special flood hazard areas inundated by 100-year flood with base flood elevations determined
- Zone VE, special flood hazard areas inundated by 100-year flood, coastal flood with velocity hazard (wave action); base flood elevation determined”.

Flood hazard areas and limits can be found on the various panels of the current FIRMs or those revised in April 2004.

The existence and severity of flood hazard areas in North and South Kona identified by FEMA on the FIRM were adopted as part of the Hawaii County Code for Flood Control purposes. According to the Flood Insurance Study (FIS) for Hawaii County, revised in April 2, 2004, which revises and updates a previous FIS for Hawaii County, the studies and analyses upon which the flood boundaries were determined was referenced to various reports and analyses prepared from 1977 to 1985. Known flood hazard areas and areas of projected development or proposed construction through 1991 were studied by detailed methods. Approximate analyses were used to study areas having a low development potential or minimal flooding possibilities.

Flood hazard maps showing the various flood zones published by FEMA can be updated by Government-funded projects through detailed re-evaluation of flooding hazards based on physical changes, improved methodology or data. The re-evaluation process is costly and time consuming. FEMA generally bases its decision to conduct a re-study on a benefit-cost analysis. In the Kona region, the benefit-cost ratio may not justify a re-study at this time.

While a new FIS may not be justifiable to update and revise the flood hazard boundaries because of the low cost-benefit ratio even with the rapid growth occurring in the area, the County can rely on the procedures established by FEMA for changing the effective FIRM's by a Letter of Map Change (LOMC). There are three LOMC categories: Letter of Map Amendment (LOMA), Letter of Map Revision on Fill (LOMR –F), and Letter of Map Revision (LOMR).

### **3.3.1 Letter of Map Revisions (LOMR)**

FEMA established procedures by which a community or developer may compile appropriate data, perform necessary analysis and submit a request for a map revision or map change on a case-by-case basis. FEMA Map revision or map change is a Letter of Map Revision (LOMR).

A proposed revision can be approved by a Letter of Map Revision from the Federal Emergency Management Agency (FEMA) officially revising the current National Flood Insurance Program (NFIP) map to show changes to floodplains, floodways, or flood elevations.

Locations of existing flood zones in the Kona area updated with Letter of Map Revisions (LOMR) are listed in Table 3-4:

Information on the above LOMR's are obtained from Flood Maps available on FEMA Map Service Center (MSC) on FEMA website, [www.msc.fema.gov](http://www.msc.fema.gov).

### **3.3.2 Conditional Letter of Map Revisions (CLOMR)**

A CLOMR from FEMA would indicate that a proposed map revision meets the minimum standards of the National Flood Insurance Program based on the condition that the proposed project which the revision is based is built as proposed. Table 3-5 lists the updated CLOMRs.

Table 3-4 Updated Letter of Map Revisions (LOMR)		
Item ID/Flood Insurance Rate Map	Item Name/Case Number	Effective Date
1551660713D LOMR LOMA LOMR LOMR LOMR LOMR	Flood Insurance Rate Map 01-09-882P-155166 02-09-976A-155166 02-09-1456P-155166 03-09-1333P-155166 03-09-1531P-155166 03-09-0554P-155166	05-16-1994* 08-07-2001 06-21-2002 04-24-2003 02-27-2004 01-20-2004 06-13-2005
1551660926E/0927D LOMR LOMA	Flood Insurance Rate Map 00-09-124P-155166 05-09-1657A-155166	06-02-1995* 09-19-2000 12-06-2005
1551660927D LOMR	Flood Insurance Rate Map 00-09-124P-155166	06-02-1995* 09-19-2000
1551660937C LOMR	Flood Insurance Rate Map 05-09-0072P-155166	09-16-1988* 02-28-2005
1551660939C LOMR	Flood Insurance Rate Map 05-09-0072P-155166	09-16-1988* 02-28-2005
<p>* Denotes Effective Date of initial map.                      LOMR – Letter of Map Revision. A letter from FEMA officially revising the current NFIP map to show changes to floodplains.                      LOMA – A letter from FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.                      Source: www.msc.fema.gov.</p>		

Table 3-5 Updated Conditional Letters of Map Revisions (CLOMR)			
Item ID/Flood Insurance Rate Map	Case Number	TMK	Effective Date
1551660926E	04-09-0429R	(Alii Highway)	CLOMR issued 6/30/04
1551660713D/926E	04-09-0307R	7-5-017:019	CLOMR issued 5/05/04
1551660939C	00-09-1072R		CLOMR issued 6/11/01
1551660713D	00-09-1101R		CLOMR issued 6/12/01
1551660466C/478C	00-09-732C	7-2-004:005	CLOMR-F issued 7/28/00 (LOMR issued 7/25/01)
1551660713D	00-09-497R	7-5-003:003	CLOMR issued 6/06/00 (LOMR issued 8/07/01- Case No. 01-09-882P)
1551660713D	97-09-133R	7-5-004:043	CLOMR issued 4/29/97 (FEMA review complete. Determination pending.)
1551660713D	95-09-887R	7-5-04:06,07,13	CLOMR issued 3/12/96
1551660714C	95-09-773R	7-6-09:014	CLOMR pending submittal of data (11/14/09)
1551660713D/713E/926D	95-09-382R	7-5-017:028	CLOMR issued 9/08/95
1551660926C/927C	95-09-148R	7-6-024:025	CLOMR issued 3/24/95
1551660713C	90-09-63R	7-5-04:035	CLOMR pending (08/07/91)
<p>Source: Department of Public Works, County of Hawaii, August 28, 2006.</p>			

### 3.4 Mauka Lands Management and Development

Management of the lands mauka of the Mamalahoa Highway to preserve the conservation and agricultural land use areas is one of the non-structural flood protection recommendation offered by both the South Kona Flood Hazard Analyses, July 1977, and the North Kona Flood Plain Management Study, December 1984.

The Hawaii Land Use Law of Chapter 205, Hawaii Revised Statutes, classifies all land in the State into four land use districts: Urban, Agricultural, Conservation, and Rural. The lands mauka of Mamalahoa Highway are designated Conservation and Agricultural.

According to the Hawaii County Zoning Code, the lands mauka of Mamalahoa Highway are zoned as follows:

- A-10a (Agricultural, minimum building site of 10 acres)
- A-1a (Agricultural, minimum building site of 1 acres)
- A-20a (Agricultural, minimum building site of 20 acres)
- A-3a (Agricultural, minimum building site of 3 acres)
- A-5a (Agricultural, minimum building site of 5 acres)
- A-7a (Agricultural, minimum building site of 7 acres)
- Forest Reserve (FR)
- Open (O)

The Kona/Kohala Natural Resources Roundtable was created in response to the Office of State Planning's Draft Land Use District Boundary Review (1991 and 1993). The review recommended that specific agricultural areas in the Kona/Kohala districts be reclassified to Conservation due to their importance in protecting watersheds and natural resources. These areas were identified as "areas of concerns" in response to landowner's concerns about the recommended re-designation of their lands.

The Roundtable formulated several alternative recommendations and management tools for government and landowners to use in addressing the need to protect natural resources in the mauka areas (Kona/Kohala Natural Resources Roundtable Final Recommendations, June 1995):

- Planning & Management Guidelines – eleven guidelines meant to assist land managers and decision-makers, both public and private, in designing and implementing projects proposed in the Mauka Kona area.
- Transfer Development Rights – designation of transfer and receiving area(s) and transfers from non-growth to growth areas.
- Natural Area Partnerships – management of natural resources on private lands dedicated in perpetuity to conservation, using funds from Natural Area Partnership Program and landowners.

- Term Easements/Less Than Fee – creation of an easement in favor of management rights such as watershed management.
- Inventory Management and Monitoring Agreements – devise information gathering, planning and management activities that are supported by landowners which assure that their land ownership and land values are protected. Utilizing agreements can provide assurances to all vested parties that native ecosystems and rare populations are protected.
- Watershed Management Surcharge – surcharge would be built around a fixed fee to be paid by all public and private users who consume water. Important Watershed Management Areas would be identified and proposed surcharge seen as a voluntary, incentive-based system.

### **3.5 Adequacy of Drainage Standards**

#### **3.5.1 Storm Drainage Standard, Department of Public Works, County of Hawaii, October 1970.**

The County of Hawaii, Storm Drainage Standards, October 1970, as revised, provide guidelines and criteria for developments in the design of storm drainage facilities. In recent years numerous heavy storms and rainfalls in Kona have resulted in flood damages and flood losses to private properties and public improvements. At the same time, the Kona area has been experiencing rapid growth and urbanization. With the availability of recent data on additional rainfall frequency and other stream flow or hydrological information re-evaluation of the drainage standards to update the guidelines and criteria for drainage and flood control is appropriate

#### **3.5.2 Chapter 27, Flood Control - Hawaii County Code**

Chapter 27, Flood Control in the Hawaii County Code was adopted to minimize public and private losses due to flood conditions in specific areas by provisions designed to protect human life and health; minimize expenditure of public funds, and the need for rescue and efforts associated with flooding. This chapter was amended and revised in 1998.

#### **3.5.3 Chapter 10, Erosion and Sedimentation Control, Hawaii County Code**

Chapter 10, Erosion and Sedimentation Control in the Hawaii County Code is adopted to regulate and control drainage pattern in conjunction with grading, grubbing, and stockpiling operations to prevent erosion damage and to satisfactorily carry off surface runoff to avoid flooding hazard. This chapter is currently being revised.

### **3.6 Proposed Measures**

Land use changes and urbanization in the Kona area increase the area covered by impermeable surfaces such as pavement and buildings, which, in turn, reduces the infiltration of rainfall and increases the potential for runoff to occur. To reduce the potential for flooding by increased runoff, several flood control measures and projects have been implemented since 2004, including construction of the Keopu Channel and Kainaliu Diversion Flood Control System, and the dam reservoirs in Waiaha (Federal

Emergency Management Agency, April 2, 2004).

With proper planning, appropriate mitigating measures, and updated County flood-control policies to regulate, control, and provide guidance for new developments and projects, adverse impacts in the Kona District can be minimized. In addition, the County is in the process of adopting new ordinances and regulations to address current Federal water quality issues relative to drainage facilities, such as the use of drywells with inserts, filters, screens, fabrics, and other devices to capture sediment and other contaminants.

Below is a list of recommended non-structural and structural measures (U.S. Soil Conservation Service, 1977 and 1984 and Hawaii County Multi-Hazard Mitigation Plan, February 2005):

Non-structural measures:

1. Updating current land use zoning to restrict development within identified floodplains or requiring proper structural design to prevent floodwater damage. Implementation of restrictive land use zoning within identified flood plains will also protect and promote public safety and welfare, and minimize loss of properties or financial losses.
2. Adopting flood plain management practice in conjunction with the NFIP to reduce flood losses by enforcing limits of building to outside flooding limits in FIRM or requiring developments to submit LOMA for FEMA approval.

Structural Measures:

1. Enforcing appropriate setback requirements from floodways or flood-prone areas.
2. Improving drainage crossings and bridges across roadways.
3. Requiring all developments and new construction to compensate for increased runoff, and maintain development generated runoff to remain on-site.
4. Developing diversion or other suitable system to channel runoff into existing lava tubes or cavities.

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## **4 TRANSPORTATION**

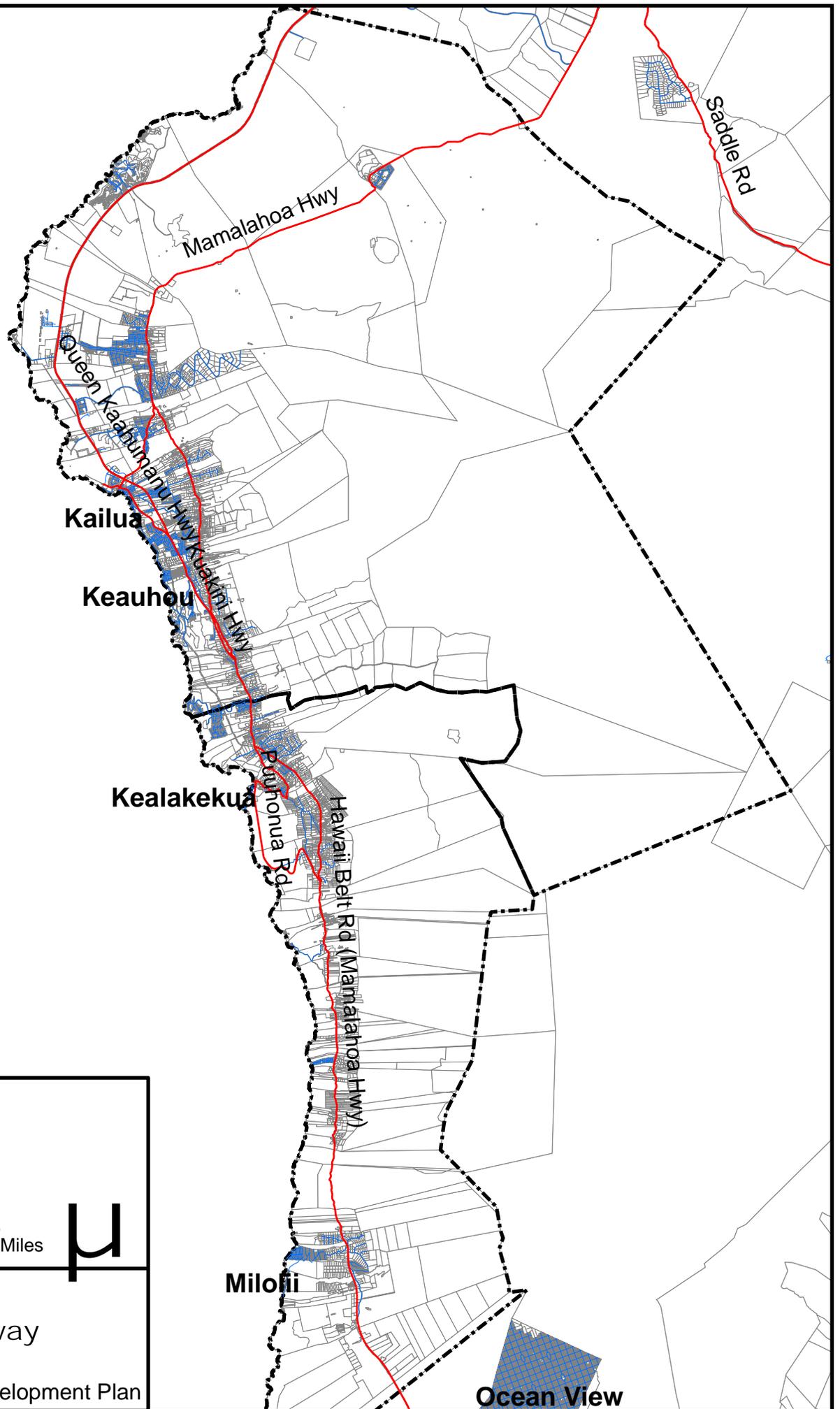
Transportation addresses the efficient movement of people and goods into, out of and within the planning area. The roadway network is the primary system for all modes of transportation from pedestrians, bicycles and cars to, mass transit and trucks. Congestion in the roadway network results from demand exceeding the capacity of the roadway system – typically manifesting in recurring congestion in specific areas. Solutions to congestion relate to reducing or altering transportation demand or increasing the capacity of roadway networks and addressing public safety. Previous transportation planning for the Kona region have typically addressed the capacity of the roadway network to accommodate projections of existing traffic demands. As such, these transportation plans typically recommended new roadways and links to address capacity and circulation issues. A more comprehensive approach would include a variety of approaches addressing both transportation demand and capacity. This chapter assesses the content, rationale for such recommendations.

### **4.1 Existing Roadway Network**

The existing transportation roadway network within the planning area is influenced by the same factors that shape the development of the individual towns. The existing roadway network is an eclectic combination of regional arterials and collector roads with smaller networks of collectors and local streets that have resulted from increasing development over decades. Topography and natural features are also a major influence over network locations within the planning area. Bounded by the ocean to the west and mountainous terrain to the east, the planning area linear in shape with regional roadways oriented in the north-south direction. These regional roadways not only service regional traffic movements but a large portion of the internal traffic as well. Travel to and from specific locations within the planning area more than likely requires the use of these regional transportation facilities.

Within the North and South Kona transportation network, the roadways can functionally be classified into arterials, major connectors, and minor connectors.

Two principal arterials providing north-south access through the region is Queen Kaahumanu and Mamalahoa Highway (see Figure 4-1). These regional facilities carry not only regional traffic traversing the planning area, but traffic between the planning area and area beyond, as well as, internal traffic originating and terminating within the planning area. The mix of trip types on specific sections of the roadways result in over-capacity conditions of the facility. To relieve the traffic demands on the regional facilities as well as provide added circulation for travel, connector roads have been developed to link the regional facilities and to provide additional roadway capacity.



**Legend**

- Major Roads
- Other Roads

0 2 4 8 Miles



Figure 4-1  
Existing Roadway  
Network  
Kona Community Development Plan

Major connector roads providing mauka-makai connections include Kuakini Highway Palani, Road, Hina Lani Street, Kaiminani Drive, and Kamehameha III Road. North – south connector roads include Alii Drive.

Mamalaho Highway is generally oriented along the coastline and provides circulation around the island through several towns and communities. From Waimea, north of the planning area, Mamalaho Highway proceeds southward as State Route 190 and continues as Route 180 in north Kona. At Honalo Junction, Mamalaho Highway continues southward as Route 11 through South Kona. Although classified as a major collector road through Kailua-Kona, Mamalaho Highway serves as one of the primary arterials in the region. Its alignment is generally composed of sharp curves and rolling terrain. This two-lane roadway is generally posted with a speed limit of 35 miles per hour (mph) through the planning area.

Queen Kaahumanu Highway is predominantly a two-lane, two-way roadway generally oriented in the north-south direction and is designated as Route 19 through the planning area. Functionally classified as a minor arterial, Queen Kaahumanu Highway provides regional access to several resorts located north of Kailua-Kona and is generally flat with a relatively straight alignment. Through the planning area, Queen Kaahumanu Highway generally runs parallel and west of Mamalaho Highway with its northern terminus is at Kawaihae, north of the planning area, and its southern terminus intersecting with Kuakini Highway within the planning area.

Kuakini Highway is predominantly a two-lane, two-way State of Hawaii roadway generally oriented in the north-south direction. The roadway operates as a major north-south collector road within the planning area, originating near the former Kona Airport in the vicinity of Makala Boulevard and continues southward intersecting with Mamalaho Highway. The roadway is generally flat and straight with limited curvature as it approaches Mamalaho Highway towards the south.

Hina Lani Street operates as an east-west collector road that connects Queen Kaahumanu Highway and Mamalaho Highway. It is predominantly a two-lane, two-way roadway that traverses the Kaloko Industrial Park and residential subdivisions towards the east near Mamalaho Highway. Hina Lani Street is generally curvilinear with steep grades to accommodate elevation differences between the two arterial roadways at its terminal points.

Palani Road operates as a collector road that provides connections to primary north-south arterial roadways. Palani Road is predominantly a four-lane, two-way State of Hawaii roadway generally oriented in the east-west direction between Kuakini Highway and Queen Kaahumanu Highway. The roadway continues eastward as a two-lane, two-way roadway and terminates at Mamalaho Highway. Palani Road has a generally straight alignment on a modest slope west of Queen Kaahumanu Highway. East of the highway, Palani

Road continues on a modest slope with a curvilinear alignment and intersects Mamalahoa Highway that is at a higher elevation.

King Kamehameha III Road provides a link between Alii Drive/Alii Highway and Mamalahoa Highway, and is generally a four-lane, two-way roadway situated on a steep incline to accommodate elevation differences between the coastline and Mamalahoa Highway. The Keauhou Shopping Center is the major traffic generator in the immediate vicinity and includes specialty retail, supermarket, eating establishments, and other services.

Alii Drive is a two-lane, two-way County of Hawaii roadway that is generally oriented along the coastline of Kailua-Kona and provides access to the coast as well as tourist-oriented shops, eateries, places of accommodation, and other uses. In addition to vehicular traffic, Alii Drive services many pedestrians throughout the day. The roadway is relatively flat throughout its curvilinear alignment with several sections of the roadway containing modest grades. The northern terminus is at the intersection of Kuakini Highway and Palani Road. From this intersection, Alii Drive curves westward and continues southward generally along the coastline and heads southeast to intersect with Kuakini Highway at its southern terminus.

## **4.2 Previous Plans**

There are several planning documents that identify the transportation system needs and address circulation and capacity constraints throughout the planning area. These documents include traffic forecasts based on development trends, and include recommendations to the transportation network to address future needs. The most intuitively obvious response to greater congestion is to expand the carrying capacity of the area's transportation system. This strategy can be implemented through diverse tactics such as road building or road widening. Although additional roads or the widening of existing roadways can improve circulation, in the short term, they may not be the most cost-effective solution in the long-term.

### **4.2.1 Hawaii Long Range Land Transportation Plan (HLRLTP) 1998**

The Hawaii Long Range Land Transportation Plan is a cooperative planning effort by the State Department of Transportation and the County of Hawaii. The plan identifies the major transportation improvements needed to support growth of the island of Hawaii until 2020.

### **4.2.2 Keahole to Kailua Development Plan (1991)**

The Keahole to Kailua Development Plan (K to K Plan), adopted by the Hawaii County Council on April 3, 1991, represents an ongoing effort by the County of Hawaii to prepare for the future urbanization of the region to meet the growing needs of West Hawaii. The K to K Plan encompasses the area from Kona International Airport at Keahole (Kau Ahupuaa) to Kailua-Kona (Palani Road), and from the shoreline mauka towards Mamalahoa Highway.

The K to K Plan addresses land use, infrastructure, and provides cost estimates for infrastructure in order to address future development in the region. The plan includes a land use plan, infrastructure plan, and financing and implementation plan for the next 20 years, providing a framework for future development of the Keahole to Kailua area.

#### **4.2.3 Keahole to Kailua Development Plan Revised Roadway Plan (1997)**

Since the preparation of the K to K Plan, development progressed rapidly and the need for a more in-depth roadway analysis became apparent. Townscape Inc. was retained by the Hawaii County Planning Department to expand on roadway concepts preseted from the 1991 K to K Plan. A detailed roadway plan and implementation strategy for the major roadways within the K to K planning area was prepared. Implementation was phased over three time periods, 2005, 2020, and 2050. The development of this detailed plan involved updating the status of various projects planned within the region and identifying roadway corridors that would be needed to accommodate future traffic.

The Roadway Plan recommends improvements to Queen Kaahumanu Highway, Palani Road, Kealakehe Parkway, Makala Road, and Hina Lani Drive; the construction of North-South Roads, including Waena Drive and Kealakaa Street, the Mid-Level Road and University Drive.

#### **4.2.4 Keahole to Kailua Roadway Master Plan (2001)**

This study revised the Keahole to Kailua Roadway Plan to accommodate developments planned or constructed since the 1997 publication. The study reviewed development plans affecting Mid-Level Road and Waena Drive. It also assessed the feasibility of alternative realignments for these roads and identified potential traffic impacts. The plan recommended the following:

- Realign Mid-Level Road mauka of Kohanaiki Business Park to the Waena Drive alignment as it crosses Kaiminani Drive.
- Terminate Waena Drive at its intersection with Kealakehe Parkway.
- Increase the Mid-Level Road right-of-way requirements from 120 feet to 150 feet. The increase accounts for future widening of the road which would offset the elimination of Waena Drive.
- Designate existing Mid-Level alignment as Main Street and increasing right-of-way from 60 feet to 80 feet to account for loss of Waena Drive.

#### **4.2.5 Keahole to Honaunau Regional Circulation Plan (2003)**

This regional transportation plan was initiated to address the peak hour traffic congestion on the region's arterial roadways during peak hours through parts of North and South Kona. According to the plan, urban sprawl, population growth, uncoordinated development, and resulting traffic congestion are severely affecting the quality of life and character of the Kona region.

The plan identified needs for new roadways and/or expansion of existing roadways for commercial vehicles, bicycle, pedestrian, and transit systems. Three types of recommendations were presented:

1. Corridor Management programmatic recommendations.
  - County Council Resolution on Transportation Corridor Management
  - Zoning and Subdivision Regulations
2. Proposed short term projects and long range concepts that address transportation needs for the next 20 years.
  - Ke Ala O Keauhou and Mamalahoa Highway Bypass – Traffic Access Management
  - Hienaloli Road/Keanalehu Road and Kealakaa Street/Kealakehe Parkway – Extension Projects
  - Bikeways and Paths – Improvements Projects
  - Mass Transit – Improvement Projects
  - Fixed Rail Mass Transit
  - Future North-South Corridors
3. Projects and programs that require further study were identified.
  - County Historic Preservation Policies
  - Community Character Benchmarks
  - Green Open Space
  - Heritage Corridor
  - General Plan Update
  - Regional Development Plan

#### **4.2.6 State Transportation Improvement Program/Capital Improvement Projects**

The Hawaii Statewide Transportation Improvement Program (STIP) provides a multi-year listing of State and County transportation projects and identifies those projects programmed for federal funding. It is a multi-modal transportation improvement program that is developed utilizing existing transportation plans and policies, and current highway, transit and transportation programming processes. Table 4-1 lists projects on the current STIP (*Statewide Transportation Improvement Program, FY 2006 – FY 2008*, HDOT, September 8, 2006).

<b>Project</b>	<b>Status</b>
HS 20. Kealakehe Parkway Extension, Keanalehu Drive to Kealaka Street	Design
HS 22. Mamalahoa Highway Safety Improvements in the Vicinity of C.Q. Yee Hop Ranch	Construction
HS 23. Mamalahoa Highway Safety Improvements in the Vicinity of Puuwaawaa Ranch Road	Construction
HS 25. Queen Kaahumanu Highway Widening Kealakehe Parkway to Keahole Airport Access Road Phase II	Construction
HS 26. Route PLH 10(1) Honokohau Harbor Access Road (CFL): 3R	Construction
HC 2. Alii Drive Road Improvements Along Oneo Bay From Hualalai Road to Walua Road	Planning and Design
HC 5. Kuakini Highway Widening, Hualalai Road to Alii Highway	Design
HC 7. Palani-Kealaka Intersection and Traffic Signal Improvements	Construction

Since several residential, employment, and activity centers are located to the north and to the south of Kailua-Kona, there is a relatively high proportion of “external-external” trips traversing through the town center. Although specific data is unavailable to determine the type of trips traveling through and within the planning area, the proportion of external-external trips appears to be in the order of 60% on the regional facilities located in the northern and southern portions of the planning area based on available traffic volume data.

As these trips enter the town center, the proportion of external-external trips reduces as internal-internal trips increases. In the northern and southern fringe of the planning area, one can deduce that the balance of 40% may be external-internal, internal-external, or internal-internal trips. However, within the town center, and without specific detailed origination/destination travel information, it is even more difficult to determine the proportion of these trips. Of these, though, the largest trip type appears to be “internal-internal” trips since much of the services, goods, employment, activity centers, and other uses are located within the planning area. The available routes for these “internal-internal” trips are limited to several collector roads and would generally include use of primary arterials.

The County of Hawaii Planning Department prepared the *Keahole to Honaunau Regional Circulation Plan, County Action Plan*, dated August 14, 2006, hereinafter referred to as the County Action Plan, examined the traffic projections along the north south corridor within the planning area. The traffic projections were based on historical traffic volume data obtained by the State Department of Transportation for both the primary north-south arterials of Queen Kaahumanu Highway and Mamalahoa Highway through Kailua-Kona between Kona International Airport and Honaunau. The Year 2020 extrapolation of historical traffic volume show approximately a doubling of base Year 2000 traffic demands.

### 4.3 Congestion

Rapid development and lack of connectivity has increased traffic congestion in North and South Kona. As development continues and smaller areas continue to grow, previously isolated areas or roadway networks should ideally be joined together to form interconnected transportation networks that can accommodate the travel demands within the region. Without such connectivity, traffic demands from these areas are directed to adjacent arterial roadways, mixing regional travel demands with local traffic, and resulting in capacity or over-capacity conditions on the regional transportation facilities.

Nearly every driver searches for the quickest route, one that is shorter or less encumbered by obstacles, such as signalized intersections, turning conflicts, or other sources of travel route friction. The direct routes are, typically, the regional or limited-access facilities that provide for the quickest travel if they are not congested. As such, motorists converge on these routes from many different points of origin. During peak travel periods, these routes become overloaded and operate at over-capacity, resulting in severe traffic congestion.

Based on baseline Year 2000 traffic demand data, the County Action Plan identifies several locations along regional transportation facilities in the planning area that currently operate at poor levels of service. In general, the following roadway segments operate at Level of Service (LOS) “D” or worse:

- Queen Kaahumanu Highway, Keahole to Palani
- Hawaii Belt Road, Palani to Kealahou
- Palani Road, east of Henry Street and west of Queen Kaahumanu Highway

The congested conditions along these sections of the highway system generally result from demand exceeding capacity during peak commuter periods. Congestion on these regional facilities can be addressed by increasing capacity to accommodate demand, or by reducing demand within roadway capacity. Alternatively, if it could be achieved by providing roadway connectors that can distribute demand to other existing. This effort would be complemented by land use policies and development standards consistent with promoting mixed-use developments to further reduce the reliance on regional transportation facilities. Connections between activity centers would also offer alternate opportunities for more routes and thereby, reduce dependence on the regional roadway system. In the Kona planning area, however, development of these connections are frequently dependent on development initiatives that may not be implemented in a timely manner or may only produce incomplete segments of a connecting roadway that may serve the associated development but provide little or no regional benefit. As a result, the regional facilities are continually burdened, servicing not only regional traffic demands, but a large portion of local traffic demands as well. Unless these connections are completed, the commensurate growth in population and vehicle use, will overwhelm any improvements in travel

time gained by increasing the capacity of regional facilities. Investment in such transportation improvements would realize a benefit for only a brief period of time. The motoring public would be frustrated if all of the policies for reducing congestion, such as expensive road widening projects, fail to produce any long-term improvements. The cycle continues as authorities or developer-driven initiatives improve highways and roadways to address congestion but those improvements create incentives to increase vehicle usage or change the location and form of both residential and non-residential growth. Over the long run, these actions tend to intensify traffic congestion.

Other congested roadways in the planning areas are not regional in nature but represent isolated operational deficiencies at signalized intersections, road intersections, driveway or access locations, turning movement provisions, pedestrian conflicts, and other operational factors. These deficiencies, in conjunction with strategies to reduce demand on the roadway network through land use policies and development standards, may be addressed through specific improvements to intersections sections of roadways.

#### **4.4 Transportation Needs**

##### **4.4.1 Shortcomings**

The primary transportation needs in the planning area should address capacity constraints along the regional facilities as well as specific roadway network deficiencies within the town center. Improvements may be achieved by implementing a combination of roadway capacity increases and travel demand reductions on the roadway network.

A large portion of trips on the regional facilities within the planning area may be considered external-external type trips and could be addressed with added roadway capacity as identified in past planning documents. However, the external-internal, internal-external, and internal-internal trip types appear to represent the bulk of trips within the planning area. Creating alternate routes and increasing connectivity between activity centers that reduce reliance on regional transportation facilities may address associated traffic congestion.

In general, however, transportation needs are typically identified in the planning process but has historically lag in implementation. As a result, the operational benefits of the improvements have not been fully realized. Oftentimes these improvements, when completed serve to reduce congestion to a certain degree but soon after revert to pre-implementation conditions as traffic demands increase. In cases of rapid population growth and land development, the roadway improvements become even less effective as traffic demands further exacerbate over-capacity conditions of the roadways.

Governmental growth-management regulations can focus on commercial development, residential development, or both, that could indirectly ease congestion. These include caps on the number of housing units or square feet of

commercial space that can be built, height limits on commercial buildings, down-zoning of vacant parcels to reduce density at which they can be developed among others. Such regulation may also address issues such as maintaining view corridors, or establishing a desirable aesthetic character of a town.

#### **4.4.2 Solutions**

The most apparent solution to improving traffic conditions through the planning area appears to be the widening of Queen Kaahumanu Highway between Henry Street and the airport. This project is intended to provide added roadway capacity to accommodate current traffic demands. Initiatives to implement this project in phases are currently underway with the project expected to be completed in the near future. However, other initiatives should be considered in conjunction with the project and include strategies to reduce traffic demand. As mentioned previously, these strategies may include land use policies and restrictions, as well as roadway connectivity to reduce the reliance on the regional facilities as travel routes. In South Kona, the Mamalahoa Bypass Road appears to be a transportation project that can yield positive results immediately. Initiatives to complete the first phase of the project from Keauhou to Halekii Street is underway and expected to be completed in the near future, with the next phase of the bypass extending further south. This project is intended to relieve traffic demands on Mamalahoa Highway through the Honalo Junction and reduce queuing along the highway in the vicinity.

The mid-level road appears to be a project that can achieve both added capacity to the north-south corridor as well as reduce traffic demands on the existing regional facilities. It would also provide added circulation opportunities as infill development progresses. A series of east-west collector roads linking the regional north-south facilities should also be provided for added circulation and to further reduce the reliance of the regional facilities. These connector roads should be planned with t appropriate development and land use regulations to increase its effectiveness on traffic congestion.

The County's Action Plan (August 14, 2006) identifies 12 individual strategies grouped into five emphasis areas to address traffic operational deficiencies in the region as well as development policies and practices, and serves as an excellent source for additional information pertaining to traffic operations. A summary of these strategies is as follows:

#### **Actions to Alleviate Congestion:**

##### **Strategy 1. Increase the capacity of the north/south arterials to accommodate the peak through-traffic.**

The strategy to increase capacity along north/south arterials is an initiative that should greatly improve existing regional traffic congestion. However, without a roadway network system that promotes connectivity between major traffic

generating uses and activity centers, reserve capacity on the arterials would be absorbed quickly as traffic demands increase over time.

**Strategy 2. Improving connectivity with a road network that spreads the traffic rather than funneling all the traffic to the major arterials.**

Connectivity provides alternate travel routes and reduces the reliance on the major arterials. While Strategy 1 aims at increasing capacity of the north/south arterials, Strategy 2 aims at reducing the demands on the major roadways. Strategy 2 coupled with Strategy 1 provides a two-fold approach to improving traffic flow through the north/south corridors.

**Strategy 3. Use existing roadways more efficiently by improving traffic flow and turning movements.**

Improvements to existing roadways and intersections to allow safer travel and improved operations may be achieved by removing travel friction points along roadway alignments and intersections. These friction points include the lack of turning lanes where such maneuvers impede through traffic flow, roadway alignments that tend to slow traffic, and lack of capacity at unsignalized and signalized intersections to accommodate traffic demands.

**Strategy 4. Increase multi-modal choices to reduce dependency on the automobile.**

Other travel modes, besides the automobile, that should be accommodated include transit service, pedestrian, and bicycle. Enhancing transit service includes a route structure that services regional and internal travel. The current transit route structure accommodates long-haul working trips during peak commuter traffic periods and should be enhanced to service internal trips for periods throughout the day. Pedestrian facilities also should be enhanced to provide safer and convenient routes. Implementation of the State's Bike Plan throughout the region would also broaden travel mode choices. However, linking these travel modes with redundant connections would be key to encouraging multi-modal travel, hence, reducing vehicular travel demands on the roadways.

**Strategy 5. Reduce commuting needs by directing growth to existing compact urban areas; encouraging affordable housing within these core urban areas; and mixing land uses so that jobs and/or daily requirements are within walking distances.**

Multi-use developments provide for self-sustainability with reduced reliance on the automobile. Currently, affordable homes are constructed in areas that do not provide jobs in the immediate vicinity, resulting in long commute trips through the region. An example is the development of affordable housing in non-resort areas

of where employment is available. As a result, long-haul commutes are necessary between housing and employment.

### **Actions to Control the Pace of development In Relation to Infrastructure Capacity**

#### **Strategy 6. Implement a concurrency system.**

A concurrency system requires a database of existing and planned infrastructure components to insure that such infrastructure is adequate to support proposed developments. The system needs to be updated regularly as infrastructure needs change, and requires the accounting of the reserve capacities of each individual infrastructure type. Should there be a lack of infrastructure capacity, proposed developments should be required to address for such need in lieu of relying on infrastructure improvements borne by others. Such a strategy requires changes to current development policies.

### **Actions to Preserve Future Roadway Corridors**

#### **Strategy 7. Implement an official map system to preserve future roadway corridors.**

An official map should include consolidated information and serve as one primary source to designate future roadway corridors. Future roadway alignments must be identified at a level detailed enough to avoid misrepresentation or misalignments resulting in awkward connections that impede the movement of efficient traffic flow. In critical areas, especially near or at connections to other facilities, or areas affecting private property, such information should be based on actual ground surveys. If such surveys are unavailable, a three-tier level of determinable accuracy represented by three ROW width descriptions, starting with a line for determined widths and progressively broader stripes for estimated ROWs as proposed in the County's Action Plan can assist in preserving future roadway corridors.

### **Actions to Finance Improvements**

#### **Strategy 8. Position priority projects to be “design-ready” or “construction-ready” to optimize funding opportunities.**

The County's initiative to finance the early stages of priority projects to advance them take advantage of available programmed funds when projects on the STIP are not ready to proceed. The initial financing would come from fair share contributions and bonds.

#### **Strategy 9. Program funding as necessary to complete key links rather than waiting for development.**

The County's initiative to finance much needed improvements to complete necessary critical links within the roadway network would provide immediate benefit to motorists by providing connectivity, offering alternate travel routes, and reducing reliance on the major arterials. This benefit should be realized as soon as possible instead of waiting for the improvement to be initiated by developers.

### **Actions to Advance the State of Knowledge and Monitor Progress**

#### **Strategy 10. Improve transportation planning and analyses.**

The County's Action Plan identifies several data information sources that aid in transportation planning. Along with the State DOT, the County obtained a video log of the streets in the region. The video log provides information such as pavement condition, signage, lane width, striping, sidewalks, utility poles, manholes and grates, traffic signal systems, intersecting street information, and roadway centerline. The video log is a valuable planning tool when evaluating existing roads or planning new road improvements in the region.

#### **Strategy 11. Monitor and communicate progress.**

Integration and compilation of all reliable information sources would serve as a comprehensive planning aid in evaluating and designating existing and future roadways, as well as other infrastructure needs. However, to remain useful, such information must be updated regularly as developments occur, as roadway improvements or new roads are constructed, or as infrastructure needs change. The County's Action Plan also identifies the use of a website to keep the public informed and to communicate information.

These strategies may be reviewed in greater detail in the County's Action Plan.

#### **4.4.3 Public Transit Needs**

Public transportation is an important component of the transportation system. As an alternative to automobile travel, public transit reduces roadway congestion, air and noise pollution, and energy consumption. In addition, public transit offers mobility to the elderly and physically impaired, and to people who are not able to or can not afford to drive.

Currently, the County operates the Hele-On bus system with a fleet of 28-buses, each with a capacity of 33-45 passengers (County of Hawaii, 2005). Hele-On provides regularly scheduled, fixed-route service using a fleet of standard buses/mini buses. Within the Kona district, a shuttle operates between Kailua, Keauhou and Kealahou.

The County also offers a shared-ride taxi service that provides door to door service within Kailua-Kona. This program allows the public to purchase two-

dollar coupons for use in lieu of cash with participating taxi companies. The Hawaii County Economic Opportunity Council, a non-profit community action agency, supplements the County's bus services by providing bus services for those with low income, the elderly, disabled, and pre-school children who attend Head Start schools.

Paratransit is the use of vans, small buses, taxis and other vehicles operated by service providers to supplement the bus service in the rural areas with on-demand door-to-door service (County of Hawaii, March 6, 2006). This service could serve as feeder routes to bus stops or park-and-ride facilities. The County of Hawaii Mass Transit Agency conducted the Rural Paratransit Study for Puna and Kona (August 2005). The study proposes a feeder service be integrated with the existing Hele-On bus routes.

#### **4.4.4 Pedestrian/Bikeway Needs**

Sidewalks are provided throughout Kona, although the predominantly older neighborhoods do not have adequate pedestrian facilities. Designated mauka-makai pedestrianways to the shoreline areas are for the most part non-existent.

Currently, the only existing bikeway facilities in the North and South Kona districts include the Walua Road Scenic Route and bike paths along Old Airport Park, Palani Road (from Kaiwi Street to Queen Kaahumanu Highway) and Queen Kaahumanu Highway (from Kealakehe Parkway to Paoa Street).

There is a need for identifying and developing pedestrian ways and bikeways to connect existing residential areas with activity centers, schools, recreational areas, and transit stops. Some of the sidewalk facilities are in need of improvement and new facilities are needed to further link existing and proposed activity areas, thereby, improving mobility for pedestrians.

There is a need to identify and designate bikeways within North and South Kona to encourage usage and increase safety along specific streets and corridors. An integrated bikeway system is needed to link activity areas, schools, recreational areas, and proposed transit centers within the planning area.

#### **4.5 Connectivity**

Within the planning area, developments include internal local networks that are oftentimes internally well-connected but offer very little connectivity with adjacent uses. Also observed are the limited number of collector roads within the planning area that link with arterial roadways or regional facilities. Portions of these collector roads are typically funded by adjacent development projects resulting in piece-meal implementation of the roadway, and are dependent upon the development of other projects along the roadway alignment to function as intended. The process has limited connectivity options until the roadway is completed in its entirety, and can take some time to complete, if completed at all. As a result, the major arterials are congested and serve all trip types, offering

limited choices of routes to travel, with poor connectivity and circulation between adjacent uses and activity centers.

#### **4.5.1 Connectivity Concept and Standards**

Connectivity allows designated roads to be used by the appropriate trip type. These designated roadways should be incorporated in development standards that guide and regulate land development, and should be established within the overall roadway network. The designated road standards should incorporate the following types of facilities:

##### **4.5.1.1 Residential Districts**

###### **4.5.1.1.1 Arterial Street**

Arterial streets are a limited access facility with minimum frequency of intersections along the roadway. Access points to abutting and adjacent residential uses should be approximately 10 intersections per mile along the Arterial street, or approximately 530 feet between intersections. Arterial streets are intended to service regional travel intersecting with Collector, Connector, or Local streets.

###### **4.5.1.1.2 Collector Street**

Collector streets offer minimum frequency of intersections but greater than arterial streets. Connections with abutting and adjacent residential uses should be adequately spaced at approximately 10 intersections per mile, or 530 feet between intersections. Collector streets are intended to link and provide circulation with regional facilities intersecting with Arterial, Collector, Connector, Frontage, and Local streets.

###### **4.5.1.1.3 Connector Street**

Frequency of intersections should also be approximately 10 intersections per mile, or 530 feet between intersections along Connector streets. Connections with abutting and adjacent residential uses are similar to collector streets. Connector streets are intended to link adjacent uses and be used for travel in lieu of regional facilities.

###### **4.5.1.1.4 Cul-De-Sac Street**

Cul-de-sac streets may be permitted only where topography or other physical conditions prohibit the feasible use of other types of streets. If used, Cul-de-sac streets shall not exceed 150 feet in length from the nearest intersection with a street providing circulation and through traffic access of a particular residential district.

###### **4.5.1.1.5 Local Street**

Intersections provided as necessary to allow access and circulation of individual internal uses.

#### **4.5.1.1.6 Pedestrian Ways**

Pedestrian ways development blocks with sides longer than 400 feet and should be oriented perpendicular to the long dimension of the block terminating at local or connector streets.

#### **4.5.1.1.7 Sidewalks**

Sidewalks should be provided on every street identified above to promote walking opportunities.

### **4.5.1.2 Commercial Districts**

#### **4.5.1.2.1 Arterial Street**

Arterial streets with minimum frequency of intersections along the roadway. Access points to adjacent commercial and mixed-uses should be approximately 10 intersections per mile along the Arterial street, or approximately 530 feet between intersections. Arterial streets are intended to service regional travel intersecting with Collector, Connector, or Local streets.

#### **4.5.1.2.2 Collector Street**

Collector streets should have a minimum frequency of intersections but more than arterial streets. Connections with abutting and adjacent commercial and mixed uses should be adequately spaced at approximately 10 intersections per mile, or 530 feet between intersections. Collector streets are intended to link and provide circulation with regional facilities intersecting with Arterial, Collector, Connector, Frontage, and Local streets.

#### **4.5.1.2.3 Connector Street**

The frequency of intersections along connector streets should also be approximately 10 intersections per mile, or 530 feet between intersections. There are more connections with abutting and adjacent commercial and mixed uses than along collector streets. Connector streets are intended to link adjacent uses and be used for travel in lieu of regional facilities.

#### **4.5.1.2.4 Cul-De-Sac Street**

Cul-de-sac streets should be prohibited in commercial or mixed-use districts.

#### **4.5.1.2.5 Local Street**

Intersections should be provided as necessary to allow access and circulation of individual internal commercial and mixed-uses.

#### **4.5.1.2.6 Pedestrian Ways**

Pedestrian ways providing for pedestrian movements across development blocks with sides longer than 400 feet and shall be oriented perpendicular to the long dimension of the block and terminating at local or connector streets.

#### 4.5.1.2.7 Sidewalks

Sidewalks should be provided on every permitted street identified above.

### 4.6 Pedestrian/Bicycle Circulation

#### 4.6.1 Bike Designations

In discussing facilities for bicycles, it is important to distinguish the specific types of bikeway facilities being proposed for designated areas. The term “bikeway” is a term used for any road, street, path, or way which is used for bicycle travel, regardless of whether such facilities are designated for exclusive use of bicycles or are to be shared with other transportation modes (*Bike Plan Hawaii, 2004*). The various designations of bikeways are defined as follows:

- **Bicycle Route.** Any street or highway designated for the shared use of bicycles and motor vehicles or pedestrians or both.
- **Bicycle Lane.** A portion of a roadway designated by striping, signing and pavement markings for the preferential or exclusive use of bicycles.
- **Bicycle Path.** A bikeway physically separated from motorized vehicular travel by an open space or barrier, and either within the highway right-of-way or within an independent right-of-way.

#### 4.6.2 Existing Pedestrian/Bicycle Plans

Existing bikeways and paths within the planning area are included in Table 4-2.

##### 4.6.2.1 Bike Plan Hawaii

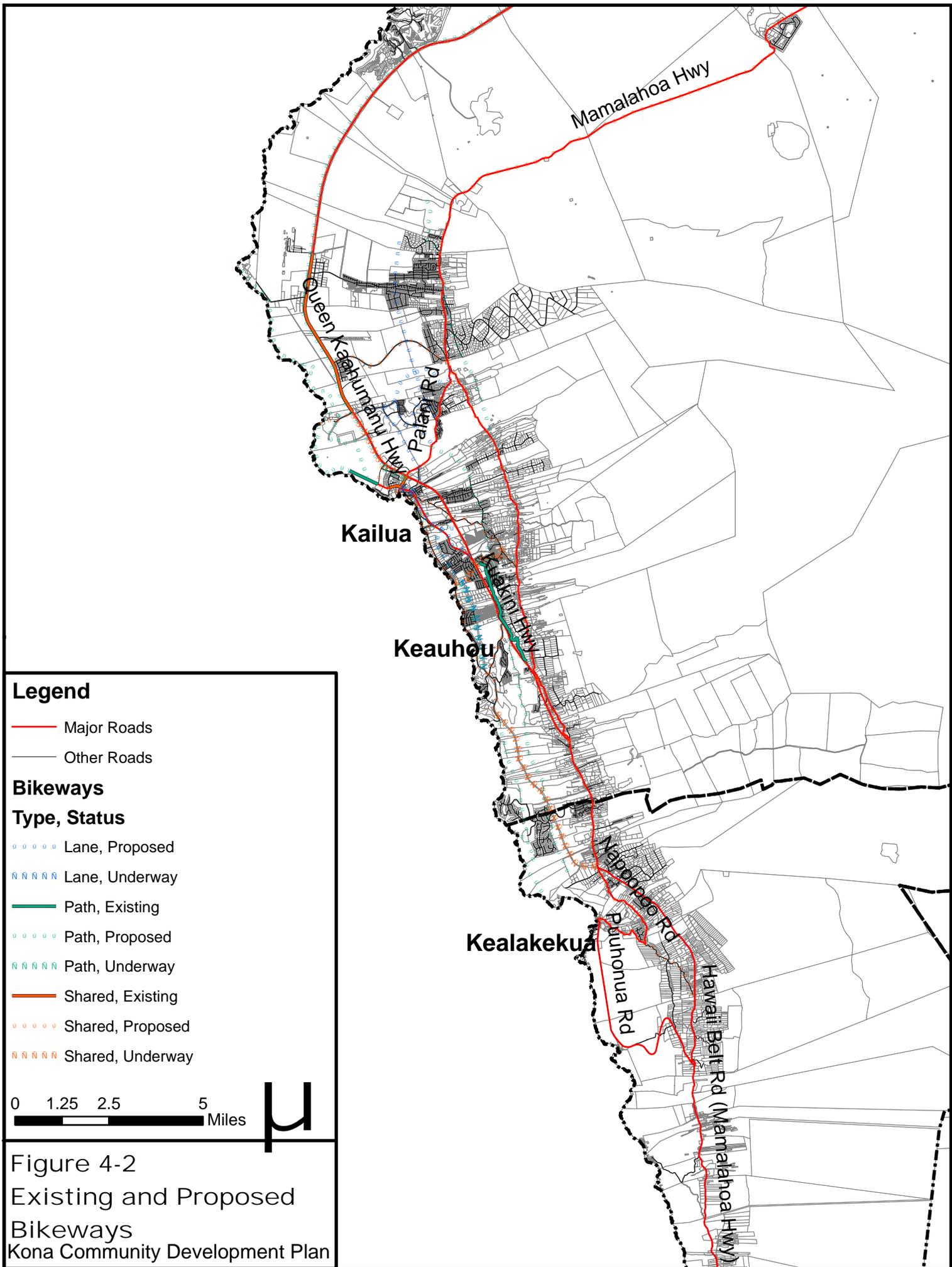
The State Department of Transportation’s *Bike Plan Hawaii* (2004) is intended to serve as a guide for the implementation of bikeways in the State. The *Bike Plan Hawaii* recommends the distribution of new bikeway facilities along the general perimeter of the islands of Oahu, Hawaii, Maui, and Kauai, as well as throughout the various community locations. The Plan identifies Walua Road Scenic Route, and bike paths along Old Airport Park, Palani Road (from Kaiwi Street to Queen Kaahumanu Highway) and Queen Kaahumanu Highway (from Kealakehe Parkway to Paoo Street) as existing bikeway facilities within North and South Kona (see Figure 4-2).

Bikeway facilities recommended by Bike Plan Hawaii for the planning area are identified in Table 4-3.

The major pedestrian activity center is located in Downtown Kailua, where it’s very tourist oriented along with hotels, offices, and shopping centers.

<b>Table 4-2 Existing Bike Facilities</b>				
<b>Bikeway</b>	<b>Route</b>	<b>Lane</b>	<b>Path</b>	<b>Trail</b>
Walua Road Scenic Path			X	
Kailua Park Path (Old Airport)			X	
Kealakehe Parkway Path			X	
Judd Trail				X
Ala Kahakai Trail				X
Mamalaho Trail				X
Kuakini Highway (Palani to Old Airport)	X			
Palani Road (Queen Kaahumanu to Kuakini)	X			
Queen Kaahumanu	X			
Alii Drive Safety Lane		X		

Source: *Keahole to Honaunau Regional Circulation Plan*, County of Hawaii, February 2003. and *Bike Plan Hawaii*, Hawaii Department of Transportation, 2004.



<b>Table 4-3 Bike Plan Hawaii Proposed Projects</b>				
<b>Project No.</b>	<b>Facility Location</b>	<b>Type</b>	<b>Juris.</b>	<b>Priority</b>
51	Ke Ala O Keawe Mamalahoa Hwy – Puuhonua Rd	Signed Shared Road	S	III
52	Puuhonua road Middle Keel Rd – Honaunau Bay	Signed Shared Road	C	III
53	Painted Church Road Keala O Keawe – Middle Keel Rd	Signed Shared Road	C	III
54	Middle Keel Road Mamalahoa Hwy – Puuhonua Road	Signed Shared Road	C	III
55	Napoopoo Road Mamalahoa Hwy – Middle Keel Rd	Signed Shared Road	C	III
56	Alii Drive Extension Lekeleke Bay – Kealakekua Bay	Path	C	III
57a	Old RR ROW – makai or Kuakini Highway Hualalai Rd – Kuakini Hwy	Path	C	III
57b	Old RR ROW – mauka or Kuakini Highway Hualalai Rd – Kuakini Hwy	Path	C	III
58a	Kuakini Highway Mamalahoa Hwy – King Kamehameha III Rd	Signed Shared Road	S	I
58b	Kuakini Highway King Kamehameha III Rd – Lako St	Signed Shared Road	S	I
58c	Kuakini Highway Laki St - Hualalai Rd	Lane	C	I
59	Haawina Road Kuakini Hwy – Old Mamalahoa Hwy	Signed Shared Road	C	II
60a	Walua Road Path Extension – North Lako St – Alii Dr	Path	C	I
60b	Walua Road Path Extension – South End of Walua Rd – Old Mamalahoa Hwy	Path	C	I
62	Connections between subdivisions south of Kailua, e.g. Koloia to Kenika Place to Sea View Komohana Kai Subdivision – Kona Sea View Subdivision	Signed Shared Road	C/P	II
63	Mamalahoa Highway Captain Cook Village Rd – Old Mamalahoa Hwy	Signed Shared Road	C	III
64	Proposed Ke Ala o Keauhou (Kahului – Keauhou Parkway) Queen Kaahumanu Hwy – Lako St	Lane/Path	C	IV
<b>Continue on next page</b>				

<b>Table 4-3 (continued)</b>				
<b>Bike Plan Hawaii Proposed Projects</b>				
<b>Project No.</b>	<b>Facility Location</b>	<b>Type</b>	<b>Juris.</b>	<b>Priority</b>
65	Alii Drive Improvements Palani Rd – Keauhou Rd	Signed Shared Road	C	I
66	Lunapule Road Alii Dr- Walua Rd	Signed Shared Road	C	II
67	Hualalai Road Old Mamalahoa Hwy-Kuakini Hwy	Signed Shared Road	C	II
68	Queen Kaahumanu Extension Henry St – Kuakini Hwy	Signed Shared Road	S	I
69	Old Mamalahoa Highway Jct. Palani Rd - Honalo	Signed Shared Road/Pull- outs	C	II
70a	Keanalehu Trail Palani Rd-Hualalai Rd	Path	C	III
70b	Keanalehu Drive Kealakehe Pathway – Palani Rd	Lane	C	IV
70c	Keanalehu Drive Kealakehe Pkwy-Kealakehe Pathway	Lane	C	I
71	Future Keohokalole Highway Kealakehe Pkwy – Queen Kaahumanu Hwy	Lane	C	IV
72	Makala Street Kuakini Hwy (Old Kona Airport) – Queen Kaahumanu Hwy	Signed Shared Road	C	II
74	Utility Easement Road Wastewater Treatment Plant – Honokohau Harbor	Path	C	II
75	Kealakaa Connector Kealakehe Pathway – Kealakaa St	Lane	C	IV
76a	Kealakehe Parkway (makai extension) Queen Kaahumanu Hwy – Honokohau Harbor	Signed Shared Road	C	III
76b	Kealakehe Parkway (makai extension) Queen Kaahumanu Hwy – Keanalehu Dr	Lane	S	I
76c	Kealakehe Parkway Extension Keanalehu Dr – Kealakaa St	Lane	C	IV
77	Old Government Road Mauka of Mamalahoa Hwy	Path	C	III
78	Future Kealakaa Street Kealakehe Pkwy – Kealakehe Pkwy	Lane	C	IV
79	Hina Lani Drive Queen K. Hwy – Old Mamalahoa Hwy	Signed Shared Road	C	III
80	Old Airport Coastal Path Honokohau Harbor – UH Research Lab (OTEC)	Path	C	III

Continues on next page				
Table 4-3 (continued)				
Bike Plan Hawaii Proposed Projects				
Project No.	Facility Location	Type	Juris.	Priority
81a	Separate path adjacent and parallel to Queen Kaahumanu Highway Makala St – Keahole Airport	Path	S	I
81b	Separate path adjacent and parallel to Queen Kaahumanu Highway Keahole Airport – Akoni Pule Hwy	Path	S	II
83	Utility Corridor at 1500' elevation Mauka of Queen Kaahumanu Hwy	Path	C	III
85a	Palani Road Queen Kaahumanu Hwy – Hina Lani Dr	Signed Shared Road	C	II

Source: *Bike Plan Hawaii*, Hawaii Department of Transportation, 2004.

#### 4.7 Relationship of residences to jobs

In general, long average commuting journeys generate more traffic congestion than shorter ones. Long journeys often result from imbalances between job sites and the places people reside. Many more jobs than housing units tend to be concentrated in areas with a job surplus or housing shortage. As a result, many people in the planning area must commute relatively long distances. Even if the number of housing units in an area is exactly the same as that required to house everyone who works there, the cost of those housing units may not be appropriate for those workers. As an example, relatively low-wage workers employed in a regional shopping center may be unable to afford nearby housing if exclusionary zoning keeps the prices high. Hence, an effective jobs-housing balance can only be achieved by closely matching both the number of local housing units and the prices and styles of those units to the number and economic capabilities of locally employed workers.

#### 4.8 Transportation Demand Management Strategies

Transportation Demand Management (TDM) measures consist of a variety of measures to reduce vehicle trip generation, either through carpooling or use of alternative modes of transportation such as walking or bicycling.

Providing and encouraging alternative modes of transportation for employees to commute to jobs in Kailua-Kona (hotels), would decrease demand for parking, and associated traffic volumes would be reduced. A Kailua-Kona Transportation Management Association could be established for this purpose. It could be managed by KBID or some other entity to help employers to develop on-site Transportation Demand Management (TDM) programs encouraging employees to commute by carpool, vanpool, bus, bicycle or walking.

The new Association would encourage and assist employers in establishing TDM programs that may include:

- On-site transportation coordinators;
- Providing bus pass and information programs;
- Incentives such as free or subsidized bus passes for those who commute by bus and which can be also for personal use;
- Organized car/vanpools;
- Preferential work shift assignments for commuter program participants;
- Bicycle parking and clothing changing amenities;
- Telecommuting programs for applicable jobs; and
- Cash commuter subsidy option for employees otherwise eligible for free parking.

## **4.9 Parking**

### **4.9.1 Centralized Parking**

Designated public parking areas provide centralized locations and serve as an interface between vehicular and pedestrian modes of travel. Generally, motorists park in these public parking areas and continue their trip as pedestrians, with return trips as pedestrians, then again as motorists. These parking areas are even more effective in areas with limited parking or high levels of vehicular traffic congestion, and minimizes the circulation of motorists along streets in the vicinity searching for parking in areas that provide little parking. Public parking within the planning area is limited with just a few areas located in Kailua. These parking areas are generally utilized and filled throughout the day. The largest and most utilized public parking area is located at the southeast corner of the intersection of Alii Drive and Hualalai Street. A smaller parking area is located off of Kuakini Highway just south of the intersection with Palani Road.

### **4.9.2 Park-and-Ride Facilities**

There are no park-and-ride lots in operation in North and South Kona. The County of Hawaii Mass Transit Agency has received funding to design and construct park and ride facilities. Two facilities are planned in Kona: in Kainaliu to serve those driving from South Kona, and near the Old Airport to serve those in Kailua-Kona who commute to the Kukio and South Kohala resorts.

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## 5 PARKS

### 5.1 Existing Conditions

Recreational facilities can be defined in two categories: Facility based and Resource based. Facility based parks are primarily administered by the County and provide for organized, spectator, or informal play recreational activities that are not dependent upon a natural resource. Resource-based parks provide public access to and enjoyment of an outstanding natural or cultural resource. The Federal and State governments play a dominant role in establishing resource-based parks. (GP, 2005)

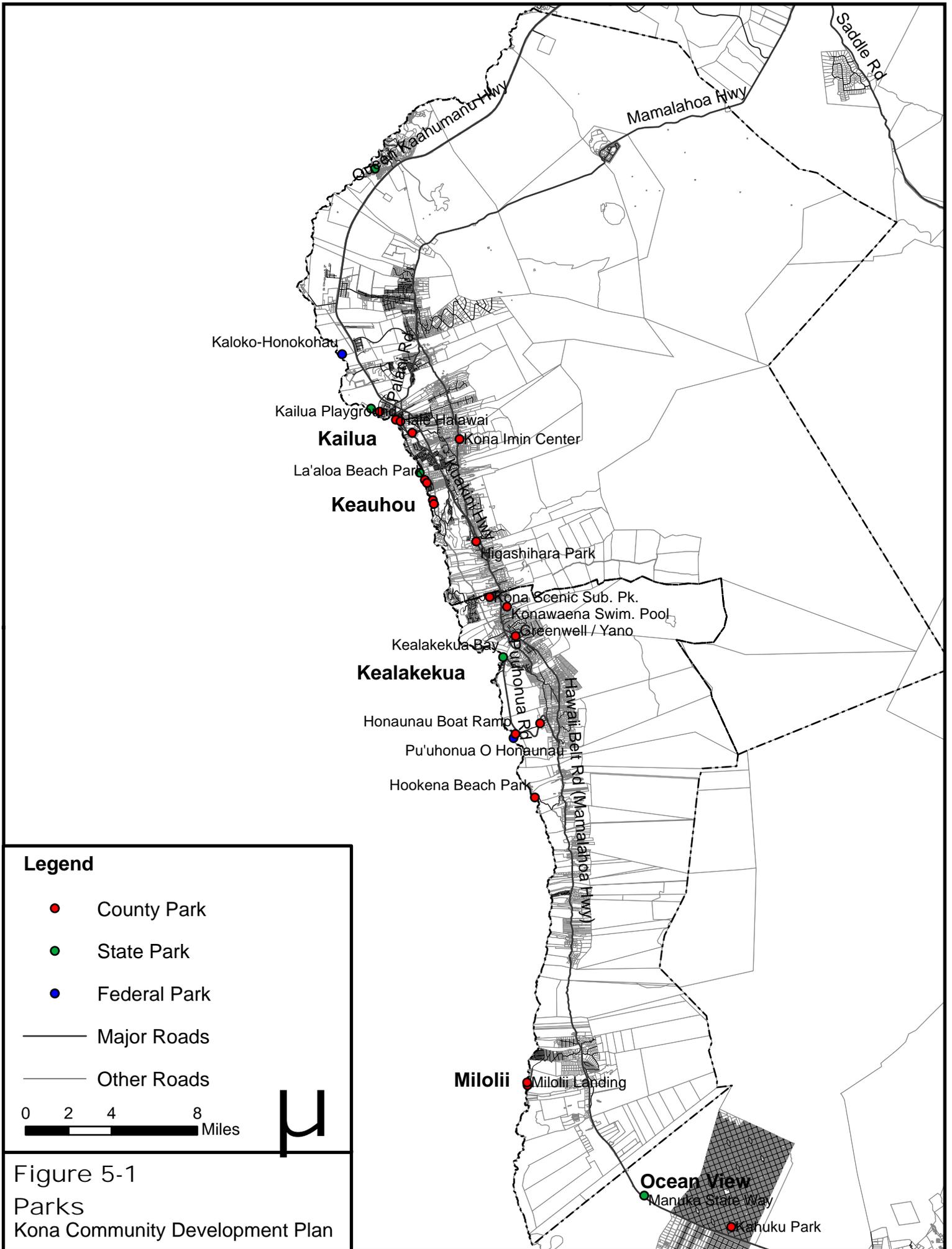
Due to an expanding population and growing number of visitors, heavy demands will be placed on the recreational resources of the County. Ideally, all residents should have convenient access to the most popular recreational facilities such as playgrounds, gymnasiums, and multi-purpose community centers. Some districts of the County have benefited more than others in terms of the number of facilities-based parks and beach parks relative to population. Kona is one of the areas that have the least amount of County facilities-based parks and beach parks in relation to population. State beach parks in North Kona, however, provide valuable resource-based opportunities in the region. (GP, 2005)

#### *“Recreational Functional Plan”*

The recreational program of the County is presently targeted toward diversification of facility-based activities. Active team sports for children and adults are continually being maintained. Recreational programs have been targeted for all ages with special emphasis to promote activities for youth. (GP, 2005)

Each recreational park provides activities year round ranging from sports, physical fitness, arts and crafts, to performing arts for all ages. During the summer, each district park offers the County Summer Fun program for grades K through 5. Parks that offer programs most often lack programs for pre-school children as well as adequate staffing to maintain the parks and programs.

See Figure 5-1 and Table 5-1 for a list of County, State and Federal Parks in the Kona District and the services available.



Kaloko-Honokohau

Kailua Playgro

**Kailua**

La'aloa Beach Park

**Keauhou**

Migashihara Park

Kona Scenic Sub. Pk.

Konawaena Swim. Pool

Greenwell / Yano

Kealakekua Bay

**Kealakekua**

Honaunau Boat Ramp

Pu'uho

Hookena Beach Park

**Milolii**

Milolii Landing

**Ocean View**

Manuka State Way

Kanuku Park

Saddle Rd

Mamalahoa Hwy

Quesh Kaahumanu Hwy

Palaui Rd

Palani Hwy

Pu'uho

Hawaii Belt Rd (Mamalahoa Hwy)

<b>Table 5-1</b>	
<b>Existing Conditions of Parks Within the County of Hawaii Kona District</b>	
<b>Facility Based Parks</b>	
<b>Kona Imin Center (Holualoa)</b>	
<ul style="list-style-type: none"> <li>• Center belongs to the administration division and operated by the district clerk</li> <li>• In past operated as a full recreational center: pool tables, ping pong tables, kilns</li> <li>• Today: Recreational center used for meetings, weddings, social gatherings, and recreational purposes.</li> </ul>	
<b>Harold H. Higashihara Park</b>	
<ul style="list-style-type: none"> <li>• Community Park: award winning children’s playground, 1 tennis court, 6 basketball courts, volleyball, 2 pavilions that can be rented for picnics, small baseball field (little league/seniors)</li> </ul>	
<b>Konawaena School</b>	
<ul style="list-style-type: none"> <li>• Konawaena Swimming pool: Operated by the County of Hawaii Aquatics division. Pool operation poor</li> <li>• Gymnasium, baseball and football fields</li> <li>• 4 tennis courts, 8-lane track</li> </ul>	
<b>Hale Halawai</b>	
<ul style="list-style-type: none"> <li>• Sports activities (9-14 years): Bowling, archery, fishing</li> <li>• Performing arts (13-18 yrs): Open Mic</li> <li>• Arts and Crafts (13-18 yers): Silk Screening</li> <li>• Physical Fitness Classes (13-18 years)</li> <li>• Summer Fun teen program (13-16 years):</li> <li>• Community interest activities (all ages): Photo class, yoga, drawing, Kung Fu/Tai Chi, karate, ukulele, hula, march of dimes walk</li> </ul>	
<b>Yano Memorial Hall (Captain Cook)</b>	
<ul style="list-style-type: none"> <li>• Sports Activity: Rec Room activities, Special programs, Billiards all ages and levels, Billiards tournament (ages 9-14), Bocce ball, basketball (ages 9-14)</li> <li>• Special events: Bike Otec (open)</li> <li>• Summer fun (grades K-5)</li> <li>• Arts and Crafts: Spinning wheel art, beginning drawing, collage, stencil designs, watercolors.</li> </ul>	
<b>Kailua Park</b>	
<ul style="list-style-type: none"> <li>• 0.7 acres</li> <li>• Basketball and Tennis courts</li> </ul>	
<b>Hill Crest Subdivision Park</b>	
<ul style="list-style-type: none"> <li>• Too small with inadequate parking</li> </ul>	
<b>HOLUALOA SCHOOL</b>	
<ul style="list-style-type: none"> <li>• School yard used for organized sports</li> <li>• Serves as a community center for meetings, social gathering, and recreational purposes.</li> </ul>	
<b>HONAUNAU AND HOOKENA SCHOOLS</b>	
<ul style="list-style-type: none"> <li>• Available for community use</li> <li>• Honaunau: small playfield used by groups as far as Miloli’i</li> <li>• Hookena: lighted basketball and volleyball courts and small playfields</li> </ul>	
<b>Kealakehe High School</b>	
<ul style="list-style-type: none"> <li>• High school facilities are open to public during non-school hours</li> <li>• Gym, 2 playfields, 4 tennis courts, and outdoor basketball courts</li> <li>• Playfields: Baseball, football, soccer, &amp; track</li> </ul>	
<b>continues on next page</b>	

<b>Table 5-1 Existing Conditions of Parks Within the County of Hawaii Kona District</b>	
<b>Arthur C. Greenwell District Park</b>	
<ul style="list-style-type: none"> <li>• 2.7 acres</li> <li>• Tennis &amp; basketball courts</li> <li>• Newly developed playground and playfield</li> </ul>	
<b>Kona Scenic Neighborhood Park</b>	
<ul style="list-style-type: none"> <li>• Baseball and football field</li> <li>• Outdoor courts</li> <li>• Restroom facilities</li> </ul>	
<b>Kekuaokalani Park Complex -at Old Kona Airport</b>	
<b>KONA COMMUNITY AQUATIC CENTER</b>	
<ul style="list-style-type: none"> <li>• Newest swimming pool in state: 50 meters with bulkhead</li> <li>• Water aerobics</li> <li>• Competitive swimming</li> <li>• Water polo</li> <li>• Recreational swimming</li> </ul>	
<b>Kekuaokalani Gym-Park</b>	
<ul style="list-style-type: none"> <li>• 34 acres</li> <li>• State of the art gym</li> <li>• Baseball diamond sanctioned for NCAA play Class A hardball</li> <li>• 4 full size softball diamonds</li> <li>• football and soccer field</li> <li>• 4 tennis courts</li> <li>• 2 playgrounds (toddler and children)</li> <li>• 4 outdoor basketball courts</li> </ul>	
<ul style="list-style-type: none"> <li>• Sports Activities: Pickleball, badminton, tennis, basketball</li> <li>• Physical Fitness (ages 16+): 100 mile club</li> <li>• Arts and Crafts: Egg decorating (ages 5-8 and 9-14)</li> <li>• Summer Fun Program (K-5<sup>th</sup> grade)</li> <li>• Community interest activities: Little league (9-14 years), AYSO (6-18 years), Hawaii Invitational Basketball clinic (ages 16+), SHOPO Softball tourney, Men's softball (ages 16+), Women's softball (ages 16+), Makule Basketball (35+ years), Kona Adult Baseball (ages 16+), Kona Adult flag football (ages 16+), Kona Fast Soccer (ages 16+)</li> </ul>	
<b>Maintenance Requirements</b>	
<ul style="list-style-type: none"> <li>• Facilities are generally manned by custodians 4 hours a day.</li> <li>• Larger parks have their own custodians</li> <li>• There are two roving crews with a north and south run.</li> <li>• On weekends different crews, but not enough employees to get job done.</li> <li>• None of the maintenance is privatized</li> <li>• Jeffery Alani 327-3552</li> </ul>	
<b>continues on next page</b>	

<b>Table 5-1 Existing Conditions of Parks Within the County of Hawaii Kona District</b>	
<b>Expansion Plans</b>	
<ul style="list-style-type: none"> <li>• State recently gave 88 acres to parks and recreation located adjacent to Kekuaokalani park (perhaps state Old Kona Airport State Recreational Area)</li> <li>• County is in process of updating to ADA standards and connecting site to sewer lines.</li> <li>• Traditionally a passive park: County will keep the walking and jogging paths.</li> <li>• Park will have more ball fields.</li> <li>• Perhaps move canoe races away from pier and into this area, to race along shore.</li> <li>• Will most likely take 3-4 years before anything begins.</li> <li>• Lack of money to fund projects as the community has done many recreational projects.</li> <li>• Existing ball fields was a project done by the army and local contractors</li> </ul>	
<b>Resource Based Parks</b>	
<b>Magic Sands Beach Park (La'aloa)</b>	
<ul style="list-style-type: none"> <li>• Lifeguards</li> <li>• Swimming, Boogie Boarding when low tide</li> <li>• Dangerous when high tide.</li> <li>• Good for snorkeling, scuba diving due to ocean access, large fish, and underwater caves</li> <li>• Facilities: Restrooms, showers, picnic area, BBQ grills, phones</li> </ul>	
<b>Milolii Beach Park</b>	
<ul style="list-style-type: none"> <li>• 1.2 acres</li> <li>• Rocky shoreline</li> <li>• Facilities for camping, picnicking, fishing and swimming</li> <li>• No potable water or electricity</li> </ul>	
<b>Kahaluu Beach Park</b>	
<ul style="list-style-type: none"> <li>• 5.4 acres</li> <li>• Near to hotels, therefore receiving intensive use from visitors and residents</li> <li>• Great Snorkeling, tidepooling, boogie boarding, surfing</li> <li>• Facilities: Restrooms, showers, picnic tables, phones, rental concession, lifeguards, small parking lot</li> </ul>	
<b>Hookena Beach Park</b>	
<ul style="list-style-type: none"> <li>• 3.4 acres</li> <li>• Sandy Beach</li> <li>• Outstanding scenic qualities</li> <li>• No potable water or electricity</li> </ul>	
<b>Pahoehoe Beach Park</b>	
<ul style="list-style-type: none"> <li>• No sand, lifeguards, or parking</li> <li>• Swimming is poor due to rocks</li> <li>• Snorkeling good for advanced/experienced swimmers.</li> <li>• Lawn and picnic area</li> <li>• Facilities: Restrooms, Showers, benches.</li> </ul>	
<b>Napoopoo Beach Park</b>	
<ul style="list-style-type: none"> <li>• Rocky shoreline</li> <li>• Great for snorkeling</li> <li>• Historic sites</li> <li>• Nearby trail leads to Hiki'au Heiau</li> <li>• Facilities: Restrooms, picnic tables, pavilion, BBQ grills, parking lot.</li> </ul>	
<b>continues on next page</b>	

<b>Table 5-1 Existing Conditions of Parks Within the County of Hawaii Kona District</b>	
<b>Kona Scenic Subdivision Park</b>	
<ul style="list-style-type: none"> <li>• A neighborhood Park</li> <li>• Baseball and football fields</li> <li>• Outdoor courts</li> <li>• Facilities: Restroom</li> <li>• Parking facility is being proposed.</li> </ul>	
<b>STATE OF HAWAII</b>	
<b>Old Kona Airport State Recreational Areas</b>	
<ul style="list-style-type: none"> <li>• 84 acres</li> <li>• No lifeguard services. Pavilion available for rental</li> <li>• Beach Park: Picnicking, surfing, tidepooling, shore &amp; spear fishing</li> </ul>	
<b>Kekaha Kai State Park</b>	
<ul style="list-style-type: none"> <li>• 1,700 acre park and wildlife sanctuary</li> <li>• Sandy beach &amp; dune offering swimming &amp; beach related activities</li> <li>• 4.5 mile hike on historic coastal trail, Ala Kahakai. Leads to Kua Bay with beach related activities</li> <li>• Midway through Ala Kahakai hike, hike to summit of Pu'u Ku'ili, a 342-foot high cone</li> <li>• Facilities: Picnic Tables, port-potties, and NO drinking water</li> </ul>	
<b>Kealakekua Bay State Historical Park</b>	
<ul style="list-style-type: none"> <li>• Views of Hikiau Heiau</li> <li>• Panoramic view of Kealakekua Bay</li> <li>• Lifeguard services during weekends at Napo'opo'o Beach</li> </ul>	
<b>Keolonahihi Park</b>	
<ul style="list-style-type: none"> <li>• Hiking</li> </ul>	
<b>Kealakekua Bay State Underwater Park</b>	
<ul style="list-style-type: none"> <li>• 315 acres</li> <li>• Opportunities for snorkeling, scuba diving, and glass bottom boat viewing to observe marine life in underwater habitat.</li> </ul>	
<b>Ala Kahakai National Park</b>	
<ul style="list-style-type: none"> <li>• <b>Currently closed</b> to public due to the magnitude and sensitivity of resources.</li> <li>• 175-mile trail corridor full of cultural and historical significance</li> <li>• Traverses through 100s of ancient Hawaiian settlement sites and over 200 ahupua'a land divisions.</li> <li>• Cultural Resources include: Heiaus, royal centers, Kahua (house site foundations), loko 'ia (fishponds), Ko'a (fishing shrines), Ki'ii pohaku (petroglyphs) holua (stone slide), and wahi pana (sacred places).</li> <li>• Natural Resources include anchialine ponds, pali (precipices), nearshore reefs, estuarine ecosystems, coastal vegetation, migratory birds, native sea turtle habitat, and several threatened and endangered endemic species of plants and animals.</li> </ul>	
<b>Kaloko-Honokohau National Historical Park</b>	
<ul style="list-style-type: none"> <li>• 1160 acre park with cultural and historical significance</li> <li>• Site of ancient Hawaiian settlement: 4 ahupua'a, fishponds, kahua, ki'l pohaku, holua, and heiau.</li> <li>• Recreational Opportunities: Boating, Fishing, Hiking, Picnic, Water Sports, Wildlife Viewing</li> <li>• Facilities: Restrooms</li> </ul>	
<b>continues on next page</b>	

<b>Table 5-1</b>	
<b>Existing Conditions of Parks Within the County of Hawaii Kona District</b>	
<b>NATIONAL PARK SERVICES</b>	
<b>Puuhonua O Honaunau National Historic Park</b>	
<ul style="list-style-type: none"> <li>• 182 acre park</li> <li>• Includes the pu'uhonua and a complex of archeological sites including: temple platforms, royal fishponds, sledding tracks, and some coastal village sites.</li> <li>• Hale o Keawe temple and several thatched structures have been reconstructed.</li> <li>• Recreational opportunities: Fishing, Hiking, Picnic, Museum/Visitor Center, Water Sports, Wildlife Viewing</li> </ul>	
<b>Puukohola Heiau National Historic Site</b>	

**5.2 After School Programs**

Table 5-2 lists the general activities that utilize DOE facilities after-school hours:

<b>Table 5-2</b>				
<b>General Activities occurring within DOE Facilities</b>				
<b>Toddler Programs</b>	<b>Elementary Programs</b>	<b>Teen Programs</b>	<b>Adult Programs</b>	<b>Elderly Programs</b>
State PATCH	A+ Afterschool	School Sports	Community schools	Senior Classes
Parks and Recreation	Tutoring (indep. Within schools)	Club sports	Adult sports Leagues	West Hawaii Senior Center
	AYSO, baseball, football, basketball	HYSA/AYSO	Community activities	County Recreational Activities
	PAL	Baseball	County park activities	Holualoa Senior Center
	County Parks and Recreational Programs	County Parks activities		Elderly Meals on Wheels
	Summer Fun			Retired Senior Volunteer Program
				Senior Employment Program

**5.3 Funding**

Hawaii County Rule Article 6: Credit Against User Fees for Private Improvements to Parks and Recreational Facilities. Section 15-55 states, "Budgetary constraints limits the County in making improvements which the department of parks and recreation wishes to make to its parks and recreational facilities. The Council wishes to provide a means by which private citizens and civic groups may be encouraged to make such improvements with the approval of the department of parks and recreation.

Kona parks funding comes from the General fund. Kona not seeing results of proportional funding for parks as the Kona district generates 70 percent of tax base.

#### **5.4 Public Access to Shoreline and Mountains**

The County of Hawaii General Plan seeks to preserve and protect natural resources and historical areas. The plan also looks to supporting more opportunities that engage the public in recreational and educational activities in a way that ensures natural and historic resources are not damaged.

##### Section 6.3 Policies for Historic Sites

(d) Public access to significant sites and objects shall be acquired, where appropriate.

##### Section 8.3 Policies for Natural Resources and Shoreline

(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.

(s) Establish a system of pedestrian

The 1995 General Plan states in Section 12.4 Standards, "The County's Public Access to the Shoreline (chapter 23, Hawaii County Code) requires the dedication of land for public rights-of-way as part of subdivision approval or the issuance of a building permit for the construction of a multiple-family residential development, under certain circumstances.

#### **5.5 Needs**

According to Section 8-6 of the Hawaii County Ordinance, Population density requirements:

*In the public interest, convenience, health, welfare and safety, there shall be a minimum ratio of five acres of land for park and playground purposes for each one thousand persons in every district.*

As stated in section 12.4, standards of Recreation, in the 1995 County of Hawaii General Plan, the minimum size of a district park should be a minimum of 10 to 30 acres, while the minimum size of a regional park is 50 acres. Community parks are typically between 4 and 8 acres, and a neighborhood park can be up to 4 acres.

## **6 EMERGENCY SERVICES**

### **6.1 Police**

#### **6.1.1 Existing Conditions**

The main police station is located in Kealahou, which oversees the entire district (see Figure 6-1). There are two substations, one in Captain Cook and the other in Keauhou. The substation in Captain Cook supports 4 of the 11 beats. There is 24/7 (24 hours, seven days a week) coverage with a total of three shifts per day. Each shift has a total of ten officers, including supervisors. Two officers are assigned to beats in the Captain Cook area. There are no foot patrol or mounted (horse) units that cover beats. There are a number of 4-wheel drive patrol vehicles. Officers are responsible for the roadways and highways within their beats. According to the *2003 – 2004 Annual Report*, approximately 60 officers manned the Kona District.

Response time varies depending on the severity of calls for service. Table 6-1 shows the types of offenses and complaints known to police.

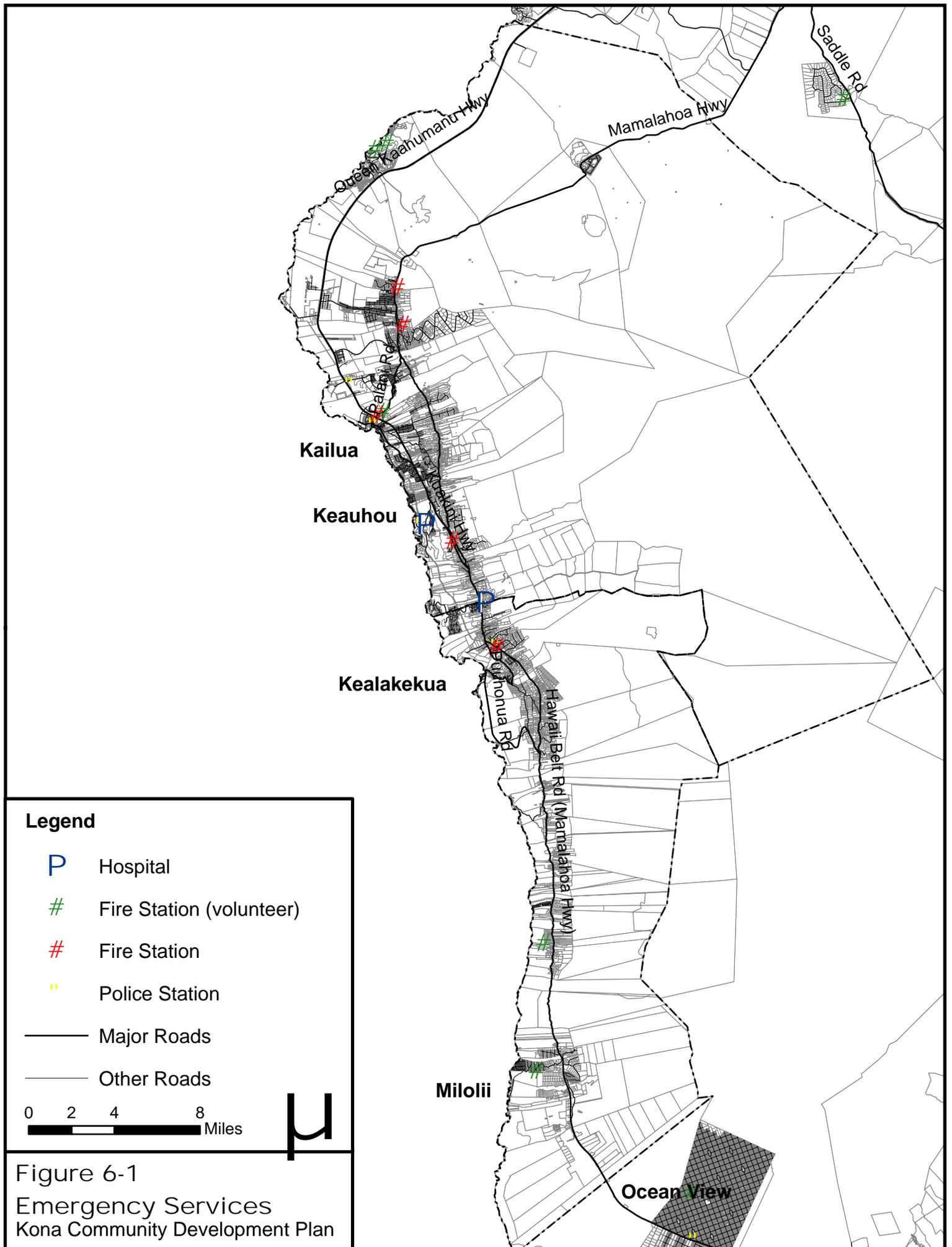
#### **6.1.2 Proposed improvements**

The Department is looking at creating a new district to encompass the South Kona area with 24-hour coverage and is currently in the process of establishing a sub-station in Kailua Town.

#### **6.1.3 Issues and Recommendations:**

As North and South Kona develop, the Police Department will service the area accordingly. The issue the entire Department is facing is that of filling officer vacancies. Once the department is fully staff level, only then can the Community Policing positions be filled to better serve the ideals and philosophy of the program.

In the development of the new district and in selection of the sub-station in Kailua town, mandate is to locate the facility in a high visible site.



<b>Classification of Offenses</b>	<b>Hawaii County</b>	<b>Kona</b>
Part I Offenses		
Murder/non-negligent manslaughter	6	2
Rape	--	--
Robbery	49	17
Aggravated Assault	77	20
Burglary	165	43
Larceny	1,451	340
Auto Theft	5,005	1,523
Other Assaults	601	222
Part I Totals	2,245	609
Part II Offenses	9,599	2,776
Arson	48	10
Forgery/counterfit	1,334	324
Fraud	1,589	431
Embezzlement	6	3
Receive stolen property	24	15
Vandalism	1,692	402
Weapons	75	10
Prostitution	--	--
Sex Offense	302	82
Narcotic Drug Laws	1,280	338
Gambling	2	1
offenses vs. Family	--	--
Driving under influence	1,062	424
Liquor laws	189	41
Drunkenness*	--	--
Disorderly conduct	201	58
Vagrancy	--	--
All Other offenses	8,560	2,626
Truancy*	--	--
Curfew	24	14
Runaways	768	259
Part II Totals	17,156,26,755	5,038
Total Parts I and II		7,814
* Not a criminal offense as of 1969.		
Source: Hawaii County Police Department Records, 2003		

## 6.2 Fire

### 6.2.1 Existing Conditions

There is a 24-hour fire facility located in Kailua-Kona with fire/Emergency Medical Services (EMS)/Rescue capabilities (see Figure 6-1). Other 24-hour fire/EMS operations are located at Keauhou and Captain Cook, respectively.

There are five volunteer fire stations located in Kona Village Resort, Four Season Resort (limbo), between Kailua-Kona and Kona Airport, Milolii Village and Kona Paradise Subdivision, respectively.

Approximately 75 percent of the calls received are for EMS while fire accounts for approximately 3 percent. Special services, false alarms, and non-emergency nature calls account of the remaining 22 percent of the calls.

Island wide, the average response time is 11 minutes, but there is no data specifically for the Kona area. If a response location is within a 5-mile radius of station, then the response time can be within a few minutes. Response time to more distant locations such as Four Seasons or Kona Village are much longer.

In general, the availability of hydrants provides adequate fire protection for most developed areas in Kona. The County Planning and Building Departments have been very stringent in assuring that fire protection requirements are complied with in new developments. Some older developments/subdivisions, however, have insufficient hydrants or none at all.

In areas relying on catchment systems for domestic water, the fire department deploys fire response vehicles with a thousand-gallon tanks. Depending upon the location and severity, the fire department will send out more assets for water supply. The fire department also has helicopter support.

In areas without infrastructure or poor vehicular access, fire stations serving rural areas may deploy off-road “brush trucks” that hold up to 250 gallons of water. In addition, helicopters with water buckets may be deployed.

### **6.2.2 Proposed Improvements**

One new station is proposed in the Makalei Development. It will have Fire fighting capabilities and a Hazardous Material Response Unit. Hawaiian Homelands is also planning to construct a reservoir in the Kohala area (closer to Waimea) to support firefighting capabilities.

### **6.3 Medical**

Kona Community Hospital is a full service hospital located in Kealahou, approximately 15 miles from the project site. The hospital’s service area covers from Kohala to Hawaiian Ocean View Estates in Kau. Hospital services includes:

- Acute inpatient medical/surgical
- Obstetrics
- Skilled nursing
- Intensive care
- Outpatient surgery.
- Outpatient and ancillary services include:
  - 24-hour emergency room

- Laboratory
- Radiology
- Pharmacy
- Occupational, physical, respiratory and speech therapy
- Dietary services
- Kimo Therapy
- Radiation Therapy
- Psychiatric Services
- 94-beds (49 acute, 11 psychiatric and 34 long-term).

Kona Community Hospital does not provide the following services and must send out to other hospitals:

- Emergency response critical
- Kidney Dialysis (Hilo)
- Cardiac services (Maui)
- Some orthopedic services (more critical cases transferred to Queens)

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## 7 SCHOOLS

### 7.1 Existing Conditions

#### 7.1.1 Public School System

The public school system in Kona is comprised of the Konawaena and Kealakehe Complexes.

##### Kealakehe Complex Track

The Kealakehe Complex track for students entering elementary schools is as follows:

##### **Elementary Schools**



##### Konawaena Complex Tract

The Konawaena Complex track for students entering elementary schools is as follows:

##### **Elementary Schools**

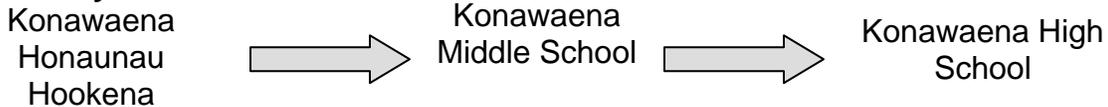
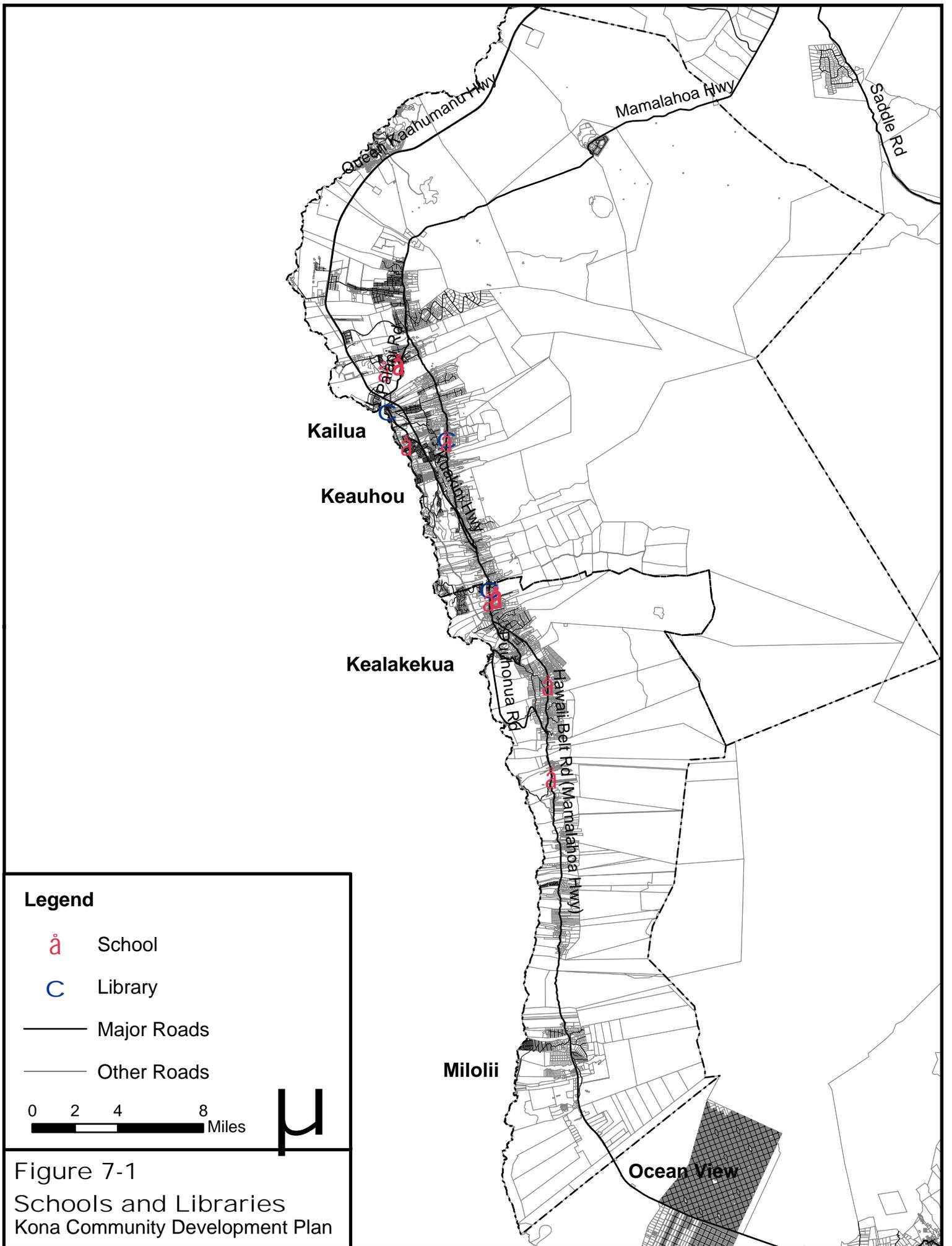


Table 7-1 lists schools in each of the complexes along with their past, current and projected future enrollment. The 2005 General Plan acknowledges the possibility of transferring students at Hookena and Honauanau to the Konawaena complex due to extremely limited program offerings and small student enrollment.

In addition to the public schools, the Hawaii Public School System also includes Hawaiian Language Immersion Schools and Public Charter Schools.

Hawaiian Language Immersion Schools immerse children in the Hawaiian language by using it as the primary language in the classroom. Kanu o ka Aina New Century Public Charter School (NCPCS) and Ke Kula o Ehunukaimalino are the only Hawaiian Language Immersion School in West Hawaii.

West Hawaii Explorations Academy Charter Public School, Innovations Public Charter School (PCS) and are charter schools located in West Hawaii.



**Table 7-1  
Projected and Current Enrollment of the DOE West Hawaii Complex Schools**

School Name	Enrollment 1998-1999	Enrollment 2002-2003	Current Enrollment 2005-2006	Projected Enrollment (SY06-07)
<b>Kealakehe Complex</b>				
Kealakehe High School	779	1,437	1,325	1,543
Kealakehe Intermediate	951	1,014	838	914
Kealakehe Elementary	1,021	965	860	955
Holualoa Elementary	438	446	423	458
Kahakai Elementary	702	591	575	620
Innovations PCS	N/A	157	119	120
Kanu o ka'aina NCPCS	N/A	95	<b>109</b>	103
West Hawaii Explorations PCS	N/A	116	133	120
Sub-total	3,891	4,821	4,382	4,833
<b>Konawaena Complex</b>				
Konawaena High	1,505	869	800	915
Konawaena Middle	229	226	384	438
Konawaena Elementary	683	653	539	554
Honaunau Elementary	391	226	109	123
Hookena Elementary	321	281	103	127
Ke Kula o Ehuuikaimalino	N/A	101	133	185
Sub-total	3,129	2,356	2,068	2,342
TOTAL	7,020	7,177	6,450	7,175

### 7.1.2 Private Schools

Kamehameha Schools provides early childhood education programs on West Hawaii as well as Extension Education for ages. Early Childhood education schools in Kona are located in Kailua-Kona, Kona, and Honaunau.

The private schools within Kona are relatively small in size with the exception of Hualalai Academy and Kona Christian Academy. Slightly over ninety percent of school age youth attend public schools. Other private schools are Kona Adventist School, Makua Lani Christian School and Hawaii Montessori School.

### 7.2 Expansion Plans

Currently, Kealakehe High School and Holualoa Elementary are near capacity. While Kealakehe Elementary is close to capacity. On the other hand, Kealakehe Intermediate and schools in South Kona have ample capacity. The West Hawaii Complex Superintendent believes that the Kona population is transitioning as the cost of living increases, with more families leaving the region. Most of the on-going development in North Kona is for high-end residences along coast, so the area is not seeing housing development that creates demand on public schools. In the long term, the Superintendent feels that development will stabilize and the Kona region will have more cosmopolitan communities. More schools will be needed in North Kona, especially if Hawaiian Homelands develops housing. By contrast, South Kona school enrollments

<b>Table 7-1 Private Schools in West Hawaii</b>			
<b>School Name</b>	<b>Current Enrollment</b>	<b>Maximum Capacity</b>	<b>Plans for Expansion</b>
Kona Adventist School Captain Cook (K-8)	31	Depends on no. of teachers	Not available for public knowledge.
Makua Lani Christian School Holualoa (G6-12)	<b>90</b>	Approx. 120	Not on this campus: New campus on Kona planned. Area still uncertain
Hawaii Montessori School Kailua-Kona (Toddler-EI)	Approx. 85	At capacity	Creating space for elementary by adding walls. Looking for land to build a new campus to increase infant and upper elementary programs.
Hualalai Academy Kailua-Kona (K-12)	Less than 240	360	Expected building in future (Confidential). Slight growth in enrollment
Kona Christian Academy Kailua-Kona (K-8)	Approx. 150	150	Not much change in enrollment due to state law (turn into Palani). Turning lane prevents any expansion. Would like to.
Kona Pacific School Kealakekua (K-7)	Approx. 85 Total: 681	105	In 3 years: 2 more buildings will go up. There is a definite growth in student enrollment

continue to decrease as the population has been relatively stable for and school age children have passed through the system.

Plans for a new increment of four classrooms at Kealakehe Intermediate will begin summer 2006. In the long term, if there is to be new schools, DOE projects that it would most likely be located in North Kona, beginning with an elementary schools and, in time a new middle school in Waikoloa. The area also applied for a significant self-help building project.

## **8 SOLID WASTE**

Hawaii County does not provide waste collection services. Private companies haul approximately 50% of the waste generated in areas that have relatively dense residential development to county landfills (Harding ESE, December 31, 2002). The remaining 50%, or possibly greater is self-hauled. Most self-hauled waste is taken to the County's transfer stations, which are provided for disposal of waste from single-family residences. The five transfer stations in North and South Kona are located in Kailua, Keauhou, Keei, Wailea, and Milolii are transfer stations.

Puuanahulu Landfill in West Hawaii is a modern, state-of-the-art facility in West Hawaii. As of 2002, Puuanahulu has more than 12,000,000 cubic yards of permitted air space, which would accommodate the current waste stream from West Hawaii for about 40 years (Harding ESE, December 31, 2002). Puuanahulu landfill is operated by county personnel with management assistance from Waste Management of Hawaii, Inc.

According to the Integrated Solid Waste Management Plan (ISWMP) (Harding ESE, December 31, 2002), agricultural waste does not enter the county system because it is recycled at the sources. Otherwise the Hawaii County Solid Waste Division disposes of all solid waste that is not diverted by recyclers.

The entire population contributes to the solid waste stream from their activities at home and at work. The waste, except for the portion that is diverted for recycling, reaches the landfills either through the county transfer stations or is hauled directly to the landfills by commercial enterprises or individuals. By county ordinance, only "single family household waste" may be deposited at transfer stations by "individuals not acting as, or on behalf of, a business, public agency, religious entity or non-profit organization." The County Solid Waste Division maintains transfer stations and transports the accumulated waste from the transfer stations to the landfills. Approximately 37% of the solid waste entering Puuanahulu Landfill is from county transfer stations, approximately 62% is from commercial haulers and approximately 6% from self-haulers. Table 8-1 shows how much waste is going to Puuanahulu Landfill from each of the transfer stations in Kona.

The county does not have staff dedicated to recycling and operates its recycling and public education efforts through contracts with outside organizations and businesses. The county diverted approximately 13% of its waste during Fiscal Year 1998-1999 compared to a rate of 19% for the State of Hawaii.

The ISWMP recommends several alternatives to improve solid waste management system. All eleven of the alternatives include landfill disposal of residual waste disposal of residual wastes because there are no practical methods of recycling or otherwise diverting all waste from the landfills.

Transfer Station	Annual Tonnage	Percent of Total
Kailua/Kealakehe	7,535.19	46
Keauhou	4,741.25	29
Keei	2,022.37	12
Waiea	1,844.51	11
Milolii	228.79	2
Total	16,372.11	

*Source: Update to the Integrated Solid Waste Management Plan for the County of Hawaii, Harding ESE, December 31, 2002.*

The Bottle Bill began on January 1, 2005. For the first year, Hawaii County had a redemption rate of about 60%.

According the 2005 Mayor's Report, landfill diversion increased from 15.7% to 20% from July 2004 – June 2005. July 2005 – October 2005, landfill diversion was 26%.

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## **FIGURES – DATA SOURCES**

### **All Figures**

- *Kona boundaries, Judicial Districts*: State of Hawaii Planning Office, 1983
- *Tax Map Key*: State of Hawaii Planning Office, <http://hawaii.gov/dbedt/gis/>
- *Major and Other Roads*: State of Hawaii, Office of Elections, January 2002; Rectified by County of Hawaii Planning Department, December 2003. Updated on February 13, 2004.

### **Figure 2-1: Wastewater Service**

- *Wastewater Service Area*: County of Hawaii Planning Department
- *Wastewater Treatment Plant*: County of Hawaii Planning Department
- *Pump Station*: County of Hawaii Planning Department
- *Gravity Line*: County of Hawaii Planning Department
- *Lateral*: County of Hawaii Planning Department

### **Figure 2-2: Critical Wastewater Disposal Area (CWDA)**

- *CWDA*: State of Hawaii, Department of Health, Environmental Management, Wastewater Division (Island of Hawaii). February 2004.

**Figures 3-1 and 3-2 Flood & Drainage for North Kona and South Kona**

- *Zone:* County of Hawaii Planning Department
- *Lastest LOMR:* County of Hawaii Planning Department
- *Streams:* State of Hawaii Planning Office, <http://hawaii.gov/dbedt/gis/>

**Figure 3-3 Flood Occurrences**

- *Flood Occurrence:* County of Hawaii Planning Department
- *Streams:* State of Hawaii Planning Office, <http://hawaii.gov/dbedt/gis/>

**Figure 4-1 Existing Roadway Network**

- *Major and Other Roads:* State of Hawaii, Office of Elections, January 2002; Rectified by County of Hawaii Planning Department, December 2003. Updated on February 13, 2004.

**Figure 4-2 Existing and Proposed Bikeways**

- *Bikeways:* County of Hawaii Planning Department

**Figure 5-1 Parks**

- *County Park:* County of Hawaii Planning Department
- *State Park:* County of Hawaii Planning Department
- *Federal Park:* County of Hawaii Planning Department

**Figure 6-1 Emergency Services**

- *Hospital:* County of Hawaii Planning Department
- *Fire Station:* County of Hawaii Planning Department
- *Police Station:* County of Hawaii Planning Department

**Figure 7-1 Schools and Libraries**

*School:* County of Hawaii Planning Department

*Library:* County of Hawaii Planning Department



# **KONA**

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## *Community Development Plan*