



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

March 17, 2020
Honolulu, Hawai'i

Approval of a Surface Water Reservation of 1.60 Million Gallons per Day
For the Department of Hawaiian Home Lands and
Establishment of Interim Instream Flow Standards for
Four Tributaries of Wailuku River, 'Āwehi, Aale, Laualu, and Kapehu Streams,
in the Surface Water Hydrologic Unit of Wailuku (8138), Hilo, Hawai'i

SUMMARY OF REQUEST

Staff requests that the Commission on Water Resource Management (Commission) approve a surface water reservation of 1.60 million gallons per day (mgd) for the Department of Hawaiian Home Lands (DHHL) to meet their foreseeable future non-potable water needs.

Staff requests that the Commission approve recommendations to establish interim Instream Flow Standards (interim IFS) for four tributaries of the Wailuku River in the surface water hydrologic unit of Wailuku, in East Hawai'i, which is a non-designated water management area:

WAILUKU (8138): 'Āwehi Stream
WAILUKU (8138): Aale Stream
WAILUKU (8138): Laualu Stream
WAILUKU (8138): Kapehu Stream

LOCATION Lower Pi'ihonua, East Hawai'i. See Figure 1.

LEGAL AUTHORITY

This request for a surface water reservation was triggered by Hawai'i Electric Light Company's (HELCO) intent to obtain a 65-year lease of water from the Wailuku River to continue operating two hydroelectric plants. Under Chapter §171-58(g), the Department of Land and Natural

Resources and the Department of Hawaiian Home Lands are required to jointly develop a reservation of water as part of the leasing process. Chapter §171-58(g) states:

The department of land and natural resources shall notify the department of Hawaiian home lands of its intent to execute any new lease, or to renew any existing lease of water rights. After consultation with affected beneficiaries, these departments shall jointly develop a reservation of water rights sufficient to support current and future homestead needs. Any lease of water rights or renewal shall be subject to the rights of the department of Hawaiian home lands as provided by section 221 of the Hawaiian Homes Commission Act.

The State Water Code provides for reservations of water in both designated and non-designated water management areas. In designated areas, water reservations may be made pursuant to §174C-49(d), Hawaii Revised Statutes (HRS), which states:

The commission, by rule, may reserve water in such locations and quantities and for such seasons of the year as in its judgment may be necessary. Such reservations shall be subject to periodic review and revision in the light of changed conditions; provided that all presently existing legal uses of water shall be protected.

Hawaii Administrative Rules (HAR) Subchapter 6 (Reservation of Water) includes §13-171-60 (Reservations of water) that provides further guidance for water reservations in water management areas:

(a) As provided in HRS §174C-49(d), the commission, by rule, may reserve water in such locations and quantities and for such seasons of the year as in its judgment may be necessary.

(b) The commission shall adopt within this subchapter specific reservations of water in water management areas in such quantities as are deemed necessary for purposes which are consistent with the public interest, including the provision of water for current and foreseeable development and use of Hawaiian home lands pursuant to section 221 of the Hawaiian Homes Commission Act and HRS §174C-101(a).

(c) Proceedings for the establishment of a reservation of water resources within a designated water management area by the commission may be initiated:

(1) Upon recommendation by the chairperson; or

(2) Upon written petition to the commission by any interested person with proper standing.

(d) Reserved water shall not be allocated from water management areas by the commission except upon application for a water use permit by the party, or parties, for whom the water was reserved.

(e) All reservations shall be subject to periodic review and revision in light of changed conditions.

HRS §174C-101(a) also authorizes water reservations for DHHL, whether or not the area has been designated a water management area:

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.

In non-water management areas, the reservation of surface water for DHHL should be coordinated with the establishment of interim IFS.

The State Water Code (Code), Chapter 174C, Hawaii Revised Statutes (HRS), provides that the Commission may adopt interim IFS on a stream-by-stream basis or a general IFS applicable to all streams within a specified area. This submittal seeks to address four streams in East Hawai‘i.

The current interim IFS for the streams being considered were established by way of Hawaii Administrative Rules (HAR) §13-169-46, which, in pertinent part, reads as follows:

Interim instream flow standard for Hawaii. The Interim Instream Flow Standard for all streams on Hawaii, as adopted by the Commission on Water Resource Management on June 15, 1988, shall be that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted off stream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard.

The current interim IFS effective date was October 8, 1988. Thus, the status quo interim IFS, in effect, grandfathered all then-existing diversions that were registered with the Commission in subsequent years. Following the initial registration of stream diversion works, any new or substantially modified stream diversion works structure required a permit for construction and amendment to the interim IFS.

Under the Code, the Commission has the responsibility of establishing IFS on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State. In the 2000 appellate ruling on the first Waiāhole Ditch Contested Case Decision and Order (“*Waiāhole I*”), the Hawai‘i Supreme Court emphasized that “instream flow standards serve as the primary mechanism by which the Commission is to discharge its duty to protect and promote the entire range of public trust purposes dependent upon instream flows.” 94 Haw. 97, 148, 9 P.3d 409, 460. The Code defines an 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.” See HRS § 174C-3 (“Definitions”). In considering a petition to amend an interim IFS, the

Code directs the Commission to “weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses.” HRS § 174C-71(2)(D).

“Instream use” means beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to:

- 1) Maintenance of fish and wildlife habitats;
- 2) Outdoor recreational activities;
- 3) Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation;
- 4) Aesthetic values such as waterfalls and scenic waterways;
- 5) Navigation;
- 6) Instream hydropower generation;
- 7) Maintenance of water quality;
- 8) The conveyance of irrigation and domestic water supplies to downstream points of diversion; and
- 9) The protection of traditional and customary Hawaiian rights.

“Noninstream use” means the use of stream water that is diverted or removed from its stream channel and includes the use of stream water outside of the channel for domestic, agricultural, and industrial purposes.

EXISTING WATER RESERVATIONS

Thus far, the Commission has established a total of 26 water reservations, all for DHHL, in both water management areas and non-designated water management areas.

Table 1 shows the previous water reservations made by administrative rule in water management areas, pursuant to HRS §174C-49(d) or by Commission action prior to the publication of the State Water Projects Plan 2017 Update.

Table 1. DHHL Water Reservations prior to the State Water Projects Plan 2017 Update.
[WMA = Water Management Area]

Approval Process	Island	Location	Effective Date	Reservation (mgd)
§13-171-61	O‘ahu	Waipahu-Waiawa WMA	02/18/1994	1.724
§13-171-62	O‘ahu	Waimānalo WMA	02/18/1994	0.124
§13-171-63	Moloka‘i	Kualapu‘u WMA	06/10/1995	2.905*
CWRM Action	Hawai‘i	Keauhou Aquifer	08/17/2015	3.398

* Per HAR §13-171-63, this amount shall be in excess of the existing uses of water on Hawaiian home lands as of the effective date of this rule (Eff. June 10, 1995)

STATE WATER PROJECTS PLAN 2017 UPDATE

More recently, reservation actions were supported by preliminary findings in the most recent update of the State Water Projects Plan, which was formally adopted by the Commission on May 16, 2017. The State Water Projects Plan is the component of the Hawai'i Water Plan that documents the water needs of all State agencies over a 20-year planning horizon. The Engineering Division of the Department of Land and Natural Resources is responsible for the development and update of the State Water Projects Plan. In addition to inventorying the existing and future water needs for State projects, through the State Water Projects Plan, Engineering Division also promotes partnerships and cost sharing to coordinate water development projects and water infrastructure improvements of potentially competing State agencies. Based on the State Water Projects Plan, Engineering Division pursues legislative funding to support new source development through Capital Improvement Project requests and administers a water credit allocation program for State agencies. Implementation of the State Water Projects Plan in close coordination with the County Water Use and Development Plan is needed to ensure orderly authorization and development of new State sources and water system infrastructure.

Initially adopted in 1990 and revised in 2003, a third update of the State Water Projects Plan was completed and adopted in 2017¹. Due to funding constraints, the Engineering Division focused this most recent State Water Projects Plan update exclusively on DHHL. DHHL was selected because: 1) they are the largest landowner amongst State agencies and thus could have the most significant impact on water resource development and use, and 2) DHHL water needs are an identified public trust purpose under the State Constitution and Water Code.

The Engineering Division and its consultant worked extensively with DHHL staff to identify priority tracts and proposed phasing over the 20-year planning horizon and to determine the breakdown of each tract in terms of residential units and agricultural acreages. The 20-year timeframe is established under HAR §13-170-42(c), which requires the State Water Projects Plan to consider a 20-year projection period for analysis purposes.

Potable water requirements were calculated by correlating DHHL's land use designations to an equivalent zoning designation in the County Water System Standards (or other applicable standards when necessary) and applying the respective unit rate (Exhibit 1). All demands from the domestic component of homesteading (Residential, Subsistence Agriculture, Pastoral) and municipal (Community Use, Commercial, Industrial) land use designations were considered to be potable.

Non-potable requirements were considered to be irrigation demands for agricultural land use designations (Subsistence, Supplemental, and General Agriculture) and stock water (sustenance water for livestock) for the Pastoral land use designation. Agricultural non-potable demands were

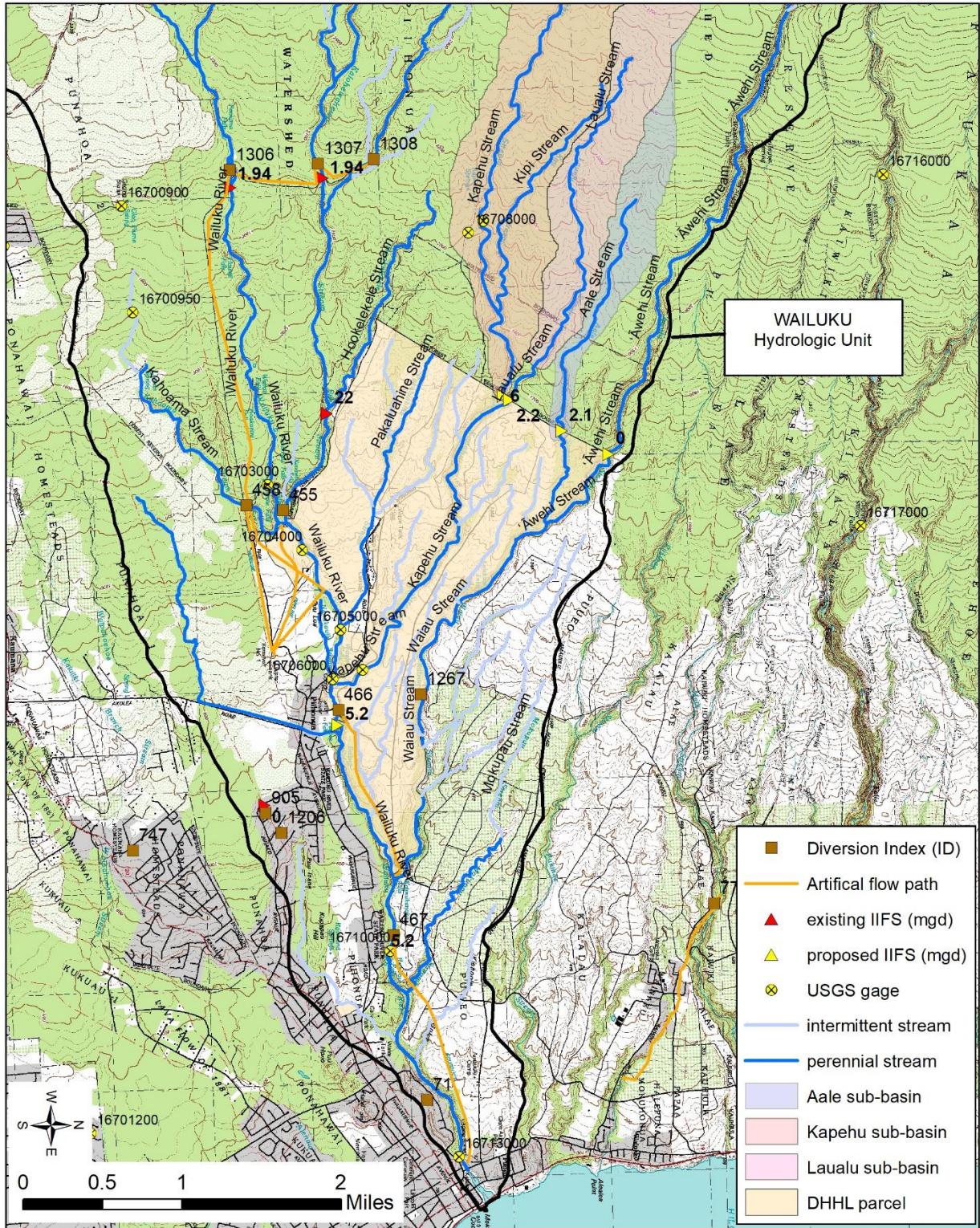
¹ Engineering Division also received separate funding to update the State Water Projects Plan for the North Kona region on the island of Hawai'i, as well as for a comprehensive statewide update. The statewide update will incorporate the 2017 update (which documents DHHL water needs) as well as the regional update for North Kona in order to develop comprehensive and coordinated water development strategies that consider and coordinate the needs and plans of all State agencies.

calculated using a unit rate of 3,400 gallons per acre per day, as recommended by the Department of Agriculture's Agricultural Water Use and Development Plan. Based on published studies, a livestock watering unit rate of 20 gallons per head per day was used for Pastoral land use designations. The unit rate non-potable requirements are shown in Exhibit 2.

A range of forecasts - high, medium, and low – were developed for both potable and non-potable end use water demands. Variability was achieved by adjusting project development data while keeping water demand unit rates fixed. Examples of adjustments included varying unit buildout rates, utilizing different unit density rates, and using different percentages of utilization of the total area for development. However, while the range of water demands for the various end uses were assessed, only the medium demand projections by water source (e.g., aquifer system areas to be developed) were provided. Thus, the recommended reservation amounts are based on the medium demand projections, which is the only available information on resource needs.

DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

Figure 1. Perennial and intermittent streams, registered diversions, active and inactive USGS gages, existing and proposed interim IFS values (mgd), and the Lower Pi'ihonua DHHL area in the Wailuku hydrologic unit, East Hawai'i.



DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

The 2017 update of the State Water Projects Plan provides a sound basis and rationale for water reservations statewide for DHHL for both potable needs (groundwater) and non-potable needs (surface water) by hydrologic unit. After discussion with DHHL staff, it was decided that establishment of additional water reservations begins with potable groundwater needs in non-designated areas on the islands of Kauaʻi, Maui, Lanaʻi, and Hawaiʻi for the following reasons:

- DHHL's needs within designated ground water management areas on the island of Oʻahu are most likely to be met through the Honolulu Board of Water Supply's (HBWS) integrated municipal water system. As shown in Table 1, DHHL has existing reservations from the Waipahu-Waiawa and Waimanalo Aquifer System Areas on Oʻahu. As DHHL tracts are developed, these reservations are to be converted to water use permits and transferred to the HBWS for water service. DHHL has no current plans to pursue new source development and does not plan to operate new water systems on Oʻahu. According to DHHL, DHHL is already in discussions with HBWS to service DHHL tracts on Oʻahu and has received verbal commitment from HBWS. HBWS is in the process of updating its Water Use and Development Plan, and the regional watershed management plans for the Primary Urban Center, ʻEwa District, and Central Oʻahu are currently underway and should incorporate DHHL needs and strategies based on the 2017 State Water Projects Plan.
- DHHL's needs within non-designated aquifer system areas on the island of Oʻahu (Waiʻanae Sector Area) will also be met through the Honolulu Board of Water Supply's (HBWS) integrated municipal water system. DHHL will rely on HBWS for new source development in the Waiʻanae Sector Area. DHHL is already in discussions with HBWS to service DHHL tracts on Oʻahu and has received verbal commitment from HBWS.
- Besides Oʻahu, the only other areas that are currently designated as a ground water management area is the island of Molokaʻi, and the ʻĪao Aquifer System on Maui. As shown in Table 1, there is an existing water reservation for DHHL for the Kualapuʻu Ground Water Management Area for 2.905 mgd in addition to existing uses; however, the 2017 State Water Projects Plan shows a projected need for only 0.840 mgd until 2031.
- Staff's preliminary review of non-potable surface water needs in the 2017 State Water Projects Plan indicate that in some cases, where there are available streamflow records, proposed future needs exceed the available flow in the stream. In most cases, however, there is no available streamflow data to compare with the proposed water needs.
- Additionally, current information on other existing off-stream uses is lacking. Therefore, reservations for surface waters should be done in concert with staff's establishment of instream flow standards, which will involve the collection of the data and information necessary to vet the amounts to be reserved.

On June 20, 2017, the Commission approved a reservation of 6.903 mgd from the Waimea Surface Water Hydrologic Unit, on the island of Kauaʻi, for non-potable water needs of DHHL's 15,061 acres of land mauka of the mana plain which were historically fed by the Kōkeʻe Ditch

DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

with water diverted from Kōkeʻe, Kauaikinanā, Kowaikōī, and Waiakoali streams. This reservation was filed on April 25, 2017 following the April 18, 2017 Commission-approved Waimea Watershed Agreement Mediated Settlement. This reservation supersedes DHHL's previous petition for 33.145 mgd filed with the Commission on November 17, 2015.

On October 16, 2018, the Commission approved a reservation of 0.513 mgd from the Wailua Surface Water Hydrologic Unit, on the island of Kauaʻi, for non-potable water needs of DHHL's lands East of Kālepa Ridge.

Table 2 shows all water reservations established via Commission action in non-designated water management areas, pursuant to HRS §174C-101(a).

Table 2. DHHL Water Reservations in Non-Designated Water Management Areas

Island	Hydrologic Unit	type	Action Date	Initial Reservation (mgd)	Current Reservation (mgd)
Kauaʻi	Waimea*	non-potable	06/20/2017	6.903	6.903
	Wailua	potable	09/18/2018	0.708	0.708
	Wailua*	non-potable	10/16/2018	0.513	0.513
	Anahola	potable	09/18/2018	1.470	1.470
	Kekaha	potable	09/18/2018	0.336	0.336
	Makaweli	potable	09/18/2018	0.405	0.405
Lanaʻi	Leeward	potable	09/18/2018	0.067	0.067
Maui	Honokōwai	potable	09/18/2018	0.770	0.770
	Kamaʻole	potable	09/18/2018	2.547	2.547
	Keʻanae	potable	09/18/2018	0.003	0.003
	Kawaipapa	potable	09/18/2018	0.118	0.118
	Lualaʻiula	potable	09/18/2018	0.063	0.063
Hawaiʻi	Keauhou	potable	08/17/2015	3.398	3.398
	Hawi	potable	09/18/2018	0.148	0.148
	Māhukona	potable	09/18/2018	3.014	3.014
	Honokaʻa	potable	09/18/2018	0.396	0.396
	Hakalau	potable	09/18/2018	0.083	0.083
	Onomea	potable	09/18/2018	0.250	0.250
	Hilo	potable	09/18/2018	0.492	0.492
	Keaʻau	potable	09/18/2018	1.336	1.336
	ʻŌlaʻa	potable	09/18/2018	0.025	0.025
	Nāʻālehu	potable	09/18/2018	0.185	0.185
Pāhoa	potable	09/18/2018	0.660	0.660	

* Surface Water Hydrologic Unit

DHHL'S WATER RESERVATION REQUEST

On October 8, 2018, CWRM received a formal request for a water reservation of 1.740 mgd for water from the Wailuku hydrologic unit (Exhibit 3). This amount represents the total potable (0.14 mgd) and non-potable (1.60 mgd) demand for water for the Lower Piʻihonua area. This

request follows the unanimous approval of the request for a water reservation from the Hawaiian Homes Commission at its October 16 and 17, 2017 meeting.

DHHL's Kaūmana-Pi'ihonua Planning Area (December 2017 DHHL Regional Plan update) addresses the approximately 1,900 acres of DHHL-designated Home Lands located in the South Hilo District on Hawai'i Island spanning four ahupua'a: Pi'ihonua, Pōnahawai, Kaūmana, and Kūkūau (Figure 2). The Kaūmana and Pi'ihonua Homestead areas are both designated for residential use. The Lower Pi'ihonua area is designated as mostly general and subsistence agriculture, with a small portion along Pi'ihonua Road designated for residential use (Figure 3). The Kaūmana Area is planned for 54 lots across 17 acres, the Pi'ihonua Homestead Area is planned for 17 lots across 6 acres, and the Lower Pi'ihonua Area is planned for 1,882 acres of agriculture, with a small portion designated as residential.

This submittal requests a reservation of 1.60 mgd of non-potable water from the Wailuku surface water hydrologic unit based on the medium-range demand for non-potable water in the Lower Pi'ihonua area.

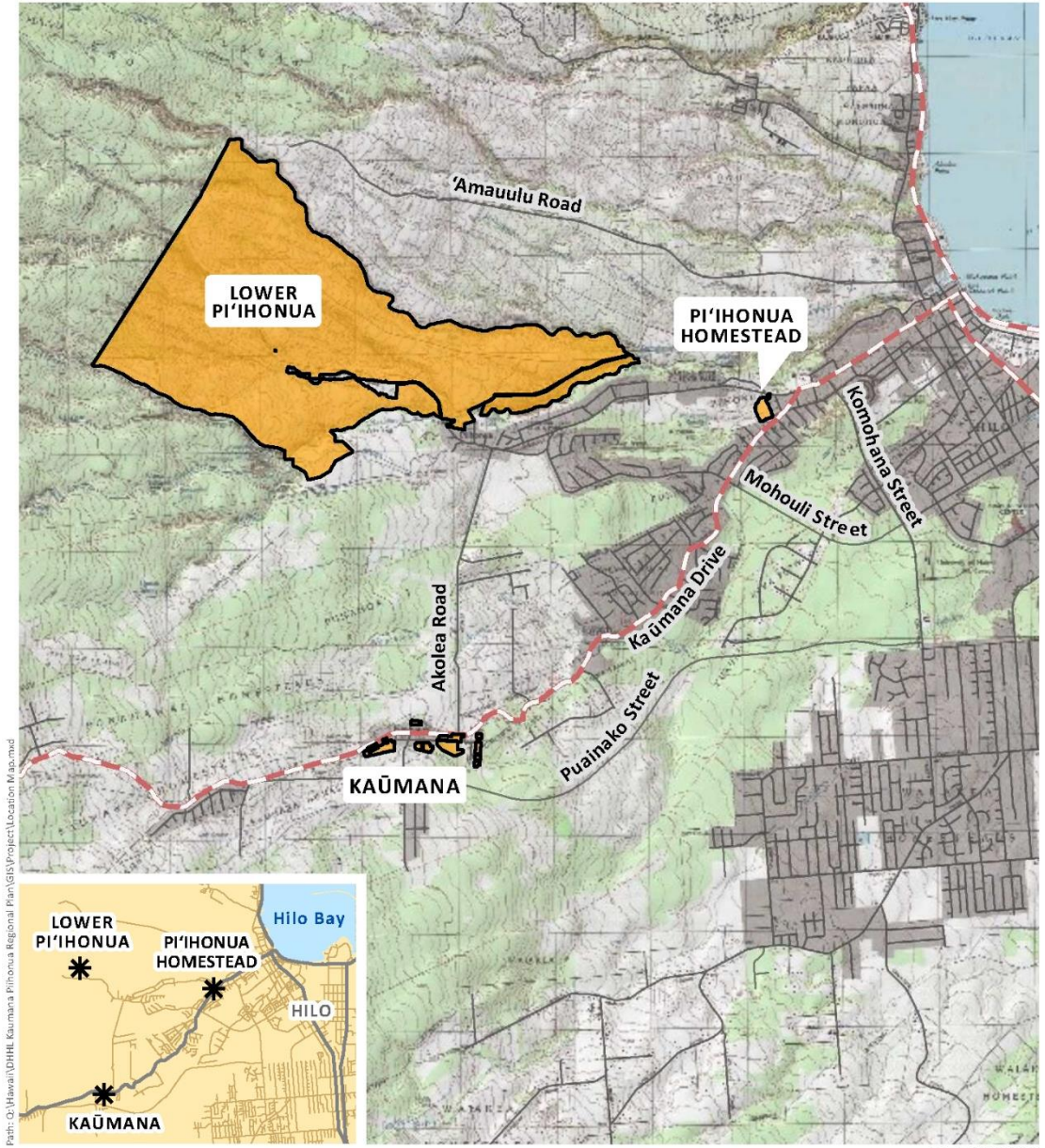
In the 2017 State Water Projects Plan Update, DHHL indicates that the majority of the Lower Pi'ihonua tract is not within the service area of any existing irrigation system.

HYDROLOGICAL CONTEXT


The availability of surface water from the Wailuku hydrologic unit to meet the non-potable needs of DHHL can be estimated based on historic streamflow records, basin characteristics and record augmentation. Historically, numerous stream and ditch gaging stations were active in the Wailuku Hydrologic Unit (Table 3). Selected natural low-flow duration discharge exceedance values were estimated for various locations on the Wailoa River, Wailuku River, and Honoli'i stream for the current (1984-2013) climate period by the U.S. Geological Survey (USGS) (Table 4). Such natural low-flow data are not available for the tributaries of the Wailuku River near Lower Pi'ihonua, where water could be diverted for agriculture on parcels that DHHL now owns.

To estimate median flow at ungaged streams, basin characteristics (e.g., catchment area, mean annual rainfall, mean basin slope, soil permeability, basin comparative ratio) identified in Table 5 were used with multiple linear regression models developed with existing basin characteristics for low-flow duration discharge values estimated at USGS gaging station across Hawai'i Island (Exhibit 4). The Pakaluahine Stream is a short tributary that originates in the Lower Pi'ihonua area and flows into the Wailuku River. Due to its small drainage area and mostly degraded land use, its flow characteristics were not modeled.

Figure 2. Planning area for the Kaūmana-Pi'ihonua Regional Plan.



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 Planning Area

Source: County of Hawai'i, ESRI Online Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

DHHL Kaūmana-Pi'ihonua Regional Plan

Department of Hawaiian Home Lands Island of Hawai'i

North

Linear Scale (feet)

0 1,250 2,500 5,000

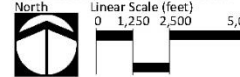

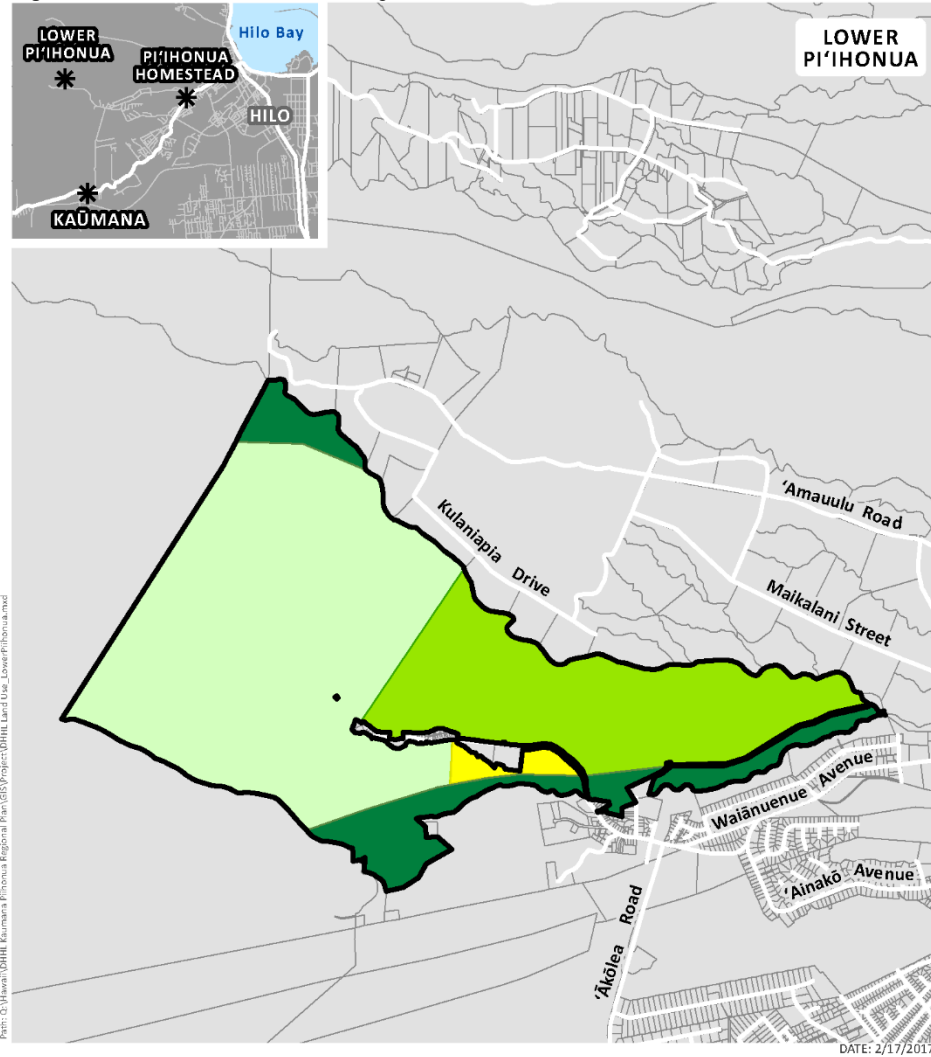










Figure 2. Distribution of land-use designation for the Lower Pi'ihonua Area.



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- | | | |
|-------------------------------------------------------------------------------------|-------------------------|-----------------------------|
|  | Planning Area | Land Use Designation |
|  | Residential | |
|  | Subsistence Agriculture | |
|  | General Agriculture | |
|  | Conservation | |

DHHL Kaūmana-Pi'ihonua Regional Plan
 Department of Hawaiian Home Lands | Island of Hawaii
 North
 Linear Scale (feet)
 0 750 1,500 3,000
 

Source: Department of Hawaiian Home Lands (May 2002), County of Hawaii (2015).
 Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

Table 3. Mean daily flow and selected flow duration discharge exceedance values for continuous-record gaging stations operated by USGS (up to 2005) located in or near the Wailuku hydrologic unit, Hawai'i.
(Source: USGS National Water Information System) [Flows are in cubic feet per second]

Station ID	Station Name	Elevation (ft)	Period of Record	Mean daily flow	Discharge (Q) for a selected percentage (xx) discharge was equaled or exceeded				
					Q ₅₀	Q ₆₀	Q ₇₀	Q ₈₀	Q ₉₀
16717000	Honoli'i Stream	1540	1911-P	128	40	31	23	16	11
16716000	Honoli'i Stream	2350	1924-32	48	12	8.4	5.4	3.4	2.0
16713000	Wailuku River at Hilo	10	1977-95	491	153	87	50	30	20
16709000	Kapehu Stream at Piihonua	950	1929-37	53	28	22	17	12	7.6
16708000	Kapehu Ditch	2000	1938-62	2.2	1.9	1.3	0.88	0.39	0.05
16707000	Kapehu Ditch Diversion	2000	1954-62	2.4	2.6	0.05	0.02	0.02	0
16705000	Hilo Boarding School Ditch	980	1931-46	13.9	14	13	13	12	11
16704000	Wailuku River at Piihonua	1090	1929-P	274	78	56	39	25	13
16703000	Wailuku River at Pukamaui	1280	1923-40	101	26	18	13	8.0	2.9
16701800	Wailuku River nr Kaumana	3520	1966-82	30	2.8	1.7	1.1	0.77	0.37
16701750	Wailuku River nr Humuula	4250	1965-82	3.2	0.20	0.12	0.06	0.03	0
16701700	Wailuku River nr Pua akala	6840	1964-65	0.13	0	0	0	0	0
16701600	Alenaio Stream at Hilo	10	2005	1.6	0	0	0	0	0
16701300	Waiakea Stream at Hilo	10	2004-05	4.3	0	0	0	0	0
16701200	Waiakea Stream nr Hilo	369	1957-66	5.3	0	0	0	0	0
16700900	Olaa Flume Spring		1974-91	6.2	4.2	3.1	1.6	0.36	0.10
16700950	Lyman Springs No. 2	1700	1981-95	4.8	4.4	4.1	3.7	3.0	1.4
16700600	Waiakea Stream nr Mountain View	860	2004-05	15	0.36	0.08	0	0	0

Table 4. Selected natural low-flow duration discharge exceedance values for continuous-record streamflow gaging stations corrected for the current (1984-2013) climate period located in or near the Wailuku hydrologic unit, Hawai'i.
(Source: USGS 2016-5103) [Flows are in cubic feet per second (million gallons per day); -- discharge is not presented due to poor rating]

Station ID	Station Name	Discharge (Q) for a selected percentage (xx) discharge was equaled or exceeded				
		Q ₅₀	Q ₆₀	Q ₇₀	Q ₈₀	Q ₉₀
16717000	Honoli'i Stream nr Hilo	40 (25.9)	30 (19.4)	22 (14.2)	16 (10.3)	11 (7.1)
16704000	Wailuku River at Pi'ihonua	76 (49.1)	49 (31.7)	30 (19.4)	17 (11.0)	9.0 (5.8)
16701700	Wailuku River nr Puaakala	dry at least 50 percent of the time				
16700000	Waiakea Stream nr Mountain View	8.4 (5.4)	6.0 (3.9)	4.5 (2.9)	2.8 (1.8)	--

DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

Table 5. Selected basin characteristics for streams draining into the Lower Pi‘ihonua Area.

Stream name	Elevation (ft)	Catchment area (mi ²)	Mean basin slope (%)	Mean basin elevation (ft)	Comparative Ratio	Soil permeability	MAR (in)
‘Āwehi	1440	12.2	12.7	4880	3.71	11.6	151
Aale	1560	0.48	12.8	4900	2.89	13	244
Laualu	1720	0.98	11.9	2320	2.68	13	245
Kapehu	1550	2.85	11.0	2590	2.53	13	234

Resultant model values closely approximated select low-flow duration discharge values with a high ($R^2 > 0.85$; $NSE > 0.85$) degree of accuracy (Table 6). Using these models, low-flow duration discharge values were estimated for the four catchments that drain into the Lower Pi‘ihonua parcel (Table 7).

Table 6. Multiple linear regression model coefficients and model statistics based on basin characteristics for select natural low-flow duration discharge exceedance values for USGS stations on Hawai‘i Island.

[R^2 = coefficient of determination; NSE = Nash-Sutcliffe Efficiency Index]

Log-transformed Dependent variable	Constant	Log catchment area (mi ²)	Mean basin slope (%)	Mean basin elevation (ft)	Comparative Ratio	MAR (in)	R ²	NSE
Q ₅₀	4.079	1.143	-0.0150	-0.000506	-0.915	0.00382	0.96	0.96
Q ₇₀	3.967	1.149	-0.0156	-0.000544	-0.942	0.00402	0.94	0.94
Q ₉₀	4.204	1.211	-0.0131	-0.000628	-1.057	0.00324	0.88	0.88

Table 7. Modeled selected natural low-flow duration discharge exceedance values for basins draining into the Lower Pi‘ihonua Area, Hawai‘i.

[Flows are in cubic feet per second (million gallons per day)]

Stream Name	Discharge (Q) for a selected percentage (xx) discharge was equaled or exceeded		
	Q ₅₀	Q ₇₀	Q ₉₀
‘Āwehi	0.79 (0.51)	0.34 (0.22)	0.08 (0.05)
Aale	5.4 (3.51)	3.2 (2.06)	1.1 (0.73)
Laualu	15.7 (10.2)	9.2 (6.0)	3.5 (2.2)
Kapehu	50.4 (32.6)	29.3 (18.9)	11.7 (7.56)

Ambient mean annual rainfall ranges from 160 to 200 inches per year, which is sufficient to satisfy the non-potable irrigation requirement of the agricultural area. However, during seasonal drought conditions, it may be necessary to utilize surface water from nearby streams to avoid losses in agricultural resources. The Integrated Water Resource Decision Support System (IWREDSS) model was run for various crops grown in the Lower Pi‘ihonua Tract to estimate agricultural water demand during the 1:2 year, 1:5 year and 1:10 year drought conditions based on irrigation type and soil conservation service soil curve numbers 77 and 82. Results of the model are provided in Table 8 for 2 acre parcels. With a 65% utilization of the 1,882 acres irrigated with drip methods at 0.003 mgd per 2-acre parcel under drought conditions, a reasonable total water demand is estimated to be 1.83 mgd.

Table 8. Results from IWREDSS for select crops and irrigation types for the Lower Pi'ihonua parcel for 2 acre parcels

Crop type	Irrigation Type	1:2 year Drought (mgd)	1:5 year Drought (mgd)	1:10 year Drought (mgd)	1:20 year Drought (mgd)
Generic Orchard Crop (Perennial)	Drip	0.003	0.005	0.007	0.008
Generic Crop (Perennial)	Drip	0.000	0.001	0.002	0.002
	Sprinkler (LG)	0.003	0.005	0.007	0.008
Generic Crop (Annual)	Drip	0.001	0.004	0.003	0.003
	Sprinkler (LG)	0.002	0.002	0.007	0.011
Avocado	Drip	0.000	0.001	0.001	0.002
	Sprinkler (LG)	0.002	0.004	0.006	0.007
Coffee	Drip	0.000	0.001	0.002	0.003
	Sprinkler	0.003	0.005	0.007	0.009
Cacao	Drip	N/A	N/A	N/A	N/A
	Sprinkler	N/A	N/A	N/A	N/A
Wetland Kalo	Flood	0.601	1.298	1.801	2.290

CONSISTENCY WITH THE HAWAII WATER PLAN

The Hawai'i Water Plan is the State's long-range water plan, and staff believes it is important that water reservations be consistent with, and have basis in, the Hawai'i Water Plan (HWP). Under the current planning framework, the State Water Projects Plan outlines the water needs for State projects (in this case for DHHL), identifies potential supply options, and feeds into the County Water Use and Development Plans. This enables State water needs to be integrated with the needs of all other use sectors (i.e., military, municipal, private, and agriculture) within each county into a comprehensive resource development strategy and implementation plan. However, county updates to their WUDP are often not as frequent, comprehensive, or timely to provide for such reservations as needed. As previously described, the 2017 Update to the State Water Projects Plan identifies the non-potable water needs of DHHL. The reservation of 1.60 mgd of non-potable water as requested by DHHL and identified in this submittal is consistent with the 2017 update.

The Hawai'i County Water Use and Development Plans are in various stages of being updated. Due to the high priority rights of DHHL under the State Constitution, State Water Code, and Hawaiian Homes Commission Act, staff does not believe it is prudent nor necessary to wait for the county plans to incorporate the needs of DHHL, especially when county priorities are inconsistent with those of DHHL. Should water reservations be approved, staff will inform the counties so that the reservations will be incorporated into the County Water Use and Development Plans as required by law. Reserving water for DHHL promotes the Commission's approach to managing the resource and protecting the public trust through the collaboration and consistency framework provided by the HWP.

PREVIOUS INSTREAM FLOW STANDARDS IN THE WAILUKU HYDROLOGIC UNIT

At the regularly scheduled October 18, 1989 meeting, the Commission approved the amendment of the interim IFS for the Wailuku River and the Kalohewahewa Stream in conjunction with the approval of the Stream Channel Alteration Permit for the Wailuku River Hydroelectric Power Company (known then as the Kahala Energy Development Corporation). The project involved the construction of a 10 MW hydroelectric power plant, a 4,700 ft penstock, 5,900 feet of connecting pipelines, and three stream diversions, one on the Wailuku River, and two on branches of the Kalohewahewa Stream. The project developers worked with the U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers, hydrologists from Utah State University, University of Hawai‘i at Mānoa Water Resources Research Center, and Commission staff to develop interim IFS using the Instream Flow Incremental Methodology (IFIM). The Hookelekele Stream, above the confluence with Kalohewahewa Stream, provided the greatest amount of habitat for native aquatic biota, and was thus of highest priority to protect. The interim IFS on Hookelekele Stream below the confluence with Kalohewahewa Stream was established at 34 cfs (22.0 mgd). When flows at the confluence exceed 34 cfs (22.0 mgd), then the flow below the diversion on Kalohewahewa Stream is 3 cfs (1.9 mgd). The interim IFS on Wailuku River was established at 3 cfs (1.9 mgd).

The Lower Pi‘ihonua area is located on the northern portion of the Wailuku surface water hydrologic unit, and the closest sources of non-potable water are the streams listed in Table 7. Thus, no modifications to the existing interim IFS for the Wailuku and Kalohewahewa streams currently in use by the hydropower facility are needed.

ASSESSMENT SUMMARY

Hydrology

The Wailuku River drains the largest catchment (252.2 mi²) in the State of Hawai‘i. The river is a fourth order perennial stream with 196.1 miles of stream reach. 65.5% of the stream length is considered headwater habitat that may flow only intermittently in response to rainfall-runoff, although water commonly collects in pools formed by collapsed lava tubes even during no flow periods. Only 4.1% of the stream length is considered middle or lower reach, but these reaches are heavily impacted by urbanization, poor water quality, and introduced species.

Maintenance of Fish and Wildlife Habitat

Wailuku River naturally provides mauka-to-makai streamflow year-round and as such, provides substantial habitat for a variety of freshwater fauna. Previous surveys by the Division of Aquatic Resources (DAR) have identified many native aquatic species, including ‘o‘opu alamo‘o (*Lentipes concolor*), ‘o‘opu nōpili (*Sicyopterus stimpsoni*), ‘o‘opu nākea (*Awaous stamineus*), hihiwai (*Neretina granosa*), and ‘ōpae kala‘ole (*Atyioda bisulcata*) in the watershed. Further, headwater reaches provide habitat for endemic damselfly species (*Megalagrion spp.*). The DAR have sampled various locations in Wailuku River on at least 12 different years since 1953. Middle and lower reaches are dominated by introduced fish and invertebrates which compete with and prey upon native species. The DAR listed the Wailuku River watershed as lacking native insect diversity (> 19 spp.), having native macrofauna diversity (>5 spp.), having priority one introduced

species, lacking an abundance of native species, no presence of candidates of endangered species, and no Newcomb's snail. Thus, the Hawaii Stream Assessment (HSA) ranked Wailuku as having "moderate" aquatic resources (2 out of 4).

Outdoor Recreational Activities

Wailuku River provides tourists and local residents with many recreational opportunities along both its middle and lowest reaches. Swimming is common in the river, especially near Hilo town, but also in the forest reserve in the many plunge pools. The HSA ranked the Wailuku River as outstanding for recreation resources for the region and the entire state, with many hiking, fishing, swimming, parks, hunting, and scenic views.

Maintenance of Ecosystems

The riparian resources of Wailuku River were classified as "outstanding" by the HSA, despite the presence of two detrimental plants (California grass and hau bush) and four detrimental animals (Mouflon, sheep, pigs, goats). A total of 60% of the watershed is considered native forest and there are four species of threatened or endangered birds that live in the watershed. About 0.7% of the hydrologic unit's landcover is considered urban and 22.4% of the unit is agriculture. Emergent wetland species exist in some parts of the watershed. The Kukuau Section of the Hilo Forest Reserve and the Watershed Reserve Section of the Hilo Forest Reserve occupy large portions of the middle and upper watershed.

Aesthetic

Due to easy accessibility from Hilo town and the designation of Wailuku River State Park (including Rainbow Falls and Boiling Pots), the Wailuku River supports much aesthetic value in the lowest reaches. Access to the river in the upper reaches to hikers and hunters also provides aesthetic value.

Instream Hydropower

The Wailuku River supports three run-of-the river hydropower plants: the 10 MW Wailuku River Hydropower Plant; the 1.15 MW Waiau Hydropower Plant; and the 2.25 MW Pu'u'eo Hydropower Plant. These interim IFS values are not expected to substantially affect the water available for any of these hydropower plants.

Maintenance of Water Quality

Wailuku River is classified by the Department of Health as Class 1A inland waters in the upper elevations and Class 2 inland waters in the lower elevations. In 2018, the Wailuku River appeared on the List of Impaired Waters in Hawai'i², Clean Water Act §303(d) for NO₃ + NO₂ in the dry season, although there were limited samples to assess other factors. The Wailuku River has been the focus of many water quality studies that have characterized the consequences of climate-driven shifts in runoff^{3,4}. Increased impervious surfaces, shifts in landcover patterns, and the spread of

²<https://health.hawaii.gov/cwb/files/2018/09/Final-2018-State-of-Hawaii-Water-Quality-Monitoring-Assessment-Report.pdf>

³Wiegner et al., 2009. Bioavailability and export of dissolved organic matter from a tropical river during base-and storm flow conditions. *Limnology and Oceanography*, 54: 1233-1242.

non-native ungulates have resulted in greater concentrations of bacteria in the river and Hilo Bay with resultant threats to the health of recreational water users⁵.

Conveyance of Irrigation and Domestic Water Supplies

While historically, water was conveyed from various tributary and spring sources within the Wailuku River to support drinking water supply for Hilo town, the river or its tributaries are not used for the conveyance of irrigation or domestic water supplies anymore.

Protection of Traditional and Customary Hawaiian Rights

The archeological resources of the Wailuku River watershed have limited survey coverage and limited predictability. There are five known sites and at least one historic or potentially historic resource. Most archeological sites in the region were destroyed during the sugar plantation era⁶. Early written accounts of Hilo describe a large settled plain with widely-spaced homes, neat gardens, and small clusters of trees. Dryland kalo and bananas grew upland, with fishponds along the coast. Kukui, hala, hibiscus, and mountain apple were grown between Waiākea Pond and the Pana‘ewa forest⁷. With the abundance of rainfall and surface flow, it is likely that wetland kalo was grown in the region, especially along tributaries that were less likely to flood⁸. The upland agricultural zone extended between three and six miles above Hilo town, up to about 1,500 feet in elevation.

The HSA did not identify any lo‘i kalo currently grown in the watershed, although there are likely to be small patches fed by spring flow in the urbanized region. It is possible that lo‘i kalo could be built on the Lower Pi‘ihonua tract. Historical records document the various methods that different varieties of kalo were grown in Hilo, taking advantage of different soil, hydrological, and flooding regimes⁹. Because of the highly permeable soils and geology of the watershed, the conveyance of water may need to use modern techniques.

Many cultural practices take place in the Pu‘u‘eo and Pi‘ihonua Ahupua‘a, located within the Wailuku River hydrologic unit. These include the cultivation of plant resources (i.e., kalo, mai‘a, and olona), the gathering of marine resources, and the use of freshwater resources. Pole fishing along the river was particularly important. Continuous mauka to makai flow in the Wailuku River has substantial cultural importance and is well documented in mo‘olelo. Important locations along the river include Waiānuenue (Rainbow Falls) and Pe‘epe‘e (Boiling Pots).

Noninstream Uses

⁴Strauch et al., 2014. Climate change and land-use drivers on water quality in tropical watersheds. *Journal of Environmental Quality*, 43(4): 1475-1483.

⁵Economy et al., 2019. Rainfall and streamflow effects on estuarine *Staphylococcus aureus* and fecal indicator bacteria concentrations. *Journal of Environmental Quality*, 48(6): 1711-1721.

⁶Tam Sing, L.M.U.K. et al., 2017. A cultural impact assessment for the renewal of Hawai‘i Electric Light’s Wailuku River Water Lease. ASM Affiliates. ASM project number 26930.00

⁷Cordy, R., 2000. *Exalted sits the Chief. The Ancient History of Hawaii Island*. Mutual Publishing, Honolulu.

⁸Muller et al., 2010. Predicting prehistoric taro (*Colocasia esculenta var. antiquorum*) lo distribution in Hawaii. *Economic Botany*, 64(1): 22-33.

⁹Bryan, G. (Lord), 1826. *Voyage of H.M.S. Blonde to the Sandwich Islands in the Years 1825-1825*. John Murry, London.

There is currently no registered noninstream uses of surface water from these tributary streams.

IMPLICATIONS OF WATER RESERVATION

Should the Commission approve this water reservation, the water reservation will be documented in the Water Resource Protection Plan, along with the prior-approved water reservations. The reservation will be included in the calculation of authorized planned use for consideration in water management area designation. Upon the designation of any of the hydrologic units as surface water management areas, staff will initiate review and rule-making pursuant to HRS §174C-49(d) and Hawaii Administrative Rule §13-171-60(b).

The utilization of 1.60 mgd of surface water from the Wailuku surface water hydrologic unit will have no long-term negative implications for instream uses, as defined by the HRS §174C-3, as this use is less than 2% of the estimated 98.9 mgd median flow (50th percentile exceedance flow) and less than 13% of the 12.93 mgd low-flow (90th percentile exceedance flow) as indicated by the USGS station on the Wailuku River near Hilo (USGS station 16713000).

ENVIRONMENTAL REVIEW (CHAPTER 343)

Hawaii Revised Statutes (HRS) Chapter 343 is not triggered by the proposed DHHL surface water reservation request because the proposal does not meet applicability requirements pursuant to HRS §343-5.

RECOMMENDATION

Based on the above, and all applicable authority, Staff recommends that the Commission:

1. Proposed Action: Reservation of Water for DHHL
Approve a reservation of surface water for the Department of Hawaiian Home Lands based on the medium-range demands, as identified in the 2017 State Water Projects Plan, in the amount of 1.60 mgd from the Wailuku surface water hydrologic unit, Wailuku, Hawai'i.
2. Proposed Action: Interim IFS
The interim IFS at each of the four tributaries that flow into DHHL's Lower Pi'ihonua Area are listed in Table 9. These interim IFS are expected to protect the instream values including the potential for recreational and aesthetic value, habitat for native aquatic biota, water quality, and traditional and customary practices downstream of any future DHHL stream diversion works.

DHHL Non-Potable Water Reservation and Interim IFS for Wailuku Hydrologic Unit

Table 9. Proposed interim IFS values and modeled natural Q_{70} flow for the Wailuku Hydrologic Unit, Hawai'i.
[Flows are in cubic feet per second (million gallons per day)]

Stream Name	Location	Q_{50}	Interim IFS	Amount available at Q_{50}	Amount available at Q_{90}
‘Āwehi	at approximately 1440 ft elevation (below the Forest Reserve Boundary)	0.79 (0.51)	natural flow	0.0	0.0
Aale	at approximately 1560 ft elevation (below the Forest Reserve Boundary)	5.4 (3.51)	3.2 (2.1)	2.2 (1.31)	0.0 (0.0)
Laualu	at approximately 1720 ft elevation (below the Forest Reserve Boundary)	15.7 (10.2)	3.5 (2.2)	12.2 (8.0)	0.0 (0.0)
Kapehu	at approximately 1550 ft elevation (below the Forest Reserve Boundary)	50.4 (32.6)	9.3 (6.0)	41.1 (26.6)	2.4 (1.56)

Ola i ka wai,

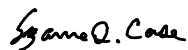


M. KALEO MANUEL
Deputy Director

Exhibits:

1. State Water Projects Plan – DHHL Update potable water demand unit rate
2. State Water Projects Plan – DHHL Update non-potable water demand unit rates by land use designation
3. 2018 Letter from DHHL Requesting a reservation of 1.60 mgd of non-potable water from the Wailuku Hydrologic Unit
4. Basin characteristics for USGS gaging stations on Hawai'i Island used in low-flow characteristic regression modelling.

APPROVED FOR SUBMITTAL:



SUZANNE D. CASE
Chairperson

Proposed Water Related DHHL Projects

Table 3.4: SWPP Potable Water Demand Unit Rates by Land Use Designation

DHHL Land Use Designation	Water System Standards Designation	Potable Water Demand Unit Rate (Average Day)			
		Hawai'i	Kaua'i	Maui	O'ahu
Residential	Residential: Single Family or Duplex	400 gal/unit	500 gal/unit	600 gal/unit	500 gal/unit
Subsistence Agriculture	Residential: Single Family or Duplex	400 gal/unit	500 gal/unit	600 gal/unit	500 gal/unit
Supplemental Agriculture	N/A	None	None	None	None
Pastoral	Residential: Single Family or Duplex	400 gal/unit	500 gal/unit	600 gal/unit	500 gal/unit
General Agriculture	N/A	None	None	None	None
Special District	Varies	Varies	Varies	Varies	Varies
Community Use	Schools, Parks	4,000 gal/acre or 60 gal/student	4,000 gal/acre or 60 gal/student	1,700 gal/acre or 60 gal/student	4,000 gal/acre or 60 gal/student
Conservation	N/A	None	None	None	None
Commercial	Commercial Only Commercial-Industrial Mix	3,000 gal/acre 140 gal/1,000 SF	3,000 gal/acre 140 gal/1,000 SF	3,000 gal/acre 140 gal/1,000 SF	3,000 gal/acre 140 gal/1,000 SF
Industrial	Light Industry	4,000 gal/acre	4,000 gal/acre	6,000 gal/acre	4,000 gal/acre

Table 3.5: SWPP Non-Potable Water Demand Unit Rates by Land Use Designation

DHL Land Use Designation	Non-Potable Water Demand Unit Rate (Average Day)			
	Hawai'i	Kaua'i	Maui	O'ahu
Residential	None	None	None	None
Subsistence Agriculture	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre
Supplemental Agriculture	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre
Pastoral	20 gal/acre	20 gal/acre	20 gal/acre	20 gal/acre
General Agriculture	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre	3,400 gal/acre
Special District	Varies	Varies	Varies	Varies
Community Use	None	None	None	None
Conservation	None	None	None	None
Commercial	None	None	None	None
Industrial	None	None	None	None

Note: In areas to be developed as Lo'i Kalo, non-potable water demand unit rate 150,000 gal/acre/day superseded unit rate in Table 3.5.

March 17, 2020

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

DOUGLAS S. CHIN
LT. GOVERNOR
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

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JOBIE M. K. MASAGATANI
CHAIRMAN
HAWAIIAN HOMES COMMISSION

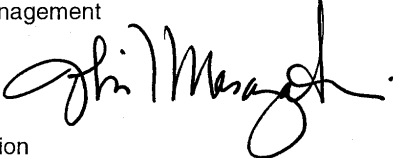
WILLIAM J. AILA, JR.
DEPUTY TO THE CHAIRMAN

October 8, 2018

RECEIVED
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RESOURCE MANAGEMENT
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MEMORANDUM

TO: The Honorable Suzanne D. Case, Chairperson
Commission on Water Resource Management

FROM: Jobie M. K. Masagatani, Chairman
Hawaiian Homes Commission 

SUBJECT: Request for Surface Water Reservation
Of 1.740 Million Gallons Per Day of Water in the
Wailuku River, Hilo, Hawai'i

At its October 16 and 17, 2017 meeting, the Hawaiian Homes Commission (HHC) unanimously approved item G-2 (attached), which authorized the Chairman to formally request a water reservation from the Commission on Water Resource Management (CWRM) for Hawaiian Home Lands in lower Pi'ihonua, Hawai'i.

The purpose of this request is to adequately reserve surface water for Department of Hawaiian Home Lands' water demands for current and foreseeable development and use on Hawaiian Home Lands in lower Pi'ihonua, Hilo, Hawai'i pursuant to Chapter 171-58(g), HRS and the State Water Code §174C-101(a), HRS.

This memorandum serves as the formal request of the Department of Hawaiian Home Lands for a water reservation of 1.740 MGD from the Wailuku River. We respectfully request CWRM to reserve, incorporate, and protect this adequate reserve of water for current and foreseeable development and use of Hawaiian Home Lands.

Enclosure

c: Wallace Ishibashi, East Hawai'i Hawaiian Homes Commissioner
Olinda Fisher, DHHL East Hawai'i District Office
Everett Ohta, Office of Hawaiian Affairs
Jay Ignacio, Hawaiian Electric Light Company
Russell Tsuji, Department of Land and Natural Resources

FILE ID:	07442-4953.8
DOC ID:	20555

20-18-507 DHHL

USGS station number, name, select flow-duration statistics, and watershed characteristics for USGS stream gaging stations on windward streams of Hawai‘i Island. [Source: USGS Water Data for the Nation (<https://waterdata.usgs.gov/nwis>)]

station number	Station Name	Q ₅₀ (cfs)	Q ₇₀ (cfs)	Q ₉₀ (cfs)	Area (mi ²)	Mean basin slope (%)	Mean basin elevation (ft)	Comparative ratio	soil permeability (12 in)	evergreen forest cover (%)	Mean Annual Precipitation (in)
16700000	Waiakea Stream nr Mountain View	8.4	4.5	1.3	21.40	7.81	4650	3.03	10.6	63	141
16704000	Wailuku River at Piionua	58	30	9	220.00	10.8	6433	2.02	9.97	28	92.9
16701800	Wailuku nr Kaumana	2.8	1.1	0.37	38.43	15.75	7123	2.06	10.84	19.98	84
16713000	Wailuku at Hilo	150	47	20	245.00	11	6095	2.09	10.1	31	102
16717000	Honolii	40	22	11	12.00	11.2	3752	2.56	13	93	188
16717600	Alia Stream nr Hilo	11	8.7	5.6	0.64	12.37	1104	3.34	11.98	12.57	190
16717800	Pohakupuka Stream nr Papaaloa	8.6	4	1.3	2.82	17.78	237.9	4.03	12.24	82.61	163
16720000	Kawainui Str nr Kamuela	4.2	1.6	0.51	1.41	11.2	4619	1.75	0.47	89	91.7
16720300	Kawaiki Stream nr Kamuela	1.1	0.5	0.16	0.42	14.26	4397	1.98	0.05	85	160
16725000	Alakahi Str nr Kamuela	2.2	1.2	0.32	0.83	12.5	4292	1.82	0.05	95	145
16737500	Waimanu Str nr Kamuela	72	43	39	7.78	62.2	2380	1.78	6.69	64	130
16756000	Kohakohau Stream nr Kamuela	2	0.9	0.46	2.39	18.45	4521	2.31	2.04	91.13	103.5
16758000	Waikoloa Str at Marine Dam	4.2	2.7	1.8	1.4	11.23	3783	1.98	0.47	7	92
200505155383801	Kawainui Str abv L. Hamakua Ditch	4.2	1.6	0.51	1.53	17.8	4619	1.75	0.05	76	166