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Testimony COMMENTING on HB1673 HD1
RELATING TO LANDFILL UNITS

REPRESENTATIVE NICOLE E. LOWEN, CHAIR
HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Hearing Date, Time and Room Number: 2/17/2026, 9:30 AM, 325

Fiscal Implications: Undetermined.

Department Position: The Department of Health (Department) offers comments on this measure.

Department Testimony: The Environmental Management Division, Solid and Hazardous Waste Branch (EMD-SHWB) provides the following testimony on behalf of the Department.

This measure proposes to repeal the prohibition in Section 342H-52(c), Hawai'i Revised Statutes on constructing, modifying, or expanding a landfill unit or any component of a landfill unit inland of the Department's Underground Injection Control (UIC) Line in counties with a population greater than five hundred thousand. This will allow the Honolulu Board of Water Supply (BWS) to enforce their waste disposal requirements, utilizing the no pass zone, without further restrictions of the UIC line.

The Department agrees with the proposed language in HB1673 HD1, as we understand that the intent of the measure is to essentially replace the UIC Line with the BWS's no pass zone; and allow the BWS, who developed the no pass zone maps to implement the requirement. According to the BWS's website[1], BWS Rules and Regulations have been adopted

[1] https://www.boardofwatersupply.com/about-us/rules-and-regulations

pursuant to the authority expressed in Section 7-105(j) of the Revised Charter of the City and County of Honolulu and Section 3-301: Waste Disposal Facilities requires the Manager and Chief Engineer of the BWS to approve plans for certain waste disposal facilities, including sanitary landfills and refuse disposal dumps. The website further denotes that the BWS's Pass/No Pass Zone map is available on the City and County of Honolulu's Department of Planning and Permitting website and their regulations state that no pass zone maps are used as guidance in decision making for approving waste disposal facilities. Considering that the name of the App on the City's website and the no pass zone itself can change over time, identifying the most recent version, and determining whether the zone has the same purpose as the original no pass zone for an external agency will be difficult. Thus, the BWS, as the developer of the no pass zone, is the appropriate agency to implement this requirement.

If the Legislature wishes the Department to ensure that the BWS enforces their regulations, we can require applicants for landfill solid waste permits that will construct, modify or expand a landfill unit in the City and County of Honolulu to obtain a certification signed by the Manager and Chief Engineer of the BWS stating that the applicant is in compliance with the BWS regulations regarding landfill siting.

The Department also asks the Legislature to consider parallel language regarding a "buffer zone" where the construction or placement of the same types of facilities that landfills are being restricted from being sited within are also restricted. For example, Act 73, Session Laws of Hawai'i 2020, which requires a one-half mile buffer for landfill units from residential, school, or hospital property, should have similar language prohibiting construction of such facilities within one-half mile of landfill units.

Offered Amendments: None

Thank you for the opportunity to testify on this measure.

BOARD OF WATER SUPPLY
KA 'OIHANA WAI
CITY AND COUNTY OF HONOLULU

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February 17, 2026

The Honorable Nicole E. Lowen, Chair
and Members
House Committee on Energy and Environmental Protection
Hawaii State Capitol, Room 325
Honolulu, Hawai'i 96813

Dear Chair Lowen and Members:

Subject: House Bill 1673, HD1: Relating to Landfill Units

The Honolulu Board of Water Supply (BWS) hereby amends its previously-submitted testimony that was electronically transmitted to this Committee. The BWS strongly opposes House Bill (HB) 1673, House Draft (HD) 1. The HD1 version repeals Hawai'i Revised Statutes Section 342H-52 (c) in its entirety, which deletes the prohibition on the construction, modification, or expansion of a landfill unit, or any component of a landfill unit, inland of an underground injection control (UIC) line in a county with a population greater than five hundred thousand.

The BWS respectfully request this measure be amended to its original version. The original version keeps intact the prohibition, deletes the UIC line and replaces that reference to "within the no-pass zone" as underscored. Further, the original version provides a definition of the "no-pass zone" as the HD1 version does not.

Thank you for the opportunity to revise our position in strong opposition to HB 1673, HD 1.

Very truly yours,

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

DEPARTMENT OF ENVIRONMENTAL SERVICES
KA ʻOIHANA LAWELAWE KAIĀPUNI
CITY AND COUNTY OF HONOLULU

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DEPUTY DIRECTOR
HOPE PO'O

IN REPLY REFER TO:
DIR 26-11

February 17, 2026

LATE

The Honorable Nicole E. Lowen, Chair
The Honorable Amy A. Perruso, Vice Chair
and Members on the Committee on Energy & Environmental Protection
415 South Beretania Street
Honolulu, Hawaiʻi 96813

Dear Chair Lowen and Vice Chair Perruso:

SUBJECT: City and County of Honolulu's Department of Environmental Services Testimony in Opposition to HB1673 and in Support of HB1673 HD1

The City and County of Honolulu's Department of Environmental Services (ENV) submits the following **comments in opposition** to HB1673 and **in support** of HB1673 HD1, relating to Landfill Units.

The modification replacing "inland of an underground injection control line" with "within the no-pass zone" is unnecessary as the underground injection control (UIC) line, which is the boundary between exempted aquifers and underground sources of drinking water, is already protective of any potential drinking water sources.

The UIC line is already utilized to govern where injection wells, which are used for injecting water or other fluids into the groundwater aquifer, may be sited to prevent them from polluting underground sources of drinking water. In addition, the existing Waimānalo Gulch Sanitary Landfill (WGSL) has operated without a detected release since its inception in 1989, further demonstrating the effectiveness of past operational controls.

ENV is actively evaluating an eastward expansion of WGSL spanning two adjacent properties, as those two properties are the only properties which meet all the current criteria and laws for siting a landfill. Replacing the existing "inland of an underground injection control line" with "within the no-pass zone" would significantly reduce the usable landfill space of that eastward expansion, further complicating the

City's ability to plan, design and develop a municipal waste landfill for the residents and businesses on O'ahu.

Preliminary calculations indicate an approximate landfill lifespan reduction from twenty (20) years to thirteen (13) years when considering the no-pass zone compared to the UIC line. A landfill is critical to maintaining uninterrupted island-wide solid waste collection and disposal services, including the management of disaster-related debris following major storms, flooding, or other emergency events.

ENV is in support of the HB1673 HD1 version of the bill which removes the UIC line as the boundary for location of landfill units.

Please feel free to contact me at (808) 768-3486 with any questions.

Sincerely,

Roger Babcock, Jr., Ph.D., P.E.
Director

SIERRA CLUB
OF HAWAIʻI

HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

February 17, 2026 9:30 AM Conference Room 325

In OPPOSITION to HB1673 HD1: RELATING TO LANDFILL UNITS

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Energy & Environmental Protection Committee,

On behalf of our over 20,000 members and supporters, the Sierra Club of Hawaiʻi **OPPOSES** HB1673 HD1, which would undermine our collective kuleana to safeguard our precious and limited drinking water aquifers from irreparable contamination.

Deciding where to place a landfill, particularly in an island setting such as ours, will always be a difficult choice. No matter what location is selected, a landfill will inevitably create a range of painful burdens based on the location selected. However, siting a landfill over one of our precious and pure drinking water aquifers is by far the worst choice that can be made. Unfortunately, this is just what was proposed by the City and County of Honolulu last year, until the legislature intervened with Act 255.

Notably, any new landfill for Oʻahu will store extremely toxic ash containing heavy metals, cancer-causing PFAS "forever chemicals," and other compounds not easily broken down through incineration, such as PCBs, asbestos, and others. This ash, when combined with rainwater, will create millions of gallons of toxic "leachate" per year. While the City and County of Honolulu administration assures the public that this leachate will be continually pumped out, transported, and treated at a wastewater facility, it is next to impossible to prevent leachate leakage; the EPA itself has concluded that all landfills inevitably leak. Meanwhile, any released leachate from this proposed landfill, whether through chronic small leaks and/or sudden mass discharges due to fire, flooding, human error, deferred maintenance, or other causes, will slowly but surely percolate into any underlying drinking water aquifer, foreclosing another source of water that our children and grandchildren will need more than ever before.

The legislature accordingly wisely passed Act 255 last legislative session, to prohibit the construction of a new landfill over any drinking water aquifer on Oʻahu. This measure as currently drafted would undo this common sense protection of our children's, grandchildren's, and future generations' water security.

The Sierra Club recognizes the prior committee's understanding that recently adopted pass/no-pass zone layers in the City's Parcels and Zoning Information App "may be used as guidelines for the Manager and Chief Engineer of the Honolulu Board of Water Supply to withhold approval of a landfill unit" above a drinking water aquifer. **However, as we saw just last year, the tremendous pressure that may be placed by current and future administrations on current and future chief engineers of the Board of**

SIERRA CLUB
OF HAWAIʻI

Water Supply could very well result in city-level actions, including costly lawsuits, could very well result in the future approval of a landfill above a drinking water aquifer. Given the findings of the prior committee – that landfill leachate contamination could lead to a “grave public health and environmental peril” – there is no reason for the legislature to abdicate its own independent kuleana to safeguard the wellbeing and water security of present and future generations, as would result in the passage of this measure.

Accordingly, the Sierra Club urges the Committee to **HOLD** HB1673 HD1. Mahalo nui for the opportunity to testify.

To: The Honorable Representative Nicole Lowen, Chair, the Honorable Amy Perruso, Vice Chair, and Members of the Committee on Energy and Environmental Protection.

From: Climate Protectors Hawai‘i and Hawai‘i Reef and Ocean Coalition (by Ted Bohlen)

Re: Hearing **HB1673 HD1 RELATING TO LANDFILL UNITS**

Hearing: Tuesday February 17, 2024 9:30 a.m.

Aloha Chair Lowen, Vice Chair Perruso, and Energy and Environmental Protection Committee Members:

The Hawai‘i Reef and Ocean Coalition (HIROC) is a group of scientists, educators, filmmakers and environmental advocates who have been working since 2017 to protect Hawaii’s coral reefs and ocean.

The Hawai‘i Reef and Ocean Coalition SUPPORTS HB1673 HD1!

Hawai‘i Reef and Ocean Coalition **SUPPORTS** this bill's protection of drinking water supplies on Oahu by repealing HRS Sec. 342H-52(c). This would allow the

manager and chief engineer of the board of water supply to determine whether to approve a proposed landfill unit, prohibiting the siting a landfill unit in the “no-pass” area rather than inland of an underground injection control line.

Hawai‘i Reef and Ocean Coalition also **SUPPORTS** amending this bill to **require that toxic incinerator ash not be used in road building, construction, or as alternative daily cover, but must be disposed of in a double-lined and duly licensed solid or hazardous waste landfill**. An exception should be made allowing continued placement of incinerator ash in the existing single-lined cells of Waimanalo Gulch Sanitary Landfill.

Please protect the environment by passing this bill with these restrictions on placement of toxic incinerator ash!

Mahalo!

Hawai‘i Reef and Ocean Coalition (by Ted Bohlen)

Plastic pollution is a major threat to the oceans, the environment, and human health. Discarded plastics wind up in landfills, incinerators, and the environment, ultimately breaking apart into tiny toxic pieces called microplastics that contaminate water, food, the air, and even our bodies. Furthermore, according to a 2021 report from Beyond Plastics, the plastic industry is on track to overtake coal as a source of atmospheric greenhouse gas emissions.

Hotels and other lodging establishments frequently provide complimentary toiletries that are packaged in single-use plastic containers. This is not consistent with the Hawai‘i tourism authority's strategic plan, which cites the goals of promoting sustainable tourism, preserving natural resources, and advocating for responsible tourism in Hawai‘i that minimizes negative environmental impacts. Some hotels have already transitioned away from single-use plastics and instead provide bulk dispensers for personal-care products or complimentary toiletries in packaging made of sustainable materials.

This bill would prohibit lodging establishments in the State from providing small (six ounces or less) plastic containers of personal care products to any person staying in a sleeping room accommodation, in any space within the sleeping room accommodation, or in any bathroom used by the public or guests. California, New York, Washington, and Illinois have already passed laws to ban small single-use plastic toiletry bottles.

This bill presents an opportunity to reduce harmful plastic waste in Hawai‘i while also making the visitor industry more sustainable.

Please pass this bill!

Mahalo!

Climate Protectors Hawai‘i and Hawai‘i Reef and Ocean Coalition (by Ted Bohlen)

HB-1673-HD-1
Submitted on: 2/16/2026 3:01:38 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Nako?olani Warrington	Kupuna for the Moopuna	Oppose	Written Testimony Only

Comments:

STRONG OPPOSITION to HB 1673 HD1

We, Kūpuna for the Moʻopuna, a hui of Hawaiian Homes Commission Act kūpuna beneficiary farmers from Panaʻewa, Hawaiʻi, **testify in STRONG OPPOSITION to HB 1673 HD 1.**

HB 1673 HD1 is a dangerous bill. Havenʻt we learned? This bill will risk creating another "Red Hill water crisis" for future generations as the pressure is on to allow a new landfill to be located above a drinking water source. As we witnessed last year, the constant pressure was on to do just that, risking the health and safety of Hawaiiʻs water and Hawaiiʻs people. Do not open the door to a new disaster waiting to happen.

NO to HB 1673 HD1. Mahalo.

Environmental Caucus of The Democratic Party of Hawai‘i

Monday, February 16, 2026

To: House Committee on Energy and Environmental Protection
Rep. Nicole E. Lowen, Chair
Rep. Amy A. Perruso, Vice Chair

Re: HB 1673, H1 1 relating to Landfills
Hearing: Tuesday, February 17, 2026, 9:30 am, Conference Room 325 & videoconference
Position: Conditional **OPPOSITION**

Aloha, Chair Lowen, Vice Chair Perruso, and Members of the House Committee on Energy and Environmental Protection!

The 6,680 members of the Environmental Caucus of the Democratic Party of Hawai‘i recognize the need for **responsible** government action in creating and managing landfills and disposing of toxic ash. For this reason, we believe that **this bill must be amended to ensure that no toxic ash be allowed to be spread on roads,** which – alas – has been the plan of the City and County of Honolulu for the past couple of years. That toxic ash, from the H-Power plant, must be buried in the landfill, on top of double-lined insulation to prevent it from leaching into the aquifer.

If toxic ash is spread on roads, as the Honolulu government plans to do, the toxins in the ash will readily leach into the aquifer. Isn’t that obvious?

Accordingly, we believe that this bill should not be passed, unless it is amended to prevent toxic ash from being spread on roads. Thank you for the opportunity to testify on this extremely important issue.

Respectfully,

Alan B. Burdick, co-chair
Environmental Caucus of the Democratic Party of Hawai‘i

Burdick808@gmail.com 808-927-1500

Comments before
February 17, 2026
House Committee on
Energy & Environmental Protection

COMMENTS ON
House Bill 1673

Relating to Landfill Siting

Mike Ewall, Esq.
Founder & Director
Energy Justice Network
215-436-9511
mike@energyjustice.net
www.EnergyJustice.net

Aloha Honorable Committee members. Energy Justice Network is a national organization supporting grassroots groups working to transition their communities from polluting and harmful energy and waste management practices to clean energy and zero waste solutions. In Hawai'i, we've been working with residents, members and member groups since our support and involvement was first solicited in 2015.

We previously supported this bill to prevent building landfills over the aquifer by expanding it to cover more areas (the no pass zone vs. the underground injection control line). However, at the urging of the Department of Health, the bill was recently gutted by the Water and Land Committee, repealing the law adopted last year, leaving it only up to the City and County of Honolulu to stop itself from siting a landfill over the aquifer as they tried to do in late 2024.

We strongly urge that HD 1 be discarded and that §342H-52 (c) be restored and strengthened as the original HB 1673 intended.

While the current leadership of the Honolulu Board of Water Supply (BWS) can be trusted to reject a new landfill over the aquifer, there is no telling what future appointed leaders of BWS might do, and these added safeguards at the state level are important to maintain.

Furthermore, we urge that the language from SB 3259 be amended into the bill to close a critical loophole. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the recent Water and Land Committee hearing on HB 1673, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem."

Let us be clear. This bill is about what to do with H-POWER's incinerator ash. A majority of the waste landfilled on O'ahu is this ash. The City and County of Honolulu has been working for years toward "recycling" H-POWER toxic trash incinerator ash into roads and perhaps other building materials. This waste currently goes into the Waimanalo Gulch Landfill and would go into any new landfill built to replace Waimanalo Gulch Landfill.

In case you did not watch the 11-minute hearing in the Water and Land Committee (see video here), this is what Ernie Lau said in response to Rep. Iwamoto's questions about the ash:

> *Lau: I have concerns about recycling the ash. And the ash, I think, comes from incineration, the residuals left after they burn the trash. That ash can contain toxins like Mike pointed out. So, now using it, say, as a material to use in paving roads – you know that roads go all*

over the place, so where could it end? Could it end up in an area where, as the road starts to break down, will some of this material that's embedded in the roadway start to leach out with rainfall, and then start to seep down into the aquifer below? There's also runoff from the roads. Where will that runoff go? So, are we inadvertently creating a bigger problem for us in the future?

[Rep. Iwamoto asked if he'd support amending the bill with the language from SB 3259.]

Lau: I would say from the idea that you don't want to spread contaminants around the environment – we're already dealing with PFAS forever chemicals – I would say that that probably is a real justifiable amendment.

If we had a choice between ash all over the island in the form of unlined roads made from incinerator ash vs. that same ash in one place in a double-lined landfill over the aquifer, the latter is clearly the lesser evil. While none of us want a new landfill over any aquifer, the need to prioritize decentralizing and spreading the problem all over the place (including over the aquifer) is paramount.

If it is too dangerous to have the same toxic trash incinerator ash in a double-lined landfill over O'ahu's aquifer, it is surely too dangerous to put in roads all over the aquifer with no liners.

Please amend the language from SB 3259 into HB 1673.

This would prohibit the spreading of ash into unlined roads and other building materials. It would also make the landfill safer by ensuring that it is covered at the end of each day so it cannot blow into the community.

Last session, in a Water and Land Committee hearing on 3/20/2025, Rep. Iwamoto and Rep. Poepoe questioned the Department of Health (DOH) about the toxicity of the ash and DOH answered that they weren't convinced that it's safe. DOH said they want more data on toxic chemicals in the ash to make sure they don't exceed their environmental action levels. In the same hearing, Ernie Lau at the Bureau of Water Supply stated that Dr. Roger Brewer tested ash in the landfill for PFAS and found significant levels. See https://www.youtube.com/live/dMszfZORYgU?si=nGeym09DywaALaSz&t=7365 (2:02:45 to 2:07:11).

The landfill currently proposed for Wahiawa is primarily for the toxic ash from H-POWER's trash incinerator. The concern driving this and other bills is that a new double-lined landfill will eventually leak and poison the aquifer. The U.S. Environmental Protection Agency has stated multiple times over the years that all landfills eventually leak. Concern over the aquifer is well-warranted.

The county's plan to use ash to build roads all over the island is even more concerning. Doing so will turn roads into linear unlined landfills with no groundwater protection that can pollute the aquifer from many directions. It will also expose road workers, everyone who drives over the

roads, and all who lives near roads where the road surface will erode over time, releasing tiny particles with toxic metals, dioxins, and other harmful chemicals.

Due to these concerns, the Democratic Party of Hawai'i adopted resolution 2024-11 (attached) opposing the use of ash in roads unless it can be "remediated" so that toxic chemicals are removed to the point where they are not detectable. Such remediation technology does not exist, and were it possible, it would not be affordable, and is not what is being proposed by the city.

The City and County of Honolulu ("city") is pursuing permits from the Department of Health to build a facility near the H-POWER trash incinerator in Campbell Industrial Park in Kapolei. This facility would be owned by the city and operated by Reworld (formerly Covanta) – the same owner/operator relationship that they have for the H-POWER incinerator. These proponents of ash "recycling" into roads have been spreading misinformation that needs to be corrected.

This facility would pull metals out of the incinerator's ash for recycling, then use the remaining ash to build roads or for other construction purposes. This is unproven and unsafe, and would be a greater threat to human health, the aquifer and the environment in general than simply placing this ash in a double-lined landfill.

Department of Health would not be regulating ash reuse "case-by-case." DOH would be permitting the ash recycling facility, enabling the county to then mix the toxic ash into asphalt at which point it is deregulated and not subject to case-by-case determinations.

Ash cannot be cleaned. There is no technology that would be applied which can remove dioxins/furans, lead, mercury, cadmium, arsenic, PFAS, and other toxic constituents out of the incinerator ash before allowing workers to handle it for roadbuilding and other construction purposes.

It is not just bottom ash. Incinerators produce fly ash (small particles caught in pollution controls… about 10% of the ash, and very toxic) and bottom ash (about 90% of the ash and less toxic, but still full of many toxic chemicals). Reworld claimed in testimony that they only handle bottom ash, but several of their own documents from their Bucks County, Pennsylvania plant (the model for the one proposed by the City and County of Honolulu) contradict their statement and show that they are taking "combined" ash, which means fly ash mixed with bottom ash.

They are not "removing aggregate" from the bottom ash. Reworld also claims that they're removing "aggregate" from the ash as if that is separate from the ash. The City and County of Honolulu and Reworld claim that they'd be diverting 60% of the ash from the landfill. If this is the case, it is the ash itself that they want to put into roads, not just some rocks they pull out of the ash. It will be the same ash that research shows will leach arsenic and other toxic metals in real-world landfill conditions over time.

Incinerator ash is NOT "like sand." Sand does not require tests for whether it's hazardous waste, and disposal in lined landfills. Sand has a neutral pH while ash is far more basic, enabling toxic

metals to leach out over time. Roger Babcock has been making false claims to the legislature and neighborhood boards about how it's just like sand. This is not true.

Ash recycling into roads is failed technology. Schemes to "recycle" toxic incinerator ash into roads have failed across the country, in Tennessee, Maine, Oregon, York County, Pennsylvania – and most recently, Bucks County, Pennsylvania, which is the model that the City and County of Honolulu is holding up as the project they want to copy. That plant, owned and operated by Reworld (Covanta) removes metals from trash incinerator ash, and used to provide the remaining ash to a nearby asphalt company to use in roads. They stopped doing this in September 2022 and were going to restart in 2023, but never did. That project apparently failed, and ash is now going back to landfills, anyway.

Ash is not safe as daily landfill cover. Ash should never be used as alternative daily cover material for itself at a landfill. Daily cover is required to prevent harmful wastes from blowing into the community at night, and the idea of "alternative daily cover material" is a ploy by the landfill industry to save money by not putting soil on top of the landfill each day while making money taking waste instead. However, ash is fine material and there are examples from across the country where this has blown off of the landfill into communities. It's better to require tarps for daily cover than to allow ash to be "cover" for itself, risking exposure to wind-blown ash particles.

Reworld cannot be trusted. Reworld (formerly Covanta) – the operator of the H-POWER trash incinerator that makes this ash – was just fined $878,000 in New York for having failed to mix their fly and bottom ash properly, and having illegally dumped hazardous incinerator ash in a landfill not permitted to take hazardous waste. See: https://dec.ny.gov/news/press-releases/2025/2/dec-orders-reworld-hempstead-to-pay-878500-in-penalties-and-environmental-benefit-funds and https://law.justia.com/cases/new-york/other-courts/2024/2024-ny-slip-op-24080.html The company also has a decades-long track record of thousands of violations.

EPA's test saying ash is "non-hazardous" does not mean it's safe, non-toxic, or inert. EPA's test for whether ash is hazardous does not account for exposure to ash by inhalation, ingestion, or even by touching it, as they now admit on their website.

EPA's test only looks at what leaches out under short-term lab conditions under a certain pH, where toxic chemicals like lead and cadmium do not leach out. Scientific experts have documented that this does not represent real-life conditions and that actual leaching of toxic chemicals from incinerator ash happens in real-life, even if not in EPA's test to determine whether the ash is technically and legally "hazardous." It is clear that passing this test does NOT mean that incinerator ash is "non-toxic" or "inert." It is far from that.

In December 2024, the U.S. Environmental Protection Agency admitted on their website that incinerator ash, even if it tests legally "non-hazardous" based on tests that only look at what leaches out of ash, can still be harmful if people are exposed in other ways, including inhalation, ingestion, or touching it. Ash can blow off of trucks, blow off of the top of landfills when used as alternative daily cover at a landfill, and would be handled by road workers. Roads will also erode over time with tiny toxic particles exposing people.

EPA's statement says:

> **6. What risks are associated with management, disposal or reuse of MSW incinerator ash?**
>
> If MSW combustor ash exceeds the toxicity characteristic regulatory limit at Title 40 of the Code of Federal Regulations Section 261.24 using the Toxicity Characteristic Leaching Procedure (TCLP), it is identified as a hazardous waste due to the risks it poses to groundwater contamination under a worst-case mismanagement scenario. Non-hazardous MSW combustor ash may still present potential risks via other pathways, such as through inhalation, ingestion, or dermal (skin) contact. These risks should also be considered during transport, disposal and/or beneficial reuse of the ash as a non-hazardous secondary material.

Communities are being told that municipal solid waste incinerator ash is "non-toxic" and "inert" as a means to dismiss concerns about toxicity of ash. This is a misinterpretation of the results of the Toxicity Characteristic Leaching Procedure (TCLP) test that is used to determine whether ash is legally hazardous. EPA's statement now makes that clear. Incinerator ash was never "non-toxic" or biologically inert.

In a 2/23/2022 meeting we had with key staff at the U.S. Environmental Protection Agency's Office of Land and Emergency Management (the office that handles solid waste), EPA staff confirmed that the TCLP test is based solely on what leaches out of ash, not on exposure pathways involving inhalation or ingestion. This is a concern because there are exposure pathways not being considered. Incinerator workers are the first to be exposed. I've toured incinerators where you can write your name in the layer of ash dust that has settled and built up on the floor, yet workers are not wearing respiratory protection. There are anecdotes from communities where ash has blown off of trucks. When ash is dumped from trucks on the surface of landfills, there can be clouds of ash dust blowing away during that activity, which has been video documented by workers in one case I've seen. Incinerator ash is typically used as alternative daily cover material at landfills, which risks ash blowing into communities.[1] There are several examples of this that we're aware of. One – at the City of Baltimore's Quarantine Road Landfill – was noticed by the Maryland Department of the Environment and the city was ordered in 2010 to stop the practice since ash was blowing off-site (we believe that they have continued the practice). See the bottom of page 2 in this memo. Off-site wind-blown ash has also been documented at an ash monofill in New England. Some landfills, like Old Dominion Landfill in Monrose (Henrico County), VA, use ash to build internal roads in landfills where trucks drive over the ash and can kick it up and track it off-site. The potentials for inhalation and ingestion are significant.

[1] Historically, landfills are required to use soil as daily cover at the end of each day to prevent waste blowing into communities at night. However, the industry has learned that they can save money by not paying to fill their air space with clean soil, and *make* money taking waste in place of soil. The practice of using waste as "alternative daily cover material" (ADCM) has become commonplace, even though it can involve exposing the community to wind-blown incinerator ash or other wastes permitted to be used as ADCM. There are numerous cases of incinerator ash blowing off of landfills when ash is used as cover material for itself.

Incinerator ash used to be considered to be categorically non-hazardous by EPA until a May 1994 Supreme Court decision that required that, if ash tests hazardous, it must be regulated as hazardous waste. Testing with the EP Tox test used to find fly ash hazardous 91% percent of the time based on lead and 97% of the time based on cadmium; bottom ash 36% of the time based on lead and 2% of the time based on cadmium; and combined ash 40% of the time based on lead and 14% of the time based on cadmium. Find more on the legal history here, as well as additional history of the Supreme Court ruling, testing changes, the above results, and how EPA's TCLP test was chemically designed to prevent a hazardous waste designation here.

In the wake of the Supreme Court ruling, EPA changed the test method to TCLP, where the testing now takes place at a higher pH where ash doesn't test hazardous. The mixing of fly and bottom ash prior to testing also enables the industry to dilute the toxicity of the fly ash while the lime in fly ash where lime scrubbers are used helps protect the bottom ash by increasing the pH. Lead and cadmium have U-shaped solubility curves where they'll leach at a high or low pH, but not in the range where the test is done. In long-term landfill conditions, changing pH can cause ash to leach lead, cadmium, arsenic, and probably other toxic chemicals. A 2004 study found that TCLP fails to simulate landfill conditions and underestimates arsenic leaching from ash, stating "[u]p to tenfold greater arsenic concentration is extracted by an actual landfill leachate than by the TCLP."

Municipal waste combustor ash passing a TCLP test does not mean that ash is non-toxic or biologically inert. The test is based solely on the content of liquids that leach out of ash at a certain pH during an 18-hour laboratory test. A TCLP determination of whether ash must be handled as hazardous waste does not account for exposures via inhalation, ingestion, or dermal (skin) contact. These exposures are possible if ash blows off of trucks during transportation, blows into the air when dumped at a landfill, blows off of the surface of a landfill (which is more possible where ash is used as daily cover material), is kicked up by trucks where ash is used to make internal roads in a landfill, or where workers handle ash to recycle it into roads or other reuse applications where it can erode or leach over time outside of a lined landfill.

Attachments

- Democratic Party of Hawai'i Resolution Adopted May 18, 2024
- Background Information in Support of House Bill 1673
- "H-POWER Pushes State to Allow Use of Ash with High Lead Content" – Environment Hawaii article
- HPOWER TAPS Appendix – this was obtained under a UIPA request to DOH and shows all test data to be redacted. Why is this crucial data a secret?
- A 2025 email exchange between DOH and consultants – this was also obtained under a UIPA request to DOH and shows the identity of a participant in Virginia to be redacted. Why is this person's involvement a secret?
- Zero Waste Europe, "Toxic Fallout – Waste Incinerator Bottom Ash in a Circular Economy - Research Report," Jan. 2022.

Democratic Party of Hawai‘i Resolution Adopted May 18, 2024

2024-11: Supporting Safe Management of Incinerator Ash

Whereas, Waste incineration facilities reduce every 100 tons of trash to about 30 tons of ash; and

Whereas, H-POWER—Hawai‘i’s only trash incinerator—operates in O‘ahu’s Campbell Industrial Park and burns up to 2,600 tons of waste per day, making it one of the nation’s largest waste incinerators, with its ash currently dumped in the Waimanalo Gulch Landfill in Honokai Hale; and

Whereas, While fly ash from trash incinerators is regulated as hazardous waste in several other nations, the U.S. Environmental Protection Agency (EPA) used to categorically define incinerator ash as non-hazardous, even though tests showed that fly ash qualified as hazardous over 90% of the time and even though bottom ash would test hazardous 36% of the time due to leaching of toxic lead or cadmium; and

Whereas, Since a 1994 U.S. Supreme Court ruling that incinerator ash must be handled as hazardous waste if it tests hazardous, the EPA changed the test, allowed mixing of fly and bottom ashes, and changed the test methods to enable incinerator ash to pass the test; and

Whereas, EPA staff admit that the ash testing regulations (which require testing only for what leachesout of incinerator ash at a certain pH in short-term lab tests) are based solely on whether people will be exposed by consuming water that has passed through ash and leached into groundwater and, ultimately, to drinking water supplies—and that ash testing regulations are not based on exposures from touching incinerator ash, or inhaling or ingesting ash particles; and

Whereas, Testing “non-hazardous” does not mean that ash is safe, “non-toxic” or biologically “inert”; and

Whereas, Incinerator ash is typically handled by workers with no respiratory protection, trucked to a landfill in trucks where some ash can blow or spill during transit, dumped from trucks where ash dust usually rises in a cloud that wind can carry, and is finally used as daily cover material for itself, instead of a tarp or clean soil to prevent wind from blowing ash into the community; and

Whereas, The City & County of Honolulu (the city) is currently working with Covanta to develop an ash “recycling” facility at Campbell Industrial Park, where incinerator ash would be exempted from being handled as waste, and would be used to build roads or for other purposes that can put workers, the public, and the environment in more contact with incinerator ash than would occur if it were properly contained and responsibly landfilled; and

Whereas, Roads and other construction materials do not last forever, and will erode and eventually be broken up, releasing more ash particles with no cautionary warnings about toxicity or special handling appropriate for material containing fine particles of highly toxic dioxins and furans, and toxic metals like arsenic, cadmium, chromium, lead and mercury; therefore be it

Resolved, That the Democratic Party of Hawai‘i urges the Hawai‘i State Department of Health and the city to: 1) Appropriately handle the incinerator ash (a type of “solid waste” as per HRS Section 342H-30) only through proper containment in a landfill, unless the ash is remediated to such a level that it does not pose a risk to public health and safety by first treating the ash to remove dioxins/furans, PFAS, mercury and other toxic contaminants to the point where the remaining ash has no detectable levels of the toxic chemicals, for which there is no known safe dose; 2) Ensure that trucking and landfilling uses secure tarps to preven ash from being blown by wind into the community; and 3) Cease all activities in pursuit of any effort to “recycle” or “reuse” H-POWER incinerator ash unless it is properly remediated as described above; and be it

Ordered, That copies of this resolution shall be transmitted to the offices of the Governor and Lieutenant Governor of the State of Hawai‘i, the Director of the Hawai‘i State Department of Health, all members of the Hawai‘i State Legislature and Honolulu City Council who are Democrats, the Mayor of the City & County of Honolulu, and the Director of the Honolulu Department of Environmental Services.

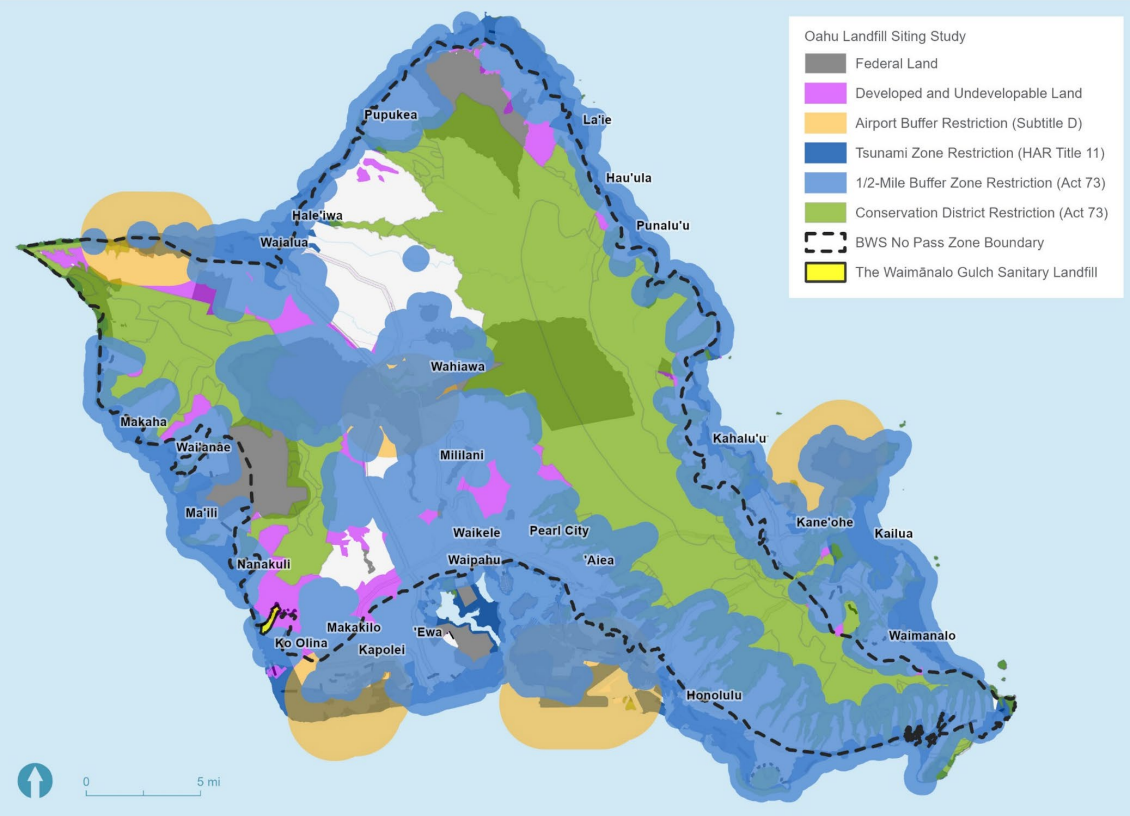
BACKGROUND INFORMATION IN SUPPORT OF HOUSE BILL 1673

This, and other bills aiming to reopen Act 73 of 2020, aim to impact the effort to site a new landfill on O'ahu. Waimanalo Gulch Landfill is supposed to close by 3/2/2028, although EPA data shows that it has many more years of capacity remaining… enough for it to last until somewhere between 2032 and 2060 depending on waste generation and composition.

The siting effort for a new landfill was supposed to be completed by the end of 2022, but was delayed for two years after not being able to find suitable land other than over the aquifer. After a failed effort to secure federal land, the City and County of Honolulu returned to one of their original proposed locations – over the aquifer – and now claims that modern double-lined landfills never leak, which is not supported by the track record of landfills across the country.

The Honolulu Board of Water Supply has testified in opposition to siting a new landfill over the aquifer out of concern for the fact that all landfills eventually leak, as has been affirmed multiple times over the years by the U.S. Environmental Protection Agency. They recommend that any new landfill be on the outside of the "no pass zone" boundary, over the caprock, which protects the aquifer from contamination.

As is evident on the map below, there is no area outside of this "no pass zone" where there is land to build a landfill because the half-mile buffer zone in Act 73 already eliminates that entire area. To enable Waimanalo Gulch Landfill to be replaced with a landfill that is not sited over the aquifer, the half-mile buffer zone would have to be reduced.



Furthermore, there are some important considerations for a landfill no matter where is it sited, in order to have the safest possible landfill:

1. **Reduce toxicity by ending incineration**

There are two things that make landfills particularly harmful: toxicity (from leachate and landfill gas releases) and climate impacts from gas generation. The toxicity is made far worse when burning waste and landfilling ash. The proposed landfill on O'ahu is primarily for the toxic ash from the H-POWER trash incinerator.[2] The landfill will be far less dangerous if trash is placed there without burning it first, which makes it more possible for toxic chemicals in waste to get out and to blow off of trucks and off of the top of the landfill (especially when ash is used as daily cover material). The City and County of Honolulu is pursuing an even more dangerous plan – to take this toxic ash and build roads with it, which would essentially be linear unlined landfills all over the island, exposing people (and the aquifer) much more than placing the ash in one place in a double-lined landfill. The H-POWER trash incinerator will not last forever, and the older two burners (that are missing two of the four air pollution control systems that most incinerators have) are now 35 years old and should be retired in the next five years. No community has chosen to bear the incredible cost of building a new incinerator in over a decade, and many communities have abandoned such pursuits after finding it politically and financially impossible. The City and County of Honolulu must plan for a future without trash incineration, and invest in Zero Waste solutions that rely on landfilling residuals in the most responsible way, which means not burning waste first.

2. **Reduce gasses, odors and leakage by source separating clean organic materials (food scraps and yard waste) to compost it and build soils**

The other main impact of landfills is from organic materials breaking down and forming leachate and landfill gas (and odors that go with it). Much of this can be avoided with a robust composting system that accepts food scraps as well as yard waste for curbside collection with economic incentives and proper education and enforcement.

3. **Stabilize the organic fraction of trash with digestion before landfilling, so you'll have a small, safer landfill**

For the dirty organic materials like sewage sludge and the organic fraction of municipal solid waste (including the food scraps that should have been source separated for composting), these materials should be digested to stabilize them before landfilling so that the methane generating

[2] As multiple life cycle assessments have demonstrated, burning trash and landfilling ash is 2-3 times more harmful than directly landfilling trash without burning first. See https://www.energyjustice.net/files/incineration/LCA.pdf for summary slides from two studies of this sort on incinerators run by the same company operating H-POWER. A study conducted for Hawai'i County in 2023 demonstrated the same when looking at the health and environmental costs of landfilling paper and plastics on Hawai'i Island vs. burning them at H-POWER on O'ahu vs. shipping them to Asia or North America for recycling. It turned out that incineration was the worst impact by far, while landfilling was less harmful, and recycling was a major benefit. See: https://drive.google.com/file/d/1tdhufZvfyXM64OnU7Z9Bdfts-_xoptaq/view

potential is removed, and the gases are produced in an enclosed system where they're easier to capture than in an open air landfill system. This is discussed in the report by EcoCycle on what to do with the "leftovers" on the path to Zero Waste: https://ecocycle.org/resources/report-zero-waste-system-leftovers/

4. **Do not use landfill gas for energy (minimize gas formation, maximize collection)**

Contrary to popular understanding, it's actually not beneficial to use landfills as energy facilities by burning captured gas for energy. This is because such projects generally involve deliberately generating more gas and manipulating the landfill in ways that are designed to increase the proportion of methane in the gas, though these manipulations tend to cause more gas to escape, which makes climate and community health impacts worse. There are strategies to best manage landfills by minimizing gas formation and maximizing collection which are discussed in the back end of the Zero Waste Hierarchy described on these pages: https://www.energyjustice.net/zerowaste/hierarchy and https://www.zwia.org/zwh.

https://environment-hawaii.org/?p=3296

Environment Hawai'i
a monthly newsletter

29 Oct 2014

H-POWER Pushes State To Allow Use Of Ash With High Lead Content

posted in: April 1999

What is H-POWER to do with its ash?

Every day that it operates, H-POWER, Honolulu's trash-to-energy plant, generates about 400 tons of ash in the process of burning about 2,000 tons of municipal solid waste. Almost all of the ash is hauled to the Waimanalo Gulch landfill, whose operator, Waste Management, Inc., is paid by the City and County of Honolulu about $16 a ton to place the ash in lined landfill cells, called monofills. That's $6,400 a day, or about $2.4 million a year.

For more than two years, H-POWER's operators have been looking for less expensive ways of dealing with the ash. In this connection, they have been pressuring officials at the state Department of Health to let them use the ash in a variety of applications: mixing it with asphalt for a paving material, making it into a construction material (something like cinder blocks), and using it as daily landfill cover (material that is spread over the refuse that arrives each day). In addition, they have asked the DOH to modify the landfill's permit to allow the mining of ash for use as a landfill cover.

So far, the Department of Health has given its approval only for the first of these uses — and even then, for a pilot project on the grounds of H-POWER's plant at Campbell Industrial Park. Nor does this use hold the promise of making great inroads into the ash supply: according to Colin Jones, H-POWER administrator for the City and County of Honolulu, the ash content in the asphalt mix is about 3 percent. "It appears that until we can develop a means of drying the ash better, this is about the best we can do," Jones wrote in a memo last October to the Department of Health's office of Solid Waste Management.

The request to use ash as landfill cover is poised to receive DOH approval — at least for a six-month or one-year demonstration project. But again, even if the DOH allows this use to continue indefinitely, that, too, would consume just a fraction of the volume H-POWER produces. The volume of daily cover that a landfill requires is typically 25 to 30 percent of the total volume of waste it takes in each day. At Waimanalo Gulch,

the daily total (excluding H-POWER ash) is 900 to 1,000 tons, which would mean at most 250 tons of the 400 tons of ash H-POWER produces each day could be used in this application.

As for use of ash in construction material, a team of researchers at the University of Hawai`i is studying the chemical and physical properties of a masonry-type product made using ash. Among other things, the researchers are studying its strength, endurance, and the degree to which heavy metals may leach from the product.

With respect to the mining of ash, the Department of Health has indicated it has no interest in allowing this. And, according to Joe Fernandez, environmental manager for Waste Management at Waimanalo Gulch, given the volume of ash produced daily by H-POWER, mining the monofills where ash has been deposited since 1990 makes no sense. "We've got more than enough [ash] coming in each day to use as cover, plus we make our own cover on site," he said, referring to Waste Management's practice of crushing rock to meet present needs for daily cover.

Ash Faulted

According to H-POWER operators, the ash is a valuable resource that is being wasted so long as it is landfilled.

DOH officials counter that even though the ash may not meet the definition of hazardous waste (indeed, as a related article in this issue explains, it cannot, since hazardous waste regulations exempt waste-to-energy plants), the ash nonetheless contains concentrations of heavy metals and other materials (including dioxins) high enough to make the uncontrolled dispersal of large quantities of it into the environment a potential public health hazard. If ash is combined with asphalt and used on roads, made into construction materials, or shaped into artifical reefs and dumped at sea (as has been done elsewhere), the result over time would be to increase the background levels of lead and other hazardous substances to which the public is exposed on a daily, routine basis, the DOH argues.

In their efforts to avoid landfilling the ash, H-POWER's contract operator, Ogden Environmental and Energy Services, prepared a risk assessment of the "beneficial use" of ash as landfill cover. The document concluded that this use would add a cancer risk of 3 in 100,000 to landfill workers and 5 in 100,000 to workers involved in ash mining — a level which the authors said compared favorably to target risk guidelines established by the Environmental Protection Agency for clean-up of Superfund sites. Superfund guidelines allow health risk levels after site clean-up to be as high as 1 in 10,000.

Leslie K.L. Au, a toxicologist with the DOH Hazard Evaluation and Emergency Response office, reviewed the risk assessment and took strong exception to the authors' use of Superfund guidelines as a standard against which to judge the health risks associated with use of ash as landfill cover. As Au writes, "We disagree with this comparison. At the landfill, we are obviously not trying to clean up a number of hazardous-waste sites which have already been unaffordably contaminated. Rather, using ash as a daily cover is the deliberate adding of hazardous contaminants to a relatively uncontaminated site which is open to the public, while trying to prevent the creation of a site which is unhealthily contaminated. Another obvious thing to say is that the easiest way to avoid creating a hazardous-waste site is not to use ash as a daily cover."

Despite his objections to the comparison, Au goes on to write, in a memo dated May 15, 1997, that, "in recognition of the conservative, health-protective overestimations of risk which the authors of this Risk Assessment used, the risk to landfill workers and visitors may be within acceptable levels."

"The exposure assessment is the key element in the Risk Assessment," Au writes. "The ash unquestionably contains substances which are hazardous to human health, so that the amount of human exposure and human intake must be tightly controlled below a certain threshold level. Failing to handle H-POWER ash at the landfill according to [the proposed method in the assessment] would increase the exposure of the workers and general public, which would then increase their added cancer risk to unacceptably high or significant levels, which would in turn reverse our verdict of 'No objection.'"

The Dutch Experience

In some countries, ash from municipal waste incinerators is permitted to be used as building material, roadbed aggregate, and fill. In nearly every case, however, the uses are restricted to bottom ash. Fly ash normally contains higher levels of lead and other materials that can pose health risks and most of the European countries that allow use of incinerator ash prohibit use of combined bottom and fly ash. (H-POWER officials want to use combined ash.)

One country with extensive experience in the use of bottom ash is the Netherlands. In the last 10 years, nearly all the bottom ash produced by municipal solid waste incinerators has been used as fill in construction projects (especially embankments, where up to 1 million tons of ash can be used in a single project) and in road work.

Dutch law requires strict regulation of the bottom ash, with limits set on the percentage of metals the ash can contain. Before any of the ash can be used, it must undergo testing and be certified. In addition, the Dutch have developed guidelines for the use of ash. Among other things, the site where the ash is proposed to be used must be at least half a meter in elevation above the average maximum groundwater level, with use banned in specially protected groundwater reserves. Also, users are required to take steps to prevent rainwater infiltrating into the ash. This can be done by applying an asphalt top and side cover to ash used in a road base or by applying an impermeable clay layer over ash used as fill.

Cutbacks in Testing

For the Dutch, rigorous testing of incinerator ash is a keystone of the reuse program. To ensure that ash meets the certification standards, both with regard to its environmental properties as well as construction specifications, samples of bottom ash are taken for every 5,000 to 10,000 tons of ash intended for use. In addition, random inspections by certifying institutes make sure that the specifications are met at all times.

Yet in Honolulu, H-POWER officials have been seeking approval from the Department of Health to reduce the frequency of ash testing required by its permit. Most recently, in a letter dated February 8, 1999, Colin Jones, the city's energy recovery administrator, asks the DOH to change the required frequency of ash testing from quarterly to annually.

Included with Jones' request are summaries of analytical reports made on combined fly and bottom ash since 1989. One data set shows the parts-per-million content of various metals, including lead, mercury, arsenic, and cadmium. The other shows the results of tests on leachate extracted from the ash using the toxicity characteristic leachate procedure test (TCLP).

"The data," Jones writes, "shows a bounded family of values which over time have trended in the downward direction for all of the metals of interest except for barium. In the case of barium, the data appears to be stabilizing toward a value of 0.8 mg/l [milligrams per liter], which is below the drinking water standard for this material."

"We believe," he continues, "this TCLP data clearly characterize the H-POWER ash as a non-hazardous material and indicate that the benign qualities of this ash are improving with time… [W]e believe this evidence should be sufficient to justify reducing the frequency of TCLP testing of our ash from quarterly to annually."

According to Gary Siu of the DOH's Office of Solid Waste Management, no decision has yet been made on Jones' request.

HAZARD.APR

State Exempts H-POWER Ash, Residue From Regulation as Hazardous Waste

Could the lead, cadmium, arsenic, and other heavy metals in H-POWER ash ever reach such high levels that the ash is regulated as hazardous waste?

Absolutely, positively not.

That's not to say the levels could not be high enough to justify concern over use of the ash in such applications as roadbeds, masonry, and landfill cover.

Nor is it to say that the metal content in the ash is always going to fall below the threshold of regulatory concern set in federal and state laws.

It is to say, however, that by definition, state regulations exempt H-POWER ash from being considered as hazardous waste, no matter how high the concentrations of such metals in either the ash itself or in the leachate produced when the ash is bathed with a mildly acidic wash, such as occurs in the standard Toxicity Characteristic Leaching Procedure (TCLP) test. (The acidity level of the TCLP wash is intended to be about the same as is found in landfills generally.)

According to Grace Simmons, head of the state Department of Health Hazardous Waste Section, the state regulations exempting H-POWER ash from consideration as hazardous waste have been in place since 1994. Simmons says the state regulations mirror federal Environmental Protection Agency language concerning ash from operations such as H-POWER, referred to in regulatory language as "resource recovery" facilities.

The EPA regulations were triggered following a U.S. Supreme Court decision in the spring of 1994. The case at issue involved ash from a Chicago trash-to-energy plant that flunked the TCLP test for lead, with one sample exceeding the EPA's recommended action level for lead in drinking water (0.015 milligrams of lead per liter of water) by 100-fold.

For non-exempt materials, if a TCLP test shows lead concentrations in the leachate of at least 5 parts per million (more than 333 times the EPA action level for drinking water), the material is to be regulated as hazardous waste.

Low Standards?

The hazardous-waste standard of 5 ppm lead in leachate, even though it does not apply to H-POWER, has itself been criticized as overly lenient to polluters. As Peter Montague writes in Rachel's Envirnment & Health Weekly of August 18, 1994, the TCLP test "does not identify the actual pollutants contained in the

ash; it only identifies those pollutants that leach out under certain specific conditions. Since, sooner or later, all of the ash will be released into the environment (even ash that is monofilled), it is the total pollutant content that will affect communities, not merely what leaches out under TCLP conditions. Therefore, the TCLP test gives a misleading estimate of the ash hazard." (Monofilling refers to the practice of placing ash in lined landfill cells intended to receive only ash. H-POWER's ash is monofilled at the Waimanalo Gulch landfill.)

H-POWER is not required to measure the total lead content in its ash as a condition of its permit to operate. However, such tests have been done, most recently in connection with the desire of the City and County of Honolulu and H-POWER's operator to see the ash re-used as landfill cover, building material, or in road construction. Under a contract issued by the federal Department of Energy's National Renewable Energy Laboratory, H-POWER ash was analyzed for a number of different elements and compounds. One sample of combined bottom ash and fly ash found lead concentrations as high as 15,809 parts per million — in other words, the ash was 1.5 percent lead. For purposes of comparison, ash samples from a sister trash-to-energy plant in Connecticut, which were used as a control in the NREL study, had on average just 37 ppm lead. (The clean-up targets for lead in soils at Superfund sites are, by contrast, 400 ppm for residential areas and 1,000 ppm for industrial or commercial areas.)

Process Residue

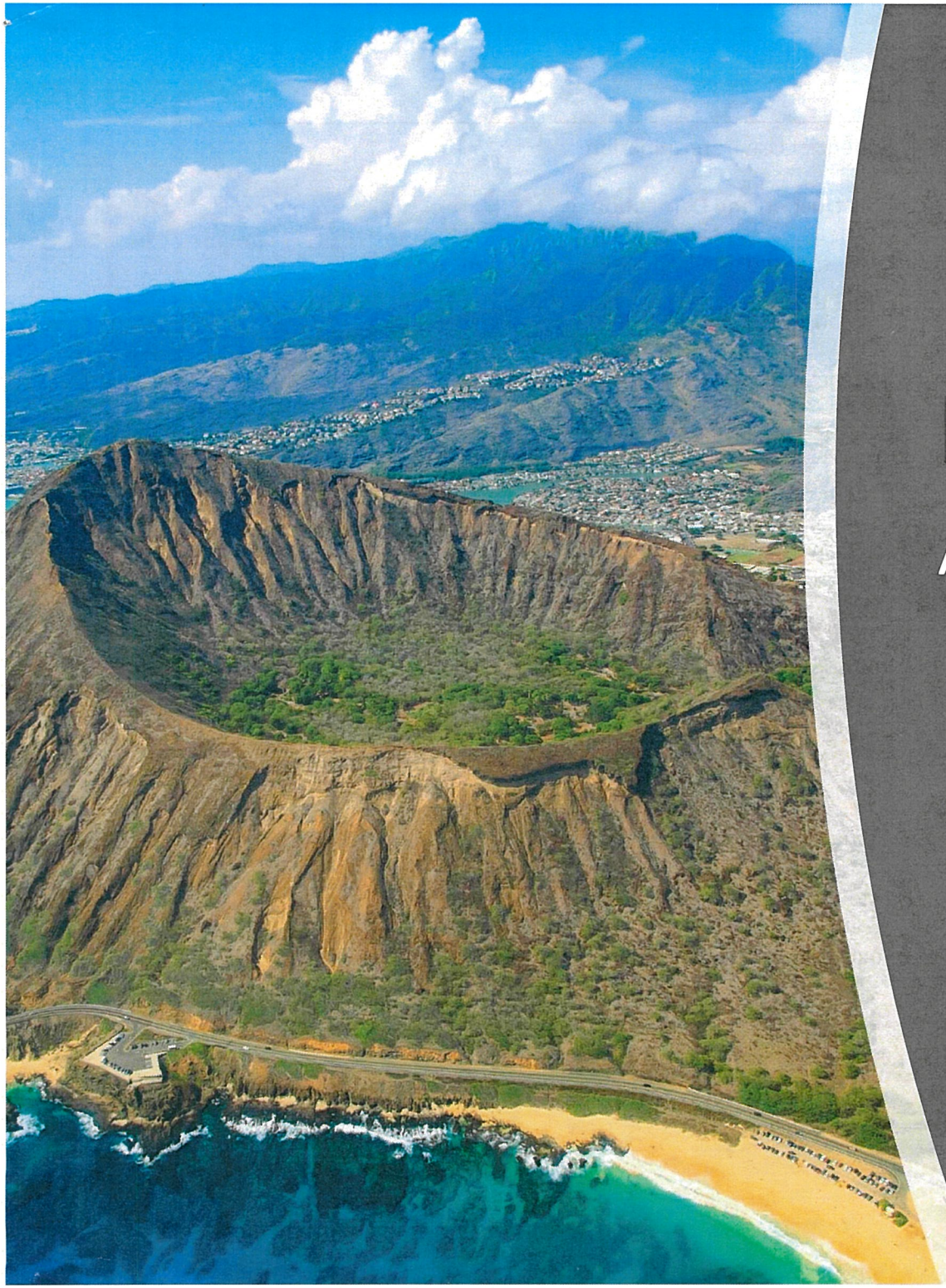
In addition to ash, H-POWER produces what it calls process residue. This residue consists of glass, dirt, metal pieces, and other heavy materials, saturated with solvents and other wet wastes, that fall through a 2-inch screen intended to remove non-combustible items from the waste stream. A spokeswoman for Ogden Environmental and Energy, which operates the plant, told Environment Hawai`i that typically, 12 to 13 percent of the solid waste received by H-POWER falls out as process residue. Thus, on a day when 2,000 tons of waste are delivered to H-POWER's front door, about 250 tons of process residue (in addition to 400 tons of ash) are taken out the back.

Much of this waste ends up being used to augment the daily cover at the Waimanalo Gulch landfill. Joe Hernandez, environmental manager for WMI, described how the residue is used: "Sometimes there are gaps and holes on the active face of the fill. When we have a homogeneous waste like this, it is used to fill the gaps in the daily face. Then after the face is smoothed out, we apply six inches of daily cover." (Hernandez mentioned that "auto fluff" — the cushions, upholstery, and plastics removed from cars by metal recyclers — is also sometimes used to augment the daily cover.)

Under terms of H-POWER's solid waste permit, the process residue must be tested periodically. Chemical analyses done in 1998 showed lead levels averaging 224.6 parts per million, with one sample showing concentrations as high as 650 ppm.

But once more, no matter how high the concentration of lead or other contaminant may be in process residue, it is exempted by state rules from regulation as hazardous waste.

— Patricia Tummons



HPOWER TAPS Appendix

Acronyms and Abbreviations

BUD	Beneficial Use Determination
C&D	Construction and Demolition
DEP	Department of Environmental Protection
EAL	Environmental Action Level
EMRF	Enhanced Materials Recycling Facility
Fe	Ferrous
GHG	Greenhouse Gas
HDOH	Hawaii Department of Health
MBN	Mass Burn
MRF	Materials Recycling Facility
NFe	Non-Ferrous
RDF	Refuse Derived Fuel
SPLP	Synthetic Precipitation Leaching Procedure
TAPS	Total Ash Processing System
TCLP	Toxicity Characteristic Leaching Procedure
TGM	Technical Guidance Manual
WGSL	Waimanalo Gulch Sanitary Landfill
WTE	Waste to Energy

Data provided by Covanta

Aggregate Testing to DOH Tier 1 EALs

Data provided by Covanta

TCLP Testing of Aggregate

TCLP testing consistently shows aggregate to be non-hazardous

Constituent	TCLP Limits (mg/L)	Sample A	Sample B	Sample C	Sample D
Arsenic	5.0	ND	ND	ND	ND
Barium	100.0	0.276	0.303	0.328	0.292
Cadmium	1.0	ND	ND	ND	ND
Chromium	5.0	ND	ND	ND	ND
Lead	5.0	ND	ND	ND	ND
Mercury	0.2	ND	ND	ND	ND
Selenium	1.0	ND	ND	ND	ND
Silver	5.0	ND	ND	ND	ND

SPLP Leaching Test of Aggregate

[redacted]

[redacted]

[redacted]

[redacted]g/L

[redacted]

Data provided by Covanta

Comparison of Bottom Ash: H-Power to NJ

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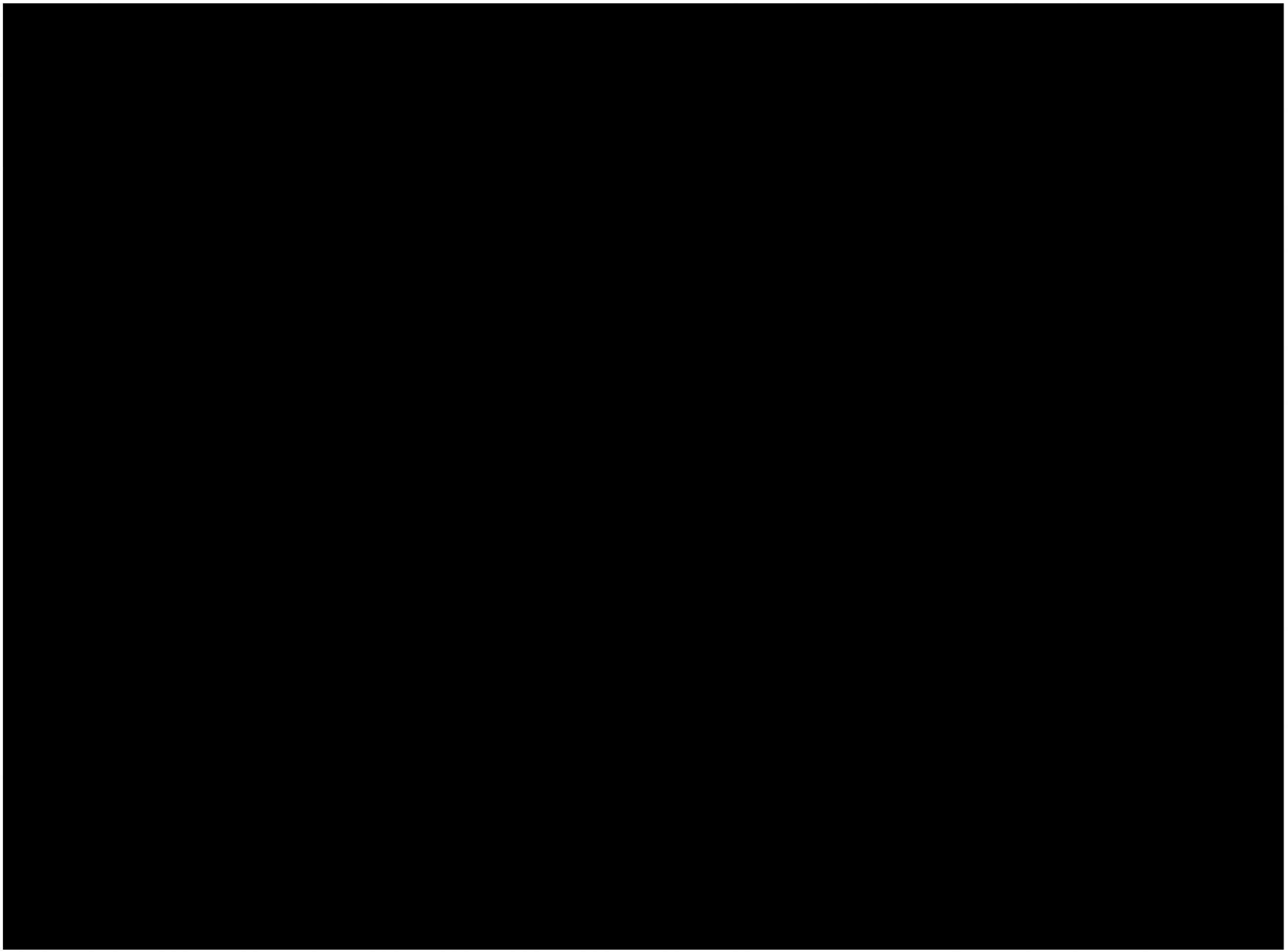

Asphalt Testing Made with Aggregate

Data provided by Covanta

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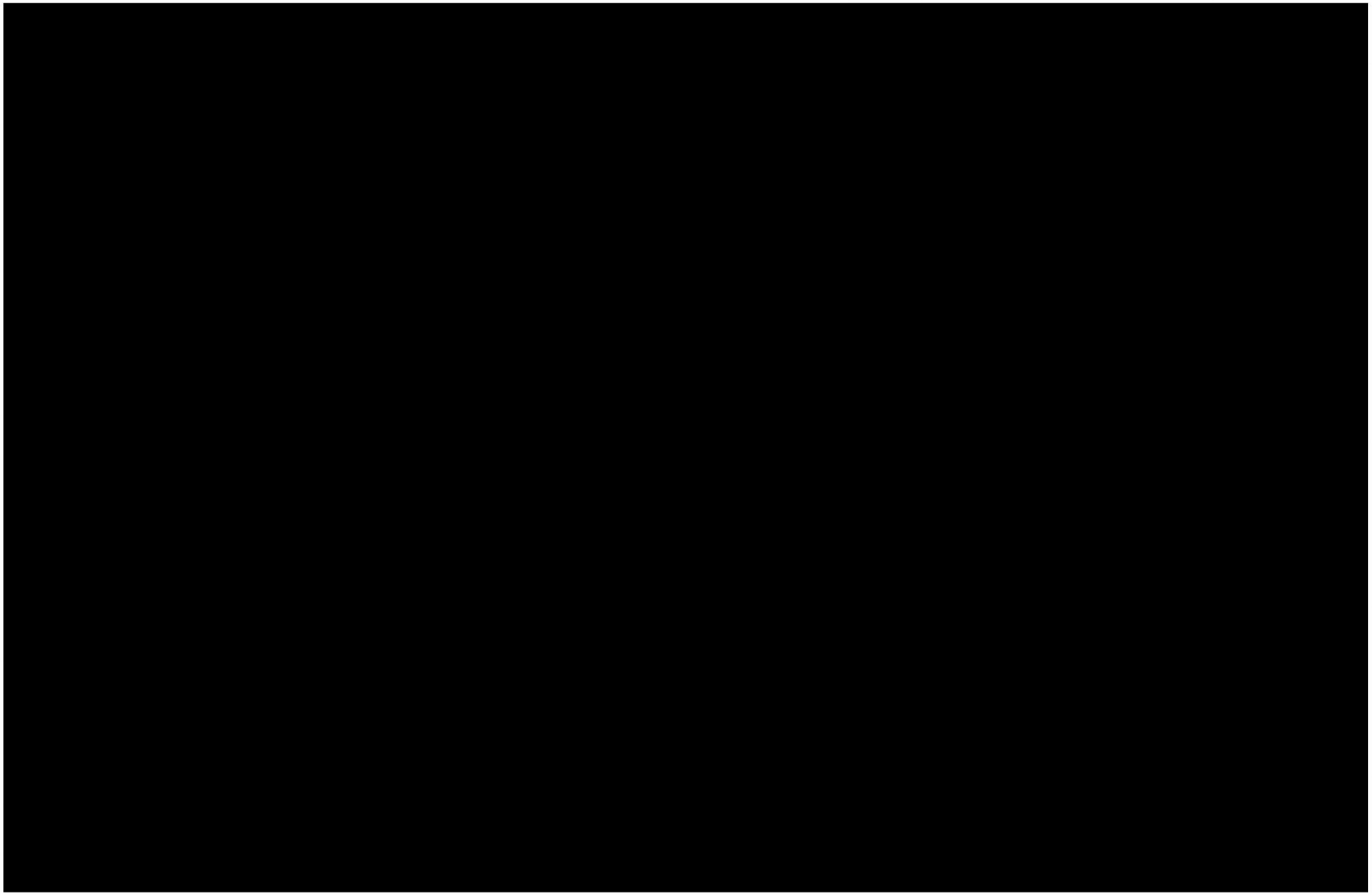
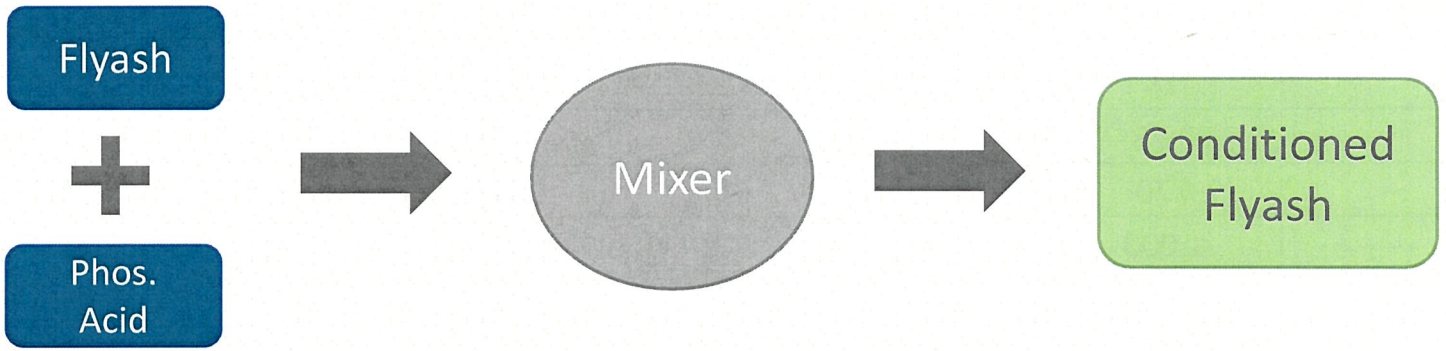


City of Honolulu Ash Processing & Recycling Facility
Flyash Conditioning using Phosphoric Acid

Proven Technology - Flyash Conditioning Using Phosphoric Acid

- Wheelabrator patented technology (1980's)
  - Previously and successfully used at several of their WTEs to condition flyash
  - Reduces flyash's leachability of metals in TCLP and SPLP tests (forms insoluble compounds)
  - Later found to not be necessary since combining bottom ash & flyash achieved the same results
- Covanta Burnaby WTE in BC, Canada Conditions Flyash Using Phosphoric Acid
  - System has been operational since 2011
  - Unlike the United States, Canada regulations don't allow flyash & bottom ash to be mixed
  - Technology ensures flyash meets TCLP limits for disposal at non-hazardous landfill

H-Power Flyash Conditioning Systems to be Upgraded with use Phosphoric Acid



Outlook

[EXTERNAL] RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

From Robert Luco <rluco@inclusionhawaii.com>
Date Tue 4/15/2025 11:25 AM
To Mau, Lenora <lenora.mau@doh.hawaii.gov>; Cruz, Lauren <lauren.cruz@doh.hawaii.gov>

Ha! Thanks for clearing that up and for reserving the room.

Rob.

Robert A. Luco
Inclusion Consulting LLC
150 Hamakua Drive #758, Kailua, Hawaii 96734
(808) 330-5617

From: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Sent: Tuesday, April 15, 2025 10:59 AM
To: Robert Luco <rluco@inclusionhawaii.com>; Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Meant Apr 30 vice May 30

Lenora Mau
Engineer | Solid and Hazardous Waste Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino
2827 Waimano Home Road, #100 | Pearl City, HI 96782
Office: (808) 586-4226

From: Mau, Lenora
Sent: Tuesday, April 15, 2025 10:58 AM
To: Robert Luco <rluco@inclusionhawaii.com>; Cruz, Lauren <Lauren.Cruz@doh.hawaii.gov>
Subject: RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Hi Rob and Lauren

I have reserved the SHWB conf room from 10-11 am on May 30 for our in-person mtg.

Lenora Mau
Engineer | Solid and Hazardous Waste Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino

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Office: (808) 586-4226

From: Robert Luco <rluco@inclusionhawaii.com>
Sent: Tuesday, April 15, 2025 10:19 AM
To: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>; Joseph Shacat (joseph.shacat@gmail.com) <joseph.shacat@gmail.com>
Subject: [EXTERNAL] RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Lenora,
10 to 11 a.m. on Wednesday, April 30th will be fine. We won't need more than an hour.

Thanks, Rob.

Robert A. Luco
Inclusion Consulting LLC
150 Hamakua Drive #758, Kailua, Hawaii 96734
(808) 330-5617

From: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Sent: Tuesday, April 15, 2025 8:42 AM
To: Robert Luco <rluco@inclusionhawaii.com>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Rob

Lauren and I are ok for an in-person mtg at our office. How long do you need?
10 am - ?

Lenora Mau
Engineer | Solid and Hazardous Waste Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino
2827 Waimano Home Road, #100 | Pearl City, HI 96782
Office: (808) 586-4226

From: Robert Luco <rluco@inclusionhawaii.com>
Sent: Monday, April 14, 2025 4:06 PM

To: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: [EXTERNAL] RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Lenora, that works for me.

Would you prefer in-person or Microsoft Teams? My preference is in-person and add [redacted] by Teams since he's calling in from Virginia.

I'll send out an Outlook Meeting notification once confirmed.

Thanks, Rob.

Robert A. Luco
Inclusion Consulting LLC
150 Hamakua Drive #758, Kailua, Hawaii 96734
(808) 330-5617

From: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Sent: Monday, April 14, 2025 2:29 PM
To: Robert Luco <rluco@inclusionhawaii.com>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Hi Rob

Lauren and I are available on Apr 30 from 10-3. How is 10 am-12 pm?

Lenora Mau
Engineer | Solid and Hazardous Waste Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino
2827 Waimano Home Road, #100 | Pearl City, HI 96782
Office: (808) 586-4226

From: Robert Luco <rluco@inclusionhawaii.com>
Sent: Monday, April 14, 2025 2:00 PM
To: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: [EXTERNAL] RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Thanks for your quick response, Lenora.

[redacted] not available on Monday, April 28th, sorry. Would any of the following other dates work for you and Lauren?

- Wednesday, April 3 - Anytime
- Thursday, May 1 - Anytime
- Friday, May 2 - Anytime

Thanks, Rob.

Robert A. Luco
Inclusion Consulting LLC
150 Hamakua Drive #758, Kailua, Hawaii 96734
(808) 330-5617

From: Mau, Lenora <lenora.mau@doh.hawaii.gov>
Sent: Monday, April 14, 2025 8:57 AM
To: Robert Luco <rluco@inclusionhawaii.com>
Cc: Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: RE: Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Robert

Next week is not good for us.
Lauren and I are available on Mon Apr 28 at 1:30 pm. Let me know if this works for you.

Lenora Mau
Engineer | Solid and Hazardous Waste Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino
2827 Waimano Home Road, #100 | Pearl City, HI 96782
Office: (808) 586-4226

From: Robert Luco <rluco@inclusionhawaii.com>
Sent: Monday, April 14, 2025 8:21 AM
To: Mau, Lenora <lenora.mau@doh.hawaii.gov>; Cruz, Lauren <lauren.cruz@doh.hawaii.gov>
Subject: [EXTERNAL] Availability for a Status Update Meeting with Inclusion re: H-Power & HARRA Permit Applications

Lenora and Lauren,
Would you both be available to meet with [redacted] Micah Tang, and me during the week of April 21 to 25?

Our proposed agenda will be to present our draft Sampling and Analysis plan for the recycled aggregate, which includes PFAS analysis, as well as the status of our response to your comments.

We are not planning to ask you for approval of our submittal, only to get feedback on our proposed approach and responses.

Thanks, Rob.

Robert A. Luco
Inclusion Consulting LLC
150 Hamakua Drive #758, Kailua, Hawaii 96734
(808) 330-5617

Toxic Fallout

Waste Incinerator Bottom Ash in a Circular Economy

Research Report - January 2022

gaia
Global Alliance for Incinerator Alternatives
Global Anti-Incinerator Alliance

ZERO WASTE EUROPE

Abstract

Bottom ash is fallout from the grate of mass-burn waste incinerators. Large quantities are produced and this residue has negative value. Visible proportions of sand, glass, and stones make it appear, on the surface, to be low hanging fruit for use in a circular economy; but bottom ash also contains appreciable quantities of toxic 'high level of concern' elements and persistent organic pollutants.

A secondary 'fallout' occurs when these substances leach from bottom ash into its surroundings across a range of conditions and timescales. The waste incineration industry fails to mention these facts when advertising bottom ash as a 'green' building material. In comparison to direct airborne pollution from waste incinerators, bottom ash has gone somewhat under the radar, making it ripe for greenwash.

This report uses independent empirical research to evidence that incinerator bottom ash is insidiously hazardous and underregulated. Risk is heightened by the fact that testing methods for its use as a building material are outdated. A list of fifteen concerns for public health and safety is provided in relation to the use of waste incinerator bottom ash in cement-based products and as road/pathway aggregate. Calls for the support of its use within a circular economy are premature, and, as per the precautionary principle, all ongoing usage should cease. Examination of independently analysed bottom ash provides a diagnostic on the operational steady state of waste incinerators, incidentally raising concerns about operational compliance with emissions legislation and the capacity of incinerators to produce benign bottom ash when fed with municipal solid waste.

1 Introduction

In Nature's biosphere, something's discarded effluence is something else's resource. All naturally occurring 'waste' is readily consumed in the efficient process of elemental recycling that operates at the Earth's surface. Within moments, creatures set about its consumption in earnest. Waste does not occur in nature because nature abhors inefficiency.

In contrast, civilisation in the 21st century has implemented an economic system which is proactively inefficient in terms of how it utilises its natural resources (the finite budget of chemicals that form the Earth's lithosphere and biosphere and the energy contained within their chemical bonds) by seeking to expedite disorder and create temporary, localised financial gain. In doing so, it has taken human endeavour above and beyond stability - i.e. the natural recycling of elements within a finite budget –; and has thrown it into the unstable realm of a throwaway society where, in an attempt to satiate this requirement, greater consumption of goods, services, and fuel must occur in greater volumes than the year before, thus creating increasingly larger amounts of waste.

Prompted by numerous environmental concerns directly arising as a result of this system, and of the logic to transition away from it, a number of ideas have been proposed which, rather than directly challenging the fundamentals of the system, suggest a reconciliation. One of these is 'sustainable development' (Spaiser et al., 2017). Another is 'circular economy' (Ellen MacArthur Foundation, 2014). Waste incineration is considered to be outside of the circular economy (ibid.). Reasons are that it is a destructive process which provides 'back-end pull' for waste generation accentuated by contractual lock-ins (Muznik, 2017).

Currently, the European Union (EU) is examining whether the use of modern waste incinerator bottom ash could be worthy of investment support within a future circular economy. The matter is being discussed as part of a wider EU Taxonomy (EU, 2020). To be aligned, suitable activities must make a "substantial contribution" to at least one of six objectives:

1. Climate change mitigation,
2. Climate change adaptation,
3. Sustainable use and protection of water and marine resources,
4. Circular Economy Transition,
5. Pollution prevention and control, and
6. Protection and restoration of biodiversity and ecosystems;

while simultaneously they must *"do no significant harm"* to any of the other objectives; in other words, progress towards one objective must not be made at the expense of another. Compliance is assessed against specified "technical screening criteria", which require that evidence is *"science based"* [sic], and *"developed via a robust methodology"* (PSF, 2021).

It is not the objective of this report to consider the de-merits of waste incineration within the circular economic model. It is its aim to provide evidence against the aforementioned criteria: specifically, the use of bottom ash in both 'unbound' aggregates (i.e. for roads and paths) and bound composites (e.g. cement based products like concrete and blocks). The topic has wider relevance to the legislative, permitting, and planning sectors where claims are put forward by the incinerator industry that bottom ash can have *"many applications"*, can be *"carbon negative"*, and even that it can assist with *"Climate change adaptation and greenhouse gas emissions"* (Powerfuel, 2020).

In this report, the hazard (if any) posed by the use of incinerator bottom ash is assessed using independent, empirical, peer-reviewed scientific literature. Specifically, the total concentrations of toxic substances in bottom ash and their propensity to leach out into the environment from subsequent products and applications. Current regulatory and testing safeguards within a European context are investigated, while drivers and motivations for the proposed use of bottom ash are also discussed.

2 Background to Bottom Ash

In the mid-1800's, prior to the first municipal solid waste incinerator (MSWI) patent (Clark, 2007) societal waste comprised mainly dust, ashes, and cinders (ca. 80% - the residue from fire grates), along with lesser quantities of vegetative matter, excrement, bones, and animal carcasses; plus minor amounts of ceramics, rags, paper, and metals (Tanner, 2006). This detritus was frequently piled up within the boundaries of rapidly expanding urban areas, and these refuse heaps were considered to be of some value (Dickens, 1865). People lived among them, scavenging was permitted, and in one city at least a fee was charged for the privilege (Melosi, 1973). Once all 'valuables' had been removed, the leftover ash and cinders were commonly used as a sub-base for paths and carriageways; indeed, in 1848, the whole of London's Great Dust Heap (Figure 1) was reportedly sold to Russia for building the streets of Moscow (Tilley, 2014).

Figure 1. King's Cross, London: the Great Dust-Heap, next to Battle Bridge and the Smallpox Hospital. Watercolour painting by E. H. Dixon, 1837 (Wellcome Collection, no date).

Modern incinerator bottom ash is markedly different from the ash and cinders which were used as a road base in the 1800s. Municipal solid waste (MSW) now includes ubiquitous quantities of plastics and their additives, along with plastic/metal composites such as printed circuit boards and other petrochemically coated substances like paper, packaging, and waste wood (Conesa et al., 2021). A recent report listed over 2400 substances in waste plastic that are identified as of potential concern because they meet one or more of the persistence, bioaccumulation, and toxicity criteria in the EU (Wiesinger et al., 2021).

The majority of modern waste incinerators are mass-burn, grate-fired systems, and the most massive quantity of residue that they produce is 'fallout' from the main grate - 'bottom ash'. Though incinerators are not built to harvest bottom ash, their purpose is to create it: the word's etymological route is a process for 'converting to cinders'. Some incinerators recover a quantity of the energy contained in waste, so-called Waste-to-Energy (WtE) or Energy-from-Waste (EfW) plants. But the waste to electricity efficiency is very low, at $\eta \leq 0.3$, essentially meaning that at least 70% of the chemical functionality in waste is lost in the process of 'converting to cinders' (Neuwahl et al., 2019).

In modern incinerators, approximately a third of the input waste is incombustible or goes uncombusted (Bielowicz, et al. 2021). This equates to about a quarter of the input mass becoming bottom ash (Bunge, 2019; Hulgaard and Vehlow, 2011). The balance - a smaller amount of solid residue - becomes entrained in the combustion gases and is either emitted into the atmosphere (Particulate Matter Research Group, 2019) or captured by gas cleaning modules (Vehlow, 2015). These entrained particles are termed fly ash and air pollution control residues (APCr) and are not part of this report.

The focus of legislation in Europe has been to minimise these airborne emissions, lately implemented via the Industrial Emissions Directive (IED) (EU, 2010). This requires that the post-combustion gas [author's emphasis] must be subjected to at least 850°C for a minimum of 2 seconds even under the most unfavourable of conditions, and that the bottom ashes/slag have total organic carbon (TOC) content of <3 wt% or their loss on ignition (LOI) is less than 5 wt%. Limit values exist only for pollutant concentrations in the airborne emissions and APCr system wastewater. The combustion environment above an incinerator grate is a hostile one to monitor and, though little is known about localised variations, temperatures above the grate are believed to oscillate around 900°C (Bunge, 2019).

At the macro-scale, bottom ash is mostly (between 50 – 97%) amorphous material, stones, shards of glass, chunks of metal, and sandy grit (Buchholz and Landsberger, 1995; Caviglia et al., 2019). The amorphous fraction is often referred to as 'slag' and 'clinker'; a product of high temperatures in the combustion zone at which substances melt, aided by elements from groups 1 and 2 of the periodic table which are fluxing agents (Miles et al., 1995). The words 'slag' and 'clinker' are often used as synonyms for bottom ash. Chemically, bottom ash has a pH in the 11-12 range (Bunge, 2019). Major constituents (ca. 90%) are oxides of sulphur (S), silicon (Si), calcium (Ca), iron (Fe) and aluminium (Al) bound, among which are numerous minor elements from different chemical groups, many of which are very toxic (Simon et al., 2021; Vateva, and Laner, 2020). Bottom ash also has some pure metals and a fraction of these are commercially extractable (Bunge, 2019).

Commercial extraction of metals is influenced by how bottom ash is temporarily stored upon discharge. Some incinerators have quenching systems (a water-filled tank) while others operate dry capture, often with a period of open air stockpiling known as weathering or ageing, each of which can alter bottom ash form and chemistry. Both ferrous (Fe) and non-ferrous (NFe) metals are extractable, but this refers to only unoxidised constituents (i.e. pure, native metals) and not to metal oxides which are grouped with the mineral constituents. Full recovery of all metals is not possible, with the remainder along with metal oxides left within what is sometimes called the 'mineral fraction' of bottom ash. This 'left-over' bottom ash residue is the subject of this report.

3 Method and Hazard Identification

Research was framed by two hypotheses:

1. The use of incinerator bottom ash could substantially contribute to the transition to a circular economy; and
2. Its utilisation will do no significant harm.

The research methodology was a literature review, with papers selected by date of publication from 2019 onwards, and only those which contained results derived from empirical research. Datasets were limited to samples of bottom ash produced by the incineration of MSW, i.e. household and commercial/industrial waste; studies reporting on special 'hazardous waste' incinerators were excluded. Also excluded were publications either directly commissioned by industry, co-authored by, or co-funded by industrial sponsors. The scope was set within Europe, defined geographically; but, for organic substances, it was extended to include empirical studies from other continents which evidenced compliance with EU legislated operational minima and/or Best Available Techniques (BAT).

The potential hazards of bottom ash are a function of its intrinsic chemistry. Further hazards are created by the interaction of bottom ash with the chemistry of its external environment when applied in product form. Risk is assessed also as a function of the legislative framework of safeguards, if any, which govern product manufacture and point of use. Literature commonly expresses the chemical hazard by two metrics: a) the 'total concentration', which is the quantity per unit mass of specific elements and compounds; and b) the mobility of these elements and compounds from bottom ash, termed 'leaching concentration', and defined as the mass of substance per unit volume of liquid used to irrigate the sample.

In this report, chemical hazard identification was based on EU REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals). All the substances listed in Table 1 were present in the bottom ash as reported by the studies which comprise this report. All are considered as High Level of Concern by fulfilling one or more of hazard criteria under EU REACH (namely: very bioaccumulative; carcinogenicity; mutagenicity; reproductive toxicity; endocrine disruption; specific target organ toxicity upon repeated exposure; and chronic aquatic toxicity), combined with the large volumes produced, as identified by Wiesinger et al. (2021). Phase change data is provided in Table 1 so that inferences can be drawn on the conditions inside the waste incinerator and by the presence and form of the substances in bottom ash.

Table 1. Selection of elements* found in MSWI bottom ash from studies in this report, and which are considered as High Level of Concern (Wiesinger et al., 2021). * = Cl^- is an ion and SO_4^{2-} is an ionic compound. ** Halkidiskis et al., 2019; Wiesinger et al., 2021.

Element	Melting Point	Boiling Point	Origin in MSW**
Arsenic (As)	Sublimes at 616°C		Used in electronics and glass, wood preservative. Biocide in plastics.
Barium (Ba)	729°C	1637°C	Antioxidant, colourant, filler, heat and UV stabiliser in plastics.
Bromine (Br)	-7°C	59°C	Major constituent of flame retardants in plastics, foams and textiles.
Cadmium (Cd)	321°C	756°C	Heat stabiliser, antioxidant and pigment in plastics. Used in metal plating and batteries.
Cobalt (Co)	1495°C	2870°C	Catalyst and pigment in plastics. Widely used in magnets and metal alloys.
Chloride (Cl^-)*	n/a	n/a	Plasticiser, heat stabiliser, colourant, antioxidant and catalyst in plastics. Major constituent of polyvinyl chloride (PVC). Wood preservative.
Chromium (Cr)	1860°C	2672°C	Catalyst and pigment in plastics. Used in metal plating.
Copper (Cu)	1084°C	2567°C	Biocide and pigment in plastics. Present as wiring in most electrical goods.
Lead (Pb)	334°C	1740°C	Colourant, antioxidant, UV and heat stabiliser in plastics. Present in batteries, metal goods, glass, electronics.
Mercury (Hg)	-39°C	357°C	Catalyst, colourant, cross-linking agent, filler and biocide in plastics.
Molybdenum (Mo)	2617°C	4612°C	Catalyst, cross-linking agent and flame retardant in plastics.

Nickel (Ni)	1453°C	2732°C	Catalyst and biocide in plastics.
Antimony (Sb)	631°C	1635°C	Main use is as a flame retardant in plastic, Also plastic catalyst, antioxidant and pigment.
Sulphate (SO_4^{2-})*	n/a	n/a	Filler, colourant, heat and UV stabiliser in plastics.
Tin (Sn)	232°C	2270°C	Biocide and antioxidant in plastics. Used as flame retardant, and in metal plate, glass, ceramics.
Vanadium (V)	1887°C	3377°C	Antioxidant in plastic. Also a lubricant in plastic manufacture. Level of concern = vanadium oxide.
Zinc (Zn)	420°C	907°C	Multiple uses as plastics additive: filler, heat stabiliser, flame retardant, slip agent, pigment.

In addition, a number of organic chemical groups are present in bottom ash and are also considered as hazardous. These are commonly known as Persistent Organic Pollutants (POPs) and most are listed within the Stockholm Convention, though some are not. POPs are long-lasting, toxic, known to bio-accumulate within higher trophic levels, and each may comprise many species with similar properties (known as congeners). These are detailed separately within §5.2.

4 Results: Legal Framework of Standards and Testing Methods

Currently in Europe, the use of waste incinerator bottom ash as a building material is fragmented (Blasenbauer et al., 2020). Some countries (Norway) prohibit its use, while one (The Netherlands) uses all that it creates. Some nations use none even though it is permitted, while many have regional variations which range in usage from 0 ≤ wt % ≤ 100. Some have use-specific requirements (e.g. in Italy bottom ash can be used in cement, bricks and expanded clay without treatment or testing, but for road use leaching tests specify only the presence of some heavy metals (Caviglia et al., 2019). Five out of twenty six EU countries provide no regulation at all, while two (Ireland and Luxembourg) prohibit domestic use but allow export (Blasenbauer et al., 2020).

The collective European Standards for building aggregate and cement-based products (EN12620, EN13139, EN13043, and EN13242) employ the general term ***"dangerous substances"***. This refers to total concentration only (no leachate), is unspecific, and is marked as ***"informative"***, rather than ***"normative"***, for the purposes of linking with other EU Directives, none of which provide adequate safeguards - Art. 53 of EU (2010) discusses the minimisation of residues, stating that ***"appropriate tests"*** should be carried out to establish their polluting potential. The matter is delegated to countries, yet no harmonised testing method exists, an issue that was identified more than a decade ago (Blasenbauer et al., 2020).

Of those countries which require leaching tests for bottom ash prior to use as a building aggregate, details are summarised below (Blasenbauer et al. 2020):

- Eleven countries use batch tests, based on EN-12457 - a method not designed for bottom ash as a building aggregate – and which uses water as leachant[1] (EN,2002/2003). This varies between countries via the following parameters:
  - the volume of eluent per mass of sample, quantified as liquid to solid ratio (L/S). Countries use either 2 or 10 $l.kg^{-1}$, and one country (Belgium) requires a two-stage test. All have a duration of 24 hours . Seven countries apply this test to grain sizes of <4mm, while three countries (plus one region in Belgium) apply it to grain sizes <10 mm.
- Four countries use a column or percolation test, with an elution rate from 0.1 to 10 $l.kg^{-1}$. Particle size is not specified in Finland and Sweden, while it is set at <4 mm in The Netherlands and two regions of Belgium. Test duration is not specified.
- The Netherlands are unique in also having a monolith test which applies only to bound aggregates. This involves placing a sample of bottom ash in water for 64 days. Particle size is not specified and L/S varies depending on the monolith size.

[1] 'Eluent' or 'leachant' is the known mass of liquid which flows through, or is agitated within a close vessel in contact with, the known mass of bottom ash, in turn capturing some portion of the toxins. Following the analysis, the quantity of toxins retained by the 'eluate' are determined as their test specific 'leaching/leachate concentration'.

The broad opinion among scientific authors is that the leaching tests are inadequate and provide insufficient safeguards. For example (Tiberg et al., 2021):

"To what extent the leaching from and presence of metals in the mineral fraction of bottom ash poses a threat to the environment and how this should be evaluated is still not entirely clear."

And, (Simon et al., 2020):

"The standard leaching tests mobilize only small amounts of the complete reservoir of certain substances in incinerator bottom ash."

Further independent observations are provided in the following section which compares empirical bottom ash analyses with the various European limit values for total concentration and leaching concentration. Information on limit values was obtained from Blasenbauer et al. (2020) and Glauser et al. (2021) unless otherwise stated. No comment is made on the suitability of limit values because (Blasenbauer et al., 2020):

"It cannot be concluded whether a specific limit value is too high or too low, since it is unknown how limit values were defined in each country."

5 Results: Empirical Research

5.1 Potentially Toxic Elements

Table 2. shows the studies which met the scope of the literature review. These were from six European countries. Note in particular in Table 2 the detail of sample preparation (ageing, metals extraction, weathering).

Table 2. Datasets which report empirical studies analysing potentially toxic elements in MSW incinerator bottom ash.

Reference	Sample provenance	Sample preparation	Method	Analyte
Bielowicz et al., 2021.	WtE plant, Poland.	Stockpiled indoors for two weeks, post Fe and NFe metals extraction. Sampling of 20kg from 350-400kg each week, analysis over 36 weeks.	Leaching to EN12457 with L/S of 10 $l.kg^{-1}$.	Ba, Cl^-, Cr, Cu, Mo, Pb, Sb, SO_4^{2-}, Zn.
Glauser et al., 2021	Two Swiss MSWI/bottom ash treatment plants: 1 wet discharge, ageing and metals extraction; 2. 'enhanced' dry treatment and metals extraction.	1 tonne, post-metal, sampled at 5-6 times over two days from each plant. Pieces of metal and unburned matter >5 mm removed. All size fractions crushed to <0.25 mm.	Leaching tests: 1. Batch at 10 $l.kg^{-1}$, a) with de-ionized water, and b) with CO_2 saturated water (reduced pH). 2. Column with de-ionized water at L/S of $0.1 \leq l.kg^{-1} \leq 10$.	Cl^-, Cu, Pb, Zn (leachate) As, Cl^-, Cd, Cr, Co, Cu, Ni, Pb, Sb, Sn, V, Zn (total concentration).
Mantovani et al., 2021.	WtE plant, Italy	Five samples totalling 30kg taken over five days. Dried for 24 hours then sieved to various grain sizes.	Total concentrations only.	Numerous.
Simon et al., 2021.	BA treatment facility, Germany.	Fe and NFe separated, no ageing. Wet separation and	6 year leach test experiment using	Cl^-, Cr, Cu, Mo, Sb, SO_4^{2-}, V.

		sieving to grain size range of 25 ≤ mm ≤ 45.	simulated rainwater in a lysimeter.	
Tiberg et al., 2021.	Six different Swedish WtE plants.	Metal extraction then aged outdoors for at least four months or treated to pH 10.	pH dependent leach test on grain sizes: 5.5 ≤ mm ≤ 8.5.	Al, Cu, Fe, Zn.
Kalbe and Simon, 2020.	Bottom ash treatment facility, Germany.	Post Fe and NFe metals extraction, no ageing. Wet separation and sieving to size range 25 ≤ mm ≤ 45.	Four different leaching tests: simulated rainwater in a lysimeter of 2.96 $l.kg^{-1}$, column up to 9.6 $l.kg^{-1}$, batch tests of 2 $l.kg^{-1}$, and 10 $l.kg^{-1}$.	Numerous
Vateva and Laner, (2020)	German MSWI plant (wet discharge system).	1900 kg taken in 9 days over a four week period. Compared 'as received', with 4 month aged, grain sizes: <0.063 ≤ mm ≤ 31.	Batch leaching test EN12457 at 10 $l.kg^{-1}$.	As, Cd, Cl^-, Cr, Cu, Hg, Ni, Pb, SO_4^{2-}, Zn.
Alam et al., 2019a	Different incinerators in The Netherlands.	Natural weathering for six weeks, then dried, and sieved to ≤ 0.125 mm.	Batch leaching test EN12457-2, at 10 $l.kg^{-1}$di-ionized water.	Numerous
Alam et al., 2019b	Different incinerators in The Netherlands.	No metals extraction, weathering for six weeks, dried at 105°C, and sieved to 3 grain sizes in range: 0.125 ≤ mm ≤ 4.	Column leaching test to EN 7383:2004, compared to sequential test of acidic, reducing, oxidising stages.	Numerous
Caviglia et al. 2019	Incinerator in Italy.	Single grab sample. Grain size sieved to 0.063 ≤ mm ≤ 20.	Batch leaching test to EN12457 with de-ionized water at L/S of 10 $l.kg^{-1}$.	Numerous

5.1.1 Comparison between Leaching Test Methods

Glauser et al. (2021) showed how the different leaching test methods of Switzerland and The Netherlands produced incompatible results for numerous potentially toxic elements from the same sample. Statistically significant correlations ($R^2 \geq 0.95$) were only found for Cu and Cl^- using deionized water as eluent. There was no statistically significant correlation for Zn ($R^2 = 0.65$), while for Pb the average concentration in the leachate from the Swiss batch test was 2.5 times higher than in the Dutch column test ($R^2 = 0.55$), thus evidencing the relative leniency of the Dutch test.

None of the bottom ash samples met Swiss regulations for landfill due to the total concentrations of heavy metals Cr, Cu, and Pb in some grain size fractions, but in particular Sb which exceeded the threshold for all size fractions, by 11 times in fine fractions, and even by 1.5 to 3 times when the bottom ash was subjected to 'enhanced treatment'. To this, the authors dryly observed that it is for a *"good reason"* that the Swiss landfill regulations only have limit values for TOC and certain non-ferrous metals, otherwise bottom ash samples would fail to comply. In general, their results showed that (Glauser et al., 2021):

"Disposal on landfills with lower requirements and recycling of bottom ash as raw material for cement clinker is not possible without applying further treatment steps."

With regard to the Dutch column leaching tests, only Cl^-, Cu, Pb, and Zn were reported, but all size fractions of bottom ash failed for Cl^-, while 62% of the samples also failed for Cu, and 38% failed for Pb. Of this, the authors commented how the Dutch column test, using deionized water, was unrepresentative because it neglected changing pH conditions over time.

Different leaching test methods using the same sample were also compared by Kalbe and Simon (2020). Some toxic elements such as Cd, Co, Ni, and Pb were shown to leach out of the bottom ash in greater quantities under column and lysimeter tests than under batch tests; while others such as Cl^-, Sb, and Sn leached out in greater quantities under batch rather than column testing, supporting the findings of Glauser et al. (2021). They explained their use of a lysimeter in comparison to the common batch or column tests (Kalbe and Simon, 2020):

"The results from lysimeter experiments are closer to real field conditions than the column test due to larger sample size and overhead irrigation rather than up-flow conditions".

As shown in Table 2, no European country uses a lysimeter for leaching tests.

Quantifying the range of results highlights the great variations that exist between batch and column test methods and hence how these permit some countries to use bottom ash while others cannot. Measured as a percentage difference in total concentration (C) across the batch and column tests, each using the same sample $((C_{batch} - C_{column})/C_{batch}) \times 100$, values differed by the following amounts: As = 63%, Cl^- = 44%, Sn = 52%, and Sb = 52%. This again quantifies the relative leniency of the Dutch column test, though for some other elements the values were negative evidencing the reverse.

Again of relevance to The Netherlands' use of column or monolith leaching tests, Allam et al. (2019a) assessed a bottom ash sample using the deionized water batch tests commonly applied in other countries. Their results showed that leachate concentrations of Cu, Cr, Mo, and Sb, along with Cl^- and SO_4^{2} from batch tests, would have put the samples above the legal threshold in The Netherlands for the use as a building aggregate. They went on to discuss options to improve bottom ash, and did not advocate weathering because:

"The formation of weathering phases reduces the leaching of potentially toxic elements for the short to mid-term; however these weathering phases are stable only in a limited pH range."

The same research group compared the Dutch column leaching tests for granular building material with a sequential leach test method (Allam et al., 2019b). In a sequential test, the sample is exposed to different conditions and therefore provides a 'worst case scenario'. No European country uses the sequential test.

Allam et al. (2019b) found that the ≤4 mm sample breached the Dutch leach test limit values for Cl^-, Cu, and Mo. They also referred to their own previously published studies from 2016 and 2017, which showed that leaching of Cr, Ni, Pb, Sb, and Zn ***"commonly exceeds the limit for use in non-isolated applications"***. With the sequential leach tests, Zn in particular was highly mobile during the conditions of low pH, while Cr, Cu, Ni, and Sb all showed high mobility during the oxidising conditions. The authors attributed this to the complexation of many toxic elements with humic material, which then become mobile when organic matter is destroyed under oxidisation. These results further evidence that the sterile leach tests are unrepresentative of real life conditions, in this case due to interactions with organic matter, and particularly as an unbound aggregate for road and footpath construction.

More results are provided below, drawing from other studies. To avoid a bland repetition of summaries, further results have been grouped to focus on specific limitations of the leach tests used across Europe in relation to the hazards of bottom ash.

5.1.2 Ageing, pH, Buffering, and Humic Material

When Glauser et al. (2021) changed the eluent of the batch test to lowered pH (using CO_2 saturated water) the differences in leachate concentrations were much greater: Zn mobility increased in the batch test by 15 times in comparison with deionized water

eluent. It was also observed that Cu leachate concentrations were higher when dissolved organic matter was present even under alkaline conditions (statistical correlation of R^2 = 0.90 between Cu concentration and dissolved organic carbon). The authors noted a high buffering capacity within the smaller fractions when CaO was present, resulting in temporary stability of both Cu and Zn.

Vateva and Laner (2020) compared their leach test results against two current and one draft German standard for building aggregate. Leachate concentrations of Cl^- and SO_4^{2-} in the samples were above the limit values for most grain fractions, while leachate concentrations of Cr, Cu, and Pb were also above limit values. They concluded that the ageing process of four months did not improve the quality of the bottom ash with regard to Cl^- and SO_4^{2-}. Interestingly, the authors observed, though did not explore, a *"substantial variation in the content of unburned organic matter over the whole nine days of sampling"*. In summary:

"The processed bottom ash was not suitable as a whole, neither as a construction material in constrained structures nor as an aggregate in concrete because it did not comply with limit values in current German regulations...Legal compliance of bottom ash as a construction material was not facilitated by longer aging [and] further manipulation or processing would be required to reduce the contents of soluble salts as well as to minimise residual metal contents."

And:

"The processed bottom ash, as a mixture, did not comply with current German limit values for use as a construction material mainly due to excessive soluble salt contents. Coarser grain size fractions were less contaminated, resulting in an utilisable potential of less than 30% of the bottom ash as a construction material."

The same draft German aggregate limit values were used as a reference by Simon et al. (2021), results which were the culmination of a six-year experiment with irrigation of a bottom ash sample by simulated rainwater (600 $mm.a^{-1}$) in a lysimeter. The lysimeter allows for temporal analyses which batch tests do not (Kalbe and Simon, 2020). In these tests, the pH did not change (9.9 ± 0.5), thus substances in the bottom ash acted as a temporary pH buffer. Even with ageing, short term release of high quantities of Cl^- and SO_4^{2-} were observed, which, along with Cu and Mo, greatly exceeded one of the limit value categories. Both Sb and V continued to be mobile throughout the six years and approached the limit values, as stated:

"Our experiment shows that the release of Sb and V from incinerator bottom ash is not minimised over the time of almost six years. Thus long-term use of incinerator bottom ash e.g. in secondary building materials can pose a potential risk to the environment".

They went on to say that no economically viable technical measures for the targeted depletion of Sb and V are available. And, in comparison to the new draft ordinance for mineral waste, the limit values were not reachable even for wet treated bottom ash (Simon et al. 2021).

In the experiments of Kalbe and Simon (2020), the substrate in the lysimeter was maintained in the alkaline range (8.5 ≤ pH ≤ 10.5). Though the authors say that in this limited range no correlation can be made between pH and Sb mobility, they did say that, at the end of the experiment, (six years) the cumulative release of Sb was still increasing. Sb release was shown to increase with decreasing Ca, as Ca forms less soluble compounds such as $CaCO_3$ (calcium carbonate) due to ageing. Thus, ageing to stabilise bottom ash will not only have an inverse effect on Sb mobility, but pro-active treatments such as adding Ca compounds would be unlikely to solve the problem as, in the long term, these will transform to $CaCO_3$ anyway (Kalbe and Simon, 2020).

Tiberg et al. (2021) confirmed that both Zn and Cu were more mobile below pH 8.5 often as much as four orders of magnitude. They also noted that leachability of these elements above neutral pH was governed by other parameters, but that humic matter increases their mobility. The authors did not refer the results to legal implications because "*clear guidance is lacking, and practice differs between countries*". They specifically referred to the limitations of the Waste Framework Directive.

5.1.3 Incinerator Instability and Hazard as a Function of Grain Size

Bielowicz et al. (2021) sampled bottom ash over a period of 36 weeks and during this time all elements studied at some stage exceeded the national leachate limit values for *"processing outside the plant"* by Polish legislation.[2] For Cl^-, the value was never below the limit at all and reached a maximum at seven times the limit value, while other significant maxima were for Ba (11.5x above the limit) and Sb (21x above the limit), with Zn also exceeding the limits on four dates; while the mean for Sb was more than twice the limit value, and exceeding the limits more often than not. The mean value for Pb concentration in the leachate exceeded the limit value by 70%. This broad variability in concentrations evidenced that the incinerator plant provided little or no constraints on toxic substances in the bottom ash. This was corroborated elsewhere by Simon et al. (2020) who observed that: *"The concentrations especially of trace metals can vary by an order of magnitude".*

Some authors suggest that removing the finer fractions of bottom ash would lead to reduced toxicity (Alam et al., 2019a). But this is not always correct. Kalbe and Simon (2020) showed that the smallest fractions (<25 mm) did not necessarily contain the most toxic elements, with approximately twice the amount of Br, Co, Cr, and Ni in the largest (0.25 ≤ mm ≤ 45) cut. Vateva and Laner (2020) also measured Cr and Pb in greater quantities in larger (>31.5 mm) and smaller (4–8 mm) fractions; Cd, Ni and Zn in smallest fractions; and, for Sn and Sb, partitioning exhibited a random spread. They also found greater concentrations in the >4 mm fraction for Cl^-, Cr, and SO_4^{2-} when the sample had been aged.

Mantovani et al. (2021) detected higher concentrations of Cr and Pb in the largest (>16 mm) fraction, while the highest concentration of Ni was in the 8 – 16 mm cut. A surface coating of finer fragments was found to cover the larger clasts and these were easily separated during transport and sieving, evidencing the friable nature of potentially toxic element release after sieving. Another interesting finding was that the LOI values measured as a function of size fraction: all greatly exceeded the EU (IED) requirements, with the lowest being 9.4% and the highest 26.4%. They concluded against the worth of sieving and screening because of potentially toxic elements (such as Cu, Ni, Zn, Pb, Sn) in all categories of carbonates, sulphates, amorphous, and LOI residues.

Caviglia et al. (2019) found that due to the presence of Cu, Italian limit values were exceeded for all size fractions below 10 mm. Other interesting findings were that LOI values exceeded EU regulations (at 6.2%); and that concentrations of most heavy metals (namely Cu, Ni, Pb, Sr, Zn) were in the mid-range (2 - 8 mm) grain sizes.

5.2 Persistent Organic Pollutants and Microplastics

Only one paper met the scope, from a research group in Norway. The methodology was therefore extended by year and to encompass recent references from outside Europe. Datasets are shown in Table 3.

Table 3. Datasets of empirical studies on organic toxins in MSW incinerator bottom ash.

Reference	Sample provenance	Sample preparation	Method	Analyte
Arp, et al., 2020	Norwegian incinerators via a waste handling facility	Samples taken over a year.	Leaching test with distilled water, as per EN12457 at 10 $l.kg^{-1}$. Shake time increased to 28 days.	PCBs (7 congeners).
Morin et al., 2017	Twelve Norwegian waste handling facilities	Sampled over one year.	Batch leaching test with distilled water, compliant with EN12457 at 10 $l.kg^{-1}$.	BFRs (PBDEs)

[2] Following personal correspondence with author: "Construction, reconstruction or renovation of railway structures and track beds, embankments, railway and road embankments, road foundations in motorways, impermeable coverings, bowls of earth settlements, cores of hydrotechnical structures and other structures and construction works, including foundations".

			Shake time increased to 28 days	
Lin et al., 2014	Two incinerators in Taiwan	Four samples per day (every 6 hours) over one week. Size fractions < 0.075 ≤ mm ≤ 9.5	Batch leaching test (shaking bottle) agitated for 18 hours with 'fluid' of pH 2.9.	PBDEs
Wang et al., 2010	Incinerator in Taiwan	Three samples per day (every 8 hours) over 3 days. Extractable Fe and NFe metals, 'stones and glass' removed.	Total concentrations. Samples compared to other ash samples downstream of the combustion chamber.	PBDD/Fs (12 congeners). PBDEs (30 congeners).
Liu et al., 2021	Three Chinese incinerators	24 samples taken over two years.	Total concentrations plus supernatant after centrifuge and pH 'stabilisation' to 7-8.	PFAS.
Hsieh et al., 2018	Incinerator in Taiwan	Taken directly from the incinerator over four years.	Total concentrations.	PCDD/Fs.
Chen et al., 2006	Two incinerators in Taiwan	Sampled 4 times per day at 2-hour intervals over one week.	Total concentrations. Size < 0.25 ≤ mm ≤ 9.5	PCDD/Fs.
Yang et al., 2021	Sixteen MSWIs and one bottom ash treatment plant in China	31 bottom ash sampled loads during stable operation.	Total concentrations.	Microplastics

5.2.1 PCBs

Polychlorinated biphenyls (PCBs) were widely used in paint and electronic capacitors until this was restricted in the 1970s. Many remain in circulation as legacy pollutants, but only three European countries (The Netherlands, Belgium, and Czech Republic) assess for the hazard of PCBs in building aggregate, and none assess for PCBs in leachate.

Arp et al. (2020) compared total concentrations of PCBs and their leachability from bottom ash and fly ash against a number of other substances from waste recycling facilities in Norway. They found that mean total concentration of PCBs were much greater in bottom ash (28 ± 34 µg kg^{-1}) than in fly ash (0.3 ± 0.8 µg kg^{-1}) - 93 times greater taken at the mean, while bottom ash showed the second highest leachability of PCBs for all samples studied. These results likely underestimate the true leach hazard, for the study only considered the freely dissolved fraction and not those PCBs associated with particles or dissolved organic carbon: the authors cite previous research that PCBs are mainly associated with particles and dissolved organic carbon by *"up to 80 - 99.9%"*. These mean total concentrations would have breached the limit value for the Czech Republic and one region in Belgium, which, if considering the full range, all limit values were exceeded. Of note is the wide variation in concentrations over the one year period of sampling.

5.2.2 PCDD/Fs

Polychlorinated dibenzo-p-dioxins/dibenzofurans (PCDD/Fs) are halogenated poly-aromatic compounds, commonly termed 'dioxins'. They produce a range of harmful effects including carcinogenicity, teratogenicity, immunotoxicity, and embryotoxicity. But, of the twenty six countries reported by Blasenbauer et al. (2020), only one of these (Germany) stipulated an assessment of PCDD/F

total concentration in bottom ash prior to its use as a building aggregate. No country required an assessment of PCDD/Fs in bottom ash leachate.

PCDD/Fs are more concentrated in fly ash than in bottom ash, but in bottom ash they are still appreciable (Hsieh et al., 2018). Over a four-year sampling period, the mean concentrations of PCDD/Fs in bottom ash (1.48 $ng.g^{-1}$) were approximately three fifths that of fly ash (2.56 $ng.g^{-1}$). Importantly, since the quantities of bottom ash produced were (mean average) three times greater than the quantities of fly ash, bottom ash was the main repository of incinerator PCDD/Fs. Again of note was the wide range of total PCDD/F concentrations in the bottom ash over the sampling period, evidencing the inconstancy of the MSWI process to stabilise PCDD/F fallout. This was expressed by the authors on a WHO_{2005}-TEQ basis[3], with concentrations varying by a factor of seven.

Chen et al. (2006) analysed total concentrations of PCDD/Fs in post metals extraction and air-dried bottom ash from two modern incinerators in Taiwan, described as *"the most effective technique for PCDD/F emission control"*. Measured on an I-TEQ basis, they found that particles ≤0.6 mm accumulate amounts of PCDD/Fs at a level potentially hazardous to the environment and so unsuitable for use in *"soil, road sub-base and construction blocks"*. Based on fertilizer limit values in Germany, one sample of bottom ash (grain sizes ≤0.6 mm) exceeded the limit values for application to pasture land, while larger grain sizes (≥2.36 mm) were borderline.

5.2.3 BFRs: PBDEs and PBDD/Fs

Brominated flame retardants (BFRs) are widely used in electronic circuit boards and plastic packaging such as microwave trays and coated textiles (Weidlich, 2021). Their concentrations in plastic range from 3 to 15% (Hennebert, 2021). Some are banned and regulated in the EU, but legacy products are in circulation, so will likely remain in waste for decades to come (ibid.). Polybrominated diphenylethers (PBDEs) are a subgroup of BFRs; many are endocrine disruptors; immune system toxicants; and form PBDD/Fs during low temperature, low oxygen regions above a MSWI grate (Weidlich, 2021). Evidence is that PBDD/Fs are as highly toxic as their better known chlorinated analogues, and more hazardous than the PBDEs from which they formed (Conesa et al., 2021). No European country currently tests for PBDEs or PBDD/Fs in building aggregate, while PBDD/Fs are neither monitored nor is there any limit for these substances in waste incineration residues.

After assessing the total concentration and leachability of PBDEs from a variety of waste handling sites, two of which were bottom ash from a modern Norwegian waste incinerator, Morin et al. (2017) found that total concentrations were approximately an order of magnitude higher in bottom ash than in fly ash, while leachate concentrations were also approximately an order of magnitude higher from bottom ash than fly ash. The study, again, did not consider the leached PBDEs sorbed to colloids or humic acids, but noted that the leaching results were likely *"biased low"* due to equilibrium not being reached over the experimental time period. The authors observed that the total concentration of BFRs remained constant between bottom ash and feedstock MSW indicating that they were not destroyed by incineration:

"Bottom ash contains concentrations of flame retardants that cannot be considered negligible [and that] this may need to be considered when landfilling bottom ash, or utilizing it in other purposes, such as filling materials."

In Lin et al. (2014), the PBDE total concentrations were 2 to 19 times higher in bottom ash than in fly ash, further evidencing that PBDEs were not completely destroyed during the incineration process. These total concentrations were two orders of magnitude higher than in urban and rural soils, more distributed in larger (0.25 ≤ mm ≤ 1) particles, and leached out at a rate approximately four orders of magnitude higher than the original waste material. Total concentrations in the bottom ash were 29 ≤ $ng.g^{-1}$ ≤ 243, but there are currently no limit values against which to compare them. The authors qualified the hazard by stating that after passing through the incinerator, the highly brominated leachable PDBEs readily degrade to lighter brominated variants, resulting in enhanced toxicity via increased uptake and bioaccumulation. They also commented that humic solutions enhance the leachability of PBDEs from

[3] TEQ = Toxicity equivalent. The sum of the products of the concentration of each compound multiplied by its Toxic Equivalence Factor (TEF). TEQ is applied due to the commonly shared toxicity across a suite of compounds to represent how their combined toxicity is additive. Two common metrics exist: I-TEQ based on TEF determined by an expert international group, and WHO-TEQ based on TEFs determined by the World Health Organisation.

bottom ash impacting on its use in ground works. Consequently, they advised caution on the proposed use of incinerator bottom ash as construction material.

The most highly cited study on POP leachability from bottom ash is by Wang et al. (2010). The authors sampled residues of bottom ash and fly ash from two air pollution control modules, and ash from two post combustion zones (economizer and superheater) three times per day at eight-hour intervals for three days, on a system *"recognized as the most effective technique for PCDD/F emissions control"*. They found that bottom ash had the highest PBDD/F and PBDE content of all residues, supporting that PBDEs were not destroyed by the incineration process; and also that PBDD/Fs were created by it giving higher concentrations than in the input waste. The content of PBDEs in bottom ash were between one and three orders of magnitude higher than in reference soils. They concluded that reutilization of incinerator bottom ash would contribute these substances to the environment.

5.2.4 PFAS

Polyfluoroalkyl substances (PFAS) have been produced since the 1940s and are widely used as flame retardants, and as water and oil repellents in and on plastics (Liu, et al., 2021). They are sufficiently soluble in water to be taken up by plants (Ghisi et al., 2019). None of the European countries reported on by Blasenbauer et al. (2020) tested for PFAS in bottom ash for use as a building aggregate.

PFAS are also not completely destroyed during the incineration process. Liu et al. (2021) found that bottom ash from two out of three incinerators sampled was enriched in PFAS at three times greater concentration than in fly ash. The authors concluded that bottom ash constitutes an important vector for PFAS into the environment; that more study is needed on the thermal transformation of PFAS; and that techniques to destroy PFAS within incinerators need to be developed. Another important finding was the widely varying concentrations of PFAS sampled in bottom ash over the two years.

5.2.5 Microplastics

The hazard posed by microplastics in bottom ash is a very new and underresearched topic. Yang et al. (2021) showed that incineration does not terminate microplastics and their presence in bottom ash ranged from 1.9 to 565 particles per kg, or up to 102,000 microplastic particles per metric ton of waste incinerated. The study was from sixteen modern MSW incinerators established or upgraded to *"advanced technology"* in the last ten years and obtained during stable operation. For all samples the LOI was below 3.2%, thus well within the <5wt% stipulated by the EU. The largest fractions of microplastic in bottom ash were identified as from packaging and building materials (polypropylene and polystyrene) indoctrinated with flame retardants thus making them resilient to high temperatures. Unfortunately, the study did not analyse for specific flame retardants or any POPs within the microplastics. There are currently no standardised test methods for determining plastic content in solid matrices, not least bottom ash, and there are no bottom ash/aggregate limit values for microplastics.

6 Discussion

6.1 Processing Influences and Implications

To understand bottom ash composition and its production mechanisms, one must first understand that waste is a poor fuel (Hulgaard and Vehlow, 2011). MSW is highly heterogeneous making its combustion a very complex phenomenon involving thousands of chemical reactions (Chagger et al., 2000). In theory, elements such as Cd and Hg with boiling points lower than the grate temperature should not be present in bottom ash, while others such as Pb and Zn with higher boiling points should always fall out through the grate. However, this does not follow, with also As, Br, Cd, even Hg in bottom ash (studies in this report, plus Buchholz and Landsberger, 1995; Meima et al., 1999; Klymko et al., 2016). Even recent authors question how volatile substances find their way

there (Glauser et al., 2021). But it is basic reactor engineering that localised that hot and cold regions occur due to endothermic drying and pyrolysis reactions that sap the internal temperature, along with rich and lean (i.e. oxygen enriched and oxygen depleted) pockets, combined with physical mass and heat transfer limitations, resulting in improper conditions for burning both spatially and temporally; while the presence of many metallic elements such as Cu and Sb create catalysis, speeding up unfavourable reactions that form chlorinated and brominated dioxins (Ebert and Bahadir, 2003; Weidlich, 2021). Added to this there are numerous plastic goods in waste which are impregnated with flame retardants (Table 1), thus not only resistant to thermal treatment, but many of which convert to more toxic forms. This is seen by the range of substances which bottom ash contains, evidencing exceedingly high temperatures (molten Cu) along with substantially low (even unburned sewage sludge is emitted) (Bunge, 2019).

Bottom ash treatment is still a fledgeling industry, progressing largely since the 1990s, and with no two treatment plants the same (Bunge, 2019). Processing is usually undertaken offsite, by a different commercial entity, and frequently after shipping across regional or national borders (Arkenbout, 2019). Mehr et al. (2021) describe how modern plants have extraction efficiencies of between $29 \leq \% \leq 92$ for five metals only, while for Pb it is only 16%. As Simon et al. (2021) state:

"The recovery of elemental metals is still a challenge in terms of recovery rate and purity".

Increased recovery of metals can be achieved by extra comminution, but this would adversely affect the residue's value as an aggregate where the integrity of larger particles must be maintained (Bunge, 2019). It would also increase the risk of toxic dust creation, a problem which is somewhat mitigated by wet discharge predominating in Europe. Wet capture creates new mineral phases, which in theory leads to some stabilisation of heavy metals, but at the same time binds elements into a mineral matrix making them unextractable with current technology (Vateva and Laner, 2020). Dry extraction creates its own problems, one of which is friability and dust containment since the dust is loaded with heavy metals (Bunge, 2019). Airborne dispersal of Pb is identified as a particular critical risk factor with road and sub-base applications (Van Praagh et al., 2018). Adverse environmental consequences of bottom ash dust release have also been reported in recent case studies from The Netherlands where it is claimed that open air transportation and handling (without precautions) resulted in marine fauna endocrine disruption at a UNESCO site (Arkenbout, 2019).

In the EU BAT document for waste incineration (EU, 2019), screening and sieving of bottom ash is recommended. However, the findings of this study do not totally concur with these recommendations, since toxic elements are widely spread across all size fractions and types of bottom ash clast. Similarly, the same document recommends weathering/ageing, and while formerly it was perceived that longer duration was better, Germany for example is moving towards shorter ageing periods, which leads to higher metal extraction potential but also higher solubility of salts and less stable mineral phases (Vateva and Laner, 2020).

Weathering/ageing can also lead to the detachment of finer particles and hence increase the mobilisation of toxins (Alam et al. 2019a). Furthermore, weathering increases the mobility of Sb from bottom ash over long timescales (Kalbe and Simon, 2020). Scientific understanding on the subject is still weak and cannot yet adequately guide praxis.

Some authors tested secondary treatment but this is not totally beneficial and has associated climate/cost impacts. Caviglia et al (2019) found that, after subjecting bottom ash to temperatures up to 1000°C, leachate concentrations of Cu, Pb, and Zn were reduced, but there were two orders of magnitude increase in leachate concentrations of Cr and Ba, and one order of magnitude increase for Al.

The increased mobility of Al is interesting and important for those companies who promote cement bound 'green' products – such as building blocks – made from incinerator residues. The matter is of concern not just for toxic substances leaching out but also structural safety, particularly where high treatment temperatures are used in manufacture (as per Caviglia et al., 2019). Aluminium reacts with water and, over time, releases hydrogen, which can lead to both fires and swelling of the block product from which it is made, thus deteriorating compressive strength (Allegrini et al., 2015; Bunge, 2019). This was supported by studies such as Vateva and Laner (2020) where metallic Al content was above 1% in all grain fractions of bottom ash treated with current BAT; and, even at this level, it was said to impair the utilisation of bottom ash as bound aggregate. Elsewhere, Tiberg et al. (2021) reported concentrations of Al of 5-6% of the total composition of the bottom ash even after metals separation.

When such products are brought to sale in Europe, they come via a weak, outdated, fragmented, and therefore unsatisfactory regulatory system of standards and testing methods. The few nationally approved leach tests represent a compromise between the desire to replicate real conditions and the wish to minimise testing time and avoid crushing (Blasenbauer, 2020). But, as shown in this report, they are not comprehensive of all toxic substances, they only represent short-term and relatively sterile conditions, thereby providing at best only a makeshift snapshot rather than a long-term assurance against product integrity and public safety. By discounting changes in pH and the influence of humic matter they also provide spurious results: High acidity (low pH) of the eluent increases the concentration of metals in the leachate and therefore overestimates the leaching potential, but slightly acidic conditions are buffered by the alkalinity and therefore temporarily stabilise it, leading to underestimation of species mobility. This also undermines the safety of bound products, since Portland cement is known to continue ageing through its lifetime and convert to $CaCO_3$ (Haselbach, 2009). Thus, bound bottom ash products are unlikely to remain stabilised over time within cement-based blocks or concrete claimed to be initially safe. This would also then lead to the fallout of toxins.

An unexpected and incidental finding of this report was the range in LOI values in excess of the legal minima. Surprisingly, this report is believed to be the first to use bottom ash (made available by independent testing) as an incinerator diagnostic. It casts doubts on whether incinerators fed with modern MSW are fit for the purpose of creating environmentally-benign, and therefore usable, bottom ash; but also on the efficacy of current incinerator monitoring and operational stability. They supplement previous concerns expressed by bottom ash treatment plant operators regarding large fluctuations in the quality of ash sent to them and general trends of decreasing quality (Arkenbout, 2019). Others have suggested that sources of POPs could result from MSW incinerator operators not applying BAT (Weber et al. 2019); while periods of Other Than Normal Operating Conditions (OTNOC) have been offered as a further supposition to account for high pollutant emissions (Arkenbout et al., 2018). This report suggests that, in fact, instability may be commonplace even during periods of steady state, a matter which requires further investigation.

6.2 Drivers and Other Motivations

In one of the more readable practical accounts on bottom ash treatment, its author concludes that the push for using bottom ash after metals extraction has nothing at all to do with environmental concerns (Bunge (2019):

"using dry processed [sic] *BA as a construction material is exclusively driven by commercial interest hiding behind a fig leaf of environmental commitment."*

He is referring to the high cost of landfill and, perhaps, also the legal impositions of reporting and monitoring prior to disposal of a commodity which has negative value (EU, 2004). Similar findings were reported by Arkenbout (2019), where the Dutch environment inspectorate concluded that a high risk of fraud comes from the waste industry due to the negative market value of bottom ash, and indicated a clear problem with current implementation of regulations (Arkenbout, 2019). It went on to say that:

"Due to a lack of commercially viable options to 'clean' the bottom ash to acceptable levels of toxins (POPs and heavy metals), it is simply not done."

There have been case studies, such as Byker (Newcastle), and Jezera (Czech Republic) where the application of incinerator ash led to local soil contamination and POP bioaccumulation, the latter accidentally supported by EU funding (Petrlik and Bell, 2020; Swedish Environmental Protection Agency, 2011; Arnika, 2021). More recently, drawing on further case studies from The Netherlands, it was concluded that (Arkenbout, 2019):

"Though research is limited, what exists indicates strong concerns for public safety and the environment" [It urgently called for further research and...] "until then, any 'useful' application of bottom or fly ash should be suspended."

Trade appears to be a driver for the use of bottom ash rather than domestic usage. Austria has no need for bottom ash as a construction material (Blasenbauer et al., 2020). The same applies to Switzerland, where vast amounts of unpolluted aggregate are

generated as a surplus to excavation work (Glauser et al., 2021). When one looks at European trading statistics, a handful of countries (particularly The Netherlands, Germany, Norway, and Belgium) are major traders in natural gravel and sand, with an economic turnover in billions of US dollars per year (Leal Filho et al., 2021). The Netherlands in particular is the third largest global exporter of sand (OEC, 2021). Combined with the unharmonised and fragmented testing methods already reported, the building aggregate standards take a laissez-faire approach which puts the onus of risk assessment on the producer, advising testing only *"when required or in case of doubt"*, while product control merely reverts back to the inappropriate EU Directives (EN, 2008):

"It is the producer's responsibility to ensure that if any dangerous substances are identified their content does not exceed limits in force according to the provisions valid in the place of use of the aggregate."

All of which creates a high level of risk to public and environmental health. The main factor controlling bottom ash use in Europe currently is not whether it is scientifically shown to be safe, but rather which leaching test method is chosen and which country or region is the point of sale. Any financial support for 'green' use of bottom ash would likely encourage the movement of hazardous material away from containment in landfill and towards countries with either no, or at least more lenient, environmental regulations. Developing countries seem particularly vulnerable. Some protection is offered by bottom ash being listed on Annex II of the Basel Convention, which seeks to minimise the transboundary movements of hazardous wastes; but not all countries are party to this, and transboundary shipping is permissible with prior consent.

Bottom ash does not have End of Waste status (Blasenbauer et al., 2020). But, according to EU rules, it may be classified as non-hazardous if proven by testing in relation to fifteen hazard classes (EU, 2014). However, there is no harmonised testing method (Blasenbauer et al., 2020). In one Dutch study for the incinerator industry, it was shown that bottom ash was in breach of limit values for the EU waste classification by Pb total concentration, being particularly vulnerable to H10 (toxic for reproduction) and H14 (ecotoxicity) (Klymco, et al. 2016). This confidential report was followed one year later by guidance explaining how the different methodologies for determining H14 could provide different (i.e pass or fail) hazard classifications, despite the limit value breach (Klymko et al., 2017).

The hazards of bottom ash were identified in the 1990s. Meima et al. (1999) found that Cd, Cu, Mo, and Pb showed leachability which was independent of pH, with Zn (all samples) and Cd showing highest leachability at low pH. The sequential leaching methodology is also not new. It was used by Buchholz and Landsberger (1995) who found that leaching of Zn was deemed to be particularly significant due to relatively high quantities in bottom ash; As, Cd and Pb leached in mildly acidic conditions and were assigned as *"long term leaching hazards"*; while As and Pb were present in the greatest range of compounds, making their containment more difficult.

Yet, nearly three decades later, and despite the evidence presented in this report, one still finds that the facts about toxins in bottom ash are totally missing in waste incinerator industry bottom ash 'fact sheets' (CEWEP, 2019). While they also go unmentioned in waste incinerator planning/permitting applications (see §1).

Recently, the United Nations Environment Programme Special Rapporteur published a document on the environmentally sound management and disposal of hazardous substances and waste. Particular criticism was directed at the waste industry (Orellana, 2021):

"Examples abound of disinformation campaigns developed by companies and industries in order to retain their market share at the expense of the rights of people, including workers, consumers, individuals and communities who are exposed to hazardous substances."

Among thirty nine recommendations, the following seem relevant (ibid.):

"Design policy interventions to address the risks and harms of hazardous substances on the basis of the best available scientific evidence."

"Respond to scientific breakthroughs by updating and revising protection measures regarding toxics in a timely manner."

"Apply the precautionary principle in all policy-making and regulatory contexts in which the relevant scientific evidence concerning hazardous substances is inconclusive."

6.3 Findings in Relation to the EU Taxonomy

This research finds that considerations of bottom ash making a substantial contribution to a circular economy transition are premature and unproven, and the hypothesis that the use of bottom ash in civil engineering applications would *"do no significant harm"* is refuted. This is by reference to the following EU Taxonomy objectives:

- Sustainable Use and Protection of Water and Marine Resources;
- Pollution Prevention and Control; and
- Protection and Restoration of Biodiversity and Ecosystems.

The use of bottom ash is seen to be excluded by Art 17, 1, d, iii of EU (2020):

"The long-term disposal of waste may cause significant and long-term harm to the environment."

With respect to Climate Change Mitigation from the use of bottom ash, and while excluding the greenhouse gas emissions directly associated with waste incineration, only one author commented on it, though some mentioned the energy demands of bottom ash treatment without comparison (e.g. Mehr et al., 2021). Bunge (2019) stated that the CO_2 emissions between landfill and the use of bottom ash in place of gravel and sand in building applications cannot be expressed in any meaningful way due to the environmental damage caused by the leaching of metals once *in situ.*

Of relevance is an earlier study from Allegrini et al. (2015) who used empirical data from leaching tests based on bottom ash obtained from a Danish bottom ash processing plant. With this they modelled the toxicity impact for metal leachate only (not POPs) via three categories: carcinogenic human toxicity; non-carcinogenic human toxicity; and freshwater ecotoxicity from the proposed utilisation of bottom ash in nine different construction scenarios. Adverse impact was shown for all three categories in eight out of the nine scenarios: a significant contribution to human carcinogenic toxicity and freshwater ecotoxicity was identified with the inclusion of bottom ash in concrete; while Cr dominated the human carcinogenic impact; and As and Zn were more influential in the non-carcinogenic toxicity category. The high impact of Cr was caused after carbonating concrete specimens were used as a road sub-base, leachate values for Cr and selenium (Se) did not comply with release limit values from concrete specimens set by the Danish government, while leachate from the same sample was not compliant prior to ageing due to excessive release of Pb, and Cu had the greatest adverse impact on freshwater ecotoxicity.

6.4 Alternatives and Recommendations

If waste incineration (a linear activity) remains for some time within a circular economy transition, then better upstream source separation of waste to remove plastics which contain toxins and/or which are known to produce POPs during waste incineration seems essential. Removal of plastics from waste incinerators would, however, have adverse consequences for internal temperature because plastics are of relatively high calorific value. Also halogens - the precursors to many POPs - will remain widely distributed in other waste substances such as coated wood and textiles (see Table 1). A robust system of traceability for toxins in waste would appear to be a preferential activity for funding, and this would offer wider benefits to a circular economy by providing a mechanism to reduce dissemination and repeated cycling of toxins. A better option is, however, to reduce the generation of waste.

Until then, an overhaul of regulatory standards and best practice is needed to better reflect science and the precautionary principle before any further use of bottom ash is sanctioned. This should involve sequential (worst case scenario) leaching test methods and

more comprehensive testing of toxic substances in leaching and total concentration analyses with a focus on long-term, life-cycle stability, along with greater European harmonisation.

6.5 Limitations

It is possible that some empirical studies were overlooked during this review. The absence of recent European-based empirical research on POPs is perplexing, and cannot be explained other than by the hypothesis that it reflects a prevalent academic funding environment in Europe, with a trend for research with commercial enterprise potential – in this case, increased bottom ash metals extraction. This would also explain the lack of research studies on toxic organics, which would likely elicit no such immediate benefit.

Only one study reported on a single grab sample. The rest provided results of long-term bottom ash sampling and analysis (maximum six years), thus strengthening the value of these results. Variations in waste composition could increase the potential for error, but this is constrained by European nations having broadly similar waste demographics (Hoornweg and Bhada-Tata, 2012). Results for organic toxins from Asian incinerators might need treating with some caution, though the plastic fraction in waste is similar globally (ibid.).

A number of studies are considered as underrepresenting the true hazard of bottom ash. For example, Glauser et al. (2021) picked out unburned organic material >5mm from the bottom ash prior to sampling; while Bielowicz et al. (2021) excluded certain samples which contained Pb exceeding national limit total concentrations, and despite this their results still showed Pb concentrations which exceeded the leachate limit value by 70%. Some studies were limited by the range of elements analysed: Vateva and Laner (2020) did not analyse Sb, an element which was shown to exceed the leachate limit values elsewhere for similar tests (Glauser et al. 2021, Simon et al. 2021).

7 Conclusions

Arising from this study, there follows a list of concerns for public health and safety relating to the use of incinerator bottom ash residues in 'circular' applications:

1. Current standards for safety are outdated. In the EU, the use of bottom ash is inadequately regulated; rather there exists a hotchpotch of, at best, autonomic rules and guidelines, with many countries having no requirement for testing.
2. Bottom ash contains significant total concentrations of elements which are a 'high level of concern' based on EU REACH hazard classifications.
3. Bottom ash test methods have inconsistently prescribed total concentration values, with regulations only requiring the determination of a handful of toxic substances.
4. Bottom ash leaching test methods have inconsistently prescribed limit values, with regulations only requiring the determination of a handful of toxic substances.
5. Bottom ash leaching test methods are not based on current science and underrepresent real conditions:
    a. They consider short-term leaching only, with some toxic elements mobile after six years of experimentation.
    b. They give spurious results due to pH buffering. This makes the sample appear to be more stable than it actually is.
    c. They fail to consider the influence of humic matter, which is shown to accelerate leaching.
    d. For bound applications they fail to consider the long-term effects of cement carbonation due to atmospheric CO_2 uptake and weathering. This gives a false estimate of stability.
6. There is a likelihood of hazardous bottom ash export to countries with more lenient regulations.
7. The waste incinerator industry fails to mention the hazards associated with bottom ash in its 'fact sheets' and in permit/planning applications.
8. Microplastics are not destroyed by the incineration process, with up to 565 microplastic particles per kg of bottom ash.

9. PCDD/Fs are present in bottom ash in larger volumes than in fly ash and in concentrations of ca. 3/5 that of fly ash. For bottom ash to be used as building aggregate, only one European country assesses for PCDD/F total concentration and no European country assesses for PCDD/Fs in leachate.
10. PBDE concentrations are an order of magnitude higher in bottom ash than in fly ash, and are not destroyed by the incineration process. No European country assesses for PBDEs in bottom ash to be used as a building aggregate, either with total concentration or leachate.
11. PCBs concentrate in bottom ash in quantities almost two orders of magnitude higher than in fly ash (taken by the mean), and they also leach from bottom ash in higher concentrations than fly ash. Only three countries in Europe assess for the total concentration of PCBs in bottom ash for use as a building aggregate, and none assess for PDBs in leachate.
12. PFASs accumulate at three times greater the total concentration in bottom ash than in fly ash. No European country assesses PFASs in bottom ash for use as a building aggregate either by total concentration or leachate.
13. The EU Best Available Techniques for bottom ash processing are outdated and do not represent current scientific knowledge:
    a. Sieving/screening to remove smaller grain size fractions is not satisfactory, with many potentially toxic elements found in larger quantities in larger grain sizes. It leads to a higher risk of toxic dust exposure and airborne toxin dissemination.
    b. Weathering/ageing is not wholly beneficial. It can lead to higher toxin mobility and indirectly increase the hazard of bottom ash by binding more metals within the mineral fraction.
14. The bottom ash treatment industry is still at a fledgling stage and it is currently incapable of removing all metals. The presence of some, such as Al, causes swelling and hydrogen release, along with a possible fire hazard in cement-bound applications over the long term. Even after treatment, Al is present in bottom ash in quantities liable to disrupt the structural integrity of cement-based (blocks and concrete) products over time, creating long-term risks associated with the use of these products.
15. Many independent studies showed that waste incinerators were not operating at a steady state in compliance with the Industrial Emissions Directive. This impacts not only on the capacity of waste incinerators to produce benign bottom ash, but also raises concerns about the efficacy of waste incinerator monitoring and policing.

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Zero Waste Europe is the European network of communities, local leaders, experts, and change agents working towards the elimination of waste in our society. We advocate for sustainable systems and the redesign of our relationship with resources, to accelerate a just transition towards zero waste for the benefit of people and the planet.

GAIA is a global network of more than 800 grassroots groups, NGOs, and individuals. We envision a just, zero waste world built on respect for ecological limits and community rights, where people are free from the burden of toxic pollution, and resources are sustainably conserved, not burned or dumped. We work to catalyze a global shift towards environmental justice by strengthening grassroots social movements that advance solutions to waste and pollution.

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Environmental Caucus of
The Democratic Party of Hawai‘i

TO: COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Rep. Nicole E. Lowen, Chair; Rep. Amy A. Perruso, Vice Chair

HEARING DATE: Tuesday, February 17, 2026 **TIME:** 9:30 a.m. **PLACE:** VIA VIDEOCONFERENCE & Conference Room 325

COMMENTS OF THE ENVIRONMENTAL CAUCUS OF THE DEMOCRATIC PARTY OF HAWAI‘I REGARDING HB1673 Relating to Waste Management

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

The Environmental Caucus of the Democratic Party of Hawai‘i submits **COMMENTS ONLY** on HB1673. We share the concerns raised by community advocates that the HD1 version of this bill has reversed the intent of the original measure. What began as a bill to strengthen protections for Hawai‘i’s aquifers has been amended in a way that guts key safeguards, creating confusion for the public and for environmental organizations attempting to respond accurately.

We urge the Committee to restore the original language of HB1673 so that the bill once again reinforces, rather than weakens, state-level protections for groundwater and drinking water resources.

However, even the original bill did not address what experts have identified as the larger and more urgent problem: the widespread use of incinerator ash in road construction across the state.

As noted by Honolulu Board of Water Supply Chief Engineer Ernie Lau, for the second year in a row, the practice of spreading ash in unlined roadbeds poses a “bigger problem” than many realize. Incinerator ash contains heavy metals, dioxins, PFAS, and other persistent toxic contaminants. When used in roads—especially in Hawai‘i’s porous volcanic soils and high-rainfall environment—these pollutants can leach directly into groundwater, threatening drinking water supplies and creating long-term contamination pathways.

For this reason, the Environmental Caucus strongly recommends that HB1673 be amended to include a clear, explicit prohibition on:

The use of municipal waste incinerator ash in road construction, road base, fill material, or any public works project.

Without this amendment, Hawai‘i risks institutionalizing a disposal practice that spreads toxic ash throughout communities, increases future cleanup liabilities, and undermines the State’s commitments to environmental protection and climate resilience.

We respectfully request that the Committee:

1. Restore the original protective language of HB1673, and
2. Add a statutory ban on the use of incinerator ash in roads, consistent with expert warnings and best practices in other jurisdictions.

Mahalo for the opportunity to provide comments.

Alan Burdick, Co-chair

Mike Ewall, Co-chair

Melodie Aduja, Co-chair Emerita

Environmental Caucus Democratic Party of Hawai‘i

HB-1673-HD-1
Submitted on: 2/16/2026 9:17:52 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
John & Rita Shockley	Free Access Coalition	Oppose	Written Testimony Only

Comments:

Aloha!

The Free Access Coalition OPPOSES HB1673. Repealing the prohibition of placing landfills above aquifers is wreckless.

Mahalo for your time.

HB-1673-HD-1
Submitted on: 2/16/2026 9:43:06 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Shelby "Pikachu" Billionaire	Kingdom of The Hawaiian Islands & Ohana Unity Party	Oppose	Remotely Via Zoom

Comments:

Testimony in Strong Opposition to HB1673 HD1 – Relating to Landfill Units

Aloha kakou, Chair and Members of the Committee,

I am Master Shelby "Pikachu" Billionaire, HRM, Kingdom of The Hawaiian Islands, H.I., Chairman of the Ohana Unity Party. Aloha nui loa from the heart of our islands, where we live by the guiding spirit of **aloha**—love, compassion, mercy, kindness, and grace—and where **‘ohana** means we mālama our ‘āina and our people above all, protecting our precious freshwater aquifers from contamination that could harm generations to come, as the ‘ōlelo no‘eau reminds us: *He ali‘i ka ‘āina; he kauwā ke kanaka.*

“The land is the chief; man is its servant.” Today, I stand in strong opposition to HB1673 HD1, urging the Committee to reject this bill that would repeal critical protections and open the door to risky landfill expansions inland of the underground injection control line in counties like O‘ahu with populations over 500,000. This bill repeals the prohibition in section 342H-52(c), Hawaii Revised Statutes, on constructing, modifying, or expanding landfill units (municipal solid waste or construction/demolition) inland of the underground injection control line—shifting decision-making authority to the manager and chief engineer of the board of water supply (e.g., Honolulu Board of Water Supply) to approve or deny based on their "no-pass zone" guidelines.

While it adds a new requirement for a **one-half mile buffer zone** around any new, modified, or expanded landfill (from the edge to nearest residential, school, or hospital property line) effective July 1, 2025—and exempts continued operation of existing permitted units without physical expansion—it weakens the hard-line statutory safeguard established by Act 255 (2025) to protect O‘ahu's freshwater aquifers. The legislature itself found that O‘ahu's aquifers are highly vulnerable in areas with smaller or nonexistent caprock, where contamination risks are greatest. The current prohibition prevents landfills in these "no-pass" zones over critical recharge areas.

Repealing it hands discretion to local officials, but discretion can be influenced, overridden, or challenged—leaving our drinking water exposed to leachate, heavy metals, and toxins from municipal waste. O‘ahu already faces landfill crises: Waimānalo Gulch Sanitary Landfill, the island's primary site, was set to close in 2028 but faces extension proposals (including up to 92.5 acres added) amid failed searches for alternatives. The city produces massive waste volumes,

with the municipal combustor alone generating **150,000 tons of ash annually**—much of which must go to landfills under current rules. Expanding inland risks polluting the aquifer that supplies over 90% of Honolulu's drinking water for nearly 1 million residents. We must prioritize **aloha ʻāina**—love and respect for the land—by keeping strong statutory bans on high-risk placements, not diluting them with buffers that may prove insufficient (a half-mile is not foolproof against groundwater migration).

True solutions lie in aggressive waste reduction, recycling, composting, advanced diversion (e.g., zero-waste goals), and exploring non-landfill technologies—not easing rules that could endanger public health and our irreplaceable water resources. **In closing, with deepest aloha and a firm call to mālama our ʻāina and ʻohana by safeguarding our aquifers from contamination, I respectfully urge the Committee to vote NO on HB1673 HD1.

Key reasons include:** - Repeals the statutory prohibition on landfill units inland of the underground injection control line in large counties—weakening aquifer protections in favor of discretionary approvals via "no-pass zones," increasing contamination risks over vulnerable caprock areas.

- Introduces a **one-half mile buffer zone** for new/modified/expanded units (effective July 1, 2025)—a step forward but inadequate alone against leachate threats to groundwater that feeds Oʻahu's primary drinking supply for **nearly 1 million people**.

- Exempts existing operations without expansion—potentially allowing indefinite use of sites like Waimānalo Gulch (facing extensions amid **150,000 tons** of annual ash waste), perpetuating reliance on overburdened landfills instead of innovation. - Undermines findings from Act 255 (2025) and ongoing crises: failed alternative siting, aquifer vulnerability, and public health stakes—prioritizing short-term convenience over long-term **mālama ʻāina**. - True embodiment of Hawaiian values: **aloha**, **ʻohana**, **mālama**, and **kōkua aku, kōkua mai**—protecting our water, our health, and our future with unbreakable safeguards, not weakened discretion.

Mahalo nui loa for your kuleana in this critical environmental work. I am available for any questions and strongly encourage you to kill HB1673 HD1—let us stand firm in aloha ʻāina to keep our waters pure for generations.

Master Shelby "Pikachu" Billionaire, HRM Kingdom of The Hawaiian Islands, H.I. Ohana Unity Party, Chairman www.Ohanaunityparty.com Presidentbillionaire@gmail.com

LATE

CHAMBER OF SUSTAINABLE COMMERCE

Rep. Nicole E. Lowen Chair
Rep. Amy A. Perruso, Vice Chair
Committee on Energy & Environmental Protection

Tuesday, February 17, 2026
9:30AM Conference Room 325

RE: HB1673 HD1 - Related to Landfill Units

Dear Chair Lowen, Vice Chair Perruso, and Members of the Committee,

The Chamber of Sustainable Commerce (CSC),respectfully OPPOSES HB1673 HD1. The Chamber of Sustainable Commerce represents more than 580 small businesses, sole proprietors and entrepreneurs across Hawai'i committed to a triple bottom line: people, planet and prosperity.

HB1673 HD1 would repeal the existing prohibition on constructing, modifying, or expanding a landfill inland of an underground injection control line in counties with populations over 500,000. This prohibition was established to safeguard O'ahu's freshwater aquifers from landfill contamination. Repealing it would remove a clear statutory protection and instead rely on discretionary approval processes.

protecting drinking water aquifers is foundational to economic resilience. Clean water is essential for agriculture, food production, hospitality, healthcare, and countless local enterprises. Any risk of landfill leachate contaminating aquifers—particularly in areas with limited caprock protection, as described in the bill findings—poses long-term environmental and economic consequences.

Landfills inevitably generate leachate. Even with mitigation measures, leakage risks persist over time. Once aquifers are contaminated, remediation is costly, prolonged, and in some cases impossible. The economic burden of water insecurity would fall on households, ratepayers, and local businesses.

Act 255 established a clear, bright-line safeguard. HB1673 HD1 would undo that protection and introduce uncertainty at a time when water security should be strengthened, not weakened.

A regenerative and resilient economy depends on protecting our most finite resource: fresh water.

Chamber of Sustainable Commerce
808.445.7606
P.O. Box 22394
Honolulu, HI 96823

KA LĀHUI HAWAIʻI

Testimony in Opposition to H.B. 1673, H.D.1
Relating to Landfill Units

LATE

Committee on Energy & Environmental Protection
February 17, 2026

Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Healani Sonoda-Pale, and I testify on behalf of Ka Lāhui Hawaiʻi in strong opposition to H.B. 1673, H.D.1.

This measure repeals the prohibition on constructing, modifying, or expanding landfill units inland of the Underground Injection Control (UIC) line on Oʻahu — a protection enacted last year to safeguard our freshwater aquifers. Reversing it places Oʻahu's primary source of drinking water at risk.

Once contaminated, aquifers can't be fully restored. Protecting our precious wai should be the priority.

Ka Lāhui Hawaiʻi respectfully urges you to reject this bill.

Respectfully submitted,
Healani Sonoda-Pale
On behalf of Ka Lāhui Hawaiʻi

HB-1673-HD-1
Submitted on: 2/11/2026 7:07:55 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Timothy Wong	Individual	Comments	Written Testimony Only

Comments:

Rep. Nicole E. Lowen, Chair Rep.

Amy A. Perruso, Vice Chair

Rep. Cory M. Chun

Rep. Sean Quinlan

Rep. Kirstin Kahaloa

Rep. Lauren Matsumoto

Rep. Matthias Kusch

Tuesday, February 17, 2026

TIME: 9:30 a.m.

PLACE: VIA VIDEOCONFERENCE Conference Room 325 State Capitol 415 South Beretania Street

Written in support of HB1673 HD1

Aloha,Chair Lowen, Vice Chair Perruso, and Members of the Committee

My name is Timothy Wong and I am a student at Mililani High School. I strongly support this bill because protecting Oahu's freshwater aquifers is an absolute must. These aquifers supply drinking water for the majority of the island's residents, and once contaminated, they are extremely difficult and costly to restore.

By prohibiting landfill construction,modification, or expansion within the designated no-pass zones, this measure pulls mapping data from the BWS. Areas with small amounts of caprock are high risk areas for contamination and it is largely resonable to restrict high risk activities in these locations.

This bill helps to strenghten current protections while allowing permited landfills to continue operation without expansion. Safeguarding Oahu's water sources protects the public and the future generations.

For these reasons, I urge the pasage of this bill,

HB-1673-HD-1
Submitted on: 2/11/2026 11:19:31 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Johnnie-Mae L. Perry	Individual	Support	Written Testimony Only

Comments:

I, Johnnie-Mae L. Perry, SUPPORT

1673 HB RELATING TO LANDFILL UNITS.

HB-1673-HD-1
Submitted on: 2/12/2026 7:57:37 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Peyton Bitterman	Individual	Support	Written Testimony Only

Comments:

My name is Peyton Bitterman, from Mililani High School, and I am writing in support of HB1673.

O‘ahu relies heavily on groundwater aquifers for its drinking water. Because we live on an island with limited freshwater resources, protecting those aquifers is not optional, but essential for public health and the long-term sustainability of our island.

HB1673 strengthens existing protections by prohibiting the construction, modification, or expansion of landfill units within the designated no-pass zone, areas where the caprock above the freshwater aquifer is thin or nonexistent. From an environmental science perspective, this is a reasonable and preventative measure. Landfills produce leachate, which can contain heavy metals and other contaminants. In areas where natural protective layers are minimal, pollutants can more easily reach groundwater supplies.

Although modern landfills are engineered with liners, no containment system is perfect or permanent. Over time, materials degrade, and natural events such as heavy rainfall can increase the risk of leakage. Once groundwater is contaminated, it is extremely difficult and costly to remediate. As stated earlier, on an island like O‘ahu, where alternative water sources are limited, prevention is far more responsible than attempting cleanup after the fact.

Importantly, this bill does not shut down existing, properly permitted landfills. Instead, it focuses on preventing new or expanding risks in identified vulnerable areas. That approach reflects thoughtful land-use planning and respect for the research conducted by the Board of Water Supply.

Protecting aquifers protects communities, ecosystems, and future generations. I respectfully urge you to support HB1673.

Thank you for your time and consideration.

HB-1673-HD-1
Submitted on: 2/12/2026 10:45:29 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Hoshio Shanti Oyama	Individual	Support	Written Testimony Only

Comments:

I am in support of HB1673 which renews the landfill requirements to reflect the best scientific data provided. The no pass zone provides much needed safeguards to drinking water. The bill also empowers local authority to analyse their data and make change without being bound to state guidelines.

Thank you for the opportunity to testify in this important measure

Sincerely,

Hoshio Oyama

Mililani High

Representative Nicole E. Lowen, Chair
Representative Amy A. Perruso, Vice Chair
House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026
9:30AM, House conference room 325
Hawaii State Capitol

Support for H.B. No.1673

Aloha, Chair Lowen and Members of the House Committee on Energy & Environmental Protection,

I am Josephine Camacho, a high school senior at Mililani High School, and an active participant in AP Environmental and the president of our environmental club (Hui Mālama o Mililani).

This bill states that it will, by 7/1/3000, allow the manager and chief engineer of the board of water supply of the specified county determine whether to approve a proposed landfill unit, or component thereof, within the no-pass zone instead. I am testifying in **support** of this **bill**.

After living on this island essentially all my life, I have seen the impending influence of the tourist industry, as well as the rise in population. Every day, we produce more and more waste, and landfills are both essential and unavoidable, especially as Hawai'i will only become increasingly dense in population.

Also working in fast food, I understand that with the scale of waste being produced daily, there needs to be designated places for that waste to go.

By year 3000, we have hopefully become more sustainable, but with that, we should also be aware of the waste that has already been produced in the centuries prior. Landfills are necessary, and the chief engineer and manager of the board of water supply should be granted the authority to determine whether or not it is safe to construct, modify, or expand a landfill unit, or any component of a landfill unit, inland of an underground injection control line in a county with a population greater than five hundred thousand.

This authority is essential to life in 3000, and will be of much use during that time, so thus I am in **support** of **HB1673**.

Mahalo for your consideration,
Josephine Camacho
Mililani High School % 2026

HB-1673-HD-1
Submitted on: 2/12/2026 10:53:13 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Buena Garcia	Individual	Support	Written Testimony Only

Comments:

Representative Nichole E. Lowen, Chair

Representative Amy A. Perruso, Vice Chair

Committee on Energy & Environmental Protection

Tuesday, February 17, 2026

9:30am, Conference Room 325

State Capitol 415 South Berenstain Street

Support for HB1673

Aloha, Chair Lowen and Members of Committee on Energy & Environmental Protection,

My name is Buena Garcia and I am a senior at Mililani High School. I am testifying in support of H.B No. 1673.

I am submitting this testimony in support of HB1673 because this measure will be able to strengthen Hawai'i's ability to protect our communities. As someone who has been born and raised in Hawai'i, this landfill act will make a difference to the people on the Island. The risk of these landfills threatening our land is big from the pollution, harmful odors, and the harmful runoff entering our communities and ecosystems will affect all of us. HB1673 matters because it pushes Hawai'i toward smarter waste management and reduces the burden on future generations. We truly deserve a healthier, cleaner environment to

grow in , not one where we are constantly expanding landfills or sacrificing more land that should be cafe for not filled with trash.

Mahalo for considering the voices of Hawai'i and for your commitment to protect our islands. I respectfully urge you to pass HB1673 so that our generation and the ones after us can live on an island that is safe, sustainable, and cared for.

Respectfully,

Buena Garcia

HB-1673-HD-1
Submitted on: 2/13/2026 3:47:10 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Brielle Ballesteros	Individual	Support	Written Testimony Only

Comments:

Representative Nicole Lowen, Chair

House Committee on Energy and Environmental Protection

Tuesday, February 17, 2026

9:30AM, House conference room 325

Hawai'i State Capitol

Support for H.B. No.1673, Draft 1

Aloha, Chair Gates and Members of the House Committee on Energy and Environmental Protection, My name is Brielle Ballesteros and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673.

I am testifying in support of protecting O'ahu's drinking water because it is critical for our community's health and future. Most of our water comes from underground aquifers, and if they become contaminated, it may take decades to recover. One major risk from landfills is leachate, a contaminated liquid that forms when water filters through trash and picks up harmful chemicals, which can seep into the ground and contaminate our water sources. I strongly support this bill because it prevents landfills from being built or expanded in areas that are vulnerable to this kind of contamination. HB1673 uses scientific data to identify these vulnerable "no-pass zones," to ensure that landfills are not placed into areas where contamination could be spread easily. By taking proactive steps, this bill can protect public health, reduce future environmental costs, and preserve Hawai'i's freshwater resources for future generations.

I hope you will consider passing H.B. No. 1673 because it is essential to protect our state's environment and health of our community and future generations. Thank you for the opportunity to testify.

Sincerely,

Brielle Ballesteros

HB-1673-HD-1
Submitted on: 2/15/2026 4:40:23 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Samuel Armenti	Individual	Support	Written Testimony Only

Comments:

Representative Nicole Lowen, Chair

Representative Amy Perruso, Vice Chair

House Committee on Energy & Environmental Protection

Tuesday, Feburary 17, 2026

9:30AM, House conference room 325

Hawaii State Capitol

Support for HB1673 HD1

Aloha Chair Gates and Members of the House Committee on Energy & Environmental Protection,

My name is Samuel Armenti and I am a student at Mililani High School. I am testifying **in support of** HB1673 HD1.

I am in support of this bill because O'ahu's aquifers are one of the most essential natural resources on the island, since we get nearly all of our fresh water from these aquifers. Therefore, it is important to take necessary actions to protect these aquifers from dangers like contamination from landfills, which this bill is designed to do by creating no-pass zones that apply to the city and county of Honolulu. If this bill did not pass, that could potentially lead to the construction of landfills in areas that lie directly over aquifers. Almost all landfills overtime, even modern ones, will eventually leak into the environment which can lead to the formation of leachate. This is a

hazardous liquid that can contaminate groundwater and soil, which would be particularly dangerous here on O'ahu since as was said earlier in my testimony, we get nearly all of our freshwater from underground water sources like aquifers. Being unable to use a big portion of our freshwater due to pollution from landfillls and lechate would have a drastic, negative impact on our local agriculture and cultural practices that require freshwater like lo'i kalo (taro patch) and loko i'a (fishpond), in addition to the environment as freshwater helps to support wetlands and streams which both house endangered species. There are several possible solutions to O'ahu's waste problem that are more environmentally friendly and do not take up as much space as landills do. These methods include the several forms of composting, reuse centers, and plasma arc gastification, the latter of which is the method I would recommend the island looks towards using due to the numerous advantages (lower greenhouse gas emissions, creation of better byproducts, uses far less space) it has over landfills and incinerators

I hope you guys consider passing HB1673 HD1 because it will provide more protection to our aquifers, which is important for O'ahu in the longterm. Much mahaloz for giving me the opportunity to testify in support of this bill.

Sincerely,

Samuel Armenti

Mililani High School

HB-1673-HD-1
Submitted on: 2/15/2026 5:51:54 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Xavier Sawa Jr	Individual	Support	Written Testimony Only

Comments:

Aloha, Chair Hashem and Members of the House Committee on Water and Land,

My name is Xavier Sawa, Jr. and I am a student at Mililani High School. I am **testifying in support** of H.B.No. 1673.

I support HB1673, because it strengthens the protection for O‘ahu’s freshwater aquifers by prohibiting the construction, modification, or expansion of landfill units within the no-pass zone. With over a million people in Hawaii, waste is a big issue that needs to be dealt with thoughtfully to maintain our beautiful island's resources. By using updated scientific data and the board of water supply’s no-pass zone mapping instead of relying solely on the former underground injection control line, this bill ensures that the decisions about where landfills are placed are guided by the best available information to prevent contamination of our drinking water sources. Protecting our aquifers is vital for public health, environmental sustainability, and sustaining life in our islands for my generation and generations to come.

I hope you will consider passing H.B.No. 1673 because it is vital to the purity and sutainability of our islands' aquifers and ecosystems. Thank you for the opportunity to testify and the time taken to consider this testimony.

The Honorable Mark J. Hashem, Chair and Members
House Committee on Water and Land

Tuesday, February 17, 2026
9:30AM in House conference room 325 VIA VIDEOCONFERENCE

Support for H.B. No.1673

Aloha, Chair Hashem and Members of the House Committee on Water and Land,

My name is Maile El-Tawansy and I am a student at Mililani High School. I am testifying **in support of** H.B. No.1673.

I am testifying specifically in support of the part of the bill that proposes that landfills should not be built on aquifers regardless of the population. Currently, it only affects Honolulu, but it should protect all of the potential drinking water sources on the island. A landfill should not be built on an aquifer because any leaks (leachate) or failures in the landfill's lining could contaminate the groundwater, which is often a source of drinking water for nearby communities. Contamination of an aquifer can spread over large areas, making the cleanup extremely difficult, expensive, and sometimes seemingly impossible. Additionally, harmful chemicals or pathogens from the landfill could pose serious long-term health and environmental risks to people, wildlife, and ecosystems that depend on the aquifer. It can lead to a water shortage, which can have further consequences within the community.

I hope you will consider passing H.B. No.1673 because it is necessary to ensure the health and safety of the communities, especially on O'ahu, and preserve potential drinking water sources. Mahalo for the opportunity to testify.

Sincerely,

Maile El-Tawansy
Mililani High School

HB-1673-HD-1
Submitted on: 2/15/2026 6:32:09 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Mary Kathryn Afable	Individual	Support	Written Testimony Only

Comments:

I support HB1673 which will limit use of incinerator ash on highways. Do we want to add another source of pollutin to the aquifer?

HB-1673-HD-1
Submitted on: 2/15/2026 7:12:09 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Adora Cobb	Individual	Support	Written Testimony Only

Comments:

Representative Lowen, Chair

Representative Kristin Kahaloa, Vice Chair

House Committee on Energy & Environmental Protection

Tuesday, February 17th, 2026

9:30 AM, House Conference Room 325 VIA videoconference

Hawaii State Capitol

HB1673, H.D. 1

In support of HB1673 - Relating to landfill units

My name is Adora Cobb & I am a high school senior living in Hawai'i. I am testifying in favor of HB1673.

Decisions made by the legislature today will directly impact my future & the future generations of Hawai'i. Clean water is something that everyone depends on, not just for drinking, but for our health, environment, & our way of living. Hawai'i is a small island state, & once our water is damaged, we cannot easily fix it. Putting landfills over our aquifers could damage our precious water. Once the trash from these landfills get into our water, it will be very hard, if not impossible, to reverse the damage done. Passing this bill shows that the legislature values long-term protection over short-term convenience & is willing to make responsible choices that put our people & future generations first.

Passing this bill will also send a strong message that Hawai'i takes environmental responsibility seriously. My generation is paying close attention to how our leaders protect & support our land & resources. Supporting this bill means choosing caution, accountability, & care for the community. This will send a strong message to Hawai`i citizens. It shows leadership & respect for the people who live here now & those that will inhabit our islands later on. I urge you to pass this bill to show that Hawai'i's leaders are committed to protecting what truly sustains us.

- Adora Cobb

HB-1673-HD-1
Submitted on: 2/15/2026 8:45:35 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Alice Abellanida	Individual	Support	Written Testimony Only

Comments:

I support this bill.

HB-1673-HD-1
Submitted on: 2/15/2026 9:11:19 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Melanie Oliveras	Individual	Support	Written Testimony Only

Comments:

Testimony in Support of H.B. 1673
Relating to Landfill Units

Aloha Chair, Vice Chair, and Members of the Committee,

My name is Melanie Oliveras, and I am a student at Mililani High School on O‘ahu. I support H.B. 1673.

As a high school student, I think a lot about the future we are inheriting. Clean drinking water is something we all depend on every day, and protecting our aquifers should always be a priority.

I support this bill because it allows experts at the Board of Water Supply to use updated data and science when deciding where landfill projects can or cannot move forward. Instead of relying only on a fixed line drawn in law, this bill allows decisions to be based on current research and real conditions underground.

This bill keeps environmental protection in place while allowing smarter, more flexible decision-making. As someone who will live with the long-term impacts of today’s choices, I believe that approach makes sense.

Thank you for the opportunity to testify in support of this bill.

Respectfully,
Melanie Oliveras
Mililani Highschool

HB-1673-HD-1
Submitted on: 2/15/2026 9:32:03 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Tyler Dacoscos	Mililani High School	Support	Written Testimony Only

Comments:

Representative Mark J. Hashem, Chair

Representative Daniel Holt, Vice Chair

House Committee on Consumer Protection & Commerce

Tuesday, February 3, 2026

9:00am, House Conference Room 411

Hawaii State Capitol

Support for H.B. No. 1673

Aloha Chair Hashem, Vice Chair Holt, and Members of the House Committee,

My name is Tyler Dacoscos, and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673.

This bill helps protect Hawai‘i’s freshwater aquifers by preventing landfills from being built or expanded in areas where pollution could reach our drinking water. As a student growing up in Hawai‘i, I think protecting our environment and water supply is really important because it affects both our health and our future.

H.B. 1673 is helpful because it promotes smarter planning and helps prevent long-term environmental damage before it happens. Passing this bill would help protect our communities and future generations.

Thank you for the opportunity to testify, and I respectfully ask you to support H.B. No. 1673.

Sincerely,

Tyler Dacoscos

Mililani High School

Representative Mark J. Hasem, Chair

House Committee on Water & Land

Tuesday, February 3, 2026

9:00am, House conference room 411

Hawaii State Capitol

Support for H.B. No.1673

Aloha Chair Hasem and Members of the House Committee on Water and Land. My name is Chariya Chinen and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673.

I am testifying in support of this measure because protecting O‘ahu’s freshwater aquifers is essential to the health and safety of our community. Our island heavily relies on groundwater for drinking water, and landfill contamination can pose a dangerous risk. Areas identified as “no-pass zones” are vulnerable because they have little or no protective caprock above the aquifer, making contamination more likely. This bill allows the Board of Water Supply to use data and aquifer vulnerability maps to determine whether landfill units should be approved in sensitive areas. Using research to guide these decisions strengthens environmental protections and helps ensure responsible waste management practices.

I respectfully urge you to support H.B. No. 1673. Mahalo for the opportunity to testify. As an individual growing up in Hawaii, it is essential to protect our freshwater resources for public health, environmental sustainability, and the future of Hawai‘i.

Sincerely,

Chariya Chinen

Mililani High School

HB-1673-HD-1
Submitted on: 2/15/2026 9:50:06 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Scot Puu-Lozier	Individual	Support	Written Testimony Only

Comments:

Representative Nicole Lowen, Chair

House Commitee on Energy and Environmental Protection

Tuesday, February 17, 2026

9:30AM, House conference room 325

Hawai'i State Capitol

Support for H.B. No.1673, Draft 1

Aloha Chair Gates and Members of the House Committee on Energy and Environmental Protection,

My name is Scot Puu-Lozier, and I am a student at Mililani High School. I am writing to express my support for H.B. No. 1673.

I support this bill because protecting Oahu's drinking water is vital to the health and future of our community. Most of our drinking water comes from underground aquafiers, which are extremely difficult to restore once contaminated. If pollution reaches these aquifers, it can take decades for them to recover.

One of the greatest risks to our water supply comes from landfill leachate. Leachate is a contaminated liquid that forms when water filters through trash and absorbs harmful chemicals. This polluted liquid can seep into the ground and eventually contaminate nearby water sources. H.B. 1673 uses scientifc data to identify vulnerable "no-pass zones," ensuring that landfills are not built or expanded in areas where contamination could easily spread.

By taking prevantative action, this bill helps protect public health, reduce long-term environmental costs, and preserve Hawai'i's freshwater resources for future generations. Acting now is far more responsible and cost-effective than trying to fix irreversible damage later.

I respectfully urge you to pass H.B. No. 1673 to safeguard our state's environment and ensure clean drinking water for our community and future genreations. Thank you for the opportunity to provide testimony.

Sincerely,

Scot Puu-Lozier

HB-1673-HD-1
Submitted on: 2/15/2026 10:48:29 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Maile Burnett	Individual	Support	Written Testimony Only

Comments:

Rep. Lisa Marten (D)

Rep. Greggor Ilagan (D)

Rep. Kim Iwamoto (D)

Rep. Mike Lee (D)

Rep. Sean Quinlan (D)

Rep. Terez Amato (D)

Rep. Linda Ichiyama - Chair, Water & Land Committee

Tuesday, February 17, 2026

9:30 AM, House conference room 325

Hawaii State Capitol

Support for H.B. No.1673

Aloha, my name is Maile Burnett, and I am a student at Mililani High School. I am testifying in support of H.B.No.1673

This Bill is about protecting one of Hawaii's most precious resources, our drinking water. Since we live on an island, almost all of our drinking water is sourced from an

underground aquifer. And once we contaminate those resources, then it is extremely costly and impossible to restore them to normal to have clean drinking water again. As this bill protects these underground aquifers, it also protects communities that can be affected by these landfills. As a member of the soccer community, there was this problem where the state wanted to build a landfill on top of our state's only soccer complex, which is located right next to Pearl Harbor. If they were to take our soccer fields, it would have affected over 1000s of our kids' soccer community. Other than our athletic community, not having clean water really affects our local families and businesses. Not having clean water also affects our tourism industry. And preventing contamination today would avoid massive expenses, and it would make sure that Hawaii has access to safe drinking water. If there were to be a landfill on top of a water aquifer, there could always be a chance that landfill liners could break and the landfill pollutants could leak into the water aquifer. And for these reasons, I respectfully urge you to pass HB1673.

Sincerely,

Maile Burnett

HB-1673-HD-1
Submitted on: 2/15/2026 10:55:48 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Nevaeh	Individual	Support	Written Testimony Only

Comments:

Rep. Nicole E. Lowen, Chair
Rep. Amy A. Perruso, Vice Chair
HB 1673
Feb 17, 2026 9:30 AM
Video Conference
In Support
My name is Nevaeh Gomes, I am a senior at Mililani High School, class of 2026, and I am testifying in favor of HB 1673 relating to landfill units.
I support this bill because how we manage our landfills directly affects our environment, our homes, and our future. As a person born and raised in hawaii I know first hand the amount of waste found everywhere, and on a island I know it's not easy to manage which is why this bill is so important.

HB 1673 helps encourage better oversight and smarter planning for landfill units. This can reduce harm to the land, water, and air, and it can also push our state to think more about waste reduction and sustainable solutions. Protecting our land and reserving it's health is our duty as the people occupying it.

In closing, I respectfully ask you to support HB 1673 to help protect public health, preserve our environment, and create a cleaner future for my generation and those after us.
Thank you for the opportunity to testify.
Nevaeh Gomes
Senior, Mililani High School (Class of 2026)

Representative Nicole E. Lowen, Chair
Representative Amy. A. Peruso, Vice Chair
House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026
9:30 AM, House conference room 325
Hawaii State Capitol

Support for H.B. No.1673

Hello, Chair Lowen and members of the House Committee on Energy & Environmental Protection,

My name is Mason Chong and I am a student at Mililani High School. I am testifying **in support** of H.B. No. 1673.

I am in strong support of this bill because Hawai'i is dependent on its groundwater resources. According to the Department of Land and Natural Resources, approximately 99% of Hawai'i's drinking water originates from aquifers. Around half of all freshwater also comes from these same supplies. I am very passionate about this because I believe that Hawai'i should move to become more sustainable in how we as a state take care of ourselves. Constructing new landfills which can potentially contaminate groundwater sources, therefore devastating our island would be extremely destructive not only to our livelihood, but also our ability to sustain ourselves as well. If this bill does not pass and landfills are to be constructed without limitation over no-pass zones, the likelihood that aquifers get contaminated is high. Once this occurs, Hawai'i will be forced to rely on importing water from the mainland which would be extremely expensive and also make our state much less independent.

I hope that you consider passing H.B. No.1673 since it is vital to the protection of Hawai'i's drinking water supply and it alleviates the potential high cost of importing water. Thank you very much for allowing me this opportunity to provide my testimony.

Sincerely,

Mason Chong
Mililani High School

Representative Nicole Lowen, Chair
Representative Amy Perruso, Vice Chair
House Committee on Energy and Environmental Protection

Tuesday, February 17, 2026
9:30AM, House conference room 325
Hawaii State Capitol

In support of H.B. No.1673 HD1

Aloha, Dr. Rep. Lowen and Energy and Environmental Protection committee,

My name is Preston Galera and I am a student at Mililani High School. I am testifying **in support of** H.B. No. 1673 HD1.

The protection of our aquifers and nearby communities is vital to protect human health for the current generation and future generations ahead. The implementation of a landfill over our aquifers runs the risk of leachate contamination in our drinking water, along with the consequences of permanently damaging the area on land around the landfill area itself. Not only does this imply endangering the lives of people in nearby communities, but it also implies that our aquifers will be contaminated without this bill being approved. As stated by the USGS via "Ground Water in Hawaii," ground water in Hawai'i accounts for 99% of our domestic water, and around 50% of all freshwater. Even with regards to current modern technology including landfills with double liners, the risk is far too great, with confirmation from the U.S. Environmental Protection Agency stating that these landfills will leak eventually. With this bill, it would protect the health of our island home and communities.

I do hope that you consider passing H.B. No. 1673 HD1 as it is an important bill to protect our environment and island communities, both present and future, from the harms of landfills on our aquifers and communities. Mahalo for your time.

Sincerely,

Preston Galera
Mililani High School

HB-1673-HD-1
Submitted on: 2/15/2026 11:34:27 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Noel Shaw	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Noel Shaw, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Noel Shaw

HB-1673-HD-1
Submitted on: 2/15/2026 11:35:23 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Jason Alexander	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

HB-1673-HD-1
Submitted on: 2/15/2026 11:38:20 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Cassidy Neal	Individual	Support	Written Testimony Only

Comments:

Representative Mark Hashem, Chair
House Committee on Water and Land

Tuesday, February 17, 2026
9:30AM, House conference room 325

Support for H.B. No. 1673

Aloha Chair Hashem and members of the House Committee on Water and Land,
My name is Cassidy Neal and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673.

I am testifying in favor of the bill. One of the main focuses of this bill is to protect human health and the environment. If any landfills are constructed, modified, or expanded, it could lead to devastating effects on the community which is why this bill is so crucially important. When rainwater is collected through buried waste that rests in landfills, it creates a very toxic liquid called "leachate" which can enter groundwater and contaminate the drinking water aquifers that we all rely on. When this happens, the polluted drinking water can cause cancer, birth defects, and respiratory disease for all nearby residents. It also degrades ecosystems, poisons wildlife, reduces soil fertility, and creates eutrophication in waterways. This bill is essential because it stops harmful practices from persisting and lowers the risk of permanent damage to the aquifers that supply safe drinking water. Acting immediately will prevent the high future costs for cleanup, public health treatment, and environmental restoration. Once contamination occurs, it becomes extremely challenging to repair or mitigate the harm it causes.

I hope you will consider passing H.B. No. 1673 because it is necessary to protect both our land and the health of our community. Mahalo for the opportunity to testify.

Sincerely,

Cassidy Neal
Mililani High School

HB-1673-HD-1
Submitted on: 2/15/2026 11:54:58 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Makayla Joslin	Individual	Support	Written Testimony Only

Comments:

Rep. Nicole E. Lowen, Chair Rep. Amy A. Perruso, Vice Chair

HB 1673

Hearing Date: 02/15/2026

Time: 12:00 am

Place: [B214/Mililani High School]

Aloha Chair and Committee Members,

I am a senior at Mililani High School and my name is Makayla Joslin, I am class of 2026. I really care about protecting our aina, which is why I am writing to support this bill with comments. We have a limited amount of our special land, and it is hard for us to fix it once it is damaged.

This bill, as I understand it, changes the wording from last year's law. "Inland of an injection control line" is changed to "no pass zone." Words matter, even if it seems like it is only changing a few words. The new wording feels less strict. It seems like it could allow more freedom in building a new landfill. I find that concerning. It might be easier to build in places that should be protected if the rules are not as strong.

Landfills take up a lot of space, and they can harm the land and water if they are not handled properly. Hawai‘i is a small island. There is no extra land for us to waste. Where we put trash needs to be done very carefully. We should think about the long-term effects, not just the short-term ones.

The ash from H-Power worries me as well. Burning trash does not make it disappear. The ash can still cause problems and is still waste. Where the ash will go and how it will be handled safely should be clearly explained in the bill. If this is not clear, it could harm our land and environment later.

The choices you make today will affect me as a student. My generation will have to live with the results. In the future, I hope for a healthy Hawai‘i with clean land and clean water. Please make sure this bill keeps strong protections for our aina and does not make it easier to harm it.

Thank you for your work and the time you took to read my testimony.

Sincerely,

Makayla Joslin

Senior, Mililani High School

(Class Of 2026)

HB-1673-HD-1
Submitted on: 2/16/2026 12:07:41 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Sherry Pollack	Individual	Oppose	Written Testimony Only

Comments:

With the limited options available on our island for appropriately siting a landfill, the military should be made to offer some of the lands that are currently under their control to be used for this purpose, especially considering our current drinking water crisis is the result of the Navy's criminal negligence at Red Hill.

HB-1673-HD-1
Submitted on: 2/16/2026 12:08:13 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Royal Chen	Individual	Oppose	Written Testimony Only

Comments:

Representative Linda Ichiyama, Chair

Representative Sean Quinlan, Vice Chair

House Committee on Water & Land

Feb 17, 2026

9:30 AM

Hawaii State Capitol

Opposition to H.B. No. 1673

Aloha Chair Ichiyama, Vice Chair Quinlan, and Members of the House Committee on Water & Land,

My name is Royal Chen, and I am a student at Mililani High School. I am writing in opposition to H.B. No. 1673 .

I am concerned about the revisions made in this draft because they seem to weaken protections for Hawai‘i’s land and natural resources. As a student learning about environmental issues and sustainability, I understand how fragile our ecosystems are and how difficult it is to repair environmental damage once it has already happened. It feels like this revision focuses more on short term convenience instead of long term responsibility.

Hawai‘i is already facing serious environmental challenges, including climate change, pressure on freshwater supplies, and the loss of native species. If environmental oversight is reduced or protections are loosened, it could lead to long-term consequences that affect both our communities and future generations. As young people who will inherit these decisions, we want to make sure our natural resources are protected.

I believe we should be strengthening environmental protections, not weakening them. I respectfully urge you to reconsider the revisions in H.B. No. 1673.

Thank you for your time and for considering my testimony.

Sincerely,

Royal Chen

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 12:37:37 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Gabriel Acosta	Mililani High School	Oppose	Written Testimony Only

Comments:

Aloha Representative Linda Ichiyama, Chair Representative Sean Quinlan, Vice Chair

My name is Gabriel Acosta, and I m a high school student from Mililani High School. I am submitting testimony in opposition to HB1673.

I understand that O‘ahu has a serious waste problem and that lawmakers are trying to plan for the future. However, I believe HB1673 moves Hawai‘i in the wrong direction. Instead of making it easier to build or expand landfills by removing protections connected to the underground injection control line, our state should focus on reducing how much waste we create so we do not need more landfills at all.

Landfills are not a long-term solution. They take up limited land, can create pollution risks, and place environmental burdens on nearby communities. As a student who will live in Hawai‘i for many years to come, I am concerned that expanding landfill options today will only delay real solutions and leave my generation with bigger environmental problems later.

Hawai‘i should be investing more in waste reduction, recycling, composting, and sustainable alternatives rather than weakening environmental protections to allow more landfill development. Protecting our freshwater resources and natural environment should remain a priority while we work toward a future that produces less waste overall.

HB1673 focuses on where landfills can go, but I believe the bigger question should be how Hawai‘i can depend less on landfills entirely. By prioritizing waste reduction and sustainable systems, we can protect both our environment and future generations.

For these reasons, I respectfully ask the committee to oppose HB1673.

Thank you for the opportunity to testify.

Respectfully submitted,
Gabriel Acosta
Mililani High School, Hawai‘i

HB-1673-HD-1
Submitted on: 2/16/2026 12:45:58 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Kaikaina	Individual	Oppose	Written Testimony Only

Comments:

Representative Cedric Gates, Chair

Representative Kristin Kahaloa, Vice Chair

House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026

9:30AM

House Conference Room 325, via Videoconference

Opposition to H.B. No. 1673

Aloha, Chair and Members of the House Committee on Energy & Environmental Protection,

My name is Kaikaina Onekea and I am a senior at Mililani High School. I am testifying in opposition to H.B. No. 1673.

This measure repeals the statutory prohibition on constructing, modifying, or expanding landfill units inland of the Underground Injection Control (UIC) line on O‘ahu. Removing this fixed statutory boundary replaces a clear, enforceable safeguard with discretionary review, reducing long-term certainty in groundwater protection.

O‘ahu’s freshwater aquifers are geologically vulnerable, particularly in areas where caprock is thin or absent. Landfills generate leachate that may contain harmful contaminants, and while modern liner systems are engineered to minimize risk, they have finite lifespans and rely on long-term monitoring and maintenance. Over extended timeframes, liner degradation, extreme weather events, or system failures can allow contaminants to migrate into groundwater. Once contamination occurs, remediation is complex, expensive, and sometimes not fully reversible.

Although the bill shifts authority to the Board of Water Supply to evaluate proposals using a “no-pass zone,” replacing a statutory prohibition with administrative discretion reduces the durability of protection. Statutory safeguards provide consistency across changing leadership and political

conditions. Drinking water security should remain grounded in clear, stable protections that prioritize long-term aquifer integrity

I hope you will consider rejecting H.B. No. 1673 because safeguarding O‘ahu’s aquifers is essential for our environment, public health, and future generations. Mahalo for the opportunity to testify.

Sincerely,

Kaikaina Onekea

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 1:00:44 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Katherine Fryer	Individual	Support	Written Testimony Only

Comments:

Please amend HB1673 to include Senate Bill 3259's prohibition on using ash from trash incineration as building material. This ash is highly toxic, containing lead, mercury, arsenic and other dangerous chemicals. If the City and County of Honolulu pursues plans to use it in roads with no liner systems, it will leech into our soil and groundwater as road surfaces erode. Our aquifers could be contaminated, and the health of road crews, drivers and local communities would be endangered.

HB-1673-HD-1
Submitted on: 2/16/2026 1:20:37 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Theo	Individual	Support	Written Testimony Only

Comments:

Monday, February 16, 2026

Support for HB 1673

My name is Theodore Shone, and I am a student from Mililani High School. I am writing in support of H.B. No 2083.

I am writing in support regarding HB 2083. This bill proposes to prohibit the construction, modification or expansion of landfill units within designated no pass zones over freshwater aquifers in counties with populations over 500,000. This is crucial for the quality control of our everyday necessity: fresh water. Freshwater aquifers are one of Hawaii's most valuable yet vulnerable resources. With multiple threats to these grand resources it is an absolute priority to protect it in every way we can. One of the ways we can accomplish this is to limit the expansion of landfills in these particular sensitive areas. This bill would be very effective as it relies on the prevention of unwanted landfills in new areas of our already struggling housing problem instead of dealing with cleanup of a consequential conflict.

As a Mililani student who has first handedly helped out in multiple actions towards protecting these water sources, I believe that it is a public health and economic issue to keep clean such a vital resource in every aspect of our island.

For these reasons, I urge the committee to pass HB1673

Mahalo for the opportunity to testify

Sincerely,

Theodore Shone

HB-1673-HD-1
Submitted on: 2/16/2026 1:44:29 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Jordyn Manago-Pinedo	Individual	Support	Written Testimony Only

Comments:

Representative Nicole E. Lowen, Chair
Representative Amy A. Perruso, Vice Chair

Committee on Energy & Environmental Protection

Tuesday, February 17, 2026

9:30AM, House conference room 325

Video Confrence

Aloha chair and memers,

My name is Jordyn Manago-Pinedo, and I am currently a junior at Mililani High school. I am testifying in support of H. B. No. 1673

I believe that this bill should remain passed as a law because it is allowing decisions of landfill placement on the island to be more thought out and safer for the community, being based on updated scientific research and local ground protection zones rather than a single fixed boundary. The Honolulu Board of Water Supply has not only the knowledge, but also the responsibility to evaluate whether a landfill location is safe. They are also in charge of the protection of the freshwater aquifers of our island, which is what provides all of the drinking water for most of O'ahu residents. This bill, turned into a law, shall enforce safety protections in place to keep our waters clean. Instead of placing any landfill where it would knowingly harm not only the environment, but the people, place it somewhere far away from any nearby residential area or somewhere that cannot cause as much damage to us and the environment.

As a student, I do care for our land and its people, ensuring there is clean and safe drinking water for future generations to come. Please take this testimony for H. B. No. 1673 into consideration and Mahalo for the opportunity to share my voice.

Sincerely,

Jordyn Manago-Pinedo

11th Grader at Mililani High School

Representative Nicole Lowen, Chair
Representative Amy Perusso, Vice Chair
House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026
9:30AM, House conference room 325

Comments for H.B. No.1673

Aloha chair Lowen, and Members of the House Committee on Energy & Environmental Protection. My name is Isaiah Villegas and I am a student at Mililani High School currently enrolled in the AP Environmental Science class. My testimony serves to offer comments regarding the bill.

I do acknowledge the fact that the landfill issue is a lingering one and this bill seeks to provide more leeway for the construction of municipal solid landfills or waste disposal centers given approval of certain directors. However, it is to my knowledge that there are very limited prospective sites where a new waste disposal facility could be constructed.

With the deferring of H.B. No.2232 I find it is increasingly imperative to be more strict and diligent in protecting our natural resources in any way possible, because I believe that the more leeway that is given it becomes much easier for our natural resources to be compromised.

Thus I kindly ask that when hearing this bill you consider the posterity of our natural resources and the posterity of our people. Thank you for taking the time to consider my testimony.

Kind regards,
Isaiah Villegas

HB-1673-HD-1
Submitted on: 2/16/2026 1:53:22 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Seanalei	Individual	Oppose	Written Testimony Only

Comments:

Dear Senator Michelle Kidani,

My name is Seanalei Abdul-Adal, and I am a senior at MIlilani High School, and I as well as many others depend on the sanitization of Hawai'is aquifers. I am testifying on how the construction, and expansion of landfill units near, or on our aquifers should be prohibited.

The entirety of the Hawaiian Islands depend on our aquifers for fresh water. We use this fresh water for drinking, cooking, showering, etc. By placing landfills closer to or on our aquifers it may harm all of Hawai'is residents. The persistant chemicals that thrive in these landfills have the potential to be consumed, and cause a health crisis for many.

Being aware of this, we should increase the prohibition on the construction and expansion of landfills. Specifically in the Waimanalo Gulch. Over __ people get their water from the Waimanalo Gulch. As previously stated this fresh water is necessarry to the survival and the health of many in Hawaii. The Waimalnalo Gulch hads previously had issues with leaking into the aquifer. To place a landfill over a main source of fresh water in Wahiawa would be at the detriment of the residents health, and security.

Rather than expanding, and creating more landfills to carry the weight of the island's waste, we should focus our efforts towards recycling, and creating less non-biodegradable products. The island of Oahu is only 597 square miles, and with 15-20 tons of marine debris reaching the shores annually there is no space to waste on increasing landfills. In order to protect Hawai'is residents we should not place these landfills over the natural sources that provide for them.

Thank you for reading my testimony. Your consideration of this issue is greaty appreciated.

HB-1673-HD-1
Submitted on: 2/16/2026 2:35:08 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Anna Chen	Individual	Support	Written Testimony Only

Comments:

Aloha,

My name is Anna Chen, and I am a student at Mililani High School. I am testifying in support of HB1673. As a young person who cares about our environment, I depend on clean water every day and so does my community. This bill helps protect critical groundwater that could be contaminated if landfills are located in vulnerable areas. It also aligns with protecting the environment that future generations like mine will inherit.

Living here, I've learned how important our natural resources are. Knowing that aquifers help feed our streams and sustain native species makes me want to do everything I can to protect them. For these reasons, I respectfully ask the committee to support HB1673

HB-1673-HD-1
Submitted on: 2/16/2026 4:11:14 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Maya Galang	Individual	Support	Written Testimony Only

Comments:

Chair Nicole Lowen

House Committee on Engery and Enviornmoent Protection (EEP)

Tuesday, February 17, 2026

9:30 AM, Video Comference

Hawaii State Capitol

Support for H.B No. 1673

Aloha, Chair Nicole Lowen and members of the House Committee on Energy and Environment,

My name is Maya Galang and I am currently a junior attending Mililani High School. I am testifying in support of H.B No. 1673.

I support this bill because Hawai'i has limited land and fragile ecosystems that require responsible and forward thinking waste management policies. Landfill units pose long-term risks to our enviornment, including contamination of soil and water resources and negative impacts on surrounding communities. Stronger regulation and oversight of landfill units will help protect public health and ensure accountability for enviornemntal safety. The communities located near landfill sites often face disproportionate environmental justice and sustainability. Preventative action now will reduce long-term environmental damage and future finacial costs. By improving standards for landfull units,

Hawai'i can promote safer waste management practices and better protect natural resources for future generations.

For these reasons, I respectfully urge you to support and pass H.B No. 1673. This bill reflects the values of mālama 'āina and our responsibility to care for Hawai'i land and people.

Sincerely and Mahalo,

Maya Galang

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 6:36:38 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Angel Iwane	Individual	Oppose	Written Testimony Only

Comments:

Chair and Members of House Committee on Energy & Environmental Protection (EEP)

Hawai'i State Legislature

Re: HB1673 - Landfill Units

Hearing Date: February 17, 2026

Time: 9:30 A.M.

Place: House Conference Room 325/ Videoconference

In opposition to H.B. No. 2038

Aloha Chair and Committee Members,

My name is Angel Iwane and I am a student at Mililani High

School. I testify in opposition to H.B. No. 2038.

I am testifying specifically in opposition to allowing landfill construction or expansion inland of the UIC line that is currently on Oahu. As a student and a child who grew up on Oahu I have felt before the struggle of not having clean drinking water. A few years back during the U.S. Navy Red Hill fuel facility incident it caused extreme water contamination and it was definitely one of the hardest moments because my family had to go out of our way to go buy bottles of water

instead of relying on things like tap water or the refrigerator. Not only that but due to the contamination it caused many people on Oahu including me to experience headaches and further health issues. It was especially difficult because due to that oil spill many people had to go to the store to get water causing there to be a high water scarcity. Overall HRS 342H- 52 subsection C is in place to protect those who live in Oahu from landfills that have a high potential to cause water contamination which is why this bill of H.B. No. 2038 is not a necessary action that should be taken especially on Oahu.

I hope you will consider opposing H.B. No. 2038 because it is a necessity to keep landfills in designated areas to avoid water contamination and further issues in the future. Mahalo for the opportunity to testify.

Sincerely,

Angel Iwane

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 7:13:43 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Georgia L Hoopes	Individual	Support	Written Testimony Only

Comments:

Aloha Committee Members!

Please restore HB 1673 to its original form so that it is not gutting our state-level aquifer protections. Also, please amend this bill to include the language from Senate Bill 3259 to close a critical loophole. A new landfill needed on Oʻahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the Water and Land Committee hearing, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem."

Mahalo!

Georgia Hoopes, Kalaheo

HB-1673-HD-1
Submitted on: 2/16/2026 8:31:31 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Pamela Elders	Individual	Oppose	Written Testimony Only

Comments:

Please restore HB 1673 to its original form so that it is not gutting our state-level aquifer protections. Also, please amend this bill to include the language from Senate Bill 3259 to close a critical loophole. A new landfill needed on Oʻahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the Water and Land Committee hearing, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem."

HB-1673-HD-1
Submitted on: 2/16/2026 8:35:51 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Christy Shaver	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Christy Shaver, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Christy Shaver

HB-1673-HD-1
Submitted on: 2/16/2026 8:37:24 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Madison Owens	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Madison Owens, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common-sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Madison Owens

HB-1673-HD-1
Submitted on: 2/16/2026 9:05:26 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Tiffany Cruz	Individual	Support	Written Testimony Only

Comments:

My name is Tiffany Cruz, and I am a student from Mililani High School and I am submitting this testimony in support of HB1673, with strong consideration for protecting our ʻāina. While I understand this bill revises last session's law by changing the language from "inland of an injection control line" to a "no pass zone," I believe it is critical that any updates do not unintentionally weaken protections for our land and communities.

Even small language changes can have significant long-term impacts. Hawaiʻi's land is limited, and landfill siting decisions affect groundwater, coastal ecosystems, and nearby neighborhoods for generations. If the revised wording creates more leeway for landfill construction, I respectfully urge the Legislature to ensure that environmental safeguards remain strong and clearly defined. Additionally, concerns raised in testimony regarding the disposal of incinerated ash from H-Power deserve careful consideration. Where and how that material is stored matters for soil quality, water safety, and community health. Protecting ʻāina means thinking beyond immediate capacity needs and planning responsibly for long-term environmental impact.

I respectfully ask that you support HB 1673 only with firm protections that prioritize environmental integrity, public health, and intergenerational responsibility. Thank you for the opportunity to provide this testimony and for your work on behalf of Hawaiʻi's communities and natural resources.

HB-1673-HD-1
Submitted on: 2/16/2026 9:07:21 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Amelei Bless	Individual	Support	Written Testimony Only

Comments:

Representative Nicole Lowen, Chair

Representative Amy A. Perruso, Vice Chair

House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026

9:30 A.M., House Conference Room 325

Hawai‘i State Capitol

Support for H.B. No. 1673

Aloha Chair Lown, Vice Chair Perruso, and Members of the Committee,

My name is Amelei Bless De La Cruz, and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673.

Growing up in Hawai’i, many of us learn how essential clean freshwater is for life, culture, and our future. Most of our drinking water comes from underground aquifers, and if those were to be contaminated by landfill pollution, the consequences would be devastating for people, animals, and ‘āina alike. H.B. 1673 would prohibit the construction, modification, or expansion of landfill units in no pass zones. I believe this bill is important because it takes a preventative approach to protecting our environment and public health. Once groundwater is polluted, it is extremely difficult or impossible to fully clean. This legislation helps ensure that future generations, including my peers and family, will

continue to have access to safe and reliable drinking water. Some may worry that restrictions make managing waste more complicated. However, protecting our freshwater must come first. Responsible waste management should never jeopardize the health and wellbeing of communities or our natural resources.

I hope you will consider passing H.B. No. 1673 to safeguard Hawai'i's precious water and to help ensure a healthier future for all island residents. Mahalo for the opportunity to testify.

Sincerely,

Amelei Bless De La Cruz

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 9:16:12 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Alexandria Manuel	Individual	Support	Written Testimony Only

Comments:

Chair and Members, Committee on Energy and Environmental Protection Hawaii State House of Representatives

1673 HB RELATING TO LANDFILL UNITS, Draft 1

Tuesday, Feb 17, 2026

9:30 AM, 325 VIA VIDEOCONFERENCE

In Support

My name is Alexandria Manuel, and I am a student at Mililani High School submitting testimony in support of HB1673.

I support this bill because Hawai'i must continue to improve waste and landfill management to ensure that the 'āina is protected for future generations. Changing the wording in the law can help Hawai'i better plan waste solutions while still proritizing our islands.

Hawai'i is my home, and I care deeply about protecting its lands and water long term. This is a place I want to see continue to thrive without the worry of landfills and waste ending up in our backyards.

Thank you for the opportunity to submit testimony in support of HB1673.

Sincerely,

Alexandria Manuel

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 9:17:39 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Kaila Manuel	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Kaila Manuel, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common-sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by the City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw last year, the tremendous pressure that may be placed on current and future city administrations and chief engineers of the Board of Water Supply could lead to city-level decisions to site a landfill above a drinking water aquifer if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Kaila Manuel

HB-1673-HD-1
Submitted on: 2/16/2026 9:19:19 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Skyler Leffew	Individual	Support	Written Testimony Only

Comments:

Representative Mark J. Hashem, Chair

House Committee on Water & Land

Tuesday, February 17, 2026

9:30 AM, House conference room 325

Hawaii State Capitol

Support for H.B. No. 1673

Aloha, Chair Gates and Members of the

My name is Skyler Leffew and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673

I am specifically testifying in support of this bill due to the importance of clean water. Clean and usable water is vital for every human being and with such a small availability of clean water existing on this planet, landfills near aquifers could further prevent humans from getting this small amount of water due to the possibility of contamination. Having clean water is so important for multiple reasons pertaining to health. Drinking contaminated water could cause various health issues such as serious infections, organ damage and cancer. It is vital that those who live in areas of potential landfill spots do not contract these health issues. To add on, some people could use the aquifers for agricultural purposes, but if the water is contaminated due to the landfill, the crops would in turn become contaminated and could cause harm to the consumers.

I hope you will consider passing H.B. No. 1673 because it is extremely vital that every person gets as much clean water as they possibly can without any risks of contamination.

Sincerely,

Skyler Leffew

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 9:19:35 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
arleen velasco	Individual	Oppose	Written Testimony Only

Comments:

I strongly oppose this bill.

The contamination of our aquifer has already occured due to having toxic material directly above our only source of fresh water on this island. The island is still dealing with the disaster of Red Hill.

We must learn from our collective mistakes. Allowing a landfill above our aquifer is irresponsible and reprehensible.

We must do as much as possible to protect the safety of our water supply for the near and far future of all humans on this island.

Please do not change the existing law. Protect our water for all of us.

Representative Nicole Lowen, Chair
House Committee on Energy & Environmental Protection

Tuesday, February 17, 2026
9:30 AM, House Conference Room 325
Hawaii State Capital

Support for H.B. No.1673

Aloha, (chair names),

My name is Taylor Tanaka, a senior at Mililani High School. I am testifying **in support of H.B.** No.1673.

I am testifying as I have recently dedicated time in my Environmental Science class to learning about landfills and their potential negative impacts on the area in which it is located. Having a landfill near aquifers or any form of water source is a serious risk as it allows the chance for leachate, a toxic byproduct of landfills that forms when water picks up contaminants from the landfill, to contaminate water sources. Leachate often consists of metals, organic materials, chemicals, and more which can stay in a water source for decades once in contact. When consuming water contaminated with leachate it can lead to serious health risks which include liver and kidney damage, increased cancer risk, as well as developmental issues in children. Moreover, leachate can impact the environment and wildlife just as badly with its runoff potentially polluting the area with polyfluoroalkyl substances (PFAS) that do not break down quickly and accumulate over time through biomagnification, leading to serious health issues in organisms. While the need for a landfill is a pressing issue, it is important to take into consideration the potential impacts that the location of one can have on the environment it's in and the people living nearby.

Truly hope that you will consider passing H.B. No. 1673 as it aids in ensuring that the location of a landfill is thought out in a way that protects local environments, communities, and the future generations to come. Mahalo for the opportunity to testify.

Sincerely,

Taylor Tanaka
Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 9:42:37 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Eli	Individual	Support	Written Testimony Only

Comments:

Dear EEP Committee,

My name is Eli Kittredge and I am in support of Bill HB1673. If this bill is passed it can help prevent any contamination of our aquifers. Our aquifers are supporting over a million of residents each year. With the Red Hill oil leak back in 2023. We have seen the affects of contamination of our very rare water source. Many people sick, and having to go out of their way just to make sure they have something clean to drink.Therefore, we should be making laws stricter around placing landfills or anything that concerns the contamination of our aquifers. With this bill it can prevent any contamination from landfills by making sure the future landfills don't go anywhere near our aquifers.

As someone who lives in the Red Hill area, I have to use the menehune water company to make sure that i have clean drinking water. Because the water i see from the tap tastes and looks very weird. I have gotten sick from drinking it. I really hope that this law is passed so that future generations don't hae to resort to outside help just to have a basc nesscity to life.

Thank you for taking your time with reading this testimony.

Sincerely,

Eli Kittredge

HB-1673-HD-1
Submitted on: 2/16/2026 9:59:06 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Lauren Ballesteros-Watanabe	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Lauren, and I am writing in **strong opposition to HB1673 HD1.**

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Lauren Ballesteros-Watanabe

HB-1673-HD-1
Submitted on: 2/16/2026 10:05:47 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Kesewatohsaeh	Individual	Support	Written Testimony Only

Comments:

To, Representative Lowen, Nicole, Chair

Energy and Environmental Protection committee

Regarding Bill H.B. 1673

Support for H.B. 1673

In support of the bill,

I am a student from Mililani high school and I am speaking on behalf of myself and my own experiences. I am testifying in favor of this bill. I am, to say the least, concerned about global warming and our earth as a whole. I want to grow up in a world where my children and their children can see the sights I see today. I am inspired by the nature I surround myself with and I would not be the person I am today without it. By tightening the restrictions around landfills, we are at the very least saving our aquifers from contamination. This won't ensure my children live in the world I do, but it is definitely a step in the right direction.

From, Kesewatohsaeh Daguio

HB-1673-HD-1
Submitted on: 2/16/2026 10:10:36 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Anne Lorenzo	Individual	Oppose	Written Testimony Only

Comments:

Aloha e Chair Lowen, Vice Chair Perruso, am e Members of the Committee,

My name is Anne M. Lorenzo, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Anne M. Lorenzo

HB-1673-HD-1
Submitted on: 2/16/2026 10:13:21 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Ruta Jordans	Individual	Support	Written Testimony Only

Comments:

Please amend this bill with the language from SB3259.You can watch the 11-minute hearing in the Water and Land Committee earlier this month where Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated that he has concerns about recycling the toxic ash and that prohibiting the ash in roads is "a real justifiable amendment" since it could leach out with rainfall, run off, and seep into the aquifer. As the roads containing toxic ash from the H-Power ininerator erode over time communities and the aquifer will be exposed to chemicals such as lead, arsenic and dioxins.

HB-1673-HD-1
Submitted on: 2/16/2026 10:21:04 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Cheryl Ho	Individual	Oppose	Written Testimony Only

Comments:

Dear Chair Lowen and Vice Chair Perruso, and Members of the Committee:

I STRONGLY OPPOSE this bill. The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on Oʻahu. This would be folly!!

I heard Ernie Lauʻs presentation about this issue last year, warning the public about the risk of contamination of the aquifer.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui,

Cheryl Ho, Nuʻuanu

HB-1673-HD-1
Submitted on: 2/16/2026 11:19:46 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Glenn Choy	Individual	Oppose	Written Testimony Only

Comments:

I strongly oppose this bill. It is not in the public interest

HB-1673-HD-1
Submitted on: 2/16/2026 11:25:50 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Danielle Ciccone	Individual	Oppose	Written Testimony Only

Comments:

Please restore HB 1673 to its original form so that it is not gutting our state-level aquifer protections. Also, please amend this bill to include the language from Senate Bill 3259 to close a critical loophole. A new landfill needed on Oʻahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the Water and Land Committee hearing, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem."

HB-1673-HD-1
Submitted on: 2/16/2026 12:46:49 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Michael Plowman	Individual	Oppose	Written Testimony Only

Comments:

Oppose!

HB-1673-HD-1
Submitted on: 2/16/2026 1:04:44 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Laura Alskog	Individual	Support	Written Testimony Only

Comments:

Please restore HB 1673 to its original form so it continues protecting our state aquifers instead of weakening those safeguards. I'm also asking that you add the language from SB 3259 to close an important loophole.

On O'ahu, any new landfill would mostly be for H-POWER incinerator ash. If that ash is considered too hazardous to place in a double-lined landfill above our aquifer, then it clearly shouldn't be spread throughout our communities in road construction without any liner protection at all. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, explained during the Water and Land Committee hearing, this is a reasonable amendment because allowing ash in roads could end up creating a much bigger contamination problem.

Thank you,

Laura Alskog

HB-1673-HD-1
Submitted on: 2/16/2026 1:09:20 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
pahnelopi mckenzie	Individual	Oppose	Written Testimony Only

Comments:

I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely, Pahnelopi McKenzie

HB-1673-HD-1
Submitted on: 2/16/2026 1:12:00 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Christine Mau	Individual	Support	Written Testimony Only

Comments:

Please restore HB 1673 to its original form so that it is not gutting our state-level aquifer protections. Also, please amend this bill to include the language from Senate Bill 3259 to close a critical loophole. A new landfill needed on Oʻahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. As Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the Water and Land Committee hearing, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem."

HB-1673-HD-1
Submitted on: 2/16/2026 1:13:56 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Jerney Lorenzo	Individual	Support	Written Testimony Only

Comments:

House of Representatives

HB1673, HD1

In favor to landfill solutions

I am Jerney Lorenzo, 17 year old student, and I am testifying in favor of finding better ways of the effects of landfills. I stand with this due to the idea that it will severely affect the individuals and families that are near the landfills. With the holding of permits, I think it is an effective way to make sure that the issues are found and solutions are created that put the people's needs first. Especially when landfills are one of the main reasons things are contaminated, it not only affects societies health but also the environment with air emissions and contaminated soil through leachate. Therefore, I am in favor of this bill due to the fact of looking into the future of society and our health.

Jerney Lorenzo

HB-1673-HD-1
Submitted on: 2/16/2026 1:19:46 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Peter Wilson	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Peter Wilson and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,
Peter Wilson

HB-1673-HD-1
Submitted on: 2/16/2026 1:20:59 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Bo Breda	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Bo breda, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,
Bo Breda

HB-1673-HD-1
Submitted on: 2/16/2026 1:31:51 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
ANDREW ISODA	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Andrew Isoda, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,

Andrew Isoda

Lahaina, Mau'i

HB-1673-HD-1
Submitted on: 2/16/2026 1:50:35 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
cheryl burghardt	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

I am in **strong** opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

We need to take these steps now. Red Hill is a known issue and we live on islands which depend on the clean water aquifers. It is already to late in some places to protect which is why it is important that when we can we keep the protections that we already have. Do not roll back.

I respectfully urge you to Oppose HB1673 HD1.

Mahalo nui for the opportunity to testify

Cheryl Burghardt

Nuuanu Oahu

HB-1673-HD-1
Submitted on: 2/16/2026 2:03:42 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Kahealani	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Kahealani, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Kahealani

HB-1673-HD-1
Submitted on: 2/16/2026 2:14:07 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Susan Gorman-Chang	Individual	Oppose	Written Testimony Only

Comments:

Susan Gorman-Chang

Opposition to HB1673 HD1.

The latest draft of HB 1673 HD1 would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

We are still dealing with the Red Hill water crisis, and it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1**.

Mahalo nui for the opportunity to testify.

Sincerely,

Susan Gorman-Chang

Ewa Beach, HI

HB-1673-HD-1
Submitted on: 2/16/2026 2:30:45 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Kealii Pang, Ph.D.	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Dr. Kealii Pang. I am a retired federal biologist with 35 years of experience in conservation and environmental protection here in Hawai‘i, and I am a resident of Kaimukī, O‘ahu. I am writing today to offer my strong opposition to HB1673 HD1.

Throughout my career, I witnessed the slow, often invisible degradation of our ecosystems. Contamination rarely happens in a dramatic spill; it happens incrementally, underground, and out of sight—until it is too late. That is precisely why the Legislature acted last year to prohibit the siting of new landfills above O‘ahu's drinking water aquifers. We know, scientifically, that modern landfills are not perpetual containment vessels. Liners fail. Leachate migrates. Gravity is constant. It is not a matter of if a landfill above an aquifer will leak, but when.

The assertion in this bill that a City ordinance regarding the Honolulu Board of Water Supply's "no-pass zone" renders the state law redundant is a dangerous gamble with our water security. State law provides a fixed, unalterable floor of protection. City ordinances and administrative decisions are subject to political pressure, budgetary shifts, and future reinterpretation. As we saw during the Red Hill crisis, relying solely on the good intentions of an agency or administration is not a viable environmental strategy. We need statutory backstops.

We are still calculating the long-term damage of the Red Hill contamination. From my home in Kaimukī, I think daily about the health of our keiki and the future of the aquifer that sustains us all. To willingly create new, predictable point-sources of pollution above the very water we drink would be a profound disservice to our island and future generations.

I respectfully urge you to HOLD HB1673 HD1. Do not roll back this essential protection. Preserve the integrity of our wai.

Mahalo nui loa for your time and for your commitment to protecting our island home.

Sincerely,

Kealii Pang, PhD
Kaimukī, O‘ahu

HB-1673-HD-1
Submitted on: 2/16/2026 2:55:18 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Michele Mitsumori	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Michele Mitsumori, and I am writing in strong opposition to HB1673 HD1.

From droughts to fires to residential and business use, we are seeing ever growing demands on limited water supplies. Last year, the Hawai‘i Legislature made a much-needed policy call by prohibiting the siting of landfills above drinking water aquifers on O‘ahu. The fact that a repeal of this prohibition is before us here in 2026 testifies to the immense pressure placed on city administrators, the Board of Water Supply, and others.

The Red Hill water crisis showed us that transparency, candor, accountability, and competence cannot be guaranteed, and that the task of cleaning, rebuilding, and healing are long, exhausting, and expensive.

I urge the Legislature to continue its responsibility to safeguard our water supply, for now and for future generations. Uphold the state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu that was passed just last year by opposing HB1673 HD1.

Mahalo for this opportunity to testify,
Michele Mitsumori

HB-1673-HD-1
Submitted on: 2/16/2026 3:00:55 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Daniel Holt	Individual	Comments	Written Testimony Only

Comments:

Please restore HB 1673 to its original form! Following the lead of the federal government by selling out environmental protections to industry or to just make one's job easier is NOT the way forward for Hawaii. Protect the land and the people.

Mahalo!

HB-1673-HD-1
Submitted on: 2/16/2026 3:33:17 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
malcolm mackey	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Malcolm Mackey, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,

Malcolm Mackey

HB-1673-HD-1
Submitted on: 2/16/2026 3:36:07 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Keri Zacher	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Keri Zacher, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely, Keri Zacher

HB-1673-HD-1
Submitted on: 2/16/2026 3:37:52 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Ezgi Green	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

I am writing in opposition to HB1673 HD1.

This bill would remove an important state protection that prevents landfills from being placed above O‘ahu’s drinking water aquifers. Protecting these water sources is vital, especially in light of the ongoing Red Hill crisis. The law passed last year helps ensure our water stays safe for future generations.

While there may be city-level protections, state-level safeguards remain essential to prevent risks to our water supply. I respectfully urge you to HOLD HB1673 HD1.

Mahalo for considering my testimony.

Sincerely,
Ezgi Green,

Waialua, O'ahu

HB-1673-HD-1
Submitted on: 2/16/2026 3:45:07 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Valerie Chang	Individual	Comments	Written Testimony Only

Comments:

Please amend bill to include language from SB 3259 to close loophole when the Water and Land Committee did not add this amendment. I remained concerned about the safety of our aquifer if we recycle toxic ash into our roads. It may leach out into the aquifer during rain storms. Our Aina needs to be protected to continue serving Hawai‘i's residents!!!

HB-1673-HD-1
Submitted on: 2/16/2026 3:55:03 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Dee Green	Individual	Oppose	Written Testimony Only

Comments:

I strongly oppose HB1673 HD1.

This bill takes a dangerous step backward by stripping away an important, plain-sense safeguard that protects O‘ahu’s drinking water aquifers from being placed beneath future landfills. At a time when residents are still dealing with the fallout of the Red Hill water crisis, weakening protections for our remaining water sources is the last thing this legislature should be doing. Clean water is not replaceable, and decisions made today will affect people who live here long after all of us are gone.

The legislature should not abandon its responsibility to protect wai for present and future generations.

HB-1673-HD-1
Submitted on: 2/16/2026 3:59:44 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Ken Stover	Individual	Support	Written Testimony Only

Comments:

support

HB-1673-HD-1
Submitted on: 2/16/2026 4:27:00 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Keli'i Ioane	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Keli‘i Ioane, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1**.

Mahalo nui for the opportunity to testify.

HB-1673-HD-1
Submitted on: 2/16/2026 5:12:26 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Mary True	Individual	Support	Written Testimony Only

Comments:

A new landfill needed on O'ahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. Please amend this bill to include the language from Senate Bill 3259 to close this loophole.

Thanks for your attention. Aloha and mahalo.

Mary True, Pepe`ekeo, 96783

HB-1673-HD-1
Submitted on: 2/16/2026 5:18:51 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
DIANE CHOY FUJIMURA	Individual	Oppose	Written Testimony Only

Comments:

/CmdAloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Diane Choy Fujimura, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,
Diane Choy Fujimura

HB-1673-HD-1
Submitted on: 2/16/2026 5:29:35 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Aly Kazama	Individual	Support	Written Testimony Only

Comments:

Representative Nicole Lowen, Chair House Committee on Energy and Environmental Protection

Tuesday, February 17, 2026

9:30 AM Video Conference, Room 325

Hawai‘i State Captiol

Support for H.B. No 1673

Aloha, Chair Lowen and Members of the House Committee on Energy and Environmental Protection,

My name is Aly Kazama, and I am currently a student at Mililani High School. I am testifying in support of H.B. No.1673.

I am submitting a testimony in support of this measure because I believe we should protect Hawai'i's environment for the health of our communities and ecosystems, both for now and for our future generations. As you know, in H.B. No. 1673, it prohibits the construction, modification, or expansion of landfill unit, or any component of a landffill unit, inland of an underground injection control line in a county with a population greater than 500,000. This prohibits no-pass zones, which may slowly start to get damaged, which could also make us have more contaminated water. We need clean water to survive, but having contaminated water, it may get difficult to survive. Having pollution and contamination near our natural resources in sensitive areas, it can get into soils and groundwater which could also reach the streams and oceans. This can threaten our ecosystem and give us problems with having clean water to be used to eat, drink, bathe, etc.

I hope you will consider passing the bill H.B. No. 1673 because it is necessary to have clean water, reduce pollution, protecting natural resources, and environmental and public health.

Sincerely,

Aly Kazama

Mililani High School

HB-1673-HD-1
Submitted on: 2/16/2026 5:31:48 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Mahealani Kamau	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Māhealani Kamau, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on Oʻahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above Oʻahu's drinking water aquifers, given the inevitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's recognition of the Honolulu Board of Water Supply's "no-pass zone," this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1**.

Mahalo nui for the opportunity to testify,

Māhealani Kamau

HB-1673-HD-1
Submitted on: 2/16/2026 6:13:04 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Lisette Akamine	Individual	Oppose	Written Testimony Only

Comments:

Aloha nui e Chair Lowen, Vice Chair Perruso, and Members of the Committee,

I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone.

Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations.

As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

For these reasons, I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify.

Sincerely,

Lisette Puanani Akamine

Kahaluʻu, Oʻahu

HB-1673-HD-1
Submitted on: 2/16/2026 6:17:45 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Reef Oudraad	Individual	Support	Written Testimony Only

Comments:

Hello,

My name is Reef Oudraad and I attend Mililani high school. I play varsity baseball and take my health very seriously. I support HB1673 because protecting O‘ahu’s precious freshwater aquifer from landfill contamination is crucial for the health and safety of our communities and future generations, and this bill’s prohibition on constructing, modifying, or expanding landfill units within designated “no-pass zones” over sensitive aquifer areas will help safeguard our drinking water and environment.

Thank you for your consideration

HB-1673-HD-1
Submitted on: 2/16/2026 6:29:02 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
irene kloepfer	Individual	Oppose	Written Testimony Only

Comments:

We have just been through the atrocities of red hill poisons above our drinking water. I find it mind bobbling that there is even the thought no less a bill going through to put a landfill anywhere near our drinking water. Do not pass this bill. Mahalo

HB-1673-HD-1
Submitted on: 2/16/2026 7:16:15 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
emily gambino	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Emily Gambino, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,

Emily Gambino

HB-1673-HD-1
Submitted on: 2/16/2026 7:17:31 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Robert Nawahine Mansfield, Jr	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Representative Nicole E, Lowen, Vice Chair Representative Amy A. Perruso, and Members of the Committee,

Committee on Energy & Environmental Protection

HB 1673 HD1

Tuesday, 17 February 2026

09:30 a.m.

CR 325 Via Videoconference

My name is Robert Nawahine Mansfield, Jr., and I am writing in **strong opposition to HB1673 HD1.**

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and**

future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui loa,

Robert Nawahine Mansfield, Jr.

Moiliili

HB-1673-HD-1
Submitted on: 2/16/2026 7:30:31 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Nanea Lo	Individual	Oppose	Written Testimony Only

Comments:

Hello Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is **Nanea Lo**, and I am writing in strong opposition to **HB1673 HD1**.

The latest draft of this measure would needlessly remove a critical and common-sense state-level protection that prevents the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the ongoing impacts of the Red Hill water crisis, it is incumbent upon all of us to do everything possible to protect the water sources we have left from foreseeable future contamination. If we are to do right by our islands—and by the future generations who will inherit them—safeguarding our drinking water must remain a top priority. For this reason, the Legislature rightly passed a law last year prohibiting the siting of landfills above O‘ahu’s drinking water aquifers, recognizing the inevitability that a landfill’s highly toxic leachate will eventually contaminate any underlying groundwater. Rolling back this protection would be a grave mistake.

While there may now be an additional layer of protection through the City’s recognition of the Honolulu Board of Water Supply “no-pass zone,” this does not justify the Legislature abdicating its own responsibility to protect our precious wai. As we have seen repeatedly, current and future city administrations—and current and future chief engineers—may face immense political and economic pressure. Without a clear and enforceable state-level prohibition, those pressures could lead to decisions that place landfills above drinking water aquifers if this measure is allowed to pass.

Our water is not expendable. It is a sacred trust owed to our children, grandchildren, and generations yet to come. The Legislature must stand firm in its duty to protect Hawai‘i’s drinking water sources.

For these reasons, I respectfully urge you to **HOLD HB1673 HD1**.

me ke aloha ‘āina,

Nanea Lo, 96826

Sierra Club of Hawai‘i Member

Hawai‘i Workers Center Board Member

Honolulu Tenants Union Member

350 Hawai‘i Member

Carbon Cashback Hawai‘i Member

Hawai‘i Tax Fairness Coalition Member

HB-1673-HD-1
Submitted on: 2/16/2026 7:52:18 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Shannon Rudolph	Individual	Oppose	Written Testimony Only

Comments:

Oppose

HB-1673-HD-1
Submitted on: 2/16/2026 8:14:25 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Carrie Ann Shirota	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Carrie Ann Shirota, and I am writing in **strong opposition** to **HB1673 HD1 Relating to Landfill Units.**

Last year, the Hawai'i Legislature passed a sensible law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater.

The latest draft of this measure would remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As acknowledged by the ‘Ōlelo No‘eau or Hawaiian proverb, "He huewai ola ke kanaka na Kāne." Literally translated, this means that people are Kāne’s living water gourd. The deeper meaning, however, is that wai or fresh water, is the source of life. Conversely, without water, we perish!

For the sake of our well-being and that of future generations, please do not roll back this critical protection by passing this measure as drafted. I respectfully request that you defer **HB1673 HD1.**

Sincerely,
Carrie Ann Shirota, Esq.

Honolulu, Hawai'i

HB-1673-HD-1
Submitted on: 2/16/2026 8:22:53 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Malia Marquez	Individual	Oppose	Written Testimony Only

Comments:
Aloha Kākou,
My name is Malia Marquez and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While here may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1**.

Mahalo nui for the opportunity to testify.

Me ka ha'aha'a,

Malia Marquez

HB-1673-HD-1
Submitted on: 2/16/2026 8:45:07 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
William Reese Liggett	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is William Reese Liggett, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Sincerely,
William Reese Liggett

HB-1673-HD-1
Submitted on: 2/16/2026 8:46:18 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Elizabeth Nelson	Individual	Oppose	Written Testimony Only

Comments:

I am writing in strong opposition to this bill. The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O'ahu.

Thank you,

Elizabeth Nelson

Kaneohe

HB-1673-HD-1
Submitted on: 2/16/2026 8:53:42 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Barbara DeBaryshe	Individual	Comments	Written Testimony Only

Comments:

Aloha e Chair Lowen, Vice Chair Perruso and committee members,

Please restore HB 1673 to its original form to reinstate our state-level aquifer protections. Also, please amend this bill to include the language from Senate Bill 3259 to close a critical loophole. A new landfill needed on Oʻahu would primarily be for H-POWER's incinerator ash. If it's too dangerous to have the same ash in a double-lined landfill over the aquifer, it's surely too dangerous to be putting in roads, all over the aquifer with no liner systems. After the Red Hill scare, it shuld be obvious to all that we must protect our waer supply at all costs.

Ernie Lau, Chief Engineer at the Honolulu Board of Water Supply, stated in the Water and Land Committee hearing, this is "a real justifiable amendment" because allowing the ash to be used in roads could be "inadvertently creating a bigger problem." I trust the BWS to know and do what is best for the wai.

Barbara DeBaryshe, Kaimuki

HB-1673-HD-1
Submitted on: 2/16/2026 9:02:12 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
jeanne wheeler	Individual	Oppose	Written Testimony Only

Comments:

Aloha: please do NOT pass this bill. Mahalo, JW

HB-1673-HD-1
Submitted on: 2/16/2026 9:03:50 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Councilmember Tamara Paltin	Individual	Oppose	Written Testimony Only

Comments:

Aloha e Chair and members,

I am in opposition of HB1673 HD1 I think it is extremely short sighted to repeal the prohibition against placing landfills above the underground injection control line. Our drinking water aquifers are extremely precious and need to be protected from catastrophic contamination.

Mahalo for your service and taking the time to read my testimony,

Tamara Paltin

HB-1673-HD-1
Submitted on: 2/16/2026 9:04:17 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Shay Chan Hodges	Individual	Oppose	Written Testimony Only

Comments:

loha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Shay Chan Hodges, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1.**

Mahalo nui for the opportunity to testify.

Mahalo, Shay Chan Hodges, Maui.

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Athan Nguyen, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect our remaining vital water sources from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. **As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.**

I respectfully urge you to **HOLD HB1673 HD1**.

HB-1673-HD-1
Submitted on: 2/16/2026 9:40:45 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Cristina Holt	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee on Energy and Environmental Protection,

My name is Cristina Holt and I am a resident of Hilo, Hawai‘i, House District 2 and Senate District 1. I am in STRONG OPPOSITION to HB1673 HD1.

This bill seeks to repeal a protection that is barely a year old. Act 255, signed into law in 2025, established a clear, bright-line prohibition on the construction, modification, or expansion of landfill units inland of the underground injection control (UIC) line in counties with a population greater than 500,000. That law exists for one reason: to protect O‘ahu's freshwater aquifers from landfill contamination.

Now, less than a year later, this bill wants to tear that protection out and replace it with discretionary authority given to the manager and chief engineer of the Honolulu Board of Water Supply, using a "no-pass zone" layer on a zoning app as a guideline.

Let me be clear about what is happening here. We are being asked to replace a hard legal prohibition with a suggestion. A law with an app.

This is the wrong direction for the following reasons:

We just fought this fight. Act 255 was the product of extensive public testimony, scientific review, and legislative deliberation. The people of O‘ahu made their position clear: do not allow landfill expansion over our drinking water. The legislature listened. The Governor signed it. Repealing that protection barely a year later undermines the public's trust in the legislative process itself.

Hard prohibitions exist for a reason. The UIC line is a scientifically established boundary. It is not arbitrary. It represents the line beyond which contamination has a direct pathway to underground sources of drinking water. Replacing a prohibition tied to that line with discretionary approval authority based on a "no-pass zone" on a zoning application is a dramatic weakening of protection, no matter how it is framed.

Discretionary authority is not a substitute for a legal prohibition. This bill's own language makes the case against itself. It states that without the prohibition in section 342H-52(c), the

manager and chief engineer "would then be able to withhold approval" of a landfill unit within the no-pass zone. The key word is "able." Not required. Not mandated. Able. That means they would also be able to approve it. That is the entire point of this repeal, and it is exactly why it is dangerous.

We already know what happens when we get this wrong. Oʻahu is still dealing with the consequences of the Red Hill Bulk Fuel Storage Facility, where inadequate protections led to catastrophic contamination of drinking water for thousands of military families and surrounding communities. The idea that we would weaken aquifer protections in the same legislative session where we are appropriating funds to study Red Hill remediation (HB1926 HD1, on this very same agenda) is staggering. We should be learning from Red Hill, not repeating the same logic that led to it.

The framing of this bill is misleading. This bill is presented as a technical improvement, swapping one protective framework for another. But the reality is simple: Act 255 says you cannot build a landfill over the aquifer. This bill says maybe you can, if someone decides it's okay. Those are not equivalent protections.

Oʻahu's freshwater is not a resource we can afford to gamble with. The island's aquifers supply drinking water to nearly a million people. Landfill contamination of groundwater is not a theoretical risk. It is a well-documented reality across the country. Once an aquifer is contaminated, remediation is extraordinarily expensive, technically difficult, and in some cases effectively impossible. The precautionary principle demands that we maintain the strongest protections available, not weaken them at the first opportunity.

I also want to note the effective date of this bill: July 1, 3000. While I understand this is a placeholder, it signals that even the drafters recognize this measure is not ready. I would argue it should never be ready, because the underlying policy is wrong.

The people of Hawaiʻi fought hard for Act 255. It was the right policy when it passed, and it is the right policy now. I urge this Committee to hold this bill and send a clear message: we do not roll back protections on our drinking water. Not after one year. Not ever.

Mahalo for the opportunity to testify.

Cristina Holt Hilo, Hawaiʻi

HB-1673-HD-1
Submitted on: 2/16/2026 10:01:43 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Rachel Alonzo	Individual	Support	Written Testimony Only

Comments:

Monday, February 16th, 2026

9:30 AM, House Conference Room 325 Via Zoom

Hawaii State Capitol

Support for H.B. No. 1673

Aloha chairpersons and members of the committee of the WAL, EEP, and JHA

My name is Rachel Alonzo and I am a student at Mililani High School. I am testifying in support of H.B. No. 1673

I am testifying in support of this bill specifically because I believe that access to clean water is a fundamental right to both humans and wildlife. In a place as diverse as Hawaii, it is imperative that we heavily monitor where landfills are being built that could potentially affect our ecosystems. As a student in AP Environmental science, I understand the importance of knowing how trash is disposed of, and how its remnants can permanently affect the environment which we as humans also use as resources. I appreciate the representatives who are advocating for the use of stricter language and regulations on where landfillers are allowed to be created. Failure to carefully consider where landfills are being placed will inevitably lead to a decrease in health and our ecosystems all over the island. In order for real progress to be made in helping to clean up the environment and maintain it, we must be more firm in the language we use to protect such resources.

I hope that you consider passing H.B. No. 1673 because it is necessary to operate our state with strict yet reasonable guidelines in order to protect the environment and our home.

Sincerely, Rachel Alonzo

Mililani High School

LATE

HB-1673-HD-1
Submitted on: 2/16/2026 10:28:09 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

Submitted By	Organization	Testifier Position	Testify
Martina Kamaka	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair and committee members,

I am a family physician and am deeply concerned about the dangers of this repeal . We are very fortunate in Hawaii to have the aquifer systems that we have and we must protect these from any possible contamination for our future generations. This was an important step toward public health and for our children and I am strongly opposed to anything like this bill that would endanger our future generations.

Mahalo,

Martina Kamaka, MD

HB-1673-HD-1
Submitted on: 2/16/2026 10:44:42 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Nakamoto David	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso and Members of the Committee.

My name is David Nakamoto, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on Oahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contramination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature righty passed a law last year to prevent the siting of landfils above Oahu's drinking water aquifers, given the inveitability of a landfill's highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City's reccognition of the Honolulu Board of Water Supply's
"no-pass zone," this is no reason for the legislature to abdicate its own responsibiity to safeguard our precious wai, and that of our children, grandchldren, and future generations As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisious to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo for this opportunity to testify.

Sincerely,

David Nakamoto

HB-1673-HD-1
Submitted on: 2/16/2026 11:05:11 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Inam Rahman	Individual	Support	Written Testimony Only

Comments:

TESTIMONY IN SUPPORT OF RESTORING HB 1673 WITH AMENDMENTS

Relating to Protection of Oahu's Aquifers

Chair and Members of the Committee,

My name is Dr. Inam U. Rahman, MD. I am a physician and longtime Hawaii resident. I submit this testimony in strong support of restoring HB 1673 to its original form and amending it to strengthen protections for our island's drinking water supply.

Oahu depends almost entirely on underground aquifers for potable water. These aquifers are not replaceable infrastructure. Once contaminated, they cannot simply be repaired or rebuilt. Protecting them must remain a top state priority for Hawaii.

As originally drafted, HB 1673 reinforced state-level protection by prohibiting new landfills in designated "no-pass" aquifer zones. The recent amendment that removes state-level safeguards and relies solely on county oversight significantly weakens those protections. While county agencies play an important role, state-level oversight ensures uniform, independent protection of a resource that serves all residents of Hawaii.

Any new landfill on Oahu would primarily handle ash from the H-POWER incinerator. Even with double liners, landfills carry long-term leakage risk. If incinerator ash is considered sufficiently hazardous to require engineered containment, it is inconsistent to allow the same material to be dispersed in road construction without liner systems across aquifer recharge zones.

During a recent Water and Land Committee hearing, the Chief Engineer of the Honolulu Board of Water Supply expressed concern that allowing ash in roads could create a "bigger problem" by permitting rainfall to leach contaminants into groundwater. That concern is scientifically valid. Heavy metals such as lead and arsenic, and persistent compounds like dioxins, pose long-term public health risks if introduced into drinking water sources. Even low-level chronic exposure can produce cumulative health effects across populations.

For these reasons, I respectfully request the following:

1. Restore HB 1673 to its original language preserving state-level aquifer protections.

2. Amend the bill to incorporate the protective language of SB 3259 prohibiting the reuse of H-POWER incinerator ash in road construction over aquifer recharge areas.

3. Require independent hydrogeologic review and ongoing groundwater monitoring for any future disposal facility outside protected zones.

Protecting Hawaii's aquifers is not simply an environmental issue — it is a public health obligation and an intergenerational responsibility. Clean water underpins our economy, our health care system, our food supply, and our quality of life.

Mahalo for the opportunity to testify and for your commitment to safeguarding Hawaii's most essential resource.

Respectfully submitted,

Dr. Inam U. Rahman, MD

Waipahu, Hawaii

HB-1673-HD-1
Submitted on: 2/16/2026 11:13:02 PM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Patti Choy	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

I am writing in **strong opposition** to HB1673 HD1.

If you are concerned about your drinking water, then you will do the right thing by holding this bill.

Thank you.

HB-1673-HD-1
Submitted on: 2/17/2026 6:29:30 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Noelle Lindenmann	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair, Vice Chair, and Members of the Committee,

I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu. As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo for this opportunity to provide testimony,

Noelle Lindenmann, Kailua-Kona

HB-1673-HD-1
Submitted on: 2/17/2026 7:21:55 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Gabrielle Kics	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Gabrielle Kics, and I am writing in strong opposition to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical, common-sense state-level protection against the siting of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

While there may or may not now be an additional layer of protection provided by City’s recognition of the Honolulu Board of Water Supply’s “no-pass zone,” this is no reason for the legislature to abdicate its own responsibility to safeguard our precious wai, and that of our children, grandchildren, and future generations. As we saw just last year, the tremendous pressure that may be placed on current and future city administrations and current and future chief engineers of the Board of Water Supply could very well lead to city-level decisions to site a landfill above a drinking water aquifer, if this measure is passed.

I respectfully urge you to HOLD HB1673 HD1.

Mahalo nui for the opportunity to testify,

Gabrielle Kics

HB-1673-HD-1
Submitted on: 2/17/2026 7:46:27 AM
Testimony for EEP on 2/17/2026 9:30:00 AM

LATE

Submitted By	Organization	Testifier Position	Testify
Arika Hultquist	Individual	Oppose	Written Testimony Only

Comments:

Aloha Chair Lowen, Vice Chair Perruso, and Members of the Committee,

My name is Arika Hultquist, and I am writing in **strong opposition** to HB1673 HD1.

The latest draft of this measure would needlessly remove a critical and common sense state-level protection against the placement of future landfills above drinking water aquifers on O‘ahu.

As we continue to navigate the Red Hill water crisis, it is incumbent upon all of us to do what it takes to protect what water sources we have left from foreseeable future contamination, if we wish to do right by our islands and the future generations who will inhabit them long after we are gone. Accordingly, the legislature rightly passed a law last year to prevent the siting of landfills above O‘ahu’s drinking water aquifers, given the inevitability of a landfill’s highly toxic leachate eventually contaminating any underlying groundwater. Please do not roll back this critical protection by passing this measure as drafted.

Mahalo,

Arika Hultquist