

# BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HI 96843  
www.boardofwatersupply.com



September 21 , 2021

RICK BLANGIARDI, MAYOR

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ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer *EW*

Suzanne D. Case, Chairperson  
and Members  
State Department of Land and Natural Resources  
Commission on Water Resource Management  
1151 Punchbowl Street, Board Room 132  
Honolulu, Hawaii 96813

Dear Chairperson Case and Members:

Subject: Non-Action Item B2 - June 18, 2021 Order to Honolulu Board of Water Supply to Bulkhead Ha`ikū Tunnel (Well No. 2450-001) and Reduce Withdrawal to 0.3 million gallons per day; He`eia Hydrologic Unit, Ko`olaupoko, O`ahu

The Honolulu Board of Water Supply (BWS) provides the following update regarding our efforts to comply with the abovementioned Order by the Commission on Water Resource Management (CWRM). Specifics of this Order that were designated for progress reporting to CWRM in September 2021, and our related activities to date as follows:

### **BWS Reduction to 0.3 MGD from Ha`ikū Tunnel**

As shown in the graph below, BWS has reduced the flow from Ha`ikū Tunnel since January 2021, from approximately 1.0 MGD to 0.5 MGD and then to 0.3 MGD on August 7, 2021. The subject flow was adjusted in stages to allow for interconnected water system adjustments and minimize the possibility of low service pressures at high elevation properties and avoiding main breaks from hydraulic hammer within the Windward 500 water system.

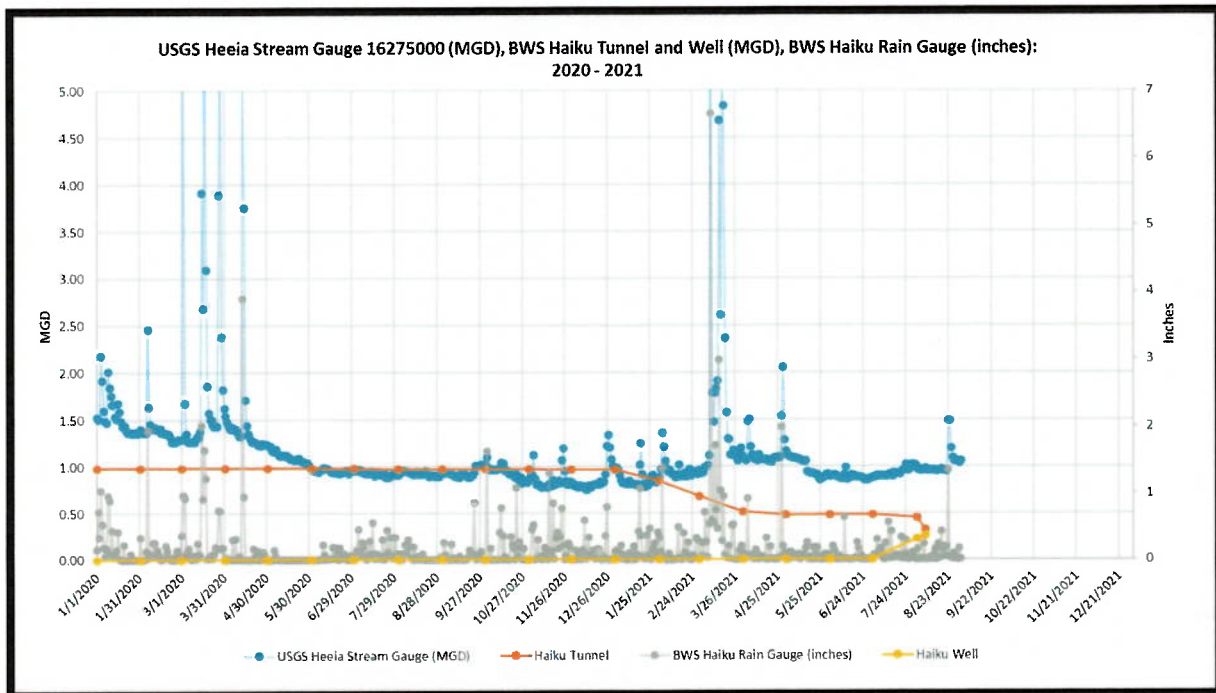
### **Water Production Reporting**

BWS expects a new water meter to be installed before the end of the year. Until then, we do not have daily production data, only physical spot reads. Our estimated monthly production report to the BWS Board is current to August 2021.

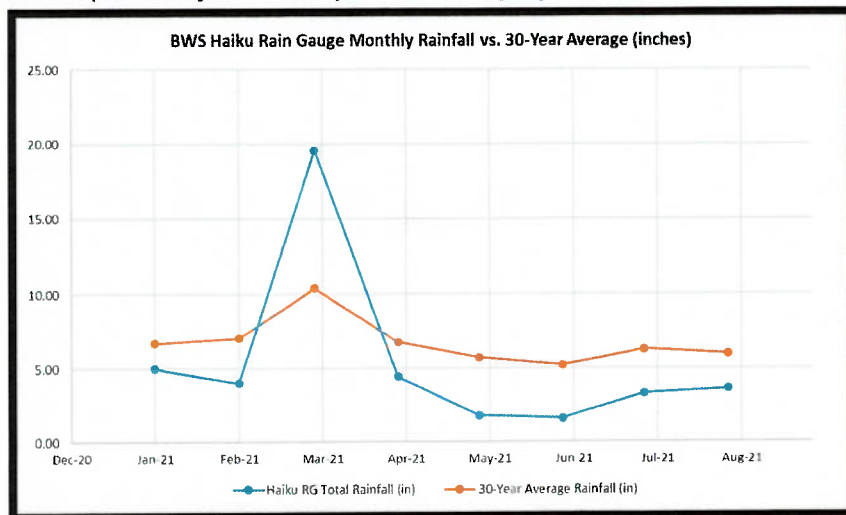
In order to install the new meter, we will have to shut down both Ha`ikū Tunnel and Ha`ikū Well for 30 days and cut into the 16-inch pipeline. However, we require `Ioleka`a Well back in service first. The shutdown will occur in the next several months when water demand is typically lower.

**Monitoring Ha`ikū Tunnel and He`eia Stream Flow**

The graph below displays the streamflow as measured at the USGS He`eia Stream Gauge (16275000), rainfall from our Ha`ikū rain gage and source production. Rainfall in Ha`ikū valley, as measured at the BWS Ha`ikū Rain Gauge, has been below normal for all but one month in 2021. This likely contributes to the lack of streamflow increase in He`eia Stream even when Ha`ikū Tunnel flow was reduced. It will take time and rainfall for water to build up behind the bulkhead.



The monthly total rainfall data since January 2021 from BWS Ha`ikū Rain Gauge, compared to the average over the past 30-year base period, is displayed below.

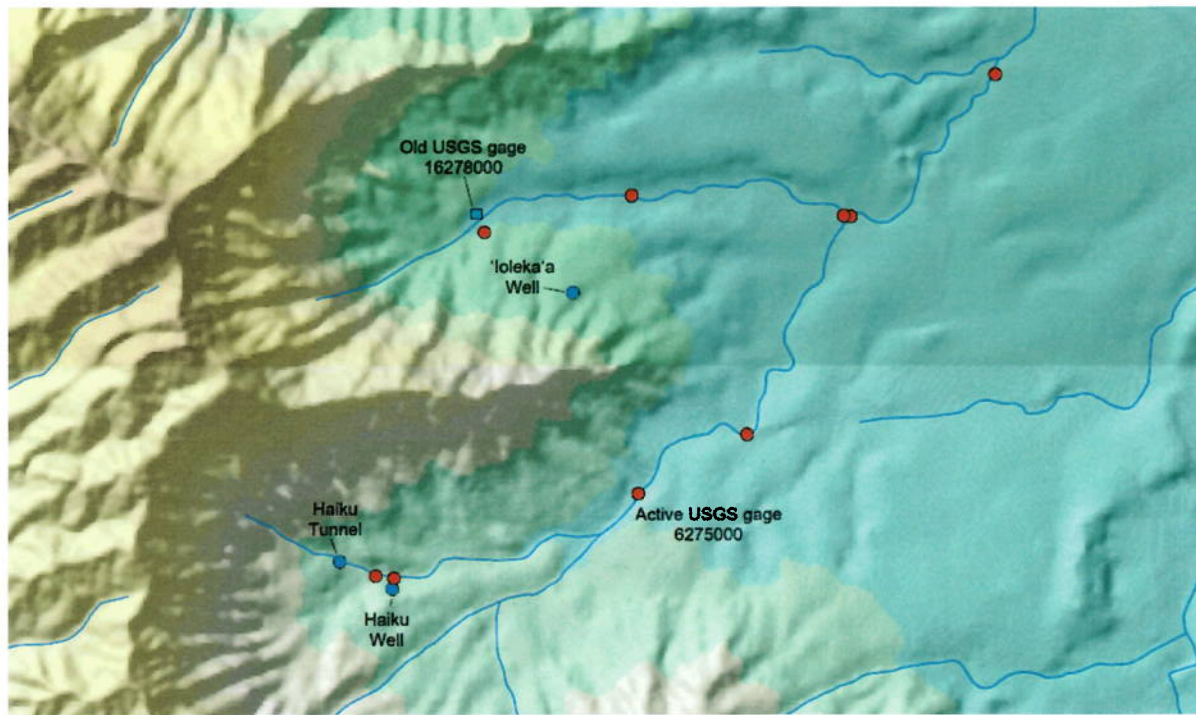


### **Installation of New Pressure Gage**

BWS operations crews are scheduled to install a new pressure gage at the Ha`ikū Tunnel portal in October. There are two pressure gages both reading different pressures. Based on a portal elevation of 550-feet, we believe there is approximately 87 feet of head behind the last bulkhead. The new pressure gage readings will confirm existing data and serve as a key indicator of dike water recovery. Higher head levels behind the bulkhead are expected to increase discharges into the gaining segments of both Ha`ikū and `Ioleka`a Streams.

### **Stream Surveys:**

USGS has initiated their field reconnaissance including stream seepage runs.



### **Assessment of Bulkhead Feasibility and Preliminary Engineering Report**

BWS is in the process of procuring a consultant to conduct a "Ha`ikū Tunnel Bulkhead - Preliminary Engineering Study". An executed contract is expected by the end of the year. The draft scope of work is attached. The budget is \$500,000.00 for the 2-year study.

### **Limitation on Water Use for Large Users Expansion Plans**


BWS letters were sent to large water users in the Windward 500 system that have expansion plans including the State Department of Health, Adventist Health Castle and Hawaii Memorial Park Cemetery notifying them of the June 18, 2021 CWRM Order. In light of the limitation on water supply, BWS is requiring necessary actions to limit increases in water use pursuant to

Ms. Suzanne D. Case, Chairperson  
and Members  
September 21, 2021  
Page 4

Section 1-101.1 Availability of Water, and Section 1-112 Use of Nonpotable Water required for Large Landscaped Areas, BWS Rules and Regulations.

If you have any questions, please contact me at 748-5061.

Very truly yours,



ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

Attachments



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

June 18, 2021

Ref: PAIFS.5666.3

Ernest Y.W. Lau, P.E.  
Manager and Chief Engineer  
Honolulu Board of Water Supply  
630 S. Beretania Street  
Honolulu, HI 96843-0001

Aloha Mr. Lau:

NOTICE OF COMMISSION ACTION  
Order to Honolulu Board of Water Supply to Bulkhead  
Ha'ikū Tunnel (Well No. 2450-001) at the 10-foot Thick Dike 1,200 feet  
From the Portal Entrance and Reduce Their Withdrawal to 0.3 million gallons per day  
He'eia Hydrologic Unit, Ko'olaupoko, O'ahu

This letter serves as your notice of action taken by the Commission on Water Resource Management (Commission) on the subject matter. On June 15, 2021, by a 7-0 vote (1 vote for approval with reservations), the Commission approved the following Order:

He'eia Stream supported one of the most agriculturally productive areas on O'ahu. The Ha'ikū Tunnel, dug at an elevation of 550 feet, depleted the groundwater storage of high-elevation dike compartments which supplied baseflow to He'eia Stream. In 1971, the USGS recommended that bulkheading at a 10-foot thick dike compartment at approximately 1,200 feet from the tunnel entrance is the preferred method to restore the storage function of the aquifer. Tunnels with high recession constants ( $b$ ), such as the Ha'ikū Tunnel, drain faster than tunnels with lower recession constants, and would therefore benefit more from bulkheading. An existing bulkhead installed and valved at 600 feet from the portal provides some small storage. The substantial ecological and cultural values supported by He'eia Stream, including habitat for native amphidromous species, restored native riparian environment, a healthy estuarine and near-shore ecosystem, recreational and aesthetic values, as well as the productivity of the He'eia fishpond and wetland to support a biocultural food production system, merits restoration of He'eia Stream to pre-tunnel baseflow. In order to protect these instream uses staff recommends that Honolulu Board of Water Supply (HBWS) bulkhead the 10-foot thick dike compartment at approximately 1,200 feet from the tunnel entrance and valve separately from the bulkhead at 600 feet from the tunnel entrance. Such action would increase spring flow in Ha'ikū while providing a more reliable source of water supply for HBWS. This solution is expected to increase the natural capacity of

the high-elevation groundwater system to store and discharge water to streams and springs in the moku of Ko'olaupoko.

As an interim measure, until the Ha'ikū tunnel is fully bulkheaded, Commission staff recommends that HBWS reduce their withdrawal from the Ha'ikū tunnel to 0.3 million gallons per day (mgd) by August 15, 2021. When the bulkheading process commences, the Ha'ikū tunnel will not be a viable source for HBWS, and therefore the entirety of the tunnel flow will be discharged into the stream.

In order to improve transparency among stakeholders, staff recommends that HBWS provides the daily amount of water withdrawn from each well source (Ha'ikū Tunnel, Ha'ikū well, and Ioleka'a well) at monthly intervals.

Following the bulkheading of the tunnel, staff will evaluate the resultant effects on stream baseflow and may amend the interim IFS or amend the HBWS water use permit as needed.

#### IMPLEMENTATION

- Within two years, HBWS will complete their feasibility study and preliminary engineering design for the proposed bulkhead.
- HBWS will communicate with the Commission and continue to coordinate with Kamehameha Schools, Department of Hawaiian Home Lands (DHHL), Papahana Kuaola, Hawai'i Community Development Authority (HCDA), National Estuarine Research Reserve (NERR), and Kāko'o 'Ōiwi water users on a quarterly basis.
- Upon completion of the feasibility study and engineering design, HBWS will have three years to complete the final design and construction of the bulkhead.
- Following the installation of the bulkhead, staff will work with HBWS, Kamehameha Schools, DHHL, Papahana Kuaola, HCDA, NERR, and Kāko'o 'Ōiwi to evaluate the implications for baseflow in Ha'ikū Stream and determine the feasibility of establishing a numeric instream flow standard.
- If HBWS determines that bulkheading is not a feasible solution upon completion of the feasibility study, staff will recommend an amendment to the interim IFS or amend the HBWS water use permit as needed.

#### MONITORING

- Streamflow monitoring shall be maintained by HBWS coordinating with USGS.
- At monthly intervals, HBWS will provide monitoring of daily flow withdrawn from the Ha'ikū Tunnel, Ha'ikū well, and Ioleka'a well.
- Periodic biological surveys shall be conducted, subject to available funding, to monitor the response of stream biota by all interested parties.
- All claimants shall cooperate with staff in conducting appropriate investigations and studies, particularly with regard to granting access to stream channels and private property related to such investigations, subject to the provisions of the State Water Code, Chapter 174C, HRS.



Ernest Y.W. Lau, P.E.

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EVALUATION

- One to two years following the completion of the bulkheading, staff shall report to the Commission on an evaluation of baseflow conditions in He'eia and nearby streams and make recommendations to amend instream flow standards at that time.

Staff will report to the Commission, at its September 2021 meeting, on the progress of:

1. HBWS reduction to 0.3 mgd from Ha'ikū Tunnel;
2. HBWS reduction from Ha'ikū Tunnel to flow in He'eia Stream;
3. Assessment of bulkhead feasibility and preliminary engineering report; and
4. Potential development of alternative water sources, including the State Hospital Well.

If you have any questions, please contact Ayrton Strauch at (808) 587-0265, or [ayron.m.strauch@hawaii.gov](mailto:ayron.m.strauch@hawaii.gov).

Ola i ka wai,



M. KALEO MANUEL  
Deputy Director

# HAIKU TUNNEL BULKHEAD PRELIMINARY ENGINEERING STUDY

## PROJECT SCOPE OF WORK

September 17, 2021

The Board of Water Supply (BWS) requires professional consulting services for Haiku Tunnel (State Well No. 3-2450-001). The subject study will include reviewing available historic information and conducting a field investigation. The study will assess the hydrogeology of the surrounding watershed and the tunnel's current condition, and evaluate the feasibility of installing an additional bulkhead near the far terminus of the tunnel, to improve storage capacity.

The selected consultant will provide and present a detailed written report of work completed, including findings and recommendations. Results from the study will provide BWS with guidance for responding to the State Commission on Water Resource Management (CWRM) June 18, 2021 Order to bulkhead Haiku Tunnel. This Order relates to CWRM's efforts to establish an Interim Instream Flow Standard (IIFS) for Heeia Stream. The first 4 scope items are concurrent actions.

1. Historic information to be reviewed for the study includes but is not limited to the following: available BWS draft designs and reports, BWS production and monitoring data. Coordination with the concurrent Heeia Stream study being performed by USGS for BWS is also required, to optimize the data collection for both efforts.
2. Field investigation: Conduct a multi-season tunnel pressure, dike storage and stream gage testing program by closing the Haiku Tunnel discharge pipeline for up to 2 years, rainfall dependent, with weekly measurements of pressure and head level trends behind the existing bulkhead to determine the maximum gain in water level storage and the USGS Heeia Stream gage flow. Study should evaluate and document any impacts to the BWS 500 water system when the tunnel discharge line is closed for the proposed extended period.
3. Evaluation: Conduct hydro-geologic, civil and geotechnical engineering evaluations to determine the maximum water level that can be sustainably maintained for a range of tunnel withdrawal rates around a central tendency of 0.3 mgd, with Haiku Well operating.
  - a. Evaluate the constructability of installing an additional bulkhead at the last dike, by dismantling the existing door hatches and pipes in the tunnel, meeting OSHA confined space safety requirements and other requirements, adding temporary airline ducts with and without the demolition and rebuilding the existing bulkheads to achieve the required access conditions. If water level gains in the shut-in testing do not reach anticipated levels, the additional bulkhead installation will be pursued.
  - b. Assess the risk of tunnel construction and from entry into the tunnel to conduct the evaluation described herein from microbiological contamination of the source based on Palolo Tunnel and Ewa Shaft experience and provide mitigative measures to minimize impacts and the corrective procedures to address potential contamination meeting DOH safe drinking water standards and BWS operating procedures for the recertification of a public drinking water source.
  - c. Assess cost/benefits, impacts and implications of balancing potable water production to meet essential Haiku Valley water demand versus stream restoration for up to three (3) alternatives, with and without additional bulkheading. Include a conceptual layout of each alternative.
  - d. Develop planning/budgeting-level design and construction cost estimates and schedules for each alternative. Identify the necessary permits, reviews, and/or approvals from regulatory agencies for each alternative.
  - e. Provide an optimum recommendation.



4. Conduct and document agency and regional stakeholder coordination and meetings, as necessary.
5. Prepare an agency review Draft, Pre-Final and Final Report.
6. Contract term is 2 years.
7. Budget: \$500,000.00

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CITY AND COUNTY OF HONOLULU  
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August 5, 2021

RICK BLANGIARDI, MAYOR

BRYAN P. ANDAYA, Chair  
KAPUA SPROAT, Vice Chair  
RAY C. SOON  
MAX J. SWORD  
NA'ALEHU ANTHONY

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ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer

Ms. Elizabeth A Char, MD, Director  
Department of Health  
State of Hawaii  
1250 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Dr. Char:

**Subject: State Commission on Water Resource Management Order of June 18, 2021 to Reduce BWS Haiku Tunnel Production to 0.3 mgd in Setting Interim Instream Flow Standards for Heeia Stream, Oahu, Hawaii**

This letter is to inform you that the State Commission on Water Resource Management (Commission) issued an Order of June 18, 2021 (attached), which requires the Board of Water Supply (BWS) to reduce Haiku Tunnel Production from 1.34 mgd to 0.3 mgd by August 15, 2021. The purpose of this reduction is to restore water into Heeia Stream. The required reduction is significant and could impact our ability to provide water service for the Hawaii State Hospital expansion and could detrimentally affect water pressures to our existing customers in mauka Haiku Valley. This could include the existing hospital, particularly during the summer months when water demand increases. The BWS is required to comply with this Order or it would be subject to potential regulatory action and penalties.

As a result of this action, we requested that the Commission require the Department of Land and Natural Resources (DLNR) to install a pump on State Well No. 2449-02, which was drilled by DLNR in 2000. This well is adjacent to the existing State-owned water tank above the hospital and should be able to serve the Hospital's water needs without requiring water flow from Haiku Tunnel. The Commission responded by requesting that its staff provide a report to the Commission at the September 21, 2021 meeting on the potential development of an alternative water source for the State Hospital.

In light of this situation, the BWS hereby informs you that it will be necessary for the State Department of Health (DOH) to install the pump on State Well No. 2449-02 for the purposes of serving the hospital with potable well water instead of the BWS Haiku Tunnel source. This action is necessary and required pursuant to Section 1-101.1 of BWS Rules and Regulations, Availability of Water. We note that if BWS was informed of the reduction order before the State Hospital expansion plans moved forward, we would not have approved the building permits. The State will have to obtain the funding and prepare the permitting, design and construction and scheduling to expedite the pump installation and inform the Commission and BWS of project progress.

We provide the following supporting points of note:

1. The hospital is a BWS customer and currently obtains potable water directly from Haiku Tunnel through a 4-inch water meter along the north end of Ala Koolau Road between the hospital and Windward Community College. State Well No. 2449-02 is currently unused and provides aquifer observation data.
2. The hospital expansion, reopening in August 2021, will increase demand from Haiku Tunnel from approximately 23,000 gpd to 100,000 gpd, with full build out reaching 200,000 gpd, according to the 2017 Final Environmental Impact Statement for the Hawaii State Hospital, New Patient Facility and Campus Master Plan Development. The increase in water use by the State DOH happens to coincide with the State Commission's requirement for the reduction in BWS Haiku Tunnel water production.
3. The State owns and maintains the Hawaii State Hospital water system and adding the pump and well to the system appears feasible since the well was test pumped for quantity and quality, 500 gpm well yield with low chloride content of 18 mg/l.
4. The State can lead by example and do its part to help restore more water into Heeia Stream by reducing noninstream water use at the hospital in furtherance of the State's stream restoration mandate.
5. Utilizing well water will significantly reduce the hospital's monthly BWS water bill.
6. BWS is agreeable to maintain the existing 4-inch water meter serving the hospital as an emergency stand-by water service in the event the pump requires maintenance and replacement. An emergency water service agreement will need to be executed.
7. The well will not affect Heeia stream flows because it is located in the Keeahala Stream system, which is highly channelized through Kaneohe and does not appear to have similar instream values compared to the Heeia wetland and fishpond.

BWS staff can assist the Safe Drinking Water Branch and DLNR Engineering staff on providing necessary information for the required permits. We can provide supporting testimony for legislative capital funding for the pump installation and assist in outreach to elected officials and the community, if needed.

If you have any questions, please contact me at 748-5061.

Very truly yours,



ERNEST Y.W. LAU, P.E.  
Manager and Chief Engineer

Attachment

Cc: Suzanne Case, DLNR  
Joanna Seto, EMD-DOH  
cc: ESO, WSO, CC, CPD, WR

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CITY AND COUNTY OF HONOLULU  
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September 13, 2021

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Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer 

Administrator  
Adventist Health Castle  
640 Ulukahiki Street  
Kailua, Hawaii 96734

Administrator:

**Subject: State Commission on Water Resource Management Order of June 18, 2021 to Reduce Board of Water Supply Haiku Tunnel Production to 0.3 Million Gallons per Day in Setting Interim Instream Flow Standards for Heeia Stream, Oahu, Hawaii**

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The HPU Hawaii Loa campus currently uses approximately 14,000 gallons per day of potable water and the proposed expansion could increase water use when water supply will be limited. In light of this situation, the BWS hereby informs you that it will be necessary for Castle's medical facilities expansion to incorporate advanced water conservation measures including utilization of rain catchments for irrigation, xeriscape landscaping, efficient irrigation systems and weather-based irrigation controllers with soil moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets, air conditioning condensate recovery, and investigate on-site gray water reuse. Plumbing and irrigation systems should be regularly checked for leaks and promptly repaired. Submeters will facilitate regular water audits of on-site water systems and water using equipment, such as cooling towers. BWS Water Sensible conservation program provides rebates for weather-based irrigation controllers with soil moisture sensors. For more information, visit the BWS website at <https://www.boardofwatersupply.com/conservation/watersensible/rebates>.



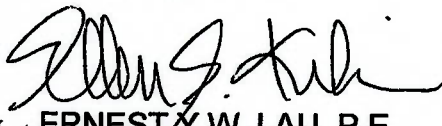
Administrator  
Sept. 13, 2021  
Page 2

This action is necessary and required pursuant to BWS Rules and Regulations, Section 1-101 Availability of Water and Section 1-112 Use of Nonpotable Water Required for Large Landscaped Areas. We note that BWS was informed of the reduction order after the expansion plans were disclosed and therefore future BWS comments on water availability will be revised accordingly. The Commission order could affect BWS approval of any future building permits for the medical facilities expansion and maximizing water conservation measures will be a condition of BWS approval.

Please provide written confirmation of receipt of this letter and compliance to its conditions.

If you have any questions, please contact Barry Usagawa, Program Administrator of our Water Resources Division at 748-5900 or by email at [busagawa@hbws.org](mailto:busagawa@hbws.org).

Very truly yours,



ERNEST Y.W. LAU, P.E.  
Manager and Chief Engineer

Attachment

cc: State Commission on Water Resource Management  
City Department of Planning and Permitting

cc: B. Usagawa

WR-21-123

## BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
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September 13, 2021

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ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer *EW*

Hawaiian Memorial Park Cemetery  
45-425 Kamehameha Highway  
Kaneohe, Hawaii 96744

Manager:

**Subject: State Commission on Water Resource Management Order of June 18, 2021 to Reduce Board of Water Supply Haiku Tunnel Production to 0.3 Million Gallons per Day in Setting Interim Instream Flow Standards for Heeia Stream, Oahu, Hawaii**

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HMPC currently uses between 40,000 gallons per day (gpd) and 55,000 gpd of potable water for irrigation and other uses and the proposed expansion will increase water use when water supply will be limited. In light of this situation, the BWS hereby informs you that it will be necessary for HMPC to investigate a connection to the Halekou irrigation well and pump station located in the Halekou interchange, State Well No. 2347-04 to 09, that currently provides nonpotable irrigation water to the Veterans Cemetery. In addition, HMPC is required to incorporate xeriscape and drought tolerant landscaping in the expansion areas to minimize irrigation water demand. HMPC is required to regularly check their irrigation systems for leaks and promptly effect repairs. BWS Water Sensible conservation program provides rebates for weather-based irrigation controllers with soil moisture sensors. For more information, visit the BWS website at <https://www.boardofwatersupply.com/conservation/watersensible/rebates>.

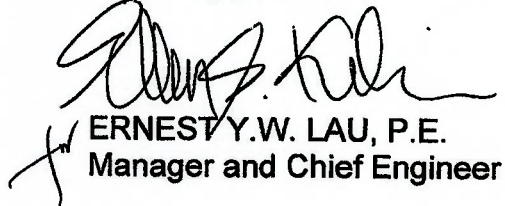


This action is necessary and required pursuant to BWS Rules and Regulations, Section 1-101 Availability of Water and Section 1-112 Use of Nonpotable Water Required for Large Landscaped Areas. We note that BWS was informed of the reduction order after the HMPC expansion plans and Environmental Impact Statement was accepted. The Commission order could affect BWS approval of any future building permits for HMPC's expansion and maximizing water conservation measures will be a condition of BWS approval.

Please provide written confirmation of receipt of this letter and compliance to its conditions.

If you have any questions, please contact Barry Usagawa, Program Administrator of our Water Resources Division at 748-5900 or by email at [busagawa@hbws.org](mailto:busagawa@hbws.org).

Very truly yours,



ERNEST Y.W. LAU, P.E.  
Manager and Chief Engineer

Attachment

cc: State Commission on Water Resource Management  
City Department of Planning and Permitting

cc: B. Usagawa

WR-21-123