Appendix M
Cultural Impact Assessment
Kamaka'ipō Gulch meets the ocean between Kaupoa and La'au Point in West Moloka'i.

La'au Point Rural-Residential Development

Kaluako'i, Island of Moloka'i

of Moloka'i Properties Limited dba Moloka'i Ranch

November 15, 2006

by
Davianna Pōmaika'i McGregor, PhD

assisted by
Sean McNamara

Professor, Ethnic Studies Department
University of Hawai'i, Manoa

Dept. of Urban & Regional Planning, UH Manoa

La'au Point Cultural Impact Assessment / 1
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Table of Contents</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Contribution</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Qualifications and Roles</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Acknowledgements</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Summary Cultural Assessment</td>
<td>9</td>
</tr>
<tr>
<td>Section 1</td>
<td>Introduction to Proposed Project</td>
<td>25</td>
</tr>
<tr>
<td>1.1</td>
<td>Purpose.</td>
<td>25</td>
</tr>
<tr>
<td>1.2</td>
<td>Scope of Work</td>
<td>26</td>
</tr>
<tr>
<td>1.3</td>
<td>Summary of Proposed La'au Point Rural-Residential Development</td>
<td>27</td>
</tr>
<tr>
<td>1.4</td>
<td>Water Plan and Kakalahale Brackish Well</td>
<td>28</td>
</tr>
<tr>
<td>1.5</td>
<td>Community-Based Master Land Use Plan for Moloka'i Ranch</td>
<td>29</td>
</tr>
<tr>
<td>Section 2</td>
<td>Framework and Methodology</td>
<td>30</td>
</tr>
<tr>
<td>2.1</td>
<td>Framework for this Cultural Assessment</td>
<td>30</td>
</tr>
<tr>
<td>2.1.1</td>
<td>La'au Subdivision Archaeological Preservation and Mitigation Plan</td>
<td>30</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Focus on Subsistence and Cultural Resources and Practices</td>
<td>30</td>
</tr>
<tr>
<td>2.1.3</td>
<td>'Ohana Responsibilities and Rights</td>
<td>34</td>
</tr>
<tr>
<td>2.1.4</td>
<td>The Importance of Subsistence on Moloka'i</td>
<td>36</td>
</tr>
<tr>
<td>2.1.5</td>
<td>Coastal Cultural Resources</td>
<td>40</td>
</tr>
<tr>
<td>2.1.6</td>
<td>The Water Plan and Waiola Case Testimonies</td>
<td>42</td>
</tr>
<tr>
<td>2.1.7</td>
<td>Broader Indirect Impacts</td>
<td>42</td>
</tr>
<tr>
<td>2.1.8</td>
<td>Community-based Master Land Use Plan for Moloka'i Ranch</td>
<td>42</td>
</tr>
<tr>
<td>2.2</td>
<td>Methodology and Process</td>
<td>43</td>
</tr>
<tr>
<td>2.2.1</td>
<td>KAL-EC, MPL, and Community Planning Process</td>
<td>43</td>
</tr>
<tr>
<td>2.2.2</td>
<td>Community Meetings</td>
<td>45</td>
</tr>
<tr>
<td>2.2.3</td>
<td>In-depth, semi-structured interviews</td>
<td>46</td>
</tr>
<tr>
<td>2.2.4</td>
<td>Site Visit and Ethnographic Sources</td>
<td>47</td>
</tr>
<tr>
<td>Section 3</td>
<td>Cultural and Subsistence Resources and Activities</td>
<td>49</td>
</tr>
<tr>
<td>3.1</td>
<td>Origin of Ownership of the Kaluako'i Ahupua'a</td>
<td>49</td>
</tr>
</tbody>
</table>

La'au Point Cultural Impact Assessment / 2
Section 9  
**Assessment of Alternatives to the Proposed Development**

  9.1 No Action Alternative .............................................136  
  9.2 Bulk or "Piece-Meal" Sale of Other MPL Land Inventory ....... 137  
  9.3 Maunaloa to La'au, Kaunakakai and Kaluako'i .................. 138  
  9.4 Hale O Lono to Pala'au ........................................... 139  
  9.5 Alternative to La'au Development ............................... 139

Section 10  
**Summary and Conclusion** ........................................ 141

  10.1 Valued Cultural, Historical or Natural Resources and  
       Traditional and Customary Native Hawaiian Rights  
       Exercised in the Petition Area ................................. 142  
  10.2 Extent to which Valued Resources and Traditional and  
       Customary Native Hawaiian Rights will Affected or  
       Impaired by the Proposed Action ............................... 146  
  10.3 Feasible Action by the LUC to Reasonably Protect  
       Native Hawaiian Rights ........................................ 150  
  10.4 Conclusion .......................................................... 154

Section 11  
**References** ......................................................... 157
List of Figures

All of the photographs were taken by Davianna McGregor on a site visit to the West Coast of Moloka'i between Kaupoa and Ka Lae o ka La'au on June 8, 2006

Cover Photo  Kamaka'iipo Gulch meets the ocean between Kaupoa and La'au Point in West Moloka'i. ............................................................... cover

Figure 1. Map of subsistence activities indicated by Moloka'i practitioners in 1993 ............................................................... 39

Figure 2. Meeting of the EC Project #47 Land Use Committee at Hale Pumehana in August 2004 ................................................. 43

Figure 3. Royal Patent deed from Mo'i Kalakaua to Charles Reed Bishop in 1875 ............................................................... 50

Figure 4. In Coulter's map of the 1853 Moloka'i population Kaluako'i was uninhabited ............................................................... 55

Figure 5. Kaluako'i Cultural Zones Map ............................................................... 59

Figure 6. Wahi Pana Table ............................................................... 74

Figure 7. Ma'o, the native cotton on federal land near La'au Point ............... 98

Figure 8. A monk seal on the western shore fronting the proposed development area ............................................................... 98

Figure 9. Fresh Water Aquifer Linkage to Coastal Subsistence ............... 127

Regarding Hawaiian orthography, the 'okina is marked by a single quotation mark (') and the kahako is marked by an "underline" above the letter ( _ ) in the narrative and informant quotations. Quotes from documents preserve the original spelling.
**Contribution**

Dr. Davianna Pomaika'i McGregor has conducted this cultural impact assessment on a pro bono basis so that the fee she would have received can be contributed to the Moloka'i Land Trust to support its mission which is:

*To protect and restore the land, natural and cultural resources of Moloka'i, and to perpetuate the unique Native Hawaiian traditions and character of the island for the benefit of the future generations of all Moloka'i, particularly Native Hawaiians.*
Qualifications and Role

The primary author, Davianna Pomaika'i McGregor is a Professor of Ethnic Studies at the University of Hawai'i Manoa. Her ongoing research endeavors have focused on documenting the persistence of traditional Hawaiian cultural customs, beliefs, and practices in rural Hawaiian communities including Moloka'i, Puna, Ka'ū, Ke'anae-Wailuanui, and Waiahole-Waikane. The findings yielded from her ongoing research endeavors are published in a forthcoming book by UH Press, *Kua'aina: Living Hawaiian Culture*.

Dr. McGregor is a part-time resident of Ho'olehua, Moloka'i. In 1993 she helped to conduct the Moloka'i Subsistence Study which was completed in 1994. In 1998, she helped write the community grant which received funding for the Moloka'i Enterprise Community. In 1998, she served as an expert witness on behalf of the subsistence practitioners in the Wai Ola Water case. In 2004-2005, she participated in the culture and land use committees which helped develop the Community-Based Master Land Use Plan for Moloka'i Ranch. In 2006 she completed a community-based responsible tourism plan for the Ke Aupuni Lokahi-Moloka'i Enterprise Community and cultural impact assessments for The Nature Conservancy preserves at Kamakou and Mo'omomi on the island of Moloka'i. In 2006 she also helped incorporate the Moloka'i Land Trust and currently serves as a member of its Board of Directors.

In 1993, Dr. McGregor, together with Dr. Jon Matsuoka of the UH-Manoa School of Social Work and and Dr. Luciano Minerbi of the Department of Urban and Regional Planning, conducted the "Native Hawaiian Ethnographic Study for the Hawai'i Geothermal Project Environmental Impact Study" which serves as the template for cultural impact studies for Hawai'i.

Sean McNamara, has a Master of Arts degree from the UH-Manoa Department of Urban and Regional Planning and is currently a doctoral student in that department. In Spring 2005 he helped research and write the Papohaku Dunes Cultural and Natural Resource Preservation Plan, Kaluako'i, Moloka'i, Hawai'i as one of eleven students in a planning practicum taught by Professor Luciano Minerbi. Sean researched ethnographic documents and oral history sources for the Kaluako'i ahupua'a and wrote the ethnographic section of this report. He also reviewed the Waiola Case testimonies and developed the subsistence flow chart to illustrate the information provided in those testimonies.

La'au Point Cultural Impact Assessment / 7
Mahalo Nui Loa To:

KAL-EC Project #47 members for their critical and exhaustive work on the Community-Based Master Land Use Plan for Moloka'i Ranch which I used as a foundation for this cultural assessment report.

Ke Aupuni Lokahi Moloka'i Enterprise Community executive director Abbey Meyer and the staff for community outreach support.

Moloka'i Land Trust for their dedication and courage and the support the offered with community outreach.

Office of Hawaiian Affairs Trustee Colette Y. Machado and staff members Irene Kaahanui and Halona Kaopuiki for community outreach and co-sponsorship of the community meetings to ensure input from the Native Hawaiian community.

Peter Nicholas, Harold Edwards and John Sabas of Moloka'i Properties Limited for their assistance with community outreach.

Professor Luciano Minerbi of the UH Mānoa Department of Urban and Regional Planning for assistance in the design of the report, the consideration of alternatives to La'au and permission to include ethnographic information gathered by graduate students in his planning practicum for the Papohaku Dunes Cultural and Natural Resource Preservation Plan, Kaluako'i, Moloka'i, Hawaii Study.

Note takers for the community meetings - Loretta Sherwood, Sean McNamara, Blake La Benz.
Summary Cultural Assessment

This Cultural Impact Assessment Report has been prepared as part of the Environmental Impact Statement (EIS) for the proposed La’au Point Development in compliance with Chapter 343, Hawai‘i Revised Statutes and Title 11, Department of Health, Chapter 200, Environmental Impact Rules, State of Hawai‘i.

This report has especially been designed to fulfill the mandate to the Land Use Commission from the Hawai‘i State Supreme Court in its ruling, Ka Pa’akai O Ka ‘Aina v. Land use Commission, State of Hawai‘i / 94 Haw. 31 (2000). The specific section of the ruling that served to guide the development of the report is as follows:

“In order for the rights of native Hawaiians to be meaningfully preserved and protected, an appropriate analytical framework for enforcement is needed. Such an analytical framework must endeavor to accommodate the competing interests of protecting native Hawaiian culture and rights on the one hand, and economic development and security, on the other . . .

In order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, the LUC, in its review of a petition for reclassification of district boundaries, must – at a minimum – make specific findings and conclusions as to the following: (1) the identity and scope of ‘valued cultural, historical, or natural resources’ n27 in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to which those resources, including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. n28

This summary, addresses the three key findings required of the Land Use Commission and government agencies empowered to make decisions affecting land use in Hawai‘i under the ruling of the Hawai‘i State Supreme Court in its ruling in Ka Pa'akai O Ka ‘Aina in 2000.
Valued Cultural, Historical or Natural Resources and Traditional and Customary
Native Hawaiian Rights Exercised in the Petition Area

The La'au Subdivision Archaeological Preservation and Mitigation Plan prepared by
Cultural Landscapes in May 2006 documents valued cultural and historical resources in
the petition area. This report focuses on valued natural resources utilized for cultural,
subsistence and spiritual purposes.

A large part of the significance of the La'au Point area is that it is raw and untouched. It
is so isolated that most of the residents of Moloka'i have never even been there and have
no direct experience with the place. This factor gives La'au an almost mythical quality.
La'au Point has become an icon of what Moloka'i represents - a rural stronghold and
reserve of Native Hawaiian culture, a cultural kipuka. If Moloka'i is "The Last Hawaiian
Island" then La'au is one of the last untouched Native Hawaiian places on "The Last
Hawaiian Island."

In Hawaiian tradition, La'au Point represents a point of no return. For those traveling by
canoe from O'ahu to Moloka'i across the Kaiwi Channel, once La'au Point is sighted,
there is not turning back to O'ahu. This concept has been applied to the issue of the
development of the La'au Point Rural-Residential Subdivision. Many Moloka'i residents
feel that if the west and south shores adjacent to La'au Point are developed, as proposed,
that this will open up Moloka'i to new residents unfamiliar with the culture and way of
life on Moloka'i and lead to irreversible cultural change.

Everyone interviewed and those who came to community meetings had reservations
about the proposed development. No one was an enthusiastic advocate, many were
reluctant supporters and those most vocal were opposed to the development.

The Maunaloa kupuna and larger community and longtime employees of Moloka'i Ranch
have the most direct and longtime experience with the area proposed for development.
What is striking is that while they are very concerned and reluctant about the
development, they are also willing to acknowledge and support the right and the need of
the Ranch to seek the development. They feel that the negative impacts could be
managed if the development would conform to the strict covenants, conditions and
restrictions outlined in the Community-Based Master Land Use Plan for Moloka'i Ranch.
They are confident that their community can work together with the project's resource
managers to provide stewardship over the marine resources that they rely upon for
subsistence. They also felt that the negative impacts would be offset with the gifting of
important legacy lands to the community.
In addition, many longtime adversaries of Moloka'i Ranch engaged in the development of the Community-Based Master Land Use Plan for Moloka'i Ranch, which includes the proposed La'au development, over the course of two and a half years throughout countless community meetings, long hours of impassioned debate, critical thinking and soul searching. For them it was a process of negotiating a lasting settlement of a thirty year struggle with Moloka'i Ranch over extravagant development schemes and the extractive use of millions gallons of the island's precious and limited water resource. The proposed La'au development was difficult for them to accept and at that point some withdrew their support. However the majority of the planning group persisted in their support for the overall Community-Based Master Land Use Plan as a reasonable and balanced approach that empowers the community to manage premier Native Hawaiian legacy lands, control population growth and land speculation and monitor the one last major development on Moloka'i Ranch lands. Moreover, the plan revolves around the management of natural resources for subsistence, cultural and spiritual purposes.

Participants in community meetings and the key informants speak of the south and west coasts adjoining La'au point and its nearshore waters as reserve of marine resources which serve as their "icebox." It is a place where fishermen usually go to get fish, 'opihi and crab for parties and gatherings of their large extended families.

The southwest shore also factors into the life cycle of the mullet, serving as a hatchery area from which they move east to Mana'e or East Moloka'i.

Along the south shore, informants identified the various fishing and gathering areas by points that they referred to as first point (Kanalukaha), second point (Kapukuwahine), third point (Kahalepohaku) and fourth point ('Opihi Road). The south shore is best known for moi, aholehole, 'ama'ama crab and 'opihi. The 'opihi starts at Kapukuwahine on the south shore and out on the cliffs along what they refer to as 'Opihi road. The west shore is best known for moi, aholehole and lobster. Due to the seasonal ocean swells, the south shore is usually harvested in the winter time when there are north swells and the west shore is usually harvested in the summer time when there are south swells. They also speak of the ocean as being very treacherous and not safe for swimming. Off of La'au Point itself, informants spoke of a very strong current which has swept even the best divers out to the open ocean.

Traditionally, it is not a place that was fished on a regular basis because it is isolated and difficult to reach. However, the increased use of boats on Moloka'i and O'ahu has changed this. Informants noted that the resources have declined in the area with heavy seasonal harvesting by boaters from O'ahu and the opening of Hale O Lono harbor and Kaluako'i as closer launching points for Moloka'i boaters.
In addition to natural resources utilized for subsistence, informants spoke of other natural resources which have cultural significance such as native plants, native species of turtles and monk seals, and the simple unspoiled natural beauty of the undeveloped seascape.

The La'au area is generally regarded as a special place of spiritual mana and power. Community participants and key informants spoke of specific burials, ʻiʻi ʻau, ʻiʻi kea, and heiau. Such specific sites are documented and described in the La'au Subdivision Archaeological Preservation and Mitigation Plan by Cultural Landscapes that is part of this EIS.

The overall spiritual quality of the La'au area as a wahi pana and wahi kapu cannot be quantified and deserves recognition and respect.
Informants identified the following coastal cultural and subsistence resources in the proposed development area.

**Coastal Cultural and Subsistence Resources**

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streams</td>
<td>x</td>
</tr>
<tr>
<td>‘auwai (taro irrigation ditches)</td>
<td>x</td>
</tr>
<tr>
<td>Ponds</td>
<td>x</td>
</tr>
<tr>
<td>Lo‘i kalo</td>
<td>x</td>
</tr>
<tr>
<td>Springs</td>
<td>x</td>
</tr>
<tr>
<td>Caves</td>
<td>x</td>
</tr>
<tr>
<td>Trials</td>
<td>x</td>
</tr>
<tr>
<td>Wahi pana (named places)</td>
<td>x</td>
</tr>
<tr>
<td>Dunes</td>
<td>x</td>
</tr>
<tr>
<td>Bridges</td>
<td>x</td>
</tr>
<tr>
<td>Surfing sites</td>
<td>x</td>
</tr>
<tr>
<td>Sandy beach</td>
<td>x</td>
</tr>
<tr>
<td>Fishing area</td>
<td>x</td>
</tr>
<tr>
<td>Fishpond</td>
<td>x</td>
</tr>
<tr>
<td>Fish house</td>
<td>x</td>
</tr>
<tr>
<td>Hunting areas</td>
<td>x</td>
</tr>
<tr>
<td>Kilo ‘a (fish sighting)</td>
<td>x</td>
</tr>
<tr>
<td>Muliwai (brackish pond)</td>
<td>x</td>
</tr>
<tr>
<td>Anchialine pond</td>
<td>x</td>
</tr>
<tr>
<td>Trails</td>
<td>x</td>
</tr>
<tr>
<td>Salt ponds</td>
<td>x</td>
</tr>
<tr>
<td>Turtle nesting area</td>
<td>x</td>
</tr>
<tr>
<td>Historic walls</td>
<td>x</td>
</tr>
<tr>
<td>Basalt veins for tools</td>
<td>x</td>
</tr>
<tr>
<td>Alae vein</td>
<td>x</td>
</tr>
<tr>
<td>Salt pans</td>
<td>x</td>
</tr>
<tr>
<td>Historic sites</td>
<td>x</td>
</tr>
<tr>
<td>Archaeological sites</td>
<td>x</td>
</tr>
<tr>
<td>Salt gathering areas</td>
<td>x</td>
</tr>
<tr>
<td>Ko‘a (fishing shrines)</td>
<td>x</td>
</tr>
<tr>
<td>Historic sites</td>
<td>x</td>
</tr>
<tr>
<td>Ho‘ailona (natural signs)</td>
<td>x</td>
</tr>
<tr>
<td>Lele (cliff jumping spots)</td>
<td>x</td>
</tr>
<tr>
<td>Pu‘uhonua (places of refuge)</td>
<td>x</td>
</tr>
<tr>
<td>Cultivation area</td>
<td>x</td>
</tr>
<tr>
<td>Native plants</td>
<td>x</td>
</tr>
<tr>
<td>Heiau (temples)</td>
<td>x</td>
</tr>
<tr>
<td>Cultural use areas</td>
<td>x</td>
</tr>
<tr>
<td>Sighting place</td>
<td>x</td>
</tr>
<tr>
<td>Pu‘uhonua (places of refuge)</td>
<td>x</td>
</tr>
<tr>
<td>Site for souls to cross over</td>
<td>x</td>
</tr>
<tr>
<td>Burials</td>
<td>x</td>
</tr>
<tr>
<td>O‘opu</td>
<td>x</td>
</tr>
<tr>
<td>Aholehole</td>
<td>x</td>
</tr>
<tr>
<td>‘Ana</td>
<td>x</td>
</tr>
<tr>
<td>Steam bath areas</td>
<td>x</td>
</tr>
<tr>
<td>Hiihiwai/wi</td>
<td>x</td>
</tr>
<tr>
<td>Aholehole</td>
<td>x</td>
</tr>
<tr>
<td>Bathing pools</td>
<td>x</td>
</tr>
<tr>
<td>Limu gathering areas</td>
<td>x</td>
</tr>
<tr>
<td>Lava tubes</td>
<td>x</td>
</tr>
<tr>
<td>Subterranean water course</td>
<td>x</td>
</tr>
<tr>
<td>Petroglyphs</td>
<td>x</td>
</tr>
<tr>
<td>Kapu kai/hi‘u wai areas</td>
<td>x</td>
</tr>
<tr>
<td>Paddling areas</td>
<td>x</td>
</tr>
<tr>
<td>Artifacts</td>
<td>x</td>
</tr>
<tr>
<td>View plane</td>
<td>x</td>
</tr>
<tr>
<td>Seasonal residential sites</td>
<td>x</td>
</tr>
<tr>
<td>Burial markers</td>
<td>x</td>
</tr>
<tr>
<td>Water caves</td>
<td>x</td>
</tr>
<tr>
<td>Birthing stones</td>
<td>x</td>
</tr>
<tr>
<td>Phallic stones</td>
<td>x</td>
</tr>
<tr>
<td>Pohaku Kane</td>
<td>x</td>
</tr>
<tr>
<td>Coral reef</td>
<td>x</td>
</tr>
<tr>
<td>Estuary</td>
<td>x</td>
</tr>
<tr>
<td>Spawning grounds</td>
<td>x</td>
</tr>
<tr>
<td>House sites</td>
<td>x</td>
</tr>
<tr>
<td>Po kane routes (night marchers)</td>
<td>x</td>
</tr>
<tr>
<td>Dams</td>
<td>x</td>
</tr>
<tr>
<td>‘Aumakua (ancestral deities) domain</td>
<td></td>
</tr>
</tbody>
</table>

They added the following additional resources:
- Monk seals
- Water catchments
- Bell stones
- Ahu stones
- Hawaiian moth
- Chamomile type flower for clearing liver
- Shells on shore
Participants in the community meetings expressed concern that the proposed
development will change the demographics of Moloka'i forever. They believe that La'au
will contribute to the increase of land values and prices and property taxes on Moloka'i.

The community expressed concern that 200 new millionaires will change the make up of
the Moloka'i community and lead to changes in the Hawaiian way of life. With more
outsiders, Moloka'i will no longer be "The Last Hawaiian Island." The proposed
development will bring in new residents unfamiliar with the culture and way of life on
Moloka'i and lead to irreversible cultural change.

The community doesn't want Moloka'i to turn into Maui or O'ahu with a large population
off-island people. They expressed regret that if the development occurs, La'au will never
be the same.

In balance, the Maunaloa kupuna shared that no matter what happens, the population will
increase and the land will be limited. While Moloka'i has been preserved it is gradually
being developed. They acknowledged that progress cannot be stopped but that it can be
controlled. The Maunaloa kupuna felt that the overall community plan of which La'au is
a part provides for the community to manage and monitor the proposed development.

Access and Trails

Community members were concerned that the subdivision might be a gated community,
and were relieved that this is not part of the plan.

Native Hawaiians and the general public will have access from two points - one on the
south shore at the southeast entry and one on the west shore at the northwest entry. In the
process to develop the Community-Based Master Land Use Plan for Moloka'i Ranch,
subsistence fishers and gatherers were very concerned that opening up the south and west
shores to public access at every 1500 feet as the County of Maui provides will deplete the
marine resources. They regretted that the opening of Hale O Lono harbor to public
access had severely decreased the marine resources there and they do not want to see that
happen in the area proposed for development. Opening up access points every 1500 feet
would have a severe impact on the subsistence resources along the west and south coasts
adjacent to La'au Point.
Community members were concerned that subdivision lot owners and their friends will have preferential access to the coast. There will be nothing to stop the home owners from going down to the beach. Those who live on the shoreline will be able to access their home and the beach by vehicle. Homeowners can create a trail to the beach and let their friends have access to the beach. Affording only two access points for the general public, while the rich people in the subdivisions will have access from their homes seems unequal. Informants also expressed concern that landowners might call police if they see the general public walking on the beach, as this has happened at Papohaku.

Participants in community meetings and informants felt it was important to provide emergency access through the subdivision to the shoreline for emergencies. They were also concerned that access should be afforded for kupuna and persons with special needs. Some pointed out that the areas closest to the access points will be heavily impacted, while spreading out the access points might spread out the impact. It was also noted that the road down to Hale O Lono harbor would need to be maintained in order to keep access to the area open.

**Subsistence Fishing and Gathering**

Informants feel that the development will spoil the experience of fishing in what is now an isolated, pristine and spiritual area. They are concerned that instead of La'au being a place to get food, it will be a place with haole in their back yards. Many informants felt that the proposed development will greatly hinder, if not abolish altogether, ongoing traditional gathering activities currently enjoyed by Moloka'i islanders at La'au. Fishermen will lack privacy if the development goes through. Yet, throw net subsistence fishers require an undisturbed beach that allows fish to forage closer inshore in order to succeed. Gatherers of 'a'ama crabs require dark silent nights to ensnare their nocturnal prey. Commotion emanating from noisy and brightly lit beach homes will negatively impact crammers' efforts to capture their already skittish prey. Gatherers of limu and pupu will very likely be met with kayakers in the water, people sunbathing on the beach, and pet animals running up and down the shoreline. If experiences elsewhere in Hawai'i hold true, it is not likely that owners of multi-million dollar beach homes will greet shoreline subsistence gatherers with open arms. It is more probable that subsistence practitioners will be confronted by insensitive newcomers intolerable of extractive activities in what they will perceive to be their front yards.

While the new landowners will probably want to go out and fish when they see the lobsters in the area, most informants felt that the new residents will probably not directly damage the fishing grounds because they don't know how to fish. The real impact on the fishing resources is from the Honolulu boaters. When the outboard motor and twin outboards came out at an affordable prices, the Honolulu boats came fishing all along the west end and south shore. These fishermen have taken everything, even the eggs. The lobster area is wiped out. The Moloka'i residents fish for the family and perhaps get an extra cooler of fish to sell. The outside commercial fishermen fish out the grounds of lobster and fish. They do not plan for the future.
Community participants and key informants were concerned that pesticides and fertilizers will contaminate the ocean and kill the marine resources. Fertilizer run off will kill the small organisms that support all of the marine life offshore. Runoff from the development will contaminate the ocean. Grading can increase erosion which will result in sediment flowing into the ocean and destroy marine resources. Some informants from the East End felt that the development would impact the mullet run and thus impact the resources on their end of the island. However, longtime fishermen who have regularly fished the south shore as members of Ranch families noted that the mullet spawn at Hale O Lono, Halena and Kolo, rather than close to La‘au. Hale O Lono is on the eastern border of the project area. Halena and Kolo are outside of the project area.

Community members wanted to be assured that the rules outlined for access and for subsistence and gathering cannot be changed by the subdivision lot owners. MPL clarified that the lot owners will be required to uphold the Covenants, Conditions and Restrictions (CC&Rs) that include these rules as part of the homeowner contract.

Providing parking areas at either end of the proposed project area and limiting access along the shoreline to foot access will open up access sufficiently that it might impact the resources, as the entry points will be closer for those who now walk and must either enter from Hale O Lono or Dixie Maru. The conservation rules might affect fishing, but if the access is easier there will be more fishing.

**Subsistence Hunting**

Hunters are concerned that the new landowners from outside of rural Moloka‘i will not want to hear shooting and may be protective of the deer and oppose even bow hunting. Deer hunting could become an animal rights issue. Bullets can travel 4 miles and 10 year kids can get a license. Need to have a sufficient buffer zone. It will only take one accident to close down hunting in the area. The overall hunting area will be reduced by the no hunting zone in the subdivision and buffer zone and the safety zone.

The plan to put in a deer fence and remove deer within the proposed subdivision will effectively close off hunting in the southwest corner of Moloka‘i. It will have to be a very high fence. The deer will keep going back. The deer will get hurt.

**Cultural Resources and Practices**

Informants are concerned that cultural sites will be destroyed once start to bulldoze and grade and clear the land for development. At Papohaku, homeowners have graded and damaged dune system and destroyed cultural sites and burials located in the dunes. They have extended their household area into the conservation zone, treated it like their own private property and tried to exclude Moloka‘i residents from the public beach area fronting their homes. The same process can occur in the proposed subdivision.

Informants expressed concern that future generations may not have a concept of how to do subsistence and only going to catch what can be carried. Future generations should be
able to be in an environment where it's just them and mother nature. They should know what it feels like.

Concern was expressed about the impact of the proposed development on the monk seals who frequent the remote beaches of the west and south shores. Monk seals might be disturbed during the grading and construction phase. New residents may have dogs who would disturb the monk seals.

Many of the informants commented that the development will require a lot of expensive landscaping because the land is rough and rocky with a lot of boulders.

**Spiritual Resources and Practices**

Can destroy ko'a fishing shrines and cultural sites, unless monitored. Informants are also concerned that once the grading starts there will be erosion when it rains and the mud will cover the ko'a, the sand and the reef.

Can disturb iwi kupuna burials unless monitored.

The overall general concern is that the development of the area will destroy the special quality of La'au as a special place of spiritual mana and power.
Feasible Action by the LUC to Reasonably Protect Native Hawaiian Rights

The Community-Based Master Land Use Plan for Moloka'i Ranch provides measures to mitigate the overall impacts of the proposed development at La'au which set unique precedents for the development of large landholdings by offshore corporations. These precedents are related to community planning, the creation of a land trust for the community, the donation of legacy lands to the land trust, the donation of easements to the land trust, the protection of subsistence fishing, gathering and hunting, reserving lands for community housing, and the creation of economic opportunities for the community through the re-opening of the Kaluako'i Hotel. The plan also provides for covenants, conditions and restrictions that landowners in the La'au Point rural residential development will need to accept and agree to uphold in order to purchase a lot.

The Land Use Commission can review the Community-Based Master Land Use Plan for Moloka'i Ranch, especially the Covenants, Conditions and Restrictions (CC & Rs). The Commission can endorse the guidelines and CC & Rs which provide mitigation of the identified impacts to the cultural and natural resources utilized for subsistence, cultural and spiritual practices and customs. The Land Use Commission can assist in the enforcement of the CC & Rs by making these part of the conditions of the rezoning of the lands from the agricultural to the rural classification.

La'au Point must be the most environmentally planned, designed and implemented large lot community in the State. The residents would be educated and informed about the environment and culture, and taught to “Malama ‘aina,” take care of the land and sea.”

This statement precedes the covenant document determined by the Land Use Committee that will place many restrictions on lot owners at La'au Point, in order to attract only those who are concerned about conservation.

As an example, the Conservation Zone and other areas to be protected (approximately 1,200 acres) within the subdivision will be the subject of an easement held by the Land Trust, with guidelines for these uses to be determined prior to the construction of the subdivision and reflecting the importance of the area archaeologically and to subsistence gathering.

These protected lands will be part of an entity that is controlled equally by the homeowners and the Land Trust. All decisions relating to this area: maintenance, subsistence protection, archaeological site protection, personnel, etc., will be the shared responsibility between the Trust and the homeowners, who will share equally in the costs.
MPL will attempt to attract buyers to the La'au point subdivision who reflect the hopes and aspirations of the community. Brochures, sales material and other promotional documents will be vetted by the Land Trust or the EC for accuracy and adherence to their principles.

One of the unique features of the CC &Rs is the condition that every person whose name is on the property title must commit to undergo a certain amount of education about the Moloka'i community and its desires and aspirations with kupuna and the Maunaloa community.

Measures will be taken to assure that these CC & Rs cannot be changed in the future. These CC & Rs include the following:

- prevent a gated community
- restrict the further subdivision of lots
- restrict the area that can be disturbed for use
- prevent construction on slopes of more that 50%
- restrict building height
- require the use of alternative energy
- prohibit the use of pesticides
- require that exterior lighting be shielded from the ocean
- require water catchments and 5,000-gallon storage tanks
- restrict landscaping to native and Polynesian introduced species suitable for dry coastal locations
- prohibit the use of noxious or invasive species; require green architecture
- manages erosion with vegetative cover
- puts a deer fence at the rear of the subdivision

The covenants, Conditions and Restrictions that landowners will need to uphold are described on pages 101 - 105 of the Community-Based Land Use Plan for Moloka'i Ranch that is part of the EIS.

**Additional Recommended Guidelines:**
Informants recommend the following additional provisions to mitigate the impact of the development on subsistence practices:

- **Fence to demarcate private property from public access area**
  All of the informants felt that it is important to have a clear physical demarcation, such as a log fence, running along the individual property lines to distinguish between private property and the public access area. By putting in a fence of some kind the public will know the boundary so that they won't trespass. Another suggestion was to use a round wire fence, called a New Zealand fence.
• **Location of Access Trail**
Informants suggested that there be a physical demarcation between the property line and the ocean, along which the trail would run. The trail would follow the contour, following the old traditional trail as much as possible. Then the existing kiawe would serve as a buffer between the trail and the sand and ocean. This can help reduce impact of the trail on the beach and ocean. The kiawe can be pruned. It is a nitrogen fixing plan and will help other plants to grow around it. The trail should be placed back from the ocean so that it won't wash out. The trail will only be for walking and not for atv's or even bicycles. The trail should not be paved but kept clear and maintained.

• **Emergency access to shoreline through subdivision**
Access through the subdivision should be provided for emergency rescue

• **Document Existing Trails and Roads**
Document and map existing trails and roads for access.

• **Kupuna Access**
To accommodate kupuna and those with special needs, have a golf cart available to assist their access.

• **Landscaping**
Need to prevent landowners from landscaping the area of the setback which ranges from 250 to 1,000 feet.

• **Support for the Maunaloa Community**
Have monies generated go into the community to support the school. Include the Maunaloa 'Ohana I Lokahi Association needs to be involved in the decisions about La'au.

• **Regulate Fertilizers**
The use of fertilizers will be regulated.

• **Involve Maunaloa Community in Stewardship**
Longtime fishers and gatherers from the Maunaloa community will be involved in the monitoring and protection of the marine resources in the development area.

• **Cultural Monitoring**
Provide onsite monitoring of sites and potential erosion areas during clearing, grading and construction. Should have the resource management plan up and running when the grading and construction starts.

• **Hunting**
Have the buyers accept that hunting occurs in the broader surrounding area.

• **Kama'aina residents of the Maunaloa community have seniority**
The seniority for hunting in accordance with traditional subsistence should be for kama'aina residents of the Kaluako'i ahupua'a and MPL employees.

La'au Point Cultural Impact Assessment / 20
• **Papohaku Preservation Plan**
  Apply relevant recommendations from the Papohaku Dunes Cultural and Natural Resource Preservation Plan, Kaluako'i, Moloka'i, Hawai'i Study.

• **Kamaka'ipo Buffer**
  The buffer area for Kamaka'ipo Gulch may need to be expanded. Due to the potential for erosion during grading and construction, the houses close to Kamaka'ipo Gulch should be moved further away from the gulch.

• **Monk Seals**
  Provide education and enforce laws protecting monk seals

• **Community-Based Subsistence Fishing Management Area**
  It is a good idea to establish the community-based subsistence fishing management area that was demonstrated in a pilot project at Mo'omomi. Should also coordinate efforts with the communities of Miloli'i, Hawai'i and Ha'ena, Kaua'i who are also establishing community-based fishing zones. Also respect the Kalaupapa people and their grounds. The rights of the Kalapana people to fish in the Volcano National Park is another model.

• **Restock moi**
  The Land Trust should use some of the money to restock moi if they diminish. Restocking should be part of the management plan.
Conclusion

The overall Community-Based Master Land Use Plan for Moloka'i Ranch is not a perfect plan because it requires the development of the relatively pristine south and west shorelines of Moloka'i adjacent to La'au Point. Nevertheless, it is truly a grassroots community plan which represents a historic good faith effort on the part of Moloka'i Properties Limited and Ke Aupuni Lokahi-Moloka'i Enterprise Community to create sustainable economic solutions that will protect the cultural integrity of a unique Hawaiian island community. This monumental effort deserves serious reflection, deliberation and endorsement.

Ke Aupuni Lokahi-Moloka'i Enterprise Community is the steward of a plan that was designed by a broad cross section of the Moloka'i community. From May through September 1998, a planning group of the Moloka'i community formed seven subcommittees on Health, Education, the Environment, the Economy, Recreation, Youth and Leadership, and Culture to develop a comprehensive grant proposal to the U.S. Department of Agriculture to receive designation as a Rural Economic Empowerment Zone. They sent out newsletters to every postal service customer on the island and held two well-attended community meetings to receive input on the grant proposal. The final proposal contained a statement of the community’s vision for Moloka'i; a description of strengths and weaknesses in the island’s economy and natural environment and a strategy for sustainable community economic development. Although the Moloka'i community was not designated as an Empowerment Zone, they succeeded in attaining the status of a Rural Enterprise Community eligible to receive federal funds totaling $2.5 million over ten years in increments of $250,000 a year to attract additional funds that would launch sustainable economic development projects. The Community-Based Master Land Use Plan for Moloka'i Ranch is Project #47 of the Ke Aupuni Lokahi-Moloka'i Enterprise Community.

Ke Aupuni Lokahi-Moloka'i Enterprise Community continues to be guided by its vision statement that also serves as the vision statement for the Community-Based Master Land Use Plan for Moloka'i Ranch. It is as follows:

*Moloka'i is the last Hawaiian island. We who live here choose not to be strangers in our own land. The values of aloha ' aina and malama ' aina (love and care for the land) guide our stewardship of Moloka'i's natural resources, which nourish our families both physically and spiritually. We live by our kupuna's (elders') historic legacy of pule o' o (powerful prayer). We honor our island's Hawaiian cultural heritage, no matter what our ethnicity, and that culture is practiced in our everyday lives. Our true wealth is measured by the extent of our generosity.*

*We envision strong ' ohana (families) who steadfastly preserve, protect and perpetuate these core Hawaiian values.*
We envision a wise and caring community that takes pride in its resourcefulness, self-sufficiency and resiliency, and is firmly in charge of Moloka'i's resources and destiny.

We envision a Moloka'i that leaves for its children a visible legacy: an island momona (abundant) with natural and cultural resources, people who kokua (help) and look after one another, and a community that strives to build an even better future on the pa'a (firm) foundation left to us by those whose iwi (bones) guard our land.

In the final analysis, the government agencies responsible for decisions about the future of the land and natural resources of Moloka'i must weigh the cultural impacts and benefits of the proposal to develop the west and south shorelines of the island of Moloka'i in consultation with the people of Moloka'i who depend upon these resources for subsistence, cultural and spiritual purposes. In particular, the kama'aina families who have lived in Maunaloa and the Kaluako'i ahupua'a for generations and the longtime employees of Moloka'i Ranch and their relatives have been the primary users of these resources and will be the most directly affected by the proposed development.

There is also the critical issue of Water. Is there enough water to provide for all of the island's major uses and yet allow this development to draw out 1,000,000 gpd of brackish water from Kakalahale? The Hawaiian homesteaders have a special claim and particular interest in this issue. MPL is actively working with all of the major managers and current users of the island's water resources to develop a solution.

There are clearly profound and unprecedented features in the overall Community-Based Master Land Use Plan for Moloka'i Ranch that will benefit future generations of the island as a whole. The gifting of fee title ownership of 26,200 acres to the Moloka'i Land Trust and dedication of 24,950 acres in conservation easements in perpetuity by Moloka'i Properties Limited (MPL) is clearly in the tradition of "Aloha Mai, Aloha Aku," "When aloha is given, aloha should be returned." Such an outstanding and magnanimous gesture deserves recognition as a model for offshore owners of Hawaiian lands on Moloka'i and other islands. Moreover, it is not just the quantity, but the quality of the lands that are being turned over that is significant. The ancient burial grounds of Kawa'aloa, the birthplace of the hula at Ka'ana and the Hula Piko at Maunaloa, the Makahiki grounds of Na'iwa, the fishing village of Kawakiu, the fishing grounds of Halena and Mokio are premier Native Hawaiian legacy lands of great significance to Native Hawaiians throughout the islands.

As with any groundbreaking work that is seeking to create innovative solutions to time worn problems, this plan takes risks. While the plan protects significant subsistence resources on the northeast shoreline of Moloka'i from Kalaupapa to Ilio Point and around to Kepuhi from development, the southwest shoreline from Kaupoa to Hale O Lono will be ringed by luxury residential homes. Extraordinary measures are incorporated into the plan to buffer and protect the subsistence and cultural resources from the negative impacts that such a development can generate.
These include:

- Upholding and assuring Native Hawaiian rights of access for cultural, subsistence and spiritual purposes.

- Creating sizeable conservation zones and buffer areas to protect the cultural sites and shoreline area.

- Ending commercial hunting so that Moloka'i kama'aina can legally engage in subsistence hunting on Ranch lands.

- Hiring two community cultural and natural resource managers who will work with the community to monitor every phase of the project, from clearing and grading, to construction and the moving in and residence of new homeowners.

- Orienting homeowners to appreciate and support the unique and special way of life on Moloka'i as the "Last Hawaiian Island."

- Limiting shoreline access to a foot trail.

Are these measures provided within the Community-Based Master Land Use Plan sufficient to protect these resources for future generations? The kupuna advise us that after all is said and done, it is La'au itself that will determine what will be acceptable and who will be accepted.
Section 1  Introduction: Proposed Development at La'au Point

1.1 Purpose

Moloka'i Properties Limited proposes to develop 200 two-acre rural-residential lots on the west and southwest shores of Moloka'i adjacent to La'au Point in the ahupua'a of Kaluako'i (portions of TMK (2)5-1-02:30). The total project area includes roads, infrastructure, an expansion of the State Conservation District, cultural and environmental preservation zones, and two beach parks on 1,492 acres of vacant land, although the actual area for which rezoning is being petitioned is 875 acres.

This Cultural Impact Assessment Report is being prepared as part of the Environmental Impact Statement (EIS) for the proposed La'au Point Development in compliance with Chapter 343, Hawai'i Revised Statutes and Title 11, Department of Health, Chapter 200, Environmental Impact Rules, State of Hawai'i.

This Cultural Impact Assessment Report is also designed to fulfill the mandate to the Land Use Commission from the Hawai'i State Supreme Court in its ruling, Ka Pa’akai O Ka ‘Aina v. Land use Commission, State of Hawai‘i / 94 Haw. 31 (2000). The specific section of the ruling that served to guide the development of the report is as follows:

“In order for the rights of native Hawaiians to be meaningfully preserved and protected, an appropriate analytical framework for enforcement is needed. Such an analytical framework must endeavor to accommodate the competing interests of protecting native Hawaiian culture and rights on the one hand, and economic development and security, on the other . . .

In order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, the LUC, in its review of a petition for reclassification of district boundaries, must – at a minimum – make specific findings and conclusions as to the following: (1) the identity and scope of ‘valued cultural, historical, or natural resources’ n27 in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to which those resources, including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. n28
In summary, the purpose of this Cultural Impact Assessment report is to:

(1) document Native Hawaiian and Local subsistence, cultural and spiritual resources and practices that are located in the proposed development area;

(2) assess the benefits and impacts of the planned development on the identified subsistence, cultural, and spiritual resources and practices; and

(3) affirm and recommend strategies and actions that can mitigate these impacts in order to protect Native Hawaiian customs and practices.

In addition to Native Hawaiians, "Local" residents of Maunaloa and employees of Moloka'i Ranch are primary users of the natural and cultural resources in the proposed development area, for subsistence and cultural purposes. Community meetings and interviews were inclusive of both Native Hawaiians and "Locals." Moreover, Chapter 343 requires an assessment of the affects of a proposed development on cultural practices in general, not limited to Native Hawaiian cultural practices.

1.2 Scope of Work

1. Conduct an examination of historical documents, Land Commission awards and historic maps to identify traditional and customary Hawaiian and "Local" subsistence, cultural and spiritual resources and activities that exist, or may have existed in the area of the proposed development adjacent to La'au Point.

2. Conduct community meetings for the sharing of concerns about the impact of the proposed La'au development upon subsistence and cultural resources in the project area.

3. Identify primary persons who engage in subsistence activities in the area of the proposed La'au Point Development and interview them in order to gather knowledge about their historic and traditional subsistence practices there. Collect insights into the benefits and impacts of the planned management actions on the cultural practices and features identified. Identify and recommend mitigation ideas for any identified impacts.

4. Prepare a report documenting the results of the review of literature, maps, and historic documents, and the results of the interviews related to traditional practices and land use. The report will assess the benefits and impacts of the planned development on the cultural practices and features identified and affirm and recommend strategies and actions that can mitigate any identified impacts.
1.3 Summary of Proposed La’au Point Rural-Residential Development

- **Project Name:** La’au Point
- **Location:** Kaluako’i, Moloka’i
- **Judicial District:** Moloka’i
- **Landowner:** Moloka’i Properties Limited
- **Applicant:** Moloka’i Properties Limited
- **Tax Map Key:** (2) 5-1-02:30; 5-1-06; 5-1-08: 04, 03, 06, 07, 13, 14, 15, 21, and 25
- **Project Area:** Approximately 1,492 acres
- **SLUDBA Petition Area:** 875 acres
- **Existing Uses:** Vacant
- **Proposed Use:** Single-family rural-residential lots, cultural preserves, trails, and public shoreline access.
- **Land Use Designations:**
  - State Land Use: Agricultural and Conservation
  - Conservation District Subzones: General and Limited
  - Community Plan: Agricultural and Conservation
  - County Zoning: Agricultural
  - Special Management Area (SMA): within the SMA
- **Permits/Approvals Required:**
  - Compliance with Chapter 343, Hawaii Revised Statutes
  - Community Plan Amendment
  - Special Management Area Use Permit
  - State Land Use District Boundary Amendment
  - Conservation District Use Permit
  - Change in Zoning
  - Grading/Building Permit
  - NPDES permit
- **Accepting Authority:** State Land Use Commission
It should be noted that while the development is called La'au Point Rural-Residential Subdivision, that La'au Point itself, is not part of the development. It is not owned by Moloka'i Properties Limited but by the U.S. federal government which owns and manages a lighthouse for navigational safety within a 51 acre parcel.

1.4 Water Plan and Kakalahale Brackish Well

As noted above, the purpose of this Cultural Impact Assessment Report is to document subsistence and cultural resources and practices that may be impacted by the proposed La'au development. Many of the participants in the community meetings, especially the Ho'olehua Native Hawaiian Homesteaders, stated that the greatest cultural impact of the proposed La'au Point Development is the impact of the water plan on the future expansion of agriculture and residences on Hawaiian Homelands and on subsistence and cultural resources makai of the well. Many voiced opposition to the proposed development because of the proposal to draw out 1,000,000 gallons per day from the abandoned Kakalahale brackish water well.

This cultural impact assessment report also documents the cultural concerns about the Kakalahale Well. It includes concerns expressed in community meetings as well as findings about cultural impacts from the testimonies provided to the Hawai'i State Commission on Water Resource Management for the contested case hearing for the Waiola Well Water Use Permit Application. Since the Kakalahale well is located in the general vicinity of the proposed Waiola Well, in the Kamiloloa aquifer sector, the community and MPL agree that the testimonies about cultural impacts in that case would be relevant to the Kakalahale Well.
1.5 Community-Based Master Land Use Plan for Moloka'i Ranch

The larger context of the proposed La'au Point Development project is the Community-Based Master Land Use Plan for Moloka'i Ranch. Initiated in 2003 by the Ke Aupuni Lokahi Mo'okai Enterprise Community (KAL-EC) and MPL, this Land Use Plan, of which the La’au application is a key piece, was designed and will be implemented by the community of Moloka'i.

On one hand, the community faced the prospect of Molokai Ranch lands being split up and sold off and the potential loss of Moloka'i Ranch employee jobs with continuing deficits in Ranch operations. On the other hand, the Moloka'i community wanted to protect existing Ranch jobs, create new economic opportunities by re-opening the Kaluako'i Hotel, while at the same time conserve its rural way of life. These complementary interests, combined, made the urgency of agreeing to the La'au Point Development project of critical importance to both the local MPL staff and the KAL-EC.

The planning process, involving more than 1,000 Moloka‘i residents, was unique, complicated and exhaustive. It sets an important precedent and model of community-based planning.

The La'au Point Development project is integral in the implementation of the Community-Based Master Land Use Plan for Moloka'i Ranch. In this report, the overall plan will be considered in the assessment of benefits, impacts and mitigation measures of the development project.
Section 2  Framework and Methodology

2.1  Framework For This Cultural Assessment

2.1.1  La'au Subdivision Archaeological Preservation and Mitigation Plan

The La'au Subdivision Archaeological Preservation and Mitigation Plan was prepared by Cultural Landscapes in May 2006. For this reason, this cultural impact assessment report will not address the cultural historical sites and features, but focus on the impacts of the proposed La'au development on subsistence and cultural resources and practices. The lead anthropologist in Cultural Landscapes is Maurice Major. Mr. Major has worked on Moloka'i since 1991. In addition to working on the archaeological inventory of La'au and writing the 2001-2002 archaeological plan for the area, he has worked in many parts of the ahupua'a of Kaluako'i and Pala'au. The following summary was prepared by Cultural Landscapes for distribution to the community in meetings held to receive input about the impacts of the proposed development on subsistence and cultural resources and practices.

"La'au Subdivision Archaeological Plan Summary:
The original version of this plan (Kahaawa to Hakina, Ahupua'a of Kaluako'i, Island of Moloka'i, Major 2001) dealt with the former “Alpha USA” parcel (TMK 5- 1-2-030). Since then, changes in the project area and the size and location of proposed subdivision lots have necessitated some revisions. More fundamentally, the Ranch’s decision to engage the community in master planning has resulted in a scaled-back development with a more conservation-oriented approach, and the proposed land trust, resource management staff, and cultural protection zones have required that the preservation and data recovery plans be augmented and revised. For the most part, the archaeological plans closely resemble the 2001 version, which was accepted by SHPD. Changes in the revised version include:

- Re-assignment of several Data Recovery sites to Preservation.
- Shift from defining buffers around individual or clustered sites to instead establishing a confined development corridor.
- Increased emphasis on active cultural resource management, anticipating as a neighbor a community land trust employing a cultural resource staff person.
- Recommendation to collect some data from preservation sites to provide a better baseline for monitoring and help expand our understanding of the chronology and nature of settlement in the area, and specifically to guide environmental restoration.
The archaeological plans for La'au include four sections that cover the various cultural resource needs that will arise in relation to 201 sites within the proposed development and preserves. They are:

**Preservation** – Describes procedures for protecting and preserving cultural sites. Actions range from the immediate to the perpetual, and include site condition evaluation, stabilization, short and long-term protection, protocol education, periodic field checks, and data collection. The focus is on conservation of cultural landscapes, rather than isolated sites.

**Data Recovery** – Describes the procedures and research issues for mapping and excavation of some sites within the road/infrastructure corridor and proposed subdivision lots. Since the most significant sites are being preserved, data recovery sites mostly consist of very simple agricultural modifications, lithic scatters, and more recent historical sites. All sites will undergo data recovery or, more likely, preservation, and samples within sites will be more robust than minimal SHPD requirements.

**Monitoring** – Describes the procedures and responsibilities for archaeological maka'ala of development activity. In addition to ensuring that preservation areas are not damaged, monitoring detects previously unknown cultural deposits, and if they are found, stops work in the area, evaluates the find, and if necessary consults with SHPD and interested parties to establish a preservation buffer or recover data.

**Burial Treatment** – Describes the procedures for dealing with known, suspected, and inadvertently discovered burial sites (with no revisions to the accepted 2001 plan). All burials will be preserved in place, and all sites of unknown function for which burial is a possibility will be preserved. Newly found burials trigger consultation with the Moloka'i Island Burial Council.

Because the plans are interrelated, and important part of the general approach is to define the **process and sequence**. The past two years of community meetings can be considered the first phase, and with ongoing consultation helps define what happens next. The Ranch has committed to planning for the entire project area, to maintain or expand upon previous preservation commitments, and to have this revision include plans for all of the affected parcels including proposed subdivision lots, whose future owners must also abide by the plans. The process continues:

- Re-survey the road corridor to verify sites, augment their descriptions, and search for new sites. Finds more significant than previous records indicate will cause re-routing. Also at this time, the Papohaku Ranchlands section of the corridor will be described and reported at inventory level for SHPD review.
• Next, short-term preservation measures will be implemented, such as establishing protective buffers and emergency stabilization.

• Next, data recovery will be implemented. At the same time, implementation of long-term preservation measures will begin.

• During the course of construction, monitoring will occur.

• Final reports for each plan will be submitted for community feedback and submitted to SHPD for review as required by rules and statutes.

2.1.2 Focus On Subsistence and Cultural Resources and Practices

Subsistence and cultural resources and practices are usually examined in relation to a particular island, district and ahupua'a. An ahupua'a runs from the sea to the mountains and contains a sea fishery and sea beach, a stretch of kula or open cultivable land and higher up its forest. The court of the Hawaiian Kingdom described the ahupua'a principle of land use in the case of In Re Boundaries of Pulehunui, 4 Haw. 239, 241 (1879) as follows:

A principle very largely obtaining in these divisions of territory [ahupua'a] was that a land should run from the sea to the mountains, thus affording to the chief and his people a fishery residence at the warm seaside, together with the products of the high lands, such as fuel, canoe timber, mountain birds, and the right of way to the same, and all the varied products of the intermediate land as might be suitable to the soil and climate of the different altitudes from sea soil to mountainside or top.

In this study, the island is Moloka'i, the district is Kona and the ahupua'a is Kaluoko'i in West Moloka'i and includes the nearshore resources out to one-quarter mile from the shoreline or to the outer edge of the reef.

Hawaiians consider the land and ocean to be integrally united and that these land sections also include the shoreline as well as inshore and offshore ocean areas such as fishponds, reefs, channels, and deep sea fishing grounds. Coastal shrines called fishing ko'a were constructed and maintained as markers for the offshore fishing grounds that were part of that ahupua'a.

It should be noted that the methods and techniques of accessing, acquiring or utilizing traditional natural resources may have changed over time but this does not detract from the fact that it is used and prepared for Hawaiian custom and practice relating to subsistence, culture or religion.
For example, Hawaiian fishermen may use motor boats rather than canoes to get to their ancestral fishing ground. They may use a nylon net rather than one sewn out of native plant materials to surround the fish and pa'ipaa'i or to entangle them in the overnight tide. In most cases they are still utilizing ancestral knowledge of ocean tides, currents and reefs to locate and catch the fish. Their catch is used to honor family 'aumakua and to feed their extended families and neighbors.

What distinguishes Hawaiian custom and practice is the honor and respect for traditional 'ohana cultural values and customs to guide subsistence harvesting of natural resources. Such 'ohana values and customs include but are not limited to the following:

1. Only take what is needed.
2. Don't waste natural resources.
3. Gather according to the life cycle of the resources. Allow the resources to reproduce. Don't fish during their spawning seasons.
4. Alternate areas to gather, fish and hunt. Don't keep going back to the same place. Allow the resource to replenish itself.
5. If an area has a declining resource, observe a kapu on harvesting until it comes back. Weed, replant and water if appropriate.
6. Resources are always abundant and accessible to those who possess the knowledge about their location and have the skill to obtain them. There is no need to overuse a more accessible area.
7. Respect and protect the knowledge which has been passed down intergenerationally, from one generation to the next. Do not carelessly give it away to outsiders.
8. Respect each other's areas. Families usually fish, hunt, and gather in the areas traditionally used by their ancestors. If they go into an area outside their own for some specific purpose, they usually go with people from that area.
9. Throughout the expedition keep focused on the purpose and goal for which you set out to fish, hunt, or gather.
10. Be aware of the natural elements and stay alert to natural signs, e.g. falling boulders as a sign of flash flooding.
11. Share what is gathered with family and neighbors.
12. Take care of the kupuna who passed on the knowledge and experience of what to do and are now too old to go out on their own.
13. Don't talk openly about plans for going out to subsistence hunt, gather, or fish.
14. Respect the resources. Respect the spirits of the land, forest, ocean. Don't get loud and boisterous.
15. Respect family 'aumakua. Don't gather the resources sacred to them.
On Molokai, the community has identified subsistence as essential to their way of life. They have participated in studies to document the importance of subsistence and to better protect the natural resources upon which they subsist. In one such study, the Governor's Task Force on Molokai Fishpond Restoration came up with a definition of subsistence that has been generally accepted. It is as follows:

| On Moloka'i, subsistence is the customary and traditional uses of wild and cultivated renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, transportation, culture, religion, and medicine; for barter, or sharing, for personal or family consumption and for customary trade. (Governor's Task Force On Moloka'i Fishpond Restoration) |

In addition to the above principles, subsistence and cultural practices are also defined by traditional responsibilities and rights of the 'ohana or extended families of Moloka'i.

2.1.3 'Ohana Responsibilities and Rights

Traditional and customary rights of ahupua'a tenants are rooted in the customs, practices and rights of the original and still primary social unit of the Hawaiian people, the 'Ohana. Custom and practice encompasses the full range of traditional, cultural, religious, and subsistence activities Native Hawaiian 'ohana have engaged in for many centuries to live as a people and survive in a unique island environment. There are customs and practices related to each major aspect of Hawaiian lifestyle and livelihood including: (1) community life; (2) family; (3) human well-being and spirituality; (4) natural environment, cultural and ecological resources; (5) rights; and (6) economics.

Throughout the islands of Hawaii, we find subsistence thriving in particular rural Hawaiian communities. Surrounding these communities, are pristine and abundant natural resources in the ocean, the streams, and the forest. This is largely due to the continued practices of aloha 'aina/kai (cherish the land and ocean) and malama 'aina/kai (care for the land and ocean). These rural communities were bypassed by the mainstream of economic, political, and social development and the Hawaiians living in these communities continued, as their ancestors before them, to practice subsistence cultivation, gathering, fishing and hunting for survival. Thus, we find in these areas that the natural resources sustained a subsistence lifestyle and a subsistence lifestyle, in return, sustained the natural resources. Moloka'i offers the premier examples of such communities. (Matsuoka, McGregor, Minerbi, 1994; McGregor, Matsuoka, Minerbi, 1997)
The quality and abundance of the natural resources of these rural Hawaiian communities such as on Moloka'i can also be attributed to the persistence of 'ohana values and practices in the conduct of subsistence activities. An inherent aspect of these 'ohana values is the practice of conservation to ensure availability of natural resources for present and future generations. These rules of behavior are tied to cultural beliefs and values regarding respect of the 'aina, the virtue of sharing and not taking too much, and a holistic perspective of organisms and ecosystems that emphasizes balance and coexistence. The Hawaiian outlook which shapes these customs and practices is lokahi or maintaining spiritual, cultural and natural balance with the elemental life forces.

In communities such as on Moloka'i where traditional Hawaiian customs and practices have continued to be practiced the 'ohana respect and care for the surrounding natural resources. They only use and take what is needed. They allow the natural resources to reproduce. They share what is gathered with family and neighbors. Through understanding the life cycle of the various natural resources, how changes in the moon phase and the wet and dry seasons affect the abundance and distribution of the resources, the subsistence practitioners are able to plan and adjust their activities and keep the resources healthy. Such knowledge has been passed down from generation to generation through working side-by-side with their kupuna or elders.

This ancestral knowledge about the land and its resources is reinforced through continued subsistence practices. While traveling to the various 'ili of the traditional cultural practices region through dirt roads and trails, and along spring fed streams, and the shoreline, practitioners continuously renew their cultural knowledge and understanding of the landscape, the place names, names of the winds and the rains, traditional legends, wahi pana, historical cultural sites, and the location of various native plants and animals. The practitioners stay alert to the condition of the landscape and the resources and their changes due to seasonal and life cycle transformations. This orientation is critical to the preservation of the natural and cultural landscape. The land is not a commodity to them. It is the foundation of their cultural and spiritual identity as Hawaiians. They proudly trace their lineage to the lands in the region as being originally settled by their ancestors. The land is a part of their 'ohana and they care for it as they do the other living members of their families.
Reflecting and summarizing the stewardship responsibilities for the land that have been passed on from one generation to the following on Moloka'i is the mana'o of kupuna Daniel Pahupu shared in a 1961 interview with Mary Kawena Pukui:

Ke ha'awi nei au ia 'oe. Malama 'oe i keia mau mea. ‘A’ohe malama, pau ka pono o ka Hawai‘i.
I pass on to you. Take care of these things. If you don’t take care, the well-being of the Hawaiian people will end.
Daniel Pahupu, in interview with Mary Kawena Pukui, Mana’e, Moloka‘i, March 9, 1961.

The community guidelines for land use principles and policies in the Community-Based Master Land Use Plan for Moloka'i Ranch and the interviews with Moloka'i kupuna and subsistence practitioners which are summarized in this report reflect the ongoing stewardship responsibilities for the marine resources of the Mo'omomi Preserve which have been assumed by contemporary generations of Moloka'i residents.

2.1.4 The Importance of Subsistence on Moloka'i

Traditionally, Moloka‘i, with its extensive protected reefs and fishponds gained the reputation of a land of "fat fish and kukui nut relish." Moloka‘i Hawaiians obtained marine resources from the shallow offshore reefs; the deep sea channels between Moloka‘i and Maui, O‘ahu, and Lana‘i (Pailolo, Kaiwi, and Kalohi); the deeper ocean off of the island’s north shore; and from an extensive network of human constructed fishponds.

Moloka‘i is known as the "Last Hawaiian Island." According to the 2000 U.S. Census, the total population of Moloka‘i was 7,257. Of this total population, 4,442 or 61 percent were Native Hawaiians. Among the eight major islands, Moloka‘i has the highest concentration of Native Hawaiians outside of Ni‘ihau.

Many families on Moloka‘i, particularly Hawaiian families rely upon subsistence fishing, hunting, gathering, or cultivation for a significant portion of their food. Even families who may not engage in such activities benefit through sharing and exchange among family members and neighbors.

The traditional Hawaiian diet study conducted on Moloka‘i in 1982 by Na Pu‘uwai, a community-based Native Hawaiian health organization proved that a diet consisting of traditional Hawaiian foods - fish, taro, breadfruit, sweet potato, etc. reduces weight and the risk of heart disease, high blood pressure and diabetes. Thus, the availability of traditional foods, most of which is acquired through subsistence fishing, hunting, gathering or cultivation, is a critical component for improving Native Hawaiian health.

The Governor's Moloka'i Subsistence Task Force Study, completed in 1994 (Subsistence Study), concluded that many families on Moloka‘i, particularly Hawaiian families,
continued to rely upon subsistence fishing, hunting, gathering, or cultivation for a significant portion of their food. A random sample survey of the families on Moloka‘i revealed that twenty-eight (28%) percent of their food was acquired through subsistence activities. Among Native Hawaiian families the survey found that thirty-eight (38%) percent of their food was derived from subsistence activities. The families reported receiving food through subsistence activities at least once a week. Virtually every person surveyed believed that subsistence was important to the lifestyle of Moloka‘i. (Matsuoka, McGregor, Minerbi, 1994, see Appendix 18)

Availability of the natural resources needed for subsistence was essential to Moloka‘i households where the unemployment rate was consistently higher than on other islands and a significant portion of the population depended upon public assistance. In March 1993, the unemployment rate of 8.1% on Moloka‘i was higher than the statewide rate of 4.7%. With regard to public assistance, in 1990, 24.4% of the Moloka‘i population received food stamps; 12% received AFDC and 32.5% received Medicaid. According to the U.S. census for 1990 21% of the families on Moloka‘i had incomes that fell below the poverty level of $12,674 for a family of four. The ability to supplement meager incomes through subsistence was very important to maintaining the quality of life of families on the island through 1994.

Subsistence has also contributed to the persistence of traditional Hawaiian cultural values, customs, and practices. Cultural knowledge, such as about place names; fishing ko‘a; methods of fishing and gathering; or the reproductive cycles of marine and land resources were passed down from one generation to the next through training in subsistence skills. The sharing of foods gathered through subsistence activities continued to reinforce good relations among members of extended families and with neighbors.

The Subsistence Study also documented the growing concerns of the Moloka‘i community about diminishing resources. While the natural resources of Moloka‘i and its surrounding waters were still abundant enough to support both subsistence and commercial harvesting, the resources were not as plentiful as adult subsistence practitioners remembered them to be when they were growing up. The subsistence practitioners were faced with challenges from tourism, commercial harvesting, offisland fishermen and hunters, and newcomers from continental U.S. and the Philippines. Hawaiian conservation practices that were customarily passed down from one generation to the next were being set aside in light of increasing competition from off-island fishermen and hunters and new residents. There was a growing feeling that "if you don't take everything when you see it, then someone will take it before you come back the next time." Thus, rather than taking only what was needed, more was being harvested and wasted. The widespread use of large freezers also contributed to overharvesting. Before the use of freezers, the ocean was "the icebox" and one only gathered enough for the ‘ohana, close neighbors and kupuna to eat. Subsistence practitioners had started to gather more than what their families could immediately eat and the surplus was being stored in freezers.
In 1993, Moloka'i subsistence practitioners who participated in the Subsistence Study realized that they had arrived at a crucial juncture. They were concerned that if something was not done to reverse the trend of overharvesting and diminishing resources there would be nothing left for future generations. They felt that community wide acceptance of traditional Hawaiian values and practices of aloha 'āina would be key to restoring the balance between subsistence fishing, gathering and hunting and the sustainability of the island's natural resources. They recognized the need for everyone in the community to make a commitment to manage the natural resources of Moloka'i not just to benefit the current generation, but for the benefit and well-being of six and seven generations into the future. Conservation education through the schools, DLNR hunter education and education about fishing rules and regulations were seen as important elements in the effort to sustain Moloka'i's natural resources. A series of recommendations for the management of resources were generated. (see report - Appendix 18)

Below is the map of subsistence activities indicated by practitioners on Moloka'i in focus group meetings throughout the island in 1993.
Figure 1. Map of subsistence activities indicated by Moloka'i practitioners in 1993.
This 1993 Subsistence Sites map indicates intensive fishing and ocean gathering in the area where the La'a'u Point Development is proposed. It also indicates that subsistence practitioners who participate in the 1993 survey hunted in the vicinity of La'a'u Point.

Interviews with key informants that were conducted for this report in 2006 indicate that the area is primarily accessed by land for subsistence resources by families of Ranch employees and families who have lived in the Maunaloa community for more than one generation. By ocean access, the marine resources are also extensively harvested by subsistence and commercial boaters from both O'ahu and Moloka'i. Unless one has a key to take a vehicle out to La'a'u, it is a long, hot, dry walk. For this reason, the primary users are those who can get a key to the gate and enter with a vehicle, that is, Ranch employees and their families and friends. In addition, especially since the road to Hale O Lono harbor was opened, Moloka'i residents with boats access the area by launching out of Hale O Lono, Pala'a or Kaunakakai. Boaters from O'ahu also frequently fish and dive along the West and south coastlines adjacent to La'a'u Point. Hunting also extends into the La'a'u area.

The Subsistence Study recommended the establishment of a "Community-Based Subsistence Fishing Management Area" from Nihoa Flats and west through Mo'omomi and over to 'Ilio Point. In 1994, the Hawai'i State Legislature passed a bill which gave the Hawai'i State Department of Land and Natural Resources the authority to designate community-based subsistence fishing management areas and to carry out fishery management strategies through administrative rules for the purpose of reaffirming and protecting fishing practices customarily and traditionally exercised for purposes of Native Hawaiian subsistence, culture, and religion. The bill also established a pilot demonstration project for the fisheries and adjacent coastline between Nihoa Flats and 'Ilio Point. The demonstration area was eventually designated between Nahihikina'u and Kaiehu points. The demonstration pilot project expired July 1, 1997. Under the Community-Based Master Land Use Plan for Moloka'i Ranch, the Moloka'i Land Trust, the KAL-EC, MPL and the broader community would seek to institute a community-based subsistence fishing management area in the nearshore area from Dixie Maru, south to La'a'u Point and east to Pala'a.

With regard to the area of the Kakalahale Well that is part of the MPL water plan, the 1993 Subsistence Sites map indicates that the Kamilo'oa shoreline and nearshore waters are used extensively for fishing and ocean gathering and that the mauka area is used for hunting and gathering of forest and stream resources. Given that there is still a high concentration of Native Hawaiians in the Kapa'akea-Kamilo'o-Makakupaia area, it is reasonable to assume that these activities are ongoing in 2006.

2.1.5 Coastal Cultural Resources

The proposed La'a'u Point Development runs along the west shore from Kaupoa to La'a'u Point and east from La'a'u Point to Hale O Lono. The primary subsistence and cultural resources are coastal and marine resources and deer. The following identifies the coastal resources which are essential for the conduct of Hawaiian subsistence customs, beliefs
and practices. Participants in community meetings and the key informants were asked to identify which of these resources are located and utilized in the area proposed for the La'au Development.

**Coastal Cultural and Subsistence Resources**

| __ | streams | __ | ponds |
| __ | ‘auwai (taro irrigation ditches) | __ | lo‘i kalo |
| __ | springs | __ | caves |
| __ | trails | __ | wahi pana (named places) |
| __ | sacred places | __ | dunes |
| __ | landings | __ | bridges |
| __ | surfing sites | __ | sandy beach |
| __ | fishing area | __ | fishpond |
| __ | fish trap | __ | fish house |
| __ | hunting areas | __ | kilo i’a (fish sighting) |
| __ | muliwai (brackish pond) | __ | anchialine pond |
| __ | trails | __ | salt ponds |
| __ | wells | __ | turtle nesting area |
| __ | historic walls | __ | basalt veins for tools |
| __ | alae vein | __ | salt pans |
| __ | shrines | __ | salt gathering areas |
| __ | ko’a (fishing shrines) | __ | heiau (temples) |
| __ | historic sites | __ | cultural use areas |
| __ | ho’a’ailona (natural signs) | __ | sighting place |
| __ | lele (cliff jumping spots) | __ | native plants |
| __ | pu’uhonua (places of refuge) | __ | holua slides |
| __ | cultivation area | __ | leina (jumping off point for souls to cross over) |
| __ | archaeological area | __ | kupa’e |
| __ | archaeological sites | __ | hiihiwai/wi |
| __ | burials | __ | ‘anae |
| __ | o’opu | __ | bathing pools |
| __ | aholehole | __ | lava tubes |
| __ | steam bath areas | __ | petroglyphs |
| __ | limu gathering areas | __ | paddling areas |
| __ | subterranean water course | __ | view plane |
| __ | kapu kai/hi’u wai areas | __ | burial markers |
| __ | artifacts | __ | birthing stones |
| __ | seasonal residential sites | __ | Pohaku Kane |
| __ | water caves | __ | estuary |
| __ | phallic stones | __ | house sites |
| __ | coral reef | __ | dams |
| __ | spawning grounds | | |
| __ | po kane routes (night marchers | | |
| __ | ‘aumakua (ancestral deities) domain | | |
2.1.6 The Water Plan and Waiola Contested Case Testimonies

The Water Plan is integral to the La'au Point development proposal. Hawaiian homesteaders, especially those with lots in Ho'olehua, feel that the greatest cultural impact of the proposed La'au Development is the MPL water plan. They feel that the withdrawal of an additional 1,000,000 gallons per day of brackish water from the Kakalahale well will take away water that the Department of Hawaiian Homelands (DHHL) will need to support future expansion of agriculture and residential lots on their Moloka'i lands.

The Water Plan was discussed in the key informant interviews. In addition to information gathered for this report, testimonies from the Waiola Water Permit contested case have been reviewed and analyzed. Issues raised in the Waiola contested case about the impact of the proposed well on subsistence resources and activities makai of the Kakalahale well are summarized and discussed in this report.

2.1.7 Broader Indirect Impacts

Community meetings and interviews focused on the impact to subsistence and cultural resources and activities in the area directly affected by the proposed La'au Residential Development, the pumping of brackish water from the Kakalahale well.

Indirect affects of the development on subsistence and cultural activities outside of the project area and water development that were raised in community meetings and interviews are summarized and generally addressed in this report. Details of the affect of the proposed development on the overall way of life on Moloka'i as "The Last Hawaiian Island" is fully addressed in the Social Impact Assessment that is part of this EIS.

2.1.8 Community-Based Master Land Use Plan for Moloka'i Ranch

The larger Community-Based Master Land Use Plan for Moloka'i Ranch will be considered in this report with regard to mitigation measures and alternate options to the proposed La'au Point Development.

In as much as issues were raised in community meetings and interviews about the overall affect of the proposed development on the way of life and lifestyle of Moloka'i, general reference is made in this report as to how the Community-Based Master Land use Plan for Moloka'i Ranch can help to mitigate these broader social impacts.
2.2 Methodology and Process

2.2.1 KAL-EC, MPL and Community Planning Process

The two-year process to develop the Community-Based Master Land Use Plan for Moloka'i Ranch was an extended process of identifying cultural and subsistence resources and practices throughout Moloka'i Ranch lands, including the lands proposed for development adjacent to La'au Point. The process included a site visit to the south and west coastline where the development is proposed. Key cultural resources, sites and complexes were visited and subsistence access routes and setbacks were discussed with MPL and its planning consultant, Frank Brandt of PBR.

Figure 2. Meeting of the EC Project #47 Land Use Committee at Hale Pumehana in August 2004.
Professor McGregor participated in the planning process as a member of the Culture Committee and the Land Use Committee. The Culture Committee identified cultural resources which should be protected under a "Cultural Conservation and Management Zone" which was defined as follows:

Establish a Cultural Conservation and Management Zone to include the Historic Cultural Sites and the Complexes of Na’iwa (Manawainui-Kahanui), Kaluako‘i-Ka’ana-Pu‘u Nana (Kalaipahoa-‘Amikopala), Kaunakakai, and Kawela Cultural Complexes; Cultural and Subsistence use and resource areas; a subsistence fishing zone of one-quarter (1/4) mile offshore on the North and West Shore and to the outside of the reef surrounding the remainder of the property (South shore).

For Kaluako‘i, the cultural district was defined as follows:

The Kaluako‘i Cultural District is to protect the historic and cultural sites and resources for current and future spiritual, cultural practices and subsistence uses. It includes the following sites and complexes:

- Punakou which is inclusive of Ka’ana, Pu‘u Nana, and Ho’olehua
- Paka‘a trail which is located in the entire Kolo Gulch
- Paka‘a cultivation fields in the uplands of Kopala
- Kalaipahoa-‘Amikopala and Kukui adze quarry sites
- Kamaka’ipo complex of sites in the entire gulch
- Kahualewa Heiau, mauka of Waikane Gulch
- Heiau, mauka of Halepa Road and between Kahinawai and Oneohilo gulches
- Kawakiu Iki and Kawakiu Nui village sites and burials
- Dunes of Keonelele
- Various fishing ko‘a along the shoreline
- Burial Site located west of Kaluako‘i water tank in Kaka‘ako Gulch
- All sites identified on the Maurice Majors maps

The Cultural Committee discussed the importance of the cultural sites and resources in the area proposed for development adjacent to La‘au Point. The members had reservations about placing the residential development in the proposed area and discussed alternative sites along the south and west shore of Moloka‘i and in the area mauka of La‘au Point and below Maunaloa Town. Alternative coastal areas were more sensitive to development because of the cultural resources or the terrain. Development mauka of La‘au would not produce the revenue necessary to re-open the Kaluako‘i Hotel and develop the residential infrastructure. These alternatives are discussed below.

In the end, through joint discussions with MPL, the Cultural Committee recommended a minimum setback of 250 feet from the designated property line along the entire shoreline; the establishment of a public access walking trail along the entire shoreline, with parking, a public park, and a comfort station at either end of the west and south shore; the creation of cultural and resource protection zones on approximately 1,000 acres; the maintenance of streams, gulches and floodways as open space; and the creation of an archaeological
preserve of approximately 116 acres at Kamaka'i po Gulch. The MPL, the KAL-EC, and the Moloka'i Land Trust will work with the community to establish a subsistence fishing zone of one-quarter (1/4) mile offshore on the North and West Shore and to the outside of the reef surrounding the remainder of the property (South shore).

2.2.2 Community Meetings

Announcements inviting the community to meetings to share concerns about on the subsistence and cultural impacts of the La'au Development Proposal were posted in two of the local Moloka'i newspapers - The Moloka'i Dispatch and the Moloka'i Island Times and flyers were posted throughout the island. The posted agenda included (1) Review plans and maps of conservation shoreline setback; cultural sites protected areas; subsistence fishing, gathering and hunting zones in relation to the proposed development; (2) Identify additional resources and protection measures; (3) Discuss water plan.

The announced community meetings, co-sponsored by the Office of Hawaiian Affairs, were held from 6pm to 8pm on:

- May 31, 2006 at the Maunaloa Elementary School Cafeteria for the Maunaloa, Kaluako'i and Papohaku communities;
- June 1, 2006 at Kulana 'Oiwi Halau in Kalama'ula for the Kalama'ula and Kaunakakai communities;
- June 5, 2006 for a focus on fishing and ocean gathering at the OHA/DHHL Conference Room;
- June 6, 2006 at Kualapu'u Elementary School Cafeteria for the Ho'olehua and Kala'e communities;
- June 7, 2006 at the Kilohana Recreational Center for the Mana'e or East End communities; and
- June 8, 2006 at the Mitchell Pauole Conference Room for a focus on hunting and land gathering.

A total of 250 persons attended the meetings and signed in as participants. Additional participants chose not to sign-in, concerned that their presence might be interpreted in this report as implied support for the plan. The input received in the community meetings are summarized below.

A special meeting with the Maunaloa kupuna was held to discuss the social impacts of the proposed development with the consultant conducting the social impact study. Input relevant to cultural impacts were noted and are included in the summary below.

Community meetings to discuss the water plan were held in Maunaloa and Ho'olehua. Input relevant to cultural impacts were noted and are included in the summary below.
2.2.3 In-depth Semi-structured Interviews

Between June 8, 2006 and August 15, 2006 eighteen kama'aina were interviewed about their experience in the proposed development area; their knowledge of natural and cultural resources in the area; their subsistence and cultural activities there; the impact of the proposed development on the identified natural resources and their described activities; concerns about the water plan; and their overall assessment of the proposed project.

Mayson "Pono" Asano, Jr. -born and raised on Moloka'i. As a member of Hana Kupono when he was young, he camped near Hale o Lono during the men's Moloka'i Hoe went fishing, gathering and picking 'opihi along the south shore.

Malu Burrows - born and raised on Moloka'i. His great-grandfather built the La'au Point Lighthouse and his grandfather and father manned the lighthouse after him. Mr. Burrows is a meat inspector.

Rikke Cooke- descendant of the Cooke family who owned Moloka'i Ranch which included the ahupua'a of Kaluako'i, including the area proposed for development. He is a professional photographer, educator.

Guy Espaniola - born and raised on Moloka'i. The Ranch evicted him from Maunaloa town when the plantation houses were razed to build the new houses.

Mercedes Espaniola - born at the Hula Piko near Maunaloa town. Raised her family in Maunaloa and continues to live there.

Joseph Espaniola - moved to Moloka'i to work for the plantation until he retired.

Pepe Espaniola - Son of Joseph Espaniola. Born and raised in Maunaloa.

Shige Inouye - born and raised on Moloka'i. He worked for Moloka'i Ranch when it was the wholesale distributor for Standard Oil and later managed the Ranch's water system.

Kalapana Kealihiomalu - born and raised in Kalapana on the island of Hawai'i, he married into the Duvauchelle family and works for the Ranch.

Dennis Kamakana - born and raised on Moloka'i, former part-time commercial fishermen, currently works for GASPRO. Mr. Kamakana's relatives were cowboys for Moloka'i Ranch and camped on the West End with his uncles and their families.
Halona Kaopuiki - born and raised on Moloka'i, Ho'olehua Homesteader, subsistence fisher, gatherer, hunter and experienced in Moloka'i field archaeology. His father and uncles worked for Moloka'i Ranch.

Rheno Lapinid - born and raised on Moloka'i. He lived in Maunaloa and Kualapu'u and worked for Libby & McNeil and Moloka'i Ranch.

Keali'i Mawae - born and raised on Moloka'i. His grandfather worked for Moloka'i Ranch. Mr. Mawae is a homesteader in Ho'olehua and is a commercial fisherman.

Henry Paleka - born and raised on Moloka'i. Worked for the plantation, the Department of Education, the power plant, and Department of Hawaiian Homes. Has been in charge of security for Moloka'i Ranch since 1995.

Josh Pastrana - born and raised on Moloka'i. His grandmother lived in a Ranch house near Kaupoa. He works with Akaku Media Center.

John Quintura - born and raised in Maunaloa, worked for the State Department of Transportation at the airport.

Junior Rawlins - born and raised on Moloka'i. Third generation working for Moloka'i Ranch. He worked for B & C Trucking.

Bernie Santiago - has lived on Moloka'i since 1955. He worked for the plantation and in construction. He was evicted from Maunaloa by Moloka'i Ranch when the company razed the plantation town and built new homes.

Information provided by the key informants are summarized in the findings section of this report and kept anonymous. Notes of the interviews will be kept on file by Professor McGregor. The information was shared generously by the informants and provides important insights into subsistence and cultural customs and practices in the area proposed for development.

2.2.4 Site Visit and Ethnographic Sources

Professor McGregor and colleague Sean McNamara went on a site visit of the area proposed for development on Moloka'i's West coast from Kaupoa to La'au Point on June 8, 2006. Photos from this site visit are included in the report.

General historical and ethnographic documents and maps were located, reviewed and analyzed by colleague Sean McNamara and his fellow students when they developed the Papohaku Dunes Cultural and Natural Resource Preservation Plan. These had been located at the Bernice Pauahi Bishop Museum archives and library, Hamilton Library, the Hawai'i State Archives, and the Survey Office of the Department of Accounting and General Services. Archaeology studies relevant to the Kaluako'i ahupua'a at the State
Historic Preservation Division (SHPD) were also gathered and reviewed for relevant information. In addition, McNamara and the planning students conducted oral history interviews about the Kaluako'i ahupua'a with Halona Kaopuiki, Kelson "Mac" Poepoe, Jimmy Duvauchelle, Billy Akutagawa, Noa Emmett Aluli, and Walter Ritte. The information gathered from the studies and interviews are summarized below in the section on the Mo'olelo and Wahi Pana of Kaluako'i.

Sections from Catherine Summers Molokai: A Site Survey, (1971) relevant to the Kaluako'i ahupua'a were reviewed for general historical information but the information relating to specific sites are included in the archaeological preservation and mitigation plan by Major. Additional ethnographic sources on the Kaluako'i ahupua'a that were relied upon for this report are listed in the bibliography. Of special note are videotaped interviews and programs with Kumu Hula John Kaimikaua in the UH Sinclair Library Wong Audiovisual Collection and an interview with John Kaimikaua by Phillip Spalding III.

Land records at the Bureau of Conveyances were also examined to reconstruct the history of ownership of the Kaluako'i ahupua'a.

Professor McGregor also reviewed ethnographic information contained in letters of "Notice of Intent to Intervene." As described above, both McGregor and McNamara reviewed testimonies in the Waiola Contested Case Hearings for information about subsistence and cultural resources and activities in the Kamiloloa area. Relevant information is included in the summary of resources and practices and the discussion of impacts of the proposed development on these resources and practices.
Section 3 Cultural and Subsistence Resources and Activities

3.1 Origin of Ownership of the Kaluako'i Ahupua'a

Tax Map Key: (2) 5-1-02:30; 5-1-06; 5-1-08: 04, 03, 06, 07, 13, 14, 15, 21, and 25

These parcels are all located in Land Grant 3146 which was sold to Charles Reed Bishop by King Kalakaua as a Royal Patent in 1875 for the sum of $5,000. A copy of this Royal Patent deed is below as Figure 3. It shows that Charles Reed Bishop purchased the ahupua'a of Kaluako'i, consisting of 46,500 acres for $5,000 or approximately 11 cents an acre. A map of Land Grant 3146 acquired from the Survey Office of the Department of Accounting and General Services is attached to this report as Attachment #1.

The area proposed for development is located within the Kaluako'i ahupua'a. Summers describes the boundaries of the Kaluako'i ahupua'a as follows:

"According to Alexander, Kaluako'i was a "district of itself" (1903:390). In Indices of Awards . . . it was also referred to as a district and as having the ahupua'a of Kaluako'i 1 and 2 (1929: 16). King said that Kaluako'i was a kalana that had the two ahupua'a, Kaluako'i 1 and 2 (Coulter, 1935:215). The boundaries of these two ahupua'a are not defined, and Kaluako'i is now considered an ahupua'a; it is the largest on the island, having an area of 46,500 acres."

Summers states that Kaluako'i was designated as government land in the 1848 Mahele. The Indices of Awards Made by the Board of Commissioners To Quiet Land Titles In The Hawaiian Islands which provides a record of the disposition of lands under the 1848 Mahele lists the ahupua'a of Kaluako'i 1 and Kaluako'i 2 as Government Lands.

As noted above, in his official capacity as ruling monarch, King Kalakaua, in 1875, granted the ahupua'a of Kaluako'i to Charles Reed Bishop for the payment of $5,000 as Royal Patent Grant 3146.

In the Bureau of Conveyances, the Book of Grantors for 1893 records the transfer of ownership of lands, leaseholds and livestock of Royal Patent Grant 3146 of Kaluako'i, Moloka'i from Charles Reed Bishop to the Trustees of Bernice P. Bishop Estate on November 14, 1893, (Book 146, p. 12, January 2, 1894).

The Book of Grantors for 1898 records the transfer of ownership of lands, leaseholds, livestock and brand of Royal Patent Grant 3146 of Kaluako'i, Moloka'i from the Trustees of Bernice P. Bishop Estate to Molokai Ranch Co. Ltd. on February 5, 1898, (Book 177, p. 170 February 9, 1898).

From February 5, 1898 to present, Royal Patent Grant 3146 of Kaluako'i has continued to be owned by Moloka'i Ranch, although the ownership of the Moloka'i Ranch, itself, has transferred several times, as described below.
Figure 3. Royal Patent deed from Moʻi Kalakaua to Charles Reed Bishop in 1875.
3.2 Ownership of Moloka'i Ranch and Use of Kaluako'i Lands

George Paul Cooke became the manager of Moloka'i Ranch in 1908 after his father, Charles M. Cooke bought Moloka'i Ranch. In his book, Mo'olelo O Molokai, George P. Cooke described how Moloka'i Ranch was formed. According to Cooke, Moloka'i Ranch was formed in 1897 by a hui of men including Judge Alfred S. Hartwell, Alfred W. Carter, and A.D. McClellan. In 1898, the American Sugar Company Limited was incorporated by Judge Alfred S. Hartwell and Alfred Carter (who were partners in the Moloka'i Ranch), and Charles M. Cooke, George H. Robertson and George R. Carter. At this point, the Moloka'i Ranch stockholders exchanged their stock for shares in the new American Sugar Company. According to George P. Cooke, the sugar cane company failed when the pumps installed in surface wells to irrigate the cane fields depleted the fresh water and started to pump salt water. In December 1908, Charles M. Cooke bought out the interests in the Moloka'i Ranch. (Mo'olelo O Moloka'i, 1949, pp. 1 - 8)

In 1991, Marshall Weisler reviewed the history of the ownership of Moloka'i Ranch in his 1991 study of the Mo'omomi dune system. According to Weisler:

"In 1875, some 30 years after the Great Mahele, Charles R. Bishop purchased, by royal patent, the lands of Kaluako'i. Responding to a query by E.O. Hall, the Minister of the Interior, R.W. Meyer, who made a rough survey of the lands of Kaluako'i in the 1850s, valued the lands - - both 'good and bad . . . at 12 1/2 cents per acre or about 5000 dollars.' (Meyer 1873:2).

Bishop transferred the property to the Bishop Estate in 1893. Five years later, three men formed Moloka'i Ranch and bought 46,500 acres of Kaluako'i from the Bishop Estate. Shortly thereafter, the American Sugar Company was formed by a group including Charles M. Cooke, George Robertson, George Carter, and two judges named Hartwell and Carter (Cooke, 1949). C. M. Cooke bought out his partners in 1908, 10 years after the establishment of American Sugar Company." (Weisler, The Archaeology of a Hawaiian Dune System: The Nature Conservancy's Mo'omomi Preserve, Moloka'i. Honolulu: The Nature Conservancy, 1991p. 10)

The Cooke family owned Molokai Ranch for almost 80 years until the late 1980s. It was operated as a family corporation separate, from Castle and Cooke. George Cooke served as manager of the Ranch for 35 years, from 1908 through 1943. Under his tenure it became the second largest cattle ranch in Hawai'i and a major producer of beef.
Libby, McNeill & Libby Company acquired a lease from Moloka'i Ranch Co., Ltd. to establish a pineapple plantation on any lands of Kaluako'i above the five hundred foot level. In February 1923, the first field of 977 acres was planted. Due to the distance to Kaunakakai over undeveloped roads, Libby decided to construct camp buildings and houses on Ranch land in the Maunaloa area. Libby built a cable landing on Pu'u Kaiaka and shipped in materials which were hauled from ship to shore using a winch to construct Maunaloa Town, as well as fertilizer, weed control paper, and pulapula (plantings). (Cooke, 1949, 90-91).

Within a few years Libby dredged a channel through the reef at Kaumanamana and built a wooden wharf that they named Kolo, the name of an adjacent area. The Kaiaka cable landing was abandoned. Ranch shipments of supplies into Moloka'i and of pineapples to the Libby Honolulu cannery shifted to Kolo. (Cooke, 1949, 91)

A pavilion was constructed near the beach at Halena for the boy scouts. Libby plantation also built cabins for use by their workers. Informants fondly remember camping at Halena and holding large parties for weddings, birthdays and other family gatherings. They also recalled camping at Halena as boy scouts. Boy scouts also came from other islands and camped at Halena.

The Ranch reorganized as Moloka'i Ranch Co., Ltd. under a new charter in 1939.

During World War II, on July 17, 1944, Moloka'i Ranch Co., Ltd. leased 1,500 acres to the U.S. military to use for training exercises and target practice. An small installation was constructed at 'Ilio Point. In 1949, the lease was extended through June 1965. According to a 1993 report by Maurice Major, an informant then living on Maui recalled participating in a Marine Corps amphibious exercise at Kaupoa Bay which involved 7,000 men who fired heavy artillery for more than a week. Spent bombs were also found during the survey of Northwest Moloka'i conducted by Marshall Weisler in 1987. A site at the extreme southwest portion of what is now the Papohakua Ranchlands Subdivision was used for a target range for gunnery and practice exercises, a bombing area, bunkers, and a control house. (UH DURP Planning Practicum, 2005, 74)

According to an informant, in the 1950s, a harbor was dredged and a wharf constructed at Hale O Lono by B & C (Brown and Clewitt) Trucking to ship out sand from Papohaku and cinders from the top of Halena hill. A 1957 contract between Moloka'i Ranch Co., Ltd. and HC & D (Honolulu Construction and Draying Company, Ltd.) allowed for sand to be removed from a 297 acre southern parcel of Papohaku Beach. (UH DURP Planning Practicum, 2005, 74). The cinders were taken out of a pit in a hill near Halena. The sand was transported to Honolulu to rejuvenate Waikiki Beach and cinders were used for highway construction. After over twenty years, the sand mining operation was exposed as illegal and terminated in the 1970s. The sand was drawn from below the high water mark which was public land and required a government permit and at some point a dredge bucket even drew the sand out of the ocean. According to Rikki Cooke the Ranch was fined and traded land at Ala Malama in Kaunakakai in lieu of the million dollar fine. Mr. Cooke provided the following information:
B & C trucking took sand from Papohaku for over 20 years. It was said that Waikiki was really Papohaku. When took shipment out they took a whole barge at a time. All day long, every day, had trucks going back and forth from Papohaku to Hale O Lono. Had a dredge at some point and went into the ocean.

They had a million dollar settlement. Traded the Ala Malama site in lieu of the fine, to the county. Moloka'i Ranch gave the Ala Malama site for the fine.

B&C Trucking also owned Seaside Inn and Pau Hana Inn.

In 1968, Moloka'i Ranch Co., Ltd. formed the Kaluako'i Corporation as a joint venture with The Louisiana Land and Exploration Company (LLL). LLL was provided a contingency for the Ranch's West End lands.

In 1972 Dole Corporation acquired Libby, McNeill and Libby and closed the Maunaloa pineapple plantation in 1975.

The Kaluako'i Resort opened in 1977 and included a hotel, a golf course, and condominiums. In 1978, the Moloka'i Ranch Wildlife Park opened for safari-like tours on the ranch lands.

In 1980 LLL separated its interests from Moloka'i Ranch Co., Ltd. and exercised its option over the West End lands from Kaluako'i to Kawakiu. These lands were sold to Tokyo Kosan in 1987. Operating as Kukui (Moloka'i), Inc. the company subdivided its property and developed the Papohaku Ranchland Subdivision.

The Ranch diversified its investments into mainland commercial property. It also sold the lands from Hale O Lono to Kaupoa to an individual investor from Las Vegas for $21 million. Within a week this investor sold the lands to Alpha U.S.A. for $35 million. Alpha U.S.A. hired Henry Ayau as its representative, Walter Ritte as a consultant, and Groups 70 as its planner. They developed a plan to develop the La'au parcel that involved Hawaiian villages.

When the investments made by Moloka'i Ranch Co., Ltd. failed, its stock was bought by Brierly Investments, Limited who became its sole stockholder in 1987.

In 1991, when Tokyo Kosan went bankrupt, it sold Kukui (Moloka'i), Inc. which owned the closed the Kaluako'i Resort and Golf Course and the adjacent lands over to Kawakiu, back to the Ranch, or its parent company, Brierly Investments, Limited. In 1993, Alpha U.S.A. also sold the lands it had purchased back to the Ranch or Brierly Investments, Limited) for $12 million. It is the shoreline area of this parcel that had been owned by Alpha U.S.A. that is now being proposed for rezoning for the La'au Point Rural-Residential Development.
Brierly Investments, Limited, itself was totally reorganized in 2000 when the Far Eastern stock markets collapsed. It is now a smaller operations-based company that is registered in Bermuda, has its headquarters in Singapore and is listed on the stock exchanges in London, New Zealand and Singapore. Its largest asset is the Thistle Hotel chain in Great Britain and it's second largest asset is Moloka'i Ranch. In December 2002, seeing that Moloka'i Ranch had operations that went beyond ranching, the corporation's name was changed to Moloka'i Properties Limited (MPL). Around the same time, the parent corporation changed its name to BIL International.

3.3 History of Kaluako'i

Kaluako'i means "The stone adz quarry," according to Catherine Summers in Molokai: A Site Survey. There are numerous quarry sites within Kaluako'i. The Kumuma'oma'o and the Haleolono are the winds of the ahupua'a.

According to Summers, Kamakau described the ahupua'a of Kaluako'i in which Mo'omomi is situated as a desolate land of famine.

George Cooke notes that according to the logs of Captain James Cook, when he came by Moloka'i in the winter, he saw red water from the gulches out half mile from shore. Erosion is not just in modern times, but it got worse with cattle and pineapple culture. Even in ancient times there was soil run off.

Stokes, after his 1909 survey stated, "This part of the island [Kaluako'i] does not give any evidence of a dense population . . . It is probable that formerly, as now, coasts were periodically visited by the inhabitants of the rest of the island for the purpose of fishing, the waters there yielding very abundantly."(cited in Summers, p.40)

According to John Wesley Coulter in Population and Utilization of Land and Sea in Hawai'i, 1853 (1931), "Nearly all the western half of the island was uninhabited. There the semi-arid climate precluded successful agriculture." His map, shown below, illustrates the distribution of the population on Moloka'i in 1853. It depicts Kaluako'i as an area without any inhabitants.
Figure 4. In Coulter's map of the 1853 Moloka'i population Kaluako'i was uninhabited.
William Bonk conducted archaeological excavations in West Molokai for his 1954 M.A. Thesis, "Archaeological Excavations on West Molokai." He excavated 9 archaeological sites on West Molokai that were either adjacent to the shoreline or less than one mile from the ocean. Based upon his excavations, Bonk concluded that the Kaluako'i ahupua'a was of significance to early Native Hawaiians for its adze quarries and extensive fishing resources. He writes:

"A conclusion which comes to the fore, as a result of this investigation of west Molokai, is that the contents of the sites excavated bear out what we had every reason to expect, that this was a decidedly marginal land for the inhabitants of Molokai. Fishing and the quest for adze stone brought people into the area, and fighting probably sent refugees into it, but temporarily. The small population of Molokai must have found ample room on the richly watered and larger land of east Molokai. Only a few fishermen families seem to have found it worth while to build homes on west Molokai. Being a distant, bare region, except for fishing, the wanderers into it would go lightly burdened and would not tarry longer than to obtain their fish or stone. They therefore would have a strong incentive not to lose(sp?) the few, vital things they took with them, and would not be much concerned with the manufacture of articles while camping in the shelters. Hence the relatively few artifacts, in number or kind, as compared with sites on Oahu and Hawaii. " (p. 139)

Bonk also provided a review of observations about West Molokai by early explorers and ethnographers which reinforce his conclusion that West Molokai was a dry, marginal, sparsely populated area of the island. The following are excerpts from these observations cited by Bonk.

Captain George Vancouver:
"The country had the same dreary and barren appearance, as that noticed on the south side, and I was informed it was equally destitute of water." (p. 16)

Archibald Menzies, naturalist on Vancouver Voyage:
"presents a naked dreary waste without either habitation or cultivation; its only covering is a kind of thick withered grass, which, in many parts, is scarcely sufficient to hide its surface apparently composed of dry rocky and sandy soil." (p.16)

Fornander in History of Kuali'i:
"The cause of all the trouble was this: The chiefs on the Koolau side of Molokai were anxious to get possession of Kekaha, a stretch of country from Kawela to Maamomi (sp); and the reason why these chiefs were so desirous of getting possession of this section of country was on account of the fishing. But the chiefs of Kekaha, know the value of these fishing grounds, were determined to hold on
to them, so this determination on their part caused a general internal conflict at this time. . ." (p. 17)

Although sparsely inhabited, Kaluako‘i has several significant natural and cultural resources which the Moloka‘i residents utilized on a seasonal basis or for specific purposes, as described below.

### 3.4 Cultural Zones of Kaluako‘i

During the time of early Western contact in the Hawaiian archipelago, Westerners viewed Kaluako‘i as an arid and sparsely inhabited land. Few were the Native Hawaiians spotted living in this ahupua‘a. Therefore, Westerners often regarded the valleys and streams of Mana‘e with the utmost importance. Beyond their grasp was that “Moloka‘i pule o‘o (Moloka‘i of the potent prayers),” a “figurative reference to Moloka‘i’s fame in sorcery” (Pukui and Elbert, 1957:266; cited in Summers:15) was a spiritual island, an island of mana. Halona Kaopuiki shares with us the mana of Molokai.

“... when you look at Molokai, when you look at the island, it’s a mo‘o, it’s a mama lizard, and all the valleys is the babies, that she is carrying on her back, of Molokai. My father use to tell us, where the mana stay, where’s the defense of the lizard, the mo‘o? The tail, the West End!” (Enos et.al., 2005:24)

Without the mo‘olelo (traditional story), the place names, and an understanding of the cultural uses and practices of Kaluako‘i, the mana of Kaluako‘i would have remained displaced by these Westerner’s first impressions. The following text describes the three zones of the Kaluako‘i ahupua‘a based on the natural resources and the cultural uses and practices found within each zone. The mo‘olelo of these areas are numbered to show the location on the previous map and the place names of SW Kaluako‘i can be found in Figure 6.
Figure 5. Kaluako'i Cultural Zones Map
3.4.1 Maunaloa Summit Zone

Topography

The Maunaloa summit area extends from Pu‘u Nana on the east to Maunaloa town on the west, basically the land above 900 feet elevation (Major 2000:8). A ridge extending southwest from Pu‘u Nana forms a somewhat level plateau between gulches draining to the south and north. Due to elevation, winds with precipitation cause cooler temperatures. These temperatures, coupled with native forest of kukui, hala, ‘ie‘ie, ‘iwa ferns, ginger, and hau (Summers 1971) thought to be present in the summit region prior to human impacts, lead to soil and climate conditions advantageous to traditional dry land agriculture. Such a forest would also have served to break the force of strong winds that today blow unabated across Kaluako‘i.

Settlement

Extending across the top of the Maunaloa volcano, the summit zone habitation complex includes a range of sites indicative of cultivation and habitation. In regards to the area south of Pu‘u Kukui, Fowke states:

The surface over hundreds of acres around these ruins is covered with house sites, long straight rows of stones, and garden lots surrounded by stone walls. Shop refuse, mostly chips and spalls from adz making, sea shells broken to obtain mollusks, coral for abrading, adzes in all stages of finish, and many “olomaikis” (chunkey stones) [ulu maika] are found. (Fowke 1922:180; cited in Major 2000:8)

Kukui Village, whose name according to John Kaimikaua refers to “light”, rather than the tree of the same name, was also located in the summit region. In this village grew large groves of the Iholena variety of banana. The underside of Iholena leaves is particularly silvery, and reflected the light of the fires so that it was visible as far away as O‘ahu; this light led to the name of the village. This variety was prized not only for its flavor, but also for the stout trunks that were good for cultivating in windy areas.

Natural Resources

Adze quarries in the summit zone were used both for the kanaka maoli of Kaluako‘i and east Moloka‘i due to regional intensification of agriculture, thereby increasing the demand for finished adzes from west Moloka‘i sources. Sinoto described the distribution of adze quarry remains on ‘Amikopala hill as follows:
There are 13 localities on Amikopala Hill where there is evidence of adz manufacture on or in close proximity to basalt outcrops. The outcrops occur mainly on the western portions of the hill, with 2 major areas that cover an area of c. 500 sq m and consist of several boulders with flakes, spalls, and occasional blanks strewn around their bases. (Sinoto 1974; cited in Dye et. al. 1985:4)

**Cultural Sites and Practices**

The summit zone is where the head of major gulches are located, generally thought of as the source and the most sacred. The summit zone of Kaluako‘i was known for its association with the gods and ‘ana‘ana (sorcery). This locality helped establish the saying amongst the kanaka maoli of the time throughout the archipelago, “Moloka‘i pule o‘o”. Noted Kumu Hula John Kaimikaua describes this area is also esteemed as the birth of hula on the island of Molokai (Alu Like, 1985; Thompson, 1977). Here, a woman named Kapoulakina‘u was sought by the people of Molokai to teach the hula. However, overwhelmed by the amount of people who wanted to learn, she decided to teach and train her younger sister to be their instructor. The name of the first hula halau located at Ka‘ana was Ho‘okuhi ‘iu‘iu. This name derived from the expression that the dancers were to mimic or imitate the dripping of water in the caves of Mauna Loa. In time, this younger sister, who taught hula under the name Laka traveled the Hawaiian archipelago to spread this new dance. As Laka’s fame grew, Kapoulakina‘u’s jealousy led her to leave the hula and learn sorcery in order to disrupt and distort the teachings of Laka. Consequently, Kapoulakina‘u turned herself into stone where she remains at Ka‘ana till this day. For this reason, in ancient days, if students forgot a step or made a mistake they would attribute it to Kapoulakina‘u. As Laka’s life came to an end, she returned to Ka‘ana where she died and her body was buried under Pu‘u Nana. At this time Molokai was praised as Molokai Ka Hula Piko, and subsequent generations would elevate Laka to a goddess. Kaimikaua further expresses his thoughts on this ‘aina:

> A lot of the past is still present here. If this place is used as a spiritual sanctuary a lot of the people would come especially for the “hula”. There’s not too many actual historical sites, you know of a “halau”, where the “hula” was done. (Spalding, 1988:4)

Lying approximately a mile ENE of ‘Amikopala there is a hill with an outcrops of rock. The largest of these rocks is the piko stone, where newborns’ umbilical cords would be placed. The Mauna Loa summit plateau was also the location for games and ali‘i recreation. According to Kamakau:

Here there was a maika playing ground just above Kaluako‘i, to which all the players of Moloka‘i, chiefs and people from Waikolu, Kalaupapa, Kala‘e, and all the other places resorted to roll maika stones, slide pahe‘e (torpedo shaped sticks used in another game), and play all kinds of other sports. (Kamakau 1991:129; cited in Major 2000:6)
Agriculture

The summit zone had the highest rainfall on the west end, along with well-drained soils. It was a good area for ‘uala (sweet potato), a staple that allowed kanaka maoli to settle in drier climates. The heads of the gulches near the summit often times were good sources of water via springs, and served as sponges, thus leading to gardening activities beyond ‘uala such as dryland kalo (taro), ko (sugarcane), and mai’a (banana). Although stone planting mounds or walls may be present in some areas, it is thought that many fields existed without durable physical traces.

Wahi Pana: Sacred Places and Their Mo'olelo

#1 Kalaipahoa

Moloka‘i’s great renown outside of the island is for its potent kahuna class, especially in the fields of ‘ana‘ana (sorcery). One of the greatest aids to a kahuna ‘ana‘ana (sorcerer) was in the ki‘i (idols) that were made with wood made from trees said to be inhabited by poisonous spirits called kalaipahoa. These sacred trees were found in the uplands of Kaluako‘i at the head of Kaka‘ako Gulch. According to oral history, these kalaipahoa were instrumental in repelling an invading army from Kahiki; a group of warriors stationed on Pu‘u o Kaiaka spied an army of canoes making for the bay. These warriors, daunted by the size of this army, called out for assistance from a kahuna who lived on a hill further back on the hill side. This kahuna advised the warriors to meet the invading army onshore while he chanted on the hillside. Indeed, so potent was the spell he created using the kalaipahoa, as soon as the aggressors landed they fell dead to a man. (Ka‘opuiki, 2005) It is said that Kamehameha I, when landing on Moloka‘i claimed one of these ki‘i as his own, so great was his respect for its mana. (Kaopuiki, 2005)

#2 Ka‘ana

Revered by many hula practitioners as the birthplace of the hula, or “ka hula piko” (the navel or center of hula). Kapo‘ulakina‘u lived at Maʻohelaia on Mauna Loa, and originated the hula, enlisting the aid of her younger sister Laka to help teach others; she also remained there in the form of a rock, deciding never to leave the mountain.

3.4.2 Midland Zone

Topography

The midland zone extends just below the Mauna Loa summit zone (below 900ft) and extends to the coastal zone. The elevations near the coastal zones differ from the North, West, and South coasts due to various typologies of the three coasts. The midlands of the North and West coasts are exposed to winds with little or minimal rainfall. The midlands of the South coasts however were shielded from strong winds, and due to their typology and location near the summit zone, they enjoyed greater occurrence of precipitation.
Settlement

The midland zone bears few signs of human presence besides the trails that connected mauka with makai (from the mountain to the sea) and temporary transient shelters.

Cultural Sites and Practices

Along with various heiau, burial caves, and ko’a, many times located in this zone were shrines or ahu created for farming and fishing communities to exchange their goods. On the North Coast is the desert strip of the West End also known as Keonelele, “the flying sand.” This desert strip connects Mo’omomi on the North Coast to Papohaku on the West Coast.

Keonelele was said to have been a “large burial place” (Hawai‘i Holomua, 1893). Emory removed 14 complete and four incomplete Hawaiian skulls (Bishop Museum Accession No. 94) from “… the lee side of a large sand hills on the north” (Emory, n.d.b:Mar 2). He estimated that there were at least 60 burials located here and, on the slopes of the hill to the N, at least 25 burials (Summers 1971:45)

Located in this zone on the West Coast are three Holua Sleds on Na Pu’u Kulua;

Two holua are on the W side of the hill, running downward in a westerly direction. They are 6 ft apart and each is 3 ft wide. Traces of paving for the northern one extended 24 ft in 1954, and for the southern one, 27ft. The third holua runs down the hill in an easterly direction. On top of the hill is a paved platform measuring 12 by 18ft, on which the survey station “Heiau” has been built (Summers 1971:51).

Located on the Eastern portion of the midland zone is Waihuna (Sacred Water), which is connected to Na‘iwa on the makahiki grounds and serves as a paliuli (divine place of spiritual essence). According to Kaopuiki, “Waihuna is just like the heart of this area, very sacred grounds, if you walk up to the top you going see the whole nine yards” (Enos, et al. 2005).

Agriculture

This zone was not predominantly known for agriculture. Mainly dry land farming would take place in this zone, especially near where springs could be found. The major exception to this is Paka’a’s fields located in both the southern portions of the summit and midland zones.

Cooke (1949:119) was told that these were Paka’a’s fields, which he planted in sweet potatoes and sugarcane in order to be able to feed the king, Keawenuia‘umi (Appendix A). Tradition locates the fields in “the
“uplands” from Pakaʻa’s house (Site 75). Described as being six in number, they are said to have stretched “farther than the eye could reach.” Each field was shaped after each of the six districts of Hawai‘i” (Fornander, 1918-1919:74). Kamakau said that the fields “…lay in a straight line from the upland of Punahou [Punakou] to the summit of the west side of the disk-(maika) playing site [Site 89] of Maunaloa” (1961:42;cited in Summers 1971:66).

The sweet potato and sugar-cane patches were about a mile long and half a mild wide. Pakaʻa did his farming in the winter months when there was an abundance of rain. The plains were made fertile when the rain fell, and sweet potatoes and sugar cane flourished. His production was great (Kamakau 1992:42; cited in Major 2000:13).

When the six overseers of the six districts of Hawai‘i went with him to the patches, they found huge patches of sweet potato and sugar cane. One could run along the fields until his limbs wearied, that was how large each overseer found his patch [Pakaʻa had planted six fields for the six districts of Hawai‘i] (Kamakau 1992:44-45; cited in Major 2000:13).

It is here that Handy had noted the presence of kuaiwi (1972:516;cited in Major 2000:9), a term that is most often referring to ridges of stone that marked field boundaries parallel to the slope and served as planting areas for perennial crops and famine food.

### 3.4.3 Coastal Zone

#### Topography

The North, West, and South coasts vary rather differently in their topography. Due to the sea cliffs of the North Coast (between ʻIlio Point and Moʻomomi), and its exposure to strong winds and big north swells, the North Coast tended to be void of permanent settlement. The exception to this is Moʻomomi, which was used as a fishing station. This area is mostly sand and puʻuone (sand dunes). Although strong winds and big north swells affect the West Coast, protected embayments along the West Coast served as safe places for landing canoes and shelter. The mouths of gulches are also strewn up and down the West and South Coasts, unlike the North Coast. They served as shelter and natural sponges of moisture. Papohaku Beach serves as a major canoe access point for the West Coast. The South Coast had access to generally calmer waters and shallow reef systems that were not found on the West and North Coasts.

#### Settlement

The North Coast tended to be devoid of permanent settlements mainly because of difficult access to the coastline and a lack of precipitation. Sheltered caves served as transient dwellings. As mentioned earlier, Moʻomomi was the major fishing station along this coast and would have served as the most logical locality to settle. The West
and South Coast differ rather dramatically from the North Coast in terms of settlement. Residential clusters were concentrated near protected embayments, generally below the 50 ft elevation (Athens et al. 1998:16) in order to access marine resources. They were also located near the mouths of gulches that served as gardening areas and potential areas for springs. Caves were also inhabited on the South Coast. As a result, the West and

South Coasts were able to sustain fishing villages in areas such as Kawakui‘iki, Kepuhi, Papohaku, Kapukuwahine, and Kanalukaha (Kaoooki 2005; Ne 1992). Also, constructed on the eastern portion of the South Coast are several fishponds that may be a clue that the South Coast of Kaluako‘i had a somewhat large population.

Natural Resources

The ahupua‘a of Kaluako‘i has, and still is well known today, for its vast marine resources, especially Penguin Banks located on the eastern portion of the South Coast, off of Kapukuwahine. Along the boulder coastline were habitats for edible mollusks such as ‘opih, pupu‘awa, pipipi, and a‘ama crab, while in the near shore area algae were abundant with a variety of species, including the edible seaweed, limu kohu (Army Corps of Engineers 1984; cited in Weisler 1987b:9). The ranges of sea life found off the coasts of Kaluako‘i follow different water zones (see Minerbi, McGregor, Matsuoka, 1993, pages 89 – 90), with favorites being moi, kumu, uhu, ‘opelu, ‘ono, akule, ‘ulua, and ‘ahi to name a few. Also found in this zone are the stratified limestone (‘unu‘unu pa‘akea) of Hale O Lonono and various adze quarries or stations, mainly found on the North Coast, such as the Mo‘omomi Quarry Complex and the Kaeo cone quarry.

Cultural Sites and Practices

Due to the importance of fishing and the marine resources found on and off the shores of Kaluako‘i, ko‘a or fishing shrines were abundantly found up and down the entire coastline along with a myriad of heiau and burials. It was possible for the kanaka maoli of Kaluako‘i to access the coastline thanks to the Maui ali‘i Kiha‘a Pi‘ilani who constructed a coastal trail, “Kealapupu i Molokai” (The shell road at Molokai). This trail was lined with shells to ensure safe travels at nighttime, thus further alluding to the vital significance of the marine resources. On the North Coast, Mo‘omomi, in conjunction with Keonelele, served as burials in the sandy areas as well as Papohaku Beach in the pu‘u‘ohe on the West Coast. Mo‘omomi was said to have been “the place for the dead” (Ka Nupepa Ku‘oko‘a, 1921c; cited in Summers:41). Also located near this area is the Kalaina Wawae (carved footprints), which are a series of oblong depressions that are said to represent human footprints. These footprints were made as a prophecy of the arrival of the boot-wearing Caucasian (Summers 1971:44). In the Kawakiu area, the northern portion of the West Coast, Emmet Aluli (2005) explains a ko‘a that was found there:
... and there was, kinda like, uh, a ko‘a, a fishing ko‘a that they pulled out 37 beautiful fishing hooks... but the more important thing was that the hooks were associated with the bones of the fish, ah. So, for the first time we thought, you could figure out what hook was used to catch what fish.

Further down the coast, a Wahi Pana located on the West Coast is Kaiaka Rock. This major outcropping between Kepuhi and Papohaku is home to a heiau facing Papohaku Beach and was used as an observation tower for fishing and scouting purposes. Just below Kaiaka Rock, facing Papohaku Beach is a canoe heiau (Kaopuiki, 2005). Kaopuiki though is not sure of the name nor of any other such site located on the island. To the south of Papohaku Beach is Pu‘u Koa‘e, this area was used to strip the flesh of bodies prior to burial.

As mentioned earlier, on the eastern portion of the South Coast is Penguin Banks. Kaopuiki (2005) explains the function and significance of the area:

Every finger on top here, we have fishing shrines. And if you do one survey of all these fingers, connected to the Penguin Bank. Moloka‘i Nui A Hina owns the Penguin Bank. This is ours we want to save it for our generations. But every finger, where I pointing, get one heiau on top, a fishing shrine. Yeah, and were the ko‘a stay, the finger stay. You going throw for moi. Next step in the ocean, the ‘ulua, same finger, next step the ‘ahi, and the deep water fishes, connected to the Banks. So we have ko‘a’s right through.

Also located in this area above Kanalukaha on Pu‘u Hakina are bell stones, Kaopuiki (2005) recalls working with the Bishop Museum:

Oh yeah, here, right here, Kanalukaha. Inside here, you know this place, I love this place because, this village over here, on top the village on top the mountain, we have bell stones, you guys know what is bell stones ah? On top there, get bell stones that I like save, that’s the only bell stones I know now. So we found the bell stone, 3 on top there.

These bell stones are significant because when struck they would kani (ring), and would alarm the fishing village of Kanalukaha the arrival of an ali‘i in his canoe. Just east of Kanalukaha is Hale o Lono. Following the pattern of Mo‘omomi, Keoneelele, and Papohaku Beach, Hale o Lono has also been noted as an extensive burial locality (Ka‘opuiki, 2005).
#3 The Red Dog of ‘Ilio Point

**Geographic Location:** ‘Ilio Point, or “the Point of the Dog.”
**Characters:** Shark god of Kainalu who takes the form of a dog when traveling on land.
**Hawaiian Values:** A desire to respect and pay homage to ancestors.

**Summary**

The shark god of Kainalu had an ancestor whose bones washed ashore on the NW end of Moloka‘i, and the people there gathered the bones and made a shrine. When the Kainalu shark wished to pay his respects to his dead ancestor, he could not go by water. He could not swim there and back between sunset and sunrise; and during the day, the shark gods of the other areas would be about. He found a solution; his mother was a dog worshiper, so he went on land and took the form of a dog. Every fifth year, he trotted to his ancestor’s shrine at ‘Ilio Point, did homage, and then slipped into the sea. Harriet Ne has seen the red dog sniffing along the roadside toward the NW point of Moloka‘i. There she has seen the dog sniff about the heiau, stand on a large slab of stone, and lift his head to howl. Then she saw him walk into the ocean and disappear.

#4 Pueokea, the Owl Daughter

**Geographic Location:** Kawakiu Iki
**Main Character:** Pueokea, a beautiful daughter who was born to a poor family who at dusk becomes a pale yellow owl.
**Food Items:** ‘Uala, Fish

**Makana:** A wristlet of which their village of Kawakiu Iki was known. Such wristlets were three inches wide and made of the mother-of-pearl that washed up on the beaches during winter storms. The mother in the story made one for her daughter, Pueokea, and one for the son of the chief of a new village just south of theirs, because they were invited to attend a lu‘au for his twentieth birthday.

**Summary**

Fearful of the people of the village, Pueokea’s parents took their daughter to a secret cave. On the day that Pueokea was one year old, her mother went to her in the cave and gave her a beautiful yellow pa‘u (skirt), some baked sweet potato, and the wristlet of mother-of-pearl. As night came on this day, Pueokea took the form of an owl, and flew southward never to return. As twenty years passed the parents received an invitation to attend a lu‘au for the chief’s son of a nearby village. Making a wristlet as a gift for the chief’s son, the mother forgot her gift and did not remember it until they reached the lu‘au. Ashamed they lingered in the background until a group of dancers, all wearing red pa‘u, came out. One of them, a short, very fair and beautiful girl, was wearing on her arm a wide mother-of-pearl wristlet. Instantly her mom knew that it was Pueokea. After dinner the guests were to present their gifts. Pueokea’s parents were to be flogged for not bringing a gift. Pueokea ran forward and offered her wristlet as a gift. Because of her beauty the chief’s son pleaded with his father to let her parents go, and so they were
released. The chief’s son soon fell in love with Pueokea. However, as night came, she turned into an owl and flew to the north. Knowing where she would go, her parents told the chief’s son how to find the secret cave. He left at once, arriving at dawn. Pueokea greeted the chief’s son with an exclamation of joy, and they were married soon after. Each time a child was born to them, a yellow owl appeared on the plains mauka of Kawakiu. It was kapu to kill an owl, especially a pale yellow one.

To this day, one who is driving along the highway to Maunaloa and to the hotel at Kepuhi may see an owl at night flying across the roadway. Pueo have been known to be helpful to motorists stranded at night.

**#5 Kepuhi, Village of the Eel**

**Geographic Location:** Kepuhi, a small village in Kaluako‘i on West Moloka‘i  
**Characters:** Lono Nu‘uhiwa- last chief, Keao- fish spotter, Anuhea- girl from Makapu‘u, O‘ahu.  
**Deities:** Moray Eel, guardian god, ‘aumakua of Kepuhi.

**Summary**

For generations Kepuhi was ruled by the Nu‘uhiwa family, and their last chief was Lono Nu'uhiwa. On his sixtieth birthday, even though there was a great feast, he was sad for he had not named a successor. He was fond of Keao but knew that Keao was too soft to be a leader.

One day Keao saw a canoe floating in the ocean. As it came closer, he noticed that there was a beautiful girl in the canoe. The girl was unconscious; when she awoke she mentioned that she was from Makapu‘u, O‘ahu and that she was fishing with her brother when they were attacked by a large eel at Makapu‘u. The chief was in wonder as the guardian god of Kepuhi was a giant moray eel.

Auhea and Keao fell in love, and soon Auhea became pregnant. One night, the kahuna dreamed that the chief of the village to succeed Lono would have the mark of the eel on his body. A few nights later, the chief died.

Three months later, Auhea gave birth to a husky boy. As Auhea lifted the baby to the kahuna, he saw three white marks running down the right side of the baby’s face from his ear to his mouth. Instantly, the kahuna broke into a joyful chant: “Behold the mark of the eel. Behold the high chief of Kepuhi.” And so life was lived, in harmony and balance, in the village of Kepuhi.
#6 Papohaku, the Stone Wall

**Geographic Location:** Papohaku Beach  
**Characters:** Chief and his people from East Moloka‘i, Kahuna of Papohaku Village.  
**Hawaiian Values:** Preserving that which is sacred or scarce (Kapu of the fish ‘opelu); respect and homage for deeds of unselfishness.

**Summary**

A chief from east Moloka‘i and a few of his people boarded canoes and set off around the island. They found themselves on the southwest coast of Moloka‘i. They paddled up to some fishermen who had a large catch of ‘opelu. Hungry, they began to eat. As they were all eating with great satisfaction, another group of fishermen came by and cried: “Stop. Do not eat the ‘opelu. This is the season of ‘opelu kapu.” However, the visiting chief only had a kapu for eating turtle, so they continued eating.

Mad with outrage and fear, the fishermen attacked the visiting chief and his men. Overpowered, they were brought before the ka huna. The visiting chief became very ill, and the only way to make things right was a human sacrifice to save the chief from death. One of his men offered himself as a sacrifice and the chief recovered.

The kahuna ordered a tree planted on the grave of the willing victim. The grave was on shore; when the tide was high, the waves would wash sand from the grave. Thus, in a very short time, the body would be exposed. In respect and remembrance, the chief ordered his men to build a stone wall about fifty feet long. All with gratitude of their fellow, the chief ordered the wall to continue for another two hundred feet. The chief himself put the last stone on the wall, saying as he did so, “I call this place Papohaku, ‘Stone Wall.’”

#7 Ka Lae o ka La‘au, the Point of the Branch

There are three versions of the naming of La‘au. The first comes from Harriet Ne, a kupuna of Molokai who was the source for *Tales of Molokai*. The subsequent versions can be found in Summers (1971:54) who compiled and provided a complete listing of known sites for *A Site Survey of Molokai*.

**Version 1**

**Geographic Location:** La‘au Point  
**Characters:** Shark god of Kainalu, shark god of Kaua‘i.  
**Natural Resource:** Hau branch, seen as a gift from strange canoes cruising offshore.
Summary

More than two hundred years ago, the shark god of Kainalu left his home off Moloka‘i and traveled to Kaua‘i. Romping in the ocean with the shark god of Kaua‘i, a floating large branch of the hau tree became stuck on the back of the Moloka‘i shark. As he swam back towards Moloka‘i, there, off the SW point, the hau branch came loose and was washed ashore. As the people on the beach saw it float ashore they took the branch and carried it inland to a fertile bit of land where some wild ‘Ilima grew. There they planted it and their chief, Kuamu, said, “We shall call this place Ka Lae o ka La‘au, or ‘the Point of the Branch.’” This hau is not like the Hawaiian variety; it is short and sprawls close to the earth, bending like a vine before the winds, but its blossoms are beautiful, so beautiful that the people of Moloka‘i offered them to their gods.

Version 2

Geographic Location: La‘au Point
Characters: Palila

Summary

Subsequent to leaving Kahului, Palila found himself on the rise of Hanauma [O‘ahu] looking at the heat rise from the pili grass of Kaunakakai, Moloka‘i. He then thrust his war club [la‘au palau, spear-club] ahead of him, which flew through the air and landed at Kaluako‘i. Here he discarded a portion of his person, which turned into the point of Kalaeokala‘au. However, at this place was a large stick of wood named Ho‘one‘enu‘u. Thereby causing Palila to dislike Molokai and once again thrust his war club into the air landing at Kaunolu, Lanai.

Version 3

Geographic Location: La‘au Point
Characters: Palila

Summary

A hero from Kaua‘i, and feared with the kapu of the gods, Palila was blessed by the gods of Manokalanipo and he received a short spear [la‘au palau] that allowed him to fly anywhere. With an appetite for women, Palila came to dwell on O‘ahu. Not long after, Palila heard the fame of Moloka‘i and flew to Kaluako‘i near pu‘u KihaaPi‘ilani. At first, the women were greatly attracted to him. However, when they began to know him better, the women kept their distance. Nonetheless, the young men of Moloka‘i went to consult a kahuna. Due to the mana of the gods of Moloka‘i, Palila’s spear lost its mana. Upset, Palila threw it away till it fell and landed on the cape [Kalaeokala‘au].

La‘au Point Cultural Impact Assessment / 70
#8 and #9 Kanalukaha and Hale o Lono, Villages of the Two Brothers

Geographic Location: Beginning in Kona, Big Island and ending in Southwest Moloka‘i

Characters: Two brothers and their sons, Kepa Kepelino (Farmer) and Keao Kepelino (canoe builder)

Hale o Lono: ‘House of Lono’; named by Kepa in honor of Lono (God of Harvest/Agriculture, Health, and Weather)

Kanalukaha: ‘Fourth Wave’; named so because of the fourth wave that was used to help push the canoe out into the ocean from the canoe pit.

Food Items: pig, poi (Kona, Big Island); dried fish, ‘uala, moi, (Southwest Moloka‘i)

Resources from Big Island: taro, sugarcane, banana seedlings planted in ravines near water holes.

Resources Found in Southwest Moloka‘i:

1. Kukui Tree- all parts of the tree are useful.
2. ‘Ulu Tree- used as food and used to make a gum out of the sap to plug canoe.
3. Spring- discovered by watching birds flying overhead dive down and come up again.
4. Milo Tree- used to carve the image of Lono.
5. ‘Aiea Tree- used to build a canoe, took four days to find a tree big enough for a canoe.
6. Uliuli- stone used to make small adzes.
7. Ehuehu- stone to make axes.
8. Kumumoe- sandstone, used to smooth rough spots on canoe.

Deities: Lono (God of Harvest/Agriculture, Health, and Weather)

1. When paddling up the SW shore of Moloka‘i, Kepa saw a cliff with “impressive black stones” forming the entrance to a cave. He was inspired to build a temple for the worship of Lono on the face of that cliff. After inspecting the cave, the brothers were impressed with the view of the ocean, beautiful and mysterious from that height. Kepa and Keao decided to spend their first night in the cave. They also decided to settle and start a village. Moving out of the cave, they consecrated the cave as a heiau and named it ‘Hale o Lono’
2. A heiau was built with offerings of ‘ulu and moi to have Lono’s blessing on the newly planted cane and seedlings. If crops were improved, they would offer Lono products of the garden every night of the new moon.

Ku (God of War and Canoes)

1. Keao calls upon Ku by chanting a prayer in the ritual of canoe launching; thanking him for helping build the canoe in a place where material was so scarce.
2. Keao builds a ko‘a (fishing shrine), offering one small moi, one kumu, one large moi, and sugarcane to Ku.
Summary

Two brothers, Kepa Kepelino and Keao Kepelino are told by their father that they must go to another island and find a place to settle and raise their families. They set off with their sons to find a new home. First stopping at Ma'alaea Bay on Maui, then Keawa Nui on SE Moloka'i, they finally make their home in SW Moloka'i. With the discovery of water they soon find the place livable. Their subsistence is based on simple agriculture and fishing. Soon the two brothers separated, Kepa to the gulch where he had planted his crops near the shrine to Lono, and Keao to the north of the halau wa'a (canoe house). The two families lived peacefully thereafter, sharing their crops and their fish catch like good brothers. Together they performed the ceremonies for good harvests and abundant fish catches.

As the sons grew older they married women from Punakua, the nearest village. When the families were too large for the amount of water, it became clear that some of the people would have to move- but so loving were they that they preferred to abandon their villages and move together to a new location than to separate.

#10 Halena, the Yellowing

Geographic Location: Halena, Southwest Moloka'i
Characters: Kahekili, ruling chief of Maui and a lesser chief of Southwest Moloka'i.
Hawaiian Values: Humility, Hospitality, and Ho'ailona (use of signs).

Summary

Kahekili, the ruling chief of Moloka'i who lived on Maui, had made plans to invade O'ahu. Stopping on Moloka'i to get supplies, he and his men paddled to the southwest coast of Moloka'i to find drinking water. As they landed, Kahekili sent his men to explore the land. He then heard a large wail of a newborn, and he and his men discovered a large cave containing several people. Recognizing that Kahekili was an ali`i nui, the father of the infant welcomed him according to royal traditions and introduced his wife and baby son.

Subsequently, Kahekili offered white tapa as his gift to the newborn son of this lesser chief. As custom, Kahekili breathed upon the tapa, as did the lesser chief. As the lesser chief did so, the white tapa turned yellow, a sign that he was sickly. The lesser chief offered hospitality of his cave and a meal to Kahekili and his men for the night.

In the morning, when Kahekili asked the name of the place the lesser chief responded, “There is no name for this place.” Kahekili responded, “Then I shall call it Halena because of the sign of the yellowish tapa.”
#11 Weke Pueo

**Geographic Location:** West End coastline, especially near Kolo  
**Characters:** mano, weke pueo  
**Marine Resources:** mano, weke pueo  
**Hawaiian Values:** dreams have a source and meaning

**Summary**

An injured mano (shark) was swimming from Maui to Molokai and the weke pueo followed it to the southwest shore of Moloka'i, drinking the blood that was flowing from its wounds. Because the weke drank the blood of the mano, it was poisoned forever. People who eat the head of this weke will be cursed by nightmares.
### Wahi Pana Table

<table>
<thead>
<tr>
<th>Name</th>
<th>Suggested Translation and Tale of Naming</th>
<th>Desc.</th>
<th>Cultural Sites and Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Amikopala</td>
<td>Waving Ripe Sugar Cane</td>
<td>Adze Quarry</td>
<td>Heiau located on the eastern spur of ‘Amikopala and to the ENE of ‘Amikopala is a piko stone. Formerly, the location of adze quarries, maika playing ground, the “Sisters of Kalaipahoa”, and to the south, were Paka’a’s fields for sweet potato.</td>
</tr>
<tr>
<td>Hakina</td>
<td>A Remnant, broken piece</td>
<td>Gulch/Hill</td>
<td>Ko’a facing south on the rising ground N of the beach and road. Kalalu heiau located on the flat land at beach level. Emory believed that this heiau was probably used to mark the seasons due to the exact N and S positions on opposite sides of the platform. Here, on a low rocky hillock are three stones standing in line with petroglyphs.</td>
</tr>
<tr>
<td>Halena</td>
<td>Yellow Trough</td>
<td>Gulch</td>
<td></td>
</tr>
<tr>
<td>Hale o Lono</td>
<td>Lono’s House</td>
<td>Land</td>
<td>Described as “… a fishing station formerly quite a village below ‘Maunaloa,’ Molokai” (Saturday Press, 1883. The Malualua is its wind. Burials in the sand dunes were noted in 1952. Ko’a located in the shelter of the Hale o Lono cliff and on the headland to the E of Hale o Lono cliff.</td>
</tr>
<tr>
<td>Hikauhi</td>
<td>Name of the daughter of Chief Ho’olehua and his wife ‘(I)loli. She became the wife of P(a)ka’a and mother of the famous K(u)aP(a)ka’a. She was lost during labor pains and her husband searched vainly for her, hence the saying applied to fruitless endeavors, Hikauhi i Kaumanamana</td>
<td>Land/Gulch</td>
<td>Formerly a fishpond here to the E of Hikauhi Gulch.</td>
</tr>
<tr>
<td>K(a)'ana</td>
<td>Division</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>K(a)haiawa</td>
<td>The sacrifice [in a] bay</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>Kahai'awa</td>
<td>The sacrifice [of the] bay</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>Kaha'iawa</td>
<td>The breaking [by the] bay</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>K(a)ha'i'awa</td>
<td>The breaking [of the] kava plant</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>K(a)ha'i'awa</td>
<td>The bay belonging to someone else</td>
<td>Land</td>
<td></td>
</tr>
<tr>
<td>Kahalep(o)haku</td>
<td>The kava plant [or drink] belonging to someone else</td>
<td>Land</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kaheu</th>
<th>Gourd?</th>
<th>Gulch/Hill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kahinawai 0</td>
<td>Hina’s water</td>
<td>Gulch</td>
</tr>
<tr>
<td>Kaluakanaka 0</td>
<td>Oven-baking man</td>
<td>Headland</td>
</tr>
<tr>
<td>Kaluakau</td>
<td>The elevated pit</td>
<td>Headland</td>
</tr>
<tr>
<td>Kaluako’i</td>
<td>The adze pit</td>
<td>Ahupua’a</td>
</tr>
</tbody>
</table>

1. Cape of the trees or the Point of the Branch. In reference to when the shark god of Kainalu traveled to Kaua‘i. There, a branch of the hau tree became stuck on the back of the shark god. Returning back to Molokai, off the Southwest point, the hau branch came loose and was washed ashore. The people on the beach took the branch and planted it amongst ‘ilima. Their chief, Kuamu, said, “We shall call this place Ka Lae o ka La’au, or ‘the Point of the Branch.’ (Relates to Harriet Ne’s Mo’olelo)

2. Named for the famous club of Palila, the Kaua‘i hero who, with a spear given him by the gods, leapt to Kiha a Pi‘ilani, a Moloka‘i hill, and there attracted all the women; the angry and jealous Moloka‘i men fought him. His club lost its mana to the gods of Moloka‘i, and so he threw it away; it landed on this cape. (Ka Nupepa Kuokoa, July 6, 1922.)

Ko’a once located at the site of the lighthouse. According to Kamakau (1869a), Kalaeokala’au was one place where “… where stone-cutters made adzes. The stone there were the ho’okele and the makai’a, also called the mahikihihi.”

K(a)ana Division Land According to Emerson (UL 45), a rock here is the body of Kapo, a hula goddess and sister of Pele. The hill is said to be the site of the original school where the ancients learned hula dancing of every kind. Above the hill lived K(u)ap(a)ka’a, the punster and hero; he taught men to farm, build houses, and fish. (Ka Nupepa Kuokoa, September 14, 1922.)

Kahalep(o)haku The stone house Land Heiau 10ft from the edge of a high cliff overhanging the sea. Believed to be the site where Kihapiilani was brought up.
## Wahi Pana Table p.3

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Location Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaluokawahine</td>
<td>The pit of the woman</td>
<td>Ko’a on the northern side of the gulch, 200 ft E of the beach. A number of house sites S and E of the ko’a in the gulch. In addition there is a trail and two structures similar to a ko’a. Ko’a also located at Kamakaipo Point.</td>
</tr>
<tr>
<td>Kam(a)ka’ip(o)</td>
<td>The night guard</td>
<td>Gulch/Point</td>
</tr>
<tr>
<td>Kamanakai</td>
<td>The sea power or the sea branch</td>
<td>Gulch</td>
</tr>
<tr>
<td>Kanalukaha</td>
<td>The fourth wave</td>
<td>Beach/Point</td>
</tr>
<tr>
<td>Kapali(h)i</td>
<td>The sliding cliff</td>
<td>Cliff</td>
</tr>
<tr>
<td>Kapuhi(k)i</td>
<td>The sounding eel</td>
<td>Point</td>
</tr>
<tr>
<td>Kapukuwahine</td>
<td>The gathering place [of] females</td>
<td>Coastal Area</td>
</tr>
<tr>
<td>Kaumanamana</td>
<td>Place branching out</td>
<td>Bay, Reef, former fish pond</td>
</tr>
<tr>
<td>Kaunala(a)</td>
<td>Placing sun</td>
<td>Bay/Gulch</td>
</tr>
<tr>
<td>Kaupoa</td>
<td></td>
<td>Ko’a located on the bluff north of the bay and to the S of the stream of Kaunala Gulch with house sites in the vicinity.</td>
</tr>
<tr>
<td>Keanaka’iole</td>
<td>The cave of the rat</td>
<td>Gulch</td>
</tr>
<tr>
<td>Keawakalani</td>
<td>The channel of the royal chief</td>
<td>Beach</td>
</tr>
<tr>
<td>Kihapii(a)</td>
<td>Kiha [child] of Pi’ilani, name for ancient Maui chief.</td>
<td>Hill</td>
</tr>
<tr>
<td>Kilo</td>
<td>Crawl or Pull</td>
<td>Land</td>
</tr>
<tr>
<td>Kopala</td>
<td>Below was a trail leading to P(a)ka’a’s sweet potato patches. (Cooke 119).</td>
<td>Hill</td>
</tr>
<tr>
<td>Ku)k(u)k(u)</td>
<td></td>
<td>Gulch</td>
</tr>
<tr>
<td>Mauna Loa</td>
<td>Long Mountain; Occupies whole western end of island</td>
<td>Mountain</td>
</tr>
<tr>
<td>Naninanikukui</td>
<td></td>
<td>Gulch</td>
</tr>
<tr>
<td>Oneohilo</td>
<td>Sand of Hilo</td>
<td>Fishpond located between Naninanikukui and Keanaka’iole Gulches.</td>
</tr>
<tr>
<td>Onovalana</td>
<td></td>
<td>Gulch</td>
</tr>
<tr>
<td>P(o)hakuloa</td>
<td>Long stone</td>
<td>Hill</td>
</tr>
<tr>
<td>Pu’u Ho’olehua</td>
<td>Hill of Ho ‘olehua</td>
<td>Hill</td>
</tr>
<tr>
<td>Pu’u N(a)n(a)</td>
<td>Observation Hill</td>
<td>Elevation</td>
</tr>
<tr>
<td>Pun(a)kua</td>
<td>Spring [of the] gods</td>
<td>On summit of Mauna Loa</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
<td>Land/Gulch</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Punakou</td>
<td>Kou tree spring. The god K(a)ne brought forth fresh water here (HM 64)</td>
<td>Land/Gulch</td>
</tr>
<tr>
<td>Waiahewahewa</td>
<td>Water of Hewahewa</td>
<td>Gulch</td>
</tr>
<tr>
<td>Waiak(a)ne</td>
<td>Water [made] by K(a)ne.</td>
<td>Gulch</td>
</tr>
<tr>
<td>Waiaoooli</td>
<td></td>
<td>Gulch</td>
</tr>
<tr>
<td>Wai‘eli</td>
<td>Dug water</td>
<td>Hill</td>
</tr>
<tr>
<td>Waihi‘i</td>
<td>Lifted water</td>
<td>Gulch</td>
</tr>
</tbody>
</table>
3.6 Subsistence, Cultural and Spiritual Resources and Practices

3.6.1 Overall Cultural Significance of La'au Point

La'au Point and the western and southern coastlines of Moloka'i which converge there have always been remote and isolated. As noted above, it was sparsely populated prior to contact. At the time of the Mahele in 1848 no claims were filed by maka'ainana to the area and it was designated as government land of the Kingdom of Hawai'i. Beginning in 1875, the La'au Point area was part of a ranch that was operated in the Kaluako'i ahupua'a by Charles Reed Bishop who had purchased Kaluako'i from the government of King Kalakaua. In 1893 Charles Reed Bishop transferred ownership of Kaluako'i to the Bishop Estate. In 1898 the Bishop Estate sold Kaluako'i to Moloka'i Ranch. Throughout the twentieth century the western and southern coasts adjacent to La'au Point continued to be part of Moloka'i Ranch and access was a privilege reserved for stockholders and employees of Moloka'i Ranch. Even during the years that the area was owned by Alpha U.S.A., this area was never developed and access was restricted.

According to John Clark's Hawai'i Place Names: Shores, Beaches, and Surf Sites, a light to guide navigators was established at La'au by the monarchy in 1881 and automated in 1912. When the lighthouse was manned, a small inlet on the north side of the point was used to service the lighthouse and it was called La'au landing. A boom extended over the inlet to unload the lighters that were brought ashore from the interisland steamers. Only a few concrete foundation blocks remain. (Clark, 2002, p. 205)

George Cooke, in his history of Moloka'i gives the following description of the Burrows family who lived at La'au Point:

John Burrows was a hao le who kept the lighthouse on the west point of Molokai, at Kalae o ka Laau, in the days when kerosene furnished the lights. John had been a retainer of the King, and as he was subject to an over-indulgence in liquor, he was sent to this isolated spot, the idea being that he might be helped to overcome his weakness. John married a Hawaiian woman, Koa by name, and raised a large family at the west end. It was a familiar sight to see him with them all in an open cart drawn by mules, coming across the wide plains to Kaunakakai for their supply of provisions. One of his sons, David, is purported to be the inventor of the "steel guitar." Several sons have worked for the ranch.

Sam Burrows, Sr., a present employee and son of John, tells of being sent by his father, to swim out from the west point to meet a steamer to deliver a letter corked tightly in a bottle which he carried with him. This letter contained an order for more kerosene for the lighthouse. (p. 132)
A Burrows descendant confirmed that there was a road from La'au to Kolo and all the way into Kaunakakai. His grandfather would drive into Kauanakakai to replenish oil for the lighthouse lamp. There was also a road from La'au to Mo'omomi. The Burrows family would go along this road and catch fish and salt it and put it in the barrel and then go with a wagon to pick it up. At the time that Burrows family first lived at La'au Point there was no kiawe, it was all pili grass. They would have to go up to Maunaloa to get wood. The family also placed white coral all around the outside of the lighthouse so that when it rained they wouldn't track mud into the lighthouse. Sam Burrows, who was described by George Cooke above, was also an excellent fisherman. The story is told that he would ask his wife to start the fire as he headed to the ocean. He would then jump in the water and when he came back the fire was just right for him to grill the enenue that he had caught.

At present, La'au Point itself, as mentioned above, is owned by the U.S. federal government which maintains a "lighthouse" as a navigational aide. A total of 51 acres at La'au Point is managed by the U.S. Coast Guard and will remain vacant and undeveloped land. According to Clark, the 20-foot steel pole supporting the light stands approximately 132 feet above sea level.

In Hawaiian tradition, lae or points of land into the ocean are culturally significant. As a feature, the lae includes not only the point itself, which can be visualized as a nose on a face, but also the forehead, the land formation from which the point juts out into the ocean.

A large part of the significance of the La'au Point area is that it is raw and untouched. It is so isolated that most of the residents of Moloka'i have never even been there and have no direct experience with the place. This factor gives La'au an almost mythical quality. La'au Point has become an icon of what Moloka'i represents - a rural stronghold and reserve of Native Hawaiian culture, a cultural kipuka. If Moloka'i is "The Last Hawaiian Island" then La'au is one of the last untouched Hawaiian places on "The Last Hawaiian Island."

In Hawaiian tradition, La'au Point represents a point of no return. For those traveling by canoe from O'ahu to Moloka'i across the Kaiwi Channel, once La'au Point is sighted, there is not turning back to O'ahu. This concept has been applied to the issue of the development of the La'au Point Rural-Residential Subdivision. Many Moloka'i residents feel that if the west and south shores adjacent to La'au Point is developed, as proposed, that this will open up Moloka'i to new residents unfamiliar with the culture and way of life on Moloka'i and lead to irreversible cultural change.

Everyone interviewed and those who came to community meetings had reservations about the proposed development. No one was an enthusiastic advocate and the most vocal were opposed to the development. The Maunaloa kupuna and larger community and longtime employees of Moloka'i Ranch have the most direct and longtime experience with the area proposed for development. While they are concerned and reluctant about

La'au Point Cultural Impact Assessment / 79
the development, they are also willing to acknowledge and support the right and the need of the Ranch to seek the development. They felt that the negative impacts could be managed if the development would conform to the strict covenants, conditions and restrictions outlined in the Community-Based Master Land Use Plan for Moloka'i Ranch. They also felt that the negative impacts would be offset with the gifting of important legacy lands to the community. In addition, many longtime adversaries of Moloka'i Ranch who were involved in developing the land use plan were willing to allow the development to proceed under guidelines and conditions agreed to over the course of a two year planning process.

**Mana'o:**

*Nobody in this room wants to see La'au developed, but if it is developed, we should do it our way.*

### 3.6.2 Access and Trails

An essential aspect of Native Hawaiian cultural and subsistence practices are access routes to reach subsistence and cultural resources. Informants shared the following information about trails and roads through which they access resources in Kaluako'i.

- **Trail on 1886 and 1897 Monsarrat Map**
  Maps produced by M.D. Monsarrat for the Hawaiian Government Survey in 1886 and 1897 clearly show a trail going from Kapalauoa near Mo'omomi to 'Ilio Point and from 'Ilio Point along the west coast to La'au Point.

- **Ranch Access Policies**
  When the Cooke's owned Moloka'i Ranch, access to the west and south coastlines adjacent to La'au point was limited to the Cooke family and the Ranch stockholders. According to Rikki Cooke, his extended family frequented the Kaupoa House. There was also a cabin at what is now Kaluako'i Hotel. Mr. Joao took care of the cabin near Kaluako'i which was rented for $5 a night. The Egusa's took care of the Kaupoa house which was rented out for $10 a night.

  The Cooke family did not camp on the south shore. Ranch employees, mostly cowboys camped on the south shore. Some of the cowboy families camped at certain spots so often that it became know by their name, such as Joao camp site. The camp sites were well-cared for. If a camp site was left with litter, one would not be allowed to get a pass to camp again.

  According to Cooke, members of the Recreation Club of Ranch stockholders could rent Kaupoa up until the Cooke family sold the Ranch. Toward the end of the era when the Ranch was owned by the Cooke family, the stock went public. If you had one share you could rent out Kaupoa House for fishing and hunting. According to Rikki Cooke, the Recreation Club of stockholders made $100,000 a year on hunting and fishing. The Kaupoa house was booked every weekend of the year, mostly by offisland Kama'aina.

La'au Point Cultural Impact Assessment / 80
The Libby Plantation workers were not ranch employees. The plantation employees were allowed access to Hale O Lono, Halena and Kolo or to the Del Monte cabin at Kawa'aloa. When the pineapple operations closed in the 1970s, access was discouraged and finally closed in 1975 after the bridge burned down. After the plantation closed and the resort operations opened, Ranch employees and resort guests were permitted access.

Ranch employees could go hunting and fishing the whole West End under a pass system that was initiated by Aka Hodges when he was the manager and honored by successive managers. Ranch employees could sign up for an area to go hunting and fishing on a first come, first serve basis. The designated areas were spaced sufficiently apart to allow enough space for fishing. Each group was supposed to stay within the designated area that they were assigned. At one time retirees were extended privileges of fishing and hunting, but under the Hodges pass system to present, once employees retired they had to turn in their keys. They were no longer extended the privileges of hunting and fishing that they had enjoyed while employed by the Ranch. The Kaupoa pasture was reserved for the Cooke family and the stockholders Recreation Club.

The rest of the island could only access the Ranch's West End lands with a Ranch or plantation employee.

Currently, a subsistence committee of the Maunaloa community manages permitted access by Ranch employees. Guided access is also provided to hotel guests and guests of out-sourced commercial contractors who offer a range of recreational activities on the Ranch. Employees and their families usually camp out on weekends. However, employees who are off on week days can go during the week. The north portion of the Ranch lands have hunting so its closed to hunting in July, August and September. A $50 deposit is required. They are limited to two or three vehicles and ten adults. ATV's and motorcycles are not allowed. Families can go only once a month to give everyone a chance. Gathering is allowed for parties, and there is a 3 gallon limit on 'opihi.

• Access for Plantation Workers
During the period of the pineapple plantation the Maunaloa community had ready access via a road from Maunaloa through the pineapple fields, to Hale O Lono and as far as Halena. When the pineapple operations closed in the 1970s, access was discouraged and finally, around 1975 the pineapple bridge along the road was burned down and access to Halena from Maunaloa through the fields was cut off.

• Hale O Lono
From the 1960s to present, Hale O Lono is the launching point for the annual Moloka'i Hoe Men's and Women's races.
Those who fish and hunt in the area get dropped off at Hale O Lono and go on foot along the south shore. Some do fishing with bamboo.

The opening of public access to Hale O Lono increased access to the south shore out to La'a'u point - both by foot and by boat. While it is still a long walk from Hale O Lono along the south coastline to La'a'u, it is closer than what it had been. Hale O Lono also provides a closer point for boats from Moloka'i to launch and get to the fishing grounds and 'opihi covered rocks of the south coastline.

• Hui Ala Loa
Hui Ala Loa opened access from Pala'au to Kolo in 1975. According to an informant the access was closed when people left rubbish and poached deer on Ranch property.

• Native Hawaiian Access
Native Hawaiian access rights protected under law and are guaranteed under the Community-Based Master Land Use Plan for Moloka'i Ranch.

• Access Patterns
Informants who fish in the area and did not have a key would be taken by jeep to the fence line and walk in from there - about an hour.

The opening of Kaluako'i and Papapohaku afforded closer access points to the western coast south to La'a'u Point - both by foot and by boat. Fishermen could begin at Kaunalu bay or what the community calls "Dixie" to walk south to La'a'u. Boaters can launch from Kaunalu bay and even an area off Kaluako'i Resort.
### 3.6.3 Identified Coastal Resources

A dozen persons filled out the survey forms. They identified the following as cultural resources in the area proposed for development.

**Coastal Cultural and Subsistence Resources**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>streams</td>
<td>ponds</td>
</tr>
<tr>
<td>‘auwai (taro irrigation ditches)</td>
<td>loʻi kalo</td>
</tr>
<tr>
<td>springs</td>
<td>caves</td>
</tr>
<tr>
<td>trails</td>
<td>wahi pana (named places)</td>
</tr>
<tr>
<td>sacred places</td>
<td>dunes</td>
</tr>
<tr>
<td>landings</td>
<td>bridges</td>
</tr>
<tr>
<td>surfacing sites</td>
<td>sandy beach</td>
</tr>
<tr>
<td>fishing area</td>
<td>fish pond</td>
</tr>
<tr>
<td>fish trap</td>
<td>fish house</td>
</tr>
<tr>
<td>hunting areas</td>
<td>kilo i’a (fish sighting)</td>
</tr>
<tr>
<td>muliwai (brackish pond)</td>
<td>anchialine pond</td>
</tr>
<tr>
<td>trails</td>
<td>salt ponds</td>
</tr>
<tr>
<td>wells</td>
<td>turtle nesting area</td>
</tr>
<tr>
<td>historic walls</td>
<td>basalt veins for tools</td>
</tr>
<tr>
<td>alae vein</td>
<td>salt pans</td>
</tr>
<tr>
<td>shrines</td>
<td>salt gathering areas</td>
</tr>
<tr>
<td>ko’a (fishing shrines)</td>
<td>heiau (temples)</td>
</tr>
<tr>
<td>historic sites</td>
<td>cultural use areas</td>
</tr>
<tr>
<td>ho’ailona (natural signs)</td>
<td>sighting place</td>
</tr>
<tr>
<td>lele (cliff jumping spots)</td>
<td>native plants</td>
</tr>
<tr>
<td>pu’uhonua (places of refuge)</td>
<td>holua slides</td>
</tr>
<tr>
<td>cultivation area</td>
<td>leina (jumping off point for souls to cross over)</td>
</tr>
<tr>
<td>archaeological sites</td>
<td>for souls to cross over</td>
</tr>
<tr>
<td>burials</td>
<td>kupe’e</td>
</tr>
<tr>
<td>o’opu</td>
<td>hiihiawai/wi</td>
</tr>
<tr>
<td>aholehole</td>
<td>‘anae</td>
</tr>
<tr>
<td>steam bath areas</td>
<td>bathing pools</td>
</tr>
<tr>
<td>limu gathering areas</td>
<td>lava tubes</td>
</tr>
<tr>
<td>subterranean water course</td>
<td>petroglyphs</td>
</tr>
<tr>
<td>kapu kai/hiʻu wai areas</td>
<td>paddling areas</td>
</tr>
<tr>
<td>artifacts</td>
<td>view plane</td>
</tr>
<tr>
<td>seasonal residential sites</td>
<td>burial markers</td>
</tr>
<tr>
<td>water caves</td>
<td>birthing stones</td>
</tr>
<tr>
<td>phallic stones</td>
<td>Pohaku Kane</td>
</tr>
<tr>
<td>coral reef</td>
<td>estuary</td>
</tr>
<tr>
<td>spawning grounds</td>
<td>house sites</td>
</tr>
<tr>
<td>po kane routes (night marchers)</td>
<td>dams</td>
</tr>
<tr>
<td>‘aumakua (ancestral deities) domain</td>
<td></td>
</tr>
</tbody>
</table>
They added the following additional resources:
  monk seals, Hawaiian moth, water catchments, bell stones, ahu stones, 
  chamomile type flower for clearing liver, shells on shore.

Along the south shore, informants identified the various fishing and gathering areas by 
points that they referred to as first point (Kanalukaha), second point (Kapukuwahine), 
third point (Kahalepohaku) and fourth point ('Opihi Road). According to informants 
there's moi and aholehole 'opihi and 'a'ama crab on the south shore. The 'opihi starts at 
Kapukuwahine on the south shore and out on the cliffs along what they refer to as 'Opihi 
road. The western shore is known for moi, aholehole and lobster.

3.6.4 Subsistence Fishing and Gathering

Participants in community meetings and the key informants speak of the south and west 
coasts adjoining La'au point and its nearshore waters as reserve of marine resources 
which serve as their "icebox." It is a place where fishermen usually go to get fish, 'opihi 
and crab for parties and gatherings of their large extended families.

The southwest shore also factors into the life cycle of the mullet, serving as a hatchery 
area from which they move east to Mana'e or East Moloka'i.

Due to the seasonal ocean swells, the south shore is usually harvested in the winter time 
when there are north swells and the west shore is usually harvested in the summer time 
when there are south swells. They also speak of the ocean as being very treacherous and 
not safe for swimming. Off of La'au Point itself, informants spoke of a very strong 
current which has swept even the best divers out to the open ocean.

Traditionally, it is not a place that was fished on a regular basis because it is isolated and 
difficult to reach. However, the increased use of boats on Moloka'i and O'ahu has 
changed this. Informants noted that the resources have declined in the area with heavy 
seasonal harvesting by boaters from O'ahu and the opening of Hale O Lono harbor and 
Kaluako'i as closer launching points for Moloka'i boaters.

- Last Protected Area
  A lot of gathering and subsistence activities take place at La'au because it is the last area 
on the West End that is protected from general public access.

- The "Icebox"
  La'au is a reserve for marine resources where families go together as a group to fish and 
gather resources for family parties. When there is a large family gathering, informants 
said that they go down to southwest shore to get crab and 'opihi.

- Treacherous Ocean
  Fishing and diving along in the ocean in front of the proposed development is unsafe. 
  There are not too many sandy beaches. The current is very strong. Fishermen say the 
current is mean - it can huki or pull one out to the deep.

La'au Point Cultural Impact Assessment / 84
• Seasonal Fishing
In the summer the south shore gets more swells and those who fish near La'au usually
fish on the West shore. In the winter time the north shore gets the swell and so the
fishing is usually on the south shore. Informants fish on both sides of La'au Point.
There's a lot of fishing after winter and before summer when the graduation and wedding
parties come up.

• Camp Out
Because they would walk out to La'au, they would have to camp overnight. They would
go in the evening, stay overnight, fish overnight and during the day and then go back.
When camping overnight and fishing they would just bring cooked rice. They would also
bring salt, because sometimes the salt on the rocks wasn't clean. They would eat what
they catch. They could cook the fish right on top of the kiawe coals and peel the skin.
They did not carry ice because it is too heavy. Whatever fish they caught early, they
would eat down there and then they would catch more fish and go home.

• Hatcheries
The shoreline provides a hatchery for young fish.

According to intervenor Vanda Hanakahi, La'au is the place where the fish gather to
begin their eastward journey along the Molokai coast to spawn at Pala'u, and then move
on toward the eastern shores of the island. An old 'olelo (saying) about Molokai is:
"Moloka'i Kai po'olo'olo'u" meaning the ocean is turbulent along the shoreline. In olden
days, the coastal waters were teeming with fish and their movement created the
turbulence. This showed the wealth of Moloka'i because of the abundance of food.

According to intervenor William Kalipi, Sr., mullet feed along the La'au coast. At the
beginning of winter, when they are fat and the November storms start, they travel East
along Moloka'i's southern shoreline to spend the winter months in Mana'e (the East End
of Moloka'i). People on the East End catch the mullet to eat. Longtime fishermen of
Ranch and Maunaloa families said that the mullet area is at Hale O Lono and from
Halena to Kolo.

• Abundant Marine Life
The ocean is rich with lobster, uhu, enenue, moi aholehole, squid, 'opih, loli (sea
cucumber), leho (cowry shell), pipipi, wana, papa'i,

• Lobster
There have always been a lot of lobsters on the south and west shores. There are still a
lot of lobsters. Informants note that conservation is important. Lobsters with eggs or out
of season should be thrown back.

An informant said that Kamaka'ipo is probably one of the best lobster grounds with
sandstone shelves that go out into the ocean.
• 'Opihi
From Kapukuwahine and along the coastal cliffs out to La'au and around to Sam White is where 'opihi is gathered. It used be accessed through what was called 'opihi road. Informants talk about walking out there to get bags of 'opihi for parties. Used to be guaranteed to get 2 gallons of 'opihi.

Those who go to get 'opihi usually go by boat, although a few hard core guys walk out there. They put the 'opihi and moi in the shade or in the water.

Whenever the water is nice, somebody is out on the rocks. In winter, gatherers go to the south side of the point and during the summer they go to the west side.

'Opihi Road has the most 'opihi but there is also some by the lighthouse.

• Crabbing
The south shore is known to have 'a'ama crab and families go there to get crab for parties.

There are two types of crab - 'a'ama and the brown fury one that lives on the reef and eats the limu.

Along the south shore there is 'a'ama and kuhono crab. In the mangrove there is kalahiki. There area also sand crabs. Kolo had Samoan crab.

• Abundant Limu (seaweed)
According to intervenor William Kalipi, Sr., the area has limu kohu, limu, lipoa, limu lipe'epe'e, limu kala.

An informant said that Halena has limu kohu, chop-chop and wawae'iole. He also said that near Pu'u Hakina there is 'ele'ele and limu kohu.

• Springs
According to intervenor William Kalipi, Sr., there are hidden freshwater springs along the coastline and as he used to walk the coastline to fish he would scoop drinking water from some of these springs. Other informants confirm that there are spots of fresh water that enabled fishermen to make it through their day.

One informant described an old well and windmill that was at Pu'u Hakina.

• Fishing
Families use La'au for subsistence and love the area. It is not a beautiful beach, but they consider it the ultimate fishing area. Informants expressed concern about interference by the residents in subsistence fishing. Conservation of the resources is important. Fishing is primarily provide food for their families. What they catch is also shared with relatives and neighbors. A group of Maunaloa fishermen still go out every two or three months to fish and share with everyone, especially with the kupuna. They also go fishing and gathering for occasions such as funerals, graduations, weddings, and baby lu'a'u.
There are moi holes and aholehole all along the shoreline. One of the main forms of fishing in the ocean in front of the proposed development is throw net for moi and aholehole. The area is considered a choice place for throwing net for moi. There are also kala, palani. While the area is heavily fished by local fishermen there is still a lot of moi. During the summer months moi is kapu.

Informants also spoke of pole fishing by the lighthouse, Kapukuwahine and Kaupoa. They also throw net in these areas.

Ranch employees would feed their families with what they got at La'a'u - moi, lobster, 'opihi, 'a'ama crab, aholehole, menpachi, kumu, uhu, enenue.

There are moi, manini, palani, and kala.

An informant said that there while there is mostly moi and aholehole, that it is mostly white fish grounds - moi, 'o'io, aholehole, manini and kala.

Some informants from Maunaloa would walk from Hale O Lono to La'a'u and even as far as Kaluako'i. They would carry gallons of water and bury it and then find it on the way back.

Another informant described how his father would start out by Kaluako'i early in the morning and walk south to La'a'u and around and meet the family at Hale O Lono and Halena.

According to Rikki Cooke, the Cooke family used it mostly for throw net, diving and shore casting. They mostly shore cast for oio. When they caught moi it was by the big burlap bag fill.

Maunaloa plantation families used to camp at Halena and hike from there straight out to the lighthouse and then catch fish as they walk back. They also carried water in glass containers and buried them in the sand. Even a week later, the water in glass containers would still be good. One informant said that he used to walk from Halena to the lighthouse with the old folks as their bag boy. They would throw net, and bury the fish that they caught, near the edge of the ocean to keep it cool, since they did not have coolers and ice. On the way back from La'a'u they would get the fish that they had buried. This would take them the whole day.

Before there were freezers, fishermen would fish for what they needed for the day and would dry the rest and thus, there was more fish.

La'a'u has a cross wave. Informants said that the old folks would go out casting at La'a'u but didn't dive. They would mostly dive by Halena camp.
• Salt
Once in a while informants gathered salt along the shoreline, however, the primary place for salt was at 'Ilio.

• Pu'u Hakina
Pu'u Hakina was another area known for fish and lobsters. Ranch families would go and camp there. They used to just bring rice and eat everything else fresh from the ocean. In the days of their grandparents, the Ranch families would catch 'o'io by the tons with a hukilau net. There might be as much as 10,000 pounds. There was so much, everyone would take home fish. George Cooke, in his book Mo'olelo O Moloka'i, has photos of the Ranch hukilau in 1926 and in 1932. It shows hundreds of people pulling in the hukilau nets. (Cooke, 1949, p. 79)

• Boats
The area is heavily accessed by those who own boats on Moloka'i as well as O'ahu. Fishers fish by net, pole, and dive from the boats. It is especially popular for fishing during lobster season, net fishing for lobster. If fishermen go to the area by boat, they only go for the day. If they walk out they are more likely to camp overnight.

Deep sea fishing extends for more than a mile out. La'au connects to the Penguin Banks, underwater.

Informants described how they launch from Hale O Lono and drive by boat to Kapukuwahine, then walk around the Lighthouse. They throw net for moi and aholehole and dive for lobster, uhu and enenue.

Boats come over for fishing, especially when the canoe races are scheduled. They come with their boats and clean out the whole area. They use the GPS to mark the lobster and ulua grounds.

With the heavy impact from boaters, there is no enenue, no kala according to some informants. Some informants say that it isn't worth their time to go fishing out by La'au. While they still go, takes a longer time to find fish and they have learned to be satisfied with less.

Informants noted that there is a strong current off of La'au point and it is risky offshore. Diving offshore is risky.

• Hale O Lono
Informants speak of fishing in the reef by Hale O Lono before it was dredged.

Hale O Lono used to have squid, mullet and lobster but when it was dredged it disappeared. The water got all milky after Hale O Lono was dredged.

Hale O Lono still has fish. Community members have caught a lot of fish at Hale O Lono a few months prior to the meetings.
Some informants would walk down to Hale O Lono with an inner tube and then swim/float toward Halena on the current.

- **Halena**
The Maunaloa community would camp and fish at Halena where there are a lot of lobsters, fish and marine resources, a sandy beach, and safe swimming.

The Filipino plantation families would walk to La’au from Halena camp and pick 'opihi, and 'a'ama crab. They would go with gallons of water and bury it at each point. On the way back they would retrieve the water they had buried. If the Ranch employees see them walking they would pick them up.

Halena is protected by reef and safer for the children to play in the ocean. La’au is almost direct ocean and rough except for only a few months in the summer.

- **Kaluako’i / Papohaku**
Informants used to do a lot of fishing and diving in front of the Kaluako’i Hotel. They continued to fish there after the development of the resort. Some of the informants still throw net and dive in front of Kaluako’i and Papohaku.

An informant spoke of fishing near Papohaku. They used to walk to the end of the pineapple field and then walk down to Papohaku. The fish were tame, right under a nearsore shelf.

- **Impact on the Resources from Boats, Previous Development and Hale O Lono Access**
The resources have already been diminished from what the longtime Maunaloa residents and Ranch employees remember - from O'ahu boaters, Moloka'i boaters, and the opening of Papahoku and Hale O Lono. At one time Moloka'i boaters could only launch from Kolo and Kaunakakai Wharves. After the hotel opened they could launch by Kaiaka Rock near the hotel. After Hale O Lono opened up they could launch from Lono. Some of the boaters launch from Lono and go to La’au where they drop guys off to get ’opihi, mostly on the south shore. Before Hale O Lono, most boaters would launch from Kaunakakai and fish for akule along the shore as far as Hale O Lono. Longtime fishermen said the resources are not like before where you are guaranteed to get a lot of fish. TV has shown all the secret places, such as where to get Samoan crab. Can easily wipe out the crab.

Informants note that the resources were fished out when the Kaluako’i hotel opened up.

At Papohaku, turtles used lay eggs but they don't go there anymore.

Informants are concerned about the changes they have seen in their lifetime and are concerned that the kids will have nothing to see and experience.
**Mana'o**

**Fishing**

Used to hike down here with my dad and he would carry loads of 'opihi and fish. We would walk from mauka to beach, fish, pick 'opihi and walk back with the load.

We had the pain of going down and carry the fish and 'opihi back. My father would hike and we follow, get the 60 to 70 pounds of fish. Go to Kapukuwahine and to La'au. I'd be carrying fish. That's the pain that we go through to bring out this treasure for our family. The joy of bringing out the resources. WE like that pain, it's good pain. We are born with that, it's normal to get that kind of difficulty.

Depends on the purpose - might risk going out even in rough weather. Like if funeral, even if rough need to go. We do a lot of praying on the beach prior and it opens up for us. We go anyway because of the purpose is for the family. The purpose has to be clear before we go awana or holoholo. When it's clear, we pray before we go and the ocean subsides and it opens up for us. Granted we had some times when it goes against all logic, with the elements up against your back.

Go for self gratification. All about the rush. We wanted to go, because we wanted to go.

When there is a purpose, flows little bit more. If moving for the community and the family then nothing can be in the way. It is there for us and we use it in the most appropriate way, then the good stuff flows and the laughter gets loud.

Making the people that will live here and their children live here, feel respected and have a sense of ownership. Our ownership is the beach and the ocean, we want to maintain that ownership. If people come and the fish get untame, we lose that ownership. Want it there for the younger ones and their children. We want everyone to be happy . . . happy.

The act of fishing and hunting have more significance - family and friends and 'ohana and culture. Not only fish because we going to fish because we are hungry. If no fish, the throw net will disappear. Do you want it to disappear in your generation? Lay net disappear. The crab net disappear.

I like to dive. But there's certain people who just like to throw net. Throw net for me is a good couple rushes. My children have that experience, but they are going to schools and running around and partying. If they are not ono for deer meat, no need. Manini was such a valuable asset for us, now manini ??? Even the Hawaiian pallette is changing. Fish?? 'opihi?? different palette.

Did a lot of fishing - diving, pick 'opihi, cook for lot of parties . . . I used to dive out that area. Fishing and swimming is very unsafe, it takes you out, its very dangerous. Once McGuire, known as one of the best divers, went fishing and the current took him into the middle of the channel between O'ahu and Moloka'i.
Pole fishing is okay. Diving is very dangerous, not too much sandy beaches and the current is very strong. From third point over to La'au the current is very strong. The worst portion is in the corner. Once we went out, my friend was sleeping on the boat, we got taken out. Good thing.

Throw net for moi and aholehole . . . by boat do net and when lobster season is open . . . Did from La'au to Pu'u Hakina, all the way to Kaunakakai . . . Pu'u Hakina, net fishing for lobster . . . Not many commercial fishermen here. I was a part time then . . . Not very much now, mostly people from offisland, because of lack of access . . . When I was fishing it was a lot of offshore fishermen from O'ahu.

There are some people who walk the shoreline and do throw net and do fishing.

People that live up Maunaloa used to walk. Younger not want to do it.

Throw net - casting overnight with the line and catch big ulua. I had a boat, when used to have Kolo Wharf down there. I had a boat. That was during the war time, for few years, then I went in the army and the wave bust up my boat. This used to be a wonderful place, now it gets crowded.

Go down and bury water - bury one here and one there. Just put the fish in the pack - Go in the morning and come back some time after lunch. Nice place to fish, go diving for uhu, manini. Squid. Throw net for moi. Get mullet too - Australian mullet - not the regular mullet - used to have plenty down by Halena side.

Moi - throw net for moi - just choice. Sometimes we used to throw net and there would be the small hammer head sharks caught in the fish nets - 2 or 3 of them and you throw them back. Fish used to always be in abundance, no one used to sell. Tutu man always say, you take enough to feed the family - you go back and you get again. Take and share, not take, take, take. Not just take and sell it.

Used to walk from Halena and to lighthouse, throw net. Plenty fish that time, I would go with the old folks and be bag boy. Throw net, catch fish, bury the fish, right where the ocean comes up. Even if the ocean buries the fish, old folks had marked it. On the way back get the fish that had been buried. One day fishing.

Our family depended on this place for food. This is our icebox. Just like Mo'omomi, a safe haven for fishes - moi in particular. Go both sides - all walk. You go down to get your food you got to walk. We have good 'ano down there, good vibe, good feeling. Know our tutu folks used to live down there - walking is all part of it. Make you feel good. Make sure your intentions are pure, your heart is pure and you always going to get because your heart is pure and you only going to take what you need.

This place is the last place, an ice box for food. Have all the historic sites that go all the way down.
I fish this place how many times. This place is abundant. I never seen moi like this in my life. The moi is mean down there. People been pounding them. Moi is abundant down there - it's awesome. People say no more, get. Lot of the holes are rough, deep and the waves crash over there. Usually they tell that's the mama - the big one's carry the eggs. The smaller is preferred to catch. Moi get season. Summer months is supposed to be closed.

Used to fish down at Papohaku side, We used to walk at the end of the pineapple field and the Ranch and walk down to where Papohaku are. The fish were real tame, just look under the shelf and they were right there.

Still have lobster . . . Deep sea fishing is more out there, a mile out. For the shoreline, moi, aholehole, 'a'ama crab.

Lot of 'opihi, lot of fish and lot of deer.

My dad go early in the morning from Kaluako'i and we meet them at Hale O Lono and Halena. From Kaluako'i around La'a'u to Hale O Lono - once or twice a month, throw net when moi was running. They throw net and walk. Was hard, but they knew how to survive. WE were never starving. We were basically raised on deer meat, lobsters and fish. My dad and his brothers would go down and bring out lobsters and give to everybody and in turn the other guys give us vegetables.

I go every once in a while. Before I had more access. I go with my cousins who work for the Ranch. We used to go down there constantly. More on the south side - Halena, Pu'u Hakina. Main thing moi and 'opihi, still lobsters. Get uhu if you going to dive. Down there is kept for the party. Every time we get party - we get all of our cousins and we walk. We go down and get enough for the party. Not like we going every weekend.

'Opihi and Crab
For parties - go down for crabbing. 'opihi more on the northshore . . . Used to have 'opihi on the south side and 'a'ama crab . . . South and west side - season for moi and lobster.

I used to get 'opihi - more by the point - 'opihi road. Honolulu guys used to always come and clean it out and they sell over there. The Honolulu guys come and clean it all out - lately they don't come cause no more too much now. It's coming back. I don't know why they got to sell them. Fish yeah - but 'opihi is raw food, if you take care and have good size, can get a good lu'a'u. 7 piece opihi for $7 - I don't blame them, money is money. They make a law and cause trouble. Law is what causes all the trouble.

There's a lot of 'opihi - abundance because not too many people go there. They used to walk far and carry bags of 'opihi.
'Opihi road - get 'opihi and out to Lighthouse. Kapukuwahine get, but no more that much rocks. From 'Opihi road to Lighthouse the majority, and then over to Sam White. Shipwreck is more sand. Not as abundant there, because the guys go pound over there. Not many go to 'Opihi road, mostly by boat. A few hard core guys who walk it. Just put the 'opihi in the shade. Moi - put in the sand, shade or the water.

**Lobster**

Kids realize when they move away, that the lobster is expensive. When we were young my dad would catch a lot of lobster, we were spoiled.

Used to go down there with Hana Kupono - camp at Hale O Lono and walk the beach all the way to La'au - only take cracker, get 'opihi, fish, plenty lobsters . . . went diving and we brought back enough lobster for each person to have one and then some - fed everybody . . . That was the best dinner - sometimes only this fish or that, and we made it work.

**Boats**

I am against the project, period. But if going through, may as well say something. I'm subsistence and these are our hunting and fishing grounds. We've reaped the benefits of the pristine fishing grounds. We would launch from Dixie at night and go into the bays. and from Hale O Lono side and come in. Feel like at one with the place. We bartered and shared with family.

**Declining Resources**

Times have changed - they are getting the young fish, the young crab. Kolo used to have abundance of Samoan crab. Used to just lay our net, wait, sit in the car and then just get an abundance.

Outside boats do the diving. Outsiders are not throw netters. Moi take gas from the locals more than the outsiders. As far as the diving part, the outsiders, get plenty air in their lungs. A few lay lobster net - don't want to lay over there, the current is mean. If you get a running tide- just huki - good bye over there and you don't have a boat out there and you are gone. If you have a boat, the guy can pick you up. The current is mean. It's not a swimming beach. Both ways it goes. Huki up, huki down, oh it huki.

If go fishing now, not like before. Lucky if you get anything. Not like before. Lot of times went diving and cannot find anything. If we come home with one squid, we lucky.

Ever since opened Papohaku and Hale O Lono opened, it's all fished out already. Now go with boats from Moloka'i and O'ahu. Before, would launch from Kolo. There were only the Maunaloa people and there were only 4 boats. We would tie up from the sand - to the Kolo pier, when Kolo was operating during the pineapple.
Used to have a nice papa by Lono - dredged the papa. When we were young, take Model A, have a long single rod, make a barb, take fishing. Take the tubes from the trucks and tie around the bamboo and use as a sling. Used to go dive by the papa by Lono. After the dredged, the water came milky. The water used to be clean, even at Lono. Early or late part of 60's dredged Lono. Sand for the freeways near the airport came from Moloka'i - when stopped the dredging made it out of asphalt.

Used to have plenty fish before, used to go fish only for today. Before there was a freezer. Just get what we need today and the rest we just dry them.

Moi, manini, palani, kala - all down that side. Before was good. It was closed by the Ranch. No one want to go past the Ranch. we walk across and get what we need in a day. Only the ranch boys. When the hotel opened, out fished the place. The place has changed from the time the hotel opened and then Lono opened up.

3.6.5 Subsistence Hunting

The area proposed for development is reserved for commercial hunting and closed to subsistence hunting. Informants acknowledge that there is poaching of deer, but not as far out as the areas proposed for development except by illegal trophy hunters for prize money. The areas proposed for development are thick with kiawe and lantana and inaccessible by land. While deer find refuge there, it is not a regularly hunted area. The closing of commercial hunting by the end of 2007 will open the premier areas on Moloka'i Ranch lands for subsistence hunting that are currently reserved and inaccessible.

- Commercial Hunting
The major hunting areas on Ranch lands are currently reserved for commercial hunting - Waikane, Kolo, Sekada Hill on top of Pu'u Hakina, and Kaupoa. Commercial hunting will cease at the end of 2007. At that point all of the Ranch lands, including these best areas will be open for subsistence hunting by permit. The closure of commercial hunting and the opening of community hunting by permit will reduce poaching.

- Pu'u Hakina Gulch
There are huge herds of deer in the Pu'u Hakina Gulch which will continue to be outside of the area to be fenced in for the proposed development.

- Increasing Number of Hunters
There are a lot of younger hunters. Trophy hunting for prize money is also a factor increasing the number of deer killed. A lot of this hunting is done by poaching. Among the old time hunters, if they poached deer it was like a Robin Hood gesture, they would always share it with family and neighbors. It was part of subsistence. Just hunting for the thrill of the kill or for prize money is outside of subsistence.

- Cattle Troughs
The deer follow the cattle. Troughs are only kept full where the cattle to where the cattle are shifted.

- **Fencing**
  MPL should also fence off the whole of the Papohaku area. The deer already congregate there where they cannot be easily hunted because it is a residential area.

Given the experience in trying to control deer at Kalaupapa, informants feel that it will be difficult to take the deer out of the area that will be fenced in and that it will also be difficult to keep the deer out.

- **Hunting Areas Diminishing on Moloka'i**
  Overall, the areas for game to roam on Moloka'i are diminishing with the impacts on the watershed from pigs and invasive species such as clidemia and the fence closure areas. Need to manage the game hunting areas.

- **Hunting and Fishing**
  Informants described how they could go hunt and then go down the trail to get to the beach and go fishing. This makes the area a prime.

- **La'aau Hunting Area**
  An informant described La'aau as an overgrown, inaccessible, flat, lantana infested area where it is very difficult to hunt. Occasionally the employees would do a drive hunt where a whole bunch of guys would walk through and push the deer to the other side where the hunters would wait for them. It was an area that deer congregated because they were protected by an inaccessible impenetrable forest.

  The informants don't usually hunt out by La'aau. They usually hunt in areas closer to the public access roads and fence. Those who are hunting for meat to feed their families not interested in going that far to hunt. Those looking for big bucks for trophies might go out as far as La'aau since it is an area that is not regularly hunted.

**Game**
Informants have hunted turkeys, guinea hens, pheasants and fracolins on ranch lands in Kaluako'i. At Kolo they used to hunt pigs.

**Mana'o**

20 years I hunted, when my kids were growing up - from Waikane all the way to Kolo and in the pineapple fields. Those days all illegal but when you hunt for food, not illegal. That's how I feed by 7 kids. Hunt around Maunaloa and Kolo back to Waikane.

Hunters who walk down from mauka to 'opihi road and then they hike to Hale O Lono.

La'aau Point Cultural Impact Assessment / 95
Hunt down, get to beach, get 'opihi, jump in and freshen up and when go home have some pupu to go with the beer.

### 3.6.6 Cultural Resources and Practices

In addition to natural resources utilized for subsistence, informants spoke of other natural resources which have cultural significance such as native plants, native species of turtles and monk seals, and the simple unspoiled natural beauty of the undeveloped seascape. Informants also shared names that were given to places after the persons who lived in the area or features of the area.

- **Native Plants**
  There is a beautiful stand of ma'o or native cotton at La'au Point. There is also Pohinahina, 'aki'aki and cressa.

- **Turtles**
  The West End is home to many turtles. There are also many sharks who feed on the turtles. At Shipwreck when the river comes down the turtles come in there.

- **Monk Seals**
  There are monk seals along the West shore at Kaupoa, Egusa's, and at the sandy area by the lighthouse and on the south shore by 'Opihi Road.

- **Natural Beauty**
  Enjoy the natural wonder, beauty, place of habitat for sea life, swimming, diving, fishing and hunting

- **Pu'u Hakina**
  Informants said that there are very significant and important cultural sites in the Pu'u Hakina area.

- **Community Names for Places**
  Egusas - the Egusa family lived near Kaupoa and took care of the bees and cleaned Kaupoa. They raised a lot of chickens. They also took care of the turkeys and checked the water troughs. He was the cook for the cowboys. Every Thursday they would go into town to buy rice and can goods.

  Kamakaipo is called fishpond.

  Sam White is where the Hawaiian cotton is growing.

  Lighthouse - the point was referred to as Lighthouse instead of La'au Point.

  Hole is where there is a shipwreck.
Cowboy House, Shit Creek, first gulch, second gulch - these are names the cowboys gave for some of the places. They knew what it referred to.

The community refers to the lae or points along the south shore using numbers - first point (Kanalukaha), second point (Kapukuwahine), third point (Kahalepohaku) and fourth point ('Opihi Road).

**Mana'o**

*I know of Hawaiian stones. One time I even found a skull close to Hale O Lono, I put it by a rock and when I came back I couldn't find it.*
Figure 7. Ma'o, the native cotton on federal land near La'au Point.

Figure 8. A monk seal on the western shore fronting the proposed development area.
3.6.7 Spiritual Resources and Practices

The La'au area is generally regarded as a special place of spiritual mana and power. Community participants and key informants spoke of specific burials, fishing ko'a, and heiau. Such specific sites are documented and described in the La'au Subdivision Archaeological Preservation and Mitigation Plan by Cultural Landscapes that is part of this EIS.

The overall spiritual quality of the La'au area as a wahi pana and wahi kapu cannot be quantified and deserves recognition and respect.

• Fishing Ko'a or Shrines
  There are fishing ko'a or shrines at each point.

• Turtle Ko'a or Shrine
  There was a turtle ko'a (shrine) above Hale O Lono until it was destroyed in the 1960s. Turtles are a favorite food of the sharks and there are also many sharks.

• Iwi Kupuna or Burial Sites
  There are many burials throughout Moloka'i's southern coastal areas, including La'au. There are iwi kupuna burial sites in the proposed development area on both the West and south shores. One informant said that her father used to go fishing at Kolo and at Kaupoa and one day he brought home a skull that was possibly from the La'au point area. Her uncle eventually took the skull to the museum.

• Burrows Family Grave Sites
  The Burrows family has 16 graves down by La'au Point.

• Caves
  There are caves in the area. The Burrows family knew of nine caves, some with ipu and kahili and one that was under water.

• Hale O Lono
  According to intervenor Vanda Hanakahi, Hale O Lono is named for the akua Lono of the Makahiki traditions, who used to rest in the harbor area. In ancient times, at the rising of the Makalii (Plaeides Constellation) kahuna gathered at Kapuupo'i, the easternmost tip of Moloka'i in an opening ceremony. They would then travel along the coastline to La'au where they closed their ceremony and then Makahiki with its games and other practices began. This meant that La'au was a special and sacred place for our Hawaiian ancestors.

  There is a graveyard in the sand by Hale O Lono, going in the direction of Halena on the beach side. If one goes to Hale O Lono, one would come home before dark.
Heiau at La'au

Informants describe a heiau at La'au by the lighthouse at the end of 'opihi road. This is located on federal land and will not be affected by the development.

- **Underwater Heiau**
  According to intervenor Vanda Hanakahi, La'au is an important place for fishing. In ancient times, every ahupua'a (district) had an underwater heiau (temple) constructed in the ocean outside the ahupua'a. The first heiau along Molokai's southern coastline is located at La'au. Again, this meant La'au had great significance for our ancestors, who depended on the ocean for their survival.

- **La'au is a Wahi Kapu Where Kahuna Gathered**
  According to intervenor Vanda Hanakahi, Kahuna (expert teachers and practitioners) did not gather at just any place. But they gathered at La'au, which means that they regarded it as sacred. La'au is a wahi kapu (sacred place). Places that are sacred should be revered and left alone. La'au is a sacred place that should never be desecrated. Some families don't go down there because it is a kapu or sacred area. 'Ohana has mele about these places.

- **Place of Mana**
  Informants spoke of La'au being a place of mana or spiritual power. They said that when they go to fish in the La'au area that there is a spiritual quality. There are ho'ailona or spiritual signs that guide them.

- **Sightings**
  One informant said that at night, while camping near Kaupoa, she saw fireballs. She has also seen menehune through the trees at night in the same area. Another informant spoke of seeing an island offshore when they were camping overnight and fishing on the south coast at La'au Point. It was close enough to swim to.

Kolo and Pala'au
Informants provided information about petroglyphs at Kolo and a cave with an old canoe in Pala'au.

**Mana'o**

*Got lot of mana inside that area - start clearing, they don't know*

*Can't do the houses and protect this and protect that- when bulldoze going to destroy everything - it's a chain effect. Those that work the tractors, and feel guilty. People building the houses will be from different islands. It's just a bad vibe. The 'ano is not pure. They going to feel it - They are not welcome down there - you go down at night - voices, drums, you know get heavy stuff down there. The only way you come out and get food is because your intentions are pure - e kala mai ia'u, it's just for food - you bond*
with your family - you always pule. always no worries, you go down there, you going to
get kaukau - no more the attitude of taking too much because someone else going to take
it.

It's hard for me to go for this because this is where we get to run away from - dealing
with day to day - take yourself out of one element - knowing that those who came before
you did the same thing.
Section 4  Assessment of Impacts of Proposed Development

4.1 Overall Impact on Moloka'i Hawaiian Way of Life

Participants in the community meetings expressed concern that the proposed development will change the demographics of Moloka'i forever. They believe that La'au will contribute to the increase of land values and prices and property taxes on Moloka'i.

The community expressed concern that 200 new millionaires will change the make up of the Moloka'i community and lead to changes in the Hawaiian way of life. With more outsiders, Moloka'i will no longer be "The Last Hawaiian Island." The proposed development will bring in new residents unfamiliar with the culture and way of life on Moloka'i and lead to irreversible cultural change.

The community doesn't want Moloka'i to turn into Maui or O'ahu with a large population of off-island people. They expressed regret that if the development occurs, La'au will never be the same.

In balance, the Maunaloa kupuna shared that no matter what happens, the population will increase and the land will be limited. While Moloka'i has been preserved it is gradually being developed. They acknowledged that progress cannot be stopped but that it can be controlled. The Maunaloa kupuna felt that the overall community plan of which La'au is a part provides for the community to manage and monitor the proposed development.

The longtime Maunaloa residents described the years of segregation that they experienced working for the pineapple plantation. The workers lived in simple plantation houses divided into Japanese camp and Filipino camp. The supervisors and managers lived in the better homes on managers' row which they called "snob hill". They fear that the new subdivision will also create a segregated community. If the residents and the community were both limited to 2 points of access, it would be more equal.

When the old Maunaloa town was demolished, a lot of the families moved out. Some of the families were evicted and this left a scar on some people. The way of life in Maunaloa changed with the development of new homes.

Development on one part of the island will affect the whole island. However, more than one informant recalled that in the past there was a tacit agreement to allow the West End to develop, while controlling population growth on the East End. Many had the attitude that the West End could be developed if the East End was protected.

All of these concerns address overall social and economic impacts of the proposed development and are addressed in the social impact study and economic impact study of this EIS. To the extent that the impacts also have ramifications for the Native Hawaiian culture that defines the way of life of all the residents of Moloka'i, these concerns are relevant and noted in this report.


**Mana'o**

The proposed development of 200 homes along the shore at La'au Point will greatly diminish, if not eliminate altogether, the solitude currently offered by this isolated corner of the island. The invasion of hundreds of new homes coupled with outsiders and their material commodities can only diminish the sanctity La'au currently provides.

Others waltz right in and don't feel the pain. We are the people of poverty who will always be kept out.

No matter how many houses they build, I will still go. I would walk and the land was still owned by someone else, and I would still go there.

Going delete my life.

It will be a major change down there. Take Kihei and Lahaina, used to be sugar cane fields and kiawe, now it's a jungle.

If the reopening will help the economy, that's good. But anything to do with the Ranch, I don't like because of what they did to me. In the long run, it will go through, you cannot fight people with money. Even though fought against the development at Maunaloa, not able to sustain the fight against the big money.

I don't want people down there - and going to be all millionaires down here. Moloka'i is not going to be what it used be . . . I say development is good, but Moloka'i is small. Look at Maui, what a horrible place it is. I've been here since 1937 and loved every bit of it and gradually getting sick of it.

Maunaloa - before that was a real plantation type looking place. We were just one family. Someone get a party, that's the whole plantation. Everyone get together. Today, right now, I barely know some of my neighbors, everyone to each his own now. And I notice - I want to get better stuff than you got. competition. no more love like it used to be. Before everyone love one another. That's the olden days.

The development will provide jobs, but for how long? Many of our children have to go to Maui and every where. What sort of community are they looking at - not live here all the time. How much money can they generate from that? Would like to see more interaction with Papohaku and Maunaloa - the only interaction is with the church members. They have their own association and we have our own association. WE need to be a community. Some would volunteer at the school. Need more interaction.

I don't know about this development. I just have to wait and see. There's something inside me that it's not ready yet. I just have to step aside and observe, something is going to show up, but when? It has something to do with the ownership of the land. If everything is nice and legal, then go ahead.
La'au is a beautiful place, got to malama pono over there.

Social impact - no one wants to go down to the beach and see them leaving rubbish or taking rocks home. Or the attitude that they own the beach frontage and that the public should not be here . . . that they have their own little community of rich haole people.

Moloka'i will never be Moloka'i for long. Once you let them in. I liike Moloka'i to be Moloka'i - place to hunt, fish, relax. Don't want us to lay gill net, run boats in front their property.

For me, I'm not for development, but will it stop because I don't like it. Just sore seeing the changes. 200 lots - that's a lot, but what can I say. It's all in the process of development. The good part is that they will give this to the trust. I hope I could lease some land to raise cattle. The good part is that they came out to the community and offered their mana'o.

Overall, not a good thing for the development [to go through], will be like the hotel down at the West End. Since I'm born and raised on Moloka'i - like how Mac was taking care of Mo'omomi - I see the changes, lot of places I see are fished out, if we don't have control we will come like Maui. Moloka'i is the best place to preserve our island. If we don't stop it now, we will lose our culture. A lot of stuff that we are losing already. When we became a state, all one time. We didn't have time to think about being a state. The state controls everything. When was Territorial was easier. The living then was more hard now that before - we eat what we can get, now we got to buy it.

I sense in our youth that they are coming more belligerent toward development. Hawaiians used to go in a shell and say no make trouble. These kids wild, mad. They want their own island the way they are used. Going to bring influx of outside influence and these guys are going to get pushed on side . . . What disturbs me is after all is said and done, I don't really know what the impact will be. It's that unknown factor. You cannot hold back progress. Maybe you can curtail it.

My father used to have his nets here. We walked from Kaunakakai to here and not one car would pass us that whole time. Now you stay here and look out the window, that's progress. I don't know what the progress will be. You go to downtown and sit in the car and look at the market and you don't know anyone going into the market. That's progress. I don't know what the impact will be and if it's negative and there's no reversing all that, it's there, and you go on with life.

I'm not against it, but if they would be more relaxed about taking care of the island instead of just thinking of making money . . . if they will acknowledge the lifestyle of the people, I support this. Human beings are born every day, but land doesn't increase. So land is very important.
I hate to see the island change like this. I want them to take care of our kids first before they look outside. Who knows, they might build 200 lots and then they cannot develop it again. At Kaluako‘i - saying the county will come in and take care of the roads. Who is in charge of water, maintenance, sewer - home owners, condo owners and hotel. Get a group of people together and they want to make changes. They come here because they love Moloka‘i. Keep Moloka‘i Moloka‘i. And then a few years, they change and they want Moloka‘i to change.

4.2 Access and Trails

Community members were concerned that the subdivision might be a gated community, and were relieved that this is not part of the plan.

Native Hawaiians and the general public will have access from two points - one on the south shore at the southeast entry and one on the west shore at the northwest entry. In the process to develop the Community-Based Master Land Use Plan for Moloka‘i Ranch, subsistence fishers and gatherers were very concerned that opening up the south and west shores to public access at every 1500 feet as the County of Maui provides will deplete the marine resources. They regretted that the opening of Hale O Lono harbor to public access had severely decreased the marine resources there and they do not want to see that happen in the area proposed for development. Opening up access points every 1500 feet would have a severe impact on the subsistence resources along the west and south coasts adjacent to La‘au Point.

Community members were concerned that subdivision lot owners and their friends will have preferential access to the coast. There will be nothing to stop the home owners from going down to the beach. Those who live on the shoreline will be able to access their home and the beach by vehicle. Homeowners can create a trail to the beach and let their friends have access to the beach. Affording only two access points for the general public, while the rich people in the subdivisions will have access from their homes seems unequal. Informants also expressed concern that landowners might call police if they see the general public walking on the beach, as this has happened at Papohaku.

Participants in community meetings and informants felt it was important to provide emergency access through the subdivision to the shoreline for emergencies. They were also concerned that access should be afforded for kupuna and persons with special needs. Some pointed out that the areas closest to the access points will be heavily impacted, while spreading out the access points might spread out the impact. It was also noted that the road down to Hale O Lono harbor would need to be maintained in order to keep access to the area open.
4.3 Subsistence Fishing and Gathering

Informants feel that the development will spoil the experience of fishing in what is now an isolated, pristine and spiritual area. They are concerned that instead of La'a'u being a place to get food, it will be a place with haole in their back yards. Many informants felt that the proposed development will greatly hinder, if not abolish altogether, ongoing traditional gathering activities currently enjoyed by Moloka'i islanders at La'a'u. Fishermen will lack privacy if the development goes through. Yet, throw net subsistence fishers require an undisturbed beach that allows fish to forage closer inshore in order to succeed. Gatherers of 'a'ama crabs require dark silent nights to ensnare their nocturnal prey. Commotion emanating from noisy and brightly lit beach homes will negatively impact crabbers' efforts to capture their already skittish prey. Gatherers of limu and pupu will very likely be met with kayakers in the water, people sunbathing on the beach, and pet animals running up and down the shoreline. If experiences elsewhere in Hawai'i hold true, it is not likely that owners of multi-million dollar beach homes will greet shoreline subsistence gatherers with open arms. It is more probable that subsistence practitioners will be confronted by insensitive newcomers intolerable of extractive activities in what they will perceive to be their front yards.

While the new landowners will probably want to go out and fish when they see the lobsters in the area, most informants felt that the new residents will probably not directly damage the fishing grounds because they don't know how to fish. The real impact on the fishing resources is from the Honolulu boaters. When the outboard motor and twin outboards came out at an affordable prices, the Honolulu boats came fishing all along the west end and south shore. These fishermen have taken everything, even the eggs. The lobster area is wiped out. The Moloka'i residents fish for the family and perhaps get an extra cooler of fish to sell. The outside commercial fishermen fish out the grounds of lobster and fish. They do not plan for the future.

Community participants and key informants were concerned that pesticides and fertilizers will contaminate the ocean and kill the marine resources. Fertilizer run off will kill the small organisms that support all of the marine life offshore. Runoff from the development will contaminate the ocean. Grading can increase erosion which will result in sediment flowing into the ocean and destroy marine resources. Some informants from the East End felt that the development would impact the mullet run and thus impact the resources on their end of the island. However, longtime fishermen who have regularly fished the south shore as members of Ranch families noted that the mullet spawn at Hale O Lono, Halena and Kolo, rather than close to La'a'u. Hale O Lono is on the eastern border of the project area. Halena and Kolo are outside of the project area.

Community members wanted to be assured that the rules outlined for access and for subsistence and gathering cannot be changed by the subdivision lot owners. MPL clarified that the lot owners will be required to uphold the Covenants, Conditions and Restrictions (CC&Rs) that include these rules as part of the homeowner contract.
Providing parking areas at either end of the proposed project area and limiting access along the shoreline to foot access will open up access sufficiently that it might impact the resources, as the entry points will be closer for those who now walk and must either enter from Hale O Lono or Dixie Maru. The conservation rules might affect fishing, but if the access is easier there will be more fishing.

**Mana'o**

*Once its developed, kiss it goodbye.*

*Bummer to walk along and the owner is out there sunbathing or swimming. Want to go to the beach when no one is there. You can walk 20 minutes to half an hour and someone is there and has already scared the fish away.*

*Look at Dixie and see what that house did to the ocean - runoff. John Burell built a house and graded. Til he graded, never saw such runoff at Dixie.*

*Big concerns about runoff.*

*Conservation is very important. Why want people to drive in and go fishing Take what you need, not take all you can get when you want it.*

*I don't think it will have a big impact. I was a young boy when I was down there, it's sitting there. I don't think it will impact the shoreline. I still go fishing down at Kaluako'i side, no problem down there. If people come down, I'll give them. If you give to people, have more good luck. Always have something come back to you . . . No general concerns about the development. I've been living here since I was born and I see how people are here.*

*Who will stop the Honolulu guys from wiping out the place - they get the opihi, the akule nets, go diving? Who would pay for the caretakers? If landowners have same access as the public, how assess them? Who will own the access land area?*

*Wow - I didn't know it was going to be this bad. This goes up there goes the last chance for the guys who live on Moloka'i and are dependent on the ocean. This goes through that's a big project . . . the moi holes, the lobster - all that will be gone . . . Everybody knew this was going to happen, the only thing was when.*

*The Hawaiians not going to afford this. They going to make restrictions where you cannot go in there. They going to keep us out. They going to monitor us. Some guys come out and say what you doing on my beach. They say this is your beach, I say this is our beach.*

*For our family that's our ice box down there. That will be hard to swallow*
Fish - the haole never damage it, they don't know how to fish. When outboard motors come out, twin outboards they could afford. They come from Honolulu. Then use the chemicals. Not the haole, they don't fish. The Honolulu boats.

With all these houses coming up - this end is history. Fertilizer run off will kill off all the small stuff that keeps things breeding. Like about 1965 - started to decline, get wiped out. The people have more access to the area. Before only us could go by car only. Now every tom, dick and harry got boat. They take everything, take the eggs too. Not think about the future. What this going to do to Moloka'i - they going leave us with a mess and then move on to the next paradise. They taking away what makes Moloka'i, Moloka'i. I don't think you can stop - too much money over here.

All the houses over there, the people not going to damage the fishing. Only thing will damage is the chemicals. They not going to damage the fish. That area where they put up the houses - always rough, always ugly. They might damage other ways. They don't know how eat 'Opihi. From one end to the other, not going to eat 'opihi. Why grumbling is because they don't want La'au to change.

Although my health prevents me from fishing now, I still eat the fish from our ocean. What happens at La'au will affect those in the East End if the fisheries are hurt by the proposed new subdivision, such as the mullet run.

Protecting by foot is good, but how they going to control those coming by boat. The fish are below high water mark. As far as controlling that, I don't know how. Not going really be a negative impact. Might be because of the access. All this time no more really access - go by boat or walk in. If have the road and allow us to park, now closer. Again conservation method - how it will impact the locals.

I don't care for development down there. Through generations will have a chance to walk the beach. When I was young I walked from Halena to down there. Going to come like Papohaku Beach. If you walk on the beach, those who own the land, call the police.

Those who buy the property, they will all have to have money in order to buy. We fishing because we need that to survive. These who come in and buy these properties, they don't need to fish to survive.

4.4 Subsistence Hunting

Hunters are concerned that the new landowners from outside of rural Moloka'i will not want to hear shooting and may be protective of the deer and oppose even bow hunting. Deer hunting could become an animal rights issue. Bullets can travel 4 miles and 10 year kids can get a license. Need to have a sufficient buffer zone. It will only take one accident to close down hunting in the area. The overall hunting area will be reduced by the no hunting zone in the subdivision and buffer zone and the safety zone.
The plan to put in a deer fence and remove deer within the proposed subdivision will effectively close off hunting in the southwest corner of Moloka'i. It will have to be a very high fence. The deer will keep going back. The deer will get hurt.

**Mana'o**

* I can hardly move around and cannot hunt, but my kids can hunt, they all love the hunting. I've been hunting since 1937,- no such thing as license. The deer come in the pineapple field, we had permission to hunt. What I think is, after the rich people come here, lot of Hawaiians going to end up in jail - they going hunting, get arrested. Everyone in my family loves to hunt - to get deer meat. Now law to close it up and put all the homes over there - already all loaded up on the West End.

**4.5 Cultural Resources and Practices**

Informants are concerned that cultural sites will be destroyed once start to bulldoze and grade and clear the land for development. At Papohaku, homeowners have graded and damaged dune system and destroyed cultural sites and burials located in the dunes. They have extended their household area into the conservation zone, treated it like their own private property and tried to exclude Moloka'i residents from the public beach area fronting their homes. The same process can occur in the proposed subdivision.

Informants expressed concern that future generations may not have a concept of how to do subsistence and only going to catch what can be carried. Future generations should be able to be in an environment where it's just them and mother nature. They should know what it feels like.

Concern was expressed about the impact of the proposed development on the monk seals who frequent the remote beaches of the west and south shores. Monk seals might be disturbed during the grading and construction phase. New residents may have dogs who would disturb the monk seals.

Many of the informants commented that the development will require a lot of expensive landscaping because the land is rough and rocky with a lot of boulders.
**Mana'o**

*The kids will never have a concept of how to do subsistence - only going to catch what you can carry. To be in an environment with you, mother nature and tutu them, not know what it feels like.*

*At Papohaku, clearing the trees even where they are not supposed to. They are not respecting the land. They say all this stuff but turn around and do something else. Just like I rent a house, I say I'm a good guy, they come back and the screens are torn and the house is bust up. Can you trust what they say?*

### 4.6 Spiritual Resources and Practices

Can destroy ko'a fishing shrines and cultural sites, unless monitored. Informants are also concerned that once the grading starts there will be erosion when it rains and the mud will cover the ko'a, the sand and the reef.

Can disturb iwi kupuna burials unless monitored.

The overall general concern is that the development of the area will destroy the special quality of La'au as a special place of spiritual mana and power.
Section 5 Proposed and Recommended Mitigation Measures

5.1 Overall Impact on Moloka'i Hawaiian Way of Life

The Community-Based Master Land Use Plan for Moloka'i Ranch provides measures to mitigate the overall impacts of the proposed development at La'au which set unique precedents for the development of large landholdings by offshore corporations. These precedents are related to community planning, the creation of a land trust for the community, the donation of legacy lands to the land trust, the donation of easements to the land trust, the protection of subsistence fishing, gathering and hunting, reserving lands for community housing, and the creation of economic opportunities for the community through the re-opening of the Kaluako'i Hotel. The plan also provides for covenants, conditions and restrictions that landowners in the La'au Point rural residential development will need to accept and agree to uphold in order to purchase a lot. These are summarized below:

Community Planning
The Community-Based Master Land Use Plan Land was initiated, designed and will be implemented by the community of Moloka'i. It is the result of a two-year planning process involving every member of the community who wished to participate.

Land Trust
A total of 26,200 acres or 40% of Moloka'i Ranch lands is donated to a Moloka'i Land Trust that has the unique mission of:
- Protecting historic cultural archeological sites.
- Preserving the precious natural and environmental resources.
- Enhancing indigenous rights through the protection of subsistence gathering.

The donated lands include premier Native Hawaiian legacy lands:

- The ancient burial ground in the sand dunes at Kawa'aloha Bay. This is one of the most famous and largest burial grounds in all of the islands. At one time the Ranch allowed the mining of sand here and disturbed the burials. The Ranch also planned to develop a resort here. Now these sacred grounds will be permanently protected under the Land Trust.
- Ka'ana, the birthplace of the hula that originated on Moloka'i and spread to other islands. This sacred site will never be destroyed or commercialized.
- Naiwa, the only traditional makahiki grounds that remain intact in the islands. This extensive area was once threatened by the development of a golf course. It will now be protected forever.
• Village sites at Kawakiu, which would be destroyed under current zoning in the Moloka'i Community Plan, will now be permanently protected.

• Burial mounds at Kawela which at one time were threatened by development will be protected under the Land Trust.

• Key subsistence fishing grounds from Keonelele to Ilio Point and from Pala'au over to Hale O Lono, including Halena and Kolo.

• The historic Paka'a house sites, upland sweet potato gardens and connecting trails.

• Kaiaka Rock which was saved from development

• Kamaka'ipo Gulch will be conserved.

• the fishing village north of Kaupoa Camp will be protect under the Land Trust.

Under the Community-based Master Land Use Plan the following development projects over which the Ranch and the community had fought are permanently abandoned.

- A 375 room hotel on Kaiaka Rock
- A 150 unit condominium at Kawakiu
- The Highlands Golf Course and Club House at Naiwa
- The Waiola Well and Pipeline

Outside of the Kaluako'i resort, the proposed La'au development will be the last major development on Moloka'i Ranch lands in the Kaluako'i ahupua'a.

**Easements**
A further 24,950 acres (38% of the property) are placed under new Land Trust protective easements, of which:

- 14,390 acres will be protected forever for agriculture use.
- 10,560 acres will remain open space.

**Protection from Development**
The combination of the donated land, existing and new easements protect more than 85% or 55,000 acres of the property from development.
**Subsistence Fishing and Hunting**
The recognition of Native Hawaiian subsistence rights, and protecting for the community, the hunting and fishing resources of the island, by:

- Seeking to establish a subsistence fishing zone from the coast to the outer edge of the reef or where there is no reef, out a quarter mile from the shoreline along the 40 mile perimeter of the property.
- Ending commercial hunting, and allowing only the community to hunt on the property.
- Ensuring access to the shoreline will be available only by foot.

**Community Housing**
Only Moloka‘i residents will decide future expansion of existing communities in the areas with a total of 200 acres around Kualapu‘u and Maunaloa to be made available for community housing, and in the 1,100 acres above Kaunakakai to be donated to the Moloka‘i Land Trust for community expansion.

**Economic Opportunities for the Community**
The Kaluako‘i Hotel will be re-opened for visitor accommodation creating more than 100 permanent jobs for the local community. By outsourcing various hotel functions such as laundry, gift shop, beach shack and spa, and by committing to use local produce, small business opportunities will be created for the community.

**Covenants, Conditions and Restrictions (CC & Rs)**
Covenants, Conditions and Restrictions that landowners will need to uphold are described on pages 101 - 105 of the Community-Based Land Use Plan for Moloka‘i Ranch that is part of the EIS.

These conditions provide that every person whose name is on the property title must commit to undergo a certain amount of education about the Moloka‘i community and its desires and aspirations with kupuna and the Maunaloa community.

*La‘au Point must be the most environmentally planned, designed and implemented large lot community in the State. The residents would be educated and informed about the environment and culture, and taught to “Malama ‘aina,” take care of the land and sea.”*

This statement precedes the covenant document determined by the Land Use Committee that will place many restrictions on lot owners at La‘au Point, in order to attract only those who are concerned about conservation.

As an example, the Conservation Zone and other areas to be protected (approximately 1,200 acres) within the subdivision will be the subject of an easement held by the Land Trust, with guidelines for these uses to be determined prior to the construction of the subdivision and reflecting the importance of the area archaeologically and to subsistence gathering.
These protected lands will be part of an entity that is controlled equally by the homeowners and the Land Trust. All decisions relating to this area: maintenance, subsistence protection, archaeological site protection, personnel, etc., will be the shared responsibility between the Trust and the homeowners, who will share equally in the costs.

MPL will attempt to attract buyers to the La'au point subdivision who reflect the hopes and aspirations of the community. Brochures, sales material and other promotional documents will be vetted by the Land Trust or the EC for accuracy and adherence to their principles.

Measures will be taken to assure that these CC & Rs cannot be changed in the future. These CC & Rs include the following:

- prevent a gated community
- restrict the further subdivision of lots
- restrict the area that can be disturbed for use
- prevent construction on slopes of more than 50%
- restrict building height
- require the use of alternative energy
- prohibit the use of pesticides
- require that exterior lighting be shielded from the ocean
- require water catchments and 5,000-gallon storage tanks
- restrict landscaping to native and Polynesian introduced species suitable for dry coastal locations
- prohibit the use of noxious or invasive species; require green architecture
- manages erosion with vegetative cover
- puts a deer fence at the rear of the subdivision

**Additional Recommended Guidelines:**
Informants recommend the following additional provisions to mitigate the impact of the development on subsistence practices:

- **Fence to demarcate private property from public access area**
  All of the informants felt that it is important to have a clear physical demarcation, such as a log fence, running along the individual property lines to distinguish between private property and the public access area. By putting in a fence of some kind the public will know the boundary so that they won't trespass. Another suggestion was to use a round wire fence, called a New Zealand fence.

- **Location of Access Trail**
  Informants suggested that there be a physical demarcation between the property line and the ocean, along which the trail would run. The trail would follow the contour, following the old traditional trail as much as possible. Then the existing kiawe would serve as a buffer between the trail and the sand and ocean. This can help reduce impact of the trail on the beach and ocean. The kiawe can be pruned. It is a nitrogen fixing plan and will
help other plants to grow around it. The trail should be placed back from the ocean so that it won't wash out. The trail will only be for walking and not for atv's or even bicycles. The trail should not be paved but kept clear and maintained.

- **Landscaping**
  Need to prevent landowners from landscaping the area of the setback which ranges from 250 to 1,000 feet.

- **Support the Maunaloa Community**
  Have monies generated go into the community to support the school. Include the Maunaloa 'Ohana I Lokahi Association needs to be involved in the decisions about La'au.

**Mana'o**

My first response was that I was really against the development. Now we are holding so many more ingredients. I can live with the development and I can live with the exchange. End. I forsee this development becoming the benchmark for conscious development in the future of the state of Hawai'i. I see it in the use of water, landscape, planning with the ecosystem, and using as much as possible native Hawaiian Plants where each participant in this development has a conscious participation in a partnership with the Land Trust for managing the shore. This will be, in my opinion, the model that honors the resources and ultimately improves the care for this whole corner of the island.

An informant gave his genealogy back to the land on West End. His ancestors are at Kepuhi beach, it is everyone's kuleana but his iwi is there. For the past 30 years he was on the sidelines, watching his leaders. His biggest kuleana right now is his aina his family. He knows where everything is on that end. He put down his shield and listened to this guy from NZ. He wants his lands back and he will give them back. For your children 7 generations down where are they going. Down the line the mo'opuna are going to manage the land and malama. He wants his land back. His kuleana is greater because this is his land.

I don't want to deal with the next ranch owner, we should make a deal. The opponents want to fight for ever.

The fence makes sense. If you don't put fence, the guy living there will complain that that is my lot, as long as it's open they will complain about people going down there.

Definitely need a demarcation between the private lands and the public lots.

I think it's a bad idea. Those that are for the process, I aloha them anyway because they just trying to do what they can for the community. We all trying to find the best way, just different roads. They are asking a lot even though they think they are not asking a lot. So it's a tough one either way - if they really paid attention to the community we would find a way much sooner to help out the ranch but their mind was set already.
I think a fence would be acceptable - wire fence - round wire fence. Called New Zealand fend - more like a pasture fence. I agree to having a delineation would benefit both ways. Development of a walking and access trail would be very important. Trail should follow the contour, with beautiful vistas. Kiawe will stay. Can be augmented with native plants. Prune kiawe - it is a nitrogen fixing and will help other plants to grow around it. Land Trust will put in the trail - not for 3 wheelers, strictly walking, not even bicycles. Bicycles not allowed, as these contribute to erosion. Not a paved trail, but a maintained trail - clear path and maintain. Old traditional trail - parts of it will find the old trail. It is very rocky.

5.2 Access and Trails

Subsistence fishermen and gatherers felt very strongly that opening access to the general public would lead to the depletion of marine resources. They observed that when Hale O Lono was opened the lobsters went. Subsistence fishers and gatherers involved in developing the master land use plan and the informants interviewed for this report were concerned if the area is opened up, that the community will keep going into the area until there is nothing left. They honestly believe that if access to the area is opened up every 1500 feet, the resources will be gone. More people are fishing now than before. There are more fishermen with better equipment. It will be ruined if vehicles are allowed to access the area every 1500 feet. The subsistence fishers and gatherers felt that the walk will be and important measure to better protect the area. They also felt that the provision of two access points and parking at either end of the development will afford sufficient access for subsistence fishers and gatherers.

Informants felt that overnight surf casting and pole fishing could be allowed but that camping should not be allowed in the reserve area. This is the policy implemented by The Nature Conservancy at their Mo'omomi Preserve.

Guidelines in the Community-Based Master Land Use Plan for Moloka'i Ranch

General Access
- Access on both MPL and Moloka'i Land Trust lands will be managed.
- Hawaiian Access Rights be enshrined on the property titles for both MPL lands and Land Trust lands.
- Non-Hawaiian access will be determined by the landowner.
- Hunting methods (rifle or bow) and game seasons are as confirmed on the Hunting Map.

Access and Use of Cultural Sites
- Sites can be accessed to fulfill traditional and customary Native Hawaiian responsibilities for cultural, religious, and subsistence purposes.
- Education and training activities can be organized through the kahu or the resource manager.
- In some cases access may be seasonal, such as during the non-hunting season, rainy/muddy season.
• Use of sites and related protocols will vary according to use of the particular site, including but not limited to:
• Monitoring its condition - integrity, boundary and buffer, setting access routes, relation to overall complex or nearby sites and resources. Sites should be assessed once a year during the dry season.
• Work to stabilize and restore sites. A plan for the stabilization and restoration of selected sites should be developed and approved by the State Historic Preservation Office.
• Rededicated for specific spiritual and cultural purposes. Identify sites which have been in continuous use, those which have been rededicated and those which shall be rededicated.
• 'Access and use of sites should follow protocols established by the Kahu and resource manager.
• Protocols should address manner of approach, entry, use, and exit of site; chants seeking entry and granting entry to sites; appropriate ho’okupu; chants and procedures to stabilize sites.
• Kahu and stewardship resource persons should train stewards in mo’olelo, protocols and responsibilities of stewardship for each site.
• There will be no commercial tours within the boundaries of Na’iwa (Manawainui-Kahanui) and Ka’ana-Pu’u Nana (Kalaipahoa-‘Amikopala) wahi pana.

CC & Rs
• Design a measure to restrict access to foot only between Dixie Maru and Hale O Lono in order to conserve resources, with an acknowledgement of Native Hawaiian gathering rights as defined by law for subsistence purposes, in a designated subsistence management area.

• CC&Rs to reflect community-driven access plan. Walking access only from each end of the subdivision to restrict area for subsistence. No access from road above subdivision in order to restrict for subsistence gathering to ensure that resources are not depleted.

• No parking all through the roads, to prevent parking and access other than at each end which will enhance the subsistence nature of access.

Additional Recommended Guidelines:
Community participants and informants reaffirmed that the Maunaloa community shall be integrally involved in the management and monitoring of access within the Kaluako’i ahupua’a. They also suggest the following additional guidelines.

• Emergency access to the shoreline through the rural-residential subdivision can be afforded for ocean rescues.
• To accommodate kupuna and those with a disability, have a golf cart available to assist their access.

• Do not allow camping in the public access and park area, although access for overnight fishing and surf casting should be allowed. The Nature Conservancy policy which allows overnight fishing can serve as a guideline.

**Mana'o**

*If want to go somewhere should hike it.*

*Put a fence so know how far can go, so don't trespass. Put the trail back from the ocean, so don't wash out. Don't have a say on this. It's a long walk, old people cannot make it. That's walk is kind of rough. Resources would be walked out if open it up. Lot of people go from Dixie - some from Pu'u Hakina. More than half gone after Papohaku. Offisland people, from O'ahu take the resources. Now summer, north shore is flat and O'ahu people come and get opihi. When opened Hale O Lono - the lobsters went If you give them privilege - they go every day, until there's nothing left.*

*I don't care if you have only walking access, guys going to do it. In 10 to 15 years you want to see the ocean. Put in kupuna road - golf carts for kupuna? I like roam over there. Now I can walk. Getting more tired and tired to walk. Even when they built Kaluako'i my dad was happy because they have the access to the beach.*

*The conservation is good. I'd rather drive in there, but if we need to walk that's okay.*

### 5.3 Subsistence Fishing and Gathering

The primary mitigation measure proposed in the Community-Based Master Land Use Plan is to work with the community, the county and the State Department of Land and Natural Resources to create a nearshore Community-Based Subsistence Fishing Management Zone. It will prohibit commercial harvesting, but unlike a marine protection no-take zone such as at Hanauma Bay, it will provide for subsistence harvesting. Under the plan, the MPL, the Moloka'i Land Trust, the landowners and the broader community will work together as follows:

• To preserve inshore fishing/subsistence resources, create a subsistence fishing zone in the coastal waters along all of the Ranch's coastline property modeled after the Hui Malama O Mo'omomi Subsistence Fishing Zone.

• Establish no commercial take zone 1/4 mile from the shoreline (north and west shore) and from the beach to the reef edge/breaker line (south shore).
• Establish demonstration fishing nurseries/kapu sites to insure reproduction of key subsistence food species (e.g. ‘opihi, moi, mullet, limu, lobster, ulua, uhu he‘e).

• Support protection for Penguin Banks from overfishing.

Guidelines in the Community-Based Master Land Use Plan for Moloka'i Ranch

• Each year, an experienced Resource Group will recommend open areas for subsistence fishing based on protecting and not depleting the resources.

• The community-based subsistence fishing zone will allow subsistence fishing and gathering but not allow commercial fishing out to the reef or out to 1/4 mile where there is no reef. There will be 2 residential cultural monitors to oversee and enforce protection of the marine resources - one who will live along the south shore at the southeast entry point and one who will live along the west shore, at the northwest entry point.

• Those provided access to fish and gather once the community-based subsistence fishing management zone is established will be asked to take an educational course on traditional fishing methods, practices and conservation measures that will be offered by the resource managers, with guidance by the Maunaloa residents.

• Persons who receive permission to access Moloka‘i Ranch lands or Trust lands can engage in the following subsistence fishing activities:
  • Hook and line fishing for pelagic species.
  • Hook and line fishing for deep sea bottom fish species.
  • Hook and line net fishing for akule.
  • Fishing with SCUBA gear permitted only for akule and ta‘ape or for research.
  • Trap fishing for deep sea shrimp.
  • Trap and net fishing for kona crab and kuhonu crab.
  • Throw netting permitted only for subsistence.
  • Hook and line fishing from shore permitted only for subsistence (no competitions are permitted).
  • Diving with spears permitted only in the daytime and only for subsistence (no spearing competitions are permitted).
  • Diving for hand harvesting permitted only in the daytime and only for subsistence.
  • Hand harvesting of a‘ama crab is permitted at night and only for subsistence.
  • Hand harvesting of ala‘eke and kuhonu for subsistence only.
  • ‘Opihi collecting permitted from shore only (no diving) and only for subsistence.
  • Harvesting of spiny lobster and slipper lobster permitted only by hand (no netting, no spearing) and only for subsistence.
  • Harvesting of mana-moi (7-12 inch) throughout the year for subsistence only.
• For rescue, monitoring, religious, management, and research purposes only, use of equipment otherwise prohibited in this section is allowed.

The establishment of a community-based fishing management zone off of La'au will involve a rule-making process with the Department of Land and Natural Resources. Should coordinate efforts with the communities of Miloli'i, Hawai'i and Ha'ena, Kaua'i who are also establishing community-based fishing zones. Also respect the Kalaupapa people and their grounds. The rights of the Kalapana people to fish in the Volcano National Park is another model.

Informants noted that they support the quarter mile subsistence fishing zone as most commercial fishermen are from O'ahu. According to the informants, there are only three commercial fishermen on Moloka'i.

Informants also noted that protecting the marine resources by limited shoreline access to foot access is good. However, they are also concerned about managing those coming to the area by boat, since a lot of those who fish the area mainly come by boat.

**CC & Rs**

The CC &Rs are designed to prevent erosion and the pollution of the ocean by pesticides.

• No building allowed on slopes of 50% or more.
• Pesticide use is prohibited.
• Won't develop in natural run off areas.

• Water quality parameters in storm water drains and in the ocean will be monitored for temperature, salinity, total suspended soils, total nitrogen, ammonia nitrogen, nitrate and nitrite, total phosphorus, chlorophyll A and silicate.

• Require drainage systems that retain any run-off within the disturbed area of the lot.

• Maximize recharge into the ground.

• Restore land areas that have been eroded by re-establishing vegetative cover.

• Minimize impervious surfaces on the lot.

• Ensure that all current run-off from the land is stopped forever.

**Additional Recommended Guidelines:**

Informants offered the following additional regulations to protect the fishing and marine resources.

• The use of fertilizers will be regulated.
• Longtime fishers and gatherers from the Maunaloa community will be involved in the monitoring and protection of the marine resources in the development area.

• Should have the resource management plan up and running when the grading and constructions starts

5.4 Subsistence Hunting

Community participants and key informants recommended that the buyers be asked to accept and guarantee that hunting will continue to occur in the broader surrounding area.

Although the area of the proposed development will be fenced off and the deer within the fenced area removed, the large deer herds are already in areas outside of the area that will be fenced in. While these best hunting areas are now reserved for commercial deer hunting, the plan provides for commercial hunting to cease at the end of 2007 at which time these areas will be open for subsistence hunting.

Guidelines in the Community-Based Master Land Use Plan for Moloka'i Ranch

• Those provided access to hunt and gather will be asked to take an educational course on traditional subsistence hunting methods, practices and conservation measures that will be offered by the resource managers, with guidance by the Maunaloa residents.

• Hunting will be for subsistence use only. The golden rule is “take only what you need for your family”.

• MPL has a contractual obligation for commercial hunting and wildlife management on parts of MPL property until December 2007. The contractor has agreed that at the conclusion of that contract he will no longer seek to conduct commercial hunting on the property and will be agreeable to work for the Land Trust and/or MPL as a Wildlife or Subsistence Hunting Manager.

• As a goal of this management plan, the Land Trust and MPL will seek to reach a mutually acceptable agreement with the contractor to cease commercial hunting prior to December 2007. MPL acknowledges that it, alone, has a moral obligation to this contractor that may extend beyond 2007.

• MPL employees and Native Hawaiian residents of the Kaluako‘i ahupua’a have seniority for hunting in accordance with traditional subsistence management custom and practice. MPL employees assume responsibilities to sustain the natural and cultural resources of the ahupua’a.

• Management Options include the following: The decision about when and how to implement a selected option would be made by Moloka‘i Ranch and Trust resource managers. The Hunting Resource Manager would need to work hand in hand with MPL’s Livestock Manager so that the pasture lands remain healthy enough to support the livestock. This is especially critical in times of drought when the deer can intrude into the pasture lands, compete with the livestock, and create erosion problems.

• Kapu on Activities such as “No Hunting for Periods of Time”
• Kapu on Animals “No Hunting of Does”
• Kapu on Areas “No Hunting in Certain Districts”
• Kapu on Seasons “No Hunting During Certain Months”
• Kapu on Times “No Night Hunting”
• Kapu on Equipment “No Dogs for Deer Hunting”, “Only Bow Zones”
• Education on Conservation and Preservation
• Education on Cultural History and Practices
• Education on Management Areas
• Education on Safety and Responsibilities

Additional Recommended Guidelines
The Maunaloa community asked that the seniority for hunting be inclusive of all of the kama'aina residents.

• The seniority for hunting in accordance with traditional subsistence should be for kama'aina residents of the Kaluako'i ahupua'a and MPL employees.

5.5 Cultural Resources and Practices

Archaeology Preservation and Mitigation Plan provides for archaeological maka'ala or monitoring of the development. The archaeology preservation and mitigation plan will provide for the monitoring of the bulldozing and construction to protect fishing ko'a, shrines and cultural sites. The plan also provides for the protection of iwi kupuna within protected areas that include appropriate buffers.

Guidelines in the Community-Based Master Land Use Plan for Moloka'i Ranch

Kaluako'i Cultural District
The Kaluako'i Cultural District is to protect the historic and cultural sites and resources for current and future spiritual, cultural practices and subsistence uses. It includes the following sites and complexes:

• Punakou which is inclusive of Ka‘ana, Pu‘u Nana, and Hoʻolehua
• Paka’a trail which is located in the entire Kolo Gulch
• Paka’a cultivation fields in the uplands of Kopala
• Kalaiapaho‘a,-‘Amikopala and Kukui adze quarry sites
• Kamakaʻipo complex of sites in the entire gulch
• Kahualewa Heiau, mauka of Waikane Gulch
• Heiau, mauka of Halena Road and between Kahinawai and Oneohilo gulches
• Kawakiu Iki and Kawakiu Nui village sites and burials
• Dunes of Keonelele
• Various fishing ko‘a along the shoreline
• Burial Site located west of Kaluako‘i water tank in Kaka‘ako Gulch
• All sites identified on the Maurice Majors maps

La'au Point Cultural Impact Assessment / 122
• Stewardship of Cultural Sites
  
  • Designate Kahu for complexes and sites including: Na'iwa (Manawainui-Kahanui); Ka'ana; Pu'u Nana (Kalaipahoa-'Amikopala); Kawakiu, Kamakaipo-La'au; Hale O Lono; Punakou. Designated Kahu for complexes and sites shall be consulted prior to decisions being made affecting those areas.

• Involve cultural resource persons, as needed, in a cultural sites stewardship role for all other protected sites and areas.

• Responsibility of Kahu and stewardship resource persons

• Ongoing Monitoring of Sites - annual assessment during the dry season

• Identify and prioritize sites for stabilization

• Develop resources for site stabilization and restoration

• Develop any interpretive signage, markers and trails of access

• Identify and prioritize sites for rededication

• Train stewards in mo'olelo, protocols and responsibilities of stewardship for each site

• Implement Management Plan

• Manage research requests

**CC & Rs**

Protection and restrictions are to be written into CC&Rs as a result of a Cultural Plan, which shall have two major components-archaeological and cultural. The Plan will follow the community guidelines for Policies and Principles adopted for this Master Land Use Plan.

**Additional Recommended Guidelines:**

The informants offered the following additional recommendations to protect the cultural and natural resources of the area.

• Apply relevant recommendations from the Papohaku Dunes Cultural and Natural Resource Preservation Plan, Kaluako'i, Moloka'i, Hawai'i Study.

• Provide education and enforce laws protecting monk seals

• Need to enforce the covenants, conditions and restrictions and include substantial penalties.

• The buffer area for Kamakaipo Gulch may need to be expanded. Due to the potential for erosion during grading and construction, the houses close to Kamakaipo Gulch should be moved further away from the gulch.
**Mana’o**

The $2000 fine is nothing to them. Not going to have someone there all the time to make sure that they won’t damage the conservation. Should lose their land. They have to realize that the conservancy area is put there for a reason. If we damage their property they arrest us and put us in jail.

### 5.6 Spiritual Resources and Practices

Cultural sites used for spiritual customs and practices such as fishing ko'a and heiau, as well as iwi kupun or burials will be protected as discussed in the previous section on cultural resources.

Perhaps there is no way to mitigate the impact upon the solitude that can now be enjoyed at La'a'u. It offers the opportunity to experience ho'ailona spiritual signs and the overall mana of La'a'u as a wahi kapu. Limiting access to a walking trail that is set back behind a row of kiawe and providing a clear demarcation between the private lots and the general public access areas can help protect the integrity of the shoreline and mitigate the impact of the houselots. Conservation zones provided for in the CC & Rs will protect the spiritual quality of important complexes such as Kamaka'ipo.

**CC & Rs**

**Conservation zone and “protected land”**

Unlike most other subdivisions, control of the conservation zones, archaeological sites, trails and native plant ecosystems would be an easement, but control would rest jointly with the Land Trust and the lot owners. Both will share the responsibility and cost to malama (care for) the area. Kamaka'ipo Gulch and other areas identified as exceptional will be transferred to ownership of the Land Trust.
Section 6  Water Plan - Kakalahale Brackish Well

6.1 Proposed Plan

The MPL Water Plan for the proposed development can be summarized as follows:

- MPL will not, at any time in the future, seek permits for additional drinking water, other than the allocation under its permits existing at July 2005, from the Water Commission. MPL will seek a Water Use Permit amendment to expand the area of use for Well 17 water to include all of the areas its PUC regulated water companies serve including expansion to service La'au Point. This will allow a shift away from using potable water on non-potable uses (e.g. the golf course) which will minimize the use of potable water from the Kualapu'u aquifer sector.

- MPL proposes to develop 1,000,000 GPD from the abandoned Kakalahale Brackish Well in the Kamiloloa Aquifer for future non-potable needs to meet the demands for non-potable uses the Master Plan proposes. This will require a Water Use Permit from the Commission on Water Resource Management.

- The maximum water allocation for the La'au Point subdivision is as follows:
  1. Potable Water: 600 gallons of potable water per day for 200 lots at 80% occupancy.
  2. Non-Potable Water: 1,500 gallons per day for 200 lots.
  3. La'au Point Parks: 1,000 GPD potable and 40,000 GPD non-potable.

A Water Plan Analysis by Ishikawa, Morihara, Lau & Fong LLP is part of this Environmental Impact Study and includes estimates of the amount of water needed for the proposed development, potential sources, potential impacts and mitigation measures.
6.2 Primary Cultural Concerns in Wai Ola Case Applicable to Kakalahale

A review of the testimonies presented in the Wai Ola Case can be summarized in the following flow chart and explained as follows:

On the island of Molokai, the struggle over water is longstanding and rooted in a cultural way of life that is dependent upon subsistence. This subsistence lifestyle is threatened when coastal resources that thrive in brackish water environments are negatively impacted due to a diminishing aquifer. These brackish water environments, located on shore as well as off shore, are ideal nursing and hatchery grounds for pua or small fries as they feed on photo plankton, brackish water organisms, and limu. Furthermore, these environments are also the breeding grounds of crabs, clams, and other small crustaceans. Together these brackish water environments serve as the foundation for the coastal food chain, as the larger carnivorous fish and octopus are able to then feed on pua and smaller crustaceans. Traditionally, Native Hawaiians recognized these relationships and built fishponds in this environment to create a coastal feeding arena. This knowledge and understanding of the interdependence of the marine environment upon infusions of fresh water which sustains a subsistence lifestyle for the people of Moloka'i, elevates the struggle over the use and distribution of fresh water from a struggle to perpetuate the culture and a way of life, to a struggle to protect life itself.
Figure 9. Fresh Water Aquifer Linkage to Coastal Subsistence Resources

Depletion of Aquifer

Negatively Impacts

Coastal Subsistence Resources

By Diminishing

Located Fresh Water Springs & Seepage

On shore

That Are Vital

Located Off shore

That Are Critical

Native Hawaiians

Built Fishponds

Around

Located Limu Growth

For Reason Being

Pua (Small Fries)/ Small Crustaceans

Eaten By

Eaten By

Eaten By

Clams

Crabs

Endangered Hawaiian Stilt

Larger Carnivore Fish/ Octopus

Freshwater Springs

A Coastal Feed Pen

Comprised Of Brackish Water Organisms

Eaten By

Eaten By

Eaten By
Professor McGregor filed testimony in the Wai Ola Case and the following are excerpts which expand upon the importance of the flow of fresh water from the Kamiloloa aquifer into the coastline of Kapa'a-kaea-Kamiloloa-Makakupaia which lay makai of Kakalahale:

"The GIS maps revealed a high concentration of Hawaiian in the Kapa'a-kaea-Kamiloloa-Makakupaia area. These Hawaiians would be engaged in subsistence activities in the neighboring areas. These same areas showed a high concentration of known historic sites. Conservation lands are located in the mauka area of Kamiloloa and rare and endangered species have been identified in this area. The prevalence of subsistence on Moloka'i was reflected in the amount of food that was derived from these practices and feelings about its overall importance to families. The fact that families were highly dependent on subsistence for survival, especially Hawaiians, points to the value of subsistence as a sector of the economy.

Q: Have you had the opportunity to review the testimonies of Louise K. Bush, Sheldon Hamakua, Walter Mendes, Wayde Lee, Martin Kahae, and Judy Caparida?
A: Yes.

Q: Are the activities they describe consistent with the traditional and customary activities in which ancient Hawaiians engaged?
A: Yes, they describe the gathering of a variety of limu including ogo, 'ele'ele, wawae'iole, manaua, and huluhuwana; a variety of fish including weke, mullet, uhu, manini, kole, oio, papio and palani; as well as he'e, ulupapa, lole, wana and a variety of crab including kuhonu, 'alamihi, and ala'eke from the neashore waters. They also describe the gathering of opae from the Kaunakakai stream and the springs in the area. From the mauka forest they describe the gathering of mamaki for tea, as well as lehua, 'a'ali'i, palapalai fern, 'ie'ie, and pukiawe for hula.

Q: How would you characterize the impact of interfering with the continuation of these traditional and customary cultural activities?
A: Interference with the continuation of these traditional customs and practices would reduce the amount of natural marine and forest resources available for subsistence activities. This would impact the diet of the families who have relied on these natural resources for food. This would negatively impact the health and well-being of these families. It would also affect the ability of the families of the extended 'ohana to continue their practices of sharing and exchange and gathering and bonding during critical life cycle events.

Q: Is there a cultural reason for assuring that any water withdrawal from the shoreline does not interfere with the type of practices enumerated in HRS 174C-101?
A: The continued gathering of marine and forest resources in the Kamiloloa area is integral to the cultural life ways, health and well-being of the families who have relied upon these resources for subsistence. It is of critical significance to the diet of these families. The ability to alternate gathering areas in accordance with seasonal variations and level of use is essential to having resources available all year round. The sharing of foods gathered through subsistence activities reinforces good relations among members of extended families and with neighbors. Subsistence is integral to the life ways of the
Hawaiians of Moloka'i, popularly referred to as the "Last Hawaiian Island." Hawaiians comprise close to 50 percent of the population. Moreover, the persistence of subsistence on Moloka'i is of critical significance to the persistence of Hawaiian culture throughout our islands. The island of Moloka'i serves as a cultural kipuka for Hawaiian culture throughout Hawai'i. Bypassed by the mainstream of political and economic change in Hawai'i until the 1970's, it serves as a preserve of Hawaiian culture from which the contemporary generation of Hawaiians continue to draw strength and inspiration in the perpetuation of Hawaiian language, culture, and spirituality."
Section 7   Assessment of Impact of Proposed Water Plan on Cultural Resources

• Water is the Primary Cultural Resource
For many participants in the community meetings, water is the primary cultural resource. They feel that drawing brackish water out of the Kakalahale well will have a huge impact on the culture and way of life on Moloka'i.

• Impact on Aquifer
Moloka'i water resources are limited and drawn primarily from the eastern mountain system of the island. For many Moloka'i residents, water is the main issue in the proposed development. They expressed concern that the additional water proposed to be drawn out of the Kakalahale well, even if it is brackish, will strain and diminish the water table on Moloka'i, increasing salinity levels. Residents are concerned that pumping brackish water from Kakalahale could raise the salinity level in neighboring wells.

Taking all of the drinking water from one area is problematic. The wells are already showing signs of elevated levels of salinity. Got to spread out source.

Community participants and key informants expressed concern about the impact of pumping brackish water on the transition zone. They are concerned that drawing water out of the transition zone might increase the salinity levels of ocean discharge as well as neighboring wells.

• Impact on Hawaiian Homesteaders
For Moloka'i homesteaders, the primary issue with the proposed development is water. Hawaiian Homesteaders have the first preference for water from the Moloka'i aquifer. If MPL is given a permit for an additional 1,000,000 gallons a day this may prevent the homesteaders from being able to draw out the water that they need for future agriculture and residences. Homesteaders believe that 1,000,000 gallons a day is too much. It will hamper the rehabilitation of Native Hawaiians on Hawaiian Homelands.

The DHHL 20 year strategic plan projects 400 more residences, but water is the limitation on the development of these homes. Homestead farmers will be affected by water taken to La'au. Homesteaders need water to keep the plants in their garden and fruit trees on their homestead growing and producing. If there's no water, thousands of acres of DHHL land may not be usable. In addition, the homesteaders won't be able to water their food plants - ulu, papaya

• Keep Water Within Ahupua'a
Idea of moving water from one ahupua'a to another is hard to accept. It is not a Hawaiian concept to move water from one ahupua'a to another.

• Impact on the Ocean
Marine resources need infusion of fresh water to spawn. The findings in the Wai Ola Case provide relevant information on the potential impact of the pumping of 1,000,000
gallons of brackish water a day can have on the marine resources makai of Kakalahale. The findings were based on the pumping of 1.25 mgd of ground water and thus the impact would be less than that projected in the Wai Ola Case.

"Ground-water models showed that pumping 1.25 mgd of ground water would reduce ground-water flux to the nearshore area by about 3% to 15%. At that magnitude, the resultant change in salinity in the fishponds would be virtually indistinguishable from the initial values.

Native Hawaiians gather limu and other marine resources all along the southern and eastern coastline of Molokai, including the shoreline area of the Kamiloloa Aquifer. They do not confine their gathering activities to areas within their ahupua'a of residence.

**Nearshore Environment**

122. The coastal boundary of the Kamiloloa aquifer comprises approximately 6 kilometers of shoreline, extending just west of Kaunakakai Gulch to just east of Ali'i Fishpond, and includes Kaunakakai Harbor channel and two large fishponds (Ali'i and Kaloko'eli fishponds).

123. No perennial stream exist within the Kamiloloa aquifer and surface runoff reaches the ocean only after significant rainfall events.

124. The coastal area off the Kamiloloa aquifer is fairly homogenous. The shoreline consists of very shallow sand and mud flats that extend offshore several hundred meters.

125. Groundwater enters the nearshore zone from seepage at the shoreline and from offshore springs. In some areas, seeps are actually visible at low tide and offshore springs are also visibly evident.

126. Freshwater springs enter the reef at numerous points along Molokai's south shore creating brackish conditions that favor seaweed growth nearshore, especially in many of the fishponds, which tend to trap fresh water.

127. Groundwater discharge into the ocean is reduced by the amount that is pumped from the ground whether it is pumped from the Kualapu'u or Kamiloloa aquifer.

128. The McNulty model predicts that if 1.25 mgd of groundwater is pumped from the proposed well, the flux of groundwater at the Kamiloloa shoreline will be reduced by about 15%. The USGS Study indicates that the coastal discharge is reduced by 3 percent over a 13-mile stretch of coastline.

129. The USGS Study predicts that pumping 0.3 mgd from the proposed well [Wai Ola] will result in a reduction in groundwater discharge of 0.8 percent over a 13-mile stretch of coastline (which extends further than the boundaries of the Kamiloloa aquifer).
largest effects occur in areas nearest the well and effects diminish with distance from the well.

Fish

133. Several important species of fish, including mullet, aholehole, and milkfish, depend upon brackish environment along Moloka'i's south shore.

134. The brackish water environment is necessary for the primary productivity that is the basis of the food chain for milkfish, mullet, aholehole, and other animals found along Moloka'i's south shore.

135. Mullet need brackish water with salinity ranging from 13 to 20 ppt. for proper maturation of their eggs.

136. After mullet, ama'ama, awa or milkfish spawn in the open ocean, the fry, up to one month old, are predators, eating zooplankton in the open ocean. Then they move to nearshore areas where they switch to an omnivore diet, and feed on diatoms, a benthic plant usually found on the bottom of estuaries where brackish water and sunlight mix to allow for their growth. They stay on this diet for the rest of their lives, reaching sexual maturity, and feeding in estuaries and stream mouth areas which are conducive to this plant. Fishermen often know these locations in their areas.

137. Brackish water environments, which Dr. Tamaru defined as having salinities of less than 30 ppt, are essential for the maturation of striped mullet from the juvenile stage to maturation. For oocyte maturation, salinities in the range of 13 to 20 ppt is important. However, salinities along the nearshore area fronting the Kamiloloa aquifer consistently exceed 30 ppt.

Limu

145. Native Hawaiians gather limu and other marine resources all along the southern and eastern coastline of Molokai, including the shoreline area of the Kamiloloa aquifer. They do not confine their gathering activities to area within their ahupua'a of residence.

149. Limu is more productive in brackish water than in pure seawater.

Mana'o

Hear that the Homesteaders don't have enough water, but when want to build a project like this, all of a sudden then get water. All of a sudden we get water? Who are we kidding? This is water that is being diverted to something that won't benefit the island.

Main concern - will they have enough water for the community, not starving the rest of the island.
Eventually the drawing out of brackish water from Kakalahale will affect us. It's not about us any more - it will affect my grandchildren. A lot of people don't realize this. Our stake is not money our stake is our family and the people. I always thinking about the island.
Section 8  Proposed Mitigation Measures for Water Plan

MPL will retain its 1.5 million gpd of potable water: 1,018,000 gpd from Well 17 and 500,000 gpd from the Molokai Ranch Mountain System. MPL proposes to develop 1,000,000 gpd from the abandoned Kakalahale brackish water well in the Kamiloloa aquifer sector for future non-potable water needs. MPL will not transmit brackish water from the Kakalahale well to the West End by the Moloka‘i Irrigation System (MIS) system. MPL will use transmission alternatives. MPL will also make its excess potable water capacity available for the use of communities outside its property. MPL will be required to measure chloride levels every month to protect against unacceptable salinity levels.

Upon approval of the Community-Based Master Land Use Plan, MPL will sign covenants preventing it from ever seeking further water permits from the Commission on Water Resources Management. MPL will also abandon the Waiola Well application.

MPL will continue its water conservation campaign to Kaluako‘i residents and future residents in the proposed development by reducing consumption, shutting off irrigation systems during rainfall, and restructuring water rates.

MPL continues to work with the major managers of Molokai’s water resources to meet the needs of the community now and in the future while protecting this precious resource. had a four party meeting with the following in September. As a first step in finding solutions to sustainable use of water on Molokai MPL met in September 2006 with the other major water managers - Department of Hawaiian Homelands (DHHL), the County of Maui, Kawela Plantation Homeowners - and the United States Geological Services and the Commission on Water Resource Management. The meeting was aimed at looking to USGS to model the needs for all parties.

In that meeting, MPL offered both DHHL and the County access to further drinking water from its Well 17 in the Kualapu‘u aquifer, saying that if necessary it would put Well 17 into a Water Trust to ensure continuity of supply for all parties. MPL has stated that it requires no further drinking water under its Master Plan. Furthermore, MPL also believes that Well 17 has the capacity to pump an additional 500,000 gallons a day, average, without affecting the sustainable yield of the aquifer. This water can be made available to both the County and DHHL.

MPL extended this offer in order to alleviate the need for Maui County to build a new well to replace its current well in the aquifer. This measure would also enable DHHL to access some of its 2.905 million gallon reservation without the added cost of additional well infrastructure. Before another meeting of the parties is convened, DHHL plans to consult with the county and review its needs under its Molokai Island Plan.

Concurrent with the LUC rezoning application, MPL is seeking permission from the Commission on Water Resources Management for its Water Plan.

La‘au Point Cultural Impact Assessment / 134
Alternate Sources
Informants spoke of efforts by Alpha U.S.A. to find water - from hiring Blackhorn who used a willow to the use of modern techniques with electromagnetic waves and a computer. An informant said that there's a well by the corn field - by Amazon trail - brackish water that was used to irrigate the hay with brackish water. He also said that there were old wells at Pala'au and at Punakou that he used to maintain by pumping out the mud. Eleven exploratory wells and boreholes were drilled on the West end between 1945 and 1991. None produced water of usable quality. There is not sufficient rainfall in Kaluako'i to sustain a viable year round rainwater catchment system.

Mana'o

_Worked with Dr. Nightingale - in 1954-55 - I was the laborer - he was the water specialist. He said it was divided into 2 pieces - right by the corn field. Billy Buchanan - he has a big well, if he has water on his property - the ranch should look there._
Section 9  Assessment of Alternatives to the Proposed Development

Section 6 of the EIS addresses alternatives to the proposed development, as required under HAR, Title 11, Chapter 200 Environmental Impact Statement Rules, Section 11-200-10(6).

In the report, the criteria for evaluating alternatives included those defined in the HAR, i.e. "those that would allow the objectives of the project to be met, while minimizing potential adverse environmental impacts," in addition to the following criteria:

- Reasonable financial returns must be generated from the funds invested.
- No expanded use of precious drinking water currently available to the company.
- No use of vast amounts of land and population increase beyond what was conceived as acceptable to the island.
- No destruction of land designated for agriculture or open space.
- No development use of potentially productive Agricultural lands versus poorly rated Agricultural land.

From a cultural standpoint, limiting the amount of water to be consumed by any development was the primary consideration in the assessment of alternatives. The impact of population increase is another important issue that was considered in the assessment.

As a part of this cultural impact assessment report the proposed alternatives are discussed below relative to the impact upon cultural, subsistence and spiritual resources and related practices.

9.1  No Action Alternative

The “no action” alternative would not involve any changes to the La'au Point project site, and the property would remain vacant of any additional improved uses. If the La'au Point community were not developed, lands would remain as fallow agricultural land and underutilized due to the poor soils and lack of irrigation water. The conservation zones would not be established at Kamaka'ipo Gulch or along the shoreline.

The Community-Based Master Land Use Plan would not be implemented. While 1,600 along the northeast coast of Moloka'i from Keonelele to 'Ilio would be donated to the Moloka'i Land Trust the remaining 24,600 acres would continue to be owned by Moloka'i Ranch. This would include the legacy lands discussed above - Ka'a'ana, the birthplace of the hula; the makahiki grounds of Naiwa; the ancient burial grounds of Kaw'a'aloa; village sites at Kawakiu; burial mounds at Kawela; the historic Paka'a house sites and gardens; Kaiaka Rock; Kamaka'ipo Gulch; and the fishing village at Kaupoa Camp.

La'au Point Cultural Impact Assessment / 136
The “no action” alternative would ultimately lead MPL to close down its ranch operations and either land bank the property for the future or put the lands up for sale, as discussed as the next and interrelated section. Employment would have to be reduced, tourist expenditures would be lost, and local businesses at Maunaloa Town and elsewhere would be affected. These losses in local jobs and probable business failures would also in turn increase the need for County and State social services.

While the "No Action" alternative would reduce the immediate demand on water resources, in the long run it would increase, because it would be combined with the second alternative of bulk or "Piece-Meal" sale of MPL lands to potentially eight times the number of landowners or to an investment corporation which could develop the land beyond the limited 200 two acre lots. The impact to cultural sites and natural resources utilized for subsistence, cultural and spiritual purposes would be far greater than what is projected in the proposed development.

9.2 Bulk or 'Piece-Meal' Sale of Other MPL Land Inventory

MPL land holdings are comprised of 101 lots that could be sold within Pāpohaku Ranchlands, Maunaloa (both Residential and Commercial), and the Industrial Park.

In addition, an existing allowable lot density analysis conducted by MPL shows that the west end Agricultural-zoned parcels comprising approximately 43,000 acres could be subdivided into more than 1,500 lots.

This “land-banking,” or individual parcel sales, would essentially close down ranch operations and reduce MPL’s employment to only 10 full-time staff as the company sells its properties to potentially 101 new owners/residents.

A proposal was made to MPL by the U.S. Marine Corps to stage amphibious and air landing exercises on the west coast of Moloka‘i between Kaupoa and La‘au Point in the area proposed for development. If the proposed development plan fails, the U.S. Marine Corps might renew their effort to have the lands leased out for these purposes. Such use would have tremendous negative impact on the marine and natural resources utilized for subsistence, cultural and spiritual purposes in that area.

In this alternative, the 24,600 acres that would otherwise have been donated to the Land Trust under the La‘au Point proposed action would instead be sold off as separate parcels. If these lots were sold off without the benefit of a master plan, the impact would include a greater number of new land owners/residents, less community control of development (i.e. design controls and CC&Rs), no land trust, and less financial support to the County and State.

As discussed above, this alternative would lead to greater overall impacts on cultural sites; natural resources utilized for cultural, subsistence and spiritual purposes; water
resources; and the overall Hawaiian way of life on Moloka'i. This scenario would result in uncontrolled growth and unmonitored utilization of lands and natural resources. It is the worst case scenario.

9.3 Maunaloa to La'au, Kaunakakai and Kaluako'i

In its review of possible alternatives to the La'au development, MPL developed models to compare alternative scenarios ranging among different agricultural and residential projects of between 27 lots/units and 1,000 lots. units.

MPL initially looked at large Agricultural lot developments conforming to existing State land use designations, the Moloka'i Community Plan, and County Zoning at Maunaloa Town and above Kaunakakai. MPL also looked at an affordable residential expansion at Kualapu'u as part of the first round of possible alternatives and at various rural and condo alternatives for Kaluako'i. MPL examined DeGray Vanderbilt’s La'au Point alternative (Kaluako'i Rural Subdivision and Golf Course).

In efforts to avoid development specific to the La'au Point project area, MPL examined nine options in detail on other Ranch lands outside of the La'au Point project site. Financial models were created to examine the alternatives’ ability to generate the necessary revenue in order to make the Community-Based Master Land Use Plan work economically.

The community and key informants felt that there would be less impact upon subsistence resources if these alternate sites were developed. While archaeological surveys would need to be conducted in these areas, most of the historical sites are within half a mile to one mile of the coastline given the traditional reliance of Native Hawaiians upon the marine resources of Kaluako'i. These areas area less likely to have cultural sites.

In looking at developing the mauka lands in place of the coastal areas, one of the informants suggested that Wai'elei would be a more suitable location for the development. If the houses are located at a mauka area, such as Wai'elei, the landowners would purchase a lot where they could build a house with magnificent views of O'ahu, Lāna'i and Maui and enjoy the cool breezes. In addition, the landowners would also acquire a ownership of commonly-owned lands at the coast located at safe beaches where a park could be developed for the special use by the landowners.

The primary cultural impact of these development models are greater overall population increases and demand for precious water resources.
9.4 Hale O Lono to Pala'au

MPL was also asked to look at the area from Hale O Lono to Pala’au There are several issues with this area, not the least of which is the proposed inclusion of this land in the Land Trust and the importance of the Ka‘ana area, from mauka to makai to Kumu John Kaimikaua. In the community planning process, his input was to exclude the area from any development.

With respect to historic cultural sites, the area has had only limited survey work to date, and where archaeological surveys have been conducted, sites have always been found. Based on the limited work, it is likely that extensive archaeological surveys would identify several large important cultural complexes such as the Paka'a house sites, cultivation fields and trail. The topography of the site is that of sloping ridges divided by deep, steep gullies. To access development along the more desirable coastal areas. MPL estimated that 24 miles of roads would be needed to service the area. This would not only be costly, but would severely impact the ability of the region to be used for subsistence hunting as currently proposed by the Plan and require the development of hundreds of lots to offset their construction costs.

According to key informants, this area has been used more intensively for subsistence fishing and gathering than the area proposed for development. Hale O Lono, Halena and Kolo were identified as the key spawning areas for mullet. Each of these areas were traditionally accessed by the Maunaloa families throughout the plantation era and they continue to be important areas for fishing and gathering. Key informants experienced spiritual phenomena in the area and observed burials and iwi kupuna. The most favored hunting grounds are also located in this area of the MPL lands.

9.5 Alternative to La'au Development

The Alternative to La'au Development Committee (ALDC) efforts to find an alternative to the La'au Point development involved the hiring of consultant Clark Stevens (New West Land Company) by the Moloka'i Enterprise Community (EC).

This alternative proposed 50 view-shed lots at La'au Point, located between 0.5 mile and 1.5 miles from the La'au shoreline, and another 100 small residential lots, which would represent a new “town” similar to Maunaloa.

The cultural impact of this proposal would depend upon the placement of this lots. Placement .5 to 1.5 miles from the shoreline reduces the impact to coastal cultural sites and to the natural coastal and marine resources utilized for subsistence, cultural and spiritual purposes. However, some of the inland sites in the particular design that was submitted are situated in areas that informants identified as extremely significant and highly sensitive from a cultural and spiritual standpoint. It is similar in concept to the models considered by MPL and discussed above in 9.3, although this particular model would have less population and demand for water than the proposed La'au Development. The infrastructure cost, according to MPL is prohibitive.
The ALDC also suggested the pursuit of a conservation “philanthropic” buyer to purchase the entire 6,348-acre parcel, or a buyer who could use the tax incentives and develop mauka of the shoreline with less density. The ALDC asserted that in order for them to move forward with finding potential purchasers, MPL must be willing to keep this alternative open and determine a purchase price for the parcel.

MPL has stated the following in regard to this purchase alternative:

If a purchaser offers the company a price for the La'au parcel that is equivalent to its development return, protects areas for subsistence as proposed and provides an endowment income to the Land Trust/CDC as proposed under the La'au development plan, it will seriously consider the offer. Should a serious buyer emerge, MPL will enter meaningful negotiations with that party or parties.

The option to pursue this alternative will remain open.
Section 10  Summary and Conclusion

This Cultural Impact Assessment Report has been prepared as part of the Environmental Impact Statement (EIS) for the proposed La'au Point Development in compliance with Chapter 343, Hawai‘i Revised Statutes and Title 11, Department of Health, Chapter 200, Environmental Impact Rules, State of Hawai‘i.

This report has especially been designed to fulfill the mandate to the Land Use Commission from the Hawai‘i State Supreme Court in its ruling, Ka Pa’akai O Ka ‘Aina v. Land use Commission, State of Hawai‘i / 94 Haw. 31 (2000). The specific section of the ruling that served to guide the development of the report is as follows:

“In order for the rights of native Hawaiians to be meaningfully preserved and protected, an appropriate analytical framework for enforcement is needed. Such an analytical framework must endeavor to accommodate the competing interests of protecting native Hawaiian culture and rights on the one hand, and economic development and security, on the other . . .

In order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, the LUC, in its review of a petition for reclassification of district boundaries, must – at a minimum – make specific findings and conclusions as to the following: (1) the identity and scope of ‘valued cultural, historical, or natural resources’ n27 in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to which those resources, including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. n28

This summary, addresses the three key findings required of the Land Use Commission and government agencies empowered to make decisions affecting land use in Hawai‘i under the ruling of the Hawai‘i State Supreme Court in its ruling in Ka Pa'akai O Ka 'Aina in 2000.
10.1 Valued Cultural, Historical or Natural Resources and Traditional and Customary Native Hawaiian Rights Exercised in the Petition Area

The La'au Subdivision Archaeological Preservation and Mitigation Plan prepared by Cultural Landscapes in May 2006 documents valued cultural and historical resources in the petition area. This report focuses on valued natural resources utilized for cultural, subsistence and spiritual purposes.

A large part of the significance of the La'au Point area is that it is raw and untouched. It is so isolated that most of the residents of Moloka'i have never even been there and have no direct experience with the place. This factor gives La'au an almost mythical quality. La'au Point has become an icon of what Moloka'i represents - a rural stronghold and reserve of Native Hawaiian culture, a cultural kipuka. If Moloka'i is "The Last Hawaiian Island" then La'au is one of the last untouched Native Hawaiian places on "The Last Hawaiian Island."

In Hawaiian tradition, La'au Point represents a point of no return. For those traveling by canoe from O'ahu to Moloka'i across the Ka'iwi Channel, once La'au Point is sighted, there is not turning back to O'ahu. This concept has been applied to the issue of the development of the La'au Point Rural-Residential Subdivision. Many Moloka'i residents feel that if the west and south shores adjacent to La'au Point are developed, as proposed, that this will open up Moloka'i to new residents unfamiliar with the culture and way of life on Moloka'i and lead to irreversible cultural change.

Everyone interviewed and those who came to community meetings had reservations about the proposed development. No one was an enthusiastic advocate, many were reluctant supporters and those most vocal were opposed to the development.

The Maunaloa kupuna and larger community and longtime employees of Moloka'i Ranch have the most direct and longtime experience with the area proposed for development. What is striking is that while they are very concerned and reluctant about the development, they are also willing to acknowledge and support the right and the need of the Ranch to seek the development. They feel that the negative impacts could be managed if the development would conform to the strict covenants, conditions and restrictions outlined in the Community-Based Master Land Use Plan for Moloka'i Ranch. They are confident that their community can work together with the project's resource managers to provide stewardship over the marine resources that they rely upon for subsistence. They also felt that the negative impacts would be offset with the gifting of important legacy lands to the community.
In addition, many longtime adversaries of Moloka'i Ranch engaged in the development of the Community-Based Master Land Use Plan for Moloka'i Ranch, which includes the proposed La'au development, over the course of two and a half years throughout countless community meetings, long hours of impassioned debate, critical thinking and soul searching. For them it was a process of negotiating a lasting settlement of a thirty year struggle with Moloka'i Ranch over extravagant development schemes and the extractive use of millions gallons of the island's precious and limited water resource. The proposed La'au development was difficult for them to accept and at that point some withdrew their support. However the majority of the planning group persisted in their support for the overall Community-Based Master Land Use Plan as a reasonable and balanced approach that empowers the community to manage premier Native Hawaiian legacy lands, control population growth and land speculation and monitor the one last major development on Moloka'i Ranch lands. Moreover, the plan revolves around the management of natural resources for subsistence, cultural and spiritual purposes.

Participants in community meetings and the key informants speak of the south and west coasts adjoining La'au point and its nearshore waters as reserve of marine resources which serve as their "icebox." It is a place where fishermen usually go to get fish, 'opihi and crab for parties and gatherings of their large extended families.

The southwest shore also factors into the life cycle of the mullet, serving as a hatchery area from which they move east to Mana'e or East Moloka'i.

Along the south shore, informants identified the various fishing and gathering areas by points that they referred to as first point (Kanaluka'ha), second point (Kapukuwhaine), third point (Kahalepohaku) and fourth point ('Opihi Road). The south shore is best known for moi, aholehole, 'a'a'ama crab and 'opihi. The 'opihi starts at Kapukuwhaine on the south shore and out on the cliffs along what they refer to as 'Opihi road. The west shore is best known for moi, aholehole and lobster. Due to the seasonal ocean swells, the south shore is usually harvested in the winter time when there are north swells and the west shore is usually harvested in the summer time when there are south swells. They also speak of the ocean as being very treacherous and not safe for swimming. Off of La'au Point itself, informants spoke of a very strong current which has swept even the best divers out to the open ocean.

Traditionally, it is not a place that was fished on a regular basis because it is isolated and difficult to reach. However, the increased use of boats on Moloka'i and O'ahu has changed this. Informants noted that the resources have declined in the area with heavy seasonal harvesting by boaters from O'ahu and the opening of Hale O Lono harbor and Kaluako'i as closer launching points for Moloka'i boaters.
In addition to natural resources utilized for subsistence, informants spoke of other natural resources which have cultural significance such as native plants, native species of turtles and monk seals, and the simple unspoiled natural beauty of the undeveloped seascape.

The La'au area is generally regarded as a special place of spiritual mana and power. Community participants and key informants spoke of specific burials, fishing ko'a, and heiau. Such specific sites are documented and described in the La'au Subdivision Archaeological Preservation and Mitigation Plan by Cultural Landscapes that is part of this EIS.

The overall spiritual quality of the La'au area as a wahi pana and wahi kapu cannot be quantified and deserves recognition and respect.
Informants identified the following coastal cultural and subsistence resources in the proposed development area.

**Coastal Cultural and Subsistence Resources**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>streams</td>
<td></td>
</tr>
<tr>
<td>‘auwai (taro irrigation ditches)</td>
<td></td>
</tr>
<tr>
<td>springs</td>
<td></td>
</tr>
<tr>
<td>caves</td>
<td></td>
</tr>
<tr>
<td>trails</td>
<td></td>
</tr>
<tr>
<td>wahi pana (named places)</td>
<td></td>
</tr>
<tr>
<td>sacred places</td>
<td></td>
</tr>
<tr>
<td>dunes</td>
<td></td>
</tr>
<tr>
<td>landings</td>
<td></td>
</tr>
<tr>
<td>bridges</td>
<td></td>
</tr>
<tr>
<td>surfing sites</td>
<td></td>
</tr>
<tr>
<td>sandy beach</td>
<td></td>
</tr>
<tr>
<td>fishing area</td>
<td></td>
</tr>
<tr>
<td>fishpond</td>
<td></td>
</tr>
<tr>
<td>fish trap</td>
<td></td>
</tr>
<tr>
<td>fish house</td>
<td></td>
</tr>
<tr>
<td>hunting areas</td>
<td></td>
</tr>
<tr>
<td>kilo i’a (fish sighting)</td>
<td></td>
</tr>
<tr>
<td>muliwai (brackish pond)</td>
<td></td>
</tr>
<tr>
<td>anchialine pond</td>
<td></td>
</tr>
<tr>
<td>trails</td>
<td></td>
</tr>
<tr>
<td>salt ponds</td>
<td></td>
</tr>
<tr>
<td>wells</td>
<td></td>
</tr>
<tr>
<td>turtle nesting area</td>
<td></td>
</tr>
<tr>
<td>historic walls</td>
<td></td>
</tr>
<tr>
<td>basalt veins for tools</td>
<td></td>
</tr>
<tr>
<td>alae vein</td>
<td></td>
</tr>
<tr>
<td>salt pans</td>
<td></td>
</tr>
<tr>
<td>shrines</td>
<td></td>
</tr>
<tr>
<td>salt gathering areas</td>
<td></td>
</tr>
<tr>
<td>ko’a (fishing shrines)</td>
<td></td>
</tr>
<tr>
<td>heiau (temples)</td>
<td></td>
</tr>
<tr>
<td>historic sites</td>
<td></td>
</tr>
<tr>
<td>cultural use areas</td>
<td></td>
</tr>
<tr>
<td>ho’ailona (natural signs)</td>
<td></td>
</tr>
<tr>
<td>sighting place</td>
<td></td>
</tr>
<tr>
<td>lele (cliff jumping spots)</td>
<td></td>
</tr>
<tr>
<td>native plants</td>
<td></td>
</tr>
<tr>
<td>pu’uhonua (places of refuge)</td>
<td></td>
</tr>
<tr>
<td>holua slides</td>
<td></td>
</tr>
<tr>
<td>cultivation area</td>
<td></td>
</tr>
<tr>
<td>leina (jumping off point for souls to cross over)</td>
<td></td>
</tr>
<tr>
<td>archaeological sites</td>
<td></td>
</tr>
<tr>
<td>kupe’e</td>
<td></td>
</tr>
<tr>
<td>o’opu</td>
<td></td>
</tr>
<tr>
<td>hiihiwai/wi</td>
<td></td>
</tr>
<tr>
<td>aholehole</td>
<td></td>
</tr>
<tr>
<td>‘anae</td>
<td></td>
</tr>
<tr>
<td>steam bath areas</td>
<td></td>
</tr>
<tr>
<td>bathing pools</td>
<td></td>
</tr>
<tr>
<td>limu gathering areas</td>
<td></td>
</tr>
<tr>
<td>lava tubes</td>
<td></td>
</tr>
<tr>
<td>subterranean water course</td>
<td></td>
</tr>
<tr>
<td>petroglyphs</td>
<td></td>
</tr>
<tr>
<td>kapu kai/hi’u wai areas</td>
<td></td>
</tr>
<tr>
<td>paddling areas</td>
<td></td>
</tr>
<tr>
<td>artifacts</td>
<td></td>
</tr>
<tr>
<td>view plane</td>
<td></td>
</tr>
<tr>
<td>seasonal residential sites</td>
<td></td>
</tr>
<tr>
<td>burial markers</td>
<td></td>
</tr>
<tr>
<td>water caves</td>
<td></td>
</tr>
<tr>
<td>birthing stones</td>
<td></td>
</tr>
<tr>
<td>phallic stones</td>
<td></td>
</tr>
<tr>
<td>Pohaku Kane</td>
<td></td>
</tr>
<tr>
<td>coral reef</td>
<td></td>
</tr>
<tr>
<td>estuary</td>
<td></td>
</tr>
<tr>
<td>spawning grounds</td>
<td></td>
</tr>
<tr>
<td>house sites</td>
<td></td>
</tr>
<tr>
<td>po kane routes (night marchers)</td>
<td></td>
</tr>
<tr>
<td>dams</td>
<td></td>
</tr>
<tr>
<td>‘aumakua (ancestral deities) domain</td>
<td></td>
</tr>
</tbody>
</table>

They added the following additional resources:

- monk seals, water catchments, bell stones, ahu stones, Hawaiian moth, chamomile type flower for clearing liver, shells on shore.
10.2 Extent to which Valued Resources and
Traditional and Customary Native Hawaiian Rights will be
Affected or Impaired by the Proposed Action

Participants in the community meetings expressed concern that the proposed
development will change the demographics of Moloka'i forever. They believe that La'au
will contribute to the increase of land values and prices and property taxes on Moloka'i.

The community expressed concern that 200 new millionaires will change the make up of
the Moloka'i community and lead to changes in the Hawaiian way of life. With more
outsiders, Moloka'i will no longer be "The Last Hawaiian Island." The proposed
development will bring in new residents unfamiliar with the culture and way of life on
Moloka'i and lead to irreversible cultural change.

The community doesn't want Moloka'i to turn into Maui or O'ahu with a large population
off-island people. They expressed regret that if the development occurs, La'au will never
be the same.

In balance, the Maunaloa kupuna shared that no matter what happens, the population will
increase and the land will be limited. While Moloka'i has been preserved it is gradually
being developed. They acknowledged that progress cannot be stopped but that it can be
controlled. The Maunaloa kupuna felt that the overall community plan of which La'au is
a part provides for the community to manage and monitor the proposed development.

Access and Trails

Community members were concerned that the subdivision might be a gated community,
and were relieved that this is not part of the plan.

Native Hawaiians and the general public will have access from two points - one on the
south shore at the southeast entry and one on the west shore at the northwest entry. In the
process to develop the Community-Based Master Land Use Plan for Moloka'i Ranch,
subsistence fishers and gatherers were very concerned that opening up the south and west
shores to public access at every 1500 feet as the County of Maui provides will deplete the
marine resources. They regretted that the opening of Hale O Lono harbor to public
access had severely decreased the marine resources there and they do not want to see that
happen in the area proposed for development. Opening up access points every 1500 feet
would have a severe impact on the subsistence resources along the west and south coasts
adjacent to La'au Point.
Community members were concerned that subdivision lot owners and their friends will have preferential access to the coast. There will be nothing to stop the home owners from going down to the beach. Those who live on the shoreline will be able to access their home and the beach by vehicle. Homeowners can create a trail to the beach and let their friends have access to the beach. Affording only two access points for the general public, while the rich people in the subdivisions will have access from their homes seems unequal. Informants also expressed concern that landowners might call police if they see the general public walking on the beach, as this has happened at Papohaku.

Participants in community meetings and informants felt it was important to provide emergency access through the subdivision to the shoreline for emergencies. They were also concerned that access should be afforded for kupuna and persons with special needs. Some pointed out that the areas closest to the access points will be heavily impacted, while spreading out the access points might spread out the impact. It was also noted that the road down to Hale O Lono harbor would need to be maintained in order to keep access to the area open.

Subsistence Fishing and Gathering

Informants feel that the development will spoil the experience of fishing in what is now an isolated, pristine and spiritual area. They are concerned that instead of La'a'u being a place to get food, it will be a place with haole in their back yards. Many informants felt that the proposed development will greatly hinder, if not abolish altogether, ongoing traditional gathering activities currently enjoyed by Moloka'i islanders at La'a'u. Fishermen will lack privacy if the development goes through. Yet, throw net subsistence fishers require an undisturbed beach that allows fish to forage closer inshore in order to succeed. Gatherers of 'a'ama crabs require dark silent nights to ensnare their nocturnal prey. Commotion emanating from noisy and brightly lit beach homes will negatively impact crabbers' efforts to capture their already skittish prey. Gatherers of limu and pupu will very likely be met with kayakers in the water, people sunbathing on the beach, and pet animals running up and down the shoreline. If experiences elsewhere in Hawai'i hold true, it is not likely that owners of multi-million dollar beach homes will greet shoreline subsistence gatherers with open arms. It is more probable that subsistence practitioners will be confronted by insensitive newcomers intolerable of extractive activities in what they will perceive to be their front yards.

While the new landowners will probably want to go out and fish when they see the lobsters in the area, most informants felt that the new residents will probably not directly damage the fishing grounds because they don't know how to fish. The real impact on the fishing resources is from the Honolulu boaters. When the outboard motor and twin outboards came out at an affordable prices, the Honolulu boats came fishing all along the west end and south shore. These fishermen have taken everything, even the eggs. The lobster area is wiped out. The Moloka'i residents fish for the family and perhaps get an extra cooler of fish to sell. The outside commercial fishermen fish out the grounds of lobster and fish. They do not plan for the future.
Community participants and key informants were concerned that pesticides and fertilizers will contaminate the ocean and kill the marine resources. Fertilizer run off will kill the small organisms that support all of the marine life offshore. Runoff from the development will contaminate the ocean. Grading can increase erosion which will result in sediment flowing into the ocean and destroy marine resources. Some informants from the East End felt that the development would impact the mullet run and thus impact the resources on their end of the island. However, longtime fishermen who have regularly fished the south shore as members of Ranch families noted that the mullet spawn at Hale O Lono, Halena and Kolo, rather than close to La'au. Hale O Lono is on the eastern border of the project area. Halena and Kolo are outside of the project area.

Community members wanted to be assured that the rules outlined for access and for subsistence and gathering cannot be changed by the subdivision lot owners. MPL clarified that the lot owners will be required to uphold the Covenants, Conditions and Restrictions (CC&Rs) that include these rules as part of the homeowner contract.

Providing parking areas at either end of the proposed project area and limiting access along the shoreline to foot access will open up access sufficiently that it might impact the resources, as the entry points will be closer for those who now walk and must either enter from Hale O Lono or Dixie Maru. The conservation rules might affect fishing, but if the access is easier there will be more fishing.

**Subsistence Hunting**

Hunters are concerned that the new landowners from outside of rural Moloka'i will not want to hear shooting and may be protective of the deer and oppose even bow hunting. Deer hunting could become an animal rights issue. Bullets can travel 4 miles and 10 year kids can get a license. Need to have a sufficient buffer zone. It will only take one accident to close down hunting in the area. The overall hunting area will be reduced by the no hunting zone in the subdivision and buffer zone and the safety zone.

The plan to put in a deer fence and remove deer within the proposed subdivision will effectively close off hunting in the southwest corner of Moloka'i. It will have to be a very high fence. The deer will keep going back. The deer will get hurt.

**Cultural Resources and Practices**

Informants are concerned that cultural sites will be destroyed once start to bulldoze and grade and clear the land for development. At Papohaku, homeowners have graded and damaged dune system and destroyed cultural sites and burials located in the dunes. They have extended their household area into the conservation zone, treated it like their own private property and tried to exclude Moloka'i residents from the public beach area fronting their homes. The same process can occur in the proposed subdivision.

Informants expressed concern that future generations may not have a concept of how to do subsistence and only going to catch what can be carried. Future generations should be
able to be in an environment where it's just them and mother nature. They should know what it feels like.

Concern was expressed about the impact of the proposed development on the monk seals who frequent the remote beaches of the west and south shores. Monk seals might be disturbed during the grading and construction phase. New residents may have dogs who would disturb the monk seals.

Many of the informants commented that the development will require a lot of expensive landscaping because the land is rough and rocky with a lot of boulders.

**Spiritual Resources and Practices**

Can destroy ko'a fishing shrines and cultural sites, unless monitored. Informants are also concerned that once the grading starts there will be erosion when it rains and the mud will cover the ko'a, the sand and the reef.

Can disturb iwi kupuna burials unless monitored.

The overall general concern is that the development of the area will destroy the special quality of La'au as a special place of spiritual mana and power.
10.3 Feasible Action by the LUC to Reasonably Protect Native Hawaiian Rights

The Community-Based Master Land Use Plan for Moloka'i Ranch provides measures to mitigate the overall impacts of the proposed development at La'au which set unique precedents for the development of large landholdings by offshore corporations. These precedents are related to community planning, the creation of a land trust for the community, the donation of legacy lands to the land trust, the donation of easements to the land trust, the protection of subsistence fishing, gathering and hunting, reserving lands for community housing, and the creation of economic opportunities for the community through the re-opening of the Kaluako'i Hotel. The plan also provides for covenants, conditions and restrictions that landowners in the La'au Point rural residential development will need to accept and agree to uphold in order to purchase a lot.

The Land Use Commission can review the Community-Based Master Land Use Plan for Moloka'i Ranch, especially the Covenants, Conditions and Restrictions (CC & Rs). The Commission can endorse the guidelines and CC & Rs which provide mitigation of the identified impacts to the cultural and natural resources utilized for subsistence, cultural and spiritual practices and customs. The Land Use Commission can assist in the enforcement of the CC & Rs by making these part of the conditions of the rezoning of the lands from the agricultural to the rural classification.

La'au Point must be the most environmentally planned, designed and implemented large lot community in the State. The residents would be educated and informed about the environment and culture, and taught to “Malama ‘aina,” take care of the land and sea.”

This statement precedes the covenant document determined by the Land Use Committee that will place many restrictions on lot owners at La'au Point, in order to attract only those who are concerned about conservation.

As an example, the Conservation Zone and other areas to be protected (approximately 1,200 acres) within the subdivision will be the subject of an easement held by the Land Trust, with guidelines for these uses to be determined prior to the construction of the subdivision and reflecting the importance of the area archaeologically and to subsistence gathering.

These protected lands will be part of an entity that is controlled equally by the homeowners and the Land Trust. All decisions relating to this area: maintenance, subsistence protection, archaeological site protection, personnel, etc., will be the shared responsibility between the Trust and the homeowners, who will share equally in the costs.
MPL will attempt to attract buyers to the La'au point subdivision who reflect the hopes and aspirations of the community. Brochures, sales material and other promotional documents will be vetted by the Land Trust or the EC for accuracy and adherence to their principles.

One of the unique features of the CC &Rs is the condition that every person whose name is on the property title must commit to undergo a certain amount of education about the Moloka'i community and its desires and aspirations with kupuna and the Maunaloa community.

Measures will be taken to assure that these CC & Rs cannot be changed in the future. These CC & Rs include the following:

- prevent a gated community
- restrict the further subdivision of lots
- restrict the area that can be disturbed for use
- prevent construction on slopes of more that 50%
- restrict building height
- require the use of alternative energy
- prohibit the use of pesticides
- require that exterior lighting be shielded from the ocean
- require water catchments and 5,000-gallon storage tanks
- restrict landscaping to native and Polynesian introduced species suitable for dry coastal locations
- prohibit the use of noxious or invasive species; require green architecture
- manages erosion with vegetative cover
- puts a deer fence at the rear of the subdivision

The covenants, Conditions and Restrictions that landowners will need to uphold are described on pages 101 - 105 of the Community-Based Land Use Plan for Moloka'i Ranch that is part of the EIS.

Additional Recommended Guidelines:
Informants recommend the following additional provisions to mitigate the impact of the development on subsistence practices:

- **Fence to demarcate private property from public access area**
  All of the informants felt that it is important to have a clear physical demarcation, such as a log fence, running along the individual property lines to distinguish between private property and the public access area. By putting in a fence of some kind the public will know the boundary so that they won't trespass. Another suggestion was to use a round wire fence, called a New Zealand fence.

La'au Point Cultural Impact Assessment / 151
• **Location of Access Trail**
Informants suggested that there be a physical demarcation between the property line and the ocean, along which the trail would run. The trail would follow the contour, following the old traditional trail as much as possible. Then the existing kiawe would serve as a buffer between the trail and the sand and ocean. This can help reduce impact of the trail on the beach and ocean. The kiawe can be pruned. It is a nitrogen fixing plant and will help other plants to grow around it. The trail should be placed back from the ocean so that it won't wash out. The trail will only be for walking and not for atv's or even bicycles. The trail should not be paved but kept clear and maintained.

• **Emergency access to shoreline through subdivision**
Access through the subdivision should be provided for emergency rescue.

• **Document Existing Trails and Roads**
Document and map existing trails and roads for access.

• **Kupuna Access**
To accommodate kupuna and those with special needs, have a golf cart available to assist their access.

• **Landscaping**
Need to prevent landowners from landscaping the area of the setback which ranges from 250 to 1,000 feet.

• **Support for the Maunaloa Community**
Have monies generated go into the community to support the school. Include the Maunaloa 'Ohana I Lokahi Association needs to be involved in the decisions about La'au.

• **Regulate Fertilizers**
The use of fertilizers will be regulated.

• **Involve Maunaloa Community in Stewardship**
Longtime fishers and gatherers from the Maunaloa community will be involved in the monitoring and protection of the marine resources in the development area.

• **Cultural Monitoring**
Provide onsite monitoring of sites and potential erosion areas during clearing, grading and construction. Should have the resource management plan up and running when the grading and constructions starts.

• **Hunting**
Have the buyers accept that hunting occurs in the broader surrounding area.

• **Kama'aina residents of the Maunaloa community have seniority**
The seniority for hunting in accordance with traditional subsistence should be for kama'aina residents of the Kaluako'i ahupua'a and MPL employees.

La'au Point Cultural Impact Assessment / 152
• Papohaku Preservation Plan
Apply relevant recommendations from the Papohaku Dunes Cultural and Natural Resource Preservation Plan, Kaluako'i, Moloka'i, Hawai'i Study.

• Kamaka'ipo Buffer
The buffer area for Kamaka'ipo Gulch may need to be expanded. Due to the potential for erosion during grading and construction, the houses close to Kamaka'ipo Gulch should be moved further away from the gulch.

• Monk Seals
Provide education and enforce laws protecting monk seals

• Community-Based Subsistence Fishing Management Area
It is a good idea to establish the community-based subsistence fishing management area that was demonstrated in a pilot project at Mo'omomi. Should also coordinate efforts with the communities of Miloli'i, Hawai'i and Ha'ena, Kaua'i who are also establishing community-based fishing zones. Also respect the Kalaupapa people and their grounds. The rights of the Kalapana people to fish in the Volcano National Park is another model.

• Restock moi
The Land Trust should use some of the money to restock moi if they diminish. Restocking should be part of the management plan.
10.4 Conclusion

The overall Community-Based Master Land Use Plan for Moloka‘i Ranch is not a perfect plan because it requires the development of the relatively pristine south and west shorelines of Moloka‘i adjacent to La‘au Point. Nevertheless, it is truly a grassroots community plan which represents a historic good faith effort on the part of Moloka‘i Properties Limited and Ke Aupuni Lokahi-Moloka‘i Enterprise Community to create sustainable economic solutions that will protect the cultural integrity of a unique Hawaiian island community. This monumental effort deserves serious reflection, deliberation and endorsement.

Ke Aupuni Lokahi-Moloka‘i Enterprise Community is the steward of a plan that was designed by a broad cross section of the Moloka‘i community. From May through September 1998, a planning group of the Moloka‘i community formed seven subcommittees on Health, Education, the Environment, the Economy, Recreation, Youth and Leadership, and Culture to develop a comprehensive grant proposal to the U.S. Department of Agriculture to receive designation as a Rural Economic Empowerment Zone. They sent out newsletters to every postal service customer on the island and held two well-attended community meetings to receive input on the grant proposal. The final proposal contained a statement of the community’s vision for Moloka‘i; a description of strengths and weaknesses in the island’s economy and natural environment and a strategy for sustainable community economic development. Although the Moloka‘i community was not designated as an Empowerment Zone, they succeeded in attaining the status of a Rural Enterprise Community eligible to receive federal funds totaling $2.5 million over ten years in increments of $250,000 a year to attract additional funds that would launch sustainable economic development projects. The Community-Based Master Land Use Plan for Moloka‘i Ranch is Project #47 of the Ke Aupuni Lokahi-Moloka‘i Enterprise Community.

Ke Aupuni Lokahi-Moloka‘i Enterprise Community continues to be guided by its vision statement that also serves as the vision statement for the Community-Based Master Land Use Plan for Moloka‘i Ranch. It is as follows:

*Moloka‘i is the last Hawaiian island. We who live here choose not to be strangers in our own land. The values of aloha 'ailana and malama 'ailana (love and care for the land) guide our stewardship of Moloka‘i’s natural resources, which nourish our families both physically and spiritually. We live by our kupuna's (elders') historic legacy of pule o'o (powerful prayer). We honor our island's Hawaiian cultural heritage, no matter what our ethnicity, and that culture is practiced in our everyday lives. Our true wealth is measured by the extent of our generosity.*

*We envision strong 'ohana (families) who steadfastly preserve, protect and perpetuate these core Hawaiian values.*
We envision a wise and caring community that takes pride in its resourcefulness, self-sufficiency and resiliency, and is firmly in charge of Moloka'i's resources and destiny.

We envision a Moloka'i that leaves for its children a visible legacy: an island momona (abundant) with natural and cultural resources, people who kokua (help) and look after one another, and a community that strives to build an even better future on the pa'a (firm) foundation left to us by those whose iwi (bones) guard our land.

In the final analysis, the government agencies responsible for decisions about the future of the land and natural resources of Moloka'i must weigh the cultural impacts and benefits of the proposal to develop the west and south shorelines of the island of Moloka'i in consultation with the people of Moloka'i who depend upon these resources for subsistence, cultural and spiritual purposes. In particular, the kama'aina families who have lived in Maunaloa and the Kaluako'i ahupua'a for generations and the longtime employees of Moloka'i Ranch and their relatives have been the primary users of these resources and will be the most directly affected by the proposed development.

There is also the critical issue of Water. Is there enough water to provide for all of the island's major uses and yet allow this development to draw out 1,000,000 gpd of brackish water from Kakalahale? The Hawaiian homesteaders have a special claim and particular interest in this issue. MPL is actively working with all of the major managers and current users of the island's water resources to develop a solution.

There are clearly profound and unprecedented features in the overall Community-Based Master Land Use Plan for Moloka'i Ranch that will benefit future generations of the island as a whole. The gifting of fee title ownership of 26,200 acres to the Moloka'i Land Trust and dedication of 24,950 acres in conservation easements in perpetuity by Moloka'i Properties Limited (MPL) is clearly in the tradition of "Aloha Mai, Aloha Aku," "When aloha is given, aloha should be returned." Such an outstanding and magnanimous gesture deserves recognition as a model for offshore owners of Hawaiian lands on Moloka'i and other islands. Moreover, it is not just the quantity, but the quality of the lands that are being turned over that is significant. The ancient burial grounds of Kawa'aloa, the birthplace of the hula at Ka'ana and the Hula Piko at Maunaloa, the Makahiki grounds of Na'iwa, the fishing village of Kawakiu, the fishing grounds of Halena and Mokio are premier Native Hawaiian legacy lands of great significance to Native Hawaiians throughout the islands.

As with any groundbreaking work that is seeking to create innovative solutions to time worn problems, this plan takes risks. While the plan protects significant subsistence resources on the northeast shoreline of Moloka'i from Kalaupapa to 'Ilio Point and around to Kepuhi from development, the southwest shoreline from Kaupoa to Hale O Lono will be ringed by luxury residential homes. Extraordinary measures are incorporated into the plan to buffer and protect the subsistence and cultural resources from the negative impacts that such a development can generate.
These include:

- Upholding and assuring Native Hawaiian rights of access for cultural, subsistence and spiritual purposes.

- Creating sizeable conservation zones and buffer areas to protect the cultural sites and shoreline area.

- Ending commercial hunting so that Moloka'i kama'aina can legally engage in subsistence hunting on Ranch lands.

- Hiring two community cultural and natural resource managers who will work with the community to monitor every phase of the project, from clearing and grading, to construction and the moving in and residence of new homeowners.

- Orienting homeowners to appreciate and support the unique and special way of life on Moloka'i as the "Last Hawaiian Island."

- Limiting shoreline access to a foot trail.

Are these measures provided within the Community-Based Master Land Use Plan sufficient to protect these resources for future generations? The kupuna advise us that after all is said and done, it is La'au itself that will determine what will be acceptable and who will be accepted.
Section 11. References


Cartwright, Bruce. (1927-1928). *Place Names of Moloka‘i & Maps*. (Ms.)


La‘au Point Cultural Impact Assessment / 157


Emerson, J.S. Kālai Pahoa Tree of Moloka‘i, in Hawaiian Ethnological Notes, vol. II, pp. 111-113. (Ms.)


Hommon, R. J. (1972). A walk-through archaeological survey of the proposed HC&D Quarry at Haleolono, Moloka‘i. Department of Anthropology, University of Hawai‘i, Honolulu: HC&D Ltd.


La‘au Point Cultural Impact Assessment / 158


La‘au Point Cultural Impact Assessment / 159


Thompson, B. (1977). *Ancient chants and dances from the island of Molokai [videorecording]*. Pearl City, Hawaii: Leeward Community College.


Appendix N
Traffic Impact Assessment Report
June 26, 2007

Molokai Properties, Limited
Amfac Center, Hawaii Tower
745 Fort Street, Suite 600
Honolulu, Hawaii 96813

Attention: Mr. Dan Orodenker

Re: Traffic Impact Assessment Report
La’au Point Subdivision
Molokai, Hawaii

Dear Mr. Orodenker:

Phillip Rowell and Associates are pleased to submit this Traffic Impact Assessment Report (TIAR) for the proposed La’au Point Subdivision. The report is presented in the following format:

A. Project Location and Description
B. Purpose and Objective of Study
C. Methodology
D. Description of Existing Streets and Intersection Controls
E. Existing Peak Hour Traffic Volumes
F. Level-of-Service Concept
G. Existing Levels-of-Service
H. 2023 Background Traffic Projections
I. Project Trip Generation
J. Traffic Assessment of Future Conditions
K. Summary and Conclusions

A. Project Description

The proposed project is located on the southwest area of the Island of Molokai. Based on the subdivision plan provided, the subdivision will consist of approximately 200 lots. See Attachment A and Attachment B. It is our understanding that these lots will be for single-family units that will be either recreational, retirement or second homes.

In addition to the single-family dwelling units shown on the subdivision plan, there is a small public park on the western edge of the project with six parking spaces and the Kaupoa Beach Camp with 40 camp sites immediately north of the project boundary.

Access to the subdivision will be via Kaluakoi Road, referred to as “Access Road” on the map. Kaluakoi Road will connect the proposed project with Maunaloa Highway (SR 460). There are additional minor roads in the area but these are unpaved and it was assumed that these roadways will not be used by traffic to and from the subdivision. It was assumed that project traffic will use the paved roadways only.
B. Purpose and Objectives of Study

The objectives of this study are:

1. Estimate the amount of traffic that the proposed subdivision will generate.

2. Assess traffic levels-of-service along the roadway providing access to and egress from the project.

3. Assess the operating conditions of the intersections within the subdivision.

4. If required, identify and evaluate traffic related improvements required to provide adequate access to and egress from the proposed project at an acceptable level-of-service.

C. Methodology

1. Define the Study Area

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. It was estimated that the project will generate a maximum of 125 trips during the morning peak hour and a maximum of 140 trips during the afternoon peak hour. The study area is limited to the major intersections that project trips will use to access the main highway, Maunaloa Highway (SR 460) at Kaluakoi Road and the intersections within the project boundary (See Attachment B).

2. Analyze Existing Traffic Conditions.

Existing traffic volumes at the study intersections were obtained from traffic counts completed Monday, August 28, 2006. The traffic volumes obtained from the traffic counts were validated by comparing the approach volumes to the most recent traffic count data available from State of Hawaii Department of Transportation.

The intersection configurations and right-of-way controls were verified at the time of the surveys. Existing traffic operating conditions were assessed using the methodology described in the 2000 Highway Capacity Manual (HCM)\(^1\).

3. Estimate Horizon Year Background Traffic Projections

Background traffic conditions are defined as future traffic conditions without the proposed project and were estimated by superimposing background growth and traffic generated by related projects in the vicinity onto existing traffic volumes.

The year 2023 was used as the horizon year. This does not necessarily represent the project completion date. It represents a date for which future background traffic projections were estimated. The year 2023 is also consistent with recent direction from the Maui County Department of Public Works and Environmental Management and the Environmental Impact Statement.

4. **Estimate Project-Related Traffic Characteristics**

The number of peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*\(^2\) and data provided in *Trip Generation*\(^3\). These trips were distributed and assigned based on the available approach and departure routes and existing approach and departure patterns as determined from the traffic counts.

5. **Analyze Project Related Traffic Impacts**

The project-related traffic was superimposed on 2023 background traffic volumes at the study intersections. The traffic impacts of the project were assessed by estimating the future levels-of-service at the study intersections. The purpose of this analysis was to identify potential operational deficiencies within the project, along the approach and departure roads and at the intersection of Kaluakoi Road at Maunaloa Highway (SR 460).

D. **Description of Existing Streets and Intersection Controls**

The only existing intersection is the intersection of Maunaloa Highway at Kaluakoi Road. A schematic diagram indicating the existing lane configuration and right-of-way control at this intersection is presented as Attachment C.

Maunaloa Highway and Kaluakoi Road are both two-lane, two-way roadways. Maunaloa Highway has an east-west orientation and Kaluakoi Road has a north-south orientation. The intersection of these two roads is an unsignalized, T-intersection. All approaches are one-lane. There are no separate turn lanes along any approach.

E. **Existing Peak Hour Traffic Volumes**

The existing traffic volumes are based on traffic counts completed Monday, August 28, 2006. The morning and afternoon peak hour traffic volumes are also summarized on Attachment C.

1. The traffic counts include buses, trucks and other large vehicles. Mopeds and bicycles were not counted.

2. The intersection was counted from 6:30 AM to 8:30 AM and from 2:30 PM to 5:00 PM on a weekday. These hours were determined from SDOT traffic count data for this specific intersection.

3. The traffic volumes shown are the peak hourly volume of each movement rather than the peak sum of all approach volumes.

4. All volumes are rounded to nearest five (5).

5. Pedestrian activity was negligible.


\(^3\) Institute of Transportation Engineers, *Trip Generation*, Washington, D.C., 2003
F. Level-of-Service Concept

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 1. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions.

<table>
<thead>
<tr>
<th>Level-of-Service</th>
<th>Expected Delay to Minor Street Traffic</th>
<th>Delay (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Little or no delay</td>
<td>&lt;10.0</td>
</tr>
<tr>
<td>B</td>
<td>Short traffic delays</td>
<td>10.1 to 15.0</td>
</tr>
<tr>
<td>C</td>
<td>Average traffic delays</td>
<td>15.1 to 25.0</td>
</tr>
<tr>
<td>D</td>
<td>Long traffic delays</td>
<td>25.1 to 35.0</td>
</tr>
<tr>
<td>E</td>
<td>Very long traffic delays</td>
<td>35.1 to 50.0</td>
</tr>
<tr>
<td>F</td>
<td>See note (2) below</td>
<td>&gt;50.1</td>
</tr>
</tbody>
</table>

Notes:
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

G. Existing Levels-of-Service

The existing levels-of-service were assessed using the methodology described in the Highway Capacity Manual. The results of the level-of-service analysis of existing conditions are summarized in Table 2.

<table>
<thead>
<tr>
<th>Intersection and Movement</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay 1</td>
<td>LOS 2</td>
</tr>
<tr>
<td>Maunaloa Highway at Kaluakoi Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound Left &amp; Thru</td>
<td>7.3</td>
<td>A</td>
</tr>
<tr>
<td>Southbound Left &amp; Right</td>
<td>9.2</td>
<td>A</td>
</tr>
</tbody>
</table>

NOTES:
(1) Delay in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual. Level-of-Service is based on delay.

The conclusion of the level-of-service analysis is that traffic currently operates at acceptable conditions at the study intersections as all movements operate at Level-of-Service A. Traffic along Maunaloa Highway operates at Level-of-Service A which implies that traffic turning from Maunaloa Highway onto Kaluakoi Road and traffic turning onto Maunaloa Highway has a negligible impact on traffic operations along Maunaloa Highway.
H. 2023 Background Traffic Projections

2023 background traffic projections are defined as future background traffic conditions without the proposed project. Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This growth factor also accounts for smaller development projects in the area for which a traffic impact study is not available or are not identified as a related project during the data collection process. The second component is estimated traffic that will be generated by other development projects (related projects) in the vicinity of the proposed project.

Background Traffic Growth

The background growth rate is typically determined from historical traffic data obtained from SDOT or from data contained in a long-range land transportation plan. For this study, the most current data available is the SDOT data. Therefore, the data provided in the SDOT data was used to estimate the background growth rate. Historical traffic counts at the intersection of Maunaloa Highway at Kaluakoi Road indicate that the approach volumes decreased from 1993 to 2003. Therefore, we assumed that there would be no additional traffic as a result of ambient background growth between 2006 and 2023.

The decrease in approach volumes at the intersection of Kaluakoi Road at Maunaloa Highway may be explained by the closure of part of the Kaluakoi Resort. As explained in the following section, this has been accounted for by including as estimate of the total traffic generated by the resort when fully developed and in full operation.

Related Projects

The second component in estimating background traffic projections is traffic generated by other proposed projects in the vicinity. Based on discussions with Molokai Properties, it was determined that all the undeveloped property between the north project boundary and Maunaloa Highway is controlled by Molokai Properties. The only development project between the proposed project and Maunaloa Highway is the remainder of Kaluakoi Resort.

The remainder of the Kaluakoi Resort to be developed will consist of 238 Ag lots, 15 single-family lots and 348 condominium units. Trip generation data for single-family residential units was used to estimate the trips generated by the agricultural lots. Trip generation data for condominiums was used to estimate the trips generated by the condominiums.

The existing 152 room hotel will re-open. Trip generation data for resort hotels was used to estimate the trips generated by these hotel rooms.

A trip generation analysis for the Kaluakoi Resort was performed and the traffic assigned to the intersection of Maunaloa Highway at Kaluakoi Road. It was assumed that 85% of the peak hour traffic would enter and exit the study area via this intersection. The remaining 15% was assumed to operate between the resort and La’au Point. The turning movements then were estimated using the distribution calculated from the turning volumes obtained from the August 2006 counts.

I. Project Trip Generation

Traffic volumes generated by the project were estimated using the methodology described in the Trip Generation Handbook4 and data contained in Trip Generation.5 This methodology typically uses trip generation rates and equations provided in Trip Generation to estimate the number of trips that the proposed


project will generate during the weekday peak hours. There are three components of the project considered in the trip generation analysis.

*Single-Family*

Based on the project description provided, the proposed single-family units would be recreational or second homes. Use of trip generation rates for single-family housing units will result of an overestimate of the number of trips into and out of the project because the data represents a typical suburban subdivision with residents that commute to and from work during the weekday peak hours. As the units in this subdivision will be recreational or second homes, there will be no commute trips.

It was decided that a trip generation study should be performed to establish trip generation rates for the specific development proposed. This procedure is consistent with the procedures described by the Institute of Transportation Engineers in the *Trip Generation Handbook*.

The first step was to identify a comparable development and perform counts of the number of trips into and out of the development. Based on the project description of the proposed project and consultation with the developer, the most comparable development for which traffic generation counts could be performed accurately is the Kahana Ridge development in West Maui. Accordingly, counts were performed along and access and egress routes to and from the project on four weekdays (one Tuesday, one Thursday and two Fridays) during October 2006 and averaged. The number of inbound and outbound trips and the inbound/outbound distribution was then calculated. The results are summarized in Table 3 and compared to the rates provided in *Trip Generation*.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Comparison of Trip Generation Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Period</td>
<td>Direction</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>Total</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>In</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>Out</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Total</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>In</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Out</td>
</tr>
</tbody>
</table>

NOTES:

The trip generation rates for single-family housing are based on the number of dwelling units, which is 200 units per the subdivision plan provided. The trip generation calculations are summarized in Table 4.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Trip Generation Calculations for Single-Family Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Period</td>
<td>Direction</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>Total</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>In</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>Out</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Total</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>In</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Out</td>
</tr>
</tbody>
</table>

NOTES:
(2) All numbers rounded to nearest five (5).
Public Parks

In addition to the single-family housing units, there is one public park within the subdivision. This park will have six parking stalls. The subdivision plan indicates that the total area of the park will be 8 acres. The trip generation data for parks provided in *Trip Generation* indicates that county parks will generate 0.01 and 0.06 trips per acre\(^6\) during the morning and afternoon peak hours, respectively. This translates into less than one trip per hour. Because this is such a small number and a majority of the trips will have origins within the subdivision, trips generated by the park were considered negligible.

Kaupoa Beach Park

Kaupoa Beach Park is located along the north boundary of the project between the ocean and Kaluakoi Road. The camp consists of approximately 40 platforms, or campsites.

Trip generation rates for campground/RV parks were used to estimated the trip generated by the Camp. These rates are based on the number of campsites or pads. The trip generation analysis is summarized in Table 5.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Direction</th>
<th>Rate or %(^{(1)})</th>
<th>Campsites</th>
<th>Trips (^{(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak Hour</td>
<td>Total</td>
<td>0.22</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>In</td>
<td>42%</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Out</td>
<td>58%</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Total</td>
<td>0.41</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>In</td>
<td>62%</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Out</td>
<td>38%</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

NOTES:
(2) All numbers rounded to nearest five (5).

Summary

The total trips generated by the single-family units and Kaupoa Beach Camp are summarized in Table 6.

<table>
<thead>
<tr>
<th>Period &amp; Direction</th>
<th>Single-Family Trips</th>
<th>Kaupoa Beach Camp Trips</th>
<th>Totals (^{(1)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak Hour</td>
<td>Total</td>
<td>125</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Inbound</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Outbound</td>
<td>90</td>
<td>5</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>Total</td>
<td>140</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Inbound</td>
<td>85</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Outbound</td>
<td>55</td>
<td>5</td>
</tr>
</tbody>
</table>

Note:
(1) All numbers rounded to nearest five (5)

\(^6\) Ibid, pages 635 & 636
The project will generate 40 inbound trips and 95 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 95 inbound trips and 60 outbound trips.

The project generated trips were distributed and assigned to the proposed street network based on the available approach and departure routes. The trips were distributed as if the residents commute to and from the project during the peak hours. This results are conservative traffic projections as the residents within the project will not be commuters as discussed in the project description. Also, there is no major employment or shopping center that would attract commuter type trips from the subdivision.

The morning and afternoon peak hour traffic volumes along the study streets are shown schematically in Attachment D and Attachment E, respectively.

J. Traffic Assessment of Future Conditions

A level-of-service analysis was performed to identify traffic operating conditions at the proposed intersections within the subdivision. The Level-of-Service analysis was performed using the following assumptions:

1. All intersections will be unsignalized.
2. All intersection approaches will be one-lane. There will be no separate left turn or right turn lanes.

The results of the Level-of-Service analysis for future conditions are summarized graphically in Attachment F and Attachment G. Shown are the control delays and levels-of-service of all controlled movements. Controlled movements are those that must yield to other movements.

As shown, all controlled traffic movements within the project will operate at Level-of-Service A, which is the highest level-of-service. This means that all the intersections are expected to operate at a high level-of-service during the peak periods and that none of the intersections require widening to accommodate anticipated traffic volumes.

A level-of-service analysis was also performed for the roadway segment of Kaluakoi Road north of the project boundary. All project traffic is concentrated along this section of roadway. The conclusion of this level-of-service analysis is that the roadway segment will operate at Level-of-Service A or B.

Lastly, a level-of-service analysis was performed for the intersection of Maunaloa Highway at Kaluakoi Road. The results are summarized in Table 7. Traffic along Maunaloa Highway will operate at Level-of-Service A. Traffic along Kaluakoi Road will operate at Level-of-Service C. As the minimum acceptable Level-of-Service is D and the level-of-service analysis concluded that the lowest Level-of-Service will be C for 2023 background plus project conditions, no improvements are recommended.

<table>
<thead>
<tr>
<th>Intersection and Movement</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay 1</td>
<td>LOS 2</td>
</tr>
<tr>
<td>Maunaloa Highway at Kaluakoi Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound Left &amp; Thru</td>
<td>7.7</td>
<td>A</td>
</tr>
<tr>
<td>Southbound Left &amp; Right</td>
<td>15.8</td>
<td>C</td>
</tr>
</tbody>
</table>

NOTES:
(1) Delay in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual. Level-of-Service is based on delay.
K. Summary and Conclusions

The conclusions of the traffic impact assessment are:

1. The proposed project will consist of approximately 200 second home and recreational lots.

2. Based on trip generation data for a comparable development, the project will generate a maximum 125 trips during the morning peak hour and 140 trip during the afternoon peak hour.

3. Based on the findings of the level-of-service analysis, the intersections within the subdivision do not require widening for separate turn lanes or signalization to accommodate project generated traffic for single-family housing. It is anticipated that all intersections will operate at Level-of-Service A, which is the highest level-of-service.

4. Based on the findings of the level-of-service analysis for the intersection of Maunaloa Highway at Kaluakoi Road, which is the access and egress location for project traffic along Maunaloa Highway, the minimum Level-of-Service is C, which is above the minimum acceptable Level-of-Service D. Therefore, no improvements are recommended.

Respectfully submitted,

PHILLIP ROWELL AND ASSOCIATES

[Signature]

Phillip J. Rowell, P.E.
Principal
List of Attachments

A. Subdivision Plan
B. Study Area and Study Intersections
C. Existing Lane Configuration and Peak Hour Traffic Volumes for Maunaloa Highway at Kaluakoi Road
D. AM Peak Hour Traffic Projections
E. PM Peak Hour Traffic Projections
F. AM Peak Hour Levels-of-Service
G. PM Peak Hour Levels-of-Service
KALUAKOI ROAD AT MAUNALOA HIGHWAY

LA’AU SUBDIVISION

SOURCE OF MAP: USGS

Attachment B
STUDY AREA AND STUDY INTERSECTIONS
AM PEAK HOUR VOLUMES (6:30 AM to 7:30 AM)

PM PEAK HOUR VOLUMES (3:15 PM to 4:15 PM)

NOTES:
2. VOLUMES ARE ROUNDED TO NEAREST FIVE (5).

Attachment C
EXISTING LANE CONFIGURATION AND PEAK HOUR TRAFFIC VOLUMES FOR MAUNALOA HIGHWAY AT KALUAKOI ROAD
Attachment D
AM PEAK HOUR TRAFFIC PROJECTIONS

Intersection 1

Intersection 2

Intersection 3

Intersection 4

Intersection 5

Intersection 6

Intersection 7

Intersection 8

Intersection 9

Intersection 10

Intersection 11

Intersection 12

Intersection 13

NOMINAL NORTH

Intersection of Kaluakoi Road at Maunaloa Highway

Intersection of Kaluakoi Road at Maunaloa Highway
Attachment E
PM PEAK HOUR TRAFFIC PROJECTIONS

Intersection 1
Intersection 2
Intersection 3
Intersection 4
Intersection 5
Intersection 6
Intersection 7
Intersection 8
Intersection 9
Intersection 10
Intersection 11
Intersection 12

Intersection of Kaluakoi Road at Maunaloa Highway
NOMINAL NORTH
Attachment G
PM LEVEL-OF-SERVICE

Intersection 1: Nominal North Intersecti...
Appendix O

Noise Assessment Report
Environmental Noise Assessment Report
La’au Point
Molokai, Hawaii

September 2006

DLAA Project No. 05-80

Prepared for:
Molokai Properties Limited
Honolulu, Hawaii
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 EXECUTIVE SUMMARY</td>
<td>1</td>
</tr>
<tr>
<td>2.0 PROJECT DESCRIPTION</td>
<td>2</td>
</tr>
<tr>
<td>3.0 NOISE STANDARDS</td>
<td>2</td>
</tr>
<tr>
<td>3.1 State of Hawaii, Community Noise Control</td>
<td>2</td>
</tr>
<tr>
<td>3.2 Federal Aviation Administration (FAA)</td>
<td>2</td>
</tr>
<tr>
<td>3.3 State Department of Transportation (HDOT), Airports Division</td>
<td>2</td>
</tr>
<tr>
<td>3.4 U.S. Environmental Protection Agency (EPA)</td>
<td>3</td>
</tr>
<tr>
<td>3.5 U.S. Federal Highway Administration (FHWA)</td>
<td>3</td>
</tr>
<tr>
<td>3.6 Hawaii Department of Transportation (HDOT)</td>
<td>3</td>
</tr>
<tr>
<td>4.0 EXISTING ACOUSTICAL ENVIRONMENT</td>
<td>3</td>
</tr>
<tr>
<td>5.0 POTENTIAL NOISE IMPACTS DUE TO THE PROJECT</td>
<td>4</td>
</tr>
<tr>
<td>5.1 Project Construction Noise</td>
<td>4</td>
</tr>
<tr>
<td>5.2 Project Generated Noise</td>
<td>4</td>
</tr>
<tr>
<td>5.3 Projection of Vehicular Traffic Noise</td>
<td>4</td>
</tr>
<tr>
<td>5.4 Projection of Aircraft Noise</td>
<td>5</td>
</tr>
<tr>
<td>5.5 Compliance with EPA Noise Guidelines</td>
<td>5</td>
</tr>
<tr>
<td>6.0 NOISE IMPACT MITIGATION</td>
<td>5</td>
</tr>
<tr>
<td>6.1 Mitigation of Project Construction Noise</td>
<td>5</td>
</tr>
<tr>
<td>6.2 Mitigation of Project Generated Mechanical Noise</td>
<td>5</td>
</tr>
<tr>
<td>6.3 Mitigation of Vehicular Traffic Noise</td>
<td>5</td>
</tr>
<tr>
<td>6.4 Mitigation of Aircraft Noise</td>
<td>5</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>6</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1  Project Location.
Figure 2  Hawaii Maximum Permissible Sound Levels for Various Zoning Districts.
Figure 3  Federal Highways Administration Recommended Equivalent Hourly Sound Levels Based on Land Use.
Figure 4  Typical Sound Levels from Construction Equipment.

APPENDIX

Appendix A  Acoustic Terminology.
1.0 EXECUTIVE SUMMARY

1.1 La’au Point is located on the south western corner of Molokai, Hawaii. The development consists of 200 lots where one story, single family recreational homes are proposed for development. The project site is located in an undeveloped area with one unpaved roadway leading to the project site.

1.2 The dominant noise sources during the project construction phase will probably be earth moving equipment, such as bulldozers and diesel powered trucks. Noise from construction activities will occur on the project site. Noise from construction vehicles en route to the project site may impact existing homes located along Kaluakoi Road. However, construction equipment noise must comply with the State DOH noise regulations.

1.3 The existing acoustical environment was not measured. The proposed project site is located in an undeveloped area where sound levels are caused by the natural environment (i.e., wind, birds, and ocean) and are typical of a rural environment.

1.4 An extension of Kaluakoi Road is planned and will provide access to the proposed project site. In addition to the low traffic volume predicted for the future, vehicles will travel at speeds typical of a residential environment. Traffic noise levels are not expected to create a significant noise impact on the project or the surrounding areas.

1.5 Although aircraft may be heard at the proposed project area, it is expected to be well outside the 55 dBA (L_{dn}) noise contour.
2.0 PROJECT DESCRIPTION

La’au Point is located on the south western corner of Molokai, Hawaii as shown in Figure 1. The development consists of 200 lots where one story, single family recreational homes are proposed for development. The project site is located in an undeveloped area with only one unpaved roadway leading to the project site.

3.0 NOISE STANDARDS

Various local and federal agencies have established guidelines and standards for assessing environmental noise impacts and set noise limits as a function of land use. A brief description of common acoustic terminology used in these guidelines and standards is presented in Appendix A.

3.1 State of Hawaii, Community Noise Control

The State of Hawaii Community Noise Control Rule [Reference 1] defines three classes of zoning districts and specifies corresponding maximum permissible sound levels due to stationary noise sources such as air-conditioning units, exhaust systems, generators, compressors, pumps, etc. The Community Noise Control Rule does not specifically address most moving sources, such as vehicular traffic noise, air traffic noise, or rail traffic noise. However, the Community Noise Control Rule does include equipment related to agricultural, construction, and industrial activities, which may not be stationary.

These maximum permissible noise levels are enforced by the State Department of Health (DOH) for any location at or beyond the property line and shall not be exceeded for more than 10% of the time during any 20-minute period. The specified noise limits which apply are a function of the zoning and time of day as shown in Figure 2. With respect to mixed zoning districts, the rule specifies that the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level. In determining the maximum permissible sound level, the background noise level is taken into account by the DOH.

3.2 Federal Aviation Administration (FAA)

Airport noise and noise contour maps are not available for Molokai Airport. The FAA addresses guidelines for compatible land uses that surround airports [Reference 2]. Noise contour maps are expressed in terms of yearly day-night average sound levels, $L_{dn}$, due to aircraft operations. The FAA states that residences outside of the 65 $L_{dn}$ noise contour are compatible without restrictions.

3.3 State Department of Transportation (HDOT), Airports Division

The State of Hawaii, Department of Transportation, Airports Division [Reference 3] has adopted noise restrictions that are more strict than the FAA. In most cases, the DOT states maximum noise limits that are 5 dB lower than the FAA. For example, the DOT states that residences outside of the 60 $L_{dn}$ noise contour are compatible.
In addition to the land use guidelines, the State of Hawaii has adopted a buyer notification requirement for residential properties with noise exposure (L_{dn}) over 55 dB. This buyer notification requirement is intended to ensure that prospective buyers of properties near airports are aware of aircraft noise and potential annoyance due to aircraft noise in vicinity of that property.

3.4 **U.S. Environmental Protection Agency (EPA)**

The U.S. EPA has identified a range of yearly day-night equivalent sound levels, L_{dn}, sufficient to protect public health and welfare from the effects of environmental noise [Reference 4]. The EPA has established a goal to reduce exterior environmental noise to an L_{dn} not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an L_{dn} not exceeding 55 dBA. Additionally, the EPA states that these goals are not intended as regulations as it has no authority to regulate noise levels, but rather they are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.

3.5 **U.S. Federal Highway Administration (FHWA)**

Although only applicable to federally funded projects, the traffic noise design limits of the FHWA can serve as design goals for most projects. The FHWA defines four land use categories and assigns corresponding maximum hourly equivalent sound levels, L_{eq(h)}, for traffic noise exposure [Reference 5], which are listed in Figure 3. For example, Category B, defined as picnic and recreation areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals, has a corresponding maximum exterior L_{eq} of 67dBA and a maximum interior L_{eq} of 52 dBA. These limits are viewed as design goals, and all projects meeting these limits are deemed in conformance with FHWA noise standards.

3.6 **Hawaii Department of Transportation (HDOT)**

Although only applicable to government funded projects, the HDOT’s traffic noise policy can serve as a design goal for most projects. The HDOT has adopted FHWA’s design goals for traffic noise exposure in its noise analysis and abatement policy [Reference 6]. According to the policy, a traffic noise impact occurs when the predicted traffic noise levels “approach” or exceed FHWA’s design goals or when the predicted traffic noise levels “substantially exceed the existing noise levels.” The policy also states that “approach” means at least 1 dB less than FHWA’s design goals and “substantially exceed the existing noise levels” means an increase of at least 15 dB.

4.0 **EXISTING ACOUSTICAL ENVIRONMENT**

Sound level measurements were not taken to assess the existing acoustical environment at the proposed project site on Molokai. The site is located in an undeveloped area where sound levels are caused by the natural environment (i.e., wind, birds, and ocean), typical of a rural environment, and aircraft flyovers. Currently, an unpaved road is the only access to the project site entrance, and access is limited to off-road vehicles. Aircraft are
routed over the northern portion of the project area to the Molokai airport, located approximately 15 miles to the east. Aircraft are clearly audible when they fly over the project site. However, flyovers occur infrequently and only during the daytime hours. It is not expected that these flyovers create an $L_{dn}$ greater than 55 dBA.

5.0 POTENTIAL NOISE IMPACTS DUE TO THE PROJECT

5.1 Project Construction Noise

Development of project areas will involve excavation, grading, and other typical construction activities during construction. The various construction phases of the project may generate significant amounts of noise. The actual noise levels produced during construction will be a function of the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 5. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction, assuming that pile driving will not be required. As the proposed project site is in an undeveloped area and the nearest residential property is more than a mile away, there will be no noise impact due to construction generated noise in the vicinity of the project site. However, a noise impact is expected for residences located along the Kolua Koi Road to the north of the proposed development due to the large trucks en route to the project site.

5.2 Project Generated Noise

The new homes may incorporate stationary mechanical equipment that is typical for residential housing. Expected mechanical equipment may include air handling equipment, condensing units, etc. Noise from this mechanical equipment and other equipment must meet the State DOH noise rules, which stipulate maximum permissible noise limits at the property line. These noise limits are 55 dBA during the daytime hours (7:00 am to 10:00 pm) and 45 dBA during the night time hours (10:00 pm to 7:00 am) for single-family housing.

5.3 Projection of Vehicular Traffic Noise

An extension of Kaluakoi Road is planned and will provide access to the proposed project site. Future residents of La’au Point will drive through an existing residential area, located approximately one mile to the north, in order to access the subdivision. Vehicles are expected to travel at speeds typical of a residential environment. The future traffic volume projections provided by Phillip Rowell and Associates [Reference 7] are based on typical single family housing units and may be an overestimate of actual traffic volumes due to the recreational or second home nature of the La’au Point subdivision. Based on the nature of the project, we do not expect a significant traffic noise increase in the existing residential area due to the project. Furthermore, traffic noise levels are expected to be below the FHWA/HDOT maximum noise limit of 67 dBA for the properties at the proposed La’au Point development. Thus, a significant noise impact due to vehicular traffic noise on the project and the surrounding area is not expected.
5.4 **Projection of Aircraft Noise**
Currently, there are approximately 20 flights per day to/from the Molokai Airport. Flights are usually routed over the northern portion of the project area, located approximately 15 miles from the airport. The aircraft are primarily propeller driven. Day-Night Noise Level ($L_{dn}$) contours for the Molokai airport are not available from the HDOT Airports Division. Noise contours greater than 55 dBA for airports similar in size are generally located within a couple of miles from the airport. Although aircraft will be heard at the proposed project area, it is expected to be well outside the 55 dBA ($L_{dn}$) noise contour and a significant noise impact is not expected.

5.5 **Compliance with EPA Noise Guidelines**
The noise levels at the proposed La’au Point Development are expected to satisfy the EPA existing design goal of $L_{dn} \leq 65$ dBA and a future design goal $L_{dn} \leq 55$ dBA for exterior noise levels. It is important to note that EPA noise guidelines are design goals and not enforceable regulations. However, these guidelines and design goals are useful tools for assessing the noise environment.

6.0 **NOISE IMPACT MITIGATION**

6.1 **Mitigation of Project Construction Noise**
Project construction noise will be intermittent and short term. Construction vehicle noise will be the main noise source. Construction vehicles should all be equipped with mufflers and should be limited to use during the daytime hours. Construction equipment noise must comply with the State of Hawaii *Community Noise Control* noise regulations [Reference 1].

6.2 **Mitigation of Project Generated Mechanical Noise**
The design of the new La’au Point development should give consideration to controlling the noise emanating from stationary mechanical equipment, such as chillers, compressors, air conditioning units, etc. so as to comply with the State of Hawaii *Community Noise Control* rules [Reference 1]. Noisy equipment should be located away from neighbors and residential units, as much as is practical. Enclosed mechanical rooms may be required for some equipment.

6.3 **Mitigation of Vehicular Traffic Noise**
There is expected to be no significant noise impacts due to traffic on the proposed project or the surrounding area. Therefore, noise mitigation for vehicular traffic noise should not be required.

6.4 **Mitigation of Aircraft Noise**
The proposed project area is expected to be well outside the 55 dBA ($L_{dn}$) noise contour. Therefore, a disclosure statement to potential home buyers should not be required for the La’au Point development.
REFERENCES


<table>
<thead>
<tr>
<th>Zoning District</th>
<th>Day Hours</th>
<th>Night Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLASS A</strong> Residential, Conservation, Preservation, Public Space, Open Space</td>
<td>55 dBA (Exterior)</td>
<td>45 dBA (Exterior)</td>
</tr>
<tr>
<td><strong>CLASS B</strong> Multi-Family Dwellings, Apartments, Business, Commercial, Hotel, Resort</td>
<td>60 dBA (Exterior)</td>
<td>50 dBA (Exterior)</td>
</tr>
<tr>
<td><strong>CLASS C</strong> Agriculture, Country, Industrial</td>
<td>70 dBA (Exterior)</td>
<td>70 dBA (Exterior)</td>
</tr>
</tbody>
</table>

---

**Exterior Noise Limits**

- **70 dBA Day & Night**: **CLASS C** (Agriculture, Country, Industrial)
- **60 dBA Day**: **CLASS B** (Multi-Family Dwellings, Apartments, Business, Commercial, Hotel, Resort)
- **55 dBA Day**: **CLASS A** (Residential, Conservation, Preservation, Public Space, Open Space)
- **50 dBA Night**: **CLASS B** (Multi-Family Dwellings, Apartments, Business, Commercial, Hotel, Resort)
- **45 dBA Night**: **CLASS A** (Residential, Conservation, Preservation, Public Space, Open Space)

---

**Hawaii Maximum Permissible Sound Levels for Various Zoning Districts**

La'au Point, Molokai

<table>
<thead>
<tr>
<th>Date</th>
<th>Project No.</th>
<th>Drawn By</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2006</td>
<td>05-80</td>
<td>TRB</td>
</tr>
<tr>
<td>ACTIVITY CATEGORY</td>
<td>ACTIVITY CATEGORY DESCRIPTION</td>
<td>MAXIMUM EQUIVALENT SOUND LEVEL L_{eq(h)}</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>A</td>
<td>LANDS ON WHICH SERENITY AND QUIET ARE OF EXTRAORDINARY SIGNIFICANCE AND SERVE AN IMPORTANT PUBLIC NEED AND WHERE THE PRESERVATION OF THOSE QUALITIES IS ESSENTIAL IF THE AREA IS TO CONTINUE TO SERVE ITS INTENDED PURPOSE.</td>
<td>57 dBA (EXTERIOR)</td>
</tr>
<tr>
<td>B</td>
<td>PICNIC AREAS, RECREATION AREAS, PLAYGROUNDS, ACTIVE SPORT AREAS, PARKS, RESIDENCES, MOTELS, HOTELS, SCHOOLS, CHURCHES, LIBRARIES, AND HOSPITALS.</td>
<td>67 dBA (EXTERIOR)</td>
</tr>
<tr>
<td>C</td>
<td>DEVELOPED LANDS, PROPERTIES, OR ACTIVITIES NOT INCLUDED IN ACTIVITY CATEGORIES A OR B ABOVE.</td>
<td>72 dBA (EXTERIOR)</td>
</tr>
<tr>
<td>D</td>
<td>UNDEVELOPED LAND</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>RESIDENCES, MOTELS, HOTELS, PUBLIC MEETING ROOMS, SCHOOLS, CHURCHES, LIBRARIES, HOSPITALS, AND AUDITORIUMS.</td>
<td>52 dBA (INTERIOR)</td>
</tr>
</tbody>
</table>

Federal Highways Administration Recommended Equivalent Hourly Sound Levels Based on Land Use

La'au Point, Molokai

Date: September 2006  
Project No.: 05-80  
Drawn By: TRB

Figure No: 3
<table>
<thead>
<tr>
<th>Noise Level (dBA)</th>
<th>COMPACTORS (ROLLERS)</th>
<th>FRONT LOADERS</th>
<th>BACKHOES</th>
<th>TRACTORS</th>
<th>SCRAPERS GRADERS</th>
<th>PAVERS</th>
<th>TRUCKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Earth Moving**

**Material Handling**

- CONCRETE MIXERS
- CONCRETE PUMPS
- CRANES (MOVABLE)
- CRANES (DERRICK)

**Stationary**

- PUMPS
- GENERATORS
- COMPRESSORS

**Impact Equipment**

- PNEUMATIC WRENCHES
- JACK HAMMERS AND ROCK DRILLS
- PILE DRIVERS (PEAKS)

**Other**

- VIBRATORS
- SAWS

**Note:** Based on limited available data samples.
Acoustic Terminology

Sound Pressure Level
Sound, or noise, is the term given to variations in air pressure that are capable of being detected by the human ear. Small fluctuations in atmospheric pressure (sound pressure) constitute the physical property measured with a sound pressure level meter. Because the human ear can detect variations in atmospheric pressure over such a large range of magnitudes, sound pressure is expressed on a logarithmic scale in units called decibels (dB). Noise is defined as "unwanted" sound.

Technically, sound pressure level (SPL) is defined as:

\[ \text{SPL} = 20 \log \left( \frac{P}{P_{\text{ref}}} \right) \text{ dB} \]

where \( P \) is the sound pressure fluctuation (above or below atmospheric pressure) and \( P_{\text{ref}} \) is the reference pressure, 20 µPa, which is approximately the lowest sound pressure that can be detected by the human ear. For example:

- If \( P = 20 \) µPa, then \( \text{SPL} = 0 \) dB
- If \( P = 200 \) µPa, then \( \text{SPL} = 20 \) dB
- If \( P = 2000 \) µPa, then \( \text{SPL} = 40 \) dB

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound sources, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined sound level of 53 dB, not 100 dB. Two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 6 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level
Studies have shown conclusively that at equal sound pressure levels, people are generally more sensitive to certain higher frequency sounds (such as made by speech, horns, and whistles) than most lower frequency sounds (such as made by motors and engines)\(^1\) at the same level. To address this preferential response to frequency, the A-weighted scale was developed. The A-weighted scale adjusts the sound level in each frequency band in much the same manner that the

human auditory system does. Thus the A-weighted sound level (read as "dBA") becomes a single number that defines the level of a sound and has some correlation with the sensitivity of the human ear to that sound. Different sounds with the same A-weighted sound level are perceived as being equally loud. The A-weighted noise level is commonly used today in environmental noise analysis and in noise regulations. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

Figure A-1. Common Outdoor/Indoor Sound Levels
Equivalent Sound Level
The Equivalent Sound Level ($L_{eq}$) is a type of average which represents the steady level that, integrated over a time period, would produce the same energy as the actual signal. The actual instantaneous noise levels typically fluctuate above and below the measured $L_{eq}$ during the measurement period. The A-weighted $L_{eq}$ is a common index for measuring environmental noise. A graphical description of the equivalent sound level is shown in Figure A-2.

![Figure A-2. Example Graph of Equivalent and Statistical Sound Levels](image)

Statistical Sound Level
The sound levels of long-term noise producing activities such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels has been developed. It is known as the Exceedence Level, $L_n$. The $L_n$ represents the sound level that is exceeded for n% of the measurement time period. For example, $L_{10} = 60$ dBA indicates that for the duration of the measurement period, the sound level exceeded 60 dBA 10% of the time. Typically, in noise regulations and standards, the specified time period is one hour. Commonly used Exceedence Levels include $L_{01}$, $L_{10}$, $L_{50}$, and $L_{90}$, which are widely used to assess community and environmental noise. A graphical description of the equivalent sound level is shown in Figure A-2.

Day-Night Equivalent Sound Level
The Day-Night Equivalent Sound Level, $L_{dn}$, is the Equivalent Sound Level, $L_{eq}$, measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 p.m. and 7 a.m. to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The $L_{dn}$ is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations.
Appendix P

Air Quality Impact Assessment
June 6, 2006

Mr. Harold Edwards
Molokai Properties, Limited
Amfac Center, Hawaii Tower
745 Fort Street, Suite 600
Honolulu, Hawaii 96813

Subject: La‘au Point Subdivision Project
Air Quality Impact Assessment

Dear Mr. Edwards:

In response to your request, we have examined the potential air quality impacts related to the proposed La‘au Point Subdivision Project located on Molokai. The results of this examination along with background information related to this issue and recommended mitigation measures are summarized below.

Project Description

Molokai Properties, Limited proposing to develop the La‘au Point Subdivision project on the island of Molokai. The project includes 1492 acres of land along the southwestern coast which will be subdivided into approximately 200 residential lots for single-family homes. It is expected that the homes will primarily be used for recreation and second residences with a 30 percent occupancy rate on an annual basis. Full project build out will likely occur over a 20-year period.

Ambient Air Quality Standards

Both federal and state standards have been established to maintain ambient air quality. At the present time, seven parameters are regulated including: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone and lead. Hawaii air quality standards are comparable to the national standards except those for nitrogen dioxide and carbon monoxide which are more stringent than the national standards.
Regional and Local Climatology

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the La’au Point area is very much affected by its near coastal situation and by nearby mountains. Winds are variable but are often trade winds from the north or northeast. Wind speeds typically vary between about 5 and 15 miles per hour. Temperatures in the La’au Point area are generally very consistent and moderate with an average daily temperature range of about 65°F to 85°F. Average annual rainfall in the area amounts to only about 15 inches.

Existing Air Quality Conditions

No ambient air quality data for the La’au Point area on Molokai has been reported by the state Department of Health. However, except for periodic impacts from distant volcanic emissions (vog), the present air quality of the La’au Point area is believed to be good.

Air Quality Impacts of Project

Short-term direct and indirect impacts on air quality could potentially occur during project construction. For a project of this nature, there are two potential types of air pollution emissions that could directly result in short-term air quality impacts during project construction: (1) fugitive dust from soil excavation and vehicle movement; and (2) exhaust emissions from on-site construction equipment. Indirectly, there also could be short-term air quality impacts from the disruption of traffic on nearby roadways, from slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers.

Fugitive dust emissions from construction activities are difficult to estimate accurately because of their elusive nature of emission and because the potential for dust generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The U.S. EPA has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium"
activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions from project construction would likely be somewhere near this level. In any case, State of Hawaii Air Pollution Control Regulations prohibit visible emissions of fugitive dust from construction activities at the property line. Thus, an effective dust control plan for the project construction phase should be prepared.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in active construction areas from becoming significant sources of dust. On days without rainfall, construction areas should be watered at least twice during the workday to help keep dust to a minimum. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials likely to give rise to airborne dust. Haul trucks tracking dirt onto paved streets from unpaved areas are oftentimes a significant source of dust in construction areas. Some means to alleviate this problem, such as tire washing or road cleaning, may be appropriate. Dust monitoring could be considered as a means to quantitatively evaluate the effectiveness of dust control measures.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Indirectly, slow-moving construction vehicles on roadways leading to and from the project site could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are increased. This impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, the schedules of commuting construction workers can be adjusted to avoid peak hours in the project vicinity.
After the period of construction, long-term impacts on air quality from motor vehicle exhausts can potentially occur at or near any project that attracts large volumes of motor vehicle traffic. Carbon monoxide emissions are usually the primary issue, and public areas near traffic-congested intersections are the main concern. Traffic associated with the proposed project will likely use Kalua Kei Road and several intersecting project access roads. The project traffic study indicates that with the project at full build-out peak-hour traffic approach volumes at these intersections will be less than about 200 vehicles per hour and that all intersections in the vicinity of the project will have very good level-of-service conditions.

Based on extensive experience in assessing traffic-related air quality impacts, traffic volume increases of less than about 5 percent or about 100 vehicles per hour and traffic approach volumes of less than about 1,000 vehicles per hour do not cause any significant impacts on air quality if adequate traffic level-of-service is provided. Considering the relatively small volumes of traffic that are expected and the very good level-of-service at nearby intersections that is forecast, traffic from the proposed project should have no significant long-term impacts on maximum air pollution levels in the project area. Although a detailed air quality modeling study could be performed to predict project impacts, such an analysis is probably unwarranted.

Depending on the demand levels, long-term impacts on air quality are also possible due to indirect emissions associated with a development's electrical power and solid waste disposal requirements. Electrical power will likely be provided by diesel-fired power plants operated by the electric utility, which would result in offsite emissions of particulate, sulfur dioxide, nitrogen oxides and other combustion byproducts. Solid waste will likely be landfilled, and any air pollution emissions would probably be limited mostly to fugitive dust. The project's electrical demand is expected to reach about 2 million kilowatt-hours per year, and the solid waste disposal demand is estimated to reach about 330 tons per year. Quantitative estimates of the potential air quality impacts were not made, but based on the estimated demand levels and the emission rates involved, any impacts will likely be negligible. Nevertheless, incorporating energy conservation design features and promoting conservation and recycling programs within the proposed development could serve to further reduce any associated impacts.
In summary, any long-term impacts on air quality from this project will likely be negligible. Short-term impacts from fugitive dust during project construction may occur, particularly due to the dry climate in the area. Because of this, an effective dust control plan should be prepared and implemented.

Please call me if you have any questions concerning the information presented herein or if you wish to discuss this matter further.

Very truly yours,

Barry D. Neal
Certified Consulting Meteorologist
Appendix Q

Economic & Fiscal Impacts;
Market Support for Real Estate Development
ECONOMIC AND FISCAL IMPACTS OF THE PROPOSED LA’AU POINT RESIDENCES ON MOLOKAI

Prepared for
Molokai Properties Limited

Prepared by
Knowledge Based Consulting Group

Revised December 2007
EXECUTIVE SUMMARY

Knowledge Based Consulting Group (KBCG) prepared the following fiscal impact analysis for the La’au Point development project located on the island of Molokai in the County of Maui, Hawaii.

PROJECT SITE

The La’au Point property is a proposed residential development within a 1,492-acre project area within the Molokai Ranch. The development program will be comprised of approximately 200 2-acre lots and associated infrastructure. As part of the overall program, an additional 18 acres will be dedicated as County parks, 130 acres will be in a land trust, 280 acres of land use buffer will be dedicated to the La’au Point homeowners association, and 450 acres will be under homeowner and land trust joint ownership. It is anticipated that the La’au Point property will be developed and built out over a 15-year timeframe and should commence development in 2009.

PRICING STRUCTURE

The La’au Point concept plan seeks to provide a mix of residential lots, which will include oceanfront home sites, ocean view homesites, and inland sites with more distant ocean views. The proposed prices for the lots range from $450,000 to $1,900,000 depending upon size of lot, view quality, and distance to the ocean.

ECONOMIC AND FISCAL IMPACTS

At final build out in 2025, approximately 174 permanent residents will reside in the La’au Point community. In addition, there will be a non-resident population of some 325 people who will occupy their residences during peak seasons. The annual average population at buildout is expected to be just over 230 persons. Expenditures by these new residents as well as maintenance, landscaping, security and other services required by the La’au Point community will support about 60 new local jobs. In addition, total development and residential construction costs are approximately $247 million, creating over 1,350 person-years of construction and related employment.

The County of Maui could receive surplus revenues of approximately $30.0 million over the development period (2009 to 2025), after receiving all revenues from property taxes and other sources (includes revenues from fuel taxes, utility taxes, license fees, permits, and state and federal grants) and incurring all expenses to serve the community.

The State of Hawaii could receive surplus revenues of $4.7 million over the development period from a combination of excise taxes, property transfer taxes, utility taxes, and income taxes on permanent residents. In addition to these on going revenues, there will be state taxes on construction materials and services. State revenues from excise taxes and income taxes on construction workers and businesses should amount to $17.7 million over the buildout period.

Finally, Molokai Properties Limited has agreed to allocate 5% of land sales to support the land trust. This commitment will provide just over $10.2 million for preservation and enhancement of the dedicated lands.
INTRODUCTION

This assessment has been prepared by Knowledge Based Consulting Group (KBCG) in response to the need to evaluate the impact on community services and facilities to the County of Maui and other service providers that would result from the development of the La’au Point project.

PROPOSED ACTION

Molokai Properties Limited proposes to develop 200 residential lots at La’au Point as part of an overall development and preservation plan for some 65,000 acres within the Molokai Ranch. The La’au Point site slopes from an elevation of sea level to 150 feet, providing good to excellent ocean and countryside views from nearly all development parcels.

The La’au Point development project is proposed for three general lot type areas:

A  West Facing Ocean Front Home Sites  40
B  South Facing Ocean Front Home Sites  58
C  Inland West Facing Ocean View Home Sites  28
D  Inland South Facing Ocean View Home Sites  74

Total Lots and Residences  200

Molokai Properties Limited would construct roadway improvements servicing the site, major electrical improvements, water and sewage treatment facilities, drainage, and other improvements. Total infrastructure investment is estimated at approximately $72 million.

A project description, along with development assumptions is provided in Table 1, and an illustrative development plan is shown below:
It is anticipated that the La’au Point lots will be developed and sold over a 5-year time frame. Construction of roads and infrastructure should commence in 2009 and lot sales will begin in 2010. Following initial lot sales, the first houses should be built around 2010 and residential construction should continue through at least 2025. This relatively slow build out of La’au Point residences should provide a steady source of construction employment for nearly the next 20 years.

Based on current housing trends and taking into account the CC&R’s of the La’au Point project which limit the overall residence size as well as allowable building envelopes within each lot, we
estimate that the average residence will be 3,500 square feet. At a current construction
allowance of $225 per square foot for a good quality residence, the average construction cost per
residence would be $787,500. Over the life of the project, total residential construction
investment will be approximately $158 million.

By applying the appropriate tax rates, the ensuing analysis develops estimates of real estate,
excise, and other tax revenues and fees to be received over time by the County of Maui and State
of Hawai‘i. Comparing these revenues to service costs then determines net impact.

At final build out in 2025, approximately 174 permanent residents will reside in the La‘au Point
community. In addition, there will be a non-resident population of some 325 people who will
occupy their residences on a seasonal basis. Expenditures by these new residents will support
about 49 local jobs and another 11 jobs will be created for maintenance, landscaping, security
and other services within the La‘au Point community.
FISCAL ANALYSIS

The program for real estate development at La’au Point is based on a phased infrastructure development and preservation plan for the La’au Point property as prepared by PBR Hawaii. The expected production schedule of lots is illustrated in Table 2, which shows the mix of product and absorption schedule by year. It is estimated that the lots will be sold over a five-year period at a rate of 35 to 50 per year, starting in 2009. The residential build out of these lots is projected to start in 2010 and continue at a rate of 10% per year such that full residential build out will not be completed until at least 2025.

Residential Sales and Build Out

The residential development program for La’au Point includes a mix of low density oceanfront and near ocean lots in a setting of unspoiled seclusion and natural beauty. It will be a unique product in the state and should attract buyers who appreciate privacy and the natural values of the land and Molokai community rather than the resort environment prevalent on the more developed islands. Based on market data from comparable non resort settings, the limited availability of low density oceanfront and near ocean property anywhere in the state, and the special conditions and requirements associated with ownership at La’au Point, KBCG anticipates annual demand for residential lots at La’au Point to range from 35 to 50 units a year.

We expect that the residential build out will stretch over at least ten years after the end of lot sales and that the community will be primarily be used for seasonal residences. In other communities with relatively expensive homes, we see that the average occupancy is relatively low. As shown below, less than 20% of the units are occupied full time and the average overall occupancy is less than 30%.

Resort Community Occupancy Patterns

<table>
<thead>
<tr>
<th>Days Occupied</th>
<th>Average Days</th>
<th>% of Households</th>
<th>Weighted Days</th>
<th>Seasonal Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td></td>
<td></td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Less than 60</td>
<td>40.2</td>
<td>35%</td>
<td>14.2</td>
<td>14.2</td>
</tr>
<tr>
<td>60 to 90</td>
<td>67.1</td>
<td>17%</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>90 to 120</td>
<td>93.3</td>
<td>11%</td>
<td>10.2</td>
<td>10.2</td>
</tr>
<tr>
<td>120 to 150</td>
<td>124.2</td>
<td>7%</td>
<td>9.1</td>
<td>9.1</td>
</tr>
<tr>
<td>150 to 180</td>
<td>157.6</td>
<td>12%</td>
<td>19.2</td>
<td>19.2</td>
</tr>
<tr>
<td>180 and over</td>
<td>250.9</td>
<td>17%</td>
<td>42.8</td>
<td></td>
</tr>
<tr>
<td>Average Days Occupied</td>
<td>107.1</td>
<td></td>
<td>64.2</td>
<td></td>
</tr>
<tr>
<td>Resident Occupancy Rate</td>
<td>29%</td>
<td></td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Rentals</td>
<td>0%</td>
<td></td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Total Occupancy Rate</td>
<td>29%</td>
<td></td>
<td>18%</td>
<td></td>
</tr>
</tbody>
</table>

Similar occupancy patterns should be observed at La’au Point. These low occupancy rates should serve to minimize the need for county services to residents and lessen any impacts of residential build out on the unspoiled and uncrowded character of the Molokai coast. At build out, we anticipate that permanent residents (persons staying at La’au Point 180 or more days per year) will occupy up to 60 of the homes (30%) and seasonal residents would occasionally occupy the remainder. Upon agreement with the community, the La’au Point CC&R’s will severely limit any rentals of the residences.
School Age Population

As the La’au Point project moves forward, it is appropriate to evaluate the impact of the project upon the Hawaii Department of Education (DOE) and determine how this might relate to the DOE "Fair Share" exaction for the project. We understand that the DOE has a formula, which calculates for each type of residential unit (SF, MF, etc.) the number of students expected. Then a dollar figure is applied per student. This exaction can range from $3,000 to $5,000 per unit. Considering the unique character of the La’au Point project and the expectation that seasonal residents and retirees will occupy a substantial share of the project, it is appropriate to examine the probable school age population to see if adjustments to the DOE formula may be justified.

The following factors should be considered:

- Only about 30% of La’au Point residents are expected to be permanent residents.
- La’au Point residents will be somewhat older than the general population.
- About 25% of permanent residents at La’au Point are expected to have children under 18 living at home. Another 10% will have family members over 18 living at home.
- The expected school age population of La’au Point permanent residents will probably include:
  - Less than 10 children ages 5 through 12
  - Less than 15 young adults ages 13 through 17
- The expected La’au Point population of school children is less than 25% of what would be expected on a pro rata basis.
- It is likely that some of the La’au Point residents will home school or send their children to private school off island.

Under these conditions, it would appear that a reduction in Department of Education impact fees would be appropriate and warranted.
MARKET AND ASSESSED VALUE
The proposed La’au Point development project is planned for 200 2-acre lots along the Molokai Coast. Approximately 98 of these lots will be front row (with no other private property between them and the coast), while the remaining 102 inland lots will be set further back. The average prices for the oceanfront lots will be about $1,750,000 for the west (sunset) facing home sites and $1,495,000 for the south facing sites, although there will be a relatively wide range in prices depending upon views and nearby oceanfront qualities. The more inland Ocean View Estates, still with expansive ocean views, will average around $470,000, but will vary in price from $425,000 to $800,000. This analysis assumes that the residential build out of the lots will be at the rate of 10% per year, starting two years after lot purchase. We have not applied an inflation factor or real estate appreciation rate to either lot prices or residential values, although both of these are likely and would add to Maui County tax revenues.

Residential Values
As shown in Table 3, residential market values for the project will be $34.9 million in the first year of lot sales (2008) and increase to $222.2 million when lot sales are completed and the first 22 homes have been built (2012). From that point on, the residential values increase by about $16 million per year as additional residences are constructed for both seasonal and permanent residents. Upon the eventual build out of all residences by the end of 2023, the residential market value will increase to $362 million.
IMPACT ON THE COUNTY OF MAUI

Table 4 illustrates the projected population for the La’au Point development project as well as estimates of tax revenues and Maui County expenses through 2023.

Population

Based upon the demographic patterns at other seasonal communities in Hawaii and what we have observed at Kaluakoi, we expect that most residents will be empty nesters and in pre retirement or retirement. The average number of persons per household at La’au Point is expected to be 2.9 as shown below:

<table>
<thead>
<tr>
<th>Household Size Distribution for La’au Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Size</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

Average family members per household 2.65

% with caretaker/caregiver 25%

Average persons per household 2.90

At the end of the lot sales period in 2012, there should be 12 new permanent residents in the La’au Point community. At final build out in 2023, approximately 174 permanent residents will reside in the La’au Point community at least 180 days per year. In addition, there will be a non-resident population that will occupy their residences on a seasonal basis. We anticipate that up to 80% of the seasonal residences may be occupied during peak seasons resulting in a maximum seasonal population of 325 part time residents. This leads to a peak population of permanent and seasonal residents of just under 500 persons and an average population of just over 230 persons.

County Tax Revenues

Below is a listing of tax rates that effect residents and commercial entities in Maui County.

<table>
<thead>
<tr>
<th>Maui Property Tax Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Residential</td>
</tr>
<tr>
<td>Apartment</td>
</tr>
<tr>
<td>Commercial</td>
</tr>
<tr>
<td>Industrial</td>
</tr>
<tr>
<td>Agricultural</td>
</tr>
<tr>
<td>Conservation</td>
</tr>
<tr>
<td>Hotel &amp; Resort</td>
</tr>
<tr>
<td>Unimproved Residential</td>
</tr>
<tr>
<td>Homeowner</td>
</tr>
<tr>
<td>Time Share</td>
</tr>
</tbody>
</table>
Unlike in Hawaii County, there is no differentiation in Maui County in the property tax rates applied to permanent and seasonal residents or to vacant land.

KBCG estimates that the County of Maui can expect to receive approximately $1.3 million in annual real estate tax revenues at the end of the lot sales period in 2012. These property tax revenues will increase at a rate of about $90,000 each year until they reach $2.1 million at residential build-out in 2023. In addition to real estate taxes, other County revenues are received in proportion to population and economic activity. These other revenues include fuel taxes, utility taxes, license fees, permits, and state and federal grants. After deducting for bond revenues, intergovernmental transfers, and transient occupancy tax, these other County revenue sources have historically represented 74% of property tax revenues. This ratio has been assumed to be constant in this model. It is estimated that the total annual tax revenue after residential build-out in 2023 will be $3.7 million, and that total taxes of $40.6 million will have been paid to that point.

County Expenditures

The County of Maui provides essential services to residents and businesses throughout the islands of Maui, Lanai, and Molokai. The overall budget for the County of Maui was $404.8 million for fiscal 2005, broken down as shown below:

<table>
<thead>
<tr>
<th>Function</th>
<th>2005 Estimate</th>
<th>2006 Budget</th>
<th>% of total</th>
<th>Increase (Decrease)</th>
<th>% Increase (% Decrease)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Improvement Projects</td>
<td>$ 64,198,120</td>
<td>$ 82,428,150</td>
<td>20.4%</td>
<td>$ 18,230,030</td>
<td>28.4%</td>
</tr>
<tr>
<td>Public Safety</td>
<td>$ 49,843,278</td>
<td>$ 56,376,512</td>
<td>13.9%</td>
<td>$ 6,533,234</td>
<td>13.1%</td>
</tr>
<tr>
<td>Solid Waste and Wastewater</td>
<td>$ 35,879,049</td>
<td>$ 40,831,028</td>
<td>10.1%</td>
<td>$ 4,951,979</td>
<td>13.8%</td>
</tr>
<tr>
<td>Finance, Countywide, Personnel, Legal</td>
<td>$ 18,700,179</td>
<td>$ 26,554,441</td>
<td>6.6%</td>
<td>$ 7,854,262</td>
<td>42.9%</td>
</tr>
<tr>
<td>Employee Benefits</td>
<td>$ 35,674,695</td>
<td>$ 42,306,400</td>
<td>10.5%</td>
<td>$ 6,631,705</td>
<td>18.6%</td>
</tr>
<tr>
<td>Bond Issuance/ Debt Service</td>
<td>$ 33,510,559</td>
<td>$ 34,917,309</td>
<td>8.6%</td>
<td>$ 1,406,750</td>
<td>4.2%</td>
</tr>
<tr>
<td>Parks and Recreation</td>
<td>$ 20,508,129</td>
<td>$ 22,265,799</td>
<td>5.5%</td>
<td>$ 1,757,670</td>
<td>8.6%</td>
</tr>
<tr>
<td>Highways</td>
<td>$ 11,554,655</td>
<td>$ 10,107,128</td>
<td>2.5%</td>
<td>($1,447,527)</td>
<td>-12.5%</td>
</tr>
<tr>
<td>Social Concerns</td>
<td>$ 13,208,956</td>
<td>$ 14,573,568</td>
<td>3.6%</td>
<td>$ 1,364,612</td>
<td>10.3%</td>
</tr>
<tr>
<td>Management</td>
<td>$ 10,605,771</td>
<td>$ 13,528,030</td>
<td>3.3%</td>
<td>$ 2,922,259</td>
<td>27.6%</td>
</tr>
<tr>
<td>Planning/ Community Development</td>
<td>$ 8,647,488</td>
<td>$ 10,653,819</td>
<td>3.6%</td>
<td>$ 2,006,331</td>
<td>23.2%</td>
</tr>
<tr>
<td>Legislative</td>
<td>$ 4,875,268</td>
<td>$ 5,145,689</td>
<td>3.3%</td>
<td>$ 270,421</td>
<td>5.5%</td>
</tr>
<tr>
<td>Transportation</td>
<td>$ 5,703,227</td>
<td>$ 12,463,498</td>
<td>3.1%</td>
<td>$ 6,760,271</td>
<td>118.5%</td>
</tr>
<tr>
<td>Water</td>
<td>$ 31,149,302</td>
<td>$ 32,656,417</td>
<td>8.1%</td>
<td>$ 1,507,115</td>
<td>4.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 344,058,676</strong></td>
<td><strong>$ 404,807,788</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>$ 60,749,112</strong></td>
<td><strong>17.7%</strong></td>
</tr>
</tbody>
</table>

Subtracting out debt service, this budget represents current expenditures in 2006 of approximately $2,933 per person, including law enforcement. Applying this full cost allocation to the projected peak population at La’au Point, the potential cost to the County of Maui to serve the La’au Point development project will be $157,000 in 2012 at the end of lot sales, rising to $1.5 million by 2023 at full build out. These expenses are projected on a conservative basis of peak occupancy whereas in actuality most residents will be seasonal occupants.
It should also be noted that the La’au Point development will provide significant infrastructure improvements that will serve the entire community, and many of the on site improvements will not require county maintenance. These lower costs are due to the following:

- Molokai Properties Ltd. will fund most or all of the building costs for infrastructure improvements (roads, water, wastewater systems, etc.), and recreational facilities.
- The La’au Point community association dues will cover the cost of:
  - Maintaining local roads
  - Operating and maintaining wastewater systems
  - Operating and maintaining recreational facilities
  - Providing on-site security
- The comparatively low occupancy rates for seasonal residences at La’au Point will result in a lower demand for County services.
- Most residents are expected to be comparatively wealthy, so they will require little government assistance.
- Most occupants will be retirees and visitors who are less likely to travel offsite during heavy traffic periods (such as they are on Molokai), and so are less likely to add to the demand for additional road capacity.
- Fewer government services are required for empty lots.

Therefore, actual county costs could be substantially less than the amounts shown in this model.

**Comparison of Revenues and Expenses**

Comparing revenues and costs, there is an annual surplus ranging from $355,000 at the end of the first year of lot sales to $2.1 million at the end of lot sales. Moreover, Maui County will have a cumulative surplus of just under $30.0 million by project buildout in 2023.
IMPACT ON THE STATE OF HAWAI’I

The State of Hawaii provides a wide range of services to meet the transportation, education, social service, and other vital needs of its population.

State Tax Revenues

Revenues to the State of Hawai’i from the La’au Point project will be generated from excise taxes, transfer taxes, utility taxes, and income taxes on individuals and businesses. These revenues go directly to the State General Fund.

Whereas there are no direct excise taxes from commercial businesses at La’au Point, resident expenditures will be subject to a 4% excise tax. Other state taxes include a 0.1% to 0.35% graduated levy on the transfer of fee interest, including leases of five years or greater, individual income taxes on permanent residents at a rate up to 8.25%, state utility taxes, and liquor taxes.

As shown in Table 5, annual state revenues from taxes on residents and their expenditures are expected to reach $276,000 at the end of lot sales in 2012 and climb to $1.3 million by 2023 as the project becomes more occupied by permanent and seasonal residents. State variable expenditures for permanent residents are estimated at $4,071 per permanent resident. Comparing state revenues to costs over the life of the project, state revenues should exceed expenditures by $4.7 million.

In addition to these on going revenues, there are state excise taxes on construction businesses and materials as well as income taxes on construction labor, which are discussed later.
JOB CREATION AND LAND TRUST SUPPORT

Resident and Visitor Spending

Spending by permanent and seasonal residents as well as the maintenance, landscaping, security and other services required by the community will create substantial permanent job support within the local Molokai community. Annual spending by new residents should be about $806,000 per year at the end of lot sales and then climb to about $6.8 million at build out. Approximately 65% of these expenditures are expected to be on Molokai, with the remainder spent elsewhere in the State of Hawaii. The annual expenditures on Molokai at build out are about $4.4 million, which represents about $22,000 in on island spending per residence.

Supportable Commercial Space

The on island resident expenditures will support existing businesses and commercial space on Molokai as well as encourage some expansion.

Permanent Jobs

As shown in Table 6, direct ongoing employment supported by new resident and lot owner spending will be about 6 jobs at the end of lot sales and then increase year by year to about 49 jobs when the project is built out in 2023. In addition, the La’au Point Community Association will provide employment for community services in maintenance, landscaping, security, and other association functions. Together, resident spending and the community association requirements will support 12 on going jobs at the end of lot sales and some 60 on going jobs upon full build out in 2023.

Land Trust Support

Molokai Properties Limited has agreed to allocate 5% of land sales to support the land trust. This commitment will provide just over $10.2 million (prior to the payment of any real estate commissions or other regulatory costs), for the preservation and enhancement of the dedicated lands.
CONSTRUCTION IMPACT

Construction Spending and Employment

As shown in Table 7, the total development and construction investment at La’au Point is expected to be about $246 million. As shown in Table 8, this investment supports over 1,350 person years of construction and service related employment over the life of the project.

Construction Excise and Other Taxes

In addition to the creation of construction jobs, the State of Hawaii will receive excise tax revenue on finished development and building materials and income taxes on construction wages. As shown in Table 9, these will amount to an additional $17.7 million in State of Hawaii revenue over the life of the project.

INDIRECT IMPACT

In 2000, the Hawaii Department of Business, Economic Development, & Tourism (DBEDT) developed a model of the impact of construction on the Hawaii economy. On the basis of the factors developed in that model, the construction expenditures of $246 million on the La’au Point project will result in an increase in total output of $302 million, an additional 2,970 person years of employment, and an additional $141 million in household income (See Table 10).
NO DEVELOPMENT ALTERNATIVE

Whereas the proposed development plan for La’au Point has been prepared with extensive input from the community, the issue of a no development alternative at La'au Point has come up in community meetings focusing on the social impact of the project. The following is an analysis of the no development alternative.

Loss of Project Benefits

Of course, the economic and fiscal benefits outlined in the preceding economic impact analysis would be lost without the development. To summarize these included:

- A residential development program of approximately 200 2-acre lots and associated infrastructure. At full buildout in 2025 this community will include 174 permanent residents as well as a non-resident population of some 325 people who will occupy their residences on an occasional basis. The annual average population at buildout is expected to be just over 230 persons.

- A program of land dedication and preservation that includes 18 acres as County parks, 130 acres in a community administered land trust, 280 acres of land use buffer that will be dedicated to the La’au Point homeowners association, and 450 acres that will be under homeowner and land trust joint ownership.

- Expenditures by these new residents as well as maintenance, landscaping, security and other services required by the La’au Pont community will support about 60 new local jobs.

- Total development and residential construction costs of approximately $247 million create over 1,350 person-years of construction and related employment.

- The County of Maui could receive surplus revenues of approximately $30.0 million over the development period.

- The State of Hawaii could receive surplus revenues of $4.7 million over the development period as well as $17.7 million in excise taxes and income taxes on construction workers and businesses.

- Finally, Molokai Properties Limited has agreed to allocate 5% of land sales to support the land trust. This commitment will provide just over $9 million for preservation and enhancement of the dedicated lands.

The above are substantial benefits that provide government revenues, community jobs, and preserve large areas of the land as permanent open space.

Effect of No Development

The principal issue of the no development alternative would be the effect of no development on the viability of ongoing operations of the Molokai Ranch Company and its employees. In evaluating this impact, we evaluated the economic health of the current operation and considered what alternatives may be available to assure ongoing sustainability of the Ranch. To do this, we
evaluated the record of current and historical operating losses as well as other potential land sales that could deliver supporting revenues. Each of these is discussed below:

**Economic History of Molokai Ranch Operations**

Table 11 presents a summary of Operating Cash Flow for Molokai Properties Limited from 2001 through 2006. It is not a pretty picture. As shown, the net loss from operations over those six years has been approximately $31.6 million. Whereas often painful cost cutting has reduced operating losses from $8.6 million in 2001 to a range of $3.6 to $3.8 million in the last three years, the increasing costs of water, energy, and insurance make it difficult to expect profitable operations in the future.

In addition to operating losses, annual capital expenditures are another drain on cash flow, averaging over $800,000 per year over the past five years. Taken in total, MPL has subsidized the continuing operations and upkeep of the Molokai Ranch to the tune of $4.7 million to $10.2 million per year. The cumulative subsidy from 2001 to 2006 years has been $36.9 million. Clearly this is not a sustainable business model.

**Alternatives Without the La’au Point Development Program**

Without the La’au Point development program, we expect that MPL will have to make some difficult choices in terms of further cutting back on ranch operations and/or breaking up the property and selling already entitled lands on a piecemeal basis. Each of these is discussed below:

**Sale of Other Land Inventory**

The GuocoLeisure Group, MPL’s ultimate parent, had Hallstrom and Associates prepare a valuation of the property on a breakup basis.

According to tax records, MPL has 101 lots that it could sell exclusive of Lot inventory within Papohaku Ranchlands, Maunaloa (both Residential and Commercial) and the Industrial Park. 23 are held by a Kaluakoi LLC, 70 by MPL and 8 by Cooke Land Company. The golf course is actually held in 6 separate TMKs but is only counted as one, as it would be impractical to sell it to more than one buyer. Each of the lots in Kaunakakai are counted as separate lots as they could be sold to different buyers although it would be unlikely that there wouldn’t be a fair amount of aggregation of those small industrial or business lots.

In addition, a density analysis conducted by MPL shows that the west end AG parcels could be subdivided into more than 1500 legal lots. This does not take into consideration any of the parcels held outside of the Kaluakoi ahupua’a. If these lots were sold off without the benefit of a master plan such as prepared for La’au Point, the impact would probably include a greater number of new land owners/residents, less control of development, no land trust, and less financial support to the County and State.

**Further Reductions in Operations**

Without the increase in support for golf and hotel operations that will come from the La’au Point development, it is likely that MPL will be forced to reduce operations and perhaps close those facilities. In addition, they would likely be forced to reduce or eliminate other subsidized operations such as maintenance, nursery, gas station, and other services. The impacts of these...
reductions would significantly affect existing employment at the Molokai Ranch and in Maunaloa. Under this doomsday scenario, MPL essentially closes down ranch operations and land banks the property for the future. Employment could be reduced by over 100 persons to around 10 full time staff, and payroll will be reduced by at least $3.5 million annually. These reductions, along with lost tourist expenditures, will in turn severely affect local businesses at Maunaloa and elsewhere. These losses in local jobs and probable business failures will in turn increase the need for County and State social services.
Table 1
Development Program for La'au Point, Molokai Ranch

<table>
<thead>
<tr>
<th></th>
<th>Total Units</th>
<th>Lot Size (SF)</th>
<th>Size of Average Residence (SF)</th>
<th>Land Area (acres)</th>
<th>% of Total</th>
<th>Lot Sales Price/ SF</th>
<th>Average Lot Price</th>
<th>Sales Value ($000)</th>
<th>SF of Residential Construction</th>
<th>Const. Cost/SF</th>
<th>Construction Cost per Residence</th>
<th>Total Residential Construction Cost ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Family Residential (lots)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A West Facing Ocean Front Estates</td>
<td>40</td>
<td>87,120</td>
<td>3,500</td>
<td>80</td>
<td>5.4%</td>
<td>$ 20.09</td>
<td>$ 1,750,000</td>
<td>$ 70,000</td>
<td>140,000</td>
<td>$ 225</td>
<td>$ 787,500</td>
<td>$ 31,500</td>
</tr>
<tr>
<td>C South Facing Ocean Front Estates</td>
<td>58</td>
<td>87,120</td>
<td>3,500</td>
<td>116</td>
<td>7.8%</td>
<td>$ 17.16</td>
<td>$ 1,495,000</td>
<td>$ 86,710</td>
<td>203,000</td>
<td>$ 225</td>
<td>$ 787,500</td>
<td>$ 45,675</td>
</tr>
<tr>
<td>B Inland West Facing Ocean View Sites</td>
<td>28</td>
<td>87,120</td>
<td>3,500</td>
<td>56</td>
<td>3.8%</td>
<td>$ 5.74</td>
<td>$ 500,000</td>
<td>$ 14,000</td>
<td>98,000</td>
<td>$ 225</td>
<td>$ 787,500</td>
<td>$ 22,050</td>
</tr>
<tr>
<td>D Inland South Facing Ocean View Sites</td>
<td>74</td>
<td>87,120</td>
<td>3,500</td>
<td>148</td>
<td>9.9%</td>
<td>$ 5.28</td>
<td>$ 460,000</td>
<td>$ 34,040</td>
<td>259,000</td>
<td>$ 225</td>
<td>$ 787,500</td>
<td>$ 58,275</td>
</tr>
<tr>
<td><strong>Subtotal Single Family</strong></td>
<td>200</td>
<td>400</td>
<td></td>
<td></td>
<td>26.8%</td>
<td></td>
<td>$ 1,023,750</td>
<td>$ 204,750</td>
<td></td>
<td></td>
<td></td>
<td>$ 157,500</td>
</tr>
<tr>
<td><strong>Total La'au Point Residential</strong></td>
<td>200</td>
<td>400</td>
<td></td>
<td></td>
<td>26.8%</td>
<td></td>
<td>$ 1,023,750</td>
<td>$ 204,750</td>
<td>700,000</td>
<td></td>
<td></td>
<td>$ 157,500</td>
</tr>
<tr>
<td>Commercial</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadways and Utility Easements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Owner/ Land Trust Joint Ownership</td>
<td>414</td>
<td></td>
<td></td>
<td></td>
<td>27.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Owner Association</td>
<td>450</td>
<td></td>
<td></td>
<td></td>
<td>30.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Trust</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td>8.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County Parks</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td>1.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Space &amp; Preservation</td>
<td>1,012</td>
<td></td>
<td></td>
<td></td>
<td>67.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL UNITS AND ACREAGE</strong></td>
<td>200</td>
<td>1,492</td>
<td></td>
<td></td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Phasing:
- Lot sales over 5 years
- Residential buildout over 15 years
<table>
<thead>
<tr>
<th></th>
<th>Lot Sales</th>
<th>Residential Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lot Sales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Facing Ocean Front Estates Annual</td>
<td>6  8  8  8  10</td>
<td>40</td>
</tr>
<tr>
<td>Cumulative</td>
<td>6  14  22 30  40</td>
<td>40</td>
</tr>
<tr>
<td>South Facing Ocean Front Estates Annual</td>
<td>10 10 10 10 18</td>
<td>58</td>
</tr>
<tr>
<td>Cumulative</td>
<td>10 20 30 40 58</td>
<td>58</td>
</tr>
<tr>
<td>Inland West Facing Ocean View Sites Annual</td>
<td>5  5  5  5  8</td>
<td>28</td>
</tr>
<tr>
<td>Cumulative</td>
<td>5 10 15 20 28</td>
<td>28</td>
</tr>
<tr>
<td>Inland South Facing Ocean View Sites Annual</td>
<td>15 15 15 15 14</td>
<td>74</td>
</tr>
<tr>
<td>Cumulative</td>
<td>15 30 45 60 74</td>
<td>74</td>
</tr>
<tr>
<td><strong>Subtotal Lot Sales</strong></td>
<td>36 38 38 38 50</td>
<td>172</td>
</tr>
<tr>
<td>Annual</td>
<td>36 74 112 150 200</td>
<td>172</td>
</tr>
<tr>
<td>Cumulative</td>
<td>36 74 112 150 200</td>
<td>172</td>
</tr>
<tr>
<td><strong>Residential Units</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>4  7  11</td>
<td>200</td>
</tr>
<tr>
<td>Annual</td>
<td>4  11 22</td>
<td>200</td>
</tr>
<tr>
<td>Cumulative</td>
<td>37 57 77 97 117 137 157 174 186 195 200</td>
<td></td>
</tr>
<tr>
<td><strong>Residency Percent</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seasonal</td>
<td>85% 84% 83%</td>
<td>82% 80% 79% 78% 77% 76% 75% 73% 72% 71% 70%</td>
</tr>
<tr>
<td>Permanent (180 days or more per year)</td>
<td>15% 16% 17%</td>
<td>18% 20% 21% 22% 23% 24% 25% 27% 28% 29% 30%</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seasonal</td>
<td>3  9  18</td>
<td>140</td>
</tr>
<tr>
<td>Permanent (180 days or more per year)</td>
<td>1  2  4</td>
<td>60</td>
</tr>
</tbody>
</table>
### Table 3
Estimated Assessed Values for La'au Point ($000)

<table>
<thead>
<tr>
<th>Lot Sales</th>
<th>Residential Buildout</th>
<th>Inflation 0.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West Facing Ocean Front Estates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Lot Value</td>
<td>$1,750</td>
<td>$1,750</td>
</tr>
<tr>
<td>Average Improvement Value</td>
<td>$788</td>
<td>$788</td>
</tr>
<tr>
<td>Lot Sales</td>
<td>$10,500</td>
<td>$14,000</td>
</tr>
<tr>
<td>Residential Buildout</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cumulative</td>
<td>$567</td>
<td>$1,166</td>
</tr>
<tr>
<td><strong>South Facing Ocean Front Estates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Lot Value</td>
<td>$1,495</td>
<td>$1,495</td>
</tr>
<tr>
<td>Average Improvement Value</td>
<td>$788</td>
<td>$788</td>
</tr>
<tr>
<td>Lot Sales</td>
<td>$14,950</td>
<td>$14,950</td>
</tr>
<tr>
<td>Residential Buildout</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cumulative</td>
<td>$822</td>
<td>$1,690</td>
</tr>
<tr>
<td><strong>Inland West Facing Ocean View Sites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Lot Value</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>Average Improvement Value</td>
<td>$788</td>
<td>$788</td>
</tr>
<tr>
<td>Lot Sales</td>
<td>$2,500</td>
<td>$2,500</td>
</tr>
<tr>
<td>Residential Buildout</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cumulative</td>
<td>$397</td>
<td>$816</td>
</tr>
<tr>
<td><strong>Inland South Facing Ocean View Sites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Lot Value</td>
<td>$460</td>
<td>$460</td>
</tr>
<tr>
<td>Average Improvement Value</td>
<td>$788</td>
<td>$788</td>
</tr>
<tr>
<td>Lot Sales</td>
<td>$6,900</td>
<td>$6,900</td>
</tr>
<tr>
<td>Residential Buildout</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cumulative</td>
<td>$3,263</td>
<td>$5,828</td>
</tr>
</tbody>
</table>

Assume residential buildout rate of 10% per year, with completions starting 2 years after initial lot sale.
## Table 4
### REVENUES AND COSTS TO MAUI COUNTY

<table>
<thead>
<tr>
<th></th>
<th>Lot Sales</th>
<th>Residential Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Estate Taxes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Lots and Residences</td>
<td>$5.86</td>
<td>$204,221</td>
</tr>
<tr>
<td><strong>Total Real Estate Taxes</strong></td>
<td>$1,648,389</td>
<td>$1,740,684</td>
</tr>
<tr>
<td><strong>Other Revenue</strong></td>
<td>74%</td>
<td>$150,805</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>$355,026</td>
<td>$745,708</td>
</tr>
</tbody>
</table>

| **Estimated Population** |           |       |       |       |       |       |       |       |       |
| Persons Per Household   |           |       |       |       |       |       |       |       |       |
| Seasonal                | 2.9       | -     | -     | 7     | 21    | 42    | 70    | 107   | 142   |
| Peak Occupancy          | 80%       | -     | -     | 3     | 6     | 12    | 20    | 32    | 46    |
| Permanent               | 2.9       | -     | -     | 10    | 27    | 53    | 90    | 139   | 188   |
| Peak Population         | -         | -     | -     | 38%   | 33%   | 33%   | 33%   | 33%   | 35%   |
| Average Occupancy       | -         | -     | -     | 4%    | 9%    | 17%   | 30    | 46    | 65    |
| Average Population      |           |       |       |       |       |       |       |       |       |
| Cost to Serve (per person, peak occupancy) | $2,933 | $2,933 | $2,933 | $2,933 | $2,933 | $2,933 | $2,933 | $2,933 | $2,933 |
| **Total Expenditure**   |           |       |       |       |       |       |       |       |       |
| Annual                  | $2,169,769 | $2,183,901 | $2,198,033 | $2,210,464 | $2,221,131 | $2,227,042 | $2,227,884 | $2,227,163 | $29,954,546 |
| Cumulative              | $14,463,929 | $16,647,830 | $18,845,863 | $21,056,326 | $24,052,630 | $27,475,997 | $27,727,383 | $29,954,546 | $29,954,546 |
### TABLE 5
ongoing revenues and costs to the state of hawaii

<table>
<thead>
<tr>
<th></th>
<th>Lot Sales</th>
<th></th>
<th>Inflation</th>
<th>Residential Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues From Residents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household Income ($000)</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 382</td>
</tr>
<tr>
<td>Excise Tax</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 6,111</td>
</tr>
<tr>
<td>Income Tax</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 16,000</td>
</tr>
<tr>
<td>Conveyance Taxes</td>
<td>$ -</td>
<td>$ 106,325</td>
<td>$ 118,575</td>
<td>$ 120,487</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$ -</td>
<td>$ 106,325</td>
<td>$ 118,575</td>
<td>$ 142,598</td>
</tr>
<tr>
<td><strong>Total State Revenues</strong></td>
<td>$ -</td>
<td>$ 106,325</td>
<td>$ 118,575</td>
<td>$ 142,598</td>
</tr>
<tr>
<td><strong>Total Permanent Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Cost to Serve (per person)</strong></td>
<td>$ 4,071</td>
<td>$ 4,071</td>
<td>$ 4,071</td>
<td>$ 4,071</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 11,806</td>
</tr>
<tr>
<td><strong>Net Surplus (Deficit)</strong></td>
<td>$ -</td>
<td>$ 106,325</td>
<td>$ 118,575</td>
<td>$ 142,598</td>
</tr>
<tr>
<td><strong>Cumulative</strong></td>
<td>$ -</td>
<td>$ 106,325</td>
<td>$ 224,900</td>
<td>$ 355,692</td>
</tr>
</tbody>
</table>

#### Residential Buildout

|                     | 2018      | 2019                      | 2020      | 2021                 | 2022  | 2023  | 2024  | 2025  | Total |
|---------------------|-----------|---------------------------|-----------|                      |       |       |       |       |       |
| **Revenues From Residents** |          |                           |           |                      |       |       |       |       |       |
| Household Income ($000)  | $ 8,593   | $ 6,750                   | $ 8,250   | $ 10,000             | $ 11,500 | $ 12,750 | $ 14,000 | $ 15,000 | $ 1,671,021 |
| Excise Tax         | $ 137,488 | $ 108,000                 | $ 132,000 | $ 160,000            | $ 184,000 | $ 204,000 | $ 224,000 | $ 240,000 | $ 6,000,000 |
| Income Tax        | $ 336,000 | $ 432,000                 | $ 528,000 | $ 640,000            | $ 736,000 | $ 816,000 | $ 896,000 | $ 960,000 | $ 1,415,251 |
| Conveyance Taxes  | $ 51,615  | $ 62,236                  | $ 72,856  | $ 83,477             | $ 92,186  | $ 98,877  | $ 103,550  | $ 106,205  | $ 9,086,272 |
| **Subtotal**       | $ 525,103 | $ 602,236                 | $ 732,856 | $ 883,477            | $ 1,012,186 | $ 1,118,877 | $ 1,223,550 | $ 1,306,205 | $ 9,086,272 |
| **Total State Revenues** | $ 525,103 | $ 602,236                 | $ 732,856 | $ 883,477            | $ 1,012,186 | $ 1,118,877 | $ 1,223,550 | $ 1,306,205 | $ 9,086,272 |
| **Total Permanent Population** |          |                           |            |                      |        |        |        |        |        |
|                      | 61        | 78                        | 96        | 116                  | 133    | 148    | 162    | 174    |        |
| **Cost to Serve (per person)** | $ 4,071 | $ 4,071                   | $ 4,071   | $ 4,071              | $ 4,071 | $ 4,071 | $ 4,071 | $ 4,071 | $ 4,071 |
| **Total Expenditure** | $ 247,924 | $ 318,759                 | $ 389,595 | $ 472,236            | $ 543,071 | $ 602,101 | $ 661,130 | $ 708,354 | $ 4,427,213 |
| **Net Surplus (Deficit)** | $ 277,180 | $ 283,477                 | $ 343,262 | $ 411,241            | $ 469,114 | $ 516,776 | $ 562,419 | $ 597,851 | $ 4,659,059 |
| **Cumulative**      | $ 1,474,921 | $ 1,758,397               | $ 2,101,659 | $ 2,512,900         | $ 2,982,014 | $ 3,498,790 | $ 4,061,209 | $ 4,659,059 |        |
## Table 6
### Employment and Land Trust Support at La'au Point

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New Resident Spending for Goods and Services</td>
<td>$171,882</td>
<td>$403,147</td>
<td>$806,293</td>
<td>$1,381,322</td>
<td>$2,148,027</td>
<td>$3,007,438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% on Molokai</td>
<td>65%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Local Spending</td>
<td>$111,723</td>
<td>$262,045</td>
<td>$524,091</td>
<td>$897,859</td>
<td>$1,396,217</td>
<td>$1,954,835</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### JOB CREATION
- Labor Component: 50%
- Average Wage: $45,000

<table>
<thead>
<tr>
<th>Total Direct Employment From Resident Spending</th>
<th>0</th>
<th>1</th>
<th>3</th>
<th>6</th>
<th>10</th>
<th>16</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct La'au Point Community Association Employment</td>
<td>Community Maintenance, Administration, and Services</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total Local Employment</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Land Trust Funds ($000)
- At 5% of Land Sales: $10,238

Source: Knowledge Based Consulting Group
Table 7
SUMMARY OF PROJECT COSTS FOR LA'AU POINT ($000)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure &amp; Development Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offsite Electrical</td>
<td>$350</td>
<td>$350</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$700</td>
</tr>
<tr>
<td>Land Restoration/ Erosion Control</td>
<td>$1,445</td>
<td>$1,445</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$2,890</td>
</tr>
<tr>
<td>Sewer System</td>
<td>$2,408</td>
<td>$2,408</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$4,815</td>
</tr>
<tr>
<td>Potable Water System</td>
<td>$1,580</td>
<td>$1,580</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$3,160</td>
</tr>
<tr>
<td>Non-potable Water System</td>
<td>$2,955</td>
<td>$2,955</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$5,910</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>$8,865</td>
<td>$8,865</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$17,730</td>
</tr>
<tr>
<td><strong>Onsite Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadways</td>
<td>$128</td>
<td>$1,667</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,079</td>
<td>$1,079</td>
<td>$1,079</td>
<td>$1,079</td>
<td>$1,079</td>
<td>$1,079</td>
<td>$7,955</td>
</tr>
<tr>
<td>Drainage Improvements</td>
<td>-</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$2,000</td>
</tr>
<tr>
<td>Housepads</td>
<td>-</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$1,188</td>
<td>$5,940</td>
</tr>
<tr>
<td>Potable Water System</td>
<td>-</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$1,097</td>
<td>$5,483</td>
</tr>
<tr>
<td>Non-potable Water System</td>
<td>-</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$1,023</td>
<td>$5,117</td>
</tr>
<tr>
<td>Electrical/Comm (Underground-Main Road)</td>
<td>-</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$8,000</td>
</tr>
<tr>
<td>Electrical/Comm (Underground-Minor Roads)</td>
<td>-</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$999</td>
<td>$4,995</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>-</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$39,234</td>
</tr>
<tr>
<td><strong>Amenities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amenity Construction</td>
<td>$1,175</td>
<td>$1,175</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$2,350</td>
</tr>
<tr>
<td><strong>Total Hard Construction Costs</strong></td>
<td>$8,865</td>
<td>$17,887</td>
<td>$9,022</td>
<td>$7,847</td>
<td>$7,847</td>
<td>$7,847</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$59,314</td>
</tr>
<tr>
<td>Contingency 15%</td>
<td>$1,330</td>
<td>$2,683</td>
<td>$1,353</td>
<td>$1,177</td>
<td>$1,177</td>
<td>$1,177</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$8,897</td>
</tr>
<tr>
<td>Planning, Arch., Eng’g and Other</td>
<td>$1,262</td>
<td>$1,262</td>
<td>$1,262</td>
<td>$1,262</td>
<td>$1,262</td>
<td>$1,262</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$3,786</td>
</tr>
<tr>
<td><strong>Total Design &amp; Construction Costs</strong></td>
<td>$1,262</td>
<td>$21,832</td>
<td>$10,375</td>
<td>$9,024</td>
<td>$9,024</td>
<td>$9,024</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$71,997</td>
</tr>
<tr>
<td><strong>On-Going Maintenance, Operations, and Management Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General &amp; Administration</td>
<td>$200</td>
<td>$800</td>
<td>$800</td>
<td>$600</td>
<td>$500</td>
<td>$400</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$4,300</td>
</tr>
<tr>
<td>Common Area / Security/</td>
<td>$-</td>
<td>$272</td>
<td>$120</td>
<td>$44</td>
<td>$56</td>
<td>$56</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$408</td>
</tr>
<tr>
<td>Sales and Marketing 6%</td>
<td>$-</td>
<td>$1,941</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$2,151</td>
<td>$11,445</td>
</tr>
<tr>
<td><strong>Total On-Going Costs:</strong></td>
<td>$200</td>
<td>$3,013</td>
<td>$3,147</td>
<td>$2,871</td>
<td>$2,695</td>
<td>$3,395</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$16,153</td>
</tr>
<tr>
<td><strong>PROJECT COSTS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Facing Ocean Front Estates</td>
<td>$567</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$1,166</td>
<td>$7,955</td>
</tr>
<tr>
<td>South Facing Ocean Front Estates</td>
<td>$822</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$1,690</td>
<td>$8,000</td>
</tr>
<tr>
<td>Inland West Facing Ocean View Sites</td>
<td>$397</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$816</td>
<td>$5,940</td>
</tr>
<tr>
<td>Inland South Facing Ocean View Sites</td>
<td>$1,049</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$2,156</td>
<td>$11,445</td>
</tr>
<tr>
<td><strong>Total Residential Construction</strong></td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$2,835</td>
<td>$15,750</td>
</tr>
<tr>
<td><strong>All Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1,462</td>
<td>$24,845</td>
<td>$13,522</td>
<td>$11,857</td>
<td>$11,719</td>
<td>$12,419</td>
<td>$24,845</td>
<td>$13,522</td>
<td>$11,719</td>
<td>$12,419</td>
<td>$24,845</td>
<td>$157,500</td>
</tr>
</tbody>
</table>

Source: Molokai Ranch; Knowledge Based Consulting Group
### Table 8

**Construction and Project Development Employment at La’au Point**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Infrastructure Costs:</strong></td>
<td>$1,262</td>
<td>$11,457</td>
<td>$21,832</td>
<td>$10,375</td>
<td>$9,024</td>
<td>$9,024</td>
<td>$9,024</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
</tr>
<tr>
<td>Labor as % of Const Cost</td>
<td>42%</td>
<td>$530</td>
<td>$4,812</td>
<td>$9,169</td>
<td>$4,358</td>
<td>$3,790</td>
<td>$3,790</td>
<td>$3,790</td>
<td>$3,790</td>
<td>$3,790</td>
</tr>
<tr>
<td>Jobs at Average Wage of $75,000</td>
<td>7</td>
<td>64</td>
<td>122</td>
<td>58</td>
<td>51</td>
<td>51</td>
<td>51</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Residential Construction Costs:</strong></td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>$2,835</td>
<td>$5,828</td>
<td>$8,820</td>
<td>$11,813</td>
<td>$15,750</td>
<td>$15,750</td>
</tr>
<tr>
<td>Labor as % of Const Cost</td>
<td>40%</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>$1,134</td>
<td>$2,331</td>
<td>$3,528</td>
<td>$4,725</td>
<td>$6,300</td>
</tr>
<tr>
<td>Jobs at Average Wage of $75,000</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>-$</td>
<td>15</td>
<td>31</td>
<td>47</td>
<td>63</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td><strong>Total Construction Jobs:</strong></td>
<td>7</td>
<td>64</td>
<td>122</td>
<td>58</td>
<td>66</td>
<td>82</td>
<td>98</td>
<td>63</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td><strong>On-Going Developer Costs:</strong></td>
<td>$200</td>
<td>$400</td>
<td>$3,013</td>
<td>$3,147</td>
<td>$2,871</td>
<td>$2,695</td>
<td>$3,395</td>
<td>$244</td>
<td>$144</td>
<td>$44</td>
</tr>
<tr>
<td>Labor as % of Ongoing Cost</td>
<td>40%</td>
<td>$80</td>
<td>$160</td>
<td>$1,205</td>
<td>$1,259</td>
<td>$1,148</td>
<td>$1,078</td>
<td>$1,358</td>
<td>$98</td>
<td>$58</td>
</tr>
<tr>
<td>Jobs at Average Wage of $60,000</td>
<td>1</td>
<td>3</td>
<td>20</td>
<td>21</td>
<td>18</td>
<td>23</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total Construction and Developer Employment:</strong></td>
<td>8</td>
<td>67</td>
<td>142</td>
<td>79</td>
<td>85</td>
<td>100</td>
<td>120</td>
<td>65</td>
<td>85</td>
<td>84</td>
</tr>
<tr>
<td><strong>Total Construction Value:</strong></td>
<td>$1,462</td>
<td>$11,857</td>
<td>$24,845</td>
<td>$13,522</td>
<td>$14,730</td>
<td>$17,546</td>
<td>$21,239</td>
<td>$12,057</td>
<td>$15,894</td>
<td>$15,794</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Infrastructure Costs:</strong></td>
<td>$71,997</td>
<td>$30,239</td>
<td>$303</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$71,997</td>
</tr>
<tr>
<td>Labor as % of Const Cost</td>
<td>40%</td>
<td>$16,153</td>
<td>$16,153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$16,153</td>
</tr>
<tr>
<td>Jobs at Average Wage of $60,000</td>
<td>108</td>
<td>$6,461</td>
<td>$6,461</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$6,461</td>
</tr>
<tr>
<td><strong>Total Residential Construction Costs:</strong></td>
<td>$157,500</td>
<td>$63,000</td>
<td>$63,000</td>
<td>$516</td>
<td>$3,969</td>
<td>$2,772</td>
<td>$1,575</td>
<td>$840</td>
<td>$157,500</td>
</tr>
<tr>
<td>Labor as % of Const Cost</td>
<td>40%</td>
<td>$16,153</td>
<td>$16,153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$16,153</td>
</tr>
<tr>
<td>Jobs at Average Wage of $60,000</td>
<td>108</td>
<td>$6,461</td>
<td>$6,461</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$6,461</td>
</tr>
<tr>
<td><strong>Total Construction Jobs:</strong></td>
<td>84</td>
<td>84</td>
<td>84</td>
<td>84</td>
<td>84</td>
<td>93</td>
<td>53</td>
<td>37</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total Construction Value:</strong></td>
<td>$15,750</td>
<td>$15,750</td>
<td>$15,750</td>
<td>$15,750</td>
<td>$12,915</td>
<td>$9,923</td>
<td>$6,930</td>
<td>$3,938</td>
<td>$245,650</td>
</tr>
</tbody>
</table>
### TABLE 9
Construction and Project Development Tax ($000)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Developer and Residential Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Infrastructure Costs:</strong></td>
<td>$1,262</td>
<td>$11,457</td>
<td>$21,832</td>
<td>$9,024</td>
<td>$9,024</td>
<td>$9,024</td>
<td>$9,024</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$71,997</td>
</tr>
<tr>
<td>Non Labor Costs as % of Const Cost</td>
<td>58%</td>
<td>$732</td>
<td>$6,645</td>
<td>$12,662</td>
<td>$6,018</td>
<td>$5,234</td>
<td>$5,234</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$41,758</td>
</tr>
<tr>
<td>Excise Tax on Finished Development</td>
<td>4.0%</td>
<td>$50</td>
<td>$458</td>
<td>$873</td>
<td>$415</td>
<td>$361</td>
<td>$361</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$2,880</td>
</tr>
<tr>
<td>Excise Tax on Building Materials</td>
<td>0.5%</td>
<td>$4</td>
<td>$33</td>
<td>$63</td>
<td>$30</td>
<td>$26</td>
<td>$26</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$209</td>
</tr>
<tr>
<td><strong>Total Residential Costs</strong></td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$2,835</td>
<td>$5,828</td>
<td>$8,820</td>
<td>$11,813</td>
<td>$15,750</td>
<td>$15,750</td>
<td>$209</td>
<td></td>
</tr>
<tr>
<td>Non Labor Costs as % of Const Cost</td>
<td>40%</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$1,134</td>
<td>$2,313</td>
<td>$3,528</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$4,725</td>
</tr>
<tr>
<td>Excise Tax on Finished Development</td>
<td>4.0%</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$113</td>
<td>$233</td>
<td>$353</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$418</td>
</tr>
<tr>
<td>Excise Tax on Building Materials</td>
<td>0.5%</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$6</td>
<td>$12</td>
<td>$18</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$32</td>
</tr>
<tr>
<td><strong>Total On-Going Developer Costs:</strong></td>
<td>$200</td>
<td>$400</td>
<td>$3,013</td>
<td>$2,871</td>
<td>$2,695</td>
<td>$3,395</td>
<td>$244</td>
<td>$144</td>
<td>$ -</td>
<td>$ -</td>
<td></td>
</tr>
<tr>
<td>Material as % of Ongoing Cost</td>
<td>50%</td>
<td>$100</td>
<td>$200</td>
<td>$1,507</td>
<td>$1,574</td>
<td>$1,436</td>
<td>$1,348</td>
<td>$1,698</td>
<td>$ -</td>
<td>$ -</td>
<td>$122</td>
</tr>
<tr>
<td>Excise Tax on Materials</td>
<td>0.5%</td>
<td>$1</td>
<td>$1</td>
<td>$8</td>
<td>$8</td>
<td>$7</td>
<td>$7</td>
<td>$8</td>
<td>$ -</td>
<td>$ -</td>
<td>$1</td>
</tr>
</tbody>
</table>

**Summary**

|                      |         |         |         |         |         |         |         |         |         |         |          |
|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|          |
| Excise Tax on Finished Development          | 4.0%    | $50     | $458    | $873    | $415    | $474    | $594    | $714    | $ -     | $ -     | $473     |
| Excise Tax on Building Materials             | 0.5%    | $4      | $34     | $71     | $38     | $39     | $45     | $52     | $ -     | $ -     | $24      |
| Income Taxes on Construction Wages          | 6.0%    | $38     | $301    | $641    | $356    | $416    | $518    | $647    | $ -     | $ -     | $433     |
| **Total Taxes on Construction**              | $92     | $793    | $1,585  | $809    | $929    | $1,157  | $1,413  | $929    | $1,233  | $1,229  |          |

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Residential Costs</strong></td>
<td>$15,750</td>
<td>$15,750</td>
<td>$15,750</td>
<td>$15,750</td>
<td>$12,915</td>
<td>$9,923</td>
<td>$6,930</td>
<td>$3,938</td>
<td>$157,500</td>
</tr>
<tr>
<td>Non Labor Costs as % of Const Cost</td>
<td>40%</td>
<td>$6,300</td>
<td>$6,300</td>
<td>$6,300</td>
<td>$6,300</td>
<td>$5,166</td>
<td>$3,969</td>
<td>$2,772</td>
<td>$1,575</td>
</tr>
<tr>
<td>Excise Tax on Finished Development</td>
<td>4.0%</td>
<td>$630</td>
<td>$630</td>
<td>$630</td>
<td>$630</td>
<td>$517</td>
<td>$397</td>
<td>$277</td>
<td>$158</td>
</tr>
<tr>
<td>Excise Tax on Building Materials</td>
<td>0.5%</td>
<td>$32</td>
<td>$32</td>
<td>$32</td>
<td>$32</td>
<td>$26</td>
<td>$20</td>
<td>$14</td>
<td>$8</td>
</tr>
<tr>
<td><strong>Total On-Going Developer Costs:</strong></td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$16,109</td>
</tr>
<tr>
<td>Material as % of Ongoing Cost</td>
<td>50%</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Excise Tax on Materials</td>
<td>0.5%</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excise Tax on Finished Development</td>
<td>4.0%</td>
<td>$630</td>
<td>$630</td>
<td>$630</td>
<td>$630</td>
<td>$517</td>
<td>$397</td>
<td>$277</td>
<td>$158</td>
</tr>
<tr>
<td>Excise Tax on Building Materials</td>
<td>0.5%</td>
<td>$32</td>
<td>$32</td>
<td>$32</td>
<td>$32</td>
<td>$26</td>
<td>$20</td>
<td>$14</td>
<td>$8</td>
</tr>
<tr>
<td>Income Taxes on Construction Wages</td>
<td>6.0%</td>
<td>$567</td>
<td>$567</td>
<td>$567</td>
<td>$567</td>
<td>$465</td>
<td>$357</td>
<td>$249</td>
<td>$142</td>
</tr>
<tr>
<td><strong>Total Taxes on Construction</strong></td>
<td>$1,229</td>
<td>$1,229</td>
<td>$1,229</td>
<td>$1,229</td>
<td>$1,007</td>
<td>$774</td>
<td>$541</td>
<td>$307</td>
<td>$17,712</td>
</tr>
</tbody>
</table>
**TABLE 10**  
Indirect Impacts of La'au Point Construction

<table>
<thead>
<tr>
<th>Sector</th>
<th>Multiplier</th>
<th>($millions)</th>
<th>Sector</th>
<th>Multiplier</th>
<th>Person Years of employment</th>
<th>Sector</th>
<th>Multiplier</th>
<th>($millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>1.000</td>
<td>$246</td>
<td>Construction</td>
<td>0.942</td>
<td>2,314</td>
<td>Construction</td>
<td>0.484</td>
<td>$119</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.070</td>
<td>$17</td>
<td>Retail Trade</td>
<td>0.059</td>
<td>145</td>
<td>Engineering and Arch</td>
<td>0.018</td>
<td>$4</td>
</tr>
<tr>
<td>Engineering and Arch</td>
<td>0.032</td>
<td>$8</td>
<td>Engineering and Arch</td>
<td>0.041</td>
<td>101</td>
<td>Manufacturing</td>
<td>0.015</td>
<td>$4</td>
</tr>
<tr>
<td>Communications</td>
<td>0.030</td>
<td>$7</td>
<td>Other Services</td>
<td>0.034</td>
<td>83</td>
<td>Retail Trade</td>
<td>0.013</td>
<td>$3</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>0.028</td>
<td>$7</td>
<td>Manufacturing</td>
<td>0.033</td>
<td>82</td>
<td>Wholesale Trade</td>
<td>0.011</td>
<td>$3</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>0.026</td>
<td>$6</td>
<td>Wholesale Trade</td>
<td>0.032</td>
<td>79</td>
<td>Communications</td>
<td>0.010</td>
<td>$2</td>
</tr>
<tr>
<td>Other Services</td>
<td>0.014</td>
<td>$3</td>
<td>Business Services</td>
<td>0.028</td>
<td>68</td>
<td>Other Services</td>
<td>0.008</td>
<td>$2</td>
</tr>
<tr>
<td>Business Services</td>
<td>0.011</td>
<td>$3</td>
<td>Communications</td>
<td>0.018</td>
<td>45</td>
<td>Business Services</td>
<td>0.007</td>
<td>$2</td>
</tr>
<tr>
<td>Other Transportation</td>
<td>0.011</td>
<td>$3</td>
<td>Other Transportation</td>
<td>0.016</td>
<td>39</td>
<td>Other Transportation</td>
<td>0.004</td>
<td>$1</td>
</tr>
<tr>
<td>Finance</td>
<td>0.008</td>
<td>$2</td>
<td>Finance</td>
<td>0.007</td>
<td>17</td>
<td>Finance</td>
<td>0.003</td>
<td>$1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>$302</td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2,973</strong></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>141</strong></td>
</tr>
</tbody>
</table>
### Table 11

**Statement of Operating Cash Flow for Molokai Properties Limited**

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Cumulative FY 2001 - 06</th>
<th>Forecast FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Cash Flow from Operations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel</td>
<td>$(3,150)</td>
<td>$(2,285)</td>
<td>$(2,173)</td>
</tr>
<tr>
<td>Golf Course</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
</tr>
<tr>
<td>Water Operations</td>
<td>$(341)</td>
<td>$(455)</td>
<td>$(177)</td>
</tr>
<tr>
<td>Minor Operations (1)</td>
<td>$79</td>
<td>$(291)</td>
<td>$(491)</td>
</tr>
<tr>
<td>Support Costs (2)</td>
<td>$(2,139)</td>
<td>$(1,329)</td>
<td>$(1,506)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$(8,707)</td>
<td>$(5,709)</td>
<td>$(4,360)</td>
</tr>
<tr>
<td>Changes in Assets and Liabilities</td>
<td>$-(881)</td>
<td>$-(115)</td>
<td>$(117)</td>
</tr>
<tr>
<td><strong>Cash Flow from Operations</strong></td>
<td>$(9,588)</td>
<td>$(5,824)</td>
<td>$(4,477)</td>
</tr>
<tr>
<td>Capital Spending</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work in Progress</td>
<td>$(547)</td>
<td>$(830)</td>
<td>$(292)</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>$(597)</td>
<td>$(150)</td>
<td>$(47)</td>
</tr>
<tr>
<td><strong>Capital Spending</strong></td>
<td>$(597)</td>
<td>$(697)</td>
<td>$(877)</td>
</tr>
<tr>
<td>Work on Master Plan</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
</tr>
<tr>
<td><strong>Net Cash Flow</strong></td>
<td>$(10,185)</td>
<td>$(6,521)</td>
<td>$(5,354)</td>
</tr>
</tbody>
</table>

**Notes:**

1. Minor Operations include Rentals, Cattle, Repair and Maintenance Shop, Nursery, Theaters, Gas Station, Kauluakoi Hotel, and Roads
2. Includes Professional fees, Legal expenses, Insurance, Real Property taxes, Partnership operations, etc.
MARKET SUPPORT FOR REAL ESTATE DEVELOPMENT AT LA’AU POINT, MOLOKAI

Prepared for

Molokai Properties Limited

Prepared by

Knowledge Based Consulting Group

Revised December 2007
SECTION I
INTRODUCTION

Knowledge Based Consulting Group (KBCG) was retained by Molokai Properties Limited to address the market opportunities for lot sales and residential development at its La’au Point property on Molokai.

Molokai Properties Limited proposes to develop 200 residential lots at La’au Point as part of an overall development and preservation plan for some 1,492 acres within the Molokai Ranch. The La’au Point site slopes from an elevation of sea level to 150 feet, providing good to excellent ocean and countryside views from nearly all development parcels.

The La’au Point development project includes four general lot type areas:

<table>
<thead>
<tr>
<th>Lot Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A West Facing Ocean Front Home Sites</td>
<td>40</td>
</tr>
<tr>
<td>B South Facing Ocean Front Home Sites</td>
<td>58</td>
</tr>
<tr>
<td>C West Facing Ocean View Home Sites</td>
<td>28</td>
</tr>
<tr>
<td>D South Facing Ocean View Home Sites</td>
<td>74</td>
</tr>
<tr>
<td>Total Lots and Residences</td>
<td>200</td>
</tr>
</tbody>
</table>

Molokai Properties Limited would construct roadway improvements servicing the site, major electrical improvements, water and sewage treatment facilities, drainage, and other improvements to service the development. An illustrative development plan is shown below:
KBCG recognizes that Molokai Properties has a unique opportunity to develop and deliver a real estate product that builds on the natural character of the land and its uncrowded oceanfront setting. During the course of the assignment we worked with the management team and land planner PBR HAWAII to refine a land plan that is designed to provide oceanfront and near ocean lots with views, privacy, and Hawaiian authenticity not easily found elsewhere in Hawaii.

In conducting the assignment, KBCG reviewed the overall real estate market in Hawaii, the development programs at other oceanfront developments in the region, current site opportunities, and overall market strength. The site is at a preferred location fronting beaches of remarkable strength and beauty. On the western side, the property is near to the Kaluakoi resort and golf course and the lots have beautiful sunset views and distant Oahu vistas. The south facing lots also have excellent ocean views and access to large areas of open space and recreation opportunities.
In conducting our analysis, KBCG began by examining the base land use plan that had been developed by PBR and Molokai Properties. This plan reflects the constraints and opportunities inherent in the land as well as a program of covenants and conditions that are acceptable to the Molokai community. We understand that the plan and its conditions reflect extensive community involvement. Within this context we addressed the following issues:

- What is the expected market demand for a low density, natural environment lot program at La’au Point?
- What design features and amenities will be particularly appropriate for the La’au Point market?
- What is a responsible pricing strategy for the La’au Point lots?
- What are the CC and R’s that are appropriate for the La’au Point market and how will they affect value?

In particular, the KBCG work program included the following tasks:

- Evaluate site opportunities and constraints in terms of oceanfront proximity and setbacks, view orientation, infrastructure development, land planning options, potential building envelopes, and design considerations.
- Analyze existing supply and projected future demand for oceanfront and ocean view lots in Hawaii and at the subject site.
- Review the projected supply and performance of comparable ocean oriented lots within selected Hawaii resorts and land sales projects. Particular attention was given as to how the uncrowded, natural character, and protective CC and R’s of the La’au Point project relate to other alternatives in the market.
- Evaluate the market of buyers who by their purchase behavior indicate that they could be candidates for La’au Point real estate. Accordingly, we analyzed assessor records to evaluate buyer origin, occupancy patterns, turnover, and sales price history for individual properties within projects that offer ocean oriented estate lots.
- Recommend a development program, pricing structure and absorption schedule for La’au Point.

Following this Introduction, Section II presents a summary of target markets and market support as well as recent overall market performance and specifics of comparable and competitive projects. The recommended development program is summarized in Section III. Appendices A, B, and C provide summary information on selected oceanfront real estate projects within Wailea, Kaanapali, and Kapalua respectively, and Appendix D summarizes real estate activity on Molokai since 2000. This assignment was conducted by Clive B. Jones, Principal, with administrative support from Megan Jones. KBCG appreciates the fine support and cooperation from Molokai Properties executives and line personnel throughout the assignment.
GENERAL LIMITING CONDITIONS

Every reasonable effort has been made to ensure that the data contained in this study reflect the most accurate and timely information possible, and they are believed to be reliable. This study is based on estimates, assumptions and other information developed by Knowledge Based Consulting Group from its independent research effort, general knowledge of the industry and consultations with the client and the client's representatives. No responsibility is assumed for inaccuracies in reporting by the client, the client's agent and representatives or any other data source used in preparing or presenting this study.

This report is based on information that was current as of April 2006 and Knowledge Based Consulting Group has not undertaken any update of its research effort since such date.

No warranty or representation is made by Knowledge Based Consulting Group that any of the projected values or results contained in this study will actually be achieved.

Possession of this study does not carry with it the right of publication thereof or to use the name of "Knowledge Based Consulting Group" in any manner without first obtaining the prior written consent of Knowledge Based Consulting Group. No abstracting, excerpting or summarization of this study may be made without first obtaining the prior written consent of Knowledge Based Consulting Group. This report is not to be used in conjunction with any public or private offering of securities or other similar purpose where it may be relied upon to any degree by any person other than the client without first obtaining the prior written consent of Knowledge Based Consulting Group. This study may not be used for purposes other than that for which it is prepared or for which prior written consent has first been obtained from Knowledge Based Consulting Group.

This study is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.
SECTION II
MARKET ENVIRONMENT FOR LA’AU POINT REAL ESTATE

This section of the report summarizes current market conditions for resort real estate on Molokai and at the principal West Maui resort communities of Wailea, Kaanapali, and Kapalua

Overall Market Environment

The market for real estate at La’au Point will be comprised of households that recognize the value of an oceanfront environment in Hawaii and have the resources to afford it. For the ocean view lots, this would generally require a net worth of at least $1 million, and for the ocean front properties the market for real estate at La’au Point comes from the high net worth individuals and families (net worth of at least $5 million) market and above.

- Nationwide, the number of households with more than $1 million in net worth (not including primary residence) tapered from its peak of 7.1 million households in 1999 to 5.5 million at the end of 2002.
- Since March 2003, equity markets have regained earlier strength such that substantial gains have been realized in the equity markets, and real estate assets have continued to climb. The number of millionaire households has now reached 8.3 million and is increasing at the rate of 700,000 per year.
- Notwithstanding short term influences, the assets of high net worth individuals should substantially exceed worldwide economic growth and grow at an average of 7% a year during the next 3 years, reaching approximately $38 trillion by 2008.
- As stock market gains evaporated in the early part of this decade, consumers began to look at housing with a renewed appreciation, making real estate and other assets a safe haven for money. They also learned to appreciate that another form of safe haven is a desirable location for themselves and their real estate when they retire. Hawaii fits this profile ideally, and anecdotal discussions with real estate brokers indicate that this safe haven motivation is already quite strong in the Hawaii market.
- The average HNW individual has about 15% of his assets in real estate, not counting the primary home.
- The high net worth individuals and families market has pulled back about 20% since the heady days of the late ‘90’s, but is regaining forward momentum in 2006.
- The number of high net worth individuals and families households is currently about 500,000 and increasing at a rate of about 20,000 to 25,000 per year. By 2020, there should be nearly 1 million high net worth individuals and families households in the United States.
- An increasing share of the high net worth individuals and families market will be represented by inherited wealth being transferred to the Baby Boomer generation.

Conclusion: There is sufficient depth of market for La’au Point and that market is growing at a healthy rate.
Key Market Segments

- **Transfer Market.** This market includes existing owners at Kaluakoi, other Molokai seasonal home owners, owners at the principal Maui resorts, and owners at premium Neighbor Island projects
  
  - Interest in the real estate market and looking at new real estate products is a popular activity with existing owners of Hawaii resort homes and lots. This transfer market represents qualified and interested resort real estate owners who have already made a purchase decision to own a home in Hawaii. Some of these owners are looking to change projects for the following reasons:
    - Congestion and crowding at key amenities
    - Homes or condominium units are too small
    - Views are compromised
    - Too far from beach
    - Decline in quality of service
    - Or, they are looking for additional investment opportunities

  - Prior KBCG surveys of owners at West Maui and Big Island resorts indicate that there could be a significant opportunity to draw buyers to an uncrowded oceanfront experience at La’au Point from the Wailea, Kapalua, and Kaanapali resorts and (to a lesser extent) from the Big Island.

- **On-going Market**
  
  - Frequent Visitors to Molokai and Maui
  
  - Single family home, luxury condominium, and other hotel suite renters

  - Friends and relatives of existing second home owners

  - The Baby Boomer Market should sustain growth in the Hawaii real estate market
    - Relocation in retirement is on the horizon for many baby boomers with nearly 6 out of 10 likely to move to a new home for retirement.
    - Of those planning to move, 31% plan to move more than three hours away from their current location.
    - Hawaii is the preferred destination of 4% of the prospective Baby Boomer retirees. Whereas this may be considered a small percentage, the potential numbers are impressive. If they fulfilled their dreams, these goals represent 20,000 to 40,000 baby boomer households relocating to Hawaii per year.
    - Health, fitness, family, and safety are on point messages to the resettling Baby Boomers.
    - Nearly all boomers (90%) believe they will be happier if they remain physically active during retirement. Their principal activities include walking, swimming, and using exercise facilities.
Most boomers (91%) expect that the U.S. fight against terrorism is not expected to subside any time soon, as most boomers feel the war will continue into their retirement.

Hawaii’s position as a probable safe haven from future terrorism events should continue to appeal to these semi-retiring baby boomers and help real estate sales.

They are also looking forward to spending more time with spouse, children, and grandchildren.

An approach to framing a healthy, self improvement lifestyle through a clean environment with supporting amenities and community services is well targeted to the needs of semi-retiring Baby Boomers

- And, Hawaii is Tax Friendly to Retirees
  - Hawaii is the most friendly State for retirement assets. – Bloomberg Wealth Management
  - The average annual tax bill for a reasonably well off retiree in Hawaii is $4,049, lowest in the country. Some comparisons: Florida: $9,351; Arizona: $8,308; New York: $14,571; California: $11,250
  - Also, Hawaii is the second friendliest state for wealth held in real assets. The average annual tax bill is $11,124, just behind Wyoming. Some comparisons: Florida: $20,869; Arizona: $15,008; New York: $31,837; California: $19,597
  - This message can be a positive counter to the prevailing impression of Hawaii as a high cost of living state.

**Maui County Real Estate**

Over the past several years there has been a dramatic increase in real estate activity throughout Hawaii. This is particularly true for resort destinations in Maui, and Molokai itself has seen substantial sales growth and price appreciation. Each of these areas are discussed below.

Maui resort condominiums reached their previous peak prices in 1990/1991, the last two years of the Japanese “Bubble” economy. From 1991 to 1997, prices declined some 30% to 40% from those peaks. However, all South Maui luxury condominiums have seen very substantial price rises the past few years, especially in the past 24 months, to the point that all prices have now risen far beyond those 1990/1991 peaks, to new all-time highs. The luxury complexes in Wailea, Makena, Kaanapali, and Kapalua have seen especially good price appreciation over the past 24 months. Inventories are very low, and in some complexes are continuing to decline further, indicating that the boom is not yet over. However, in late 2005 and early 2006, the market has leveled off indicating that price increases may have overshot demand. This will most likely result in a slight pullback in the overall market in the short term as speculative activity subsides. However, for the long term the basic market drivers outlined above should sustain the market for well located and unique oceanfront properties well into the future.

**Overall Performance (Table 1)**

- Total real estate sales in the three principal West Maui resorts (Kapalua, Kaanapali, and Wailea) was about $711.1 million in 2005, up from $645.2 million in 2004.
• In terms of units, the resort market is about 2/3 condominiums, 11% lots, and 22% single family residences.

• In terms of value, the mix is led by villas/condominiums (49% of resort real estate sales) followed by single family residences (38%).

• Lots are a relatively small part of the Maui resort real estate market (11% of units and 13% of sales). In most cases, this reflects a lack of well positioned lot inventory.

• This distribution of real estate sales on Maui is very different than that on the Big Island resorts, where lots are 45% of sales and residences are a relatively small share of the market.

By Resort

• Wailea/Makena had the highest number of sales, 237 in 2005. Wailea also captured the most value, $374.6 million for a 53% market share.

• Kaanapali had 221 sales distributed across condominiums ($142 million), lots ($14.9 million), and residences ($50.8 million) for a total of $207.7 million.

• Kapalua had 69 sales for $128.7 million.

• The top resorts across Hawaii in terms of real estate sales in 2005 were Wailea ($374.6 million), Kukio ($340.6 million), Mauna Lani ($252.6 million), Kaanapali ($207.7 million), Waikoloa ($173.4 million), Hualalai ($143.2 million), Kapalua ($128.7 million), and Mauna Kea ($43.7 million).

By Product within Maui Resorts

• There were 355 villa and condominium sales for a value of $347.5 million. The average unit was 1,162 square feet priced at $979,000 ($859/sq. ft.). This average condominium size is significantly lower than at the Big Island resorts where the average is 1,640 square feet.

• There were 56 lot sales for a value of $91.4 million. The average lot was about 47,000 square feet priced at $1.6 million ($34/sq. ft.).

• There were 116 residence sales for a value of $272.3 million. The average residence was about 3,250 square feet priced at $2.35 million (722/sq. ft.).

Absorption (Tables 2 and 3)

• There were 44 closings per month at the Maui resorts in 2005, down slightly from the hectic pace of 54 units per month seen in 2004

Absorption and Pricing Comparison for 2005 and 2004 (Tables 4 and 5)

• Resort price increases continued at a remarkable pace. Compared to 2004, the price increases in 2005 were:
  o Condominiums. Average prices increased 17% to nearly $980,000 ($859/SF). Range of $756/SF (Kaanapali) to $959/SF (Kapalua).
  o Single Family Lots. Average prices increased 38% to $1.6 million ($34/SF). Range of $14/SF (Kapalua) to $61/SF (Kaanapali and Wailea)
Residences. Average prices increased a remarkable 52% to $2.35 million ($722/SF). Range of $589/SF (Kaanapali) to $837/SF (Kapalua)

- Overall price appreciation was highest at Kaanapali and Kapalua (+35%), followed by Wailea (+31%).
- Combining changes in absorption and price, overall real estate sales volume for the three resorts increased to about $59.3 million per month in 2005, compared to $53.8 million per month in 2004.
- Average unit sizes stayed about the same for condominiums, but increased 9% over 2004 for residences.

**Competitive Environment**

- The competitive environment for the La’au Point lots residences will be shaped by an extreme shortage of available oceanfront property within Hawaii. This shortage has contributed to rapidly escalating prices. For example, the oceanfront units at the Wailea Beach Villas are reselling in the $6.5 million to $7.5 million range and the two Wailea Point resales in 2005 sold for an average of $4.4 million. This price escalation is also seen on the Big Island with several oceanfront homes at Hualalai and Kukio selling for $10 million and up.
- Most of the new resort real estate inventory on Maui will be in relatively moderate priced products that will not be within comfortable walking distance of the ocean. Recent and projected additions to the West Maui resort inventory include:

<table>
<thead>
<tr>
<th>Property</th>
<th>Location</th>
<th># of Units</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned condominium/timeshare conversions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maui Marriott Resort</td>
<td>Kaanapali</td>
<td>311</td>
<td>October 2005</td>
</tr>
<tr>
<td>Kapalua Bay Hotel</td>
<td>Kapalua</td>
<td>155</td>
<td>Spring 2008</td>
</tr>
<tr>
<td>Planned additions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westin Ocean Villas</td>
<td>Kaanapali</td>
<td>177</td>
<td>Partially Completed</td>
</tr>
<tr>
<td>Intrawest-Honua Kai</td>
<td>Kaanapali</td>
<td>700</td>
<td>Beginning Sales</td>
</tr>
</tbody>
</table>

These projects generally target the condominium and vacation ownership buyer and have little overlap with the La’au Point target market.

- La’au Point’s competitive advantage lies in delivering its own core values (unobstructed beach and ocean frontage, environmental sensitivity, residential privacy, uncrowded amenities, and the cultural/ family values synonymous with Molokai) with quality and precision.

**Price Performance for Oceanfront Condominiums/ Villas in West Maui Resorts**

Since the La’au Point lots and residences will be one of the few oceanfront properties available in Hawaii, KBCG examined the sales history of selected oceanfront properties on Maui since 2000. These included front row units at the following projects.

<table>
<thead>
<tr>
<th>Wailea/ Makena</th>
<th>Kaanapali</th>
<th>Kapalua</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wailea Point</td>
<td>Ali‘i</td>
<td>Ironwoods</td>
</tr>
<tr>
<td>Makena Surf</td>
<td>Whaler</td>
<td>Coconut Grove</td>
</tr>
</tbody>
</table>

Each of these oceanfront projects is described in Appendices A, B, and C along with site plans and recent sales history by unit.
## Price History for West Maui Oceanfront Villas

<table>
<thead>
<tr>
<th>Year</th>
<th>$/Square Foot</th>
<th>Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$1,158</td>
<td>$2,194,538</td>
</tr>
<tr>
<td>2001</td>
<td>$884</td>
<td>$2,096,671</td>
</tr>
<tr>
<td>2002</td>
<td>$1,131</td>
<td>$2,396,250</td>
</tr>
<tr>
<td>2003</td>
<td>$1,163</td>
<td>$2,693,358</td>
</tr>
<tr>
<td>2004</td>
<td>$1,489</td>
<td>$2,810,345</td>
</tr>
<tr>
<td>2005</td>
<td>$1,957</td>
<td>$3,766,500</td>
</tr>
</tbody>
</table>

Average prices have risen from just over $2 million in 2000/01 to over $3.7 million.

In terms of price per square foot, the average has essentially doubled in five years and now runs around $2,000 per square foot.
Price Performance for Oceanfront Residences in West Maui Resorts

Since 1997, prices for oceanfront single family homes have essentially tripled in terms of total price and $ per square foot, and quadrupled in terms of value per front foot of ocean exposure.

Theses levels of price appreciation for both condominiums and residences demonstrate very strong market awareness and appreciation of the scarcity and value of oceanfront property.
Molokai Real Estate (Tables 6 and 7)

Whereas Molokai does not have the high density resort products of Maui, it has also seen strong growth in its real estate markets, particularly since the reopening of the Kaluakoi golf course.

- Total real estate sales in Molokai were about $83 million in 2005, up slightly from a record $79.8 million in 2004.
- In terms of units, the market is fairly evenly split between condominium resales (69), lot sales (106), and residences (77).
- In terms of value, residences represent $37.8 million, lots represent $27.4 million, and condominiums account for $18.0 million.
- Lots are a major part of the Molokai real estate market (40% of units and 35% of sales).
- This distribution of real estate sales on Molokai is similar to that on the Big Island resorts, where lots are 45% of sales.

For Kaluakoi

- Kaluakoi had 65 sales or resales for $34.1 million in 2005. These included 32 condominiums ($9.3 million), 25 lots ($12.6 million), and 8 residences ($12.2 million).
- Kaluakoi sales prices are substantially higher than elsewhere on Molokai. The average price for a lot at Kaluakoi in 2005 was $503,000, compared to $182,000 elsewhere on the island. Residence prices reflect this land value with the average price for a Kaluakoi residence surpassing $1.5 million in 2005.
- Sales volume has increased substantially in the past three years.

### Average Number of Sales per Year

<table>
<thead>
<tr>
<th>Period</th>
<th>Condos</th>
<th>Lots</th>
<th>Residences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 to 2002</td>
<td>23</td>
<td>8</td>
<td>2</td>
<td>33 per year</td>
</tr>
<tr>
<td>2003 to 2005</td>
<td>40</td>
<td>41</td>
<td>8</td>
<td>87 per year</td>
</tr>
</tbody>
</table>

- In addition to the increased volume of sales, average prices and prices per square foot at Kaluakoi in 2005 were also substantially higher than in 2000:

### Percent Increase Over 2000

<table>
<thead>
<tr>
<th></th>
<th>Condos</th>
<th>Lots</th>
<th>Residences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Sales</td>
<td>-3%</td>
<td>+127%</td>
<td>+167%</td>
<td>+38%</td>
</tr>
<tr>
<td>Sales Volume</td>
<td>+172%</td>
<td>+348%</td>
<td>+919%</td>
<td>+358%</td>
</tr>
<tr>
<td>Average Price</td>
<td>+180%</td>
<td>+97%</td>
<td>+282%</td>
<td></td>
</tr>
<tr>
<td>Price/ SF</td>
<td>+153%</td>
<td>+103%</td>
<td>+350%</td>
<td></td>
</tr>
</tbody>
</table>

Origin of Hawaii and Molokai Real Estate Buyers (Table 8)

- The United States represents nearly 90% of the buyers of resort real estate in Hawaii, followed by Japan at 8%, and Canada at 2%. The large majority of U.S. buyers (74%) are from the Pacific States. The market distributions for Maui, the Big Island, and Molokai are as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>Maui</th>
<th>Hawaii</th>
<th>Molokai</th>
</tr>
</thead>
</table>

Knowledge Based Consulting Group
As shown, the islands have reasonably similar origin patterns with Maui doing a little better in Southern California, while Hawaii has a greater proportion of Northern California owners, and Molokai has more owners from within Hawaii.

- For individual resorts, the differences in origin patterns are quite substantial:

<table>
<thead>
<tr>
<th>Resort</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maui</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makena</td>
<td>Northwest (25%)</td>
<td>Alaska/Hawaii (19%)</td>
<td>N. California (16%)</td>
</tr>
<tr>
<td>Kapalua</td>
<td>Northwest (20%)</td>
<td>N. California (16%)</td>
<td>S. California (14%)</td>
</tr>
<tr>
<td>Kaanapali</td>
<td>Northwest (21%)</td>
<td>S. California (21%)</td>
<td>N. California (18%)</td>
</tr>
<tr>
<td>Wailea</td>
<td>Northwest (32%)</td>
<td>Alaska/Hawaii (17%)</td>
<td>N. California (9%)</td>
</tr>
<tr>
<td><strong>Hawaii</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hualalai</td>
<td>N. California (56%)</td>
<td>Alaska/Hawaii (13%)</td>
<td>Midwest/ South (7%)</td>
</tr>
<tr>
<td>Keahou</td>
<td>Northwest (27%)</td>
<td>Japan (22%)</td>
<td>Alaska/Hawaii (13%)</td>
</tr>
<tr>
<td>Kohala</td>
<td>Northwest (40%)</td>
<td>N. California (17%)</td>
<td>S. California (14%)</td>
</tr>
<tr>
<td>Mauna Kea</td>
<td>Northwest (44%)</td>
<td>N. California (19%)</td>
<td>Midwest/South (10%)</td>
</tr>
<tr>
<td>Mauna Lani</td>
<td>Northwest (20%)</td>
<td>N. California (18%)</td>
<td>S. California (16%)</td>
</tr>
<tr>
<td><strong>Molokai</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>Hawaii/ Alaska (22%)</td>
<td>S. California (19%)</td>
<td>N. California (18%)</td>
</tr>
</tbody>
</table>

- The owners of Kaluakoi real estate reside in a wide geographic region, including other Hawaiian islands. The largest source market is California (37%), followed by Hawaii (22%) and the Pacific Northwest and Alaska (15%). About 10% are Molokai residents. About 5% of the Kaluakoi condo owners live in Canada and there is very little other foreign ownership. For Molokai in general, and La’au Point and Kaluakoi in particular, there appears to be a substantial opportunity for expansion into the Northwest market.

**MARKET DEPTH FOR REAL ESTATE AT LA’AU POINT**

There is a wide range of resort real estate products in the state of Hawaii, but the consistently highest values are obtained for those properties that have direct access to the ocean and/or unobstructed ocean views. Walking distance to a beach adds an additional lot sales premium.

The principal markets for La’au Point include the opportunity to relocate existing Kaluakoi and Molokai property owners (Local Transfer Market) as well as attract buyers who currently own property elsewhere in Hawaii (Interisland Transfer Market) and bring in new buyers from qualified markets (Ongoing Market). Being able to successfully penetrate the transfer market will be a key factor in La’au Point’s initial success. Our market research shows that there is significant potential from this market. The approximate size of the transfer and ongoing markets are shown below:
Depth of Local and Interisland Transfer Market for La’au Point Lots

There are over 500 owners at Kaluakoi and over 6,400 condominiums and single family residences in the principal West Maui resorts. Many of these units were built 15 to 20 years ago and besides being older, they are often smaller than what owners now desire as they spend more time at their seasonal home, and their views may have been compromised as new projects have been developed. Any or all of these factors support the potential for a strong transfer market out of existing resort home properties to the uncrowded natural oceanfront environment that will be preserved at La’au Pont. The potential demand from this transfer market is outlined below: Note that these figures do not include potential buyers from the owners of vacation ownership property on West Maui or owners that have property outside of the master planned resorts.

### Depth of Molokai Transfer Market for La’au Point Lots and Residences

<table>
<thead>
<tr>
<th>Resort</th>
<th>Condominiums</th>
<th>Single Family</th>
<th>Total Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaluakoi</td>
<td>299%</td>
<td>225%</td>
<td>524%</td>
</tr>
<tr>
<td>Income and/or Net Worth Qualified Kaluakoi</td>
<td>75%</td>
<td>224</td>
<td>80%</td>
</tr>
<tr>
<td>Number Looking to Switch or Add Real Estate</td>
<td>40%</td>
<td>90%</td>
<td>50%</td>
</tr>
<tr>
<td>Percent Looking to Switch from Condo to Single Family</td>
<td>30%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Percent That Would Consider Molokai</td>
<td>80%</td>
<td>22%</td>
<td>80%</td>
</tr>
<tr>
<td>Penetration Rate for La’au Point Lots and Residences</td>
<td>60%</td>
<td>15%</td>
<td>60%</td>
</tr>
</tbody>
</table>

### Depth of Interisland Transfer Market for La’au Point Lots and Residences

<table>
<thead>
<tr>
<th>Resort</th>
<th>Condominiums</th>
<th>Single Family</th>
<th>Total Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wailea/ Makena</td>
<td>1,642</td>
<td>1,182</td>
<td>2,824</td>
</tr>
<tr>
<td>Kaanapali</td>
<td>2,413</td>
<td>1,182</td>
<td>2,789</td>
</tr>
<tr>
<td>Kapalua</td>
<td>564</td>
<td>376</td>
<td>802</td>
</tr>
<tr>
<td>Number Looking to Switch or Add Real Estate</td>
<td>4,619</td>
<td>1,796</td>
<td>6,415</td>
</tr>
<tr>
<td>Percent Looking to Switch from Condo to Single Family</td>
<td>60%</td>
<td>15%</td>
<td>60%</td>
</tr>
<tr>
<td>Percent That Would Consider Molokai</td>
<td>75%</td>
<td>15%</td>
<td>71</td>
</tr>
<tr>
<td>Penetration Rate for La’au Point Lots and Residences</td>
<td>40%</td>
<td>15%</td>
<td>60%</td>
</tr>
</tbody>
</table>

This transfer demand, on its own, seems sufficient to support about 3/4 of the units that are planned be developed at La’au Point.
**On-going Mainland Market**

The size of the Ongoing Market for luxury second or seasonal homes in the price range anticipated for the La’au Point Lots and Residences is based on the number of U.S. households with a net worth of $2.5 million or more including home equity. The size of the market with net worth of $2.5 million+ is

<table>
<thead>
<tr>
<th>Number of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast States</td>
</tr>
<tr>
<td>Southern States</td>
</tr>
<tr>
<td>Midwestern States</td>
</tr>
<tr>
<td>Western States</td>
</tr>
<tr>
<td>Total Market</td>
</tr>
</tbody>
</table>

This market potential is then adjusted to account for its proximity to Hawaii and the buyer origin distribution at Hawaii resort projects:

<table>
<thead>
<tr>
<th>Number of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast States (@ 10%)</td>
</tr>
<tr>
<td>Southern States (@ 10%)</td>
</tr>
<tr>
<td>Midwestern States (@ 20%)</td>
</tr>
<tr>
<td>Western States (@ 100%)</td>
</tr>
<tr>
<td>Geographic Market</td>
</tr>
</tbody>
</table>

Although there is an overall market potential of 421,000 households, not all of them are in the market for additional second home or seasonal home properties.

| Available market to purchase new/additional seasonal home (@ 20%) | 85,000 |
| Penetration rate for the State of Hawaii (@ 10%) | 8,500 |
| Add: Foreign buyers (@ 15% of mainland) | 1,275 |
| Add: Local Hawaii Buyers (@ 10% of mainland) | 850 |
| Total Depth of Ongoing Demand | 10,625 |
| Market Share for Single Family Lots (@20%) | 2,125 |

This demand for luxury properties will have a limited number of oceanfront options to choose from in Hawaii. We expect that the La’au Point Lots and Residences’ market share will therefore be quite strong and affected mainly by additional resales that come on the market rather than new oceanfront development.

| Molokai Market Share (@15%) | 318 |
| Penetration Rate for La’au Point Lots and Residences (@60%) | 192 |

In addition, this market is increasing at about 7% per year.

**Resort Guest Conversion**

In addition to the ongoing market and transfer market potential, there is the opportunity to convert frequent Molokai hotel guests to real estate buyers. Prior research shows that 50% of frequent Hawaii visitors who do not have a home in Hawaii have a significant interest in owning Hawaii real estate. Of those that annually stayed two weeks or more in Hawaii, 70% are interested. Whereas we do not know the number of frequent Molokai visitors staying at the
ranch, it is certainly worth checking as a source of potential buyers who have already expressed their appreciation for the island and the desire to return on a regular basis.

**TOTAL MARKET POTENTIAL FOR LA’AU POINT LOTS AND RESIDENCES**

<table>
<thead>
<tr>
<th>Number of Lots and Residences</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Molokai Transfer Market</td>
</tr>
<tr>
<td>From Interisland Transfer Market</td>
</tr>
<tr>
<td>Ongoing Market</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>58</td>
</tr>
<tr>
<td>98</td>
</tr>
<tr>
<td>192</td>
</tr>
<tr>
<td>348</td>
</tr>
</tbody>
</table>

As discussed, the transfer market on its own is sufficient to provide initial support for the La’au Point Lots and Residences project and that is a strong comfort level for moving forward. The ongoing market is also quite strong but it is typically more difficult to reach and it requires more education and longer to develop. However, the location of La’au Point at an increasingly difficult to find beachfront location in Hawaii provides strong differentiation for the project site to both mainland and foreign visitors.
Table 1
Summary of West Maui Resort Real Estate Sales, 2004

<table>
<thead>
<tr>
<th>Resort</th>
<th>Number of Sales</th>
<th>Sales Value</th>
<th>Average Sales Price</th>
<th>Market Share (#)</th>
<th>Market Share ($)</th>
<th>Share of Total (#)</th>
<th>Share of Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condos</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>144</td>
<td>$147,226,414</td>
<td>$1,022,406</td>
<td>33.5%</td>
<td>41.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>221</td>
<td>$140,714,434</td>
<td>$636,717</td>
<td>51.4%</td>
<td>39.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>65</td>
<td>$70,401,000</td>
<td>$1,083,092</td>
<td>15.1%</td>
<td>19.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>$358,341,848</td>
<td>$833,353</td>
<td></td>
<td></td>
<td>67.5%</td>
<td>55.5%</td>
</tr>
<tr>
<td><strong>Lots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>48</td>
<td>$62,847,990</td>
<td>$1,309,333</td>
<td>55.2%</td>
<td>61.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>26</td>
<td>$16,730,000</td>
<td>$643,462</td>
<td>29.9%</td>
<td>16.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>13</td>
<td>$21,898,980</td>
<td>$1,684,537</td>
<td>14.9%</td>
<td>21.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>$101,476,970</td>
<td>$1,166,402</td>
<td></td>
<td></td>
<td>13.7%</td>
<td>15.7%</td>
</tr>
<tr>
<td><strong>Residences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>82</td>
<td>$121,860,800</td>
<td>$1,486,107</td>
<td>68.3%</td>
<td>65.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>27</td>
<td>$33,035,991</td>
<td>$1,223,555</td>
<td>22.5%</td>
<td>17.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>11</td>
<td>$30,515,000</td>
<td>$2,774,091</td>
<td>9.2%</td>
<td>16.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>$185,411,791</td>
<td>$1,545,098</td>
<td></td>
<td></td>
<td>18.8%</td>
<td>28.7%</td>
</tr>
<tr>
<td><strong>All Resort Real Estate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>274</td>
<td>$331,935,204</td>
<td>$1,211,442</td>
<td>43.0%</td>
<td>51.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>274</td>
<td>$190,480,425</td>
<td>$695,184</td>
<td>43.0%</td>
<td>29.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>89</td>
<td>$122,814,980</td>
<td>$1,379,944</td>
<td>14.0%</td>
<td>19.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>637</td>
<td>$645,230,609</td>
<td>$1,012,921</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary of West Maui Resort Real Estate Sales, 2005

<table>
<thead>
<tr>
<th>Resort</th>
<th>Number of Sales</th>
<th>Sales Value</th>
<th>Average Sales Price</th>
<th>Market Share (#)</th>
<th>Market Share ($)</th>
<th>Share of Total (#)</th>
<th>Share of Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condos</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>131</td>
<td>$148,864,575</td>
<td>$1,136,371</td>
<td>36.9%</td>
<td>42.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>178</td>
<td>$142,019,454</td>
<td>$797,862</td>
<td>50.1%</td>
<td>49.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>46</td>
<td>$56,572,517</td>
<td>$1,229,837</td>
<td>13.0%</td>
<td>16.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>355</td>
<td>$347,456,546</td>
<td>$978,751</td>
<td></td>
<td></td>
<td>67.4%</td>
<td>48.9%</td>
</tr>
<tr>
<td><strong>Lots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>29</td>
<td>$55,355,500</td>
<td>$1,908,810</td>
<td>51.8%</td>
<td>60.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>16</td>
<td>$14,932,000</td>
<td>$933,250</td>
<td>28.6%</td>
<td>16.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>11</td>
<td>$21,080,000</td>
<td>$1,916,364</td>
<td>19.6%</td>
<td>18.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>$91,367,500</td>
<td>$1,631,563</td>
<td></td>
<td></td>
<td>10.6%</td>
<td>12.8%</td>
</tr>
<tr>
<td><strong>Residences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>77</td>
<td>$170,467,000</td>
<td>$2,213,857</td>
<td>66.4%</td>
<td>62.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>27</td>
<td>$50,788,328</td>
<td>$1,881,049</td>
<td>23.3%</td>
<td>18.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>12</td>
<td>$51,015,000</td>
<td>$4,251,250</td>
<td>10.3%</td>
<td>18.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>$272,270,328</td>
<td>$2,347,158</td>
<td></td>
<td></td>
<td>22.0%</td>
<td>38.3%</td>
</tr>
<tr>
<td><strong>All Resort Real Estate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>237</td>
<td>$374,687,075</td>
<td>$1,580,958</td>
<td>45.0%</td>
<td>52.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali</td>
<td>221</td>
<td>$207,739,782</td>
<td>$939,999</td>
<td>41.9%</td>
<td>29.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>69</td>
<td>$128,667,517</td>
<td>$1,864,747</td>
<td>13.1%</td>
<td>18.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>527</td>
<td>$711,094,374</td>
<td>$1,349,325</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: KBCG
Knowledge Based Consulting Group
### Table 2

**Summary of Resort Real Estate Sales on Maui, 2005**

<table>
<thead>
<tr>
<th>Resort</th>
<th>Condos/ Villas</th>
<th>Lots</th>
<th>Residences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wailea</td>
<td>32 39 31 29 9 10 3 7 17 27 17 16</td>
<td>58 76 51 52 237</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>Kaaanapali</td>
<td>40 43 51 44 1 3 9 3 9 7 5 6</td>
<td>50 53 65 53 221</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>9 16 13 8 2 3 5 1 3 3 3 3</td>
<td>14 22 21 12 69</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>81 98 95 81 12 16 17 11 29 37 25 25</td>
<td>122 151 137 117 527</td>
<td>43.9</td>
<td></td>
</tr>
</tbody>
</table>

Source: Knowledge Based Consulting Group, Hawaii Information Service

### Table 3

**Monthly Distribution of Maui Resort Real Estate Sales**

<table>
<thead>
<tr>
<th>2005</th>
<th>Wailea</th>
<th>Kaaanapali</th>
<th>Kapalua</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>February</td>
<td>13</td>
<td>4</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>March</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>April</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>May</td>
<td>12</td>
<td>4</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>June</td>
<td>19</td>
<td>5</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>July</td>
<td>12</td>
<td>1</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>August</td>
<td>11</td>
<td>1</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>September</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>October</td>
<td>10</td>
<td>4</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>November</td>
<td>11</td>
<td>2</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>December</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Closed YTD</td>
<td>131</td>
<td>29</td>
<td>77</td>
<td>178</td>
</tr>
</tbody>
</table>

Source: Knowledge Based Consulting Group, Hawaii Information Service
### Table 4
Summary of Maui Resort Real Estate Sales by Active Project and Resales, 2004 and 2005

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>2004 sales</th>
<th>2005 sales</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># $</td>
<td>$</td>
<td># $</td>
</tr>
<tr>
<td><strong>Wailea</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villa Polo Beach Club</td>
<td>1 $ 1,550,000</td>
<td>1,550,000</td>
<td>1 $ 3,000,000</td>
</tr>
<tr>
<td>Villa Polo Beachfront</td>
<td>1 $ 4,019,445</td>
<td>4,019,445</td>
<td>0 $</td>
</tr>
<tr>
<td>Villa Wailea Alanui</td>
<td>4 $ 7,125,000</td>
<td>1,781,250</td>
<td>0 $</td>
</tr>
<tr>
<td>Villa Wailea Point Village</td>
<td>1 $ 4,700,000</td>
<td>4,700,000</td>
<td>3 $ 13,775,000</td>
</tr>
<tr>
<td>Villa Na Hale O Makena</td>
<td>9 $ 14,885,000</td>
<td>1,653,889</td>
<td>9 $ 16,511,500</td>
</tr>
<tr>
<td>Villa Makena Surf</td>
<td>13 $ 28,886,450</td>
<td>2,222,035</td>
<td>4 $ 9,664,000</td>
</tr>
<tr>
<td>Villa Grand Champion</td>
<td>32 $ 18,092,500</td>
<td>565,391</td>
<td>25 $ 18,088,500</td>
</tr>
<tr>
<td>Villa Wailea Fairway</td>
<td>15 $ 10,268,000</td>
<td>684,531</td>
<td>18 $ 16,455,700</td>
</tr>
<tr>
<td>Villa Wailea Ekahi I</td>
<td>5 $ 3,680,000</td>
<td>736,000</td>
<td>6 $ 6,323,300</td>
</tr>
<tr>
<td>Villa Wailea Ekahi II</td>
<td>6 $ 4,982,000</td>
<td>830,333</td>
<td>6 $ 7,680,000</td>
</tr>
<tr>
<td>Villa Wailea Ekahi III</td>
<td>7 $ 4,350,000</td>
<td>621,429</td>
<td>8 $ 7,997,000</td>
</tr>
<tr>
<td>Villa Wailea Elua I</td>
<td>5 $ 7,609,989</td>
<td>1,521,998</td>
<td>4 $ 6,200,000</td>
</tr>
<tr>
<td>Villa Wailea Elua II</td>
<td>7 $ 9,700,000</td>
<td>1,385,714</td>
<td>10 $ 10,336,500</td>
</tr>
<tr>
<td>Villa Wailea Ekolu</td>
<td>14 $ 8,693,250</td>
<td>620,946</td>
<td>24 $ 18,559,525</td>
</tr>
<tr>
<td>Villa Palms at Wailea</td>
<td>12 $ 8,392,000</td>
<td>699,333</td>
<td>9 $ 7,748,550</td>
</tr>
<tr>
<td>Villa Palms at Wailea II</td>
<td>12 $ 10,292,780</td>
<td>857,732</td>
<td>10 $ 10,336,500</td>
</tr>
<tr>
<td>Land Maui Meadows</td>
<td>3 $ 1,575,000</td>
<td>525,000</td>
<td>1 $ 758,000</td>
</tr>
<tr>
<td>Land Kaimanu Estates</td>
<td>1 $ 1,250,000</td>
<td>1,250,000</td>
<td>0 $</td>
</tr>
<tr>
<td>Land Wailea Golf Estates</td>
<td>1 $ 465,490</td>
<td>465,490</td>
<td>0 $</td>
</tr>
<tr>
<td>Land Wailea Highlands</td>
<td>2 $ 327,500</td>
<td>1,637,500</td>
<td></td>
</tr>
<tr>
<td>Land Palau'ea</td>
<td>8 $ 185,900</td>
<td>2,323,750</td>
<td></td>
</tr>
<tr>
<td>Land Wailea Kialoa</td>
<td>2 $ 655,000</td>
<td>327,500</td>
<td>2 $ 1,145,000</td>
</tr>
<tr>
<td>Land Wailea Golf Vistas</td>
<td>26 $ 22,367,500</td>
<td>860,288</td>
<td>7 $ 7,257,500</td>
</tr>
<tr>
<td>Land Wailea Pualani</td>
<td>6 $ 3,085,000</td>
<td>514,167</td>
<td>4 $ 3,030,000</td>
</tr>
<tr>
<td>Land Makena</td>
<td>7 $ 23,950,000</td>
<td>3,421,429</td>
<td>4 $ 18,200,000</td>
</tr>
<tr>
<td>Land Maluhia</td>
<td>2 $ 9,500,000</td>
<td>4,750,000</td>
<td></td>
</tr>
<tr>
<td>Residence Palau'ea</td>
<td>1 $ 8,000,000</td>
<td>8,000,000</td>
<td></td>
</tr>
<tr>
<td>Residence Wailea Highlands</td>
<td>2 $ 13,500,000</td>
<td>6,750,000</td>
<td></td>
</tr>
<tr>
<td>Residence Wailea</td>
<td>1 $ 9,900,000</td>
<td>9,900,000</td>
<td></td>
</tr>
<tr>
<td>Residence Maui Meadows</td>
<td>41 $ 40,098,900</td>
<td>978,022</td>
<td>34 $ 40,595,000</td>
</tr>
<tr>
<td>Residence Kaimanu Estates</td>
<td>2 $ 6,300,000</td>
<td>3,150,000</td>
<td></td>
</tr>
<tr>
<td>Residence Wailea Fairways</td>
<td>3 $ 2,726,000</td>
<td>908,667</td>
<td>3 $ 4,964,500</td>
</tr>
<tr>
<td>Residence Wailea Kai</td>
<td>10 $ 10,680,000</td>
<td>1,068,000</td>
<td>8 $ 10,067,500</td>
</tr>
<tr>
<td>Residence Wailea Golf Estates</td>
<td>5 $ 10,725,000</td>
<td>2,145,000</td>
<td>7 $ 16,813,500</td>
</tr>
<tr>
<td>Residence Wailea Kialoa</td>
<td>7 $ 12,904,200</td>
<td>1,843,457</td>
<td>7 $ 16,175,000</td>
</tr>
<tr>
<td>Residence Wailea Golf Vistas</td>
<td>3 $ 4,700,000</td>
<td>1,566,667</td>
<td>2 $ 5,807,500</td>
</tr>
<tr>
<td>Residence Wailea Pualani</td>
<td>6 $ 8,389,000</td>
<td>1,398,167</td>
<td>7 $ 10,594,000</td>
</tr>
<tr>
<td>Residence Makena</td>
<td>4 $ 8,937,700</td>
<td>2,234,425</td>
<td>1 $ 3,100,000</td>
</tr>
<tr>
<td>Residence Makena Place</td>
<td>2 $ 12,800,000</td>
<td>6,400,000</td>
<td>1 $ 7,500,000</td>
</tr>
<tr>
<td>Residence Maluhia</td>
<td>3 $ 30,150,000</td>
<td>10,050,000</td>
<td></td>
</tr>
<tr>
<td><strong>Residence Total</strong></td>
<td>82 $ 121,860,800</td>
<td>1,486,107</td>
<td>78 $ 173,567,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>274 $ 331,935,204</td>
<td>1,211,442</td>
<td>237 $ 374,687,075</td>
</tr>
</tbody>
</table>
### Table 4
Summary of Maui Resort Real Estate Sales by Active Project and Resales, 2004 and 2005

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Subdivision</th>
<th>2004 sales</th>
<th></th>
<th>2005 sales</th>
<th></th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>$</td>
<td>Average Price</td>
<td>#</td>
<td>$</td>
<td>Average Price</td>
</tr>
<tr>
<td><strong>Kaanapali</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maui Kai</td>
<td>8</td>
<td>$2,853,000</td>
<td>$356,625</td>
<td>4</td>
<td>$1,991,330</td>
<td>$497,833</td>
</tr>
<tr>
<td>Papakea</td>
<td>4</td>
<td>$2,227,000</td>
<td>$556,750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaanapali Shores</td>
<td>56</td>
<td>$26,484,958</td>
<td>$472,946</td>
<td>40</td>
<td>$22,763,950</td>
<td>$569,099</td>
</tr>
<tr>
<td>Mahana</td>
<td>27</td>
<td>$16,974,826</td>
<td>$628,697</td>
<td>10</td>
<td>$9,258,000</td>
<td>$925,800</td>
</tr>
<tr>
<td>Hale Kaanapali</td>
<td>10</td>
<td>$3,395,000</td>
<td>$339,500</td>
<td>17</td>
<td>$8,100,600</td>
<td>$476,506</td>
</tr>
<tr>
<td>Kaanapali Plantation</td>
<td>7</td>
<td>$3,264,000</td>
<td>$466,286</td>
<td>3</td>
<td>$2,247,000</td>
<td>$749,000</td>
</tr>
<tr>
<td>Masters @ Kaanapali Hillside</td>
<td>29</td>
<td>$21,674,300</td>
<td>$747,390</td>
<td>24</td>
<td>$24,954,100</td>
<td>$1,039,754</td>
</tr>
<tr>
<td>Vintage</td>
<td>11</td>
<td>$10,860,750</td>
<td>$987,341</td>
<td>10</td>
<td>$11,295,000</td>
<td>$1,129,500</td>
</tr>
<tr>
<td>International Colony Club</td>
<td>7</td>
<td>$3,071,000</td>
<td>$438,714</td>
<td>8</td>
<td>$4,880,400</td>
<td>$610,050</td>
</tr>
<tr>
<td>Maui Eldorado</td>
<td>14</td>
<td>$4,320,600</td>
<td>$308,614</td>
<td>17</td>
<td>$8,678,159</td>
<td>$510,480</td>
</tr>
<tr>
<td>Kaanapali Alii</td>
<td>11</td>
<td>$16,080,000</td>
<td>$1,461,818</td>
<td>9</td>
<td>$13,755,000</td>
<td>$1,528,333</td>
</tr>
<tr>
<td>Kaanapali Royal</td>
<td>11</td>
<td>$6,874,000</td>
<td>$624,909</td>
<td>9</td>
<td>$6,716,000</td>
<td>$746,222</td>
</tr>
<tr>
<td>Whaler</td>
<td>27</td>
<td>$20,764,500</td>
<td>$769,056</td>
<td>20</td>
<td>$20,057,915</td>
<td>$1,002,896</td>
</tr>
<tr>
<td>Summit</td>
<td>3</td>
<td>$4,097,500</td>
<td>$1,365,833</td>
<td>3</td>
<td>$5,095,000</td>
<td>$1,698,333</td>
</tr>
<tr>
<td>Subtotal</td>
<td>221</td>
<td>$140,714,434</td>
<td>$636,717</td>
<td>178</td>
<td>$142,019,454</td>
<td>$797,862</td>
</tr>
<tr>
<td>Land</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Kaanapali Estates</td>
<td>1</td>
<td>$555,000</td>
<td>$555,000</td>
<td>0</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Ke Alii S/D I Ph IIA</td>
<td>3</td>
<td>$1,680,000</td>
<td>$560,000</td>
<td>3</td>
<td>$3,530,000</td>
<td>$1,176,667</td>
</tr>
<tr>
<td>Pinnacle at Kaanapali</td>
<td>16</td>
<td>$10,745,000</td>
<td>$671,563</td>
<td>2</td>
<td>$2,190,000</td>
<td>$1,095,000</td>
</tr>
<tr>
<td>Kaanapali Hillside</td>
<td>2</td>
<td>$1,100,000</td>
<td>$550,000</td>
<td>3</td>
<td>$1,920,000</td>
<td>$640,000</td>
</tr>
<tr>
<td>Kaanapali Golf Estates</td>
<td>2</td>
<td>$1,275,000</td>
<td>$637,500</td>
<td>2</td>
<td>$1,435,000</td>
<td>$717,500</td>
</tr>
<tr>
<td>Ke Alii S/D I</td>
<td>2</td>
<td>$1,375,000</td>
<td>$687,500</td>
<td>6</td>
<td>$5,857,000</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>26</td>
<td>$16,730,000</td>
<td>$643,462</td>
<td>16</td>
<td>$14,932,000</td>
<td>$933,250</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ke Alii S/D III</td>
<td>1</td>
<td>$825,000</td>
<td>$825,000</td>
<td>3</td>
<td>$3,592,000</td>
<td>$3,523,328</td>
</tr>
<tr>
<td>Kaanapali Vista</td>
<td>16</td>
<td>$17,862,500</td>
<td>$1,116,406</td>
<td>13</td>
<td>$21,893,000</td>
<td>$1,684,077</td>
</tr>
<tr>
<td>Kaanapali Hillside</td>
<td>7</td>
<td>$10,297,000</td>
<td>$1,471,000</td>
<td>5</td>
<td>$10,550,000</td>
<td>$2,110,000</td>
</tr>
<tr>
<td>Kaanapali Golf Estates</td>
<td>3</td>
<td>$4,051,491</td>
<td>$1,350,497</td>
<td>4</td>
<td>$8,930,000</td>
<td>$2,232,500</td>
</tr>
<tr>
<td>Ke Alii S/D I</td>
<td>1</td>
<td>$2,300,000</td>
<td>$2,300,000</td>
<td>5</td>
<td>$1,200,000</td>
<td>$2,800,000</td>
</tr>
<tr>
<td>Subtotal</td>
<td>27</td>
<td>$33,035,991</td>
<td>$1,223,555</td>
<td>27</td>
<td>$50,788,328</td>
<td>$1,881,049</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>274</td>
<td>$190,480,425</td>
<td>$695,184</td>
<td>221</td>
<td>$207,739,782</td>
<td>$939,999</td>
</tr>
</tbody>
</table>
### Table 4
Summary of Maui Resort Real Estate Sales by Active Project and Resales, 2004 and 2005

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Subdivision</th>
<th>2004 sales</th>
<th>2005 sales</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>$</td>
<td>#</td>
<td>$</td>
</tr>
<tr>
<td>Kapalua</td>
<td></td>
<td>$</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Villa</td>
<td>Bay Villas</td>
<td>20</td>
<td>$17,458,000</td>
<td>$872,900</td>
</tr>
<tr>
<td>Villa</td>
<td>Golf Villas</td>
<td>20</td>
<td>$12,263,000</td>
<td>$613,150</td>
</tr>
<tr>
<td>Villa</td>
<td>Ironwoods</td>
<td>6</td>
<td>$16,152,500</td>
<td>$2,692,083</td>
</tr>
<tr>
<td>Villa</td>
<td>Ridge</td>
<td>15</td>
<td>$11,560,000</td>
<td>$770,667</td>
</tr>
<tr>
<td>Villa</td>
<td>Coconut Grove</td>
<td>4</td>
<td>$12,967,500</td>
<td>$3,241,875</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>65</td>
<td>$70,401,000</td>
<td>$1,083,092</td>
</tr>
<tr>
<td>Land</td>
<td>Pineapple Hill</td>
<td>2</td>
<td>$1,724,800</td>
<td>$862,400</td>
</tr>
</tbody>
</table>
| Land    | Kapalua                       | 1          | $4,794,180  | $4,794,180 | 0 $
| Land    | Plantation Estates            | 7          | $11,820,000 | $1,688,571 | 3 $7,600,000 | $2,533,333 | 50% |
| Land    | Pineapple Hill at Kapalua PH 2 | 3         | $3,560,000  | $1,186,667 | 1 $1,300,000 | $1,300,000 | 10% |
| Land    | Honolua Ridge                 | 3          | $1,716,667  | $5,150,000 | 1 $1,916,364 | $1,716,667 | 14% |
| Subtotal |                              | 13         | $21,898,980 | $1,684,537 | 11 $21,080,000 | $1,916,364 | 14% |
| Residence | Pineapple Hill               | 7          | $16,765,000 | $2,395,000 | 8 $22,195,000 | $2,774,375 | 16% |
| Residence | Kapalua Place                | 1          | $4,470,000  | $4,470,000 | 1 $8,000,000 | $8,000,000 | 79% |
| Residence | Pineapple Hill at Kapalua PH 2 | 3        | $9,280,000  | $3,093,333 | 1 $4,900,000 | $
| Residence | Plantation Estates           | 2          | $15,920,000 | $7,960,000 | 1 $5,015,000 | $4,251,250 | 53% |
| Subtotal |                              | 11         | $30,515,000 | $2,774,091 | 12 $51,015,000 | $4,251,250 | 53% |
| Total   |                              | 89         | $122,814,980 | $1,379,944 | 69 $128,667,517 | $1,864,747 | 35% |
|          |                              | $645,230,609 | $1,012,921 | $711,094,374 | $1,349,325 | 33% |
| Monthly Average |        | 53         | $53,769,217 | 44 $59,257,865 | $

Source: Knowledge Based Consulting Group
Table 5
Comparison of West Maui Resort Community Real Estate Sales, 2005 to 2004

<table>
<thead>
<tr>
<th>Resort</th>
<th>Number of Sales</th>
<th>Total Sales</th>
<th>Average Sales Price</th>
<th>$/SF</th>
<th>Number of Sales</th>
<th>Total Sales</th>
<th>Average Sales Price</th>
<th>$/SF</th>
<th>Average Price Change</th>
<th>Average Size (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condos</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>131</td>
<td>$148,864,575</td>
<td>$1,136,371</td>
<td>$945</td>
<td>144</td>
<td>$147,226,414</td>
<td>$1,022,406</td>
<td>$820</td>
<td>11%</td>
<td>1,202</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15%</td>
<td>1,247</td>
</tr>
<tr>
<td>Kapalua</td>
<td>178</td>
<td>$142,019,454</td>
<td>$797,862</td>
<td>$756</td>
<td>221</td>
<td>$140,714,434</td>
<td>$636,717</td>
<td>$610</td>
<td>25%</td>
<td>1,055</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24%</td>
<td>1,043</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>355</td>
<td>$347,456,546</td>
<td>$978,751</td>
<td>$859</td>
<td>430</td>
<td>$358,341,848</td>
<td>$833,353</td>
<td>$717</td>
<td>17%</td>
<td>1,139</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20%</td>
<td>1,162</td>
</tr>
<tr>
<td><strong>Lots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>28</td>
<td>$52,255,500</td>
<td>$1,866,268</td>
<td>$61</td>
<td>48</td>
<td>$62,847,990</td>
<td>$1,309,333</td>
<td>$46</td>
<td>43%</td>
<td>30,379</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>34%</td>
<td>28,612</td>
</tr>
<tr>
<td>Kapalua</td>
<td>16</td>
<td>$14,932,000</td>
<td>$933,250</td>
<td>$61</td>
<td>26</td>
<td>$16,730,000</td>
<td>$643,462</td>
<td>$38</td>
<td>45%</td>
<td>15,385</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61%</td>
<td>17,124</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>55</td>
<td>$88,267,500</td>
<td>$1,604,864</td>
<td>$34</td>
<td>87</td>
<td>$101,476,970</td>
<td>$1,166,402</td>
<td>$36</td>
<td>38%</td>
<td>46,668</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-6%</td>
<td>32,016</td>
</tr>
<tr>
<td><strong>Residences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>78</td>
<td>$173,567,000</td>
<td>$2,225,218</td>
<td>$741</td>
<td>82</td>
<td>$121,860,800</td>
<td>$1,486,107</td>
<td>$526</td>
<td>50%</td>
<td>3,001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41%</td>
<td>2,827</td>
</tr>
<tr>
<td>Kapalua</td>
<td>27</td>
<td>$50,788,328</td>
<td>$1,881,049</td>
<td>$589</td>
<td>27</td>
<td>$33,035,991</td>
<td>$1,223,555</td>
<td>$399</td>
<td>54%</td>
<td>3,194</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>48%</td>
<td>3,066</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>117</td>
<td>$275,370,328</td>
<td>$2,353,593</td>
<td>$722</td>
<td>120</td>
<td>$185,411,791</td>
<td>$1,545,098</td>
<td>$519</td>
<td>52%</td>
<td>5,080</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39%</td>
<td>3,996</td>
</tr>
<tr>
<td><strong>All Real Estate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wailea</td>
<td>237</td>
<td>$374,687,075</td>
<td>$1,580,958</td>
<td>$598</td>
<td>274</td>
<td>$331,935,204</td>
<td>$1,211,442</td>
<td>$519</td>
<td>31%</td>
<td>3,259</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapalua</td>
<td>221</td>
<td>$207,739,782</td>
<td>$939,999</td>
<td>$939</td>
<td>274</td>
<td>$190,480,425</td>
<td>$695,184</td>
<td>$695</td>
<td>35%</td>
<td>3,879</td>
</tr>
<tr>
<td>Kapalua</td>
<td>69</td>
<td>$128,667,517</td>
<td>$1,864,747</td>
<td>$1,864,747</td>
<td>89</td>
<td>$122,814,980</td>
<td>$1,379,944</td>
<td>35%</td>
<td>3,879</td>
<td>3,879</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>527</td>
<td>$711,094,374</td>
<td>$1,349,325</td>
<td>$637</td>
<td>$645,230,609</td>
<td>$1,012,921</td>
<td>33%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: KBCG
## Table 6
### Molokai Sales History

<table>
<thead>
<tr>
<th>Sales</th>
<th>2006 (2 months)</th>
<th>2005</th>
<th>2004</th>
<th>2003</th>
<th>2002</th>
<th>2001</th>
<th>2000</th>
<th>% Change (00 to 05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condos</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
</tr>
<tr>
<td>Paniolo Hale</td>
<td>3 $1,380,000</td>
<td>3 $1,200,000</td>
<td>9 $2,725,000</td>
<td>6 $1,010,000</td>
<td>6 $1,499,551</td>
<td>3 $440,000</td>
<td>8 $1,636,500</td>
<td></td>
</tr>
<tr>
<td>Ke Nani Kai</td>
<td>6 $1,830,200</td>
<td>19 $5,710,250</td>
<td>16 $3,120,100</td>
<td>13 $1,814,250</td>
<td>8 $971,500</td>
<td>6 $638,500</td>
<td>3 $424,500</td>
<td></td>
</tr>
<tr>
<td>West Molokai Resort</td>
<td>1 $305,000</td>
<td>10 $2,433,500</td>
<td>22 $3,703,110</td>
<td>21 $2,117,000</td>
<td>8 $767,000</td>
<td>5 $443,000</td>
<td>22 $1,380,000</td>
<td></td>
</tr>
<tr>
<td>Kaluakoi Subtotal</td>
<td>10 $3,515,200</td>
<td>32 $9,343,750</td>
<td>47 $9,548,210</td>
<td>40 $4,941,250</td>
<td>22 $3,238,051</td>
<td>14 $1,521,500</td>
<td>33 $3,441,000</td>
<td>-3%</td>
</tr>
<tr>
<td>Molokai Shores</td>
<td>2 $441,500</td>
<td>5 $1,268,000</td>
<td>6 $666,000</td>
<td>3 $324,000</td>
<td>2 $233,000</td>
<td>4 $389,900</td>
<td>5 $435,000</td>
<td></td>
</tr>
<tr>
<td>Hotel Molokai</td>
<td>2 $217,000</td>
<td>6 $449,000</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molokai Beach Cottages</td>
<td>1 $180,000</td>
<td>3 $540,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kilohana Kai Subdivision</td>
<td>5 $975,000</td>
<td>5 $615,000</td>
<td>2 $280,000</td>
<td>1 $140,000</td>
<td>4 $542,000</td>
<td>1 $140,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavecrest I</td>
<td>4 $1,242,000</td>
<td>22 $5,643,000</td>
<td>24 $4,229,705</td>
<td>19 $1,807,400</td>
<td>12 $1,068,500</td>
<td>3 $227,000</td>
<td>4 $383,000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17 $5,378,700</td>
<td>69 $17,966,750</td>
<td>88 $15,507,915</td>
<td>64 $7,352,650</td>
<td>37 $4,679,551</td>
<td>26 $2,718,400</td>
<td>44 $4,482,000</td>
<td>57%</td>
</tr>
<tr>
<td>Lots</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>6 $3,218,000</td>
<td>25 $12,586,500</td>
<td>65 $19,086,919</td>
<td>33 $10,425,870</td>
<td>2 $630,000</td>
<td>10 $3,125,000</td>
<td>11 $2,809,000</td>
<td>127%</td>
</tr>
<tr>
<td>Other</td>
<td>8 $1,715,500</td>
<td>81 $14,771,014</td>
<td>147 $17,401,939</td>
<td>57 $7,207,120</td>
<td>21 $2,479,800</td>
<td>11 $1,401,000</td>
<td>9 $905,000</td>
<td>800%</td>
</tr>
<tr>
<td>Total</td>
<td>14 $4,933,500</td>
<td>106 $27,357,514</td>
<td>212 $36,488,858</td>
<td>90 $17,632,990</td>
<td>23 $3,109,800</td>
<td>21 $4,526,000</td>
<td>20 $3,714,000</td>
<td>430%</td>
</tr>
<tr>
<td>Residences</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
<td>Sales Volume</td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>0 $ -</td>
<td>8 $12,224,600</td>
<td>5 $4,688,000</td>
<td>5 $5,808,500</td>
<td>0 $ -</td>
<td>4 $2,394,500</td>
<td>3 $1,200,000</td>
<td>167%</td>
</tr>
<tr>
<td>Others</td>
<td>7 $2,122,000</td>
<td>69 $25,616,340</td>
<td>77 $23,102,373</td>
<td>54 $11,685,230</td>
<td>46 $7,596,450</td>
<td>45 $5,787,300</td>
<td>32 $6,057,000</td>
<td>116%</td>
</tr>
<tr>
<td>Total</td>
<td>7 $2,122,000</td>
<td>77 $37,840,940</td>
<td>82 $27,790,373</td>
<td>79 $17,493,730</td>
<td>46 $7,596,450</td>
<td>49 $8,181,800</td>
<td>35 $7,257,000</td>
<td>120%</td>
</tr>
<tr>
<td>Total</td>
<td>38 $12,434,200</td>
<td>252 $83,165,204</td>
<td>382 $79,787,146</td>
<td>213 $42,479,370</td>
<td>106 $15,385,801</td>
<td>96 $15,426,200</td>
<td>99 $15,453,000</td>
<td>155%</td>
</tr>
</tbody>
</table>
## Table 7
### Molokai Real Estate Pricing History

<table>
<thead>
<tr>
<th></th>
<th>2006 (2 months)</th>
<th>2005</th>
<th>2004</th>
<th>2003</th>
<th>2002</th>
<th>2001</th>
<th>2000</th>
<th>% Change (00 to 05)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condos</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paniolo Hale</td>
<td>$460,000</td>
<td>$400,000</td>
<td>$302,778</td>
<td>$168,333</td>
<td>$249,925</td>
<td>$146,667</td>
<td>$204,563</td>
<td>$173</td>
</tr>
<tr>
<td>Ke Nani Kai</td>
<td>$305,033</td>
<td>$300,539</td>
<td>$195,006</td>
<td>$139,558</td>
<td>$121,438</td>
<td>$106,417</td>
<td>$141,500</td>
<td>$147</td>
</tr>
<tr>
<td>West Molokai</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resort</td>
<td>$305,000</td>
<td>$243,350</td>
<td>$168,323</td>
<td>$100,810</td>
<td>$95,875</td>
<td>$88,600</td>
<td>$62,727</td>
<td>$145</td>
</tr>
<tr>
<td>Subtotal Kaluakoi</td>
<td>$351,520</td>
<td>$291,992</td>
<td>$203,153</td>
<td>$123,531</td>
<td>$147,184</td>
<td>$108,679</td>
<td>$104,273</td>
<td>$157</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>$220,750</td>
<td>$111,000</td>
<td>$108,000</td>
<td>$116,500</td>
<td>$97,475</td>
<td>$87,000</td>
<td><strong>155%</strong></td>
</tr>
<tr>
<td>Molokai Shores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel Molokai</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cottages</td>
<td>$180,000</td>
<td>$180,000</td>
<td>$123,000</td>
<td>$140,000</td>
<td>$135,500</td>
<td>$140,000</td>
<td>$93,000</td>
<td>$102</td>
</tr>
<tr>
<td>Kilohana Kai</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subdivision</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavecrest I</td>
<td>$310,500</td>
<td>$256,500</td>
<td>$176,238</td>
<td>$95,126</td>
<td>$75,667</td>
<td>$125</td>
<td>$140,000</td>
<td>$162</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>$316,394</td>
<td>$258,090</td>
<td>$172,117</td>
<td>$135,209</td>
<td>$215,524</td>
<td>$185,700</td>
<td><strong>20%</strong></td>
</tr>
<tr>
<td><strong>Lots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>$536,333</td>
<td>$503,460</td>
<td>$293,645</td>
<td>$315,936</td>
<td>$312,500</td>
<td>$255,364</td>
<td>$200,000</td>
<td>$97%</td>
</tr>
<tr>
<td>Other</td>
<td>$214,438</td>
<td>$182,258</td>
<td>$118,381</td>
<td>$126,441</td>
<td>$127,364</td>
<td>$100,556</td>
<td>$100,000</td>
<td>$20%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>$352,393</td>
<td>$358,245</td>
<td>$312,326</td>
<td>$338,864</td>
<td>$355,950</td>
<td>$300,000</td>
<td><strong>156%</strong></td>
</tr>
<tr>
<td><strong>Residences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>$1,528,075</td>
<td>$937,600</td>
<td>$1,161,700</td>
<td>$216,393</td>
<td>$165,140</td>
<td>$166,976</td>
<td>$207,343</td>
<td><strong>137%</strong></td>
</tr>
<tr>
<td>Others</td>
<td>$303,143</td>
<td>$371,251</td>
<td>$300,031</td>
<td>$216,393</td>
<td>$165,140</td>
<td>$166,976</td>
<td>$207,343</td>
<td><strong>124%</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$303,143</td>
<td>$491,441</td>
<td>$338,907</td>
<td>$296,504</td>
<td>$165,140</td>
<td>$166,976</td>
<td>$207,343</td>
<td><strong>124%</strong></td>
</tr>
</tbody>
</table>
## Table 8

### Origin of Property Owners at Kaluakoi, Molokai

<table>
<thead>
<tr>
<th>Zip Code Range</th>
<th>States</th>
<th>Localities</th>
<th>Lot or Residence</th>
<th>Condominium</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 10000</td>
<td>MA to NJ</td>
<td></td>
<td>7 3.1%</td>
<td>8 2.7%</td>
<td>15 2.9%</td>
</tr>
<tr>
<td>10000 20000</td>
<td>NY to DE</td>
<td></td>
<td>3 1.3%</td>
<td>4 1.3%</td>
<td>7 1.3%</td>
</tr>
<tr>
<td>20000 30000</td>
<td>DC to SC</td>
<td></td>
<td>6 2.7%</td>
<td>3 1.0%</td>
<td>9 1.7%</td>
</tr>
<tr>
<td>30000 40000</td>
<td>GA to MS</td>
<td></td>
<td>5 2.2%</td>
<td>3 1.0%</td>
<td>8 1.5%</td>
</tr>
<tr>
<td>40000 50000</td>
<td>KY to MI</td>
<td></td>
<td>5 2.2%</td>
<td>9 3.0%</td>
<td>14 2.7%</td>
</tr>
<tr>
<td>50000 60000</td>
<td>IA to MN</td>
<td></td>
<td>0 0.0%</td>
<td>7 2.3%</td>
<td>7 1.3%</td>
</tr>
<tr>
<td>60000 70000</td>
<td>IL to Ne</td>
<td></td>
<td>2 0.9%</td>
<td>7 2.3%</td>
<td>9 1.7%</td>
</tr>
<tr>
<td>70000 80000</td>
<td>IA to TX</td>
<td></td>
<td>2 0.9%</td>
<td>3 1.0%</td>
<td>5 1.0%</td>
</tr>
<tr>
<td>80000 90000</td>
<td>CO to NV</td>
<td></td>
<td>15 6.7%</td>
<td>29 9.7%</td>
<td>44 8.4%</td>
</tr>
<tr>
<td>90000 91000</td>
<td>CA Los Angeles, Long Beach</td>
<td></td>
<td>13 5.8%</td>
<td>9 3.0%</td>
<td>22 4.2%</td>
</tr>
<tr>
<td>91000 92000</td>
<td>CA Pasadena, Glendale, Ontario</td>
<td></td>
<td>7 3.1%</td>
<td>10 3.3%</td>
<td>17 3.2%</td>
</tr>
<tr>
<td>92000 93000</td>
<td>CA San Diego, Orange County</td>
<td></td>
<td>24 10.7%</td>
<td>24 8.0%</td>
<td>48 9.2%</td>
</tr>
<tr>
<td>93000 94000</td>
<td>CA Ventura, Fresno, Monterey</td>
<td></td>
<td>10 4.4%</td>
<td>16 5.4%</td>
<td>26 5.0%</td>
</tr>
<tr>
<td>94000 95000</td>
<td>CA San Francisco, Palo Alto, Marin</td>
<td></td>
<td>23 10.2%</td>
<td>23 7.7%</td>
<td>46 8.8%</td>
</tr>
<tr>
<td>95000 96000</td>
<td>CA San Jose, Santa Cruz, Sacramento</td>
<td></td>
<td>9 4.0%</td>
<td>26 8.7%</td>
<td>35 6.7%</td>
</tr>
<tr>
<td>96000 96200</td>
<td>CA Redding, Eureka, Lake Tahoe</td>
<td></td>
<td>0 0.0%</td>
<td>1 0.3%</td>
<td>1 0.2%</td>
</tr>
<tr>
<td>96700 96900</td>
<td>HI Molokai</td>
<td></td>
<td>31 13.8%</td>
<td>21 7.0%</td>
<td>52 9.9%</td>
</tr>
<tr>
<td></td>
<td>Maui</td>
<td></td>
<td>15 6.7%</td>
<td>2 0.7%</td>
<td>17 3.2%</td>
</tr>
<tr>
<td></td>
<td>Oahu</td>
<td></td>
<td>15 6.7%</td>
<td>24 8.0%</td>
<td>39 7.4%</td>
</tr>
<tr>
<td></td>
<td>Kauai</td>
<td></td>
<td>4 1.8%</td>
<td>1 0.3%</td>
<td>5 1.0%</td>
</tr>
<tr>
<td></td>
<td>Hawaii</td>
<td></td>
<td>1 0.4%</td>
<td>1 0.3%</td>
<td>2 0.4%</td>
</tr>
<tr>
<td>97000 98000</td>
<td>OR</td>
<td></td>
<td>9 4.0%</td>
<td>15 5.0%</td>
<td>24 4.6%</td>
</tr>
<tr>
<td>98000 99500</td>
<td>WA</td>
<td></td>
<td>9 4.0%</td>
<td>28 9.4%</td>
<td>37 7.1%</td>
</tr>
<tr>
<td>99500 99999</td>
<td>AK</td>
<td></td>
<td>9 4.0%</td>
<td>8 2.7%</td>
<td>17 3.2%</td>
</tr>
<tr>
<td>90000 99999</td>
<td></td>
<td></td>
<td>0 0.0%</td>
<td>0 0.0%</td>
<td>0 0.0%</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td>1 0.4%</td>
<td>15 5.0%</td>
<td>16 3.1%</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
<td>0 0.0%</td>
<td>1 0.3%</td>
<td>1 0.2%</td>
</tr>
<tr>
<td>Other Foreign</td>
<td></td>
<td></td>
<td>0 0.0%</td>
<td>1 0.3%</td>
<td>1 0.2%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>225 100.0%</td>
<td>299 100.0%</td>
<td>524 100.0%</td>
</tr>
<tr>
<td>California Total</td>
<td></td>
<td></td>
<td>86 38.2%</td>
<td>109 36.5%</td>
<td>195 37.2%</td>
</tr>
<tr>
<td>Hawaii Total</td>
<td></td>
<td></td>
<td>66 29.3%</td>
<td>49 16.4%</td>
<td>115 21.9%</td>
</tr>
</tbody>
</table>
SECTION III

MARKET SUPPORTABLE REAL ESTATE PRODUCTS AT LA’AU POINT

The market research for La’au Point Lots and Residences indicates that there is a sufficient market that has the income, net worth, and product interest to qualify for a lot at La’au Point. The challenge for Molokai Properties Limited is to create a real estate product that appeals to this market and an operations and amenity program that delivers buyer satisfaction. A highly targeted database marketing and image program will also be critical components for project success. KBCG’s market research recommends that the development program should follow some basic product criteria and strategies. These criteria include:

DEVELOPMENT FEATURES

- **Oceanfront Premiums.** The scarcity and premiums for ocean front, and particularly beach front, property are substantial and these opportunities are reflected in the site plan.

- **Privacy.** There should be concern for owner privacy and exclusivity reflected throughout the project. This is particularly important with respect to sight lines from and toward the building envelopes/residences.

- **Residential Activity.** Since La’au Point will not have any built product, it will be important to demonstrate some momentum for community development through incentives for early home building to spec builders and others. It would also be advisable to have an assistance program to guide/manage the approval and construction process for individual lot buyers who are trying to build a home.

- **Protected ocean views from second row and inland units.** This commitment must be easily communicated to the market.

- **Attractive landscaping.** Special landscaping treatments using native plants should differentiate La’au Point from Kaluakoi, particularly at the entrance to La’au Point residential areas and at focal points of owner activity.

- **Project character.** The project should make a special effort to appreciate and incorporate Hawaiian culture, graciousness and service. This is an inherent strength of the people of the island of Molokai and one in which they should be extremely proud. This pride and graciousness should continue to be expressed in the nature and quality of improvements, sensitivity to the land, and other appropriate ways

Pricing Considerations

Prices for oceanfront and unobstructed ocean view lots, condominiums, and residences are at a premium throughout the Hawaiian Islands. As seen in the following price comparison for lots of between 1 acre and 10 acres, the price per square foot begins to accelerate as lot sizes reach two acres or less.
**Ocean View Lots**

Two acre lots with good ocean views have value ratios between $5 per square foot and $25 per square foot depending upon location. The average is $10 per square foot.

![Graph showing value ratios for Maui Ocean View Lots of One Acre or More](image1)

**Ocean Front Lots**

The value ratio for Ocean Front lots also begins to increase at the two acre size mark (indicating that there is relatively little value in a larger lot sales product for this market). The average value ratio for a two acre ocean front lot is around $37 per square foot. Hence the proposed 2-acre lot program for La’au Point is both cost efficient and market efficient when compared to a larger lot program.

![Graph showing value ratio for Maui Oceanfront Lots of 1 Acre and More](image2)
Big Island Comparison

The Big Island has a more active oceanfront lot market and the below chart shows a relatively linear relationship between lot size and value ratio. On the Big Island, 2 acre ocean front lots in the master planned resorts achieve prices in the $4 million range.

Beachfront lots such as those recently sold at Black Sand Beach and Pauoa Beach at Mauna Lani and at Kukio range from $6 million to about $20 million.

Local Conditions

The sales prices and absorption rates for oceanfront and ocean view property at La’au Point will also be influenced by the sales experience and inventory available at Kaluakoi. The recent sales history for lots and residences at Kaluakoi is presented in Appendix D. Currently, ocean view lots are selling at prices of around $400,000 to $500,000 for 5 acres and $600,000 to $700,000 for 20 acres, with view quality being the principal variable. As discussed in Section II, prices have accelerated rapidly in recent years.

There have been relatively few ocean front property sales at Kaluakoi, so we analyzed both raw land sales and residence sales to estimate residual land value. For the 5 acre oceanfront parcels, lot prices are in the $1.25 million range, while the residual value approach yields land values of $800,000 to $2.1 million (3 sales).

Competitive Environment

In terms of future competition, there are a number of projects on the Big Island that are targeted at the luxury market, and there may be some oversupply of ocean view properties in the near term. On the other hand there is very little upcoming inventory of first row beachfront or beach access property. Kukio is just starting sales of its Lot 4 program north of Kona Village, with initial sales at occurring at around $6.5 million. The Kohanaiki project just south of the airport will have some 40 front row lots, but they are set well back from the ocean. Nevertheless, the developer plans to put these on the market in the $4 to $6 million range. On Maui, there are a few new lot developments selling at Kapalua, Kaanapali, and Wailea but they are generally golf and ocean view products mauka of the highway. The only ocean front products currently available are high density condominium and fractional ownership products that are not really competitive with La’au Point. The Royal Lahaina is currently going through the approval

Knowledge Based Consulting Group
process for a more low density condominium product in association with its renovation program. Whereas these will be very attractive units, there will be relatively few and at substantial prices.

**Market Pricing and Absorption for La’au Point**

Considering the strength of underlying demand for oceanfront and quality ocean view property on Hawaii, lot prices should remain at a premium due to limited supply. Whereas Molokai has traditionally lagged the other islands in terms of real estate development and tourism activity, it is becoming better known and recognized as a low density and uncrowded alternative to the resort islands. It is also not trying to capture the ultra premium market that is targeted by the Kohala Coast of the Big Island, the West Maui resorts, and Lanai. Under these conditions, we expect that there will be a significant tradeoff between pricing and absorption rates at La’au Point. An accelerated absorption rate can be achieved through holding prices at a benchmark substantially below the other islands. The greatest value can be achieved by spreading out the development period to capture the premiums associated with the increasing scarcity of oceanfront and prime oceanview real estate in Hawaii. The basic price structure for the La’au Point lot program is shown below. The west facing properties have higher base prices due to their sunset views and proximity to the resort amenities of Kaluakoi.

**Market Driven Pricing Structure for La’au Point Home Sites**

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Number</th>
<th>Premium</th>
<th>Unit Price</th>
<th>Lot Size</th>
<th>$/SF</th>
<th>Sales Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>West/ Sunset Facing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Oceanfront</td>
<td>40</td>
<td>250%</td>
<td>$1,750,000</td>
<td>87,120</td>
<td>$20.09</td>
<td>$70,000,000</td>
</tr>
<tr>
<td>C Premium Ocean View</td>
<td>28</td>
<td>25%</td>
<td>$500,000</td>
<td>87,120</td>
<td>$5.74</td>
<td>$14,000,000</td>
</tr>
<tr>
<td>South Facing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Oceanfront</td>
<td>58</td>
<td>225%</td>
<td>$1,495,000</td>
<td>87,120</td>
<td>$17.16</td>
<td>$86,710,000</td>
</tr>
<tr>
<td>D Premium Ocean View</td>
<td>74</td>
<td>15%</td>
<td>$460,000</td>
<td>87,120</td>
<td>$5.28</td>
<td>$34,040,000</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td></td>
<td>$1,023,750</td>
<td>17,424,000</td>
<td>$11.75</td>
<td>$204,750,000</td>
</tr>
</tbody>
</table>

With this pricing program the project could achieve an absorption rate of around 40 units per year, yielding a total sales value of $205 million, before appreciation and inflation.
IMPACT OF LA’AU POINT DEVELOPMENT ON REAL PROPERTY TAXES

We have been asked to comment on the potential increases to real property tax on existing property in the areas of Maunaloa, Kualapu’u, Kaunakakai and beyond on Molokai as a result of the development of La’au Point, a 200 one-acre high-end lot development on the extreme southwest end of the island. Specifically, “Will the sale of the proposed estate lots cause real property taxes to increase in these areas?”

The question is a valid one. The simple answer is that the assessments of existing property that is not adjacent (and thus not competing in the same market or market area), and/or that has different highest and best use potentials, will not be directly affected.

This finding is based on our analyses of paired assessment trends over time between expanding developments and non-adjacent land holdings, an understanding of value trends and influences, and discussion with the Maui County and Oahu tax offices concerning this specific matter. Of particular note has been the historic lack of ‘cause and effect’ between changes in market prices in Kaluakoi and assessed values elsewhere on the island.

Although not the case with La’au Point, significant market activity on property that has similar use potentials on adjacent lands may cause a change in market value and hence assessment -- but, this is for similar kinds of property, such as lots in the same subdivision or agricultural parcels that have near identical characteristics, where potential purchasers would consider them as alternatives.

The fact is the La’au Point lots are physically separated from the rest of Molokai by hundreds of acres of ranch land, and will be a unique market unto itself. Secondary impacts, if any, might only be potentially possible among the makai portions of the Kaluakoi Ranch lots; however even this inventory already has an established dataset of its own comparable market activity. The creation of the proposed 26,400 acre Land Trust, and another 24,000 acres in either protective or agricultural easements, isolates and distinguishes La’au Point from the rest of urban Molokai.

Changes in assessments are the result of comparable market transactions, fueled by new economic activity or a scarce amenity. La’au Point is not a comparable to the existing real estate.

Only to the extent there is new worker in-migration to the island to support or sustain the development and its residents, could there be some modest indirect impact on selected real estate activity and prices. Offsetting, is the moratorium on further Molokai Ranch Land development as a result of the Land Trust, and protective and agricultural easements, which will reinforce the status quo and limit further development.

James E. Hallstrom, Jr., MAI, CRE
Dated: November 14, 2006
Appendix S

Social Impact Assessment
# Contents

1. Background and Introduction .......................................................... 1  
   1.1. Report Preparation and Description ........................................ 1  
   1.2. The Role and Purpose of Social Impact Assessments .................. 2  
   1.3. Description of the Plan and the Project .................................. 3  
       1.3.1. The Community-Based Master Land Use Plan .................. 3  
       1.3.2. Proposed Changes at Lā’au Point ................................ 5  

2. Profile of the Existing Community ................................................. 8  
   2.1. Historic Overview .................................................................. 8  
   2.2. Study Area Definition ......................................................... 9  
   2.3. Population and Housing Trends ............................................ 10  
       2.3.1. Population Trends ............................................... 10  
       2.3.2. Housing Trends .................................................. 12  
   2.4. Demographics ...................................................................... 13  
       2.4.1. Age and Ethnicity ................................................ 13  
       2.4.2. Housing and Households ......................................... 15  
       2.4.3. Education and Labor Force ...................................... 17  
       2.4.4. Income and Poverty ............................................. 19  

3. Major Forces for Change ............................................................... 22  
   3.1. Public Plans and Forecasts .................................................... 22  
       3.1.1. Maui County General Plan ...................................... 22  
       3.1.2. Moloka‘i Community Plan ....................................... 23  
       3.1.3. Socio-Economic Forecasts ....................................... 25  
   3.2. Ke ‘Aupuni Lōkāhi – Moloka‘i Enterprise Community ............. 26  
   3.3. Department of Hawaiian Home Lands .................................... 29  
   3.4. Public Improvements .......................................................... 30  

4. Preliminary Community Issues ....................................................... 32  
   4.1. Approach and Participants .................................................... 32  
       4.1.1. Public Information Meeting ................................... 33  
       4.1.2. Focus Groups ...................................................... 34  
       4.1.3. Community Interviews .......................................... 38  
   4.2. Comments about Relationship to Moloka‘i and Moloka‘i Style .... 45  
       4.2.1. Relationship to Moloka‘i ...................................... 45  
       4.2.2. Moloka‘i Style .................................................. 46  
       4.2.3. Hopes for the future ............................................. 49
Lā'au Point  Social Impact Assessment

Contents

4.3. Reactions to the Community Based Master Land Use Plan ..... 50
  4.3.1. Positive Characteristics of the Plan ........................... 51
  4.3.2. Problems with the Plan ........................................... 52

4.4. Reactions to the Lā'au Point Project .................................. 53
  4.4.1. Full Support for the Project With or Without the Plan .. 53
  4.4.2. Conditional Acceptance of the Project and Support of Plan 54
  4.4.3. Opposition to the Project and Support for Plan ........... 55
  4.4.4. Opposition to the Project and the Plan ...................... 55

4.5. Suggestions from Meeting and Focus Group Participants and Interviewees.............................................................................. 56
  4.5.1. Suggestions on the Plan .......................................... 57
  4.5.2. Suggestions on General Overall Project..................... 58
  4.5.3. Suggestions on Specific Project Components or Effects 58
  4.5.4. Other Suggestions.................................................. 60

4.6. Analysis .......................................................................... 60

5. Potential Social Impacts....................................................... 63
  5.1. Overview of Impact Analysis in this Report ......................... 63
    5.1.1. Direct and Indirect Impacts ..................................... 63
    5.1.2. The No-Project Scenario........................................ 63

5.2. Population Impacts................................................................ 64

5.3. Relationship to Public and Community Plans ....................... 67

5.4. Impacts on the Social Environment ..................................... 69
    5.4.1. Two Models ........................................................... 69
    5.4.2. Relevance to Lā'au Point ........................................ 75
    5.4.3. Lā'au Point Project Impacts ..................................... 77
    5.4.4. Project Significance and Mitigation ......................... 79
    5.4.5. Social Impacts of No-Project Scenario....................... 81

5.5. Impacts on Public Services and Facilities ......................... 82
    5.5.1. Police Protection Services ........................................ 82
    5.5.2. Fire Protection ....................................................... 83
    5.5.3. Medical Facilities .................................................... 85
    5.5.4. Public Schools........................................................ 86

References ................................................................................. 88

Appendices ................................................................................. 90
  Appendix A: Written Comments From the Public Meeting ............ 90
  Appendix B: Written Comments from West End Residents Focus Group 91
  Appendix C: Written Comments from Filipino Focus Group ........ 94
Tables and Figures

Table 1: Proposed Lā'au Point Project Land Use ........................................5
Table 2: Acreage in State Land Use Commission Petition.........................6
Figure A: Study Area for this Report .......................................................10
Table 3: Moloka'i Population and Housing Trend, 1970 to 2000 ...............11
Figure B: Population Trend for Study Area and East Moloka'i, 1970 to 200012
Figure C: Housing Trend for Study Area and East Moloka'i, 1970 to 200013
Table 4: Study Area Age and Ethnicity, 1990 and 2000 .........................14
Table 5: Study Area Housing Units and Households, 1990 and 2000 ......16
Table 6: Study Area Education and Labor Force, 1990 and 2000 ..........18
Table 7: Study Area Income and Poverty, 1990 and 2000 .....................20
Table 8: Socio-economic forecasts for Moloka'i, 2005 to 2030 ...............25
Table 9: List of People Who Signed In at the Public Meeting...............34
Table 10: Participants in Maunaloa Residents Focus Group Session ..........35
Table 11: Participants in West End Residents Focus Group Session .......36
Table 12: Participants in Filipino Focus Group Session .......................36
Table 13: Participants in Alternatives to Lā'au Development Committee Focus Group Session .................................................................37
Table 14: List of People Interviewed .....................................................39
Table 15: Project Population Estimates .................................................66
1. Background and Introduction

Molokai Properties Ltd., also known as Molokai Ranch, has prepared the Community Based Master Land Use Plan, herein referred to as the Plan, for its land holdings in Moloka‘i, Hawaii. The Plan area encompasses over 60,000 acres. Prepared in conjunction with the Moloka‘i community, the plan includes various actions, including transferal of land to a new Land Trust and renovation of an existing hotel.

To implement a portion of the Plan, amendments to the State Land Use Map are required for proposed actions at Lā‘au Point, herein referred to as the Project. An Environmental Impact Statement, or EIS, is being prepared for uses requiring these amendments. This report is summarized in and appended to the EIS that accompanies the State Land Use Boundary petition.

The proposed Project is an integral part of a Community-Based Master Plan, which is described in this report. The relationship between the Project and the Plan is symbiotic in that realization of the Plan requires Project implementation. Further, the Project’s scope and characteristics were based on the overall Plan and its conditions.

This report therefore incorporates discussion and analysis of the Plan as appropriate to analyzing the social impacts of the Project.

1.1. Report Preparation and Description

This social impact assessment was prepared by Earthplan, whose principal Berna Cabacungan managed the project and served as primary interviewer, researcher, analyst and writer. Independent contractor Michael P. Mays assisted in interviews and research related to community issues, public services and facilities and projects with similar characteristics. Nalani Dahl of Community Planning and Engineering assisted with interviews and research related to census information and major forces independent of the proposed action.

The remaining portions of Section 1 present the role and purpose of social impact assessments and describe the Plan and proposed changes that require amendments to the State Land Use Map.

Section 2 establishes social context with a historic overview, population and housing trends, and demographic information. Section 3 extends the baseline information by examining the major forces for change that would influence Moloka‘i with or without the Plan or proposed changes.
Section 4 presents preliminary community issues based on interviews held in the course of this study. Section 5 identifies potential social impacts in terms of population impacts, relationship to public and community plans, impacts on the social environment, and impacts on public services and facilities.

1.2. The Role and Purpose of Social Impact Assessments

Social impact assessment is a study of how a proposed action or plan affects the human environment. While there are many facets to the human environment, the social context is basically framed by relationships. The social aspects of an area relate to people living and interacting with other people. Social impact analysis explores changes in the physical environment of a community or neighborhood caused by a proposed land development may affect the neighborhood as a social environment.  

Social impact assessment, hereafter referred to as SIA, became a recognized subfield of research and policy application, with the passage of the U.S. National Environmental Policy Act (NEPA) legislation in 1969. It is an interdisciplinary, inter-professional field of social science knowledge and application. SIA draws sometimes from social science, but other times from organizational development, political analysis, or journalism. Its primary function has to do with the development and disclosure of social information relevant to informing the decision-making process and/or designing management actions to deal with problematic social outcomes of a proposed project.

The goal of SIA is to predict the social effects of a policy, program or project while still in the planning stage, before those effects have occurred. The overall framework for SIA is anticipatory research, which seeks to place the expectation and attainment of desired outcomes on a rational and reliable basis.

Commonly identified uses of SIA include:

---


Understanding the ability of a community or group to adapt to changing conditions - In identifying social consequences of a proposed action, cause- and-effect relationships are complex. Different people and different communities react differently to similar events. An important function of SIAs is therefore to obtain and analyze the necessary information about community organization and likely responses to changing conditions. As such, the non-project social scenario is as important as the with-project scenario because it provides the analyst with a realistic social context for the proposed action.

Defining the problems or clarifying the issues involved in a proposed change Frequently, opposition to or support for a proposed project can only be understood and addressed when the proponent is aware of cultural tendencies, underlying issues, vested interests, and misperceptions. The SIA is the basis for defining and clarifying project or program issues in a systematic approach within the EIS framework.

Illuminating the meaning and importance of anticipated change - An important objective of SIA is to determine what meaning a probable impact would have for a community and its residents. Whereas a certain impact may have relatively low social significance in some communities, it may be given more import or significance in other settings or communities.

Identifying mitigation opportunities or requirements - Another function of SIA is to explore how a proposed action can cause the least adverse and most beneficial impacts, and to identify responses from the community and affected persons. SIA information can be crucial in determining what mitigation is necessary, what mitigation alternatives exist, and which mitigation strategies are most likely to work.

1.3. Description of the Plan and the Project

1.3.1. The Community-Based Master Land Use Plan

As noted earlier, social impact assessment is a study of relationships. In that the proposed Project is an integral part of a Community-Based Master Plan, an overview of the Plan is hereby presented.

Molokai Ranch owns over 60,000 acres or about 35 percent of the island of Moloka‘i. Most of its property is located at the west end of the island. Molokai Ranch worked with the Moloka‘i community to develop a plan that designates future uses for all of its land holdings. Highlights of the Plan are as follows:
Protection of land holdings and resources from future development

The Plan protects 55,000 acres, or 85 percent of Molokai Ranch’s land holdings, from development in perpetuity through Land Trust donations and Protective Easement restrictions.

Formation of Moloka'i Land Trust

A key component in the protection from future development is the formation of the Moloka'i Land Trust. Molokai Ranch would donate 26,200 acres, or 40 percent of its land holdings, to the Land Trust. The Land Trust’s ownership and management of these lands will:

- Protect historic and cultural sites;
- Preserve natural and environmental resources; and
- Protect subsistence gathering

The land donation includes two hotel-zoned sites at Kaluako'i and several culturally significant sites. Of the total land gift, 14,390 acres would be protected in perpetuity for agricultural use and 10,560 acres agriculturally zoned lands would be protected as Open Space, thereby prohibiting structural development.

Part of the land donation includes the site of existing communications facilities that operate under a rental agreement with Molokai Ranch. The income generated by these rentals, which currently total more than $250,000 per annum with a capitalized value exceeding $2.5 million, will support the Land Trust in its administrative costs.

Formation of Moloka'i Community Development Corporation

The Plan calls for the formation of the Moloka'i Community Development Corporation, hereafter referred to as CDC, to develop affordable housing, expand educational opportunities and assist Land Trust with project funding.

To help the CDC initiate its operations, Molokai Ranch would provide a 1,300 acre land base for future development of affordable housing. This land base includes:

- Conveyance of 1,100 acres above Kaunakakai, some of which could be used for affordable housing, and
- Reservation of 200 acres around Kualapu'u and Maunaloa for future development of affordable housing in partnership with Molokai Ranch.

In addition, Molokai Ranch would gift several resources to the CDC that would support community development, including:
- 5 acres in Kaunakakai zoned light industrial and available for development in 2011
- 3.2 acres adjacent to Maui Community College (MCC) that will be sold to MCC at market value
- $100,000 from a sale of five acres to Maui County for a new Kaunakakai Fire Station

Renovation of Kaluako’i Hotel and upgrade of the golf course

In discussions related to the formation of the Plan, community participants expressed a strong desire to reopen Kaluako’i Hotel and upgrade the Kaluako’i Golf Course. The Plan therefore includes this component.

1.3.2. Proposed Changes at Lā’au Point

The Lā’au Point Project site is part of a 6,348-acre identified as Tax Map Key (2)5-1-02, parcel 30. Previously used for agricultural and ranch operations, the land is currently vacant. The Project site is relatively dry, supporting mostly kiawe forest and shrub vegetative zones.

The Project site encompasses almost 1,500 acres, as shown in Table 1.

Table 1: Proposed Lā’au Point Project Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 Rural Residential House lots</td>
<td>400</td>
</tr>
<tr>
<td>Conservation and preservation</td>
<td>433</td>
</tr>
<tr>
<td>Rural open space</td>
<td>145</td>
</tr>
<tr>
<td>Parks</td>
<td>17</td>
</tr>
<tr>
<td>Agricultural land</td>
<td>301</td>
</tr>
<tr>
<td>On-site roadways and infrastructure</td>
<td>60</td>
</tr>
<tr>
<td>Off-site road corridor</td>
<td>136</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,492</strong></td>
</tr>
</tbody>
</table>

Of the total Project site, required amendments to the State Land Use Map are presented in Table 2.
Table 2: Acreage in State Land Use Commission Petition

<table>
<thead>
<tr>
<th>Proposed Use</th>
<th>Acreage</th>
<th>Existing Designation</th>
<th>Proposed Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 Rural Residential House lots</td>
<td>400</td>
<td>Agriculture</td>
<td>Rural</td>
</tr>
<tr>
<td>Rural open space</td>
<td>145</td>
<td>Agriculture</td>
<td>Rural</td>
</tr>
<tr>
<td>Parks</td>
<td>8</td>
<td>Agriculture</td>
<td>Rural</td>
</tr>
<tr>
<td>On-site roadways and infrastructure</td>
<td>60</td>
<td>Agriculture</td>
<td>Rural</td>
</tr>
<tr>
<td>Conservation and preservation</td>
<td>253</td>
<td>Agriculture</td>
<td>Conservation</td>
</tr>
<tr>
<td>County park *</td>
<td>9</td>
<td>Conservation</td>
<td>Rural</td>
</tr>
</tbody>
</table>

Total acreage in petition to the State Land Use Commission: 875 acres

* Land will revert to Conservation District after all project improvements are completed.

The Project features the sale of 200 rural residential lots ranging from 1.5 to two acres. The proposed access road corridor will run north to south from Pōhakuloa Road to Kaupoa Beach Camp Road, connecting with Kaluako’i Road and Kulawai Loop. An open space buffer will surround the residential lots.

The Project conservation land will include existing such designated lands and proposed lands for re-designation. It would include coastline, gulches and cultural preserves. Lot lines will be at least 50 feet mauka of current Conservation District boundary. The makai boundary for the community will be determined by current Conservation District or SMA boundary, whichever is greater.

The Moloka’i Land Trust will have ownership of all Conservation District land, including those within the Project site. It would solely own and manage the 116-acre Kamāka’ipō Gulch, and jointly own and manage the 335 acres of Conservation District land in the Project site with the Lā’au Point community homeowners association. The homeowners association will own and manage 280 acres of Agricultural District land in the Project site. This land contains common areas between lot clusters and the mauka buffer zone.

The Project is intended to reduce significant operations deficits that have been borne by Molokai Ranch since the company has acquired the property. Because of this projection of financial viability, Molokai Ranch would then be in a position to proceed with commitments to on-site resource protection and land and other donations included in the Plan.
Hence, implementation of the proposed Project would be the springboard, or starting point, in implementing the overall Plan. The Land Trust and CDC would be enabled to undertake their missions that have been outlined by the community and Molokai Ranch.

Also, proceeds generated by Project implementation would fund renovations and upgrading of Kaluako’i Hotel and Golf Course. Proceeds would fund endowment to CDC that would include five percent of the net sales of lots, plus yet-undetermined percentage of subsequent resale.
2. Profile of the Existing Community

This section establishes the social context for this project. Section 2.1 provides a historic overview. Section 2.2 describes the Study Area. In Section 2.3, population and demographic information is presented.

2.1. Historic Overview

At the time of western contact in 1778, Moloka'i's estimated population was 10,500 persons. In 1859, the Hawaiian government combined Moloka'i's Ko'olau and Kona Districts into one district due to a significant population decrease from 6,000 persons in 1832 to 2,864 persons in 1859. It was felt that such consolidation would allow for efficient administration.

Lands that eventually were part of Molokai Ranch were assigned in 1848 as part of the Great Mahele, and title to these lands was subsequently inherited by Bernice Pauahi Bishop, the last descendant of the Kamehameha dynasty. In 1859, Kamehameha IV established a sheep ranch on the west end at Kaluako'i. His brother, High Chief Kapuaiwa who became Kamehameha V, expanded this holding through acquisition of more land and addition of other types of livestock.

Princess Pauahi’s inheritance excluded the land of Kaluako'i in west Moloka'i, as these were granted to her husband Charles Bishop in 1875. A group of Honolulu business owners purchased these lands and formed Molokai Ranch in 1897.

Molokai Ranch’s principal enterprise was cattle raising, and their lands included 70,000 acres acquired from Bishop interests and 30,000 acres of leased land. American Sugar Company took over those lands in 1898, and leaseholds of large tracts of government land between the ranch lands.

In 1908 Moloka'i was incorporated into the newly formed Maui County. The Kalaupapa Settlement was administratively separated and became Kalawao County. It was to be managed by the State Department of Health. Moloka'i, not including Kalawao County, encompasses 53 ahupua'a. By 1910, the population had significantly declined to 1,006.

Charles Cooke purchased American Sugar Company in 1908 after unsuccessful attempts at cane sugar cultivation due to saline well water. Cooke established Molokai Ranch, and his son George Cooke managed the company.
In the early 1920s, the population increased significantly. By 1930, the number of island residents quadrupled from the 1910 count; approximately 4,400 people lived on Molokai. A major influence was passage of the Hawaiian Homes Act in 1921, resulting in the settlement of Kalama‘ula, Ho‘olehua, Pālā‘au and Kapakea.

Agriculture was another major influence in population growth and settlement patterns. Pineapple was raised on Maunaloa lands leased from Molokai Ranch from 1923 to 1976 by Libby, McNeill & Libby Company, which later became Dole Pineapple. California Packing Corporation, or Del Monte, operated a pineapple plantation at Kualapu‘u. These activities attracted new residents and also a gradual population shift west from the more populated eastern areas.

In the late 1970s, resort development added to the island’s economy when Molokai Ranch and Louisiana Land and Exploration Company formed a partnership to develop the Kaluako‘i Resort. Molokai Ranch eventually sold its interest in that venture.

By the 1980s, the plantations closed, leaving the island dependent on diversified agriculture, primarily vegetable farming and cattle ranching.

In 1987, Brierly Investments, Limited, or BIL, became the sole stockholder of Molokai Ranch, whose land holdings comprised 52,000 acres. BIL reacquired 6,300 acres in southwest Moloka‘i in 2001. These lands included the abandoned Kaluako‘i Hotel, the Kaluako‘i Golf Course and undeveloped resort lands.

### 2.2. Study Area Definition

The Study Area of this social impact assessment is the West Moloka‘i region, which is coterminous with Census Tract 318. With Lā‘au Point as the starting point and heading northeast, physical landmarks in the Study Area include Kaupoa Beach, Pāpōhaku Beach, Wahilauhue, ‘Ilia Point, Mokio Point, Kaiehu Point, Kawa‘aloa Bay, Momomi, Nēnēhānaupō, Pālā‘au State Park, Ka Ule o Nānāhoa look out, Mokomoko Gulch, Manawainui Gulch, Pala‘au Fishpond, Pākanaka fishpond, Kikauhi coast, Kolo Wharf, Halena, and Hale o Lono Harbor.

Study Area communities include Pāpōhaku Ranch, Kaluako‘i, Maunaloa Town, Ho‘olehua, Ma‘ālehu, Kala‘e, and Kualapu‘u. Kaluako‘i Hotel and Golf Course and Molokai Ranch Lodge and Beach Villas are located in the Study Area, as well as Moloka‘i Airport. Figure A illustrates the Study Area for this analysis.
For comparative purposes, information is provided for Moloka'i Island, which includes the Census Tracts 318 and 319, the latter of which is East Moloka'i. East Moloka'i includes the town of Kaunakakai. Census Tract 319, which is Kalaupapa and part of Kalawao County, is not included this analysis. Reportedly 147 persons live in this census tract in 2000, and related population and demographic statistics from this tract are insignificant to this analysis.

**Figure A: Study Area for this Report**

![Study Area Map]

### 2.3. Population and Housing Trends

#### 2.3.1. Population Trends

Moloka'i's population increased from 5,089 persons in 1970 to 7,257 persons in 2000, which represents an overall 43 percent increase. As Table 3 indicates, the rate of growth during this 30-year period was highest in the 1970s, when the population increased an average of 1.5 percent a year.
### Table 3: Molokaʻi Population and Housing Trend, 1970 to 2000

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>5,089</td>
<td>5,905</td>
<td>1.5%</td>
<td>6,587</td>
<td>1.1%</td>
<td>7,257</td>
<td>1.0%</td>
</tr>
<tr>
<td>Housing</td>
<td>1,449</td>
<td>2,334</td>
<td>4.9%</td>
<td>2,731</td>
<td>1.6%</td>
<td>3,013</td>
<td>1.0%</td>
</tr>
</tbody>
</table>


As Figure B shows, most of Molokaʻi’s population growth occurred in East Molokaʻi in this 30 year period. East Molokaʻi’s population increased from 2,574 in 1970 to 4,688 in 2000, which represents a significant 82 percent increase. The highest rate of growth occurred in the 1970s, when the East Molokaʻi population increased an average of 3.3 percent a year.

In contrast, the Study Area population increased only two percent over 30 years. West Molokai’s population decreased from 1970 to 1990 due to plantation closures. Further, the Study Area experienced only a 1.7 annual growth rate in the 1990s. In 2000, the Primary Study Area population of 2,569 persons accounted for 35 percent of Molokaʻi’s total resident population.
2.3.2. Housing Trends

Between 1970 and 2000, Moloka‘i’s supply of housing units more than doubled, from 1,449 units in 1970 to 3,013 units in 2000. Most of this increase occurred in the 1970s, when housing units increased an average of 4.5 percent a year.

Further, most of the increase in housing unit supply occurred in East Moloka‘i. As Figure C shows, East Moloka‘i’s housing unit supply increased 136 percent from 780 units in 1970 to 1,843 units in 2000. Most of this increase occurred in the 1970s, when the housing unit supply increased an average of 6.7 percent a year.
2.4. Demographics

2.4.1. Age and Ethnicity

Moloka‘i’s resident population tends to be younger than the State as a whole. In 1990 and 2000, the State’s median age was 32.6 years and 36.2 years, respectively. As Table 4 shows, Moloka‘i’s median age was 30.6 years in 1990 and 34.25 years in 2000.
Table 4: Study Area Age and Ethnicity, 1990 and 2000

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of</td>
<td>Primary</td>
<td>East</td>
<td>State of</td>
<td>Primary</td>
<td>East</td>
<td>State of</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Hawaii</td>
<td>Study Area</td>
<td>Molokai</td>
<td>CT 318</td>
<td>CT 317</td>
<td>CT 318</td>
<td>CT 317</td>
<td>CT 317</td>
</tr>
<tr>
<td>Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Population</td>
<td>1,108,229</td>
<td>6,587</td>
<td>2,168</td>
<td>4,419</td>
<td>1,211,537</td>
<td>7,257</td>
<td>2,569</td>
<td>4,688</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 5 years</td>
<td>7.5%</td>
<td>10.4%</td>
<td>9.6%</td>
<td>10.8%</td>
<td>6.5%</td>
<td>7.4%</td>
<td>7.9%</td>
<td>7.1%</td>
</tr>
<tr>
<td>5 to 17 years</td>
<td>20.5%</td>
<td>27.5%</td>
<td>28.5%</td>
<td>27.0%</td>
<td>20.6%</td>
<td>25.5%</td>
<td>26.5%</td>
<td>24.9%</td>
</tr>
<tr>
<td>18 to 44 years</td>
<td>42.4%</td>
<td>31.8%</td>
<td>31.6%</td>
<td>31.9%</td>
<td>36.8%</td>
<td>30.9%</td>
<td>31.8%</td>
<td>30.5%</td>
</tr>
<tr>
<td>45 to 64 years</td>
<td>18.3%</td>
<td>18.1%</td>
<td>19.3%</td>
<td>17.4%</td>
<td>22.9%</td>
<td>22.7%</td>
<td>21.0%</td>
<td>23.7%</td>
</tr>
<tr>
<td>65 or older</td>
<td>11.3%</td>
<td>12.3%</td>
<td>11.0%</td>
<td>12.9%</td>
<td>13.3%</td>
<td>13.5%</td>
<td>12.8%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Median Age</td>
<td>32.6 years</td>
<td>30.6 years</td>
<td>30.4 years</td>
<td>30.8 years</td>
<td>36.2 years</td>
<td>34.25 years</td>
<td>32.9 years</td>
<td>35.6 years</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian*</td>
<td>33.4%</td>
<td>17.5%</td>
<td>18.4%</td>
<td>17.0%</td>
<td>24.3%</td>
<td>13.8%</td>
<td>12.6%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Chinese*</td>
<td>6.2%</td>
<td>1.2%</td>
<td>1.1%</td>
<td>1.3%</td>
<td>4.7%</td>
<td>0.6%</td>
<td>0.5%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Filipino*</td>
<td>15.2%</td>
<td>20.6%</td>
<td>20.8%</td>
<td>20.5%</td>
<td>14.1%</td>
<td>12.6%</td>
<td>9.8%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Japanese*</td>
<td>22.3%</td>
<td>8.7%</td>
<td>6.2%</td>
<td>10.0%</td>
<td>16.7%</td>
<td>4.4%</td>
<td>3.5%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Hawaiian*</td>
<td>12.5%</td>
<td>49.0%</td>
<td>50.7%</td>
<td>48.2%</td>
<td>6.6%</td>
<td>34.1%</td>
<td>39.6%</td>
<td>31.1%</td>
</tr>
<tr>
<td>Part Hawaiian**</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>13.9%</td>
<td>18.3%</td>
<td>18.0%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Other</td>
<td>10.4%</td>
<td>2.9%</td>
<td>2.8%</td>
<td>3.0%</td>
<td>19.8%</td>
<td>16.3%</td>
<td>15.9%</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

* indicates that the 2000 numbers identify those who claim one race only.
** indicates that the 2000 numbers identify those who claim two or more races, one of which is Native Hawaiian. The State data includes up to five races, Moloka‘i up to three races only.
*** indicates that the 2000 number identifies those who claim one or more races.

Source: Census 1990, Summary Tape File 1; Census 2000 Summary Tape File 1; The State of Hawaii Data Book 2000; and The Maui County Data Book 1998

In terms of specific age groups, Moloka‘i had a larger minor population (17 years and younger) and a smaller working age population (18 years to 64 years) compared to the State age profile. Moloka‘i’s minor population accounted for one-third of the total population, compared to the State’s 27 percent. Moloka‘i’s working age population accounted for 54 percent of the total population, compared to the State’s 60 percent.

Mirroring the island’s aging trend, the Study Area and East Moloka‘i experienced higher median ages in 2000, with 32.9 years and 35.6 years, respectively. The Study Area tended to be younger than East Moloka‘i, however. Over 34 percent of West Moloka‘i was 17 years old or younger, compared to 32 percent in East Molokai. Also, 12.8 percent of West Moloka‘i was 65 years and older, which was lower than 13.8 percent in East Moloka‘i in the same category.
A detailed analysis of ethnic trends is not possible due to the methodology differences in gathering information between the 1990 and 2000 census taking. In 1990, census respondents were required to select a single ethnic category. In 2000, multi-ethnic respondents were allowed to select the appropriate number of categories. Ethnicity statistics from the two periods are not comparable, and analysis is confined to same year statistics.

In 1990, the largest ethnic categories in the State were Caucasian (33 percent), Japanese (22 percent), and Filipino (15 percent). Hawaiians made of 12.5 percent of the State population. In Moloka‘i, Hawaiians accounted for 49 percent of the 1990 population. Filipinos made up the second largest category (21 percent), followed by Caucasians (17 percent). The 1990 ethnic profiles in the Study Area and East Moloka‘i are similar in terms of largest ethnic groups.

In 2000, the State's largest ethnic categories continued to be Caucasian (24 percent), Japanese (17 percent) and Filipino (14 percent). Hawaiians and part Hawaiians made up 20 percent of the State population.

Moloka‘i’s Hawaiian population continued to be the largest group in 2000, making up 52 percent of the total population. Thirty-four percent reported being a single race, and 18 percent reported being part Hawaiian. The Study Area had a higher proportion of Hawaiians (58 percent) than East Moloka‘i (50 percent).

In both the Study Area and East Moloka‘i, Caucasians made up the second largest ethnic category, at 13 and 14 percent, respectively. The third largest group, Filipinos accounted for ten percent of the Study Area and 14 percent of East Moloka‘i.

2.4.2. **Housing and Households**

In 1990, the housing vacancy rate in Moloka‘i was significantly high. As indicated in Table 5, 26 percent of the housing units were vacant, compared to nine percent in the State housing supply.

In terms of types of housing occupancy in 1990, when compared to the State, Moloka‘i had proportionally more owner occupied homes. Moloka‘i’s 1990 median value of owner-occupied units at $100,250 was significantly lower than the State median of $245,300. Moloka‘i’s median rent was also lower at $279, compared to the State’s median rent of $599.
Table 5: Study Area Housing Units and Households, 1990 and 2000

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of Hawaii</td>
<td>Molokai</td>
</tr>
<tr>
<td>Housing Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>389,810</td>
<td>2,731</td>
</tr>
<tr>
<td>Occupied</td>
<td>91.4%</td>
<td>74.2%</td>
</tr>
<tr>
<td>By Owner</td>
<td>53.9%</td>
<td>63.0%</td>
</tr>
<tr>
<td>By Renter</td>
<td>46.1%</td>
<td>37.0%</td>
</tr>
<tr>
<td>Vacant</td>
<td>8.6%</td>
<td>25.8%</td>
</tr>
<tr>
<td>Median Value of Owner Occupied Units</td>
<td>$245,300</td>
<td>$100,250</td>
</tr>
<tr>
<td>Median Value of Renter Occupied Units*</td>
<td>$599</td>
<td>$316</td>
</tr>
<tr>
<td>Households</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>356,748</td>
<td>2,013</td>
</tr>
<tr>
<td>Average Size</td>
<td>3.01</td>
<td>3.31</td>
</tr>
<tr>
<td>Families</td>
<td>266,439</td>
<td>1,584</td>
</tr>
<tr>
<td>Average Size</td>
<td>3.48</td>
<td>3.77</td>
</tr>
<tr>
<td>Nonfamily/Individual</td>
<td>90,309</td>
<td>429</td>
</tr>
</tbody>
</table>

Source: Census 1990, Summary Tape File 1; Census 2000 Summary Tape File 1; The State of Hawaii Data Book 2000; and The Maui County Data Book 1998

In 2000, the State’s housing vacancy rate increased to twelve percent, and the housing vacancy rate in Moloka‘i continued to be high at 24 percent. The proportion of owner-occupied homes in both the State and Moloka‘i increased slightly. Moloka‘i’s median value of owner-occupied homes was $143,150, which was lower than the State median value of $272,700. The island’s median rent of $518 was lower than the State median rent of $721.

The Study Area had a significantly high housing vacancy rate in 2000 at 34 percent, which was almost double East Moloka‘i’s vacancy rate. Of the Study Area’s occupied units, 32 percent were rentals, which is lower than the 38 percent rentals in East Moloka‘i.

The median value of owner-occupied homes in the Study Area was $131,400, which was lower than East Moloka‘i’s median of $154,900. Moloka‘i’s households have been and continue to be larger than State averages. In 1990, the State average household size was 3.01 persons, while Moloka‘i had an average of 3.31 persons. The Study Area average household size was a high 3.5 persons.

Family sizes were correspondingly high. The 1990 State average family size was 3.48 persons; in Moloka‘i, 3.77 persons.
These trends continued in 2000. While the State average household size was 2.92 persons, Molokai’s average was 3.18 persons. The Study Area average household size was 3.3 persons. Family sizes in Molokai and the Study Area also significantly exceeded the State average.

2.4.3. **Education and Labor Force**

Both the State and Moloka'i educational profiles improved from 1990 to 2000. In 1990, 20 percent of those 25 years and older did not graduate from high school, as shown in Table 6. In Moloka'i, 34 percent did not complete high school as of 1990.

By 2000, only 15 percent of the State population 25 years and older did not complete high school, and 56 percent had attended college.

By 2000, the Moloka'i non-graduation rate decreased to 22 percent and the Study Area and East Moloka'i rates decreased as well. Forty percent of the Study Area residents had graduated from high school as of 2000, and another 36 percent attended college. College attendance was higher in East Moloka'i, at 42 percent.
Table 6: Study Area Education and Labor Force, 1990 and 2000

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of Hawaii</td>
<td>Molokai</td>
</tr>
<tr>
<td>Less than 9th grade education</td>
<td>10.1%</td>
<td>14.7%</td>
</tr>
<tr>
<td>High school education, no graduation</td>
<td>9.8%</td>
<td>19.7%</td>
</tr>
<tr>
<td>High school education, includes equivelancy</td>
<td>28.7%</td>
<td>32.1%</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>20.1%</td>
<td>14.3%</td>
</tr>
<tr>
<td>College degree, Associates</td>
<td>8.3%</td>
<td>6.8%</td>
</tr>
<tr>
<td>College degree, Bachelors</td>
<td>15.8%</td>
<td>8.7%</td>
</tr>
<tr>
<td>College degree with masters, graduate or professional degree</td>
<td>7.1%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Civilian Labor Force</td>
<td>61.8%</td>
<td>60.6%</td>
</tr>
<tr>
<td>Armed Forces</td>
<td>6.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Not in Labor Force *</td>
<td>29.6%</td>
<td>35.7%</td>
</tr>
<tr>
<td>Unemployed **</td>
<td>2.3%</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

Occupations - Civilian Labor Force**

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of Hawaii</td>
<td>Molokai</td>
</tr>
<tr>
<td>Management and professional</td>
<td>26.4%</td>
<td>23.0%</td>
</tr>
<tr>
<td>Service</td>
<td>17.6%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Sales &amp; Office</td>
<td>32.6%</td>
<td>21.8%</td>
</tr>
<tr>
<td>Farming, fishing and forestry</td>
<td>2.9%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Production, transportation and material moving</td>
<td>10.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Construction, extraction, and maintenance</td>
<td>10.0%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>

* Not in Labor Force includes all people 16 years old and over who are not classified as members of the labor force. Consisting mainly of students, housewives, retired workers, people not looking for work, etc.

** Unemployed includes all civilians 16 years old or over who are neither "at work" nor "with a job but not at work" during the reference week, and who were looking for work during the last 4 weeks, and were available to start a job.

For Native Hawaiians on Moloka‘i, the high school graduation rate was a high 50 percent and another 30 percent attended college. 3

In 1990, the labor participation profile was similar in the State and Moloka‘i island, but there were differences between the Study Area and East Moloka‘i. Respectively, 61 percent and 60 percent of the State and Moloka‘i labor population participated in the civilian labor force in 1990. The Study Area had a higher participation rate (65 percent) than East Moloka‘i (59 percent).

---

In 1990, 36 percent of Molokaʻi’s working population was not in the labor force, and non-participation was particularly high in East Molokaʻi at 38 percent. 1990 unemployment was also high in East Molokai at 3.8 percent, compared to 3.6 percent island wide.

By 2000, proportionally more Molokaʻi residents did not participate in the labor force or were unemployed. While over 50 percent of Molokaʻi residents were in the civilian labor force, another 43 percent did not participate in the labor force. Further the 2000 unemployment rate was high at 6.5 percent. Census statistics for the Study Area and East Molokaʻi were similar.

For Native Hawaiians on Molokaʻi, the civilian labor force participation was higher at 59 percent, and 41 percent were not in the labor force. Another 8.5 percent was unemployed. 4

The unemployment rate for Molokaʻi has increased to 8.5 percent by June 2006. The State unemployment rate at that time was 3.7 percent. 5

In terms of occupations, the largest category of occupation in 1990 in the State was sales and office (33 percent). For Molokaʻi in 1990, the largest category was service (25 percent), followed by management and professional (23 percent). Service occupations comprised the largest category in the Study Area in 1990.

In 2000, the largest occupational category in the State and Molokaʻi shifted to management and professional, with 32 percent and 29 percent, respectively. Service occupations comprised the second largest occupation in Molokaʻi; in the State, sales and office occupations were second.

In the Study Area, management and professional and service occupations accounted for the two largest groups of occupations. There was a significant decrease in farming, fishing and forestry occupations in the Study Area. In 1990, 15 percent were in this category, and this decreased to eight percent in 2000.

### 2.4.4. Income and Poverty

In 1990 and 2000, Molokaʻi’s median household and family incomes have been consistently and significantly lower than statewide medians. Census information indicates some improvement in terms of dependence on public assistance income from 1990 to 2000.

---


5 Personal Communication with Robin Komoto from the State of Hawaii Department of Labor and Industrial Relations, August 1, 2006.
As indicated in Table 7, Moloka‘i’s 1990 median household income of $25,923 was $12,906 less than the State’s median household income of $38,829. The differential was similar for family income. In 1990, Moloka‘i’s median family income of $29,973 was $13,000 less than the State’s median family income of $43,156.

**Table 7: Study Area Income and Poverty, 1990 and 2000**

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of</td>
<td>Moloka‘i</td>
</tr>
<tr>
<td></td>
<td>Hawaii</td>
<td></td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$38,829</td>
<td>$25,923</td>
</tr>
<tr>
<td>Households w/ Public Assistance Income</td>
<td>7%</td>
<td>20%</td>
</tr>
<tr>
<td>Median Family Income</td>
<td>$43,176</td>
<td>$29,973</td>
</tr>
<tr>
<td>Median Nonfamily/Individual Income</td>
<td>$24,376</td>
<td>$10,591</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$15,770</td>
<td>$9,622</td>
</tr>
<tr>
<td>Percent Below Poverty Levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td>14.3%</td>
<td>35.4%</td>
</tr>
<tr>
<td>Families</td>
<td>6.0%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Nonfamily/Individual</td>
<td>8.3%</td>
<td>20.3%</td>
</tr>
</tbody>
</table>

* Poverty status data reflects only the year prior to the census (1990 uses data from 1989; 2000 uses data from 1999)

** Poverty level of a person is measured by comparing one’s total family income in the last 12 months with the poverty threshold appropriate for that person’s family size and composition. If the total income of that person’s family is less than the threshold appropriate for that family, then the person is considered poor or “below poverty level”. The thresholds (income cutoffs) are arranged in a matrix that takes into account family size and the presence and number of children under 18.

Sources: Census 1990, Summary Tape File 3; Census 2000 Summary File 4; The State of Hawaii Data Book 2000; and American Coomunity Survey 2004 Subject Definitions

In 2000, the difference between the State and Moloka‘i median household incomes increased to $15,636. For median family incomes, the difference was more pronounced at almost $20,000.

While statewide households with public assistance remained steady between 1990 and 2000, Molokai’s proportion decreased from 20 percent in 1990 to 14 percent in 2000. Both the Study Area and East Moloka‘i followed this decrease in public assistance for households.

Note that income pattern in the Study Area and East Moloka‘i changed from 1990 and 2000. In 1990, the Study Area’s median household, family and individual incomes were higher than East Moloka‘i. In 2000, the situation reversed, although the per capita income in the Study Area remained higher.
In terms of poverty levels, Moloka'i had consistently higher levels than the State. In both 1990 and 2000, Moloka'i’s proportion of households, families, and individuals with incomes below poverty level was more than double those of the State.

While Moloka'i’s proportion of households with incomes below poverty level increased by less than two percent between 1990 and 2000 (compared to the State’s four percent increase), there were significant changes in the two census tracts. In the Study Area, the household poverty category almost doubled, from 19 percent to 35 percent. In East Moloka'i, the household category decreased from 44 percent in 1990 to 38 percent in 2000.
3. Major Forces for Change

This section identifies forces for change in the Study Area that are independent of the proposed project. The information extends the baseline information on the social environment by exploring the type of change directed by public policy, plans, and relevant public improvement projects.

Section 3.1 presents public plans and forecasts. Section 3.2 discusses the Ten-Year Strategic Plan prepared by the Moloka'i Enterprise Community, and Section 3.3 highlights the Moloka'i Island Plan prepared by the State Department of Hawaiian Home Lands. Public improvements are presented in Section 3.4.

3.1. Public Plans and Forecasts

3.1.1. Maui County General Plan

The Maui County Charter requires that its General Plan recognize and state the major problems and opportunities concerning the needs and the development of the county and the social, economic and environmental effects of such development. The General Plan sets forth the desired sequence, patterns and characteristics of future development. Formation of the 1990 General Plan included eight regional citizen teams from Moloka'i, Lana'i and Maui. The goals of the participation program included broad-based community participation and the development of objectives and strategies to address challenges facing the County as a whole.

Five themes form the framework for the Maui County General Plan, as follows:

- Protect Maui county's agricultural land and rural identity
- Prepare a directed and managed growth plan
- Protect Maui county's shoreline and limit visitor industry growth
- Maintain a viable economy that offers diverse employment opportunities for residents
- Provide for needed resident housing

The General Plan’s objective for Moloka'i is to encourage the independent economic revitalization. Policies for Moloka'i include:
Encourage diversified industries to locate to Moloka'i that will form a stable employment base,

Ensure that necessary infrastructure and social services are available to support new development,

Promote alternate agricultural and aquacultural pursuits consistent with the human resources available on the island of Moloka'i,

Discourage lengthening of the existing Moloka'i Airport runway, and discourage the State's efforts to relocate Moloka'i Airport's facilities to the west end of the island, and

Support constructive efforts by the Moloka'i community to evaluate the feasibility of Moloka'i becoming its own County.  

An update of the General Plan is currently underway.

3.1.2. Moloka'i Community Plan

Maui County prepared nine Community Plans that reflect current and anticipated conditions, and advance planning goals, objectives, policies and implementation considerations of the General Plan. The Moloka'i Community Plan provides specific direction to address these components within Moloka'i's values and unique attributes. The Moloka'i Community Plan was first adopted by Ordinance No. 1357 in 1984, and was updated in 2001.

The Moloka'i Community Plan identified key problems that provided the underlying basis for the planning goals, objectives and policies. These problems included:

- Limited economic opportunity, which is the most significant problem facing the community,
- Need to upgrade infrastructure,
- Lack of community control over local decisions,
- Lack of social and recreational facilities and public services,
- High cost of housing, and
- Lack of sufficient water resources.

---

6 Maui County General Plan 1990 Update, available online at [www.co.mauि.hi.us/departments/Planning/generalPlan1990.htm](http://www.co.mauि.hi.us/departments/Planning/generalPlan1990.htm)
The Plan then identified goals as broad statements that identify a preferred future condition. Each goal was accompanied by objectives and policies, as well as implementing actions. Goals that are particularly relevant to this SIA are as follows:

- **Land Use**: Enhance the unique qualities of the island of Molokai to provide future generations the opportunity to experience rural and traditional lifestyles.

- **Subsistence**: The continued practice of subsistence as part of the Molokai lifestyle which incorporates and fosters the traditional and cultural values of conservation, mālama 'aina and 'auwana.

- **Environment**: Preserve, protect and manage Molokai's exceptional natural land and water resources to ensure that future generations may continue to enjoy and protect the island environment.

- **Cultural Resources**: Preservation, enhancement and appropriate use of cultural resources, cultural practices and historic sites that provide a sense of history and define a sense of place for the island of Molokai.

- **Economic Activity**: A balanced local economy which provides preferred employment levels, long-term viability and sustainability while meeting residents' needs, respecting cultural and natural resources, and is in harmony with Molokai's rural quasi-subsistence lifestyle.

- **Housing**: Housing opportunities which are affordable, safe and environmentally and culturally compatible for the residents of Molokai.

- **Social Infrastructure**: An efficient and responsive system of people-oriented public services which enable residents to live a safe, healthy and enjoyable lifestyle.

Goals related to indigenous architecture, design, infrastructure, government and the Department of Hawaiian Home Lands are also contained in the Molokai Community Plan.

In the Study Area, various amendments to the Land Use Map were made in the 2001 update in the Study Area. The largest revision was to redesignate approximately 593 acres in Maunaloa to Park (Golf Course).

The Molokai Community Plan designates specific areas in the Project site Agriculture and Conservation. Molokai Ranch will seek to amend the Community Plan to change the area of the proposed houselots from Agriculture to Rural.
3.1.3. Socio-Economic Forecasts

The Maui County Planning Department developed a socio-economic forecast in preparation for the 2006 General Plan Update. The forecast serves as a planning tool to predict future growth scenarios, and is based on projections developed by the State Department of Business, Economic Development and Tourism.

The model in this forecast is not designed to predict short-term economic cycles. Rather, it provides estimates of long-term trends. Actual conditions will diverge on a short term basis within the long-term time frame.

The baseline forecast for Moloka‘i incorporates historical information and forecasts growth in population and jobs. Unemployment is projected as declining over time as the local economy becomes more similar to that of other Maui County islands. Table 8 contains socio-economic forecasts.

**Table 8: Socio-economic forecasts for Moloka‘i, 2005 to 2030**

<table>
<thead>
<tr>
<th>Historical</th>
<th>Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>6,717</td>
</tr>
<tr>
<td>Households</td>
<td>2,088</td>
</tr>
<tr>
<td>Housing Demand</td>
<td>2,198</td>
</tr>
<tr>
<td>New Resident Demand</td>
<td>n/a</td>
</tr>
<tr>
<td>New Non-Resident Demand</td>
<td>n/a</td>
</tr>
<tr>
<td>Visitor Units</td>
<td>559</td>
</tr>
<tr>
<td>Labor Demand *</td>
<td>2,519</td>
</tr>
<tr>
<td>Unemployment</td>
<td>10.3%</td>
</tr>
</tbody>
</table>

* Labor demand is estimated as total employment plus assumed market level of unemployment (4% of Civilian Labor Force). Figure for 1990 not comparable as it uses lower estimate of self-employed persons.


In terms of population growth, the forecast projects an 18 percent increase by 2030, from a projected 2005 population of 7,127 to a 2030 population of 8,395. This increase is the lowest in Maui County. The overall Maui County population is projected to grow by 42 percent.
3.2. Ke ‘Aupuni Lōkāhi – Moloka‘i Enterprise Community

The Moloka‘i Enterprise Community, or EC, is part of the federal U.S. Department of Agriculture Enterprise Community (EC) /Empowerment Zone (EZ) Program. The EC process in the U.S. began in 1998, which included the participation from the Moloka‘i community. The EC process on Moloka‘i involved thousands of community members in hundreds of meetings. The result is a ten-year strategic plan for Moloka‘i. The U.S. Department of Agriculture designated the entire island of Moloka‘i as an Enterprise Community. To date the EC has included and supported over 40 projects in its ten-year strategic plan. Hence, this effort has significant influence over the forces for Moloka‘i’s future.

This EC prepared a Community Strategic Plan with broad-based community participation. The vision statement of this plan embodies the fundamental values that provide the framework for the plan, as follows:

Moloka‘i is the last Hawaiian Island. We who live here choose not to be strangers in our own land. The values of aloha ‘aina and mālama ‘aina (love and care for the land) guide our stewardship of Moloka‘i’s natural resources, which nourish our families both physically and spiritually. We live by our kūpuna’s (elders) historic legacy of pule o o (powerful prayer). We honor our island’s Hawaiian cultural heritage, no matter what our ethnicity, and that culture is practiced in our everyday lives. Our true wealth is measured by the extent of our generosity.

- We envision strong ‘ohana (families) who steadfastly preserve, protect and perpetuate these core Hawaiian values.
- We are wise and caring community that takes pride in its resourcefulness, self-sufficiency and resiliency, and is firmly in charge of Moloka‘i’s resources and destiny.
- We envision a Moloka‘i that leaves for its children a visible legacy: an island momona (abundant) with natural and cultural resources, people who kōkua (help) and look after one another, and a community that strives to build an even better future on the pa’s (firm) foundation left to us by those whose iwi (bones) guard our land.  

---

7 Molokai Enterprise Community, Vision Statement, available online at [http://molokaiiec.org/aboutus/vision.htm](http://molokaiiec.org/aboutus/vision.htm)
Priorities and strategic focus for the next five years are summarized as follows:

- **Compatible Community Development Process:** Work with Molokai Ranch to create compatible development strategies as part of the Molokai Ranch Community-Based Master Plan.

- **Community Land Trust:** Create and implement a community land trust to help make the vision of Moloka'i community a reality.

- **Economic Base:** Create an economic base that preserves the preferred Moloka'i lifestyle, uses traditional Hawaiian culture as the foundation, and uses all the island’s resources in a pono way.

- **Financial Stability:** Establish financial strength and stability to carry out long term goals and sustain the long term viability of Ke ‘Aupuni Lōkāhi.

- **Organizational Stability and Capacity:** Build Ke ‘Aupuni Lōkāhi’s technical, management, leadership and adaptive capabilities.

The Strategic Plan identifies two goals expected to build momentum and leverage Ke ‘Aupuni Lōkāhi’s resources, as follows:

1. **Develop Moloka'i’s economic base in ways that 1) maintain Moloka'i’s preferred lifestyle; 2) builds on Native Hawaiian culture; 3) protects Moloka'i’s natural resources for future generations; 4) generates employment and economic opportunities for local residents; and 5) are community driven.**

2. **Strengthen Ke ‘Aupuni Lōkāhi’s technical, management, leadership and adaptive capacities to effectively support its ongoing programs, projects, and initiatives.**

Collectively, the goals have seven action areas which are related in some way to the Community-Based Master Land Use Plan. In general, the action areas strengthen the community’s ability to carry out the strategies, and specifically call for the establishment of a community land trust and the creation of employment and economic opportunities as related to the reopening of Kaluako’i.  

---

8 This vision statement was subsequently used in the 2001 Moloka'i Community Plan.

The EC also prepared a community-based visitor plan for the island. Community tourism is defined as a process by which a community is empowered to share its greatness while preserving its dignity. It is small in scale and driven by a genuine desire of the community to share itself, its history, traditions, and customs with strangers, as a means by which to support economic growth.

This Moloka'i initiative is a process-oriented tourism that differs from the tourist destination areas approach used to sell “culture” to visitors. Community Tourism allows the participating residents to share their living culture in a natural setting with small, manageable groups of visitors. The types of cultural settings, community events, cylindrical festivities and sports gatherings offered will depend on residents’ willingness and breadth of sharing a rural and cultural lifestyle.

Community Tourism is activity oriented with the community making decisions on what is shared, breadth of cultural activities to be shared to promote greater understanding and appreciation of the island’s heritage. An intimate interaction between host and guests benefits both. The activity shared with guests exists for its own sake and is not artificial, something created to entertain.

Community Tourism places limitations on the numbers of tourists an area or activity can sustain so that the island will not be overwhelmed by masses of visitors distracting daily rural living. The Community Tourism travel initiatives and offerings are operated by local, indigenous, traditional populations to promote their lifestyle, preserve their traditions, environment and cultural assets. Engaging visitors on the community’s terms empowers the host culture, preserving a sense of place and dignity.

The Community Tourism Plan was conceived as a five-year implementation process involving community participation in gathering data on promotional activities, scheduling events, resident activity participants and requiring a Visitor Coordinator and Committee oversight.

The important initial step upon which the plan rests is establishing an agreement on the tourism carrying-capacity for the island. A monthly calendar of events for each year will be created such as geo-tours, rodeo, Makahiki, and many others for families with keiki.  

---

10 Davianna Pōmaika'i McGregor, PhD, Moloka'i Responsible Tourism Initiative: A Community-Based Visitor Plan for Moloka'i” (February 2006).
3.3. Department of Hawaiian Home Lands

Development of State Department of Hawaiian Home Lands, or DHHL, properties has been and is a major force for change in Moloka'i. Moloka'i DHHL lands are situated in 'Ualapu'e, Kapa'akea, Makakupa'ia, Kamiloloa, Kalama'ula, Kalaupapa, Pālā'au, and Ho'olehua. These holdings comprise 25,899 acres, or 16 percent of the island’s total acreage.

DHHL prepared the Moloka'i Island Plan, or MIP, in June 2005. The MIP provides recommendations for the future use its land holdings and identifies priority areas for homestead development. Highlights of the MIP recommendations are as follows:

- **Residential Homesteads**: The MIP proposes 417 new residential homesteads, with priorities focusing on 'Ualapu'e, Kapa'akea, Makakupa'ia and Kamiloloa. A target of 361 units is identified as priorities. Currently, DHHL residential areas encompass 742 acres.

- **Agriculture Homesteads**: The MIP calls for completion of 58 Naiwa agricultural lots in Ho'olehua that were previously awarded. In addition, the MIP includes the subdivision of Ho'olehua lands that could yield 544 agriculture lots. Currently, 2,350 acres are designated for Subsistence Agriculture; for Supplemental Agriculture, 5,862 acres.

- **Pastoral Homesteads**: Currently, 1,927 acres are designated for pastoral use.

- **General Agriculture**: This designation preserves land for future use, and makes it available for farming and ranching leases. Currently, over 8,498 acres are designated for general agriculture.

- **Special District**: Areas that are environmentally or culturally sensitive are in this designation. Comprising 5,558 acres, lands in this category are to be protected, and are made available for certain community and community uses.

- **Community Use**: Community Use designated areas are located in residential communities and accommodate schools, park sites and community use areas. Currently 224 acres are in this category.

- **Conservation**: Environmentally sensitive areas in Kalaupapa and Ho'olehua comprise the 655 acres in this category.

- **Commercial**: These lands are designated for DHHL income generation and encompass 58 acres in Kalama'ula and Ho'olehua.
Industrial: Sixteen acres in Kapa'akea are in this category.  

3.4. Public Improvements

In general, most of the public improvements in Maui County’s Fiscal Year 2006, 6-Year Capital Improvement Program are related to relatively minor upgrades and improvements. County projects related to socially-relevant public services and facilities are as follows:

- New Kaunakakai Fire Station, Government Facilities  
  *Fire and Public Safety Department*: Design and construction of a new station.

- New Moloka‘i Baseyard, Government Facilities
  *Public Works and Environmental Management – Engineering Division*: Buy six contiguous lots at the Moloka‘i Industrial Park, design and build new baseyard.

- New Moloka‘i Police Station, Government Facilities
  *Police Department*: A new station will bring a sense of pride and importance not only to the employees of the Police Department, but also to the residents of Moloka‘i.

- New Pukoo Fire Station, Government Facilities
  *Fire and Public Safety*: Construction of a new fire station in Puko‘o.

In terms of State projects, planned improvements are mostly minor improvements and upgrades. The Department of Transportation, Airports Division, prepared a master plan for Ho'olehua Airport. Highlights of the two phases of improvements are as follows:

*Phase 1 (1998 – 2005)*

- Resolve impacts for Runway 5-23 improvements on Hawaiian Homestead land
- Mass grade approximately 360,000 cubic yards of excavation northeast of Runway 5-23

*Phase 2 (2006 – 2020)*

- Resolve impacts for Runway 5-23 improvements on Hawaiian Homestead land for Runway 5-23 extension and other improvements needed to satisfy FAA regulations and design criteria.

---

• Extend Runway 5-23 by 500 feet to the southwest

• Construct new passenger terminal building, new aircraft parking apron and new cargo building

• Develop new general aviation hangars, new helicopter apron, new passenger terminal roadways, and new parking lot. ¹²

Implementation of this master plan is undetermined.

4. Preliminary Community Issues

Impacts are changes that may occur as a result of a proposed action, plan or policy. Issues are reactions and opinions. Issues can change over time, as people's priorities and values change.

Issues analysis helps decision-makers identify and analyze community concerns about a proposed action. To ensure that a proposed action is reviewed in the full social context in which the project is proposed, feelings and concerns about the existing community need to be considered as well. For example, it is helpful to understand if a project is unique in terms of its issues, or if reactions are consistent with other proposed changes.

Issues analysis differs from statistical surveys, the latter of which is designed to focus on frequency of reactions. Polls are valuable because they tell us about the opinions of the majority or the minority. The survey instrument is not conducive to dialogue, however, and the personalized reasons for these opinions are not evident, or need to be inferred from the responses.

In contrast, the only time we make reference to the quantity of opinion in issues analysis is where there is significant difference of number or a distinct trend.

Section 4.1 discusses the approach for the issues analysis, and describes the three sources of community input. Section 4.2 presents findings related to feelings about respondents’ relationships to Moloka‘i and their definition of “Moloka‘i Style.” Section 4.3 presents reactions to the Plan, and reactions to the Project are summarized in Section 4.4. Section 4.5 presents community suggestions, and Section 4.6 presents our analysis.

4.1. Approach and Participants

This issues analysis is crucial in understanding the full context of issues important to a broad cross section of people. Given the high-profile nature of both the Plan and the Project, there has been much publicized opinion both for and against the Plan and the Project. For a thorough issues analysis, it is important to identify not just issues important to vocal individuals, but also issues important to those whose opinions have not been featured in the media or expressed in public meetings.
Hence, a major objective of this analysis was to capture the opinions of a broad cross section of the community, regardless of previous media coverage, publicized opinion, public testimony or any other venue for taking a public stance. We made every effort to reach both prominent community members, as well as the “silent majority” to understand the full breadth of public opinion on the Plan and the Project.

Although the venues and participants varied, there was a common line of questions that followed a basic approach.

- **What is Moloka‘i Style?** In our research and experience in other meetings, there was an underlying theme of a Moloka‘i identity. People often assessed activities, behavior, and attitudes based on whether or not it was reflective of a Moloka‘i value or behavior. There seemed to be a common understanding shared by residents of what constitutes a Moloka‘i identity. To understand issues related to the Plan and the Project, it was therefore necessary to place these in the context of “Moloka‘i style.”

- **The Community Based Master Land Use Plan and Lā‘au Point:** As discussed in Section 1, the Project has an integral relationship with the Plan. Hence, after we asked questions about Moloka‘i style, we described the Plan and the Lā‘au Point project that is the subject of the Land Use Commission petition. We then asked for reactions to both.

- **Relationship of the Plan and Project to Moloka‘i Style:** Participants were then asked to relate their feelings about the Plan and Project to their perspective on Moloka‘i Style. They were also asked to share suggestions.

Three sources of information were used, including 1) a public information meeting, 2) several focus groups and 3) community interviews. Subsequent sections describe the venue and participants of each source.

### 4.1.1. Public Information Meeting

A public meeting was held to discuss social impacts related to the Community Based Master Land Use Plan and the proposed project at Lā‘au Point. The meeting was held at Kaunakakai Elementary School cafeteria on July 26, 2006, 6:00 PM. It was publicized in local newspapers.

Approximately 32 people attended, and Table 9 lists the 27 participants who signed in.
Table 9: List of People Who Signed In at the Public Meeting

<table>
<thead>
<tr>
<th>Name</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcia Allison</td>
<td>Cummins K Mahoe III</td>
</tr>
<tr>
<td>Bob Boylan</td>
<td>Michael Martin</td>
</tr>
<tr>
<td>Marilyn Burgin</td>
<td>Abbey Mayer</td>
</tr>
<tr>
<td>Cheryl Corbiell</td>
<td>Steve Morgan</td>
</tr>
<tr>
<td>Harold Edwards</td>
<td>Guy Hanohano Naehu</td>
</tr>
<tr>
<td>Tom Holloman</td>
<td>Peter Nicholas</td>
</tr>
<tr>
<td>Illona Honig</td>
<td>Josh Pestrana</td>
</tr>
<tr>
<td>Elizabeth Johnson</td>
<td>Brennan Purtzer</td>
</tr>
<tr>
<td>William Kaholoaa, Sr.</td>
<td>Kalaniula Ritte</td>
</tr>
<tr>
<td>Bill Kapuni</td>
<td>Yogesh Simpson</td>
</tr>
<tr>
<td>Victoria Kapuni</td>
<td>Glenn Teves</td>
</tr>
<tr>
<td>Sol Kawai, Jr.</td>
<td>Bree Ullman</td>
</tr>
<tr>
<td>Cynthia Luafalemana</td>
<td>Matt Yamashita</td>
</tr>
<tr>
<td>Uya-Justina Luafalemana</td>
<td></td>
</tr>
</tbody>
</table>

At least five people chose to not to add their names to the sign-in sheet. At the meeting, they said they did not want their names to be used in a way that might construe support of the Plan or Project.

Although the agenda was loosely followed, and some people objected to the questions and presentation of the Plan, participants generally discussed relevant topics. Participants who spoke at the meeting were adamant in their opposition to the Plan and Project.

Not all participants voiced their opinion, and it is not assumed that the spoken opinions were unanimous. It was clear, however, that all who spoke were in opposition. One person submitted written comments and it is presented in Appendix A. Input from this meeting is incorporated in the overall analysis.

4.1.2. **Focus Groups**

Focus groups are essentially meetings that serve as focused interviews of a group of people. While individual interviews provoke thought and elicit personal views, focus groups add another dimension with group exchange and dynamics. In this analysis, focus groups were selected as another avenue for input to optimize the number of contacts within a limited time frame.
Also, focus group meetings provide an opportunity for group exchange outside the typical public meeting. In our review of media coverage of public meetings on controversial subjects in Moloka'i, discussions tend to be confrontational and heated. The focus group sessions for this issues analysis were designed to provide non-confrontational settings. The groups were generally homogenous in that participants shared a common background or common position regarding the Plan and Project.

The format for the focus group sessions was similar to that of the public meeting. Earthplan contacted a member of the group, and that individual was responsible for extending invitation to his or her peers. Each group had a unique perspective and participants and general characteristics are hereby described.

- **Maunaloa residents**

  Maunaloa is the town closest to the Project site. A focus group session was held with a group of these residents on July 25, 2006 in the Lōkahi Room at the Molokai Lodge. Table 10 lists the ten participants.

  \begin{table}[h]
  \centering
  \begin{tabular}{|l|l|}
  \hline
  Ziantell Dudoit & Janice Pele \\
  Raymond Hiro & John Pele \\
  Roxanne Hiro & Bo Perez \\
  Kalapana Kelihiomalu & Brennan Purtzer \\
  Davianna McGregor & C. Kehau Pule \\
  \hline
  \end{tabular}
  \caption{Participants in Maunaloa Residents Focus Group Session}
  \end{table}

  One person lived outside Maunaloa on the West End and was invited by a participant. One lived elsewhere but worked in Maunaloa, and another person attended as an observer.

  In general, participants were supportive of the Plan and the Project. They were hopeful that the Project would improve economic conditions and that the Plan would preserve cultural and environmental resources. Further, they expressed a desire for effective implementation that avoids mismanagement and unfair personal gain. Input from this session is incorporated in the overall analysis.

- **West End residents**

  Residents of Kaluako'i and Pāpōhaku Ranch are in close proximity to the Project and would have direct contact with Project activities and residents. A focus group session was held with a group of these residents on July 31, 2006 in the Lōkahi Room at the Molokai Lodge. Table 11 lists the ten participants.
Table 11: Participants in West End Residents Focus Group Session

<table>
<thead>
<tr>
<th>George Benda</th>
<th>Keith Rasmussen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pat Benda</td>
<td>Carol Tahmoush</td>
</tr>
<tr>
<td>Bob Dreyer</td>
<td>Mike Tahmoush</td>
</tr>
<tr>
<td>Joseph Pentak</td>
<td>Raymond Tensfeldt</td>
</tr>
<tr>
<td>Barbara Rasmussen</td>
<td>Yvonne Wheeler</td>
</tr>
</tbody>
</table>

Some of these people participated in the preparation of the Plan, and are active in community efforts. In general, they felt that the Plan was acceptable. Their primary reaction to the Project was its effect on their community in terms of infrastructure and public services. They envisioned opportunities to improve these facilities with the development of the project and several suggestions were offered. Input from this session is incorporated in the overall analysis. Two people submitted written comments and these are contained in Appendix B.

- Filipino residents

Our initial research indicates that while people of Filipino ancestry comprise the third largest ethnic group in Moloka‘i, they tended to avoid public meetings and controversial settings. This group was therefore considered part of the silent majority. A focus group session was held with a group of these residents at a private residence on July 27, 2006. Table 12 lists the 24 participants.

Table 12: Participants in Filipino Focus Group Session

<table>
<thead>
<tr>
<th>Estefonia Acoba</th>
<th>Erlinda Oasary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cresencia Befitel</td>
<td>Sylvia Pabalan</td>
</tr>
<tr>
<td>Sara Bongolan</td>
<td>Benny Piros</td>
</tr>
<tr>
<td>Tess Bongolan</td>
<td>Fely Piros</td>
</tr>
<tr>
<td>Adelina Cera</td>
<td>Leo Piza</td>
</tr>
<tr>
<td>Stanley Cera</td>
<td>Catalina Rabara</td>
</tr>
<tr>
<td>Annabelle Clemente</td>
<td>Ben Ragonton</td>
</tr>
<tr>
<td>Jerry Clemente</td>
<td>Perlita Ragonton</td>
</tr>
<tr>
<td>Debbie Davis</td>
<td>Elena Ragonton</td>
</tr>
<tr>
<td>Rudy Lat</td>
<td>Navario Ragonton</td>
</tr>
<tr>
<td>Francisco Mercado</td>
<td>Lawrence Reyes</td>
</tr>
<tr>
<td>Leonida Molina</td>
<td>Yolanda Reyes</td>
</tr>
</tbody>
</table>
These participants tended to be supportive of both the Plan and the Project due to perceived low negative impacts and the benefits of the Project’s employment generation. They appreciated the reopening of Kaluako‘i Resort, affordable housing and resource conservation. Input from this session is incorporated in the overall analysis. Two people submitted written comments and these are contained in Appendix C.

- Alternatives to Lā‘au Point Committee

During the formation of the Plan, the Alternative to Lā‘au Point Development Committee, hereafter referred to as ALDC, was formed to:

- Create an alternative document that speaks to sustainable economic models that encompasses MPL lands, particularly Ke Lae Lā‘au
- To ensure the establishment of a sustainable community land trust which serves as the mechanism for responsible land management
- To develop viable fundraising strategies to support the implementation and sustainability of those efforts.  

A focus group session with people who were active in the ALDC was held on July 28, 2006 in a private office. Table 13 lists the five participants.

| Table 13: Participants in Alternatives to Lā‘au Development Committee Focus Group Session |
| Mahealani Davis |
| Kekama Helm |
| Josh Pestrana |
| Mikiala Pescaia |
| Matt Yamashita |

All were participants in both the formation of the Plan and the ALDC report. This group was critical of the community-based process in the development of the Plan; they believed that the report on alternatives was not genuinely considered in the decision-making process. Further, as may be surmised by the name of the committee, this group disapproved of the Project. Input from this session is incorporated in the overall analysis.

\[13 \text{ New West Land Company, et al., Report to the Ke ʻAupuni Lōkāhi, Inc., Moloka‘i Enterprise Community (EC) (October 8, 2005), page 3.}\]
4.1.3. Community Interviews

The most extensive effort in this issues analysis focused on interviews of community members. Three interviewers conducted most of the interviews over a one and a half-week period. Most of the interviews were held in person; a few telephone interviews were conducted as requested.

Our primary objective was to learn about the existing community and how the Plan and Project would relate to people’s feelings and community values. Hence, though the interview questions were standard, we also allowed for flexibility so that those interviewed could converse, or “talk story,” in a manner that was comfortable for them.

Interviewees were informed that their names and affiliations would be listed in this report. We noted that the affiliations and organizational information was solicited to provide the readers an indication of the interest base of those interviewed. People spoke as individuals, and did not represent or speak for their organizations.

They were further informed that their individual conversations were confidential, and that their comments would be collectively analyzed. Confidentiality was very important for those who were concerned that their individualized views may be publicized and that they would be criticized by people who oppose the Plan or Project.

Because of the interviews afforded more personal interaction than group meetings, we expanded the areas of questions as follows:

- Relationship with Moloka‘i
- Description of Moloka‘i Style
- Hopes for the future of Moloka‘i, for their children and grandchildren
- Reactions to the overall Plan (not just the Lā‘au Point portion)
- Reactions to the Project as part of the Plan and by itself
- Relationship of the Plan and Project to Moloka‘i Style
- Suggestions

As previously discussed, an understanding of the full range of feelings and concerns about a proposed project needs a broad cross-section of people. Every effort was made to contact people who are active in their community through their participation in social, educational, cultural, and economic development activities and organizations, as well as people who might not be active, but were referred to us by those interviewed.
A few people chose to participate in more than one aspect of this study. They were interviewed and also chose to attend the public meeting or a focus group. No one participated in all three activities.

Five people declined to be interviewed. Two did not want to participate because of the high profile of this project and did not want to take any kind of position. Two were concerned about being part of a study that was part of the petition to the State Land Use Commission; they did not want their participation to be construed as support. Both attended the public meeting. One person had agreed to be interviewed, but was busy at the agreed upon time.

In all, 62 people were interviewed. Those interviewed were asked to identify their organizational and other affiliations so that the reader would have an idea as to the cross section of interests reflected in this analysis. Interviewees shared their opinions as individuals, however, and were not asked to take a position for their organization. Further, individuals selected the affiliations that would be listed in this report. The list of names is provided in Table 14.

Table 14: List of People Interviewed

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation and Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vivian “Vani” Ainoa</td>
<td>President of Na Pu’uwai - Native Hawaiian Health System for Moloka’i</td>
</tr>
<tr>
<td></td>
<td>Member of Ka’ahumanu Society</td>
</tr>
<tr>
<td></td>
<td>Kamiloloa, One Ali’i resident</td>
</tr>
<tr>
<td>Billy Akutagawa</td>
<td>Executive Director of Na Pu’uwai – Native Hawaiian Health System for Moloka’i</td>
</tr>
<tr>
<td></td>
<td>Certified gun safety trainer on Moloka’i (works with the State Department of Land and Natural Resources as volunteer)</td>
</tr>
<tr>
<td></td>
<td>Member of the Board of Directors of Moloka’i Community Health Center</td>
</tr>
<tr>
<td></td>
<td>Past member of Moloka’i Burial Council</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Zesseca Apiki</td>
<td>Moloka’i Branch Manager of Maui Economic Opportunity</td>
</tr>
<tr>
<td></td>
<td>Member of Moloka’i Chamber of Commerce</td>
</tr>
<tr>
<td></td>
<td>Member of General Advisory Committee of Local Advisory Charter School</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Kahu Anna L. Arakaki</td>
<td>Kupuna</td>
</tr>
<tr>
<td></td>
<td>Kahu of Ka Hale La’a O Ierusalem</td>
</tr>
<tr>
<td></td>
<td>Ho’olehua Homestead resident</td>
</tr>
<tr>
<td>Name</td>
<td>Affiliation and Residence</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Kuulei Arce</td>
<td>Loan Manager in Business Development Corporation, Maui Economic Opportunity</td>
</tr>
<tr>
<td></td>
<td>Member of 4-H Club</td>
</tr>
<tr>
<td></td>
<td>Ho’olehua resident</td>
</tr>
<tr>
<td>George Benda</td>
<td>Co-founder of Aka’ula School</td>
</tr>
<tr>
<td></td>
<td>Pāpōhaku Ranchlands resident</td>
</tr>
<tr>
<td>Pat Benda</td>
<td>Pāpōhaku Ranchlands resident</td>
</tr>
<tr>
<td>Julie-Ann Bicoy</td>
<td>Director of Moloka’i Visitors Association</td>
</tr>
<tr>
<td></td>
<td>Past elementary school teacher</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Lori Buchanan</td>
<td>Former Commissioner of the Moloka’i Planning Commission</td>
</tr>
<tr>
<td></td>
<td>Owner of Moloka’i Mortuary</td>
</tr>
<tr>
<td></td>
<td>Field Technician of Moloka’i / Maui Invasive Species Committee</td>
</tr>
<tr>
<td></td>
<td>Ho’olehua resident</td>
</tr>
<tr>
<td>Louise Malulani Bush</td>
<td>Vice President of Ho’olehua Homestead Association</td>
</tr>
<tr>
<td></td>
<td>Administrative Assistant of Kamehameha Schools</td>
</tr>
<tr>
<td></td>
<td>Ho’olehua resident</td>
</tr>
<tr>
<td>Judy Caparida</td>
<td>Kupuna in Manae</td>
</tr>
<tr>
<td>Stacy Crivello</td>
<td>President of Board of Directors of Moloka’i Enterprise Community</td>
</tr>
<tr>
<td></td>
<td>Ho’olehua resident</td>
</tr>
<tr>
<td>Nani Duvauchelle</td>
<td>Case Manager in Community Services, Maui Economic Opportunity</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Jojo Espaniolo</td>
<td>Kupuna</td>
</tr>
<tr>
<td></td>
<td>Maunaloa resident</td>
</tr>
<tr>
<td>Lisa Esteron</td>
<td>Case Manager in Community Services, Maui Economic Opportunity</td>
</tr>
<tr>
<td></td>
<td>Maunaloa resident</td>
</tr>
<tr>
<td>Ray Foster</td>
<td>Hawaiian Research, Site Manager of Monsanto</td>
</tr>
<tr>
<td></td>
<td>President of Kawela Home Owners Association</td>
</tr>
<tr>
<td></td>
<td>Kawela resident</td>
</tr>
<tr>
<td>Ruby Guerra</td>
<td>Camp Host at Kaupoa Beach Villas</td>
</tr>
<tr>
<td></td>
<td>Shop Kualapu’u steward and secretary for ILWU unit</td>
</tr>
<tr>
<td></td>
<td>Kualapu’u resident</td>
</tr>
</tbody>
</table>
## Preliminary Community Issues

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation and Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carol Harms</td>
<td>Owner of Budget Car Rentals at Ho'olehua Airport, West end resident</td>
</tr>
<tr>
<td>Dayna Harris</td>
<td>Realtor, Kaunakakai resident</td>
</tr>
<tr>
<td>Donna Haytko-Paoa</td>
<td>Professor / Coordinator at Maui Community College in Moloka'i, East end resident</td>
</tr>
<tr>
<td>Kekama Helm</td>
<td>Canoe club coach with Kukui O Moloka'i, Hui malama o moopuni (subsistence), Works with youth project development for QLCC, Ho'olehua and Kalama'ula Homestead resident</td>
</tr>
<tr>
<td>Zachary Helm</td>
<td>President of Kalama'ula Homestead Association, Organizes and supports community recreation activities at the Maui County Parks and Recreation Department, Entertainer, Kalama'ula resident</td>
</tr>
<tr>
<td>Raymond Hiro</td>
<td>Member of Executive Board of Maunaloa 'Ohana I Lōkāhi Association, Maintenance Foreman at the Molokai Lodge and Beach Villas, Maunaloa resident</td>
</tr>
<tr>
<td>Pearl Hodgins</td>
<td>Executive Secretary of the Moloka'i Chamber of Commerce, Vice President of Moloka'i Main Street, President of Moloka'i Museum and Cultural Center, Kipu resident</td>
</tr>
<tr>
<td>Karen Holt</td>
<td>Executive Director of Moloka'i Community Services Council, Kaunakakai resident</td>
</tr>
<tr>
<td>Irene Kaahanui</td>
<td>Kupuna, Ho'olehua Homestead resident</td>
</tr>
<tr>
<td>Jule Kamakana</td>
<td>Owner of Bamboo Pantry, Member of Moloka'i Visitors Association, Member of Moloka'i Camber of Commerce, Member of Board of Directors of Aka'ula School, Kalama'ula Homestead resident</td>
</tr>
<tr>
<td>Name</td>
<td>Affiliation and Residence</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Deldrine &quot;Kauinohea&quot; Kapuni</td>
<td>Kupuna program with Alu Like</td>
</tr>
<tr>
<td></td>
<td>Kawela resident</td>
</tr>
<tr>
<td>Halona Kaopuiki</td>
<td>Ho'olehua homesteader</td>
</tr>
<tr>
<td>Irene Lam</td>
<td>Manager of Community Development, Moloka'i, US Department of Agriculture</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Jina Lee</td>
<td>Administrator at Moloka'i Community Health Center</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Justine Luafalamana</td>
<td>Student at Moloka'i High School, East end resident</td>
</tr>
<tr>
<td>Collette Machado</td>
<td>Ho'olehua Homestead resident</td>
</tr>
<tr>
<td>Ruth“Manu”</td>
<td>East End resident</td>
</tr>
<tr>
<td>Captain Dan Matsuura</td>
<td>Captain in Maui County Police Department, Moloka'i</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Ed Misaki</td>
<td>Director of Nature Conservancy, Kualapu'u resident</td>
</tr>
<tr>
<td>Paul Mordasini</td>
<td>President of the West Moloka'i Association, President of Pāpōhaku Ranchlands, West end resident</td>
</tr>
<tr>
<td>Steve Morgan</td>
<td>Founder of West Moloka'i Citizens Committee, Head deacon at Seventh Day Adventist Church</td>
</tr>
<tr>
<td></td>
<td>West end resident</td>
</tr>
<tr>
<td>Hanohano Naehu</td>
<td>Co-founder of Hemowai Productions, Hawaiian activist, East end resident</td>
</tr>
<tr>
<td>Uala Napolean</td>
<td>Ho'olehua Homestead resident</td>
</tr>
<tr>
<td>Vicki Newberry</td>
<td>Head and founding partner of Aka'ula School, Kaunakakai resident</td>
</tr>
<tr>
<td>Alberta K. Patchen</td>
<td>State of Hawaii Managed Work Force Development, Volunteer with Na Pu’uwai Health Care system</td>
</tr>
<tr>
<td></td>
<td>Kamalo resident</td>
</tr>
<tr>
<td>Annette Pauole-Ahakuelo</td>
<td>Facilitator at Moloka'i Kūha’o Business Center, Member of Moloka'i Chamber of Commerce</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
</tbody>
</table>
## Preliminary Community Issues

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation and Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverly Pauole-Moore</td>
<td>Member of Moloka‘i Board of Realtors</td>
</tr>
<tr>
<td></td>
<td>Members of Moloka‘i Chamber of Commerce</td>
</tr>
<tr>
<td></td>
<td>Member of Moloka‘i Main Street Association</td>
</tr>
<tr>
<td></td>
<td>Members of Moloka‘i Filipino Association</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>John Pele</td>
<td>Part owner of Maunaloa General Store</td>
</tr>
<tr>
<td></td>
<td>Rooms manager at the Molokai Lodge and Beach Villas</td>
</tr>
<tr>
<td></td>
<td>Board member of Moloka‘i Enterprise Community</td>
</tr>
<tr>
<td></td>
<td>Maunaloa resident</td>
</tr>
<tr>
<td>Christie Pentak</td>
<td>Secretary of West Moloka‘i Association</td>
</tr>
<tr>
<td></td>
<td>Former member of the Board of Directors of Ke Nani Kai (Kaluako‘i condominium )</td>
</tr>
<tr>
<td></td>
<td>Chair of Read to Me International (literacy program)</td>
</tr>
<tr>
<td></td>
<td>Head of Athletics for Special Olympics</td>
</tr>
<tr>
<td></td>
<td>Kaluako‘i resident</td>
</tr>
<tr>
<td>Kuulei Perez</td>
<td>Kupuna with Native Hawaiian Education</td>
</tr>
<tr>
<td></td>
<td>Member of Ho‘olehua Homesteaders Association</td>
</tr>
<tr>
<td></td>
<td>Part time Maunaloa resident</td>
</tr>
<tr>
<td>Julia Keli‘ikuli Peter</td>
<td>Employee of gallery</td>
</tr>
<tr>
<td></td>
<td>Ho‘olehua resident</td>
</tr>
<tr>
<td>Maile Pidot</td>
<td>Kapuna of Maunaloa ‘Ohana I Lōkāhi Association</td>
</tr>
<tr>
<td></td>
<td>Maunaloa resident</td>
</tr>
<tr>
<td>Marlene Kamuela Purdy</td>
<td>President of Ho‘olehua Homestead Association</td>
</tr>
<tr>
<td></td>
<td>Operates family agriculture business</td>
</tr>
<tr>
<td></td>
<td>Ho‘olehua resident</td>
</tr>
<tr>
<td>Eliza “Aunty Kauila” Reyes</td>
<td>Member of Board of Directors of Aka‘ula School Board</td>
</tr>
<tr>
<td></td>
<td>Member of Ka‘ahumanu Association</td>
</tr>
<tr>
<td></td>
<td>Kupuna at Kaunakakai School</td>
</tr>
<tr>
<td></td>
<td>Kalama‘ula resident</td>
</tr>
<tr>
<td>Kalanilua Ritte</td>
<td>Co-founder of Hemowai Productions</td>
</tr>
<tr>
<td></td>
<td>Ho‘olehua Homestead resident</td>
</tr>
<tr>
<td>Walter Ritte</td>
<td>Administrator of Hawaiian Learning Center</td>
</tr>
<tr>
<td></td>
<td>Ho‘olehua resident</td>
</tr>
</tbody>
</table>
### Name and Affiliation

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation and Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carl Brito</td>
<td>Airports Operations and Maintenance Supervisor, Maui District (Ho'olehua Airport),</td>
</tr>
<tr>
<td></td>
<td>Airports Division, State Department of Transportation</td>
</tr>
<tr>
<td></td>
<td>Kualapu'u resident</td>
</tr>
<tr>
<td>Moomoi Seasio</td>
<td>Fisherman</td>
</tr>
<tr>
<td></td>
<td>Ho'olehua Homestead resident</td>
</tr>
<tr>
<td>Dr. Dan Shuman</td>
<td>Clinic Director and Family Physician</td>
</tr>
<tr>
<td></td>
<td>Kaunakakai resident</td>
</tr>
<tr>
<td>Penelope Spiller</td>
<td>Retired State of Hawaii employee</td>
</tr>
<tr>
<td></td>
<td>Ho'olehua resident</td>
</tr>
<tr>
<td>April Torres</td>
<td>Kawela resident</td>
</tr>
<tr>
<td>John Torres</td>
<td>Kawela resident</td>
</tr>
<tr>
<td>Elizabeth West</td>
<td>Employee of Maunaloa business</td>
</tr>
<tr>
<td></td>
<td>Maunaloa resident</td>
</tr>
<tr>
<td>Captain Wren Westcoatt</td>
<td>Captain of Kaunakakai Fire Station</td>
</tr>
<tr>
<td>Sonya Yuen</td>
<td>Owner of Kualapu'u Market</td>
</tr>
<tr>
<td></td>
<td>Kualapu'u resident</td>
</tr>
</tbody>
</table>

The following highlights characteristics of those interviewed:

- **Place of residence**

  Ho'olehua was home to the largest group of interviewees, at 26 percent. The second largest group comprised residents of Maunaloa / West End, at 20 percent, followed by Kaunakakai, at 19 percent.

- **Length of residence**

  Interviewees tended to have strong roots in Moloka'i. Over half of those interviewed were born and raised on Moloka'i. Regardless of whether they had left for school or other reason, those who were born on Moloka'i considered themselves born and raised on the island; 32 people established their Moloka'i roots at birth. Another four people described themselves as “long-time residents,” and another two lived on Moloka'i for more than 40 years. Twelve interviewees had lived on Moloka'i between ten and 30 years, and ten people lived on Moloka'i less than ten years. Information on length of residence was unknown for two people.
4.2. Comments about Relationship to Moloka‘i and Moloka‘i Style

4.2.1. Relationship to Moloka‘i

In interviews, people were asked to describe their relationship to Moloka‘i. They defined this relationship from several perspectives, the most common of which were home and family. The following summarizes their comments:

- **Home**

  Those interviewed typically consider Moloka‘i their home in the most fundamental sense. It is their birthplace, their origin, the “soil in which my roots are planted.” A common explanation of this relationship was “I was born here and will die here.” It was felt that, regardless of whether one had moved away for school, marriage or employment, the island’s welcome was always understood. Moloka‘i was always safe haven and those interviewed knew that eventually they would move back.

  Interviewees who were born and raised on Moloka‘i felt that being from Moloka‘i is their #1 identity. More recent residents felt that moving to Moloka‘i was “coming home.”

- **‘Ohana**

  Another common type of relationship was family, and this relationship was described through several lenses:

  A place to raise a family: Moloka‘i is safe place to raise children, and everyone looks out for each other’s children. The rural and natural environments provide a rich learning ground, and there are fewer distractions that plague urban environments.

  My family’s roots: Families are typically multi-generational, and ancestors can be traced and linked to various parts of the island.

  One big family: People are typically related to each other. They either had direct blood relationship, or were part of each other’s extended family. Hānai relationships were common. The bottom line was that these family relationships transcended differing views, walks of life, politics, religious affiliations and other potential divisions.

  Kupuna and mother: Moloka‘i is considered a kupuna and mother to her residents. She feeds, shelters and nurtures her people.
Protective environment

For those interviewed, their relationship with Moloka'i is also defined by a mutually protective environment. There is a sense of protection among the residents and between the people and the island. Interviewees noted that they would sacrifice for Moloka'i "without a second thought." One person described this relationship as a love affair; he has a responsibility to take care of and protect the island.

A provider

Interviewees appreciate a relationship with Moloka'i the provider. They feel that the island provides everything they need, including food, comfort, spiritual strength and stability.

A destination that became home

For more recent residents, Moloka'i is a destination that became home. They had moved to Moloka'i for employment or as a second home, and felt drawn to call the island home.

4.2.2. Moloka'i Style

Interviewees and participants in the public meeting and focus group sessions were asked to describe what is unique to Moloka'i. The term "Molokai Style" helps to define the social context for the Plan and the Project.

Foundation of Hawaiian values

Moloka'i is termed the last Hawaiian island, and people noted that the foundation for Moloka'i Style is Hawaiian culture and values. 'Ohana, mālama 'aina and aloha 'aina form the bases for the various facets of Moloka'i Style. As one person said, "We don’t talk Hawaiian. We do Hawaiian. When there’s a luau, we don’t go to Safeway. We go to the ocean and the mountains.” Building upon this Hawaiian foundation are the contributions of other cultures.

Laid back

A common attribute of Moloka'i Style is "laid back," which reflects both attitude and behavior. Being laid back was described as being patient and accepting. It means waiting patiently in your car when the driver in front of you stops in the middle of the road to chat with the driver of an oncoming car. It means keeping the speed limit and tolerating long lines at the gas station and in stores.
Social interaction

Also common was a clear pattern of social interaction. People noted that, not only did “everyone know each other,” they also took care of each other. They talked about generosity and stopping to help someone with car trouble. People would find fruit on their doorstep with no note from the giver. Extra catch from fishing would be shared around the neighborhood. It was noted that even though there may be controversy and conflict, “when push comes to shove,” people will help each other. Homelessness is virtually non-existent because people look out for those in need.

Friendliness is best reflected in the tendency to wave as you pass other drivers “even if you don’t know them.”

Moloka’i Style also means respecting and accepting each other. It was noted that newcomers are welcomed and families stick together even though they may be on different sides of an issue.

Survival

Moloka’i Style is a tradition of survival. People were comfortable, if not dependent, on outdoor living, and the island’s natural resources provide for subsistence living. It is expected that people take only what they need to maintain sustainability.

Survival also depends on maintaining good relationships with each other. People trust and depend on each other and bartering and trading are still practiced.

Self-identity

According to participants, Moloka’i Style means knowing who you are and your inherent value, and not depending on class or status for identification. Moloka’i Style is being comfortable with yourself regardless of your economic situation, and respecting others unconditionally. Hence, while those with low incomes should not be ashamed of being poor, the affluent should be satisfied with a modest house. As one person said, “When I was a child, we didn’t know we were poor.”

Undesirable transitions and contradictions

While Moloka’i Style meant mostly positive attributes, there were also some characteristics that were considered negative, and it was feared that these are becoming increasingly evident.
A common problem was the increasing antagonism associated with controversial matters. It was felt that Moloka‘i is becoming known for its controversy and confrontation and that this is not reflective of the Friendly Isle.

Kūpuna noted they that did not teach people rudeness and name-calling and that this type of behavior is becoming more common at public meetings. It hurt them to see such behavior from their own Moloka‘i people. They and others felt that this confrontational attitude is intimidating and causes a loss of aloha, respect and friendliness.

It was also felt that there is a continuing contradiction related to subsistence living. People said that while some pride themselves in their subsistence lifestyle, they are also willing to supplement their income with public assistance funds. That is not true subsistence but dependence on government.

Values and behavior that are not Moloka‘i Style are those that disrupt or lessen the positive attributes. Hence, rudeness, impatience, road rage, pushiness and confrontation are considered counter to the laid back nature of Moloka‘i Style. Further, conditions associated with urban settings, such as high density development, traffic congestion, social anonymity, high crime rate, homelessness, shopping centers and large box stores, are not Moloka‘i Style. People stressed that they did not want to become like Maui, Oahu or Princeville on Kauai.

From a social perspective, being egocentric or selfish is not Moloka‘i Style. It was also felt that excluding or insulting different ethnic groups is not Moloka‘i Style, and neither is coming to Moloka‘i with a “missionary attitude.”

An important non-Moloka‘i Style included values related to money. People objected to the attitude that everything is a commodity and has a price, that money can buy everything. This implies power for the affluent, and suggests that non-tangible assets, such as culture and values, are unimportant since they have no price tag. Money-related issues also extend to conspicuous consumption, whereby the affluent build expensive luxury homes, drive fancy cars and wear designer clothes. This emphasizes economic differences and creates schisms between haves and have-nots.
4.2.3. **Hopes for the future**

The most common hope for the future was that Moloka‘i residents would improve their ability to survive on the island. It was noted that struggling should not be a requirement to living on Moloka‘i. This hope extended to people who had left the island and would like to return; currently, they have few options. Survivability was linked to the following:

- **A stable economy:** It was noted that Moloka‘i had not yet recovered from the plantation closures, and that island still needs economic opportunities that will provide a diversity of jobs, including management positions, and alternatives to the visitor industry.

- **Improved education:** People wanted to see the educational system help young people improve their skills and increase their knowledge so that they can make better choices and have more options.

- **Decreased dependence on public assistance funds:** It was noted that receiving government assistance is somewhat of a sub-culture on the island, and that this dependence is not a healthy condition.

- **Improved public services:** People hoped that on-island medical services would be expanded so that they did not need to travel to other islands for treatment, and that police and fire protection services and facilities would be upgraded. West end and DHHL homestead residents hoped that infrastructure improvements would be implemented as planned and expected. DHHL homestead resident hoped that their water system would be expanded and improved.

Another common hope related to the legacy for future generations.

- **Resilient values:** It was generally recognized that change is inevitable. Indeed, it was pointed out growth and decline are part of natural cycles in physical, social and economic environments. While people were willing to “keep up with the world” and incorporate modern improvements, they wanted to make sure that the positive aspects of Moloka‘i Style prevailed. Hawaiian culture, strong family values and social respect and support must be passed down to future generations.

It was also hoped that the Moloka‘i community will be more unified in the future. The strong passion expressed in controversial projects is eroding some of the good parts of Moloka‘i Style, and it was hoped that people learn to be more open and accepting of each other’s views.
Relationship to environment: An important component of the Moloka'i Style is a strong relationship with the environment. As discussed previously, people depend on their environment for sustenance, recreation and general well-being, and they are committed to protecting environmental resources.

Passing on this legacy was very important. One person noted that “we have not inherited earth from our ancestors, but are borrowing it from our children,” and others stressed that they wanted to make sure that their children and grandchildren have the same affinity for and relationship with the environment. Additionally, they wanted the environment to be even more abundant and accessible, thereby providing more food sources and other resources that can be shared by all.

It was also felt that the environment should not be compromised in any way, even it means less jobs and economic opportunities.

An important part of hope for the future was growth and development, and there was strong consensus that growth needs to be planned, slow and controlled. Further, there was a sense of the “right type of growth.” People wanted to make sure that new development would fit in. They were concerned that luxury housing would bring in millionaires, and generally assumed that these new residents would have values that conflict with Moloka'i Style. Further, there was concern that rich newcomers would have more power and would take control over future decisions.

Maunaloa residents hoped that their town would be revitalized. They remembered when the Maunaloa was a thriving community supporting many businesses and more activities. They pointed out that Maunaloa has too many empty houses, and that business is slow. They wanted to see their town regain its previous vitality, energy and liveliness.

4.3. Reactions to the Community Based Master Land Use Plan

Meeting participants and interviewees were asked to share their views on the Molokai Ranch Community Based Master Land Use Plan. People either liked the Plan because of what it contains, or disliked the Plan because of what it represents. The divergent reactions are hereby discussed.
4.3.1. **Positive Characteristics of the Plan**

People who approved of the Plan believed that it is a rare and unique opportunity. Given over three decades of conflicts between the community and Molokai Ranch, this Plan forges ahead with mutually beneficial results. Both people who were active in the formation of the Plan and non-participants felt that the Plan offers many benefits to the Moloka'i community and the following highlights these types of comments.

- **Reliable basis for community expectations**

  The Plan designates future uses for over 60,000 acres. People noted that this commitment to future uses provides a solid basis for what to expect on these lands. It was noted that the planning area comprises 110 census tracts, which raises the possibility of multiple landowners and thus different directions for future change. Consolidation of these properties in one overall Plan results in a collective set of changes in one source. The Plan is therefore a reliable source for community expectations for future uses and activities.

- **Meaningful local control**

  It was felt that the process for developing the Plan was open and inclusive, and the community had several opportunities to participate. The resulting Plan is the product of two years of meetings and many compromises. People felt that the Plan was truly the result of a local control in a community-based process.

  They noted that this local control will be extended through various components of the Plan. Most significant is the transfer of ownership of 26,200 acres to a Land Trust. These lands would be owned and managed by a local entity in perpetuity. Additional control would be achieved in Conservation-designated lands and other lands set aside for preservation purposes. Further, through the CDC, there would be local control in the development of affordable housing and community expansion. The Plan therefore promotes community-based self-governance of substantial assets.

  It was stressed that the implementation measures to carry out the land transfers and other transactions needs to ensure fairness and responsible stewardship.

- **Significant conservation and preservation measures**

  The people’s relationship between environmental and cultural resources is core to Moloka'i Style. The Plan allows for preservation, protection and management of significant cultural features and valuable environmental resources.
Protection and management of subsistence activities

The Plan was considered consistent with community subsistence practices in that it allows access to areas that previously were off limits. Further, resource and activity management would be by local control via the Land Trust.

Reopening of the Kaluako‘i Hotel and upgrade of the Golf Course

People associated the reopening of the hotel with positive economic activity. They felt that the reinstatement of hotel employment, coupled with visitor spending dollars throughout the community, would help stabilize the economy and increase personal income. Further, residents looked forward to revisiting a once popular local gathering place.

Those who liked the Plan felt it embodies Moloka‘i style in several ways. It allows for local control over land and other resources. It helps people survive by providing economic opportunities and provisions for affordable housing. The Plan promotes subsistence gathering and ensures the protection and preservation of large tracts of land. This will protect these lands from further development in perpetuity, thereby maintaining the rural open space character of the West End.

4.3.2. Problems with the Plan

Those who did not like the plan had problems with what the Plan represents.

Questionable process

People were critical of the process undertaken to form the Plan. Those who oppose the plan said that the resulting Plan was very different from early discussions. They felt that much of the process was lip service and patronizing, and that “they were going to do what they were going to do anyway."

Those involved in the ALDC process felt that their efforts and recommendations went unheeded. They cited the short time frame in which they were to produce their report, and felt that decisions were made without consideration of their input. One person’s perspective of this situation was that the process employed manipulation, fear-based thinking and a hastened time frame.

Also, some people had difficulty sustaining effort in attending numerous meetings over a long period of time.
People who did not like the Plan expressed resentment over the Plan’s relationship to the Project. They felt that the Plan is “being dangled like a carrot” so that the community will accept the Lā’au Point Project. They believed that the Plan’s give backs were not worth the Project. They objected to the “either-or” choice as if choosing Lā’au would somehow solve the community’s problems. One person likened the situation to the unsuccessful use of mongoose, which are nocturnal animals, to eradicate rats, which are diurnal. He felt that using Plan to justify the Project would cause more harm than good.

People who object to the Plan believe it is not Moloka‘i Style. They questioned the integrity of the process and felt that it did not embody social interaction that is characteristic of Moloka‘i Style. They do not feel that the tradeoff is fair and therefore not Moloka‘i Style. Moreover, they believed that the Plan will bring in outsiders with different values that would conflict with Moloka‘i Style. These outsiders would have direct access and use of resources that people depend on and value for their cultural and spiritual attributes.

4.4. Reactions to the Lā’au Point Project

4.4.1. Full Support for the Project With or Without the Plan

Those who supported the Project unconditionally believed that it was the best option for the project site.
They believed that the Lā'au Point project is probably the least obtrusive of options for the site. The density is low, and there is a generous setback from the ocean. Cultural and archaeological resources would not be disturbed, and there will be shoreline access to a coast that has historically been off-limits to the majority of the population.

Further, development of the properties will yield economic opportunities. Construction related jobs will be generated by infrastructure improvements, lot preparation and house construction. There would also be ongoing jobs to fulfill the security, service and maintenance needs of new homeowners. It was expected that the cost benefit ratio would benefit the island. The property tax base would be increased, thereby increasing funding for schools and other public services and facilities. Yet, because the new residents would mostly be part-time, their use of these facilities would be intermittent and minimal.

Those who take this unconditional position note that, as the landowner, Molokai Ranch has a right to develop its property to yield reasonable profit. For them, this Project reflects a thoughtful and positive alternative in the use of the subject property. The Project is compatible with Moloka‘i Style.

4.4.2. Conditional Acceptance of the Project and Support of Plan

Those who wholeheartedly approved of the Plan tended to accept the Project as a satisfactory trade-off. They believed that the Plan’s long-term and far-reaching benefits outweigh potential negative Project impacts.

Acceptance of the Project is not always easy, however. The Project elicits mixed feelings, and this was a common tendency among Plan proponents. The Project requires significant change in an area that is virtually untouched. People value the pristine nature of Lā'au Point. Those who have fished or camped in this area cite the area’s abundant resources and powerful mana. Ideally, for them, no change would come to Lā'au Point.

Nevertheless, they are willing to accept the Project because they understand that its implementation is the only way the Plan can be implemented. The Project will provide the springboard for Plan. These people envision a significant legacy through Plan implementation, one that will persevere through future generations. For them, because the Plan is Moloka‘i Style, the Project is also Moloka‘i Style because of its relationship to the Plan.
Local control over portions of the Lā'au Point Project is reassuring for those who have mixed feelings. The Land Trust will manage the shoreline conservation area in partnership with the new homeowners association. They will manage Kāmaka'ipō Gulch and oversee other significant resources in the Project site.

Further, it is felt that the low-density nature of the project, buffer zones and shoreline access features are positive features compared to higher density housing developments. The Project is also preferable to what has occurred on the East End, where change has been scattered, uncontrolled and subtle. With Lā'au Point, the community knows what will happen.

4.4.3. Opposition to the Project and Support for Plan

Support for the Plan did not always imply Project support. Those involved in the ALDC liked the Plan, but preferred that the Lā'au Point Project not be carried out for reasons incorporated in Section 4.4.4.

This group has recommended an alternative to the project. The ALDC supports "the purchase of the Lā'au Point property, in full or in part, by a "single" purchaser, meaning a third party, individual or entity." The purchaser should be motivated to preserve or conserve the property, including conservation development, or by educational uses. The purchaser may be motivated by tax incentives. It was hoped that the new buyers would work with the Land Trust in its role in carrying out the Plan.

4.4.4. Opposition to the Project and the Plan

For those who do not like the Plan, the Project is the focus of their objection. While their objections have various facets, there are two recurring themes in their opposition.

---

14 Alternative to Lā'au Development Committee (ALDC), Memorandum to Ke 'Aupuni Lōkahi, Molokai EC, Board of Directors re: New West Land Company Report to the ALDC/EC and Next Steps, dated January 12, 2006.
• Impacts on social environment

People who oppose the Project are concerned that the impacts of 200 luxury homes on currently limited access property will have irrevocably negative social impacts. They feel it is unfair that millionaire newcomers will be able to live on a shoreline that has historical restricted access. They expect that the rich newcomers will come from neighborhoods that have pet leash laws and noise ordinances; the new residents will not appreciate local people fishing and hunting in their backyard. Eventually, it is expected that the newcomers will restrict such activities.

Project opponents also believe that the millionaire newcomers will have a commodity-based value system that will clash with Moloka‘i Style. The new residents will demand more services to suit the lifestyle to which they are accustomed. It was expected that the newcomers will demand expensive wine and gourmet food in the markets and restaurants.

People who disagree with the Project fear that, because “money is power,” the new residents will have powerful influence over local matters. All in all, it is feared that the newcomers will force local residents to live by imported values and outsider norms. To these people, the cumulative effects of change are that the Hawaiian culture and Moloka‘i Style will be negatively impacted.

• Water application

Project opponents strongly resent that Molokai Ranch is requesting an increase in non-potable water allocation to support the Project and other activities. The subject water source is in central Moloka‘i where homestead lands are located. They perceive that the Project is taking DHHL water to support rich newcomers.

Further, project opponents fear that there may not be enough water to support future local needs, much less the needs of rich newcomers. They do not believe aquifer and sustainable yield data from independent sources.

4.5. Suggestions from Meeting and Focus Group Participants and Interviewees

The last query was for suggestions, and participants in all venues responded. This section groups suggestions by topic, and every effort was made to capture the essence and tone of their input.
4.5.1. **Suggestions on the Plan**

Make sure the Land Trust has trustworthy and honest people.

Select credible and honest people for the Land Trust. Make sure they are from Moloka'i.

Bring in a few experts from outside to sit on the Land Trust. They could bring in broad experience and help the other trustees do their job.

Find a way to put water issues under Land Trust.

Continue to have a community-based process. This will be especially important when you set up the Land Trust and CDC.

Have a Maunaloa representative on the Land Trust.

Do the Land Trust and CDC. Don't ask us to choose Lā'au Point.

Give us something without asking for Lā'au.

Sell the property to the Moloka'i people.

Community needs to buy the ranch. If we own it, there would be no more trade offs.

If you want to make money, one that doesn't threaten existing lifestyle, find an alternative method of reaching your goals over longer period of time and in concert with community goals.

Find other ways to make money at Kaluako'i, such as an educational center or teaching resource (marine science, aquaculture, agriculture)

Get the hotel, restaurant and golf course running first.

Renovate the hotel, then we talk. Find alternatives for ranch lands (koa, macadamia nuts).

Build one more hotel, renovate the existing hotel, build two more condo projects, and add nine holes to the golf course.

Support the 15 acres designated for expansion of Maui Community College, Moloka'i campus. Expand the designated acreage for sale of property to be the same as the Moloka'i Community Plan.

Document the Plan in an enforceable legal document, preferably under government jurisdiction.
4.5.2. **Suggestions on General Overall Project**

Make sure the Project gets passed. We need the jobs and economic benefits.

Get going on the Project so that the Plan can go forward.

Let people know how the community can help move the Project forward. We need the Plan.

Make sure the Project gets approved. We need it.

Spread development over larger area that is integrated into different communities, rather than on one parcel.

Help us find a new buyer for Lā'au Point, one who would take care of the land and not develop it. This will help Molokai Ranch meet its financial objectives and protect the land from development.

Sell the Lā'au property to Bishop Estate. Let them come up with cultural theme that is more ecologically friendly.

There are other alternatives for the Lā'au site, such as a Hawaiian cultural tourism model. Give alternatives a real time frame.

Cancel the project. We don’t want to be another Honolulu, Lahaina or LA. We want subsistence and self-sufficiency. We want sovereignty.

Don’t do Lā'au; it isn’t needed.

4.5.3. **Suggestions on Specific Project Components or Effects**

Preserve the human relationship with the fishing grounds. Put in a fence between the makai boundaries of the house lots and the shoreline. Plus, make sure new residents must also go through the resource management program.

Don’t develop the shoreline. Move inland.

Move housing more mauka. Increase the buffer zone between the ocean and houses.

Increase shoreline access points.

Make sure that the resource management team is effective and follows whatever rules are set up.

The resource management team needs to be from this ahupua’a. We have been taking care of this land for generations.
Need to set up a good educational program. Start with a pilot program that addresses ocean and shoreline conservation practices.

Enforcement in conservation areas need to start in the very the beginning. Don’t let people cut corners.

Need a spiritual component. Make sure kūpuna provide spiritual guidance are provided throughout the process. Get kūpuna from the West End, one that is from the ahupua’a and knows the land, not one from the other side or another island.

Help to educate visitors and new residents so the can feel welcomed and not be afraid to interact. Mutual respect is important.

Show new Lāʻau Point residents how to participate in local efforts.

Do not create a gated community.

Re-route the Project access route through Maunaloa town. This will establish a connection between new and local residents, and support the town’s businesses.

Don’t put a road through Maunaloa town.

Don’t bring the road through Pāpōhaku.

Put in walking paths along new roads.

Fix existing infrastructure.

Expand infrastructure to existing Pāpōhaku and Kaluakoʻi residents (electricity, water, telephone, cable).

Upgrade the infrastructure in the West end. This should include improvements to water, telephone, cable, DSL and electricity systems.

A parcel of land has been designated to house a fire station near Kaluakoʻi. MPL and its partners should commit to building a fire station as part of the overall plan. The facility could then be transferred to the control of Maui County.

Put land aside for water desalination.

Keep police and fire departments informed of the Project’s progress so we can prepare.

Put in affordable housing.
4.5.4.  Other Suggestions

We need to change our attitudes and not be selfish. We need to share our water.

Think about locals before you accommodate newcomers.

Keep up a good process.

Be open with the community. Don’t hide information even if it’s not favorable to the ranch. Trust us.

Get people involved. Openly communicate. Don’t be afraid or ashamed.

We need to get more open-minded people to the meetings – enough fighting.

Have more informal meetings like the focus groups so people like us can learn more about the Project. We do not want to go to public meetings. Too intimidating. The newspapers are biased.

We’ve worked so hard to get this far. Let’s not start over.

Develop affordable housing by Moloka‘i standards, not Maui standards.

Don’t give us a myth that there is water. There is one land. Prove that there is more than one aquifer.

Don’t impact water supply. Respect the Hawaiians.

Take care of your employees. You have good people.

4.6. Analysis

Despite the wide range of opinions and concerns about the Plan and the Lā‘au Point Project, this analysis finds significant commonalities. First, there is a consensus on Moloka‘i Style. People share the Moloka‘i identity and relate to each other through a common understanding of Moloka‘i values and behavior.

Second, people are passionate about Moloka‘i. Living on Moloka‘i is an intentional choice. People are committed to their relationship with the island. Those who left for awhile have been drawn to return. They seek the return of their children so that they too can enjoy strong relationships with the island and her people. More recent residents made a conscious decision to live here and fit into the social fabric.
People are equally passionate about protecting their island and perpetuating the Moloka'i Style. Regardless of their position on the Project or Plan, people want to protect Moloka'i from detrimental change. The controversy stems from a divergence in the approach on how to protect and perpetuate.

For proponents of the Plan, their approach to protecting Moloka'i is to be proactive in determining the island’s destiny. The lack of control due to landownership and land use issues implies an unknown future and possible proposals that could threaten the island, its people and its resources. They have chosen to solve this problem by coming up with a Plan that brings more community control over land resources through land ownership, resource management and land use controls.

To them, the Project is part of this larger scenario because it is a necessary springboard for the Plan. In this scenario, the Project is part of the solution.

For others, however, the Project is the heart of the problem and not a solution. They focus on Lā'au Point because to them it signifies a threat to the people, the environment, the Hawaiian culture and Moloka'i Style. Their approach to solving the problem is to fight its approval and implementation. Indeed, there have been strong public statements by project opponents that they will do whatever it takes to stop the Project.

Activism is not new to Moloka'i. Proposed development projects are typically met with scrutiny and skepticism. Moloka'i residents are experienced in taking a stand and opposing efforts they disapprove. Recently, the proposal to allow cruise ships to land in Moloka'i was defeated, and the University of Hawaii withdrew its patent applications for genetically-modified taro when Moloka'i activists protested. Proponents of the Plan and Project participated in these efforts.

The uniqueness of this situation is the relationship between a specific development proposal and a plan that extends far beyond project boundaries. While Lā'au Point Project opponents are putting up signs and organizing protests, Plan proponents are exploring mechanisms for coming up with a resource management program and establishing a Land Trust and a Community Development Corporation. Hence, while both sides are seeking to protect Moloka'i, their strategies have no commonality. There is little that can be done to bridge the gap.
For those who are not strongly aligned with either side, and this is likely a large part of the community, the prominent issue is the Lā'au Point Project. They are accustomed to activist efforts, and Lā'au Point is no exception. In interviews and three of the four focus group sessions, people were very aware of the Project and less knowledgeable about the Plan. It was easier for them to address the Project than to discuss the Plan.

Based on our issues analysis, we believe that the uncommitted residents of Moloka'i share the same values of Moloka'i Style and have the same passion and commitment to protect the island. It is to their advantage to know about the Plan and the Project so that they understand the full implication of both. Many of those we interacted with in this study indicated that they will not attend public meetings because they dislike the antagonism and conflict. To help them make an informed decision, every effort should be made to share information with them in a non-confrontational environment that encourages constructive dialogue.
5. Potential Social Impacts

An overview of impact analysis is presented in Section 5.1. Section 5.2 identifies population impacts and Section 5.3 discusses the Project’s relationship to public and community plans. Section 5.4 presents the Project’s impact on the social environment and potential impacts on public services and facilities are identified in Section 5.5.

5.1. Overview of Impact Analysis in this Report

5.1.1. Direct and Indirect Impacts

Because of the relationship between the Project and the Plan, the Project’s implementation, or its non-implementation, will have a direct effect on the Plan. Further, it has an indirect relationship with Plan components. Where appropriate, a discussion of the Project’s effect on the Plan is provided to understand the full social context of social impacts.

For the purposes of this analysis, two levels of impact are identified. Direct impacts are those that specifically result from Project implementation. These include, for example, population increase, and increase in demand for public services resulting from the new population.

Indirect impacts are the Project’s effect on the Plan. A secondary impact, for example, is the Project’s enabling of the formation of the CDC and the Land Trust, as well as the reopening of the Kaluako‘i Hotel.

5.1.2. The No-Project Scenario

In our social impact assessments, the No-Project scenario typically signifies the absence of a projected impact. Hence, the project need (e.g. affordable housing, infrastructure improvements, housing demand) would not be met, and direct and indirect impacts would not occur.

In this analysis, the No-Project scenario has a significant effect on the Plan. Since the Project is the only springboard for the Plan, the Project’s non-implementation means that most of the Plan will not be realized. The only Plan component that will occur without the Project is the gifting of 1,600 acres to the Land Use Trust. All other Plan components would likely not be implemented.
Further, the principal issue of the No-Project scenario is the viability of ongoing operations of Molokai Ranch and its employees. The net loss from operations between 2002 and 2006 was approximately $31.6 million. Cost cutting measures reduced operating losses from $8.6 million in 2001 to a range of $3.6 to $3.8 million in the past three years. In addition to operating losses, annual capital expenditures annually average over $800,000 million. In total, the MPL subsidy of operations and upkeep average between $4.7 to $10.2 million annually. The cumulative subsidy in the last five years is $36.9 million.

If the Project is not implemented, it is therefore highly likely that MPL will need to seek other options summarized as follows:

- Sale of other land inventory: MPL has 101 lots that could be sold exclusive of inventory in Pāpōhaku Ranchlands, Maunaloa and the Industrial Park. In addition, the agricultural lots in the West End could legally be subdivided into more than 1,500 lots; this does not include the parcels held outside the Kaluako’i ahupua’a. It is unlikely that a single buyer would acquire all these holdings, and highly likely that multiple buyers would be involved.

- Further reduction in operations: Without increased support for the hotel and golf course operations that would result from the Project, MPL options include further operational reductions and possible closures. In addition, MPL would likely be forced to reduce or eliminate other subsidized operations such as maintenance, nursery, gas station and other services.

With these reductions would come possible termination of ranch operations and land banks. Employment could be reduced by over 100 jobs to ten full time positions.

These measures would result in lost tourist expenditures and severely affect local businesses throughout Moloka’i.\(^\text{15}\)

As appropriate, the No-Project scenario is incorporated in this impact analysis.

### 5.2. Population Impacts

The population characteristics of the proposed Project are based on the marketing objectives and program, which are included in the economic analysis in the EIS.\(^\text{16}\)

\(^{15}\)\textit{Knowledge Based Consulting Group, Economic and Fiscal Impacts of the Proposed Lā’au Point Residences on Moloka’i (June 2006), page 16.}\n
The Project features low density oceanfront and near shoreline lots in a setting of undeveloped seclusion and natural beauty. It is considered a unique project and expected to attract buyers who seek privacy and the natural setting, and appreciate the Moloka'i community. These buyers are distinguished from those who would be attracted to the resort environment of other islands.

Lots will be an average of two acres. Lot prices will range from approximately $1.48 million on the western shoreline section to an average of $650,000 on inland lots. The overall average lot price is estimated at $970,952.

The residential market values are projected at $34.4 million in 2008, which is the first year of lot sales, and increase to $211.9 million in 2012, when the lots are sold and the initial homes are built. As additional homes are built, residential values are projected to increase annually by an approximate $16 million, and at the projected build-out in 2023, the residential market value is estimated at $352 million.

The average size of the residential units is 3,500 square feet. It is anticipated that the building footprint will cover between three and eleven percent of the lot.

The time frame for the Project calls for the development and sale of the proposed 200 lots over a five-year period beginning in 2007. Construction of initial houses should begin in 2010 and is expected to continue through 2023.

Lā'au Point buyers are typically expected to be in their pre-retirement or retirement years with very few or no school-aged children. In terms of housing occupancy rates, Lā'au Point is projected to follow resort community occupancy patterns, whereby less than 20 percent of the units are occupied full time and the average overall occupancy is less than 30 percent.

Table 15 summarizes Project population estimates.

---

16 Knowledge Based Consulting Group, Economic and Fiscal Impacts of the Proposed Lā'au Point Residences on Molokai (April 2006).
### Table 15: Project Population Estimates

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average household size *</td>
<td>2.90 persons</td>
</tr>
<tr>
<td>Estimated permanent population in 2012 (end of lot sales period) **</td>
<td>12 persons</td>
</tr>
<tr>
<td>Estimated permanent population in 2023 (final build-out)</td>
<td>174 persons</td>
</tr>
<tr>
<td>Estimated seasonal population during peak seasons ***</td>
<td>325 persons</td>
</tr>
<tr>
<td>Estimated peak population of permanent and seasonal residents</td>
<td>499 persons</td>
</tr>
<tr>
<td>Average on-site combined population of permanent and seasonal residents</td>
<td>230 persons</td>
</tr>
</tbody>
</table>

* Includes possible caregiver  
** Permanent residence is defined as living in the unit at least 6 months in a year.  
*** Up to 80 percent of seasonal residences may be occupied during peak seasons.


In terms of numbers, the Project population at build-out will account for a very small portion of the County population forecasted for Moloka'ī in 2025. The permanent population will account for two percent of the forecasted 8,068 persons in 2025. During peak seasons, the on-site population will account for six percent of the island population, and, on the average, Lā'au Point residents will make up three percent of the island population. The Project population will be well within the population forecast for Moloka'ī and will therefore have an insignificant impact on population counts.

For comparison purposes, another development effort proposed for Moloka'ī is the increase of DHHL residential lots. The MIP identifies the development 361 lots or units as a priority. Assuming that these units would be developed by 2025, and based on the County-generated socio-economic forecast for Moloka'ī, the new DHHL units could house an estimated population of 1,018 persons. Residents at this new DHHL residential development would account for 13 percent of the forecasted population for 2025.

---

17 Based on ratio of projected population to projected households, which is 2.82 persons.
In terms of relationship to the Plan, the Project would allow the Plan to move forward with affordable housing and community development. The Plan calls for provisions of both land and financial resources. The affordable housing component would generate population impacts, the extent of which is unknown at this time. The CDC would need to evaluate impacts in its efforts to develop the affordable housing, and submit necessary studies to support its applications for those development projects.

5.3. Relationship to Public and Community Plans

Section 3.1 presents public policies that guide the future direction of Moloka‘i. These policies embody community values and provide a basis for community expectations for the social environment.

The Maui County General Plan identifies county-wide themes, and the Project is consistent as follows:

- **Agricultural and rural identity:** The Project contains provisions intended to protect the rural identity. The Project is directly consistent with this theme in that the bulk of the Project site would remain undeveloped, and therefore retain a rural character. Indirectly, the Project would act as a catalyst for the Plan, which calls for the protection of 55,000 acres in perpetuity.

- **County shoreline and visitor industry growth:** The Project includes the expansion of the shoreline conservation area, and is therefore directly consistent with the theme of shoreline protection. The Plan is also consistent with this theme in that, while it includes provisions to re-open the Kaluako‘i Hotel, it puts a cap on further development of visitor units. Part of the property that is zoned for resort use would be conveyed to the Land Trust and further development would be prohibited.

- **Economy:** The Project supports this theme in that revenues from its implementation would be used to upgrade the Kaluako‘i Hotel. This action would generate short and long term employment and therefore help to support a viable economy.

- **Resident housing:** The Project supports this theme in that it would lead to the formation of the CDC that would in turn develop affordable housing.

The Project requires revision to the Land Use Map in the Moloka‘i Community Plan for portions of the development. It is relevant to several goals advocated by the Moloka‘i Community Plan, as follows:
- Land use: The Project is consistent with the goal of providing future generations with the opportunity to experience rural and traditional lifestyle. Its implementation will lead to the protection of 55,000 acres from development and formation of the Land Trust to own and manage these lands for future generations.

- Subsistence: The Project is consistent with the goal to promote the continued practice of subsistence. Project plans include the expansion of shoreline conservation lands that would be available for subsistence practices. These lands would be managed by a local Land Trust. In addition, project implementation would lead to the protection of 55,000 acres that would be managed by the Land Trust. Subsistence activities would be an integral part of its management program.

- Environment and cultural resources: The Project supports goals intended to preserve, protect, manage and enhance environmental and cultural resources. Within Project boundaries, the conservation area would be expanded and be placed under the ownership and management of the Land Trust. Further, Kāmakaʻipō Gulch and other cultural resources will be part of the Land Trust’s responsibility. The Project also supports these goals in that it will make possible Plan components that lead to the protection and management of 55,000 acres for preservation purposes.

- Economic activity: The Project is consistent with the goal for a preferred, viable and sustainable economy that is in balance with resident needs and values, cultural and natural resources and lifestyle. Proceeds from Plan implementation will support the reopening of the Kaluakoʻi Hotel, an action that was strongly supported in the development of the Plan.

- Housing: Project implementation will allow the transfer of land and financial resources to the CDC for the development of affordable housing. It is therefore consistent with the goal to provide housing opportunities that are affordable and culturally compatible.

Section 3.2 presents the Ten-Year Community Strategic Plan prepared by the EC in collaboration with the community. The Project is highly consistent with this plan in that it is the result of the EC’s strategy to create compatible development strategies as part of the Community Based Master Land Use Plan. Further, the Project enables the formation of a Community Land Trust, a strategy intended to make the vision a reality.

In summary, the Project is consistent with public and community plans that guide the future of Molokaʻi. The Project serves as a catalyst to carry out the community policies and goals embodied in the Molokai Ranch Community Based Master Land Use Plan. Hence, the Lāʻau Point Project has a significantly positive relationship with public and community plans.
5.4. Impacts on the Social Environment

The fabric of the social environment is woven by relationships. The threads of this fabric are interpersonal relationships, relationships to the environment, to the culture, to the past and future, to the global community, to the neighborhood.

The Moloka'i social environment is a colorfully rich textured fabric. Those of Moloka'i readily recognize it, and others see its uniqueness. In Section 4, the identity of Moloka'i Style was found to be common and prevalent. While this social environment has proven resilient over time, it was also considered fragile and vulnerable. The desire to protect this social environment was widespread and often passionate.

This analysis explores how the Lā'au Point Project fits into this social environment. Will it blend into the existing pattern, or will it change the design? Will it add to the richness, or will it detract from its beauty?

The following sections present two models for growth, explore how they relate to the Project, and examine the Project’s social impacts.

5.4.1. Two Models

Two models of growth in Hawaii were analyzed to understand how they might apply to the Lā'au Point Project. In our study, both Lanai and West Maui were cited as examples of what people did not want to see in Moloka'i. Recent rapid change in Lāna'i has resulted in major transformation in the social environment and related problems. Lāna'i development is therefore presented as a model of rapid, significant change. West Maui has experienced significant population growth over a thirty-year period. It is included in this analysis because of the population increase due to in-migration and the shift in settlement patterns.

Lāna'i Development – Rapid Economic Shift and Social Problems

The Lāna'i community had been a stable community of 2,700. Residents lived a rural plantation lifestyle for many years. Since 1920, Lāna'i’s one-crop economy was built solely on the primary production of pineapple. In 1985, California-based Flexi-van Corporation merged with the island’s existing landowner Castle & Cooke and assumed 98 percent of the island. Plans to phase out pineapple and develop tourism were subsequently announced.
Agriculture was phased out and the first resort was opened in 1988, followed by a second in 1990. The rapid development of a tourism based economy, with the development of Koele Lodge and Manele Bay Hotel and golf courses, marked a shift away from agribusiness for the entire island. In addition, the development includes a 375-acre luxury residential development.

The longitudinal social impacts and mental health aspects of this change were studied over a five year period from 1989 to 1993.\(^{18}\)

The resort development phase necessitated the influx of construction workers from other locations. Local residents underwent extensive training for resort positions that would require radically new interactive skills and knowledge for the upscale resort. The population increase and interactive difficulties between newcomers and residents was just the first shock to the very cohesive agricultural and agrarian, multiethnic community. In 1989, drug and alcohol use attributed to construction worker influx was reported. Marital difficulties and divorce increased as more personal and social options became available to women in unstable relationships. Psychological and family problems increased as the resorts neared completion in 1991.

As Dole Co. attempted to gain permits for luxury resort homes and golf courses, resistance was mounted by Lanaians for Sensible Growth (LSG) and the ILWU leaders to slow or alter the development progress. Some felt that the plans would create a two-tiered society - the rich and the working poor. The luxury homes met with resistance as residents felt the negative social and cultural impacts outweighed the Company’s desire for profits.

As the researchers observed, some cultural infusion can broaden the cultural base of a community but often the new values clash with the traditional ones, thereby upsetting the social fabric as drastic demographic and ecological shifts have been shown to affect other Hawaiian communities.

For those residents having strongly felt community cohesion, the faster, unfamiliar pace and new faces were threatening. Recreation areas were taken over by visitors and new workers from the mainland. Researchers were faced with uncovering the depth and breadth of these overt and covert feelings, social and psychological impacts. The qualitative reports of residents were evaluated through guided discussion and focus groups. Issues included the following:

---

Families were changing - Awareness that less structured work schedules was affecting time spent with family and in recreating activities, hunting and fishing.

Loss of community cohesion – Past plantation working hours afforded time spent supporting others and in group and calendrical cultural activities. Families were becoming more self-centered.

Increased crime – The youth, spending more time with peers and less unsupervised time with parents, was committing petty, property theft.

Increased stress - Long-time residents were less adaptive than newcomers to rapid economic changes and working in up-scale environment under demanding supervisors.

Company controls – The economic changes were forced on them by the company.

Company broke promises in the past – Newcomers hold most of the higher supervisory positions that residents had trained for and been promised.

Growing job insecurity – Financial losses at the resorts forced layoffs. The Company used layoffs as leverage to gain support for luxury home developments. Many workers had mortgages in new affordable homes.

Greater disparity between rich and working poor – Wealthy tourists become new residents in luxury home communities.

Development leads to changing behaviors/values – The new economy afforded purchasing new items. Children were given money by parents and became more materialistic.

Big chain stores could wipe out local businesses – The 27 small business owners feared that wealthy new residents’ consumer demands would displace them or cut off the trickle down financial benefits they had anticipated. As it turned out, few experienced business benefits from newcomers, the resorts had their own services and gift shops.

Development brought loss of local culture – Acculturation to new lifestyles and pace decreased family values and cultural institutions. Loss of culturally esteemed values of collectivity, support and respect for elders were diminishing.

Out-migration of youth/no jobs – Youth employment during the summer months at plantation jobs had given them a common bonding experience, increasing community cohesion. Many forced to leave the island because of layoffs at the resorts.
Concerns about water supply – Some felt that the aquifer should not be depleted; careless watering of the golf course with potable water would cause problems in event of a drought.

Overcrowding of beaches – Residents felt the presence of newcomers occupying favorite recreation areas. Youth and fishermen were sensitive to this.

Race problems between haole and locals – There were rank, class differences in jobs with Caucasians holding more supervisory/managerial positions. ¹⁹

Some social impacts had generational, age, class and cultural implications. For example, those older, long-term residents with strong sentiments for community cohesion were affected most by rapid change, seen as threatening and most stressful. Feelings of disrupted community cohesion brought on by shift work and holding multiple jobs for job instability, placed more stress on the nuclear family. Community cohesion was also reduced by limited discretionary time available for traditional institutions (church activities) and voluntarism in community projects. Work place adaptations to mainland supervisors, differences in socially acceptable behaviors and interactions, and cultural misinterpretations interacting with authoritarian superiors and resort guests caused mental health problems. In contrast, the Caucasian newcomers and repatriated Lanaians holding better jobs were optimistic, with new opportunities, and having left problems behind.

The most striking negative adaptation to economic change was the increase in crime. Assaults, vandalism, theft of property, disorderly conduct, and so on, increased remarkably in the period of 1991 to 1995. The influx of non-local, wealthy newcomers evidently created a “have and have not” scenario of resentment. Young residents and fishesman also resented the presence to newcomers “taking over” favorite beaches, polluting them, and having amenities built to serve the newcomers. Overcrowding was disruptive and fishermen had to compete with tour boats and snorkelers.

¹⁹ Ibid, pages 76 to 83.
The study concluded that, given the problems resulting from the rapid and monolithic social change, it might be more worthy and cost-effective to encourage prevention of these problems through the sustainability of traditional lifeways than through human service interventions. Human service response to social fall-out is a requisite measure, but cannot compensate for what is lost in the way of family and community process. The qualities imparted to individuals from healthy families and communities reflect the sanctity of these institution; they cannot be replicated.

**West Maui – Significant In-Migration and Shift in Settlement Patterns**

West Maui’s main settlement areas include the former whaling town of Lahaina, which has most of West Maui’s permanent residents, and the coastal resort expanse stretching north from Kā‘anapali to Kapalua. Kā‘anapali has been planned and marketed as an integrated unit since the early 1960s. Complementing the resort area along the shoreline are planned residential communities mauka of the main highway. The newer developments around Kapalua have followed a similar strategy of master planning. Interspersed with the major resorts are pockets of older residential neighborhoods and villages.

During the heyday of West Maui’s sugar industry early this century, camps for the workers of Maui Land and Pineapple and the Pioneer Mill dotted the region. The plantation camps dwindled and ultimately disappeared as employment in the West Maui sugar industry dwindled.

With the development of Kā‘anapali, West Maui experienced major economic revival, and as the region’s visitor industry grew throughout the 1970s and 1980s, the population mix significantly changed. Labor shortages in the booming visitor and construction industries attracted young workers, especially from the continental U.S., to the area. Retirees and investors also moved into the area and purchased upscale homes, often vacation units in planned communities developed around the Kā‘anapali and Kapalua golf courses.

Between 1970 and 2000, West Maui’s population more than tripled, subdivisions replaced agricultural fields, and hotels and condos fronted the shoreline. Also, settlement patterns shifted. Almost three-fourths of the West Maui population resided in and around Lahaina in 1990. Ten years later, almost half the population lived in the Kā‘anapali – Kapalua region.
Earthplan conducted two social impact assessments on Kā'anaapali projects. The first study was on a timeshare resort on the 96-acre at North Beach. The second study was conducted six years later on the Kā'anaapali 2020 Plan. Kā’anaapali 2020 was a master planning effort that incorporated the principles of Smart Growth, New Urbanism and alternative modes of transportation aiming to create livable communities where people can live. The planning area covered 4,325 acres. Proposed uses were intended to be consistent with town development and included residences, employment centers, a hospital and other community uses. Kā’anaapali 2020 entailed a lengthy and intensive community participation program.

In both studies, community interviewees were asked to describe the region’s strengths and problems. Community strengths were similar in both. They included the social environment, including the diversity of people, the beauty of the natural environment, and the cultural and historical legacy. Community problems in both studies tended to be related to regional growth, and these included:

- **Public Infrastructure:** Traffic congestion and the lack of an efficient transportation system were the direct result of increased resident and visitor population. Parks were overused and improvements to sewerage and drainage systems were not keeping up with new development.

- **Affordable Housing:** The lack of affordable housing was a big problem. The region’s rental unit supply is dominated by short term, high-priced rentals targeting tourists. Many of the region’s employees cannot afford to live in West Maui, and must therefore commute from other parts of the island.

- **Social Problems:** In the second study, some people felt that the relationship between newcomers and long-time residents had improved. Still, there was continuing animosity based on financial disparity. It was pointed out the many of the relatively new residents (ten years and less) live in the higher-priced and gated Kā’anaapali and Kapalua communities. It was felt that it was difficult for some workers to witness the conspicuous economic differences while they have difficulty with economic survival. Also, it was felt that newcomers tend to be more articulate, and some eventually assume leadership roles in community organizations and efforts. While this was considered a positive contribution, it was sometimes considered negative when the

---

newcomers try to impose their own culture and experience on the existing community. Crime and drugs were a continuing concern.

Although there was continued concern about social problems generated by an influx of newcomers and visitors, there was a difference in attitude between the two studies. In the second study, community informants felt that there was more community cohesion. As the newer residents settled in, people were accepting the differences in viewpoints and cultures. The newer residents were contributing to local efforts, and the respect between long-time and recent residents was reportedly growing.

Further, there was optimism about the future in the second study. Many of the interviewees participated in the Kā'anapali 2020 effort. They felt that they were able to work together and compromise, and that the plan was a reflection of a preferred future for West Maui.

5.4.2. Relevance to Lā'au Point

The Lāna'i model illustrates how a rapid shift from a single-product agribusiness to resort and luxury development caused significant social disruption. While other communities with plantation closures have options of diversification or relocation to nearby employment centers, the Lāna'i community was only offered the option of upscale resort development and accompanying resort service jobs. Long-term residents were forced to adapt to the new economy. Faced with the specter of unemployment, they supported the economic change and job opportunities of resort development, but with some skepticism.

The problems related to lack of options are directly to lack of community control. Lāna'i residents were not afforded to opportunity to have meaningful input in the future of their island. Economic disparity and racial tension exacerbated feelings of helplessness and social stress.

In meetings and interviews on the Lā'au Point Project, people who opposed the project feared the Moloka'i would follow this Lāna'i model if the Project were implemented. They felt that residents would be subject to the control of the rich newcomers. They were concerned that their lifestyle would be irrevocably diminished by the presence of millionaires who would flaunt their wealth and disrespect local values.

Two factors suggest that Project implementation would not result in social conditions that exist on Lāna'i.

- Community control: Whereas Lāna'i residents historically accepted the conditions of the island's predominant employer, Moloka'i has traditionally exhibited self-reliance and independence. Changes and proposals are scrutinized, and residents make their own options if they
do not like what is presented. Community control was a salient factor in the development of the Plan and Project.

- Multiple forces for change: Lāna‘i was given only one option to change. Moloka‘i has multiple options. The economic base is more diversified than that of Lāna‘i, and people have more choices than just the visitor industry.

The social problems present on Lāna‘i could occur anywhere, however, as long as long as people feel an absence of choice and loss of control due to development. The lesson to be learned from Lāna‘i is how to prevent such social problems. The Lāna‘i study encourages the prevention of these problems through the sustainability of traditional values and practices. Rather than replacing existing values with imported standards, new development should build upon the traditions that existed prior to the change.

To those who participated in this SIA, West Maui is an urban environment characterized by too many structures, too many people, too many newcomers, and too much development. This was highly undesirable, and it was felt that any step in this direction would be detrimental to Moloka‘i. For those who oppose Lā‘au Point, this Project is a step in that direction.

Development has indeed significantly altered West Maui’s social environment. The social impacts of development in West Maui have generated significant changes. The increase in population and shift in settlement patterns are measurable impacts. Changes in the political and social structure are less tangible but no less significant.

Two factors suggest that the replication of West Maui’s social environment in Moloka‘i due to the Lā‘au Point Project is highly unlikely.

- Significant difference in timing and scale: Lā‘au Point Project build-out is estimated to take 16 years. At the end of this period, an estimated 174 people will be permanent residents. This will account for only two percent of the population forecasted for 2025. The likelihood of these people having significant influence in changing Moloka‘i’s social and political structure is low.

- Protection of land from future development: If the Project is implemented, over 55,000 acres will be protected from development. This will prevent a change in settlement patterns on subject lands.
Nevertheless, the West Maui model can serve as example for relationships between long-time residents and newcomers. While there are still differences in values and lifestyle, community cohesion in West Maui was growing. Long-time residents have come to appreciate the contributions of more recent residents, and the latter have learned to work within the framework of the local community.

5.4.3. Lā‘au Point Project Impacts

The impacts of the Project on the social environment are based on the number and type of new residents. It is estimated that 174 permanent residents will live at Lā‘au Point, and that peak occupancy would have 499 residents on-site. The average number of permanent and seasonal residents is 230.

The new residents are expected to share common socio-economic characteristics, the most notable of which is high income. Lā‘au Point residents are expected to be empty nesters and in pre-retirement or retirement age. Further, most of them are expected to be based elsewhere, and will live at Lā‘au Point on a part-time or seasonal basis.

Expectations of conflicting values and unfair treatment

The impacts of this new community are related to expectations and preconceptions of other social groups. There is a tendency to expect certain behavior and values of people who are different. Race and gender have culturally and historically been the bases for expectations. Economic class differences also elicit preconceptions, as do age, religion, politics, occupation and lifestyle. The bases for these expectations vary, including cultural mores, the media, experience, parents, authority, and so on.

It is therefore typical to expect that Lā‘au Point residents will have values and behavior that are different if not counter to Moloka‘i Style. Part of the Project’s impact on Moloka‘i’s social environment is therefore the sheer expectation of conflicting behavior and values. These expectations create an atmosphere that awaits conflicts, and an atmosphere of tension and apprehension.

This impact on the social environment is already occurring. In meetings and interviews for this study, we found that people have many expectations of the new residents, and these expectations are especially negative for those who oppose the Project. People expect the new residents to have materialistic values and to look down on those who are poor. They expect the new residents to be haole, and to have stereotypical characteristics of that ethnic group. People expect the new residents to have little or no appreciation for Moloka‘i Style, including social behavior, subsistence gathering and ocean recreation.
Further, Project opponents publicize these expectations, and these visible and vocal expectations can influence those who are neutral about the Project.

**Community conflict**

The Project has elicited passionate community discourse. Project opponents especially have vocalized their strong objection to the Lā'au Point project. In interviews and meetings for this study, opponents have vowed to use aggressive measures to fight the project in legal and public arenas. Bumper stickers and signs are reminders of their position, and members of the Save Lā'au group, Hui Ho'opakele, are planning to occupy the Lā'au area.

This contentious public debate affects the social environment because it breeds apprehension and social disharmony.

**Social interactions and relationships**

Another impact on the social environment is related to future social interactions and relationships between existing and new residents. These interactions can be positive or negative.

- **Interactions at Lā'au Point**

  The Project will open up Lā'au Point to the community, and existing and new residents will interact. These interactions are especially sensitive because Lā'au Point is “our ‘aina” to existing residents and home to the new residents. Interactions can be positive if both parties are respectful and appreciate each other’s privacy and right to enjoy Lā'au Point. The interactions are inevitably negative if either party displays possessiveness or disrespect for the other’s relationship to this area.

- **Interactions in community efforts**

  Community efforts provide opportunities for positive interactions because both existing and new residents can work toward a common goal. Encouragement and appreciation for each other’s contributions go a long way in creating positive interactions. If newcomers insist on his or her way, or places higher value on “where I come from,” or existing residents exclude newcomers, then interactions become negative and counter-productive.

---

Potential Social Impacts

- Casual interactions

Casual interactions in stores, churches, schools, banks and other public places are the most common and impressionable. In discussing Moloka‘i Style, people often referred to their experiences in these venues. Friendliness and common courtesy between casual acquaintances plant the seeds for positive interactions. Impatience and rudeness will leave a negative impression that may extend to future interactions.

Community experience at Lā‘au Point

In addition to personal interactions at Lā‘au Point, the social environment of existing residents also includes the actual experience of visiting the area. Although study participants generally did not frequent this area, they knew of and appreciated its mana. The seclusion and pristine nature, along with abundance of food sources, make this a very special place for Moloka‘i residents. It is part of Moloka‘i Style.

Having luxury homes and affluent residents would alter this experience, particularly if the homes and property fences are very visible or prominent. The juxtaposition of natural beauty and expensive homes would be offensive for those who resent the presence of outsiders or structural development.

On the other hand, existing residents may appreciate the ability to visit a previously inaccessible area regardless of nearby uses.

Impact on West End residents

Residents of Pāpōhaku Ranchlands and Kaluako‘i would have a direct relationship with the Lā‘au Point Project. These areas are currently fairly isolated, and the project would bring increased activity due to the shared access road with Lā‘au Point residents and those using the public access.

5.4.4. Project Significance and Mitigation

As previously discussed, the Lā‘au Point Project is not expected to have the same magnitude of impact as the development of Lāna‘i or West Maui.

A significant impact on the social environment is the embodiment of negative expectations related to Lā‘au Point residents and the public controversy. Project opponents have focused on Lā‘au Point as the problem. While the Project itself does not generate this impact of negative, it is the target of intense criticism.
The heated nature of this controversy has a detrimental effect on the social environment. It causes social disharmony and stress. In focus group sessions and interviews conducted for this study, people repeatedly said that they do not go to meetings because of confrontational behavior. They feel intimidated and have become less inclined to participate in public meetings. Kūpuna were concerned that this type of behavior was becoming more common. The mitigation to offset this already existing impact is to give people the opportunity to learn about the Project and the Plan in a non-confrontational setting so that they can make an informed decision on their own.

Regarding social interaction and relationship, the Project does not add a new element to Moloka'i’s social environment. The community is already experiencing change, and East Moloka'i in particular has undergone transformation.

Recent real estate transactions suggest that affluent people are continuing to buy expensive homes in East Moloka'i. From January 2000 to May 2006, there were 83 real estate transactions, not including family transfers and other non-applicable transactions. The mean selling price for the total inventory, not including the highest and lowest values, was $334,774. In contrast, the mean selling price of the 47 homes in Maunaloa, Kualapu'u and Kaunakakai was $235,586.

Interaction between existing residents and affluent newcomers is therefore already occurring. And from accounts in interviews and meetings, Moloka'i Style is still persistent and resilient in spite of these new residents.

To mitigate potential social conflicts due to economic disparities between the existing and new residents, there needs to be social integration on a regional level. Newcomers need to be informed of and sensitized to local values and lifestyle. Existing residents could help the new residents assimilate into the community using practices recommended in the Community-Based Tourism Plan. This scenario of mutual adjustment and acceptance is very likely, especially given the acceptance and aloha that is characteristic of Moloka'i Style.

---

23 Information provided by Ke 'Aupuni Lōkāhi, with assistance from local realtors.
In terms of community experience at Lā‘au Point, it is crucial that existing residents feel welcome to use the public accesses and visit the shoreline. Expectation management should be incorporated in the resource management program orientation so that shoreline visitors are comfortable with the new development. Also, to the extent possible, the structures should be located to limit visibility from the shoreline. This would enhance the natural setting for shoreline visitors and provide privacy for the homeowners.

Regarding impacts on Pāpōhaku Ranchlands and Kaluako‘i residents, improvements to shared infrastructure would help to balance the impacts related to increased users and activities. In meetings and interviews with these residents, they had several suggestions which are included in Section 4. Further discussion on these matters is recommended.

5.4.5. Social Impacts of No-Project Scenario

Except for the impact related to negative expectations and current community conflict, Project impacts on the social environment are manageable and can be mitigated, as discussed in the previous section.

The Project’s most significant impact on the social environment is its enabling of the Community-Based Land Use Plan. While many parts of the Plan are important, its core social value is the provision for community control and self determination. It is community control that will help existing and new residents take care of the shoreline and other conservation areas. It is community control that will mālama cultural resources and promote subsistence activities. It is community control that will develop the right type of affordable housing and will make sure that Moloka‘i Style is perpetuated.

This type of community control strengthens the social fabric because it allows people to make meaningful contributions within a predictable framework. Hence, while, the Project by itself is just a development project, its contextual impact in the Plan has major social significance and value.

Non-implementation of the Project is even more significant. If the Project is not implemented and MPL seeks other alternatives, the future of its holdings is uncertain. The community would lose control of resources, and economic opportunities would decrease. There may be multiple landowners, which would make it difficult to develop a cohesive and comprehensive plan for West Moloka‘i. The uncertain future of land uses and cultural and environmental resources, coupled with diminished hope for jobs, would cause social anxiety and tension and stress social and health services.
Unemployment and out-migration rates would likely increase. Further, for those who would lose their job or business due to business closures, financial pressures and family stress would result and they would need to find alternative means of support.

5.5. Impacts on Public Services and Facilities

5.5.1. Police Protection Services

Moloka'i police protection services are provided by the Maui County Police Department. The Police Station is located in Kaunakakai, next to the Kaunakakai Fire Station. In addition to the Commanding Officer position, there are 29 positions including:

- One Lieutenant
- Six sergeants
- Twelve patrolmen
- Five dispatchers
- One school resource officer
- One community officer
- One auxiliary officer

Approximately 90 per cent of the police officers are from Moloka'i.

A minimum of two officers and one sergeant are on duty at any given time. The island is divided into an east and a west beat. Each beat has three eight-hour shifts, and each shift is staffed by one officer.

The Moloka'i community is very rural in character. The most frequent crime problems revolve around domestic quarrels, neighbor disputes and family quarrels. Many of these are situational; younger males are sometimes participants in fights. Some problems could stem from stress related to financial issues due to the high unemployment rate. Moloka'i also has a drug use problem like every other community after the introduction of crystal methamphetamine to Hawaii.  

---

24 Personal communication with Captain Dan Matsuura, Maui County Police Department, Moloka'i Division, July 25, 2006.
The Project will directly impact police protection services due to increase of people and activity on and around the Project site. During construction, construction activities will increase activity and access on private property. In the long-term time frame, there will be an increase in demand from the additional population, more homes and property, and increased activity resulting from public parks and more public accesses. Lā‘au Point is very remote and the response time for all emergency services is about 25 minutes. Further, the population in the Kaluako‘i region is dispersed.

To mitigate impacts, the Police Department should be kept informed of each stage of the construction process in anticipation of security or traffic issues. Further, on-site private security services can help to deter trespassing, loitering and property crime.

The Project will have an indirect impact on police protection services due to implementation of the Plan. Additional population would result from the increase in affordable housing units, and portions of conservation land may be accessible for cultural and subsistence uses. Specific impacts of these efforts are outside the scope of this study, and would need to be analyzed the implementation of these Plan components progresses.

5.5.2. Fire Protection

Three fire stations serve Moloka‘i. The main station is the Kaunakakai Fire Station located next to the Police Department. An engine company, Kaunakakai Fire Station has an Engine and Tanker, a rescue boat and a utility truck. There are five to six firefighters on duty every twenty-four hours.

The Ho‘olehua Fire Station serves the west end, and houses a full five-man engine company. The Pūko‘o Fire Substation is 16 miles east of Kaunakakai and houses a two-man engine company.

In addition to fire emergencies, the department has first responder medical assistance capability when needed. Emergency Medical Service, or EMS, is provided by Medivac, a private ambulance service of American Medical Response Company. EMS has two ambulances, one with two people on duty and a backup ambulance serviced by call-back personnel.

The Project will directly impact fire protection services due to the increased demand generated by additional population, the presence of more structures, and increased activity at the parks and along the shoreline. The Project area is about 25 to 35 minute response time from the Ho‘olehua Engine Co. station and about 20 additional minutes from Kaunakakai Engine Co.
Most responses to the project area would probably be medical related
given the older population. Further, there is a risk of brush fires in the
area due to dryness and high winds. Due to the remoteness and long
response-time, brush fires can have a considerable head-start.

Mitigation measures to address these impacts include:

- Inform residents that keeping driveways open for fire truck and tanker
  access is their responsibility.

- The access points at the public parks at either end of the project
  should be designed for jet ski launch capability. There should be
clearly defined access points within the Project area.\(^{25}\)

- Water rescues such as wind surfers, diver and swimmer related
  accidents can be handled by jet skis. Fishing boat accidents would
  require the rescue boat. Newspaper accounts of helicopter assistance
  (from Maui) being used in searching for lost boats or swimmers,
  though uncommon, give Moloka‘i additional ocean rescue capability.\(^{26}\)

The Project will have an indirect impact on fire protection services due to
implementation of the Plan. Additional population would result from the
increase in affordable housing units, and portions of conservation land
may be accessible for cultural and subsistence uses. Specific impacts of
these efforts are outside the scope of this study, and would need to be
analyzed as Plan implementation proceeds.

\(^{25}\) Currently the Fire Department’s 21 foot rescue boat is launched from Kaunakakai. The feasibility and
community acceptance of boat launch facilities is undetermined at this time. Given the past and possible
future boat landings at Lā‘au Point, there is strong community concern that outside boaters would be
inconsistent with subsistence activities along this shoreline.

\(^{26}\) Personal communication with Captain Wren Westcoatt, Kaunakakai Fire Station, July 27, 2006.
5.5.3. Medical Facilities

Moloka'i is served by the Moloka'i General Hospital, which is part of the Queens Health System based in Honolulu. Located in Kaunakakai, the Moloka'i General Hospital houses 15 patient beds, of which 13 are acute care beds and two are long-term care beds. Its service population is the island of Moloka'i.  

Services include:

- 24-hour emergency room
- Inpatient services
- Family planning/midwifery
- Family doctor/internist
- Laboratory
- Physical therapy
- Radiology
- Ultrasound
- Mammography
- CT (cat scan)
- Bone density testing
- Echo-cardiograms
- Allergist
- Cardiologist
- Endocrinologist
- Gastroenterologist
- General surgeon
- Nephrologist
- Ophthalmologist
- Orthopedist
- Pediatric-develop mentalist
- Physiatrist
- Podiatrist
- Urologist
- Veterans' affairs

In addition, there are specialty clinics for appointment visits including

---

27 Information was provided by Punahele Alcon, Administrative Assistant, Moloka'i General Hospital, August 31, 2006
In June, 2005, Moloka'i General Hospital celebrated the opening of a new wing to their facility. The $7.5 million project represents completion of Phase I of the development, conceptualized in 1997. The new wing includes two new trauma rooms, new CAT scan, new radiology room, emergency room, delivery room, and storage rooms among others. Work on Phase II, which included the relocation of the Women’s Health Center and expansion of the medical office, was to begin shortly thereafter.

In addition to the hospital, Moloka'i’s medical services include a rural health clinic that is part of the hospital, two private physician practices, a midwife, three dental practices, a community health center, and one chiropractic clinic. Other medical and health services include three mental health care homes, an area health education center, Care Resources (nursing home without walls), ambulance medical response, Moloka'i Occupational Center, Na Pu‘uwai, Kalua Ola Hou, Molokai Drugs, and several government programs.

The Project will directly impact hospital services by increasing the service population; the service area will be unaffected. It is anticipated that on-site residents will be older than the general population, and thus require a higher level of service.

The low level of permanent population will help to offset impact on health care services. Further, it is expected that on-site residents will have live-in caretakers and caregivers, thereby reducing the need for medical and health services.

The Project will have an indirect impact on medical and health services related to implementation of the Plan. Additional population would result from the increase in affordable housing units. Specific impacts of these efforts are outside the scope of this study, and would need to be analyzed as the implementation of these Plan components proceeds.

5.5.4. Public Schools

Moloka'i has six public schools, including three elementary, one conversion charter school elementary, one intermediate and one high school. In the last three years, educational resources were expanded to include a private charter high school and a private charter middle school. Maui Community College offers post-secondary opportunities.

---

28 Tracy Liu, MGH unveils its new wing, The Moloka'i Island Times, Volume 01, Issue 23 (June 29, 2005).

29 Center for Rural Health Works, Island of Molokai, Hawaii, Medical Service Area - Economic Impact of the Health Center (September 2005), Table 9: Direct Economic Activities of the Health Sector, Island of Molokai, 2005.
Project residents would be served by Maunaloa Elementary School for kindergarten through grade six, Moloka‘i Intermediate School for grades six through eight, and Moloka‘i High School for grades nine through twelve. Other options include the three charter schools.

Located in upper Maunaloa town, Maunaloa Elementary School has been experiencing decreasing enrollment, from 73 students in 2003, to 69 students in 2004, and to 57 students in 2005. Moloka‘i High School is located in Ho‘olehua. It experienced decreasing enrollment from 446 in 2003 students to 405 students in 2004, and a minor increase to 408 in 2005.

The Project impact on the public education system was assessed in the economic and fiscal analysis. It was found that in the permanent resident population, at full build-out, less than 25 students are projected. This includes less than ten students in kindergarten through grade six, and less than 15 students in grades seven through twelve.

These estimates are based on a low housing occupancy rate, the age of the anticipated population and educational preferences. Approximately 30 percent of the La‘au Point residents are expected to be permanent residents and the new residents are expected to be older than the general population. About 25 percent of the permanent residents are expected to have children under 18 living at home; another ten percent are estimated to have family members over 18 living at home. Further, it is likely that some of the Lā‘au Point residents will home school or send their children to private schools.

The Project impact on educational facilities is therefore expected to be minimal. Mitigation measures are presented in the economic and fiscal analysis.  

---

30 Knowledge Based Consulting Group, Economic and Fiscal Impacts of the Proposed La`au Point Residences on Molokai, prepared for Molokai Properties Limited (April 2006).
References


Matsuoka, PhD., Jon K. *Economic Change and Mental Health on Lāna’i.* 1997.

Maui County. *2005 County Data Book.*


Appendices

Appendix A: Written Comments From the Public Meeting

One person submitted the following comments:

- **The Land Use Plan guarantees cultural, substance, environmental, economic sustainability. Without a plan, the island will be destroyed. The focus is on a minor part of the plan – 200 homes. I’ll be dead before 200 homes are built – just as Pāpōhaku Ranchland developed slowly.**

- **Having economic development will allow families to qualify for homestead properties, affordable homes, self-sufficiency, etc.**

- **The future is not bright without this plan. Technology will allow development of the land – make water. This technology is around the corner. With land in the land trust, it stays under the stewardship of Moloka‘i. This land will be protected from development,**

- **Two hundred homes will not bring permanent residents. The expansion of Hawaiian homesteads will perpetuate the dominance of Hawaiians population-wise. Three month residents don’t get involved in the community.**

- **The island real estate market has already stressed the island. The land use plan will bring stability to the west end.**

- **Moloki will change; there is no such thing as staying the same. The plan helps reduce impacts by the community input and charting a course for the future.**

- **The population was once 10,000 on Molokai. Memories are short.**

- **In the community plan, a larger development was approved. The plan has a smaller development.**

- **Subsistence is part of the plan. The plan wants to perpetuate subsistence.**

- **Hawaiian culture will survive. The plan shows a sensitivity for culture to allow for Hawaiian practices. The rules are developed by Hawaiians for the community and Hawaiians. That is better than a foreign landowner.**

- **This plan is an agreement for the future.**
Appendix B: Written Comments from West End Residents

Focus Group

One couple submitted the following comment:

As full time residents of Moloka‘i for the past 19 years (and part time residents for an additional 5+ years), we’d like to voice of wholehearted support for the La‘au Point Project under discussion at meetings being held this coming week. Having attended planning meetings related to La‘au since the very beginning, we stress that our support has not changed and that we firmly believe the project is good for the island and that the years of careful planning will benefit the people of Moloka‘i.

Specifically, this project is in deed low-impact and most certainly being planned with environmental and aesthetics in mind. Issues such as water, erosion and land preservation, care of flora and fauna all have been addressed.

In the latter case, in regard to fishing and hunting, we’d like to add that from our experience some of the very people who oppose the project in respect to fishing and hunting are the very folks who are misusing these precious resources and at times endangering the lives of islanders during poaching expeditions.

As for the cultural aspects of the project, great care has been taken to include preservation in a very sensitive and caring manner. This in itself is exciting and a win/win for the island and those who treasure Hawaiian heritage.

Not to be forgotten, the financial benefit the project will have for our island that most certainly needs all the help it can get in terms of employment and economic input. To survive Moloka‘i must feed its economic engine. Controlled growth such as this does just that meaning that residents will be able to remain on their home island and will be able to raise their families in a healthy and productive social setting. Stagnation is not the answer nor is massive development. Thus, La‘au is a perfect solution.

Beyond this is the Land Trust element that has been incorporated and which will benefit and save the entire island for generations to come.
I think it is important for those reviewing this project to fully review the standing and credentials of those who oppose this important project. The agenda of the vocal minority group and its funding source should be noted as their negative campaign is nothing new on-island and has disrupted the community for years. Be it the well organized hui or West Enders with NIMBY mentalities, their goal is and has long been to bring down the Ranch at the expense of the good folks who hope to have a future on Moloka'i. Please, in considering this matter, don't base your conclusions on bumper-sticker mentality and paid ads in newspapers. There is a huge, albeit, silent majority who want this project to go through and want to see Moloka'i succeed. Again, please think beyond the negative rhetoric much of it wrong and hyped for propaganda purposes.

In conclusion, we truly believe that a controlled growth project such as La'au Point could well serve as a model for others. The Ranch and the EC are to be congratulated for devoting so much time and effort in working with the community at large and for thinking to the long-term sustainability of our fragile environment and those who live here. Again, we commend them and strongly support the La'au Point Project.

Thanks to all who have worked so long and hard during the planning phase.

Their dedication and unselfish desire to ensure better time for Moloka'i are remarkable as has been their creative thinking with a view to the future.

Mahalo nui loa!

The following comment was submitted by an individual after the meeting:

I have one comment that I neglected to make at the meeting which does relate to social impact/quality of life specifically to residents of Maunaloa, Pāpōhaku Ranchlands, Moana Makani, Kaluakoi Hotel guests, the condo owners and renters and the Fairway residents as well as future owners at La'au Point. I understand that a parcel of land has been designated to house a FIRE STATION. Rather than just a parcel, I propose that MPL and its partners, commit to building a fire station as part of the overall plan. The facility would then be transferred to the control of Maui County.

As a practical matter, most insurance companies will not write policies because the community is located a distance from a fire station which they consider an unacceptable risk. Perhaps as a result of having first responders within a reasonable distance of emergencies, one of the many lives lost on our West End beaches could be saved. A fire station would serve the entire West End community, not just the proposed La'au Point.
I can't stop thinking about it and need to underscore the importance of the negative impact it will have on Moana Makani, Ranchlands and Fairways residents....that is the use of Kaluakoi Road as the access point. I saw a report of the Maunaloa meeting you held and noticed that comments had been made in support of constructing the road through their town. Initially, it probably falls under economic impact however the fall out of NOT allowing economic development is negative social impact....poor schools, no job opportunities and the social vitality of the town. MPL seems to be turning a deaf ear to this suggestion.....as is sometimes said “don't confuse me with the facts, my mind's made up".
Appendix C: Written Comments from Filipino Focus Group

One person submitted the following comment:

*I feel that the Laau Development will not impact Molokai’s lifestyle.*

- We want people to have jobs.
- Get off of welfare and learn how to work and be self-sufficient.
- No other landowner would even think of giving any community ¾ of their lands. This opportunity is rare.
- Having more new money on island will help all businesses, schools, churches, etc.

*My family is in support of Laau development. I appreciate you letting us write our comments. We are not public speakers. Too intimidating.*

One person submitted the following comment:

*The project is a great opportunity for the people of the community to be self-sufficient. Will create continuing jobs for the people. The amount of land that will be sold is limited so I don’t see any threat of mainlanders or rich people disrupting the present Molokai.*
Effects of Ground-Water Withdrawal on Kaunakakai Stream Environmental Restoration Plan, Moloka‘i, Hawai‘i
The proposed habitat-restoration site near the mouth of Kaunakakai Stream will provide habitat for the native Hawaiian Stilt (*Himantopus mexicanus knudseni*). The U.S. Army Corps of Engineers is planning to create about 2.75 acres of wetland habitat in the area shown by removing sediment and lowering the streambed.
Contents

Abstract ........................................................................................................................................... 1
Introduction ......................................................................................................................................... 1
  Purpose and Scope ......................................................................................................................... 2
Setting ................................................................................................................................................ 2
  Regional Hydrogeologic Setting .................................................................................................. 2
  Kaunakakai Hydrogeologic Setting ............................................................................................. 5
  Withdrawals ................................................................................................................................... 7
Numerical Simulation of Additional Ground-Water Withdrawal ......................................................... 11
  Model Description ....................................................................................................................... 11
  Model Application ......................................................................................................................... 11
  Description of Model Scenarios ................................................................................................... 12
Model Results .................................................................................................................................... 12
  Scenario 1 ..................................................................................................................................... 13
  Scenario 2 ..................................................................................................................................... 16
  Scenario 3 ..................................................................................................................................... 16
  Scenario 4 ..................................................................................................................................... 16
  Scenario 5 ..................................................................................................................................... 19
  Scenario 6 ..................................................................................................................................... 19
  Effects on Kaunakakai Habitat-Restoration Site .......................................................................... 19
Model Limitations .............................................................................................................................. 23
Summary ........................................................................................................................................... 23
References Cited .................................................................................................................................. 24

Figures

1. Map of Island of Moloka‘i, Hawai‘i, showing proposed Kaunakakai habitat-restoration area and selected geographic features......................................................... 3
2. Aerial photograph showing proposed Kaunakakai habitat-restoration area near the mouth of Kaunakakai Stream, Island of Moloka‘i, Hawai‘i ....................... 4
3. Map showing average measured ground-water levels for the period 1938–97, ground-water levels from resistivity measurements, and altitude of top of saline water body determined from time-domain electromagnetic survey, Island of Moloka‘i, Hawai‘i ................................................. 6
4. Schematic cross section of the ground-water-flow system on the Island of Moloka‘i, Hawai‘i ........................................................................................................ 8
5. Map showing aquifer systems designated by the State of Hawai‘i Commission on Water Resource Management and locations of selected wells on the Island of Moloka‘i, Hawai‘i ................................................................. 9
6. Scenario 1 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i ................................... 14
7. Scenario 2 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i ................................ 17
8. Scenario 3 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 18
9. Scenario 4 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 20
10. Scenario 5 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 21
11. Scenario 6 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 22

Tables

1. May 2007 ground-water-use permits for the Island of Moloka‘i, Hawai‘i .......... 10
2. Summary of withdrawal scenarios simulated with the ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 13
3. Summary of changes in steady-state ground-water level simulated with the ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 15
4. Summary of changes in steady-state coastal discharge simulated with the ground-water-flow model for the Island of Moloka‘i, Hawai‘i .......................................................... 15
## Conversion Factors

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>inch (in.)</td>
<td>2.54</td>
<td>centimeter (cm)</td>
</tr>
<tr>
<td>foot (ft)</td>
<td>0.3048</td>
<td>meter (m)</td>
</tr>
<tr>
<td>mile (mi)</td>
<td>1.609</td>
<td>kilometer (km)</td>
</tr>
<tr>
<td></td>
<td>Area</td>
<td></td>
</tr>
<tr>
<td>acre</td>
<td>4,047</td>
<td>square meter (m²)</td>
</tr>
<tr>
<td>square foot (ft²)</td>
<td>0.09290</td>
<td>square meter (m²)</td>
</tr>
<tr>
<td>square mile (mi²)</td>
<td>2.590</td>
<td>square kilometer (km²)</td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td></td>
</tr>
<tr>
<td>gallon (gal)</td>
<td>3.785</td>
<td>liter (L)</td>
</tr>
<tr>
<td>gallon (gal)</td>
<td>0.003785</td>
<td>cubic meter (m³)</td>
</tr>
<tr>
<td>million gallons (Mgal)</td>
<td>3.785</td>
<td>cubic meter (m³)</td>
</tr>
<tr>
<td>cubic foot (ft³)</td>
<td>0.02832</td>
<td>cubic meter (m³)</td>
</tr>
<tr>
<td></td>
<td>Flow rate</td>
<td></td>
</tr>
<tr>
<td>cubic foot per second (ft³/s)</td>
<td>0.02832</td>
<td>cubic meter per second (m³/s)</td>
</tr>
<tr>
<td>gallon per day (gal/d)</td>
<td>0.003785</td>
<td>cubic meter per day (m³/d)</td>
</tr>
<tr>
<td>million gallons per day (Mgal/d)</td>
<td>0.04381</td>
<td>cubic meter per second (m³/s)</td>
</tr>
<tr>
<td>inch per year (in/yr)</td>
<td>25.4</td>
<td>millimeter per year (mm/yr)</td>
</tr>
</tbody>
</table>

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

°F = (1.8 × °C) + 32

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

°C = (°F - 32) / 1.8

Vertical coordinate information is referenced to mean sea level.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Altitude, as used in this report, refers to distance above the vertical datum.

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (μS/cm at 25°C).

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (μg/L).
Abstract

The U.S. Army Corps of Engineers, in cooperation with the County of Maui Department of Public Works and Environmental Management, has proposed to construct 2.75 acres of shallow ponds and mudflats near the mouth of Kaunakakai Stream, Moloka‘i, Hawai‘i to restore habitat for the endangered native Hawaiian Stilt. Kaunakakai Stream is ephemeral upstream from the habitat-restoration site. Where the pond and wetland bottoms are below the water table, the ponds and wetland will be sustained by ground-water discharge during dry-weather conditions. Because ground water is the main source of water for the proposed ponds and wetland, a reduction of ground-water level and discharge near the mouth of Kaunakakai Stream will have an effect on the availability of habitat.

In response to concerns about the possible effects of ground-water withdrawal on the habitat-restoration project near the mouth of Kaunakakai Stream, the U.S. Geological Survey undertook the present investigation to estimate, using an existing numerical ground-water-flow model, the changes in ground-water level and coastal discharge caused by redistributed and additional ground-water withdrawals. Steady-state water-level and coastal-discharge changes, relative to recent base-case conditions, were estimated for each of six withdrawal scenarios. Redirected and additional ground-water withdrawals in the six scenarios were simulated from selected sites in the area between Kualapu‘u and ‘Ualapu‘e. For the scenarios tested, model results indicate that withdrawals from existing and proposed wells cause a water-level decline of about 0.1 feet in the vicinity of the Kaunakakai habitat-restoration site. In addition, model results indicate a reduction of ground-water discharge, ranging from 98,000 to 170,000 gallons per day, to the model element containing the habitat-restoration site, although the existing spatial discretization in the model is too coarse to reliably estimate the reduction of ground-water discharge to the stream. Reduction in discharge to the habitat-restoration site is likely less than the total indicated by the model element because the site covers a small fraction (about 5 percent) of the area of a model element.

Ground-water-level declines near the habitat-restoration site will reduce (1) the available wetted habitat area by an amount that is dependent on the bottom slope of the ponds near their edges, (2) the maximum water depth of the ponds by about 0.1 feet, and (3) the average water depth by an amount that is dependent on the bottom shape of the ponds. The salinity of ground water discharging into the wetland area likely will increase by an unknown amount in response to increased withdrawals upgradient from the site. A numerical model capable of simulating density-dependent flow and transport is needed to evaluate the effects of withdrawal on salinity in the area.

Introduction

The U.S. Army Corps of Engineers (USACE), Honolulu Engineering District, in cooperation with the County of Maui Department of Public Works and Environmental Management (DPWEM), has proposed improvements to the existing Kaunakakai Stream Flood Control Project near the mouth of Kaunakakai Stream, Moloka‘i, Hawai‘i (fig. 1) to restore habitat for the endangered native Hawaiian Stilt (Himantopus mexicanus knudseni). (Kaunakakai Stream also is commonly referred to as Kaunakakai Gulch, but for the purposes of this report it will be referred to as Kaunakakai Stream.) The Kaunakakai Stream Flood Control Project was completed in 1950 and consists of an enlarged
Purpose and Scope

In response to concerns about the possible effects of ground-water withdrawal on the habitat-restoration project near the mouth of Kaunakakai Stream, the U.S. Geological Survey (USGS) undertook the present investigation, in cooperation with the USACE and DPWEM, to quantify the hydrologic effects of withdrawal from selected sites on ground-water levels and coastal discharge of ground water. An existing numerical ground-water-flow model (Oki, 1997) was used to estimate changes in water level and coastal discharge caused by redistributed and additional ground-water withdrawals in the area between Kualapu‘u and ‘Ualapu‘e on Moloka‘i. This report describes the results of model simulations that assess the hydrologic effects of redistributed or additional ground-water withdrawals relative to 2006 average or May 2007 permitted withdrawal rates. No new data were collected as part of this study.

Setting

The Island of Moloka‘i, the fifth largest of the Hawaiian Islands, occupies an area of 260 mi² (Juvik and Juvik, 1998) between latitude 21°00′–21°15′ N. and longitude 157°20′–156°40′ W. (fig. 1). The island is composed mainly of two shield volcanoes (Stearns and Macdonald, 1947): the older West Moloka‘i Volcano, which rises to an altitude of 1,381 ft, and the younger East Moloka‘i Volcano, which rises to an altitude of 4,961 ft. The town of Kaunakakai lies near the south coast of central Moloka‘i, about 0.25 mi east of Kaunakakai Stream, and on the south flank of East Moloka‘i Volcano (fig. 1).

Regional Hydrogeologic Setting

The geologic setting of the island of Moloka‘i has been described in detail by numerous investigators (for example, Lindgren, 1903; Stearns and Macdonald, 1947; Beeson, 1976; Macdonald and others, 1983; Stearns, 1985). Langenheim and Clague (1987) described and renamed the stratigraphic framework of volcanic rocks on Moloka‘i. The exposed rocks of East Moloka‘i Volcano are named the East Moloka‘i Volcanics and the Kalaupapa Volcanics (Langenheim and Clague, 1987). Kaunakakai Stream flows over the East Moloka‘i Volcanics, which is divided into two informal members—a lower member consisting of shield-stage tholeiitic, olivine-tholeiitic, and picritic-tholeiitic basalts and postshield-stage alkalic basalt; and an upper member consisting of postshield-stage mugearite and lesser amounts of hawaiite and trachyte (Langenheim and Clague, 1987). The upper member forms a relatively thin (approximately 50–500 ft thick) veneer over the lower member (Stearns and Macdonald, 1947). The northeastern part of East Moloka‘i Volcano contains numerous intrusive volcanic dikes, which form a dike complex and reduce bulk permeability of the rocks in the area. The volcanic rocks of West Moloka‘i Volcano are known as the West Moloka‘i Volcanics (Langenheim and Clague, 1987) and are separated from the East Moloka‘i Volcanics by an erosional surface that forms a hydrologic confining unit over the West Moloka‘i Volcanics.
Figure 1. Map of Island of Moloka'i, Hawai'i, showing proposed Kaunakakai habitat-restoration area and selected geographic features. Gl, gulch; Fk, fork; Str, stream.
Figure 2. Aerial photograph showing proposed Kaunakakai habitat-restoration area near the mouth of Kaunakakai Stream, Island of Moloka'i, Hawai'i (U.S. Army Corps of Engineers, 2004).
the orographic lifting of moisture-laden northeast-
erly trade winds along the windward slope of East
Moloka‘i Volcano. West Moloka‘i Volcano is con-
siderably drier because it does not extend upward
into the cloud-forming zone at higher altitudes.
Maximum mean annual rainfall is more than 150
in. near the summit of East Moloka‘i Volcano in the
northeastern part of the island (Giambelluca and
others, 1986). Over West Moloka‘i Volcano, maxi-
mum mean annual rainfall is about 25 in., and along
the coastal areas of the southern and western parts
of the island, mean annual rainfall is less than 16 in.

Rain that falls on the surface either (1) runs off,
(2) evaporates or is transpired by vegetation, or (3)
recharges the ground-water system. Total ground-
water recharge on Moloka‘i was estimated from a
monthly water budget to be 188.6 million gallons
per day (Mgal/d), which represents an average
of about 15 in/yr over the island (Shade, 1997).
Ground-water recharge estimated by Shade (1997)
varys spatially from a minimum of near 0 in/yr in
the western part to a maximum of about 100 in/yr in
the northeastern part of the island.

Water that recharges the ground-water system
flows from zones of higher to lower hydraulic head,
as measured by ground-water level. Water levels
are highest in the mountainous interior parts of the
island, particularly in the northeast, and lowest near
the coast. Thus, ground water flows from the moun-
tainous interior areas to coastal discharge areas.

Measured water levels are available primar-
ily in wells along the south coast and in the central
plain (fig. 3). In the vicinity of Kualapū‘u, mea-
sured water levels are about 8 to 12 ft above sea
level; along the south shore, water levels are 1 to 3
ft above sea level near ‘Umipa‘a and Kawela
and 4 to 5 ft above sea level between Kamalō and
Pūko‘o.

Available data are insufficient to develop a
detailed contour map of water levels for the entire
island. MacCarthy (1941) used electrical-resistivity
measurements to determine the depth to saltwater,
and then applied the Ghyben-Herzberg relation
to estimate the altitude of the water table in the
western part of the island (fig. 3). For hydrostatic
conditions, and assuming a sharp interface between
freshwater (specific gravity 1.000) and saltwater
(specific gravity 1.025), the Ghyben-Herzberg rela-
tion predicts that every foot of freshwater above sea
level must be balanced by 40 ft of freshwater below
sea level. For dynamic conditions, the Ghyben-
Herzberg relation generally underestimates the
freshwater-lens thickness near the discharge zone
and overestimates it near the recharge zone. The
Ghyben-Herzberg relation is sometimes used to
estimate the depth at which brackish water in the
transition zone has a salinity about 50 percent that
of seawater. MacCarthy (1941) estimated that the
water-table altitude in the western part of the island
ranges from about 1 to 14 ft above sea level. The
water-level estimates made from resistivity mea-
surements are only approximate because use of the
Ghyben-Herzberg relation to predict water levels
from estimated depths to saltwater (1) ignores the
freshwater-saltwater transition zone and (2) does
not account for dynamic conditions in the aquifer
where vertical flow is present. Unquantified errors
probably are associated with the resistivity measure-
ments and the geophysical models used to represent
actual subsurface conditions.

Ground water that is not withdrawn from wells
and tunnels discharges naturally from the aquifer at
onshore springs and seeps in deeply incised val-
leys and at subaerial and submarine coastal springs
and seeps. Ground water on Moloka‘i is uncon-
fined in inland areas. Along the south coast, ground
water may be confined by sedimentary deposits
that impede the seaward discharge of fresh ground
water. Fresh ground water on the island occurs
in two main forms—(1) as a lens-shaped body of
freshwater, called a freshwater lens, floating on
denser, underlying saltwater within permeable dike-
free rocks; and (2) as dike-impounded water ten to
hundreds of feet above sea level.

Kaunakakai Hydrogeologic Setting

The Kaunakakai study area is located in the
south-central coastal part of the island, where mean
annual rainfall is less than 16 in. Near the inland
reaches of Kaunakakai Stream, mean annual rainfall
exceeds 120 in. (Giambelluca and others, 1986).
Stearns and Macdonald (1947) observed small
perched springs discharging from the upper member
of the East Moloka‘i Volcanics in the north bank
of the South Fork of Kaunakakai Stream, between
altitudes of 2,450 and 3,150 ft, where the upper
member overlies 3 to 5 ft of red ashly soil. Swamps
upstream of the springs also may contribute flow to
the South Fork of Kaunakakai Stream. During dry
weather on October 9, 1945, total streamflow down-
stream of the springs was 0.12 ft³/s; drainage from
the swamps was 0.062 ft³/s and discharge from the
springs was estimated to be 0.054 ft³/s (Stearns and
Macdonald, 1947). On January 5, 1946, after three
additional months of mostly dry weather, stream-
flow downstream of the springs was estimated to
be 0.019 ft³/s, all of which was attributed to the
springs (Stearns and Macdonald, 1947). No springs
have been mapped in the North Fork of Kaunakakai
Stream. Discharge measurements are not available
EXPLANATION

- **LINE OF EQUAL WATER LEVEL AS DETERMINED**
  BY RESISTIVITY MEASUREMENTS (MacCarthy, 1941)
  Interval, 1 foot. Datum is mean sea level. Dashed where inferred

- **LINE OF EQUAL DEPTH TO SALINE WATER BODY AS DETERMINED**
  BY TIME-DOMAIN ELECTROMAGNETIC SURVEY (HAWAII COMMISSION ON WATER RESOURCE MANAGEMENT, 1997)
  Interval, 200 feet. Datum is mean sea level.

- **APPROXIMATE DIRECTION OF GROUND-WATER FLOW**

- **WELL AND AVERAGE MEASURED WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL**

---

**Figure 3.** Map showing average measured ground-water levels for the period 1938–97, ground-water levels from resistivity measurements, and altitude of top of saline water body determined from time-domain electromagnetic survey, Island of Moloka'i, Hawai'i (modified from Oki, 2006).
to characterize spring discharge for more recent conditions.

The North and South Forks of Kaunakakai Stream flow over the upper member of the East Moloka‘i Volcanics above altitudes of about 1,600 and 3,000 ft, respectively. Below these altitudes, the North and South Forks flow over the more permeable rocks of the lower member of the East Moloka‘i Volcanics. Stearns and Macdonald (1947) indicated that several streams on the southern slope of East Moloka‘i Volcano are perennial in their upper reaches, but do not flow continuously to the coast because of seepage losses and evaporation. These streams generally are perennial where they flow over lavas of the upper member of the East Moloka‘i Volcanics and where water discharges from springs or drains swamps. Where streams flow over the more permeable lower member, surface water more readily may be lost to infiltration. The South Fork of Kaunakakai Stream was described as perennial above an altitude of 1,900 ft (Stearns and Macdonald, 1947).

During water years 1951–98, mean discharge of Kaunakakai Stream near an altitude of 240 ft was 1.9 ft/s measured at USGS stream-gaging station 16414000 (Kaunakakai Gulch at Kaunakakai, Moloka‘i, Hawai‘i), downstream of the confluence of the North and South Forks. (Data from stream gaging-station 16414000 are available on the worldwide web at [http://waterdata.usgs.gov/hi/nwis/wnis/?site_no=16414000&agency_cd=USGS](http://waterdata.usgs.gov/hi/nwis/wnis/?site_no=16414000&agency_cd=USGS)). Recorded daily mean discharge at gaging station 16414000 was zero about 88 percent of the time during water years 1951–98, indicating that, at this site, Kaunakakai Stream probably flows only in response to rainfall. Farther downstream, recorded daily mean discharge at gaging station 16414200 (Kaunakakai Gulch at 75 feet) was zero about 91 percent of the time during water years 2004–6 ([http://waterdata.usgs.gov/hi/nwis/wnis/?site_no=16414200&agency_cd=USGS](http://waterdata.usgs.gov/hi/nwis/wnis/?site_no=16414200&agency_cd=USGS)). No known diversions exist upstream from the gaging stations, although discharge from the Moloka‘i Irrigation System (MIS) Tunnel into Kaunakakai Stream sometimes may augment streamflow.

Near the mouth of Kaunakakai Stream, where habitat restoration is being proposed, Kaunakakai Stream is perennial where it is hydraulically connected to the ground-water system. Near the coast, the main ground-water-flow system consists of a freshwater-lens system (Gingerich and Oki, 2000) within dike-free rocks. In general, a freshwater-lens system includes a lens-shaped freshwater body, an intermediate transition zone of brackish water, and underlying saltwater (fig. 4). Within a freshwater-lens system, fresh ground water generally moves from inland areas to the coast. A saltwater circulation system exists beneath the freshwater lens (Cooper and others, 1964; Souza and Voss, 1987). Saltwater flows landward in the deeper parts of the aquifer, rises and mixes with seaward flowing freshwater forming a brackish-water transition zone, and then discharges to the ocean. The thicknesses of freshwater and the brackish-water transition zone are controlled by factors including aquifer permeability, recharge rate, ground-water-withdrawal rate, and extent of mixing between freshwater and underlying saltwater. The freshwater-lens system is recharged mainly by inflow from upgradient areas and also by direct infiltration of precipitation and irrigation water. Near the study area, discharge from the freshwater-lens system is by diffuse seepage near the coast, to springs, to Kaunakakai Stream, to the atmosphere by evapotranspiration, and to withdrawal wells.

In the study area, the freshwater-lens system exists in the dike-free volcanic rocks and sedimentary deposits near the coast. Alluvium overlies the volcanic rocks near the mouth of Kaunakakai Stream, where ground-water levels probably range from near sea level to about 2 ft above mean sea level (fig. 3). Both ground-water levels and stream stage are expected to be affected by ocean tides and longer-term variations in sea level. On the basis of water-quality information from nearby wells, the salinity of ground water near the mouth of Kaunakakai Stream is likely brackish because of mixing with saltwater from the ocean.

### Withdrawals

In response to concerns about the water resources of Moloka‘i, the State of Hawai‘i Commission on Water Resource Management (CWRM) designated the entire island as a Ground Water Management Area in 1992. This action authorized the State to manage ground-water withdrawals on Moloka‘i through a permitting process to protect the island’s water resources. The CWRM has divided the island into 16 management areas or aquifer systems (Hawai‘i Commission on Water Resource Management, 1990), primarily defined on the basis of geologic conditions and topographic divides (fig. 5) (Mink and Lau, 1992). Limits on ground-water withdrawals on the island currently are based on sustainable-yield estimates for each of the 16 aquifer systems. As of May 2007, the CWRM had issued water-use permits authorizing a total of 8.077 Mgal/d of ground-water withdrawals from wells and tunnels on the island (table 1), although reported withdrawals are less than this total. In addition to
the 8.077 Mgal/d of water-use permits, the State of Hawai‘i Department of Hawaiian Home Lands (DHHL) has a reservation for 2.905 Mgal/d of ground water from the Kualapu‘u area (fig. 5; table 1), and the MIS Tunnel develops ground water, estimated to be about 1.822 Mgal/d during 1992–96 (Oki, 1997).

Most of the ground water withdrawn on Moloka‘i is from the Kualapu‘u area, the southeast coastal area, and the dike complex in the northeastern part of the island. On the basis of complete monthly reports during 2006, the annual mean withdrawal from wells (excluding the MIS Tunnel) on Moloka‘i during 2006 was about 2.917 Mgal/d (computed from digital data supplied by Lenore Nakama, Hawai‘i Commission on Water Resource Management, written commun., 2007). This total is not representative of island-wide withdrawal during 2006—incompletely reported monthly withdrawals from some wells and unreported withdrawals from other wells and tunnels would probably increase the total by several million gallons per day.

Five production wells (0801–01, 0801–02, 0801–03, 0901–01, and 0902–01, fig. 5) have been drilled in the Kualapu‘u area for either irrigation or domestic use. Wells 0901–01 and 0902–01, drilled in 1950 and 1946, respectively, originally were used to irrigate pineapple fields in the Hoolehua Plain area. Well 0902–01 was abandoned in 1964 when surface water from the MIS Tunnel (fig. 1) became available. Since 1976, water from Well 17 (0901–01) has been used for domestic supply and irrigation in the western part of the island. During 2006, mean withdrawal from Well 17 (0901–01) was 0.902 Mgal/d. Kualapu‘u wells 0801–01 and 0801–02 (fig. 5) were completed in 1949 and 1979, respectively, and well 0801–03 (Kualapu‘u Mauka) was drilled in 1987. During 2006, annual mean withdrawals from wells 0801–01, 0801–02, and 0801–03 were 0.213, 0.465, and 0.712 Mgal/d, respectively.
Figure 5. Map showing aquifer systems designated by the State of Hawai‘i Commission on Water Resource Management and locations of selected wells on the Island of Moloka‘i, Hawai‘i.
### Table 1. May 2007 ground-water-use permits for the Island of Moloka'i, Hawai'i

[Mgal/d, million gallons per day; --, 2006 withdrawal information incomplete or not reported to the Hawai'i Commission on Water Resource Management]

<table>
<thead>
<tr>
<th>Well</th>
<th>Name</th>
<th>May 2007 water-use permit, in Mgal/d</th>
<th>2006 average reported withdrawal, in Mgal/d</th>
<th>Aquifer system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0350–01</td>
<td>Keawanui salt</td>
<td>0.240</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0350–05</td>
<td>Wescoat</td>
<td>0.004</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0350–07</td>
<td>Manawai no. 1</td>
<td>0.015</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0350–09</td>
<td>Oceanic Institute salt</td>
<td>0.750</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0352–09</td>
<td>Kamalō</td>
<td>0.010</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0352–10</td>
<td>Kamalō-Curtis</td>
<td>0.012</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0352–11</td>
<td>Shige's farm</td>
<td>0.004</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0352–12</td>
<td>Urauchi No. 1</td>
<td>0.001</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0354–01</td>
<td>Meyer, Inc., no. 1</td>
<td>0.029</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0354–02</td>
<td>Meyer, Inc., no. 2</td>
<td>0.040</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0354–03</td>
<td>Well no. 3</td>
<td>0.017</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0354–04</td>
<td>Meyer, Inc., no. 4</td>
<td>0.005</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0354–07</td>
<td>Keonekuino-Tevs</td>
<td>0.045</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0447–02</td>
<td>Pūko'o Farm</td>
<td>0.003</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0448–01</td>
<td>Mapulehu</td>
<td>0.003</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0448–03</td>
<td>Mapulehu Shaft</td>
<td>0.007</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0449–01</td>
<td>'Ualapu'e Shaft</td>
<td>0.185</td>
<td>0.272</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0449–06</td>
<td>Kaula'a-Shephard</td>
<td>0.008</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0456–04</td>
<td>Breadfruit well and AG no. 1</td>
<td>0.285</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0456–06, 0456–08, 0456–09</td>
<td>Kawela Plantation DW1–DW3</td>
<td>0.285</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0456–16</td>
<td>Kawela-Iaea no. 3</td>
<td>0.017</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0456–17</td>
<td>Johnson</td>
<td>0.016</td>
<td>--</td>
<td>Kawela</td>
</tr>
<tr>
<td>0457–01</td>
<td>Kawela Shaft</td>
<td>0.330</td>
<td>0.237</td>
<td>Kawela</td>
</tr>
<tr>
<td>0501–04</td>
<td>Kupa Shaft</td>
<td>0.056</td>
<td>0.035</td>
<td>Kamiloloa</td>
</tr>
<tr>
<td>0501–06</td>
<td>Home Pumehana</td>
<td>0.005</td>
<td>--</td>
<td>Kamiloloa</td>
</tr>
<tr>
<td>0501–07</td>
<td>Kaunakakai Park</td>
<td>0.075</td>
<td>--</td>
<td>Kamiloloa</td>
</tr>
<tr>
<td>0546–02</td>
<td>Pū'e'elelū</td>
<td>0.202</td>
<td>--</td>
<td>Waialua</td>
</tr>
<tr>
<td>0549–01</td>
<td>Mapulehu Tunnel</td>
<td>0.010</td>
<td>--</td>
<td>'Ualapu'e</td>
</tr>
<tr>
<td>0601–01</td>
<td>Oloolo</td>
<td>0.075</td>
<td>0.081</td>
<td>Kamiloloa</td>
</tr>
<tr>
<td>0602–03</td>
<td>Kalaikamanu Hou</td>
<td>0.005</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0603–01</td>
<td>'Umipa'a</td>
<td>0.046</td>
<td>0.000</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0605–01, 0605–02</td>
<td>ORCA Shaft no. 1 and no. 2</td>
<td>0.600</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0605–03</td>
<td>ORCA no. 3</td>
<td>0.040</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0705–05</td>
<td>Nā'iwa</td>
<td>0.012</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0706–02</td>
<td>South Hoolehua</td>
<td>0.864</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0706–03</td>
<td>Pālā'au salt</td>
<td>0.001</td>
<td>--</td>
<td>Manawainui</td>
</tr>
<tr>
<td>0759–01</td>
<td>Waialo no. 1</td>
<td>0.656</td>
<td>--</td>
<td>Kamiloloa</td>
</tr>
<tr>
<td>0801–01, 0801–02</td>
<td>Kuala'pu'u DHHL 1 and 2</td>
<td>0.367</td>
<td>0.678</td>
<td>Kualapu'u</td>
</tr>
<tr>
<td>0801–03</td>
<td>Kuala'pu'u mauka</td>
<td>0.516</td>
<td>0.712</td>
<td>Kualapu'u</td>
</tr>
<tr>
<td>0844–01</td>
<td>Pu'u O Hoku no. 1</td>
<td>0.235</td>
<td>--</td>
<td>Waialua</td>
</tr>
<tr>
<td>0855–01, 0855–02, 0855–03</td>
<td>Waikolu Tunnel 22–24</td>
<td>0.853</td>
<td>--</td>
<td>Waikolu</td>
</tr>
<tr>
<td>0901–01</td>
<td>Well no. 17</td>
<td>1.018</td>
<td>0.902</td>
<td>Kualapu'u</td>
</tr>
<tr>
<td>1058–01</td>
<td>Waihānau no. 239</td>
<td>0.094</td>
<td>--</td>
<td>Kahanui</td>
</tr>
<tr>
<td>1059–01</td>
<td>Waikalae Tunnel</td>
<td>0.036</td>
<td>0.00036</td>
<td>Kualapu'u</td>
</tr>
<tr>
<td>DHHL reservation</td>
<td>DHHL reservation</td>
<td>2.905</td>
<td>--</td>
<td>Kualapu'u</td>
</tr>
<tr>
<td>MIS Tunnel</td>
<td>Moloka'i Irrigation System Tunnel</td>
<td>1.822</td>
<td>--</td>
<td>Waikolu</td>
</tr>
</tbody>
</table>

1Not simulated.

2No water-use permit; value is 1992–96 average withdrawal (Oki, 1997), equally distributed to two model nodes.
Near the south coast, ground-water withdrawals are mainly from two Maui-type wells (consisting of a shaft excavated to or below the water table, and one or more infiltration tunnels extending outward from the shaft); one well (0457–01, fig. 5), near Kawela, was completed in 1921, and the other well (0449–01, fig. 5), near ‘Ualapu’e, was completed in 1936. During 2006, annual mean withdrawals from wells 0457–01 and 0449–01, respectively, were 0.237 and 0.272 Mgal/d. Total reported annual mean withdrawals, on the basis of complete records, from other wells near the south coast were about 0.116 Mgal/d. Incompletely reported and unreported withdrawals from drilled wells and numerous shallow dug wells along the south coast probably are less than a few million gallons per day.

Three production wells (0855–01, 0855–02, and 0855–03, fig. 5) drilled in 1961 withdraw water from the dike complex in the northeastern part of the island. Water from these wells enters the MIS. Although withdrawals during 2006 from wells 0855–01, 0855–02, and 0855–03 were not reported to the CWRM, from the most recently reported data during the period 2000–2, mean withdrawal from these three wells was 0.99 Mgal/d.

Because of increased demand for water associated with the growing population, projected increases in demand over the next few decades, and rising salinity of the water pumped from some existing wells, water purveyors on Moloka‘i have considered increasing withdrawals from existing wells, drilling additional wells, and redistributing withdrawals among wells. The County of Maui Department of Water Supply (DWS) is considering drilling additional wells to (1) replace existing sources that have increasing salinity, (2) reduce withdrawals in the Kualapu’u area, and (3) meet anticipated future water demand (Oki, 2006). Moloka‘i Properties Limited, the largest private landowner on Moloka‘i, is considering using brackish water from the existing Kākalahale well (0700–01) for nonpotable needs and using water developed from Well 17 (0901–01) for potable uses only (PBR Hawaii and Associates, Inc., 2006). Excess water available from Well 17 could be made available to communities outside of Moloka‘i Properties Limited lands (PBR Hawaii and Associates, Inc., 2006).

Numerical Simulation of Additional Ground-Water Withdrawal

A numerical ground-water-flow model previously was constructed to simulate steady-state regional ground-water flow on Moloka‘i (Oki, 1997). The model was used in another study to estimate changes in steady-state water level and coastal discharge caused by possible redistributed and additional ground-water withdrawals in the area between Kualapu‘u and ‘Ualapu’e (Oki, 2006) and also is used for the present study.

Model Description

The regional model uses the two-dimensional (areal), finite-element code AQUIFEM–SALT (Voss, 1984), which was designed to simulate the flow of confined or unconfined fresh ground water in systems that may have a freshwater lens. AQUIFEM–SALT simulates freshwater and saltwater as immiscible fluids separated by a sharp interface, the depth of which is determined by the Ghyben-Herzberg relation. In reality, a diffuse transition zone exists between the core of freshwater and underlying saltwater. AQUIFEM–SALT simulates the vertically averaged freshwater head in the aquifer and assumes that flow is entirely horizontal and that all wells fully penetrate the freshwater lens.

Because of increased demand for water associated with the growing population, projected increases in demand over the next few decades, and rising salinity of the water pumped from some existing wells, water purveyors on Moloka‘i have considered increasing withdrawals from existing wells, drilling additional wells, and redistributing withdrawals among wells. The County of Maui Department of Water Supply (DWS) is considering drilling additional wells to (1) replace existing sources that have increasing salinity, (2) reduce withdrawals in the Kualapu‘u area, and (3) meet anticipated future water demand (Oki, 2006). Moloka‘i Properties Limited, the largest private landowner on Moloka‘i, is considering using brackish water from the existing Kākalahale well (0700–01) for nonpotable needs and using water developed from Well 17 (0901–01) for potable uses only (PBR Hawaii and Associates, Inc., 2006). Excess water available from Well 17 could be made available to communities outside of Moloka‘i Properties Limited lands (PBR Hawaii and Associates, Inc., 2006).

Model Application

The model by Oki (1997) was used in this study to estimate the steady-state hydrologic effects of ground-water withdrawals on ground-water levels and coastal discharge. The original model domain includes the entire Island of Moloka‘i and offshore coastal-discharge zone. The model domain was discretized using a finite-element mesh consisting of 6,432 nodes and 6,251 square elements (1,640 ft on a side). The original mesh is valid for testing the scenarios described in this study.

A base case defined by 2006 annual mean withdrawal rates, if completely reported, and May 2007 permitted withdrawal rates, otherwise, (table 1) was
used to compute changes in water level and coastal discharge caused by redistributed or additional ground-water withdrawals. In the model, withdrawals were assigned to the node nearest to the withdrawal site. The hydraulic characteristics and the magnitude and distribution of long-term average recharge used in the original model (Oki, 1997) were used for all simulations in this study.

Boundary conditions used in the original model include a no-flow boundary condition coinciding with the perimeter of the mesh and head-dependent discharge boundary conditions used to simulate ground-water discharge to the ocean and streams. Because ocean levels, coastal bathymetry, and stream-channel altitudes have not changed significantly, the original boundary conditions (Oki, 1997) were used in this study. Modification of model coastal leakance near the mouth of Kaunakakai Stream, where sediment will be excavated to create habitat, was considered unnecessary because (1) the excavated area represents less than 5 percent of the area of a model element, (2) the estimated confining-unit thickness (25 ft) in the excavated area likely would change by less than 10 percent, and (3) the resulting area-weighted confining-unit thickness and leakance value for the model element therefore would change by less than 1 percent.

The water level in Pu‘u O Hoku No. 1 well (0844–01, fig. 5), which was drilled after the original model was constructed, is about 9 ft above mean sea level (Hawai‘i Commission on Water Resource Management, unpub. data, 2006), indicating that the well site probably is not in the dike complex as originally modeled. Thus, the model is not used to specifically assess the hydrologic effects of ground-water withdrawal from this well, which is located near the east end of the island, outside the main area of withdrawals between Kualapu‘u and ‘Ualapu‘e.

Description of Model Scenarios

The base-case scenario was used as a reference for computing changes in steady-state water level and coastal discharge caused by redistributed or additional ground-water withdrawals. The withdrawal rates used in the base case were 2006 mean reported withdrawal rates, if completely reported, an estimated 1.822 Mgal/d withdrawal from the MIS Tunnel (Oki, 1997), and May 2007 permitted withdrawal rates, otherwise (excluding Pu‘u O Hoku No. 1, Waiola No. 1, and the DHHL reservation). Pu‘u O Hoku No. 1 (0844–01) was not simulated because of uncertainty described previously. The proposed Waiola No. 1 well (0759–01) likely will not be drilled (Charley F. Ice, Hawai‘i Commission on Water Resource Management, written commun., 2006), and was omitted from the model. The DHHL reservation was omitted from the base case because of uncertainty as to feasible well locations. The base-case withdrawal rates range from 0.001 Mgal/d (well 0352–12) to 1.822 Mgal/d (MIS Tunnel) and total 9.296 Mgal/d (table 1). Total withdrawal represented in the base case is 5 percent of recharge (187 Mgal/d). Recharge in the model (187 Mgal/d) differs slightly from 188.6 Mgal/d estimated by Shade (1997) because discretization near the shoreline causes the modeled land area to differ slightly from the actual land area.

Withdrawal rates simulated in scenarios 1–6 were determined during discussions with the USACE and were based on published information and preliminary plans of various water purveyors (table 2). In scenario 1, withdrawal from the Kākahale well (0700–01) was increased from zero (base case) to 1.0 Mgal/d (PBR Hawaii and Associates, Inc., 2006). Scenario 2 is similar to scenario 1 but includes increased withdrawal from Well 17 (0901–01), increasing from 0.902 to 1.7 Mgal/d. Scenarios 3 and 5 are similar to scenario 1, but withdrawals from three existing wells (0449–01, 0457–01, and 0801–03) were fully or partially redistributed to three proposed wells (‘Ualapu‘e, Kawela, and Manawainui) (Oki, 2006). Scenarios 4 and 6 are similar to scenario 2, but withdrawals from three existing wells (0449–01, 0457–01, and 0801–03) also were fully or partially redistributed to three proposed wells (‘Ualapu‘e, Kawela, and Manawainui). In scenarios 1, 3, and 5, total withdrawal exceeds the base-case withdrawal by 1.0 Mgal/d, whereas in scenarios 2, 4, and 6, total withdrawal exceeds the base-case withdrawal by 1.798 Mgal/d.

Model Results

For each of the scenarios tested, the changes in water level and coastal discharge were determined relative to the base case. Simulated water-level changes are greatest at withdrawal sites and decrease outward with distance elsewhere. Within the zone where water levels decline because of increased withdrawal, the salinity of water pumped from existing wells may increase, although the extent of the increase cannot be predicted accurately with the sharp-interface model used in this study. Similarly, within the zone where water levels rise because of decreased withdrawal, the salinity of water pumped from existing wells may decrease by an unknown amount. The change in the salinity of water pumped from existing wells is dependent on
the amount of water-level change and the location of the open interval of the well relative to the depth of the freshwater-saltwater transition zone. Greater water-level changes (all other factors being equal) are expected to cause greater salinity changes. Deep wells or wells near the coast may be located near a source of brackish ground water (transition zone) and affected to a greater extent than shallow or inland wells.

Simulated changes in coastal discharge generally are greatest immediately downgradient from sites of simulated changes in withdrawal. In general, changes in coastal discharge are difficult to measure directly except at onshore springs where discharge is channelized. Thus, the numerical model is used in this study to provide estimates of changes in coastal discharge caused by redistributed or additional ground-water withdrawals. In this study, the changes are represented over areas defined by model elements (1,640 by 1,640 ft). Changes less than or equal to 1,000 gal/d within model elements are considered too small to be represented accurately by the regional model and therefore are not shown; however, changes greater than 1,000 gal/d generally account for about 95 percent of the total simulated change in discharge. Simulated changes in coastal discharge may not accurately reflect actual local-scale changes because of the level of spatial discretization and because local-scale heterogeneities in the hydraulic characteristics of the rocks are not represented in the model.

### Scenario 1

In scenario 1, withdrawal of 1.0 Mgal/d from the Kākalahale well (0700–01) causes water levels and coastal discharge to decrease relative to base-case conditions (fig. 6, tables 3, 4). The simulated water-level decline at the Kākalahale well is 0.61 ft, and water-level declines decrease outward from the well. The areal extent of simulated water-level decline, as indicated by the –0.01-ft line of equal water-level change, is from the Hoolehua Plain in the west to Kawela in the east (fig. 6). The areal extent of simulated water-level decline is limited in the northeast by the dike complex of East Moloka'i Volcano and in the west by the confining unit separating the West and East Moloka'i Volcanics. Near the Kaunakakai Stream habitat-restoration site, the simulated water-level decline is 0.08 ft (table 3).

Coastal discharge decreases mainly along the south coast from Pālā‘au in the west to beyond Kawela in the east, but also along the north coast, northwest of the Kākalahale well. The total reduction in coastal discharge simulated in scenario 1 is equal to the withdrawal from the Kākalahale well (1.0 Mgal/d). In general, the simulated decrease in coastal discharge caused by withdrawal from the Kākalahale well is greatest in the coastal area immediately downgradient from the well. Within individual model elements, coastal discharge is reduced by as much as 110,000 gal/d south-southwest of the Kākalahale well and east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge is 0.08 ft (table 3).

Coastal discharge decreases mainly along the south coast from Pālā‘au in the west to beyond Kawela in the east, but also along the north coast, northwest of the Kākalahale well. The total reduction in coastal discharge simulated in scenario 1 is equal to the withdrawal from the Kākalahale well (1.0 Mgal/d). In general, the simulated decrease in coastal discharge caused by withdrawal from the Kākalahale well is greatest in the coastal area immediately downgradient from the well. Within individual model elements, coastal discharge is reduced by as much as 110,000 gal/d south-southwest of the Kākalahale well and east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge is 0.08 ft (table 3).

### Table 2. Summary of withdrawal scenarios simulated with the ground-water-flow model for the Island of Moloka'i, Hawai'i.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Kākalahale (0700–01)</th>
<th>Well 17 (0901–01)</th>
<th>Kualapu‘u Mauka (0801–03)</th>
<th>Kawela Shaft (0457–01)</th>
<th>‘Ulalpu‘e Shaft (0449–01)</th>
<th>Manawainui proposed</th>
<th>Kawela proposed</th>
<th>‘Ulalpu‘e proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base case</td>
<td>0</td>
<td>0.902</td>
<td>0.712</td>
<td>0.237</td>
<td>0.272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.123</td>
</tr>
<tr>
<td>1</td>
<td>1.0</td>
<td>0.902</td>
<td>0.712</td>
<td>0.237</td>
<td>0.272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.123</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
<td>1.7</td>
<td>0.712</td>
<td>0.237</td>
<td>0.272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.921</td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
<td>0.902</td>
<td>0.480</td>
<td>0</td>
<td>0</td>
<td>0.232</td>
<td>0.237</td>
<td>0.272</td>
<td>3.123</td>
</tr>
<tr>
<td>4</td>
<td>1.0</td>
<td>1.7</td>
<td>0.480</td>
<td>0</td>
<td>0</td>
<td>0.232</td>
<td>0.237</td>
<td>0.272</td>
<td>3.921</td>
</tr>
<tr>
<td>5</td>
<td>1.0</td>
<td>0.902</td>
<td>0.280</td>
<td>0</td>
<td>0</td>
<td>0.432</td>
<td>0.237</td>
<td>0.272</td>
<td>3.123</td>
</tr>
<tr>
<td>6</td>
<td>1.0</td>
<td>1.7</td>
<td>0.280</td>
<td>0</td>
<td>0</td>
<td>0.432</td>
<td>0.237</td>
<td>0.272</td>
<td>3.921</td>
</tr>
</tbody>
</table>
Figure 6. Scenario 1 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day from the Kākahale well (0700–01).
Table 3. Summary of changes in steady-state ground-water level simulated with the ground-water-flow model for the Island of Moloka‘i, Hawai‘i.

[Values in red bold indicate that withdrawal rate differs from base-case withdrawal at the site; positive values indicate an increase in water level, whereas negative values indicate a decrease in water level]

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Kākalahale (0700–01)</th>
<th>Well 17 (0901–01)</th>
<th>Kualapu‘u Mauka (0801–03)</th>
<th>Kawela Shaft (0457–01)</th>
<th>‘Ualapu‘e Shaft (0449–01)</th>
<th>Manawainui proposed</th>
<th>Kawela proposed</th>
<th>‘Ualapu‘e proposed</th>
<th>Kaunakakai Stream habitat-restoration site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simulated water-level change (feet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Base case</td>
<td>5.98</td>
<td>6.89</td>
<td>7.34</td>
<td>2.95</td>
<td>3.64</td>
<td>6.13</td>
<td>4.86</td>
<td>4.75</td>
<td>1.38</td>
</tr>
<tr>
<td>2</td>
<td>–0.61</td>
<td>–0.09</td>
<td>–0.09</td>
<td>–0.01</td>
<td>0.00</td>
<td>–0.22</td>
<td>–0.04</td>
<td>0.00</td>
<td>–0.08</td>
</tr>
<tr>
<td>3</td>
<td>–0.71</td>
<td>–3.40</td>
<td>–1.45</td>
<td>–0.02</td>
<td>0.00</td>
<td>–0.38</td>
<td>–0.06</td>
<td>0.00</td>
<td>–0.12</td>
</tr>
<tr>
<td>4</td>
<td>–0.65</td>
<td>0.26</td>
<td>0.57</td>
<td>0.10</td>
<td>0.09</td>
<td>–0.49</td>
<td>–0.14</td>
<td>–0.08</td>
<td>–0.09</td>
</tr>
<tr>
<td>5</td>
<td>–0.74</td>
<td>–2.81</td>
<td>–0.65</td>
<td>0.10</td>
<td>0.09</td>
<td>–0.65</td>
<td>–0.16</td>
<td>–0.08</td>
<td>–0.09</td>
</tr>
<tr>
<td>6</td>
<td>–0.77</td>
<td>–2.35</td>
<td>–0.03</td>
<td>0.10</td>
<td>0.09</td>
<td>–0.89</td>
<td>–0.16</td>
<td>–0.08</td>
<td>–0.13</td>
</tr>
</tbody>
</table>

\(^1\)Simulated base-case ground-water level, in feet.

Table 4. Summary of changes in steady-state coastal discharge simulated with the ground-water-flow model for the Island of Moloka‘i, Hawai‘i.

[Overall maximum changes in coastal discharge are within an individual model element. Model elements are square areas 1,640 feet on a side. Only model elements with base-case coastal discharge greater than 1,000 gal/d considered. gal/d, gallons per day; --, not applicable]

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Reduction in coastal discharge near Kaunakakai Stream habitat-restoration site (gal/d)</th>
<th>Overall maximum absolute change in coastal discharge (gal/d)</th>
<th>Overall maximum relative change in coastal discharge (percent)</th>
<th>Number of model elements with coastal-discharge change greater than 5 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase</td>
<td>Decrease</td>
<td>Increase</td>
<td>Decrease</td>
</tr>
<tr>
<td>1</td>
<td>98,000</td>
<td>--</td>
<td>110,000</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>149,000</td>
<td>--</td>
<td>150,000</td>
<td>63</td>
</tr>
<tr>
<td>3</td>
<td>110,000</td>
<td>37,000</td>
<td>123,000</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>161,000</td>
<td>33,000</td>
<td>164,000</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>118,000</td>
<td>37,000</td>
<td>132,000</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>170,000</td>
<td>33,000</td>
<td>172,000</td>
<td>4</td>
</tr>
</tbody>
</table>

\(^1\)Simulated reduction in coastal discharge near Kaunakakai Stream habitat-restoration site is from the entire model element nearest the site.

\(^2\)Values in parentheses indicate number of elements with change in steady-state coastal discharge greater than 5 percent and greater than 50,000 gal/d.
Scenario 2

Withdrawals simulated in scenario 2 are similar to those in scenario 1 except that withdrawal from Well 17 (0901–01) was increased from 0.902 to 1.7 Mgal/d. Increased withdrawal from Well 17 causes greater declines in water level and greater reductions in coastal discharge relative to scenario 1 (fig. 7, tables 3, 4). The simulated water-level decline is 3.40 ft at Well 17 and 0.71 ft at the Kākalahale well. The water-level declines decrease outward from Well 17 and the Kākalahale well (0700–01). In scenario 2, the areal extent of simulated water-level decline, as indicated by the –0.01-ft line of equal water-level change, is greater than the extent in scenario 1. Near the Kaunakakai Stream habitat-restoration site, the simulated water-level decline is 0.12 ft in scenario 2 (table 3), which is 0.04 ft greater than the simulated decline in scenario 1.

In scenario 2, coastal discharge decreases mainly along the south coast from Pālā’au in the west to beyond Kawela in the east, but also along the north coast, northwest of Well 17. Because of increased withdrawal from Well 17 in scenario 2 relative to scenario 1, overall coastal-discharge reduction and reduction at common sites is greater in scenario 2. Within individual model elements, coastal discharge is reduced by as much as 150,000 gal/d along the south coast east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge from the model element closest to the site is 149,000 gal/d in scenario 2, which is an 11-percent reduction relative to base-case conditions (fig. 7, table 4) and which is greater than the simulated reduction in scenario 1 (98,000 gal/d). This reduction in coastal discharge may overestimate the discharge reduction in Kaunakakai Stream, which covers a small fraction of the area represented by the model element.

Scenario 3

Total withdrawal simulated in scenario 3 is equal to the total withdrawal simulated in scenario 1, but scenario 3 includes a redistribution (full or partial) of withdrawals from existing wells to proposed wells. DWS is considering reducing withdrawal from well 0801–03 to reduce the possibility of saltwater intrusion in the Kualapuu area, where several existing wells are closely spaced. Because of increasing salinity in water pumped from wells 0457–01 and 0449–01 (Oki, 2006), DWS also is considering replacing these wells with wells located farther inland. In scenario 3, withdrawal from well 0801–03 was reduced by 0.232 Mgal/d, and withdrawal from the proposed Manawainui well was increased from zero to 0.232 Mgal/d; withdrawal from well 0457–01 was reduced from 0.237 Mgal/d to zero, and withdrawal from the proposed Kawela well was increased from zero to 0.237 Mgal/d; withdrawal from well 0449–01 was reduced from 0.272 Mgal/d to zero, and withdrawal from the proposed ‘Ualapu’e well was increased from zero to 0.272 Mgal/d.

Reduced withdrawal from well 0801–03 causes the water level near the well to increase by 0.57 ft (fig. 8). Because of the increased withdrawals from the proposed Manawainui and Kawela wells, the simulated water-level decline at the Kākalahale well in scenario 3 (0.65 ft) is greater than the simulated decline in scenario 1 (0.61 ft). In scenario 3, the areal extent of simulated water-level decline around the Kākalahale well (0700–01), as indicated by the –0.01-ft line of equal water-level change, is less than the extent in scenario 1 because of the decreased withdrawal from well 0801–03. Near the Kaunakakai Stream habitat-restoration site, the simulated water-level decline is 0.09 ft in scenario 3 (table 3), which is 0.01 ft greater than the simulated decline in scenario 1. The effects of redistributing withdrawal from well 0449–01 to the proposed ‘Ualapu’e well do not extend to Kaunakakai Stream.

In scenario 3, coastal discharge increases slightly along the north coast, northwest of well 0801–03, because of the reduced withdrawal from that well. Local increases in coastal discharge also are simulated near other sites of reduced withdrawal (wells 0457–01 and 0449–01). Within individual model elements, coastal discharge is reduced by as much as 123,000 gal/d along the south coast east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge from the model element closest to the site is 110,000 gal/d in scenario 3 (fig. 8, table 4), which is an 8-percent reduction relative to base-case conditions and which is greater than the simulated reduction in scenario 1 (98,000 gal/d).

Scenario 4

Total withdrawal simulated in scenario 4 is equal to the total withdrawal simulated in scenario 2, but scenario 4 includes a redistribution (full or partial) of withdrawals from existing wells to proposed wells identical to the redistribution described in scenario 3. Reduced withdrawal from well 0801–03 causes the water-level decline at Well 17 to decrease from 3.40 ft (scenario 2) to 2.81 ft (scenario 4). In contrast, the increased withdrawals from the proposed Manawainui and Kawela wells
Figure 7. Scenario 2 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day (Mgal/d) from the Kākalahale well (0700–01) and increasing withdrawal from Well 17 (0901–01) from 0.902 to 1.7 Mgal/d.
Figure 8. Scenario 3 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day (Mgal/d) from the Kākalahale well (0700–01), and redistributing (fully or partially) withdrawal from existing wells to proposed wells. Withdrawal from well 0801–03 was reduced by 0.232 Mgal/d, and withdrawal from the proposed Manawainui well was increased from zero to 0.232 Mgal/d; withdrawal from well 0457–01 was reduced from 0.237 Mgal/d to zero, and withdrawal from the proposed Kawela well was increased from zero to 0.237 Mgal/d; withdrawal from well 0449–01 was reduced from 0.272 Mgal/d to zero, and withdrawal from the proposed ‘Ualapu’e well was increased from zero to 0.272 Mgal/d.
cause the water-level decline at the Kâkalahale well (0700–01) to increase from 0.71 ft (scenario 2) to 0.74 ft (scenario 4). Near the Kaunakakai Stream habitat-restoration site, the simulated water-level decline is 0.13 ft in scenario 4 (table 3), which is 0.01 ft greater than the simulated decline in scenario 2.

In scenario 4, coastal discharge decreases mainly along the south coast, but also along the north coast, northwest of Well 17 (0901–01). Local increases in coastal discharge are simulated near sites of reduced withdrawal (wells 0457–01 and 0449–01). Within individual model elements, coastal discharge is reduced by as much as 164,000 gal/d along the south coast east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge from the model element closest to the site is 161,000 gal/d in scenario 4 (fig. 9, table 4), which is an 11-percent reduction relative to base-case conditions and which is greater than the simulated reduction in scenario 2 (149,000 gal/d).

**Scenario 5**

Simulated withdrawal in scenario 5 is similar to withdrawal in scenario 3, except that withdrawal from 0801–03 is further reduced by 0.2 Mgal/d and withdrawal from the proposed Manawainui well is increased by an equal amount. In scenario 5, the water level at well 0801–03 increases by 1.11 ft relative to the base case, compared to an increase of 0.57 ft in scenario 3. Because of the increased withdrawal from the proposed Manawainui well, the simulated water-level decline at the Manawainui well in scenario 5 (0.72 ft) is greater than the simulated decline in scenario 3 (0.49 ft). Near the Kaunakakai Stream habitat-restoration site, the simulated water-level decline is 0.09 ft in scenario 5 (table 3), which is equal to the simulated decline in scenario 3.

In scenario 5, coastal discharge increases slightly along the north coast, northwest of well 0801–03, because of the reduced withdrawal from that well. Local increases in coastal discharge also are simulated near other sites of reduced withdrawal (wells 0457–01 and 0449–01). Within individual model elements, coastal discharge is reduced by as much as 172,000 gal/d along the south coast east of Kaunakakai Stream. Near the Kaunakakai Stream habitat-restoration site, the simulated reduction in coastal discharge from the model element closest to the site is 170,000 gal/d in scenario 5 (fig. 11, table 4), which is a 12-percent reduction relative to base-case conditions and which is greater than the simulated reduction in scenario 4 (161,000 gal/d).

**Effects on Kaunakakai Habitat-Restoration Site**

Model results indicate that withdrawals (within the ranges tested) from Well 17 (0901–01), the Kâkalahale well (0700–01), and the proposed Manawainui and Kawela wells cause a water-level decline of about 0.1 ft in the vicinity of the Kaunakakai habitat-restoration site. This reduction in ground-water level will cause a reduction of ground-water discharge to Kaunakakai Stream, but the existing spatial discretization in the model is too coarse to reliably estimate the reduction. The simulated reductions of discharge in the model element containing the habitat-restoration site range from 98,000 to 170,000 gal/d. Reduction in discharge to the habitat-restoration site likely is less than the total indicated by the model element because the
Figure 9. Scenario 4 of ground-water-flow model for the Island of Moloka'i, Hawai'i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day (Mgal/d) from the Kākalahale well (0700–01), increasing withdrawal from Well 17 (0901–01) from 0.902 to 1.7 Mgal/d, and redistributing (fully or partially) withdrawal from existing wells to proposed wells. Withdrawal from well 0801–03 was reduced by 0.232 Mgal/d, and withdrawal from the proposed Manawainui well was increased from zero to 0.232 Mgal/d; withdrawal from well 0457–01 was reduced from 0.237 Mgal/d to zero, and withdrawal from the proposed Kawela well was increased from zero to 0.233 Mgal/d; withdrawal from well 0449–01 was reduced from 0.272 Mgal/d to zero, and withdrawal from the proposed ‘Ualapu‘e well was increased from zero to 0.272 Mgal/d.
Figure 10. Scenario 5 of ground-water-flow model for the Island of Moloka‘i, Hawai‘i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day (Mgal/d) from the Kākahale well (0700–01), and redistributing (fully or partially) withdrawal from existing wells to proposed wells. Withdrawal from well 0801–03 was reduced by 0.432 Mgal/d, and withdrawal from the proposed Manawanui well was increased from zero to 0.432 Mgal/d; withdrawal from well 0457–01 was reduced from 0.237 Mgal/d to zero, and withdrawal from the proposed Kawela well was increased from zero to 0.237 Mgal/d; withdrawal from well 0449–01 was reduced from 0.272 Mgal/d to zero, and withdrawal from the proposed ‘Ualapu‘e well was increased from zero to 0.272 Mgal/d.
Figure 11. Scenario 6 of ground-water-flow model for the Island of Moloka’i, Hawai’i, showing simulated changes in steady-state ground-water level and coastal discharge (relative to base-case conditions) caused by withdrawing 1.0 million gallons per day (Mgal/d) from the Kākalahale well (0700–01), increasing withdrawal from Well 17 (0801–01) from 0.902 to 1.7 Mgal/d, and redistributing (fully or partially) withdrawal from existing wells to proposed wells. Withdrawal from well 0801–03 was reduced by 0.432 Mgal/d, and withdrawal from the proposed Manawaiinui well was increased from zero to 0.432 Mgal/d; withdrawal from well 0457–01 was reduced from 0.237 Mgal/d to zero, and withdrawal from the proposed Kawela well was increased from zero to 0.237 Mgal/d; withdrawal from well 0449–01 was reduced from 0.272 Mgal/d to zero, and withdrawal from the proposed ‘Ualapu’e well was increased from zero to 0.272 Mgal/d.
site covers a small fraction (about 5 percent) of the area of the model element.

The reduction of ground-water level near the habitat-restoration site also may reduce the wetted habitat area available to the native species. The extent of reduction in wetted habitat area is controlled by the slope of the ponds near their edges, which will be affected by channel scour associated with large storms and sedimentation. The maximum water depth of the proposed ponds will be reduced by about 0.1 ft, and the average water depth also will be reduced by an amount that is dependent on the bottom shape of the ponds. The salinity of ground water discharging into the wetland area likely will increase by an unknown amount in response to increased withdrawals upgradient from the site. A numerical model capable of simulating density-dependent flow and transport is needed to evaluate the effects of withdrawal on salinity in the area.

**Model Limitations**

The ground-water-flow model of Moloka‘i used in this study has several limitations. The number of monitor wells is insufficient to define the spatial distribution of water levels in inland areas in the southeastern part of the island, in the western part of the island, and in the dike complex in the northeastern part of the island. Thus, the distribution of simulated water levels is unverified in some places. Furthermore, the thickness of the freshwater lens is poorly known in most parts of the island, including areas of proposed additional ground-water withdrawal.

Because of a lack of sufficient water-level data used to constrain the simulations, the model used in this study is not unique—that is, different distributions of hydraulic conductivity could be used to construct a model that produces equally acceptable simulated water levels. The model used in this study can be refined, and the ground-water-flow system can be better represented as more data become available to constrain the model.

Because the ground-water-flow model contains only a single layer, vertical hydraulic gradients cannot be simulated, and the simulated drawdown caused by additional withdrawal underestimates the actual drawdown near partially penetrating wells. In addition, the model should not be viewed as a quantitatively precise predictive tool because of the uncertainty in the hydraulic-conductivity distribution. The model is, nevertheless, the best available tool for analyzing the possible regional hydrologic effects of ground-water withdrawals on Moloka‘i under steady-state conditions. Transient hydrologic effects of withdrawals were not considered in this study.

The AQUIFEM–SALT model simulates a sharp interface between freshwater and saltwater. Simulated freshwater thickness from AQUIFEM–SALT overestimates the actual freshwater thickness. In reality, freshwater is separated from underlying saltwater by a freshwater-saltwater transition zone, which can be represented by using a model capable of simulating density-dependent ground-water flow and transport.

The ground-water-flow model simulates the regional effects of additional withdrawal on coastal discharge. The actual reduction in coastal discharge on a local scale may not be accurately represented by the model because of the relatively coarse spatial discretization and because local-scale heterogeneities in the hydraulic characteristics of the rocks are not represented. Furthermore, changes to the hydraulic characteristics of the system, caused for example by excavation or filling near sites of ground-water discharge, may not be represented accurately in the model.

**Summary**

The U.S. Army Corps of Engineers, in cooperation with the County of Maui Department of Public Works and Environmental Management, has proposed to construct 2.75 acres of shallow ponds and mudflats near the mouth of Kaunakakai Stream, Moloka‘i, Hawai‘i to restore habitat for the endangered native Hawaiian Stilt. Where the pond and wetland bottoms are below the water table, the ponds and wetland will be sustained by ground-water discharge during dry-weather conditions. Upstream of the lowland coastal area where Kaunakakai Stream is hydraulically connected to the ground-water system, Kaunakakai Stream is ephemeral. Because ground water is the main source of water for the proposed ponds and wetland, a reduction of ground-water level and discharge near the mouth of Kaunakakai Stream will have an effect on the efficacy of the habitat-restoration project. Redistributed and additional ground-water withdrawals will affect ground-water levels and discharge of fresh and brackish water near the project.

In response to concerns about the possible effects of ground-water withdrawal on the habitat-restoration project near the mouth of Kaunakakai Stream, the USGS undertook the present investigation to quantify the hydrologic effects of withdrawal.
from selected sites on ground-water levels and coastal discharge. An existing numerical ground-water-flow model was used to estimate changes in ground-water level and coastal discharge caused by redistributed and additional ground-water withdrawals in the area between Kualapuʻu and ‘Ualapuʻe.

The ground-water-flow model was used to quantify changes, relative to base-case conditions, in steady-state ground-water level and coastal discharge for each of six withdrawal scenarios. Withdrawals simulated in the base case were average 2006 withdrawal rates, if completely reported, and May 2007 permitted rates otherwise. Simulated changes in ground-water level are greatest at withdrawal sites and decrease outward with distance elsewhere. Simulated changes in coastal discharge generally are greatest immediately downgradient from sites of withdrawal change. For the scenarios tested, hydrologic changes caused by withdrawals were limited to areas outside the low-permeability dike complex of East Molokaʻi Volcano and to areas east of the confining unit separating West and East Molokaʻi Volcanics. Water-level declines at withdrawal sites were as much as 3.40 ft at Well 17 (0901–01), and coastal-discharge reductions in individual model elements (square areas 1,640 ft on a side) were as much as 170,000 gal/d along the south coast.

For the scenarios tested, model results indicate that withdrawals from existing and proposed wells cause a water-level decline of about 0.1 ft in the vicinity of the Kaunakakai habitat-restoration site. In addition, model results indicate a reduction of ground-water discharge to the stream, although the spatial discretization in the existing model is too coarse to accurately estimate the reduction of ground-water discharge to the stream. Reduction of discharge in the model element containing the habitat-restoration site ranges from 98,000 to 170,000 gal/d. Reduction in discharge to the habitat-restoration site is likely less than the total indicated because the site covers a small fraction (about 5 percent) of the model element.

The reduction of ground-water level near the habitat-restoration site will reduce (1) the available wetted habitat area by an amount that is dependent on the bottom slope of the ponds near their edges, (2) the maximum water depth of the ponds by about 0.1 ft, and (3) the average water depth by an amount that is dependent on the bottom shape of the ponds. The salinity of ground water discharging into the wetland area likely will increase by an unknown amount in response to increased withdrawals upgradient from the site. A numerical model capable of simulating density-dependent flow and transport is needed to evaluate the effects of withdrawal on salinity in the area.

The ground-water-flow model simulates the regional effects of additional withdrawal on water level and coastal discharge. The actual reduction in water level and coastal discharge on a local scale may not be accurately represented by the model because of the relatively coarse spatial discretization used in the model and because local-scale heterogeneities in the hydraulic characteristics of the rocks are not represented. Furthermore, human-induced changes to the hydraulic characteristics of the system, caused for example by excavation or filling near sites of ground-water discharge, may not be represented accurately in the model.

References Cited


ANALYSIS
OF THE WATER PLAN
FOR THE
COMMUNITY-BASED
ENTERPRISE COMMUNITY/MOLOKA`I RANCH
MASTER LAND USE PLAN
I. INTRODUCTION AND PURPOSE

The purpose of this report is to analyze whether the Water Plan proposed for Community-Based Enterprise Community/Molokai Ranch Master Land Use Plan ("Master Land Use Plan") is reasonable and realistic. In particular, this study analyzes:

1. Whether the projected water demands are reasonable and realistic for the proposed land use plan; and
2. Whether the identified sources of water to meet the demands are realistically available.

For purposes of this report, a "reasonable and realistic" determination is based primarily upon a regulatory analysis, i.e., considering regulatory, policy, and other legal constraints. The author is not a hydrologist, geologist, or engineer. Thus, no analysis is made, and no opinions are expressed, about the reliability of water resource data upon which regulatory decisions are made, e.g., sustainable yields estimates adopted for the Molokai aquifer systems. Additionally, no analysis is made or opinion expressed about the economic feasibility of the proposed Water Plan.

This report begins in Section II with a brief description of Master Land Use Plan and a discussion of the supporting Water Plan. Section III provides a brief description of fresh water resources on Molokai. A description of the major water developments and water users that potentially may affect, or be affected by, implementation of the Water Plan is provided in Section IV. A nutshell review of pertinent water laws and regulations follows in Section V. Finally, considering all of the above, the analysis set forth in Section VI concludes that the Water Plan is reasonable and realistic.
II. MASTER LAND USE PLAN AND WATER PLAN

A. Community-Based Master Land Use Plan

Molokai Properties, Ltd. (MPL) is the largest private landowner on Molokai, with approximately 65,000 acres in western and central Molokai. Most of that land is currently undeveloped or utilized in low intensity agriculture (ranching, pasture).

The Master Land Use Plan proposes setting aside over 85% of these lands and protecting them forever from any further development. Of the lands that will be set aside, 26,200 acres to be held in perpetuity for the community in a Molokai Land Trust. An additional 29,000 acres will be subject to protective easements that will limit uses to agriculture, conservation and preserving open space. To preserve Molokai's agricultural economy and lifestyle, 14,390 acres that are currently in grass or crops will be protected for future agricultural use.

Instead of the several residential and condominium developments that had been proposed over the years by Molokai Ranch, Alpha USA, and Kaluakoi, MPL (which currently owns, in addition to the Ranch lands, Kaluakoi and the lands previously owned by Alpha USA) will provide approximately 200 acres around Maunaloa and Kualapuu for housing for the community, and approximately 1000 acres above Kaunakakai for future community expansion. The nature and timing of these developments will be determined by Molokai residents.

MPL will limit its future residential development to no more than 200 two-acre lots at Laa Point. These lots will be subject to a number of restrictive covenants that will prevent increased densities. For example, further subdivision of individual lots will be prohibited and disturbance of each 2-acre lot will be limited to no more than 30% (approximately one-half acre).

On the commercial side, MPL will reopen the Kaluakoi Hotel, including the golf course. The Lodge at Maunaloa, and the Paniolo, Kolo, and Kaupoa visitor camps will continue to operate at current levels. Expansion of the Pala’au Industrial Park is expected to more than double current potable water consumption to approximately 297,000 gpd.

B. Water Plan

A key feature of the Water Plan is that only existing sources, at currently permitted amounts, will be utilized to meet all of the potable water needs for Waiola O Molokai and Molokai Public Utilities’ current customers and MPL’s future developments proposed under the Master Land Use Plan.

MPL controls three water systems: (1) the Kaluakoi System, operated by Molokai Public Utilities, Inc., which services the existing Kaluakoi Development; (2) the Waiola O Molokai, Inc. System, which supplies drinking water to communities on Molokai Ranch land; and (3) the Molokai Rauch Mountain Water System, which currently provides potable water for
Maunaloa and Palaau Industrial Park, irrigation water for Maunaloa Village, the Lodge and Kaupoa Camp, and water for Molokai Ranch's livestock operations.

The source of water for the Kaluakoi System is Well 17, located in the Kualapuu Aquifer system. A water use permit for 1,018,000 gpd from Well 17 has been issued by the Water Commission. Permitted uses include the Kaluakoi Hotel, condominiums and residential uses, the golf course and other irrigation uses, as well as 76,000 gpd that is sold to Waiola for servicing Kualapuu Town, and the 94,000 gpd "charge" for transmission of Well 17 water through the Molokai Irrigation System to Kaluakoi.

Waiola purchases water from the Kaluakoi's Well 17, from DHHL's Kualapuu wells, and from Molokai Ranch's Mountain Water system, which is treated for potable use at Waiola’s Puu Nana water treatment plant. Current demand is approximately 195,000 gpd.

The Mountain Water System moves surface water approximately 20 miles from the mountains of Central Molokai to the far reaches of MPL's holdings. The system has an average yield of 500,000 gpd, but, as with all surface water systems, is highly dependent on the weather. Currently, approximately 500,000 gpd from the Mountain Water System has been treated at the Puu Nana water treatment plant for potable uses in Maunaloa and Palaau Industrial Park.

The Water Plan proposes that potable water needs for existing uses and additional needs resulting from the reopening of the Kaluakoi Hotel and development at Laau Point will be met with 1,018,000 gpd from Well 17 and 500,000 gpd of treated water from MRL’s mountain water system. Waiola will abandon plans to develop a potable water well in the Kamiloloa Aquifer.

Nonpotable water demands will be met with the remaining water developed by the Mountain Water System and by development of 1 mgd of brackish water from the Kakalahale Well in the Kamiloloa Aquifer. Additionally, in the future, treated wastewater will be another source of irrigation water for the golf course. Other nonpotable uses will include landscaping and irrigation around Kaluakoi, the future Laau Point lots, Maunaloa Village, the Lodge and Kaupoa Camp, and water for Molokai Ranch's livestock operations.

The Water Plan prepared by MPL, dated December 2004, is attached as Appendix A.
III. BRIEF DESCRIPTION OF MOLOKAI WATER RESOURCES

Typical of all of the major Hawaiian Islands, Molokai has very wet areas with abundant water resources and very arid areas where water resources are scarce. Rainfall on Molokai ranges from more than 150 inches in the higher elevations of the northeastern part of the island to less than 16 inches in the coast areas of south and west Molokai.2

A. Ground Water Resources

Molokai’s ground water resources are of three types: basal, perched, and dike-confined. Although basal groundwater underlies most of the island, its quality varies significantly. Generally speaking, good quality potable water is found in East Molokai; basal water is somewhat brackish in Central Molokai, and completely brackish in West Molokai.

Percolating water temporarily perched on ash beds is often of such volume that some of it runs underground along the bed and issues as springs. Some of these springs have a sufficiently regular flow to be included in the County water system.

The perennial streams in East Molokai are largely due to springs issuing from dike structures. Dike-confined water is also developed with tunnels or wells.3

1. Sustainable Yields4

For purposes of planning and management of ground water resources, the Water Commission divides each island into Aquifer Sectors, which reflect broad hydrogeological similarities yet maintain traditional hydrographic, topographic, and historical boundaries where possible. As subsets of Aquifer Sectors, Aquifer Systems are more specifically defined by hydraulic continuity.

Sustainable yields are established for each Aquifer System by the Water Commission. Sustainable yield refers to the forced withdrawal rate of groundwater that could be sustained indefinitely without affecting either the quality of the pumped water or the volume rate of pumping. Head is the elevation of the unconfined water table above sea level. There is not a unique value for sustainable yield; the value depends on the head that will preserve the integrity of the groundwater resource at the level decided upon by the Water Commission.

Although established sustainable yield estimates are used as key management tools by the Water Commission, they are sometimes based on scanty data, and, therefore, not very reliable. Furthermore, the sustainable yield estimate for any aquifer system does not consider the feasibility of developing the groundwater. In many regions, including the windward areas of East Molokai, taking advantage of a high sustainable yield estimate may not be economically feasible.

Total estimated sustainable yield for the island of Molokai is 81 mgd The following table shows the sustainable yield for each aquifer system.
<table>
<thead>
<tr>
<th>Aquifer Sector</th>
<th>Aquifer System</th>
<th>SY</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>40101 – Kaluakoi</td>
<td>2 mgd</td>
<td>Brackish</td>
</tr>
<tr>
<td>West</td>
<td>40102 – Punakou</td>
<td>2 mgd</td>
<td>Brackish</td>
</tr>
<tr>
<td>Central</td>
<td>40201 – Hoolehua</td>
<td>2 mgd</td>
<td>Moderately brackish</td>
</tr>
<tr>
<td>Central</td>
<td>40202 – Maunawainui</td>
<td>2 mgd</td>
<td>Moderately brackish</td>
</tr>
<tr>
<td>Central</td>
<td>40203 – Kualapuu</td>
<td>5 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Southeast</td>
<td>40301 – Kamiloloa</td>
<td>3 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Southeast</td>
<td>40302 – Kawela</td>
<td>5 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Southeast</td>
<td>40303 – Ualapue</td>
<td>8 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Southeast</td>
<td>40304 – Waialua</td>
<td>8 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40401 – Kalaupapa</td>
<td>2 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40402 – Kahanui</td>
<td>3 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40403 – Waikolu</td>
<td>5 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40404 – Haupu</td>
<td>2 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40405 – Pelekuru</td>
<td>9 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40406 – Wailau</td>
<td>15 mgd</td>
<td>Potable</td>
</tr>
<tr>
<td>Northeast</td>
<td>40407 – Halawa</td>
<td>8 mgd</td>
<td>Potable</td>
</tr>
</tbody>
</table>

B. Surface Water Resources

There are 36 perennial streams on Molokai. "Perennial streams" include (1) continuous streams that flow to the sea year-round under normal conditions, including streams with diversions, and (2) interrupted streams (whether the interruptions are natural or man-made) that flow year-round in the upper portions and intermittently at lower elevations under normal conditions.\(^5\)

Virtually all of the stream flow on Molokai originates in the East Molokai mountains, flows north and east to the ocean and is characteristically flashy.\(^6\) In general, streams in the windward northeastern valleys of Molokai are perennial throughout most of their lengths. Most of the streams that drain to the southern coast of East Molokai are perennial only in the upper reaches where rainfall is persistent or where water is drained from marsh area or springs.\(^7\) No measurable stream flow occurs in arid and semi-arid Central and West Molokai.\(^8\)

All of the streams on Molokai are considered "small streams," meaning they have median flows less than or equal to 10 cubic feet per second (cfs) or average flows less than or equal to 20 cfs.\(^9\)
IV. MOLOKAI WATER SYSTEMS

A discussion of the major water systems in west and central Molokai is presented here for consideration of how the Water Plan may affect, or be affected by, other water users.

A. DHHL

The State Department of Hawaiian Home Lands (DHHL) is one of the major landowners on Molokai, owning more than 25,000 acres in Hoolehua, Kalamaula, Kalaupapa, Kamiloaloa, Kapaakea, and Makakupu`ia. Its Central Molokai homesteads are served by a water system that draws from two wells in Kualapuu (0801-01 and 0801-02). Permitted withdrawals from these two wells total 367,000 gpd. Not all of the water withdrawn from these wells are used on the homestead lots. Waiola purchases approximately 20,000 gpd from DHHL to serve its customers in the Kipu/Kalae area.  

DHHL also has a reservation for 2.905 mgd from the Kualapuu Aquifer. This reservation essentially precludes any new groundwater development in the Kualapuu Aquifer, except by DHHL. No definite plans are yet known as to when or where DHHL will draw on this reservation. There had been a proposal to increase withdrawals from DHHL’s existing wells; however, new well sites will have to be developed to access the full amount of the reservation.

B. County

Maui County’s water system on Molokai includes well 0801-03 in close proximity to the two DHHL Kualapuu wells. The County has a permit to withdraw approximately 0.5 mgd from this well.

Additionally, along the southern coastal areas of East Molokai are the County’s Kaunakakai and Ualapue systems which utilize ground water from the basal aquifer.

C. Private Systems

Since the purchase of Kaluakoi Development by Molokai Properties, Ltd. in 2001, the major private water systems on the island are ultimately controlled by the same entity.

1. Wai`o`ala O Molokai

Wai`o`ala O Molokai, a regulated public utility, is a wholly owned subsidiary of Molokai Ranch, Limited. It is a regulated public utility in the business of purveying potable water to end users. Currently, it supplies residences and businesses in Kipu/Kalae, Kualapuu, and Maunaloa.

Wai`o`ala does not own any water source. Instead, its water supply is provided by Molokai Ranch’s Mountain Water System and through purchases of water from DHHL and Well 17.
In 1998, following contested case proceedings, Wai’ola obtained from the Water Commission authority to drill a deep potable water well in the Kamiloloa Aquifer and withdraw approximately 656,000 gpd to serve Wai’ola’s existing customers and for future developments planned by Molokai Ranch. The permit issuance was appealed to the Hawaii Supreme Court, which, in 2004, vacated the permit and remanded the case to the Water Commission for further proceedings. Due to changes in land use plans, as encompassed in the Master Land Use Plan, Wai’ola has not sought commencement of remand proceedings. Instead, under the Water Plan, Wai’ola will abandon plans to develop the potable water well in the Kamiloloa Aquifer.

2. Molokai Ranch Mountain Water System

Six stream diversions and one tunnel in the upper Kawela, Kamakou and Lualohi basins supply the Molokai Ranch Mountain Water System, which feeds Maunaloa Village and Kualapuu. The yield from these sources varies substantially from season to season, with the minimum flow estimated to be about 110,000 gpd.\(^{12}\)

A 20-mile long gravity-fed transmission system connects the central Molokai sources with Maunaloa Village. From Puu Nana, there is a connection to the Kaluakoi system. Ten million gallons of storage exist within the system.

At Puu Nana, a water treatment plant treats approximately 0.5 mgd of nonpotable water from the Mountain Water System to drinking water standards for distribution to Waiola’s customers. The remainder of the water developed by the Mountain Water System is used for irrigation in Maunaloa Village, the Lodge, and Kaupoa Camp, and for Molokai Ranch’s livestock operations.

3. Well 17

In Kualapuu, Wells 0902-01 and 0901-01, drilled in 1946 and 1950, respectively, were originally used to irrigate pineapple fields in the Hoolehua Plain area. Well 0902-01 was abandoned in 1964 when water from the Molokai Irrigation System became available. Since 1976, water from well 0901-01, referred to as Well 17, has been used for domestic and irrigation purposes in Kaluakoi, through a system operated by Molokai Public Utilities, Inc. (MPU), a regulated public utility.

The water use permit for Well 17 permits the withdrawal of 1.018 mgd for domestic and irrigation uses in Kaluakoi and for Wai’ola’s customers in Kualapuu Town.

Although Well 17 produces potable quality water, the water is treated to meet drinking water standards because in the transmission of water from Well 17 to Kaluakoi, Well 17 water is combined with nonpotable water. Until recently, water used at Kaluakoi was transmitted via the MIS to the west end where it is treated before distribution to customers. This treatment facility has been out of compliance for several years and the subject of a Department of Health Compliance Order. Now, with MPU under common ownership with Molokai Ranch,
a more efficient system is being implemented. Water from Well 17 is combined with water from the Mountain Water System, treated to drinking water standards at the Puu Nana treatment plant, and delivered to the Kaluakoi use area via existing pipes and Molokai Ranch's reservoir at Maunaloa.

D. MOLOKAI IRRIGATION SYSTEM

The Molokai Irrigation System (MIS), built by the State and funded by Federal and State funds, develops surface water and high-level ground water in Waikolu Valley on East Molokai to irrigate farm lands in the central and western parts of the island. Three production wells (0855-01 to -03) drilled in 1961 withdraw water from the dike complex in northeastern Molokai. Combined with surface water diverted from Waikolu Stream, the MIS transports approximately 1.5 mgd via a 10-mile tunnel and pipeline transmission link from the wet northeast section to the central plain. An open reservoir at Kualapuu stores the water prior to its entering a distribution network extending from Hoolehua to Mahana.

Although the existing system is denominated the "first phase," there are no near-term plans for expansion of the MIS.

Pursuant to HRS § 168-4, DHHL lessees have a priority right to two-thirds of the water developed by the MIS system.\textsuperscript{13}
V. WATER LAWS, REGULATIONS AND POLICIES

Any analysis of water use or development on Molokai requires consideration of the State Water Code, common law, and the public trust doctrine, as well as the Hawaii Water Plan, and, in particular, the Maui County Water Use and Development Plan, and also the report of the Molokai Water Working Group. Additionally, because DHHL has large landholdings on Molokai, special consideration of DHHL's water rights is imperative in any discussion of water regulation on Molokai.

A. State Water Code

Pursuant to Article XI, § 7 of the Hawaii State Constitution, the legislature enacted the Hawaii Water Code, Hawaii Revised Statutes Chapter 174C, in 1987. A primary feature of the Water Code is the regulation of water usage through a permitting system under the jurisdiction of the Commission on Water Resource Management (Water Commission). This permitting jurisdiction exists in water management areas that have been so designated by the Water Commission. Outside of designated water management areas, the Hawaii Supreme Court has stated that the common law governs.14 While this is generally true with respect to ground water, the Water Commission has extensive regulatory authority over all surface waters in streams, whether or not in designated water management areas.

1. Ground Water

The entire island of Molokai was designated as a ground water management area effective May 13, 1992. Thus, a water use permit issued by the Water Commission is required for the withdrawal or use of any ground water on Molokai.15

Within one year of the effective date of designation, all existing uses of Molokai ground water were to have filed applications for existing use permits.16 Although, as a general rule, existing uses have priority over new uses, existing uses must be shown to be “reasonable-beneficial” and allowable under the common law of the state.17

Any new uses of water, i.e., uses not occurring on or before May 13, 1992, or uses which had been occurring on or before May 13, 1992, but failed to obtain existing use permits for failing to timely file an existing use application or other reasons, must meet all seven criteria set forth in HRS § 174C-49(a) in order to obtain a water use permit from the Water Commission.

1) That the proposed use of water can be accommodated with the available water source;
2) That the proposed use of water is a reasonable-beneficial use: that it is a “use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest;
3) That the proposed use of water will not interfere with existing legal uses of water;
4) That the proposed use of water is in the public interest;
5) That the proposed use of water complies with state and county general plans and land use designations;
6) That the proposed use of water complies with county land use plans and policies; and
7) That the proposed use of water would not interfere with rights of the Department of Hawaiian Home Lands.

Ground water use permits that have been issued by the Water Commission for existing and new uses in west and central Molokai (areas potentially affected by the Water Plan), are listed below.

<table>
<thead>
<tr>
<th>Aquifer System</th>
<th>Well</th>
<th>Permit Allocation (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kualapuu</td>
<td>0901-01 Well 17(^{18})</td>
<td>1.018</td>
</tr>
<tr>
<td></td>
<td>0801-03 Maui DWS</td>
<td>0.516</td>
</tr>
<tr>
<td></td>
<td>0801-01 DHHL 1</td>
<td>0.367</td>
</tr>
<tr>
<td></td>
<td>0801-02 DHHL 2</td>
<td></td>
</tr>
<tr>
<td>Kamiloloa</td>
<td>0501-04 Kupa Shaft/Haw’n Res.</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>0501-06 Puuehana/Hale Mohalu</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>0501-07 Kaiwakakai Park</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td>0601-01 Oloolo/Haw’n REs.</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td>0759-01 – Waiola(^{19})</td>
<td>0.656</td>
</tr>
<tr>
<td>Kawela</td>
<td>0456-01 Breadfruit Tree</td>
<td>0.285</td>
</tr>
<tr>
<td></td>
<td>0457-01 Kawela Shaft/DWS</td>
<td>0.330</td>
</tr>
</tbody>
</table>

2. Surface Water

Currently, there are no surface water management areas on Molokai.\(^{20}\) This does not mean, however, that the Water Commission lacks regulatory powers with respect to surface waters. Indeed, a primary reason for not designating surface water management areas is that the Water Commission has, and exercises, regulatory authority that provides the same protections for streams that designation would offer.

HRS § 174C-3 defines “stream” as “any river, creek, slough, or natural watercourse in which water usually flows in a defined bed or channel. It is not essential that the flowing be uniform or uninterrupted. The fact that some parts of the bed or channel have been dredged or improved does not prevent the watercourse from being a stream.”

A “stream diversion” is “the act of removing water from a stream into a channel, pipeline, or other conduit.” “Channel alteration” under HRS § 174C-3 means (1) to obstruct, diminish, destroy, modify, or relocate a stream channel; (2) to change the direction of flow of water in a stream channel; (3) to place any material or structures in a stream channel; and (4) to remove any materials or structures from a stream channel.
A permit is required for any stream diversion or channel alteration (except for routine maintenance), whether or not the stream is in a water management area. As with water use permit applications, the Water Commission reviews the application for stream diversion or alteration for consistency with state and county land use plans and policies. Additionally, the Commission is guided by the following considerations:

1) The quantity and quality of the stream water or the stream ecology shall not be adversely affected;
2) Where instream flow standards or interim instream flow standards have been established pursuant to HAR chapter 13-169, no permit should be granted for any diversion works which diminishes the quantity or quality of stream water below the minimum established to support identified instream uses, as expressed in the standards; and
3) The proposed diversion works shall not interfere substantially and materially with existing instream or noninstream uses or with diversion works previously permitted.

Notwithstanding those considerations, however, a stream diversion permit or a channel alteration permit may be granted if the Water Commission determines that it would clearly be in the public interest.

In essence, the Water Commission goes through most of the same analysis in deciding on a stream diversion or channel alteration permit as it does for a water use permit in a designated water management area. In some cases, obtaining a stream diversions or channel alterations permit may be even more difficult to obtain than a ground water use permit. That is because, pursuant to the second criterion, diversions or alterations that would diminish the quantity or quality of water below the established instream flow standard or interim instream flow standard are not to be granted unless there is some clear overriding public interest.

a. IIIFS for Molokai streams

The Water Code defines “instream flow standard” as “a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.” An “interim instream flow standard” is “a temporary instream flow standard of immediate applicability, adopted by the commission without the necessity of a public hearing, and terminating upon the establishment of an instream flow standard.”

Currently, the interim instream flow standard for all Molokai streams reflects the status quo as of June 15, 1988. This IIIFS was based on water diversions existing on that date and not on analyses of biological, ecological, or other instream values weighed against economic impacts of offstream diversions.

3. Reasonable-Beneficial
To obtain a water use permit, whether for existing or new uses, the proposed use must be shown to be reasonable-beneficial. Criteria for stream diversion permits, while not couched in the same terminology, essentially include the same elements as a reasonable-beneficial test.

"Reasonable-beneficial" is defined in HRS § 174C-3 as the "use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest."

Over the past several years, three significant concepts have been developing and are being applied by the Water Commission in conducting any "reasonable-beneficial" analysis. These are:

1. Proposed water uses must be consistent with county zoning approvals;
2. Water duties will be closely scrutinized to promote efficient use of water; and
3. Alternative sources analyses must be conducted.

a. Consistency with County Zoning Approvals

In Hawaii, at the State level, the State Land Use Commission classifies all lands as either urban, rural, agricultural and conservation. Except for conservation district lands, the uses of which are regulated by the Board of Land and Natural Resources, the counties have a certain degree of authority in regulating particular uses and establishing specific requirements within these broad classifications.

At the county level, each of the counties has adopted its own general plan that includes broad policy statements about the overall development and future of the county. County development or community plans guide development within specific regions or communities within the county, and must be consistent with the county general plan. Finally, zoning designations for individual lots must be consistent with the relevant community plan.

It is not explicit, from the language of the Water Code, whether appropriate county zoning designations are required prior to obtaining a permit for a proposed use of water in order to be "consistent with the state and county land use plans" to meet the reasonable-beneficial test. The Water Commission, in practice, had consistently required that county zoning designations be consistent with the proposed use. In the Waiʻoala case, the applicant had argued that the timing for obtaining appropriate county zoning designations may not be conducive to long-term water planning, including infrastructure development, and that consistency with the community plan would be a more appropriate test. Waiʻoala's argument had been rejected by the Water Commission, and that decision has not been overturned by the Hawaii Supreme Court.29 Thus, any proposed water use for future developments must show that it has obtained appropriate county zoning designations before the Water Commission will issue a water use or stream diversion permit for such use.

b. Water Duties
A significant issue in the Waiahole Ditch case involved appropriate water duties for particular uses. In that case the Water Commission generally applied a water duty of 2500 gallons per acre per day for diversified agriculture and 2000 gpd for pineapple in Kunia, Oahu; but varied from that standard where particular facts and circumstances evidenced different actual usage. In one case, the allocation was higher than 2500 gpd; in another it was lower. On appeal, the supreme court conducted a lengthy review of how the Water Commission arrived at and applied the water duties, and twice remanded the allocations to the Water Commission for further review.

One of the lessons to be gleaned from the Waiahole Ditch case is that the efficient use of water, one of the benchmarks of a reasonable-beneficial use, will be closely scrutinized through a water duty analysis.

For domestic uses, standards established by the county water departments serve as general guidelines. A more complex analysis is required for irrigation uses.

c. Alternative Sources

An alternative water source analysis, according to the Hawaii Supreme Court, is “intrinsic to the public trust” and the definition of “reasonable-beneficial.” Thus, before issuing a water use permit for any proposed use, the Water Commission must ask whether there are other sources of water that could practically be used for this same purpose. Practicable for this purpose, means that the water is available and capable of being utilized considering cost, technology and logistics. If more than one source of water can practically be used for the same purpose, then the Water Commission may (and, indeed, may be obligated to) prioritize among the water resources and decide which source should be utilized.

For example, in the Waiahole Ditch contested case, the Water Commission was faced with whether to allow agricultural lands to be irrigated with water that originated on the Windward side of Oahu and directly affected stream flow inasmuch as it may have been practicable to use groundwater pumped from the Leeward side of the island for the same purpose. In prioritizing water resources, the Commission may, among other things, decide that the Leeward groundwater, being of potable quality, should be held in reserve for future drinking water needs, or, alternatively, decide that the benefits from having more water in the streams justified the use of groundwater for irrigation.

As technologies improve and costs decrease, desalinated water and reclaimed wastewater will more and more become practicable alternative sources of non-potable water.

B. Common Law

Common law governs outside of designated water management areas. The common law of water in Hawaii, however, is not well developed, and more questions than answers abound, including questions relating to the intersection and interrelationship of common law with the Water Code.
1. **Ground Water: Correlative Rights**

*City Mill Company, Limited v. Honolulu Sewer and Water Commission*\(^{33}\) held that the rule of correlative rights expresses the common law relating to groundwater in Hawaii. As explained by the court:

> [A]ll of the owners of lands under which lies an artesian basin have rights to the waters of that basin; that each may use water therefrom as long as he does not injure thereby the rights of others and that in times when there is not sufficient water for all each will be limited to a reasonable share of the water.\(^{34}\)

For purposes of this report, however, the rule of correlative rights is irrelevant. The supreme court, in the Waiahole case, held that the regulatory system based on permits issued by the Water Commission displaces the common law of correlative rights in designated water management areas.\(^{35}\) Because the entire island of Molokai is designated as water management areas, rights to withdraw and use groundwater are established through permits issued under the Water Code, rather than pursuant to common law doctrines.

2. **Surface Water: Riparian Rights**

Riparian owners (very generally, those who own land abutting a stream) possessed riparian rights to water pursuant to HRS § 7-1. In *Reppin v. Board of Water Supply*,\(^{36}\) the Hawaii Supreme Court adopted the “reasonable use doctrine” of riparian rights. Under the reasonable use doctrine “a riparian owner is entitled only to a reasonable use of the waters of a natural watercourse and may not bring an action to prohibit the reasonable use of another absent a demonstration of injury to his own use.”\(^{37}\)

It is clear that riparian rights attach to riparian lands and that the owner cannot convey those rights separate from the land. Beyond that, there is very little that is clear about Hawaii’s common law of riparian rights.

Furthermore, questions about how riparian rights under the common law coalesce with permitting requirements for stream diversions and with interim instream flow standards remain unanswered.

On Molokai, where many of the perennial streams are in remote locations removed from developable lands (for agriculture or otherwise), issues surrounding riparian rights are not as urgent as they may be on other islands.

3. **Surface Water: Appurtenant Rights**

Appurtenant water rights are measured by the amount of land under taro cultivation at the time of the Mahele, multiplied by the average quantity of water used per day per acre in growing that taro. The water rights remain with the land even when taro ceases to be
cultivated on the land. But the water is appurtenant to the taro land and cannot be transferred to other lands.\textsuperscript{38} And an attempt to sever the appurtenant water right from the land may extinguish the appurtenant right.\textsuperscript{39}

Unlike correlative rights and riparian rights, appurtenant rights are not displaced by the Water Code, even in designated surface water management areas. Instead, Article XI, § 7 of the State Constitution assured its survival and the Water Code accords some of the highest priority and clear preferential treatment to appurtenant water rights.

C. Underlying Policies

1. Rights of DHHL

In addition to the requirement that all water use permits not interfere with, and be subject to, the rights of DHHL, subsection 174C-101(a) of the Water Code provides:

\textbf{§174C-101 Native Hawaiian water rights.} (a) Provisions of this chapter shall not be construed to amend or modify rights or entitlements to water as provided for by the Hawaiian Homes Commission Act, 1920, as amended, and by chapters 167 and 168, relating to the Molokai irrigation system. Decisions of the commission on water resource management relating to the planning for, regulation, management, and conservation of water resources in the State shall, to the extent applicable and consistent with other legal requirements and authority, incorporate and protect adequate reserves of water for current and foreseeable development and use of Hawaiian home lands as set forth in section 221 of the Hawaiian Homes Commission Act.

The essence of Section 221 of the HHCA is the provision of adequate water for the productive use of Hawaiian home lands.\textsuperscript{40}

In the \textit{Waiola} case, the Hawaii supreme court held that the Water Commission has a public trust duty to protect a reservation of water for DHHL’s future needs. Protecting such a reservation means not only subtracting the amount of the reservation from the available sustainable yield of the aquifer, but also assuring that other water developments do not otherwise jeopardize DHHL’s ability to access the reserved water in the future.

Currently on Molokai, DHHL holds a reservation for 2.905 mgd from the Kualapuu Aquifer.

Additionally, pursuant to HRS §168-4, DHHL lessees have a priority right to two-thirds of the water developed for the MIS.

2. Traditional and Customary Native Hawaiian Rights

The Water Code, in section 174C-101(c), provides for the protection of traditional and customary native Hawaiian rights:
Traditional and customary rights of ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778 shall not be abridged or denied by this chapter. Such traditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one's own kuleana and the gathering of hiihiwai, opae, o'opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes.

In the surface water arena, issues involving traditional and customary rights have centered around the availability of water for growing taro, and adequacy of stream flows for indigenous flora and fauna traditionally gathered by native Hawaiians.

With respect to ground water, the issue has primarily been the effect of groundwater withdrawals on freshwater discharge into the ocean and the impact on nearshore biota, such as limu.

3. Public Trust

All decisions made by the Water Commission, including the issuance of water use permits, are overlain by the Commission's responsibility to uphold the public trust doctrine. The Hawaii Supreme Court iterated three fundamental principles embodied in the state water resources trust:

First, the state has both the authority and duty to preserve the rights of present and future generations in the waters of the state, which, in effect, precludes any grant or assertion of vested rights to use water to the detriment of a public trust purpose. This authority empowers the state to revisit prior diversions and allocations, even those made with due consideration of their effect on the public trust. Second, the state bears an affirmative duty to take the public trust into account in the planning and allocation of water resources and to protect public trust uses whenever feasible. Third, there are no absolute priorities between broad categories of trust uses under the water resources trust, precisely because all public trust purposes must be protected; thus, the Commission must weigh competing public and private water uses on a case-by-case basis. That being the case, the Commission, as the primary guardian of public rights under the trust, must take the initiative in considering, protecting, and advancing public rights in the resource at every stage of the planning and decision making process. In sum, the state may compromise public rights in the resource pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state. 41

The purposes or uses of the public trust can evolve with changing public values and needs. 42 As of this date, the Hawaii Supreme Court has identified four "uses" protected under the public trust doctrine: (1) maintaining the purity and flow, the continued existence and preservation of the waters of the state; (2) domestic uses, primarily drinking; (3) to preserve

- 16 -
Native Hawaiian and traditional and customary rights; and (4) reservations of water to DHHL for current and foreseeable domestic, stock water, aquaculture, and irrigation activities on tracts leased to native Hawaiians.43

D. Hawaii Water Plan: Maui County Water Use and Development Plan

The Water Code requires that the Water Commission implement and utilize comprehensive water resources planning in its regulation and management of the State’s water resources. As part of that mandate, the Water Code requires the development and updating of the Hawaii Water Plan to guide the Water Commission in its general powers, duties, and responsibilities assuring economic development, good municipal services, agricultural stability, and water resource protection.

The Water Code calls for coordination among the Water Commission, the counties and other state agencies to formulate an integrated and coordinated program for the protection, conservation, and management of water in each county.

County water use and development plans are components of the Hawaii Water Plan intended to insure that the future water needs of the county are met by setting forth “the allocation of water to land use.”

1. Current Status of Hawaii Water Plan

The initial Hawaii Water Plan prepared by various state and county agencies was formally adopted by the Water Commission in 1990. Action on a 1992 update was deferred pending further refinements to plan components.

In 2000, the Water Commission adopted a Statewide Framework to guide the updating of the various components of the Hawaii Water Plan. The updating process is currently ongoing. No updated plan has yet been approved by the Water Commission. Thus, the 1990 Hawaii Water Plan is still the official document.

2. Maui County Water Use and Development Plan

The Maui County Water Use and Development Plan (WUDP) was passed as an ordinance by the Maui County Council and approved by the Mayor in October 1990.

Much of what is stated in the WUDP with respect to Molokai is significantly outdated. At the time the WUDP was being prepared, three large landowners - Molokai Ranch, the owner of more than 50,000 acres in central and west Molokai; Kukui (Molokai), then the owner of the Kualapuu Resort; and Alpha USA, owner of approximately 6,300 acres in west Molokai - were in various stages of making significant development plans for their respective properties. At the time, based on very sketchy data, projected 2010 water demand for these three entities amounted to 10 mgd of potable water. It was anticipated that each of these entities would attempt to secure water from the Kualapuu Aquifer to meet their needs.
Noting that there were no plans for additional surface water development, the WUDP concluded that projected water needs by the major water users in central and west Molokai exceed the estimated sustainable yield of the Kualapuu Aquifer. Therefore, the WUDP recommended that all prospective major water users in central and west Molokai, including DHHL, the county, and the large private landowners, work cooperatively towards developing an integrated water system that would include a non-potable water system. Additionally, evaluation of alternative sources development was encouraged.44

E. Molokai Water Working Group

The Molokai Water Working Group was originally appointed in October 1982 by Bill Paty, who was then the Chairperson of the Water Commission. Its purposes were (1) to recommend to the Water Commission a plan for water development on Molokai that assists the county and community in developing its Water Use and Development Plan; and (2) to test a community “working group” model that, if it works, could be used elsewhere in the State when communities are faced with tough water issues. The Working Group was asked to enter into good faith deliberations aimed at producing the highest consensus possible on demand forecasts, bulk water allocations, recommendations to manage both supply and demand, and the best plans the Working Group might offer on balancing future water uses.

The original Working Group presented a written report in July 1993.

In late 1995, then Water Commission Chairperson Mike Wilson convened a second Water Working Group for the express purpose of revisiting and updating the July 1993 report. A revised report, superceding the July 1993 report, was issued by the Working Group in April 1996.

In its 1996 report, the Working Group set forth a number of general recommendations, plus several recommendations specific to each of the four Aquifer Sectors on the island. The complete report is attached as Attachment B. A number of the Working Group recommendations are discussed in the analysis section of this report.
VI. ANALYSIS

The purpose of all of the foregoing is to establish the framework within which the analysis of whether the proposed Water Plan is reasonable and realistic can be made. In other words, based on water laws and policies, water resources and potentially competing demands, what is the likelihood of MPL being able to implement the Water Plan in support of its Master Land Use Plan?

As discussed below, the Water Plan is progressive with respect to both water supply and demand. Conservation strategies currently touted but seldom implemented in Hawaii are integral parts of the Water Plan. In conjunction with the proposal that only existing sources at currently permitted amounts will be used to meet all of MPL’s current and future potable water needs, the Water Plan should readily pass regulatory muster. Indeed, it should be held up as a model for balancing development with the preservation and protection of our precious water resources.

A. Reasonable and Realistic Water Demands

1. Potable Water

Essentially, the potable water Plan is to use no more than what is currently available from Well 17 and the 0.5 mgd from Mountain Water System to meet not only existing needs, but also to meet the needs for future growth, i.e., reopening the Kaluakoi Hotel, developing 200 lots at Laa Point, and expansion of Pala‘au Industrial Park.

At first blush, such a scheme appears overly optimistic, or even unrealistic. However, it is feasible because the Water Plan calls for (1) significantly decreasing current use of potable water for irrigation; (2) increasing efficiencies within existing systems; and (3) aggressive water conservation strategies.

a. Decreasing Current Use of Potable Water for Irrigation

The Water Commission granted a water use permit authorizing the withdrawal of 1.018 mgd from Well 17 based on the following uses (in gallons per day):

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaluakoi Hotel</td>
<td>67,000</td>
</tr>
<tr>
<td>Kaluakoi Condos</td>
<td>186,000</td>
</tr>
<tr>
<td>Kaluakoi Residential</td>
<td>51,000</td>
</tr>
<tr>
<td>Golf Course</td>
<td>400,000</td>
</tr>
<tr>
<td>Beach Park</td>
<td>26,000</td>
</tr>
<tr>
<td>Nursery</td>
<td>18,000</td>
</tr>
<tr>
<td>Filter Backwash</td>
<td>100,000</td>
</tr>
<tr>
<td>MIS System Use Charge</td>
<td>94,000</td>
</tr>
<tr>
<td>Kualapuu Town (Waialoa)</td>
<td>76,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,018,000</strong></td>
</tr>
</tbody>
</table>
Of the 1.018 mgd for authorized uses, more than half is for irrigation purposes, including irrigation of the golf course. In doing an alternative source analysis, as a matter of policy, if non-potable water sources are available, such sources should be used for irrigation in this area where there is not an overabundance of potable water. Under the Water Plan, approximately 600,000 gpd of potable water from Well 17 will be "freed up" from existing irrigation uses by using alternative nonpotable water sources, leaving that amount available for potable needs associated with future developments.

b. Increasing Efficiencies In Existing Systems

Inadequate maintenance of the MPU system has resulted in significant system losses. It is anticipated that current system losses 200,000 gpd can be reduced to about 100,000 with improvements to system.

Additionally, not insignificant amounts of water are lost through evaporation as water is transported to Kaluakoi through the open MIS system. Piping potable water to Kaluakoi from the Puu Nana treatment plant will result in less water being lost to evaporation.

c. Aggressive Water Conservation Strategies

Some of the most aggressive water conservation strategies in the State are being implemented and even further strategies are proposed for the future development at La‘au Point.

(1) Conservation Rates

After MPL acquired MPU, it restructured the water rates to, among other things, implement tiered water conservation rates that provide a financial incentive to customers to conserve water. The water duties applied by the Water Commission for different user types was used as the base rate. All water use above that amount is billed at a much higher "conservation rate." The utility had proposed a conservation rate of twice the base rate. Due to concern about "rate shock" expressed by the Consumer Advocate, the conservation rate will be ramped up in phases. Ultimately, however, it is anticipated that a conservation rate that is substantially higher than the base rate will go into effect for water usage that exceeds the water duties upon which the Water Commission bases its allocations.

The effectiveness of conservation rates has already manifested itself. Within 15 months of the conservation rate going into effect, there have been measurable reductions in water usage by Kaluakoi residents. Water consumption has dropped by 45% in the Ranchlands, and a passing shower will cause water consumption to drop dramatically.

(2) Water Conservation Strategies: La‘au Point Development

It is anticipated that the majority of the residences in the 200-lot La‘au Point subdivision will be second or third homes for the owners. Inasmuch as these residences will probably not be
occupied much of the time, domestic water consumption is anticipated to be less than average for these types of units.

In addition, a number of covenants that will be attached to these lots will ensure conservation of potable water. These covenants include:

- Restrictions on further subdivision of lots
- Disturbance of lot limited to no more than 30% (approx. ½ acre)
- Restrict water use for irrigation (landscaping)
  - Require re-use and collection/storage systems for catchments
  - Only drip systems permitted for irrigation
- Require all houses to have at least a 5,000-gallon storage tank for water captured from roofs (could be used for drinking water or irrigation)
- Covenants on drinking water use – designed to ensure an overall maximum drinking water daily use of 500-600 gpd
  - Double flush toilets
  - Specially designed shower heads for conservation
  - Must use dual water system (potable and nonpotable)

By combining these aggressive water conservation strategies with improvements in the existing water delivery systems, and taking irrigation uses off the potable water system (i.e., putting the right water to the right use), the projected potable water demands set forth in the Water Plan are reasonable and realistically achievable.

2. **Nonpotable Water Demands**

Nonpotable uses will include irrigation of the Kaluakoi golf course, landscaping and other irrigation around Kaluakoi, the future Laau Point lots, Maunaloa Village, the Lodge and Kaupoa Camp, and water for Molokai Ranch’s livestock operations.

Under the Water Plan, nonpotable water demands will be met with the remaining water developed by the Mountain Water System and by development of 1 mgd of brackish water from the Kakalahale Well in the Kamiloa Aquifer. Additionally, in the future, treated wastewater will be another source of irrigation water for the golf course.

Compared to domestic water needs, irrigation water demands (especially non-agriculture demands) are much more flexible and more readily fluctuate relative to supply. Additionally, there are more alternative sources of irrigation water. Thus, nonpotable water demand, for purposes of this report, does not require as vigorous an analysis as the demand for potable water.

Nevertheless, it is worth noting several of the covenants that will be attached to the Laau subdivision that are aimed at limiting the demand for non-potable water from the Ranch’s mountain water system or the Kakalahale Well that is proposed for development as a brackish water source. The covenants include:
• Restrict landscaping to appropriate native and Polynesian introduced species that are drought tolerant and suitable for coastal locations

• Drainage systems
  ✓ Require drainage systems that retain any runoff within the disturbed area of the lot
  ✓ Maximize recharge into the ground
  ✓ Restore land area that have eroded by re-establishing vegetative ground cover
  ✓ Minimize impervious surfaces (paved) on each lot

B. Availability of Identified Water Sources

As noted at the outset of this report, an analysis of the availability of the water sources identified in the Water Plan is a regulatory, and not a hydrological, analysis. This analysis considers the degree of consistency between the Water Plan and the various water laws, regulations, and policies.


The water use permitting provisions of the Water Code apply to ground water resources in this case. Under the proposed Water Plan, two ground water sources are identified: (1) the already developed Well 17 in the Kualapuu Aquifer, from which withdrawals of 1.018 mgd is already permitted for uses in Kaluakoi and Kualapuu; and (2) the Kakalahale Well in Kamiloloa, which is already drilled but not yet developed or permitted. The proposal is to develop 1 mgd of brackish water from the Kakalahale Well. No additional withdrawals will be sought from Well 17.

a. Potable Water Source

The Water Commission, in the Kukui (Molokai) case, has already gone through the analysis of the impact of withdrawing 1.018 mgd from Well 17 on other existing uses and on other rights belonging to DHHI, including its reservation of 2.905 mgd in the Kualapuu Aquifer. The permit will have to be modified by removing existing irrigation uses in Kaluakoi as permitted uses and substituting domestic uses for future residences and expansion of Palaa Industrial Park. Such modification should, if anything, improve the reasonable-beneficial analysis by better matching the quality of water to the type of use.

As discussed in an earlier section, the Water Plan incorporates aggressive conservation strategies that are aimed at keeping consumption well within the range of water duties applied by the Water Commission. However, in order to meet the reasonable-beneficial test, before such permit modification can be authorized, appropriate zoning designations will have to be obtained for the future Laau Point development.

b. Nonpotable Water Source

The Water Plan calls for developing 1 million gallons per day of brackish water from the existing, but currently unused, Kakalahale Well. Located in the Kamiloloa Aquifer at
elevation approximately 980 feet, the well was drilled in 1969 to provide drinking water to the Kaluakoi Resort. However, because of the brackish quality of the water, the well was never used as a production well.

A water use permit would be required before the Kakalahale Well can be put into production. While the current sustainable yield of the Kamiloloa Aquifer can accommodate a withdrawal of 1 mgd from this well, the Water Commission will have to analyze whether pumpage of this amount at this location will adversely impact other existing wells, and whether it would jeopardize DHHL’s ability in the future to access its reservation of 2.905 mgd from the Kualapuu Aquifer.

Additionally, appropriate zoning designations for the future Laau Point development will have to be obtained prior to issuance of a water use permit for the Kakalahale Well to the extent that uses will include irrigation of the Laau Point lots.

The conservation strategies proposed in the Water Plan should be sufficient for a finding that the proposed use of water will be economic and efficient.

2. **Consistency with Surface Water Regulations Under Water Code**

The only surface water resources proposed for use under the Water Plan are those already developed by Molokai Ranch’s Mountain Water System, which has been diverting surface water for over 100 years. All of the diversions have been registered with the Water Commission since 1987. Inasmuch as all of the existing diversions were in place on June 15, 1988, they are incorporated in the current IIFS. Presently, there are no pending petitions to amend the interim instream flow standards of those streams that are diverted for the Mountain Water System.

3. **Consistency with the Common Law**

Because the entire island of Molokai is regulated as a ground water management area, the common law relating to ground water, i.e., the doctrine of correlative rights, is inapplicable in this case.

Appurtenant and riparian surface water rights do not appear to be issues in this case inasmuch as the surface water resources identified in the Water Plan have been diverted for over 100 years and there are no currently unresolved claims.

4. **Consistency with Rights of DHHL**

As discussed above, implementation of the Water Plan will require a finding by the Water Commission that the withdrawal of 1 mgd of brackish water from the Kakalahale Well will not impact DHHL’s existing wells in Kualapuu, nor jeopardize DHHL’s ability to access its reservation in the Kualapuu Aquifer.
The Water Commission already engaged in that analysis with respect to the withdrawal of 1.018 mgd from Well 17. Additionally, there are no outstanding claims by DHHL for the surface water that is diverted by Molokai Ranch’s Mountain Water System.

Permits issued by the Water Commission are subject to any superior rights to water that DHHL may have pursuant to the Hawaiian Homes Commission Act.

The Water Plan does not rely on water developed by the MIS, and therefore would have no impact on DHHL’s priority rights in that system.

5. Consistency with Traditional and Customary Native Hawaiian Rights

In issuing the permit for withdrawal of 1.018 mgd from Well 17, the Water Commission must have already determined that traditional and customary native Hawaiian rights would not be unduly impacted.

That analysis will have to be conducted with respect to withdrawal of 1 mgd of brackish water from the Kakalahale well.

Presently, there are no outstanding claims that traditional and customary native Hawaiian rights are being abridged by the diversions of the Mountain Water System.

6. Consistency with the Public Trust Doctrine and Identified Public Trust Uses

The Water Plan stays within sustainable limits of water development and thus ensures that water resources are protected for future use. Aggressive conservation measures and putting the right water to the right use through the utilization of alternative sources of water are also consistent with protecting and wisely using water resources as the public trust doctrine mandates.

In the Waiola case, the Hawaii supreme court instructed that

the state may compromise public rights in the resource pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state.46

It is significant (and uncommon) that at this early stage of a master plan development process the level of analysis provided in this report is given for a proposed Water Plan. Engaging the water issues from the outset ensures that decisions will be made with the “level of openness, diligence, and foresight” required of those bearing responsibilities for protecting our public trust resources.

7. Consistency with Maui County Water Use and Development Plan

- 24 -
The Molokai section of the currently approved Maui County Water Use and Development Plan is seriously outdated. However, the developments proposed and anticipated water demand under the current Master Land Use Plan and Water Plan are significantly lower than stated in the Maui WUDP.

Still relevant, however, are the WUDP’s recommendations that all prospective major water users in central and west Molokai work cooperatively towards developing an integrated water system that would include a non-potable water system and that alternative water sources be developed.

Integrating the MPU system serving Kaluakoi, the Waiola system serving the potable water needs of Molokai Ranch lands, and the Mountain Water system to increase efficiencies and to better match the quality of water with the type of use is a significant step in addressing the first of the WUDP’s recommendation.

Plans for developing the Kakalahale well as a brackish water source, treating effluent for reuse as irrigation water for the golf course, and capturing rainwater and runoff on individual house lots for small scale irrigation are consistent with the second of the WUDP’s recommendation.

8. **Consistency with Recommendations of Molokai Water Working Group**

In its 1996 report, the Molokai Water Working Group set forth a number of general recommendations, plus several recommendations specific to each of the four Aquifer Sectors on the island. Below is an analysis of the consistency of the Water Plan with the relevant Working Group recommendations.

**General Recommendation B**

*The working group recommends that all large-scale water planning/water management should consider that agriculture will continue to be the economic and cultural “heart” of Molokai.*

The Master Plan provides for the protection and preservation of agricultural lands. Although the Water Plan does not address additional developments of sources for agricultural water, it does not subtract from or jeopardize existing sources of agricultural water.

**General Recommendation C.**

*The working group recommends that DHHL’s water needs, which are currently tied to lands at Hoolehua and Kalamaula through 2010, be reserved first.*

Use of Well 17 at currently permitted levels does not interfere with or jeopardize existing water sources serving DHHL lands and preserves DHHL’s reservation of 2,905 mgd of ground water in the Kualapuu Aquifer. A showing that withdrawal of 1 mgd of brackish water from the Kakalahale Well would not jeopardize DHHL’s ability to access its
reservation in the Kualapuu Aquifer will have to be made to the Water Commission in order to obtain a water use permit for that source.

General Recommendation D.

The working group recommends that due to limited information, the capacity of the aquifers should be treated conservatively and protected until more precise determinations can be made.

In line with this recommendation, the sustainable yield of the Kualapuu Aquifer was reduced from 7 to 5 mgd. The ground water withdrawals proposed in the Water Plan are well within the sustainable yields of the respective aquifers.

General Recommendation G

The working group recommends that ground water must be reserved first to fulfill domestic, and public health, safety, and welfare needs.

Of the 1.018 mgd water allocation permitted by the Water Commission for Well 17, about half is for irrigation purposes. Under the Water Plan, potable groundwater withdrawn from Well 17 will not be used for irrigation, but instead will be used for existing and future domestic water needs, which is clearly in line with the Water Working Group’s General Recommendation G.

General Recommendation H

The working group recommends priority use of non-potable water should be for demonstrable and reasonable-beneficial agricultural usage which includes subsistence farming and public facility needs.

Although the Water Plan does not address additional developments of sources for agricultural water, it does not subtract from or jeopardize existing sources of agricultural water. Additionally, by utilizing reclaimed effluent to irrigate the golf course and capturing rain and surface water on individual house lots for irrigation, there will be less competition with agriculture for other non-potable water resources.

General Recommendation I

The working group recommends use of any water for golf courses should be lowest priority.

The water use permit granted for withdrawal of ground water from Well 17 does not comport with the working group’s General Recommendation I inasmuch as potable water is allocated for golf course irrigation. The Water Plan, on the other hand, calls for non-potable water, developed from the Kakalahale well, instead of potable water from Well 17, to be used for
irrigation. Furthermore, future plans are to use even lower quality water, i.e., reclaimed water from the sewage treatment plant, for golf course irrigation.

**General Recommendation K.**

The working group recommends that all additional water supply should first be sought in the Sector for which it shall be used.

Due to the lack of water resources in the West Sector, water for the reopening of the Kaluakoi Resort and for the Laau Point development will have to be imported from other sectors.

**General Recommendation L.**

The working group recommends that all the water rights of DHHL homesteaders as provided under the Hawaiian Homes Commission Act, State Water Code, and other laws must be recognized and preserved by the State of Hawai‘i and the Counties of Maui and Kalawao. Other rights which may exist pertaining to Hawaiians not residing on DHHL lands must also be honored.

See the discussion in Section VI.B.4, above, as to the consistency of the Water Plan with the rights of DHHL.

**General Recommendation M.**

The working group recommends that principles of supply and demand management be followed to the greatest extent allowed by law.

**General Recommendation N.**

The working group recommends that new water supplies should be sought first through conservation management tools such as water pricing (inverted rate structure, etc.)

Central Sector, Recommendation B.1

*Bulk groundwater allocations should generally coincide with the "2010 Potable Water Use Projections" subject to on-going studies of the aquifer's capacity (see Exhibit 4).*

Although the uses listed on the Exhibit 4 are outdated, the estimated amount of long-term water use under the Water Plan is less than projected in the 2010 Potable Water Use Projections.

Central Sector, Recommendation B.2
Limit groundwater withdrawal in the Kualapuu Aquifer System to 5.0 mgd. 0.57 mgd (5.0 mgd limit minus 4.43 mgd 2010 Water Projections) may be used to satisfy other correlative uses unless subsequent information changes this.

Subsequent to the Water Working Group report, the sustainable yield of the Kualapuu Aquifer was reduced from 7 to 5 mgd. The Water Plan does not propose additional development of water from the Kualapuu Aquifer beyond what is already developed and permitted from Well 17.

**Southeast Sector, Recommendation C.1**

*Limit groundwater withdrawal to 33% of its developable yield subject to verification of existing users and water use permits.*

The combined sustainable yield for the four aquifer systems in the Southeast Aquifer Sector is 24 mgd. Currently permitted uses is less than 1 mgd. Additionally, under the Water Plan, Waiola intends to abandon plans to develop its Kamilolea well. Developing the 1 mgd Kakalahale brackish water well would be well within the limitations of this Recommendation.

**Southeast Sector, Recommendation C.2**

*Any withdrawals from this Sector should not diminish water supplies and supply availability for traditional uses, including taro patches and fishponds. Baseline water requirements for these uses needs to be determined.*

Prior to utilizing the Kakalahale Well as a nonpotable water source, a water use permit from the Water Commission will have to be obtained. In that process, it will have to be shown that withdrawal of 1 mgd of brackish water from the Kakalahale well will not abridge traditional and customary native Hawaiian rights, including rights involving the use of taro patches and fishponds.

**Southeast Sector, Recommendation C.3**

*Development of additional water from the Southeast Sector should be allocated first to existing residences of this Sector that are not yet served.*

Prior testing of the Kakalahale well showed that it would not produce potable water. Thus the well site would not be suitable for development of water to serve existing residences.

**C. Conclusion**

Certain findings and decisions, especially with respect to development of the Kakalahale Well will have to be the subject of future findings and decisions by the Water Commission. Thus, a definitive answer cannot be given at this time as to the whether MPL will be able to
implement all components of the Water Plan. However, given the available information, and the progressive character of the Water Plan, the likelihood is very high that the Water Plan will receive regulatory approvals.
ENDNOTES

1 Issuance of this permit was the subject of a contested case proceeding, referred to as the Kukui (Molokai) case. The case has been appealed to the Hawaii Supreme Court. As of this writing, the supreme court has not rendered a decision on this matter.


6 Bulletin B16, at p. xii.

7 USGS 1997 Study at p. 15.

8 Bulletin B16, at p. xii.

9 Hawaii Stream Assessment at p. 55-56.


13 HRS §168-4 Preference. To the extent that the same may be necessary from time to time for the satisfaction of their water needs, domestic and agricultural, the Hawaiian homes commission and lessees of the Hawaiian homes commission shall at all times, upon actual need therefor being shown to the board of agriculture, have a prior right to two-thirds of the water developed for the Molokai irrigation and water utilization project by the tunnel development extending to Waikolu valley and ground water developed west of Waikolu valley, which was planned by the board of land and natural resources as the first stage of the Molokai irrigation project.


15 HRS § 174C-48(a). However, no permit is required for domestic consumption by individual users.
10 HRS § 174C-50(c).

11 HRS § 174C-50(b).

12 See endnote 1.

13 Technically, this is not a permitted allocation because the Hawaii supreme court vacated and remanded the Water Commission’s decision for further proceedings.

14 There are no surface water management areas anywhere in the State.


16 HAR § 13-168-32(d) and §13-169-52(c).

17 HAR § 13-168-32(e) and 13-169-52(c).

18 HAR § 13-168-32(d)(2) and §13-169-52(c)(2).

19 HRS § 174C-3.

20 HRS § 174C-3.

21 HAR § 13-168-47.


23 Similarly, in the Waiahole Ditch case, Gentry’s application for a water use permit for golf course irrigation was denied on the basis that the lands on which the water was to be used had not yet been zoned for golf course use.


25 Waiahole II, 105 Haw. at 19.

26 Ko’olau Ag, 83 Haw. at 491.

27 30 Haw. 912 (1929)

28 Id. at 923.

29 Waiahole I, 94 Haw. at 179.

30 65 Haw. 531 (1982)

31 Id. at 553.


Section 221 of the Hawaiian Homes Commission Act reads as follows:

§221. Water. (a) When used in this section:

(1) The term "water license" means any license issued by the board of land and natural resources granting to any person the right to the use of government-owned water; and

(2) The term "surplus water" means so much of any government-owned water covered by a water license or so much of any privately owned water as is in excess of the quantity required for the use of the licensee or owner, respectively.

(b) All water licenses issued after the passage of this Act shall be deemed subject to the condition, whether or not stipulated in the license, that the licensee shall, upon the demand of the department, grant to it the right to use, free of all charge, any water which the department deems necessary adequately to supply the livestock, aquaculture operations, agriculture operations, or domestic needs of individuals upon any tract.

(c) In order adequately to supply livestock, the aquaculture operations, the agriculture operations, or the domestic needs of individuals upon any tract, the department is authorized (1) to use, free of all charge, government-owned water not covered by any water license or covered by a water license issued after the passage of this Act or covered by a water license issued previous to the passage of this Act but containing a reservation of such water for the benefit of the public, and (2) to contract with any person for the right to use or to acquire, under eminent domain proceedings similar, as near as may be, to the proceedings provided in respect to land by sections 101-10 to 101-34, Hawaii Revised Statutes, the right to use any privately owned surplus water or any government-owned surplus water covered by a water license issued previous to the passage of this Act, but not containing a reservation of such water for the benefit of the public. Any such requirement shall be held to be for a public use and purpose. The department may institute the eminent domain proceedings in its own name.

(d) The department is authorized, for the additional purpose of adequately irrigating any tract, to use, free of all charge, government-owned surplus water tributary to the Waimea river upon the island of Kauai, not covered by a water license or covered by a water license issued after July 9, 1921. Any water license issued after that date and covering any such government-owned water shall be deemed subject to the condition, whether or not stipulated therein, that the licensee shall, upon the demand of the department, grant to it the right to use, free of all charge, any of the surplus water tributary to the Waimea river upon the island of Kauai, which is covered by the license and which the department deems necessary for the additional purpose of adequately irrigating any tract.

Any funds which may be appropriated by Congress as a grant-in-aid for the construction of an irrigation and water utilization system on the island of Molokai designed to serve Hawaiian home lands, and which are not required to be reimbursed to the federal government, shall be deemed to be payment in advance by the department and lessees of the department of charges to be made to them for the construction of such system and shall be credited against such charges when made.

(e) All rights conferred on the department by this section to use, contract for, or acquire the use of water shall be deemed to include the right to use, contract for, or acquire the use of any ditch or pipeline constructed for the distribution and control of such water and necessary to such use by the department.

(f) Water systems in the exclusive control of the department shall remain under its exclusive control; provided that the department may negotiate an agreement to provide for the maintenance of the water system and the
billing and collection of user fees. If any provision or the application of that provision is inconsistent with provisions contained in this section, this section shall control.

Water systems include all real and personal property together with all improvements to such systems acquired or constructed by the department for the distribution and control of water for domestic or agricultural use.


42 Wai‘ahole I, 94 Haw. at 136.

43 Wai‘ahole I, 94 Haw. at 136-137; Wai‘ola, 103 Haw. at 431.

44 County of Maui Department of Water Supply and Planning Department, Hawaii Water Plan: Maui County Water Use and Development Plan, March 1990, at pp. 36-41.

45 When the Water Commission rendered its decision granting the water use permit for Well 17, MPL was not affiliated with Well 17 or MPU. Also, the requirement of conducting an alternative sources analysis was clarified in 2004, when the Hawaii supreme court issued its Waiahole II decision, long after the Water Commission’s decision in the Kukui (Molokai) case.

46 Wai‘ola, 103 Haw. at 401.
APPENDICES

Appendix A  Molokai Properties, Limited, EC Project #47: Water Plan, December 2004
Appendix B  Report of the Molokai Water Working Group, Revised April 1996
WATER USE PLAN

I. Molokai Properties, Limited Existing Water Systems

Molokai Properties, Limited (MPL) operates 3 water systems, two of which are subject to State Public Utilities Commission (PUC) regulation. All three systems are subject to regulation by the State’s Commission on Water Resource Management (CWRM).

II. Kaluakoi System (Molokai Public Utilities, Inc. (MPU))

MPU services the existing Kaluakoi Development. Its source is Well 17 in Kualapuu which has a water use allocation of 1,018,000 gallons per day (GPD). The following is the permitted allocation established by the Water Commission based on the then existing uses:

<table>
<thead>
<tr>
<th>Description</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuualo’i Hotel</td>
<td>67,000</td>
</tr>
<tr>
<td>Condos</td>
<td>186,000</td>
</tr>
<tr>
<td>Residential</td>
<td>51,000</td>
</tr>
<tr>
<td>Golf Course</td>
<td>400,000</td>
</tr>
<tr>
<td>Beach Park</td>
<td>26,000</td>
</tr>
<tr>
<td>Nursery</td>
<td>18,000</td>
</tr>
<tr>
<td>Filter Backwash</td>
<td>100,000</td>
</tr>
<tr>
<td>Mo’o’o Ranch</td>
<td>0</td>
</tr>
<tr>
<td>System loss</td>
<td>0</td>
</tr>
<tr>
<td><strong>Keluako’i Total</strong></td>
<td><strong>848,000</strong></td>
</tr>
<tr>
<td>MIS System Use Charge</td>
<td>94,000</td>
</tr>
<tr>
<td>Kualapuu Town</td>
<td>76,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,018,000</strong></td>
</tr>
</tbody>
</table>

In this paper “current use” is defined as the average daily use over a one-year period. Current use of the MPU system, with the Kaluakoi Hotel closed is approximately 800,000 GPD.

At the time the Kaluakoi System was acquired by MPL in December 2001 it had been out of full compliance with Department of Health Drinking Water Standards since 1993. Those standards, which went into effect nation-wide, required drinking water systems using surface water or systems using groundwater under the influence of surface water to meet higher water quality standards to provide a greater margin of safety to their customers.
That non-compliance led to a Consent Order that MPL inherited from the previous owners of Kaluakoi. At the time of acquisition, the compliance deadline was extended to September 15, 2004. A one-year extension was subsequently requested and approved. MPL could have satisfied the Consent order by either using a dedicated pipeline from Well 17 (an alternative that was abandoned) or by installing new treatment facilities that could meet the current standards. New filtration equipment was installed and became operational on September 14, 2005.

Essentially, MPU starts with clean, compliant water as it leaves Well 17. However, use of the Molokai Irrigation System (MIS) to convey this water to the west end mixes in surface water creating the need for treatment to again make it safe for drinking water purposes.

III. Existing System Losses

Much has been said about MPU’s system losses and we acknowledge that the system we inherited had losses of approximately 200,000 gallons per day.

Prior to the upgrade, the largest water loss was the approximate 100,000 gallons per day consumed in backwashing the sand filters at Puu Okoli that were part of the system MPL inherited. The old Ag lines and the open reservoir between Mahana and the entrance to Kaluakoi were also historically large water wasters. Completion of the system upgrade allowed 17,500 lineal feet of this old pipeline to be removed from service.

All systems have some level of loss. Most systems aim for losses of about 10%--a reasonable target for the Kaluakoi System at build-out.

IV. Waiola O Molokai, Inc. Systems

Waiola is the Public Utilities Commission regulated entity that supplies drinking water to the remaining communities on Molokai Ranch land.

The Ranch has been in the water business for more than 100 years. Its role in this area expanded significantly when it inherited the drinking water systems for Maunaloa and Kualapuu when their lessees abandoned those plantation towns.

Waiola also supplies water to Kalae/Kipu and the Molokai Industrial Park/Manawainui areas. Prior to 1993, all of this water was supplied from the Ranch’s surface water system. With the imposition of more stringent standards, these systems shifted from surface water to purchased well water.
The Kipu/Kalae system (approximately 20,000 gallons per day) is supplied with well water purchased from the Department of Hawaiian Homelands (DHHL).

The Kualapuu system (76,000 gallons per day as noted above) is supplied from Well 17 via a bulk water purchase agreement with MPU.

Initially, Maunaloa and the Industrial Park were supplied with water purchased from the County Board of Water Supply, from its well in Kualapuu. When that agreement came to an end in May 1998, MRL built a new treatment facility that meets the new standards.

V. Molokai Ranch Mountain (AG) system

The initial water system of the Ranch is more 100 years old and moves surface water approximately 20 miles from the central mountains of Molokai to the far corners of MPL’s holdings through a combination of six and eight inch pipelines. Currently, the surface water system has 3 primary uses:
1.) Feed water for the Puu Nana water treatment plant that provides potable water for Maunaloa and the Industrial Park;
2) Irrigation water for landscaping of Maunaloa Village, the Lodge and Kaupoa camp;
3) Water for the Ranch’s livestock operations.

The system has an average yield of approximately 500,000 gallons per day, but as with all surface water systems, its yield is highly weather dependent. Seasonal flows of 1,300,000 gallons per day can be achieved during winter storms, while summer drought lows of 65,000 gallons per day have occurred.

In many ways the Ranch’s surface water system is like its much larger counterpart on Molokai, the MIS, which is also a surface water system.

While numbers vary, one estimate of the average yield of the MIS is 3,500,000 GPD making it about seven times larger than the ranch system in terms of yield. In terms of storage, the Ranch’s 44,000,000 gallons of storage pales in comparison to the MIS’s 1.4 billion gallons which is more than 30 times greater.

Both are highly dependent on the weather and rely heavily on winter rains to sustain demand during the drier summer months. One area of difference between the two systems is the MIS’s ability to pump high-level ground water to supplement gravity surface water flows while the Ranch system relies totally on surface water delivered by gravity.

Surface water is the basis for our agricultural industry on Molokai as it is much cheaper to deliver to customers.
The typical energy costs for MPU to raise water 1,000 feet to the surface (the elevation of the Kualapuu Wells) is $1.00 per 1,000 gallons. Without high energy costs, water from Molokai’s existing surface water systems can be kept affordable which is a critical factor to the future of farming on Molokai.

Inexpensive water is the key to expanding agriculture on Molokai and Molokai Ranch supports this wholeheartedly.

VI. MPL and the MIS

Since the first days of the Kaluakoi development, transmission of Well 17 water to the Resort utilized the MIS distribution system and the old Libby, McNeill & Libby irrigation pumps, pipelines, and reservoirs. These pipelines are 24 inch from the MIS reservoir to beyond the Kaluakoi reservoir at Puu Nana.

Currently MPU leases MIS transmission capacity for $135,000 per year. Based on current usage, that is equivalent to about 51 cents per 1,000 gallons for the right to use a portion of the excess capacity of the existing infrastructure. Other users pay 31.5c per 1000 gallons, plus an acreage assessment. To our knowledge, the Ranch is the largest financial contributor to the system.

In addition MPU "pays" the MIS "a systems loss” equal to 10% of the water it transmits.

MPL does not use MIS water. It puts in 1,111,111 gallons of water for every 1,000,000 gallons it takes out at its Mahana pump station. Over the course of a year, this additional input amounts to about 30,000,000 gallons.

When we acquired the assets of Kukui (Molokai), Inc. and MPU in December 2001, Kukui had a pumping deficit of 30,000,000 gallons. We made up this deficit by mid February 2002.

Since then, we have been in arrears only once, between April 5 to August 19, 2004. It was the result of the change-out of the old Detroit diesel engine with a new Caterpillar four-stroke diesel that is expected to be a more reliable power unit to drive the Well 17 pump. In hindsight, we should have built up greater reserves prior to taking the Well 17 motor out of commission.

This breakdown has, quite rightly, raised concern from homesteaders that a future breakdown could lead to a similar occurrence.

MPL proposes that it advances the MIS system 100 million gallons and retains that surplus in the system at all times. That amount of water would equate to about 4 feet of depth out of the 52 feet of usable storage capacity.
In the event of any future breakdown at Well 17, this surplus would more than cover any conceivable repair time.

MPL also proposes that preference farmers are able to use this surplus in the event of a drought emergency.

VII. Water Needs Going Forward

We have stated that MPL **DOES NOT** need any more drinking water than currently allocated for the proposed Master Use Plan.

Under this Plan, MPL will abandon the Waiola Well application.

If this Plan is approved, MPL will sign covenants preventing it from ever seeking further water permits from the Water Commission.

This Master Use Plan is proposing:

(a) Potable Water:

MPL retains its 1.5 million gallons per day of water currently allocated:

- 1,018,000 GPD from Well 17
- 500,000 GPD from the Mountain System.

(b) Non-Potable Water

It is proposing to develop 1,000,000 GPD from the abandoned Kakalahale brackish water well in the Kamiloloa aquifer sector for future non-potable needs.

By gradually moving current non-potable uses such as the golf course, irrigation of the hotel, condos and large lots to non-potable water, we believe our existing 1.5 GPD potable allocation from a combination of Well 17 and the mountain system will meet all of our long-term potable demand.

Non-potable needs can be supplied by a combination of use of our existing mountain system and the unused Kakalahale Well.

We have proposed that the remaining 1,000,000 GPD be drawn from the Kakalahale brackish water well. This well which was built by Kaluakoi Corporation in 1969, has been pump tested and demonstrated capable of providing 1,000,000 GPD of good quality brackish water (chlorides at 500 ppm, or twice the drinking water standards).
Our advice is that drawing water from the Kakalahale well will have no impact on the yield of the Kualapuu aquifer.

While concerns have been raised about its use by the MIS or on DHHL lands, we believe it is a good source for west end irrigation needs.

We WILL NOT propose transmission of the Kakalahale brackish water to the West End by the MIS system.

We are currently investigating transmission alternatives.

Why is this Plan so different from previous West End water proposals?

Previously three separate large land owners, Molokai Ranch, Alpha USA and Kukui (Molokai) Inc all had or were developing massive comprehensive development plans that would have required as much as a total of 20,000,000 gallons of water per day to support.

Because our proposed Master Plan limits development, proposed water use is subsequently dramatically reduced as the table below shows.

VIII. Laau Point Water Use

The proposed Laau Point project, like the Papohaku Ranchlands subdivision, is expected to comprise second and third homes whose owners spend a limited amount of time on island. At Papohaku, 60% of those who have built houses are not permanent residents.

Also like Papohaku, we would expect actual dwelling construction to lag lot sales by several years. To date, about 20% of lots in Kaluakoi have been built on. After more than twenty years, the build-out rate is less than one percent per year as an average. We believe a combination of low occupancy, water conservation education, xeriscaping and tiered water rates will moderate water consumption by these homeowners.

While we expect home construction to be slow, water demands during the construction period are expected to be in the order of 50,000-150,000 gallons per day. Initial erosion protection and control measures would likely require an additional 50,000-100,000 gallons per day as well. The construction phase is projected to be 2 years. The initial erosion control phase would be expected to continue well after construction ranging from 5 to 10 years.
The public park(s) would require potable water and non-potable water for irrigation concurrent with the completion of site construction.

We anticipate it would be several years into the sales of the project before wastewater recycling would be a significant contribution to the supply of irrigation water for landscaping features, erosion etc. In the interim, non-potable water not required for unbuilt house lots would support these uses.

In summary, we would expect that water use for the project would start out as a significant percentage of total demand then drop after completion of construction and then slowly rise again as home construction proceeded.
IX. Water Usage Under Proposed Master Plan

(In Gallons Per Day)

### CURRENT WATER USE

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Potable</th>
<th>Potable Irrigation</th>
<th>Non-Potable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaluakoi Hotel &amp; Golf Course</td>
<td>2,000</td>
<td>405,120</td>
<td></td>
</tr>
<tr>
<td>Kaluakoi Condos</td>
<td>116,250</td>
<td>70,880</td>
<td></td>
</tr>
<tr>
<td>Kaluakoi Residential</td>
<td>70,500</td>
<td>143,825</td>
<td></td>
</tr>
<tr>
<td>Maunaola/Industrial Park</td>
<td>136,370</td>
<td>25,480</td>
<td></td>
</tr>
<tr>
<td>Ranch Operations/ Misc.</td>
<td>41,500</td>
<td>150,000</td>
<td></td>
</tr>
<tr>
<td>Kualapuu</td>
<td>76,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>442,620</td>
<td>619,825</td>
<td>175,480</td>
</tr>
<tr>
<td><strong>TOTAL POTABLE</strong></td>
<td></td>
<td></td>
<td>1,062,445</td>
</tr>
<tr>
<td>Total Potable &amp; Non-Potable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Categories</td>
<td></td>
<td></td>
<td>1,237,925</td>
</tr>
</tbody>
</table>

### FULLY DEVELOPED WATER USE

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Potable</th>
<th>Non-Potable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current and Future Changes (within 50 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaluakoi Hotel &amp; Golf Course</td>
<td>33,400</td>
<td>273,240</td>
</tr>
<tr>
<td>Golf Course Wastewater Reuse</td>
<td></td>
<td>-100,000</td>
</tr>
<tr>
<td>Kaluakoi Condos</td>
<td>116,250</td>
<td>70,880</td>
</tr>
<tr>
<td>Kaluakoi Residential</td>
<td>228,500</td>
<td>633,825</td>
</tr>
<tr>
<td>Maunaola/Industrial Park</td>
<td>296,870</td>
<td>25,480</td>
</tr>
<tr>
<td>Ranch Operations/Misc.</td>
<td>41,500</td>
<td>150,000</td>
</tr>
<tr>
<td>Laau Point Lots</td>
<td>96,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Laau Point Parks</td>
<td>1,000</td>
<td>40,000</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>889,250</td>
<td>1,393,425</td>
</tr>
<tr>
<td>Long term growth &gt; than 50 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community directed growth in Kualapuu and Maunaola</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>1,089,520</td>
<td>1,393,425</td>
</tr>
<tr>
<td><strong>TOTAL ALL USES</strong></td>
<td></td>
<td>2,482,945</td>
</tr>
</tbody>
</table>

We have stated that our projected West End water use will not exceed our existing permits plus 1.0 MGD of brackish water from the Kakalahale Well. Current use is grouped into 3 types of water; potable, potable irrigation, and non-potable. Currently 619,825 GPD of irrigation demand is met with potable water.

This use will be shifted to non-potable sources over time, freeing up this water for new potable uses. Renovation of the golf course (130 acres of turf down to 80 acres of turf) will reduce water consumption and reopening of the Hotel and higher condo occupancies will provide more wastewater. This is reflected in the much-reduced demand for golf course and hotel irrigation.

The La’au potable allocation is based on 600 GPD for 200 lots at 80% occupancy. The non-potable water is based on 1,500 GDP for 200 lots.
X. The Role of Water Conservation

At the time of the Kaluakoi acquisition, we understood that water conservation would play an important role in managing the West End’s water usage.

The Water Commission reinforced that understanding in its water use permit for Well 17 that was issued after we took title to the Kaluakoi assets.

The Commission required MPU to report on its progress in controlling water waste, to conduct an educational campaign on water conservation with its customers, and to investigate a non-potable source for the golf course to allow potable water being used for non-potable uses to be available for other potable purposes.

We immediately identified and corrected several long-term water waste issues. We conducted a water conservation campaign over 12 months. However the most important action undertaken to date has been to restructure MPU’s water rates to properly reflect the true cost of providing this service and to implement tiered water conservation rates that provide a financial incentive to customers to conserve water.

We approached our rate structure by using the Water Commission allocation amounts by user type as the base rate. All water use above that amount would be billed at a much higher “conservation rate”. We proposed that the base rate be $3.18 per 1000 gallons and the conservation rate be twice as much or $6.36 per thousand gallons.

As an example, the Water Commission used 560 gallons per unit for the Condos plus 2,000 gallons per day per acre for irrigation. A 50-unit condo on a 4-acre site would have 36,000 gallons per day in its base rate (560 gallons X 40 units plus 2,000 gallons X 4 acres for irrigation). Any water used above this amount would be sold at the higher conservation rate.

As the permit allocation amount was 1,000 gallons per day for all residential uses (even though the existing usage in the Papohaku Ranchlands was noted in the permit to be 5,308 gallons per day per residence), we proposed that the conservation rate begin at 1,000 gallons per day for residential customers.

Because of a concern the Consumer Advocate termed “rate shock”, we agreed to reduce the conservation rate to $4.70 per 1,000 gallons and phase-in the conservation rate for residential customers. For residential customers the conservation rate applies to all water used in excess of 5,000 gallons per day.
However the Consumer Advocate and the Public Utilities Commission agreed that we could telegraph that our next rate increase – then anticipated to be two to three years away-- would likely see the conservation rate take effect for all residential water use in excess of 1,000 gallons per day.

For the most part Kaluakoi residents have adjusted their water use. Consumption has dropped by 45% in the Ranchlands and the condos have shown reduced water consumption as well since the rate hike in September 2003. The most notable change is that customers now respond to rainfall and shut off their irrigation systems. Previously we saw very little reduction in water use after a good rain. Now a passing shower will cause water consumption to drop dramatically.

XI. Contingency Planning

We have stated that the 2.5 million gallons of water per day is the maximum this community-based Master Plan will require; 1.0 million gallons of existing drinking water from Well 17, and 0.5 MGD from the Mountain System, and one million gallons of brackish water from the Kakalahale Well.

The question has been posed; what if the Plan needs more water? What if there is increased demand for agriculture, particularly on MPL lands designated for agriculture, or on lands to be donated to the land trust.

MPL will never go back to the community and seek more drinking water.

If more non-potable water is needed for agriculture in particular, we still have two options:

- The brackish water available to MPL from the Prawn Farm at Palaaau, which is currently permitted for 864,000 gallons per day of which 500,000 gallons per day could be available for reuse.
- Desalination.

The Prawn Farm water is very brackish; 1300 parts per million as chlorides (drinking water must have no more than 250 parts per million), and it would three times as expensive to remove the salts to bring it to an acceptable level for use as agricultural water as obtaining water from the Kakalahale Well.

But it is an option for the future and particularly for non-potable uses.
Currently, desalting is still about 4 times more expensive on Molokai than developing an operating deep groundwater well. While it is not a viable economic alternative today, this technology continues to improve and its costs are declining as a result.

As this technology continues to improve, the cost of producing water will come down. As our conservation rates go up, at some point the two lines will cross, and we will find the balance between demand and supply. We have talked about the ability to have multiple rate blocks for both potable and non-potable water.

Structured properly, these rates would, in effect, subsidize prudent or thrifty water users and penalize excessive water use. At the higher rate blocks, the cost of desalination can be recovered. Because of this, there would be no pressure to pursue additional groundwater or surface water sources from the central or east end of the island.

XII. Water and Hawaiian Rights

Every water use permit issued by the Water Commission contains a provision that the allocation will be reduced if it interferes with the rights of the Department of Hawaiian Homelands.

The water code states that each County’s Water Use and Development Plan, and the State’s Water Project Plan, “shall incorporate the current and foreseeable needs of DHHL”.

Hawaii revised statutes provides that the Hawaiian Homes Commission and its lessees have a prior right to 2/3 of the water in the MIS. Supreme Court rulings have affirmed that the priority uses of water include Native Hawaiian and traditional and customary rights.

For Molokai Properties Limited, the issue of Hawaiian Water Rights is very clear; our existing allocations are subject to reduction if they interfere with DHHL’s rights to water in the future and due consideration must be given to DHHL’s projected needs with any proposed new allocations.

Essentially we have proposed in our Master Plan to forever limit our withdrawals of potable groundwater to that which has already been permitted and seek only one million gallons per day of non-potable water from the existing proven brackish Kakalahale well in the Kamiloloa aquifer sector.
In essence, we are requesting 2 million gallons of groundwater out of the estimated developable 33.5 million gallon estimated sustainable yield of the island (about 6%), in the knowledge that it could be reduced in the future if necessary for DHHL’s needs to be met. As we see it, it’s a matter of law.

So we believe that if DHHL used every reasonable effort to develop its 2.905 MGD allocation in Kualapuu and wasn’t successful, the Water Commission would then be obligated to reduce our allocation as necessary so that DHHL would get the full benefit of their allocation at the time it was needed.

We do not believe that scenario will eventuate because:

1) We believe the work done by the USGS supports that the estimates of water availability will be realized.
2) There is a strong consensus on island to limit development that will limit total water demand.
3) Large quantities of groundwater for agriculture will be cost prohibitive.
REPORT OF THE MOLOKAI WATER WORKING GROUP

Revised April 1996

Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii

Originally Presented July 1993

APPENDIX B
July 31, 1996

Michael Wilson, Chairman, and Members of the Commission on Water Resource Management Department of Land & natural Resources Kalanikomoa Building 1151 Punchbowl Street Honolulu, Hawaii 96813

Dear Commissioners:

We are pleased to convey to you the results of the second round of discussions by the Molokai Working Group which was initiated by you in November, 1995 and which concluded its meetings on April 30, 1996.

As you recall, the group reconvened for the express purpose of revisiting and updating the initial report issued in July, 1993. The group was expanded to include additional representation from community, development, agricultural and homestead interests. The report does not make wholesale changes to the work of the original Molokai Working Group. Instead, you will find certain additions, modifications and deletions that, in the eyes of the group, improve the substance and clarity of the report’s intent.

Once again, we applaud the efforts of the group’s members who spent many hours in tough conversations searching for the highest levels of consensus possible. Where they have achieved such consensus, we hope it will prove useful to the Commission. Finally, we want to express our personal thanks to all those who entered these lengthy discussions in the spirit of good will and collaborative problem solving.

Sincerely yours,

Peter Adler

Stanley Lum
MOLOKAI WORKING GROUP

MEMBERSHIP

1993  1996

JUDY CAPARIDA
Mana'e Resident

JUDY CAPARIDA
Mana'e Resident

WARREN HAIT
West End Landowners

DUNCAN ANNAN
Moloka'i Ranch

BEN HENDERSON
Dept. Hawaiian Home Lands

KEONI AGARD
Dept. Hawaiian Home Lands

ALAN HOLT
The Nature Conservancy

ED MISAKI
The Nature Conservancy

LARRY JEFTS
Commercial Farmer

TOM DECOURY
Commercial Farmer

BOB JOHNSON
Maui County Administration

WILL SPENCE
Maui County Administration

NOELANI JOY
Hawaiian Homesteader

NOELANI JOY
Hawaiian Homesteader

PAT KAWANO
Maui County Council

PAT KAWANO
Maui County Council

COLETTE MACHADO
Mana'e Resident

COLETTE MACHADO
Mana'e Resident

WAYNE MEYER
Mana'e Resident

WAYNE MEYER
Mana'e Resident

WILLIAM PFEIL
Commercial Farmer

WILLIAM PFEIL
Commercial Farmer

WALTER RAGSDALE
Moloka'i Planning Commission

WREN WESCOATT
Moloka'i Planning Commission

DEGRAY VANDERBILT
Kaunakakai Resident

DEGRAY VANDERBILT
Kaunakakai Resident

RON HEDANI
Kukui (Moloka'i), Inc.

ELLEN KRAFTSOW
Maui Dept. of Water Supply

GLENN TEVES
Hawaiian Homesteader

STAFF
CHARLEY ICE

ERIC HIRANO
CONTENTS

I. INTRODUCTION
   A. Introduction to Revisions, 1996 1
   B. Introduction to Original, 1993 1

II. FINDINGS 4

III. GENERAL RECOMMENDATIONS 4

IV. RECOMMENDATIONS BY SECTORS 7
   A. Northeast Sector 7
   B. Central Sector 7
   C. Southeast Sector 8
   D. West Sector 8

List of Exhibits

Exhibit

1. Estimated Developable Yields by Aquifer Sectors/Systems
2. Breakdown of Existing Groundwater Usage in MGD
3. Breakdown of Existing Surface Water Usage in MGD
4. Breakdown of 2010 Potable Water Use Projections in MGD
5. Non-Potable Water Use Projections in MGD (5 to 10 years and 2010 to Build Out)

Glossary and Acronyms

APPENDICES
Appendix A - Molokai Working Group "Contract"
Molokai Working Group

I. INTRODUCTION
The report that follows was originally presented in July 1993, following about six months of explorations and deliberations. It was revisited in late 1995 and revised in April 1996.

INTRODUCTION TO THE 1996 REVISED REPORT
This report by the second Moloka'i Water Working Group supercedes the first report done by the original Moloka'i Working Group in July 1993.

The second group was convened by CWRM Chairperson Michael Wilson in late 1995 for the express purpose of revisiting and updating the initial report issued in July 1993. The group was expanded to include additional representation from community, development, agricultural, and homestead interests (see Membership page). The group met seven times, heard presentations from experts, engaged in discussions and deliberations, and then reviewed the previous report with an eye towards updating and revising certain portions of it.

All changes to the original report are indicated in italics and only "consensus changes" have been included. We also note that most of the changes were developed at the group's last two meetings and, based on instructions by the group, were then written out by the facilitators and staff, circulated back to members to insure accuracy, and only then included in this report.

The result follows. The second Moloka'i Water Working Group did not make wholesale changes to the work of the original Working Group. Instead, Commissioners and other readers will find certain additions, modification, and deletions that, in the eyes of the group, improve the substance and clarity of the report's intent, and that can give general and sector-by-sector guidance to decision-makers.

The Moloka'i Water Working Group again gratefully acknowledges the assistance of many people who provided helpful time and information, including attorneys Doug McDougall and Alan Murakami and hydrologist Bill Meyer, for their good work on behalf of current and future generations of Moloka'i.

ORIGINAL INTRODUCTION
This report details the final findings and recommendations of the Molokai Working Group, a group appointed in October, 1992 by Mr. William Paty, recently retired Chairperson of the Commission on Water Resource Management (Commission). In his opening comments to the Molokai Working Group, Mr. Paty explained the group's purpose as follows:

• To recommend to the Commission a plan for water development on Molokai that assists the County and Community in developing its Water Use and Development Plan; and

• To test a community "working group" model that, if it works, could be used elsewhere in the State when communities are faced with tough water issues.

More specifically, Mr. Paty asked the Working Group to enter into good faith deliberations aimed at producing the highest consensus possible on demand forecasts, bulk water allocations, recommendations...
Molokai Working Group

to manage both supply and demand, and the best plans the Working Group might offer on balancing future water uses. Between November, 1992 and June, 1993, the group met ten times at various locations on the Island of Molokai. All meetings were open to the public and most were attended by one or more interested Molokaian.

To facilitate its own process, the Working Group developed and adopted a unique set of ground rules governing participation, attendance, and meeting courtesies (see Appendix A). Of particular importance was the group’s initial agreement to operate by full consensus rather than through voting. The Working Group agreed that full consensus meant that any single individual could veto an item from going forward. This report, therefore, is forwarded to the Water Commission with the consensus of the entire Working Group.

It is hoped that the Commission on Water Resource Management will find this report helpful in identifying policy areas which should be addressed and which, if properly articulated, can aid greatly in shaping decisions bearing on water usage in the future.

Users of this report should keep four factors in mind when reading this report. First, the Molokai Working Group acknowledges that the data currently available provides an incomplete understanding of Molokai's water resources. Therefore, the group has taken a conservative approach, by generally accepting without revising water use projections submitted to the group.

Second, the report does not attempt to deal with every water issue being faced by the people of Molokai. Time and resource constraints, not to mention data constraints, required that the group focus only on those various supply and demand issues that seem most immediate and important at a policy level. Some of these issues must be reserved for when more complete information is available.

Third, the Working Group has not sought to suggest detailed allocations for the future. The hard work of choosing among different proposed users remains with the Commission. Nonetheless, the Working Group has sought to address the questions of what "principles" ought to have higher and lower priority in the balancing work that the Commission must inevitably do and these are reflected in the recommendations. The group has limited itself to the next 10-20 years as a "planning window" but tried also to provide fundamental guidelines about water use that can guide decisions for the future.

Fourth, the Working Group contained in its membership a reasonable cross-section of some of Molokai's various interest groups, however, many important voices did not, because of time and resource pressures, have an opportunity to participate in the Working Group's discussions. It is important, therefore, that all of Molokai's people be encouraged to share their views on the matters discussed in this report.

In responding to Mr. Paty's directive and submitting this report, the Working Group also wishes to acknowledge the need -- and express its desire -- to continue working together to help analyze and resolve four remaining "tough" issues. These are (1) groundwater and wellhead protection for Molokai; (2) Hawaiian and DHHL rights to water; (3) streamflow protection and possible restoration; and (4) Kualapuu wellfield protection. Until these issues are resolved, the Working Group's work remains meaningful and necessary and we hope the Commission will make every effort to enable the Working Group's continuing discussions.
Molokai Working Group

It is also recommended that the Commission will convey to the Maui County Council, Maui County Administration, including the Board of Water Supply of the County, the State Department of Agriculture, and the State Department of Hawaiian Home Lands the concerns, findings, and recommendations contained herein.

The Molokai Working Group gratefully acknowledges the assistance of William Paty, Rae Loui, Ben Kudo, and Paul Matsuo who provided critical information and perspective at various points during the Working Group's meetings. Finally, the Group thanks the Commission for the opportunity to provide its views and encourages the Commission to continue such efforts on Molokai and on all of the other islands as well.
II. FINDINGS

A. Agriculture will continue to be the economic and cultural "heart" of Molokai.

B. Sustainable yield of the Kualapu’u Aquifer appears to have been fully allocated in 1996. The areas of greatest present & future conflict have to do with agricultural and recreational uses of water.

C. While DLNR/DoWaLD Bulletin B16 (1966) estimated that the island’s sustainable yield was 83 mgd, the 1993 Working Group agreed to work with a developable yield of 39 mgd for planning purposes (see Exhibit 1). In 1996, the Water Working Group has agreed to use an estimate of 41.5 mgd for planning purposes, which differs from the earlier figure as follows:

1. It includes 4.5 mgd already developed in the Waikolu System of the Northeast Sector;
2. It reduces the original estimate of 7 mgd in the Kualapu’u Aquifer System to 5 mgd.

It should be noted that, of the 41.5 mgd, at least 8 mgd is brackish, leaving only 33.5 mgd developable sweet water.

D. The group has worked to gather estimates of existing uses, future demands, and supply and finds the following: (see Exhibits 2 - 5)

1. 1996 groundwater permitted usage is 8.59 MGD;
2. 1996 surface water reported usage is 2.96 MGD;
3. The Department of Hawaiian Home Lands has a groundwater reservation of 2.905 MGD from the Kualapu’u Aquifer System;
4. 1993 projected potable water use for 2010 is estimated at 11.55 MGD;
5. 1993 projected non-potable water use for 5-10 years is estimated at 20.52 MGD;
6. 1993 projected non-potable water use from 2010 to "build out" is estimated at 42.90 MGD.

III. GENERAL RECOMMENDATIONS

A. The working group recommends that the Commission initiate and coordinate water resource studies to improve everyone’s understanding of the available resources.
The working group recommends that all large-scale water planning/water management should consider that agriculture will continue to be the economic and cultural "heart" of Molokai.

The working group recommends that DHHL's water needs, which are currently tied to lands at Hoolehua and Kalamaula through 2010, be reserved first.

The working group recommends that due to limited information, the capacity of the aquifers should be treated conservatively and protected until more precise determinations can be made.

The working group recommends that priorities for water use should follow the lead of community development as determined by the intent of the Community Plan and DHHL development plans in force at the time the Commission makes its decision.

The working group recommends that the Water Use and Development Plan follow these guidelines:

1. **For planning and management:**
   a) all wells and stream intakes should have meters, gages, or other measuring devices; withdrawals greater than 10,000 gpd should be reported monthly, including drawdown and salinity in wells, with instruments subject to periodic checks by CWRM staff; withdrawals up to 10,000 gpd should be recorded monthly and submitted annually, subject to periodic checks by CWRM staff.
   b) Water Use Permit Applications should include not only TMK, present designations and zoning, proposed use, and consumption standard; they should also include available historical consumption data.

2. Use a projected resident population that complies with the Community Plan as a guideline for planning county policies and services (1990 - Resident population, 6,700 ± Visitor population, 800 ± 2)

3. Retain Kaunakakai Town as the population center of the island;

4. Limit the visitor accommodation center to Kalaupōi;

5. Maintain agriculture as the primary economic activity;

6. Develop a comprehensive water system for agricultural use;

---

2. from West Maui Regional Capacity Study Project, October 1, 1992.
6. Develop a comprehensive water system for agricultural use;
7. Improve current water quality, distribution system, and develop new water sources for Molokai Community Plan areas;
8. Incorporate a section on supply- and demand-side management, including water conservation incentives and public awareness programs; and
9. Incorporate a program to maximize watershed quality, including the initiation of Maunaloa Mountain’s reforestation.

G. The working group recommends that ground water must be reserved first to fulfill domestic, and public health, safety, and welfare needs.

H. The working group recommends priority use of non-potable water should be for demonstrable and reasonable-beneficial agricultural usage which includes subsistence farming and public facility needs.

I. The working group recommends use of any water for golf courses should be lowest priority.

J. The working group recommends that an intensive study be implemented to capture surface overflow during heavy rains from intermittent streams (Kamalo, Kawela, Kalae, Kaunakakai, Manawainui) for surface water use, increasing recharge of the associated aquifer, and decreasing siltation of Molokai’s reefs.

K. The working group recommends that all additional water supply should first be sought in the Sector for which it shall be used.

L. The working group recommends that all the water rights of DHHL homesteaders as provided under the Hawaiian Homes Commission Act, State Water Code, and other laws must be recognized and preserved by the State of Hawaii and the Counties of Maui and Kalawao. Other rights which may exist pertaining to Hawaiians not residing on DHHL lands must also be honored.

M. The working group recommends that principles of supply and demand management be followed to the greatest extent allowed by law.

N. The working group recommends that new water supplies should be sought first through conservation management tools such as water pricing (inverted rate structure, etc.).
The working group recommends that Molokai should have a core of undisturbed watersheds.

The working group recommends that local advice on water resource issues be through a permanent entity similar in form and representation to the present Molokai Working Group.

The Water Working Group recommends that the 1995 version of the Final Report be revisited every two years, and at these times to include meetings or briefings with the State Water Commission, County Council, Mayor, and Board of Water Supply to discuss the group’s updated report.

IV. RECOMMENDATIONS BY SECTORS

A. NORTHEAST SECTOR

1. The development of new water resources from the undeveloped portions of the Northeast Sector should be held in reserve.

2. Existing uses (NPS, DOA, DHHL, DOH, etc.) should continue if they are consistent with the State Water Code.

3. Utilization of existing MIS capacity should be done cautiously with current monitoring. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems.

B. CENTRAL SECTOR

1. Bulk groundwater allocations should generally coincide with "2010 Potable Water Use Projections" subject to on-going studies of the aquifer's capacity (see Exhibit 4).

2. Limit groundwater withdrawal in the Kualapuu Aquifer System to 5.0 mgd. 0.57 mgd (5.0 mgd limit minus 4.43 mgd 2010 Water Projections) may be used to satisfy other correlative uses unless subsequent information changes this.

3. Groundwater withdrawal from the Kualapuu Aquifer System over the 5.0 mgd limit set in 2 above, may be exceeded by a maximum of 2.0 mgd only if DHHL requires additional resources and water quality is not threatened.

4. The Manawainui Aquifer System should be renamed to Palaau Aquifer System.
C. SOUTHEAST SECTOR

1. *Limit groundwater withdrawal to 33% of its developable yield* subject to verification of existing users and water use permits.

2. Any withdrawals from this Sector should not diminish water supplies and supply availability for traditional uses, including taro patches and fishponds. *Baseline water requirements for these uses needs to be determined.*

3. Development of additional water from the Southeast Sector should be *allocated* first to existing residences of this Sector that are not yet served.

D. WEST SECTOR

1. Encourage and promote reforestation on Maunaloa’s Mountains for the purpose of long range water resource enhancement.
**BREAKDOWN OF EXISTING GROUNDWATER USAGE IN MGD**

*These figures represent information available to but not confirmed nor substantiated by the Group in 1993; current information should be sought from the CWRM.*

**CENTRAL SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>Client/Usage</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manawaiui</td>
<td>Hawaiian Research</td>
<td>0.56</td>
</tr>
<tr>
<td>Kualapuu</td>
<td>1. County DWS</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>2. DHHL</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>3. Kaluakoi Resort</td>
<td>0.82</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td><strong>1.79</strong></td>
</tr>
</tbody>
</table>

**NORTHEAST SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>Client/Usage</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kahanui</td>
<td>National Park Service</td>
<td>0.22</td>
</tr>
<tr>
<td>Waikolu</td>
<td>1. DOA MIS</td>
<td>1.13</td>
</tr>
</tbody>
</table>

**SOUTHEAST SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>Client/Usage</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamiloloa</td>
<td>Hawaiian Research</td>
<td>0.26</td>
</tr>
<tr>
<td>Kawela</td>
<td>1. County DWS</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>2. Kawela Plantation</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>3. Kamalo Ranch</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td><strong>0.52</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>Client/Usage</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulapue</td>
<td>1. County DWS</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>2. Kamalo Ranch</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>3. Place, M. J.</td>
<td>0.22</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td><strong>0.62</strong></td>
</tr>
</tbody>
</table>

**WEST SECTOR**

| Usage (MGD)    | 0.00                        |

**TOTAL**

| Usage (MGD)    | 5.10                        |
BREAKDOWN OF EXISTING SURFACE WATER USAGE IN MGD

*These figures represent information available to but not confirmed nor substantiated by the Group in 1993; current information should be sought from the CWRM.*

**CENTRAL SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>User</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kualapuu</td>
<td>County DWS</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Molokai Ranch</td>
<td>0.07</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td><strong>0.10</strong></td>
</tr>
</tbody>
</table>

**NORTHEAST SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>User</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waikolu</td>
<td>Molokai Ranch</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>DOA MIS</td>
<td>2.71</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td><strong>2.75</strong></td>
</tr>
</tbody>
</table>

**Halawa System**

<table>
<thead>
<tr>
<th>User</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>County DWS</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**SOUTHEAST SECTOR**

<table>
<thead>
<tr>
<th>System</th>
<th>User</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamiloloa</td>
<td>Molokai Ranch</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**Kawela System**

<table>
<thead>
<tr>
<th>User</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molokai Ranch</td>
<td><strong>0.08</strong></td>
</tr>
</tbody>
</table>

**WEST SECTOR**

<table>
<thead>
<tr>
<th>Total</th>
<th>Usage (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>2.96</strong></td>
</tr>
</tbody>
</table>

*EXHIBIT 3*
Molokai Water Working Group, 1996

BREAKDOWN OF 2010 POTABLE WATER USE PROJECTIONS IN MGD*

Estimates were furnished by users and were accepted by working group without challenge. These figures are estimates and projections made in 1993, based on information available at that time.

<table>
<thead>
<tr>
<th>CENTRAL SECTOR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manawainui System</td>
<td></td>
</tr>
<tr>
<td>1. Hawaiian Research</td>
<td>0.56</td>
</tr>
<tr>
<td>Kualapuu System</td>
<td></td>
</tr>
<tr>
<td>1. County DWS</td>
<td>0.94</td>
</tr>
<tr>
<td>2. DHIL</td>
<td>0.84</td>
</tr>
<tr>
<td>3. Kaluakoi Resort</td>
<td>2.14</td>
</tr>
<tr>
<td>4. Other State Projects</td>
<td>0.11</td>
</tr>
<tr>
<td>5. Palanau Industrial Park</td>
<td>0.20</td>
</tr>
<tr>
<td>6. Others (Kualapuu, Kalae, Kipu)</td>
<td>0.20</td>
</tr>
<tr>
<td>Subtotal</td>
<td>4.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NORTHEAST SECTOR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kahanui System</td>
<td></td>
</tr>
<tr>
<td>1. National Park Service</td>
<td>0.22</td>
</tr>
<tr>
<td>Waikolu System</td>
<td></td>
</tr>
<tr>
<td>1. DOA MIS</td>
<td>2.70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOUTHEAST SECTOR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamiloa System</td>
<td></td>
</tr>
<tr>
<td>1. Hawaiian Research</td>
<td>0.26</td>
</tr>
<tr>
<td>Kawela System</td>
<td></td>
</tr>
<tr>
<td>1. County DWS</td>
<td>0.32</td>
</tr>
<tr>
<td>2. Kawela Plantation</td>
<td>0.40</td>
</tr>
<tr>
<td>3. Kamalo Ranch</td>
<td>0.04</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.76</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ulapue System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. County DWS</td>
<td>0.18</td>
</tr>
<tr>
<td>2. Kamalo Ranch</td>
<td>0.22</td>
</tr>
<tr>
<td>3. Place, M. J.</td>
<td>0.22</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.62</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEST SECTOR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha USA</td>
<td>2.01</td>
</tr>
</tbody>
</table>

TOTAL | 11.55 |

* Decisions by the State of Hawaii or County of Maui relating to planning for, regulation, management, and conservation of water resources shall incorporate and protect adequate reserves of water for the full current and foreseeable development and use of Hawaiian home lands.

1 Water development source unidentified.

EXHIBIT 4
Molokai Water Working Group, 1996

NON-POTABLE WATER USE PROJECTIONS IN MGD*

Estimates were furnished by users and were accepted by working group without challenge. These figures are estimates and projections made in 1993, based on information available at that time.

<table>
<thead>
<tr>
<th></th>
<th>5 to 10 years</th>
<th>Total 2010 to Build out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHHL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoolehua</td>
<td>4.00</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>Kalaaua</td>
<td>1.42</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Subtotal DHHL</td>
<td>5.42</td>
<td>23.5</td>
<td></td>
</tr>
<tr>
<td>Other MIS users</td>
<td>2.50</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>Molokai Ranch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, Dairy, Pastures:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Ag. Park - Kualapuu</td>
<td>7.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Coffee - 800 acres</td>
<td>1.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Dairy - 4,000 head</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Palm Nursery - brackish</td>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Feedlot</td>
<td>0.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Pastures</td>
<td>0.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Hay - assume all irrigated on Homesteads</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal Agriculture</td>
<td>10.6</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Maunaloa Links</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ironwoods</td>
<td>0.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Network</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal Recreation</td>
<td>0.50</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Kaluakoi Resort</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation: Golf Course Addition</td>
<td>0.00</td>
<td>(two 36-hole courses)</td>
<td></td>
</tr>
<tr>
<td>Alpha USA</td>
<td>1.50</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20.52</strong></td>
<td><strong>42.9</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Decisions by the State of Hawaii or County of Maui relating to planning for, regulation, management, and conservation of water resources shall incorporate and protect adequate reserves of water for the full current and foreseeable development and use of Hawaiian home lands.

1From DHHL projections
   From DOA - MIS average delivery = 7.5 mgd
   2/3 x 7.5 mgd = 5.0 mgd preference to DHHL
   1/3 x 7.5 mgd = 2.5 mgd for other MIS users
   Note: deficit from MIS of 0.42 mgd

2Assumes maximum usage of 1/3 of MIS for other users

3Water development source unidentified

4A portion of this projection will be met by the MIS and a portion from private sources

Note: Non-Potable Water Use Projections are for major agricultural and recreational uses in the central and western areas of the island. It does not include instreams uses, fishponds, taro patches, aquacultural projections, etc.

EXHIBIT 5
APPENDIX A
Glossary and Acronyms*

Glossary

1. **Appurtenant Water Right - Generally recognized that Kuleana lands in taro production at the time they were granted by the government (usually during the 1848-1856 Great Mahele) retain appurtenant rights to the quantity of water necessary to grow taro in the same manner on the same land.

2. **Correlative Water Right - Generally recognized as that all landowners overlying a ground water basin have a right to share in the use of the underground waters.

3. Demonstrable - Capable of being demonstrated, to prove, to exhibit.

4. Developable Yield - Calculated by subtracting out water resources not directly available from the sustainable yield due to the possible interaction between ground water and streams.

5. Non-Potable Water - Not suitable for drinking.

6. Potable Water - Suitable for drinking.

7. Reasonable-Beneficial Use - The use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest.

8. Sustainable Yield - The maximum rate at which water may be withdrawn from a water source without impairing the utility or quality of the water source as determined by the Commission.

Acronyms

1. DOA - State Department of Agriculture
2. DHHL - State Department of Hawaiian Home Lands
3. DOH - State Department of Health
4. DWS - Maui County Department of Water Supply
5. MGD - Million Gallons per Day
6. MIS - Molokai Irrigation System
7. NPS - National Park Service

* The glossary and acronyms have been provided by the facilitators and staff at the request of the Molokai Working Group and does not in any way reflect a consensus decision of the group.

** These definitions are general in nature and are not to be assumed to be a full legal definition of the terms.
APPENDIX B

Working Group "Contract"
(Ground rules of the group were adopted by consensus)

1. Facilitators role is to assist group through the process and enable consensus decision-making. Facilitators will stay neutral and any member of the group can stop the process to remind the facilitators of this.

2. It's OK to disagree -
   Members will make their best efforts to stay patient.

3. Be tough on issues wherever possible -
   Members will be easy on each other.

4. Common courtesies -
   Members agree not to interrupt, walkout or hog the floor.

5. The group will operate by consensus -
   See Attachment A

6. Members agree not to have meetings electronically recorded -
   Facilitators will record on flip chart paper supplemented with notes.

7. Members agree that there will be alternates when members are not able to attend meetings.

8. Release of group proceedings -
   No one person speaks for the group. Group speaks as one, after reaching consensus.

9. Meetings will be open to the community -
   But non-working group members can speak only by invitation of the group.

10. The community can submit ideas or information in writing to the members.

11. In the spirit of reaching consensus, it is expected that members will not simply say "NO" to an idea without affirming an alternative.
APPENDIX C
Attachment A

Levels of Consensus

4. "Yes"
   I fully support and endorse . . . .

   I can live with it, even though it doesn't meet all my needs.

2. "Yes, with Reluctance"
   I don't like it and must register my feelings but, I'll defer to the wisdom of the group.

1. "No"
   I must stand in the way of this.

0. "Abstain"
   I abstain because of . . . .

RECEIVED
SEP 15 1997
EARTHJUSTICE LEGAL DEFENSE FUND, INC.
BIBLIOGRAPHY


County of Maui Department of Water Supply and Planning Department, Hawaii Water Plan: Maui County Water Use and Development Plan, March 1990.


Appendix V

Waterline Easements Map
Appendix W

Preliminary Engineering Report;
Preliminary Drainage Report
Preliminary Engineering Report

Laau Point Project at
West Molokai, Hawaii

TMK: (2) 5-1-02: Portion of 30

Prepared For:
Molokai Properties, Ltd.
745 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Date: July 2006
Revised: November 2006
Revised: August 2007

WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers – Land Surveyors
Wells Street Professional Center – Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793
# TABLE OF CONTENTS

## I. INTRODUCTION ............................................... 1

## II. PROJECT LOCATION AND TOPOGRAPHY ........................ 1

## III. EXISTING INFRASTRUCTURE

3.1.a Potable Water ............................................. 2
3.1.b Non-Potable Water ......................................... 2
3.2 Sewer System ................................................. 3
3.3 Drainage System .............................................. 3
3.4 Roadway ................................................ 3 - 4
3.5 Electrical, Telephone and CATV Systems ...................... 4

## IV. PROPOSED INFRASTRUCTURAL IMPROVEMENTS

4.1.a Potable Water ............................................. 4
4.1.b Non-Potable Water ......................................... 4 - 5
4.2 Sewer System ................................................. 5
4.3 Drainage System .............................................. 5 - 6
4.4 Roadway ................................................ 6
4.5 Electrical, Telephone and CATV Systems ...................... 6
4.6 Solid Waste .............................................. 6

## V. CONCLUSION ................................................. 7

## VI. EXHIBITS

1. Location Map
2. Site Specific
3. Flood Insurance Rate Map
4. Existing Drainage Map
5. Conceptual Drainage Master Plan
6. Subsurface Drainage System Detail
7. Riser Detail of Desilting Basin
8. Preliminary Grading Plan for Roadways
Preliminary Engineering Report  
for  
Laau Point Project at  
West Molokai, Hawaii

I. INTRODUCTION

The applicant, Molokai Properties, Limited (MPL), is asking the State Land Use Commission to change the land use designation of approximately 842 acres of ag land to rural that would ultimately allow for the subdivision of this area for 200 rural homesite lots averaging 2 acres each. They will also be seeking a County of Maui Community Plan amendment and change in zoning of the project area from ag to rural.

This report briefly describes and evaluates existing infrastructure in the project vicinity. It also provides a brief summary of probable infrastructural improvements that will be constructed to support the project.

II. PROJECT LOCATION AND TOPOGRAPHY

The project is located at the southwest tip of the Island of Molokai. The project area encompasses a band of land ranging from 1,500 to 2,000 feet inland of the existing conservation district boundary. The land along the western coastline extends approximately 10,400 feet north of Laau Point terminating at Kaupoa Beach Camp. The land along the southerly coastline extends approximately 15,400 feet east of Laau Point towards Hale Lono Harbor.

Existing grade across the westerly parcel ranges from 25 feet at the conservation line to approximately 125 feet along its mauka boundaries. Cross slopes varies between 3 to 7 percent. The southerly parcel of land has a steeper cross slope ranging from an elevation of around 50 feet at the conservation line to approximately 200 feet along its mauka boundaries. This translates to cross slopes that range between 7 and 15 percent, although steeper slopes can be found in isolated areas in between.
III. EXISTING INFRASTRUCTURE

3.1.a Potable Water:

MPL operates two water systems that serve West Molokai.

The Molokai Ranch Mountain System (MRMS) taps surface water from the mountains in central Molokai and conveys it to Puu Nana water treatment plant for Maunaloa and the Industrial Park. In addition, it provides water for landscaping at Maunaloa Village, the Lodge and Kaupoa Camp as well as water for the Ranch’s livestock. Seasonal flows vary between 1,300,000 gpd and 65,000 gpd. The average yield of this system is 500,000 gpd. This system’s mountain source has a storage capacity of 39,000,000 gallons which helps to compensate for the seasonal fluctuation in source.

The source of water for the Kaluakoi water system is well 17, east of Kualapuu. In December 2001, MPL acquired the assets of Kukui (Molokai) Inc. including its water system and its water use allocation of 1,018,000 gpd. Current use of the Kaluakoi system, with the Kaluakoi Hotel totally closed, is approximately 800,000 gpd. Water from well 17 is transported via rental space in the Molokai Irrigation System to Mahana. It is then pumped to a 7,000,000 reservoir at Puu Nana for treatment. The treated water is then piped to a 3.0 MG reservoir in Maunaloa and gravity fed to Kaluakoi. The Kaluakoi distribution system terminates approximately 9,000 feet north of the Laau Point project site.

3.1.b Non-Potable Water:

Although untreated mountain water is being used for irrigation in Maunaloa, water from the existing, but currently unused Kakalahale well above Kaunakakai, is proposed to replace this irrigation water source. Mountain water presently being used for irrigation will then be treated and converted to augment the potable water supply for West Molokai.
3.2 **Sewer System:**

The project site is obviously not sewered. Although, Maunaloa Village which is located approximately 5.60 miles northeast of the project site, has its own private sewer system, the distance and grade makes it impractical to pump wastewater from the project site to Maunaloa.

Kaluakoi depends on individual wastewater systems to handle its sewer in accordance with DOH rules and regulations.

3.3 **Drainage System:**

There are several drainageways that transect the project site in the mauka/makai direction. Runoff in these gullies will be allowed to pass through the project site uninhibited. The present flow patterns in these channels will be preserved. Where roads cross these drainageways, culverts will be installed to convey the 100 year flows across the roadway.

Perforated risers will be added to the inlets of these culverts as shown in Exhibit 7. In addition, subject to the availability of boulders from the roadway excavation, boulder berms will be constructed upstream of some of the inlets to reduce the velocity in the drainway and also to induce gravitational settling of water borne silt and debris before it enters the culverts. Energy dissipators will be constructed at the outlets of these drainage culverts to keep the velocities equal to or less than pre-development velocities, in accordance with the provisions of Article 15-04-06 subparagraph (8) of Title NC-15, “Rules for the Design of Storm Drainage Facilities in the County of Maui.”

3.4 **Roadway:**

Primary access to the project will be from Kaluakoi Road which is located 9,000 feet north of the project site. This is a 22 feet wide paved road.

Maunaloa Highway, which is a State Highway, terminates at Maunaloa Village. Hale Lono Harbor is served by a coral-based unpaved road which abuts the
southeast corner of the project site. This road connects Hale Lono Harbor to Maunaloa Highway.

3.5 Electrical, Telephone and CATV Systems:

Currently, there is an underground distribution system in Kaluakoi north of the project site. There is also an overhead system that runs to Hale Lono Harbor east of the project site.

IV. PROPOSED INFRASTRUCTURAL IMPROVEMENTS:

4.1.a Potable Water:

A new potable water system will be extended from Kaluakoi to the project. All lots will be metered separately. For the near term needs, water from MPL’s mountain source will continue to be treated at the Puu Nana treatment plant. Long term sourcing is proposed to come from well 17 and MPL’s mountain source as current non-potable uses being supplied by these sources are shifted to the non-potable source from Kakalahale well. When customer demand in Kaluakoi warrants, the Laau Point distribution system will be looped to the Maunaloa system, thereby augmenting the systems at Kaluakoi and the Laau Point project.

Probable water demand at full buildout is projected at 96,000 gpd. This is based on 80% occupancy of the 200 lots at 600 gpd, exclusive of irrigation.

4.1.b Non-Potable Water:

Initially, water for irrigation and fire protection will be provided from surplus mountain water. In the long term, brackish water from Kakalahale well will be used for irrigation and fire protection. A storage tank or reservoir will also be constructed above the project site to provide adequate pressure and to meet the storage requirements for fire protection. All lots will be metered. Fire hydrants will be installed along the road spaced at intervals between 450 to 500 feet. Various alignments are under consideration to bring non-potable water to the project site
from the Kakalahale well source. The applicant projects that the non-potable
demand at full buildout will be around 300,000 gpd.

4.2 Sewer System:

The applicant proposes to install a central package treatment plant for the
project. Individual homes will be connected to this plant via a low pressure force
main. The treatment plant will be designed to provide tertiary quality water suitable
for use of common area landscape irrigation.

At full buildout and 80% occupancy, the project could generate as much as
70,000 gpd of wastewater; however, daily flows of approximately 20,000 gallons are
anticipated due to projected average occupancy of 30%.

The wastewater treatment and collection system will be designed and
constructed in full compliance with State Department of Health Rules and
Regulations.

4.3 Drainage System:

Roadways constructed across existing drainageways will be provided with
culverts to convey offsite runoff safely across them. Storm drainage systems will
also be installed along the roadway shoulders to convey pavement runoff into the
closest drainageways. Subsurface storage and filtration systems will be installed at
the end of each roadway drainage system to intercept water borne silt and other
debris before they are discharged into the drainageways and State waters.

Additional runoff generated by each lot will be retained on the lot in onsite
surface or subsurface retention systems. This is to ensure that additional runoff
generated by the project is kept within the project limits all in accordance with the
provision of the Maui County’s Storm Drainage Standards.

The current runoff from the proposed 200 lots and roadways is 512 c.f.s. for
a 50-year 1-hour storm. This is expected to increase by 111 c.f.s. to 623 c.f.s. The
total volume needed to store this increase is 152,390 ft³. Since the increase in runoff
due to the roadway pavement is estimated at \((\frac{53}{111}) = 48\%\), approximately 52\% is attributable to the imperiousness in each lot. The required storage in the roadway and lots are \((0.48 \times 152,390) = 73,147 \text{ ft}^3\) and 79,243 \text{ ft}^3 respectively. It is estimated that approximately 20 feet of 5 feet diameter perforated pipe buried in each lot or a retention basin of equal capacity will be required to handle the additional runoff generated during a 50-year 1-hour storm event. See Exhibits 6 and 7 for details of subsurface systems on road and in lots.

4.4 **Roadway:**

Roads within the project will be designed and constructed in accordance with the Provisions of Section 18.16 of the Maui County Code. All roads will be built to County minor road standards with 40 feet wide right-of-way and 22 feet pavement widths. Grassed swales will be provided on shoulders to convey runoff into a storm drain system. Horizontal and vertical curves will be designed to meet stopping sight distance requirements for residential projects in the County of Maui.

4.5 **Electrical, Telephone and CATV Systems:**

Electrical, telephone and CATV distribution systems will be extended underground from Kaluakoi. At its eastern terminus, this underground distribution system will be connected to the existing overhead system servicing Hale Lono Harbor to provide an alternative means of serving the project.

4.6 **Solid Waste:**

Material derived from the clearing and grubbing operation will be chipped and spread over adjoining Ranch Lands and allowed to decompose as organic matter. Boulders and other excavated material that are not recycled and used in the project will be stockpiled in adjoining Ranch Lands also with proper erosion control measures.
V. **CONCLUSION:**

Based on the foregoing, it is our professional opinion that any project related impact can and will be readily mitigated by initiating Best Management Practices (BMP) during construction and by installing the infrastructural improvements proposed herein by the applicant.
VI. REFERENCES:


**EXHIBITS**

1. Location Map  
2. Site Specific  
3. Flood Insurance Rate Map  
4. Existing Drainage Map  
5. Conceptual Drainage Master Plan  
6. Subsurface Drainage System Detail  
7. Riser Detail of Desilting Basin  
8. Preliminary Grading Plan for Roadways
Preliminary Drainage Report

La`au Point Project at
West Molokai, Hawaii

TMK: 5-1-02: Portion of 30

Prepared for:
Molokai Properties, Ltd.
745 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Date: July 2006
Revised: November 2006
Revised: August 2007

WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers – Land Surveyors
Wells Street Professional Center – Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii  96793
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. PROPOSED PROJECT</td>
<td></td>
</tr>
<tr>
<td>A. Site Location</td>
<td>1</td>
</tr>
<tr>
<td>B. Project Description</td>
<td>1</td>
</tr>
<tr>
<td>III. EXISTING CONDITIONS</td>
<td></td>
</tr>
<tr>
<td>A. Topography and Soil Conditions</td>
<td>2</td>
</tr>
<tr>
<td>B. Drainage</td>
<td>2 - 3</td>
</tr>
<tr>
<td>C. Flood and Tsunami Zone</td>
<td>3</td>
</tr>
<tr>
<td>IV. DRAINAGE PLAN</td>
<td></td>
</tr>
<tr>
<td>A. General</td>
<td>3 - 4</td>
</tr>
<tr>
<td>B. Hydrologic Calculations</td>
<td>4 - 5</td>
</tr>
<tr>
<td>C. Conclusion</td>
<td>5</td>
</tr>
<tr>
<td>V. REFERENCES</td>
<td>6</td>
</tr>
</tbody>
</table>

## EXHIBITS

1. Location Map
2. Site Specific Soil Classification Map
3. Flood Insurance Rate Map
4. Existing Drainage Map
5. Conceptual Drainage Master Plan
6. Subsurface Drainage System Detail
7. Riser Detail of Desilting Basin
8. Preliminary Grading Plan for Roadways

## APPENDIX

A. Hydrologic Calculations
B. TR-20 / TR-55 Offsite Drainage Calculations
I. INTRODUCTION

This preliminary drainage report has been prepared to examine both the existing drainage conditions and proposed drainage plan for subject development.

II. PROPOSED PROJECT

A. Site Location:

The project is located at the southwestern tip of Molokai on the north and easterly side of La’au Point. It is situated along the coastline between Kaluakoi Resort to the north and Hale Lono Harbor to the east (see Exhibit 1).

The petition area encompasses approximately 850 acres summarized as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 house lots</td>
<td>400± Acs.</td>
</tr>
<tr>
<td>Roadways</td>
<td>46± Acs.</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>14± Acs.</td>
</tr>
<tr>
<td>Park</td>
<td>8± Acs.</td>
</tr>
<tr>
<td>Open Space</td>
<td>382± Acs.</td>
</tr>
<tr>
<td>Total</td>
<td>850 Acs.±</td>
</tr>
</tbody>
</table>

B. Project Description:

The proposed plan is to create 200 rural residential lots ranging in size between approximately 1 and 3 acres.

Proposed improvements include asphalt paved roadways, grassed drainage swales; storm, sewer and water systems; underground electrical, telephone and CATV distribution systems; and landscaping.
III. **EXISTING CONDITIONS:**

A. **Topography and Soil Conditions:**

The project site is undeveloped and was previously used for seasonal grazing. The site generally slopes in a mauka/makai direction. The cross slopes along the westerly strip of land between Kaluakoi and La`au Point varies between 3 to 7 percent, whereas the lands along the southerly boundary toward Hale Lono Harbor is a bit steeper with cross slopes ranging between 7 and 15 percent.

According to the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*¹, prepared by the United States Department of Agriculture, Soil Conservation Service, the soil classification found at the project site is predominantly KKTC Kapuhikani. These soils are geographically associated with Holomua and Molokai soils. This soil contains many stones on the surface and throughout its profile. Average depth to bedrock is estimated at 27 inches.

B. **Drainage:**

There are several drainageways that transect the project site in the mauka/makai directions. Current runoff in these drainageways for a 100 year 24 hour storm range between 29 and 1753 cfs. The present flow patterns in these channels will be maintained. Culverts will be sized to convey these flows across the roadways that generally run perpendicular to these natural drainageways.

C. **Flood and Tsunami Zone:**
According to Flood Insurance Map parcel number 150003 - 0025B dated June 1, 1981 prepared by FEMA, the project site is predominantly situated in Zone C which is described as areas subject to minimal flooding. Portions of project site located along the lower lying coastline are in A4 and high hazard V zones. However, none of the lots fall within these zones. However lots that extend into the high hazard V zone will be required to comply with the provisions of section 19.62.060, “Standards of Development,” Subsection “G” in Title 19 of the Maui County Code.

IV. DRAINAGE PLAN

A. General:

The primary objective of the drainage plan is to minimize the impact on the downstream conservation land and coastal ecosystem by implementing the following practices and design criteria:

a. Maintain the present drainage patterns within the existing drainageways.

b. Confine the clearing, grubbing and grading to the road right-of-ways and areas needed for installation of the infrastructure.

c. Install storm drainage system to collect runoff from the roadway swales and run it through a surface or subsurface detention and desilting facilities before discharging the runoff into nearby drainageways.

d. To minimize disturbance of existing conditions, existing drainageways that transects the lots in a mauka-makai direction, may be undergrounded and subsurface or surface detention facilities
installed at the downstream end of such drainageways. In addition, the CC and R’s will state that the existing flow patterns through/across lots shall be retained and maintained by the lot owner.

e. Require all lots to retain the additional runoff generated by the development of their lot in surface or subsurface retention facilities onsite.

f. Plant all disturbed areas with ground cover upon completion of the grading operation. Provide interim and/or permanent sprinkler systems to ensure continuous ground cover.

g. Initiate and maintain erosion control practices during and after completion of the project.

According to our calculations, the current peak runoff from the project site for a 50 year 1 hour duration storm is 512 cfs. Peak post development runoff from the developed lots and roadways is estimated at 623 cfs.

Surface and/or subsurface retention facilities will be sized to retain the difference in peak runoff in each lot. The runoff volume each lot must retain is approximately 365 ft³ per lot.

B. Hydrologic Calculations:

The onsite hydrologic calculations are based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui", Title MC-15, Chapter 4 and the "Rainfall Frequency Atlas of the Hawaiian Islands", Technical Paper No. 43, U. S. Department of Commerce, Weather Bureau:

Rational Formula used:

\[ Q = CIA \]
Where  \( Q = \) Rate of Flow (cfs)  
\( C = \) Runoff Coefficient  
\( I = \) Rainfall Intensity (inches/hour)  
\( A = \) Area (Acres)

The offsite hydrologic calculations are based on procedures by the U.S. Department of Agriculture, Soil Conservation Service (SCS). This procedure is described in detail in the SCS National Engineering Handbook, Section 4, Hydrology (NEH-4). The 100-year inundation limits was determined by using the US Army Corps of Engineers HEC-RAS River Analysis System Version 2.2 software.

C. Conclusion:

The proposed development is not expected to have a significant adverse effect on the existing downstream properties. The anticipated increase in surface runoff from the paved roadway area will be directed into surface or subsurface detention and/or desilting facilities before being released into the nearby drainageways. Also, the increase in runoff from each developed lot will be retained onsite in surface or subsurface facilities. In addition, the contractor will be required to comply with State and County approved Best Management Practices for the duration of the construction period.
V. REFERENCES


EXHIBITS

1  Location Map
2  Site Specific Soil Classification Map
3  Flood Insurance Rate Map
4  Existing Drainage Map
5  Conceptual Drainage Master Plan
6  Subsurface Drainage System Detail
7  Riser Detail for Desilting Basin
8  Preliminary Grading Plan for Roadways
APPENDIX A

HYDROLOGIC CALCULATIONS
<table>
<thead>
<tr>
<th>Lot #</th>
<th>Area (acs)</th>
<th>Longest Run (ft)</th>
<th>Elevation Change (ft)</th>
<th>Percent Slope</th>
<th>Number of Sublots</th>
<th>Roof Area (acs)</th>
<th>Heavy Soil Area (acs)</th>
<th>Heavy Soil C coeff</th>
<th>Weighted C coeff</th>
<th>T_r (min)</th>
<th>I coeff</th>
<th>Q value (cfs)</th>
<th>Storage Volume (c.f.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1a</td>
<td>8</td>
<td>400</td>
<td>10</td>
<td>2.50%</td>
<td>5</td>
<td>0.57</td>
<td>7.43</td>
<td>0.22</td>
<td>0.27</td>
<td>21.0</td>
<td>3.90</td>
<td>8.50</td>
<td>16062</td>
</tr>
<tr>
<td>R-1b</td>
<td>8</td>
<td>400</td>
<td>12</td>
<td>3.00%</td>
<td>5</td>
<td>0.57</td>
<td>7.43</td>
<td>0.22</td>
<td>0.27</td>
<td>20.0</td>
<td>3.95</td>
<td>8.61</td>
<td>15493</td>
</tr>
<tr>
<td>R-2</td>
<td>26</td>
<td>580</td>
<td>17</td>
<td>2.93%</td>
<td>14</td>
<td>1.61</td>
<td>24.39</td>
<td>0.22</td>
<td>0.27</td>
<td>23.5</td>
<td>3.70</td>
<td>25.51</td>
<td>53943</td>
</tr>
<tr>
<td>R-3a</td>
<td>13</td>
<td>580</td>
<td>4</td>
<td>0.69%</td>
<td>4</td>
<td>0.46</td>
<td>12.54</td>
<td>0.22</td>
<td>0.25</td>
<td>32.0</td>
<td>3.30</td>
<td>10.54</td>
<td>30367</td>
</tr>
<tr>
<td>R-3b</td>
<td>5</td>
<td>450</td>
<td>23</td>
<td>5.11%</td>
<td>2</td>
<td>0.23</td>
<td>4.77</td>
<td>0.22</td>
<td>0.25</td>
<td>19.5</td>
<td>3.95</td>
<td>5.01</td>
<td>8787</td>
</tr>
<tr>
<td>R-4</td>
<td>39</td>
<td>950</td>
<td>54</td>
<td>5.68%</td>
<td>18</td>
<td>2.07</td>
<td>36.93</td>
<td>0.35</td>
<td>0.38</td>
<td>25.0</td>
<td>3.70</td>
<td>55.09</td>
<td>123958</td>
</tr>
<tr>
<td>R-5</td>
<td>32</td>
<td>750</td>
<td>30</td>
<td>4.00%</td>
<td>14</td>
<td>1.61</td>
<td>30.39</td>
<td>0.35</td>
<td>0.38</td>
<td>25.0</td>
<td>3.70</td>
<td>45.01</td>
<td>101268</td>
</tr>
<tr>
<td>R-6</td>
<td>7</td>
<td>910</td>
<td>34</td>
<td>3.74%</td>
<td>3</td>
<td>0.34</td>
<td>6.66</td>
<td>0.35</td>
<td>0.38</td>
<td>28.0</td>
<td>3.50</td>
<td>9.30</td>
<td>23432</td>
</tr>
<tr>
<td>R-7</td>
<td>7</td>
<td>775</td>
<td>42</td>
<td>5.42%</td>
<td>4</td>
<td>0.46</td>
<td>6.54</td>
<td>0.22</td>
<td>0.27</td>
<td>23.5</td>
<td>3.70</td>
<td>6.94</td>
<td>14675</td>
</tr>
<tr>
<td>R-8</td>
<td>15</td>
<td>980</td>
<td>43</td>
<td>4.39%</td>
<td>9</td>
<td>1.03</td>
<td>13.97</td>
<td>0.22</td>
<td>0.27</td>
<td>30.0</td>
<td>3.35</td>
<td>13.58</td>
<td>36671</td>
</tr>
<tr>
<td>R-9a</td>
<td>27</td>
<td>1080</td>
<td>61</td>
<td>5.65%</td>
<td>12</td>
<td>1.38</td>
<td>25.62</td>
<td>0.35</td>
<td>0.38</td>
<td>26.0</td>
<td>3.60</td>
<td>37.00</td>
<td>86570</td>
</tr>
<tr>
<td>R-9b</td>
<td>37</td>
<td>450</td>
<td>23</td>
<td>5.11%</td>
<td>16</td>
<td>1.84</td>
<td>35.16</td>
<td>0.35</td>
<td>0.38</td>
<td>19.5</td>
<td>3.95</td>
<td>55.51</td>
<td>97413</td>
</tr>
<tr>
<td>R-10</td>
<td>24</td>
<td>775</td>
<td>62</td>
<td>8.00%</td>
<td>12</td>
<td>1.38</td>
<td>22.62</td>
<td>0.22</td>
<td>0.26</td>
<td>21.5</td>
<td>3.85</td>
<td>24.20</td>
<td>46827</td>
</tr>
<tr>
<td>R-11</td>
<td>10</td>
<td>510</td>
<td>42</td>
<td>8.24%</td>
<td>5</td>
<td>0.57</td>
<td>9.43</td>
<td>0.22</td>
<td>0.26</td>
<td>18.0</td>
<td>4.10</td>
<td>10.74</td>
<td>17396</td>
</tr>
<tr>
<td>R-12</td>
<td>10</td>
<td>340</td>
<td>24</td>
<td>7.06%</td>
<td>6</td>
<td>0.69</td>
<td>9.31</td>
<td>0.22</td>
<td>0.27</td>
<td>16.0</td>
<td>4.30</td>
<td>11.62</td>
<td>16736</td>
</tr>
<tr>
<td></td>
<td>R-13a</td>
<td>R-13b</td>
<td>R-14</td>
<td>R-15</td>
<td>R-16</td>
<td>R-17</td>
<td>R-18</td>
<td>R-19</td>
<td>R-20</td>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>8</td>
<td>18</td>
<td>15</td>
<td>6</td>
<td>19</td>
<td>12</td>
<td>4</td>
<td>7</td>
<td>401</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>640</td>
<td>420</td>
<td>440</td>
<td>510</td>
<td>450</td>
<td>690</td>
<td>365</td>
<td>570</td>
<td>520</td>
<td>201</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>32</td>
<td>23</td>
<td>29</td>
<td>38</td>
<td>38</td>
<td>35</td>
<td>50</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>521</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.38%</td>
<td>7.62%</td>
<td>5.23%</td>
<td>5.69%</td>
<td>8.44%</td>
<td>5.51%</td>
<td>9.59%</td>
<td>8.77%</td>
<td>8.85%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.76</td>
<td>0.57</td>
<td>1.03</td>
<td>1.03</td>
<td>0.34</td>
<td>1.03</td>
<td>0.80</td>
<td>0.23</td>
<td>0.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41.24</td>
<td>7.43</td>
<td>16.97</td>
<td>13.97</td>
<td>5.66</td>
<td>17.97</td>
<td>11.20</td>
<td>3.77</td>
<td>6.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
<td>0.22</td>
<td>0.35</td>
<td>0.22</td>
<td>0.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.39</td>
<td>0.39</td>
<td>0.38</td>
<td>0.39</td>
<td>0.38</td>
<td>0.26</td>
<td>0.39</td>
<td>0.26</td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.0</td>
<td>17.5</td>
<td>17.5</td>
<td>20.0</td>
<td>17.0</td>
<td>22.0</td>
<td>15.5</td>
<td>19.0</td>
<td>18.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.00</td>
<td>4.15</td>
<td>4.15</td>
<td>3.95</td>
<td>4.20</td>
<td>3.80</td>
<td>4.40</td>
<td>4.00</td>
<td>4.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>68.21</td>
<td>13.05</td>
<td>28.72</td>
<td>23.19</td>
<td>9.69</td>
<td>18.75</td>
<td>20.60</td>
<td>4.19</td>
<td>7.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>116643</td>
<td>20553</td>
<td>45230</td>
<td>41735</td>
<td>14822</td>
<td>37125</td>
<td>28739</td>
<td>7166</td>
<td>12455</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1014064</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## LAAU POINT SUBDIVISION

**PRE-DEVELOPMENT DRAINAGE CALCULATIONS**

Project Site Surface Runoff (50 Yr. - 1 Hr. = 2.4 Inches)

<table>
<thead>
<tr>
<th>Lot #</th>
<th>Area</th>
<th>Longest Run (ft)</th>
<th>Elevation Change (ft)</th>
<th>Percent Slope</th>
<th>C coeff</th>
<th>T_c (min)</th>
<th>I coeff</th>
<th>Q value (cfs)</th>
<th>Storage Volume (c.f.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1a</td>
<td>8</td>
<td>400</td>
<td>10</td>
<td>2.50%</td>
<td>0.22</td>
<td>21.0</td>
<td>3.90</td>
<td>6.86</td>
<td>12973</td>
</tr>
<tr>
<td>R-1b</td>
<td>8</td>
<td>400</td>
<td>12</td>
<td>3.00%</td>
<td>0.22</td>
<td>20.0</td>
<td>3.95</td>
<td>6.95</td>
<td>12514</td>
</tr>
<tr>
<td>R-2</td>
<td>26</td>
<td>580</td>
<td>17</td>
<td>2.93%</td>
<td>0.22</td>
<td>23.5</td>
<td>3.70</td>
<td>21.16</td>
<td>44762</td>
</tr>
<tr>
<td>R-3a</td>
<td>13</td>
<td>580</td>
<td>4</td>
<td>0.69%</td>
<td>0.22</td>
<td>32.0</td>
<td>3.30</td>
<td>9.44</td>
<td>27181</td>
</tr>
<tr>
<td>R-3b</td>
<td>5</td>
<td>450</td>
<td>23</td>
<td>5.11%</td>
<td>0.22</td>
<td>19.5</td>
<td>3.95</td>
<td>4.35</td>
<td>7625</td>
</tr>
<tr>
<td>R-4</td>
<td>39</td>
<td>950</td>
<td>54</td>
<td>5.68%</td>
<td>0.35</td>
<td>25.0</td>
<td>3.70</td>
<td>50.51</td>
<td>113636</td>
</tr>
<tr>
<td>R-5</td>
<td>32</td>
<td>750</td>
<td>30</td>
<td>4.00%</td>
<td>0.35</td>
<td>25.0</td>
<td>3.70</td>
<td>41.44</td>
<td>93240</td>
</tr>
<tr>
<td>R-6</td>
<td>7</td>
<td>910</td>
<td>34</td>
<td>3.74%</td>
<td>0.35</td>
<td>28.0</td>
<td>3.50</td>
<td>8.58</td>
<td>21609</td>
</tr>
<tr>
<td>R-7</td>
<td>7</td>
<td>775</td>
<td>42</td>
<td>5.42%</td>
<td>0.22</td>
<td>23.5</td>
<td>3.70</td>
<td>5.70</td>
<td>12051</td>
</tr>
<tr>
<td>R-8</td>
<td>15</td>
<td>980</td>
<td>43</td>
<td>4.39%</td>
<td>0.22</td>
<td>30.0</td>
<td>3.35</td>
<td>11.06</td>
<td>29849</td>
</tr>
<tr>
<td>R-9a</td>
<td>27</td>
<td>1080</td>
<td>61</td>
<td>5.65%</td>
<td>0.35</td>
<td>26.0</td>
<td>3.60</td>
<td>34.02</td>
<td>79607</td>
</tr>
<tr>
<td>R-9b</td>
<td>37</td>
<td>450</td>
<td>23</td>
<td>5.11%</td>
<td>0.35</td>
<td>19.5</td>
<td>3.95</td>
<td>51.15</td>
<td>89773</td>
</tr>
<tr>
<td>R-10</td>
<td>24</td>
<td>775</td>
<td>62</td>
<td>8.00%</td>
<td>0.22</td>
<td>21.5</td>
<td>3.85</td>
<td>20.33</td>
<td>39335</td>
</tr>
<tr>
<td>R-11</td>
<td>10</td>
<td>510</td>
<td>42</td>
<td>8.24%</td>
<td>0.22</td>
<td>18.0</td>
<td>4.10</td>
<td>9.02</td>
<td>14612</td>
</tr>
<tr>
<td>R-12</td>
<td>10</td>
<td>340</td>
<td>24</td>
<td>7.06%</td>
<td>0.22</td>
<td>16.0</td>
<td>4.30</td>
<td>9.46</td>
<td>13622</td>
</tr>
</tbody>
</table>
# LA'AU POINT SUBDIVISION

**PRE/POST DEVELOPMENT ROADWAY DRAINAGE CALCULATIONS**

Project Site Surface Runoff (50 Yr. - 1 Hr. = 2.4 Inches)

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Area (Sq. Ft.)</th>
<th>Total Area (acres)</th>
<th>Pre-Development Runoff Coefficient</th>
<th>Post-Development Runoff Coefficient</th>
<th>Length (ft.)</th>
<th>Elevation Difference (ft.)</th>
<th>Average Slope</th>
<th>Time of Conc. (Min.)</th>
<th>Rainfall Intensity (50yr.-1hr.) (in./hr.)</th>
<th>Q Pre-Development (50yr.-1hr.) (cfs)</th>
<th>Q Post-Development (50yr.-1hr.) (cfs)</th>
<th>ΔQ (Net Increase)</th>
<th>Volume Increase (Sq. Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23487</td>
<td>0.539</td>
<td>0.35</td>
<td>0.68</td>
<td>500</td>
<td>29</td>
<td>5.80%</td>
<td>20</td>
<td>4</td>
<td>0.75</td>
<td>1.47</td>
<td>0.71</td>
<td>1281</td>
</tr>
<tr>
<td>2</td>
<td>82232</td>
<td>1.888</td>
<td>0.35</td>
<td>0.68</td>
<td>1300</td>
<td>37</td>
<td>2.85%</td>
<td>34</td>
<td>3</td>
<td>3.2</td>
<td>2.11</td>
<td>4.11</td>
<td>6100</td>
</tr>
<tr>
<td>3</td>
<td>18044</td>
<td>0.414</td>
<td>0.35</td>
<td>0.68</td>
<td>350</td>
<td>28</td>
<td>8.00%</td>
<td>16</td>
<td>4.4</td>
<td>0.64</td>
<td>1.24</td>
<td>0.60</td>
<td>866</td>
</tr>
<tr>
<td>4</td>
<td>148893</td>
<td>3.418</td>
<td>0.35</td>
<td>0.68</td>
<td>4350</td>
<td>175</td>
<td>4.02%</td>
<td>75</td>
<td>2.2</td>
<td>2.63</td>
<td>5.11</td>
<td>2.48</td>
<td>16750</td>
</tr>
<tr>
<td>5</td>
<td>134582</td>
<td>3.090</td>
<td>0.35</td>
<td>0.68</td>
<td>1810</td>
<td>44</td>
<td>2.43%</td>
<td>36</td>
<td>3.15</td>
<td>3.41</td>
<td>6.62</td>
<td>3.21</td>
<td>10406</td>
</tr>
<tr>
<td>6</td>
<td>28381</td>
<td>0.652</td>
<td>0.28</td>
<td>0.65</td>
<td>625</td>
<td>14</td>
<td>2.24%</td>
<td>25</td>
<td>3</td>
<td>0.67</td>
<td>1.57</td>
<td>0.89</td>
<td>2007</td>
</tr>
<tr>
<td>7</td>
<td>48170</td>
<td>1.106</td>
<td>0.35</td>
<td>0.68</td>
<td>1100</td>
<td>44</td>
<td>4.00%</td>
<td>28</td>
<td>3.5</td>
<td>1.35</td>
<td>2.63</td>
<td>1.28</td>
<td>3219</td>
</tr>
<tr>
<td>8</td>
<td>139869</td>
<td>3.211</td>
<td>0.35</td>
<td>0.68</td>
<td>2100</td>
<td>83</td>
<td>3.95%</td>
<td>35</td>
<td>3.2</td>
<td>3.60</td>
<td>6.99</td>
<td>3.39</td>
<td>10681</td>
</tr>
<tr>
<td>9</td>
<td>78926</td>
<td>1.812</td>
<td>0.35</td>
<td>0.68</td>
<td>1800</td>
<td>77</td>
<td>4.28%</td>
<td>33</td>
<td>3.25</td>
<td>2.06</td>
<td>4.00</td>
<td>1.94</td>
<td>5771</td>
</tr>
<tr>
<td>10</td>
<td>16821</td>
<td>0.386</td>
<td>0.35</td>
<td>0.68</td>
<td>300</td>
<td>16</td>
<td>5.33%</td>
<td>15.5</td>
<td>4.35</td>
<td>0.59</td>
<td>1.14</td>
<td>0.55</td>
<td>773</td>
</tr>
<tr>
<td>11</td>
<td>36123</td>
<td>0.829</td>
<td>0.28</td>
<td>0.65</td>
<td>640</td>
<td>31</td>
<td>4.84%</td>
<td>21.5</td>
<td>3.85</td>
<td>0.89</td>
<td>2.08</td>
<td>1.18</td>
<td>2286</td>
</tr>
<tr>
<td>12</td>
<td>72080</td>
<td>1.655</td>
<td>0.28</td>
<td>0.65</td>
<td>1125</td>
<td>56</td>
<td>4.98%</td>
<td>27.5</td>
<td>3.5</td>
<td>1.62</td>
<td>3.76</td>
<td>2.14</td>
<td>5304</td>
</tr>
<tr>
<td>13</td>
<td>40519</td>
<td>0.930</td>
<td>0.28</td>
<td>0.65</td>
<td>720</td>
<td>33</td>
<td>4.58%</td>
<td>23</td>
<td>3.8</td>
<td>0.99</td>
<td>2.30</td>
<td>1.31</td>
<td>2707</td>
</tr>
<tr>
<td>14</td>
<td>60219</td>
<td>1.382</td>
<td>0.35</td>
<td>0.68</td>
<td>1950</td>
<td>84</td>
<td>4.31%</td>
<td>35</td>
<td>3.2</td>
<td>1.55</td>
<td>3.01</td>
<td>1.46</td>
<td>4599</td>
</tr>
<tr>
<td>15</td>
<td>25920</td>
<td>0.595</td>
<td>0.35</td>
<td>0.68</td>
<td>450</td>
<td>7</td>
<td>1.56%</td>
<td>23</td>
<td>3.8</td>
<td>0.79</td>
<td>1.54</td>
<td>0.75</td>
<td>1545</td>
</tr>
<tr>
<td>16</td>
<td>46741</td>
<td>1.073</td>
<td>0.35</td>
<td>0.68</td>
<td>840</td>
<td>8</td>
<td>0.95%</td>
<td>33</td>
<td>3.25</td>
<td>1.22</td>
<td>2.37</td>
<td>1.15</td>
<td>3418</td>
</tr>
<tr>
<td>17</td>
<td>86412</td>
<td>1.984</td>
<td>0.35</td>
<td>0.68</td>
<td>1800</td>
<td>39</td>
<td>2.17%</td>
<td>36</td>
<td>3.15</td>
<td>2.19</td>
<td>4.25</td>
<td>2.06</td>
<td>6681</td>
</tr>
<tr>
<td>18</td>
<td>75455</td>
<td>1.732</td>
<td>0.35</td>
<td>0.68</td>
<td>1900</td>
<td>58</td>
<td>3.05%</td>
<td>37.5</td>
<td>3.1</td>
<td>1.88</td>
<td>3.65</td>
<td>1.77</td>
<td>5981</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>49931</td>
<td>1.146</td>
<td>0.35</td>
<td>0.68</td>
<td>800</td>
<td>26</td>
<td>3.25%</td>
<td>28.5</td>
<td>3.45</td>
<td>1.38</td>
<td>2.69</td>
<td>1.31</td>
<td>3347</td>
</tr>
<tr>
<td>20</td>
<td>85111</td>
<td>1.954</td>
<td>0.35</td>
<td>0.68</td>
<td>1700</td>
<td>69</td>
<td>4.06%</td>
<td>34</td>
<td>3.2</td>
<td>2.19</td>
<td>4.25</td>
<td>2.06</td>
<td>6314</td>
</tr>
<tr>
<td>21</td>
<td>13457</td>
<td>0.309</td>
<td>0.35</td>
<td>0.68</td>
<td>160</td>
<td>7</td>
<td>4.38%</td>
<td>13</td>
<td>4.7</td>
<td>0.51</td>
<td>0.99</td>
<td>0.48</td>
<td>561</td>
</tr>
<tr>
<td>22</td>
<td>18180</td>
<td>0.417</td>
<td>0.35</td>
<td>0.68</td>
<td>240</td>
<td>6</td>
<td>2.50%</td>
<td>17</td>
<td>4.25</td>
<td>0.62</td>
<td>1.21</td>
<td>0.59</td>
<td>896</td>
</tr>
<tr>
<td>23</td>
<td>33186</td>
<td>0.762</td>
<td>0.35</td>
<td>0.68</td>
<td>575</td>
<td>19</td>
<td>3.30%</td>
<td>22.5</td>
<td>3.8</td>
<td>1.01</td>
<td>1.97</td>
<td>0.96</td>
<td>1935</td>
</tr>
<tr>
<td>24</td>
<td>41618</td>
<td>0.955</td>
<td>0.28</td>
<td>0.65</td>
<td>633</td>
<td>41</td>
<td>6.48%</td>
<td>21</td>
<td>3.85</td>
<td>1.03</td>
<td>2.39</td>
<td>1.36</td>
<td>2572</td>
</tr>
<tr>
<td>25</td>
<td>32881</td>
<td>0.755</td>
<td>0.28</td>
<td>0.65</td>
<td>980</td>
<td>61</td>
<td>6.22%</td>
<td>25</td>
<td>3.7</td>
<td>0.78</td>
<td>1.82</td>
<td>1.03</td>
<td>2325</td>
</tr>
<tr>
<td>26</td>
<td>41575</td>
<td>0.954</td>
<td>0.35</td>
<td>0.68</td>
<td>820</td>
<td>54</td>
<td>6.59%</td>
<td>23</td>
<td>3.8</td>
<td>1.27</td>
<td>2.47</td>
<td>1.20</td>
<td>2477</td>
</tr>
<tr>
<td>27</td>
<td>72489</td>
<td>1.664</td>
<td>0.28</td>
<td>0.65</td>
<td>1650</td>
<td>86</td>
<td>5.21%</td>
<td>31.5</td>
<td>3.3</td>
<td>1.54</td>
<td>3.57</td>
<td>2.03</td>
<td>5760</td>
</tr>
<tr>
<td>28</td>
<td>65685</td>
<td>1.508</td>
<td>0.28</td>
<td>0.65</td>
<td>950</td>
<td>30</td>
<td>3.16%</td>
<td>30.5</td>
<td>3.35</td>
<td>1.41</td>
<td>3.28</td>
<td>1.87</td>
<td>5131</td>
</tr>
<tr>
<td>29</td>
<td>22491</td>
<td>0.516</td>
<td>0.28</td>
<td>0.65</td>
<td>350</td>
<td>18</td>
<td>5.14%</td>
<td>17</td>
<td>4.25</td>
<td>0.61</td>
<td>1.43</td>
<td>0.81</td>
<td>1242</td>
</tr>
<tr>
<td>30</td>
<td>42142</td>
<td>0.967</td>
<td>0.28</td>
<td>0.65</td>
<td>590</td>
<td>27</td>
<td>4.58%</td>
<td>21</td>
<td>3.85</td>
<td>1.04</td>
<td>2.42</td>
<td>1.38</td>
<td>2605</td>
</tr>
<tr>
<td>31</td>
<td>92097</td>
<td>2.114</td>
<td>0.28</td>
<td>0.65</td>
<td>2050</td>
<td>55</td>
<td>2.68%</td>
<td>37</td>
<td>3.1</td>
<td>1.84</td>
<td>4.26</td>
<td>2.43</td>
<td>8075</td>
</tr>
<tr>
<td>32</td>
<td>17595</td>
<td>0.404</td>
<td>0.28</td>
<td>0.65</td>
<td>290</td>
<td>11</td>
<td>3.79%</td>
<td>16.5</td>
<td>4.3</td>
<td>0.49</td>
<td>1.13</td>
<td>0.64</td>
<td>954</td>
</tr>
<tr>
<td>33</td>
<td>22984</td>
<td>0.528</td>
<td>0.28</td>
<td>0.65</td>
<td>350</td>
<td>2</td>
<td>0.57%</td>
<td>27</td>
<td>3.5</td>
<td>0.52</td>
<td>1.20</td>
<td>0.68</td>
<td>1660</td>
</tr>
<tr>
<td>34</td>
<td>75894</td>
<td>1.742</td>
<td>0.28</td>
<td>0.65</td>
<td>1950</td>
<td>54</td>
<td>2.77%</td>
<td>37</td>
<td>3.1</td>
<td>1.51</td>
<td>3.51</td>
<td>2.00</td>
<td>6655</td>
</tr>
<tr>
<td>35</td>
<td>72813</td>
<td>1.672</td>
<td>0.28</td>
<td>0.65</td>
<td>2100</td>
<td>56</td>
<td>2.67%</td>
<td>37.5</td>
<td>3.1</td>
<td>1.45</td>
<td>3.37</td>
<td>1.92</td>
<td>6471</td>
</tr>
<tr>
<td>36</td>
<td>30760</td>
<td>0.706</td>
<td>0.28</td>
<td>0.65</td>
<td>660</td>
<td>11</td>
<td>1.67%</td>
<td>28</td>
<td>3.5</td>
<td>0.69</td>
<td>1.61</td>
<td>0.91</td>
<td>2304</td>
</tr>
<tr>
<td>37</td>
<td>12864</td>
<td>0.295</td>
<td>0.28</td>
<td>0.65</td>
<td>200</td>
<td>3</td>
<td>1.50%</td>
<td>17.5</td>
<td>4.25</td>
<td>0.35</td>
<td>0.82</td>
<td>0.46</td>
<td>731</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2006627</strong></td>
<td><strong>46.066</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49.2</td>
</tr>
</tbody>
</table>

V:\Projdata\06proj\06021\Reports\Prelim Drain\Roadway-Drainage-Areas.xls
APPENDIX B

TR-20 / TR-55 OFFSITE DRAINAGE CALCULATIONS
## LAAU POINT SUBDIVISION
OFFSITE DRAINAGE CALCULATIONS (EXISTING)

Project Site Surface Runoff (100 Yr. - 24 Hr. = 8.2 Inches)
Project Site Surface Runoff (50 Yr. - 1 Hr. = 2.45 Inches)

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Area (Acres)</th>
<th>Area (Soil Group B) (acs.)</th>
<th>Area (Soil Group C) (acs.)</th>
<th>Area (Soil Group D) (acs.)</th>
<th>Curve Number</th>
<th>Runoff Coefficient</th>
<th>Longest Run (ft)</th>
<th>Elevation Change (ft)</th>
<th>Percent Slope</th>
<th>Tc (min.)</th>
<th>Intensity</th>
<th>Peak Runoff (cfs)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>105.68</td>
<td>37.76</td>
<td>56.33</td>
<td>11.59</td>
<td>75.98</td>
<td>n/a</td>
<td>5165</td>
<td>295</td>
<td>5.71%</td>
<td>56</td>
<td>n/a</td>
<td>182</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>2</td>
<td>95.44</td>
<td>35.65</td>
<td>12.48</td>
<td>47.30</td>
<td>77.74</td>
<td>n/a</td>
<td>4520</td>
<td>298</td>
<td>6.59%</td>
<td>44</td>
<td>n/a</td>
<td>198</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>3</td>
<td>1007.48</td>
<td>739.08</td>
<td>194.61</td>
<td>73.78</td>
<td>72.03</td>
<td>n/a</td>
<td>15330</td>
<td>622</td>
<td>4.06%</td>
<td>177</td>
<td>n/a</td>
<td>788</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>4</td>
<td>266.42</td>
<td>99.30</td>
<td>129.40</td>
<td>37.72</td>
<td>75.98</td>
<td>n/a</td>
<td>5230</td>
<td>243</td>
<td>4.65%</td>
<td>62</td>
<td>n/a</td>
<td>430</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>5</td>
<td>99.22</td>
<td>0.00</td>
<td>91.41</td>
<td>7.81</td>
<td>79.39</td>
<td>n/a</td>
<td>2290</td>
<td>130</td>
<td>5.68%</td>
<td>25</td>
<td>n/a</td>
<td>283</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>6</td>
<td>66.09</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>0.32</td>
<td>2120</td>
<td>143</td>
<td>6.75%</td>
<td>36</td>
<td>3.25</td>
<td>69</td>
<td>50-yr 1-hr Storm</td>
</tr>
<tr>
<td>7</td>
<td>45.12</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>0.32</td>
<td>2400</td>
<td>70</td>
<td>2.92%</td>
<td>48</td>
<td>2.85</td>
<td>41</td>
<td>50-yr 1-hr Storm</td>
</tr>
<tr>
<td>8</td>
<td>554.75</td>
<td>6.05</td>
<td>513.37</td>
<td>35.33</td>
<td>79.21</td>
<td>n/a</td>
<td>9908</td>
<td>371</td>
<td>3.74%</td>
<td>105</td>
<td>n/a</td>
<td>701</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>9</td>
<td>355.60</td>
<td>71.81</td>
<td>283.79</td>
<td>0.00</td>
<td>76.98</td>
<td>n/a</td>
<td>8936</td>
<td>355</td>
<td>3.97%</td>
<td>101</td>
<td>n/a</td>
<td>440</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>10</td>
<td>524.85</td>
<td>294.23</td>
<td>230.62</td>
<td>0.00</td>
<td>73.39</td>
<td>n/a</td>
<td>10030</td>
<td>342</td>
<td>3.41%</td>
<td>132</td>
<td>n/a</td>
<td>494</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>11</td>
<td>34.07</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>0.30</td>
<td>2350</td>
<td>72</td>
<td>3.06%</td>
<td>47</td>
<td>2.8</td>
<td>29</td>
<td>50-yr 1-hr Storm</td>
</tr>
<tr>
<td>12</td>
<td>1235.36</td>
<td>1105.78</td>
<td>129.59</td>
<td>0.00</td>
<td>70.05</td>
<td>n/a</td>
<td>21085</td>
<td>623</td>
<td>2.95%</td>
<td>282</td>
<td>n/a</td>
<td>593</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>13</td>
<td>3731.65</td>
<td>3581.62</td>
<td>170.04</td>
<td>0.00</td>
<td>69.46</td>
<td>n/a</td>
<td>30260</td>
<td>1183</td>
<td>3.91%</td>
<td>333</td>
<td>n/a</td>
<td>1753</td>
<td>100-yr 24-hr Storm</td>
</tr>
<tr>
<td>14</td>
<td>246.23</td>
<td>172.77</td>
<td>73.46</td>
<td>0.00</td>
<td>71.98</td>
<td>n/a</td>
<td>8536</td>
<td>325</td>
<td>3.81%</td>
<td>114</td>
<td>n/a</td>
<td>247</td>
<td>100-yr 24-hr Storm</td>
</tr>
</tbody>
</table>

Date: August 2007
### MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

### MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)

(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>47.016</td>
<td></td>
<td>10.5000</td>
<td>182.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td>47.016</td>
<td></td>
<td>10.5000</td>
<td>182.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td>47.016</td>
<td></td>
<td>10.5000</td>
<td>182.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>47.016</td>
<td></td>
<td>10.5000</td>
<td>182.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2

STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ Rain File - ID = - TypeI 24hr
Rain File - ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = .9327 hrs
Drainage Area = 105.680 acres  Runoff CN = 76

------------------------------------------
Computational Time Increment = .05182 hrs
Computed Peak Time = 10.5185 hrs
Computed Peak Flow = 182.38 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 10.5000 hrs
Peak Flow, Interpolated Output = 182.33 cfs

------------------------------------------
DRAINAGE AREA
-----------------------
ID: SUBAREA 10
CN = 76
Area = 105.680 acres
S = 3.1579 in
0.2S = .6316 in

Cumulative Runoff
--------------------
5.3402 in
47.030 ac-ft

HYG Volume...
47.016 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .93270 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .05182 hrs = 0.08333 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qP = 128.38 cfs
Unit peak time Tp = .62178 hrs
Unit receding limb, Tr = 2.48713 hrs
Total unit time, Tb = 3.10891 hrs
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Depth</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>Type I</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Return Event</th>
<th>Type</th>
<th>Event</th>
<th>HYG Vol</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL</th>
<th>Pond Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td></td>
<td>44.349</td>
<td></td>
<td>10.3500</td>
<td>190.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td></td>
<td>44.349</td>
<td></td>
<td>10.3500</td>
<td>198.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td></td>
<td>44.349</td>
<td></td>
<td>10.3500</td>
<td>198.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td></td>
<td>44.349</td>
<td></td>
<td>10.3500</td>
<td>198.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ Rain File -ID = - TypeI 24hr
Unit Hdy Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = 0.7388 hrs
Drainage Area = 95.440 acres  Runoff CN= 78

===============================================
Computational Time Increment = 0.04925 hrs
Computed Peak Time = 10.3434 hrs
Computed Peak Flow = 198.65 cfs

Time Increment for HYG File = 0.0500 hrs
Peak Time, Interpolated Output = 10.3500 hrs
Peak Flow, Interpolated Output = 198.48 cfs

===============================================

DRAINAGE AREA
------------------
ID:SUBAREA 10
CN = 78
Area = 95.440 acres
S = 2.8205 in
0.2S = 0.5641 in

Cumulative Runoff
-----------------
5.5762 in
44.349 ac-ft

HYG Volume...
44.349 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****
Time Concentration, Tc = 0.73883 hrs (ID: SUBAREA 10)
Computational Incr, Tm = 0.04925 hrs = 0.10000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = 0.7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = 0.7491)

Unit peak, q = 146.37 cfs
Unit peak time Tp = 0.49254 hrs
Unit receding limb, Tr = 1.97017 hrs
Total unit time, Tb = 2.46271 hrs
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)

(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>408.903</td>
<td>--</td>
<td>12.0500</td>
<td>768.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN</td>
<td>POND</td>
<td>408.903</td>
<td></td>
<td>12.0500</td>
<td>768.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT</td>
<td>POND</td>
<td>408.903</td>
<td></td>
<td>12.0500</td>
<td>768.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>408.903</td>
<td></td>
<td>12.0500</td>
<td>768.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = 2.9462 hrs
Drainage Area = 1007.480 acres  Runoff CN= 72

*****************************************************************************
Computational Time Increment = .05036 hrs
Computed Peak Time = 12.0362 hrs
Computed Peak Flow = 768.21 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0500 hrs
Peak Flow, Interpolated Output = 768.09 cfs
*****************************************************************************

DRAINAGE AREA
------------------
ID: SUBAREA 10
CN = 72
Area = 1007.480 acres
s = 3.8889 in
0.2s = .7778 in

Cumulative Runoff
-----------------
4.8704 in
408.901 ac-ft

HYG Volume... 408.903 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****
Time Concentration, Tc = 2.94617 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .05036 hrs = 0.02564 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 387.47 cfs
Unit peak time Tp = 1.96406 hrs
Unit receding limb, Tr = 7.85625 hrs
Total unit time, Tb = 9.82032 hrs
### MASTER DESIGN STORM SUMMARY

**Network Storm Collection:** MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

### MASTER NETWORK SUMMARY

**SCS Unit Hydrograph Method**

(*Node=Outfall; +Node=Diversion;)

*(Trun= HYG Truncation: Blank= None; L=Left; R= Rt; LR=Left&Rt)*

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>118.545</td>
<td></td>
<td>10.6000</td>
<td>430.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td>118.545</td>
<td></td>
<td>10.6000</td>
<td>430.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td>118.545</td>
<td></td>
<td>10.6000</td>
<td>430.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>118.545</td>
<td></td>
<td>10.6000</td>
<td>430.04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24,000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = 1.0412 hrs
Drainage Area = 266.420 acres  Runoff CN= 76

==============================================================================
Computational Time Increment = .04958 hrs
Computed Peak Time = 10.5606 hrs
Computed Peak Flow = 430.68 cfs
Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 10.6000 hrs
Peak Flow, Interpolated Output = 430.04 cfs

==============================================================================

DRAINAGE AREA

ID: SUBAREA 10
CN = 76
Area = 266.420 acres
S = 3.1579 in
0.2S = .6316 in
Cumulative Runoff

5.3402 in
118.562 ac-ft

HYG Volume... 118.545 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 1.04121 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .04958 hrs = 0.07143 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333,  K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 289.92 cfs
Unit peak time Tp = .69412 hrs
Unit receding limb, Tr = 2.77650 hrs
Total unit time, Tb = 3.47062 hrs

S/N: FCXYW8H7K7A
Bentley PondPack (10.00.022.00) 9:50 PM
Bentley Systems, Inc.  8/14/2007
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>Type I 24hr</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank= None; L= Left; R= Rt; LR= Left & Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>47.058</td>
<td></td>
<td>10.1500</td>
<td>283.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN</td>
<td>POND 100</td>
<td>47.058</td>
<td></td>
<td>10.1500</td>
<td>283.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT</td>
<td>POND 100</td>
<td>47.058</td>
<td></td>
<td>10.1500</td>
<td>283.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>47.058</td>
<td></td>
<td>10.1500</td>
<td>283.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ 
Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ 
HYG File - ID = - SUBAREA 10 pre100
Tc = .4192 hrs
Drainage Area = 99.220 acres Runoff CN= 79

-----------------------------------------------------------------------------------------------
Computational Time Increment = .04658 hrs
Computed Peak Time = 10.1548 hrs
Computed Peak Flow = 283.70 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 10.1500 hrs
Peak Flow, Interpolated Output = 283.48 cfs

-----------------------------------------------------------------------------------------------
DRAINAGE AREA
---------------------
ID: SUBAREA 10
CN = 79
Area = 99.220 acres
S = 2.6582 in
.02S = .5316 in

Cumulative Runoff
---------------------
5.6944 in
47.083 ac-ft

HYG Volume... 47.058 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .41924 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .04658 hrs = 0.1666Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qP = 268.16 cfs
Unit peak time Tp = .27949 hrs
Unit receding limb, Tr = 1.11795 hrs
Total unit time, Tb = 1.39744 hrs
### MASTER DESIGN STORM SUMMARY

**Network Storm Collection:** MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>Type I 24hr</td>
</tr>
</tbody>
</table>

### MASTER NETWORK SUMMARY

**SCS Unit Hydrograph Method**

 (*)Node=Outfall; +Node=Diversion;  
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>263.248</td>
<td>--</td>
<td>11.1000</td>
<td>700.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td>263.248</td>
<td>--</td>
<td>11.1000</td>
<td>700.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td>263.248</td>
<td>--</td>
<td>11.1000</td>
<td>700.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>263.248</td>
<td>--</td>
<td>11.1000</td>
<td>700.71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\
Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\
HYG File - ID = - SUBAREA 10 Pre100
Tc = 1.7573 hrs
Drainage Area = 554.750 acres  Runoff CN= 79

Computational Time Increment = .05093 hrs
Computed Peak Time = 11.1037 hrs
Computed Peak Flow = 700.78 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.1000 hrs
Peak Flow, Interpolated Output = 700.71 cfs

DRAINAGE AREA
--------------
ID: SUBAREA 10
CN = 79
Area = 554.750 acres
S = 2.6582 in
0.2S = .5316 in
Cumulative Runoff
------------------
5.6944 in
263.247 ac-ft

HYG Volume...
263.248 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 1.75728 hrs (ID: SUBAREA 10)
Computational Incr, Tm = 0.05093 hrs = 0.04348 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 357.70 cfs
Unit peak time,Tp = 1.17149 hrs
Unit receding limb, Tr = 4.68596 hrs
Total unit time, Tb = 5.85745 hrs
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outlet; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Right; LR=Left&Right)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Return Event</th>
<th>Type</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>100</td>
<td>JCT</td>
<td>161.741</td>
<td></td>
<td>11.0500</td>
<td>440.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>100</td>
<td>IN POND</td>
<td>161.741</td>
<td></td>
<td>11.0500</td>
<td>440.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>100</td>
<td>OUT POND</td>
<td>161.741</td>
<td></td>
<td>11.0500</td>
<td>440.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>100</td>
<td>AREA</td>
<td>161.741</td>
<td></td>
<td>11.0500</td>
<td>440.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ 
Rain File -ID = - TypeI  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ 
HYG File - ID = - SUBAREA 10 Pre100
Tc = 1.6797 hrs
Drainage Area = 355.600 acres  Runoff CN= 77

=====================================================================
Computational Time Increment = .05090 hrs
Computed Peak Time = 11.0450 hrs
Computed Peak Flow = 440.59 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.0500 hrs
Peak Flow, Interpolated Output = 440.48 cfs
=====================================================================

DRAINAGE AREA
----------------
ID:SUBAREA 10
CN = 77
Area = 355.600 acres
S = 2.9870 in
0.2S = .5974 in

Cumulative Runoff
-----------------
5.4581 in
161.743 ac-ft

HYG Volume... 161.741 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 1.67969 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .05090 hrs = 0.04545 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333,  K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 239.88 cfs
Unit peak time Tp = 1.11977 hrs
Unit receding limb, Tr = 4.47906 hrs
Total unit time, Tb = 5.59883 hrs
# MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

# MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank= None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>218.216</td>
<td></td>
<td>11.4500</td>
<td>494.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOND 10</td>
<td>IN</td>
<td>POND</td>
<td>218.216</td>
<td>100</td>
<td>11.4500</td>
<td>494.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOND 10</td>
<td>OUT</td>
<td>POND</td>
<td>218.216</td>
<td>100</td>
<td>11.4500</td>
<td>494.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>218.216</td>
<td></td>
<td>11.4500</td>
<td>494.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs   Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\Rain File - ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\HYG File - ID = - SUBAREA 10 Pre100
Tc = 2.2044 hrs
Drainage Area = 525.000 acres  Runoff CN = 73

-----------------------------------------------
Computational Time Increment = .05068 hrs
Computed Peak Time = 11.4526 hrs
Computed Peak Flow = 494.25 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.4500 hrs
Peak Flow, Interpolated Output = 494.20 cfs

-----------------------------------------------
DRAINAGE AREA
----------------
ID: SUBAREA 10
CN = 73
Area = 525.000 acres
S = 3.6986 in
0.2S = .7397 in

Cumulative Runoff
-----------------
4.9876 in
218.206 ac-ft

HYG Volume...
218.216 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 2.20443 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .05068 hrs = 0.03448 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.331, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 269.85 cfs
Unit peak time Tp = 1.46958 hrs
Unit receding limb, Tr = 5.87833 hrs
Total unit time, Tb = 7.34792 hrs
### MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Depth</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

### MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Division;)

(Trun= HYG Truncation: Blank= None; L=Left; R=Rt; LR=Left & Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>427.348</td>
<td></td>
<td>13.5000</td>
<td>592.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td>427.348</td>
<td></td>
<td>13.5000</td>
<td>592.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td>427.348</td>
<td></td>
<td>13.5000</td>
<td>592.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>427.348</td>
<td></td>
<td>13.5000</td>
<td>592.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration  = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir  = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\nRain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir  = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\nHYG File - ID = - SUBAREA 10 Pre100
Tc      = 4.7082 hrs
Drainage Area = 1106.000 acres  Runoff CN= 70

=================================================================
Computational Time Increment = .04982 hrs
Computed Peak Time = 13.5014 hrs
Computed Peak Flow = 592.75 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 13.5000 hrs
Peak Flow, Interpolated Output = 592.74 cfs
=================================================================

DRAINAGE AREA
---------------
ID:SUBAREA 10
CN  = 70
Area  = 1106.000 acres
S    = 4.2857 in
0.2S  = .8571 in

Cumulative Runoff
-----------------
4.6366 in
427.344 ac-ft

HYG Volume... 427.348 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 4.70818 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .04982 hrs = 0.01587 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp  = 1.6698 (solved from K = .7491)

Unit peak,     qp = 266.17 cfs
Unit peak time Tp = 3.13871 hrs
Unit receding limb, Tr = 12.55483 hrs
Total unit time, Tb = 15.69354 hrs
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>Type I</td>
</tr>
<tr>
<td>Pre100</td>
<td></td>
<td></td>
<td>24 hr</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)

(Trun= HYG Truncation: Blank= None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Type</th>
<th>Return Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>1405.757</td>
<td></td>
<td>14.2500</td>
<td>1752.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN</td>
<td>POND 100</td>
<td>1405.757</td>
<td></td>
<td>14.2500</td>
<td>1752.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT</td>
<td>POND 100</td>
<td>1405.757</td>
<td></td>
<td>14.2500</td>
<td>1752.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>1405.757</td>
<td></td>
<td>14.2500</td>
<td>1752.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc. Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ Rain File - ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calcs\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = 5.5475 hrs
Drainage Area = 3732.000 acres  Runoff CN = 69

===============================================
Computational Time Increment = .04998 hrs
Computed Peak Time = 14.2433 hrs
Computed Peak Flow = 1752.51 cfs
Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 14.2500 hrs
Peak Flow, Interpolated Output = 1752.50 cfs

DRAINAGE AREA
---------------------
ID: SUBAREA 10
CN = 69
Area = 3732.000 acres
S = 4.4928 in
0.2S = .8986 in

Cumulative Runoff
-------------------
4.5201 in
1405.756 ac-ft

HYG Volume... 1405.757 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 5.54754 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .04998 hrs = 0.01351 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333,  K = .7491 (also, K = 2/(1+(Tc/Tr))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 762.25 cfs
Unit peak time Tp = 3.69827 hrs
Unit receding limb, Tr = 14.7307 hrs
Total unit time, Tb = 18.49134 hrs
MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyCounty

<table>
<thead>
<tr>
<th>Return Event</th>
<th>Total Depth in</th>
<th>Rainfall Type</th>
<th>RNF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre100</td>
<td>8.2000</td>
<td>Synthetic Curve</td>
<td>TypeI 24hr</td>
</tr>
</tbody>
</table>

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank= None; L=Left; R=Rt; LR=Left&Rt)

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Return Type Event</th>
<th>Return Type Event</th>
<th>HYG Vol ac-ft</th>
<th>Trun</th>
<th>Qpeak hrs</th>
<th>Qpeak cfs</th>
<th>Max WSEL ft</th>
<th>Max Pond Storage ac-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OUT 10</td>
<td>JCT</td>
<td>100</td>
<td>99.932</td>
<td>11.2500</td>
<td>246.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>IN POND</td>
<td>100</td>
<td>99.932</td>
<td>11.2500</td>
<td>246.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POND 10</td>
<td>OUT POND</td>
<td>100</td>
<td>99.932</td>
<td>11.2500</td>
<td>246.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBAREA 10</td>
<td>AREA</td>
<td>100</td>
<td>99.932</td>
<td>11.2500</td>
<td>246.62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs  Rain Depth = 8.2000 in
Rain Dir = V:\Projdata\06proj\06021\Calc\OFFSITE DRAINAGE\ Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\06proj\06021\Calc\OFFSITE DRAINAGE\ HYG File - ID = - SUBAREA 10 Pre100
Tc = 1.9065 hrs
Drainage Area = 246.230 acres  Runoff CN= 72

--------------------------------------------------------------------------------
Computational Time Increment = .05084 hrs
Computed Peak Time = 11.2351 hrs
Computed Peak Flow = 246.76 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.2500 hrs
Peak Flow, Interpolated Output = 246.62 cfs

--------------------------------------------------------------------------------
DRAINAGE AREA
-----------------
ID:SUBAREA 10
CN = 72
Area = 246.230 acres
S = 3.8889 in
0.2S = .7778 in

Cumulative Runoff
-----------------
4.8704 in
99.936 ac-ft

HYG Volume...
99.932 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 1.90646 hrs (ID: SUBAREA 10)
Computational Incr, Tm = .05084 hrs = 0.04000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 146.34 cfs
Unit peak time Tp = 1.27094 hrs
Unit receding limb, Tr = 5.08377 hrs
Total unit time, Tb = 6.35471 hrs
Appendix X

Wastewater Treatment Design
WASTEWATER TREATMENT DESIGN AND OPERATING ASPECTS

Treatment Requirements for R-1 Recycled Water

The primary method of effluent disposal proposed for the La’au Wastewater Treatment Plant (WWTP) is beneficial reuse as irrigation water for select areas of conservation lands along the coastline and for soil erosion control in arid areas of this project. Therefore, the effluent produced by the WWTP shall meet the Hawaii State Department of Health (DOH) R-1 recycled water quality criteria. R-1 quality recycled water requires the effluent to be at all times oxidized, then filtered, and then exposed to a disinfection process that kills pathogens.

Overview of Proposed Treatment Facilities

A fully integrated wastewater treatment system that incorporates biological processes, ultrafiltration membranes, and disinfection technology is proposed for the WWTP due to the stringent effluent requirements for R-1 recycled water. This technology combines the activated sludge process with micro-pore filtration in a compact membrane bioreactor (MBR). Both oxidation and filtration are achieved in the MBR, thus eliminating the need for separate secondary and tertiary treatment processes.

Preliminary treatment of the plant influent for treatment in the MBR include coarse bar screening, grit removal, flow equalization, anoxic basin, pre-aeration, and fine screening of the wastewater.

Final effluent from the MBR, virtually particulate-free, will be disinfected using ultraviolet irradiation to render it bacteriologically safe for recycle and disposal.

Solids generated at the WWTP include screenings, grit and sludge. Screenings and grit will be dried on-site using sand drying beds and disposed in a county landfill.

A schematic of the treatment proposed at the WWTP and a conceptual site layout are provided in Figures 1 and 2, respectively. Constituent concentration levels anticipated after each treatment process are presented in Table 1.

TABLE 1
ANTICIPATED EFFLUENT CONSTITUENT LEVELS

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Influent</th>
<th>MBR</th>
<th>UV Disinfection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average BOD$_5$ (mg/L)</td>
<td>240</td>
<td>&lt; 5</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Average SS (mg/L)</td>
<td>240</td>
<td>&lt; 5</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Fecal Coliform – median (CFU/100 mL)</td>
<td>$10^8$</td>
<td>&lt; 23</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>30 - 50</td>
<td>&lt; 0.2</td>
<td>&lt; 0.2</td>
</tr>
</tbody>
</table>
FIGURE 1

PROCESS FLOW DIAGRAM
Figure 1
Flow Diagram – Submerged Membrane Bioreactor Wastewater Treatment Plant

1. Preliminary treatment using coarse screens
2. Grit Removal
3. Equalization Tank - Size dependent on system peak flow
4. Fine Screen – 1/8" opening
5. Anoxic / Aeration / Membrane Tanks (MBR) and Permeate Pumps and Air Blowers
6. Disinfection by ultraviolet irradiation
7. Effluent storage basins (when not irrigating using recycled water)
8. Waste sludge holding tank for biosolids dewatering on sand drying beds

Recirculation path and equipment are not shown
FIGURE 2
CONCEPTUAL WWTP LAYOUT
Sludge Treatment and Disposal

The MBR is essentially a high mixed liquor suspended solids (MLSS) activated sludge process utilizing a membrane as a means to separate the solids from the liquid. The MLSS concentration in the MBR typically ranges between 15,000 mg/L to 30,000 mg/L with sludge ages typically in excess of 40 days. Therefore, sludge digestion is typically not required following the MBR. Wasted sludge (or biosolids) from the MBR will be dewatered to humus using sand drying beds, a practice that is particularly conducive in the arid climate of west Molokai. Biosolids residue for disposal at a county landfill will be small, amounting to about 70 cubic yards annually.

Alarms and Telemetering

Alarms indicating high and low liquid level conditions, equipment malfunction, and other emergency conditions will be a feature of the WWTP. Visual and audio alarms will be integrated in the control centers of the WWTP, and any alarm signals will be sent through telephone lines to the homes and mobile telecommunication devices of key maintenance personnel as an additional safety measure during non-work hours.

Odor Control

Since the collection system for the development is not extensive and the sewer flow velocities are high in the small-diameter pressure mains, the detention time in the sewer system should be relatively short, thereby minimizing the formation and emission of odors at the WWTP.

Reliability and Redundancy

Safeguards will be incorporated in the plant design to ensure that treatment operations are uninterrupted in the event of power failure or equipment malfunction. Design features will comply with the reliability and redundancy provisions promulgated in the “Guidelines for the Treatment and Use of Recycled Water”, prepared by the Hawaii State Department of Health, and dated May 15, 2002, and amendments thereto. For power supply reliability, an auxiliary generator will automatically operate and transfer power during electrical power outages. For process redundancy, multiple units of tanks, pumps, and other key equipment will afford parallel operation during times when a process unit is taken out of service for maintenance or repair.

During times when the irrigation system is not in operation or when recycled water quantities exceed the irrigation requirements, a storage tank and backup storage and disposal impoundment will be utilized for any excess, such as in times of inclement weather or system maintenance.

Restricted Public Access

Wastewater conveyance pump stations and treatment facilities will be fenced to restrict public access.
**Warning Signs and Special Precautions**

Effluent reuse facilities, including piping and appurtenances, and application areas subject to public access will have warning signs stating that irrigation water is not fit for consumption. These signs shall comply with the DOH guidelines.

**Construction Phasing**

The treatment plant will be constructed with an initial capacity of 60,000 gallons per day (gpd), and consist of dual parallel process trains of 30,000 gpd to afford operating redundancy. At some future time when the wastewater flow is forecast to increase as build-out of the project nears, another increment of up to two 30,000 gpd capacity modules will be added to the existing plant. Concomitant with this expansion will be provisions for additional drying beds and ancillary equipment.
Appendix Y
Kaluakoi Resort Map