

II. ALTERNATIVES ANALYSIS

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This chapter addresses alternatives considered in the development of the Master Plan and its various implementation components.

A. ALTERNATIVE 1: PREFERRED PLAN UTILIZING LANDS MAUKA AND MAKAI OF HONOAPI'ILANI HIGHWAY (OLOWALU TOWN MASTER PLAN)

Alternative 1, the Preferred Plan, described in Chapter I of this document was developed through an extensive community-based planning process referred to as “Olowalu Talk Story”, which began in November 2005. Refer to **Figure 4**. The “Olowalu Talk Story” workshop or planning charette included the input of participants consisting of residents, community organizations, professionals, town planners, and government agencies. Project plans were continuously evaluated, assessed, and updated to incorporate the views of the participants and their stated desires in order to preserve Maui’s quality of life, provide affordable housing for local residents, and preserve natural resources. Significant natural resources that were identified in the planning process for preservation or protection in recognition of the ahupua’a system of land management included the Olowalu Cultural Reserve (OCR), the archaeological and cultural resources of Olowalu, Olowalu Stream, Kapa`iki, the historic Olowalu Church, Camp Olowalu (formerly Pecusa), Olowalu Wharf, Olowalu General Store, the monkey pod trees on Honoapi`ilani Highway, the makai open spaces and recreational uses, and the coastal waters of Olowalu.

Refinement of the Master Plan has been through continued dialogue with interested parties established during “Olowalu Talk Story”, especially with the residents of Olowalu. Preferred Alternative 1 of the Master Plan took six (6) years to develop and numerous iterations of the plan. Refer to **Appendix “A”**. The basic concepts of a sustainable and walkable community have been incorporated in the Master Plan. The country town centers are on relatively flat land and residential uses are within a five (5) minute walk to or one fourth mile of centers of activity to reduce the dependency on the automobile.

Concurrent with the refinement of the Master Plan, Olowalu Ekolū, LLC and Olowalu Town, LLC have participated in the Maui Island Plan (MIP) process to include the Master Plan in the Urban Growth Boundary (UGB) and Rural Growth Boundary (RGB). Both the General Plan Advisory Committee and Maui Planning Commission recommended the Master Plan for

the MIP. The MIP includes portions of the Olowalu Town Master Plan in the Urban and Rural Growth Boundaries. The MIP was adopted by the Maui County Council by Ordinance No. 4004 on December 28, 2012. The MIP did not include the two (2) makai properties in the directed growth boundaries.

According to the MIP, Olowalu Town will be designed to recognize and perpetuate the land and resources management system of ahupua`a. The town will provide public access between the ocean and the mountains; protect the natural environment, particularly Olowalu Stream, the shoreline, and coral reefs and marine resources; preserve mauka and makai view corridors and perpetuate the OCR. In order to achieve these goals, the MIP made provisions for potential expansion of the growth boundaries makai of the existing Honoapi`ilani Highway in the context of the West Maui Community Plan update or amendment process. Expansion of the growth boundaries may consider the need to: protect adjacent coastal and marine ecosystems (including the reefs at Olowalu), enhance public shoreline access and open space, and implement the proposed Pali to Puamana Parkway Plan.

In order to create a sustainable community, perpetuating the land and resources management system of ahupua`a, use of both the mauka and makai lands are proposed in Preferred Alternative 1. Use of these lands allows for mauka to makai integration of a system of parks, public access, open space and the OCR with urban and rural uses and public infrastructure. Of particular importance is development of the mauka to makai drainage systems to protect the nearshore waters and ecosystems, as well as proposed plans by the Applicants to develop the park and open space lands. In keeping with implementation of the Pali to Puamana Parkway Plan, Preferred Alternative 1 allows relocation of Honoapi`ilani Highway landward and creation of enhanced recreation areas, such as parks, open space and public access makai of the existing Honoapi`ilani Highway.

According to the MIP, the Master Plan is intended to meet the needs of Maui residents as a revitalized and sustainable Olowalu community. Olowalu Town will provide housing, employment, recreational, and cultural opportunities in the context of a mixed-use sustainable community that preserves the area's natural, cultural, and historic resources. Olowalu Town is envisioned as a pedestrian-friendly community that integrates a variety of housing types with employment opportunities, commercial, and recreational uses developed concurrently with public services and infrastructure (MIP, pp. 8-63).

As a proposed sustainable community, the environment is a key element of the proposed Alternative 1 Master Plan. Of particular environmental concern is the relationship between project-related stormwater runoff and sediments and nearshore water quality conditions. As

such, stormwater quality enhancements incorporating Low Impact Development (LID) measures are proposed to mitigate impacts to the nearshore waters. The Master Plan proposes to retain as much runoff onsite as possible, primarily on the mauka side of Honoapiʻilani Highway and discontinue the existing conditions in which stormwater runoff from the mauka vacant lands exit through existing culverts under Honoapiʻilani Highway directly into the ocean. See **Appendices “C” and “C-2”**. As noted in the *Assessment of Marine Water Chemistry and Biotic Community Structure* study, the existing stormwater runoff is of concern to the area north of Hekili Point and south of Olowalu Stream due to the direct flow of runoff into the ocean. See **Appendix “E”**.

Creative solutions for new infrastructure will also be required for water, sewage, roadways, and related systems. These solutions will be implemented concurrent with the development of the Olowalu Town Master Plan (OTMP). Detailed discussion of infrastructure is provided in Chapter III of this EIS.

Alternative 1 utilizes vacant lands that were formerly used for agricultural cultivation and provides housing, shopping, and community-living opportunities for Maui residents, including seniors and first-time homebuyers. Infrastructure improvements will be necessary to provide needed services to the Master Plan community. These infrastructure improvements that will be built as part of the Master Plan community will also enhance and increase the services available to current Olowalu residents, such as upgraded water and fire protection systems, as well as the opportunity to eliminate individual wastewater systems through the construction of a state of the art wastewater treatment facility.

It is noted that cost benefit considerations were taken into account in affirming the viability of Alternative 1. As noted previously, the estimated construction cost for the project, including vertical construction and the Honoapiʻilani Highway realignment costs, is estimated to be \$465.6 million. The Assessment of Economic and Fiscal Impacts (Appendix “M”) further indicates that property values for the residential components at build-out is estimated to be \$757.5 million while the value of commercial spaces is calculated to be about \$52.5 million. While the valuations presented in the Assessment of Economic and Fiscal Impacts report are not framed in the context of a project development feasibility analysis, it does provide a positive indicator that the long-term feasibility of the project, under Alternative 1, is considered reasonable and appropriate.

B. ALTERNATIVE 2: UTILIZE LANDS MAUKA OF HONOAPI`ILANI HIGHWAY (MIP SCENARIO)

Alternative 2 (the MIP scenario) also follows the principles of ahupua`a land management and is in concert with the directed growth boundaries of the MIP. In this regard, Alternative 2 does not include the makai portion or approximately 45 acres in the proposed OTMP. Except for the existing residential uses, this alternative limits the use of the makai area to the existing OCR, agriculture, and recreation uses. Refer to **Figure 5**. Portions of the vacant makai lands are currently overgrown with kiawe, shrubs and grasses. Except for Camp Olowalu, which is available to fee paying guests, the vacant lands have not been developed for parks or recreational uses beyond public access to and informal access along portions of the shoreline from both ends of Olowalu and a public beach access with unpaved parking from the former Olowalu Mill site. A portion of the makai area is located within the OCR and will be subject to land altering activities to implement the objectives of the OCR. As with Alternative 1, LID measures will need to be incorporated into any land altering work necessary to meet the objectives of the OCR to minimize impacts on the nearshore waters.

Alternative 2 will keep the makai land in its present condition and retain it in the State Land Use (SLU) Agricultural District. Existing, limited, and agricultural uses (tree farms) will continue on the makai properties. Development of future parks and public access improvements will require land acquisition and development funds by the County of Maui. Also, current drainage patterns will be maintained with stormwater runoff eventually sheet flowing into the ocean.

With respect to the mauka lands, similar to Alternative 1, Alternative 2 will retain as much runoff onsite as possible, primarily on the mauka side of Honoapi`ilani Highway, and discontinue the existing conditions in which stormwater runoff from the mauka vacant lands exit through existing culverts under Honoapi`ilani Highway directly into the ocean.

Alternative 2 maintains the same residential unit count and land uses as Alternative 1, except it limits development to the area mauka of Honoapi`ilani Highway. Alternative 2 may be perceived as more appropriate due to the distance from the shoreline and perceived lesser impact to the nearshore waters, primarily the reefs (coral) and marine biota (i.e. manta rays and black tip sharks). However, as noted previously, under Alternative 2 stormwater runoff from the makai lands will continue to sheet flow into the ocean. Although Alternative 2 will leave the makai lands available for implementation of the County of Maui's proposed Pali to Puamana Plan which identifies portions of the makai lands for park use, it will require land acquisition by the County of Maui.

Alternative 2 will have similar impacts on infrastructure and public services as those assessed for Alternative 1.

From a financial feasibility standpoint, Alternative 2, like Alternative 1, is considered to be a viable planning option. The overall total cost for Alternative 2 will be slightly lower than that of Alternative 1 as the costs of developing the makai park and open space lands would not be a cost component. However, the cost savings will be offset with the elimination of potential ocean front market units, which will reduce overall revenue benefits. While market attractiveness may be diminished without the makai lands, the value of housing units and commercial areas is expected to exceed the cost of infrastructure systems and vertical construction, yielding a benefit-cost indicator which would point to project viability.

C. ALTERNATIVE 3: NO ACTION

On September 12, 2000 the Olowalu lands were granted Special Management Area Use Permit No. 990021 to develop the existing agricultural lots, including the Olowalu Makai Subdivision and Olowalu Mauka Subdivision. Lots in the Olowalu Makai Subdivision and the Olowalu Mauka Subdivision have been sold. Of the remaining agricultural lots under the control of Olowalu Ekolu, LLC and Olowalu Town, LLC, there is limited diversified farming occurring on the properties. These include a tomato farm, tree farms, cattle and horse grazing. It is noted that these current limited agricultural enterprises share the benefit of low lease rents which support the business-side element of the farming operations.

Alternative 3 would result in the continued sale of the remaining agricultural lots and the current small-scale agricultural use of the lots. While this option is considered an alternative from a planning perspective, it does not provide needed housing for local residents through a comprehensively planned sustainable community. Alternatives 1 and 2 will provide housing employment and recreational opportunities. In addition, Alternative 3 does not include any improvements to address the current runoff of sediments into the ocean. Therefore, Alternatives 1 and 2 are considered to yield a greater community benefit than Alternative 3. The rationale for the foregoing is provided below.

With the demise of Pioneer Mill in 1999 and cessation of pineapple cultivation in West Maui in 2009, there is an abundance of agricultural lands available for farming operations. Existing constraints, such as the ease in getting out-of-State agricultural products to State-wide markets at lower cost, limits diversified agriculture from expanding at a pace that would absorb the available agricultural lands. In the foreseeable future, there is no cash crop similar to sugarcane or pineapple envisioned that will be able to absorb the available vacant agricultural

lands that were created with the demise of these two (2) plantations. While there may be interest in bio-fuel crops, from an economic feasibility perspective, growing of such crops will more than likely require large-scale commercial farms rather than smaller diversified agricultural lots, such as those found in Olowalu.

With the surplus of agricultural lands available for farming operations on Maui, planning for future communities on the island must then discern lands which are most appropriate for meeting the needs of the island's residents and businesses, from historic, spatial relationship, infrastructural and environmental points of view. Based on the planning analysis and technical studies conducted for the MIP and Olowalu Town, the Olowalu area is considered a functionally appropriate opportunity for new community development.

Alternative 3, No Action, may be perceived by some as advantageous from the standpoint of maintenance of the status quo regarding community character and environmental management. However, the existing problems associated with sedimentation into Olowalu Stream and the ocean, as well as traffic and erosion on Honoapi'ilani Highway continues or is further exacerbated under Alternative 3. The No Action alternative does not enhance the opportunity for physical activity or support social interaction, which are key components of a healthy community. The tradeoff considerations, then, relate to best use of the Master Plan lands from a community benefit perspective. As discussed previously, the Applicants believe that the creation of a master planned sustainable community which meets local housing and economic development needs in the context of the community character and its environmental management is the appropriate scenario for the use of lands at Olowalu.

D. ALTERNATIVE 4: DEFER ACTION

Alternative 4 is to defer development of the area and, hence, land use entitlement applications until a future date. As noted previously, the proposed action has been in the planning and analyses phases of work since 2005. The process for securing appropriate land use entitlements typically span a number of years, to be followed by detailed design and engineering. In order to successfully program work for new community development, careful plotting of development milestones is needed to ensure that unnecessary delays are minimized. Alternative 4 is not deemed to be in alignment with the need for local housing which falls within a more immediate timeframe which coincides with the County of Maui's comprehensive planning processes adopting the MIP and future update of the West Maui Community Plan.

In particular, Alternative 4 introduces the element of uncertainty with respect to future

conditions. For example, revisions to regulatory protocols may result in added complexity in the land use entitlements processes resulting in lengthier approval durations and attendant higher costs of development (which ultimately translates to higher consumer costs). In this regard, project planning and land use entitlements processing for Olowalu Town is now approaching 10 years in length. Deferral of planning and land use entitlements will result in further delays in bringing new housing products to market for Maui's residents. The continued supply-demand imbalance has historically fueled higher housing costs for residents.

Delays in project implementation will also impact public-private partnership opportunities with respect to the realignment of Honoapi'ilani Highway, which is viewed to be a public interest infrastructure project. Delays in the realignment of Honoapi'ilani Highway is considered an adverse impact to the movement of people, goods and services for island businesses, residents and visitors. Delays in achieving a permanent transportation solution will then be replaced by interim and incremental improvements to address coastal erosion issues, and highway capacity concerns.

In addition, deferral of the project will result in a significant time lag of project benefits such as the implementation of sustainable LID stormwater management measures designed to enhance nearshore water quality conditions. Similarly, deferral of the project will place "on-hold" community sustainability benefits associated with new wastewater treatment technologies, water re-use practices, and agricultural infrastructure improvements. As a project designed to accommodate future growth, deferral of the OTMP will delay public-private partnership opportunities for addressing public service needs, including those related to police, fire, and educational system improvements.

E. ALTERNATIVE 5: RESORT AND RESORT RESIDENTIAL USE

From a master planning standpoint, alternative uses considered included developing resort uses, such as hotel units, with limited commercial support services to take advantage of the natural resources, especially the shoreline and ocean resources; as well as developing the area as a resort residential area as envisioned in Land Zoning Map No. 7. Refer to **Figure 9**. These types of uses could be established, however, these uses are viewed as taking away opportunity for focusing on a comprehensively planned sustainable community benefitting local residents including the provision of affordable housing. The Applicants' proposal is based on a philosophical priority embracing sustainability which yields the land uses, product mixes and spatial relationships identified in Alternatives 1 and 2, and which gives preference to local families.

The challenge for Alternative 5, then, is its focus on the visitor market and higher end housing product. The provision of public services, such as fire, police, recreational and educational services, would be provided to serve a market which in a larger context, may dilute and shift capital improvements programming and prioritization away from those needed by residents. The disadvantage of Alternative 5 is further illustrated by the likely housing product imbalance to be realized under this option. For example, resort residential housing is marketed to the higher-end customer who has the means to acquire housing products which have construction materials, quality and design amenities which lead to significantly higher sales prices. In today's market context, resort residential units are not sold to local families. Additionally, the 25 percent workforce housing requirement may not necessarily be located at Olowalu, which eliminates the locational advantage Olowalu offers to local residents from a commute efficiency standpoint. In general, the misalignment of Alternative 5 with the Applicants' values and desire to improve the quality of life for Maui's residents, results in an alternative which does not warrant further consideration.

Notwithstanding the foregoing disadvantages, Alternative 5 (Resort and Resort Residential Use) is considered financially viable. While vertical construction cost will be substantially higher than those presented for Alternatives 1 and 2, the values of the resort products at build-out will be substantially higher as well, likely yielding higher revenues to offset development costs. Specific quantifiable costs measuring feasibility potential of Alternative 5 is not presented because specific unit and product types have not been identified. However, if this alternative was to be considered, such costs would be developed through an iterative process of master plan development and cost estimating to ensure that units and products associated with the project yield a financially viable proposal. Notwithstanding, as noted previously, this alternative is not in keeping with the applicants' objective of providing housing for Maui residents.

F. ALTERNATIVE 6: OTHER LOCATIONS

Alternative 6 considered alternative locations within the West Maui region. Potential sites located within the UGB of the MIP do not have the geographic qualities to implement a sustainable community in accordance with the Hawaiian land management system of ahupua'a. Unfortunately, the lands within the UGB located in Lāhainā Town to Kapalua have been urbanized from Honoapi'ilani Highway to the shoreline and along the various stream systems, many of which have been channelized. As such, these alternative locations are not able to accommodate the sustainability plan proposed in Olowalu and does not meet the objectives of the Applicants.

Looking at lands beyond the UGB, alternative locations may be considered on State land use classified “Agricultural” lands mauka of Honoapiʻilani Highway between the Kāʻanapali 2020 Master Plan area and the Pulelehua Master Plan area (near the West Maui Airport). Such lands, however, are not considered a viable option as they will require an amendment to the Maui Island Plan. This land use entitlement process will require the preparation of a new Chapter 343, Hawaiʻi Revised Statutes document, including new studies related to traffic, archaeology, engineering, flora and fauna, market and fiscal and economic impacts. In effect, consideration of lands beyond the UGB yields outcomes similar to Alternative 4, Defer Action.

G. INFRASTRUCTURE DEVELOPMENT CONSIDERATIONS

As a sustainable community, creative solutions for infrastructure systems will be required. The formulation of the preferred infrastructure system elements required careful engineering analysis, taking into account land use relationships, environmental impact mitigation, and relationships to existing and planned infrastructure systems. The basis for developing the preferred infrastructure system alternatives are described below.

Wastewater treatment and disposal requires utilization of technology that eliminates injection wells, locates facilities down gradient of water resources, locates facilities outside of any potential hazard area, such as the flood zones, and locates facilities in an area readily accessible, with limited impacts on existing and proposed residential and commercial uses. The wastewater facility site was placed on the northern portion of the property adjacent to the existing County of Maui’s Recycling and Refuse Convenience Center which generates existing nuisances from noise, dust and odors and is accessible from an existing driveway. Additionally, the site needs to be accessible to large landscaped areas in order to utilize the R-1 recycled water for irrigation, as well as provide for the natural treatment systems consisting of a constructed wetland and soil aquifer treatment system. The facility’s proposed location next to the County’s Recycling and Refuse Convenience Center also will accommodate the solid waste to be generated by the project.

The existing private water system will be upgraded with additional source wells, storage and transmission lines. The area on the mauka side of the future relocated Honoapiʻilani Highway near the existing well and water storage tank was selected as the most likely area for the new source wells and storage for convenient connection to the existing system. This location is up-gradient to allow gravity flow transmission lines and minimize the need for pump stations to supply drinking water to the proposed and existing communities.

The alignment of the future relocated highway was designed to be consistent with the County's Pali to Puamana Master Plan, as well as the objectives of the Hawai'i Department of Transportation's (HDOT) Honoapi'ilani Highway Realignment/Widening Project (Mā'alaea to Launiupoko). The mauka alignment was selected based on the criteria of the Federal Highway Administration (FHWA) and HDOT, the topography of the site, and the existing natural constraints of the property where it narrows at both entrances to Olowalu along the shoreline. Relocating the highway further mauka will change the existing Honoapi'ilani Highway from a higher speed arterial to a lower-speed secondary roadway. The lower-speed secondary roadway will enhance and improve traffic safety of recreational users seeking to access the shoreline and create the opportunity to expand parks with associated amenities along the shoreline.

Drainage will be handled through a system of retention basins located within the approximate 140 acres of 223 acres (Alternative 1) and 200 acres (Alternative 2) of open space and park lands in the Master Plan, as well as Low Impact Development (LID) measures. There is adequate acreage of open space and park lands included in the Master Plan to handle not only drainage but to provide necessary open spaces and park lands for both passive and active recreation. As a fundamental design criterion, the drainage system also needed to retain all the post development flows, as well as some of the pre-development flows in order to minimize impacts on the nearshore water quality, especially at the Olowalu Stream outlet.

H. SUMMARY

The following criteria were used to evaluate the Alternatives:

1. Community Planning Effort
 - Community based planning effort initiated to develop Alternatives
2. Sustainability
 - Incorporates green infrastructure
 - Incorporates green buildings
 - Walkable community encourages transit, pedestrian, and bicycle transportation
3. Land Use
 - Consistent with Maui Island Plan Directed Growth Boundaries
 - Consistent with West Maui Community Plan Land Use Map
 - Supports agriculture
4. Natural Resources
 - Reduces sedimentation and protect water quality on mauka lands

- Reduces sedimentation and protect water quality on makai lands
 - Protects scenic resources mauka of Honoapi`ilani Highway
 - Enhances scenic resources mauka of Honoapi`ilani Highway
 - Protects scenic resources makai of Honoapi`ilani Highway
 - Enhances scenic resources makai of Honoapi`ilani Highway
 - Protects open space resources
5. Infrastructure
- Improve infrastructure (i.e., water, wastewater disposal, etc.)
 - Allows implementation of State Department of Transportation (HDOT) highway plans
6. Recreation, Parks, and Public Access
- Creates mauka recreational opportunities by providing additional parks
 - Creates shoreline recreational opportunities and access to the shoreline
7. Cultural Resources
- Observe the Hawaiian land management system of ahupua`a
 - Expands the Olowalu Cultural Reserve or create Cultural Reserves
8. Housing
- Provides housing for Maui residents
 - Provides affordable housing
9. Employment
- Creates employment
10. Timeframe
- Meets Applicants' timeframe (refer to **Table 5**)

Evaluation of the foregoing criteria is identified in the following **Table 6**.

Table 6. Evaluation of Criteria

CRITERIA	EVALUATION
1. Community Planning Effort	
Alternative 1	Olowalu Talk Story Provided Input on Master Plan; community desires considered during MIP process.
Alternative 2	Olowalu Talk Story Provided Input on Master Plan; community desires considered during MIP process.
Alternative 3	Community desires not considered.
Alternative 4	Community desires deferred to a later date in time.
Alternative 5	Community desires not considered. Requires community planning effort.
Alternative 6	Community desires not considered. Requires community planning effort.
2. Sustainability	
Alternative 1	Incorporates principles of green infrastructure and building design and walkable communities.
Alternative 2	Incorporates principles of green infrastructure and building design and walkable communities.
Alternative 3	Remains as is and does not promote green infrastructure, building design, or walkable communities.
Alternative 4	Defers consideration of green infrastructure, building design, and walkable communities to a later date in time.
Alternative 5	Does not promote green infrastructure or design.
Alternative 6	Does not promote green infrastructure or design.
3. Land Use	
Alternative 1	Partially consistent with MIP, requires community plan amendment, and includes agricultural lots.*
Alternative 2	Consistent with MIP, requires community plan amendment, and includes agricultural lots.
Alternative 3	Not consistent with MIP, consistent with community plan, and maintains agricultural land.
Alternative 4	Defers implementation of the MIP, community plan amendment, and temporarily maintains agricultural land.
Alternative 5	Not consistent with MIP and West Maui Community Plan.
Alternative 6	Requires finding an appropriate location and implementation of an amendment to the MIP and subsequent land entitlements.
4. Natural Resources	
Alternative 1	Proposed drainage system following Low Impact Development (LID) standards retains runoff mauka of Honoapiʻilani Highway in conjunction with LID measures makai of the highway and reduces sedimentation into the nearshore waters to protect water quality and marine biota. Scenic and open space resources mauka and makai of the highway are protected by the proposed system of parks, open space, greenways and expansion of the OCR.
Alternative 2	Proposed drainage system following LID standards retains runoff mauka of Honoapiʻilani Highway to reduce sedimentation into the nearshore waters to protect water quality and marine biota. Land makai of the highway will remain as is and will not decrease sedimentation into the nearshore waters. Scenic and open space resources mauka of the highway are protected by the proposed system of parks, open space, greenways and expansion of the OCR. Lands makai of the highway will remain unchanged.

Table 6. Evaluation of Criteria (Continued)

CRITERIA	EVALUATION
Alternative 3	The land remains unchanged and does not improve water quality or enhances scenic and open space resources.
Alternative 4	Defers improvements to reduce sedimentation and improve water quality and enhancement of scenic and open space resources to a later date in time
Alternative 5	Does not address LID drainage systems to reduce sedimentation and improve water quality or measures to enhance scenic and open space resources.
Alternative 6	No alternative location available.
5. Infrastructure	
Alternative 1	Improvements to existing infrastructure, including but not limited to drinking water and fire protection, is proposed, as well as a wastewater treatment facility that does not require injection wells. Provides corridor for Honoapiʻilani Highway inland.
Alternative 2	Improvements to existing infrastructure, including but not limited to drinking water and fire protection, is proposed, as well as a wastewater treatment facility that does not require injection wells. Provides corridor for Honoapiʻilani Highway inland.
Alternative 3	Remains unchanged, with no infrastructure improvements. Honoapiʻilani Highway remains in its present location.
Alternative 4	Improvements to infrastructure and relocation of Honoapiʻilani Highway is deferred to an indefinite timeframe.
Alternative 5	Improvements to infrastructure, including a wastewater treatment facility that does not require injection wells, have not been considered. Honoapiʻilani Highway remains in its present location.
Alternative 6	No alternative location available.
6. Recreation, Parks and Public Access	
Alternative 1	System of parks, open space, greenways, and expansion of the OCR mauka and makai of Honoapiʻilani is proposed to provide recreational opportunities, parks, and public access including to the shoreline.
Alternative 2	System of parks, open space, greenways, and expansion of the OCR mauka of Honoapiʻilani is proposed to provide recreational opportunities, parks, and public access on the mauka lands.
Alternative 3	Remains unchanged and does not provide new or improved recreational opportunities, parks, and public access.
Alternative 4	Defers development of parks, open space, greenways, and expansion of the OCR to an indefinite timeframe.
Alternative 5	Improvements to parks, open space, greenways, and expansion of the OCR are not addressed in this alternative.
Alternative 6	No alternative location available.
7. Cultural Resources	
Alternative 1	Is based on the ahupuaʻa Hawaiian system of land management and proposes to expand the OCR.
Alternative 2	Is based on the ahupuaʻa Hawaiian system of land management and proposes to expand the OCR.
Alternative 3	Remains unchanged and does not incorporate the ahupuaʻa system of land management and does not expand the OCR or create cultural reserves.
Alternative 4	Is based on the ahupuaʻa Hawaiian system of land management and proposes to expand the OCR but defers the project to an indefinite timeframe.

Table 6. Evaluation of Criteria (Continued)

CRITERIA	EVALUATION
Alternative 5	Is not based on the ahupua`a system of land management and does not expand the OCR.
Alternative 6	No alternative location available.
8. Housing	
Alternative 1	Provides housing for Maui residents and affordable housing.
Alternative 2	Provides housing for Maui residents and affordable housing.
Alternative 3	Remains unchanged and does not provide housing for Maui residents or affordable housing.
Alternative 4	Housing for Maui residents and affordable housing is deferred to a later date in time when the need is today.
Alternative 5	Provides resort residential housing that is for the off-island investor.
Alternative 6	No alternative location available.
9. Employment	
Alternative 1	Creates employment for future residents.
Alternative 2	Creates employment for future residents.
Alternative 3	The limited commercial uses remain unchanged and does not create future employment centers.
Alternative 4	Creates employment centers for future residents at a later date in time.
Alternative 5	Creates employment for hotel or resort workers.
Alternative 6	No alternative location available.
10. Timeframe	
Alternative 1	Meets Applicants' timeframe
Alternative 2	Meets Applicants' timeframe
Alternative 3	Require major redesign of Master Plan. Delay will not meet Applicants' timeframe.
Alternative 4	Does not meet Applicants' timeframe
Alternative 5	Requires major redesign of Master Plan. Delay will not meet Applicants' timeframe
Alternative 6	Requires locating an alternative location and initiating new environmental and land entitlement process. Delay will not meet Applicants' timeframe.
Note: * MIP includes footnote that potential urban growth areas makai of the existing Honoapi'ilani Highway may be undertaken in conjunction with updates or amendments to the West Maui Community Plan.	

The evaluation of the Development Alternatives are summarized below in **Table 7.**

Table 7. Summary of Evaluation of Alternatives

CRITERIA	ALTERNATIVES					
	1	2	3	4 ^a	5	6 ^b
Community Planning Effort						
Community Based Planning	Y	Y	N	Y	N	N/A
Sustainability						
Green Infrastructure	Y	Y	N	Y	N	N/A
Green Buildings	Y	Y	N	Y	N	N/A
Walkable Community	Y	Y	N	Y	N	N/A
Land Use						
Consistent with Maui Island Plan Directed Growth Boundaries	Y ^c	Y	N	Y	N	N/A
Consistent with West Maui Community Plan Land Use Map	N	N	Y	N	N	N/A
Support Agriculture	Y	Y	Y	Y	N	N/A
Natural Resources						
Reduces Sedimentation and Protect Water Quality on Mauka lands	Y	Y	N	Y	N	N/A
Reduces Sedimentation and Protect Water Quality on Makai Lands	Y	N	N	Y	N	N/A
Protects Scenic Resources Mauka of Honoapi'ilani Highway	Y	Y	N	Y	N	N/A
Enhances Scenic Resources Mauka of Honoapi'ilani Highway.	Y	Y	N	Y	N	N/A
Protects Scenic Resources Makai of Honoapi'ilani Highway	Y	Y	N	Y	N	N/A
Enhances Scenic Resources Makai of Honoapi'ilani Highway	Y	N	N	Y	N	N/A
Protects Open Space Resources	Y	Y	Y	Y	N	N/A
Infrastructure						
Improve Infrastructure	Y	Y	N	Y	Y	N/A
Implements HDOT Highway Plans	Y	Y	N	Y	N	N/A
Recreation, Parks and Public Access						
Improve Mauka Parks and Public Access	Y	Y	N	Y	N	N/A
Improve Makai Parks and Public Access	Y	N	N	Y	N	N/A
Cultural Resources						
Observes Hawaiian Land Management System (Ahupuaa)	Y	Y	N	Y	N	N/A
Expands the Olowalu Cultural Reserve or Create Cultural Reserves	Y	Y	N	Y	N	N/A
Housing						
Provides Housing for Residents	Y	Y	N	Y	N	N/A
Provides Affordable Housing	Y	Y	N	Y	Y	N/A
Employment						
Creates Employment	Y	Y	N	Y	Y	N/A
Timeframe						
Meets Applicants Timeframe	Y	Y	N	N	N	N/A
TOTAL	23	20	3	22	3	0
^a Alternative 4 is the same as Alternative 1, except deferred to an indefinite date. ^b N/A - Not Applicable (No Alternative Location Available). ^c Partially consistent. MIP includes footnote that potential urban growth areas makai of the existing Honoapi'ilani Highway may be undertaken in conjunction with updates and amendments to the West Maui Community Plan.						

Alternatives 1, 2, and 4 reflect positive attributes as related to the evaluation criteria, however, Alternative 4 would be deferred to a later date in time and will not provide housing for Maui residents that are needed today or meet the timeframe of the Applicants (refer to **Table 5**).

In general, the benefits of each alternative should be weighed against the project's goal of providing a comprehensively planned community for Maui's residents. Alternatives 1 and 2 reflect positive attributes as it relates to the evaluation criteria. Alternative 3 (No Action) is not aligned with the project's goal and Alternative 4 (Deferred Action) places "on-hold", the achievement of the project's goal and introduces an element of uncertainty as it relates to future conditions and circumstances.

The benefits of Alternatives 1 and 2 include the provision of a new mauka Honoapi'ilani Highway alignment which addresses coastal erosion issues and diverts traffic away from potential recreational opportunities along the existing Honoapi'ilani Highway corridor. Associated with the relocation of the highway is the opportunity to establish land use spatial allocations which respect the need to mitigate noise and air quality impacts, through the delineation of appropriate setbacks from the highway. Alternative 5 (Resort and Resort Residential Use) would likely include the realignment of Honoapi'ilani Highway as well, which would yield benefits similar to Alternatives 1 and 2.

Additionally, as a residential master planned community for Maui residents, Olowalu Town, under Alternatives 1 and 2, will provide the needed support facilities to ensure a fully integrated and functional community. Such facilities will include opportunities for new school, fire, and police infrastructure. Alternative 5 (Resort and Resort Residential Housing) could potentially include public service support facilities (fire and police), but will not likely provide new school facility opportunities based on this alternative's target population.

The evaluation summary, as presented in Table 7, indicates in a comprehensive fashion, the benefits associated with each alternative. The evaluation categories (e.g., sustainability, natural resources, recreation, land use, etc.) yield a rank order regime which places Alternatives 1, 2, and 4, as the leading options. As noted previously, however, Alternative 4 (Deferred Action) leads to implementation uncertainty which ultimately eliminates this option for the realm of development feasibility. Alternative 5 (Resort and Resort Residential Housing) yields a low rank order in terms of benefits, primarily due to its focus on the visitor industry as opposed to local resident needs.

Alternatives 1 and 2 satisfy the purpose and intent of Olowalu Town, LLC and Olowalu Ekolu, LLC to provide needed housing and employment opportunities to Maui residents in

a sustainable community in a timely manner. Formulation of plans and systems for the Master Plan for Alternatives 1 and 2 were based on lengthy study, in recognition that planning for a new sustainable community requires diligent and detailed analysis across a range of disciplines. The evaluation of these alternatives also involved a full process of community engagement which facilitated the identification of design and engineering options and their evaluative criteria. As such, Alternatives 1 and 2 are evaluated in this Environmental Impact Statement.

**H.III. DESCRIPTION OF
THE EXISTING
CONDITIONS, POTENTIAL
IMPACTS AND PROPOSED
MITIGATION MEASURES**

H.III. DESCRIPTION OF THE EXISTING CONDITIONS, POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Existing and Surrounding Land Use

a. Existing Conditions

The approximately 636-acre Master Plan area is located approximately fourteen (14) miles southwest of Wailuku and four (4) miles southeast of Lāhainā Town.

In a regional context, Olowalu has historically been a settlement area. Prior Within Olowalu Valley and along the original stream route, traditional Hawaiian agricultural practices were fairly intense and based primarily on *lo`i* agriculture. There were approximately 1,124 *lo`i kalo*, 28 *`uala* (potato) patches, 27 *kula* (open field or pasture), and 31 plots of land with unspecified land uses. When examining this level of agricultural intensity during the mid-1800s, and its correlation to population, Marion Kelly presents missionary estimates for the productivity of *lo`i kalo* as a minimum of 10 to 30 individuals per acre (Kelly, 1989). Based on the intensity of agriculture and these estimates, prior to western contact it, is estimated that up to 2,000 Hawaiians were living and thriving in Olowalu. As recently as the 1930s, Olowalu was a thriving plantation towncamp which included employment related to the agricultural use of the land, housing for employees, a school, medical facilities, stores, theater, recreational facilities and places of worship (Ainsworth, 2011). Olowalu, during the hey-day of the plantation era, was a multi-cultural and multi-generational community. The closure of the Olowalu Mill in August 1931 and the subsequent relocation and consolidation of mill operations to with Pioneer Mill in Lāhainā Town marked the decline of the once thriving Olowalu community (Ainsworth, 2011).

Prior to the closure of Pioneer Mill in 1999, lands within the Olowalu area were cultivated in sugarcane. Today, land uses found in Olowalu include

Olowalu Church, Olowalu General Store, Camp Olowalu (formerly known as Camp Pecusa), which is available to fee paying guests, Olowalu Cultural Reserve (OCR), and Kapa`iki, encompassing single-family residences reminiscent of the plantation era of the Olowalu area. The former plantation manager's residence and other plantation-era single-family residences are located makai of Honoapi`ilani Highway, across from the Olowalu General Store. The former manager's residence and grounds are used for special functions under a Conservation District Use Permit issued by the Board of Land and Natural Resources. The Olowalu Mill Site and Olowalu Wharf (consisting of a pier and breakwater) formerly used for the loading and unloading of sugar into barges, are located along the shoreline. A State beach access, including an unpaved driveway, dirt and gravel parking and portable toilets are located adjacent to the Olowalu Mill ruins.

Additional existing uses include residential subdivisions. Subdivision of portions of the Olowalu region have been completed with some parcels sold to individual purchasers. These include the Olowalu Makai Komohana Subdivision, Olowalu Makai Hikina Subdivision, and the Olowalu Mauka Subdivision. While a majority of the former lands used for sugarcane cultivation now lie fallow, limited agricultural endeavors exist on portions of the Olowalu lands.

b. Potential Impacts and Mitigation Measures

~~The proposed action calls for~~ Alternatives 1 and 2 propose the establishment of a sustainable master-planned community in the once thriving Olowalu plantation town offering approximately 1,500 residential units to be implemented in phases spanning approximately 10 years. ~~The proposed project~~ Alternatives 1 and 2 will include a mix of residential and commercial uses in a neighborhood town setting, providing for a similar mix of uses that were present during the plantation era in Olowalu. The land use principles employed in the planning and design of the proposed Master Plan Alternatives 1 and 2 are intended to address quality of life, economic sustainability, environmental protection and preservation parameters.

Key resources within the Master Plan are being preserved in the OCR. The OCR includes Olowalu Stream, Olowalu Valley and many of the archaeological, historic, and cultural sites, including Pu`u Kilea, Ka`iwaloa

Heiau, and the Olowalu petroglyphs.

The Master Plan design is for Alternatives 1 and 2 is based on smart growth and sustainable land use principles. The spatial layout of land uses is based on careful consideration of varying densities, vehicular and pedestrian connectivity, and balance of uses to create a mixed-use community. The resulting Master Plan is for Alternatives 1 and 2 is compatible with surrounding land uses. The highest density uses are centered around neighborhood town centers, which provide for a range of business and employment opportunities. Residential land uses surround the neighborhood town centers at decreasing densities as distance from the center increases. Parks or agricultural and rural lots are situated along the outskirts of the development, providing a transition zone between the surrounding agricultural uses and neighborhood town centers. Land uses surrounding the existing Kapa`iki and Olowalu Church include parks and open space as well as low density single-family homes. Lands surrounding the Olowalu General Store are planned for town center and residential development. The other town center uses surrounding the Olowalu General Store may include business and commercial establishments consistent with the existing general store. The spatial layout of the proposed Master Plan was in Alternatives 1 and 2 was carefully designed taking into consideration existing surrounding land uses. Adverse impacts to surrounding land uses are not anticipated as a result of the proposed project Master Plan. Infrastructure support systems will be constructed concurrently with the project, ensuring that the proposed development is adequately served by basic services.

2. Climate

a. Existing Conditions

Maui is characterized by a semi-tropical climate containing a multitude of individual microclimates. The mean annual temperature of the island is about 77 degrees Fahrenheit. A high proportion of the rainfall that Maui receives each year falls on the northeast facing shores leaving the south and west coastal areas relatively dry. The Master Plan area for Alternatives 1 and 2 is located within one of these drier areas of West Maui.

Olowalu is generally sunny, warm and dry throughout the entire year. Annual temperatures in the region (from the Kapalua Airport) average in the mid to

high 70's to high 60's to low 80's (Maui County Data Book, 2010-2012). June through September are historically the warmer months of the year, while the cooler months are December through March. During the summer months, average daily temperatures in the region typically range from the mid-70's to the high 70's to mid-80's. During the winter months, average daily temperatures in the region typically range from the mid-60's to high 70's (Maui County Data Book, 2012).

Average rainfall distribution in the region averages approximately fifteen (15) inches per year (Maui County Data Book, 2010-2012). Rainfall in the Olowalu region is highly seasonal, with most of the precipitation occurring in the winter months (November through February). Between October and March, the southerly winds and heavy rainfall from Kona storms may be experienced.

b. Potential Impacts and Mitigation Measures

From an environmental standpoint, replacement of vegetative surfaces with hardscapes associated with roadways, housing units, and commercial buildings may yield a tendency towards slightly increasing ambient air temperatures. To address this so-called "heat island" effect, open spaces and park lands are integrated as significant components of the Master Plan for Alternatives 1 and 2. Landscape designs and planting plans will be employed to provide shading. Building designs, as well, will utilize green building principles following the Leadership in Energy and Environmental Design for Neighborhood Development (LEED ND) standards which take advantage of solar and natural wind conditions within the Master Plan areas for Alternatives 1 and 2. The Master Plan for Alternatives 1 and 2 proposes to utilize Olowalu's abundance of direct exposure to the sun as a sustainable source of solar energy and photovoltaic energy. With respect to the current land cover characteristics within the area, the development of the Master Plan for Alternatives 1 and 2 is not anticipated to create adverse impacts to the area's microclimate.

3. Topography

a. Existing Conditions

Most of the Olowalu area was formerly utilized for sugarcane cultivation with much of the land now fallow. Near the shoreline, the topography is generally

flat to slightly sloping. Proceeding mauka, the land slopes gently higher to the foothills of the West Maui mountains. Elevations in the Olowalu area generally range from near sea level to approximately 500 feet above mean sea level. The topography of the Master Plan areas for Alternatives 1 and 2 encompasses a range of topographic conditions from the generally flat coastal area makai of Honoapiʻilani Highway, to steeper riverine conditions along Olowalu Stream. The topography or slope of the property ranges from five (5) percent to 15 percent slope near the mauka limits, to three (3) percent to five (5) percent slope near the mid-section of the property, and near level to three (3) percent along the coastal portions of the property. See **Appendix “BC”**.

The steep valleys and mountain slopes and terrain surrounding the project site serve as natural geographic and physical boundaries to contain the project limits and prevent outward sprawl.

b. Potential Impacts and Mitigation Measures

In general, the higher density residential areas and neighborhood town centers are planned for areas having favorable development slope conditions of less than five (5) percent. Steep or sensitive landforms are to be preserved as natural features or open space areas.

Grading work will be undertaken to set roadway grades and adjacent grades of developable parcels. Future design work for the project Alternatives 1 and 2 will utilize existing topography to minimize grading of steep slopes and extensive cuts and fills. Significant landform transformations in terms of cut and fill requirements are not anticipated. All grading work will comply with applicable requirements of Chapter 20.08, Soil Erosion and Sedimentation of the Maui County Code (MCC). The proposed project is not anticipated to present any significant adverse impacts on the existing topography and landform of the surrounding area.

4. Agricultural Land Characteristics and Soils

a. Existing Conditions

(1) Agricultural Land Characteristics

State Land Use District

As previously mentioned, the Master Plan area is designated as “Agricultural” and “Conservation” by the State Land Use Commission. Approximately 621,609 acres in Alternative 1 and 568 acres in Alternative 2 are designated as “Agricultural”, while 1,527 acres in Alternative 1 and 22 acres in Alternative 2 are classified as “Conservation”. Island wide, “Agricultural” land totals approximately 235,770,242,720 acres, representing just over 50 percent of the island. The “Agricultural” lands within the Master Plan area for Alternative 1 comprise less than approximately 0.20.3 percent and 0.2 percent for Alternative 2 of the total “Agricultural” lands on the island.

Important Agricultural Lands

Although Chapter 205 of Hawai‘i Revised Statutes mandates the Counties to recommend to the State Land Use Commission certain lands for designation as Important Agricultural Lands (“IAL”), the County has not designated such lands. Presumably, these lands will include the higher-quality farmlands on Maui. However, State law does not allow the Counties to recommend lands for IAL designation if those lands have been designated for urban use by any State or County plans, such as the MIP.

The Urban and Rural components of Alternative 1 that are *mauka* of the existing Honoapi‘ilani Highway, and all of the Urban and Rural components of Alternative 2, are within Maui County’s Growth Boundaries. As such, these lands would not be recommended by the County for IAL designation. However, the Urban components of Alternative 1 that are *makai* of the highway could be eligible for consideration of an IAL designation.

Agricultural Lands of Importance to the State of Hawai'i (ALISH)

In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH). The classification system is based primarily, though not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other Important" agricultural land, with all remaining lands termed "Unclassified".

When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply to produce sustained high yields of a specific crop. "Other Important" agricultural lands include those that have not been rated as "Prime" or "Unique", but are of statewide or local importance for agricultural use.

Approximately 62,000 Excluding lands used for country estates and golf courses, approximately 59,390 acres, or 26 approximately 24 percent, of Maui's 235,770 242,720 acres of State Land Use Commission designated "Agricultural" lands is characterized as "Prime" and "Unique" lands by the ALISH system. Within the proposed Master Plan for Alternative 1, approximately 19 percent of the project's 636 acres are classified as "Prime" agricultural lands, while 39 about 40 percent is considered "Other Important" agricultural lands and the remainder has no designation under the ALISH system. In Alternative 2, approximately 20 percent of the project's 591 acres are classified as "Prime" agricultural lands, approximately 43 percent is considered "Other Important" agricultural lands, and the remainder is not designated under the ALISH system. The remaining 42 percent of the Master Plan area is not designated by the ALISH system. See **Figure 911** and **Table 78**.



Source: DBEDT, State GIS

Figure 9-11

Proposed Olowalu Town Master Plan Agricultural Lands of Importance to the State of Hawaiʻi Map



NOT TO SCALE

Table 78. Agricultural Lands of Importance to the State of Hawai'i

	Acres Within Master Plan	Percent of Total
Prime	121	19
Other	247.6	38.9
Not Classified	267.2	42
Total	635.8	100

	Acres Within Alternative 1	Percent of Total	Acres Within Alternative 2	Percent of Total
Prime	119	18.7	119	20.1
Other	252	39.6	252	42.6
Not Classified	265	41.7	220	37.2
TOTAL	636	100	591	100*
* Totals are not exact due to rounding to the nearest number Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015				

Land Study Bureau (LSB) Overall Productivity Rating

The University of Hawai'i, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with "A" representing the class of highest productivity soils and "E" representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness. ~~On~~Excluding lands used for country estates and golf courses, on the island of Maui, "A" and "B" designated lands comprise approximately 21 percent47,600 acres of the island's State Land Use "Agricultural" lands.

The Master Plan areas isfor Alternatives 1 and 2 is located on lands primarily designated as "A71i", "B72i", "B87i", "E73" and "E95" by the LSB. See **Figure 1012**. The "A" and "B" designations reflect lands at the higher range of productivity. The specific designation of "A71i" indicates that these lands are non-stony, moderately fine and well-drained, while the "B72i" designation reflects lands which are stony, moderately fine and well-drained. The "B78i" category represents lands which are characterized as stony to very stony, fine



Source: Land Study Bureau

Figure 1012

Proposed Olowalu Town Master Plan Land Study Bureau Land Classifications Map

NOT TO SCALE



and well-drained. The “E73” category reflects lands with rocky and well-drained conditions. Finally, areas designated as “E95” are typified as non-stony to rocky and well-drained. Overall, lands with an “A” designation represents approximately 43 percent of the 636-acre Master Plan for Alternative 1 and approximately 38 percent of the 591-acre Alternative 2, while “B” lands account for approximately 39 percent in Alternative 1 and approximately 42 percent in Alternative 2.

Approximately 19 percent of the Master Plan area is for Alternative 1 and 20 percent of the area for Alternative 2 are designated as “E”, the lowest productivity rating. See **Table 89**.

Table 89. Land Study Bureau Overall Productivity Rating

	Acres	Percent of Total
A	264.6	41.6
B	250.1	39.3
E	121.1	19
Total	635.8	100

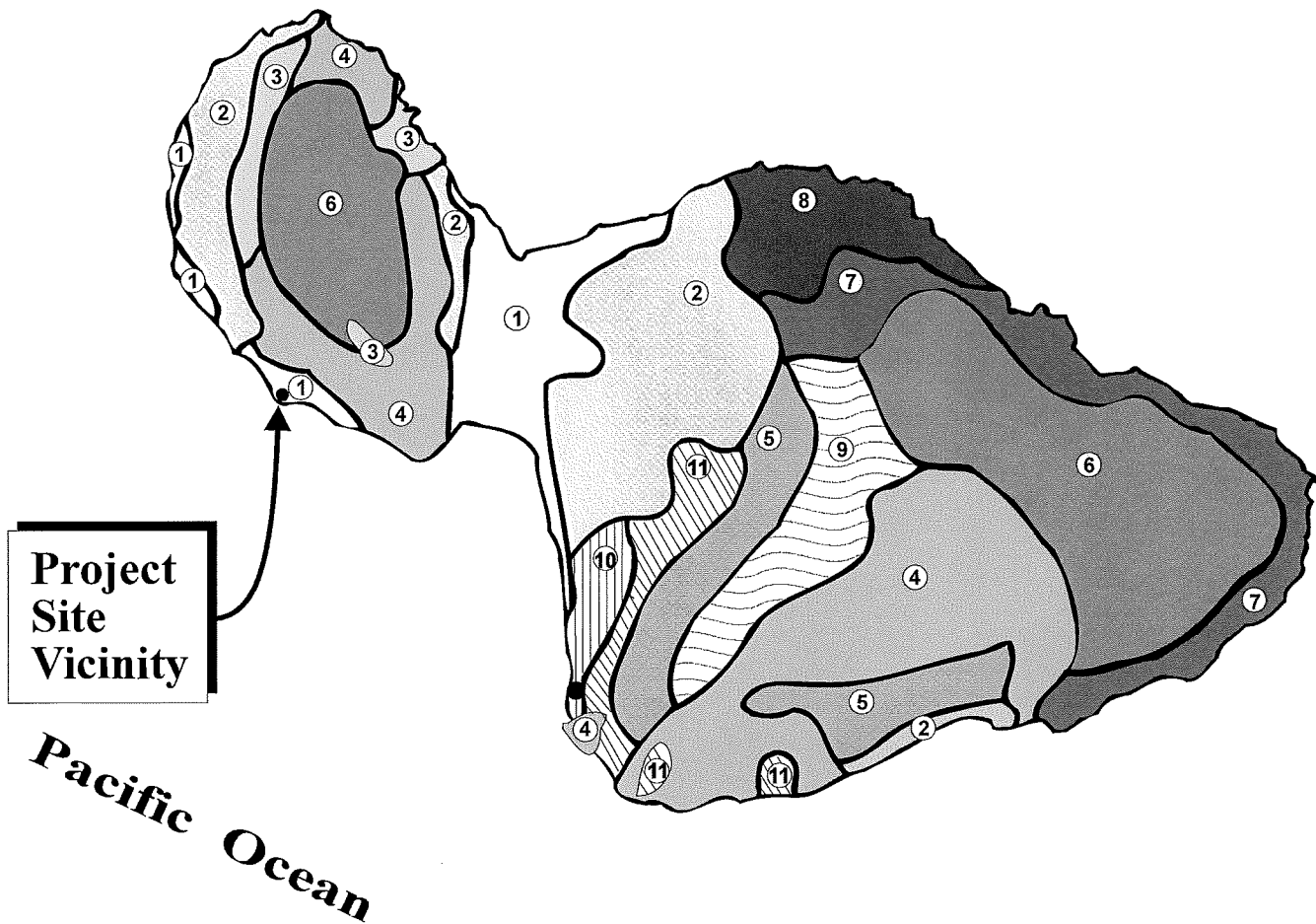
	Acres Within Alternative 1	Percent of Total	Acres Within Alternative 2	Percent of Total
A	270	42.5	227	38.4
B	245	38.5	245	41.5
E	121	19	119	20.1
TOTAL	636	100	591	100
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015				

(2) Soil Characteristics

According to the U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS), underlying the Master Plan areas for Alternatives 1 and 2 is the Pulehu-Ewa-Jaucas association. See **Figure 1113**. This series consists of well-drained soils on alluvial fans and stream terraces and in basins. These soils were developed in alluvium washed from basic igneous rock. The soil types specific to the area are delineated in **Figure 1214**. General characteristics of the soil types within the Master Plan area are presented in **Table 910**.

LEGEND

- | | |
|--|--|
| ① Pulehu-Ewa-Jaucas association | ⑦ Hana-Makaalae-Kailua association |
| ② Waiakoa-Keahua-Molokai association | ⑧ Pauwela-Haiku association |
| ③ Honolua-Olelo association | ⑨ Laumaia-Kaipoipoi-Olinda association |
| ④ Rock land-Rough mountainous land association | ⑩ Keawakapu-Makena association |
| ⑤ Puu Pa-Kula-Pane association | ⑪ Kamaole-Oanapuka association |
| ⑥ Hydrandepts-Tropaquods association | |



Base Map Source: U.S.D.A., Soil Conservation Service

Figure 113

Proposed Olowalu Town
Master Plan
Soil Association Map

NOT TO SCALE



 MUNEKIYO HIRAGA

Prepared for: Olowalu Town, LLC and Olowalu Ekolu, LLC

OlowaluTown\MasterPlan\Final EIS\SOILS

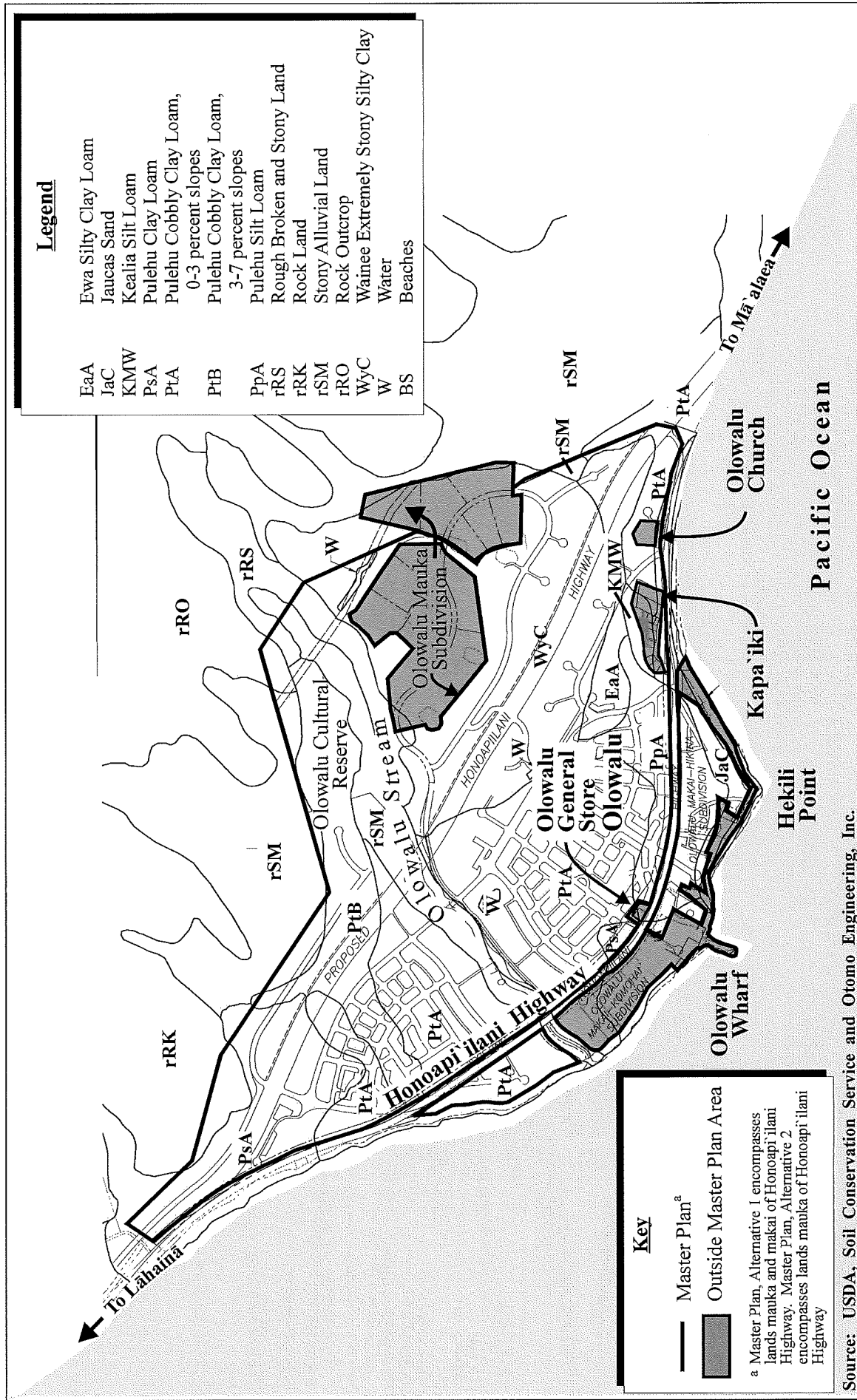


Figure 1214 Proposed Olowalu Town Master Plan
Soil Classification Map



Table 910. Olowalu Town Master Plan Soil Characteristics

		Master Plan Area Alternative 1		Master Plan Area Alternative 2		Land Capability Classification ^(a)	
Soil Series	General Soil Characteristics	Acres	Percent of Total	Acres	Percent of Total	Non-Irrigated	Irrigated
Ewa Silty Clay Loam, 0-3 percent slopes (EaA)	Runoff is very slow and erosion hazard is no more than slight.	25	43.9	25	4	IVc	I
Jaucas Sand, 0-15 percent slopes (JaC)	Soil is neutral to moderately alkaline; permeability is rapid, and runoff is very slow to slow; hazard of water erosion is slight, but wind erosion is a severe hazard where vegetation has been removed.	14	23.2	6	1	VII _s	--
Kealia Silt Loam (KMW)	Soil is poorly drained and has a high content of salt. Ponding occurs in low areas after a heavy rain. Slopes range from 0 to 1 percent.	3	4.0	3	0.5	VII _w	--
Pulehu Clay Loam, 0-3 percent slopes (PsA)	Soil is found on alluvial fans, and stream terraces and basins. Permeability is moderate, runoff is slow, and erosion hazard is no more than slight.	6266	9810.4	64	10.8	IVc	I
Pulehu Cobbly Clay Loam, 0-3 percent slopes (PtA)	This soil is similar to Pulehu clay loam (PsA) except that it is cobbly.	204209	32232.9	194	32.8	IV _s	II _s
Pulehu Cobbly Clay Loam, 3-7 percent slopes (PtB)	On this soil, runoff is slow and erosion hazard is slight. Some areas have thin, stratified layers of sand and gravel at a depth of 20 to 36 inches.	58	9.1	57	9.6	IV _s	II _e
Pulehu Silt Loam, 0-3 percent slopes (PpA)	This soil is similar to Pulehu clay loam (PsA), except that the texture is silt loam.	4342	676.6	27	4.6	IVc	I
Rough Broken and Stony Land (rRS)	Consists of very steep and stony gulches. Runoff is rapid and geologic erosion is active.	1918	3	17	2.9	--	--
Rock Land (rRK)	Made up of areas where exposed rock covers 25 to 90 percent of the surface. Rock outcrops and very shallow soils are the main characteristics.	76	110.9	6	1	VII _s	--
Stony Alluvial Land (rSM)	Consists of stones, boulders, and soil deposited by streams along the bottom of gulches and on alluvial fans. In most places, slopes range from 3 to 15 percent.	55	878.6	53	9	VII _s	--
Rock Outcrop (rRO)	Consists of areas where exposed bedrock covers more than 90 percent of the surface.	4	0.7	4	0.7	--	--
Wainee Extremely Stony Silty Clay, 7-15 percent slopes (WYC).	This soil is moderately sloping and occurs on smooth, alluvial fans. Permeability is moderately rapid, runoff is slow to medium, and erosion hazard is slight to moderate.	136132	21420.8	132	22.3	VI _s	VI _s
Water (W)	Water	2	0.4	2	0.3	--	--
Beaches (BS)	Beach sand	2	0.3	---	---	--	--
Grand Total		634 ^(b) 636	100199.6 ^(b)	590 ^(b)	99.5 ^(b)		

Notes:

^(a) Land Capability Classification ranges from I (highest) to VIII (lowest). Letters *e*, *w*, and *s* represent subclasses. Subclass *e* is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Subclass *w* is made up of soils for which excess water is the dominant hazard or limitation affecting their use. Subclass *s* is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content. Subclass *c* is made up of soils for which the climate (the temperature or lack of moisture) is the major hazard or limitation affecting their use.

^(b) Totals are not exact due to rounding to the nearest number

Source: U.S. Department of Agriculture, Soil Conservation Service

The Pulehu Cobbly Clay Loam, 0-3 percent slopes (PtA) soil and Wainee Extremely Stony Silty Clay, 7-15 percent slopes (WyC) comprise the majority of the Master Plan area. PtA soil is a cobbly soil characterized by moderate permeability, slow runoff, and slight erosion hazard. WyC soil is an extremely stony soil characterized by moderately rapid permeability, slow to medium runoff and slight to moderate erosion hazard.

Land Capability Classification

The USDA Natural Resources Conservation Service (NRCS) rates soils using its Land Capability Classification System. The system rates soils on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. The NRCS rates soils into eight (8) classes ranging from I (highest capability) to VIII (lowest capability). The definitions of the classes are presented below:

- *Class I* soils have slight limitations that restrict their use.
- *Class II* soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- *Class III* soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- *Class IV* soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
- *Class V* soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- *Class VI* soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- *Class VII* soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.

- *Class VIII* soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for esthetic purposes.

The higher-quality soils (Rated I and II) are: EaA, PsA, PpA, PtA, and PtB. Excluding lands used for country estates and golf courses, approximately 39,300 acres of the State Agricultural lands are high-quality soils. For each alternative, approximate acreages by NRCS soil rating and project component are as shown in **Table 11**:

Table 11. NRCS Soil Ratings

	I	II	VI to VIII	TOTAL
Alternative 1	133	266	237	636
Alternative 2	116	252	223	591
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015				

Each class may be assigned a subclass designation. The subclasses are defined below:

- *Subclass e* is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Erosion susceptibility and past erosion damage are the major soil factors that affect soils in this subclass.
- *Subclass w* is made up of soils for which excess water is the dominant hazard or limitation affecting their use. Poor soil drainage, wetness, a high water table, and overflow are the factors that affect soils in this subclass.
- *Subclass s* is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.
- *Subclass c* is made up of soils for which the climate (the temperature or lack of moisture) is the major hazard or limitation affecting their use.

The Land Capability Classification for the soils found within the project site is presented in **Table 910** above. Three (3) soil types,

representing approximately 20 percent of the Master Plan area, are designated as Class I, the highest classification, when irrigated. When irrigated, the PtA soil has a Land Capability Classification of Class IIs while the WyC soil has a classification of VIs. These two (2) soils, which account for the majority of the Master Plan area, both have the “s” subclass designation due to their rocky nature.

b. Potential Impacts and Mitigation Measures

Generally, the Master Plan area, for the most part, areas for Alternatives 1 and 2 lies within the State Agricultural district and is largely designated for agricultural uses by the West Maui Community Plan and Maui County zoning. Historically, these designations represented the former larger-scale cultivation of sugarcane by Pioneer Mill whose last harvest of large-scale sugarcane in Olowalu occurred in 1999, the same year Pioneer Mill closed its operations. However, Today, the majority most of the lands formerly used for agricultural cultivation are currently vacant and not in active agricultural production.

Agricultural activities are an important part of Alternative 1’s and 2’s goal of becoming a sustainable development. Of the approximate 636 acres of the Master Plan for Alternative 1, approximately 175 acres or 28 percent will remain in agriculture. Of the approximate 591 acres of the Master Plan for Alternative 2, approximately 173 acres or 29 percent will remain in agriculture approximately 161 acres will remain in agriculture primarily along Olowalu Stream. Additionally, the OCR, which accounts for 74 acres of the Master Plan areas, for Alternatives 1 and 2 will provide an opportunity to cultivate traditional native crops, such as taro.

The LSB designates a significant portion of the OCR as “E” lands which ALISH identifies as “Unclassified”. Within the OCR “*kalo*” and other traditional Hawaiian crops have shown to be productive. These lands are important to traditional Hawaiian crops in the context of its location adjacent to Olowalu Stream within the OCR. Also, lands to be redistricted into the Rural District include “A” and “B” lands identified by ALISH as “Prime” and “Other” which does not preclude future owners to conduct agricultural pursuits.

Within the traditional neighborhoods future residents will be given the opportunity to establish “neighborhood or community gardens” to supplement self-sustainability in terms of communities growing their own food.

As previously noted, in Alternative 1, approximately 19 percent of the project’s 636 acres is classified as “Prime” agricultural lands by ALISH, while approximately 40 percent is classified as “Other Important” and approximately 42 percent is not classified. In Alternative 2 approximately 20 percent of this alternative’s 591 acres is classified as “Prime” agricultural lands by ALISH, while approximately 43 percent is classified as “Other Important” and approximately 37 percent is not classified. Approximately 43 percent of the Master Plan for Alternative 1 and approximately 38 percent of Alternative 2 are classified as “A” by the LSB; approximately 39 percent and approximately 42 percent, respectively, as “B”; and approximately 19 percent in Alternative 1 and approximately 20 percent in Alternative 2 as “E”. The development of the Olowalu Town Master Plan (OTMP) for Alternatives 1 and 2 involves the loss of agricultural land that includes prime and other important agricultural lands with agriculturally suitable soil characteristics.

Table 12 and **Table 13** show a breakdown of the lands by ALISH, and **Table 14** and **Table 15** are a breakdown of the lands classified by the LSB Overall Productivity Rating for Alternative 1 and Alternative 2, respectively:

Table 12. ALISH Classification for Alternative 1

ALISH	Urban (Acres)	Rural (Acres)	Agricultural (Acres)	Conservation (Acres)	Total (Acres)
Prime	76	18	25	1	119*
Other	152	38	62	1	252*
Unclassified	38	112	88	25	265*
TOTAL	266	168	175	27	636

* Totals are not exact due to rounding to the nearest number
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015

Table 13. ALISH Classification for Alternative 2

ALISH	Urban (Acres)	Rural (Acres)	Agricultural (Acres)	Conservation (Acres)	Total (Acres)
Prime	76	18	25	0	119
Other	152	38	61	1	252
Unclassified	0	112	87	21	220
TOTAL	228	168	173	22	591
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015					

Table 14. Land Study Bureau Classifications for Alternative 1

LSB	Urban (Acres)	Rural (Acres)	Agricultural (Acres)	Conservation (Acres)	Total (Acres)
A	205	25	33	7	270
B	50	119	76	2	245*
E	11	24	66	18	121*
TOTAL	266	168	175	27	636
* Totals are not exact due to rounding to the nearest number Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015					

Table 15. Land Study Bureau Classifications for Alternative 2

LSB	Urban (Acres)	Rural (Acres)	Agricultural (Acres)	Conservation (Acres)	Total (Acres)
A	167	25	31	3	227*
B	50	119	75	2	245*
E	11	24	67	17	119*
TOTAL	228	168	173	22	591
* Totals are not exact due to rounding to the nearest number Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015					

In Alternative 1 and 2, the NRCS Soil Ratings are identified in **Tables 16 and 17**, respectively.

Table 16. NRCS Soil Ratings for Alternative 1

Component	I	II	VI to VIII & Unrated	Total
Urban (Petition Area)	80	162	24	266
Rural (Petition Area)	20	42	106	168
Agricultural	33	60	82	175
Conservation	0	2	25	27
Project Total	133	266	237	636
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015				

Table 17. NRCS Soil Ratings for Alternative 2

Component	I	II	VI to VIII & Unrated	Total
Urban (Petition Area)	64	148	16	228
Rural (Petition Area)	20	43	105	168
Agricultural	32	59	82	173
Conservation	0	2	20	22
Project Total	116	252	223	591

Productive farmland is used to describe land that meet one or more of the soil-rating criteria listed below in **Table 18** and **Table 19**:

Table 18. Summary Soil Ratings for Alternative 1

Component	NRCS I & II	ALISH Prime	LSB A or B	Productive Farmland
Urban (Petition Area)	242	76	255	255
Rural (Petition Area)	62	18	144	154
Agricultural	93	25	109	123
Project Total	397	119	508	532
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015				

Table 19. Summary Soil Ratings for Alternative 2

Component	NRCS High	ALISH Prime	LSB A or B	Productive Farmland
Urban (Petition Area)	212	76	217	220
Rural (Petition Area)	63	18	144	154
Agricultural	91	25	106	121
Project Total	366	119	467	495
Source: Plasch Econ Pacific LLC and Munekiyo Hiraga, 2015.				

Of the approximate 636 acres of State Agricultural district lands in Alternative 1, approximately 532 acres are potentially productive farmland of which approximately 504 acres (409 acres Petition area and 95 acres highway, parks, etc.) are proposed for development with approximately 28 acres of high-quality farmland kept as small farms. In Alternative 2, of the approximate 591 acres of State Agricultural district lands approximately 495 acres are potentially productive farmland of which approximately 468 acres (374 acres Petition area and 94 acres for highway, parks, etc.) are proposed for development with approximately 28 acres of potentially productive farmland kept as small farms. For comparison, the loss of approximately 500 acres of high-quality farmland amounts to less than 0.7 percent of the 72,100-acre supply of high-quality farmland on Maui Island. Also on the MIP, approximately 3,540 acres of high quality farmland or about 4.9 percent of the island-wide supply of such lands are designated for future development. Not all proposed projects will be developed and the loss of high-quality farmland will be gradual depending on the demand for new homes and visitor units.

While the proposed development will commit agricultural land, some of which has been identified as prime, to non-agricultural use, the loss will not significantly affect the overall availability of land to farmers in the County and State. The project will result in the loss of agricultural lands that could be used for diversified agriculture. However, the decline of plantation agriculture on Maui and statewide, has made additional land available for diversified agriculture. The project will convert underutilized fallow lands into a sustainable, mixed-use community. A more detailed discussion assessing impacts to agriculture from a socio-economic standpoint is provided in Chapter III, Section B.3.

Best Management Practices (BMPs) will be implemented both prior to and during grading and construction to minimize opportunities for soil erosion at the site. Upon completion of construction, landscaping will be installed which will stabilize the ground on a permanent basis. With implementation of the foregoing mitigation measures, the proposed project is not anticipated to present significant adverse impacts on soil conditions within the Master Plan areas. Moreover, the soil types found on the property do not present any limitations to the constructability of the proposed Master Plan project.

5. Pesticides, Fertilizer Use, and Hazardous Substances

a. Existing Conditions

The Olowalu region has a history of wide-spread and long-term sugarcane cultivation. Prior to the Applicants obtaining the property, the previous landowner conducted a limited Phase I environmental site assessment in 1998. At that time, consultation with the State Office of Hazard Evaluation and Emergency Response (HEER) was conducted. HEER commented that pesticides used by the sugarcane industry in recent times and their residuals should not pose a significant human health risk because of their rapid decomposition in soil. Indicators of potential risks from past agricultural use are typically found in the soil, surface water and groundwater. The existing ~~potable~~drinking water well source has not detected levels of chemical contaminants established as unsafe for human habitation by the Environmental Protection Agency (EPA) and State Department of Health (DOH).

The Master Plan ~~area is~~areas for Alternatives 1 and 2 are located south-east of the former Olowalu Sanitary Landfill, a 53-acre facility that was closed in 1992 and is now covered with grass. The landfill was closed in accordance with EPA and DOH requirements at the time by the County of Maui, Department of Environmental Management (DEM). The former landfill is physically separated from the Master Plan areas for Alternatives 1 and 2 by the steep topography and ridgeline of the West Maui Mountains.

There is no evidence that leaching of pollutants from the landfill are occurring. According to the Impact on Water Resources Study prepared by Tom Nance Water Resource Engineering, sample data of groundwater collected in 2010 from the existing wells included detectable levels of nitrogen, phosphorus,

silica and salt which are typical background constituents. It did not contain other detectable chemicals typical of leachate associated with an unlined landfill. As such, it does not appear that chemical pollutants from the closed landfill are leaching into the groundwater resources at Olowalu. See **Exhibit “C”** **Appendix D**.

Further, the Assessment of Marine Water Chemistry and Biotic Community Structure for Olowalu prepared by Marine Research Consultants, Inc. identified only nutrients associated with groundwater and stormwater discharges, which indicate leaching of chemical pollutants from the closed landfill is not occurring offshore. See **Exhibit “D”** Refer to **Appendix “E”**.

b. Potential Impacts and Mitigation Measures

The project site has not been in active sugarcane production for over 10 years since the closure of Pioneer Mill in 1999. Since that time, the area has largely remained fallow. There has been no large-scale use of pesticides or fertilizers on the property for over 10 years, as such no adverse significant impacts are anticipated.

The use of fertilizers for landscape maintenance within the Master Plan for **Alternatives 1 and 2** will be minimal. Drainage improvements for the proposed project are designed to ensure that increases in runoff due to the development are retained on-site and do not impact downstream properties and nearshore marine environments.

6. Natural Hazards

a. Existing Conditions

The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program under which flood-prone areas are identified and flood insurance is made available. FEMA produces Flood Insurance Rate Maps (FIRM), an insurance and floodplain map that identifies the areas subject to flooding during a 1 percent annual chance (100-year) flood event, as well as areas inundated by the 0.2 percent annual chance flood. The 100-year floodplain is the boundary of the flood that has a 1 percent chance of being equaled or exceeded in any given year, while the 500-year floodplain is

the boundary of the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. FEMA's Flood Insurance Rate Map (FIRM) adopted by the County of Maui on September 19, 2012, indicates the Master Plan area is areas in Alternatives 1 and 2 are located in Flood Zone "X" (unshaded), Zone "X" (shaded), Zone "A", Zone "AE", Zone "AO", and Zone "VE". See **Figure 15**.

Zone "X" (unshaded) is an area of minimal flooding, while Zone "X" (shaded) is an area of moderate flood hazard with average depths of less than 1 foot, usually the area between the limits of the 100-year and 500-year floods. Zone "X" (shaded) is located on the outer fringes of Olowalu Stream. Zone "A" are areas with a 1 percent chance of flooding; Zone "AE" is the base floodplain where base flood elevations are provided; and Zone "AO" is river or stream flood hazard areas and areas with a 1 percent or greater chance of shallow flooding with a depth of 1 foot. Zones "A", "AE" and "AO" are located along the shoreline and along Olowalu Stream and Gulch and an area near Kapa'iki. Zone "VE" is the coastal flood area located along the shoreline and are coastal areas with a 1 percent or greater chance of flooding and an additional hazard from storm waves. The flood elevation in this area is 7 feet above mean sea level (amsl). See **Figure 15**.

Maui's coastal lands, along with other coastal areas around the world, are susceptible to erosion, accretion and sea level change. Because significant variability in sea level can occur, determining global mean sea level changes are complex. Nevertheless, numerous studies have sought to measure sea level rise. Global sea level rise is assumed to be caused by melting of ice reservoirs in Greenland and Antarctica, as well as various other alpine glaciers and ice sheets, and thermal expansion of the upper ocean water column due to heating of the atmosphere. In Olowalu, erosion rates and potential impacts from sea level rise have not been identified.

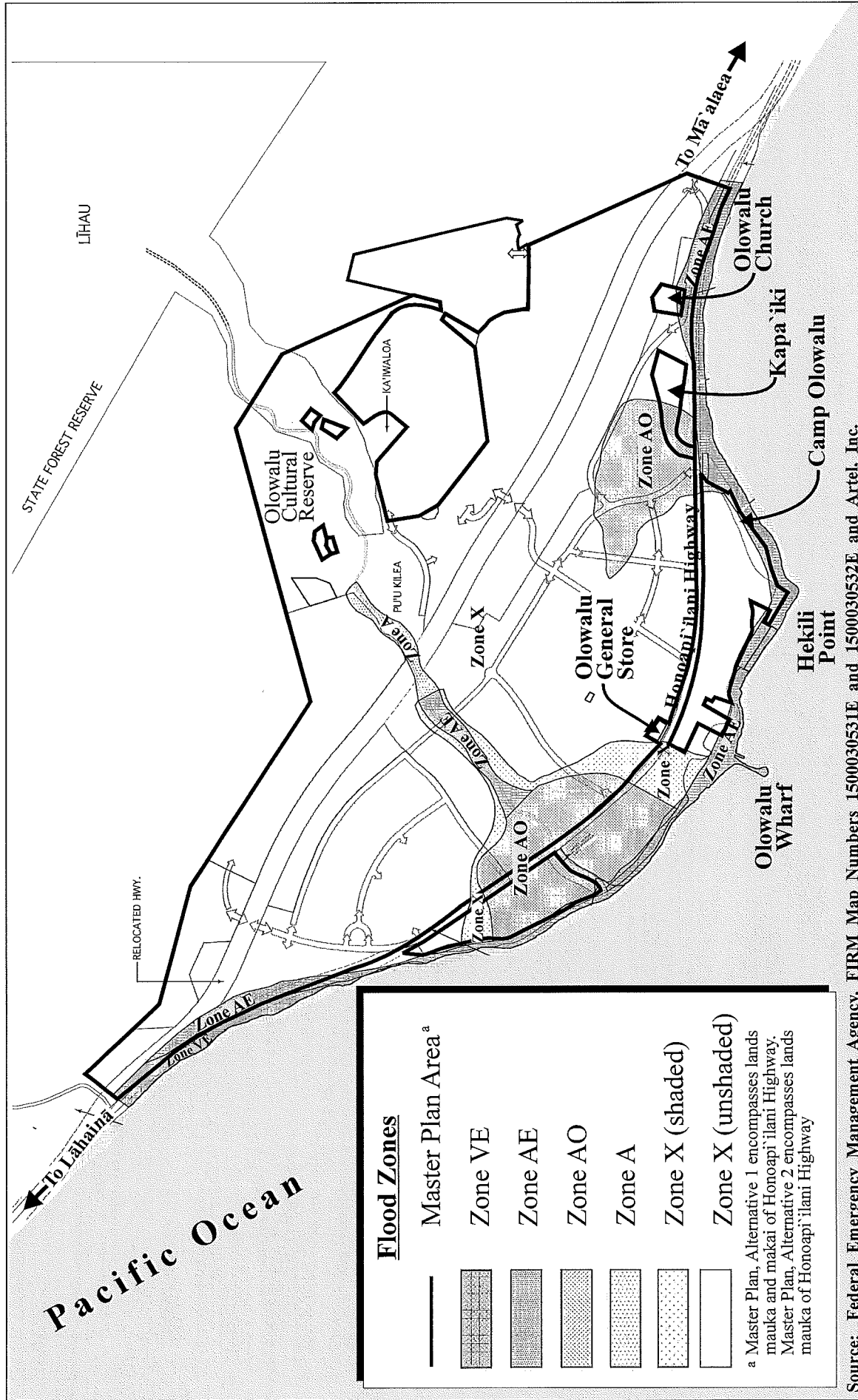


Figure 1315

Proposed Olowalu Town Master Plan Flood Insurance Rate Map

NOT TO SCALE



Since the preparation of the Draft EIS, the County of Maui has adopted erosion rate maps for Olowalu. According to the Erosion Maps prepared for the County of Maui Department of Planning, the Olowalu study area is defined by Olowalu Wharf and Hekili Point. Olowalu Wharf erosion map encompasses the shoreline segment from Olowalu Wharf to the south to Awalua Beach to the north while the Hekili Point erosion map encompasses the shoreline segment from Olowalu Wharf to the north to Ukumehame Gulch to the southwest. The shoreline on the Olowalu Wharf erosion map is comprised of continuous black sand beach and cobble beach with intermittent patches of calcerous sand, while the Hekili Point erosion map is comprised of both sand and cobble beaches. Fronting the shoreline is a fringing reef and rocky shoals extending offshore while the back shore is dominated by Honoapiʻilani Highway and former sugarcane fields and kiawe trees. See **Figure 16** and **Figure 17**.

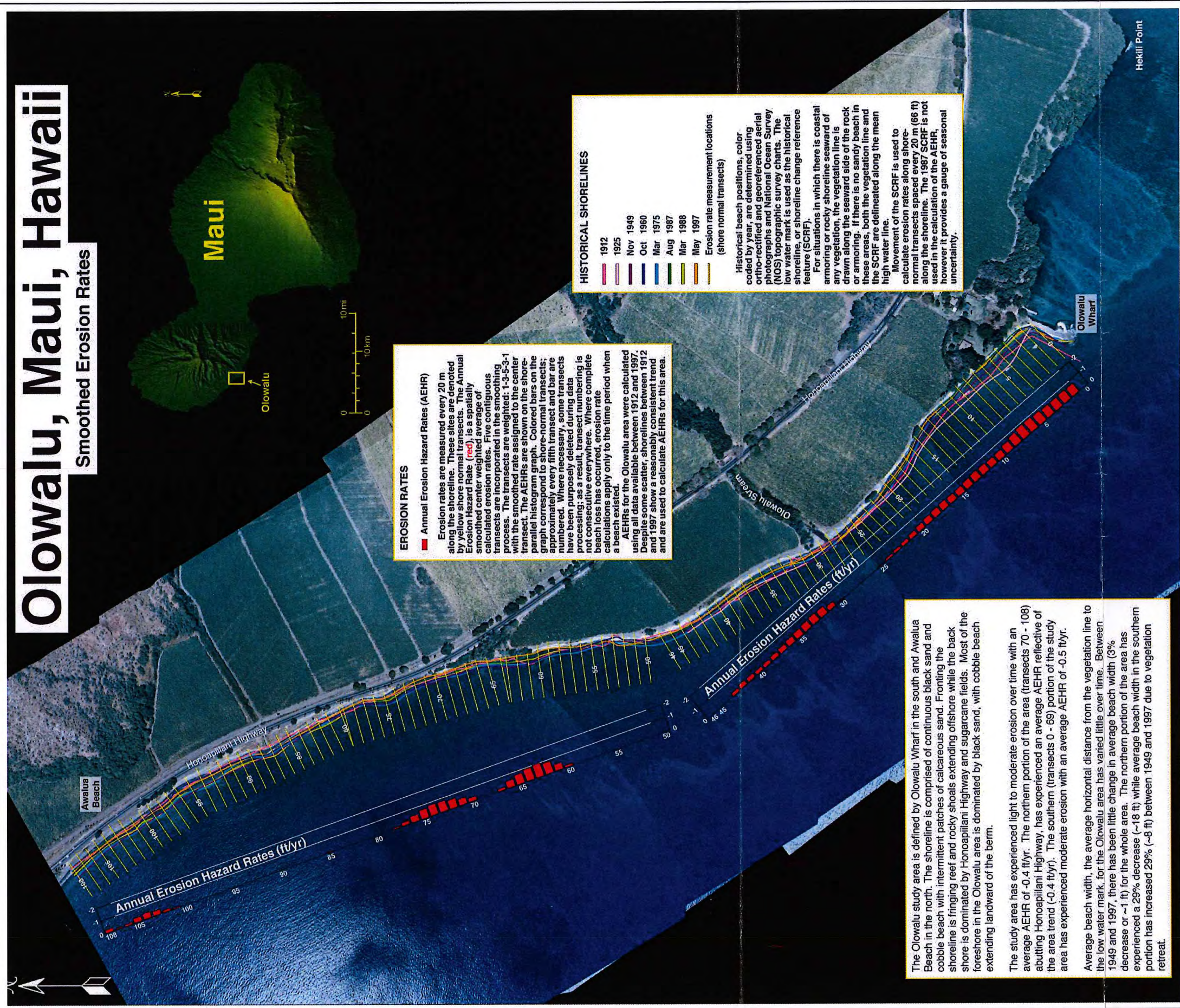
The Olowalu Wharf erosion map study area experiences light to moderate erosion over time with an average Annual Erosion Hazard Rate (AEHR) of -0.4 ft/year. The northern portion of the area (transsects 70-108) abutting Honoapiʻilani Highway has an average AEHR reflective of the trend of -0.4 ft/yr. The southern area (transects 0-69) has experienced moderate erosion with an average of -0.5 ft/ yr. Refer to **Figure 16**.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, for the Olowalu Wharf erosion map area has varied little over time. Between 1949 through 1997, there has been little change in average beach width (3 percent decrease or 1 foot) for the whole area. However, the northern portion of the area has experienced a 29 percent decrease (~18 ft) while average beach width in the southern portion has increased 29 percent (~8 ft) between 1949 and 1997 due to vegetation retreat.

The Hekili Point erosion map study area as a whole has experienced a consistent trend of moderate erosion with an average AEHR of -0.7 ft/ yr. The shoreline along the western portion of the area (transects 105-210) is dominated by stands of kiawe trees. This section has experienced moderate erosion over time reflecting the area trend (-0.7 ft/yr). The eastern portion (transects 24-104) is backed by Honoapiʻilani Highway. Here, several sections of the highway are directly threatened by shoreline change. This

Olowalu, Maui, Hawaii

Smoothed Erosion Rates



Source: Coastal Geology Group, School of Ocean and Earth Science and Technology, University of Hawai'i at Manoa

Figure 16

Proposed Olowalu Town Master Plan
Olowalu Wharf Shoreline Erosion Rates Map

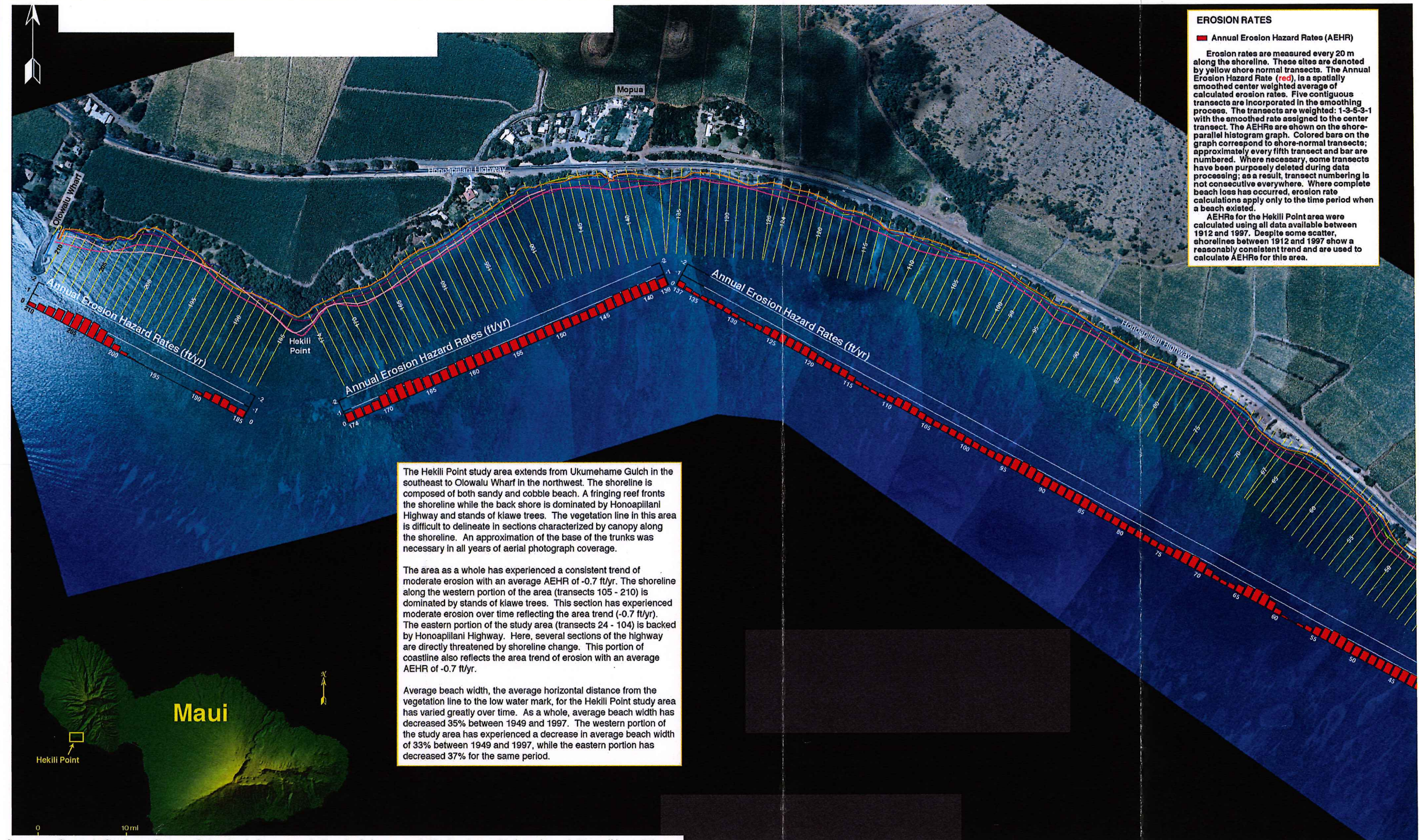


NOT TO SCALE



Prepared for: Olowalu Town, LLC and Olowalu Ekolu, LLC

Olowalu Town\MasterPlan\Final EIS\OlowaluShoreErosion



Source: Coastal Geology Group, School of Ocean and Earth Science and Technology, University of Hawai'i at Manoa

Figure 17

Proposed Olowalu Town Master Plan Hekili Point Shoreline Erosion Rates Map

NOT TO SCALE



portion of coastline also reflects the area trend of erosion with an average AEHR of -0.7 ft/yr. Refer to **Figure 17**.

Average beach width for the Hekili Point study area has varied greatly. As a whole, average beach width has decreased 35 percent between 1949 and 1997. The western portion has experienced a decrease in average beach width of 33 percent between 1949 and 1997, while the eastern portion has decreased 37 percent for the same period.

In addition, the U.S. Geological Survey (USGS) Technical Hazard Map for the Olowalu region between Launiupoko Point and the southern limits of Ukumehame State Beach Park has an overall hazard rate from moderate to high which is a direct function of the low coastal slope of this area. To the east, where the individual hazards are mitigated by the increase in coastal slope and harder substrate, it is reduced to moderate to low (USGS, 2002).

The tsunami hazard is ranked high along this entire low-lying coastal terrace. It is reduced to moderately high for the steeper rocky head-lands to the east. The stream-flooding hazard is moderately high for the Ukumehame Beach area and moderately low only along the steep head-lands to the east. Along the Olowalu coast, it is ranked high where larger streams drain the increasingly wetter mountains to the west. The threat from high waves is ranked moderately low here where the greatest waves reaching the shoreline are associated with the southern swell. The storm hazard however, is ranked moderately high along this coast which faces south-west toward the majority of passing storms that track to the west. Erosion is greatest along the lowest-lying beach areas between Ukumehame Beach and Mōpua, where it is ranked high. Sections of the coastal highway, the sole southern access to West Maui, are threatened by coastal erosion and have been protected with armoring by the State Department of Transportation (HDOT). At Mōpua, the rocky point partly mitigates erosion, so this hazard is reduced to moderately low. Beyond Hekili Point, the erosion threat is ranked moderately high. The sea level and volcanic/seismic hazards are moderately high because of the low coastal slope and Olowalu's location within seismic hazard zone 2 (USGS, 2002).

The tsunami evacuation zone for Olowalu is the area seaward (makai) of Honoapiʻilani Highway near Olowalu General Store. See **Figure 18**. The zone moves 400 feet mauka of the highway in areas where the highway is close to the shoreline mainly south of Kapaʻiki and north near the County’s Recycling and Refuse Convenience Center. The sloping topography of the mauka lands provides higher ground for evacuation purposes through the existing Olowalu roadways.

According to the University of Hawaiʻi (UH) Sea Grant College Program, “*Sea-Level Rise and Coastal Land Use in Hawaii: A Policy Tool Kit for State and Local Governments, 2011*” report sea levels are rising due to climate change. Over the past century, global mean sea level rose about six (6) to eight (8) inches and the rate of global sea level rise has doubled since 1990. According to the report, it recommends using sea level rise benchmarks of 1-foot by year 2050 and 3-feet by 2100 for Hawaiʻi.

Three (3) basic approaches to sea-level rise adaptation have been identified:

- *Accommodation.* Adjustment of an existing system to changing natural conditions (e.g., strengthening flood-proofing regulations or expanding hazard zones).
- *Protection.* Hardening of a system in its existing location to withstand impacts from changing conditions (e.g., shoreline hardening such as seawalls and revetments).
- *Retreat.* Relocating existing structures to avoid impacts.

Located in Hawaiʻi, the project site is also susceptible to hurricanes. The Central Pacific hurricane season starts on June 1st and ends on November 11th. The Hawaiʻi State Civil Defense operates a system of outdoor sirens throughout the State to alert people of emergencies and natural hazards, including hurricanes and tsunamis. There is an existing siren on the makai side of Honoapiʻilani Highway (entering Olowalu from Māʻalaea) near Camp Olowalu.

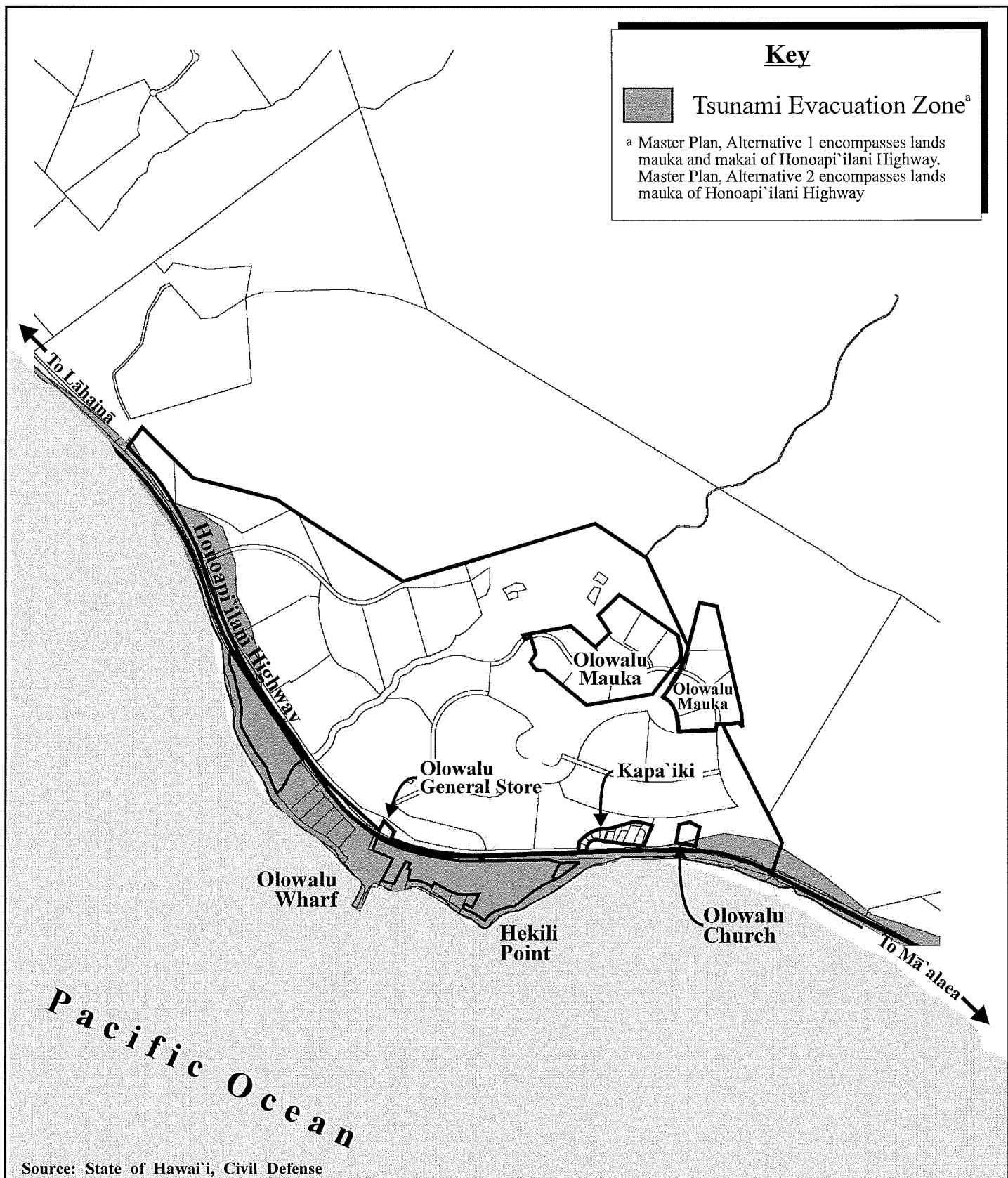


Figure 18

Proposed Olowalu Town Master Plan Tsunami Evacuation Map

NOT TO SCALE



 **MUNEKIYO HIRAGA**

Prepared for: Olowalu Town, LLC and Olowalu Ekolu, LLC

Olowalu Town\MasterPI\Final EIS\TsunamiEvacuation

The region of West Maui that the project is located in is susceptible to wild fire hazards, particularly during the long dry seasons. Lands that were formerly cultivated for sugarcane in West Maui have reverted to dry grassland and shrubland following the end of sugar production in the region. Also, State lands abutting these areas are not maintained and are also susceptible to wildfires. Dry vegetation on these private and State lands serve as a fuel hazard for fires. In 2007, a large fire in the area of Olowalu and Launiupoko swept up into the nearby West Maui Natural Area Reserve and in May 2010, another fire broke out in the region.

b. Potential Impacts and Mitigation Measures

~~As previously noted, portions of the Master Plan fall within flood hazard areas. The proposed Master Plan does not involve any development within the portion of the Master Plan area that is within Flood Zone VE, the area along the shoreline with a 1 percent or greater chance of flooding and additional hazards from storm waves. Portions of the Master Plan will be located in Zones AO (Depth 1 foot) and X (shaded) which may be prone to shallow flooding.~~

A major portion of the Master Plan area for Alternatives 1 and 2 is located within Flood Zone “X” (unshaded), an area of minimal flooding and outside of the 0.2 percent annual chance flood. In Alternative 1, the remaining portion of the Master Plan is located within Flood Zone “X” (shaded) along Olowalu Stream and Special Flood Hazard Areas Zones “A” along the upper portion of Olowalu Stream in the OCR, “AE” along the shoreline mainly in the 150 shoreline setback area, “AO” along Olowalu Stream, and “VE” coastal flood area with velocity hazard (wave action). Refer to **Figure 15**.

In Alternative 2 the areas makai of Honoapiʻilani Highway are not included in the Master Plan, therefore, Alternative 2 is not located within Zones “AE” and “VE”. Portions of the Master Plan for Alternative 2 mauka of the highway are located in the flood zones similar to Alternative 1. Refer to **Figure 15**.

Generally, lands of the Master Plan for Alternatives 1 and 2 which lie within the Special Flood Hazard Area are envisioned for agriculture, OCR, or parks and open space. Construction within ~~other~~ special flood hazard areas will be

in compliance with Section 16.62.060, MCC, relating to standards for development within special flood hazard areas. Flood Hazard Area Development Permits will be obtained prior to the initiation of construction activities, as applicable.

While it is difficult to forecast specific sea-level rise patterns in the future, the applicant recognizes that changes in global sea-levels are an ongoing process that may cause changes to coastal landscapes. As such, the According to the National Oceanic and Atmospheric Administration's (NOAA) digital coastal map, by year 2100 a 3-foot or 1-meter sea level rise for the Olowalu coastline will be limited to the area of the Master Plan in Alternative 1 along the shoreline. See **Figure 19** (Hekili Point) and **Figure 20** (Olowalu). The northern side of the Olowalu coast line appears to have the greater inland inundation.

The proposed Master Plan provides for Alternative 1 observes an existing 150-foot setback from the coastline within which no development will occur. See **Figure 21**. The 150-foot shoreline setback is an existing condition that was established as part of a Special Management Area (SMA) Use Permit approved in 2000. See **Appendix "S"**. The anticipated inundation zone from sea level rise by the year 2100 is located near the shoreline in many cases on the beach area. As such, the 150-foot setback area is adequate to ensure that development is not adversely affected by future sea level rise.

To mitigate potential impacts associated with natural disasters, all buildings within the proposed Master Plan for Alternatives 1 and 2 will comply with the Uniform Building Code, as amended for Maui County, and provided for in Section 16.26 of the MCC. In addition, the Applicants will coordinate with the Hawaii State Civil Defense agency to determine whether public facilities within the Master Plan for Alternatives 1 and 2 meet public shelter specifications and can serve as a shelter during emergencies, including wildfire, tsunami or hurricane events. As appropriate, the Applicants will coordinate with the Hawai'i State Civil Defense agency to develop an evacuation plan that would include, at minimum, appropriate signage directing the public to safe locations in the event of an emergency.