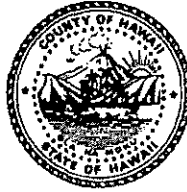


PUNA COMMUNITY DEVELOPMENT PLAN



SEPTEMBER 2008

COUNTY OF HAWAI'I



STATE OF HAWAI'I

ORDINANCE NO. 08 116

BILL NO. 318
(Draft 4)

AN ORDINANCE ADOPTING THE COUNTY OF HAWAI'I PUNA COMMUNITY DEVELOPMENT PLAN.

BE IT ORDAINED BY THE COUNCIL OF THE COUNTY OF HAWAI'I:

SECTION 1. Purpose. The purpose of this ordinance is to adopt the Puna Community Development Plan (attached hereto as Appendix A, as amended to Draft 3) pursuant to the County of Hawai'i General Plan. Section 15.1 (February 2005 as amended).

SECTION 2. Adoption. Chapter 16, section 16-2, Hawai'i County Code 1983 (2005 Edition, as amended), is amended to read as follows:

"Section 16-2. Adoption of community development plans. The community development plans listed below are adopted and incorporated by reference. A copy of the plans and amendments shall be available for public inspection at the Planning Department.

PUNA. The document identified as "Puna Community Development Plan" is adopted by reference subject to later amendments by ordinance, and may be cited as the "Puna CDP." The planning area for the Puna CDP encompasses the judicial district of Puna and the Volcano Census Designated Place that includes the Volcano Golf Course subdivision in the district of Ka'u."


SECTION 3. Severence. In the event that any portion of this ordinance is declared invalid, such invalidity shall not affect the other parts of this ordinance.

SECTION 4. Material to be repealed is bracketed and stricken. New material is underscored. In printing this ordinance, the brackets, bracketed and stricken material, and

underscoring need not be included.

SECTION 5. Effective Date. This ordinance shall take effect upon its approval

INTRODUCED BY:



COUNCIL MEMBER, COUNTY OF HAWAI'I

Kona, Hawai'i
Date of Introduction: August 13, 2008
Date of 1st Reading: August 13, 2008
Date of 2nd Reading: August 27, 2008
Effective Date: September 10, 2008
REFERENCE: ~~Comm.~~ 1300 67/11 Council

OFFICE OF THE COUNTY CLERK
 County of Hawai'i
 Kona, Hawai'i

(Draft 4)

RECEIVED

Introduced By: Bob Jacobson
 Date Introduced: August 13, 2008
 First Reading: August 13, 2008
 Published: N/A

REMARKS: _____

Second Reading: August 27, 2008
 To Mayor: September 5, 2008
 Returned: September 10, 2008
 Effective: September 10, 2008
 Published: September 18, 2008

REMARKS: _____

2008 SEP 18 10 30 AM HAWAII COUNTY CLERK				
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Ford				
Higa				
Hoffmann	X			
Ikeda		X		
Jacobson	X			
Naeole	X			
Pilago	X			
Yagong	X			
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Ikeda		X		
Jacobson	X			
Naeole	X			
Pilago	X			
Yagong	X			
Yoshimoto		X		
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I DO HEREBY CERTIFY that the foregoing BILL was adopted by the County Council published as indicated above.

APPROVED AS TO
 FORM AND LEGALITY:

Andy D. Seay
 DEPUTY CORPORATION COUNSEL
 COUNTY OF HAWAII

Date SEP - 8 2008

[Signature]
 COUNCIL CHAIRMAN

Casey Gorman
 COUNTY CLERK

Bill No.: 318 (Draft 4)
 Reference: C-1300.67/PC-89
 Ord No.: 08 116

Approved/Disapproved this 10th day
 of September, 2008
Harry Kim
 MAYOR, COUNTY OF HAWAII

PUNA COMMUNITY DEVELOPMENT PLAN

SEPTEMBER 2008

Puna Community Development Plan Steering Committee

Jon A. Olson, Chair
Greg Braun, Vice-Chair
Eddie Alonzo
Stephanie Bath
Barbara Lively
Martha Lockwood
Kim D. Tavares
Frederick R. Warshauer
Darren AhChong (former member)
JoAnne Backman (former member)
Shirley Pedro (former member)

County of Hawai'i Planning Department Staff

Christopher Yuen, Director
Larry Brown
Ron Whitmore

Consultant to the Steering Committee (PlanPacific, Inc.)

John P. Whalen, FAICP, Principal
Christopher Pramoulmetar
Kenji Salmoiraighi

Cover: The flower of the 'ōhi'a lehua tree, which is found from mauka to makai in Puna, and is a symbol of resilience and adaptability.



PUNA COMMUNITY DEVELOPMENT PLAN
September 2008

PROLOGUE

ŌLELO HOĀKĀKA

What we have in common is far greater than what separates us.

We need to become teachers of generosity through our compassionate deeds, actions, and example.

We need to address globalization, environmental changes, widespread poverty, and rapid human population growth.

Existing political and economic models need to be re-conceptualized, transformed, and balanced.

A cosmic sense of purpose and belief, coupled with critical and creative thinking will help us see the possibilities of the future.

It's a kakou thing - we are all connected.

Hawaiians have been here for [centuries].

The Po'e Kahiko, the People of Old, mastered environmentalism and sustainability.

In these times, if we look back to the wisdom and ways of our ancestors, we could better move forward.

'E kuleana kakou!

It's everyone's responsibility!

Luana Jones, Puna resident

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Chapter 1

INTRODUCTION

1.1 THE SETTING

Puna's natural environment is dominated by volcanic activity, unique geological events and formations, and a variety of plant communities that provide habitat for native species. Eruptions of Kīlauea and the nearby volcano Mauna Loa continue to shape the ecology of the region, and even the land itself. Rainfall is higher on the windward slopes of Kilauea, while the leeward slopes, extending into Ka'u, are relatively arid. The wetter side is covered by thick forests of 'Ohi'a trees and Hapu'u tree ferns on all but the youngest of lava flows or cleared land. On the drier side, vegetation is more open, exposing the underlying geology.

A distinguishing feature of Puna's native forest is its interaction with repeated, relatively recent lava flows, creating varied ages of forests underlain by different compositions of lava flows, ash and explosion deposits. This, in turn, enriches biodiversity, especially in older stands of forest, known as "kipuka", that have been isolated by younger lava flows.

Some of the native animal and plant species present in Puna are endemic to Hawai'i, found nowhere else in the world. In addition, Puna harbors many other native species, such as the Pueo (Hawaiian Owl), the 'Amakihi, the 'Apapane, and various insects, some of which are rare.

Puna's unique lava tube caves are a notable geological feature and popular attraction. Kazumura Cave is recognized as the world's longest lava cave at nearly 40 miles. The lava caves are also important as natural habitats for endemic cave-adapted species of insects and invertebrates. In addition, some of caves were used by ancient Hawaiians as burial sites for Ali'i (royalty) and others.

Puna's geology and biological resources inspired reverence for the landscape by the original human inhabitants of Hawai'i. By cultural tradition, Kīlauea is the home of the goddess Pele, giving the volcano and its surroundings sacred status. Ancient Hawaiians recognized Puna as Pele's land, with human habitation subject to Pele's will. Maka'aina, or commoners, were free to relocate to other ahupua'a (the lands of another chief) when Pele reasserted her dominion over the land. A map dated 1826 indicates 24 ahupua'a located around the entire coast of Puna.¹ While human settlement from ancient times was concentrated in a 1- to 3-mile band near the shoreline, mauka areas near the volcano and upper reaches of forest were visited for gathering as well as spiritual purposes.

¹ Community Management Associates for the County of Hawai'i, *Puna Community Development Plan Technical Report*, 1995.

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leading commercial activities. By 1850, agriculture diversified with the cultivation of potatoes, onions, pumpkins, oranges, and molasses.² Soon, sugarcane was in large-scale production. The dominant operation in Puna was the Puna Sugar Company, whose plantation fields extended for ten miles along both sides of Highway 11 between Kea'au and Mountain View, as well as in the Pāhoa and Kapoho areas.³

Macadamia nuts and papaya were introduced in 1881 and 1919 respectively. Since the closure of the Puna Sugar Company in 1991, papaya and macadamia nut production have become the leading cash crops of Puna. About 97% of the state's papaya production occurs in Puna, primarily in the Kapoho area. The closure of sugar production in Puna potentially opened a large amount of agriculture land to a more diversified industry, although much of the former plantation land lies unused and covered predominantly by non-native trees, shrubs and grasses.

A variety of growing conditions supports diversified agriculture in Puna. Presently, Puna produces at least 40 different agricultural products including cut flowers, fruits, vegetables, and livestock. While the district is generally a wet, warm climate, drier conditions at lowland areas such as Kapoho are ideal for cultivating papaya, whereas wetter, cooler conditions in the Volcano area are suitable for growing crops that cannot thrive in many other areas of Hawai'i. Even the wettest of areas have produced well under greenhouse cover. Also, due to volcanic activity, the age of the soils varies considerably throughout Puna, with corresponding variations in inherent natural fertility and tendency to resist weeds.

The recent pattern of residential development and population growth in Puna is the result of widespread land subdivision within the past half century. Between 1958 and 1973, more than 52,500 subdivision lots were created. Since that time, nearly 2,500 of these lots have been covered by lava flows or have been rendered unbuildable by shoreline subsidence, reflecting the risks of building on a landscape subject to volcanic and seismic hazards. Moreover, most subdivision lots are accessed by private, unpaved roads. The streets generally lack sidewalks and lighting, and do not meet current County standards in terms of pavement width, vertical geometrics, drainage and other design parameters. None of the subdivisions have central sewer systems and only a couple have private water systems. Most lots rely on individual catchment systems supplemented with private delivery trucks for potable water. Large sections of some subdivisions are off the power grid.

Despite the natural hazards and rudimentary infrastructure and services in these subdivisions, build-out of the lots has been occurring, with the northeast quadrant of Puna and in the vicinity of Volcano experiencing the highest rates of population growth. Puna is experiencing the fastest rate of growth of all the districts in the County of Hawai'i. The Census population count in 2000 for Puna was 31,335. In March 2007 the estimated population was 43,071, an increase of over 37% in less than 7 years. By 2030, the population is projected grow to approximately 75,000. Since only about one-quarter of the available lots have been developed at present, is clear that these extensive subdivisions present formidable challenges to

² Hawai'i's Agricultural Gateway website, <http://www.hawaiiag.org/history.htm>

³ Hawaii Sugar Planters' Association, Plantation Archives, http://www2.hawaii.edu/~speccoll/p_puna.html



INTRODUCTION

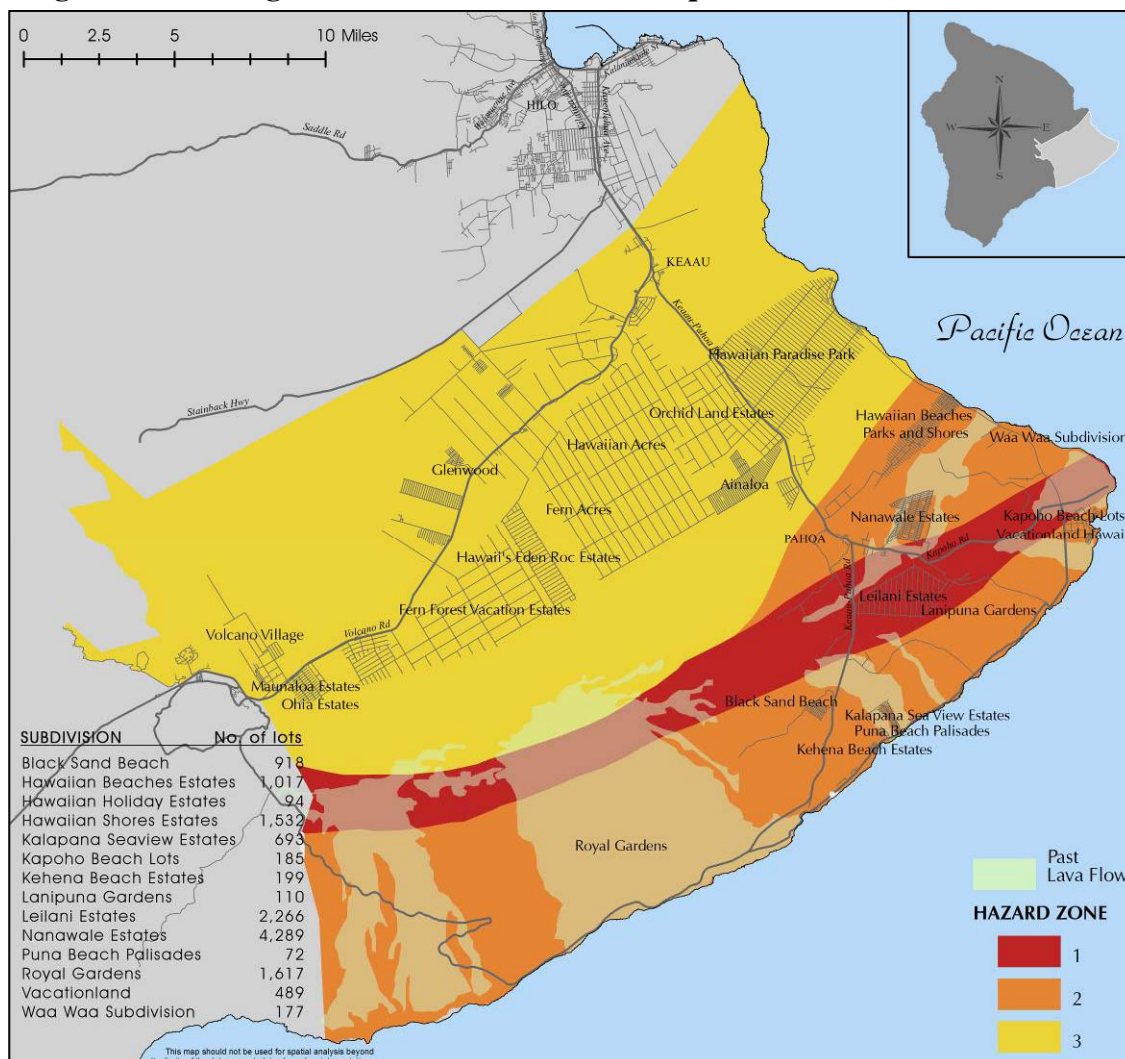
the natural environment and the rational management of development and future population growth.

1.2 THE PLANNING CHALLENGE

If Puna continues to develop at the present rate within the framework of the extensive subdivisions, there will be several types of significant, long-term consequences:

- An increasing number of people and property improvements are being put at risk due to natural hazards. All of Puna lies within the three most hazardous geological risk zones: LF1, LF2 and LF3. About 6,400 subdivision lots lie in the highest hazard zone, LF1, and over 500 of these are exposed to additional risks from subsidence, tsunami and earthquakes. That 2,038 lots in the lower hazard zone LF2 have been covered or cut off by lava flows in recent decades underscores the hazardous nature of much of the district.

Figure 1-2: Geological Risk Zones Relative to Populated Areas and Subdivisions



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- Because Puna’s subdivisions are so large and have few arterial streets, evacuation of residents on short notice in the event a lava flow, earthquake, tsunami or hurricane is a significant problem with serious consequences to public safety. The potential problem worsens as subdivision lots continue to develop and no infrastructure improvements are made.
- As more lots are developed, an increasing number of residents expect improved infrastructure. The cumulative impact of widespread use of cesspools on the quality of the aquifer and coastal waters is undetermined. Retrofitting infrastructure improvements is expensive, and not all residents are willing to either bear the cost or accept the transition from a “rural” setting to one that is more suburban.
- Because subdivision lots were sold in their undeveloped state rather than with dwellings, development has occurred in an uneven, “leap-frog” pattern, which makes it even more difficult to develop infrastructure and provide services to the population. Residents often must make long trips to employment, schools, shopping and other destinations to meet daily needs.
- While most of these subdivisions are on agricultural-zoned lands, the actual use of developed lots is predominantly residential. As in-fill residential development continues, it will be more difficult for existing small-lot agricultural uses to remain viable due to complaints from neighbors about nuisance effects of agricultural operations and potential increases in crop theft or vandalism.
- Lot development adversely impacts the native forest in an obvious way when an entire lot is cleared of vegetative cover to make way for buildings and yards. But clear-cutting and pin-to-pin grading and grubbing of lots has subtler impacts, as well, such as:
 - Openings in the forest promote the spread invasive, non-native species. Non-native plants affect the forests by changing the soil chemistry and increasing shade, making it hard for native plants to compete and survive.
 - Fragmenting the forest creates “edge” habitat that further accelerates the decline of native organisms.
 - Fragmentation also changes the microclimate of adjacent forest (i.e., increased temperature and sunlight and decreased moisture in the understory), altering growing regimes for plants and the suitability of nesting sites.
 - Grading creates boggy areas devoid of vegetation, providing breeding habitat for mosquitoes, a vector for avian malaria, which further threatens the native bird population.
 - Re-contouring of lots through grading and filling alters local drainage patterns and affect adjacent properties or rights-of-way.
 - Lot grading can lead to the collapse of an underlying lava tube, which in turn may expose a unique cave ecosystem or an ancient burial site or artifact.



INTRODUCTION

The combination of these challenges calls for bold planning initiatives to re-shape the pattern of future growth and development in a manner that is more in harmony with the natural setting and more supportive of a better, sustainable quality of life. These initiatives are embodied in the three main themes of this plan.

1.3 ORGANIZATION OF THE PLAN

The Puna Community Development Plan is organized into three overarching themes that correspond to the top three issues that face the region, as identified in the public involvement process, including:

- Public participation and County policy, as reflected in earlier planning efforts, including the draft Puna Community Development Plan in the early 1990's, the County of Hawai'i General Plan (2005), the Puna Regional Circulation Study (2005), and the various community-based master plans produced for several of Puna's subdivisions and villages.
- The 130 Small Group Meetings held throughout Puna in early 2006 to solicit issues, concerns and ideas at the "grass roots" level.
- The two public workshops held in July and September, 2006, to provide background information on conditions and trends and potential tools to address issues, as well as to solicit additional comments and ideas from Puna stakeholders.
- The analyses and recommendations in written reports prepared and submitted by the citizen-based Working Groups.
- Comments received on the series of three Working Papers prepared by the project consultant to address each of the three themes, drawing from the reports of the Working Groups and the preceding planning efforts.
- Deliberations and decisions by the Puna Community Development Plan Steering Committee in a series of meetings in September through December 2007 on preliminary goals, objectives and actions compiled by the project consultant, based on the results of the above work products.

At its January 18, 2007 meeting the Steering Committee adopted the following vision statement to embrace the three themes and guide the direction of the plan:

The Vision: Mālama Puna A Mau Loa!

Residents of Puna live in harmony with the `āina while promoting a sustainable vibrant local economy, healthy communities, and a viable transportation system that is accessible, friendly and safe for now and future generations.

The three themes of this plan are presented in the following order:

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- **Mālama I Ka ‘Aina** establishes how the contextual natural, historic and cultural features of Puna should be preserved and respected. The goals, objectives and implementing actions under this theme address cultural and historic sites and districts; forest lands and unique geological features; scenic resources; and drainage, aquifers and coastal water quality.
- **Growth Management** addresses how the future pattern of human settlement and land use should be shaped to respect that context and support the desired quality of life for Puna’s residents. The goals, objectives and implementing actions under this theme address the land use pattern; agricultural and economic development; public services, social services and housing; parks and recreation and renewable energy and energy efficiency.
- **Transportation** focuses on sustainable approaches to transportation to support the goals of the two above themes. The goals, objectives and implementing actions under this theme address mass transit and alternative travel modes, travel demand management and roadway connectivity and safety.



INTRODUCTION

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Chapter 2

MĀLAMA I KA 'ĀINA

Despite the destruction of native forest and other resources that has occurred in Puna, and the potential for much more damage through land development in the extensive subdivisions, as described in Chapter 1, there remains a good opportunity not only to protect what is left, but even reverse some of the historical impacts.

Puna contains vast acreage of largely intact natural area that comes under the protection of Federal and State regulations; for example:

- The western portion of Puna is dominated by Hawai'i Volcanoes National Park and the adjoining upper east Hawai'i rainforest. The Park was designated by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as an International Biosphere Reserve in 1980, reflecting its value for research and protection of evolutionary resources, and as a World Heritage Site in 1987, citing its geological resources.
- The State of Hawai'i designated two areas adjoining the Park as Natural Area Reserves -- Kahauale'a and Pu'u Maka'ala -- meeting the same standards of resource quality and protective management as the Biosphere Reserve.
- The State also manages several other forest reserves in Puna comprising 131,659 acres: Upper Waiakea Forest Reserve, Waiakea Forest Reserve, Ola'a Forest Reserve (Mountain View Section), Nanawale Forest Reserve, Malama Ki Forest Reserve, Keau'ohana Forest Reserve, and the recently acquired Wao Kele O Puna Forest Reserve.⁴
- The State Conservation District, which encompasses almost all of the above areas as well as some additional lands, is organized as a regulatory hierarchy under the jurisdiction of the Hawai'i Department of Land and Natural Resources (DLNR). There are five subzones of the Conservation District, each intended to provide a degree of regulatory protection that reflects the intactness or relative significance of the resources that are present in those subzones. About half of Puna's Conservation District is in the Protective Subzone, which is the most restrictive of the five subzones in terms of allowable uses. The remainder is in either the Limited Subzone, which is designated for areas with potential high risk of natural hazard, or the Resource Subzone, which is generally applied to less intact forest reserves.
- The Conservation District also includes the submerged lands beneath coastal waters. DLNR's Office of Conservation and Coastal Lands therefore addresses shoreline and

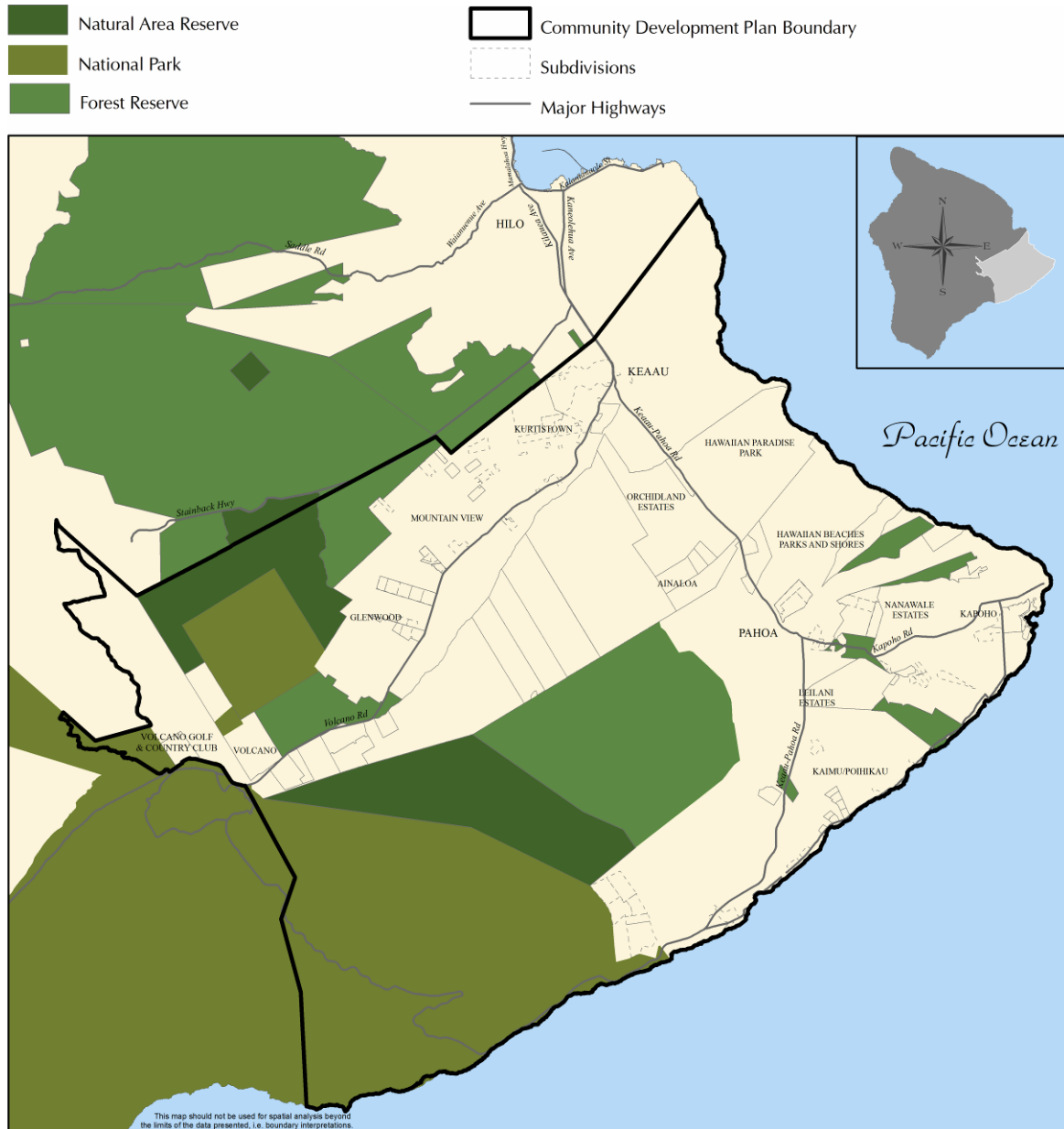
⁴ The Wao Kele O Puna Forest Reserve is owned by the Office of Hawaiian Affairs but managed by DLNR's Division of Forestry and Wildlife.



MĀLAMA I KA 'ĀINA

near-shore issues and regulations. The Hawai'i Department of Health (DOH) is responsible for monitoring and protecting the quality of the waters themselves under the authority of the Federal Clean Water Act.

Figure 2-1: Natural Areas Under Federal or State Protection



The remainder of Puna – about 56% of the entire land area of the district – lies predominately within the State Agricultural District and, to a lesser extent, in the State Urban and Rural Districts. The County has primary jurisdiction over land use and development in these Districts and can take proactive measures to protect resources in these areas, which encompass



former agricultural fields and pastures, early towns and villages, extensive partially developed subdivisions, and large tracts of native forest.

While much of the natural environment and some of the cultural heritage of these areas has been altered and compromised, effective and timely intervention can do much to prevent further degradation and possibly even restore some of what has been lost or undergoing change.

The theme of Mālama I Ka ‘Āina encompasses all aspects of the natural and cultural environment, seeking to preserve and perpetuate not only the native forests and geological formations, but also pristine waters, unspoiled, star-lit skies, serene natural habitats, and vestiges of Puna’s historic heritage. The following sections propose specific new regulatory, incentive, and educational programs to promote sustainable practices to preserve Puna’s natural and cultural resources indefinitely. On a broader level, Chapter 3 will complement these proposals with measures to reshape Puna’s development pattern and reduce the development potential of existing subdivisions.

2.1 HISTORIC, CULTURAL, AND SCENIC RESOURCES

Only nine sites in Puna are listed on the Hawai’i and/or National Register of Historic Places, but there are many other sites throughout the district that have been identified as having historic significance.

Puna’s coastal areas have relatively dense concentrations of historical, cultural, and burial sites. Burial sites and cultural artifacts are not uncommon on subdivision lots, although many are hidden in lava tubes, making them susceptible to destruction due to grading. While the State Historic Preservation Division (SHPD) plays a role in reviewing construction permits and State law requires that construction activity be halted in the event of discovery of archaeological remains, the effectiveness of these measures is limited due to a shortage of SHPD staff, lack of information about the location of sites, and weak inspection and enforcement mechanisms. Greater County-level involvement in this process could improve results.

Puna’s history is also evident in the architecture of its older towns and villages; namely, Kea’au, the Kurtistown-Mountain View corridor, Pāhoa, and Volcano. Each of these places has a distinctive design character that reflects its history and location. Volcano presently has a small, legally recognized historic district, but otherwise there are no special design controls to preserve the design character of these towns. Of the four towns, Volcano and Pāhoa have the greatest potential for designation as Special Design Districts, based on their existing fabric. Design controls for Kea’au and Kurtistown-Mountain View can be woven into the “floating zone” approvals for the village center designations for those places, which is discussed further in Chapters 3 and 5.

Scenic natural settings are numerous in Puna, but they are, for the most part, protected by existing land use controls or public land agencies. Trails and scenic byways deserve special mention, since they are continuous visual experiences along a designated corridor and are particularly vulnerable to loss. Because they also serve a transportation function, they are addressed in Section 4.5 as well as below.



MĀLAMA I KA 'ĀINA

2.1.1 Goals

- a. Structures and cultural sites that are significant to Puna's history and cultural traditions are preserved.
- b. The design character and natural setting of older communities that are representative of Puna's historic development are perpetuated.
- c. Areas of scenic and cultural interest are accessible to the public in a manner that does not detract from their aesthetic, natural and cultural value.
- d. Awareness and appreciation of the host culture is expanded.
- e. The native forests of Puna are revered as part of the native culture and are provided with permanent protection from degradation and loss.
- f. Tourism in Puna is compatible with historic and natural resources and not intrusive into the area's communities.

2.1.2 Objectives

- a. Create a County entity and adopt a process for identifying historic and cultural sites and advocating for their preservation and/or restoration within the County's permitting and approval processes.
- b. Adopt appropriate location-specific development standards and design guidelines for buildings, landscape treatment and public infrastructure for communities designated for Special Design District status.
- c. Protect cultural sites from destruction by development activity.
- d. Adopt "kānaka" building code standards to allow structures utilizing traditional Hawaiian building design and construction methods.

2.1.3 Actions

- a. Establish a County historic preservation commission, making the County eligible for Certified Local Government (CLG) status and Federal historic preservation funds. The purposes of the commission are to:
 - Provide historic preservation review and advice to the Planning Department, Department of Public Works and other County, State, and Federal agencies;
 - Receive preservation grants from government and other sources, such as the Historic Hawai'i Foundation to encourage owners to inventory, preserve or restore historic and cultural features on their property;
 - Recommend to the State Historic Preservation Division on permit review criteria and candidate sites for listing on the Hawai'i Register of Historic Places;
 - Assist in development of historic and cultural interpretation programs for sites that are planned for restoration, such as the Old Puna Trail historic corridor and Red Road scenic byway;
 - Advise the Departments of Planning, Public Works and Health on their permit approval recommendations;



- Notify development permit applicants about guidelines and standards for identifying and protecting cultural and historic artifacts and features. Prior to and during development projects, applicants should seek advice from the Departments of Planning and Public Works about permit approval requirements;
 - Assist the County and local organizations in planning and conducting cultural events; and
 - Request State funding for cultural sensitivity training and other educational programs appropriate for County employees, realtors, tour guides, and anyone involved with promoting or developing Puna lands.
- b. Initiate Special Design District detailed planning, design standards and review procedures for the following areas:
- Volcano Village historic core and the separate Biosphere Reserve Buffer Zone (*see Section 2.3.3 a*) ;
 - Pāhoa Town;
 - Kea‘au Town; and
 - Kurtistown-to-Mountain View corridor.
- Refer to Chapter 5 for implementation guidelines related to this action.*
- c. Amend the County building code to add standards for structures utilizing traditional Hawaiian building design and construction methods. There may be certain limitations placed on the occupancy or use of these structures, such as for cultural purposes, accessory uses and/or occasional gatherings only.
- d. Amend the County grading ordinance to require consultation with the Historic Preservation Division and the aforementioned County Historic Preservation Commission prior to the issuance of a grading permit.

2.2 NATIVE FORESTS AND GEOLOGICAL FEATURES

As mentioned in the introduction to this chapter, much of Puna’s native forests and unusual geological features are protected by a network of Federal and State management and regulatory controls. However, there are several important areas and features that are exposed to significant impact from activities outside of these protected areas and require County initiatives to protect these resources:

- Lava tubes and caves, some of which host endemic wildlife, extend throughout the district. Collapsed tubes and caves can also protect portions of forest from fires, enabling native vegetation to reach a climax condition. The destruction of such features could therefore disrupt the ecological system.
- The upper Puna forests and segments of the lower Puna forest are among the finest and most well preserved of their types in the state. Some of these areas, however, are zoned for agriculture and urban uses and are therefore presently unprotected by regulation.



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- The community of Volcano and surrounding subdivisions contain some of the most extensive areas of native forest and it is situated directly between the high-quality protected native forest areas mentioned in the introduction to this Chapter, thereby providing a critical linkage between these native habitats. Currently, much of this area is zoned for residential or agriculture use, without any additional regulatory control to prevent further subdivision or excessive land clearing.

2.2.1 Goals

- a. The connection between intact native forests in Volcanoes National Park and nearby State forest reserves and natural area reserves is preserved while allowing for more limited orderly development of the residential and agricultural areas in between.
- b. Destruction of native forest through development activity is abated.
- c. The spread of invasive species through abandonment of previously cleared areas is reduced.
- d. Residents, those employed in the real estate and construction industries, and the general public are made more aware of the value of the native forest, the threats to that ecosystem, and actions that can be taken to sustain the forest.

2.2.2 Objectives

- a. Adopt a Biosphere Reserve Buffer Zone (BRBZ) and designate a BRBZ Advisory Commission to guide development within the region's native forest through regulatory measures and economic incentives.
- b. Adopt regulatory measures, educational programs and incentives to preserve remnants of native ecosystems in Puna subdivisions, especially remnants at lower elevations.
- c. Modify and enforce Chapter 10, Hawaii County Code (HCC), to prevent storm water diversion to other properties.
- d. Increase the County's role in helping to sustain the native forest, primarily through tax incentives, new regulations and zoning changes.
- e. Provide tax incentives to encourage more landowners to participate in programs to preserve native species and to remove invasive species.

2.2.3 Actions

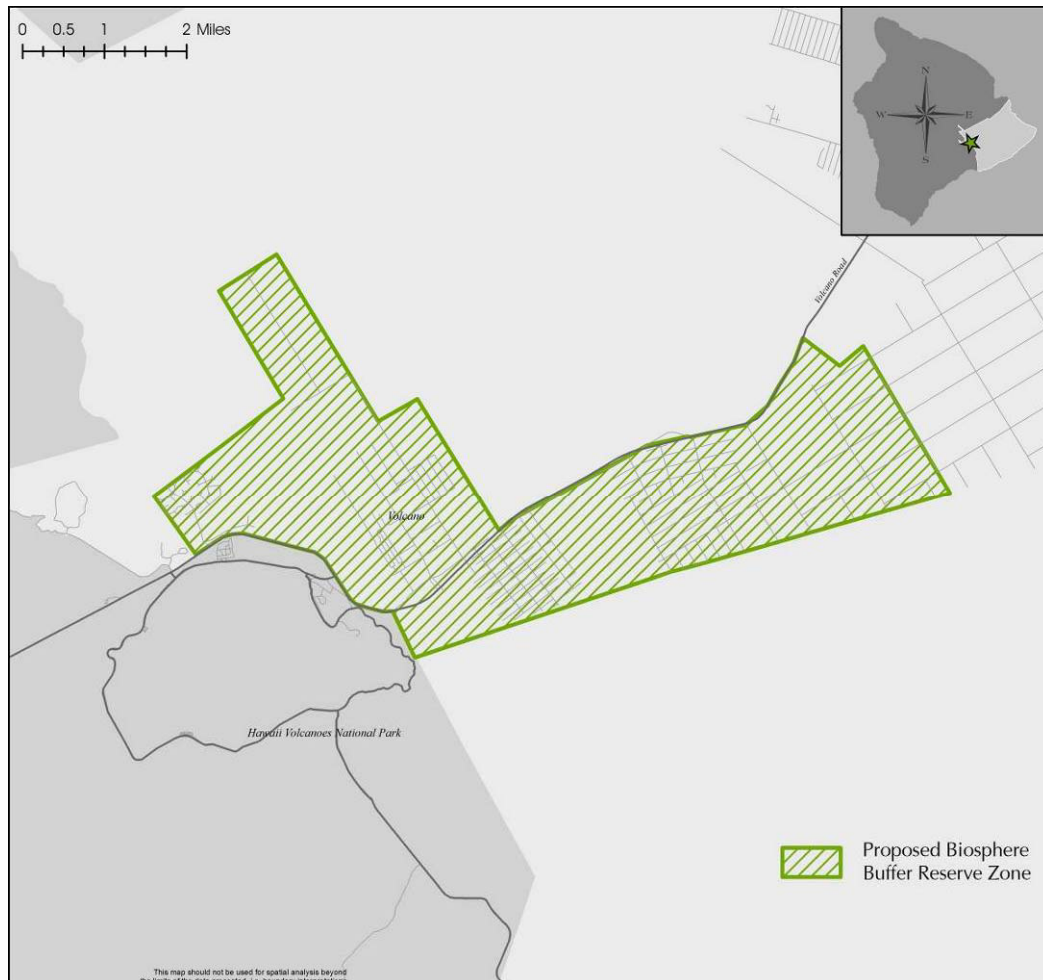
- a. Enact a BRBZ, either separately or as an overlay district for the greater Volcano area, to include the following provisions and other supporting measures:
 - Standards for maximum land disturbance within the BRBZ;
 - A system to monitor the 'Ohi'a forest canopy with the BRBZ;
 - A set of economic incentives designed to reduce forest clearance and the number of developable lots within the BRBZ and transfer development rights within or out of the BRBZ;
 - Mitigation standards and procedures that provide guidelines for the restoration and re-planting of disturbed areas;



- A study to mitigate localized flooding in ecologically friendly ways, such as using vacant, forested lots to absorb floodwaters (*see also Action c. in Section 2.3.3.*);
- Use of “small-footprint” septic tanks to reduce lot grading;
- An expert advisory committee to assist in developing standards, project reviews and public education programs related to the BRBZ;
- Designation of unencumbered State-owned lands near Wright Road for either Natural Area Reserve or Forest Reserve status;
- Amendment to the General Plan to recognize the purpose and intent of the BRBZ and designation of State-owned lands in the BRBZ to “Open”;
- Prohibition of Ohana Dwelling Units within the BRBZ; and
- Re-zoning agricultural- and residential zoned lots to an appropriate designation to prevent further subdivision.

Refer to Chapter 5 for implementation guidelines related to this action.

Figure 2-2: Proposed Biosphere Reserve Buffer Zone





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- b. Amend the grubbing and grading ordinance and/or the zoning code to protect native species, geological and historic features outside of the BRBZ by preventing pin-to-pin lot grading, clearing and grading encroachments onto adjacent lots and water diversions into adjoining properties. The new regulations should provide standards for the preservation of native vegetation, review and public notice procedures for grading permits, and penalties for violations.

Refer to Chapter 5 for implementation guidelines related to this action.

- c. Establish an Office of County Ecologist within the Planning Department to administer the new regulatory provisions and foster partnerships to provide public education and technical support for forest conservation, such as:
 - Assisting other County agencies such as Department of Public Works and Department of Parks and Recreation in their programs and facility planning and maintenance as they relate to native species habitat preservation;
 - Engaging in collaborative relationships with Federal and State agencies, educational institutions and non-profit organizations that conduct research or administer programs for the protection of native species habitat and the abatement of invasive species; and
 - Launching and sustaining a public education and outreach program to enlist community support and involvement in forest protection and to raise awareness of invasive species and practices that threaten the native forest.
- d. Provide indirect County support for native vegetation preservation via land conservation trusts by offering real property tax reductions for conservation easements and contributing County land, where appropriate, to a trust for native habitat management.
- e. Reduce the minimum lot size to qualify for the native forest preservation tax reduction and allow it in any zoning district. Enrollment of a lot in this program is voluntary, but it is binding and permanent, and attached to effective measures to prevent significant clearing or other adverse alterations of the forest cover.
- f. Encourage the County and the State to investigate and implement alternatives to the use of herbicides for weed control on public properties.

2.3 AQUIFERS, COASTAL WATERS AND STORMWATER

The fresh water basal lens underlying Puna floats or flows on sea water and has been measured to reach up to 30 feet above sea level and has an estimated lens thickness of up to 1,200 feet. The aquifer, due to the porosity of the substrate and the extensive forested watershed, is believed to contain huge flows of high quality ground water even at very low elevations.

The most extensive centralized water service area in Puna is the County's Ola'a-Mountain View system, composed of eleven service areas extending along the Highway 11 from the former Puna Sugar Company mill to the Ola'a Reservation Lots, and along Highway 130 to Kaloli Drive. The County also maintains smaller water systems serving the Pāhoa and Kalapana areas. The Hawaiian Beaches subdivision is served by a private system installed by the developer. However, nearly all residents, including farmers, in other inhabited areas that are not presently serviced by water systems depend upon catchment systems to supply their water needs, including fire-fighting.



Water demand is likely to increase at a faster rate in lower Puna than in mauka areas because it is experiencing greater population growth and has a drier climate. To reduce delivery costs during dry periods, the aquifer at lower elevations, particularly in the presently undeveloped Maku'u area, could be tapped as a future source of potable water development. Therefore, it is important to maintain the water quality of that aquifer. One of the potential threats is the cumulative impact of additional individual wastewater disposal systems, especially cesspools, in the subdivisions that overlie the makai portion of the aquifer. As the aquifer approaches the coast, it is more likely to be susceptible to pollution from individual wastewater systems because of the relative proximity of groundwater to the surface. Close proximity of groundwater to the surface reduces the amount of filtration that can occur before effluent reaches the groundwater. The widespread distribution of individual wastewater systems and current Department of Health regulations combine to limit the areas where municipal potable water wells can be sited, despite the abundance of ground water.

The near-shore environment may also be affected because of reduced filtration. All of Puna's coastal waters are classified as "AA" waters, meaning that they are regulated as the most unspoiled in Hawaii. State law mandates that Class AA waters "remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions."⁵ For this reason, wastewater disposal in the coastal zone requires special precaution.

Polluted stormwater runoff is not a significant concern at present, although there are areas in Puna – specifically, Volcano-to-Mountain View and Hawaiian Acres-to-Orchidland – where stormwater has created persistent localized flooding problems in populated and agricultural areas. This appears to be attributable to land use alterations. Due to complex drainage patterns on a lava landscape that lacks natural surface drainage systems, remedies for this problem would have to be studied from a localized drainage management perspective.

2.3.1 Goals

- a. Aquifers that could be used for future community wells in high growth lower elevation areas are protected from pollution by untreated wastewater disposal systems.
- b. Coastal waters maintain and increase their quality.
- c. There is a strategy to address storm water runoff and localized flooding problems.

2.3.2 Objectives

- a. Plan for future potable and irrigation water demand and preserve a contamination-free zone in the portion of the aquifer in lower Puna for future development as a potable water source.
- b. Improve wastewater treatment methods and standards in areas designated for future aquifer use and in coastal areas.
- c. Address the special challenges of managing storm water runoff on Puna's lava terrain on a watershed basis.

⁵ Hawaii Administrative Rules, Section 11-54



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2.3.3 Actions

- a. Encourage State legislation to prohibit the use of cesspools as a means for wastewater disposal in areas below 1,000 feet Mean Sea Level, with the objective of protecting both water quality in coastal areas, as well as in the aquifer, particularly the portion underlying State-owned lands in the Maku‘u area, where there is potential to develop the source for community potable water wells and agricultural irrigation purposes.
- b. Seek State Department of Health acceptance of small-footprint septic wastewater treatment designs; for example, those using drip irrigation or low-pressure pipe and double-tank no-leach field designs. Also, seek acceptance of small decentralized treatment systems and clustered septic systems for wastewater treatment in village/town centers, clustered residential development and other special circumstances.
- c. Prepare watershed management plans for the Volcano-to-Mountain View and Hawaiian Acres-to-Orchidland areas to address localized flooding problems.
- d. By agency agreements and control of zoning and building permits, ensure that a corridor of the Puna watershed at least two miles wide between Wao Kele O Puna forest area and the ocean to the northeast is protected from uses that might contaminate groundwater. No wastewater discharge from cesspools, septic systems, or sewage treatment plants would be allowed within this corridor, nor would disposal of surface runoff. All development within the corridor through Maku‘u and Keonepoko (Nui and Iki ahupua‘a) would be required to utilize centralized sewage treatment plants and/or self-contained pumped septic systems in order to preserve the purity of the groundwater.
- e. In areas below 100 feet above Mean Sea Level, require all black wastewater disposal systems to be contained, pumpable units or be connected to a collective treatment facility. Explore the use of Special Management Area regulations to require this as part of permits for new development.

2.4 SHORELINE AREA

Land use development in Puna’s shoreline area is vulnerable to significant physical risk due to a couple of factors:

- The lack of reef protection for most of the Puna shoreline allows significant wave energy to impact its coast and for noticeable shoreline overwash and retreat during storms to be realized, even where the coastline consists of elevated bluffs. Current Shoreline Setback (SLSB) rules and practices do not adequately take into account these natural processes, nor do they protect development, natural resources or public shoreline access.
- The coastal areas of southeast Puna, as particularly evident in Kapoho, are subsiding at varying rates, up to as much as 0.7 inches per year. Extrapolated over a 50-year period – which is a reasonable lifespan for a house – the subsidence would be nearly 3 feet. As evidence of this phenomenon, many of the lots in the Kapoho area are already submerged. Adding to the risk, the continuing subsidence allows periodic storm waves to rush ever greater distances inland, depending on the slope and exposure. Already within the Vacationland Hawaii subdivision, these waves have been observed to reach back to at least the third row of houses and parcels.



Current coastal flood zone maps are often not reflective of the dynamic changes that are occurring in Puna, and the extent of actual wave wash hazard.

Figure 2-3: Shoreline Subsidence in Kapoho Area



Foreground shows lots that have submerged. Photo credit: G. Shiroma

Important coastal resources – biological, historical and access trails – are also at risk of degradation or loss due to development and erosion. Traditionally, coastal trail alignments moved inland as the shoreline retreated, but contemporary legal practice often leads to the loss of trail segments. Similarly, coastal vegetation naturally tracks inland with shoreline erosion, unless the vegetation line is artificially maintained. Present Special Management Area (SMA) rules and review practices do not adequately take these change factors into account. New technologies in remote sensing and Geographic Information Systems (GIS) can be applied as tools to improve the evaluation of historical data.

2.4.1 Goals

- a. Exposure of development to the risks of shoreline subsidence and coastal flooding is reduced.



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- b. Shoreline biological, historical and cultural resources are adequately protected.

2.4.2 Objectives

- a. Improve data collection and analysis related to present and historic changes in shoreline conditions and resources.
- b. Expand the scope of regulations and review procedures for shoreline development to consider dynamic and interrelated potential hazards to development.
- c. Strengthen the capacity of the County to identify important shoreline resources and evaluate development regulations and proposed developments in the shoreline area.
- d. Support actions consistent with the State of Hawai'i Ocean Resources Management Plan.

2.4.3 Actions

- a. Draw upon coastal zone and geological expertise and technological resources in State agencies, the University of Hawai'i, and the U.S. Geological Survey, as well as informed public comment, to expand and improve the database, reference material and interpretive skills at the County level for the review of shoreline area development proposals.
- b. Retrieve and record information on trails and historic resources in the coastal zone, including the research of old survey and plat maps and various records of the Mahele, Land Commission and Royal Patents.
- c. Conduct historical and biological surveys, either permit-by-permit or on a region-wide basis, to improve the quality of decision-making on SMA and SLSB applications and State Shoreline Certifications. Do not grant SMA permits to subdivide property when it is probable under current trends and projections that it will be submerged at high tide within 100 years.
- d. Take into account special subsidence and storm wave conditions found in Puna, as identified by research and informed public comment, in the determination of State Shoreline Certifications.
- e. Perform a collaborative study among County, State, Federal and University regulators and researchers to observe and delineate the limits of inland wave wash following each large storm and extra high tide event, and use these studies, in addition to informed public comment, to develop and implement refined flood zone maps.
- f. Develop and adopt special zoning and development regulations for the greater Kapoho area (Kipu Point to Pu'ala'a) to take into account the problems associated with ongoing and catastrophic subsidence and property loss, pressure to develop lots for residential and commercial use, and increasing demand for access to the shoreline area for recreational use. Request the State to make some of their Kapoho area accreted lands available for integrated solutions, including relocation/land exchange and new recreational opportunities.



Chapter **3**

MANAGING GROWTH

Chapter 1 (Section 1.2) lists numerous reasons why unabated build-out of Puna's subdivisions would have very negative, if not potentially disastrous, consequences. Puna contains nearly 45% of the islands' total subdivided lots, a low build-out percentage, and the highest growth rate, all on a landscape that is exposed to the highest risk of volcanic and seismic activity. It would be prudent to reduce the risk to future residents and properties by transferring development rights on vacant lots in high risk zones to other, less hazardous locations elsewhere on the island.

Within Puna, the vision is to reshape the development pattern by moving away from the sprawl effects of the existing subdivisions and toward the formation of village and town centers. Over the long term, this will improve the feasibility of developing supporting infrastructure for populated areas, give residents better access to public and commercial services, stimulate local employment opportunities, and reduce dependence on the automobile for transportation. It will also help preserve natural and cultural resources by limiting the spread of the development, as noted in the previous chapter

Some village and town centers already exist in the form of older settlements that were built prior to the creation of the extensive subdivisions a few decades ago. There are opportunities to create new village centers within existing subdivisions that are experiencing higher rates of development, primarily on lands that had been set aside by the subdivider for community or commercial purposes. Tools such as "transfer of development rights" (TDR) and "land pooling" need to be employed to facilitate the development of housing in the village centers in order to make them viable communities.

In addition, zoning maps should be reassessed and revised to greatly reduce the subdivision potential of larger undeveloped parcels throughout Puna. The zoning code should be revised to prevent increased density in a random fashion through the 'ohana dwelling and additional farm dwelling permit process.

Land pooling may offer expanded opportunities for commercial agriculture in subdivisions with small lots by creating larger parcels for agricultural production. While small lots can be used by residents to produce food for their own consumption, larger lots tend to support a wider range of commercially viable agriculture production because of economies of scale, reduced potential for real or perceived nuisance effects on immediate residential neighbors, and lower real estate values per square foot, when compared to small parcels.

While more than half of its land area is zoned for agriculture, and Puna is a center for agricultural activity, current mapping systems present an unclear picture of the productivity potential of agricultural land in the district. There are three inconsistent mapping systems in

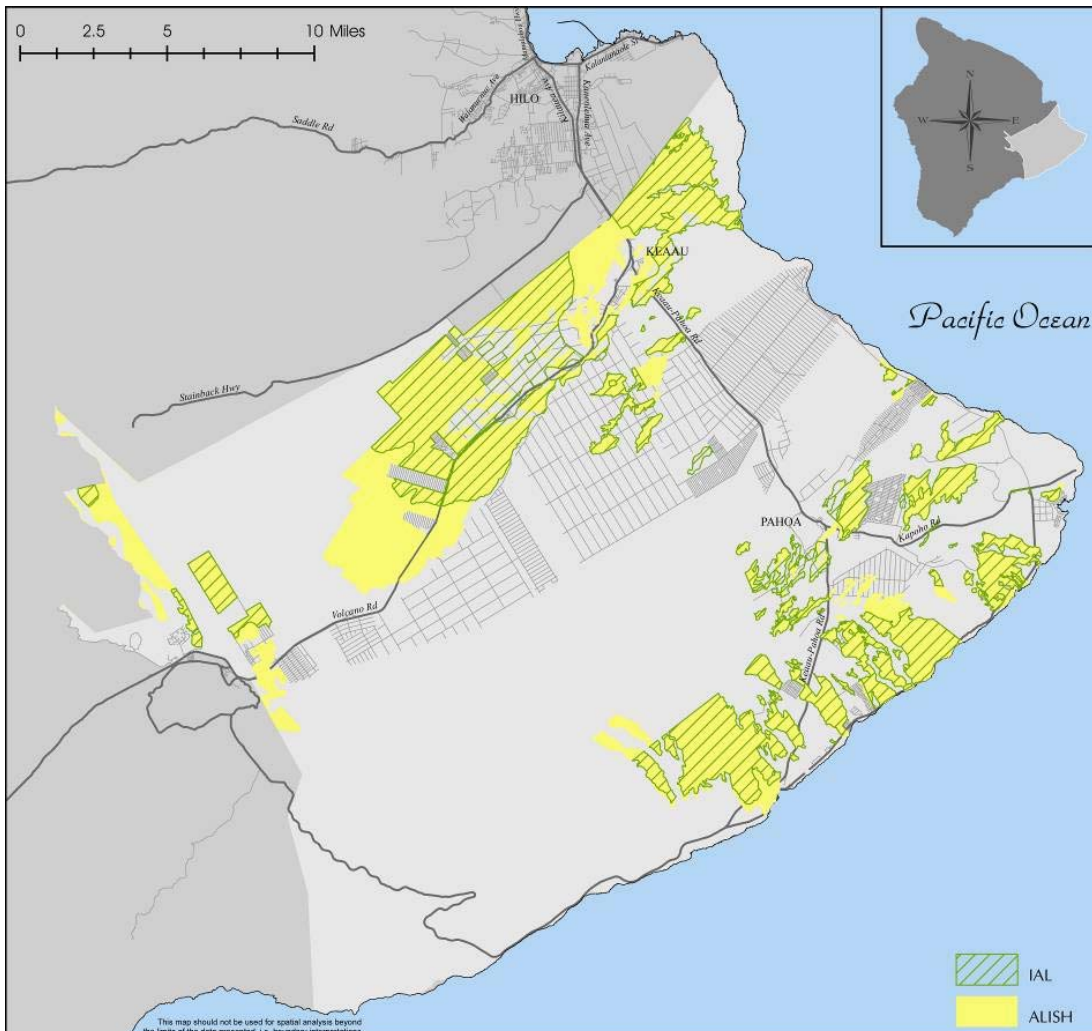


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effect. The only system that has regulatory effect is Land Study Bureau (LSB) soil classifications, which are referenced in the State Land Use Law, Chapter 205, Hawaii Revised Statutes. This system is more than four decades old and reflects a pattern of plantation agricultural use that has dwindled to insignificance in Hawai'i. There are no "A" or "B" lands in the entire district of Puna, which implies incorrectly that Puna's lands have lesser agricultural value.

The State has not formally adopted a system to replace the LSB classifications, but the State Department of Agriculture has prepared maps depicting Agricultural Lands of Importance to the State of Hawai'i (ALISH) that reflect more accurately than the LSB maps the value of lands to support diversified agriculture. ALISH maps are therefore used more often than the LSB maps when evaluating agricultural lands. The County's LUPAG adopted a similar, but not identical, mapping system for areas deemed to be Important Agricultural Lands (IAL.) While there is some correspondence between the ALISH and IAL maps, there is by no means an exact match (see Figure 3-1).

Figure 3-1: ALISH and IAL Lands in Puna





ALISH lands cover a total of approximately 75,596 acres in Puna, whereas IAL lands cover only about 51,653 acres. Moreover, the omission of ALISH lands from the IAL designation to create large “urban expansion” areas surrounding Kea‘au and Pāhoā when there is still much unused development capacity in Puna’s subdivisions is hard to justify. It would be helpful to have a mapping system for agricultural lands that is relevant to Puna’s agricultural activities so that they can be adequately preserved and planned for future use.

The Puna Community Development Plan seeks to manage growth by: encouraging a more efficient, environmentally sustainable land use pattern; reducing the number of and rearranging previously-approved subdivision lots; requesting the County to change the zoning of lots now inappropriately zoned for present and future use and growth; promoting agricultural use and other “green” employment in the district; promoting the use of renewable energy; improving the delivery of social services and housing assistance; and providing the necessary public services, parks and recreation opportunities in a manner that supports community-building and an improved quality of life.

3.1 LAND USE PATTERN

“Village centers” (or “town centers” for the larger settlements) are the model on which Puna’s future land use pattern will be based, redirecting Puna’s extensive subdivisions from their present course of sprawl development. Three types of village centers are proposed to provide varying levels of services based on location, size, and functional attributes. Regional village centers are located at Puna’s largest existing urban settlements – Kea‘au, Hawaiian Paradise Park, and Pāhoā – and are meant to provide a wide range of services and amenities. Keaau and Pāhoā already have a nucleus of region-serving facilities, so they take on more of the characteristics of a town rather than a village. Community village centers provide a more limited range of services in smaller existing urban settlements and subdivisions that are experiencing the greatest rates of population growth. Community centers are projected for Volcano, Mountain View, Kurtistown, Hawaiian Paradise Park, and ‘Āinaloa. Neighborhood village centers serve smaller or more remote communities with relatively small lot sizes. Neighborhood centers are projected for Glenwood, Orchidland Estates, Hawaiian Paradise Park, Hawaiian Beaches, Nanawale Estates, Leilani Estates, and Kapoho.

The principal tools to reshape future land use in Puna include: (1) TDR to re-distribute development rights of subdivision lots that are located in high hazard zones or high-value native forests; (1) land pooling to form village centers and grow town centers while preventing sprawl development; (3) adjustments to County and State tax codes to discourage land speculation and provide tax relief for long-time homeowners and renters and to provide an incentive for removing development rights from property; (4) district-wide rezoning and tighter restrictions on variances from subdivision standards to discourage further subdivision of properties that are not within designated village/town centers; and (5) amendments to the County zoning code to discourage excessive lot clearance and speculative building practices.

3.1.1 Goals

- a. Puna retains a rural character while it protects its native natural and cultural resources.
- b. The quality of life improves and economic opportunity expands for Puna’s residents.



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- c. Services and community facilities are more accessible in village/town centers that are distributed throughout the region, including the underserved subdivisions that have been experiencing higher levels of development growth.
- d. Exposure to high risk from natural hazards situations is reduced.
- e. Inappropriate and disproportionate County zoning can be adjusted in order to maintain and increase the quality of life and to preserve valued natural and cultural resources in the district.
- f. Native vegetation, coastal and historic resources are provided new forms of protection.
- g. Reduced overall number of buildable lots in Puna.
- h. Incentives, disincentives, regulations and other methods are used to diminish land speculation in Puna.

3.1.2 Objectives

- a. Implement tools for re-shaping the pattern of future development to prevent further sprawl, such as land pooling and transfer of development rights.
- b. Develop a typology for existing and proposed village/town centers, including criteria for their location, scale, uses and design.
- c. Enhance the role of existing and new village/town centers by allowing expanded commercial uses, facilitating the development of farmers markets and community gathering places, opportunities for special needs housing, and infrastructure to support more compact development form and multi-modal travel.
- d. Create new village/town centers as necessary, in or near presently underserved subdivisions, beginning with those experiencing higher rates of population growth so residents of those areas will have community activities and more convenient access to services.
- e. Target investments in public services and infrastructure to promote the development of village/town centers and, secondarily, to serve the peripheral subdivision areas.
- f. Limit the size of dwellings and accessory uses that are allowed in non-conforming, agriculturally-zoned subdivisions to discourage excessive lot clearance and speculative building practices.
- g. Identify a supporting role for the County in land assembly for the formation of village/town centers.
- h. Explore additional methods to protect native species habitat and historic features from development by use of economic incentives, development restrictions, and district-wide rezoning.
- i. Provide tax relief for properties whose development rights have been reduced through conservation easements, transfer of development rights and similar measures.
- j. Explore innovative methods to reduce property speculation, such as elevated tax rates associated with rapid resale, and/or district-wide rezoning.
- k. Where possible, reduce density and build-out within the district by various means including selective rezoning.



3.1.3 Actions

- a. Adopt enabling legislation for a transfer of development rights program.
- b. Provide County support for land use entitlements and land assembly for village center formation and voluntary land pooling projects by:
 - Creating a “floating zone” in the County zoning code that allows parcels in a land pooling project to be treated as a joint use development containing a mix of uses pursuant to a single site development plan;
 - Initiating a special use permit request or petition for a land use district boundary amendment for uses that would require such designations under State law;
 - Seeking an amendment to the State Land Use Law (Chapter 205, Hawai‘i Revised Statutes) that would enable the adoption of special “rural town/village” standards for locations meeting certain criteria in the State Agriculture District or State Rural District, subject to a review and approval process that is simpler than the present method of boundary amendment;
 - Seeking State enabling legislation to allow County retention of lots that are in foreclosure for delinquent real property tax payments rather than having them auctioned for sale to the highest bidder, so that they can be used for relocation purposes when other properties are acquired for future rights-of-way, public facilities, land assembly related to village/town center development, or other objectives of the community development plan; and
 - Extending technical assistance and advice to a community-based land pooling association concerning legal and financial aspects of land pooling as they relate to County or State legal requirements and tax policies.
- c. Establish the following general classifications and locations for village and town centers in Puna:
 - Kea‘au, Pāhoa, and Hawaiian Paradise Park shall serve as Regional Town Centers to provide a wide range of services for the Puna district;
 - Community Village Centers shall provide a more limited range of services in smaller existing urban settlements and in large subdivisions that are experiencing the greatest rates of build-out; namely, at ‘Āinaloa, Kurtistown, Mountain View, two or more locations in Hawaiian Paradise Park, and at Volcano; and
 - Neighborhood Village Centers shall be the smallest in scale and located in underserved remote communities and in subdivisions with relatively small lot sizes and significant rates of population growth.

Refer to Chapter 5 for more detailed implementation guidelines on this proposed action.
- d. Facilitate land use entitlements and other tools for the development of existing and future village/town centers and special design districts by:
 - Approving commercial zoning or use permits for existing commercial uses in designated village/town centers that do not presently have appropriate entitlements, and for proposed uses at appropriate nearby locations, provided that the size and use



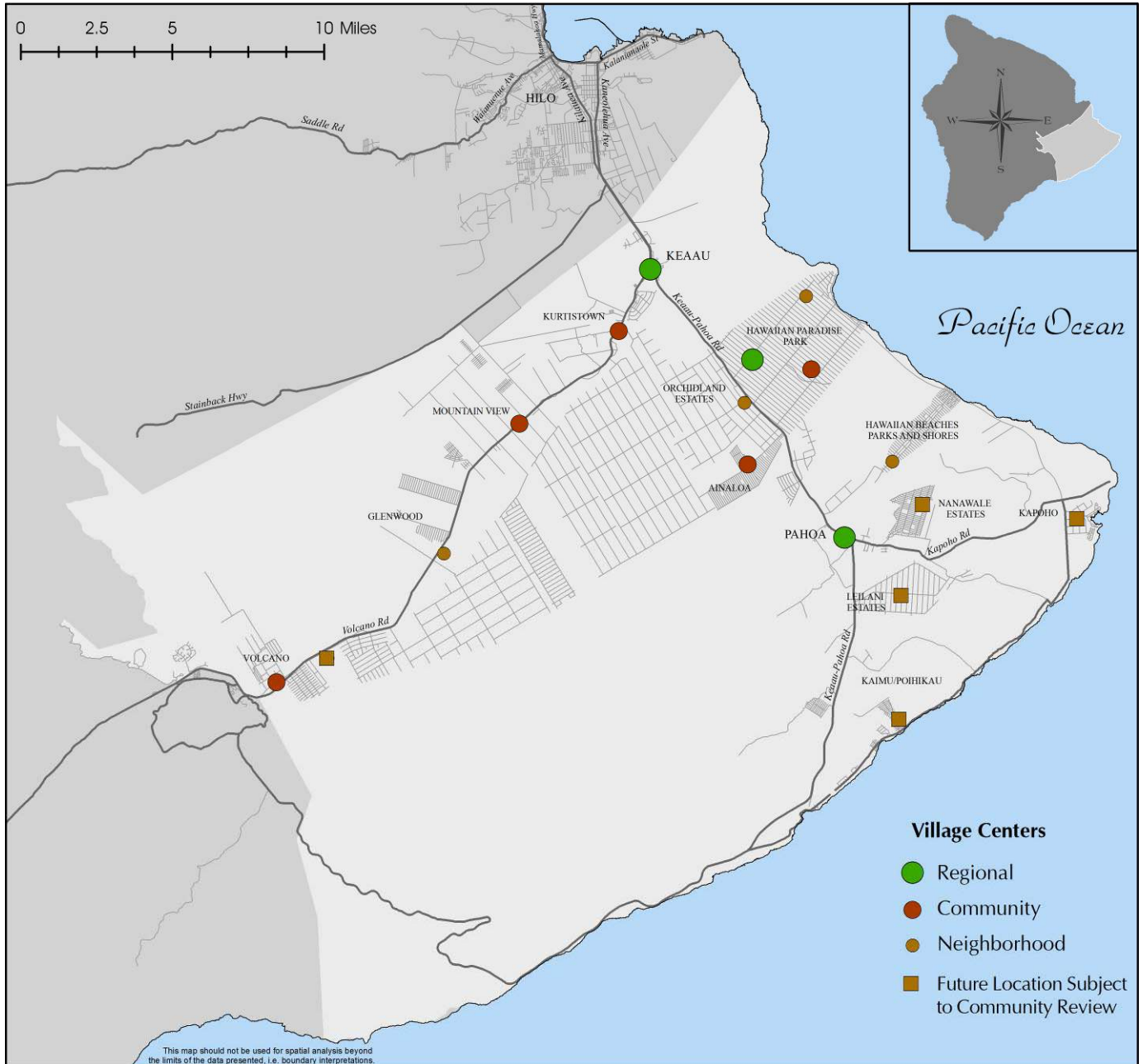
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of the expansion area conforms to the criteria applicable to the type of village/town center at that location; and

- Denying zone changes for commercial or light industrial use on sites that are not within designated village/town centers.

Refer to Chapter 5 for more detailed implementation guidelines on this proposed action.

Figure 3-2: Proposed Town and Village Center Locations





- e. Facilitate land use entitlements and financing for the development of new village/town centers by:
 - Creating a “floating zone” for new village/town centers with pre-determined development standards based on village/town center type that can be applied to the village/town center once its location has been determined; and
 - Providing loan guarantees or making grants to community associations or partnerships for the development of necessary infrastructure for the village/town center.

Refer to Chapter 5 for more detailed implementation guidelines on this proposed action.

- f. Amend the zoning code and/or apply district-wide rezoning to limit allowable building footprint on residential and agricultural-zoned lands, except for sites designated as village/town centers or for land pooling projects.
- g. Require County agencies to establish Level of Service standards for County infrastructure and services and report periodically on the degree to which these standards are being met in Puna and proposed steps towards meeting those standards, if they are not being achieved.
- h. Urge the Department of Hawaiian Home Lands (DHHL) to conform to the goals and objectives of the Puna Community Development Plan (PCDP) with respect to the use and development of its lands.
- i. Reduce property tax assessments and payments to token amounts for properties whose development rights have been removed or significantly and permanently reduced by means of a conservation easement, transfer of development rights, land pooling or similar measure.
- j. Conduct a study on the impacts from subdivision build-out based on predictions related to: native ecosystems; potential potable water well sites; and flooding due to loss of forest.
- k. Require that notice of pending applications for special permits, variances and zoning changes be given to property owners within a greater distance from the affected site than is now required by law.

3.2 AGRICULTURE AND ECONOMIC DEVELOPMENT

Puna is primarily an agriculture district with high diversification of production. Even with the demise of sugar cane production in Puna, agriculture remains a viable economic land use, both for commercial export of products and for local consumption.

With the transition in recent decades from plantation-based agriculture to smaller-scale, diversified agricultural operations, Puna faces several challenges. Below are those that the Puna Community Development Plan attempts to address in some way:

- Rising land costs, especially within subdivisions where residential dwellings are the principal use, make it difficult for new farmers to acquire land for a viable agricultural operation.



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- Despite an abundance of vacant subdivision lots for residential use, agricultural-zoned lands continue to be further subdivided, primarily through a variance process from the provision in the subdivision code that requires a water system (sec. 23-84) and with variances from County-standard roads. Allowing a proliferation of such subdivisions creates more lots with poor infrastructure and adds residential growth in areas that already have more lots than can be served. Such subdivisions should be limited in scale.
- Many areas formerly in sugar cane production and highly suitable for diversified crops are not available for small farming operations.
- While Puna's high rainfall generally supplies agricultural needs through economical catchment, during dry spells growers need other water sources. Even if the lot is within a County water service area, there is inadequate capacity to provide for agricultural uses because the County lines are designed for domestic use only.
- Small-scale, independent operations face several additional challenges: (1) finding efficient, cost-effective ways to get products to market, whether for export or local consumption; (2) acquiring and maintaining specialized equipment, facilities, and other infrastructure; (3) providing security to prevent pilferage of products; (4) securing labor assistance at the times when needed.

There are opportunities, as well as challenges, for the growth of economic activity in Puna:

- Agricultural tourism is emerging as part of a mix of attractions that draw visitors to Puna. With the rebirth of native Hawaiian culture and new appreciation for nature, Puna has established itself as a premier natural and cultural attraction, with Hawaii Volcanoes National Park as a main draw. Eco-tourism generates income by providing community-based services to visitors of natural and cultural sites in a way that protects and nurtures the natural and cultural systems, in a manner that is economically sustainable.
- Given Puna's combination of resources and geographic location, new employment can be generated in other "green" industries, such as alternative energy research and development and natural resources management.
- The development of village/town centers, as described in Section 3.1, will create new local employment opportunities and provide farmers with new local market venues for their products.

These challenges and opportunities are addressed in the following goals, objectives and actions.

3.2.1 Goals

- a. Lands for agricultural use are preserved.
- b. Quality agricultural land is dedicated to agricultural use in perpetuity.
- c. Opportunities for diversified agriculture increase.
- d. Puna's agricultural production emphasizes environmentally-friendly methods.



- e. Puna agricultural products represent an increasing local market share.
- f. There are more agriculture-related employment training and local job opportunities for youth.
- g. Local job growth is primarily in “green” industries such as agriculture, alternative energy, communications technology, eco-tourism and natural resources management.

3.2.2 Objectives

- a. Discourage urban growth and further subdivision on lands that have been identified as having potential value for agricultural use through appropriate zoning re-designations and new code provisions.
- b. Create larger lots for agricultural use in existing small-lot subdivisions through land pooling and other methods.
- c. Acquire unused agricultural lands to create opportunities for new farm operations.
- d. Discourage real estate speculation on agriculturally-zoned lands.
- e. Provide County tax incentives to promote and preserve agricultural use of lands that are currently or historically in agricultural use.
- f. Provide sites and infrastructure for farmers markets at County parks and proposed village/town centers.
- g. Form partnerships with local businesses and educational institutions to advance education and training in two sectors:
 - 'Green' sector, to include agriculture, alternative energy, resource recycling and recovery, and other related areas; and
 - The information technology sector.
- h. Support agricultural tourism with emphasis on events such as orchid celebrations, papaya festivals, locally-produced food festivals (i.e., “Taste of Puna”.)
- i. Promote farm business such as local food stores and “farm stay” bed and breakfasts. These can be coupled with youth training programs for low income youth.
- j. Provide infrastructure support for youth education and job training in the technology and agricultural sectors.
- k. Protect quality agricultural lands, especially fallow agricultural lands, through purchase or lease by County, State or community land trust, and provide long term leases for community use.
- l. Create new “green” employment opportunities in the agricultural, alternative energy, and natural resources management in Puna.

3.2.3 Actions

- a. Prohibit variances that allow subdivisions that rely on water catchment or roads that do not meet subdivision road standards to a maximum of six lots, unless the subdivision results in lots averaging at least twenty acres in size, and averaging at least four times the minimum lot size allowed by zoning, up to an absolute limit of twenty lots. There shall be no further variances to permit re-subdivision of lots created by such variances. Where



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lots were created by previous variances allowing catchment, and the variance provided that further variances should not be allowed, enforce those provisions by denying further variances on such lots.

- b. Downzone all Agricultural (A) zoned parcels in the State Agricultural District in Puna as follows:
 - Lots of 100 acres or more to A-20a;
 - Lots of 50 acres or more but less than 100 acres to A-15a;
 - Lots of 5 acres or more but less than 50 acres to a designation that would allow no more than a two-lot subdivision; and
 - Lots of less than 5 acres to A-5a.
- c. Rescind the Urban Expansion Area designations in the County of Hawai'i General Plan LUPAG, except where they correspond to the recommended Village Center boundaries for Kea'au and Pāhoa, as illustrated in Chapter 5.
- d. Seek State legislation to impose a higher conveyance tax rate and/or capital gains taxes on Puna properties that are re-sold within a short period, with exceptions for properties providing affordable housing.
- e. Seek State legislation to allow the County to hold onto properties that are in foreclosure due to property taxes in arrears rather than immediately auctioning them to the highest bidder in order to:
 - Discourage speculative re-sale and/or building;
 - Allow the use of these properties in land pooling projects in nonconforming subdivision that would create larger lots committed to agricultural use;
 - Protect unknown natural and cultural sites or features;
 - For educational programs for agriculture, forestry and natural resources management; and
 - For use in community land trusts and land exchanges.
- f. Provide land and infrastructure for farmers' markets within village/town centers.
- g. Seek State legislation or rule-making to allow local agricultural producers to make direct sales to consumers at County-designated farmers markets at the 0.5% general excise tax rate rather than the 4.0% rate that applies to retail sales.
- h. Develop an agri/eco-tourism policy, including necessary zoning legislation. Provide County assistance and support for agri-tourism, emphasizing and prioritizing off-farm agri-tourism opportunities such as farmers markets, special events; restaurants specializing in local food products; and fusion of local agricultural products with cultural and arts events in Puna. As a second priority, the agri/eco-tourism policy would promote on-farm opportunities, but only where infrastructure exists, and not in private subdivisions with private roads.
- i. Develop business incubator districts in Kea'au, Pāhoa and Mountain View where small businesses can, for a start-up period of two to three years, occupy spaces at subsidized rent, share receptionist and other common support services and facilities, and have access to business mentoring, marketing skills training, and product promotion programs.



- j. Promote use of the incentives offered by the designation of an Enterprise Zone within Puna to attract businesses to establish in the area and employ Puna residents.
- k. Support the partnership of the Hawaii Community College (HCC) and The Bay Clinic to establish a youth business center in Kea'au to develop entrepreneurial spirit in youth, increase employment options and job readiness, and increase college enrollment, with a focus on technology skills.
- l. Support the development of a community-based organic farming operation and training facility in or near Puna, in cooperation with the University of Hawai'i at Hilo (UH Hilo) and HCC.
- m. Develop job opportunities in Puna in renewable energy generation, especially solar power installations, but also bio-fuel crops and direct-use geothermal applications.
- n. Conduct a study to define and identify important agricultural lands in Puna, recognizing the district's unique soil and climate conditions and opportunities for diversified agricultural enterprises.
- o. Create a fund to purchase or receive identified important agricultural lands and facilitate the formation of a community land trust to manage those lands and leasing them for farming and agricultural support facilities.
- p. Create a real property tax exemption (perhaps 4 to 6 years) for farmers entitled to Federal crop loss insurance.
- q. Encourage organic farming and gardening by establishing a Puna agriculture scholarship with HCC and UH Hilo.

3.3 SOCIAL SERVICES AND HOUSING

Social services include not only programs to provide assistance to special needs populations, but also health and medical facilities to serve the entire community. "Medical facilities", in this instance, does not apply to County emergency paramedical services, which are covered in the following Section 3.4. With a growing population, Puna clearly needs more social and health care services within the district. Yet, there are two major challenges to making them accessible to residents:

- As a rural area with a rudimentary transportation system and dispersed population, it is difficult for residents in need to reach the services; and
- Puna's high percentage of low-income residents tends to increase the need for social services, yet discourages private health care providers from locating in Puna due to insurance issues.

Schools are also an important social resource, serving not only as educational institutions, but also as de facto community centers and recreation areas in rural areas where few other venues are available for meetings, events and organized or informal sports. Unfortunately, current policies of the Department of Education (DOE) do not favor smaller schools at dispersed locations, which would enable them to be more conveniently accessed by walking, bicycling, or at least a shorter vehicle trip. Also, the availability of school facilities after hours for community activities varies at the discretion of the school principal. Although County influence over public education and school facilities is quite limited, the Puna Community Development Plan can try



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to influence changes in DOE policies to better integrate schools within the fabric of Puna's communities.

As mentioned above, Puna has a high percentage of lower-income residents, and the district is regarded as place of opportunity for affordable housing. The subdivision lots offer some of the lowest-price sites in Hawai'i for owner-built housing. Approximately 85 percent of the island's Section 8 low-income rental housing certificate holders are Puna residents. Nevertheless, there are still many residents without adequate housing, and opportunities for retaining and expanding the stock of affordable housing are narrowing as land values rise in Puna and government housing subsidies shrink. New approaches are needed to respond to this challenge, such as stimulating the development of multi-family, self-help, and congregate housing.

3.3.1 Goals

- a. Puna residents have improved access to emergency and primary medical care and preventive public health programs.
- b. Substance abuse, domestic violence and other social problems are reduced.
- c. Puna residents have increased access to assistance programs to develop, repair or rent affordable housing.
- d. Programs are available to assist those seeking housing in Puna.
- e. Public education is better integrated into Puna's communities.

3.3.2 Objectives

- a. Seek additional locations for medical/substance abuse/senior home care treatment facilities in both lower and upper Puna.
- b. Provide effective and readily accessible substance abuse treatment and prevention services within Puna.
- c. Provide transitional shelter and programs to assist homeless Puna residents in moving toward self-sufficient status.
- d. Support initiatives by DHHL to develop appropriate projects for housing and job opportunities for Native Hawaiians in Puna.
- e. Increase the availability of accessible and affordable housing through self-help programs, government assistance and innovative housing tenure arrangements, such as co-housing, limited equity cooperatives, and community land trusts.
- f. Increase opportunity for community involvement in public education.
- g. Urge the State to locate its community facilities, such as public schools, in designated village/town centers, and to design them in conformance to the criteria applicable to the type of village/town center at that location.

3.3.3 Actions

- a. Develop a centrally-located, 24-hour, full-service medical facility, with trauma care, in Puna. Establish multiple clinic level facilities offering primary medical and dental services in village centers in Upper and Lower Puna. Expand existing County-funded transportation services to carry people from subdivisions to medical facilities.

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- b. Establish “one-stop centers” at Pāhoa, Kea‘au, Volcano, Mt. View, Hawaiian Paradise Park and Kurtistown to provide referrals, support and advocacy related to the following issues:
 - Substance abuse treatment and prevention;
 - Assistance for housing, special needs housing, homeless persons, and community development;
 - Teen pregnancy prevention/birth control;
 - Child care and elder care options;
 - Transportation and service coordination;
 - Employment;
 - Serving clients with disabilities;
 - Domestic violence screening/abatement/prevention;
 - Access to medical services and complementary health services, including nursing programs for homebound clients; and
 - Access to clean water and education on catchment water.
- c. Build partnerships between the County and non-profit organizations to increase the range of social services and economic development opportunities.
- d. Seek State enabling legislation to allow homeowners and organizations such as Habitat for Humanity to do their own plumbing and electrical work on modest-sized dwellings in order to lower self-help housing construction costs.
- e. Offer educational programs, through the County Office of Housing and Community Development, to develop financial skills of renters who seek opportunities for home ownership, and to develop awareness of effective rental strategies for owners and tenants.
- f. Sponsor, through the County Office of Housing and Community Development, programs to increase homeownership opportunities, such as the Home Investment Partnerships Program for mutual self-help housing development and limited-equity cooperatives.
- g. Promote multi-family housing – especially for those with special needs, such as the elderly – in designated regional or community village/town centers.
- h. Provide low-interest loans, on a sliding scale according to household income, for the repair and renovation of existing housing.
- i. Amend building codes to allow occupancy of residential dwelling before final inspection and to facilitate bringing non-conforming structures up to the code effective at the time of their initial construction.
- j. Urge the State to increase local control over public schools in Puna by measures such as:
 - Changing the structure of school boards to provide greater local representation and decision-making;
 - Changing Department of Education (DOE) policy to allow smaller schools at more dispersed locations; and/or
 - Removing the cap on the formation of new charter schools.



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See, also, Section 3.5, Action c, calling for community access to school facilities.

3.4 PUBLIC SAFETY AND SANITATION SERVICES

Public safety and sanitation services in Puna have needed to adapt to the widely dispersed settlement pattern in the district and poor road conditions in most of the subdivisions. It is neither cost-efficient nor practical for the County to provide a sufficient number of police, fire and paramedical facilities with associated staffing and equipment to provide coverage to all populated areas with the response times that are typical of urban or most suburban areas. Therefore, County services are supplemented with community policing programs and volunteer fire stations, usually with at least some degree of County assistance in the form of training, equipment and/or personnel.

While police and fire stations are essential community facilities, they do not necessarily need to be located directly within town or village centers. The most important criterion for locating these facilities is the response time to respond to emergencies within the service area. Consequently, direct access to a major highway is an advantage. At present, the police and fire stations at Pāhoa and Kea'au are near the center of town, although the County is planning to replace these with facilities that are slightly outside of town on sites with direct highway access.

As noted earlier, there are no public wastewater treatment systems in Puna. Similarly, there is no municipal house-to-house solid waste collection service. The County provides solid waste transfer stations located in Pāhoa, Glenwood, Volcano, Kalapana, and Kea'au. Until recently, all solid waste was disposed in landfills. Following previous upgrades to the Kea'au solid waste transfer station the County upgraded the Pāhoa, Glenwood, and Volcano facilities in late 2007 to support recycling, including an improved redemption center for bottles and cans, collection bins for scrap metal, mixed recyclables, and green waste.

Adaptive strategies to improve public safety and sanitation services will need to evolve as Puna's population grows and the land use pattern is gradually reshaped into the village/town center model.

3.4.1 Goals

- a. All residents have an equitable level of service access to police, fire, and paramedical services.
- b. Free wireless internet is available district-wide.
- c. Infrastructure investments facilitate the growth management strategy described in Section 3.1.

3.4.2 Objectives

- a. Provide additional locations for emergency services to reduce the response time to a larger percentage of residents.
- b. Improve and broaden communications access for a larger number of residents.



3.4.3 Actions

- a. Develop permanent fire stations at Hawaiian Beaches/Shores, Hawaiian Paradise Park, lower Volcano, and Mountain View, with emergency paramedical services.
See, also, Section 3.3, Action a, relating to emergency medical facilities.
- b. Provide additional volunteer fire stations and expanded programs for training community emergency/readiness volunteers in all large subdivisions as suitable sites become available and the growth in the subdivision warrants.
- c. Provide free wireless internet services to Puna's subdivisions, starting with those that lack cable service.
Refer to Section 4.1 for related discussion and Action c.
- d. Provide more emergency call boxes along State highways.
- e. Encourage enhancement of cell phone service to expand coverage to more remote areas.
- f. Boost the Department of Environmental Management (DEM) recycling budget to develop an economy and to create more jobs related to recycling.
- g. Relocate the Kea'au and Pāhoa solid waste transfer stations to sites more suitable to serve the major populated areas that they were intended to serve.
- h. Increase County resources to handle the abandoned/derelict car removal program.
- i. Provide public financial support for the development of utility and potable water connections, and wastewater treatment facilities, within approved village/town centers where they are desired by residents or needed to support planned and approved development.

3.5 PARKS AND RECREATION

Puna contains most of Hawaii Volcanoes National Park, which is the premier nature park in the Islands. Added to the inventory of nature parks are the State-owned: MacKenzie State Recreation Area (13.1 acres), located between Pohoiki and Opihikao at the edge of the Malama-Ki Forest Reserve; and Lava Tree State Monument (17.1 acres), located near the junction of Kapoho-Pahoia Road and Pohoiki Road. There is also a 78.3-acre undeveloped State parcel located adjacent to Honolulu Landing along the Puna Coast Road between Kapoho and Hawaiian Shores subdivision that at one time had been provided to the County of Hawai'i by the State through Executive Order for development as a park.

The County owns smaller shoreline parks: two undeveloped sites within Hawaiian Paradise Park; Isaac Hale Beach Park, located adjacent to Pohoiki Bay; and the nearby Ahalanui Park site, which was purchased in 1993 to replace the two former parks (Kaimū Beach Park and Harry K. Brown Park) that were destroyed by lava flows.

There are few community parks in the district for active recreation. The largest public facilities are the County's Shipman Park in Kea'au and Pāhoa Park, which includes a pool and a neighborhood center for meetings, programs and indoor recreational activities. The County maintains a gymnasium at Mountain View, outdoor basketball courts at Kurtistown and Hawaiian Beaches, and tennis courts at Kurtistown and Kea'au.



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The Department of Education maintains recreational facilities at their schools in Kea‘au and Pāhoia and Mountain View, but these are primarily for use by students and not always available for general community use.

There are also some recreational facilities that are owned and maintained by community associations. Some of the subdivisions contain undeveloped parcels that have been set aside for future community use, including parks. However, funds have not been available to develop significant facilities on them, either from private or public sources.

Puna will clearly need to expand its parks and recreation facilities as the population grows. There is a particular need to develop community parks in underserved large subdivisions, such as Hawaiian Paradise Park, where development is occurring at a relatively fast pace.

3.5.1 Goals

- a. Puna offers a variety of public recreational areas, reflecting the beauty and diversity of the natural setting, and recreational programs for people of all ages and physical abilities that are not currently available.
- b. There is an equitable dispersal of parks and recreation facilities readily accessible to most Puna residents.
- c. The development of future parks supports the growth management goals, objectives and actions set forth in Section 3.1 of this plan.

3.5.2 Objectives

- a. Adopt the following classification for expansion and improvement of parks in Puna:
 - *Camp Ground*: An area with potable water and restroom facilities for overnight tent camping, which may be available on a permit or fee-for-service basis.
 - *Coastal Activity Area*: A shoreline recreational area that is accessed by a park or a public easement
 - *Community Park*: A recreational park or facility intended to be used primarily by residents of the area that is owned and maintained by the County or by a private entity with unrestricted public access.
 - *Linear Park*: A recreational, non-motorized pathway (except motorized wheelchairs), which may be inter-connected or within a right-of-way of an existing or new roadway, and is separated from travel lanes and adjacent properties by a landscaped buffer, with occasional rest stops or viewing spots.
 - *Preserve*: A site with features of significant natural or historic value that provides minimal facilities for public visitation, such as interpretive signage, a walking trail and small parking area, and is maintained by a stewardship program.
- b. Encourage the collocation of schools, parks and senior centers to promote interactivity between community members of all ages.
- c. Identify lands to be used for parks in connection with subdivision interconnectivity.



3.5.3 Actions

- a. Consider expanding the *Camp Ground* at MacKenzie State Park to include public property south of MacKenzie.
- b. Improve and expand *Coastal Activity Areas* as follows:
 - At Ahalanui Beach Park: (1) accessibility improvements; (2) screened changing area next to showers designed to blend with natural surroundings; (3) repairs to parking lot surface; and (4) added picnic tables.
 - Consider hand-developed modifications to the tidepools east of Pohoiki Bay beyond the area known as “Shacks” for use as “keiki pools”, but retain traditional fish-netting use.
 - Pursue development of a camp ground and/or ocean recreation park with potential boat launch ramp and marina facilities on State-owned accreted land at Cape Kumukahi, provided that Hawaiian burial sites are adequately protected and respected.
 - Consider acquisition and development of Honolulu Landing, Kapoho Crater (Green Lake) and Sand Hill.
 - Develop support facilities for the use of the State-owned park at Kehena Beach.
 - Encourage the development of a hiking and coastal trail and camp system to provide for pedestrian recreational opportunities.
- c. Improve and expand *Community Parks* as follows:
 - Develop new Community Parks in:
 - Hawaiian Acres, at three sites approximately 1) near the mauka terminus of Orchidland Drive, 2) between 6th and 7th Roads and D and F Roads, and 3) near Fern Acres at the mauka end of E Road;
 - The North Kulani Road area, between Ihope and Huina Roads;
 - Glenwood, on makai side of South Glenwood Road;
 - Nanawale Estates subdivision;
 - Leilani Estates subdivision;
 - Orchidland Estates subdivision; and
 - The mauka portion of Hawaiian Beaches subdivision.
 - Pāhoa Regional Park: (1) Convert the existing fire station into a senior center with certified kitchen for congregate meals program and activities/dining room; (2) Repair pump and provide solar heating system and heat-retaining cover for swimming pool; (3) Provide art center and covered performance stage; (4) Provide children’s museum and playground; (5) Develop skateboard park; (6) Provide sheltered picnic areas; (7) Build loop access road to lessen traffic on Pāhoa main street; and (8) Provide lighted parking areas and walking paths linked to Pāhoa village center.
 - Shipman (Kea‘au) Regional Park: (1) Interior fencing and re-arranging parking layout to reduce safety hazard to children chasing balls; (2) More shade, seating, and picnic



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tables for attendees at games and events; (3) Large pavilion for team and family activities; (4) Additional fields for football and baseball; and (5) Additional lighting and restrooms. Develop new gym at Shipman Regional Park or acquire the National Guard Armory for this use.

- Develop a new District Park on a 20-acre parcel owned by Hawaiian Paradise Park Owners' Association at 16th Avenue and Maku'u Drive. Improvements would include a swimming pool, a gym, field complex and community center.
 - Develop recreational programs to complement use of Cooper Center and Volcano Community Park in partnership with the Volcano Community Association.
 - Provide accessibility, playground and other improvements at Mountain View Community Park and A. J. Watt Gym.
 - Expand hours of operation and night lighting for some outdoor activities at regional and larger community parks to serve working adults and young retirees.
 - Develop a new senior center in Mountain View with a certified kitchen for a congregate meals program, room for activities and dining, restrooms, and van vehicle and staff.
 - Provide in each village center a recreational park and village green that is scaled and designed to fit the needs of the community that the village center serves.
 - To supplement Community Parks, make recreation facilities and meeting rooms at public schools available for community use after school hours, whether through direct requests from a community representative to a school principal or a formal standing agreement between the County and the Department of Education.
 - Create small parks as part of right-of-way acquisition for new connecting road segments between subdivisions (see Section 4.3.) This may consist of lot remnants that are not needed for the right-of-way.
- d. Create and improve *Linear Parks* as follows:
- When acquiring rights-of-way for constructing new roadways or improving existing major roadways, make provisions for parallel multi-use recreational trails with appropriate landscaped buffers on either side and provide connections to other such existing or planned trails, to the extent possible.
 - Complete development of Old Volcano Trail as a pedestrian and bicycle pathway.
 - Acquire the former railroad right-of-way from Kapoho through Hawaiian Paradise Park and develop it for hiking, bicycling and horse-back riding.
 - Plan for the acquisition and development of the former railroad right-of-way from Hawaiian Paradise Park to Railroad Avenue in Hilo for bicycle, pedestrian and horse-back riding, provided that measures are taken to protect agricultural uses of adjoining lands.
 - Plan for public access along Old Government Road (coastal trail) as a bicycle and hiking trail with a natural and cultural resource interpretive program.
- e. Create and improve *Preserves* as follows:



- For designated preserves, assess the appropriate level of site visitor usage and implement self-guided or steward-led interpretative tours through the site.
- Improve conditions at Wai‘ōpae Tidepools and the Marine Conservation District by:
(1) Offering tax credits to nearby private landowners as incentive to convert existing cesspools, where they exist, to septic tanks with a pump-out system; (2) Providing public sanitary facilities, including a toilet and trash receptacle; (3) Providing off-street parking that does not encroach into private lands; and (4) Providing permanent public access.
- Consider acquiring Green Lake and adjacent land for native plant/habitat restoration and a nature center with activities and interpretive programs for school-aged students and the general public.
- Consider hiking trails through Nanawale Forest Reserve, provided that areas with intact native forest are adequately protected.
- Pursue development of a passive cultural resources and ethno-botanical park in Hawaiian Paradise Park, to include the rock wall, native and introduced plants and exceptional trees.

3.6 ENERGY SUSTAINABILITY

Puna’s energy demand continues to rise because of rapidly increasing residential development. The cost of installing and maintaining the electrical grid is very high because of weather, vegetation, and the relatively great distances from house-to-house.

Many people live “off-the-grid”; that is, where dwellings, particularly in more remote locations, are not connected to the electrical power service provided by the local utility company, Hawaiian Electric Light Company (HELCO). While many residences remain unconnected to the power grid, some choose to connect to the grid to supply at least a portion of their power needs or to provide back-up power. Solar power is cost-competitive with electricity provided by the utility company, so this appears to be the most promising renewable source of power at present, especially when combined with the tax incentives for the installation of alternative energy devices and direct assistance to reach the lower-income homeowners or renters who could most significantly benefit from lower utility costs. The County can also play a direct role in the use of alternative energy and promotion of energy conservation by incorporating these features into the design of public improvements and by amending building codes.

There are two power generation facilities in Puna. HELCO’s Puna Steam Plant and the geothermal power generation source at Kapoho operated by Puna Geothermal Venture (PGV). It is unlikely that large-scale expansion of geothermal power generation within the eastern rift zone of Puna will occur within the time horizon of the Puna Community Development Plan. On the other hand, there is potential to capture excess heat for direct use in agricultural applications, if the PGV plant undergoes a modest pending expansion.

3.6.1 Goals

- a. Puna has made significant progress towards achieving energy self-sufficiency by 2020.



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- b. A significant percentage of Puna households continue to live completely or partially off the electrical power grid.
- c. Puna lowers its dependence on fossil fuel as an energy source, becoming a demonstration area for alternative sources, systems and fuels.
- d. There are incentives for the use of renewable energy sources.

3.6.2 Objectives

- a. Promote use of solar technologies, such as solar water heaters and photovoltaic power systems.
- b. Employ energy-efficient design standards for public building and residential development, including ventilation and cooling.
- c. Recognize, when establishing regulatory standards, that while energy efficiency yields long-term cost savings for low-income households, it may impose added initial construction cost on housing. Accordingly, reduced property tax assessments for self-powered homes and businesses should be implemented.

3.6.3 Actions

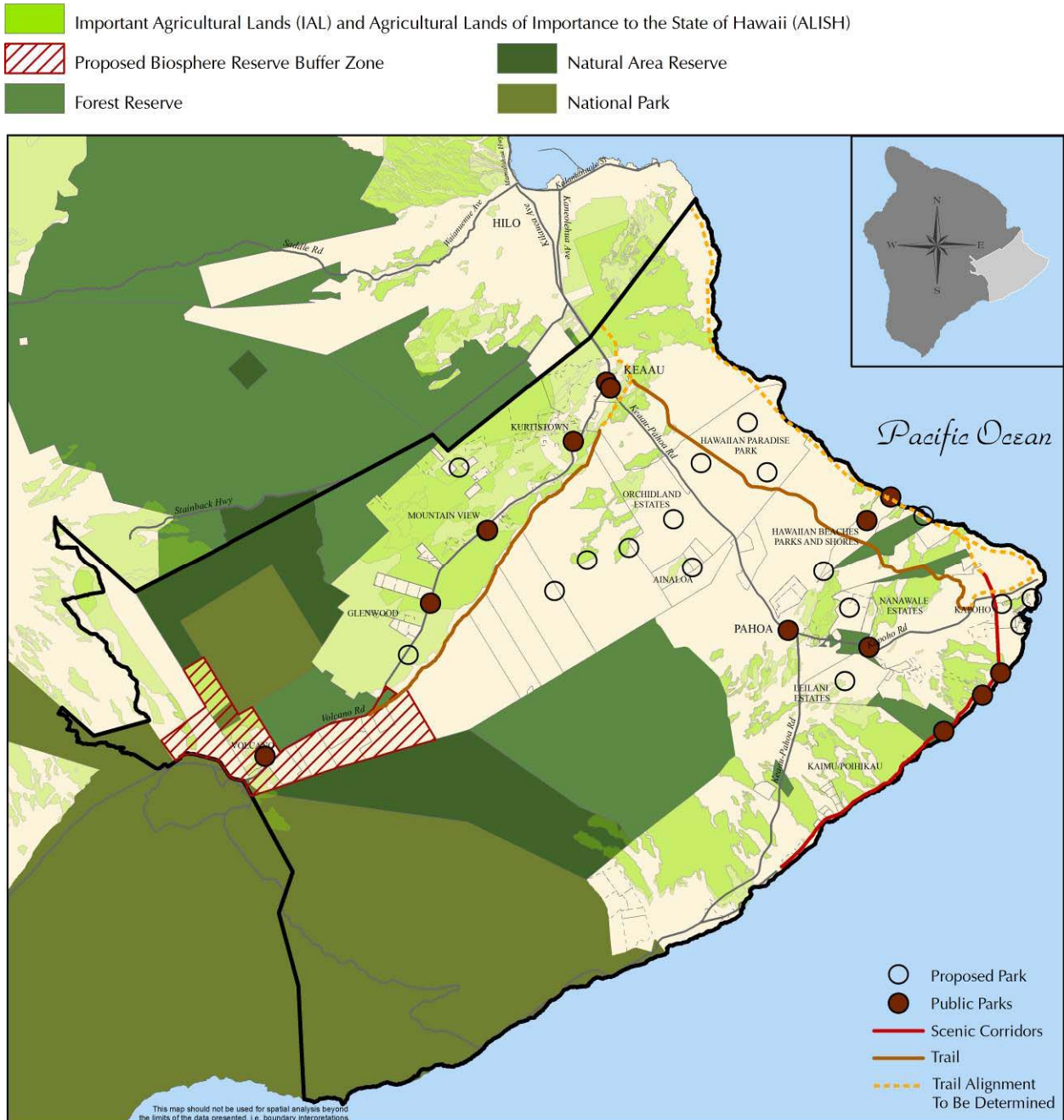
- a. Apply Leadership in Energy and Environmental Design (LEED) standards for public buildings, with a minimum goal of silver level.
- b. Investigate the use of ground-water cooling systems for public buildings.
- c. Require energy efficiency standards for larger residences. Applicable standards might include better insulation for the outer walls, low-emissivity windows and doors, reduction of roof heat gain, and use of energy-efficient appliances.
- d. Incorporate energy-efficient features into the construction of lower-cost homes with the use of public subsidies.
- e. Establish a Renewable Energy Research & Development fund with University of Hawai'i at Hilo.
- f. Apply the Public Utilities Commission Public Benefits Fund to incentives to homeowners and landlords to retrofit dwellings for alternative energy devices and systems, using a sliding scale to provide greater subsidies to low-income households. The County may augment this with matching grants and low-interest loans.
- g. Negotiate a direct use of geothermal agreement for agricultural uses as part of any expansion of the capacity of the Puna Geothermal Venture plant.
- h. Promote biomass energy and fuel production using wood chips from exotic trees.
- i. Pursue the development of new renewable energy sources such as Ocean Thermal Energy Conversion (OTEC), wave-energy generation and solar energy capture as the technology advances to make an investment in such a demonstration and production facility in Puna feasible.
 - To facilitate this, pursue an ocean energy subzone or enterprise zone designation for a section of coastal land in Puna, preferably on State land, in order to encourage research and production of ocean-based alternative energy systems and facilities.

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- In addition to energy generation, cold water aquaculture and agricultural processing should be encouraged and accommodated, including refrigerated warehouse and processing facilities, hot-water treatment of agricultural products, and agricultural product washing and packing facilities.

Figure 3-3: Overview of Parks and Natural Area Network in Puna





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Chapter 4

TRANSPORTATION

Sprawl development is increasingly evident in the travel patterns of Puna residents. At present, most of Puna's workforce commutes by personal vehicle to employment locations outside of the district, primarily to Hilo. Residents also make frequent trips to Hilo for shopping and services. About a quarter of the workforce carools, but congestion is growing along Puna's principal corridors during peak commute periods.

State highways are the primary transportation routes. Highway 11 between Kurtistown and Hilo and Highway 130 between Pāhoa and Kea'au carry the greatest amount of traffic during peak commuting periods. Most roads in Puna's nonconforming subdivisions are privately owned, often in poor physical condition and not designed for through traffic. There are many missing connections between the road networks of adjacent subdivisions. The present circulation network, combined with the district's sprawl development pattern, results in a number of problems:

- There is a lack of alternative routes for emergency access, especially when highways are blocked by a traffic crash or downed utility pole, or when there is a natural disaster such as a hurricane, tsunami, lava flow or earthquake that requires evacuation;
- Highways become more congested during peak periods due to the lack of alternative roadways;
- Highway intersections with substandard private streets are dangerous due to inadequate lighting or intersection controls, combined with high traffic speed along the highway;
- It is difficult for the County's Mass Transit Agency (MTA) to operate an efficient Hele-On Bus service that offers a viable travel option for a large number of Puna residents, especially those in more remote areas;
- There are few facilities for walking or bicycling, even in more built-up areas; and
- It can be life-threatening to cross Highways 130 and 11 on foot. This is particularly true for youth, the elderly and the disabled.

The Puna Community Development Plan seeks to promote more efficient and environmentally responsible travel by limiting demand for commuting and other trips; promoting mass transit and alternative travel modes; and providing alternate routes to reduce trip lengths and travel time.



TRANSPORTATION

4.1 TRAFFIC DEMAND MANAGEMENT

The long-term remedy for the problem of commuter traffic is to transform the pattern of land use and economic activity to reduce the travel demand to Hilo and other destinations beyond Puna. Making this shift is a key goal of the Puna Community Development. Shorter-term relief from the crush of commuting traffic can be achieved by diverting some of this travel to mass transit and ride-sharing or by reducing peak period traffic volumes via telecommuting and staggered work hours.

Communications technology can do much to reduce the need to travel, particularly in rural areas like Puna. For example, the provision of free wireless access to the Internet can enable more home occupations, provide back-up for emergency and everyday communications, and expand the spectrum of quality life experiences for Puna residents. County, State and/or Federal expenditures to provide free wireless access are justifiable as a means to avoid or defer at least some of the cost and environmental impact of making very expensive and extensive improvements to Puna's deficient roadway network.

4.1.1 Goals

- a. The percentage of single-occupancy vehicles during peak commute periods is reduced.
- b. The percentage of residents who commute to employment or travel for services outside of Puna is reduced.
- c. Reliance on fossil fuels for transportation is reduced.

4.1.2 Objectives

- a. Promote ride-sharing, van-pools, and car-pooling.
- b. Expand telecommuting opportunities.
- c. Provide more services and employment within Puna's village and town centers.
- d. Create new employment opportunities in Puna in order to reduce long commuting.

4.1.3 Actions

- a. Promote van pool and ride-sharing alternatives more actively by working through major employers and large institutions such as UH Hilo and HCC, which can offer incentives such as preferential parking for ride-share vehicles.
- b. Promote staggered work hours and telecommuting with major employers and institutions as a means to reduce peak period traffic, focusing on the following:
 - Researching and implementing telecommuting and staggered work hours for County and State employees; and
 - Researching feasibility of starting UH Hilo classes no earlier than 9:30 a.m.
- c. Facilitate telecommuting by developing a wireless communications network that enables most Puna residents to gain free access to the Internet.

Refer to related Action c in Section 3.4.



4.2 MASS TRANSIT

Poor road conditions, combined with incomplete connectivity in the street system and a dispersed pattern of development, make it challenging to devise and sustain a viable mass transit system for Puna. The County's Hele-On bus operates a Hilo-Pāhoa route along Highway 130 five times a day, and a Hilo-Ka'u route along Highway 11 once a day. These are long, circuitous routes that, while providing reasonably good coverage to more remote areas, also results in high operating costs and lengthy trip time that discourages ridership. While the 2000 Census indicated that less than 1% of Puna's workforce commuted by bus, ridership more than doubled after the County initiated a free fare service between Pāhoa and Hilo in 2005. This demonstrated the potential demand for transit service that could be expanded with other improvements and initiatives, such as more convenient routes and schedules, marked stops, park and ride facilities, transit centers, and marketing programs.

The County Mass Transit Agency (MTA) is currently planning significant system improvements by converting to a "hub-and-spoke" system, consisting of the following elements:

- Large Hele-On coaches operating frequent runs on a shorter route between Hilo and a primary Puna "hub" at Kea'au and secondary hubs at Pāhoa and other village centers near highways.
- Paratransit vans to pick-up passengers who have called in from outlying areas to be brought to one of the transit hubs.
- Central coordination by MTA of all paratransit services, including those operated by social service agencies for designated residents with special needs.
- Park-and-ride lots at transit hubs and possibly other locations.

4.2.1 Goals

- a. Mass transportation options are increased for all Puna residents.
- b. Transit service and improvements reinforce and complement the development of village/town centers.
- c. A greater percentage of commuters use mass transit.

4.2.2 Objectives

- a. Convert the present Hele-On Bus routes and services to a "hub-and-spoke" system, with paratransit vehicles bringing passengers from outlying areas to Hele-On Bus hubs and also distributing passengers within the Hilo area.
- b. Coordinate County transit services with special needs paratransit services and school transportation.
- c. Provide park-and-ride lots at key regional sites to promote commuter ridership.
- d. Strengthen County capability and resources to operate the transit system and increase ridership.
- e. Ensure that pedestrians can access bus stops safely.



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4.2.3 Actions

- a. Prepare a County-wide Transit Master Plan to provide an overall framework for transit improvements while incorporating user input from each district.
- b. Improve transit service operations by:
 - Increasing transit service to a minimum of two additional runs during peak hours;
 - Establishing demand responsive transit in subdivisions;
 - Providing commuter express bus service from Pāhoa to Hilo and Volcano to Hilo; and
 - Establishing a hub-and-spoke transit system, in which transit circulators are teamed with trunk routes on major highways.
- c. Develop transit hubs at the following locations:
 - Kea’au (Primary Hub): In-town location near commercial centers or on State lands adjacent to the soccer fields; second site could include a new Mass Transit Agency (MTA) baseyard and headquarters;
 - Pāhoa (Secondary Hub): On County-owned sites, either adjacent to Pāhoa Community Center or on Highway 130 near Kahakai Boulevard where the new fire and police stations are planned;
 - Volcano (Secondary Hub): Either at Cooper Center or on other available land; and
 - Mountain View or South Kulani (Secondary Hub).
- d. Provide park-and-ride lots at the transit hubs and within Hawaiian Paradise Park at one or two of the proposed village/town center sites, where the community-owned parcel could serve as a parking lot for commuters, as well as a location for farmers’ markets.
- e. Provide express bus service for commuters from Pāhoa to Hilo and Volcano to Hilo. Local buses or paratransit services could feed into selected stops in order to service broader areas.
- f. Develop a cooperative program with the Department of Education and private schools to provide student passes for the Hele-On Bus.
- g. Launch a public education campaign promoting transit services, tailoring them to target populations such as youth, commuters, and the elderly.
- h. Cultivate public/private partnerships, such as employer-sponsored bus passes.
- i. Expand the staff of the Mass Transit Agency to provide greater support for public relations, route planning and coordination, technical operations and fleet management.
- j. Investigate other incentives to increase ridership, such as continuance of free fare program, convenient bus ticketing systems, reduced monthly rates for residents and special needs populations, adding airport and post office service and tourist passes.
- a. Work with Hawaii Department of Transportation (DOT) in creating safe pedestrian conditions for using mass transit

4.3 ROADWAY NETWORK

The principal routes in Puna are two State-owned highways, which are covered in the following section. Presently, the County maintains nearly 188 miles of roads in Puna, including



some that serve as collector roads and emergency access routes, as well as some local paved streets in a limited number of subdivisions.

Roads within most subdivisions are privately-owned and maintained by community road maintenance associations. Most of the roads are narrow and lack paving, lighting, traffic control signs and drainage systems. In many sections, there is inadequate sight distance due to sharp curves or irregular road gradients.

There is also poor roadway connectivity between most subdivisions, which means that one must take a circuitous route to travel from one subdivision to another. This, in turn, puts an additional strain on the highways and the few collector streets in the network. Of greater concern to public safety in an area prone to natural hazards, there are few alternative routes for emergency access and evacuation.

The rapidly developing subdivisions whose principal access is Highway 130 are of particular concern. To help alleviate traffic congestion along Highway 130 during peak periods and provide an alternate route, the County of Hawaii General Plan and the Puna Regional Circulation Plan (2005) propose a Puna Makai Alternative Route (PMAR). However, these plans did not resolve the alignment and design for PMAR through Hawaiian Paradise Park (HPP). While the concept of a limited access parkway has merit, it would be very difficult to acquire right-of-way for this through a large subdivision such as HPP in a timely and cost-effective manner. Therefore, a shorter route through HPP is a more practical and less disruptive alternative to implement within the time-frame of this plan.

4.3.1 Goals

- a. There are adequate emergency and evacuation routes and connectivity throughout Puna's roadway network.
- b. Improvements are phased so that short-term actions support and lead toward projects that will take a longer time to implement.
- c. Roadways are pedestrian and bicycle friendly.
- d. Traffic congestion and traffic-related health risks are reduced.

4.3.2 Objectives

- a. Create alternative, redundant routes for existing Highways 11, 130 and 132 utilizing existing routes wherever possible.
- b. Develop PMAR along the general route shown in Figure 4-1, with the specific design and alignment to be determined based on an environmental impact study that identifies a project having the least environmental and socio-economic impact.
- c. Designate new connectivity points for local traffic and emergency and evacuation routes within the existing roadway network.
- d. Develop a phased implementation plan for coordinated actions by County and State transportation and public works departments.
- e. Improve appropriate "roads in limbo" that are used widely for public access.



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4.3.3 Actions

- a. Short Term (2008-2012)
 - Plan and design the PMAR alignment through an environmental impact statement process that meets Federal Highway Administration (FHWA) standards and therefore qualifies the project for FHWA funding;
 - Require building setbacks within HPP lots along the designated PMAR alignment, as necessary, to reserve the potential for a future PMAR extension through the remainder of HPP;
 - Establish emergency routes, using mostly existing road beds;
 - Include pedestrian and bicycling requirements in all projects; and
 - Create connectivity alignments between the following subdivisions: Hawaiian Acres and Fern Acres, Fern Acres and Kopua Farm Lots, Eden Rock and Fern Forest, Orchidland and Hawaiian Acres, Nanawale and Hawaiian Beaches/Shores, Hawaiian Beaches and HPP, Kea‘au Agricultural Lots and a site adjacent to Kea‘au Elementary School, Ohia Estates and Royal Hawaiian. These inter-subdivision roads should be staggered, low-impact, and multi-modal. The general locations are indicated as ovals in Figure 4-1.
- b. Medium Term (2012-2017)
 - Construct a two-lane PMAR roadway that connects Kaloli Drive between approximately 16th Avenue and 10th Avenue in HPP to either Highway 11 or Highway 130 in the vicinity of Kea‘au;
 - Construct a two-lane, unpaved, gated emergency access roadway between Kahakai Boulevard to HPP which can later be converted into a future extension of PMAR; and
 - Construct a two-lane roadway between Nanawale and Kahakai Boulevard that can be used as both an emergency access route and a future extension of PMAR.
 - Study the need, desirability and feasibility of adding an alternative route between Pāhoa and Highway 11 and between Highway 11 and Stainback Highway in the stretch between Glenwood and Kurtistown, as generally depicted on Figure 4-1.
- c. Long Term (2017-2030)
 - Construct Phase II segments of PMAR, as generally depicted in Figure 4-1.
 - Acquire additional right-of-way via land pooling, exchanges, and other means to extend PMAR through Hawaiian Paradise Park;
 - If increased traffic demand indicates, construct the PMAR extension through the remainder of HPP, as depicted generally in Figure 4.1, and convert the emergency access route from Kahakai Drive to HPP as a PMAR extension by removing the gate and paving the surface;

4.4 HIGHWAYS

There are four highways within the district of Puna:

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- Volcano Road (Highway 11), which provides access to and from Hilo, serves the upper Puna region, and connects Puna to Ka‘u;
- Puna Road (Highway 130), which runs from Kea‘au to Kalapana-Kaimu, providing access from upper to lower Puna;
- Kapoho Road (Highway 132), which spans between Pāhoā and Kapoho; and
- Puna Coast Road (Highway 137), which links Kapoho to Kalapana-Kaimu.

Highways 11 and 130 are under the jurisdiction of the State of Hawai‘i Department of Transportation (DOT). Generally speaking, these highways are designed to facilitate efficient vehicular travel according to standards that are based on operational characteristics, including speed limits, projected traffic volumes at various periods, and locations where vehicles enter and exit the highway. Pedestrian, bicycle, and mass transit travel have been typically secondary considerations, although Federal programs and funding are available to address the specific needs for these travel modes and incorporating them into the design and improvement of State highways.

While the County does not have control over State highways, the Puna Community Development Plan urges DOT to integrate multi-modal travel, emphasize safety and traffic calming over efficient travel speed, and incorporate aesthetic features into the design and improvement of highways.

4.4.1 Goals

- a. Highways have design features that improve traffic safety and reduce collisions, particularly at intersections.
- b. Highway design is more aesthetically pleasing and compatible with the natural and rural character of Puna.
- c. Increased County and community influence over highway planning and design decisions.

4.4.2 Objectives

- a. Make intersection improvements along highways that allow safer access from intersecting streets as a priority over traffic speed on the highway, giving preference to the use of roundabouts.
- b. Consider roundabouts as a means to control private driveway access to major highways with higher traffic volumes, such as Highway 130.
- c. Use native landscaping for highway improvements and connectivity points, emphasizing the retention of native vegetation.
- d. Incorporate traffic-calming features into highway design in preference to signage and signalization, where possible.

4.4.3 Actions

All the following are recommendations to DOT.

- a. Short Term (2008-2012):



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- Make interim intersection improvements on Highways 11 and 130;
 - Reduce speed limit on Highway 130 to 45 mph between the Kea`au bypass and `Āinaloa Boulevard;
 - Conduct a study to determine the most efficacious way to create greater highway safety for all travel modes, including a cost benefit analysis for each studied method, and consideration of a wide range of traffic calming features, the use of frontage roads and various types of intersection controls; and
 - Implement the Shoulder Lane conversion project between the Kea`au Bypass and Shower Drive/Pohaku Drive as a reversible lane to accommodate AM and PM peak periods.
- b. Medium Term (2012-2017)
- Increase capacity on Highway 130 between the Kea`au Bypass road and `Āinaloa Boulevard, utilizing the results of the study of highway safety alternatives described above;
 - Construct an exit right lane on Highway 11 below Kea`au Agricultural lots to Kea`au Village using the existing Old Volcano Road right-of-way; and
 - Create a right hand turn lane from Highway 132 onto Highway 130.

4.5 NON-MOTORIZED TRAVEL AND SCENIC BYWAYS

Within Puna, bicycle and pedestrian facilities are very limited. Two multi-use trails of significant length are planned. One is the restoration and improvement of Old Volcano Trail, which roughly parallels Highway 11 for a length of about 14 miles between Kea`au and Volcano. The other is Puna Railroad Bikeway, which, as the name implies, follows the alignment of the former railroad and a portion of Railroad Avenue, and would extend between Kapoho and Hilo, traversing Hawaiian Paradise Park (HPP). The first project is now underway, but the second project requires acquisition of a substantial amount of right-of-way from private owners before it can proceed. When completed, these trails will offer not only a recreational opportunity, but also a safe and attractive route for alternative travel modes between populated areas and places of employment and commercial and community services.

Scenic Byways are somewhat of a hybrid between a highway and a trail. Typically, they are not used for heavy vehicular traffic or primarily for utilitarian purposes. They incorporate pullover areas for vehicles at scenic spots and usually make provisions for bicycling or hiking. There also special design controls on signage, landscaping and other roadway features. Federal funds are available for corridors that are designated as a Scenic Byway. Puna's Highway 137 (Red Road) is a good candidate for this designation.

Section 4.3 pointed out that lack of road connectivity between subdivisions discourages direct travel routes and impairs access in event of emergencies, but lack of connectivity is also problem within many of the internal subdivision street networks. In HPP, for example, the length of blocks between the mauka-makai collector streets is about one mile. This discourages walking and bicycling to make short trips from one block to another because there are no pathways that cut through the mile-long block to allow a more direct route. If village centers are



created within existing subdivisions, which is a central part of the vision of the Puna Community Development Plan, then there will be more local trips. Consequently, new routes need to be created within subdivisions to facilitate these shorter trips – not just by vehicle, but also walking and bicycling. If land pooling is used to create the village center, the same process can be used to obtain rights-of-way for the new pathways. Alternatively, the subdivision owners' association could acquire 10-20 foot wide easements straddling lots line for these passageways, but County financial and/or legal assistance would probably be necessary to do this.

4.5.1 Goals

- a. There are safe walking and bicycling routes to schools, parks and bus stops.
- b. There are safe pedestrian crossings on Highways 130 and 11, particularly Highway 130.
- c. Puna has a network of contiguous scenic trails between and within subdivisions for walking, bicycling, and horseback-riding.
- d. Village/town centers incorporate walking and bicycling paths.
- e. Routes are designated and improved as scenic byways.

4.5.2 Objectives

- a. Implement a Safe Routes to School (SR2S) programs for all schools in Puna.
- b. Survey, acquire rights-of-way for, and develop historic trails for non-motorized travel, which may also be used partially as emergency vehicle or evacuation routes, when needed.
- c. Identify and develop improvement plans for scenic byways.
- d. Encourage the identification and preservation of historic trails throughout the district.

4.5.3 Actions

- a. Request that the State allocate in the State Transportation Improvement Plan (STIP) a larger share of Federal “flex funds” (i.e., the Section 402 program funds) for projects in Puna from highway capacity improvements to transit-related and alternative travel mode improvements, including pedestrian and bicycle safety.
- b. Allocate funding to the County Department of Public Works to make improvements such as sidewalk and crosswalks, traffic signage and acquisition of access easements based on recommendations of a safe routes to schools/parks assessment. A priority project is the construction of a walkway/bikeway between Kea'au Agricultural lots and the Kea'au Elementary and High Schools.
- c. Invest in walkways, bicycle facilities, “park-once” lots, landscape improvements, themed signage programs and transit stops in approved village/town centers.
- d. Allocate additional funding to the County Police Department to consistently monitor traffic operations along safe routes to schools/parks and enforce against traffic code violations.
- e. Complete surveys, acquisition of right-of-way, maintenance agreements, planning and design, and construction for multi-purpose trails, including:



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- Old Volcano Trail, extending between points near Volcano and the Puna Railroad Bikeway;
- Railroad Avenue (portions of which are known as Railroad Right-of-Way), extending between points near Kapoho and Panaewa;
- Old Puna Trail (portions of which are known as Old Government Road or Beach Road), extending between points near Kapoho and Hilo; and
- All coastal trails.

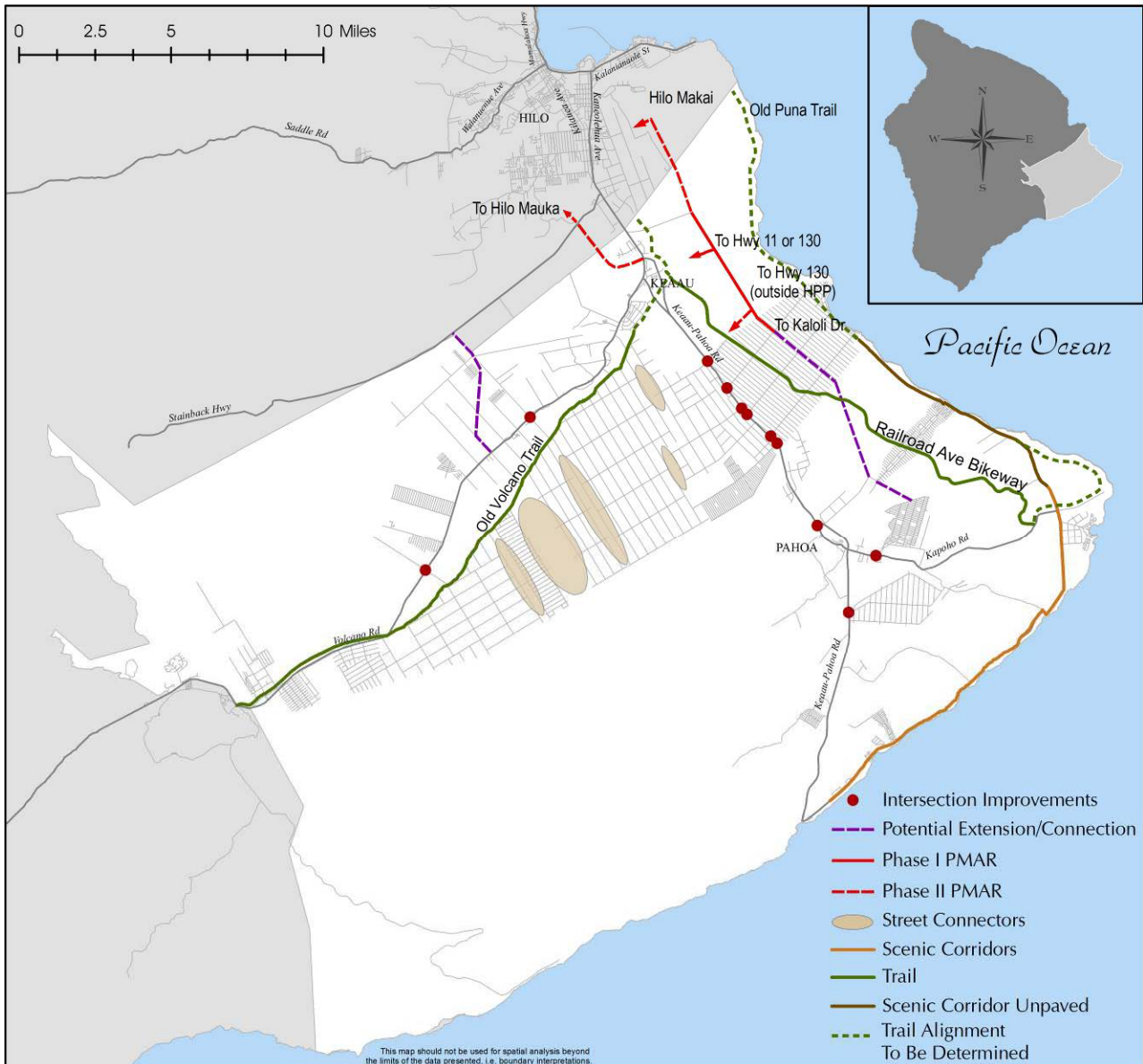
Trails may also be used as emergency access routes, where appropriate.

f. Improve Highway 137 (Red Road) as a scenic corridor by:

- Requiring a 15-foot easement along the frontage of private properties along the corridor within which native and mature trees of non-invasive species must be retained, unless they are in poor health due to natural conditions, not due to malicious acts, and/or pose a threat to public health and safety;
- Preserving Mango, Kamani, and Monkeypod groves and tree tunnels;
- Providing property tax relief to owners who maintain the easement in the manner intended and State tax credits to those who replant easements with non-invasive plant material approved by the County;
- Adding interpretive markers and small visitor parking areas at historical sites, such as the two Kehena sites listed in the General Plan;
- Providing pullouts along the highway at intervals so that travelers can stop to enjoy the scenery without conflict with traffic in travel lanes;
- Delineating and maintaining physical access to the shoreline at appropriate locations on the makai side of the road;
- Minimizing tree pruning by using special, shielded cable for overhead utility lines or by undergrounding sections of the line;
- Minimizing excessive lighting by limiting street lights to major intersections and informing residents along the corridor about how to reduce illumination of driveways;
- Adding a restroom and emergency phone below Seaview before Kehena Beach;
- Creating a simple walking trail on the lava and new parking area with restrooms on the State owned accretion land at the new Kaimū Beach;
- Posting warning signs, where appropriate, in newly realigned sections; and
- Covering old section of road with cinder soil to allow Naupaka to reclaim the land.



Figure 4-1: Proposed Transportation Corridor Improvements



Note: The ovals representing “Street Connectors” in the above map indicate the general areas where road connections between existing streets in adjoining subdivisions will be located, subject to a planning, site selection and design process involving the owners and residents of the affected subdivisions (see Section 4.3.3 a.)



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Chapter **5**

IMPLEMENTATION

The County shall create a community-based body to advocate for the implementation of the actions proposed in this plan. This chapter provides more detailed guidance for the implementation of key elements of the plan – i.e., strategies for the protection of natural and cultural features and the formation of village centers as a growth management tool. At the end of the chapter is a matrix that lists each of the actions set forth in the previous chapters, identifies the lead and supporting organizations responsible for implementing the action, and the estimated cost of the action, if it is a major capital improvement.

5.1 NATURAL AND CULTURAL RESOURCE PROTECTION

5.1.1 Biosphere Reserve Buffer Zone (Volcano Area)

Below are suggested provisions for regulating and monitoring uses and activities in the proposed Biosphere Reserve Buffer Zone (BRBZ) that is described in Section 2.2, Action a.

- Establish standards for maximum land disturbance within the BRBZ, including building footprints, impervious surface, and clearance of vegetation within setbacks. rights-of-way or easements for utility lines, roadways, driveways and trails with the objective of allowing reasonable use of property and structures while not diminishing the larger goal of protecting the natural resources and ‘Ohi‘a canopy of the Biosphere Reserve Buffer Zone District;
- Develop a system to monitor the ‘Ohi‘a forest canopy of the BRBZ to be used as a measure of success in conservation of the region’s forest resources;
- Adapt and develop a set of economic incentives designed to reduce forest clearance, reduce the number of developable lots, reduce total development rights within the BRBZ and transfer development rights within or out of the BRBZ;
- Establish mitigation standards and procedures that provide guidelines for the restoration and re-planting of recently developed areas, including those that were disturbed by unauthorized activity;
- Adopt an ordinance that would direct and fund the Public Works Director to commission a study to identify the flood paths and source areas in the BRBZ, and to design and recommend ordinance language to implement innovative ways to reduce the scale and impacts of flooding, including the acquisition of or rights to strategic vacant, forested lots to use for absorbing floodwaters;
- Establish provisions for “small-footprint” designs for septic tanks to reduce the need for lot grading;
- Create and appoint a nine-member advisory committee with expertise in the area’s ecology, natural areas, and history to assist in developing standards, project reviews and public education programs related to the BRBZ;



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- Request, via County Council resolution, that the State Department of Land and Natural Resources (DLNR) consider designating its unencumbered lands near Wright Road for either Natural Area Reserve or at least Forest Reserve status;
- Amend the General Plan to recognize the purpose and intent of the BRBZ and acknowledge its role as part of an integrated Federal, State and County strategy to protect a unique natural resource of global significance; and
- Re-zone agricultural- and residential zoned lots to zoning districts that closely match their present lot size to discourage further subdivision and development within the BRBZ.

5.1.2 Revised Grading and Grubbing Controls (District-wide)

Below are suggested revisions to County grading and grubbing regulations to protect native forests and geological and cultural features.

- Support ongoing vegetation mapping projects to identify areas where good quality native forest exists. When reliable mapping is available, establish protected areas of existing good quality native forest where grading, grubbing, and other land clearing would be limited to reasonably accommodate a homesite, some open areas for yards, gardens, or landscaping, and driveways, with preservation of a perimeter forested area. Allow additional clearing only for bona fide agricultural activities, and verify that agriculture is actually being conducted.
- Support efforts by the State Historic Preservation Division (SHPD) to create a Geographic Information System (GIS) database of known archaeological and historical sites. Once the database is available, require implementation of protective measures, such as fencing, for all grading and grubbing in the vicinity of known sites, except where prior SHPD authorization has been obtained.
- Require that applications for grading and grubbing permits contain the following property authorizations and certifications:
 - Written authorization of the lot owner and proof of ownership, such as a real property tax record or deed.
 - Certification by a licensed surveyor that: (1) the lot being prepared for development is the right Tax Map Key (TMK) parcel; (2) the proposed development area (size) is correct; and (3) all required building setbacks are outside of the planned site development prior to approval to begin site work.
- Require that yards and native trees at other locations on the site that are designated for preservation be clearly staked or flagged prior to and during land preparation, clearing and construction, and that notice of the grading and grubbing work be posted on the property frontage, visible from the access road.
- Establish stiffer penalties for violations of these grading and grubbing restrictions than for other types of zoning or grading violations because, while most of the latter types of violations can be corrected by remedial work, it is difficult to restore cultural



sites, unique geological features or native forests, especially the removal of a significant stand of mature trees.

5.2 VILLAGE/TOWN CENTER FORMATION

5.2.1 Zoning Designations

Village and town centers are expected to include a mix of uses, including small-lot and higher density residential, retail and office commercial, service-type light industrial, and public and quasi-public facilities, such as schools, churches and parks.

Some of the proposed centers already contain many of these “urban” uses, and even a limited amount of zoned area to accommodate expansion of these uses. Other proposed village centers – namely, those within most of the nonconforming subdivisions – have no urban-type zoning and little or no existing commercial activity or public facilities. Most of the larger subdivisions, however, contain community-owned lots that have been designated for community uses. While these lots provide a potential location for a Village center of suitable size, they lack the zoning – and usually the infrastructure – to fulfill this potential.

Because the formation of village and town centers is a keystone of the Puna Community Development Plan’s growth management theme, and many of the proposed village centers require land assembly and significant infrastructure improvements, the maps defining the location of the village centers are not meant to imply that the landowner(s) of the affected area may apply directly for re-zoning in the conventional way. Instead, the following approaches will be used for the zoning of village/town centers:

- All commercial, light industrial, residential and quasi-public uses within village centers shall be authorized under the “floating zone” method; i.e., where the village center zoning district is defined in zoning code, but is not applied to a specific parcel or group of parcels until an application is made for approval of the zoning map by the County.
- The village/town center floating zone may supersede existing zoning designations, provided that the uses are located within the areas designated as village center.
- The floating zone may also allow mixed use within a building and establish special, place-appropriate development and design standards, including for public facilities.
- If the village center site is on land that is owned by an entity that owns at least 50 acres of land elsewhere in Puna, the intensity of uses in the village/town center may be augmented by the amount of development potential that is transferred from nearby agricultural-zoned and residential-zoned properties that lie outside of the designated village center. Development potential will be measured by “Potential Dwelling Units” (PDUs); i.e., the number of dwelling units that could be developed on the agricultural-zoned or residential-zoned land under its zoning classification, as determined by minimum allowable lot area, assuming one dwelling per lot.



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- More intensive residential development, including multi-family dwellings, within and in the immediate vicinity of village/town centers may be allowed by the transfer of development rights from other areas using a variety of mechanisms, including the process described above, land pooling, planned unit development and development agreements.
- Public and quasi-public uses, such as schools, churches and community centers, may be developed within village centers without the transfer of PDUs. The development of such uses outside of a village center by Special Permit will be discouraged, unless there is a compelling reason to locate the facility in an outlying area due to its particular characteristics or circumstances.
- Existing buildings with existing commercial, industrial and residential zones in village/town centers may be repaired, replaced or expanded without a floating zone review procedure. However, vacant parcels and new buildings within these zoning districts will require review for compliance with the applicable floating zone standards.

5.2.2 Criteria for Proposed Locations and Boundaries

The Puna Community Development Plan (PCDP) defines three types of centers – regional, community, and neighborhood – which differ in size and range of uses according to their intended function (see Table 5-1.)

The maps toward the end of this chapter indicate the suggested locations for the village centers in greater detail, based on the following criteria:

- *Size of the village/town center according to its intended type and purpose.* Land areas need to be large enough to accommodate their intended purpose. Regional Town Centers are estimated to require more than 30 acres of commercial land use; Community Village Centers an estimated 10 to 30 acres; and Neighborhood Village Centers about 5 to 10 acres. In addition, there should be land available for community and residential uses within the village center.
- *Urban zoning and/or uses of an urban character.* A State Urban District designation, existing commercial and/or residential zoning, and the visible presence of built form sometimes indicate at least an embryonic form of a village center. Within some of the non-conforming subdivisions, however, these conditions are lacking or minimal.
- *Public uses or facilities, especially those that people frequently visit.* Where possible, village centers should either encompass or be located adjacent to existing community facilities such as churches, schools, parks, and community centers to promote convenient walking, bicycling and transit access to these uses.
- *Consistency with an applicable community-based plan.* The locations of proposed centers in Volcano, Orchidland and Hawaiian Paradise Park were identified in plans that were prepared by their respective community associations.



- *Land owned by a community or subdivision association.* Several subdivisions and communities have land that is owned by either a community association or the County that offers an opportunity to develop and use as part of a center.
- *Availability of vacant private lots for development of clustered housing or new pathways.* Groups of adjacent vacant lots in nonconforming subdivisions may sometimes be incorporated into a potential village center or be used to create improved access to the village center from surrounding lots. The use of vacant lots minimizes the displacement of homeowners and reduces complications in land assembly.
- *Ease of access to village center from surrounding populated areas.* Village and town centers should have convenient access to travel routes. The larger town centers generally need to be located near, but not necessarily directly on, highways. Smaller village centers may be located at some distance from highways, but there should be convenient walking and bicycling, as well as driving, routes to the village center for the people living in the communities that the village centers support.

The maps shown in this chapter are not meant to be precise or strictly interpreted, but rather as guidelines for reviewing the requests for village center floating zone designation, at which time the boundaries will be fixed.

5.2.3 Use and Design Standards

Land uses, design themes and architectural and site design standards for each village/town center will be determined through the floating zone site approval process. Table 5-1 provides guidance on the scale, uses, and general site and design characteristics for three types of town/village centers.

Some existing locations are proposed for possible Special Design District treatment, as noted in Section 2.1.3, Action b. A Special Design District would provide more detailed design guidance on the development of village centers that exhibit historic development patterns that define a unique “sense of place.” The strongest candidates for Special Design District designation in Puna, in relative order, are:

- *Volcano Village* presently has a small, legally recognized historic district. According to a 1993 inventory by the Hawai'i State Historic Division, Volcano has a high concentration of historic structures, mostly residential dwellings. Most of these are outside of the designated historic district. The inventory can serve as a basis for establishing both the boundaries of the Special Design District and the design parameters for development within it.⁶ A major decision to make, with the involvement of affected property owners and residents, is the extent to which the demolition, renovation and addition to existing historic dwellings will be controlled by design standards, and what those standards will be. In addition design standards for new developments need to be identified and described.

⁶ Boone Morrison Architects, Inc., for the Department of Land and Natural Resources, Historic Preservation Division, *Volcano Village Historic Building Inventory*, 1993.



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Landscape standards are also appropriate for Volcano, although issues related to lot clearance could also be addressed in regulatory controls other than the Special Design District.

- *Pāhoa Town* has a main street – the former highway route before the construction of the by-pass road – that still retains much of the original streetwall of plantation-era structures, as well as some significant stand-alone buildings. Most of the uses are commercial or civic. There has been no historic structure inventory on the scale or level of detail as the Volcano inventory. Some of the older buildings in Pāhoa appear to be in deteriorated physical condition. Also, Pāhoa does not enjoy the same level of prosperity as Volcano, so a low-interest loan program for businesses and building owners would probably be needed to complement a Special Design District. The County has acquired a large tract of land within Pāhoa Town, which presents a significant opportunity for community revitalization and a possible catalyst for economic activity.
- *Kea‘au Town* also has roots as a plantation town, but has lost many of the buildings and other physical features of that era. Nevertheless, it retains some of the character of an older rural town with the informal arrangement of buildings and scale, roof forms, exterior materials and colors of buildings. It also includes some notable landscape features, including mature canopy trees and the line of towering roadside palms between Ola‘a Community Center and Kea‘au High School. As noted earlier, since most of the land in Kea‘au is held by a single owner (Shipman Estate), there is an opportunity to carry an integrated design theme throughout the town without necessarily adopting a Special Design District. The landowner has retained planning and design consultants who are presently engaged in developing design guidelines.
- *Mountain View-to-Kurtistown* is a corridor that includes small settlements dating from plantation days and earlier that have been historically connected to Volcano and Kea‘au by transport routes. There are still some buildings and small areas where there is evidence of an historic development pattern. A limitation is that Highway 11 bisects Mountain View, which makes it difficult to preserve the design integrity of an older settlement. The more generic design guidelines for Community Village Centers, in addition to some direct measures – such as relocating Mountain View Elementary School away from the highway, as recommended by one of the Working Groups – may be a more effective strategy for this corridor than Special Design District designation.



Table 5-1
General Use and Design Criteria by Village/Town Center Type

	Regional Town Center	Community Village Center	Neighborhood Village Center
Service Area Population	20,000 to 50,000 residents	7,000 to 15,000 residents	3,000 to 6,000 residents
Typical Uses	More than 40 tenant spaces for full range of retail and personal services, repair shops and other light industrial uses	20 to 40 small tenant spaces for retail and personal services, repair shops	5 to 15 small tenant spaces for convenience retail and personal services
Commercial Land Area	More than 30 acres	10-30 acres	Up to 10 acres
Commercial Floor Area	Up to 250,000 square feet aggregate, but no tenant spaces larger than 50,000 square feet.	Up to 150,000 square feet aggregate, but no tenant spaces larger than 25,000 square feet.	Up to 50,000 square feet
Other Uses	Regional park; schools (all grades); community hall, theater; outdoor events area; bed-and-breakfast homes and small inns; elderly or other special needs housing; transit hub; medical facility with emergency room; police and fire station; walking and bicycling paths.	Community park, elementary or middle school, community center and outdoor events area; bed-and-breakfast homes and small inns; elderly or other special needs housing; transit stop; medical clinic; walking and bicycling paths.	Neighborhood park, elementary school, multi-purpose meeting room or (minimum) place to congregate or post community notices; outdoor events area (e.g., barbecues and farmer's markets); small bed-and-breakfast homes; transit (or paratransit) stop; connections to walking and bicycling paths.
Design Character	Vernacular architecture that respects the historic context and scale of the community; light industrial uses on periphery to avoid building forms or activities that conflict with the pedestrian-oriented character in the Town Center core; small repair shops in Town Center core subject to performance/design criteria.	Informal, vernacular architecture that utilizes natural exterior materials and earth-tone colors and respects the context and scale of the community, especially where historic structures are present, such as in Volcano Village and the older area of Mountain View.	Informal, vernacular architecture that is small in scale and reflects a rural residential ambience, using natural exterior materials and earth-tone colors.
Access	Access to one or more paved roads; commercial or public uses without direct driveway access to Highway 11 or Highway 130.	Access to one or more paved roads; commercial or public uses without direct driveway access to Highway 11 or Highway 130; no "drive-thru" commercial use.	Access to a paved road, except that there should be no direct access or visibility from either Highway 11 or Highway 130; no "drive-thru" commercial use.



IMPLEMENTATION

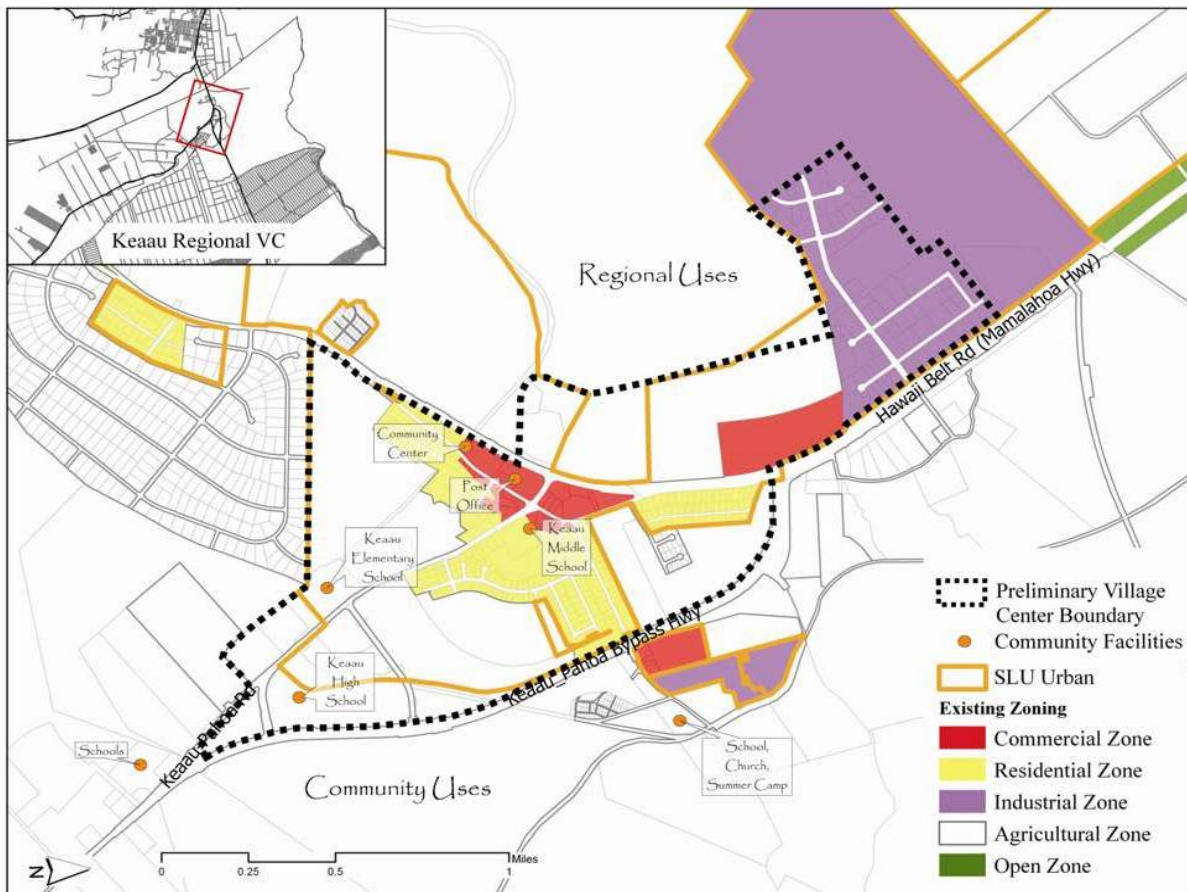
Kea'au Regional Town Center

The Kea'au Town Center consists of two parts. The area bounded by Highway 11 and the Highway 130 By-Pass, including the original plantation village, for uses that are oriented primarily to residents of the Kea'au community itself. The exceptions are the middle and high school and the post office next to Kea'au Shopping Center, which are region-serving facilities. Most uses of a regional orientation – e.g., Shipman Park, the areas already zoned for commercial and light industrial uses, and proposed new police, fire, transit, and medical facilities – are to be located north of Highway 11 to provide convenient vehicular access.

The area designated for community-oriented use is 597 acres, approximately 24% of which has been zoned and/or developed for commercial, residential and public/quasi-public use. The area for region-oriented uses covers 331 acres, approximately 50% of which is now zoned or developed for commercial, industrial or public use. Nearly all of the designated village center is within the State Urban District.

There is no community-based plan for Kea'au, but the principal landowner, Shipman Estate, has a master plan that indicates not only the development of the area within the designated village center, but, in the long-term, much of their land beyond. Control of most of the land by a single owner facilitates the planning and development of the proposed village center.

Figure 5-1: Kea'au Regional Town Center





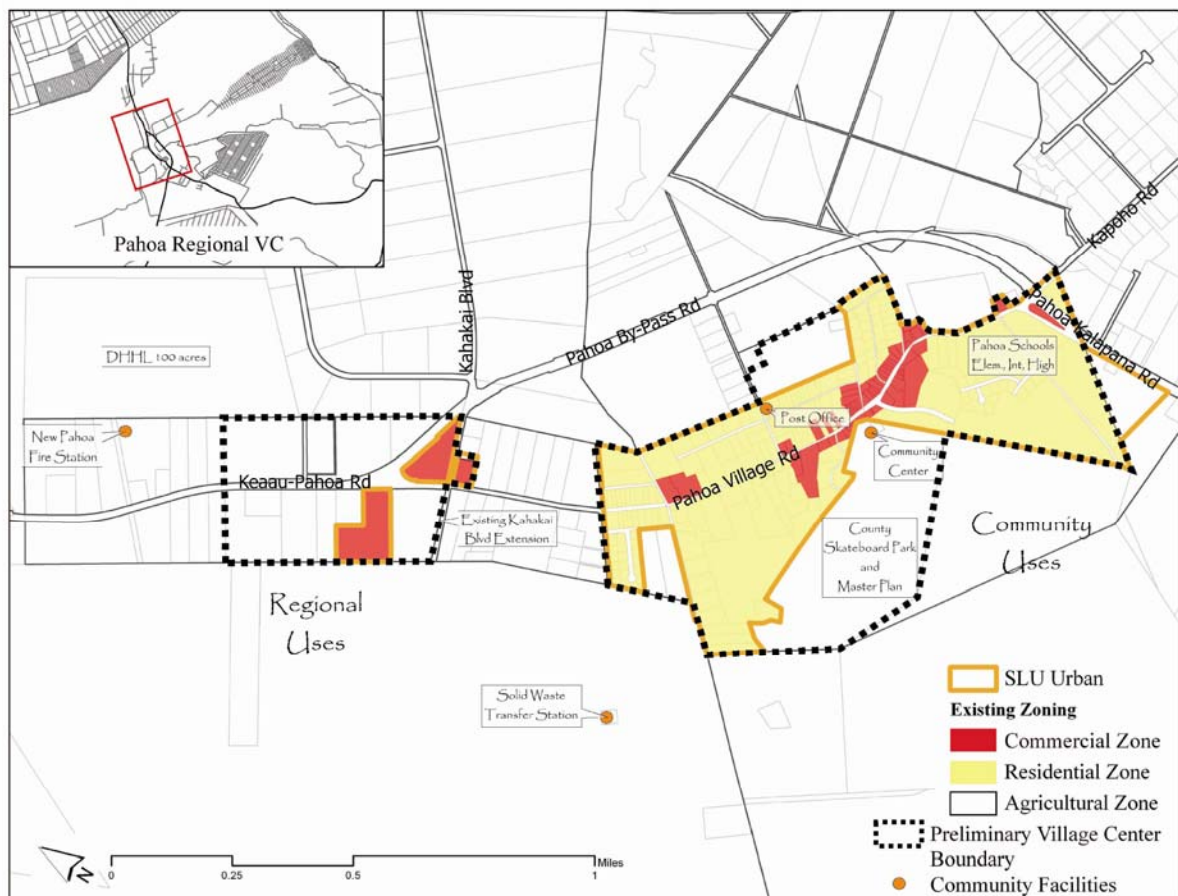
Pāhoa Regional Town Center

Like Kea’au, Pāhoa’s village center is divided into two parts. The northern portion straddling Highway 130 at the intersection with the Bypass Road is intended for regional uses and services – e.g., areas already zoned for commercial and light industrial uses; proposed new police, fire, and ambulance facilities; and a proposed transit hub. The area straddling Pāhoa Village Road from ‘Apa’a Street to the intersection of Kapoho Road and Pāhoa-Kalapana Road, is intended to contain uses that are oriented primarily to residents of the Pāhoa community itself. The exceptions are the post office in the center of town and the intermediate and high school at the southern tip of town, which are region-serving facilities.

The area designated for community-oriented use is 280 acres, approximately 66% of which has been zoned and/or developed for commercial, residential and public/quasi-public use. The area for region-oriented uses covers 78 acres, approximately 16% of which is now zoned or developed for commercial, industrial or public use. Nearly all of the designated village center is within the State Urban District.

The County has recently acquired a 50 acre parcel near the center of town, which presents a good opportunity to expand the regional park and provide other facilities to stimulate the development of the town core.

Figure 5-2: Pāhoa Regional Town Center





IMPLEMENTATION

Hawaiian Paradise Park Regional Town Center and Village Centers

Hawaiian Paradise Park contains 8,804 parcels; 99% of which are 1 acre or less in size. The subdivision is also developing at a relatively rapid rate because of its proximity to Hilo and affordability of parcels. Six 40-acre areas of land were set aside by the original subdivider for potential future community and commercial uses. Three of these 40-acre areas have been identified for development as a town or village center. The sites are distributed in a triangular pattern to optimize their accessibility throughout the subdivision. All are adjacent to one of the principal mauka-makai streets in the subdivision.

The site closest to Highway 130 is designated as a Regional Town Center, primarily because of the high rate of growth in this quadrant of the subdivision. Land pooling and transfer of development rights to encourage a greater clustering of residential use near this town center is encouraged. The other two sites are designated for the development of a Community and Neighborhood Village Center. The latter is 20 acres in size.

The intention in the future is to have all service and community uses located within either the town center or one of the two village centers to reserve outlying properties for residential and agricultural use, create activity centers for community and commercial uses, and to promote greater efficiency in travel and infrastructure development.

Figure 5-3: Hawaiian Paradise Park Regional Town Center and Village Centers



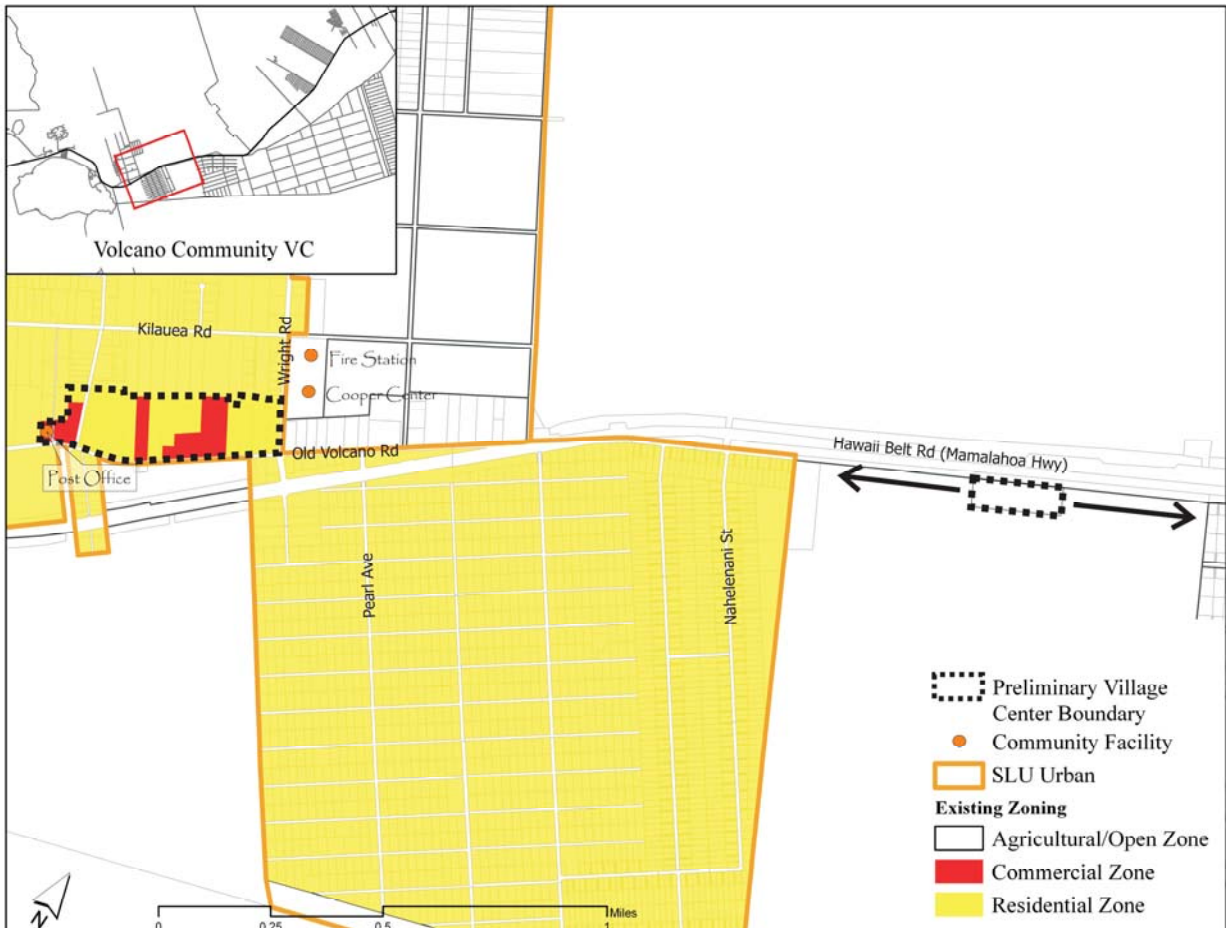


Volcano Community Village Center

As suggested by the Volcano Community Association, the village center in Volcano is split into two locations. The larger of the two sites, along the Old Volcano Highway between Haunani Road and Wright Road, is within the historic core of Volcano. It is roughly 43 acres and entirely within the State Urban District. Portions of this site have County commercial zoning, but the community association’s Vision 2020 Update proposes the creation of a Rural Commercial (CR) district with specific design guidelines to respect Volcano’s historic character. The description of the CR zoning resembles the criteria for a village center.

The second, and smaller, portion of the village center would be at a presently undeveloped site on the other side of Highway 11 between the Maunaloa Estates and Ohia Estates subdivisions. This portion of the village center is intended for more service-oriented businesses. While this site does not contain historic structures, businesses should not be prominently visible or have direct vehicular access to Highway 11. Instead, access to the second portion of the village center would be via a parallel right-of-way remnant of the Old Volcano Highway.

Figure 5-4: Volcano Community Village Center





IMPLEMENTATION

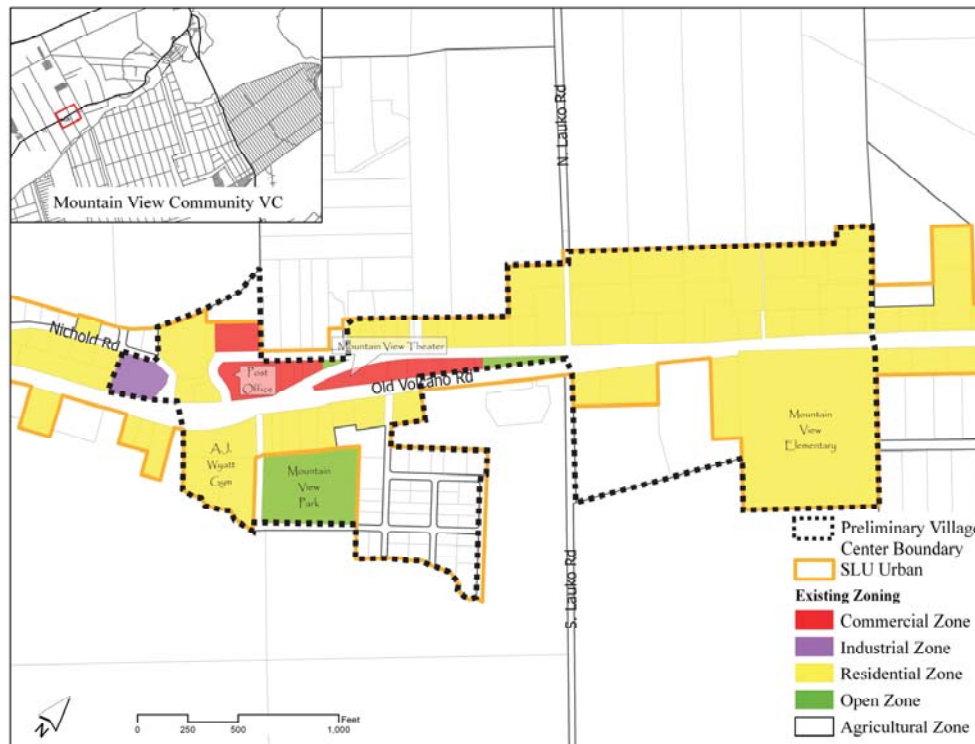
Mountain View Community Village Center

Mountain View already has a commercial-zoned area of more than 3 acres, so its village center is focused on this existing core. The area shown for the village center in the map below is approximately 85 acres and encompasses the existing elementary school, community park, Historical Mountain View Theater, A.J. Wyatt Gym and some relatively small residential lots, as well as the commercial core.

Highway 11 runs through the village center, providing access from the east and west. Lauko Road runs perpendicular to Highway 11, with the intersection near the middle of the village center. Measures to make crossing Highway 11 safer in this area should be considered, such as a bypass route or signal-controlled crosswalk.

Some have proposed the relocation of Mountain View Elementary School so that the facility can be converted into a senior community center. Ideally, the new school location would be closer to the community park, gym, and small-lot residential area. Having the school closer to the gym and park, would make the community more walkable, with more convenient and safer access for frequent users.

Figure 5-5: Mountain View Community Village Center



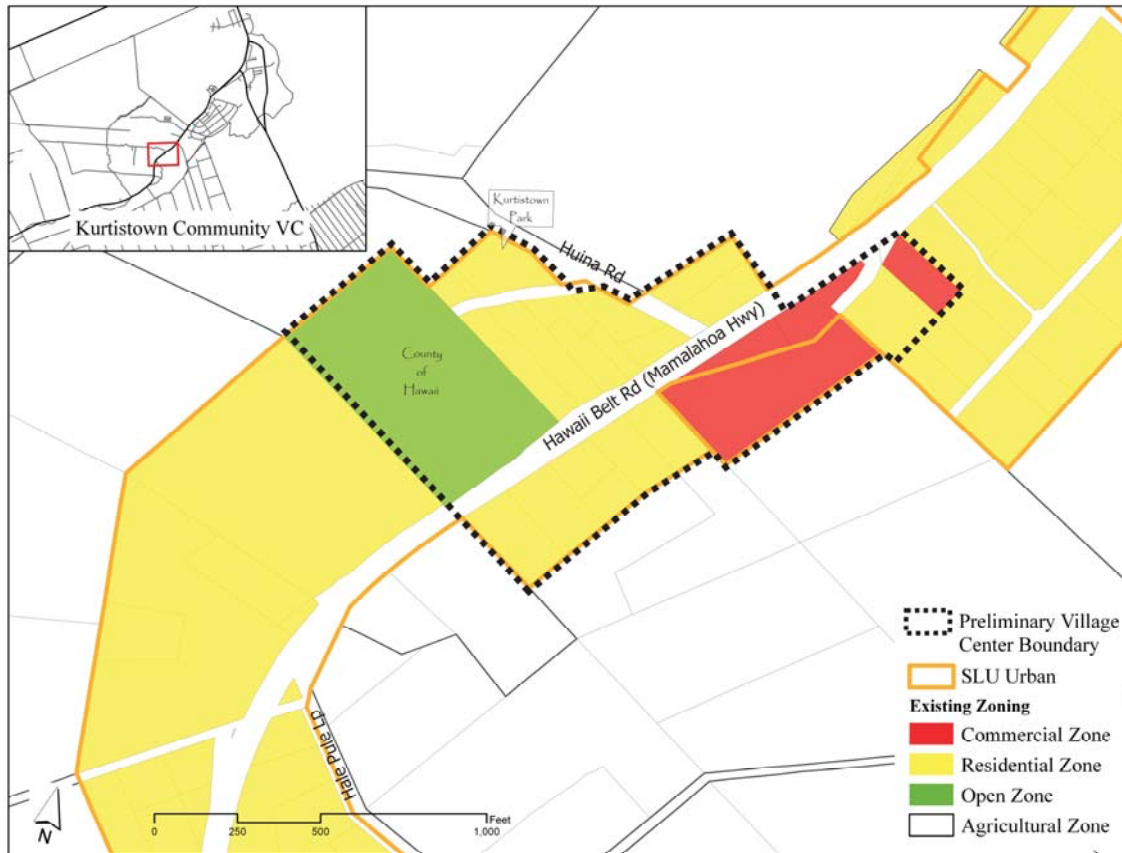
Kurtistown Community Village Center

The Kurtistown Community Village Center, which is aligned along Highway 11, encompasses approximately 35 acres. Approximately 15 acres or 44% of the area is already



developed. Roughly half of the designated area lies within the State Urban District. A little more than 15 acres is zoned for residential use and is occupied by single family dwellings. Approximately 9.5 acres is zoned for commercial use. The largest parcel, at nearly 7 acres, is owned by the County. As part of the village plan, a controlled crosswalk or a by-pass route should be considered in order to make it safer and more convenient to cross Highway 11.

Figure 5-6: Kurtistown Community Village Center



‘Āinaloa Neighborhood Village Center

The ‘Āinaloa Community Association owns three 8.25-acre sites distributed evenly throughout the subdivision. Two of the sites are vacant. The most central of these is suggested as the site for the village center. The site consists of two parcels – one 5.5 acres and the other 2.75 acres – separated by a road. The typical lot size in the subdivision is 0.275 acres. All of the lots immediately surrounding the proposed village center are vacant, so the village center could conceivably be expanded without displacing homeowners.

Primary access to the village center would be Tree Fern Drive, Ginger Lane, and Rainbow Drive. These streets, like all the others in ‘Āinaloa, provide access to the center of the subdivision from the two main paved roads that span the outside edges of the subdivision.



IMPLEMENTATION

As part of the formation of the village center, it would be useful to consider the creation of a pedestrian way that could also be used for bicycles to provide better access to the village center. The potential alignment is illustrated in the map below. The pedestrian way could be created by acquiring a 5-foot to 10-foot wide easement from properties along their common boundaries.

Figure 5-7: Ainaloa Neighborhood Village Center

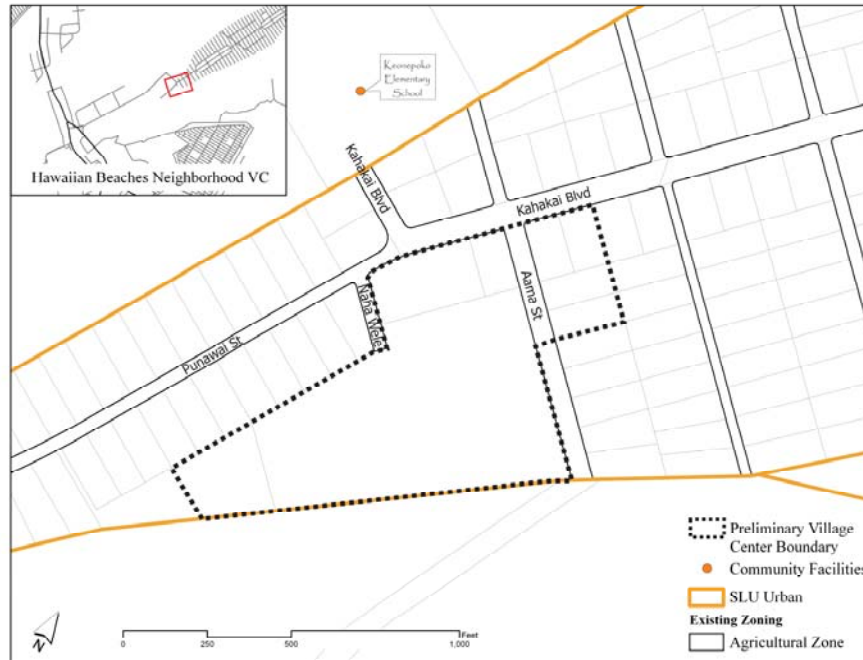


Hawaiian Beaches Neighborhood Village Center

The Hawaiian Shores Community Association owns nearly 12 acres at the entrance to the subdivision across the street from the Keonepoko Elementary School. The largest of the association's parcels already contains a 2,304 square foot building, presumably used as a community center. The combined area is suitably sized and situated for a village center. Access to the center would be provided along A'ama Street, Kahakai Boulevard, and Naha Wele. Four vacant parcels across A'ama Street totaling 2.19 acres could be acquired for expansion of the village center. The entire site is within the State Urban District.



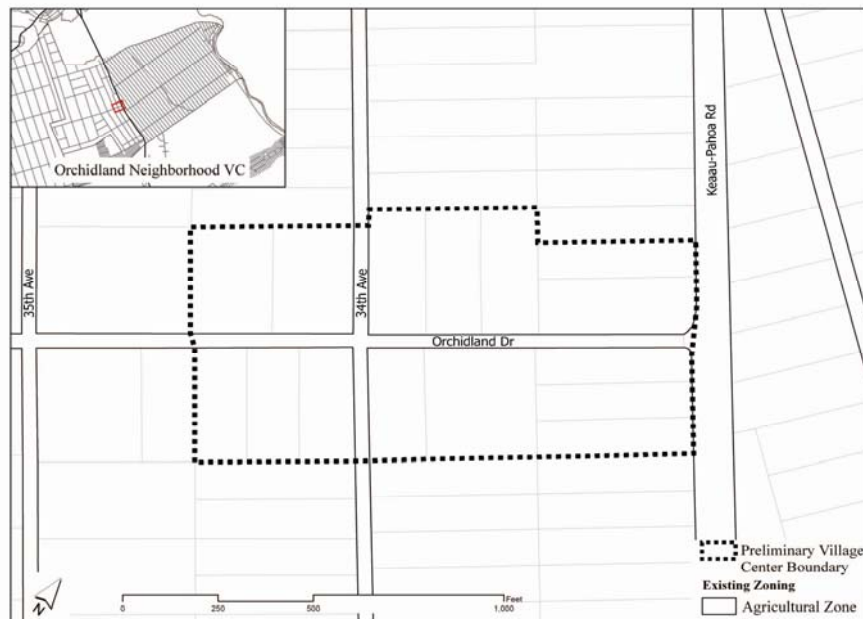
Figure 5-8: Hawaiian Beaches Neighborhood Village Center



Orchidland Neighborhood Village Center

The Orchidland neighborhood village center location was identified by the community association to be “located along Orchidland Drive from Highway 130 to halfway between 34th and 35th Avenues”, which encompasses 15 parcels and an area of about 16 acres. The area is outside the State Urban District.

Figure 5-9: Orchidland Neighborhood Village Center





IMPLEMENTATION

Nanawale Neighborhood Village Center

The Nanawale Community Association owns a 23.23-acre vacant parcel at the center of the subdivision that is adequate to serve as a neighborhood village center.

Access to the parcel is provided for on all four sides of the parcel. The only special use permitted within the subdivision is a church/school facility located in the northwest corner of the subdivision. The majority of parcels within the subdivision are less than a quarter acre in size. The road network through the subdivision is extensive making the proposed village center accessible and convenient. The proposed village center lies within the State Urban District.

Figure 5-10: Nanawale Neighborhood Village Center





5.3 IMPLEMENTATION TABLE

The Implementation Table on the following pages identifies, for each of the proposed actions in the Puna Community Development Plan, the organization(s) responsible for taking the lead or supporting role for implementation, the projected timeframe for implementation, and the estimated cost, in 2007 dollars, of implementing the action, if it is a major capital improvement project. In some cases, the cost could not be determined until further planning work and feasibility study has been completed to better define the scope of the project. Those instances are noted by “TBD” (to be determined.) A key to the organizations referenced in the table is below. Where organizations are co-equal partners in a role, they are separated by a comma. Where one has relatively greater responsibility or authority, they are separated by a diagonal line.

Key to Acronyms in Implementation Table

BD	County of Hawai'i Building Department
CA	Community Association (or subdivision homeowners' association)
CC	County of Hawaii Corporation Counsel
COU	County of Hawaii Council
DBEDT	State of Hawai'i Department of Business, Economic Development & Tourism
DHHL	State of Hawai'i Department of Hawaiian Home Lands
DLNR	State of Hawai'i Department of Land and Natural Resources
DOE	State of Hawai'i Department of Education
DOT	State of Hawaii Department of Transportation
DPW	County of Hawai'i Department of Public Works
DWS	County of Hawai'i Department of Water Supply
EMPL	Employers (referring to large institutions)
FED	Federal agencies (various, depending on function)
FIN	County of Hawai'i Department of Finance
HCC	Hawaii Community College
HELCO	Hawaii Electric Light Company
HFD	County of Hawai'i Department of Public Works-Building Division
HFDC	Hawaii Housing Finance & Development Corporation
HPD	County of Hawai'i Police Department
DEM	County of Hawaii Department of Environmental Management
DPR	County of Hawaii Department of Parks and Recreation
LEG	Hawaii State Legislature
MTA	County of Hawai'i Mass Transit Agency
NGO	Non-governmental organization (non-profit community association, etc.)
OHCD	County of Hawaii Office of Housing & Community Development
PD	County of Hawai'i Planning Department
PUC	State of Hawai'i Public Utilities Commission
R&D	County of Hawai'i Department of Research and Development
UH	University of Hawaii at Hilo

When implementing the actions listed in the following table, the Working Group and Working Paper report that addresses the relevant topic(s) shall be considered as a reference to provide greater specificity on the location, description and intention of the proposed action.



IMPLEMENTATION

Section	Action Item	Responsibility		Timetable			Est. Cost \$1,000 (2007)
		Lead	Supporting	2008-12	2013-17	2018-30	
MĀLAMA I KA 'ĀINA							
2.1.3	Historic, Cultural, and Scenic Resources						
(A)	Establish a county historic preservation commission	COU	PD	X			
(B)	Initiate Special Design District designations for the following areas: –Volcano Village –Pāhoā Town –Kea'au Town –Kurtistown-Mountain View corridor	PD PD PD PD	COU COU COU COU	X X	X X		
(C)	Amend the county building code for traditional Hawaiian building design and construction methods	DB	COU/PD	X			
(D)	Amend the county grading ordinance to require consultation with the Historic Preservation Division and County Historic Preservation Commission	COU	PDW/PD	X			
2.2.3	Native Forests and Geological Features						
(A)	Enact a BRBZ Design District	COU	PD/DPW	X			
(B)	Amend County code to protect native species, geological and historic features outside of the BRBZ	COU	DPW/PD	X			
(C)	Establish an office of County Ecologist within the Planning Department	COU	PD	X			
(D)	Provide County support for forest preservation by offering real property tax reductions and contributing land	COU	FIN,DPW	X	X	X	
(E)	Reduce the minimum lot size to qualify for the native forest preservation tax reduction and allow it in any zoning district	COU	FIN	X			
(F)	Investigate alternatives to herbicides for weed control on public lands	DOT,DPW	DOE, DPR,DLNR	X			
2.3.3	Aquifers and Coastal Waters						
(A)	Encourage State legislation to prohibit the use of cesspools as a means for wastewater disposal in areas below 1,000 feet Mean Sea Level	LEG	DOH/DLNR	X			
(B)	Seek state Department of Health acceptance of small-footprint septic wastewater treatment designs and clustered septic systems	LEG	DOH	X			
(C)	Prepare watershed management plans for the Volcano-to-Mountain View and Hawaiian Acres-to-Orchidland areas to address localized flooding problems	DPW	DW/PD		X		
(D)	Ensure that a corridor of the Puna watershed at least two miles wide between Wao Kele O Puna forest area and the ocean is preserved for future potable water use	LEG	DOH/DLNR		X		
(E)	Require blackwater wastewater disposal systems to be contained or connected to a collection system in areas below 100 feet Mean Sea Level	PD	DOH, DPW, DEM	X			
2.4.3	Shoreline Area						
(A)	Expand and improve database, references and skills at County level to review shoreline permit applications	PD	UH,DBEDT,FED	X			
(B)	Research and record information on trails and historic resources	DLNR	PD	X			
(C)	Conduct historic and biological surveys for review of shoreline permit applications and certifications and prohibit SMA permits for subdivision of properties likely to be	PD,DLNR	NGO	X			

PUNA COMMUNITY DEVELOPMENT PLAN
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Section	Action Item	Responsibility		Timetable			Est. Cost \$1,000 (2007)
		Lead	Supporting	2008-12	2013-17	2018-30	
	underwater in 100 years						
(D)	Take into account subsidence and storm waves in shoreline certifications	DLNR	PD	X			
(E)	Study storm wave and high tide patterns to develop refined coastal flood zone maps	FED,UH,DLNR	DPW	X			
(F)	Implement special zoning and development controls for Kapoho area to address subsidence issues	PD	UH,DBEDT,FED	X			
3.1.3	MANAGING GROWTH Land Use Pattern						
(A)	Adopt enabling legislation for a transfer of development rights program	COU	CC	X			
(B)	Provide county support for land use entitlements and land assembly for voluntary land pooling projects by:						
	–Creating a "floating zone" in the County zoning code	PD	CA	X			
	–Initiating a special use permit request or petition for land use boundary amendment	PD	LUC		X	X	
	–Seeking amendment to State Land Use Law to enable "rural town/village" standards	PD	LUC	X			
	–Seeking State enabling legislation to allow County to retain lots delinquent in real property taxes	PD	FIN	X			
–Extending technical assistance and advice to community-based land pooling associations	CC, FIN	NGOs	X	X	X		
(C)	Establish the following general classifications for village and town centers: Regional, Community and Neighborhood	PD	CA	X			
(D)	Facilitate land use entitlements and other tools for the development of existing and future village/town centers and special design districts by:						
	–Approving commercial zoning or use permits for existing commercial uses in designated village/town centers	PD	COU	X			
	–Denying zone changes for commercial or light industrial use on sites that are not within designated village/town centers	PD	COU	X	X	X	
(E)	Facilitate land use entitlements and financing for the development of new village/town centers by:						
	–Creating a "floating zone" classification for new village/town centers	PD	CA	X			
	–Providing loan guarantees or grants to community associations or partnerships for infrastructure development	COU	FIN		X	X	
(F)	Amend the zoning code and/or apply district-wide rezoning to limit allowable building footprint on residential and agricultural-zoned lands	COU	PD	X			
(G)	Require County agencies to establish and report on Level of Service standards for infrastructure and services	COU	PD,DPW,HFD,HPD,DWS,DPR	X	X	X	
(H)	Urge the Department of Hawaiian Home Lands (DHHL) to conform to the goals and objectives of the PCDP	COU/LEG	DHHL	X			
(I)	Consider fixing the real property tax assessments of voluntarily enrolled property owners	COU	FIN		X		
(J)	Conduct study on the impacts from subdivision build-out	PD	DLNR, DW	X			
(K)	Require wider notice of pending applications for special permits, variances and zoning changes	PD	COU	X			



IMPLEMENTATION

Section	Action Item	Responsibility		Timetable			Est. Cost \$1,000 (2007)
		Lead	Supporting	2008-12	2013-17	2018-30	
3.2.3	Agriculture and Economic Development						
(A)	Limit water system and road standard variances for new subdivisions on agricultural-zoned land	PD	COU	X			
(B)	Initiate down-rezoning of lands in Agricultural zoning districts to discourage further subdivision into small lots	PD	COU	X			
(C)	Rescind Urban Expansion Areas on the LUPAG, except where they correspond to designated village centers	COU	PD	X			
(D)	Seek State legislation to impose higher conveyance and/or capital gains taxes on short-term property re-sales	LEG	FIN	X			
(E)	Seek state legislation to allow the county to hold onto properties that are in foreclosure due to property taxes in arrears rather than immediately auctioning them to the highest bidder	PD	FIN	X			
(F)	Provide land and infrastructure for farmers' markets within village/town centers	R&D	DPW	X	X		
(G)	Seek State authorized lower General Excise Tax rate on local agricultural products sold at County farmers markets	LEG	R&D	X			
(H)	Develop an agri/eco-tourism policy, necessary zoning and other County assistance farmers markets, special events, restaurants specializing in local food products, and similar promotions of local agriculture	R&D	PD	X			
(I)	Develop business incubator districts in Kea'au, Pāhoa, and Mountain View	R&D	DBEDT/DP	X	X		
(J)	Promote use of the incentives offered by the designation of an Enterprise Zone	R&D	DBEDT	X	X	X	
(K)	Support the HCC-The Bay Clinic partnership to establish a youth business center in Kea'au	UH, NGO	DBEDT, R&D	X			
(L)	Support the development of a community-based organic farming operation and training facility in cooperation with UH	UH	R&D	X			
(M)	Develop job opportunities in Puna in renewable energy generation	R&D	DBEDT		X	X	
(N)	Conduct a study to define and identify important agricultural lands in Puna	PD	R&D	X			
(O)	Create a fund to purchase or receive identified important agricultural lands	R&D	FIN		X		
(P)	Create a real property tax exemption (perhaps 4 to 6 years) for farmers entitled to Federal crop loss insurance	COU	FIN		X		
(R)	Encourage organic farming and gardening by establishing a Puna agriculture scholarship with HCC and UH Hilo	UH	LEG/COU	X	X	X	
3.3.3	Social Services and Housing						
(A)	Develop a centrally located full-service medical facility based on a non-profit model	NGO	LEG/DOH	X	X	X	
(B)	Establish "one-stop" social services assistance centers at various locations	NGOs	DSSH, OHCD	X	X		
(C)	Build partnerships between the County and non-profit organizations for social services and economic development	COU	NGO,OHCD,R&D	X	X	X	
(D)	Seek State enabling legislation to help lower self-help housing construction costs	LEG	COU/OHCD, DB	X			
(E)	Offer educational programs to develop financial skills of	OHCD	HFDC	X	X	X	

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Section	Action Item	Responsibility		Timetable			Est. Cost \$1,000 (2007)
		Lead	Supporting	2008-12	2013-17	2018-30	
	renters and rental strategies for owners and tenants						
(F)	Sponsor programs to increase homeownership opportunities	OHCD	HFDC	X	X	X	
(G)	Promote multi-family and special needs housing in village/town centers	HFDC/OHCD	PD	X	X	X	
(H)	Provide low-interest, sliding-scale loans for housing repair and renovation	OHCD	COU		X	X	
(I)	Amend building code to allow occupancy of residential dwelling before final inspection	COU	BD	X			
(J)	Urge the State to increase local control over public schools	LEG	COU	X	X		
3.4.3	Public Safety and Sanitation Services						
(A)	Develop permanent fire stations at, Hawaiian Beaches/Shores, Hawaiian Paradise Park, lower Volcano, and Mt. View	COU	HFD		X	X	
(B)	Provide additional volunteer stations in subdivisions as sites become available and growth warrants	HFD	NGOs	X	X	X	
(C)	Provide free wireless internet services	COU,LEG	FED		X	X	
(D)	Provide more emergency call boxes along State highways	DOT			X		
(E)	Encourage enhancement of cell phone service to cover remote areas	LEG	PUC		X		
(F)	Boost Department of Environmental Management recycling budget	COU	DEM	X	X	X	
(G)	Relocate Kea'au and Pāhoā solid waste transfer stations	DEM			X		
(H)	Increase County resources to handle abandoned/derelict car removal	COU	DEM	X	X	X	
(I)	Provide public financial support for infrastructure development within approved village/town centers	COU/FED	DEM, DW		X	X	
3.5.3	Parks and Recreation						
(A)	Consider expanding the Camp Ground at MacKenzie State Park to include public property south of MacKenzie	DLNR	DPR		X		450
(B)	Improve and expand Coastal Activity Areas as follows: -Ahalanui Beach Park -Consider modifications to tidepools beyond "Shacks" for use as "keiki pools" -Pursue development of a camp ground and/or ocean recreation park with potential boat launch ramp and marina facilities at Cape Kumukahi -Consider acquisition and development of Honolulu Landing, Kapoho Crater and Sand Hill -Develop support facilities for Kehana Beach State Park -Encourage development of hike/camp coastal trail system	DPR	COU	X			925
		DLNR			X		185
		DLNR	LEG		X		TBD
		DLNR, DPR, COU	DPR, DLNR			X	TBD
		DLNR, DPR	DPR, NGO	X		X	TBD
(C)	Improve and expand Community Parks as follows: -Develop new community parks in Hawaiian Acres, Glenwood, Nanawale Estates, Leilani Estates, Orchidland Estates, and Hawaiian Beaches subdivision -Various improvements to Pahoā Regional Park -Various improvements to Shipman (Kea'au) Regional Park -New regional park and various improvements at Hawaiian Paradise Park -Develop recreational programs for Cooper Center and Volcano Community Park	DPR	COU		X		TBD
		DPR	COU	X	X	X	3,750
		DPR	COU	X	X	X	3,300
		DPR	COU	X	X	X	9,400
		DPR	COU	X			



IMPLEMENTATION

Section	Action Item	Responsibility		Timetable			Est. Cost
		Lead	Supporting	2008-12	2013-17	2018-30	\$1,000 (2007)
	–Provide improvements at Mountain View Community Park and A. J. Watt Gym	DPR	COU		X		185
	–Expand hours of operation at regional and larger community parks	DPR	COU		X		
	–Develop a new senior center in Mountain View	DPR	OHCD		X		185
	–Provide in each village center a recreational park and village green	DPR,NGOs	COU		X	X	TBD
	–Make recreation facilities and meeting rooms at public schools available for community use after school hours	DOE	DPR,NGOs	X			
	–Create small community parks as part of right-of-way acquisition for new connecting road segments between subdivisions	DPW	NGOs		X	X	
(D)	Create and improve Linear Parks as follows:						
	–When acquiring rights-of-way for constructing new roadways or improving existing major roadways, make provisions for parallel multi-use recreational trails	DPW,DOT	COU		X	X	
	–Complete development of Old Volcano Trail as a pedestrian and cycle pathway	DPW	COU	X			
	–Acquire former railroad right-of-way from Kapoho through Hawaiian Paradise Park for hiking, bicycling and horse-back riding	DPW	DLNR		X		
	–Plan for acquisition and development of the former railroad right-of-way from Hawaiian Paradise Park to Railroad Avenue in Hilo	DPW	DLNR			X	
	–Plan for public access along Old Government Road (coastal trail) as a bicycle and hiking trail	DLNR	DPW		X		
(E)	Create and improve Preserves as follows:						
	–Assess appropriate level of site visitor usage and implement self-guided or steward-led tours	DLNR	DPR	X			
	–Improve conditions at Wai'ōpae Tidepools	DLNR	LEG		X		600
	–Consider acquiring Green Lake and vicinity for native habitat restoration and nature center	DLNR	LEG		X		TBD
	–Consider hiking trails through Nanawale Forest Reserve	DLNR			X		300
	–Pursue development of passive cultural/botanical park in Hawaiian Paradise Park	DLNR	DPR			X	TBD
3.6.3	Energy Sustainability						
(A)	Apply LEED standards for public buildings, with a minimum goal of silver level	BD	COU	X			
(B)	Investigate ground-water cooling for public buildings	DBEDT	DPW	X			
(C)	Require energy efficiency standards for larger residences	BD	COU	X	X		
(D)	Incorporate energy-efficient features into the construction of lower-cost homes with the use of public subsidies	OHCD,HFDC	PUC	X	X	X	
(E)	Establish a Renewable Energy Research & Development fund with UH-Hilo	UH	DBEDT/R&D				
(F)	Apply the PUC Public Benefits Fund to retrofit dwellings for alternative energy, with sliding scale to reach low-income households	PUC	COU,OHCD	X	X	X	
(G)	Negotiate a direct use of geothermal agreement for agricultural uses as part of any expansion of the capacity of the Puna Geothermal Venture plant	HELCO,PUC	R&D	X			

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Section	Action Item	Responsibility		Timetable			Est. Cost \$1,000 (2007)
		Lead	Supporting	2008-12	2013-17	2018-30	
(H)	Promote biomass energy and fuel production using wood chips from exotic trees	PUC	DBEDT,R&D	X	X	X	
(I)	Pursue new renewable energy sources (OTEC, wave energy, solar capture) as technology advances	PUC	DBEDT,R&D		X	X	
	-Pursue and ocean energy or enterprise subzone	R&D	DBEDT,PD		X		
	-Pursue other applications besides energy capture (e.g., aquaculture and agricultural product washing)	R&D	DBEDT		X	X	
TRANSPORTATION							
4.1.3 Traffic Demand Management							
(A)	Promote VanPool and ride-sharing alternatives more actively	DOT	R&D,EMPL	X			
(B)	Promote staggered work hours and telecommuting with major employers and institutions	COU,UH	EMPL	X			
(C)	Facilitate telecommuting by developing free Wi-Fi reception in Puna	COU,LEG	FED		X	X	TBD
4.2.3 Mass Transit							
(A)	Prepare a county-wide Transit Master Plan	MTA	FED				TBD
(B)	Improve transit service operations by:	MTA	FED				
	-Increasing transit service to a minimum of two additional runs during peak hours	MTA	FED	X			1,200
	-Establish demand responsive transit in subdivisions	MTA	FED		X		TBD
	-Provide commuter express bus service from Pahoia to Hilo and Volcano to Hilo	MTA	FED		X		TBD
	-Establish a hub-and-spoke transit system	MTA	FED		X		TBD
(C)	Develop transit hubs at the following locations:						
	-Kea'au (Primary Hub)	MTA	FED		X		TBD
	-Pāhoia (Secondary Hub)	MTA	FED		X		
	-Volcano (Secondary Hub)	MTA	FED		X		
-Mountain View (Secondary Hub)	MTA	FED		X			
(D)	Provide park-and-ride lots at transit hubs and HPP	MTA	FED	X	X		
(E)	Provide express bus service for commuters from Pahoia to Hilo and Volcano to Hilo	MTA	FED	X			
(F)	Develop a cooperative program with public and private schools to provide student passes for the Hele-On Bus	MTA	DOE,LEG,NGOs	X			
(G)	Launch public education campaign promoting transit services	MTA	NGOs	X	X	X	
(H)	Cultivate public/private partnerships, such as employer-sponsored bus passes	MTA	NGOs, EMPL	X	X	X	
(I)	Expand MTA staff to provide greater support for transit operations	COU	FIN,MTA	X	X		
(J)	Investigate other fare/ticketing incentives to increase ridership	MTA	FED	X			
(K)	Work with DOT in creating safe pedestrian conditions for using mass transit	MTA	DOT	X	X		
4.3.3 Roadway Network							
(A)	Short Term (2008-2012)						
	-Plan and design PMAR alignment	DPW	DOT	X			
	-Require building setbacks in HPP for potential PMAR extension	PD	DPW	X			
	-Establish emergency routes using mostly existing road beds	DPW	NGOs	X			



IMPLEMENTATION

Section	Action Item	Responsibility		Timetable			Est. Cost
		Lead	Supporting	2008-12	2013-17	2018-30	\$1,000 (2007)
	-Include pedestrian and bicycling requirements in all projects	DPW	NGOs	X			
	-Create connectivity alignments between various subdivisions	DPW	NGOs	X			
(B)	Medium Term (2012-2017)						
	-Construct a two-lane roadway between Kaloli Dr and Kea'au	DPW	NGO		X		19,200
	-Construct unpaved two-lane roadway between Kahakai Blvd and HPP	DPW	DLNR,NGO		X		4,400
	-Construct a two-lane roadway from Nanawale to Kahakai Blvd	DPW	NGO		X		4,000
	-Study need/feasibility of Paho-Hwy 11 and Hwy 11-Stainback Highway alternative routes	DPW	DOT			X	
(C)	Long Term (2017-2030)						
	-Construct Phase II segments of PMAR	DPW	DOT			X	33,500
	-Acquire additional right-of-way through HPP to extend PMAR	DPW	DOT			X	1,700
	-If traffic demands, construct PMAR extension through HPP to connect to Kahakai Boulevard	DPW	DOT			X	23,000
4.4.3	Highways						
(A)	Short Term (2008-2012)						
	-Intersection improvements on Highways 11 and 130	DOT	LEG/FED	X			5,500
	-Reduce speed limit on Hwy 130 to 45mph (Kea'au Bypass to Ainaloa Blvd)	DOT	LEG/FED	X			
	-Determine most effective ways to improve highway safety for all travel modes	DOT	LEG/FED	X			
	-Implement the Hwy 130 shoulder lane conversion project between Kea'au Bypass and Shower Drive and consider using the 3 rd lane as a reversible lane for peak periods	DOT	LEG/FED	X			6,500
(B)	Medium Term (2012-2017)						
	-Increase capacity on Hwy 130 between bypass road and Ainaloa, based on optimal safety	DOT	LEG/FED		X		28,000
	-Construct a right exit lane on Hwy 11 below Keaau Ag lots to Keaau Village using the existing Old Volcano Rd ROW	DOT	LEG/FED		X		
	-Create a right hand turn lane from Hwy 132 onto Hwy 130	DPW	LEG/FED		X		
4.5.3	Non-Motorized Travel and Scenic Byways						
(A)	Request that the STIP allocate a larger share of federal "flex funds" to transit-related and alternative travel modes	COU	DOT,FED	X	X	X	
(B)	Allocate funding to DPW for safe routes to schools/parks improvements, with Kea'au improvements as a priority	COU	DPW	X	X	X	
(C)	Invest in pedestrian-, bicycle- and parking-related improvements in approved village/town centers	COU	DPW	X	X	X	
(D)	Allocate funding to the HPD to monitor traffic operations along safe routes to schools/parks	COU	HPD	X	X	X	
(E)	Complete surveys, acquisition of right-of-way, maintenance agreements, planning and design, and construction for multi-purpose trails	DPW,DLNR	COU,LEG	X	X		10,700
(F)	Designate and improve Highway 137 (Red Road) as a Scenic Byway	DPW			X	X	1,100



GLOSSARY

Action – A specific recommendation, such as a project or program, intended to implement a policy or achieve an objective.

Community Village Center – An area intended for public/civic uses, or community-oriented commercial uses and some higher density residential development within or immediately surrounding the village center.

Density – The ratio of the number of dwelling or rental units to the gross land area of gross land area.

Development Agreement – A written agreement for specified periods of time between the County, any governmental entity or agency made a party thereto, and any person having a legal or equitable interest in real property for the purpose of vesting the right to develop such property in accordance with laws, ordinances, resolutions, rules, and policies of any governmental entity or agency made party to the agreement in effect at the time such agreement is executed, and for the purpose of delineating development requirements that may include, but are not limited to, affordable housing, design standards, water allocations, dedications of real or personal property, on-site and off-site infrastructure and other development related improvements and government services, which shall be approved by resolution of the County Council and executed by the Mayor on behalf of the County.

Emergency Access – Unpaved public or private roadways that are accessible to the public only during an emergency when the normal roadway infrastructure is closed or an emergency evacuation is necessary

Environmental Impact Statement (EIS) – An informational document prepared in compliance with Chapter 343, Hawaii Revised Statutes, and/or the National Environmental Policy Act (NEPA) that discloses the environmental and social impacts of a proposed action on the community and state, measures proposed to minimize adverse effects, and provides alternatives to the action.

Goal – A desired outcome expressed in simple terms that describes the desired end state.

Important Agricultural Lands – LUPAG designation for lands with better potential for sustained high agricultural yields because of soil type, climate, topography, or other factors. Important agricultural lands were determined by including the following lands:

- Lands identified as “Intensive Agriculture” on the 1989 General Plan Land Use Pattern Allocation Guide Maps.
- Lands identified in the Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system as “Prime” or “Unique.”
- Lands classified by the Land Study Bureau’s Soil Survey Report as Class B “Good” soils. There are no Class A lands on the Island of Hawai’i.
- Lands classified as at least “fair” for two or more crops, on an irrigated basis, by the U.S.D.A. Natural Resource Conservation Service’s study for suitability for various crops.
- State agricultural parks.



IMPLEMENTATION

Kānaka – Hawaiian term for “people”, which in modern context is shorthand reference to “kānaka maoli”, meaning to people who trace their ancestry to the period prior to Hawai‘i’s contact with the West.

Keiki – Hawaiian term for “children” or “child”.

Land Pooling – A technique whereby a group of neighboring landowners enter into a partnership for the unified planning, servicing, and subdivision of their lands; with the project costs and benefits shared among the landowners.

Land Use Pattern Allocation Guide (LUPAG) – The LUPAG Map in the County of Hawai‘i General Plan indicates the general location of various land uses in relation to each other.

L.E.E.D (Leadership in Energy and Environmental Design) – A certification program that confers awards for buildings that conserve resources such as energy, water, and open space.

Makai – Hawaiian term for “towards the sea.”

Mauka – Hawaiian term for “inland, upland, towards the mountain.”

Mixed Use – A land use pattern that integrates compatible residential, commercial, industrial, office, institutional, or other land uses.

Neighborhood Village Center – An area intended for public/civic uses, or small scale neighborhood oriented commercial uses. The commercial uses are of a small scale and are intended to serve the needs of the village residents.

Off-the-Grid – Buildings that are not connected to the public utility electrical system. These structures typically use on-site renewable energy sources, such as solar panels or wind turbines to generate their own electricity.

Objective – An objective is a desired endpoint that leads toward accomplishing a goal.

Open Space – Undeveloped land or water body which is free of structures and equipment, except for those that are incidental to the land’s open space uses. Open space may include the following: flood protection, creating a sense of special separation from incompatible land uses, areas for agricultural operations, passive recreation, active recreation, conservation uses, or historical site preservation.

Park-Once Lots – Parking lots that serve several uses within convenient walking distance, reducing the necessity to drive in order to make short trips between the uses.

Pedestrian Way – This is a public right-of-way through a block between lots for pedestrian traffic. The right-of-way has a maximum width of twenty feet and may also be used as a utility easement.

Policy – A deliberate plan of action to guide decisions and achieve rational outcomes.

Potential Dwelling Units – The number of dwelling units that can be developed on a piece of property based on the zoning classification.

Regional Town Center – A concentrated area intended for mixed use, higher density residential, retail, commercial employment, and/or regional one-of-a-kind facilities such as major civic, medical, education, and entertainment facilities.

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Ride Share (Van Pooling) – Transportation of more than one person for commute purposes in a motor vehicle, with or without the assistance of a commuter matching service.

Right-of-Way – A strip of land acquired by reservation, dedication, prescription, or condemnation and intended to be occupied by a street, trail, water line, sanitary sewer, and /or other public utilities or facilities.

Roads in Limbo – Roads over which there is a jurisdictional dispute between the County and the State of Hawai'i concerning responsibility for repair, maintenance and operation. The problems resulting from this dispute are documented in a 1989 study by the State of Hawai'i Legislative Reference Bureau's titled *Roads in Limbo: an Analysis of the State-County Jurisdictional Dispute*.

Transfer of Development Rights – The transfer of allowable dwelling units or other development unit from one parcel of land to another, in exchange for open space.