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STAFF SUBMITTAL

COMMISSION ON WATER RESOURCE MANAGEMENT

February 15, 2012
Honolulu, Hawaii

Request to Authorize the Chairperson to Enter Into a Contract
Agreement to Develop a Central Oahu Non-potable Water Master Plan

SUMMARY OF REQUEST

The Commission Staff requests the Commission on Water Resource Management (Commission) authorize the Chairperson to:

1. Enter into a contract agreement to develop a Central Oahu Non-potable Water Master Plan, and
2. Authorize up to $75,000 in funding to develop this plan.

BACKGROUND

Land use in Central Oahu is in transition. With the decline of plantation sugar and pineapple, vast tracts of former sugarcane lands lie fallow. There are plans for increased agricultural activity in the Kunia Road corridor, expansion of military housing at U.S. Army Schofield Barracks, and proposals for new urban developments. There is significant non-potable water demand associated with each of these planned activities. Use of non-potable water sources to meet these future demands will protect and conserve potable ground water for higher uses.

The Commission records show that over 12 million gallons per day (mgd) of high-quality ground water from the Wahiawa Aquifer System Area is currently permitted for non-potable uses. An additional 13 mgd is permitted from the down gradient Waipahu-Waiawa Aquifer System Area for non-potable uses (see Exhibits 1 and 2). If these non-potable uses could be converted to non-potable water sources, over 25 mgd more of high-quality ground water could be conserved.

There are numerous sources of non-potable water in the Wahiawa-Mililani-Kunia region:

1. Lake Wilson

   The North and South Forks of Kaukonahua Stream descend from the Koolau Mountains and feed Lake Wilson. The City's Wahiawa Wastewater Treatment Plant, urban stormwater from municipal drainage systems, and runoff from surrounding agricultural, military, and urban lands also feed into the lake. Lake Wilson has a current capacity of 2.5 *billion* gallons. The daily pass

through flow is estimated to be about 36 mgd. Currently, a portion of the outflow from the lake is combined with R-1 water from the Schofield Wastewater Treatment Plan to feed Dole's Wahiawa Irrigation System. This system supplies water for agricultural activity in the Mokuleia-Wailua-Haleiwa region (Exhibit 3).

2. Schofield Wastewater Treatment Plant

   Aqua Engineers operates the Schofield Wastewater Treatment Plant under a lease with the U.S. Army. The plant is designed to be a 4.2 mgd facility. Current flows are about 2.2 to 2.3 mgd, but are expected to increase to about 3 mgd due to base expansion. The R-1 water is discharged just below the dam and is mixed with water from Lake Wilson to service the Wahiawa Irrigation System. By a 1994 agreement, to promote diversified agriculture in the North Shore, a precedent was set for the Army to pay a fee for Dole to take the water. At the time, the water was R-2 quality. The plant was since upgraded to produce R-1 water which has a much higher value; however, the practice of paying Dole has continued. Currently, the Army pays Dole $550,000 a year on a month-to-month lease agreement. The Army would like to reuse as much of the R-1 water as possible and is currently using R-1 water on base for landscaping and recreational fields. Funding was recently granted through a congressional appropriation to construct a line to the Leilehua Golf Course. There are plans to increase use of the R-1 water on base (Exhibit 4). However, even after satisfying the Army's needs (estimated to be about 1 mgd), there will still be about 2 mgd of R-1 water available for other uses.

3. City & County of Honolulu's Wahiawa Wastewater Treatment Plant

   The City & County of Honolulu's Wahiawa Wastewater Treatment Plant discharges R-2 water into Lake Wilson. Although the effluent is being treated to the highest tertiary level, the water is considered R-2 due to the lack of a primary disposal. It is anticipated that reuse of the effluent will become the primary method of disposal. The plant has a design capacity of 2.49 mgd. Average flows are about 2 mgd (Exhibit 5).

4. Stormwater Reclamation and Reuse Opportunities

   In 2008, the Commission completed an appraisal-level study of large-scale stormwater reclamation and reuse opportunities statewide. One of the most promising opportunities involved collecting stormwater from the Wheeler Army Air Force Base and conveying it via the Waiahole Ditch to end users (Exhibit 6). The study found a significant amount of existing infrastructure already in place for collection, treatment, storage, and conveyance of stormwater. Given approximately 190 acres of impervious surface at Wheeler, about 6.8 million gallons of stormwater could be reclaimed for non-potable uses during a 1-hour rainfall event (1-year recurrence interval).

5. Waiahole Ditch

   The Waiahole Ditch transports about 12 mgd from windward Oahu high-level tunnels to serve agriculture and other uses along its alignment in Mililani and the Kunia Road corridor (Exhibit 7). The ditch system terminates in Kunia. If extended, the ditch could convey non-potable water from Central Oahu to down-gradient users as far away as Ewa, or for direct recharge of the brackish Ewa caprock aquifer.

Central Oahu non-potable water might provide non-potable water to agriculture (diversified agriculture, biofuel production, and seed) in Central Oahu and the North Shore regions, for landscaping, and for irrigating parks in military and residential housing developments in the Kunia, Wahiawa, and Waipio areas. It is unclear what the future non-potable water demands will be without exploring different land use scenarios.

There are also concerns with the increased volume of domestic wastewater associated with this growth and a need to explore options for treatment and disposition of this wastewater. Current designs anticipate transporting municipal wastewater generated in Central Oahu to the Honoluliuli Wastewater Treatment Plant/Reclamation Facility in the Ewa Plain for treatment and reuse or disposal. This is energy intensive and expensive. There may be opportunities to decentralize treatment and recycle this wastewater locally which would increase opportunities for beneficial reuse.

Increased urban and community development will lead to more and more paved and impervious surfaces – roofs, roads, parking lots and other hard surfaces. During high rainfall events, increased runoff from these surfaces will increase sediments and pollutants flowing into streams and drainage ways. Similarly, increased agricultural activities may have the same effect. The combination of increased urbanization and agricultural activity leads to greater impairment of near shore waters and damage to coral reefs during storm events. Capture and reuse of this runoff could mitigate surface and near shore water quality while enhancing non-potable supplies for urban irrigation.

Finally, the increasing threat of climate change and its impacts to rainfall, timing, and intensity further complicate water resource and water supply planning. University of Hawaii researchers report that climate change impacts on water resources are already evident in Hawaii. Air temperatures are rising. Aggregate rainfall appears to be declining statewide. Baseline stream flows have been falling. These climatic trends will result in less aquifer recharge and lower stream base flows, further underscoring the need to plan for increased use of alternative water sources.

In light of these converging and sometimes competing factors, government agencies and stakeholders need to examine solutions that can address these concerns in a more comprehensive fashion.

NEED FOR A PLAN

Faced with the growing uncertainties of water supply and increasing demand, and the challenges and opportunities in wastewater management, new, coordinated, and integrated water resource planning is needed in Central Oahu.

If water supply planning and implementation proceed in a piecemeal fashion, the opportunity to partner and leverage resources may be lost resulting in higher capital and operating costs and potentially unfavorable outcomes. By taking a regional approach and involving multiple stakeholders, there may be economies in savings and avoided costs. For example, reusing wastewater in Central Oahu may reduce the size and capital costs to expand the planned secondary treatment facility at Honouliuli Wastewater Treatment Plant. That would also reduce the operations and the energy cost to pump the wastewater to Honouliuli. Through a regional plan, there may be a synergy among entities that would not pencil out financially for any single party acting independently.

Given the numerous interested stakeholders in the area, there is a need to engage all stakeholders - landowners, farmers, developers, the military, wastewater treatment plant operators, Board of Water Supply, Department of Health, etc. – in a collaborative planning effort that looks at all resources, all potential demands, and identifies solutions in the best interests of the community and the State. The Commission wants to ensure that water supply, wastewater, and stormwater planning in Central Oahu proceed in a way that can address issues and concerns early in the process and to mitigate any foreseeable conflicts.

This planning effort can also ensure that precious potable water is preserved for drinking or domestic uses while maximizing the use of non-potable water for appropriate non-potable needs. Environmental benefits may also be realized through decreased wastewater disposal via injection well or ocean discharge and increased stormwater capture and reuse that will mitigate near shore water quality impacts during storm and high runoff events.

The proposed study is consistent with and will help to implement the Commission's policies. Viable and appropriate use of reclaimed water is an important step toward the fuller beneficial integration of Hawaii's water resources in our community.

AUTHORITY

The Commission's authority to conduct planning studies under Haw. Rev. Stat. §174C-5(6), provides in part, that the Commission:

> *Shall cooperate with federal agencies, other state agencies, county or other local governmental organizations, and all other public and private agencies created for the purpose of utilizing and conserving the waters of the State, and assist these organizations and agencies in coordinating the use of their facilities and participate in the exchange of ideas, knowledge, and date with these organizations and agencies;*

Haw. Rev. Stat. §174C-5(13) further provides that the Commission:

> *Shall plan and coordinate programs for the development, conservation, protection, control, and regulation of water resources based upon the best available information, and in cooperation with federal agencies, other state agencies, county or other local governmental organization, and other public and private agencies created for the utilization and conservation of water.*

PLAN OBJECTIVES

There are five key objectives of this planning study.

1. Establish a Central Oahu non-potable water advisory group comprised of key stakeholders and water experts to help guide this study.

2. Inventory current and potential sources of non-potable water in the Central Oahu area, including, but not limited to Lake Wilson, City and County of Honolulu Wahiawa Wastewater Treatment Plant, Schofield Barracks Wastewater Treatment Plant, stormwater capture and reuse, Waiahole Ditch water, and existing (and future) urban wastewater systems. The inventory should assess current and potential water quantities, current and potential service areas, water quality characteristics, water service constraints, system storage and conveyance appurtenances, and any other source characteristics important to regional non-potable water master planning.

3. Identify current and future uses for non-potable water generated in the Central Oahu area, including but not limited to agricultural demands in the Kunia, Wahiawa, and North Shore areas, landscape, park, and golf course irrigation demands and other non-potable uses in the residential, military, and commercial sectors within the current and potential service areas from the sources identified above.

4. Explore options for matching the sources of non-potable water outlined in Objective 2 to meet the demands for this water indicated in Objective 3.

5. Develop a Central Oahu non-potable water master plan which would include preliminary cost estimates of new infrastructure and operational costs.

FUNDING

Staff requests that the Commission approve up to $75,000 in funding to develop the plan described above. Funds would derive from the Commissions general fund, special fund, or a combination of both, subject to available funding. Staff will actively seek cost-sharing partners to contribute to the development of this planning study. Funding contributions from key agencies, organizations, stakeholders or partners may also be used as a cost-share towards the completion of this project.

ENVIRONMENTAL REVIEW (Haw. Rev. Stat. Chapter 343)

The planning study described here is exempt from Hawaii's environmental review process under Hawaii Administrative Rules, § 11-200-5(d). This planning study will identify possible future projects which have not been approved, adopted, or funded. No testing or other actions which may have a significant effect on the environment are involved. Therefore, the proposed action is exempt from Hawaii Revised Statutes, Chapter 343.

RECOMMENDATIONS

Staff recommends that the Commission:

1. Authorize the Chairperson to enter into a contract agreement and to approve funding not to exceed $75,000 to develop a Central Oahu non-potable water master plan.

2. Authorize the Chairperson to make such further amendments or modifications of the contract agreement (consistent with the terms set forth above) as may be necessary to accomplish the goals described here, provided that any amendment or modification does not require additional Commission funding.

The terms of this agreement will be subject to the approval of the Chairperson and the Attorney General.

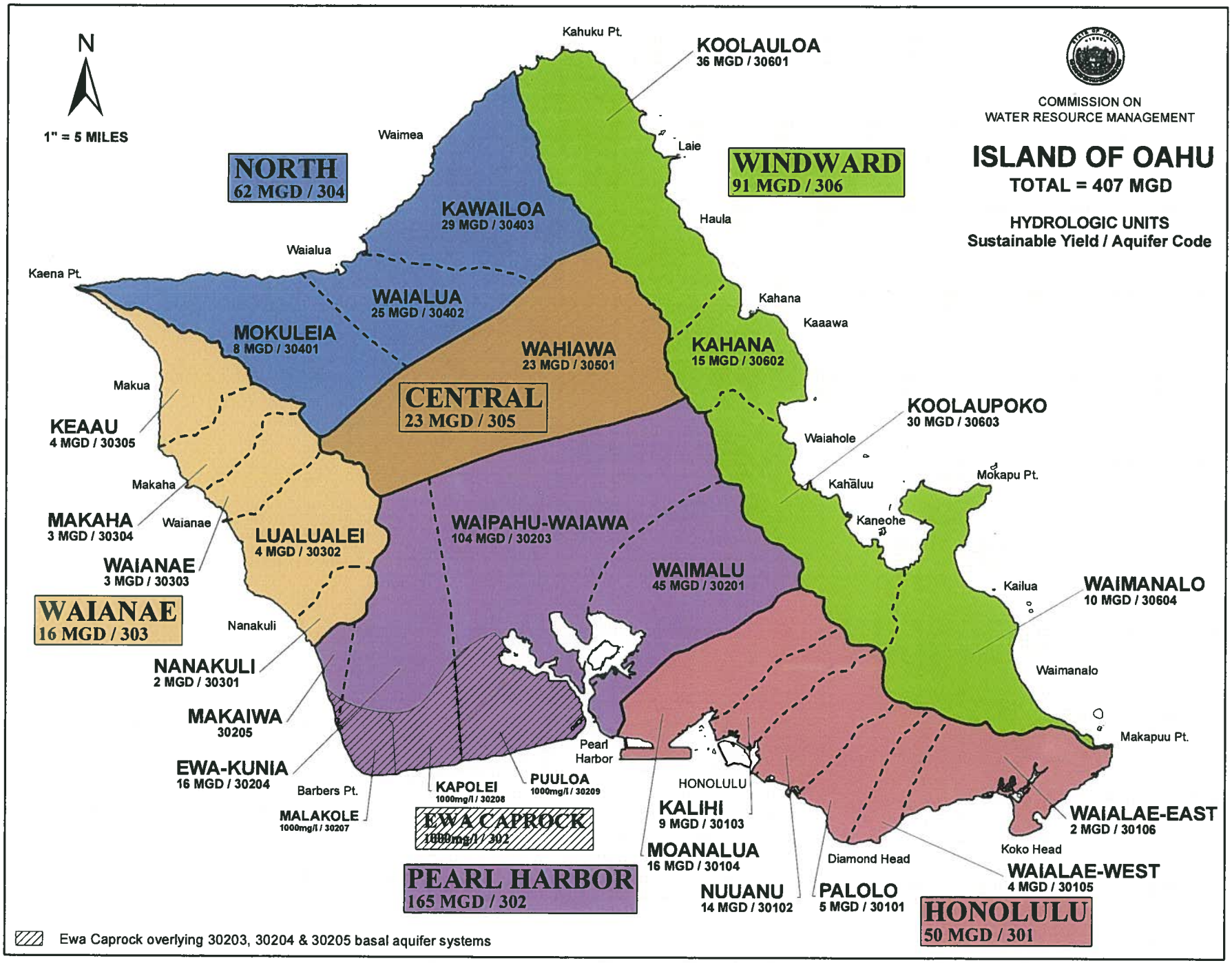
Respectfully Submitted,

WILLIAM M. TAM
Deputy Director

Exhibits:
(1) Oahu Aquifer System and Sector Area Map
(2) Permitting Non-Potable Uses in the Wahiawa and Waipahu-Waiawa Aquifer System Areas
(3) Map of Lake Wilson and Wahiawa Irrigation System
(4) Schofield Wastewater Treatment Plant Potential Reuse Sites
(5) Wahiawa Wastewater Treatment Plant
(6) Wheeler Army Air Force Base Stormwater Reclamation and Reuse Opportunity
(7) Map of Waiahole Ditch System

APPROVED FOR SUBMITTAL:

WILLIAM J. AILA, JR.
Chairperson



Map ID: 1026

08/28/2008

Map Projection: Universal Transverse Mercator

Exhibit 1

Water Use Permits for Non-Potable Uses

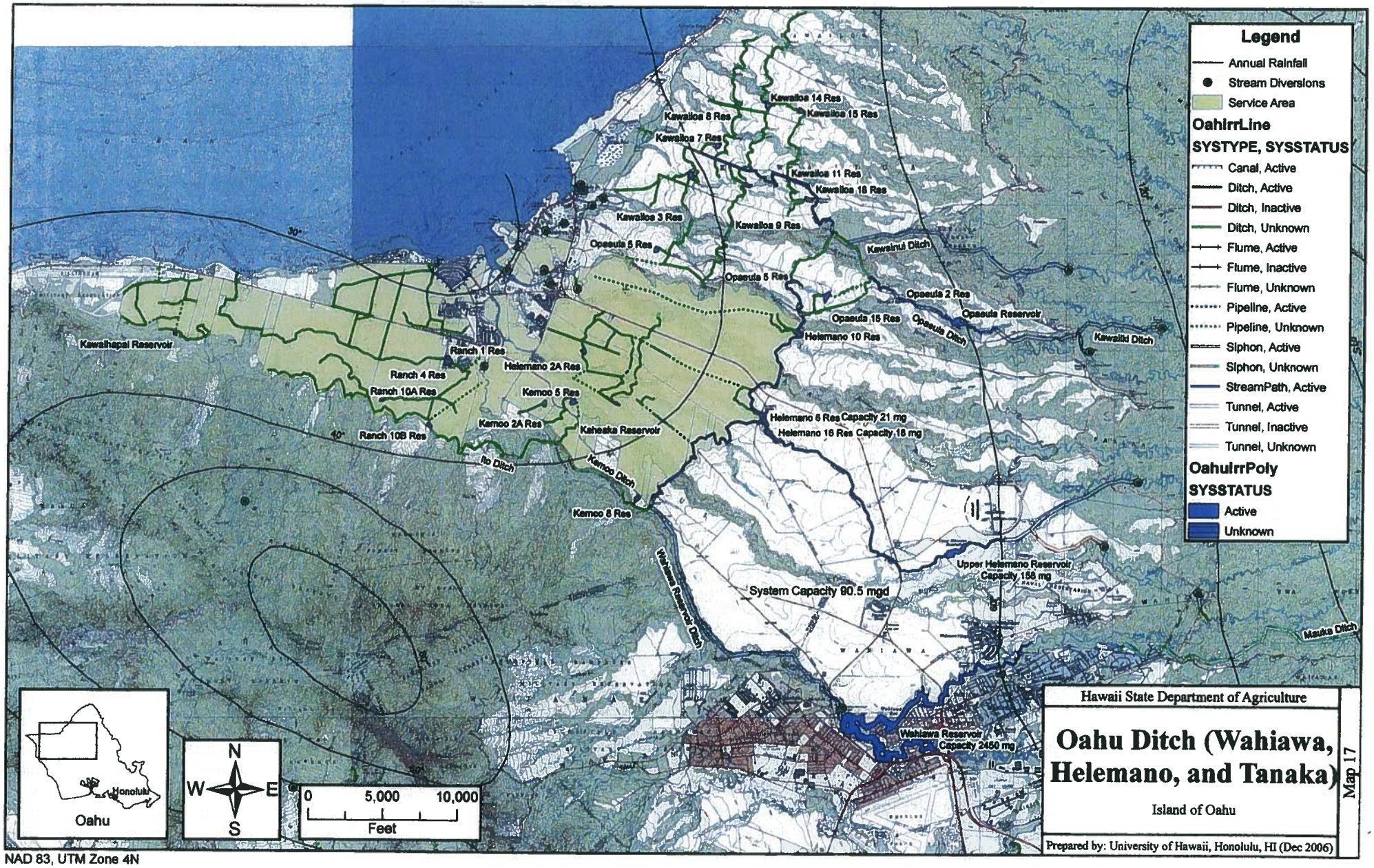
Waipahu-Waiawa Aquifer System Area

WUP No.	Permittee	Well No.	Allocation	Type of Use
084	Harris Rug CL	2201-14	0.003	Industrial
090	Michael Watanabe	2300-11	0.68	Agriculture
091	Michael Watanabe	2300-20	0.4	Agriculture
108	Yoshimura, D.	2459-21	0.006	Agriculture
456	Abe, Tadahiro	2202-02	0.009	Agriculture
575	Royal Kunia CC	2401-07	0.6	Golf Course Irrigation
573	Kenneth Simon	2358-35 & 44	0.04	Agriculture
454	Hawaii Country Club	2603-01	0.4	Golf Course Irrigation
692	Waiawa Development LLC	2658-07	0.524	Golf Course Irrigation
693	Waiawa Development LLC	2658-08	0.458	Golf Course Irrigation
627	US Fish & Wildlife	2359-19	0.18	Habitat Maintenance
749	Taba Farms	2358-21, 22, 26, 29	0.864	Agriculture
767	Robinson Kunia Land, LLC	2602-03	0.1	Agriculture
805	D.R. Horton - Schuler Homes, LLC	2102-02, 04 to 22, 2202-03 to 20	7.969	Agriculture
814	Roman Catholic Church - HI	2101-01	0.11	Agriculture
902	Hoban E&C USA, Inc.	2301-01 to 10	0.95	Golf Course Irrigation
Total			**13.293**	

Wahiawa Aquifer System Area

WUP No.	Permittee	Well No.	Allocation	Type of Use
32	Waialua Sugar	3102-02	2.58	Agriculture
138	Waialua Sugar	3203-02	1.72	Agriculture
717	BOH for Galbraith Estate	3103-01	2	Agriculture
765	Sandwich Isles Comm.	2801-03	0.1	Agriculture
826	Kelena Farms	3203-01	1.442	Agriculture
876	Alii Turf Co., LLC	3001-01	0.115	Agriculture
879	Hawaiian Earth Products	3104-02	0.355	Agriculture
880	Kunia Water Association	2803-05 & 07	3.96	Agriculture
Total			**12.272**	

Exhibit 2



NAD 83, UTM Zone 4N

Exhibit 3

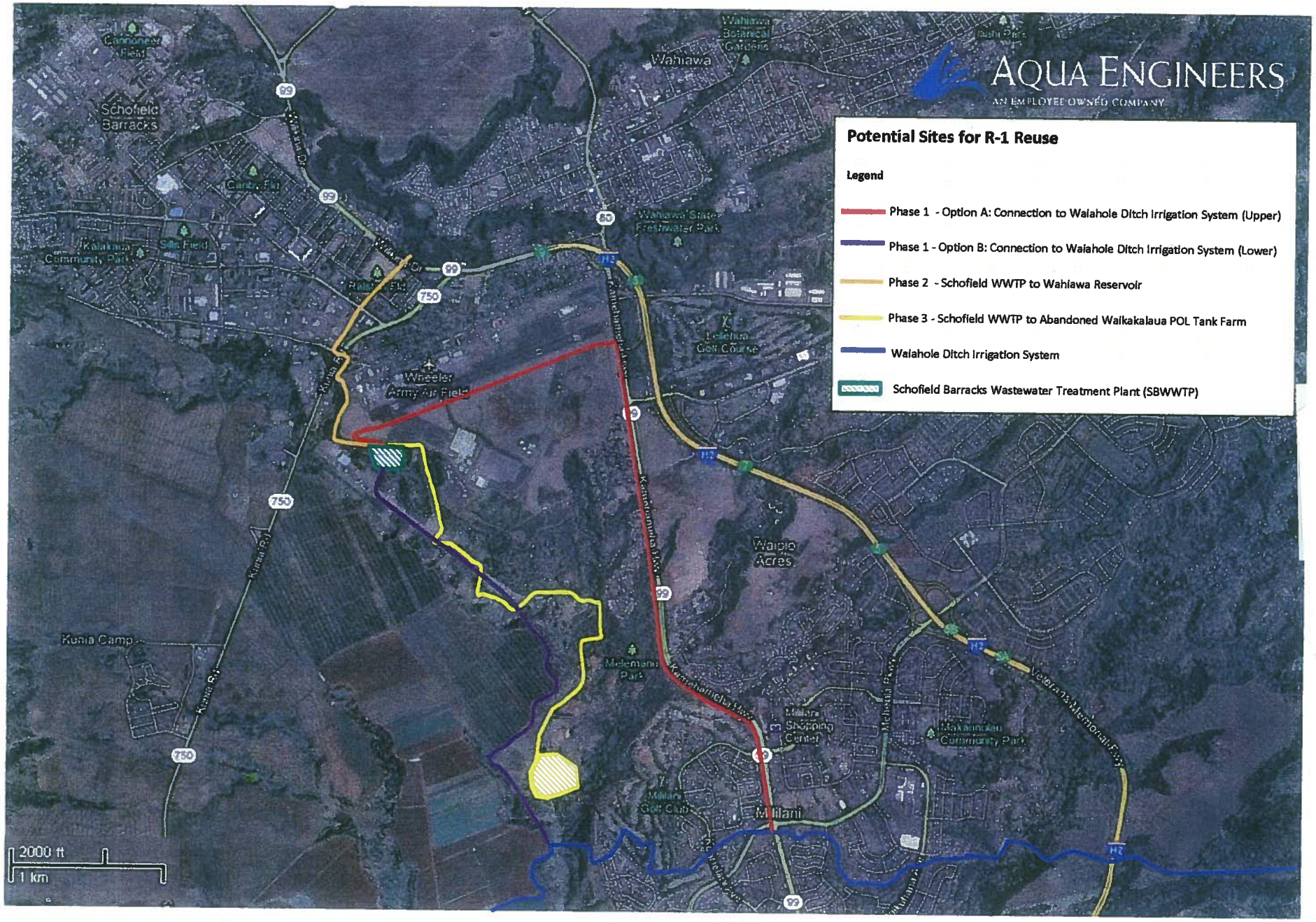

AQUA ENGINEERS
AN EMPLOYEE-OWNED COMPANY
Potential Sites for R-1 Reuse
Legend
Phase 1 - Option A: Connection to Waiahole Ditch Irrigation System (Upper)
Phase 1 - Option B: Connection to Waiahole Ditch Irrigation System (Lower)
Phase 2 - Schofield WWTP to Wahiawa Reservoir
Phase 3 - Schofield WWTP to Abandoned Waikakalaua POL Tank Farm
Waiahole Ditch Irrigation System
Schofield Barracks Wastewater Treatment Plant (SBWWTP)
Wahiawa
Schofield Barracks
Wheeler Army Air Field
Waipio Acres
Mililani
Kunia Camp
2000 ft
1 km

Exhibit 4

WAHIAWA WASTEWATER TREATMENT PLANT

Tax Map Key:	7-3-007:002
Address:	111 California Ave Wahiawa, HI 96786
Phone:	621-5098
Supervisor:	Berwin Nyuha
Supervisor phone:	620-0232
Supervisor cell:	NA
Year in service:	1927
Process type:	
Design capacity:	2.49 mgd
Avg flow processed:	1.774 mgd (FY 2007)
Mil gals treated:	647.417 (FY 2007)
Serviced laterals:	4,435
WTD number:	020

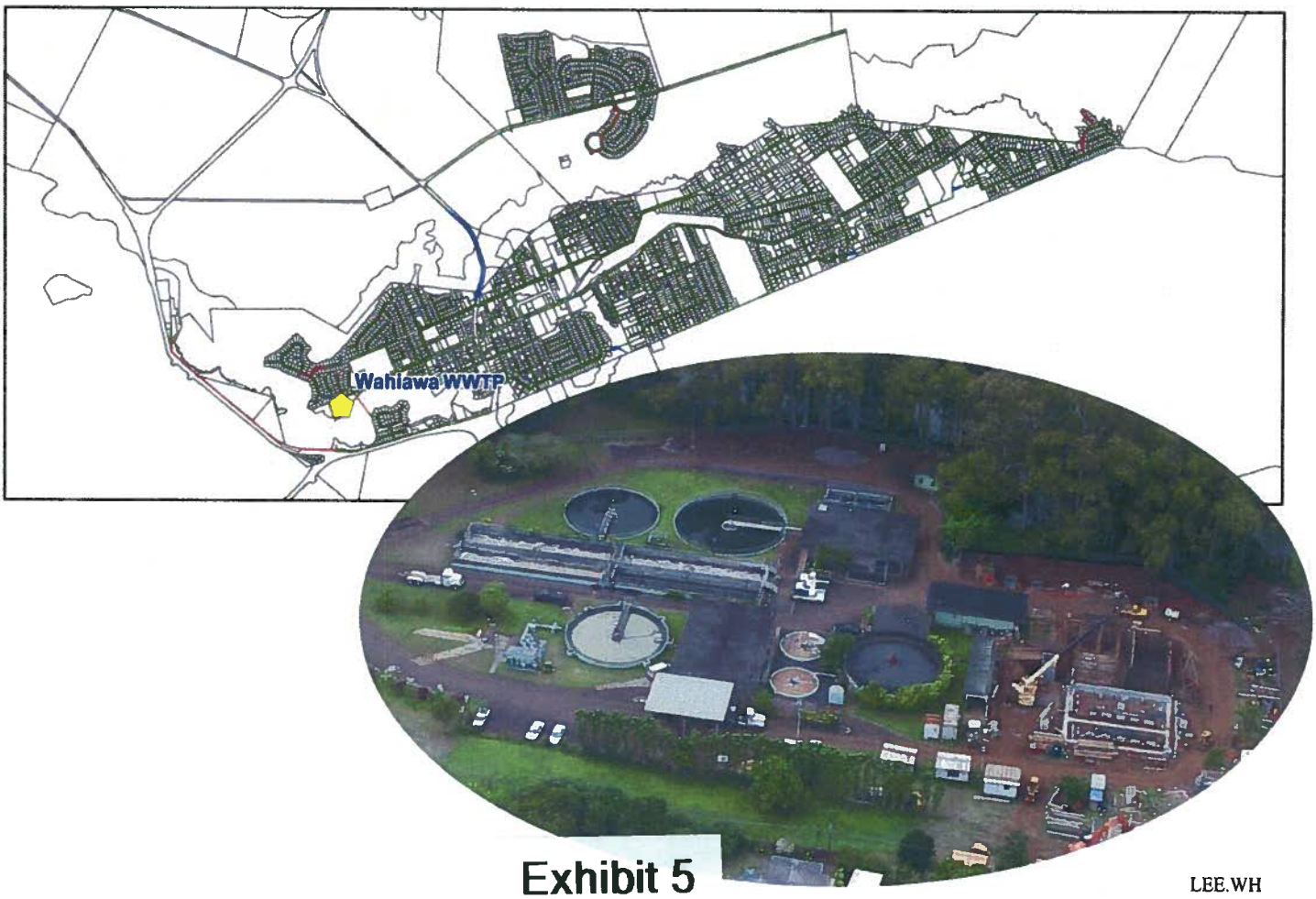


Exhibit 5

LEE.WH

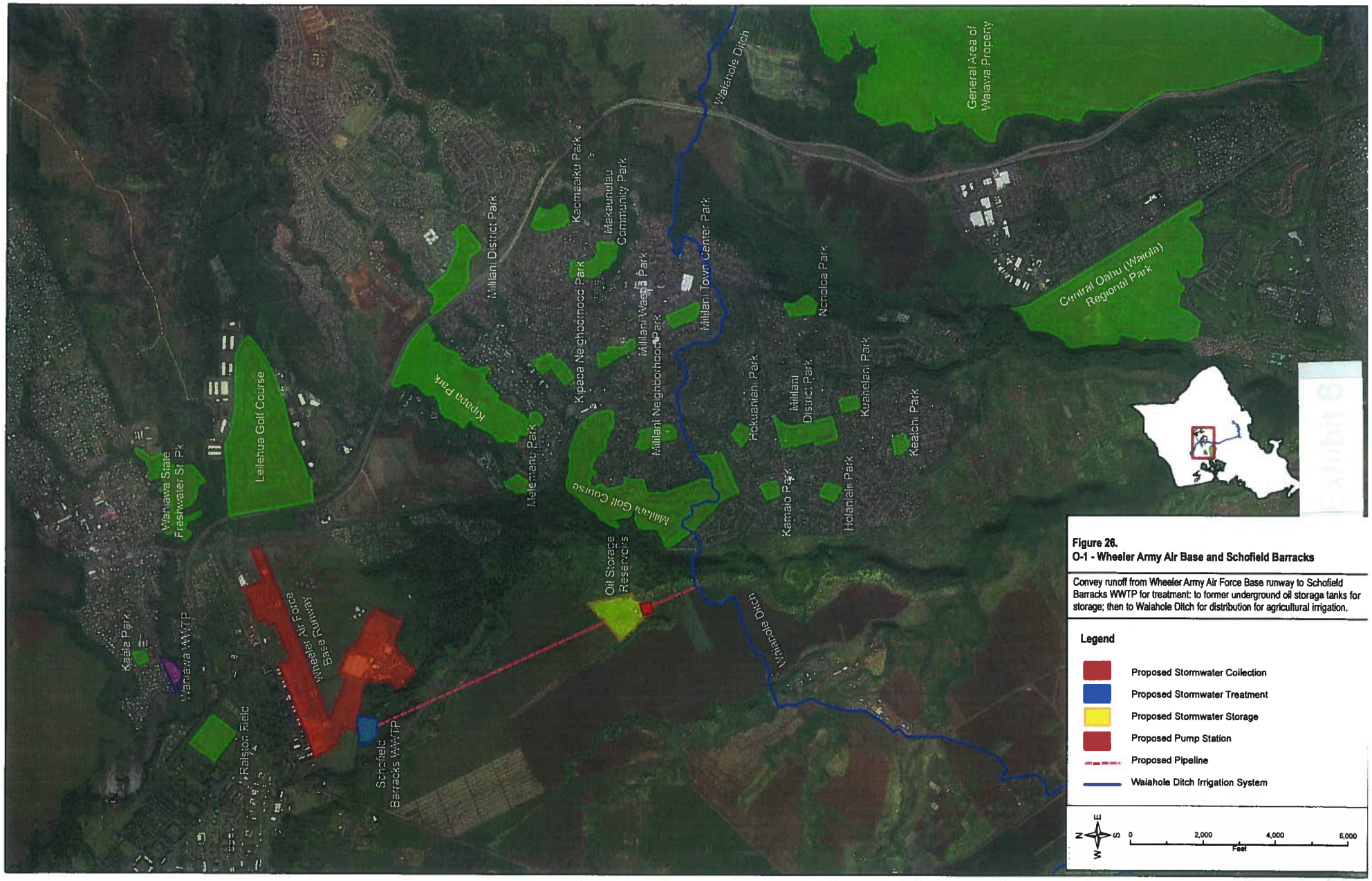
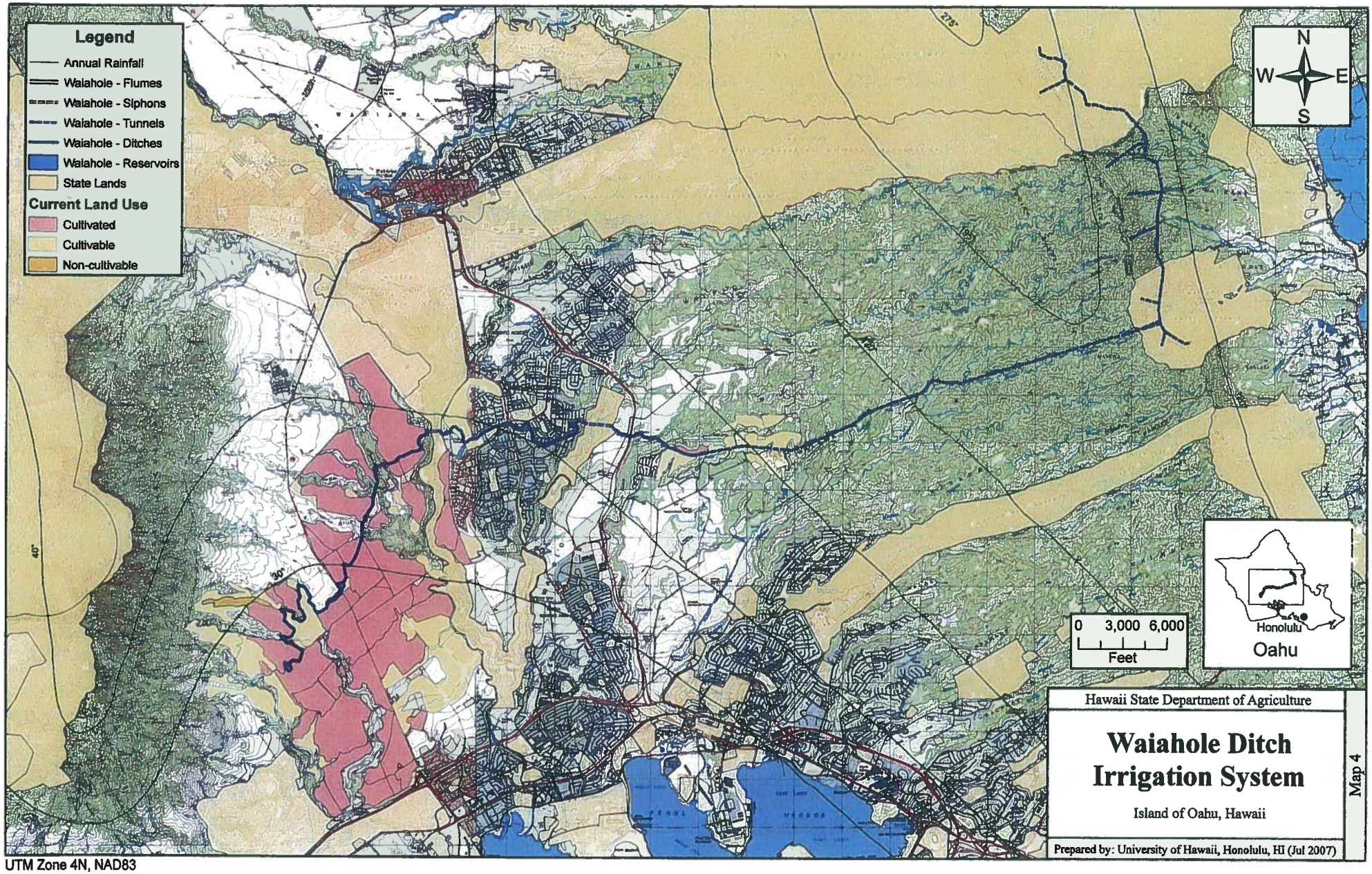


Figure 26.
O-1 - Wheeler Army Air Base and Schofield Barracks

Convey runoff from Wheeler Army Air Force Base runway to Schofield Barracks WWTP for treatment: to former underground oil storage tanks for storage; then to Waiahole Ditch for distribution for agricultural irrigation.

Exhibit 6



UTM Zone 4N, NAD83

Exhibit 7