Grassroot Institute of Hawaii
Policy Brief, September 2024

How fixes to Maui's water-fixture policy could ease its housing crisis

Residents have been getting hosed by outdated plumbing rules and fees

By Jonathan Helton and Aaron Lief

GRASSROOT
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President's message

Keli'i Akina, Ph.D.
President and CEO
Grassroot Institute of Hawaii

Dear Reader,

One of our priorities at the Grassroot Institute of Hawaii is to identify policies that will help reduce the cost of housing in Hawaii, since that is one of the largest contributors to our high cost of living and a main reason people continue to leave the state.

In many ways, Hawaii's housing crisis is a home-building crisis. Housing is scarce and home prices are high because we have not been building enough homes.

In the past, we have identified zoning, permitting, taxation and fees among the barriers to homebuilding, but one of the most interesting – and somewhat obscure – issues our researchers have encountered is how water-fixture regulations are stifling housing growth in Maui County.

Water fixtures are household accessories and appliances that use water, such as toilets, showers, washing machines, sinks, pot fillers and dishwashers. As we explain in this brief, Maui County's rules regarding water fixtures have served to increase the costs associated with homebuilding on the islands of Maui, Molokai and Lanai.

The situation has become so severe that some homeowners resort to removing laundry room sinks or exterior hose faucets in order to allocate water fixtures elsewhere in their homes.

Maui County's outdated water-fixture regulations are especially worrisome in light of how they might be hindering the rebuilding and recovery of Lahaina and other areas affected by the devastating August 2023 wildfires.

The good news is that along with uncovering this unique barrier to homebuilding in Maui County, we have identified policies that could mitigate some of the expenses and delays associated with it.

This research shows how, bit by bit, we can clear away even the most unassuming barriers that contribute to Hawaii's housing shortage and high prices.

E hana kākou! (Let's work together!)

Sincerely,

Keli'i Akina

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Introduction

A decades-old budget rule is causing a lot of trouble for Maui County residents seeking to build new housing in the wake of the August 2023 wildfires that severely aggravated the county's already-existing crisis-level housing shortage.

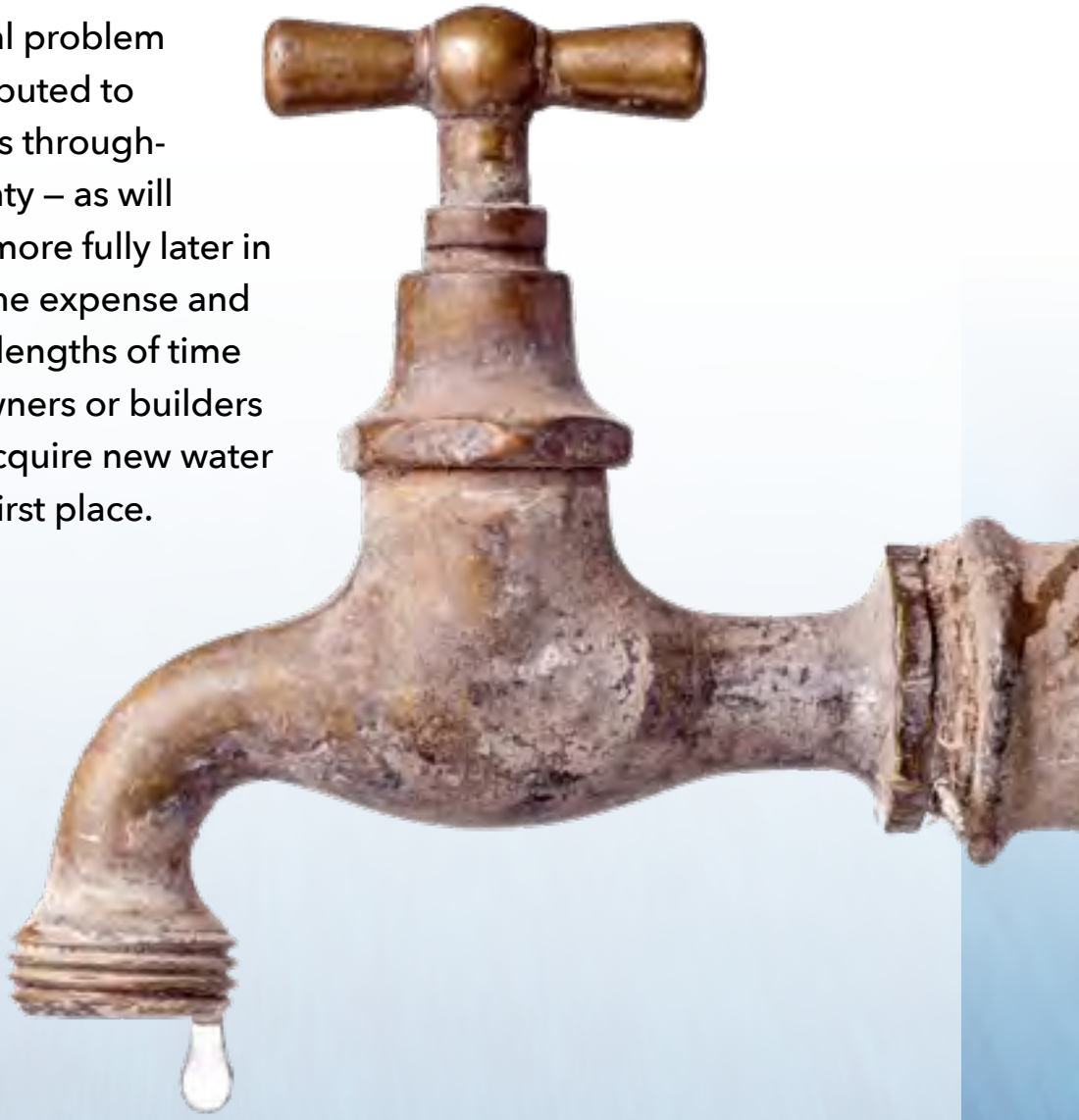
Detailed in Appendix B of the county's annual budget,[1] this rule specifies how many water fixtures can be installed in a home or business based on the county's estimates of how much water each fixture uses – called water-fixture units.

Unfortunately, Maui County has not updated its water-fixture-unit specifications since 1995, which along with the high fees the county charges for these units has discouraged or delayed the timely construction of much-needed housing in the county.

Policymakers should prioritize updating or eliminating the county's water-fixture-unit requirements and related fees, which are the highest in the state.

County policymakers also should consider transferring ownership and management of water meters to homeowners, which would encourage homeowners to use their water appliances more efficiently.

An additional problem that has contributed to building delays throughout Maui County – as will be explained more fully later in this brief – is the expense and unreasonable lengths of time many homeowners or builders must wait to acquire new water meters in the first place.



What is a water fixture?

Water fixtures are water-using appliances such as toilets, showers, washing machines, sinks, pot fillers,[2] hose bibs[3] and dishwashers that are connected to the water meter.

What is a water-fixture unit?

A water-fixture unit refers to how much water a particular water appliance or fixture is estimated to be capable of using in a given amount of time, measured in gallons per minute.

Each water appliance is given a score. Higher scores are assigned to appliances that are believed to use more water per minute.

Another factor in calculating water-fixture units is the statistical likelihood that a given appliance will be in use at the same time as other water appliances. One can connect more appliances to a water meter than it is capable of supplying simultaneously, as it is unlikely that all the fixtures would be in use at the same time.

For most homes on Maui, a single 5/8 meter is sufficient to supply the water typically needed by residents.

What is a water meter?

Water meters are devices through which county water is supplied to users, provided for a fee by the Maui Department of Water Supply.

The circumference meter sizes for homes typically are 5/8-inch, 3/4-inch and 1-inch, with 1-inch water meters being able to provide the largest amount of water to the fixtures on a gallons-per-minute basis.

For most homes on Maui, a single 5/8-inch meter is sufficient to supply the water typically needed by residents. A larger water meter might be needed for larger homes.

The fees to obtain water meters from the county range from $12,060 for a 5/8-inch meter to $33,356 for a 1-inch meter.

By comparison, Kauai's per-meter charge for single-family homes is $14,115[4]; Hawai'i County's per-meter cost is $1,319 for the first connection and $6,095 for subsequent ones[5]; and Honolulu's meter charges are based on the number of fixture units needed and the type of residential use, so they range from $185.33 to $271.27 per fixture unit.[6]

Another problem for Maui homebuilders and renovators is that the average wait time to obtain a new or upgraded water meter for a property that already receives water ranges between four to six months.[7]

Some parts of the county experience significantly longer waits. Such is the case with Upcountry, where some residents have been waiting to buy water meters since 2003.[8]

How do all these features interact?

In Hawaii and most western states, calculating the maximum capacities of water meters and how many water fixtures they can handle is usually based on data provided by the Uniform Plumbing Code of the International Association of Plumbing and Mechanical Officials and the M22 Manual of Water Supply Practices of the American Water Works Association.[9]

If calculated properly, the water-fixture units assigned should align closely with the physical capacities of the water meters. However, this doesn't seem to be the case with Maui County, for reasons to be explained later in this report.

Typically, someone building a new home on Maui would be seeking to install a 5/8-inch water meter. Acquiring this meter would cost $12,060 and come with the authorization to install water appliances equal to a total of 31 water-fixture units.

A three-bed, two-full-bathroom house with a washing machine hookup, standard kitchen appliances such as a dishwasher and a sink, and two exterior hose bibs would take up about 23 of those fixture units, leaving room for a few extra sinks, hose bibs or other fixtures.

Adding an ohana unit with one bathroom, a washing machine and a kitchen sink with a dishwasher would require paying for additional water-fixture units.

Building two ohana units on a property might require the purchase of a larger water meter or an additional water meter, adding significant cost and time to the project.

Someone building a larger home from scratch might simply buy a larger meter that would provide access to more water-fixture units.

Maui County's current limits on water-fixture units are described in the portion of the annual budget that sets rates and fees.

As shown in Table 1, water fixtures for commercial buildings in Maui County have a different set of unit multipliers based on whether the water-using appliances in the buildings will be for public or private use, and whether they use flush-tank or flush-valve toilets.[10]

Meter size	Flush-tank toilet	Flush-valve toilet
5/8 inch	31	-
3/4 inch	53	13
1 inch	128	48
1-1/2 inch	380	245
2 inch	692	631
3 inch	1,926	1,926
4 inch	3,620	3,620
6 inch	8,300	8,300
8 inch	12,000	2,000

Source: "**Water Meter Sizing Worksheet – Non-Residential,**" Appendix Maui County Department of Water Supply

The only way commercial buildings can have more water-fixture units than allowed by their meter sizes is to buy new water meters with bigger capacities – which can be quite expensive and come with long wait times – or remove existing fixture units to allow for new uses.

Homebuilders or home renovators have a third option: If they want to add water fixtures that will require more than 31 fixture units, they must pay a fee charged on a per-unit basis. For fiscal 2025, the allowable extra water-fixture units and fees for residences are are detailed in Table 2.

Table 2

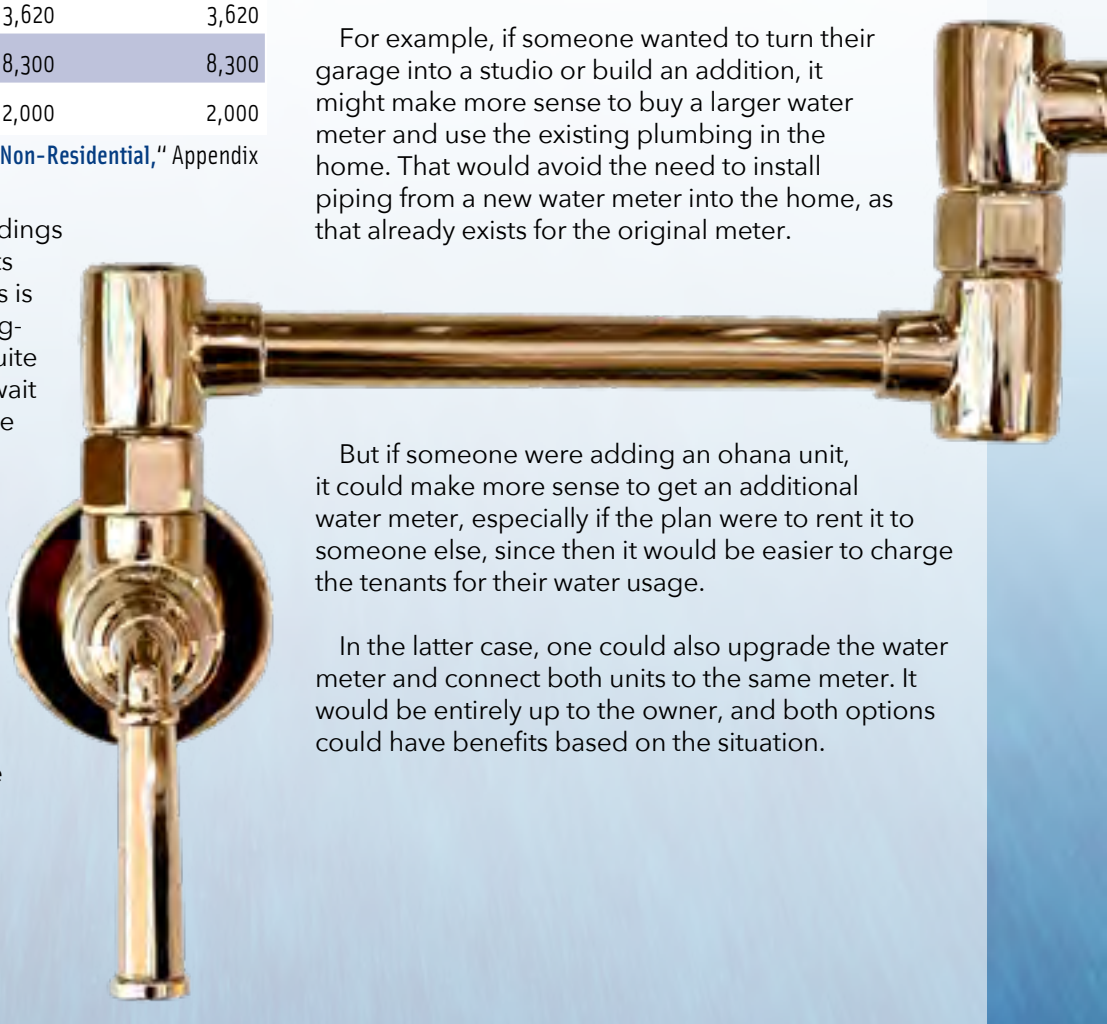
Meter size	Meter cost	WFUs included with the water meter fee	Additional per-unit cost	Maximum additional units
5/8 inch	$12,060	31	$389	11
3/4 inch	$18,884	53	$356	48
1 inch	$33,356	128	$261	245

Source: "**Revenues - Fees, Rates, Assessments and Taxes,**" Appendix B of Maui County's fiscal 2025 budget, p. 60.

In fiscal 2023, the Maui County Council increased the number of additional water-fixture units allowed for its 5/8-inch water meters to 11. Previously it had been just eight.[11]

The provision that residential users could buy additional units was first authorized in 2016.[12] Before then, Maui homebuilders and homeowners had two options: Buy a larger water meter or remove existing water appliances to accommodate new ones.

For example, if someone wanted to turn their garage into a studio or build an addition, it might make more sense to buy a larger water meter and use the existing plumbing in the home. That would avoid the need to install piping from a new water meter into the home, as that already exists for the original meter.



But if someone were adding an ohana unit, it could make more sense to get an additional water meter, especially if the plan were to rent it to someone else, since then it would be easier to charge the tenants for their water usage.

In the latter case, one could also upgrade the water meter and connect both units to the same meter. It would be entirely up to the owner, and both options could have benefits based on the situation.

Page 6 How water-fixture...

How Hawaii's other counties deal with this issue

Not all of Hawaii's counties regulate water use in the same manner.

Honolulu County, for example, has a limit on fixture units, but its fixture scores are different.[13] They have not been updated in 20 years, but they are more closely aligned with current UPC guidelines than Maui's, which have not been updated in almost 30 years.

For some fixtures such as bathroom sinks, toilets and washing machines, Honolulu specifies even lower scores than the Uniform Plumbing Code.

On Kauai and Hawaii Island, the counties do not have codified water-fixture unit scores, caps or fees.[14] Rather, they use the standards of the UPC and M22 Manual directly.

This is advantageous because these publications are updated as technology improves. It also gives engineers and plumbers the autonomy to apply their expertise when circumstances depart from the norm.

Maui County should update its worksheet that governs the water-fixture unit scores for water appliances.

Recommendations

In light of the major differences between Maui's policies and those of Hawaii's other counties, Maui policymakers should consider making the following changes:

1. Recalculate Maui's water-fixture unit scores

Maui County should update its worksheet that governs the water-fixture unit scores for water appliances.

In 1992, the Maui County Council enacted an ordinance requiring all new construction to be built with low-flow water fixtures. In 1995, the Maui Department of Water Supply updated its fixture-unit multipliers to account for both the old non-low-flow fixtures and the new low-flow fixtures.[15] The multipliers for low-flow fixtures have not changed since 1995, according to available records.

For example, the Uniform Plumbing Code now rates a hose bib at 2.5 fixture units, with each additional bib at 1 fixture unit.[16] Honolulu does the same.[17] Maui County, on the other hand, rates all hose bibs at 3 fixture units.[18]

For a dishwasher, Maui County is 2, and Honolulu and the UPC are both 1.5. Meanwhile, the Uniform Plumbing Code gives dishwashers a lower multiplier than toilets, whereas Maui County does the opposite.

There was a time when dishwashers were much less water-efficient; however, modern dishwashers use about 4 gallons of water per load, and toilets use 1.28 gallons per flush.[19]

Considering that toilet use is much more frequent than dishwasher use, this illustrates how these outdated multipliers prevent Maui County residents from adding fixture units that their water meters are physically capable of supplying.

Currently, some Maui county residents experience delays because they are forced to upgrade or purchase an additional water meter even though their current water meter may be capable of handling the additional fixtures.

Maui's Department of Water Supply should consider adopting the regularly updated UPC multipliers – or even Honolulu County's, which assigns some lower fixture-unit scores than the Uniform Plumbing Code.[20]

2. Consider removing Maui's water fixture-unit limits

A decade ago, then-Maui Mayor Alan Arakawa recommended that Maui's fixture-unit count be removed entirely.[21]

This was more practical than it might at first sound, because fixture-unit maximums are a function of meter size, so licensed plumbers should have the requisite knowledge to inform builders about the size of meters they should purchase and how many appliances they can connect to them.

3. Reduce the fees for additional water-fixture units

The current Maui County fee of $389 for each additional water-fixture unit for 5/8 inch meters presents an unnecessary barrier to the expansion of existing homes.

Buying the maximum allowable 11 extra units would cost a homebuilder or home renovator about $4,200 – in addition to the $12,060 spent on the initial water meter. If it were possible to buy more, that would obviously cost more as well.

Ironically, county incentives such as the 'Ohana Assistance Program have been enacted to encourage homeowners to build housing in existing urban areas with access to adequate infrastructure,[22] but fees for water-fixture units run counter to that goal.

4. Give residents responsibility for maintenance and repair of water meters

Some fixtures can experience low to no water pressure if the number of water appliances in a home exceeds the capacity of the water meter.

For the Maui Department of Water Supply, this means that the meter will need to be repaired or replaced, since maintaining water meters in the county is currently its responsibility.

But if homeowners had that responsibility, they could work with licensed plumbers to determine the risks they are willing to take for potentially exceeding a water meter's capabilities.

If the Department of Water Supply no longer had to foot the maintenance bill for water meters, it would no longer need to be concerned with how many water appliances a homeowner might have.

If homeowners had more water fixtures than could be supplied from their water meters, they would be incentivized to reduce their water-fixture usage so as not to damage their water meters or render their appliances inoperable, or else buy a new water meter.

Conclusion

Recent events highlight the need to reform Maui County's outdated and costly water-fixture unit policy.

Maui had a housing problem prior to the August 2023 wildfires,[23] which destroyed about 3,000 homes.[24] Now that it needs even more new housing, the county's existing fixture-unit rules stand as a greater roadblock.

Syd Smith, owner of Maikiko Coffee Estate, said in a recent interview that some Maui property owners who are at or near their fixture-unit limits have resorted to taking laundry room sinks out or even removing hose bibs from the sides of their houses to get a few more units to use elsewhere on their properties.[25]

Not everyone is willing to do that, however, and many might be more likely to forgo building altogether when encountering this hurdle.

Cumbersome water-fixture unit limits could also hinder the intent of a bill recently introduced at the Maui County Council that would allow homeowners to construct more homes per lot – in addition to the current provisions allowing one or two accessory dwellings, depending on the lot size.[26]

Residents looking to add a third small home might have to wait years to buy a new water meter to accommodate the appliances,[27] and it would cost them thousands of dollars in fees.

Updating or removing the county's water-fixture unit rules and associated fees would be an easy way for the county to set more homebuilding into motion.

Endnotes

1 "Appendix B: Revenues - Fees, Rates, Assessments and Taxes," County of Maui, Fiscal Year July 1, 2024 to June 30, 2025, p. 60.
2 A pot filler is a faucet located on the backsplash of a kitchen range or cooktop that can swing out over the burners to fill large stock pots for heating.
3 A hose bib is a water faucet on the exterior of a building.
4 "Facilities Reserve Charge," Kaua'i Department of Water, Revised June 15, 2020, pp. 4-5.
5 "Water Rates," County of Hawai'i Department of Water Supply, Effective Feb. 1, 2024. See "Facilities Charges."
6 "Revision to the Schedule of Rates and Charges for the Furnishing of Water and Water Service," Honolulu Board of Water Supply, accessed April 29, 2024.
7 Correspondence with the Maui Department of Water Supply, June 18, 2024.
8 "Upcountry Water Service Priority List," Maui Department of Water Supply, updated Jan. 1, 2022.
9 "2024 Uniform Plumbing Code," International Association of Plumbing and Mechanical Officials, 2023; and "Sizing Water Service Lines and Meters," in "M22 Manual of Water Supply Practices," American Water Works Association, 2024.
10 "Water Meter Sizing Worksheet – Non-Residential," Maui County Department of Water Supply, form revised Nov. 18, 2020, accessed Aug. 13, 2024.
11 "Appendix B: Revenues - Fees, Rates, Assessments and Taxes," County of Maui, Fiscal Year July 1, 2022 to June 30, 2023, p. 55; and "Appendix B: Revenues - Fees, Rates, Assessments and Taxes," County of Maui, Fiscal Year July 1, 2023 to June 30, 2024, p. 58.
12 Gladys Baisa, "New water fixture units within reach of more residents," The Maui News, Aug. 28, 2016.
13 Email correspondence with officials in the Honolulu Board of Water Supply's engineering department. Honolulu's water-fixture scores can be found on the county's "Fixture Unit Computation Worksheet." See "Applications and Permits," accessed June 5, 2024.
14 Email correspondence and phone calls with engineers at the Hawaii Island and Kauai county water supply departments.
15 David Craddick, Maui Department of Water Supply director, "Low Flow Fixture Values," memo sent April 27, 1995.
16 The Uniform Plumbing Code, p. 340.
17 "Applications and Permits."
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19 JoAnn Emmel, Kathleen Parrott and Julia Beamish, "Dishwashing and Water Conservation: An Opportunity for Environmental Education," The Journal of Extension, Vol. 41, No. 1, Article 10, 2003, p. 3; "A Brief History of Plumbing Efficiency," PHCP Pros, March 7, 2017; and "How much electricity does my dishwasher use?" Direct Energy, Dec. 7, 2023.
20 See Honolulu County's "Fixture Unit Computation Worksheet" and the 2024 Uniform Plumbing Code, p. 340.
21 Maui County Council minutes for Oct. 29, 2015, p. 84.
22 Alice Lee, "Expediting new housing opportunities through the 'Ohana Assistance Program," Maui County, Feb. 29, 2024.
23 Janis Magin Meierdiercks, "Maui Is Hawai'i's Least Affordable County for Homeownership," Hawaii Business Magazine, April 2, 2023.
24 "The Hawaii Housing Dashboard," Economic Research Organization at the University of Hawai'i, Sept. 26, 2023.
25 "Welcome to Syd Smith's Maui, land of infernal regulations," Grassroot Institute of Hawaii, March 21, 2024.
26 Maui County Council's Bill 103 (2024).
27 John B. Guard, "2022 Upcountry Maui Water Meter List Update," Hawaii Life, May 13, 2022.
28 Correspondence with the Maui Department of Water Supply, June 18, 2024.

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