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BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAI'I

In the Matter of the Contested Case Hearing Regarding Water Licenses at Honomanu, Keanae, Nahiku, and Huelo, Maui	DLNR FILE NO. 01-05-MA PETITIONERS' DIRECT TESTIMONY OF BEATRICE PUALANI KEPANI KEKAHUNA; CERTIFICATE OF SERVICE Hearing Date: October 10, 2005 Time: 9:00 a.m. Officer: Hon. E. John McConnell, Esq.

PETITIONERS' DIRECT TESTIMONY OF
BEATRICE PUALANI KEPANI KEKAHUNA

Q. Please state your name for the record.

A. BEATRICE PUALANI KEPANI KEKAHUNA.

Q. When and where were you born?

A. June 3, 1932 in the Hana Hospital in Hana, Maui.

Q. Who are your parents and grandparents?

A. My mother was Juliana Martha Koko. My father was Lokana Kepani, Jr. and his mother was Pi`i`ōhia, aka Piohia.

Q. What are the properties in Honopou in which you currently own an

interest?

A. In addition to other property in Honopou, my `ohana also acquired title to Royal Patent Grant 1082 to Kaimi. The Kingdom also granted Royal Patent Grant 3101 in two apana, consisting of two separated parcels, approximately 6 and 9.82 acres each, to my grandfather Kepani. Apana 1 of Grant 3101 now consists of 5.7 acres and is now TMK 2-9-01-6. LCAw. 5595-E:1, which surrounds Grant 1918:1, abuts Grant 3101:2. All of these parcels, except for Grant 3101:1, are, together with Grants 1082 and 3101:2, a part of the larger TMK 2-9-01-14, collectively consisting of 22.81 acres. The relevant tax map, now shows that Elizabeth Kepani and others in my `ohana own Grants 1082, 1918:1, and 3101:1 and 2, and LCAw. 5595-E:1. My father deeded his partial interest in TMK 2-9-01-14 to me and my sister Virginia Amaral effectively providing my sister and I with the legal authority to cultivate taro on these lands. This parcel is riparian to Honopou Stream.

Q. How do you use that TMK?

A. I farm a portion of this land with my cousin Marjorie Wallet and her `ohana, but the current stream flow does not allow us to cultivate taro as we wish.

Q. Who is the current owner of the kuleana on which your hale is located?

A. LCAw. 5459-X:2 to Imihia is designated as TMK 2-9-01-16. My dad deeded that parcel to Lokana Kepani Jr. my oldest brother, now deceased. His three sons, Clifford, Gary, and Thomas who all live and work in Honolulu. They have collectively given me permission to live on and farm this kuleana which is riparian to Honopou Stream.

Q. How do you use that kuleana?

A. I occupy the house on LCAw. 5459-X:2 to Imihia, where I also have 3 taro lo`i.

Q. Where are the lands located?

A. TMK sheet 2-9-01 depicts the area along the Honopou Stream. This land is located down an unpaved road makai of the main government highway.

Q. How did you end up living and farming on the lands you currently occupy?

A. I helped my `ohana raise taro in Honopou since I was a little girl. As an

adult, I continued to farm taro despite the lack of sufficient streamflow in Honopou Stream.

Q. What is your background in taro farming?

A. I grew up with my parents in Honopou, on the lands mentioned above along Honopou Stream. I had to work the lo`i as a child (keiki). I recall growing taro along the Honopou Stream on Grant 3101:2, Grant 1918:1, LCAw. 5595-E:1, and LCAw. 5459-X:2.

Q. How much taro did you grow back then?

A. As a girl, I remember that we kept about 25 lo`i in wetland taro on Grant 3101:2, Grant 1918:1, and LCAw. 5595-E:1. We had about 3 lo`i near the house on LCAw. 5459-X:2.

Q. What kind of taro did your `ohana grow?

A. Mainly lehua.

Q. How did you `ohana manage so many lo`i?

A. We planted in cycles to take advantage of the placement of the lo`i, `auwai, and the need to let each lo`i rest in between plantings. This pattern allowed the lo`i to stay rich and productive. If we didn't let the lo`i rest in between plantings, the crops would suffer.

Q. Were there other Hawaiian families that lived along the Honopou Stream when you were a girl?

A. Yes, people used to go mauka-makai in the valley, farming mauka and fishing along the shore.

Q. What kinds of fish would these residents of Honopou catch?

A. People would catch many kinds of fish for their diets – manini, po`opa`a, hīnālea, enenue, and moi. There was even a trail that went through our `aina for this purpose.

Q. Would they gather other kinds of foods?

A. Yes, they would gather limu along the shore and hihiwai, o`opu, and ōpae in the stream. There were lots of hihiwai, o`opu, and ōpae, when there was more water in the stream.

Q. What about today?

A. Now, no more. The water in the stream is dirtier, and there is less coming down all the way to the ocean.

Q. Where did you gather what you needed from the stream when you were a girl?

A. I just went to the stream right by our kuleana. For example, in the early morning, I'd fish for o`opu, as they slept in the sand. I didn't even use fish hooks; I just picked them from the stream. I also gathered ōpae `oeha`a, which lived in our lo`i and `auwai.

Q. How would you eat the o`opu?

A. We would dry them, lāwalu paha with salt.

Q. Where would you get salt?

A. We'd gather salt from the small natural pools, kāheka, near the sea.

Q. What other foods did you gather or grow?

A. I used to catch moi li`i during its season, with a safety pin. My father also grew sweet potato (uala), pumpkin (pāla`ai paha), squash, sugar cane, and various vegetables.

Q. How important was the stream and `aina to your `ohana?

A. It was vital to our culture and survival. The land sustained and gave life to the families along the stream.

Q. Have you sought the BLNR staff assistance to restore flow?

A. I don't understand why the Department of Land and Natural Resources (DLNR) staff won't act to help us taro farmers and Hawaiian cultural practitioners. They've known about our problem for years, yet refuse to take any action against A&B/EMI to put more water back into the streams. I've made complaints to several generations of these state employees without any result. They come out and visit, look at my problem, then do nothing. My attorneys have repeatedly described in detail my inability to grow more than a small amount of taro with the available water released downstream of the ditch. No one from the DLNR staff has taken any initiative to determine whether I can now grow the amount of taro I am trying and entitled to grow with the amount of water now in the stream. I have been frustrated for years by the failure of the State to address my and others water rights by requiring A&B/EMI to return

streamflow to Honopou Stream so I can grow as much taro on these lands as my father and grandfather before him once did. I asked all that time, but without any response. I am now forced to go to formal contested case hearings. That is not right.

Q. What financial burden has this placed on you and your family?

A. Taro farming, fishing, and gathering from the sea and coastline all contributed significantly to helping me offset the significant costs of feeding my family. It also allowed me to engage in the cultural traditions I learned from my elders and which I want to pass on to my keiki and mo`opuna. Denying me water in the stream has an immediate, direct, and significant effect on my ability to sustain my family with food and cash to pay for living costs and to pass on these cultural practices. In effect, the loss of water has signicantly adversely impacted my cultural heritage and my `ohana's self-sufficiency. I have to pay for the difference in food costs.

In the past 4-5 years, the price of poi available to me in the store costs $5 per plastic container and is shipped from Kaua`i. The poi from the Maui bags tasted better, but I can hardly get local poi anymore because the supply is so low, especially when you go into a store late in the day. Also, because I cannot find the hihiwai, o`opu, and ōpae, I am forced to buy other foods to substitute for those sources. This all adds to my food bill. Since I only have social security benefits, every little bit makes a big difference. I would much prefer to be able to rely more on what nature used to provide families like mine in Honopou to help me feed myself and my family.

Q. Has this situation imposed other costs on you?

A. I cannot afford to pay for any major costs of pursuing my legal claims, but I am obligated to pay for the costs of legal representation from the Native Hawaiian Legal Corporation. I have to ask for a waiver of that obligation because I cannot afford to pay for them. I also cannot afford to pay for any mediators, should any be appointed to mediate this dispute.

Q. What is your reaction to this situation?

A. I don't think it's fair, nor legal. I only want to get the water I am clearly entitled to get to farm taro and gather from the stream as my ancestors did. That's an entitlement the DLNR should have recognized and done something about long ago, instead of allowing A&B/EMI to continue victimizing me and my `ohana. The water I

am seeking comes from ceded lands the state is supposed to manage for my benefit and other native Hawaiians. The DLNR is not doing that job and is, in the process, ignoring Hawaiians. Given my superior rights, I should be able to pick up the phone, call someone at the DLNR, inform them that I am being denied a sufficient amount of streamflow and have the problem resolved quickly. Instead, I have to prove that water should be released from the diversions. The water diversions the DLNR is allowing are illegal and should stop so I get as much water as I need to grow taro and once again gather from the Honopou Stream as my ancestors did. Once my rights and the superior rights of others are satisfied then the DLNR may determine what, if any, amount of the excess can be diverted.

Q. Where have you seen these diversions on Honopou Stream?

A. Right below the main highway on the stream, EMI has a large concrete dam that diverts water into the Haiku Ditch. In place of the natural flow, EMI has installed 4 inch pipes to carry a fraction of the natural stream flow beyond the dam. A gate use to control the release of water into the stream from this diversion. My dad used to open and close that gate as he needed, but now only the 4 inch pipes over the dam allow for a fixed amount of water to flow downstream and that isn't nearly enough to satisfy my rights and the rights of others.

Q. How has this low flow specifically affected your `ohana?

A. We can't plant as much taro as we once did. I still grow taro on LCAw. 5459-X:2. I have started to restore the lo`i on LCAw. 5595:E:1, and a portion of Grants 1918 and 3101:2. However, the low flow has prevented me from going further. Although I and my `ohana want to open up more already existing taro lo`i on our property, there isn't enough water flow to do so. Also, my `ohana and I are unable to exercise other traditional and customary native Hawaiian rights in and around our ahupua`a, coastline and adjacent ocean waters for subsistence, cultural and religious purposes passed on to us by our ancestors.

Q. How many traditional taro lo`i could you plant on the lands you mentioned?

A. About 33-35 lo`i.

Q. How many do you now have planted?

Q. 1-2 lo`i.

B. What is the reason you do not have more lo`i planted in taro?

A. When there's not enough water, as now, and for the past several years, the taro will rot without sufficient flow through to keep the temperature down in the lo`i.

Q. What are you planning to do in this current situation?

A. I have to leave some lo`i fallow for good farming practices. I would try to open up 3 now, to see whether we can grow it. I am asking the DLNR to force EMI to release water from its ditch so enough water reaches the intake to my `auwai.

Q. What kind of taro will you plant?

A. I'd prefer Moi or Aweweo kalo because it can be used for both poi and and luau leaf, but there is more chance it would encounter problems with root rot, so I feel I have to wait until the decision in this case gives me the water I need.

Q. How many lo`i would you open if you had all the water you needed?

A. Maybe 20-25, so I can rotate crops at different times in different lo`i. That means I'll leave about a third fallow.

Q. Who would help you?

A. My cousin Marjorie Wallet, her daughter, Lyn Scott, and my 2 sons Sanford and Boniface. Only the DLNR and its partner A&B/EMI is stopping me from growing the taro I could grow.

Q. Didn't A&B/EMI put in an additional pipe in the past year to make it easier on you?

A. It put in an extra pipe to pass more water over its dam above me, but the additional flow does not provide what I really need. Garrett Hew's employees started measuring the difference in flow during an especially rainy period. As a result, the difference in flow was due more to the rain than the flow through the additional pipe. Flow measurements should be taken during the normal dry period to get a true picture. The regular additional flow from the pipe is not sufficient for me to open up more taro lo`i. I can't rely on the flow through this additional pipe given the costs and amount of work involved with adding more taro lo`i.

Q. It seems as though your roots in Honopou are very deep?

A. I am connected to that land by birth and heritage and will always live there. I believe in malama `aina, as my dad taught me as a girl, and apply it today in my

kupuna years. There is an old cemetery just above the old Honopu landing. No one is assigned to care for it, so I take care of it myself. This tradition of malama `aina is important to all Hawaiians like me who have tried to remain on the lands on which we were raised.

The many Hawaiian families, like mine, that once thrived on this coast depended on an abundant flow of water in the streams for our taro growing and gathering activities. Our ability to depend on this water was critical to our being able to survive off the land. However, the diversions undertaken by A&B/EMI with the State's blessing have all but extinguished that ability. The decline in water flow as a result has steadily made our situation worse, because we increasingly lose the ability to fend for ourselves and pushed into relying more on a cash economy for our basic needs. If we had more water flowing in the stream, the resulting farming and gathering activities we would no doubt pursue would help restore our confidence, security, and culture. Without it, we continue to feel burdened by the resulting loss in food and cultural activities so dependent on naturally flowing streams.

I am now 73 years old and have seen many negative changes to the stream and the activities we pursued as Hawaiians that relied on that stream flow. I want to grow more taro and pass on that knowledge to my children and grandchildren so they can continue to make the lands of my ancestors as productive as they once were. I cannot do that without the state and A&B/EMI restoring the stream flow to which we as Hawaiians superior rights. These rights continue to take a back seat to the economic motivations of a private sugar plantation. This is Hawai`i. Our rights are supposed to be enforced so we can keep our unique cultural practices alive and well.

CERTIFICATE OF SERVICE

I hereby certify that two (2) copies of the foregoing document were duly served on Linda L. Chow, Deputy Attorney General, for Hearings Officer, The Honorable E. John McConnell on August 1, 2005, by hand delivery. I further certify that one (1) copy was served on the remaining parties as indicated, on August 1, 2005.

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DATED: Honolulu, Hawai'i, August 1, 2005.

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BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

Petition Contesting Application for Long Term Disposition of Water Licenses and Issuance of Interim Revocable Permits at Honomanu, Keanae, Nahiku, and Huelo, Maui	DLNR FILE No. 01-05-MA DECLARATION OF LEE JAKEWAY

DECLARATION OF LEE JAKEWAY

I, LEE JAKEWAY, declare as follows:

1. I am currently employed by HC&S as its Superintendant of Water Coordination. I am originally from the State of Michigan, where I attended Michigan State University and received a Bachelor of Science degree in Agricultural Engineering in 1975. I subsequently attended the University of Hawaii and received a Masters degree in Agricultural Engineering in 1977. I then worked for the Hawaii Sugar Planters Association for approximately 15 years on various research projects before returning to the mainland for other employment. I became a certified as an Agricultural Engineer by the State of Hawaii in 1983. I returned to Hawaii in 1999 to accept my current position with HC&S.

2. As HC&S' Superintendant of Water Coordination, it is my responsibility to monitor and coordinate HC&S' use of water delivered by East Maui Irrigation Co. This entails monitoring the available surface water that is being delivered to HC&S on a daily basis

EXHIBIT "C"

EXHIBIT A-153

from East Maui via the EMI system, and making daily decisions regarding which of HC&S's pumps to operate for what periods of time in order to supplement the surface water being received.

3. HC&S cultivates sugar on approximately 37,000 acres. Approximately 30,000 of these are irrigated by EMI delivered water. Of these, approximately 5000 are irrigated solely by EMI water and approximately 25,000 are irrigated with a combination of EMI water and groundwater pumped by HC&S when EMI ditch flows are inadequate to meet the irrigation needs of the fields. Surface water from West Maui is used to irrigate the approximately 7000 acres that cannot be irrigated with EMI water.

4. Most of the water delivered to HC&S by EMI is used for irrigation of the approximately 30,000 acres of sugar fields that can receive EMI water but some is also used for factory purposes.

5. The factory purposes for which EMI water is used include makeup water for the boilers, industrial water for grounds and landscape maintenance, water for fertilizer mixing, factory utility water that provides cooling water to evaporator condensers and is then used as cane wash water, and water for fire protection (in pressurized pipelines). The average aggregate amount of EMI water that is used for these purposes ranges from 3 to 8 mgd.

6. The irrigation needs of the approximately 30,000 acres that receive EMI water is determined by the daily evapotranspiration rate, which is defined as the loss of water from the soil both by evaporation and by transpiration from the plants growing thereon, and varies during the year depending upon climatic conditions, solar insolation, temperatures, humidity, and wind speed. In order to maintain sugar yields the sum of available rainfall plus irrigation water applied to the fields must approach this figure as much of the time as possible.

The evapotranspiration rate tends to be the highest during the months of May through October, which are the peak growing, planting and harvesting periods for the plantation.

7. For approximately 5000 acres (HC&S field nos. are 100, 101, 109, 110, 111, 112, 113, 116, 117, 118, 119, 120, 200, 300, 301, 302, 303, 304, 307, 312, 313, 314, 400, 401, 410, and 413), EMI surface water is the only available irrigation source.

8. For approximately 25,000 acres that receive EMI water, ground water can be pumped from HC&S wells as an alternate source of irrigation water. The ground water is brackish, however, i.e., it contains salts in varying amounts depending upon location and pump usage rates, which makes it less desirable and less effective than EMI water, which is fresh. Surface water is therefore the preferred source in whatever amounts it can be delivered both because it is fresh and because it can be delivered by gravity flow rather than by pumping, which consumes electric power. The limiting factors on the amount of ground water that can be used for irrigation of these fields are the amount of power that is available for running the pumps and the salinity of the ground water. As a result of these factors, the quantity of ground water that is realistically available for irrigation of HC&S fields during non-drought conditions ranges from 40 to 80 mgd depending upon the number of pumps operating .

9. The amount of irrigation water that is needed for the approximately 30,000 acres that receive EMI water varies with the weather but averages from a low of 134 mgd during the winter months to a high of 268 mgd during the peak usage months from May to October. For the last 3 operating years (2002-04), the average breakdown was 71% surface water and 29% pump water.

10. During the months of peak usage, it is a constant challenge for HC&S to apply enough water to replace the loss of soil moisture in the fields at a rate that approaches the

evapotranspiration rate. For example, the average evapotranspiration rate for sugarcane in the month of July is 0.325 acre-inches per day, but the median flow delivered by EMI during this period amounts to an equivalent of 0.232 acre-inches applied over 30,000 acres or about 71% of the evapotranspiration requirement. The balance of the deficit water will try to be met with pumped irrigation water, but it is operationally difficult to maintain the required soil moisture levels through mainly pumped water. When ditch flows are at maximum capacity, HC&S tries to catch up by irrigating the cane to restore the soil moisture that was lost during a previous dry period. The soil basically acts as the water reservoir to maintain growth for the cane plant.

11. In order to maintain its acreage in sugar cultivation at yields that allow sugar cultivation to be economic, HC&S has to constantly monitor, conserve and carefully prioritize the manner in which available water is applied to the fields. The fact that HC&S uses drip tubes to irrigate the fields, for example, has greatly increased the efficiency of HC&S' use of irrigation water.

12. HC&S does not have the capacity to irrigate all of its fields simultaneously. The irrigation water that is available is applied in "rounds" to different fields in accordance with priorities that are assigned to them by the farm managers. The highest priority is given to fields that are being planted, the second priority is given to fields that are ripening, and the third priority is given to all other fields (routine irrigation). During the peak growing months, HC&S needs all of the water that is delivered by EMI, except during extremely rainy weather. This is because the average daily flows delivered to it by EMI combined with the amount of ground water that can practicably be pumped typically fall short of the amount of water that is needed to replenish the soil moisture of the fields to keep up with the cane crop evapotranspiration rate, as explained in the example given earlier.

13. Because HC&S maximizes the use of all of the EMI water that it receives from EMI, reductions in the amount of water HC&S receives from EMI during most periods of the year will have a detrimental effect on HC&S because it will have the effect of increasing the deficit between the ideal level of irrigation water needed to maximize sugar yields and the amount that HC&S is actually able to deliver. In addition, reductions of EMI water during periods of low flows in the EMI ditch system would place the viability of HC&S' operations in jeopardy because such reductions would increase the length of time that fields are deprived of moisture replacement to the point where, apart from achieving less than optimum yields, crops may be lost, and plantings deferred.

14. HC&S generates its power needs principally through a combination of the burning of bagasse and other supplemental fuels in its power plant and the operation of its hydro power turbines on its ditch system, which are supplied by EMI water. The total power generation capacity of HC&S' combined system is 36 megawatts (MW) during cane grinding periods (30 MW from steam and 6 MW from hydro). The annual electricity generation contribution from hydro units that run off of the ditch system was 9.2% of total electric power generated from 2002 to 2004.

15. HC&S has a firm power contract with Maui Electric Company ("MECO") pursuant to which HC&S is obligated to supply to MECO 12 MW of power from 7:00 a.m. to 9:00 p.m. daily except Sunday and 8 MW at all other times, subject to events of force majeure. The contract provides for monetary penalties in the event these requirements are not met. The 30 MW total capacity of the steam-powered system combined with HC&S' internal power

consumption and obligations to supply power to MECO is a limiting condition on HC&S' ability to pump groundwater during dry periods when the hydro units may not be operating.

I declare, verify, certify, and state under penalty of perjury that the foregoing is true and correct.

Executed at Puunene, Hawai'i, on July 29, 2005.

LEE JAKEWAY

Maui County Water Use and Development Plan

Upcountry District

Final Candidate Strategies Report

Upcountry Water Advisory Committee
Review Draft

July 27, 2009

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EXHIBIT A-154

Recommended Upcountry District Plan

The Upcountry District is at a threshold in terms of the economics of water supply to meet new water demands. The Upper Kula and Lower Kula surface water systems are the major source of inexpensive water for this region. The reliable capacity of these sources is finite and, in the drier summer months and during drought conditions, is already at practical limits. Additional reservoir capacity can provide only limited additional reliable drought period capacity. New growth in water demand on the Upcountry system will have to be met by substantially more expensive resources.[19]

The limits on the amount of economical water available in the Upcountry District result in several important water allocation policy issues that must be resolved. Surface water must be allocated between municipal uses, agricultural uses and the need for restoration of water to East Maui streams. In the near future the operation protocols and water pricing policies for the Upper Kula non-potable water line will have to be resolved.[20] It is also clear that the availability of water currently diverted from East Maui streams for municipal and agricultural purposes will be reduced as amendments are made to the incumbent Interim Instream Flow Standards for these streams. The magnitude of these reductions has not been determined but it is clear that mitigating actions will be necessary in order to maintain the existing level of drought period reliable capacity provided by the East Maui Irrigation ditch system.

Meanwhile, there is a pressing need for additional water production capacity. There is an existing backlog of water demand on the Upcountry District system with a substantial waiting list for new water meters. There is frustration regarding recurrent needs to conserve water during dry periods when water is most needed for irrigation purposes.

There are several policy determinations that need to be addressed, either implicitly or explicitly in deciding and implementing a recommended plan. These determinations can be informed by analysis but are not answered resolutely by analyses:

- How will providing drought period reliability be balanced with providing the most economic water services.
- How will agricultural water needs be balanced with municipal water availability and pricing?
- Will the County continue to support the amendment of East Maui stream interim instream flow standards in light of the resulting costs to mitigate impacts on the drought period reliability of the Upcountry system?
- Are the limits to Upcountry District availability for new meters to be determined primarily by drought period reliability criteria or by operational economics? This affects both policies regarding the issuance of new meters and how the system is operated to maintain drought reliability.
- Will efficient use of water be promoted by expenditures on conservation programs, by mandates or by a combination of both?

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19. Depending on location of water use, marginal production costs for new water demand in drier summer months is up to ten times as expensive as existing average water production costs. The capital costs to provide new water sources for new water services is several times higher than existing the existing system development fees intended to cover these costs.

20. There is a stark divergence of thought amongst the various implementing and affected agencies and stakeholders regarding how water feeding into and out of the agricultural water line will be priced, managed, controlled and allocated.

A recommended Upcountry District plan is outlined below to serve as a starting point for review and discussion for the Upcountry District section of the Maui County Water Use and Development Plan. The general terms of the recommended strategy are described, followed by some specific recommendations consistent with implementation of the strategy.

The recommended strategy attempts to address the planning objectives derived from comments by the Upcountry District Water Advisory Committee. The strategy consists of several components:

- Department of Water Supply actions to provide water needs for its customers
  - Conservation programs to reduce water production requirements
  - New sources of water supply
  - Regulations and rate designs to promote responsible use of water
- Programs to protect the county's aquifers, watersheds and streams
- Priorities and policies regarding water use and allocation

The recommended Upcountry District Plan is outlined below:

Short Term Resources

- ACQUIRE NEW WELLS INSTALLED BY NON-DWS DEVELOPERS AS APPROPRIATE: New wells that comply with DWS standards and would provide resources that will be of long term value to the DWS Upcountry District should be acquired provided that contractual terms are beneficial to the DWS and its customers.
- PROVIDE BOOSTER PUMP STATION EQUIPMENT REDUNDANCY: Provide third trains of motors and pumps to the Phase 6 and Phase 10 booster pumps to provide sufficient backup reliability to operate two pumps at each booster station continuously with sufficient backup capacity. In the alternative, provide backup replacement equipment on-island to allow immediate replacement of failed equipment.
- CONTINUE AND ACCELERATE LEAK DETECTION AND REPAIR PROGRAM
  - Provide additional budget, staff and equipment to accelerate leak detection and repair for all DWS systems.
- REFINE SYSTEM OPERATING PROTOCOLS TO INCREASE PRODUCTIVE USE OF EXISTING RESERVOIRS
  - Refine Upcountry District system reliability standards
  - Examine and determine system operational constraints and identify explicit appropriate protocols for reservoir management
  - Determine what system modifications and measures are necessary to increase system reliability and/or productive use of surface water capacity
- EXPLORE DEMAND RESPONSE OPTIONS Demand response options are measures that can be implemented quickly during periods of restricted water availability or in response to water supply system disruptions. In order for these options to be effective, protocols and authorities need to be established in advance of the need for demand response measures.
  - Landscape irrigation scheduling restrictions
  - Monitoring and enforcement of waste prohibitions
  - End-use restrictions (on pavement cleaning / watering, automobile washing, dust control with potable water and other discretionary uses of water)

- CONTINUE INVESTIGATION OF SURFACE WATER TREATMENT DISINFECTION BYPRODUCT REDUCTION MEASURES

Long Term Resources

In previous sections of this report several final resource strategies were examined that posed alternative approaches to providing new water supply for the DWS. The recommended strategy recognizes that there is substantial uncertainty regarding the feasibility, costs and timing of the availability of some of the final resource strategies.

Discussion:

- Additional raw water storage reservoir capacity for the Lower Kula system would be cost effective and would provide long term benefits in terms of reduced electrical power consumption and operating costs.
  - Optimum added reservoir capacity from an economic and system operation standpoint would be between 100 to 300 million gallons.
  - Permitting and construction of a 300 million gallon reservoir east of the existing reservoir may not be practical due to environmental concerns at the candidate sites east of the existing Piiholo reservoir.
    - Candidate reservoir sites for a 300 MG reservoir east of the existing reservoir are located where roads through protected subzones with identified endangered species would be required. A Habitat Conservation Plan and Incidental Take License(s) would be required which could add substantial costs to the project
  - A reservoir of at least 100 MG may be feasible near the existing Piiholo reservoir outside of environmentally sensitive areas.
  - Budgeting for the large initial capital expenditures for reservoir construction has not been determined or committed.
- New raw water storage capacity to serve the Kamole WTP would cost less than addition of basal wells as a means to mitigate the expected reductions in Wailoa Ditch base flows resulting from implementation of amendments to the interim instream flow standards on East Maui streams. However, if a substantial number of basal wells would be added to the Upcountry system prior to commissioning a Kamole WTP reservoir, the cost effectiveness of the installing the reservoir would be diminished.
  - A 100 MG reservoir would mitigate a 20 MGD reduction in Wailoa Ditch base flows.
  - A 200 MG reservoir would mitigate a 30 MGD reduction in Wailoa Ditch base flows.
  - With reductions in base flows exceeding 30 MGD it would be more cost effective to provide drought period reliable capacity by additional basal wells than adding reservoir capacity for the Kamole WTP.
  - Budgeting for the large initial capital expenditures for reservoir construction has not been determined or committed.
- Basal groundwater wells are being drilled and developed by non-DWS entities. These wells are being offered to the DWS in trade for source credits and water entitlements or are being offered to meet subdivision requirements to identify a source of water to serve new services.
  - The addition of basal well capacity does not provide all of the infrastructure necessary to provide an economical source of water.

- Basal wells function as backup resources and do not provide economical water production capability.
- Water from basal wells also requires installation and operation of booster pump capacity to deliver water to the location of water demands.

- The long term water quality and long term productivity of new wells is not possible to determine reliably until wells are drilled and tested. The productivity and water quality of some wells are proving to be substantially different from others even in relatively close proximity.

- Improvements to the intake structure of the Kamole WTP is cost effective compared to drilling new basal wells to provide incremental drought period reliable capacity.
  - The ability of these improvements to provide drought period reliable capacity for the Upcountry District is limited but valuable.
  - These improvements would not appreciably increase the average supply of water to the Upcountry District system under average conditions.
- New growth in demand for water on the Upcountry District system is very expensive to provide, both in terms of capital costs and long term operating costs.
  - The amount of economical surface water available on the Upcountry systems is finite and is at its limits. Except for a limited amount of new capacity provided by additional raw water storage on the existing surface water systems, new growth will ultimately will be served by pumping up thousands of feet from basal groundwater aquifers.
  - Any new growth in water demand on the Upcountry systems be much more expensive to serve than existing demand and will cost much more than current system development fees provide.

Recommendations:

Based on these considerations the following plan components are recommended regarding acquisition of new potable water supply sources for the Upcountry District:

- DETERMINE THE OPTIMAL SPECIFIC LOCATION AND FEASIBLE CAPACITY AND PROCEED WITH DEVELOPMENT OF A NEW RAW WATER STORAGE RESERVOIR FOR THE LOWER KULA SURFACE WATER SYSTEM
  - Convene a meeting of principal environmental permitting agency representatives to discuss and determine probable constraints, conditions, mitigation measures and costs for alternative sites for a new reservoir
  - Proceed with studies to determine the feasibility, optimal reservoir capacity and location and, as determined to be appropriate, proceed with budgeting, environmental permitting and engineering for a new storage reservoir.
- DETERMINE WHETHER NEW BASAL WELLS OR A RAW WATER STORAGE RESERVOIR ARE THE PREFERRED METHOD TO PROVIDE DROUGHT PERIOD RELIABLE CAPACITY FOR THE UPCOUNTRY SYSTEM.
  - Determine whether incremental drought period reliable capacity additions that could be provided by developing or acquiring new basal wells should be deferred until a raw water reservoir can be commissioned for the Kamole WTP.
    - Determine the most likely magnitude of reduction in Wailoa Ditch base flows resulting from amendments of the IIFS on East Maui streams.
    - Refine capital cost estimates for a Kamole WTP reservoir project and determine capital funding alternatives.

        - Initiate discussions with Alexander and Baldwin regarding mutually productive protocols for allotment of water at Kamole Weir under varying ditch flow conditions.
        - Determine whether it is acceptable to defer the provision of new drought period reliable capacity that would be provided by incremental additions of basal wells until a Kamole reservoir can be put into service.
    - IF SO DETERMINED, ACQUIRE NEW BASAL WELLS DEVELOPED BY NON-DWS ENTITIES
        - Review all wells offered by non-DWS entities to assure that water quality, long term productivity, project engineering and materials all sufficiently meet DWS standards
        - Assure that all new water source contracts provide sufficient net benefits for existing DWS customers and prospective customers on the upcountry waiting list.
    - IF SO DETERMINED, PROCEED WITH DESIGN, PERMITTING AND CONSTRUCTION OF A RAW WATER STORAGE RESERVOIR TO SERVE THE KAMOLE WTP.
- INSTALL ADDITIONAL BOOSTER PUMP CAPACITY AS NECESSARY
    - Provide sufficient booster pumping redundancy to provide reliable service in extended periods of Phase 6 and Phase 10 pumping.
- INVESTIGATE FEASIBILITY AND PROCEED WITH IMPROVEMENTS TO KAMOLE WTP INTAKE STRUCTURES TO INCREASE DROUGHT PERIOD RELIABLE CAPACITY
    - Improvements could include a small raw water storage reservoir to increase operational flexibility of the Kamole WTP and reduce filtration costs by increasing water clarity.
- IMPLEMENT PROGRAMMATIC WATER CONSERVATION MEASURES
    - Immediately take steps to begin implementation of water conservation programs designed to attain at least 15% of the technical conservation potential for the Upcountry District within five years.
        - Budget for initial implementation of programs in FY2010.
        - Provide additional DWS staff positions and train existing DWS staff in indoor and outdoor conservation audit procedures, DSM contract management and program tracking and evaluation procedures.
        - Retain expert assistance to assist the DWS to determine optimal DSM program designs, solicit and procure DSM program implementation contracts, conduct necessary market research and publicity outreach, establish a portfolio of conservation programs for the DWS systems and implement accountable program tracking and evaluation procedures.
        - Establish and facilitate an agricultural water user group to discuss and promote water efficiency measures.
    - Based on experience with program implementation and based on continuing needs to defer the need for new supply resources consider more aggressive DSM programs.
- INVESTIGATE AND IMPLEMENT OPTIONS FOR IMPROVEMENTS THAT WOULD REDUCE SYSTEM OPERATION COSTS

- Determine the feasibility of installing a new storage tank and water supply line from the Kamole WTP to serve the Haliimaile service area without pumping to the elevation of the Pookela Tank.
- Determine the feasibility of installing a water line to drop water from the Lower Kula system to the Kula Agricultural Park to reduce pumping costs under some conditions.

- MAINTAIN OPANA / AWALAU AS A NON-POTABLE WATER SOURCE AND RESERVE FOR POSSIBLE FUTURE SOURCE FOR TREATMENT AND POTABLE USE

Regulatory Measures

- CONVENE DISCUSSIONS BETWEEN THE IMPLEMENTING AND AFFECTED AGENCIES AND STAKEHOLDERS TO RESOLVE MATTERS PERTAINING TO THE DISPOSITION, OPERATION, MANAGEMENT AND CONTROL OF THE UPPER KULA AGRICULTURAL NONPOTABLE WATER LINE.
- MAINTAIN AND/OR EXTEND INVERTED BLOCK AND PROGRESSIVE RATE DESIGNS: The existing DWS inverted block rate design is progressive in the respect that it provides aggressive price signals in the higher consumption blocks that encourage conservation and also provides lifeline rates for low volume consumers.
  - Consider increasing the rate block price differential and/or providing an additional higher cost block.
  - Ensure that all costs necessary to provide water services are included in rates.
- REVIEW SYSTEM EXPANSION FINANCING POLICIES AND/OR ESTABLISH SUFFICIENT SYSTEM DEVELOPMENT FEES
  - The County should establish sufficient and appropriate System Development Fees that are consistent with the fiscal purposes and policies of the DWS. The source and transmission components of the current fees are not sufficient to pay for commensurate new source and transmission improvements. As an alternative the County should consider revising its system development financing policies to provide debt financing for system expansion improvements where necessary.
  - Consider establishing specific system development fees for each district or system.
  - Consider waiving any future increases in system development fees for prospective customers who have been on the Upcountry waiting list for some specified period of time
- ESTABLISH WATER SOURCE DEVELOPMENT CONTRACT STANDARDS: The Maui County Code provides that approvals of new subdivisions require prior verification by the Water Director of a long term reliable source of water. In areas where the DWS does not currently have sufficient water capacity or production capability, potential land developers have a strong incentive to develop new potable water sources in order to obtain required verification. Few developers want to operate water sources or commit to providing perpetual water services. In most cases developers prefer to transfer ownership of a new water source to the DWS in trade for verification of water availability, entitlements to obtain water meters and/or source credits towards payment of DWS System Development Fees.

  From the perspective of potential source developers as well as for the interests of the County there is a need for clear policies and standards regarding water source con-

tracts. Clear standards would provide fairness, encourage reasonable financial investments in new sources and ensure that new sources are safe, properly sited and contribute to the system planning and operation objectives of the DWS.

- SOURCE CREDITS: Establish clear and uniform standards for determining source credits
  - Source credits should be denominated in dollars towards the cost of system development fees at the time the source credits are redeemed (rather than in terms of capacity or meter equivalents).
  - Terms and transferability of source credits should be clearly established.
- ENTITLEMENTS: Establish clear and uniform standards for determining entitlements, reservations and verifications of water availability.
- WELL SITING: Establish standards and/or pre-established zones for well (or other source) location requiring consideration of:
  - Source / Wellhead protection to ensure long term water quality
  - Source elevation and impacts on water system operation costs
  - Proximity to existing water system transmission lines
  - Need to boost water to elevation of land developments
- SYSTEM INTEGRATION: Establish standards for integration of new sources with the DWS system
  - Need and role of new source in DWS long range system plans
  - Functional / operational role of the new water source
  - Variable and fixed operation costs
  - Storage and disinfection contact requirements
  - Design of new sources to DWS construction / engineering standards

- ESTABLISH CLEAR, MEANINGFUL CRITERIA FOR DETERMINING AVAILABILITY OF WATER AND NEED FOR NEW SYSTEM SUPPLY RESOURCES: The DWS needs to have a clear method to determine whether there are sufficient water resources and sufficient infrastructure to supply new water demands. This is necessary for several reasons including (1) the need to determine verifications of sufficient water source for new subdivisions, (2) the timing of need for new source development and capital improvements in order to maintain reliable water service and (3) implementing water allocation policies.
  - Commission a study/project to develop reasonable and useful system reliability standards, system capacity expansion criteria and methods to determine and express the status of water availability for new water services.

Resource Protection and Restoration

Actions, programs and measures to protect and restore cultural, watershed and groundwater resources are essential components of Maui's WUDP.

Watershed protection and restoration

Healthy forests and soil in our watershed areas are essential to maintain the healthy streams and ground water aquifers that are the source of our water supplies. These resources need protection and, in some places, substantial restoration. Healthy forests invite and capture precipitation, retain water to replenish aquifers, maintain base flow in streams, prevent soil erosion and flooding and maintain stream water quality.

- SUPPORT WATERSHED PARTNERSHIP AGREEMENTS
- SUPPORT FENCING AND UNGULATE CONTROL PROGRAMS TO PROMOTE REFORESTATION
- SUPPORT PROGRAMS TO CONTROL INVASIVE SPECIES

Wellhead protection

- IMPLEMENT A WELLHEAD / AQUIFER PROTECTION ORDINANCE FOR EACH ISLAND

Stream restoration

Healthy streams are essential to support Hawai'i's unique stream fauna and provide sufficient cool water necessary for growing taro.

- SUPPORT APPROPRIATE AMENDMENT OF INTERIM AND OR PERMANENT INSTREAM FLOW STANDARDS BY CWRM
- SUPPORT PROGRAMS TO PROTECT AND RESTORE STREAMS
- CONSIDER IMPACTS ON RELIANCE ON WATER FROM STREAMS IN COUNTY LAND USE DETERMINATIONS

Protection of Cultural Resources

- SUPPORT STREAM RESTORATION MEASURES
- CONSULT WITH BURIAL COUNCIL AND LOCAL KULEANA REPRESENTATIVES REGARDING DWS ACTIONS

Energy Efficiency and Energy Production

Energy costs are the single largest expense of the DWS. The DWS is the largest aggregate customer of Maui Electric Company (MECO). Opportunities to use energy more efficiently, manage the timing of electrical loads with MECO and to generate electrical energy can all benefit the County and DWS customers.

Efficient use of energy by the DWS will reduce costs to the County and DWS customers and reduce the impacts associated with electrical power production. Cost effective energy efficiency measures are consistent with all of the WUDP planning objectives.

Managing the timing of electrical energy use (load management) can be a valuable resource to MECO. The DWS can benefit by existing MECO load management incentives and by negotiating benefits resulting from future power management protocols with MECO.

The DWS has several opportunities to produce renewable energy for its own use that would reduce system costs. Renewable energy production opportunities are site specific due to the nature and availability of renewable energy sources and proximity to the DWS system electrical loads. Several specific opportunities for potential wind and hydroelectric generation have been identified for the Upcountry District. Opportunities for the Upcountry District will depend on the location of future resource development.

- ESTABLISH DWS ENERGY RESOURCE COORDINATOR POSITION
  - Establish a full time staff position or contract for assistance to monitor, investigate and implement energy efficiency programs, load management measures and energy generation opportunities
- IDENTIFY AND IMPLEMENT ENERGY EFFICIENCY OPPORTUNITIES
  - Participate in existing MECO energy efficiency programs

        - Prescriptive programs - Lighting in DWS buildings
        - Customized Rebate Programs - HVAC in DWS buildings and motor and pump efficiency investments
    - Participate in upcoming Public Benefit Fund Administrator energy efficiency programs
    - Invest in high efficiency equipment wherever cost effective
    - Monitor and optimize energy consumption of motor loads
        - Establish and monitor baseline efficiency metrics for pumping loads
        - Measure and monitor actual operational motor loads for energy diagnostics and optimization of equipment replacement
    - Establish system operation protocols that consider energy efficiency
        - Tabulate marginal operation costs for all system resources
        - Determine operational protocols to minimize energy costs without compromising system functionality
    - Optimize power factor correction on all large motor loads
        - Monitor balance of electrical service three phase legs
        - Determine and install optimum power factor correction capacitance for each large motor load
- IDENTIFY AND IMPLEMENT LOAD MANAGEMENT OPPORTUNITIES
    - Review and, as appropriate, amend MECO rate rider contracts
        - Balance MECO rate incentives versus system operation functionality
    - Monitor and negotiate load management opportunities, especially electrical system transient management services
        - Monitor MECO system needs and proposed measures to incorporate increased wind generation on the Maui electrical grid
        - Develop DWS load management protocols that are valuable to the MECO system.
        - Negotiate for shared system and economic benefits for load management services provided by DWS to MECO
- IDENTIFY AND IMPLEMENT ENERGY GENERATION OPPORTUNITIES
    - Monitor ongoing opportunities for cost effective energy generation to serve DWS electrical loads

Water Allocation Policies

This section of this report is currently drafted to provide an expository discussion of possible water allocation policies. As this matter is discussed in various public forums more concrete recommendations may be offered.

The State Water Code (Code) clearly provides that each county shall adopt a WUDP by ordinance **"... setting forth the allocation of water to land use in that county..."**[21] Apart from this unequivocal directive, however, the Code is silent and provides no further guidance regarding water allocations in the county WUDP's. The Code does not identify how the allocations

should be made or what purposes they are intended to serve. The Code does not identify any context or venue in which the allocations should be applied nor does it explicitly provide any authority to implement or enforce water allocations.[22]

There have been discussions in several venues regarding allocations of water in the WUDP but there is no consensus regarding how the allocations should be expressed or how they should be applied. There are diverse opinions on this matter.

In order to provide a starting point for further detailed discussion regarding the "allocation of water to land use" in the WUDP, several clarifications and approaches are outlined below.

Venues and Purposes for Allocations

Water allocation in the WUDP can serve several purposes, either as guidelines or as rules.

- Water allocation policies established in the WUDP can serve as ***guidelines:***
  - To the CWRM regarding amendments to interim instream flow standards (IIFS) and establishing instream flow standards (IFS)
    - These CWRM standards determine allocation of water to in-stream versus off-steam uses
  - To the CWRM regarding allocation of water to competing uses and users in water management areas.[23]
    - Permits for water use issued by the CWRM in surface water management areas explicitly allocate water between instream uses and offstream uses as well as between competing off-stream users.
    - Permits for water use issued by the CWRM in ground water management areas explicitly allocate water, within aquifer sustainable yields, to competing ground water uses and users.
  - To the DWS in making decisions within its discretionary authority
  - To state and county agencies, including the Maui County Council, in determining rules, ordinances, policies and plans, including the General, Island and Community Plans.
- Water allocation policies in the WUDP can potentially serve as **rules** regarding determinations within the authority of the Maui County Council:
  - Rules regarding actions by the DWS including
    - Issuance of water meters
    - Issuance of reservations for water meters
    - Certification by DWS Director of availability of reliable source of water supply necessary for subdivision approvals
    - Approval of contracts with water source developers

21. HRS 174C-31(a)(2)

22. The County certainly may have authority to allocate water provided by the DWS to DWS customers but this authority does not derive from the Code's language regarding the Hawaii Water Plan or the County Water Use and Development Plans. There is a distinction between "users" in the context of the Code and DWS customers. In the context of the Code the DWS is a "user" but the DWS customers are not users. The DWS serves many customers

23. In the context of allocation of water by the CWRM, the DWS is a "user" but individual DWS customers are not "users" by way of receiving water from the DWS. These allocations are made in accordance with the provisions of the State Water Code, HRS Chapter 174C. Allocations of water between existing and potential DWS customers are determined by the County in accordance with DWS policies and county ordinances and rules.

        - Development of DWS supply and transmission resources
        - Restrictions on certain water uses during drought or temporary system deviance
    - Rules regarding actions by County agencies including
        - Planning Commission
        - Department of Public Works
        - Planning Department permitting and/or subdivision approvals
        - Board of Variance and Appeals actions
    - Rules with respect to the actions listed above regarding set asides or reservations for specific priority uses, possibly including
        - Affordable housing projects
        - Kuleana or public trust domestic uses
        - Hospitals or other municipal emergency or public service uses
        - Department of Hawaiian Homelands (DHHL) projects
        - General or specific agricultural uses

Hierarchy of Priorities

A general hierarchy could be outlined to establish water use priorities. Outlined below is one example of a hierarchy of priorities of water use derived from existing law and practical considerations:

- Public Emergency Uses (Temporary)
    - Fire control
- Public Trust Uses
    - Instream uses
    - Kuleana kalo, subsistence agriculture and domestic uses
- Reasonable / Beneficial Uses
    - Essential municipal public service uses (hospitals)
    - DHHL domestic uses
    - Domestic uses
    - DHHL agricultural uses
    - Agricultural uses
    - Government uses (offices)
    - Hotel / Commercial / Industrial uses
    - Non - essential municipal public service uses (parks)
    - Landscape Irrigation uses
- Non-Reasonable / Non-Beneficial Uses
        - Excessive or Purposeless Commercial uses
        - Wasteful or Excessive Landscape irrigation uses
        - Waste

Set-Asides

Amounts of water could be set aside for specific users or uses. For example, it could be determined that a specific amount of water or a percentage of available water would be set aside for DHHL projects, for affordable housing, for agriculture, or other projects determined by the Council. Implementation of a set-aside policy requires quantification of the total amount of water available and the amounts already committed to existing and "entitled" uses. This approach requires several determinations and presents several challenges. It would be necessary to:

- Determine what categories of water users or uses would have water set aside
- Determine what amounts of water would be set aside for each beneficiary category of users or uses
- Determine whether the set-asides would be applied to the County as a whole, to each island or to specific areas, districts or systems.
- Establish a clear and concise method of determining, on an ongoing basis, how much total water is available to be allocated. It would have to be determined whether the set-asides would allocate portions of
  - potential sources (aquifer sustainable yields or stream flows),
  - existing developed infrastructure (existing wells, treatment plants, transmission and storage), or
  - planned infrastructure.
- If set-asides are made against planned infrastructure it would have to be determined what threshold would determine whether water would be considered "available"
  - source construction contract ?
  - feasibility study ?
  - inclusion in the CIP ?
  - inclusion in the WUDP?
- Establish a clear and concise method of determining, on an ongoing basis, how much of the total available water is already committed. This could include any of several categories of use:
  - use by existing customers with meters
  - average historical consumption basis ?
  - expected continued increase in use per meter (as lots with meters are improved and "built out".
  - anticipated use by projects and subdivisions that have some level of implicit or explicit entitlement or reservation
  - verification of long term water source by the DWS director
  - water meter reservation
  - land use approvals
  - water promised or committed by source development contracts
  - water promised or committed by contract with DWS (letters or memoranda of understanding)
- Determine at what stage of which process the set aside allocations would be determined and at what stage the determinations of net availability would be

applied:

- in General, Island or Community Plan land use designation process ?
- in the WUDP ?
- as a set aside allocation ordinance ?
- at time of subdivision verification of water source availability by DWS director?
- at time of reservation or issuance of water meter ?

Allocations of Specific Water Sources to Land Use

Specific water sources could be allocated to specific land uses or categories of land uses.[24] For example, the output of a specific well or production tunnel could be allocated to municipal potable use. Raw water from a specific diversion or reservoir could be allocated to agricultural uses in a specific area. Specific allocations of water for instream uses could be identified.

Statements of Allocation Policies

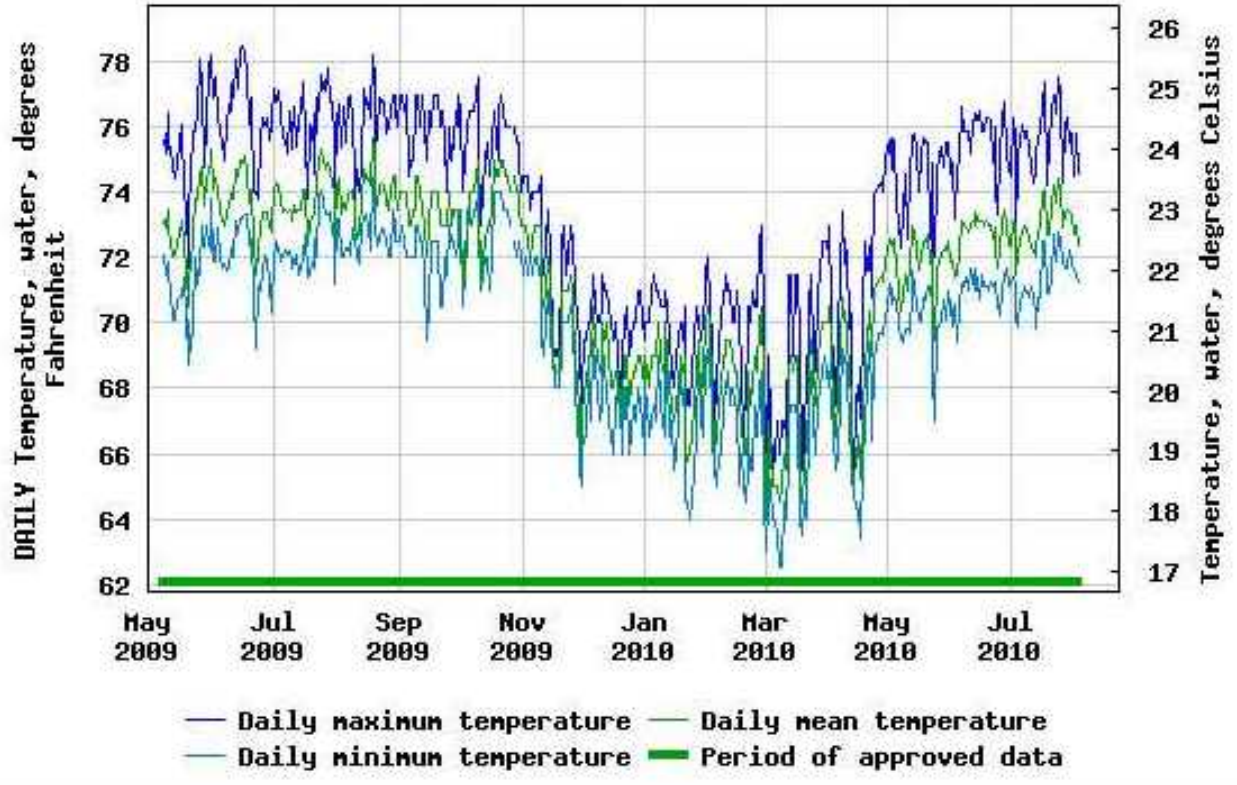
The County could express its allocation of water to land use by stating policies that should apply generally or to specific circumstances. Some examples are provided, including statements of policy that have been suggested in the WUDP public process:

- Maintain mauka to makai flow in Maui's streams
- Return all water to the streams
- Give priority to riparian, kuleana and instream uses
- Give priority to DHHL uses
- Use ground water for potable uses and surface water for non-potable uses
- Provide for the needs of existing users before allowing new uses (land development)
- Give priority to residents' needs over visitor industry needs

24. It is recognized that the County may not have explicit authority to directly allocate water from some specific sources. In these cases the allocations would serve as policy statements.

USGS

USGS 205548156143901 Diversion Ditch at outlet, nr Honopou Str, Maui,HI



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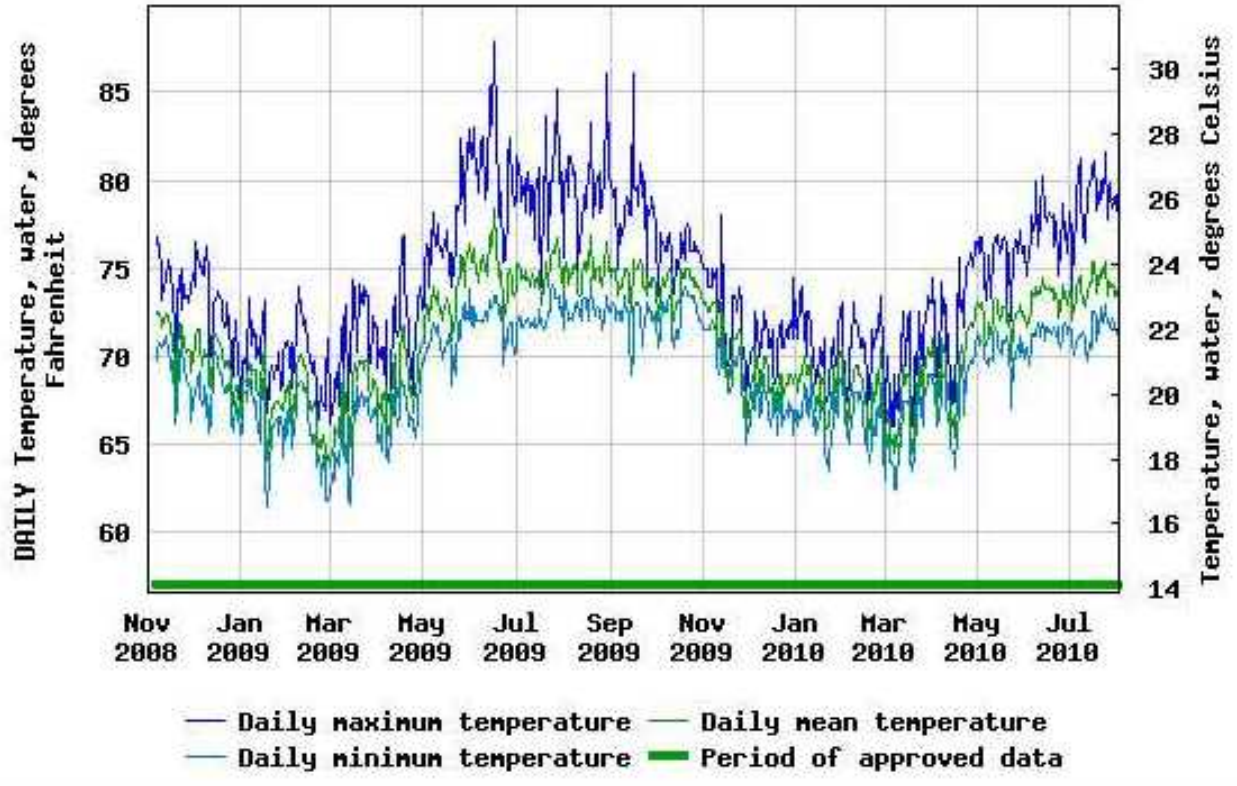
USGS

USGS 205549156143601 Diversion 1, loi outlet, Honopou Stream, Maui, HI



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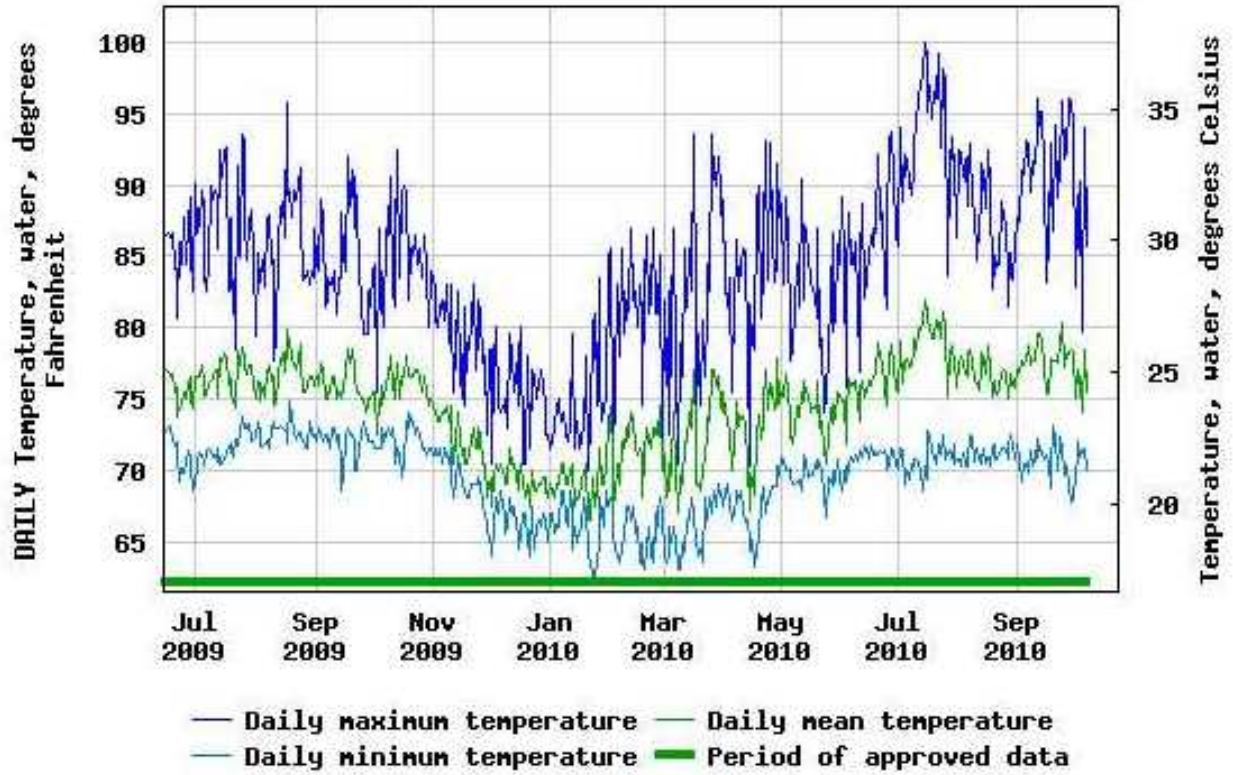
USGS

USGS 205549156143602 Diversion 2, loi outlet, Honopou Stream, Maui, HI



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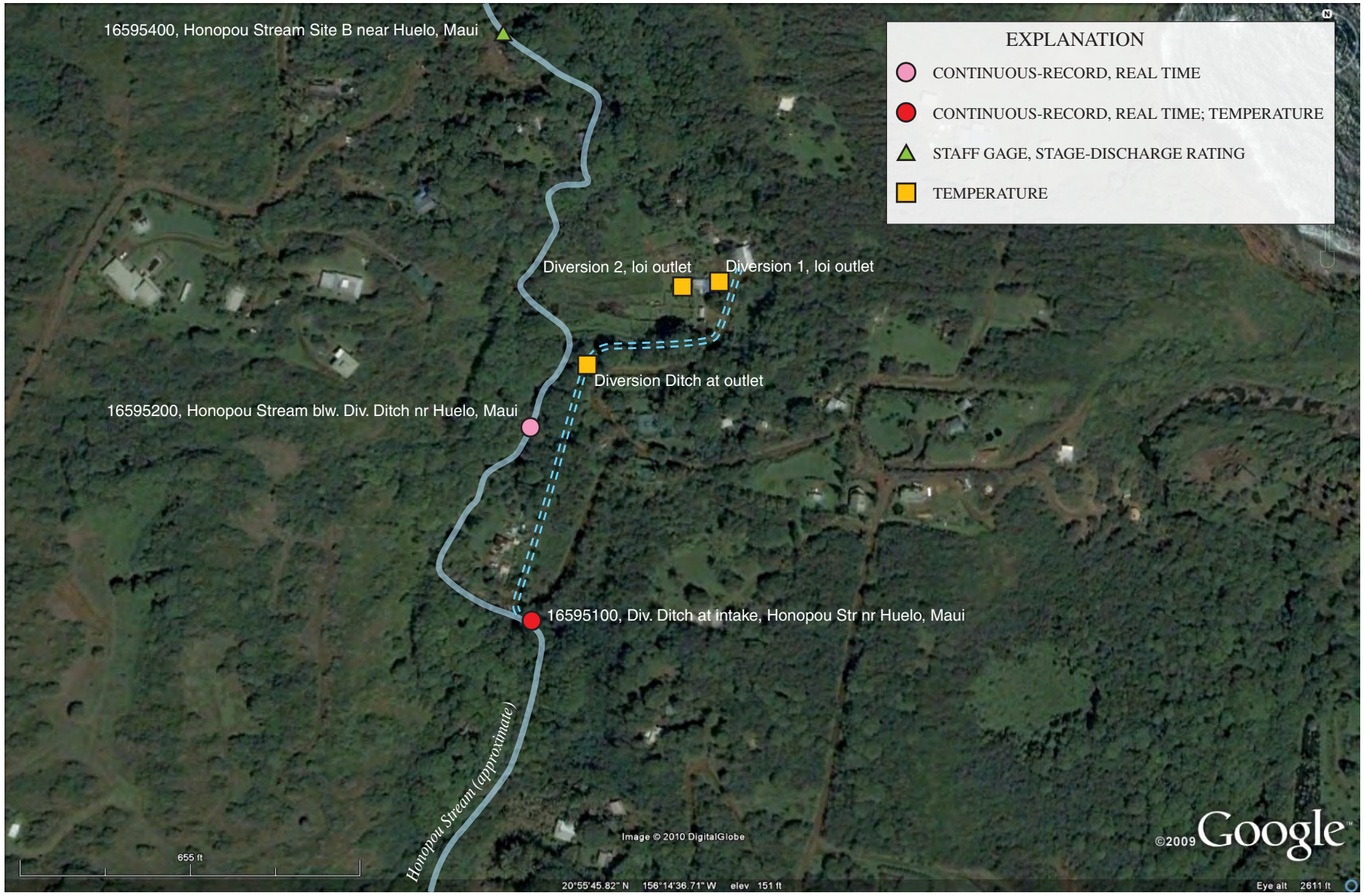

EXHIBIT A-158

EXHIBIT A-159