

# BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HI 96843  
[www.boardofwatersupply.com](http://www.boardofwatersupply.com)



April 20, 2021

RICK BLANGIARDI, MAYOR

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

JADE T. BUTAY, Ex-Officio  
ROGER BABCOCK, Jr., Ex-Officio

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

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

## NOTICE

The Board of Water Supply, City and County of Honolulu, will hold a Regular Meeting on Monday, April 26, 2021, at 2:00 p.m. in the Boardroom, Public Service Building, 630 South Beretania Street, Honolulu, Hawaii.

Pursuant to the Nineteenth Supplementary Proclamation issued by Governor David Y. Ige on April 9, 2021, related to the COVID-19 emergency, in order to allow public participation in a manner consistent with social distancing practices, the following procedures are in effect for the meeting.

Some Board members may be participating in the meeting by interactive conference technology from remote locations.

### TESTIMONY

Testimony can be submitted as follows:

- Written testimony may be emailed to [board@hbws.org](mailto:board@hbws.org) or faxed to (808) 748-5079. Testimony is due by Monday, April 26, 2021, at noon. Written testimonies should include the submitter's address, email address, and phone number. Written testimony will be posted to the BWS website [at boardofwatersupply.com](http://www.boardofwatersupply.com).
- Mail written testimony to Board of Water Supply, 630 S. Beretania St., Honolulu, HI 96843. Testimony is due by Monday, April 26, 2021, at noon.
- On-line testimony will be accepted at [boardofwatersupply.com/testimony](http://www.boardofwatersupply.com/testimony). Fill out the testimony form. Due by Monday, April 26, 2021, at noon.
- Telephone testimony will be accepted during the meeting at (808) 748-6040. Callers will be placed in a queue and brought up to testify one at a time.
- In-person testimony will not be accepted.

Testimony is limited to two (2) minutes and shall be presented by the registered speaker only.

### MATERIALS AVAILABLE FOR INSPECTION

Meeting materials ("board packet" under HRS Section 92-7.5) are accessible at [www.boardofwatersupply.com/boardmeetings](http://www.boardofwatersupply.com/boardmeetings).

### VIEWING THE MEETING

The meeting will be viewable via live streaming on:  
(1) the BWS website: [www.boardofwatersupply.com/live](http://www.boardofwatersupply.com/live). Video will appear on screen. You may have to click the arrow on video to start it. You may have to unmute audio as muted audio tends to be the default setting.

## **SPECIAL REQUESTS AND ACCOMMODATIONS**

If you require special assistance, an auxiliary aid or service, and/or an accommodation due to a disability to participate in this meeting (i.e., sign language interpreter; interpreter for language other than English, or wheelchair accessibility), please call 748-5172 or email your request to [board@hbws.org](mailto:board@hbws.org) at least three business days prior to the meeting date.

The agenda for the April 26, 2021, Regular Meeting of the Board of Water Supply is as follows:

**ITEMS REQUIRING BOARD ACTION**

1. Approval of the Minutes of the Regular Meeting Held on March 29, 2021
2. Authorizing a Public Hearing to Consider the Proposed Fiscal Year 2021-2022 Operating and Capital Improvement Program Budget

**ITEMS FOR INFORMATION**

1. Regulated Dams under Board of Water Supply Control and Management
2. Lessons Learned from the COVID-19 Pandemic
3. Status Update of Groundwater Levels at All Index Stations
4. Water Main Repair Report for March 2021

**EXECUTIVE SESSION**

1. Approval of the Minutes of the Executive Session Held on March 29, 2021
2. To Consult with the Board's Attorney on Questions and Issues Pertaining to the Board of Water Supply's Proposed Settlement of Claim #20-047-D, Relating to Property Damages at 98-641 Moanalua Loop, Aiea, Hawaii, Following a 8" Cast Iron Main Break Between Lii Ipo Street and Lokowai Place, Aiea, Hawaii, on January 21, 2020 [HRS §92-5(a)(4)]
3. To Consult with the Board's Attorney on Questions and Issues Pertaining to the Board of Water Supply's Proposed Settlement of Claim #19-078, Relating to Property Damages at 91-508 Pupu Street, Ewa Beach, Hawaii, Following a 8" Cast Iron Main Break between Huleia Place and Amio Street, Ewa Beach, Hawaii, on September 28, 2019 [HRS §92-5(a)(4)]
4. To Consult with the Board's Attorney on Questions and Issues Pertaining to the Board of Water Supply's Proposed Settlement of Claim #20-096, Relating to Property Damages at 55 Dowsett Avenue, Hawaii, Following a 8" PVC Main Break between Pali Highway and 71 Dowsett Avenue, Honolulu, Hawaii, on April 23, 2020 [HRS §92-5(a)(4)]
5. To Consider the Evaluation of the Chief Engineer, Where Consideration of Matters Affecting Privacy Will be Involved [HRS §92-5(a)(2)]

## MINUTES

### THE REGULAR MEETING OF THE BOARD OF WATER SUPPLY

April 26, 2021

At 2:02 PM on April 26, 2021, in the Board Room of the Public Service Building at 630 South Beretania Street, Honolulu, Hawaii, Board Chair Andaya called to order the Regular Meeting.

**Present:** Bryan P. Andaya, Chair via WebEx  
Kapua Sproat, Vice Chair via WebEx  
Max J. Sword, Board Member via WebEx  
Ray C. Soon, Board Member via WebEx  
Na'alehu Anthony, Board Member via WebEx  
Jade T. Butay, Board Member, Ex-Officio via WebEx  
Roger Babcock, Jr., Board Member, Ex-Officio via Webex

**Also Present:** Ernest Lau, Manager and Chief Engineer  
Ellen Kitamura, Deputy Manager and Chief Engineer via WebEx  
Jason Takaki, Program Administrator, Capital Projects Division via Vimeo  
Jadine Urasaki, Assistant Program Administrator, Capital Projects Division via WebEx  
Jennifer Elflein, Program Administrator, Customer Care Division via Vimeo  
Kathleen Elliott-Pahinui, Information Officer, Communications Office via Vimeo  
Raelynn Nakabayashi, Executive Assistant I, Executive Support Office  
Micheal Fuke, Program Administrator, Field Operations Division via WebEx  
Jason Nikaido, Assistant Program Administrator, Field Operations Division  
Joseph Cooper, Waterworks Controller, Finance Division via WebEx  
Leanne Matsumoto, Assistant Waterworks Controller, Finance Division via WebEx  
Michele Thomas, Executive Assistant I, Human Resources Office via Vimeo  
Henderson Nuuhiwa, Program Administrator, Information Technology via Vimeo  
Michael Matsuo, Land Administrator, Land Division  
Erwin Kawata, Program Administrator, Water Quality Division via Vimeo  
Barry Usagawa, Program Administrator, Water Resources Division

Kevin Ihu, Program Administrator,  
Water System Operations Division  
Via Vimeo

Kathy Mitchell, Administrative Services Officer  
Via Vimeo

Deanna Thyssen, Managers Secretary via WebEx  
Joy Cruz-Achiu, Board Secretary

Steven Norstrom, Information Specialist II,  
Communications Office

Stella Bernardo, Information Specialist II,  
Communications Office via WebEx

Blaine Fergerstrom, Information Specialist II,  
Communications Office via WebEx

**Others Present:**

Jeff Lau, Deputy Corporation Counsel  
via Conference Call

Jessica Wong, Deputy Corporation Counsel  
via WebEx Call

**Absent:**

## REGULAR MEETING

Chair Bryan Andaya announced he was joining the Regular Meeting via WebEx with other Board Members and requested a roll call for the Regular Meeting. Chair Andaya asked each Board Member to respond verbally when their names were called. Vice Chair Kapua Sproat, aye; Board Member Max Sword, aye; Board Member Na'alehu Anthony, aye; and Board Member Roger Babcock, Jr., aye.

Chair Andaya stated he would acknowledge other Board Members as they joined the meeting.

At 2:04 PM, Chair Andaya stated Board Member Ray Soon joined the Regular Meeting via WebEx.

Chair Andaya requested all attendees calling in or video conferencing to please mute their microphone when not speaking to the audience. When intending to speak, unmute their microphone and identify themselves before speaking.

Chair Andaya introduced those present in the Boardroom, Manager Ernest Lau, Board Secretary Joy Cruz-Achui, and Information Specialist Steven Norstrom. Joining from the City and County Corporation Counsel was Deputy Jeff Lau via Conference Call and Deputy Jessica Wong via WebEx Call.

Chair Andaya stated under the Nineteenth Supplementary Proclamation issued by Governor David Ige on April 9, 2021, to follow public participation in a matter consistent with COVID-19 practices. The following procedures are in effect for the meeting:

Board Members are participating from remote locations via WebEx.

Chair Andaya shared the various ways to submit testimony: Written testimony may be submitted by email to [board@hbws.org](mailto:board@hbws.org), by fax to (808) 748-5079; mailed to Board of Water Supply, 630 S. Beretania St., Honolulu, HI 96843; or online at the [boardofwatersupply.com/testimony](https://boardofwatersupply.com/testimony), which were all due on Monday, April 26, 2021, at noon. However, late testimony will be accepted by email, fax, or mail. Telephone testimony is accepted by calling (808)748-6040, where you will be put in the queue and allowed to testify one at a time. Unfortunately, due to the pandemic, in-person testimony is suspended. Pursuant to HRS Section 92-7.5, Board Meeting materials are available to view on our website at [www.boardofwatersupply.com/boardmeeting](https://www.boardofwatersupply.com/boardmeeting).

Chair Andaya also announced the Board Meeting is broadcasted live on the BWS website at [www.boardofwatersupply.com/live](https://www.boardofwatersupply.com/live).

**APPROVAL OF MEETING** Approval of the Minutes of the Regular Meeting Held on March 29, 2021.

**MOTION TO APPROVE** Na'alehu Anthony and Max Sword motioned and seconded, respectively, to approve the Minutes of the Regular Meeting of March 29, 2021.

Chair Andaya asked Mr. Norstrom, is there was anyone to testify by telephone. Mr. Norstrom responded there were no telephone testifiers. Chair Andaya asked if there was any discussion on the minutes from the Board Members. There were no comments or discussion from the Board Members.

In lieu of a roll call vote, Chair Andaya requested a voice vote on the motion and requested that Board Members in favor of the motion say "Aye." The Board members present responded with a verbal "Aye." Chair Andaya then inquired if any Board Members would like to object or vote "Nay" on the motion. There were no objections or "Nay" votes. Chair Andaya announced that the motion was unanimously carried.

THE MINUTES OF THE REGULAR MEETING HELD ON MARCH 29, 2021, WERE APPROVED AT THE APRIL 26, 2021 BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
RAY C. SOON	X		
MAX J. SWORD	X		
NA'ALEHU ANTHONY	X		
JADE T. BUTAY			ABSENT
ROGER BABCOCK, JR.	X		

“April 26, 2021

**AUTHORIZING  
A PUBLIC  
HEARING TO  
CONSIDER THE  
PROPOSED  
FISCAL YEAR  
2021-2022  
OPERATING AND  
CAPITAL  
IMPROVEMENT  
PROGRAM  
BUDGET**

**Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843**

**Chair and Members:**

**Subject: Authorizing a Public Hearing to Consider the Proposed  
Fiscal Year 2021-2022 Operating and Capital Improvement  
Program Budget**

We recommend that the Board authorize a public hearing to be held at 2:00 p.m. on Monday, May 24, 2021, to consider the resolution to adopt the proposed Operating and Capital Improvement Program Budget for the fiscal year beginning July 1, 2021 and ending June 30, 2022. A Budget Workshop is tentatively scheduled on May 10, 2021, at 2:00 pm.

Attached is the draft of the “Notice of Public Hearing” to be published prior to the hearing date.

Respectfully Submitted,

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

Attachment”

The foregoing was for information only.

**MOTION TO  
APPROVE A  
PUBLIC  
HEARING**

Ray Soon and Max Sword motioned and seconded, respectively, to approve the Authorizing a Public Hearing to Consider the Proposed Fiscal Year 2021-2022 Operating and Capital Improvement Program Budget.

**DISCUSSION:**

Chair Andaya asked for clarification. Is this authorization for a Public Hearing to conduct the May 10, 2021 Budget Workshop?

Manager Ernest Lau explained that the Public Hearing is to be held on May 24, 2021, at 2:00 PM, before the Regular Board meeting. The Budget Workshop on May 10, 2021, will be on a separate notice.

Board Member Max Sword inquired if printed copies of the Draft Budget Books are available for the public should they be requested.

Manager Lau replied that the public may request a printed copy of the Board of Water Supply (BWS) draft budget book by directly contacting the BWS. He also stated that digital copies were distributed amongst the Board Members and printed copies are also available for those requesting a copy.



Board Member Sword suggested adding to the notice a note stating printed copies of the BWS Draft Budget Books are available upon request by contacting the BWS.

Manager Lau agreed with Board Member Sword that it would be a good idea to add to the notice and let the public know that printed copies of the BWS Draft Budget Book are available.

Manager Lau recognized Raelynn Nakabayashi, Executive Assistant I, Executive Support Officer.

Ms. Nakabayashi shared that the draft Notice of Public Hearing, which will be posted in the Honolulu Star Advertiser prior to the Public Hearing and Regular Board Meeting on May 24, 2021. The Public Hearing Notice will inform the public that a Public Hearing will be held on Monday, May 24, 2021, at 2:00 PM to discuss the Fiscal Year 2022 Operating and Capital Improvement Program (CIP) Budget. Noted in the Public Hearing Notice are ways to submit testimony, how to view the public hearing and how to obtain materials.

Chair Andaya asked the Board Members if there was any further discussion on authorizing a public hearing. There were no comments or discussions from the Board Members.

Chair Andaya asked Mr. Norstrom if there was anyone to testify by telephone. Mr. Norstrom responded there were no telephone testifiers. He asked Board Secretary Ms. Cruz-Achiu if there were any written testimony. Ms. Cruz-Achiu responded there was no written testimony.

In lieu of a roll call vote, Chair Andaya requested a voice vote on the motion and requested that Board Members in favor of the motion say "Aye." The Board members present responded with a verbal "Aye." Chair Andaya then inquired if any Board Members would like to object or vote "Nay" on the motion. There were no objections or "Nay" votes. Chair Andaya announced that the motion was unanimously carried.

At 2:13 PM, Board Member Jade Butay joined the Regular Board meeting via WebEx.

AUTHORIZING A PUBLIC HEARING TO CONSIDER THE PROPOSED FISCAL YEAR 2021-2022 OPERATING AND CAPITAL IMPROVEMENT PROGRAM BUDGET WAS APPROVED ON APRIL 26, 2021			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
RAY C. SOON	X		
MAX J. SWORD	X		
NA'ALEHU ANTHONY	X		
JADE T. BUTAY			ABSENT
ROGER BABCOCK JR.	X		

## NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU, will hold a PUBLIC HEARING in the Board Room, Public Service Building, 630 South Beretania Street, on Monday, May 24, 2021, at 2:00 p.m. or soon thereafter, where all interested persons shall be afforded the opportunity of being heard, while complying with all directives from the Governor of the State of Hawaii and the Mayor of the City and County of Honolulu, on the adoption of the Proposed to the Fiscal Year (FY) 2021-2022 Operating and Capital Improvement Program Budget of the Board of Water Supply for the fiscal year beginning July 1, 2021, and ending June 30, 2022.

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## VIEWING THE MEETING

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Persons wishing to present telephone testimony are requested to register by 1:00 p.m. on Friday, May 21, 2021, with Luella Paekukui, 748-5176, by providing your name, phone number, and subject matter of testimony. Telephone testimony is limited to two (2) minutes and shall be presented by the registered speaker only. Any person requiring special assistance may contact Luella Paekukui at (808) 748-5176 no later than May 18, 2021, so that appropriate accommodations can be provided.

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU

**ITEM FOR INFORMATION NO. 1**

“April 26, 2021

**REGULATED  
DAMS UNDER  
BOARD OF  
WATER SUPPLY  
CONTROL AND  
MANAGEMENT**

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843

Chair and Members:

Subject: Regulated Dams under Board of Water Supply Control and Management

In light of the recent potential failure of a regulated dam on Maui and the fining of owners of regulated dams on Oahu and Hawaii Island, Michael Matsuo, Land Administrator, will provide information on the three (3) State-regulated dams – Nuuanu Open Reservoir No. 4, Mauna Olu 530' Open Reservoir and Nuuanu Open Reservoir No. 1 – under Board of Water Supply jurisdiction, control and management.

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

Attachment”

The foregoing was for information only.

**DISCUSSION:** Michael Matsuo, Land Administrator, Land Division, gave the report.

Chair Andaya asked if the Board Members had any questions.

Board Member Soon inquired why the BWS is maintaining the three reservoirs since doing so is not part of the BWS' core mission and asked why we not return them to the State or transfer them to the Department of Facility Maintenance.

Mr. Matsuo responded that the three (Nuuanu) reservoirs were turned over to the BWS because they were being used for potable water distribution in the past. But, when they were no longer being used as such, the BWS did not take any action to transfer them to a more appropriate government agency. Thus, they remain under the BWS control to this day.

Manager Lau added that the BWS has made multiple attempts to return the reservoirs and surrounding properties to the State, but the offers were declined.

Board Member Soon commented he doesn't understand why the BWS continues to own the Mauna Olu 530 Reservoir, especially since it's supplying the golf courses in Makaha.

Manager Lau explained that when the BWS acquired lands in Makaha in the 1980s, it included the property that contains the Mauna Olu 530 Reservoir as well as Glover Tunnel, which was once owned by the developer of Makaha Valley, and currently provides non-potable water to the reservoir.

Mr. Matsuo commented that the use of Mauna Olu 530 Reservoir aligns with the BWS's conservation of resources. The BWS shouldn't provide potable water to be used for irrigation.

Manager Lau stated that Glover Tunnel was previously owned by the developers, which was included when the BWS acquired the lands in Makaha. He confirmed that Glover Tunnel produces non-potable water, which supplies the lower tunnels and irrigation water to the golf courses.

Board Member Soon asked does the BWS charge the golf courses non-potable water rates to cover costs.

Manager Lau confirmed that the golf courses are charged the non-potable rate and stated that lower non-potable water rates encourage use and conservation of potable water for consumption. He responded to Board Member Soon that he needed to verify the cost of service analysis from the last rate study to determine whether the BWS is recovering its full costs or if these costs are being subsidized by potable customers. Manager Lau indicated that the BWS would get back to Board Member Soon on this.

Board Member Soon responded he would appreciate receiving that information to have a better understanding of all three reservoirs. He commended the BWS for bringing all three reservoirs to Department of Land and Natural Resources (DLNR) standards and suggested this might be the appropriate time to transfer the facilities back to the State.

Manager Lau stated since joining the BWS nine and half years ago, he has made multiple attempts to return the Nuuanu reservoirs back to the State because of the liability. But, he has had no success in doing so. Manager Lau further stated that BWS has been investigating the use of the captured stormwater from Nuuanu Reservoirs No. 1 and 4 to generate hydro-electric power and possibly recharge the aquifer. With climate change, the island might experience intense, short duration rainstorm events. Rather than allow that water to flow into the ocean, the BWS may be able to detain it and then use it to recharge the aquifer. BWS has an ongoing study to look into this.

Board Member Jade Butay inquired if the BWS receives funding from the Federal or State Government for dam safety.

Manager Lau replied that the BWS doesn't have any access to State funds for the work BWS performed. He stated he was unaware if the United States Army Corps of Engineers would help fund improvements for these particular dams. He stated that while there are federal funds for the Ala Wai watershed projects, he was unsure if federal funding was available for the Nuuanu and Mauna Olu dams.

Board Member Butay asked if it would be an option to remove the three reservoirs since they no longer serve a purpose and are classified as high hazard.

Manager Lau replied decommissioning the dams is an option. However, decommissioning may be a challenge for Nuuanu Reservoirs No. 1 and 4 since the areas below them are heavily urbanized. He stated the dams currently serve as a detention basin and help moderate the flows into the stream from storms. Thus, removing them could cause severe flooding. He stated before decommissioning the dams, BWS would need to evaluate the risk factors, downstream liabilities, and regulatory requirements.

Mr. Matsuo commented Nuuanu Reservoir No. 4 may be more problematic because it's the largest of the Nuuanu reservoirs, and decommissioning Nuuanu Reservoir No. 1 may raise a lot of concerns from the downstream residents. He echoed Manager Lau's statement that decommissioning Nuuanu Reservoir No. 1 without providing any way to mitigate the flows that would be longer detained by the dam would cause flooding of the downstream residents.

Board Member Sword agreed with Board Member Soon's concern about the use of the reservoirs. He inquired how long BWS has been studying alternate uses of the reservoirs.

Manager Lau responded that BWS conducted an initial study with some support from the Ulupono Initiative into generating electricity by dropping water from the higher dam into the lower dam. But, the BWS was unsuccessful in selling power to Hawaiian Electric. He stated BWS is currently studying the use of captured stormwater to recharge the aquifer. This study has been going for about three to four years.

Vice Chair Kapua Sproat asked if the study on how to recharge aquifers is looking at doing so using injection wells or using the reservoirs themselves.

Manager Lau responded that there probably some recharge from the reservoir already, but there is heavy siltation in the reservoirs that reduce its ability for recharge. Thus, the study is investigating the use of injection wells to recharge the aquifer. But, the water would have to be treated before it can be injected into the aquifer.

Mr. Matsuo added that water would flow from Nuuanu Reservoir No. 4 to Nuuanu Reservoir No. 1, where the injection wells would be located. This water would be used to recharge the aquifer that feeds BWS's Kalihi sources.

Manager Lau mentioned that the drop in elevation from Nuuanu Reservoir No. 4 to Nuuanu Reservoir No. 1 could generate power that may help offset treatment and injection costs.

Vice Chair Sproat commented it's great for inline and asked if treatment and injection were part of the ongoing study and when the study would be completed.

Manager Lau confirmed that treatment and injection are part of the ongoing study. He further stated that the BWS is looking at what actions could be taken to adapt to climate change and resiliency. He also indicated that he would follow up with the division responsible for the study and report back to the Board.

Manager Lau indicated that based on today's discussion, the BWS could again write to the State to request the transfer of the reservoirs back to them.

Board Member Sword suggested exploring every option and weighing the pros and cons. He stated he is open to sending a letter to the State to request the transfer.

Manager Lau stated he would reach out to the State again regarding the transfer of the reservoirs.

Board Member Soon suggested that before a letter is sent to the State requesting they take over responsibility for the reservoirs, a "white paper" will be presented to the Board. This "white paper" should indicate why we continue to own these dams, their value to our ratepayers, why the ratepayer should be paying for the dams as opposed to all State taxpayers, and what the value is to the BWS of keeping the dams going forward.

Board Member Soon indicated that if keeping the dams is of no value or benefit to the BWS, the BWS should proceed aggressively on returning them to the State or transferring them to the appropriate county agency.

Vice Chair Sproat echoed Board Member Soon's suggestion and added that it would be helpful for her to get some sense of the benefits and costs of keeping the dams. If no one wants to accept the transfer of the dams, then the BWS can decide what would be in the best interest of the BWS – decommissioning them or, for example, getting the golf courses to accept some maintenance liabilities, especially for the Mauna Olu Reservoir. She also wanted to know how much it cost to re-line the Mauna Olu 530 Reservoir.

Because he and staff did not have that information readily available, Manager Lau replied we would get back to the Board on the relining costs for the Mauna Olu 530 Reservoir.

Vice Chair Sproat commented she is curious to see the cost factors because maintaining the reservoirs can be expensive.

Manager Lau agreed and stated that staff would gather the requested information and report back to the Board.

Chair Andaya thanked Mr. Matsuo and Manager Lau for the presentation and the Board Members for their excellent questions and suggestions. He commented that due to recent events with other dams, it was a good idea for the Board to discuss the short-term emergency plan for the dams under the BWS control and the long-term strategic plan for these dams. He understands gathering information may take some time and keep this item on the Board's agenda. He wasn't certain if, at some point, it would be appropriate to create a Permitted Interaction Group (PIG) or to include the issue on the following strategic planning meeting agenda. But, he did want to monitor the status of these dams moving forward.

Vice Kapua Sproat requested the following regulated dams discussion be in the executive session.

Manager Lau agreed to gather detailed information to brief the Board and consult with Corporation Counsel.

Chair Andaya expressed his gratitude to Mr. Matsuo, Manager Lau, and the BWS for keeping the dams in compliance.

Manager Lau responded that as long as the BWS retains ownership, it is the responsibility of the BWS to comply with the dam safety regulations.





# STATE REGULATED BWS DAMS



**Board Presentation**  
**April 26, 2021**



BWS has three (3) State-regulated dams under its jurisdiction, control and management

1. Nuuanu Open Reservoir No. 4
2. Mauna Olu 530' Open Reservoir
3. Nuuanu Open Reservoir No. 1

## Nuuanu Open Reservoir No. 4

- Located off Pali Hwy 4.5 miles from Honolulu
- Constructed in 1910
- Reconstructed in 1934
- Original purpose was to provide drinking water to Honolulu
- After 1919, used for flood control, then as a fishery
- Fishery discontinued in 2000's





## Nuuanu Open Reservoir No. 4

Dam Length = 2,120 feet

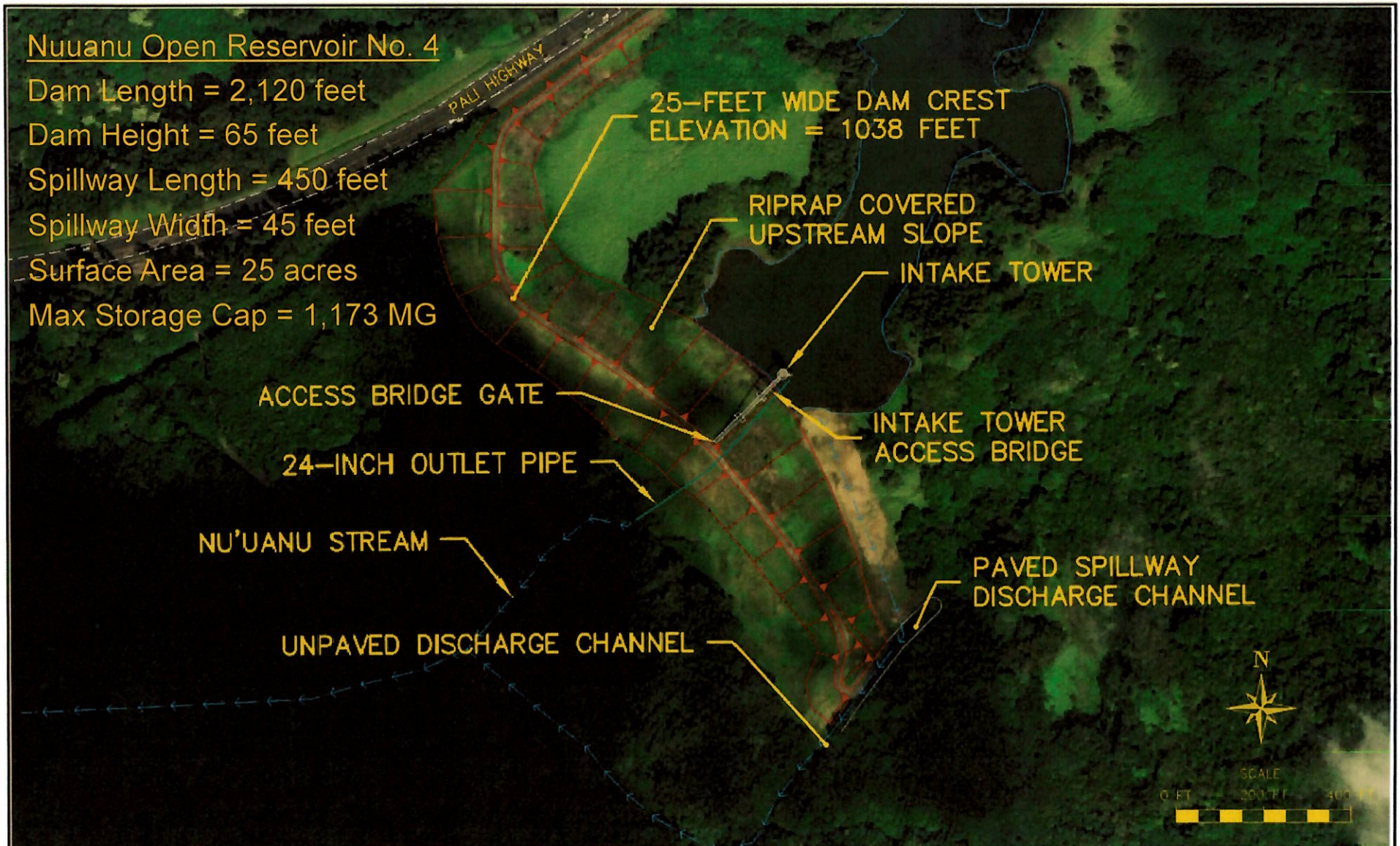
Dam Height = 65 feet

Spillway Length = 450 feet

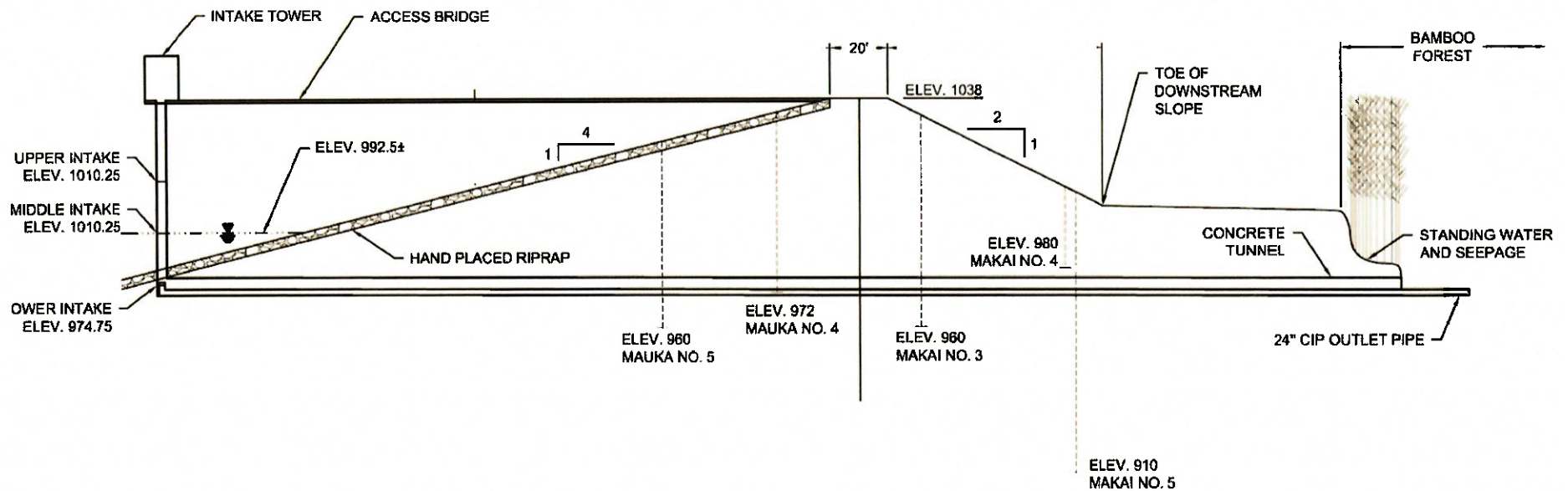
Spillway Width = 45 feet

Surface Area = 25 acres

Max Storage Cap = 1,173 MG



## Nuuanu Open Reservoir No. 4

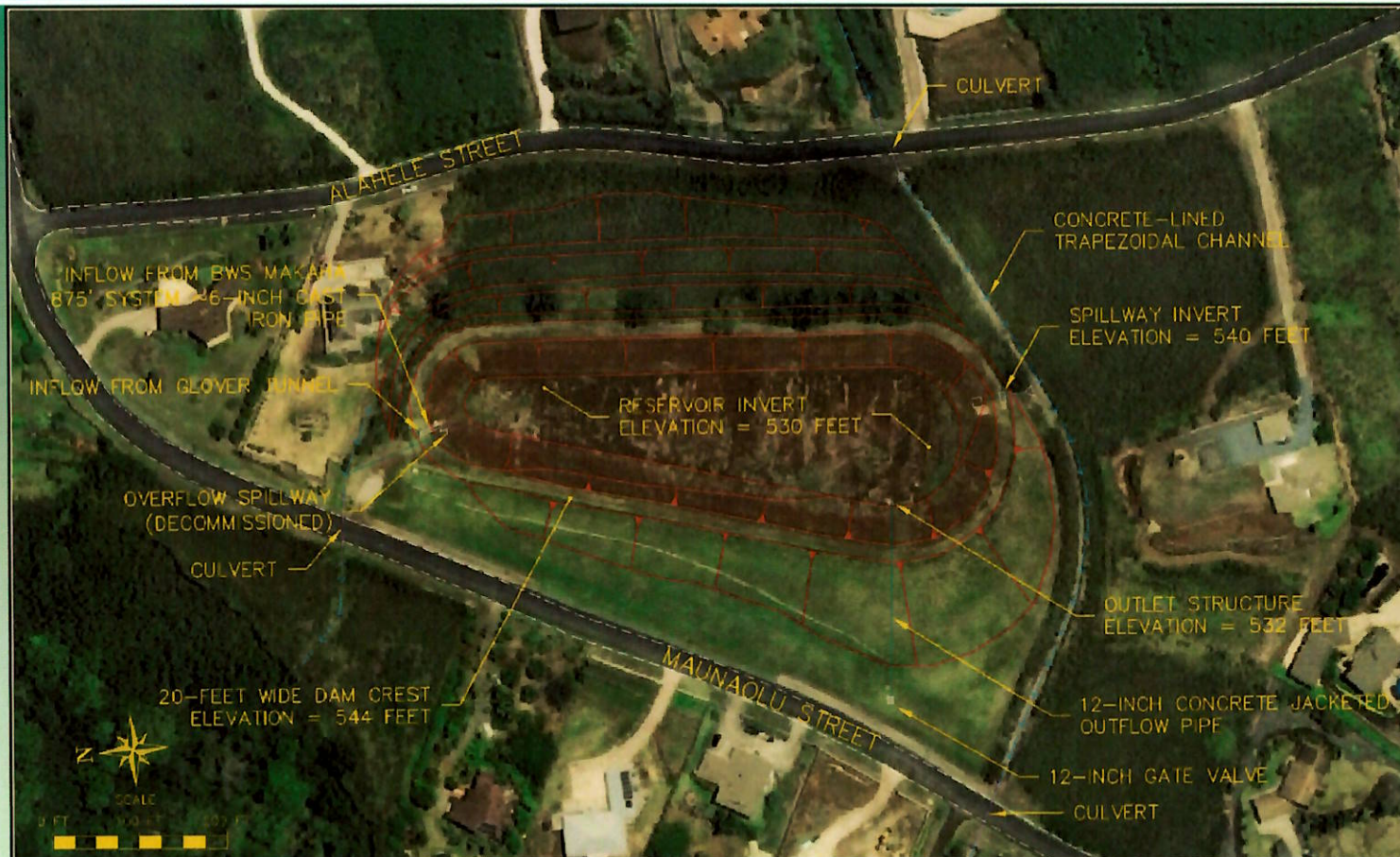


## Dam Cross Section

## Mauna Olu 530' Open Reservoir

- Located in Makaha
- Constructed in 1966
- Purpose is to supply non-potable (non-drinkable) water to irrigate Makaha Valley Country Club and Makaha Resort golf courses
- Currently serving only Makaha Valley Country Club
- Fed primarily by Glover Tunnel





## Mauna Olu 530 Open Reservoir

Dam Length = 800 feet

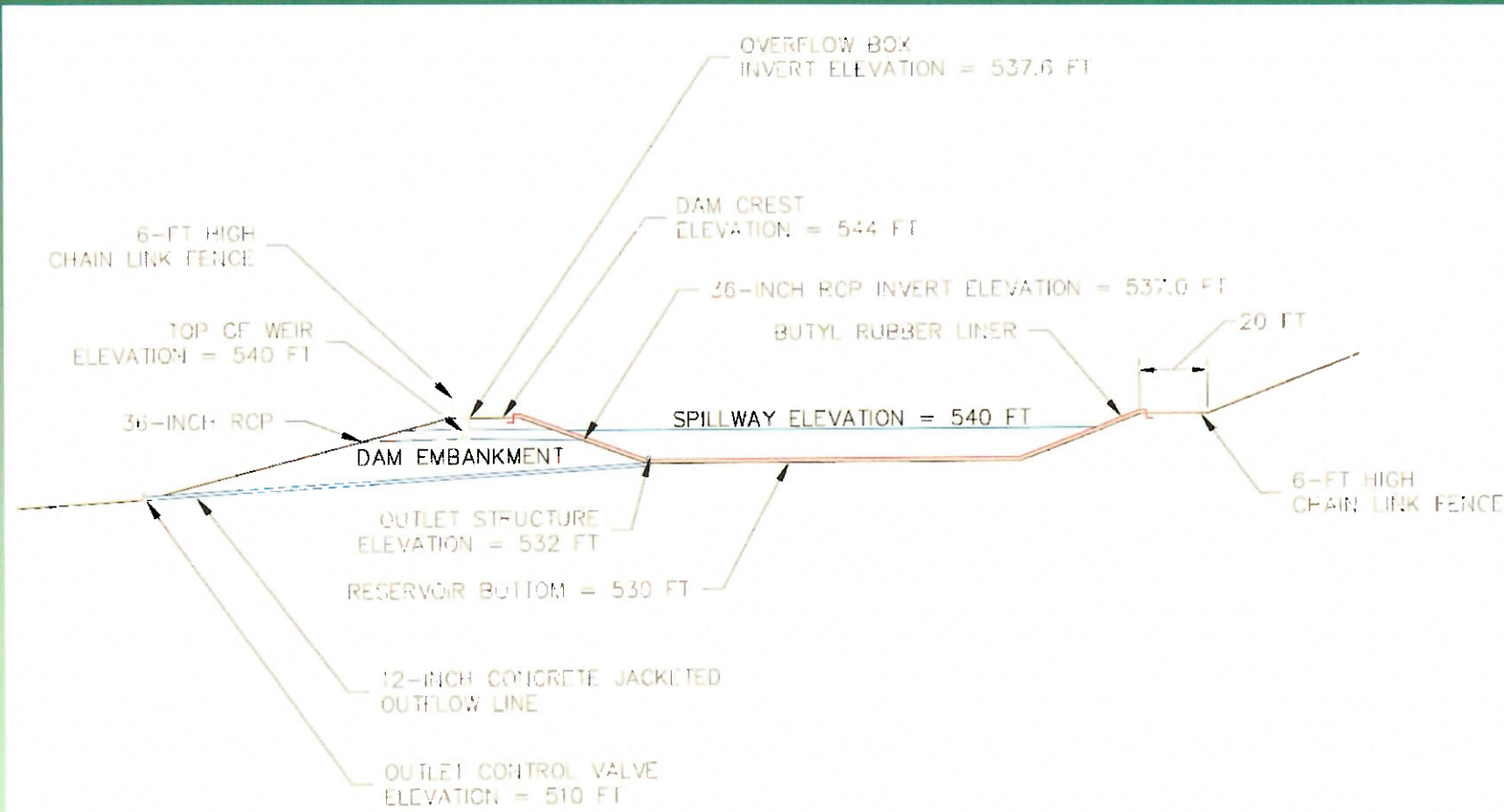
Dam Height = 27 feet

Spillway = 36-inch Pipe

Surface Area = 2.3 acres

Max Storage Cap = 7 MG

# Mauna Olu 530' Open Reservoir



## Dam Cross Section



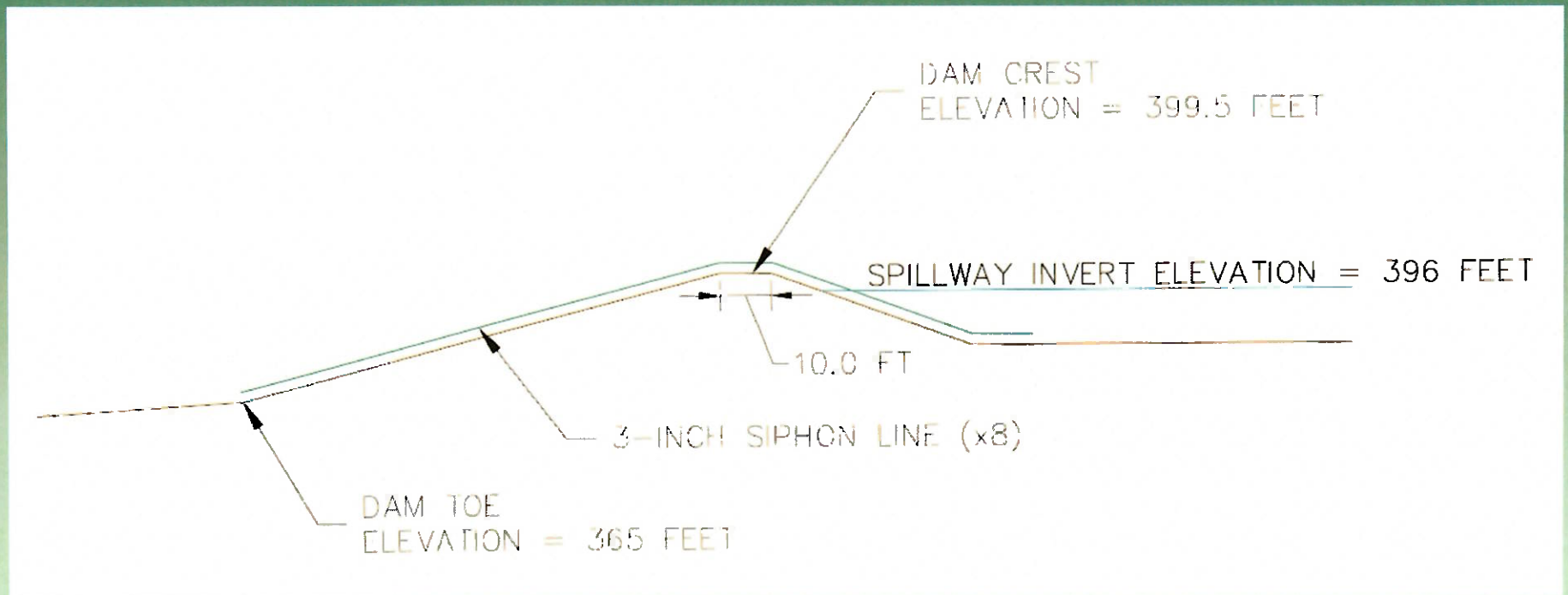
## Nuuanu Open Reservoir No. 1

- Located off Pali Hwy 2.4 miles from Honolulu
- Constructed in 1889
- Original purpose was to supply drinking water & hydroelectric power to Honolulu
- Currently used as debris and storm water detention basin





# Nuuanu Open Reservoir No. 1



## Dam Cross Section



# State Dam Safety Regulations

State Department of Land and Natural Resources administers the dam and reservoir safety program and classifies dams in accordance with:

- Chapter 179D, Hawaii Revised Statutes
- Title 13, Chapter 190.1, Hawaii Administrative Rules

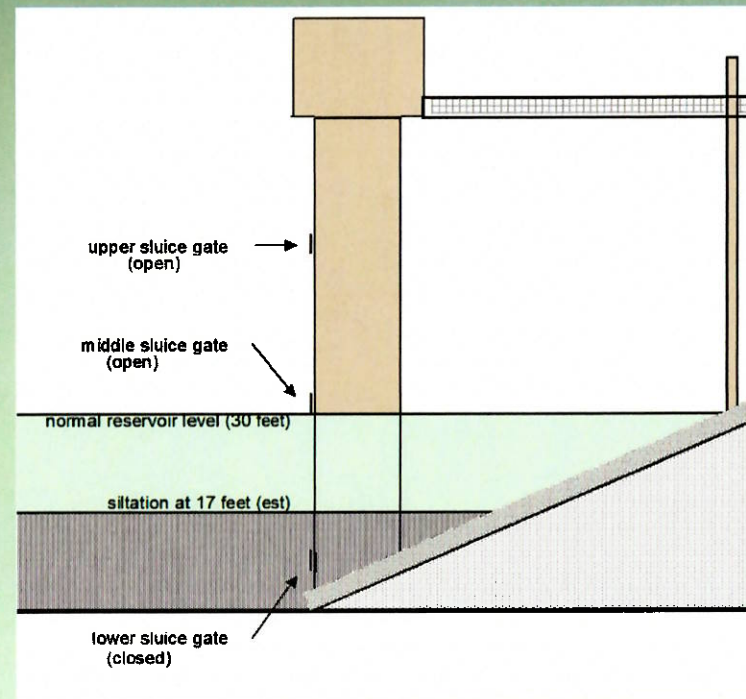
## Nuuuanu 4 Dam Inspections

- Classified as “High Hazard”
- State inspected dam on 1/15/04, 1/13/10, 8/14/12, 10/26/12, 11/13/14, 11/2/17 and 2/4/21
- Per inspection need to:
  - Remove trees and vegetation from crest, embankments, toe, approach to spillway, spillway
  - Repair sluice gates & trash racks
  - Re-establish water level markings on tower



# Nuuanu 4 Dam Inspections

- Per inspections need to (cont.):
  - Remove silt blocking lowest sluice gate
  - Repair potholes on dam crest access road
  - Remove temporary access road from embankment (used to remove trees)





## Nuuanu 4 Dam Improvements

- Removed trees and overgrown vegetation from in and around dam and maintain on a monthly basis using local landscaping company



# Nuuanu 4 Dam Improvements

- Dam improvements under construction:

- Dredge silt from around intake tower
- Repair sluice gate controls, trash racks, bridge to tower
- Extend drain line
- Install weirs to monitor seepage
- Repave dam crest access road



- Construction of improvements estimated to be complete by first quarter of 2022



# Mauna Olu 530 Dam Inspections

- Classified as “High Hazard”
- State inspected dam on 11/14/14, 8/3/17 and 2/27/20
- Per inspections need to:
  - Remove overgrown vegetation on crest, embankment and toe
  - Perform hydrological & hydraulics study, determine adequacy of spillway
  - Perform dam stability analysis



# Mauna Olu 530 Dam Inspections

- Per inspections need to (cont.):
  - Repair damaged and torn reservoir liner
  - Provide upstream outlet control to drain reservoir
  - Repaint water level markings on reservoir liner
  - Repair inlet channel concrete wing wall



# Mauna Olu 530 Dam Improvements

- Removed overgrown vegetation from in and around dam and maintain on a monthly basis using local landscaping company
- Replaced reservoir liner



# Mauna Olu 530 Dam Improvements

- Designed and installed new 36-inch drain line to act as spillway
- Repaired inlet channel concrete wing wall
- Installed water level staff gauge on liner
- Remote water level gauge currently under design



# Nuuanu 1 Dam Inspections

- Classified as “High Hazard”
- State inspected dam on 10/30/15, 8/2/17 and 2/4/21
- Per inspections need to:
  - Install outlet pipe to empty water from reservoir
  - Remove trees and other overgrown vegetation on the crest and embankments, along toe and in spillway
  - Install water level gauge



# Nuuanu 1 Dam Improvements

- Removed trees and overgrown vegetation from in and around dam and maintain on a monthly basis using local landscaping company



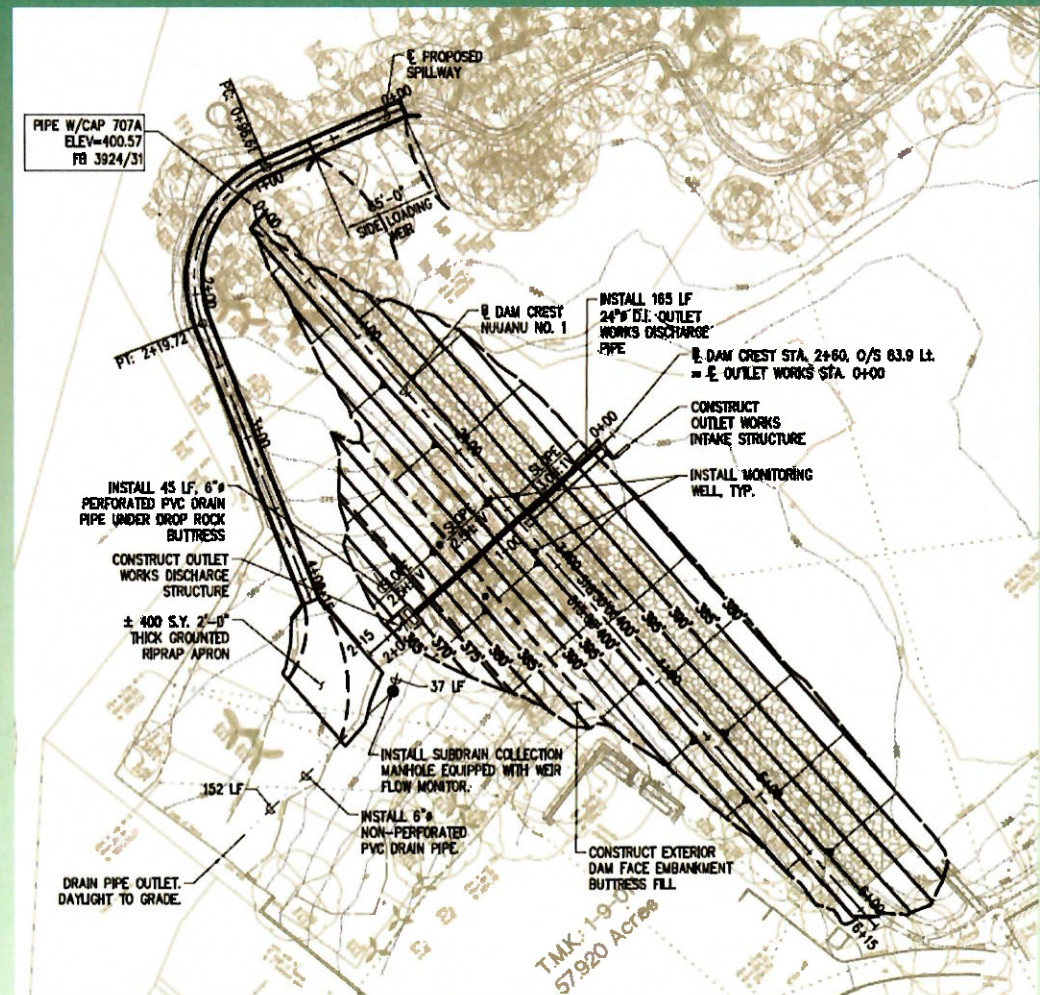
# Nuuanu 1 Dam Improvements

- Installed eight (8) siphons to drain reservoir
- Installed water level remote & staff gauges
- Installed new security cameras



## Nuuanu 1 Dam Improvements

- Dam improvements currently under design:
  - Concrete lined spillway
  - 24-inch drain through dam with upstream control
  - Monitor wells, weirs and subdrains to monitor seepage
  - Improved embankments for better stability
- Design to be completed by late 2021/early 2022; construction to begin Fall 2022 (estimated)







# Emergency Action Plans

- Emergency Action Plans (EAP) prepared for all 3 regulated dams (last updated in 2020) & submitted to State
- EAP identifies action triggers in response to various situations including:
  - Earthquakes
  - Overtopping
  - Seepage
  - Sinkholes
  - Embankment failures
  - Sabotage or terrorism
  - Hurricane and heavy rain events



## Emergency Action Plans (cont.)

- EAP identifies three (3) event levels:
  - Level 1: Non-emergency, unusual event, slowly developing
  - Level 2: Emergency, Potential Dam Failure Situation
  - Level 3: Urgent Emergency, Dam Failure Imminent or In-Progress
- Triggers for event levels:
  - For Level 1, new conditions are detected, but not worsening
  - For Level 2, dam conditions are starting to deteriorate to the extent that failure may occur
  - For Level 3, dam conditions have deteriorated to extent that failure is worsening or imminent

# Emergency Action Plans (cont.)

- Examples of event triggers:
  - For Level 1:
    - New cracks in embankment without seepage
    - Visible evidence of embankment slope slippage
    - Water level is 2 feet below spillway and rising
  - For Level 2:
    - New cracks in embankment with seepage through crack
    - Sudden or rapid sliding of embankment slope
    - Water level dropping without apparent cause
    - Cloudy discharge or sediment seen in seepage
    - Spillway flowing but water level continuing to increase
    - Spillway flow could flood downstream roads, homes



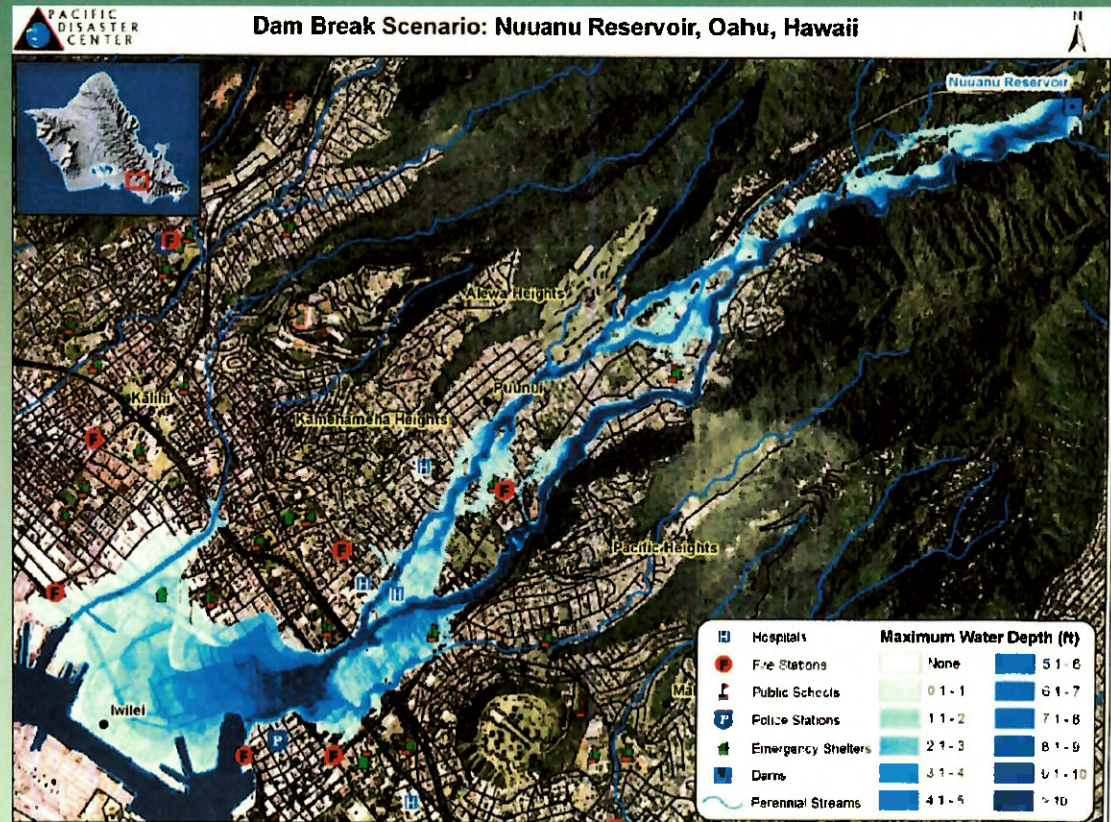
## Emergency Action Plans (cont.)

- Examples of event triggers:
  - For Level 3:
    - Sudden or rapid sliding of embankment slope resulting in uncontrolled release of water
    - Presence of whirlpool indicating rapid draining through dam
    - Overtopping of dam crest
    - Spillway is flowing with severe erosion

# Evacuation Plans

## Dam Evacuation Plans

- Based on flood inundation studies
- Created in consultation with City Department of Emergency Management and State Department of Land and Natural Resources

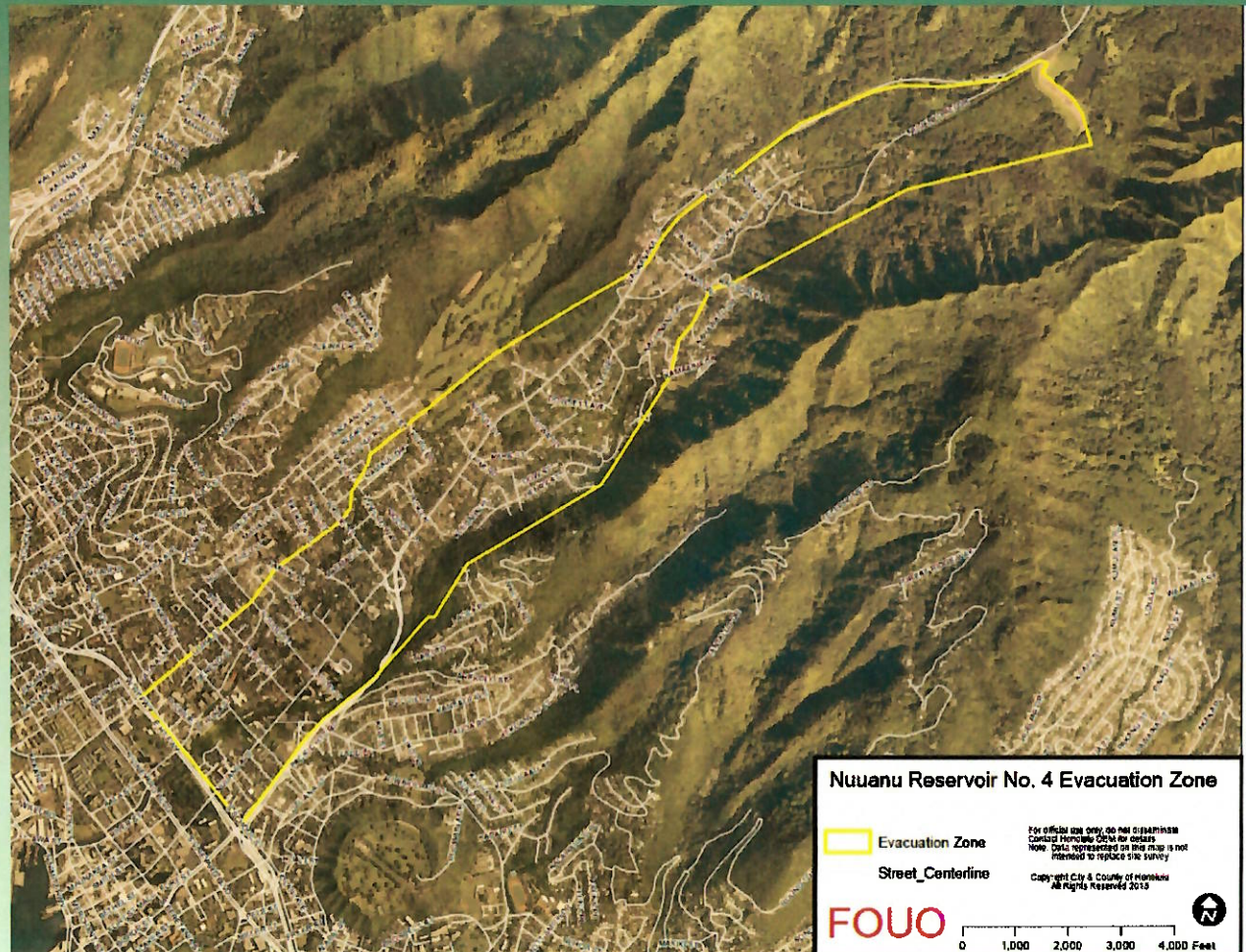




# Evacuation Plans (cont.)

## Evacuation Plan for Nuuanu 4

- From reservoir to H-1 Hwy
- Both sides of Pali Hwy, thru portions of Nuuanu, Pauoa & Liliha



## Evacuation Plans (cont.)

### Evacuation Plan for Mauna Olu

- From reservoir to Makaha Beach
- Thru Makaha Resort GC, between Kili Dr & Manuku St



## Evacuation Plans (cont.)

### Evacuation Plan for Nuuanu 1

- From reservoir to Honolulu Harbor
- Ewa side of Pali Hwy, thru portions of Liliha & thru Iwilei






## BWS Actions

- Keep water level at less than half full at Nuuanu 4
- Water level has not reached Nuuanu 4 spillway despite heavy rains (40-days & nights of rain in 2006)
- Keep water level at Nuuanu 1 as low as possible




## BWS Actions

- During emergencies and events:
  - Provide daily water level readings to Hawaii Emergency Management Agency, Dept. of Land and Natural Resources, and Dept. of Emergency Management
  - Coordinate and communicate with Mayor's Office
- Outreach to Neighborhood Board; provide links to evacuation plans and dam information



**BOARD OF WATER SUPPLY**  
The B. Chung Building  
650 South University Street  
Honolulu, HI 96813-0001

Hours of Information: (808) 530-0001  
Water Emergencies: (808) 748-0000 Ext. 1 (24 hours)  
Office Hours: Monday - Friday, 7:30 am to 4:00 pm  
Information: [info@bws.org](mailto:info@bws.org)  
Email: [communications@bws.org](mailto:communications@bws.org)



### HAWAII DAM AND RESERVOIR SAFETY PROGRAM

**The Hazard Dam and Reservoir Safety Program** exists to protect the health, safety, and welfare of the citizens of the State by reducing the risk of failure of the dams or reservoirs.

**What are dams?**  
A barrier constructed to hold back water resulting in a reservoir that can be used for a variety of purposes: agriculture, water supply, to generate electricity, flood or sediment mitigation.

**History of Dams in Hawaii**  
Since the late 1800's and early 1900's many dams were built to support agriculture across the state.

**Dam Safety regulatory programs in Hawaii**

- 1966 US Army Corps of Engineers
- Continues Federal Inspection of High Hazard Dams
- 1968 Hawaii Dam Safety Act
- 1969 Hawaii Dam Safety Act (HDSA)
- 1988 Hawaii Dam Safety Act (HDSA)
- 1997 Hawaii Dam Safety Act (HDSA)
- 2007 Hawaii Dam Safety Act (HDSA)
- 2012 Hawaii Dam Safety Act (HDSA)

**Regulatory size**

- Greater than 25 ft high and to each volume but not less than 6 ft tall or 10 ac-ft in volume

**October 2018 Statistics**

**Reservoirs or dams and reservoirs records**

- Total - 16
- High - 16
- Other - 0
- None - 0

**Q&A**

**1. Why should I care about dams?**

- a) Dams provide a great asset to the community in providing stored water for irrigation, water supply, to generate energy and flood and sediment control. However, they come with risks if dams are to a dam failure, not only the flooding of the communities, but the loss of the asset and how it benefits the community.



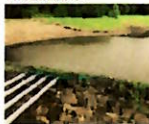
**2. What are risks associated with dams?**

- a) Dams can fail by structural failure, mechanical failure or hydraulic failure.
- b) Structural - non-structural defects causes the failure of the dam.
- c) Mechanical - manufacturing defects or failure can cause a dam failure.
- d) Hydraulic - overtopping due to increased reservoir levels or as a result of other causes.

**3. Are I or could I be affected by a dam and what is the dam failure flood inundation area?**

- a) Yes, you could be affected by the overflow of a dam. Flood inundation areas can be modeled and the flood from down the road can be modeled. There is a potential for the banks of the stream and downstream tributaries to be overtopped with a dam failure and flows to the river.
- b) You can find out if you live in a Dam Evacuation area by visiting <http://www.bws.org/dam>
- c) The Evacuation area is a much larger area that may be affected by flooding. The evacuation area is designed to emergency managers to control the movement of people in and out of the potential hazardous and determined by the roadway network at particular neighborhood.
- d) Once I determine that my property is in a dam break inundation area, what's next?
- e) Know where the dam is located compared to your location.
- f) Find out the downstream channel and identify to learn or emergency contact of the dam.
- g) Become familiar with the roads and roadsides that would be closed down in the event of a potential dam break.
- h) Determine where to take to seek refuge from the potential flooding. Depending on the downstream flooding, what options to move, including vertical evacuation.

These photos show the permanently-installed siphon system which helps to maintain the water level at the Nuuanu Reservoir.



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### NUUANU RESERVOIR NO. 1 DAM (DA-0154) INFORMATION

**Why am I receiving this notice?**  
The Board of Water Supply (BWS) is providing this information bulletin on the Nuuanu Reservoir No. 1 Dam (DA-0154).

Nuuanu Reservoir No. 1 Dam is located on the Ewa side of Pal Highway above Kulehouliki by Oahu County, Oahu.

**BWS operation of the Nuuanu Reservoir No. 1 Dam**

Because Nuuanu Reservoir No. 1 has no outlet works other than its emergency spillways, this provides capacity in the reservoir for run-off. The BWS continues to monitor and draw water from the reservoir.

**What level does the water need to reach to require mandatory evacuation?**

When the water level reaches a feet below the top of the dam, a mandatory evacuation notice will be issued. BWS is working with the Mayor's Office and the Department of Emergency Management to coordinate the evacuation plan, which includes public evacuation notification and operation of evacuation centers, *when needed*.

**If I need to be evacuated, how will BWS notify me?**

BWS will work with the city Department of Emergency Management (DEM) and other city agencies to provide notice to the affected residents. Should evacuees become mandatory, personnel from the Honolulu Police Department, Honolulu Fire Department, and City Department of Emergency Management would assist in notifying the community.

**Do you have a list of streets in the evacuation zone so I can see if I live in that area?**

BWS worked with the Department of Emergency Management to determine the extent of the evacuation zone. A map is on the other side of this sheet.

**In the event of a mandatory evacuation, where can I find an evacuation center?**

Locations of evacuation centers would be provided to community leaders and the media to share with the public. Stay tuned to local news media and social media channels for up-to-the-minute information.

**Residents would need to bring everything they might need for at least 24 hours – food, water, clothing, medicines, etc. The evacuation shelters would only provide a place to stay.**

**Who should I contact for more information?**

For more information, please call the BWS Communications Office at 748-0041 or email [communications@bws.org](mailto:communications@bws.org).



**NUUANU DAM NO 1**

- 510 ft Dam @ CA-0154
- Year completed: 1905
- Purpose: flood control, water supply
- Dam type: Earthfill
- Dam height: 34 feet
- Maximum crest width: 9 feet
- Dam height to crest: 9 feet
- Storage: 21 million gallons
- Surface area: 10 acres



— Crest to top of Dam  
— Spillway = 3 ft  
— Reservoir  
— W.L. = 2.5 ft  
— Flow of Dam

# BWS Actions

- Monitor water levels in reservoirs on-line using cameras and water level gauges
- Lower water levels as necessary using siphons (at Nuuanu 1) or portable pump units

Meta Data									
NESDIS ID	EDD0A2EC		NWS Location ID	NUDH1	Owner	EDDLNR			
Location	NUUANU RESERVOIR NO. 4 NEAR HONOLULU 5NE								
Latitude	N 21°21'11"		Longitude	W 157°48'26"		HSA	HFO	State	HI
Channel	80	Transmission Interval (min)	60	Next Transmit GMT	22:12:10	Initial Transmit Time (HH:MM:SS)	00:12:10		

Decode Information									
NWSLI	Data Interval(min) Self-time	Data Interval(min) Random	SHEF Code	Time Offset (min)	Coefficient Self-time	Coefficient Random	Constant	Base Elevation (ft)	Gage Correction
NUDH1	5	1	HGIRG	2	0.01	0.01	0	0	0

Data values are **PROVISIONAL**

Today  Decoded Data



KA WAI OLA

*Water for Life*



Board of Water Supply  
City and County of Honolulu

QUESTIONS?

ITEM FOR INFORMATION NO. 2

"April 26, 2021

**LESSONS  
LEARNED FROM  
THE COVID-19  
PANDEMIC**

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843

Chair and Members:

Subject: Lessons Learned from the COVID-19 Pandemic

Raelynn Nakabayashi, Executive Assistant I, Executive Support Office, will provide information on Lessons Learned from the COVID-19 Pandemic.

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

Attachment"

The foregoing was for information only.

**DISCUSSION:**

Raelynn Nakabayashi, Executive Assistant I, Executive Support Office, gave the report.

Board Member Anthony expressed his gratitude for the update. He stated that it's encouraging to see the City & County (C&C) of Honolulu and State of Hawai'i offices are using this time as an opportunity to transform services for the betterment of the different agencies.

Board Member Butay stated telework is an ongoing challenge at the Department of Transportation (DOT). Therefore, the managers are given the responsibility to determine who is allowed to telework since they have a better understanding of each position's requirements. He asked Manager Lau how he is dealing with the equity of teleworking.

Manager Lau replied that not all positions are suitable for telework; for example, the United Public Workers (UPW) Field Operations staff cannot do their work remotely. He stated he had authorized the division program administrators to decide what positions can telework. The BWS continues to do all possible to create a safe work environment for all BWS employees by providing face masks, social distancing, adequate office arrangement, and flexible work schedules. Unfortunately, it's not total equity where all BWS employees have the option to telework.

Board Member Butay commented that teleworking is a privilege, not a right which the DOT is handling telework on a case by case basis and may be revoked at any time.

Manager Lau agreed with Board Member Butay that teleworking is a privilege and not a right stating that everyone was required to come into

work in person prior to the pandemic. It is due to the pandemic that the Hawaii government allowed flexibility to telework. At the BWS, all telework employees are expected to perform the same duties and be just as productive as if they were to come into work; everyone, including supervisors, maintains the same responsibilities. Those that work remotely are required to maintain a telework log that their immediate supervisor reviews and approves. He mentioned that it might be difficult for new employees to telework since in-person training may be needed. He explained that each person who teleworks must go through a process before bringing it to him to decide whether to approve an employee for telework.

Board Member Butay stated that the DOT also goes through the same process, with himself making the final decision. He commented with a new employee; it may be a little challenging because their work relies on developing a strong relationship built on trust.

Manager Lau agreed with Board Member Butay about building a cohesive team. He explained that the City and County of Honolulu (C&C) is currently operating under a COVID version of telework to provide social distance and help reduce the spread of the virus within the workplace. However, when a permanent telework policy is established by the C&C, the BWS will have to re-evaluate and make changes to abide by the new policy. Lastly, he stated that the BWS had learned valuable lessons throughout the pandemic that will be beneficial to the BWS.

Chair Bryan Andaya asked if there were any further questions. Since there were no other questions, he thanked Board Member Anthony for raising the topic and Ms. Nakabayashi and Manager Lau for preparing the report.

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**Board of Water Supply**  
City and County of Honolulu

# **Lessons Learned from the COVID-19 Pandemic**



**April 26, 2021**





# **We Are Emerging Stronger From This Experience**

**“Disruption and ambiguity can yield valuable lessons...we are capable of far greater adaptability than we may previously have imagined”**

(Laura Empson and Jennifer Howard-Grenville, Harvard Business Review)

- We remain focused on our Mission and Goals while:
  - ✓ Keeping our employees and customers safe
  - ✓ Evaluating all Business Processes and Metrics
  - ✓ Looking for Additional Ways to Optimize Processes







# Continuity of Operations Plan

- ✓ We've reviewed our operations & critical functions
  - ✓ Identified key positions and absentee tolerance levels
  - ✓ Developed contingency plans for all functions
  - ✓ Implemented "safety" protocols for key functions and personnel
  
- ✓ We've established contacts and contingency plans to ensure critical services and supplies are maintained





# Ensuring Safety for Employees

## Lessons Learned

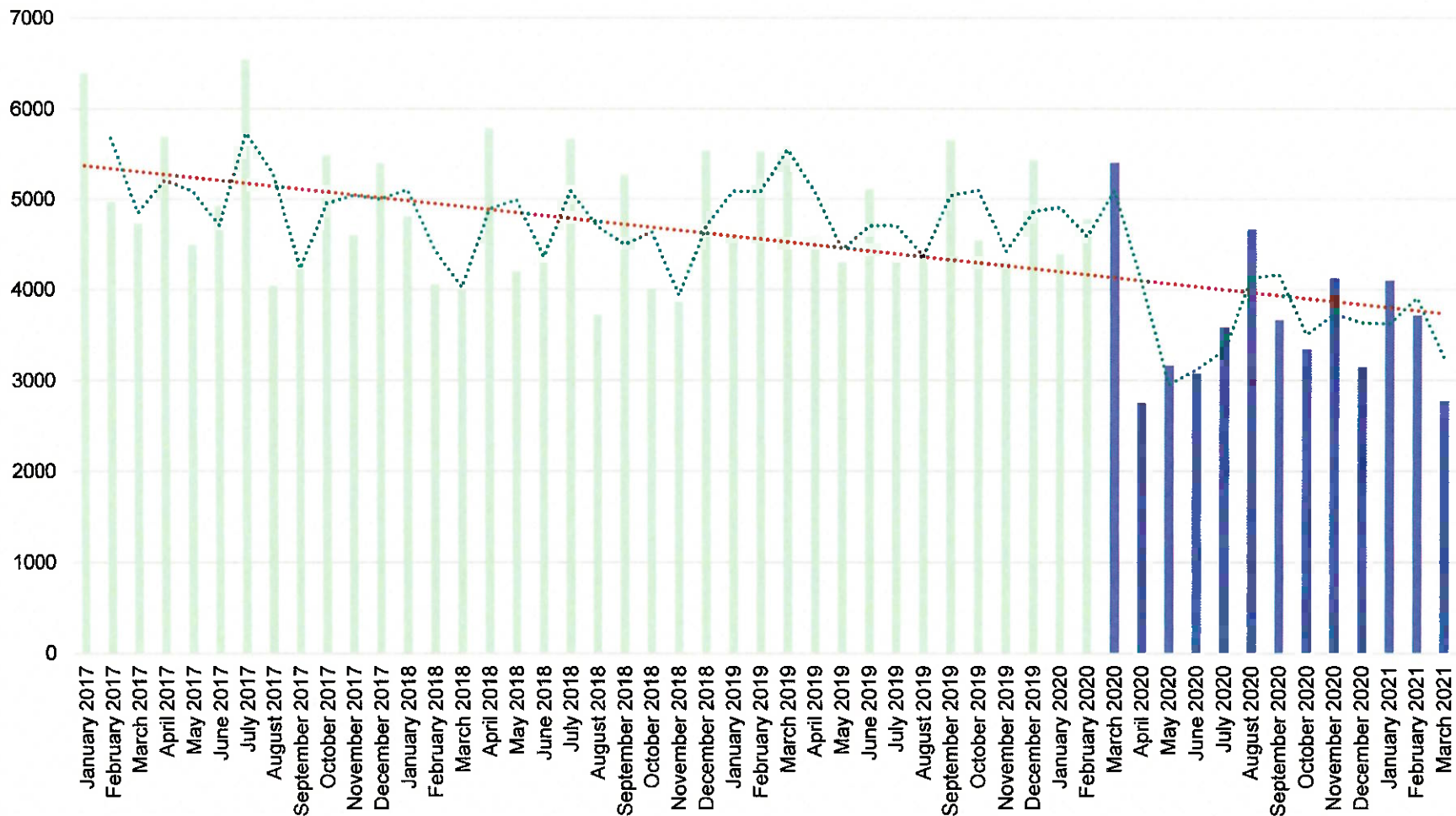
- Sick Employees must stay home
- Remote work is doable
- Re-evaluation of open concept floor plans and workstation allocations
- Increased routine cleaning enhances comfort in the workplace





## Sick Leave Taken During the Pandemic Actually Decreased

Sick Leave Hours





# Lessons Learned: Remote Work - SUCCESSES

- Reduction in both Office Space and Parking requirements.
- Increased productivity and efficiency, when managed appropriately.
- Communication with staff is more organized and efficient.
- Employee trust & accountability.



# Lessons Learned: Remote Work - CHALLENGES

- Remote Work is not a “one-size” fits all program.
  - Telework works best for certain types of work done by specific types of people (both Employees and Supervisors).
- Maintaining the “Human Element” is important.
- Combating “Virtual Meeting Fatigue”.





# Ensuring Safety for Customers

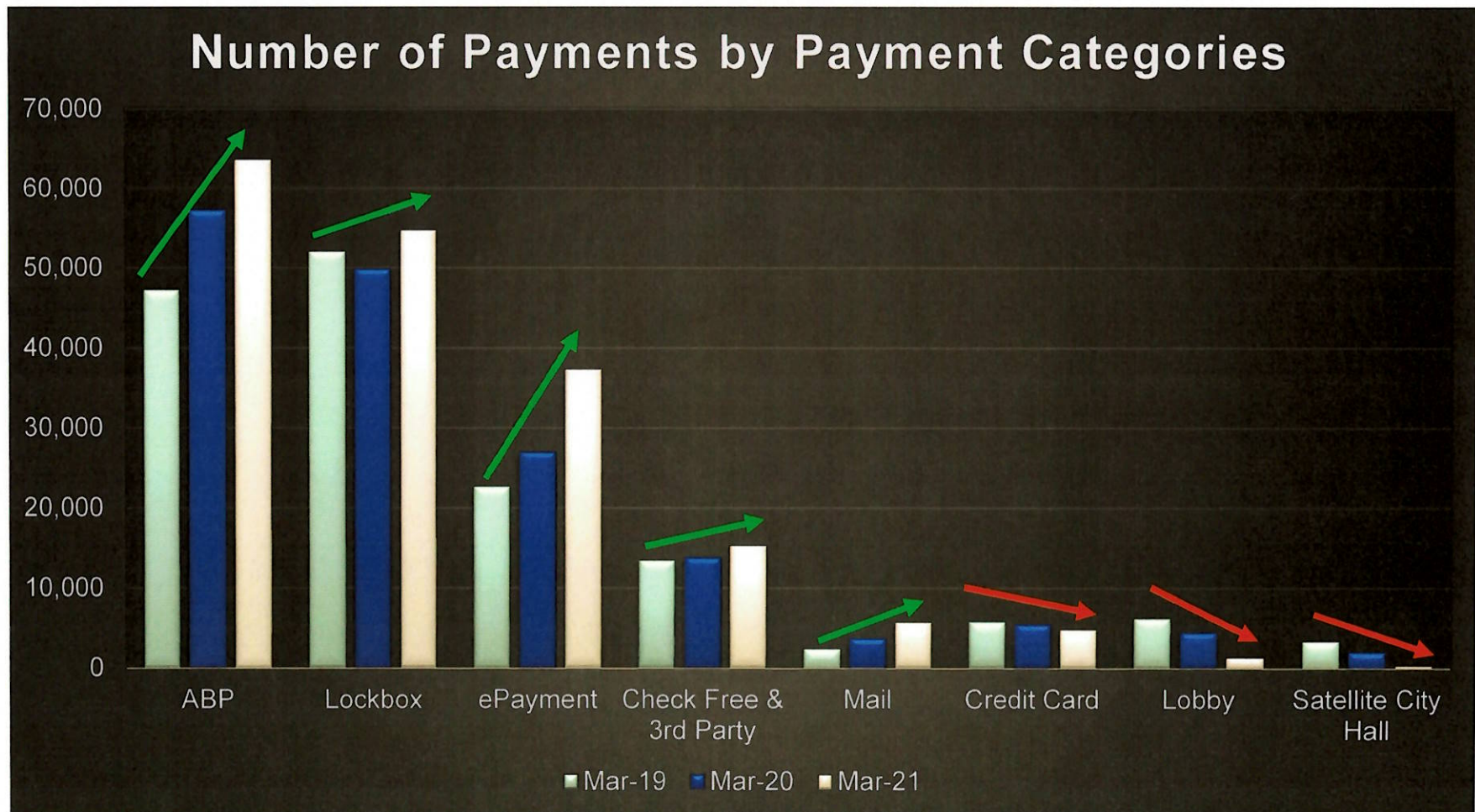


## Lessons Learned

- Remote business options are popular and enhance the customer experience
- Clear designation of Public Areas and wayfinding is important
- Communication is key



## Customers Have Been Adopting Remote Business Options





## Monitoring Our Finances

Updated our Long-Range Financial Plans to include added stressors, such as the Pandemic.



Established strict budgetary controls and practices.

Continue monitoring our revenues. Increased collections efforts while remaining cognizant of the economic challenges our customers are facing.







## Optimizing Workflows



### Investments in Technology

- Cisco WebEx Systems
  - Expanded to all Base Yards
  - Virtual Board Meetings that are Live-Streamed to the Public
- Remote Worker & Virtual Meeting Tools
  - Laptops, Web Cameras, Headsets
  - Telework Log
- Digital Transformations
  - Electronic and Digital Signatures
  - Professional Services Consultant Portal
  - Scanning and Electronic Document Retention
  - Interactive Voice Response

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City and County of Honolulu

# Other Benefits Investing in Technology



UX Design: "COVID-19: The Ultimate Design Thinking Use Case"

Meeting and Training attendance have increased.

Re-Evaluated and studied processes to make them more efficient.

Increased use of technology allowed staff to innovate and develop solutions for new and rapidly changing "problems".



# BWS Continues to Learn From This Experience

**The provision of Safe, Dependable and Affordable Water can have no interruptions...but that doesn't mean we can't change our processes and adapt.**

We've continued full operations during the COVID-19 Pandemic by focusing our efforts, collectively, to:

- ✓ Ensure Employee and Customer Safety
- ✓ Evaluate COOP and Update as Needed
- ✓ Review and Closely Monitor our Financial Position
- ✓ Optimize Workflows and Business Processes

**WATER FOR LIFE**

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**Board of Water Supply**  
City and County of Honolulu

# Questions?

Thank you!



ITEM FOR INFORMATION NO. 3

“April 26, 2021

STATUS  
UPDATE OF  
GROUNDWATER  
LEVELS AT  
ALL INDEX  
STATIONS

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843

Chair and Members:

Subject: Status Update of Groundwater Levels at All Index Stations

There were two aquifer index stations in low groundwater condition for the production month of March 2021. Punaluu and Waialua are in Caution Status. The monthly production average for March 2021 was 121.01 million gallons per day.

The Board of Water Supply rainfall index for the month of March 2021 was 208 percent of normal, with a 5-month moving average of 130 percent. As of April 6, 2021, the Hawaii Drought Monitor showed no dry conditions for the island of Oahu. The National Weather Service is forecasting La Nina conditions continuing through the spring months, with potential above-normal rainfall through June 2021.

Most monitoring wells exhibited increased head levels for the month due to decreased pumping and increased rainfall during the month. Average monthly Production for March 2021 was lower compared to the previous year and the 5-year monthly average.

Respectfully Submitted,

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

Attachment”

The foregoing was for information only.

DISCUSSION: Barry Usagawa, Program Administrator, Water Resources Division, gave the report.

Board Member Roger Babcock, Jr. understands that depending on the time of the year, the five-yearly monthly average ranges between 130 million gallons per day (mgd) to 150 mgd but was curious as to what the five-year monthly average was 20-years ago.

Mr. Usagawa replied he recalled the five-year monthly average was 155 mgd, and in August 2003, it reached 181 mgd. He stated because of conservation and educational awareness, the need for production has decreased significantly.

Vice Chair Sproat mentioned she has been working on water issues for the last twenty years. She has since witnessed while other counties were looking to increase supply, the Honolulu BWS was looking into conservation management and demand-side management. Therefore, she expressed her gratitude to Manager Lau, Mr. Usagawa, and the BWS staff for all the hard work and leadership in making a significant difference.

Mr. Usagawa expressed appreciation to the BWS customers who have assisted in water conservation.

**PRODUCTION, HEAD AND RAINFALL REPORT  
MONTH OF MARCH 2021**

**POTABLE**

STATION	MGD
<b>HONOLULU (1)</b>	
KULIOUOU	0.00
WAILUPE	0.09
AINA KOA	0.05
AINA KOA II	0.63
MANOA II	0.44
PALOLO	1.01
KAIMUKI HIGH	0.78
KAIMUKI LOW	1.25
WILDER	6.98
BERETANIA HIGH	6.14
BERETANIA LOW	0.25
KALII HIGH	0.00
KALII LOW	0.00
KAPALAMA	1.49
KALII SHAFT	7.72
MOANALUA	1.41
HALAWA SHAFT	8.18
KAAMILO	0.88
KALAUAO	4.95
PUNANANI	10.91
KAHUMANU	0.24
HECO WAIU	1.70
MANANA	0.23
<b>WELLS SUBTOTAL:</b>	<b>55.35</b>
MANOA TUNNEL	0.17
PALOLO TUNNEL	0.00
GRAVITY SUBTOTAL:	0.17
<b>HONO. SUBTOTAL:</b>	<b>55.52</b>

STATION	MGD
<b>WINDWARD (2)</b>	
WAIMANALO II	0.14
WAIMANALO III	0.00
KUOU I	0.34
KUOU II	0.06
KUOU III	0.26
LULUKU	0.90
HAIKU	0.00
IOLEKAA	0.00
KAHALUU	0.63
KAHANA	0.97
PUNALUU I	0.00
PUNALUU II	2.43
PUNALUU III	0.75
KALUANUI	0.95
MAAKUA	0.23
HAUULA	0.26
<b>WELLS SUBTOTAL:</b>	<b>7.93</b>
WAIM. TUNNELS I & II	0.00
WAIM. TUNNELS III&IV	0.19
WAIHEE INCL. WELLS	0.13
WAIHEE TUNNEL	4.12
LULUKU TUNNEL	0.12
HAIKU TUNNEL	0.68
KAHALUU TUNNEL	1.54
<b>GRAVITY SUBTOTAL:</b>	<b>6.79</b>
<b>WIND. SUBTOTAL:</b>	<b>14.71</b>

STATION	MGD
<b>NORTH SHORE (3)</b>	
KAHUKU	0.30
OPANA	0.08
WAIALEE I	0.36
WAIALEE II	0.57
HALEIWA	0.00
WAIALUA	1.58
<b>N.SHORE SUBTOTAL:</b>	<b>2.91</b>

<b>MILILANI (4)</b>	
MILILANI I	1.25
MILILANI II	0.00
MILILANI III	0.29
MILILANI IV	2.16
<b>MILILANI SUBTOTAL:</b>	<b>3.69</b>

<b>WAHIAWA (5)</b>	
WAHIAWA	0.90
WAHIAWA II	1.94
<b>WAHIAWA SUBTOTAL:</b>	<b>2.84</b>

<b>PEARL CITY-HALAWA (6)</b>	
HALAWA 277	0.61
HALAWA 550	0.00
AIEA	1.10
AIEA GULCH 497	0.26
AIEA GULCH 550	0.22
KAONOHI I	0.97
WAIMALU I	0.00
NEWTOWN	0.73
WAIU	0.50
PEARL CITY I	0.82
PEARL CITY II	1.03
PEARL CITY III	0.22
PEARL CITY SHAFT	0.93
<b>PEARL CITY-HALAWA SUBTOTAL:</b>	<b>7.38</b>

STATION	MGD
<b>WAIPAHU-EWA (7)</b>	
WAIPIO HTS.	1.43
WAIPIO HTS. I	0.85
WAIPIO HTS. II	0.32
WAIPIO HTS. III	1.26
WAIPAHU	5.54
WAIPAHU II	2.41
WAIPAHU III	1.86
WAIPAHU IV	2.81
KUNIA I	2.09
KUNIA II	1.83
KUNIA III	1.70
HOAEAE	6.28
HONOULIULI I	0.00
HONOULIULI II	1.59
MAKAKILO	0.15
<b>WAIPAHU-EWA SUBTOTAL:</b>	<b>30.13</b>

<b>WAIANAE (8)</b>	
MAKAHA I	0.00
MAKAHA II	0.28
MAKAHA III	0.39
MAKAHA V	0.37
MAKAHA VI	0.00
MAKAHA SHAFT	0.00
KAMAILE	0.06
WAIANAE I	0.23
WAIANAE II	0.22
WAIANAE III	0.66
<b>WELLS SUBTOTAL:</b>	<b>2.20</b>
WAI. C&C TUNNEL	1.40
WAI. PLANT. TUNNELS	0.22
<b>GRAVITY SUBTOTAL:</b>	<b>1.62</b>
<b>WAIANAE SUBTOTAL:</b>	<b>3.83</b>

**NONPOTABLE**

NONPOTABLE	MGD
KALAUAO SPRINGS	0.42
BARBERS POINT WELL	1.04
GLOVER TUNNEL NP	0.32
<b>NONPOTABLE TOTAL:</b>	<b>1.77</b>

**RECYCLED WATER (FEBRUARY 2021)**

RECYCLED WATER	MGD
HONOULIULI WRF R-1	6.18
HONOULIULI WRF RO	1.15
<b>RECYCLED WATER TOTAL:</b>	<b>7.33</b>

**PRODUCTION, HEAD AND RAINFALL REPORT  
MONTH OF MARCH 2021**

**PRODUCTION SUMMARIES**

TOTAL WATER	MGD
PUMPAGE	112.43
GRAVITY	8.58
POTABLE TOTAL:	121.01
NONPOTABLE	1.77
RECYCLED WATER	7.33
TOTAL WATER:	130.11

CWRM PERMITTED USE AND BWS ASSESSED YIELDS FOR BWS POTABLE SOURCES				
WATER USE DISTRICTS		A	B	C
		PERMITTED USE/ BWS YLDS	MAR 2021	DIFF. A-B
1	HONOLULU	82.93	55.35	27.58
2	WINDWARD	25.02	10.46	14.56
3	NORTH SHORE	4.70	2.91	1.79
4	MILILANI	7.53	3.69	3.84
5	WAHIAWA	4.27	2.84	1.43
6	PEARL CITY-HALAWA	12.25	7.38	4.87
7	WAIPAHU-EWA	50.63	30.13	20.50
8	WAIANAE	4.34	2.20	2.14
TOTAL:		191.67	114.96	76.71

CWRM PERMITTED USE FOR BWS NONPOTABLE SOURCES				
WATER USE DISTRICTS		A	B	C
		PERMITTED USE	MAR 2021	DIFF. A-B
7	WAIPAHU-EWA (BARBERS POINT WELL)	1.00	1.04	-0.04
TOTAL:		1.00	1.04	-0.04

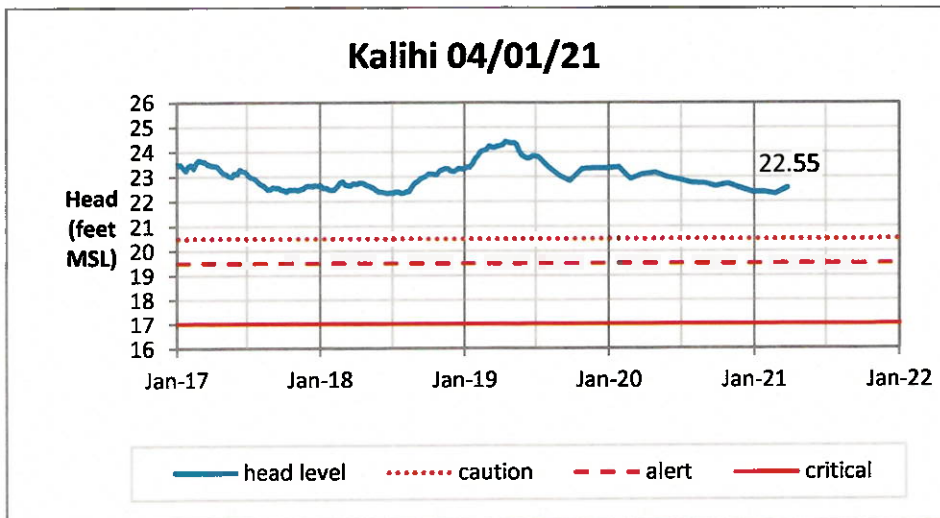
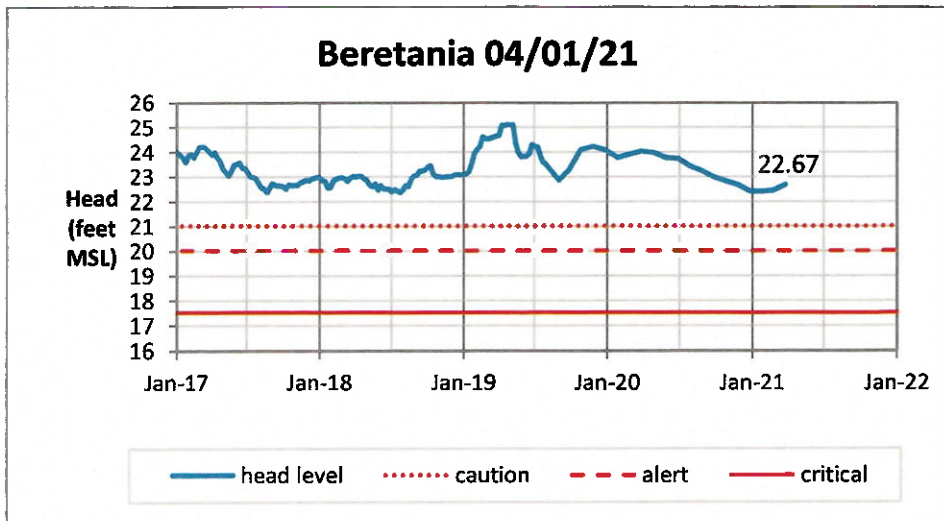
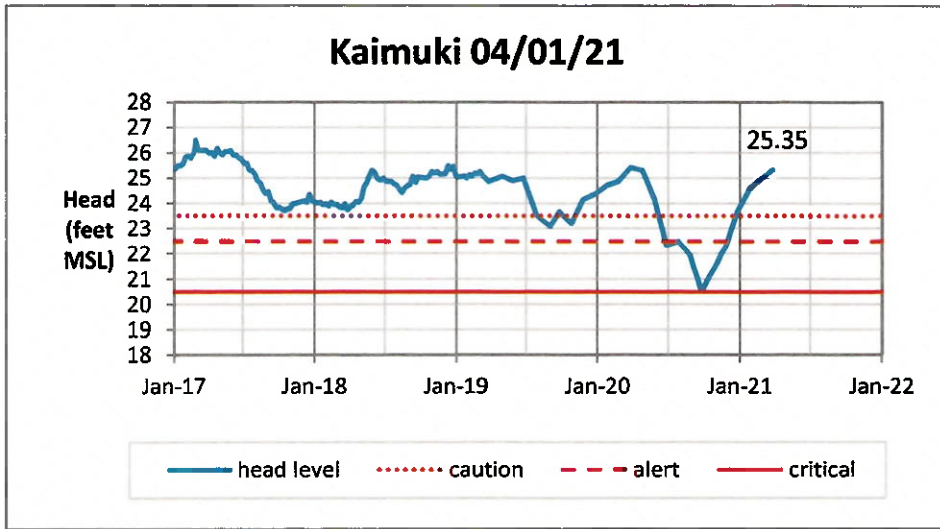
**EFFECTIVE WATER DEMAND PER DISTRICT**

IMPORT/EXPORT BETWEEN WATER USE DISTRICTS			
FROM	TO		MGD
2	1	WINDWARD EXPORT	0.64
7	8	BARBERS PT LB	4.48

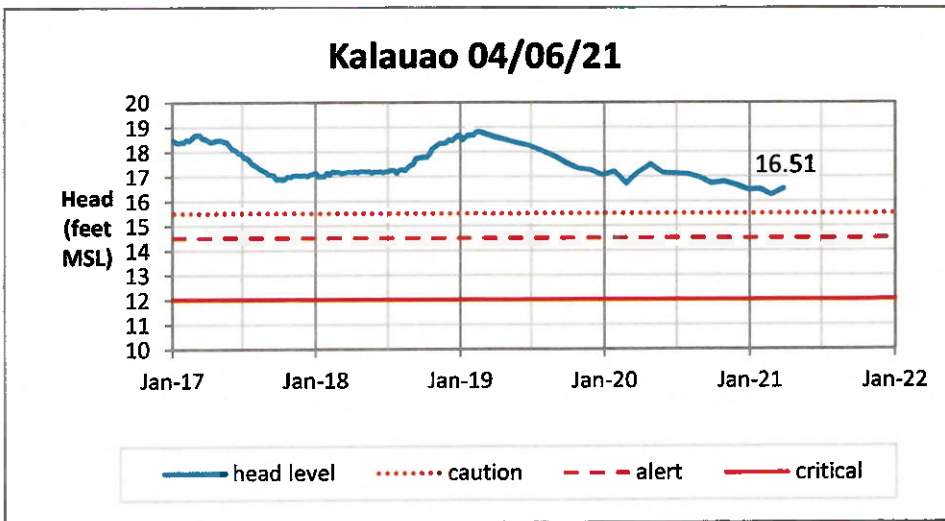
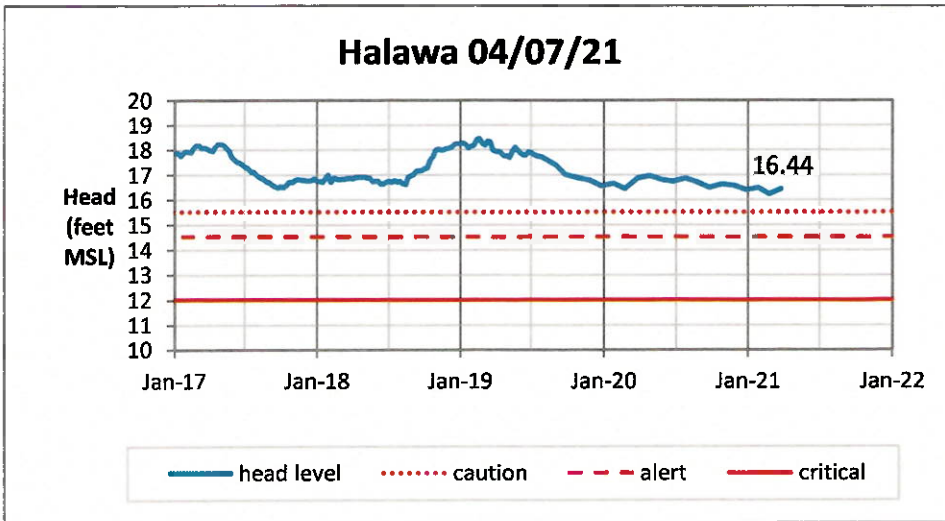
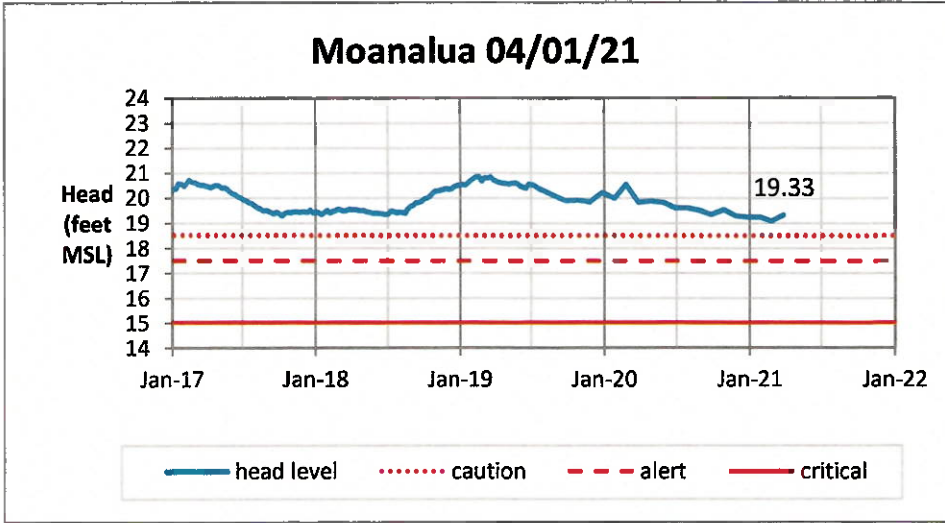
WATER USE DISTRICTS		SUBTOTAL	IMPORT	EXPORT	EFFECTIVE WATER DEMAND
1	HONOLULU	55.35	0.64	-	55.99
2	WINDWARD	10.46	-	0.64	9.82
3	NORTH SHORE	2.91	-	-	2.91
4	MILILANI	3.69	-	-	3.69
5	WAHIAWA	2.84	-	-	2.84
6	PEARL CITY-HALAWA	7.38	-	-	7.38
7	WAIPAHU-EWA	30.13	-	4.48	25.65
8	WAIANAE	2.20	4.48	-	6.69
TOTAL:		114.96	5.12	5.12	114.96



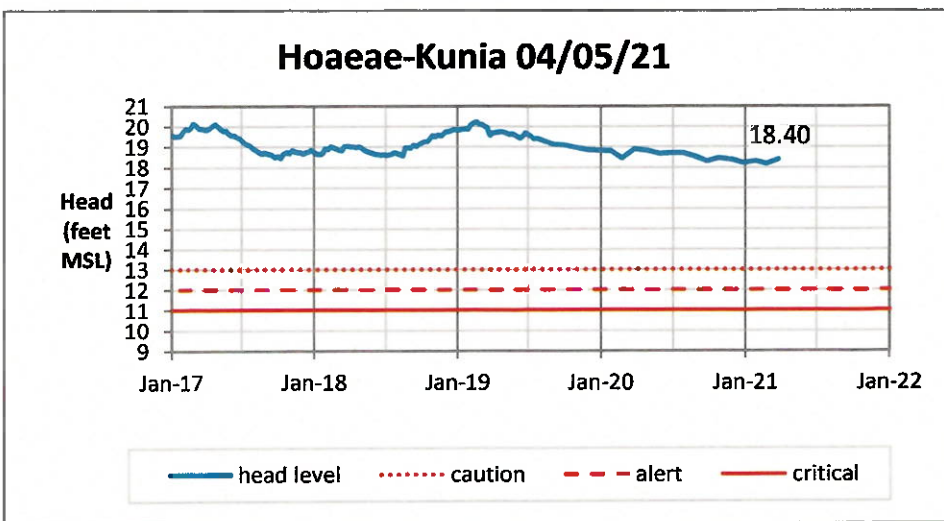
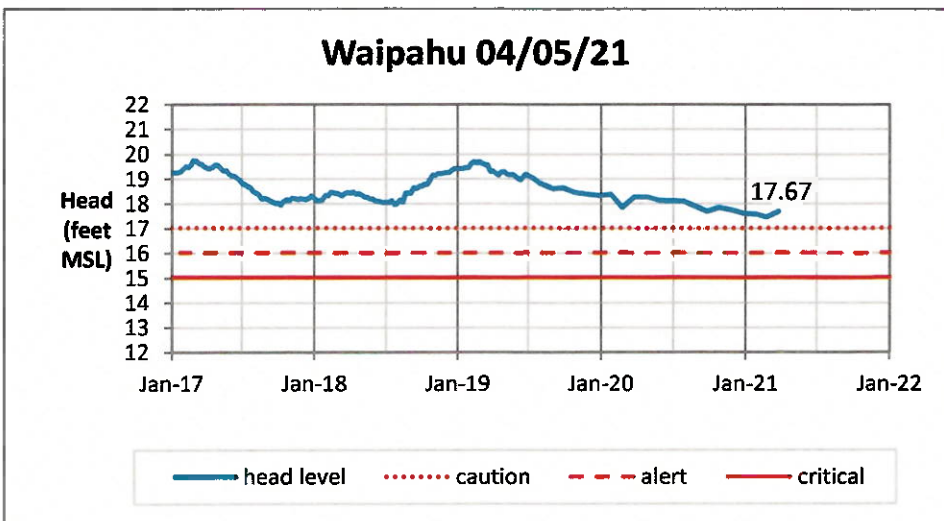
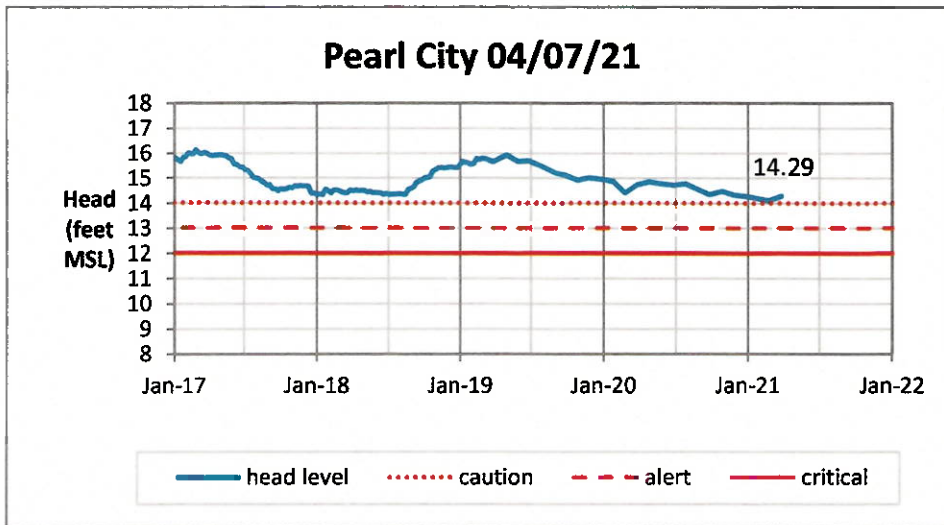
# Head Report



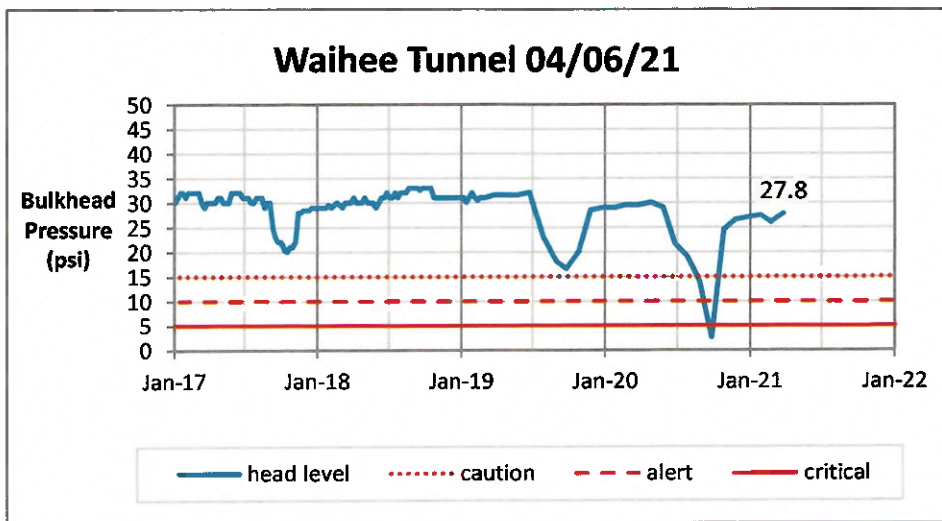
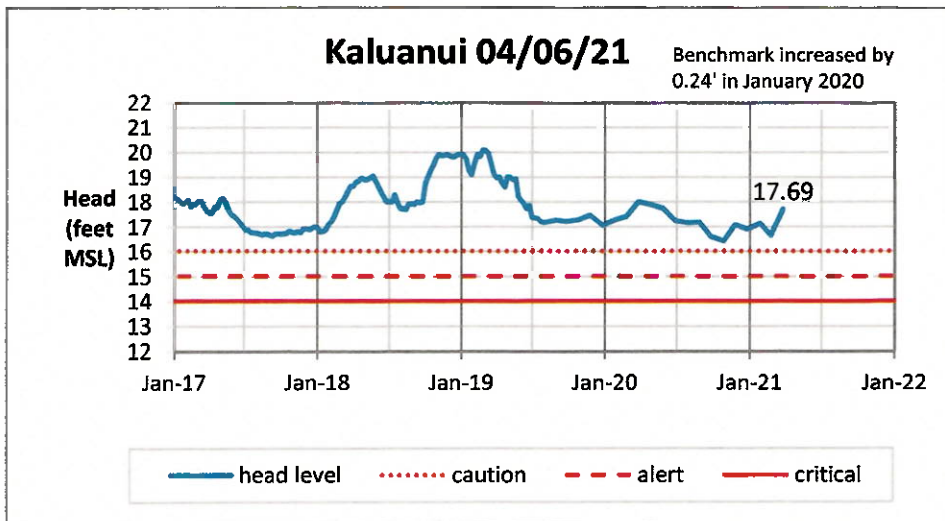
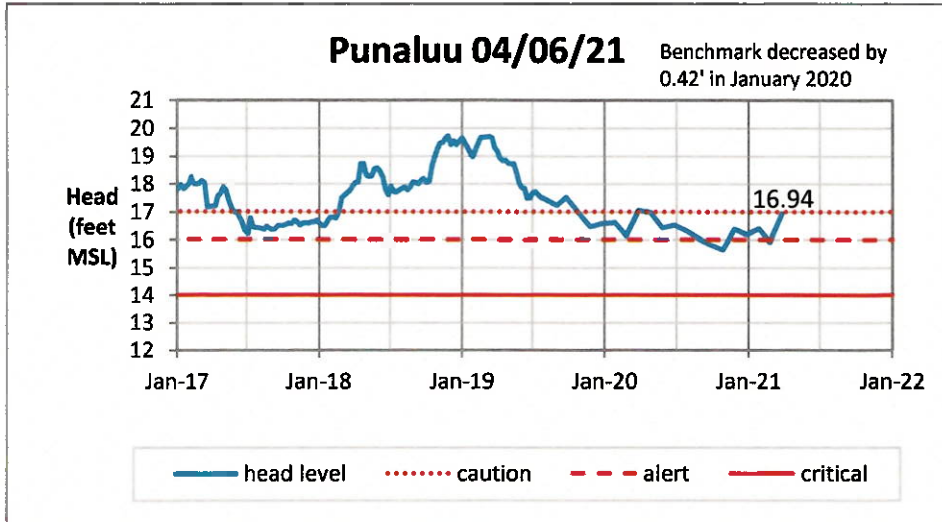
# Head Report



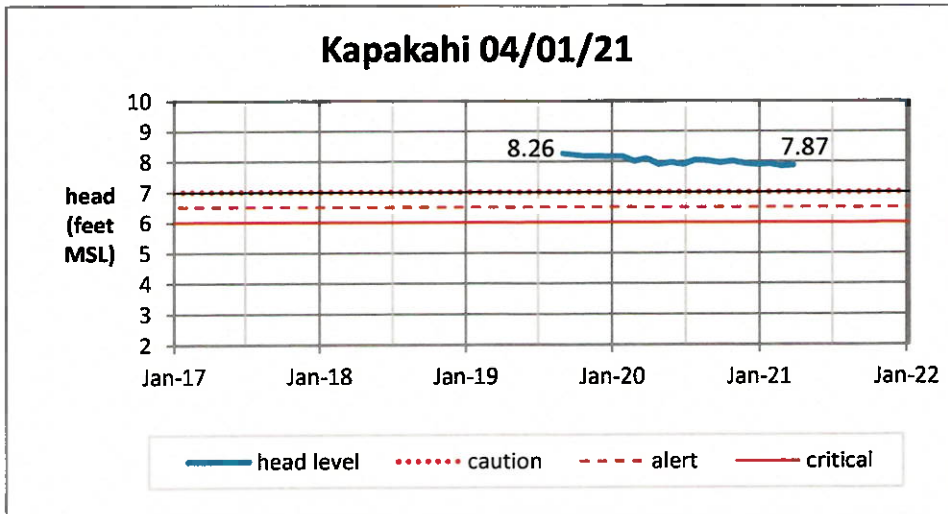
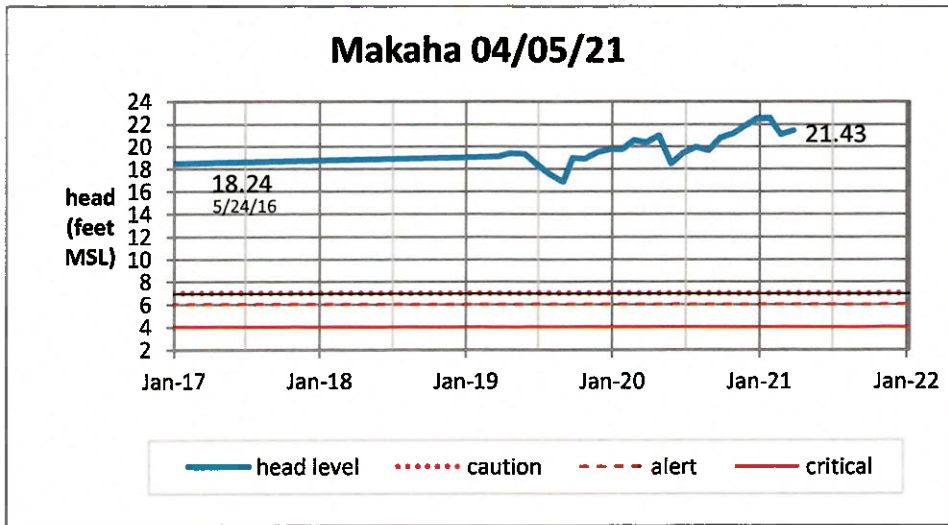
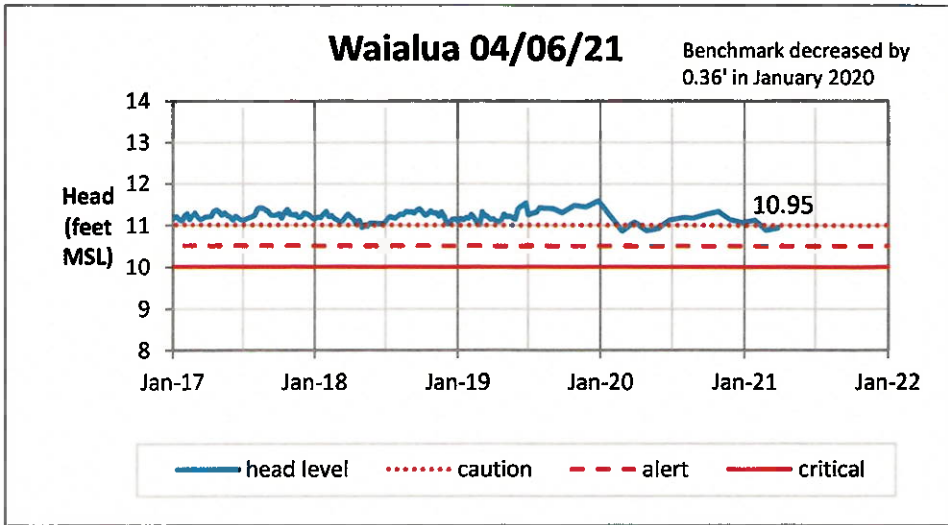
# Head Report

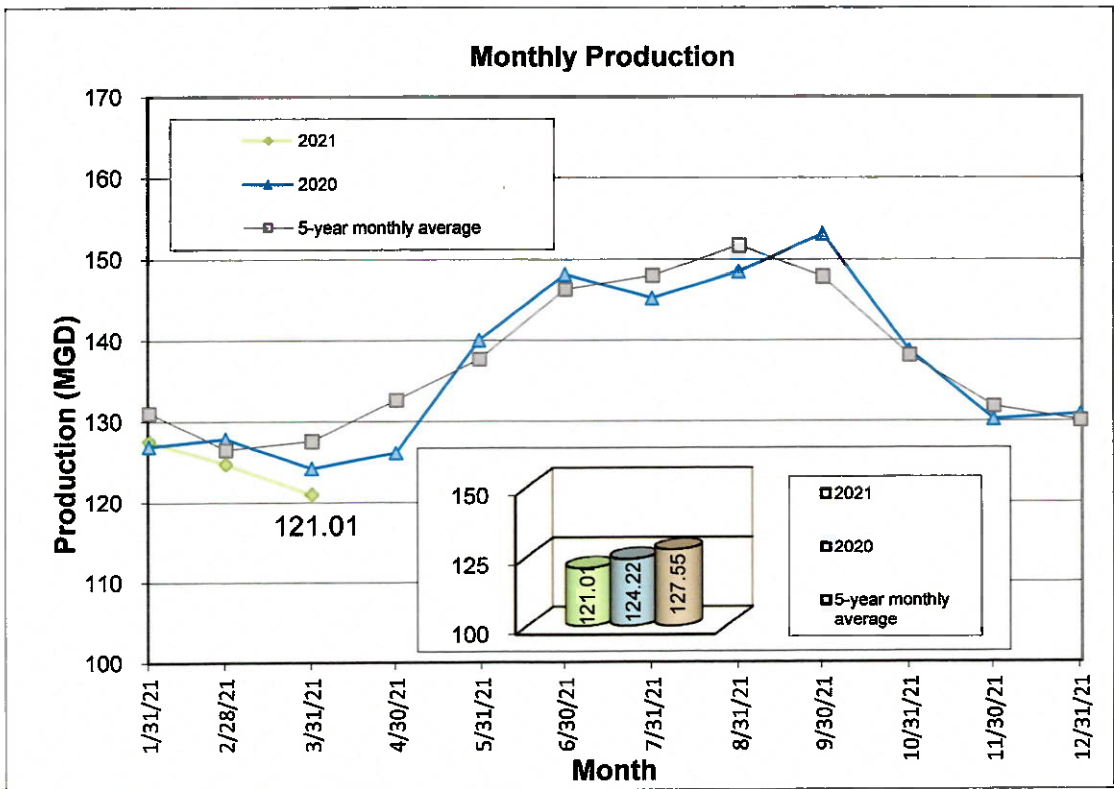
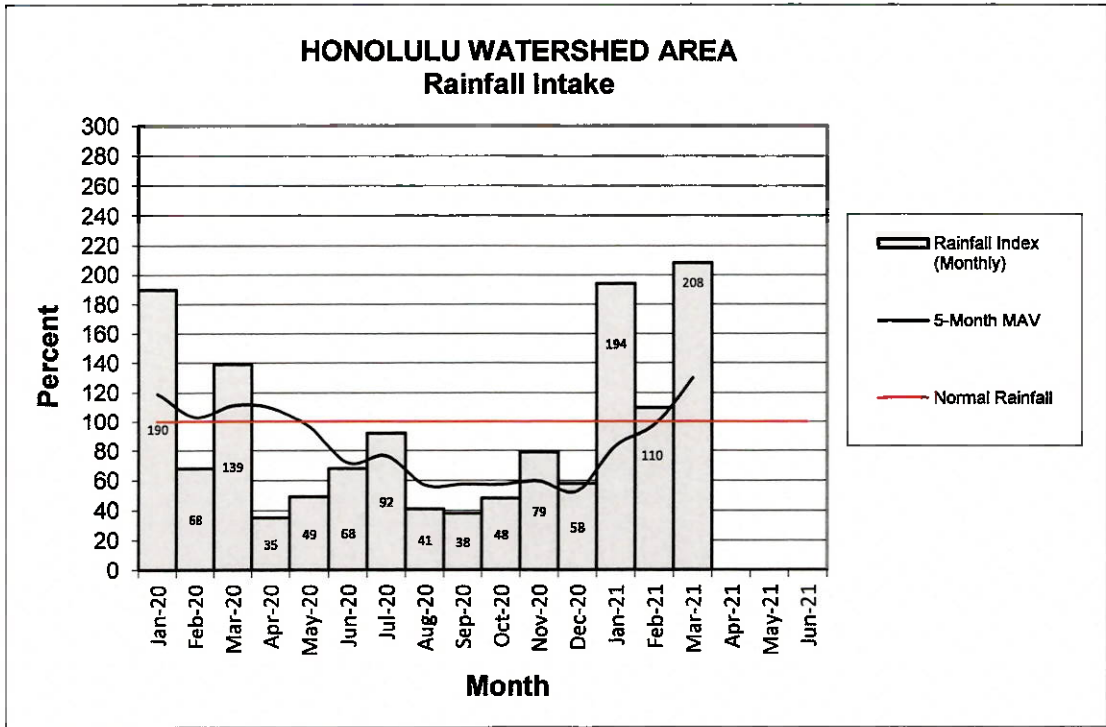


# Head Report



# Head Report





ITEM FOR INFORMATION NO. 4

“June 22, 2020

WATER MAIN  
REPAIR  
REPORT FOR  
MARCH 2021

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843

Chair and Members:

Subject: Water Main Repair Report for March 2021

Michael Fuke, Program Administrator, Field Operations Division, will report on water main repair work for the month of March 2021.

Respectfully submitted,

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

Attachment”

The foregoing was for information only.

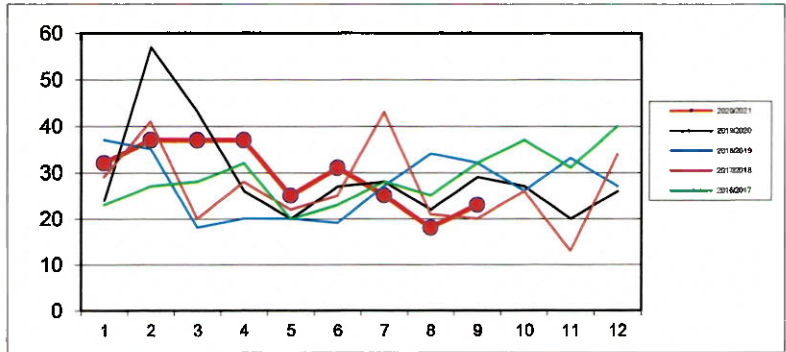
DISCUSSION:

Michael Fuke, Program Administrator, Field Operations Division, gave the report. No comments or discussion.

## WATER MAIN REPAIR REPORT for March 2021

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Total
2020/2021	32	37	37	37	25	31	25	18	23				265
2019/2020	24	57	43	26	20	27	28	22	29	27	20	26	349
2018/2019	37	35	18	20	20	19	27	34	32	26	33	27	328
2017/2018	29	41	20	28	22	25	43	21	20	26	13	34	322
2016/2017	23	27	28	32	20	23	28	25	32	37	31	40	346

Date	Address	Size (In)	Pipe Type
3/1/2021	1446 Alewa Dr, Honolulu	4	CI
3/1/2021	1656 Stillman Ln, Honolulu	6	CI
3/1/2021	98-1039 Kaonohi St, Aiea	8	CI
3/2/2021	53-004 Pokiwai Pl, Hauula	6	CI
3/2/2021	2309 Ahakapu St, Pearl City	4	CI
3/2/2021	702 Wyllie St, Honolulu	6	CI
3/3/2021	91-242 Ewa Beach Rd, Ewa Beach	12	PVC
3/4/2021	619 Isenberg St, Honolulu	12	CI
3/9/2021	92-819 Palailai St, Kapolei	8	CI
3/9/2021	98-150 Lipoa Pl, Aiea	8	CI
3/10/2021	Roosevelt Ave, Kapolei	14	PVC (RO)
3/12/2021	91-558 Onelua St, Ewa Beach	8	CI
3/13/2021	1471 Hoohaku St, Pearl City	8	CI
3/16/2021	906 Kaaahi St, Honolulu	12	CI
3/16/2021	45-892 Kupohu St, Kaneohe	8	DI
3/17/2021	91-1128 Kaiopua St, Ewa Beach	8	PVC
3/19/2021	45-706 Pilina Pl, Kaneohe	6	CI
3/21/2021	85-193 McArthur St, Waianae	8	PVC
3/22/2021	99-619 Pohuli St, Aiea	4	CI
3/24/2021	2313 Kamehameha Hwy, Honolulu	6	CI
3/25/2021	68-109 Akule St, Waiialua	8	CI
3/26/2021	207 Koalele St, Honolulu	6	AC
3/28/2021	2130 Kanealii Ave, Honolulu	8	CI



18 miles of pipeline were surveyed by the Leak Detection Team in the month of March.



**MOTION TO  
RECESS INTO  
EXECUTIVE  
SESSION**

There being no further business Chair Andaya at 3:30 PM called for a motion to adjourn the Open Session. Jade Butay so moved; seconded by Ray Soon and unanimously carried.

Upon unanimous approved motion, the Board recessed into Executive Session Pursuant to [HRS § 92-5 (a)(4)] and [HRS § 92-5 (a)(2)] at 3:30 PM to Consider Issues Pertaining to Matters Posted for Discussion at an Executive Session.

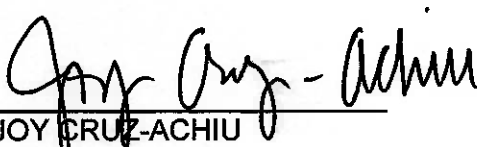
**OPEN  
SESSION**

The Board reconvened in Open Session at 4:53 PM.

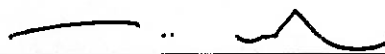
**MOTION TO  
ADJOURN**

There being no further business Chair Andaya at 4:54 PM called for a motion to adjourn the Regular Session. Ray Soon so moved; seconded by Jade Butay and unanimously carried.

The minutes of the Regular Meeting held on April 26, 2021 are respectfully submitted,

  
 \_\_\_\_\_  
 JOY CRUZ-ACHIU

APPROVED:

  
 \_\_\_\_\_  
 BRYAN P. ANDAYA  
 Chair of the Board  
 MAY 24 2021

\_\_\_\_\_  
 Date

THE MINUTES OF THE REGULAR MEETING HELD ON APRIL 26, 2021, WERE APPROVED AT THE MAY 24, 2021 BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
RAY C. SOON	X		
MAX J. SWORD	X		
NA'ALEHU ANTHONY	X		
JADE T. BUTAY	X		
ROGER BABCOCK, JR.	X		