



County of Hawai'i  
Office of the County Auditor



## Department of Public Works Bridges and Culverts

Report No. 2024-03  
November 25, 2024



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November 25, 2024

Honorable Heather Kimball, Council Chair  
and Members of the Hawai'i County Council  
Hawai'i County Council  
25 Aupuni Street  
Hilo, Hawai'i 96720

Dear Council Chair Kimball and Council Members,

In accordance with generally accepted government auditing standards and the Hawai'i County Charter Section 3-18(d)(2), the Office of the County Auditor conducts or causes to be conducted performance and/or financial audits of the funds, programs, services, and operations of any county agency, executive agency, or program, as set forth by the county auditor in an annual audit plan that shall be transmitted to the county council and the mayor and filed with the county clerk as a public record.

We have completed our engagement focusing on bridge and culvert maintenance efforts at the County of Hawai'i's Department of Public Works. The objective sought answers to the following questions:

1. **Compliance** – Does the Department of Public Works (DPW) comply with the Federal Highway Administration (FHWA), state and local standards? What other governance frameworks, regulations, or standards does DPW adhere to?
2. **Infrastructure Assessment** – How does DPW assess the current condition of bridges and culverts, and are these assessments aligned with FHWA standards?
3. **Repair and Maintenance Practices** – How is DPW tracking, monitoring, prioritizing, and completing repairs and maintenance activities for the County's bridges and culverts?
4. **Resources Utilization** – How does DPW effectively manage its resources, including workforce, equipment, and budget, to ensure the optimal maintenance of bridges and culverts?
5. **Emergency Response** – How effective are DPW's emergency response processes for bridge and culvert maintenance?

While we found that the DPW generally complies with the FHWA's National Bridge Inspection Standards (NBIS) for bridge and culvert inspection processes, they are non-compliant with Hawai'i Revised Statute Chapter 464. This finding revealed opportunities for improvement, leading us to make seven recommendations.

We appreciate the department's cooperation during the audit. While the overall coordination was satisfactory and most information was provided as requested, there were some minor delays and a few instances where additional follow-up was needed to obtain all necessary documentation. Despite these challenges, the audit was completed effectively.

In response to a draft of this report, management expressed general agreement with our audit results.

To improve government accountability and ensure audit recommendations are implemented or resolved, we will continuously monitor the state of recommendations using our remediation tracker. To view the department's status, visit us at <https://www.hawaiicounty.gov/our-county/legislative/office-of-the-county-auditor/remediation-tracker>.

If there are any questions or concerns about the status of the recommendations discussed, feel free to contact our office at 808.961.8386.

Respectfully,

*Tyler J. Benner*

County Auditor  
County of Hawai'i

cc: Mitchell D. Roth, Mayor  
Deanna Sako, Managing Director  
Diane Nakagawa, Finance Director  
Jon Henricks, County Clerk  
Stephen Pause, P.E., Director of Public Works  
Alan "Keone" Thompson, P.E., Engineering Division Chief  
Neil Azevedo, Highways Division Chief

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# Bridge and Culvert Maintenance



Bridge #24-3 Kupulau Road Bridge, Nov. 2023



Bridge #24-5 Ainalako Road Culvert, Nov. 2023

## Why OCA Conducted this Audit

The safety and reliability of the County's bridges and culverts are critical to public safety, as these structures ensure safe travel, protect communities from flooding, and support emergency response efforts. Proper maintenance and efficient management of resources, including work order processes, are essential to prevent structural failures that could endanger lives and property. This audit was conducted to evaluate whether the Department of Public Works' repair, maintenance, work order processes, and resource utilization practices comply with federal, state, and local regulations and standards. The audit aims to strengthen public safety, ensure infrastructure resilience, and promote efficient use of public resources.

## What OCA Found

A review of DPW's Bridge section revealed areas where efforts could be better aligned, and improvements could be made. More specifically, we identified the following findings:

[Finding 1: Non-Compliance with HRS 464](#)

[Finding 2: Incomplete Culvert Inventory](#)

[Finding 3: Lack of Culvert Policies and Procedures](#)

[Finding 4: Undefined Roles and Responsibilities](#)

[Finding 5: Lack of Interdepartmental Communication](#)

[Finding 6: Lack of Routine Maintenance and Repairs](#)

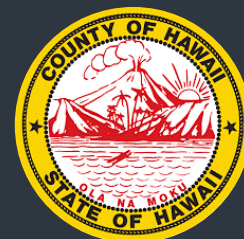
[Finding 7: Reliance on Contractors](#)

## What OCA Recommends

We make seven recommendations to help DPW's bridge section identify improvement opportunities and perform its management responsibilities more effectively. Key recommendations include:

- Ensure compliance with HRS § 464-4
- Enhance and Expand the County's Culvert Inventory
- Formalize Written Policies and Procedures
- Establish Clear Roles and Responsibilities
- Establish an Effective Communication Protocol
- Develop and Implement a Maintenance Schedule
- Establish a Process for Independent Review

These changes can help DPW support good decision-making and continual improvement and ensure the current processes continue to meet the needs of the County. DPW generally agreed with our recommendations.



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# About Us

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## **Mission**

It is our mission to serve the Council and citizens of Hawai'i County by promoting accountability, fiscal integrity, and openness in local government. Through performance and/or financial audits of County agencies and programs, the Office of the County Auditor examines the use of public funds, evaluates operations and activities, and provides findings and recommendations to elected officials and citizens in an objective manner. Our work is intended to assist County government in its management of public resources, delivery of public services, and stewardship of public trust.

## **Audit Authority**

Hawai'i County Charter § 3-18 establishes an independent audit function within the Legislative Branch through the Office of the County Auditor.

## **Purpose**

This engagement evaluated the safety, efficiency, and responsibility of managing county bridges and culverts. Our audit reviewed safety, risks, asset management, performance, best practices, and stakeholder involvement. Results assure stakeholders about bridge and culvert safety and guide future decisions and spending.

## **Performance Audit Definition**

Performance audits provide objective analysis, findings, and conclusions to assist management and those charged with governance and oversight with, among other things, improving program performance and operations, reducing costs, facilitating decision-making by parties responsible for overseeing or initiating corrective action, and contributing to public accountability.

Our objective in performance auditing is to improve public services provided by the County government. We do this by recommending specific actions to address the issues we raised and by providing valuable information to the public, the administration, program leadership, the county council, and the mayor.

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# Objective, Scope & Methodology

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## Objective

Is the Department of Public Works' repair and maintenance practices, work order processes, infrastructure conditions, and resource utilization for the County's bridges and culverts in compliance with the US Department of Transportation's Federal Highway Administration (FHWA) standards and other applicable governance?

## Scope

The audit engagement began in July 2023. The Office of the County Auditor engaged with the Department of Public Works in September 2023.

This audit evaluated the repair, maintenance, and work order procedures for bridges and culverts from July 2021 through June 2023. We also assessed infrastructure conditions and resource use. Our examination encompassed regulatory compliance, inspection methods, and the overall success of maintenance activities.

We focused on identifying areas for improvement and provided actionable recommendations to enhance the safety, efficiency, and longevity of the County's bridges and culverts.

**Disclaimer:** While the audit team possesses the collective knowledge necessary to review processes, procedures, and compliance with regulatory standards, we do not possess the technical expertise required to independently assess or judge the safety of the infrastructure. Nor does our audit override any technical analyses, recommendations, or assessments made by licensed engineers and other qualified professionals. Any conclusions or recommendations made in this audit should be considered complementary to, and not a substitute for, expert technical evaluation and safety determinations.

## Methodology

To accomplish our objective, we conducted the following activities:

- Developed an understanding of policies, procedures, and maintenance processes and identified key stakeholders.
- Conducted interviews and corroborated with department administration and staff.
- Collected and analyzed data, including maintenance records, budgets, inspection reports, and other relevant information.
  - Assessed compliance with applicable laws, governance, and standards such as:

- Federal Highway Administration (FHWA)
- National Bridge Inspection Standards (NBIS)
- Hawai'i Bridge Inspection Manual (HBIM)
- Hawai'i Revised Statute Chapter 464
- Reviewed, as necessary, information pertinent to the maintenance of bridges and culverts, along with work order processes.
- Conducted site visits to observe monitoring and oversight practices.
- Noted exceptions and identified areas for improvement.
- Remained mindful of potential fraud, waste, and abuse during the audit.

We conducted this performance audit in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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# Definitions

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**23 CFR 650:** The abbreviation for the term “Code of Federal Regulations – Title 23”. The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the departments and agencies of the Federal Government. Title 23 is the section designated for Highways, while Section 650 is designated for Bridges.

**AASHTO Manual:** The term “AASHTO Manual” means the American Association of State Highway and Transportation Officials (AASHTO) “Manual for Bridge Evaluation”, including interim Revisions, excluding the 3<sup>rd</sup> paragraph in Article 6B.7.1, incorporated by reference in § 650.317.

**Bridge:** Defined in CFR 650.305 as “A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a tracking or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between under coping of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the small contiguous opening.”

**BrM:** A comprehensive bridge management system that can assist agencies in allocating scarce resources to protect existing infrastructure investments, ensure safety, and maintain mobility. It stores inventory and inspection information about an agency’s bridges, culverts, and other structures and provides a rich set of modeling and analysis tools to support project development, budgeting, and program development. It can be used to define and schedule projects for individuals or groups of structures.

**Critical Finding:** A structural or safety-related deficiency that requires immediate action to ensure public safety.

**Culvert:** A pipe or small structure used for drainage under a road, railroad, or other embankment. A culvert with a span length greater than 20 feet is included in the NBI and receives a rating using the NBI scale.

As defined by the Department of Public Works: Pipes or structures which are designed to allow water to flow under or through roadways and other structures that might otherwise impede the passage of stormwater.

**Drywell:** An underground structure that disposes of unwanted water, typically stormwater runoff, by dissipating the runoff into the subsurface soils.

**Federal Highways Administration (FHWA):** The agency within the US Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation’s highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program).

**Maintenance:** FHWA Guidance on Highway Preservation and Maintenance, dated February 25, 2016, describes work performed to maintain the transportation system's condition or respond to specific conditions or events that restore the highway system to a functional state of operations. Maintenance is a critical component of an agency's asset management plan, including *routine and preventive* maintenance.

- **Routine maintenance** involves work performed in reaction to an event, season, or activities that are done for short-term operational needs that do not have preservation value. This work requires regular reoccurring attention. Per 23 USC 116 (d), owner agencies are required to properly maintain projects financed with Federal-aid funds. Therefore, routine maintenance activities are not eligible for Federal funds. Examples of routine maintenance include:
  - Trash, Litter, and Dead Animal Removal
  - Graffiti Removal
  - Hazardous Material Removal
  - Asphalt Patch with No Membrane on Concrete Deck
  - Accident Damage to Bridge and Its Appurtenances (Signs or bridge barriers)
  - Storm Damage
- **Preventive maintenance (PM)** or preservation activities retard future deterioration and avoid large expenses in bridge rehabilitation or replacements and are eligible for Federal funds. PM is a cost-effective strategy for extending the service life by applying cost-effective cyclical or condition-based treatments.

Examples of **Cyclical** maintenance activities

- Clean/Wash Bridge Deck and/or Super/Substructure
- Clean and Flush Deck Drains
- Clean Deck Joints
- Deck/Parapet/Rail Sealing and Deck Crack Sealing
- Seal Super/Substructure Concrete

Examples of **Condition Based** maintenance activities

- Deck Drain - Repair/Replace
- Deck Joint Seal Replacement
- Deck Joint Repair/Replace/Elimination
- Electrochemical Extraction (ECE)/Cathodic Protection (CP)
- Concrete Deck Repair in Conjunction with Overlays, CP Systems or ECE Treatment
- Deck Overlays (thin polymer epoxy, asphalt with waterproof membrane, rigid overlays)
- Repair/Replace Approach Slabs

**National Bridge Inventory (NBI):** An aggregation of the State transportation department, Federal agency, and Tribal government bridge and associated highway data maintained by the Federal Highway Administration (FHWA). The NBIS requires each State transportation department, Federal agency, and Tribal government to prepare and maintain a bridge inventory, which must be submitted to FHWA per these specifications annually or whenever requested (23 CFR 650.315).

**National Bridge Inspection Standards (NBIS):** Federal regulations establish requirements for inspection procedures, frequency of inspections, qualification of personnel, inspection reports, and preparation and maintenance of a state bridge inventory. The NBIS applies to all structures defined as bridges located on all public roads.

**Non-NBI Bridge:** Bridges or culverts are not in the NBI, as they are not subject to the NBIS regulations. This is a type of “Non-Reportable Structure.” Non-NBI bridges may have one or more of the following characteristics: (a) less than twenty feet long; (b) not subject to highway loads (i.e., may carry only pedestrians, water, etc.); (c) publicly owned but not on a public road; (d) not publicly owned.

**Non-Reportable Structure:** A structure that is not required to be included in the annual NBI or NTI data submittal but may be included and managed in the BrM database. Examples include pedestrian bridges, privately owned structures, culverts, and bridges less than 20 feet.

**Private Bridge:** A bridge open to public travel and not owned by a public authority as defined in 23 USC 101.

**Routine Inspection:** Regularly scheduled comprehensive inspection consisting of observations and measurements needed to determine the physical and functional condition of the bridge and identify changes from previously recorded conditions.

**Undermining:** An erosion phenomenon which can cause collapse, the rupture of dykes and flooding. The hollowing action of flowing water (sea water or fresh water) on a riverbed, bank, cliff, or engineering works (dykes, bridge, piers, etc.).

**Underwater Inspection:** Inspection of the underwater portion of a bridge substructure and surrounding channel, which cannot be inspected visually at low water or by wading or proving, and generally requiring diving or other appropriate techniques.

**Water System:** Defined in the context of bridge inspections as a system that includes any water body or waterflow that affects or is affected by the bridge. This encompasses rivers, streams, lakes, reservoirs, and other bodies of water, including their associated drainage systems.

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# Chapter 1

## Introduction

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### **Department of Public Works (DPW) Primary Functions**

DPW directs and administers departmental functions, programs, and activities for the public's health, safety, and environment through planning, design, construction, operation, and maintenance of the County's infrastructure. DPW administers applicable Federal, State, and local laws and rules governing public works programs.

### **Department of Public Works' Mission and Goals**

#### Mission

DPW's mission is to serve the community by building, operating, and maintaining the County's infrastructure in order to create a safe, resilient, and sustainable Hawai'i Island community.

#### Goals

Further, its goals are:

1. Safety – No one gets hurt on the job! Building a culture of safety through training, education, and policy development; strive to minimize accidents; promote employee personal responsibility; maintain a safe work environment for our employees, customers, vendors, and the entire public.
2. People – Our employees are our greatest resource! Treat all employees with respect, build highly functioning teams; encourage growth and technical development in the job; foster a sense of personal worth for every employee.
3. Transparency – Promote honesty and openness with our employees and the public.
4. Customer service – Strive to provide high quality customer service, treating every member of the public like 'ohana.
5. Continuous improvement – committed to continuously improve our operations and enhancing our customers' experience.

### **Department of Public Works - Engineering Division**

Hawai'i County Code Chapter § 2-41(1) states, "The engineering maintenance division is responsible for coordinating the planning, engineering, and implementation of the highway and drainage capital improvement projects, coordinating all land surveying, conducting necessary land rights acquisition, and providing construction inspectional services."

The Engineering Division provides civil engineering, land surveys, and regulatory services in accordance with Chapters 10, 22, and 27 of the Hawai'i County Code (HCC). The Division is comprised of the following six sections:

- Administration
- Land Surveying
- Regulatory Review
- Design and Investigation
- Bridge
- Inspection

The Administration section provides the following services:

1. Provides general supervision and administrative support.
2. Coordinates civil engineering (non-building) projects and programs using County, State, and Federal funds.
3. Supervises and coordinates land acquisition activities for the Department.

The Land Surveying section provides the following services:

1. Provides general land surveying services, including topographic maps and boundary studies.
2. Produces parcel maps and their descriptions for the County.
3. Reviews privately generated survey maps and descriptions.
4. Addresses survey issues and complaints related to County facilities, such as road encroachments.
5. Maintains an inventory/file of all road and drainage right-of-ways, Public Works parcels, and survey records generated by the County.
6. Provides County maps and survey information to the public.

The Regulatory Review section provides the following services:

1. Implements/enforces the applicable regulatory requirements of Chapters 10, 22 and 27, HCC.
2. Provides comments to the Planning Department on land-use related matters, such as subdivision, 'ohana, variance, and change of zone applications; and on Special Management Area (SMA), Use, and Special Permits.
3. Investigates and resolves regulatory complaints (except for building permit plans), reviews and/or coordinates the review and approval of all private construction plans, traffic reports, flood studies, environmental documents, as they relate to the interests and regulatory authority of the Department.

The Design and Investigation section provides the following services:

1. Plans, designs, and constructs civil engineering (non-building) County Capital Improvement Projects (CIP).
2. Plans, designs, and constructs civil engineering (non-building) County Capital Improvement Projects (CIP).
3. Investigates and resolves roadway, drainage, and other related complaints.
4. Provides drafting services.

The Bridge section provides the following services:

1. Plans, designs, and constructs County bridge repair, maintenance and replacement projects.
2. Manages bridge inspections in accordance with National Bridge Inspection (NBI) regulations.
3. Conducts structural analysis to determine NBI bridge load ratings as required.

The Inspection section provides the following services:

1. Inspects civil engineering (non-building) County CIP; private subdivision, and development construction.
2. Inspects grading, grubbing and stockpiling work per Chapter 10 of the HCC.
3. Inspects construction within the County right-of-way (R-O-W) per Chapter 22 of the HCC.

### **Department of Public Works - Highway Maintenance Division**

Hawai'i County Code Chapter § 2-41(4) states, "The highway maintenance division shall be responsible for the construction and maintenance of all roads, streets, highways, footpaths, storm drains, bridges, flood channels, and certain cemeteries."

#### Highway Administration

The Highway Maintenance Division oversees and directs the maintenance of roadways, drainage systems, and public flood control structures. The Division also completes in-house resurfacing projects and responds to various road emergencies as well as natural disasters.

#### District Baseyards

Each District Baseyard maintains and repairs roads, streets, highways, bridges, storm drains and other flood control structures in their respective geographical area.

#### Highway Maintenance Districts

Hawai'i County is made up of nine unique districts covering a span of approximately 4,028 square miles. To better meet the demands of each unique district, the Department of Public Works Highways Maintenance Division has incorporated six unique districts where staff are tasked with the upkeep and maintenance of unique responsibilities. These districts are as follows:

1. South Hilo
2. Puna
3. Ka'u
4. Kona
5. North and South Kohala
6. Hāmākua

## **Funding of Bridge Activities**

Bridge activities are funded through the County's Highway Fund. This fund is sourced from the Hawai'i fuel tax under Hawai'i Revised Statutes (HRS) § 243-6, § 248-8, and § 248-9. This tax is comprised of three parts: a state fuel tax, a county fuel tax, and the environmental response, energy, and food security tax. Rates vary on the type of fuel (i.e., diesel, gasoline, or alternative fuel) and the use of the fuel (on highway or off-highway). County rates further vary by County and are governed by Hawai'i County Ordinance pursuant to HRS § 243-5. Hawai'i County's fuel tax rate is \$0.23 per gallon of gasoline or diesel.

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# Noteworthy Achievements

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## Engineering

Committed to improving infrastructure and transportation safety, DPW's Engineering Division has made progress in creating and managing an inventory of non-National Bridge Inventory (NBI) bridges in Hawai'i County. Through innovative planning and maintenance techniques, DPW has demonstrated a commitment to engineering excellence, contributing to the stability, structural integrity, and reliability of bridges and culverts essential for community connectivity.

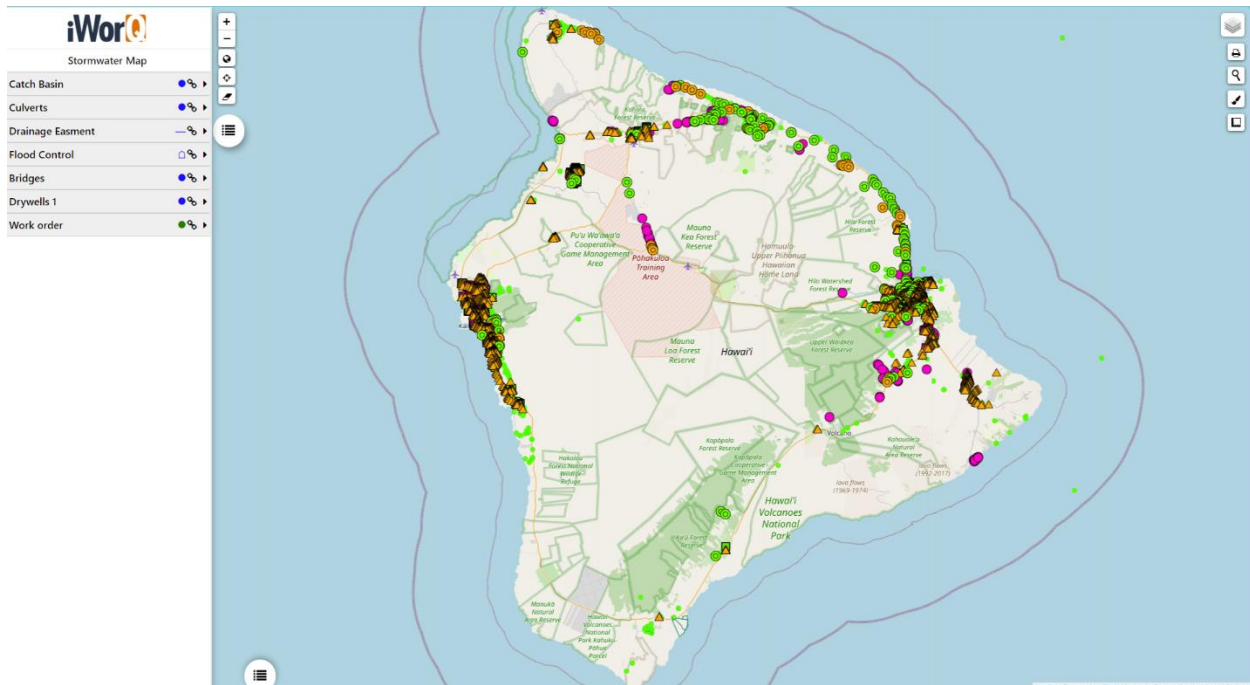
DPW's efforts help to ensure crucial transportation routes remain resilient, promoting economic success and safety. Moving forward, DPW's Engineering Division is dedicated to further innovation and collaboration, fostering a resilient and interconnected infrastructure landscape.

## Highway Maintenance

DPW is committed to enhancing the efficiency and effectiveness of its operations. As part of this commitment, in November 2023, DPW Highways implemented its work management system, iWorQ, aimed at better managing certain county assets and work orders. This new system will revolutionize the way Highways Maintenance tracks, maintains, and optimizes the use of its assets, ensuring that its resources are utilized to their fullest potential.

The new system will provide a centralized, digital platform for the real-time monitoring and management of certain county assets. This includes infrastructure such as roads, bridges, and drainage systems. Key features of the system include:

- Work order management: Streamlined processes for generating, assigning, and tracking work orders, ensuring timely completion of maintenance and repair tasks.
- Inventory tracking: Real-time tracking of certain county assets, providing detailed information on their location, conditions, and maintenance history.
- Work order management: Streamlined processes for generating, assigning, and tracking work orders, ensuring timely completion of maintenance and repair tasks.
- Predictive maintenance: Utilizing data analytics to predict and prevent asset failures, thereby reducing downtime and extending the lifespan of county assets.
- Resource allocation: Improved allocation of resources, ensuring that the right tools and personnel are available for each task.



In addition to implementing its work management system, DPW has recognized the need to review and optimize its policies and procedures. To achieve this, DPW has contracted consultant, Berry, Dunn McNeil & Parker, LLC, in April 2024, to review standard operating procedures (SOPs) of the department's Highways Maintenance Division. The consultant's role will include:

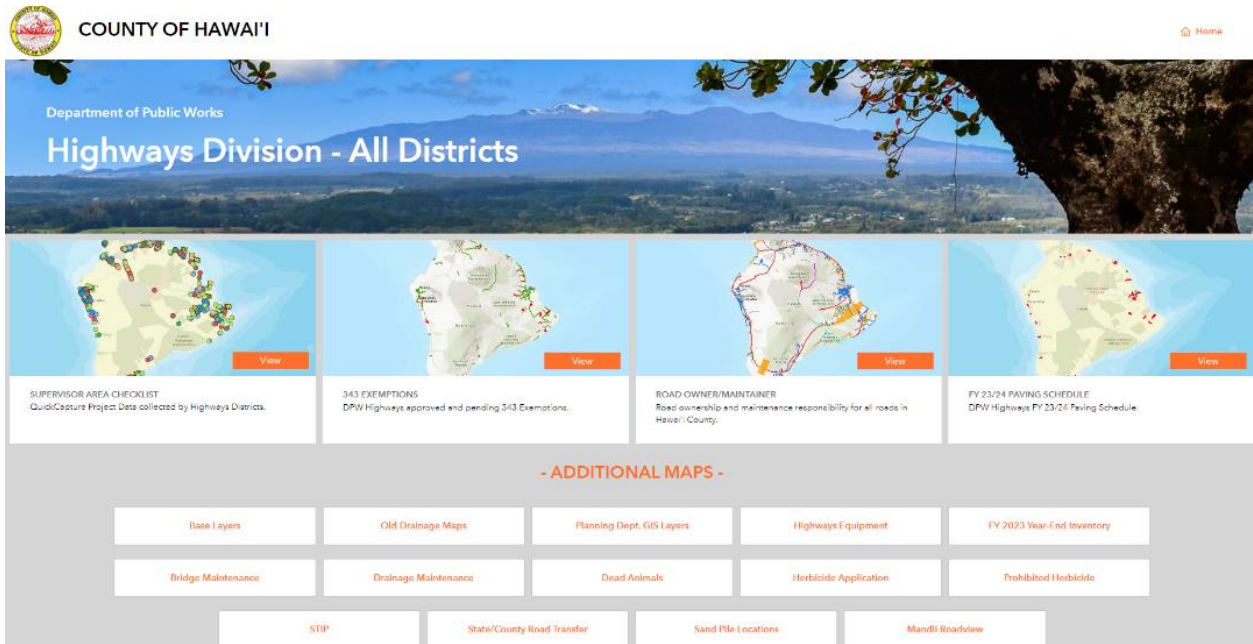
- Identify missing policies and procedures in addition to updating all existing Highways Maintenance policies and procedures where necessary.
- Comprehensive review: Conducting a thorough review of all current Highway Maintenance Division policies and procedures to identify areas for improvement.
- Stakeholder engagement: Engaging appropriate staff to gather input and ensure that proposed changes align with operational realities and best practices.
- Implementation support: Assisting in the implementation of new or revised policies and procedures, providing training and support to DPW staff as needed.

The introduction of the work management system and the comprehensive review of Highway Maintenance Division's policies and procedures represent significant steps forward for DPW. These initiatives will not only enhance the department's operational capabilities but also improve service delivery to the community.

The Highway Maintenance Division has taken a significant step forward in modernizing its infrastructure management by establishing a Geographic Information System (GIS) mapping system to assist in the management of culverts. This initiative reflects the department's recognition of the importance of leveraging technology to enhance efficiency and effectiveness in infrastructure management.

The GIS mapping system represents a valuable tool for visualizing and organizing culvert data, including location, size, condition, and maintenance history. It can streamline decision-making

processes, improve asset management strategies, and prioritize maintenance and repair efforts based on accurate and up-to-date information.



This development yields significant benefits for infrastructure resilience, efficiency, and safety. DPW may enhance its capacity to manage and safeguard critical culvert assets, ultimately contributing to improved transportation networks and community resilience.

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# Chapter 2

## Audit Results

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### Background

“The United States has a problem with its bridges: More than 30 percent are reaching the end of their lifespan and need repair or replacement. Meanwhile, travel demands, and the costs of labor and materials are increasing while many budgets stagnate or fall. Bridge owners have become more reactive than proactive in their approach to managing and addressing their bridge program needs, leading to a “worse first” management style. Unfortunately, this strategy leaves bridges in good condition neglected until they become a public burden or safety hazard.”<sup>1</sup>

To ensure bridge safety, the National Bridge Inspection Standards (NBIS) were established in 1971 and overseen by the Federal Highway Administration (FHWA) to govern the rigorous inspections of highway bridges across the United States. These inspections are pivotal in distinguishing between bridges categorized under the National Bridge Inventory (NBI) and those outside this classification. This distinction is crucial as it aims to prevent potential structural and operational issues that could compromise bridge safety. Furthermore, the data collected from these inspections enables bridge owners to make informed decisions concerning necessary repairs and ongoing maintenance efforts.

Bridges within the NBI strictly adhere to stringent inspection protocols outlined in the Manual for Bridge Evaluation by the American Association of State Highway and Transportation Officials (AASHTO). Adherence underscores a commitment to upholding critical structures' structural robustness and operational efficiency, setting them apart from non-NBI bridges. AASHTO further requires states to maintain these inspections and information in a database known as the Bridge Management system (BrM).

### Overview

Hawai'i County road systems relies on a system of bridges and culverts to keep its transportation infrastructure functioning smoothly. These structures are vital for connectivity, ensuring safe passage and accessibility throughout the County. Maintaining these bridges involves thorough assessment and upkeep, considering various factors such as safety, structural integrity, environmental impact, and functionality.

DPW's Bridge Section adheres to the AASHTO Manual with the latest Hawai'i Department of Transportation (HDoT) Bridge Management, Bridge Inspection Manual (BIM) to ensure compliance with federal regulations CFR 650 Subpart C and Subpart E.

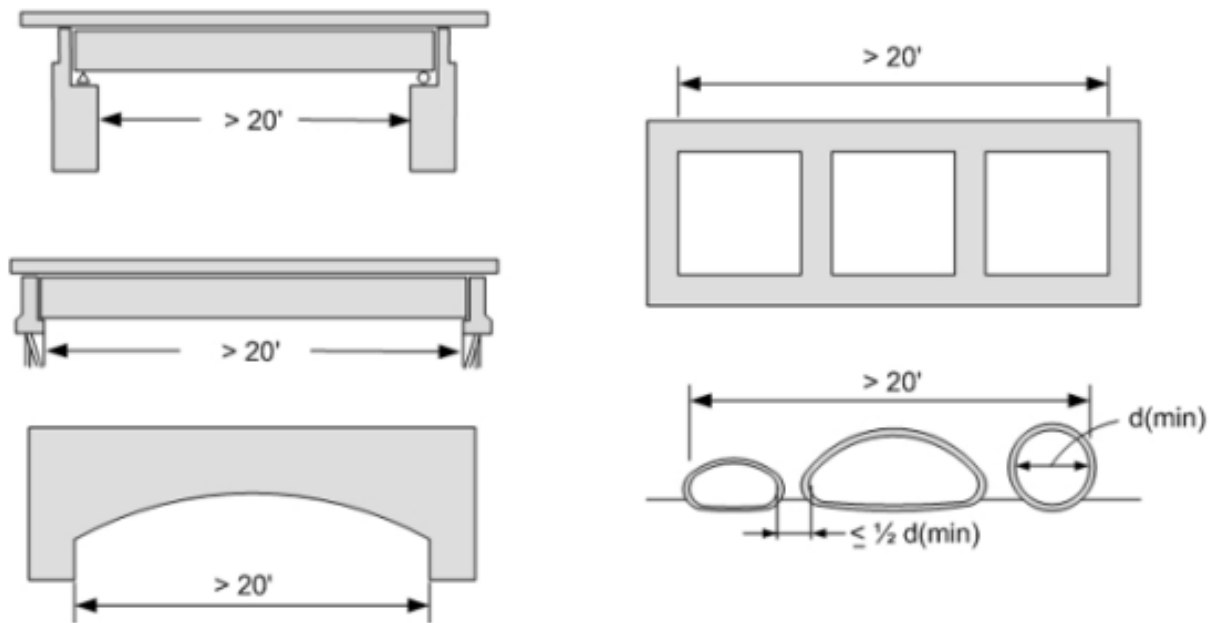
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<sup>1</sup> [Changing How Engineers Think About Bridge Maintenance | FHWA \(dot.gov\)](#) by Judy Francis 09/2017, accessed 01/10/2024

Further regulating the process of bridges and culverts and providing additional quality assurance, the United States Army Corps of Engineers (USACE), in agreement with FHWA, has taken on additional responsibilities to ensure compliance with the NBIS as it relates to levee systems within the United States.

**Bridges and Culverts**

Bridges included as part of the NBI are defined as a structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a tracking or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between under coping of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the small contiguous opening. This includes culverts with a span length greater than 20 feet, which are also included in the NBI and receive a rating using the NBI scale.



Examples – NBI Bridge Lengths

Source: [https://www.fhwa.dot.gov/bridge/snbi/snbi\\_march\\_2022\\_publication.pdf](https://www.fhwa.dot.gov/bridge/snbi/snbi_march_2022_publication.pdf)

Hawai'i County currently has 144 bridges qualifying under the NBI and requiring inspections on a 24-month interval or routine inspection (RTN), and two underwater bridges that also require underwater inspections (UW) not to exceed a 48-month interval.



Map of Hawai'i County's National Bridge Inventory

Source: [National Bridge Inventory](#) | [National Bridge Inventory](#) | [Hawai'i Statewide GIS Program](#)

As of February 2024, the County currently has nine NBI bridges in poor condition, 6% of the total. Two of the nine are closed, and one is not slated for repair.

- Pauahi Street Bridge (#22-2) – Bridge construction currently in progress as of April 2024.
- Hanawā Stream Bridge (#27-5) – Bridge design work is ongoing as of March 2022.
- Kawainui Stream Bridge (#27-7) – Bridge design work is ongoing as of February 2023.
- Waimaauau Stream Bridge (#28-1) – Bridge replacement design commenced in 2017.
- Ka‘ahakini Stream Bridge (#29-1) – Closed; bridge replacement design ongoing as of March 2024.
- ‘Ōpe‘a Stream Bridge (#31-2) – Bridge design work is ongoing as of March 2022.
- Kaiwilahilahi Stream Bridge (#35-1) – Bridge construction repair commenced August 2024.
- Ka‘ula Gulch Bridge (#41-1) – Bridge design work is ongoing as of February 2023.
- Lauhala Bridge (#42-1) – Bridge has been permanently closed since 2011.

Although not required, the FHWA and several engineering associations, including the USACE, strongly recommend that states adopt guidelines to monitor shorter structures or those known as non-NBI bridges. Additionally, the Hawai‘i Bridge Inspection Manual states that owners [of Non-NBI Structures] “may want to track or be aware of structures that do not meet the definitions contained in the NBIS or the NTIS such as Pedestrian bridges, privately owned bridges, or structures < 20 feet. These structures are not included in the National Inventories but may be included in the BrM database at the owner’s discretion.”

Non-NBI bridges or non-reportable structures are those that are not subject to the NBIS regulations and may have one or more of the following characteristics:

- (a) less than 20 feet long,
- (b) not subject to highway loads (i.e., may carry only pedestrians, water, etc.),
- (c) publicly owned but not on a public road, and
- (d) not publicly owned.

As of July 2023, there are currently 17 non-NBI bridges in the County’s inventory, which is continually being updated and developed. Currently, there are no requirements for the inspection frequency of non-NBI bridges, and they are typically investigated only when complaints are received.

#### Contracted NBI Inspection Engineers

In November 2023, the audit team joined DPW’s Engineering Consultants in inspecting four NBI bridges and culverts. The inspections revealed the conditions of the bridges inspected and the challenges the engineers encountered. The engineers demonstrated high expertise, complied with strict criteria and guidelines, and were proficient in explaining and addressing the queries raised by the auditors. The contracted engineers noted that DPW staff had never accompanied them during inspections and expressed concerns regarding the comments and edits requested by engineering staff to bridge reports.



Bridge #24-4 Ho'aka Road Box Culvert: Vegetation on NBI box culvert.



Bridge #24-5 Ainalako Road Culvert: Excessive vegetation on NBI road culvert.



Bridge #24-3 Kupulau Road: Contracted Engineers conducting NBI inspections.



Bridge #24-6 Komohana Street Bridge - Waiakea Stream Bridge: Graffiti may impact inspections.

Photos courtesy of the Office of the County Auditor

## External Challenges

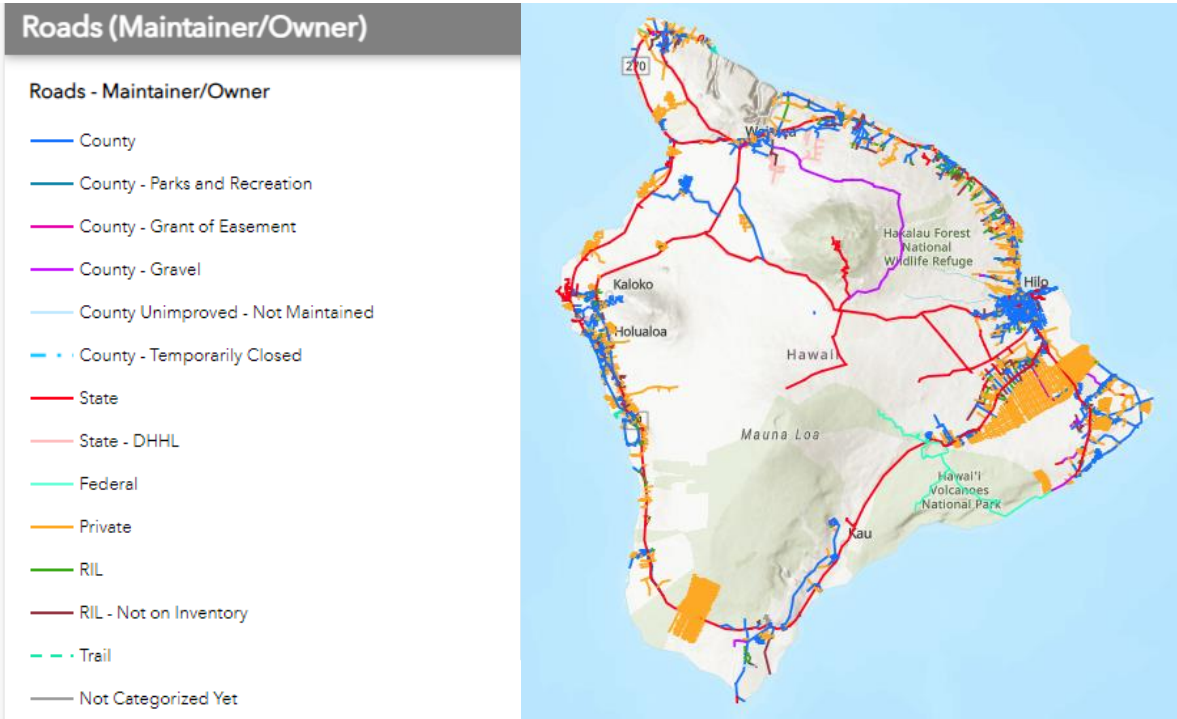
### Private Property Owner Obligations

Many layers affect the County's ability to maintain the bridges and culverts properly. For example, DPW staff can only complete maintenance or repair efforts within the County's right-of-way. This may pose issues when overgrowth or blockage occurs on private property. Under Hawai'i Revised Statute § 46-11.5, each County must ensure that channels, streambeds, streambanks, and drainageways are maintained to carry off storm waters and remove debris to prevent public nuisances. Private owners are responsible for upkeep, but the County can enforce this obligation. Failure to comply may result in a civil penalty of up to \$500 per day. The County is responsible for maintenance unless the areas are privately or state-owned, in which case the respective owner is responsible.

Further, Hawai'i County Code Chapter 27, § 27-37 states, "In addition to any other section, if any encroachment or obstruction exists, under, over or through any portion of a drainage, floodway, levee system, or watercourse within the County and the encroachment or obstruction is observed, or a complaint made to the department of public work of the County of Hawai'i, then the

department of Public Works shall investigate and forthwith, give notice to the owner to remove the encroachment and/or obstruction in the manner provided in this article.”

Generally, this process involves an investigation initiated through a complaint, and if warranted, a notice of violation to the property owner is issued for any potential obstruction.



Map image of Hawai'i County Road Ownerships courtesy of DPW's Highway Maintenance GIS portal

Property owner obligations add a layer of complexity, potentially inhibiting the County's eligibility to retain insurance or obtain emergency reimbursement funding. One such example relates to the Pa'auau Stream, which impacts up to 30 properties. The waterway system was declared inactive in August 2008 due to encroachments, mainly on private property, including fences, sheds, and vegetation. Staff have commenced efforts to increase public communication, and department staff have sent correspondence, held meetings, and gone door-to-door.



Structural encroachment on private property along the Pa'auau Channel.



Vegetation encroachment on private property along the Pa'auau Channel.

Photos courtesy of DPW's Highway Maintenance Division

Additionally, County efforts to maintain bridges and culverts can be delayed by regulatory groups including the State's Department of Land and Natural Resources (DLNR) Division of Conservation and Resources Enforcement and the State Historic Preservation Division (SHPD).

#### Division of Conservation and Resources Enforcement

The Division of Conservation and Resources Enforcement is “responsible for enforcement activities of the department. The division, with full police powers, enforces all State laws and rules involving State lands, State Parks, historic sites, forest reserves, aquatic life and wildlife areas, coastal zones, Conservation districts, State shores, as well as county ordinances involving county parks.”

One specific example of the delays experienced can be noted in the Wailoa Stream. Repair efforts commenced in response to Hurricane Lane (August 2018). Initially identified as a Federal Emergency Management Agency (FEMA) project, a plan of action was underway. However, this was sidelined due to the USACE indicating the waterway was under their jurisdiction. Subsequently, their efforts were put on hold when DLNR stepped in with concerns regarding possible turtle nesting in the sedimentary material. Ultimately, it has now been deemed the County's responsibility due to required dredging, where DPW is currently trying to secure funding to hire a consultant to design and plan.

#### State Historic Preservation Division (SHPD)

SHPD is responsible for protecting and preserving the state's cultural and historical sites. They ensure that projects follow state and federal laws related to historic preservation or those structures 50 years or older.

Bridge #25-2, Pi'ihonua Bridge, qualifies under SHPD and was identified in March 2019 as a critical finding. The Hawai'i Department of Transportation's Highway Division defines critical findings as a “structural or safety-related deficiency that requires immediate follow-up or action, as described in CFR 650.313(h)”. As of April 2024, DPW has experienced SHPD delays and is currently in the project's design phase, where DPW is awaiting permitting and approval of final design plans.



Concrete spall measuring approximately 12" long x 14" high x 1.5" deep, with exposed reinforcement (minor section loss observed).



Delaminated area measuring approximately 4' long x 10" high occurring in downstream fascia of Girder 1 at North abutment.



Delaminated area measuring approximately 30" long x 10" high occurring in the upstream fascia of Girder 2 at North abutment with diagonal crack measuring up to 0.04" wide occurring in web and bottom flange of girder.



Upstream end of North abutment footing/scour protection exhibits undermining measuring approximately 6' long x 5' high x 4'-6" deep.



The downstream end of North abutment footing/scour protection exhibits undermining measuring approximately 10' long x 4' high x 5'-6" deep.



Erosion and undermining of the south fascia of center pier scour protection.

Photos obtained from Pi'ihonua Bridge Critical Findings Report provided by of the DPW's Engineering Division

If components fail, it can disrupt an entire water system. For example, a blocked inlet or a damaged culvert can cause water to back up, leading to flooding upstream. A failed storm drain, or a leaking catch basin might overwhelm the system, causing water to spill over and damage properties. Bridges that collapse or become obstructed can block water flow, exacerbating flood risks in affected areas. Failures in maintenance structures can lead to unchecked blockages and system inefficiencies. When multiple components fail, the consequences are magnified, leading to widespread flooding, property damage, and costly repairs

Therefore, holistic management of the County's bridges and culverts as essential components of the larger water system are necessary for the safety, longevity, and economic vitality. It ensures structural integrity, aligns with environmental standards, and fosters public confidence. Proactive upkeep safeguards safety, infrastructure functionality, and community well-being, emphasizing cost-effectiveness, resilience, and historic preservation.

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# Non-Compliance with HRS 464

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## Overview

When considering the management and maintenance of critical infrastructure projects, success hinges on having highly qualified individuals in key roles. These projects require general expertise and a high degree of specialized knowledge. These certifications are essential because they ensure that individuals possess the technical skills and industry-specific competencies necessary to oversee complex projects, maintain high standards, and mitigate risks. In the case of bridge and maintenance work in Hawai'i County, ensuring that key positions are filled with certified professionals is not just a best practice but also a legal requirement. Hawai'i Revised Statutes (HRS) Chapter 464 mandates that certain professionals engaged in the design and oversight of infrastructure projects must be duly licensed. This statutory requirement underscores the importance of professional qualifications in safeguarding public safety and ensuring the integrity of infrastructure developments.

HRS 464 delineates two levels to regulate professionals' qualifications in critical infrastructure projects. First, the statute requires that any new construction projects involving infrastructure must have plans prepared and overseen by a licensed professional engineer. This ensures that the design and planning stages are managed by individuals with the specialized knowledge necessary to address the complexities and risks inherent in new developments. Second, while maintenance work on existing infrastructure does not require formal plans, it still mandates that a licensed professional engineer oversees the project. This approach ensures that even routine maintenance is conducted under the supervision of a qualified professional, thereby maintaining the integrity and safety of existing infrastructure.

## Audit Activity

We reviewed applicable guidance, including Hawai'i Revised Statutes, historical documents such as job postings and position descriptions, reviewed application packets and interviewed appropriate management, staff and conducted tests of some of the application packets requested and found:

- Hawai'i Revised Statute (HRS) § 464-4 Public Works states (a) Notwithstanding any other provision to the contrary, public works projects involving:

Alteration or new construction shall be required to have:

- Plans or specifications prepared by or under the supervision of an appropriately licensed professional engineer, architect, or landscape architect. The licensed professional engineer, architect, or landscape architect, as the case may be, shall stamp the plans or specifications and indicate that the licensee has prepared or supervised the preparation of the plans or specifications and
- A licensed professional engineer, architect, or landscape architect designated by the State, county, or political subdivision that is undertaking the public works project to observe the alteration or new construction. For the observation of construction of these types of public works projects, the licensed professional

engineer, architect or landscape architect, as the case may be, shall not be required to stamp the plans or specifications.

Maintenance work shall:

- Not be required to have plans or specifications prepared by or under the supervision of an appropriately licensed professional engineer, architect, or landscape architect; and
- Be required to have a licensed professional engineer, architect, or landscape architect designated by the State, county, or political subdivision that is undertaking the public works project to observe the maintenance work. For the observation of construction of this type of public works project, the licensed professional engineer, architect, or landscape architect, as the case may be, shall not be required to stamp the plans or specifications.
- Position descriptions and qualifications for most of the bridge section have not been updated in at least nine years, leaving them outdated and misaligned with current regulatory standards.
- A review of the positions revealed that the job description and qualifications for the maintenance work do not require an engineering license, a critical omission given the work's technical nature and law requirement.
- Highways maintenance work lacks personnel with the appropriate engineering license as required by HRS § 464-4 (2) (B).
- The Highway Maintenance Division previously had a Civil Engineer IV position, which was reallocated to a GIS Analyst in 2018.

In summary, DPW needs to bring its practices into compliance with HRS § 464-4 by ensuring that appropriately licensed professionals oversee critical infrastructure projects assessing its organizational structure to align with current legal requirements. Management should determine the appropriate placement of these licensed professionals within the hierarchy.

### **Cause of the Condition**

DPW doesn't have a licensed engineer to oversee maintenance work as required by HRS § 464-4.

### **Effect of the Condition**

DPW is operating out of compliance with state law, leading to maintenance work being conducted without mandated professional oversight, which may result in discrepancies between the executed work and required standards.

**Finding 1: DPW is non-compliant with HRS § 464-4.**

**Recommendation 1: Ensure compliance with HRS § 464-4**

We recommend that DPW review and, where necessary, revise its organizational structure to ensure compliance with HRS § 464-4. This should include, but not be limited to:

- Updating position descriptions and job qualifications to require the appropriate skillsets.
- Establishing protocols for project oversight by licensed professionals appropriately placed within the department ensures that all activities are conducted with the necessary expertise and accountability.

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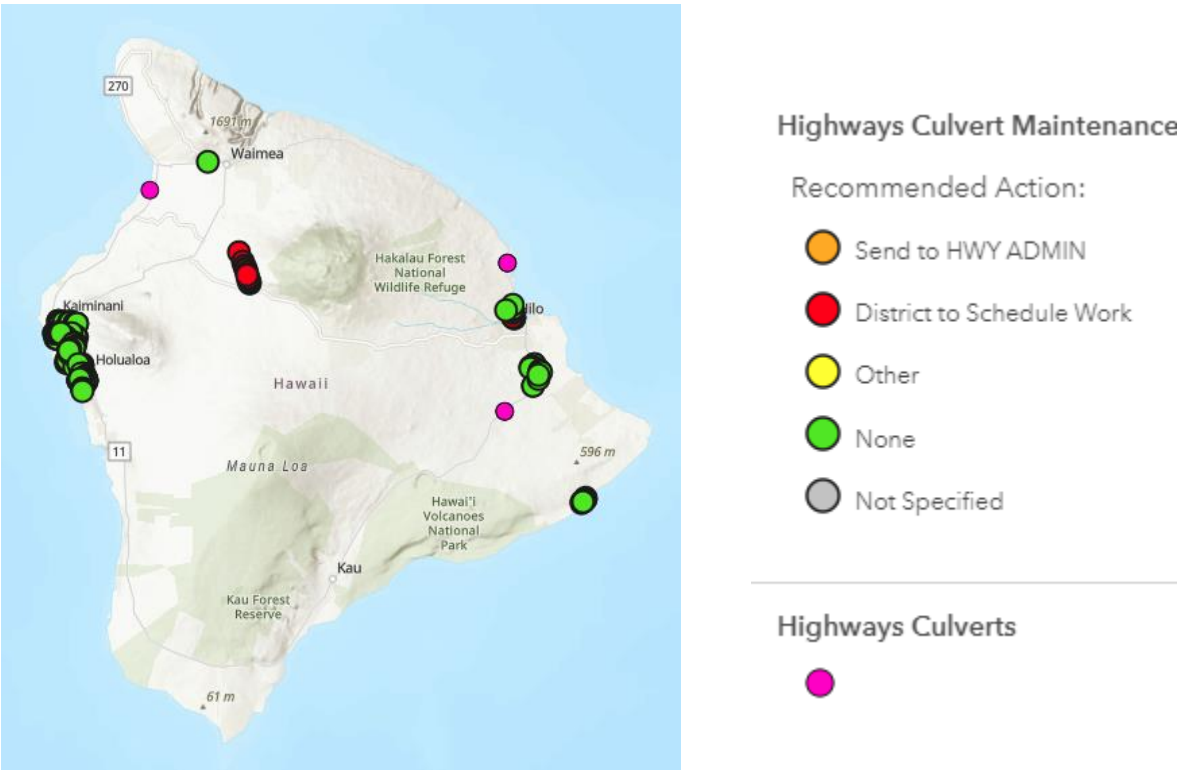
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# Incomplete Culvert Inventory

## Overview

A comprehensive culvert inventory serves as a foundational asset in infrastructure management, providing a systematic record of culvert structures, critical for efficient water flow and infrastructure preservation.

Adequate infrastructure management relies on a detailed understanding of culvert systems. Culverts, as defined by the County, are pipes or structures which are designed to allow water to flow under or through roadways and other structures that might otherwise impede the passage of storm water, necessitate meticulous documentation to ensure effective maintenance, infrastructure planning and environmental conservation.



Images courtesy of DPW's Highway Maintenance Division's GIS portal

## Audit Activity

We conducted site visits, interviewed management and staff, reviewed various documents and industry best practices, and identified the following:

- DPW is improving its operations with a new system called iWorQ, launched in November 2023. This system will help DPW's Highway Maintenance Division manage certain county assets and work orders more effectively. This digital platform will assist in tracking and managing assets such as roads, bridges and drainage systems in real time and will include features:

- Work order management
- Inventory tracking
- Predictive maintenance
- Resource allocation
- DPW lacks a comprehensive inventory of all County culverts. While the Highway Maintenance Division has prioritized compiling this information into a County GIS system, updates have been inconsistent.
- DPW's Highway Maintenance Division does not have policies and procedures governing culvert mapping and inventory.
- While staff know many problematic culverts that require maintenance, they lack information regarding the total number and condition of culverts within each district.
- Historical maps and culvert information have often been inaccessible, limiting the accuracy of inputting data into maps without additional fieldwork or site visits.
- GIS personnel inputting information may lack the necessary training or permissions to interpret engineer legacy maps and legal descriptions effectively.

### **Cause of the Condition**

As of March 2024, the Highway Maintenance Division did not have a complete culvert inventory.

### **Effect of the Condition**

The lack of a comprehensive inventory increases inefficiencies in maintenance planning and allocation of resources, leading to potential delays in repairs, increased risk of infrastructure failures, and difficulties in addressing critical issues promptly.

### **Finding 2: DPW lacks a comprehensive culvert inventory.**

#### **Recommendation 2: Enhance and Expand the Existing County's Culvert Inventory**

We recommend that DPW's Highway Maintenance Division refines and strengthens its existing culvert inventory to ensure it more effectively supports the management and maintenance of county-owned culverts. This should include, but not be limited to:

- **Standardized Procedures:** Develop precise guidelines for data collection, inspections, and maintenance procedures.
- **Staff Training:** Educate employees on the significance of and processes involved in inventory management.
- **Resource Allocation:** Assign personnel dedicated time and tools to capture culvert location and data input accurately.
- **Mapping All Culverts:** Utilize historical records and field assessments to document all county culverts.
- **Prioritization:** Establish criteria for ranking culverts based on their importance.

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# Lack of Culvert Policies and Procedures

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## Overview

Preserving the structural soundness and operational efficiency of culverts across Hawai'i County is pivotal to maintaining infrastructure functionality and durability, regulating water flow, and minimizing environmental impacts.

Comprehensive policies and procedures ensure a prolonged lifespan, increase safety, and sustain efficiency. While not explicitly highlighted, FHWA and various engineering associations, such as the National Society of Professional Engineers (NSPE), advocate for local governments and municipalities to develop meticulous protocols.

## Audit Activity

We reviewed FHWA guidelines, historical policies, and industry benchmarks, conducted on-site inspections, and interviews with appropriate management and staff. Our assessment revealed the following:

- Our evaluation found that the Highway Maintenance Division was practicing a process for culvert maintenance; however, as of August 2023, formal written policies and procedures were lacking. The last set of written policies and procedures, which were used in December 2011, are obsolete.
- Highway Maintenance staff acknowledged the necessity of documented policies and procedures and confirmed efforts were underway to compile and formalize these essential guidelines.
- Subsequently, during the audit, the Highway Maintenance Division Chief took proactive steps. In November 2023, written policies and procedures were formulated and disseminated among division staff.
  - Additionally, staff were encouraged to openly discuss any concerns or changes necessary to better integrate policies and procedures into daily practices.
- In an effort to ensure all activities are considered and have appropriate guidance, DPW has contracted a consultant to identify, review and update all policies and procedures for the Highway Maintenance Division.

Our audit monitored the transition from a functional yet undocumented process to formalizing and distributing written policies and procedures.

### **Cause of the Condition**

The Highway Maintenance Division lacked written policies and procedure.

### **Effect of the Condition**

The Highway Maintenance Division's lack of policies and procedures impaired effective management, accountability, and decision-making for the County's culvert infrastructure, reducing system resilience and increasing potential maintenance oversights.

### **Finding 3: DPW's Highway Maintenance Division lacked documented policies and procedures specifically designed for managing and maintaining culvert inventories.**

### **Recommendation 3: Formalize Written Policies and Procedures**

Subsequently, policies and procedures were developed and distributed.

### **Status: Partially Implemented**

DPW's Highway Maintenance Division should continue to develop, implement, and formalize written policies and procedures to guide staff. To align with industry best practices, the Highway Maintenance Division should:

- **Conduct annual reviews and updates:** of policies and procedures to ensure they remain current and relevant.
- **Document dissemination and understanding:** ensuring employees are fully informed of and are compliant with the latest policies and procedures.

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# Undefined Roles and Responsibilities

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## Overview

Bridge and culvert management depends on clear roles and responsibilities, eliminating confusion and ensuring task completion. Defined roles streamline workflows for better prioritization and resource allocation, and risk management tasks, including assessments and emergency plans, are assigned, enhancing regulatory compliance.

The Government Accountability Office's (GAO) Greenbook Section 3.07 supports this approach, stating that management should assign key roles based on unit responsibilities, maintaining a clear accountability chain. Effective management extends beyond task assignment, emphasizing the need for roles matched to individual expertise and qualifications, fair workload distribution to prevent burnout, clear communication for collaboration, and performance metrics to track role effectiveness and identify improvement areas.

## Audit Activity

We reviewed relevant documents and guidance, policies, procedures, and past audits related to bridges and culverts, conducted site visits, and interviewed relevant management and staff. Our review revealed the following:

- The Highway Maintenance and Engineering Divisions are not delineating their respective roles and responsibilities.
- Hawai'i County Code Chapter 2, Section 2-41 assigns bridge and culvert maintenance to the Highway Maintenance Division:
  - (1) Engineering Division. The engineering division is responsible for coordinating the planning, engineering, and implementation of the highway and drainage capital improvement projects, coordinating all land surveying, conducting necessary land rights acquisition, and providing construction inspectional services.
  - (4) Highway Maintenance Division. The highway maintenance division shall be responsible for the construction and maintenance of all roads, streets, highways, footpaths, storm drains, bridges, flood channels, and certain cemeteries.
- Historically, the Highway Maintenance Division was responsible for performing concrete spall and crack maintenance on bridges in addition to vegetation work requests.
  - Larger bridge and culvert repairs (>20 feet or higher) that pose significant safety concerns or require equipment beyond the county's capabilities are not performed by the Highway Maintenance Division but are instead contracted out.
- In August 2021, the Engineering Division identified a partial collapse and undermining of the Wilder Road Culvert, possibly due to inconsistent maintenance. The Engineering Division is currently in the design and permitting stage to reconstruct and replace the culvert, estimated to cost \$3.4 million. Without intervention, the road may experience significant undermining, leading to unsafe conditions and accelerated deterioration of the roadway and culvert.



Caption: Total corrosion of the Wilder Road Culvert.

Photos courtesy of the DPW's Engineering Division

- Additionally, challenges have emerged concerning timber bridge maintenance projects, such as the Kawaiui Stream Bridge. Meetings were conducted to coordinate and assign responsibilities for various project aspects. When the Engineering Division requested a status update, the Highway Maintenance Division questioned the assignment of roles instead of providing the requested update.
- The Highway Maintenance Division is responsible for storing and inventorying timber bridge deck materials. In April 2023, Engineering requested an updated inventory. To date, no inventory has been provided by the Highway Maintenance Division.

### **Cause of the Condition**

The lack of clearly defined roles and responsibilities stems from a lack of communication and coordination within DPW, coupled with discrepancies between position descriptions and actual responsibilities regarding various bridge and culvert maintenance elements.

### **Effect of the Condition**

The absence of clearly defined roles and responsibilities has led to confusion and a lack of accountability, hindering the department's ability to manage maintenance, allocate resources, and effectively fulfill its responsibilities in maintaining bridges and culverts.

### **Finding 4: DPW lacks clearly defined roles and responsibilities over the department's various duties.**

#### **Recommendation 4: Establish Clear Roles and Responsibilities**

We recommend that DPW work to thoroughly review its organizational structure and establish clear roles for all staff members, ensuring alignment with project needs and departmental objectives.

Additionally, divisions should properly document communication to facilitate coordination and mitigate risks associated with ambiguous responsibilities.

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# Lack of Interdepartmental Communication

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## Overview

DPW's Highway Maintenance and Engineering Divisions play complementary roles in the overall management of the County's bridges and culverts. The Engineering Division is responsible for planning, engineering, construction, and management of roadways, bridges, drainage structures, and similar civil engineering capital improvement projects. In contrast, the Highway Maintenance Division is tasked with maintaining County roads and rights-of-way, including repair, construction, and other works to improve road conditions for safety. Effective communication and coordination between these divisions are essential to ensure timely responsiveness and successful completion of their various tasks.

The GAO's Greenbook Principle 14 emphasizes the importance of clear communication within an organization. This includes sharing high-quality information across all levels and departments. This information empowers staff to fulfill their roles, manage risks, and contribute to a strong internal control system.

Effective interdepartmental communication holds paramount importance within any organization. It ensures coordination, increased efficiency, and better decision-making within a department. Conversely, poor communication can hinder progress, lead to conflicts, and costly mistakes.

## Audit Activity

We reviewed relevant documents and guidance, policies, procedures, and past audits related to bridges and culverts, conducted site visits, and interviewed relevant management and staff. Our review revealed the following:

- A 2009 limited-scope performance audit of Hawai'i County's Highway Fund by the Office of the Legislative Auditor<sup>2</sup> found that the department's lack of regular communication and coordination during various planning and execution phases hindered its productivity.
- Staff from both the Highway Maintenance Division and the Engineering Division expressed concerns regarding the status of specific tasks, roles, and responsibilities of various individuals and the division, as well as overall expectations.
- The current process for managing bridge and culvert maintenance requires coordination between the Engineering and Highway Maintenance Divisions. However, staff have identified challenges in tracking the progress of assigned tasks, particularly when projects are transferred from one division to the other. These challenges include issues with setting timelines, providing updates, and establishing clear deadlines.
- When tasks or projects require escalation beyond routine maintenance capabilities, there have been challenges in receiving timely feedback. A review of historical documents identified a case involving a problematic drywell reported over 24 years ago, which has resulted in much more costly repairs. Subsequently, repairs are now underway. This

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<sup>2</sup> Our audit did not include a detailed assessment of the underlying data or procedures used in the previous audit. Therefore, we do not express an opinion on the effectiveness or accuracy of the work.

highlights the need for improved communication and follow-up processes between different levels of maintenance.

### **Cause of the Condition**

DPW has not fully developed mechanisms for effective interdepartmental communication.

### **Effect of the Condition**

Persistent over time, the absence of strong communication mechanisms has led to challenges in project coordination, resulting in unresolved tasks, confusion regarding roles and responsibilities, and delays in maintenance timelines.

### **Finding 5: Interdepartmental communication plagues DPW, impacting maintenance oversight and productivity.**

#### **Recommendation 5: Establish an Effective Communication Protocol**

We recommend that DPW institute an effective communication protocol between the Engineering and Highway Maintenance Division. This protocol should include, but not be limited to:

- Standardized reporting procedures
- Regular updates on maintenance statuses
- Training and guidelines on various assessments to improve accuracy in maintenance evaluations.

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# Lack of Routine Maintenance and Repairs

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*Several water structures, like levees and floodwalls, are labeled inactive by the US Army Corps of Engineers due to poor conditions. In the event of failure, Hawai'i County would be ineligible for funds under the Restoration and Inspection Program and responsible for covering the costs associated with the failure.*

## Overview

Maintenance, in accordance with FHWA Guidance on Highway Preservation and Maintenance, “describes work that is performed to maintain the condition of the transportation system or respond to specific conditions or events that restore the highway system to a functional state of operations.” Maintenance includes both *routine* and *preventive* maintenance.

Routine maintenance includes tasks performed in response to short-term needs, like removing trash and graffiti or fixing storm or accident damage. Preventive maintenance aims to prevent future deterioration and avoid costly repairs. It includes cyclical maintenance, such as cleaning and sealing, and condition-based maintenance, such as replacing deck joints or repairing approach slabs.



Photo 1: DPW's Highway Maintenance Division conducting pre-storm clearing of brush and vegetation.



Photo 2: Problematic area needing additional clearing post-storm events.

Photos courtesy of the Office of the County Auditor

The FHWA's guide advises roadway agencies to establish vegetation management programs to determine optimal maintenance practices for each area. Such a program involves various strategies like mowing, mechanical and hand brush cutting, herbicide use, livestock grazing, cultivating desired plants, and re-vegetation.

The USACE established the Rehabilitation and Inspection Program (RIP) to ensure the continued effectiveness of flood control projects in agreement with the FHWA. This program applies to

federal and non-federal projects, with inspections for rehabilitation needs and the condition of federally authorized hurricane/shore protection projects.

The primary goal of RIP is to maintain reliable flood protection for people, communities, and property. It aligns with Public Law 84-99 (PL 84-99) and other relevant USACE authorities, emphasizing the responsible use of taxpayer dollars entrusted to the Corps.

Inspections go beyond the structures themselves. They also consider stream characteristics like meandering, braiding, and sediment buildup. Additionally, inspectors look for signs that might affect future stream changes, such as bridge debris buildup or historical accounts of flooding.

Failing to maintain these structures properly can result in a poor condition report, making them ineligible for RIP funding and potentially placing them in an "inactive" status.

### **Audit Activity**

We reviewed historical records and documentation, including Department and Council records, conducted site visits to examine repair and maintenance efforts, reviewed other relevant guidance, such as work orders, and interviewed appropriate management and staff, compared to industry best practices and Federal regulations, and found:

- After inspections or public complaints, the Engineering Division assigns and forwards appropriate work orders to the Highway Maintenance Division for bridge and culvert maintenance.
  - These work orders detail each structure's condition and necessary maintenance, like deck cleaning or repainting.
  - The Highway Maintenance Division Chief is responsible for assigning the work.
  - Work orders are scheduled by District Road Overseers.
  - Not all work has been scheduled.
- While some requests in the work orders are complex or costly, many are minor tasks such as removing debris from surfaces, cleaning and sealing bridge joints, painting bridge elements, and clearing vegetation. Routine maintenance items typically do not involve substantial costs but require a maintenance schedule and adequately trained personnel.
- Several water structures, like levees and floodwalls, are labeled inactive by the USACE due to poor conditions. In the event of failure, Hawai'i County would be ineligible for funds under the RIP program and responsible for covering the costs associated with the failure.
- From September 2021 to June 2023, 116 work orders were generated for the Highway Maintenance Division to complete. During this time, 26 of the 116 were completed, leaving 93, or 80% of the work orders, outstanding.
- Further exacerbating the issue, Ordinance 2022-003, made effective July 1, 2022, by the Hawai'i County Council, prohibited glyphosate-based products, also known as weed killer, in County parks and recreational facilities. DPW voluntarily followed suit and prohibited using such products in July 2023. DPW administration have provided some alternatives

to help with vegetation maintenance and management, but staff have expressed concerns about whether these measures are sufficient.

- Highway Maintenance Division staff expressed frustrations in their inability to properly handle vegetation growth with limited alternatives and noted vegetation growth occurs quicker in Hawai'i conditions.

### **Cause of the Condition**

The Highway Maintenance Division lacks a schedule for prioritizing and managing routine maintenance and repairs.

The Engineering Division does not provide deadlines for work order requests to be completed.

DPW's decision to voluntarily prohibit the use of certain products potentially increases the demand for maintenance and repairs as the department works to rebalance its workload.

### **Effect of the Condition**

The Highway Maintenance Division's lack of maintenance schedules and the Engineering Division's absence of work order deadlines cause inefficiencies in handling routine maintenance and repairs.

DPW's decision to voluntarily prohibiting the use of certain products increases pressure to conduct more frequent routine maintenance.

### **Finding 6: DPW lacks a maintenance schedule and clear deadlines to effectively manage the County's bridges and culverts.**

#### **Recommendation 6: Develop and Implement a Maintenance Schedule**

We recommend DPW develop a comprehensive maintenance schedule inclusive of but not limited to:

- Develop a cohesive maintenance schedule for various tasks to reduce unnecessary work orders while increasing timeliness, consistency, and overall efficiency.
- Implement a data monitoring system to oversee, verify, and provide details related to maintenance and repair activities.
- Improve collaboration efforts between the Engineering and Highway Maintenance Divisions and other stakeholders to strengthen communication defining expectations and goals.

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# Reliance on Contractors

## Overview

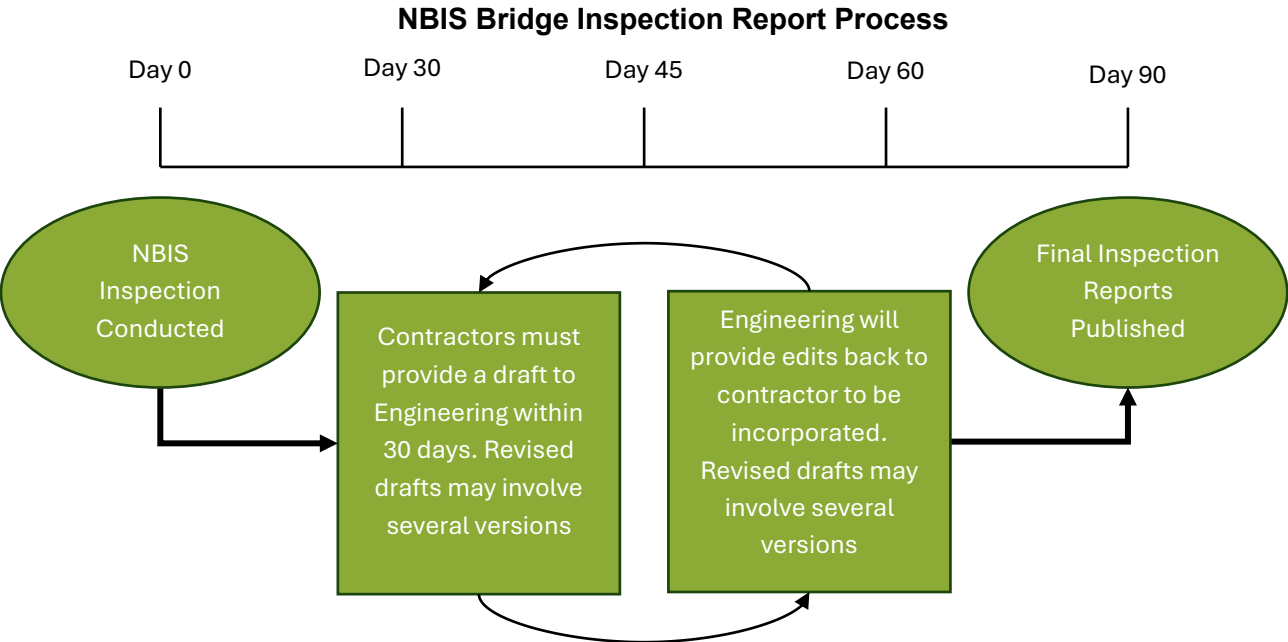
Inspecting bridges and culverts under the NBIS represents a key aspect of infrastructure management, ensuring their safety, functionality, and longevity. In many cases, governmental bodies, or private entities responsible for infrastructure maintenance often rely on engineering contractors to conduct these inspections. While this approach can offer several benefits, such as expertise, efficiency, and cost-effectiveness, it also presents certain challenges and potential risks, particularly when there's a lack of independent confirmation or review of the inspection findings.

Independently inspecting bridges and culverts and conducting sampling is necessary for verifying contractor findings, ensuring quality, and reducing errors. It mitigates risks, demonstrates compliance, and streamlines the process, minimizing back-and-forth edits between DPW and contractors.

## Audit Activity

We reviewed relevant documents and guidance, policies, procedures, conducted site visits and accompanied DPW's contracted engineer team to inspections, and interviewed relevant management and staff and found:

- DPW staff has not ever accompanied contractor engineers during NBIS inspections. DPW explained this is to remain independent of the process.
- Contracted engineers concurred that DPW staff never accompanied them during an inspection and that until the auditor ride-along, they had never met staff in person.



Compiled by the Office of the County Auditor Based on Information provided by DPW's Engineering Division

- Contracted engineers expressed concerns regarding edits and changes requested by DPW to reports. Contractors stated that of the three state counties they conduct inspections for, Hawai'i County is the only jurisdiction that scrutinizes the reports to such an extent, which may prolong the time it takes for the contracted engineers to complete and publish the required reports.
  - Despite these delays, Hawai'i County has not had past due or late bridge inspection reports as required by the NBIS.
- Drawing out timelines further, comments by DPW are not all requested after the initial review. Occasionally, the drafts are returned to the contractors three to four times with additional comments.
  - The current bridge inspection program manual requires inspectors to specify the precise location and measurements of defects in close-up photos. DPW frequently asks contractors to incorporate redundant details into overall images referring to defect details observed and noted in close-up photos. Replicating these notes in the overall photo is unnecessary and can sometimes clutter the image.
  - Defect sizes are requested to be added to photos when the information is noted in the photo's caption.
  - Historically, contractors would mark crack locations and measurements using arrows. Instead, DPW requested cracks be indicated by drawing a line over their length in the photos. This change has two drawbacks:
    1. Cracks are no longer naturally visible in the image.
    2. It becomes challenging for future inspectors to visually discern differences between inspection photos and the real-time condition of the crack.



**PHOTO 18 CELL 1 WALL 1 @ 9'-3" AND 15'-4" FR UPSTRM END: 0.010" AND 0.020" WIDE, 3'-11" AND 4'-5" LONG (CS2) VERTICAL CRACKS, 2 FT = CS2 1130**

Photo courtesy of Nagamine Okawa Engineers Inc. Biennial Routine Bridge Inspection Report 2023  
Ho'aka Road Box Culvert # 24-4

### **Cause of the Condition**

DPW's Bridge Section staff does not accompany contracted engineers on inspections to confirm what is being reviewed.

### **Effect of the Condition**

Increased edits and questions from the Engineering Bridge Section delayed the publishing of required reports. Additionally, DPW cannot independently confirm the condition of various structures without at least completing spot checks or sample testing on bridges inspected during the year.

### **Finding 7: DPW Lacks a Process for Independent Reviews.**

#### **Recommendation 7: Establish a Process for Independent Reviews**

We recommend that DPW's Bridge Section establish processes to verify and confirm accuracy and continuity in contracted bridge inspections.

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# Chapter 3

## Fraud, Waste, and Abuse

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As a practice, we remain mindful and document instances of fraud, waste, and abuse within the scope of the audit objective and not specifically Countywide.

Management reported no fraud, ongoing investigations, or pending litigation that may impact this audit.

### **What is Waste?**

“Waste” involves needless and careless expenditures of county funds or the misuse or mismanagement of county resources and property. Waste can be both intentional or unintentional.

The deferral of necessary maintenance tasks, intended to preserve infrastructure conditions and prolong operational life, has led to considerable inefficiency. This delay elevates routine maintenance into substantial capital projects, escalating expenses, and strains public funds.

This trend represents a hazard to public safety. Postponing maintenance raises the probability of infrastructure failure, potentially causing severe consequences. Failing to address maintenance requirements promptly increases costs and jeopardizes public welfare, emphasizing the critical necessity of prioritizing timely maintenance practices.

Ultimately, the lack of investment in proactive maintenance wastes resources and poses a significant risk to public safety, thus contributing substantially to inefficient expenditure within the Department of Public Works.

In closing, the improper use of government resources or positions are commonly uncovered by employees and the public. We strongly encourage reporting of any concerns through our fraud and whistleblower hotlines:

Fraud and Waste Hotline: (808) 480-8213

Whistleblower Hotline: (808) 480-8279

Email: [concern@hawaiiicounty.gov](mailto:concern@hawaiiicounty.gov)

Fax Number: (808) 961-8905

Mail: Office of the County Auditor

120 Pauahi St. Ste. 309

Hilo, HI 96720

To access the complaints directory:

<https://www.hawaiicounty.gov/our-county/legislative/office-of-the-county-auditor/inquiry-and-complaint>

Submit a claim:

<https://www.hawaiicounty.gov/our-county/legislative/office-of-the-county-auditor/inquiry-and-complaint/intake-form>

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# Conclusion

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Through our evaluation of the Department of Public Works' (DPW) practices and procedures related to bridge and culvert maintenance, we determined that while DPW generally complies with the FHWA's NBIS for inspection processes, there are notable areas needing improvement.

Notably, DPW's failure to fully comply with Hawai'i Revised Statutes (HRS) Chapter 464, which mandates that key engineering functions be overseen by licensed professional engineers, raises concerns. The current lack of qualified engineering oversight in some areas exposes the County to potential legal risks and compromises the integrity of inspection and maintenance operations.

In addition to this statutory non-compliance, deficiencies in inventory management, procedural guidelines, information accessibility, and staff training were noted. These gaps hinder effective culvert management and may compromise full compliance with FHWA standards. Unclear delineation of responsibilities between the Highway Maintenance and Engineering Divisions leads to inefficiencies, conflicts, and project delays, affecting task statuses, roles, and overall staff expectations.

Increased issues in vegetation management due to restrictions on certain products and delays in completing work orders further impede maintenance efforts and could lead to increased future costs. Restrictions on certain products compound these issues. Furthermore, interactions between DPW staff and contracted engineers regarding inspection reports reveal concerns about efficiency and clarity, with scrutiny over inspection reports and redundant detail requests potentially delaying report completion and compromising future inspections' effectiveness.

In conclusion, addressing these challenges requires a comprehensive approach that includes improved communication and coordination, clarification of roles and responsibilities, compliance with HRS 464 requirements, enhancing inspection processes, and providing adequate resources for maintenance and vegetation management. By tackling these issues, the Department of Public Works can better ensure compliance with FHWA standards and other relevant regulations while safeguarding the integrity of the County's bridges and culverts.

To improve government accountability and ensure audit recommendations are implemented or resolved, we will continuously monitor the status of pending recommendations using our remediation tracker. To view the status, visit us at: <https://www.hawaiicounty.gov/our-county/legislative/office-of-the-county-auditor/remediation-tracker>

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# Chapter 4

## Management Response

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Mitchell D. Roth  
*Mayor*

Deanna S. Sako  
*Managing Director*



Stephen M. Pause, P.E.  
*Director*

Malia Kekai  
*Deputy Director*

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November 25, 2024

Mr. Tyler Benner  
County of Hawaii  
Office of the County Auditor  
120 Pauahi Street, 209  
Hilo, HI 96720

Subject: Response to Audit Report No. 2024-03  
Department of Public Works – Bridges and

Culverts Dear Mr. Benner,

The County of Hawai‘i Department of Public Works (DPW) is providing this response to the referenced Audit Report dated November 25, 2024. In general, DPW agrees with the findings, however, as noted within this response, DPW offers clarification on some of the conclusions drawn by the Auditors.

Finding 1: Non-Compliance with HRS 464

This finding is a result of DPW bringing to the attention of the Auditors that *HRS 464-4 Public Works* requirements are not presently being met, as the Highways Division undertakes maintenance work as defined in this Chapter without a licensed professional engineer observing the work. The Audit confirms that “DPW needs to bring its practices into compliance with HRS 464-4 by ensuring that appropriately licensed professionals

oversee critical infrastructure projects assessing its organizational structure to align with current legal requirements.” Further, the Audit indicates that “management should determine the appropriate placement of these licensed professionals within the hierarchy.”

DPW agrees with this finding. Similar to Building, Traffic and Engineering divisions, the Highways Division should be led by a licensed professional who has responsibility to oversee maintenance work being performed. Other options to consider would be placing a licensed engineer in the Highways organization, or possibly re-organizing DPW so that Engineering and Highways are under the responsibility of one chief who is a licensed engineer. Once a path is selected, DPW will work with Human Resources to ensure compliance.

#### Finding 2: Incomplete Culvert Inventory

This finding states that “DPW lacks a comprehensive inventory of all County culverts.” Further, the Audit indicates that “lack of a comprehensive inventory increases inefficiencies in maintenance planning and allocation of resources, leading to potential delays in repairs, increased risk of infrastructure failures, and difficulties in addressing critical issues promptly.”

DPW acknowledges that preparation of the inventory of culverts is incomplete and will incorporate the findings into the plan forward to enhance and expand the County’s culvert inventory. Use of the asset management system (iWorQ), training of field personnel, and GIS mapping tools will improve the overall inventory. Highways have two workers in each District tasked with locating culverts to complete the culvert inventory. DPW estimates the culvert inventory could be completed within a year.

#### Finding 3: Lack of Culvert Policies and Procedures

The Audit found that “the Highway Maintenance Division was practicing a process for culvert maintenance; however, as of August 2023, formal written policies and procedures were lacking. The last set of written policies and procedures, which were used in December 2011, are obsolete.”

DPW acknowledges the need to complete work tasks efficiently and in a consistent manner. To this end on April 15, 2024, DPW Highways contracted consultant Berry Dunn to update all work policies and procedures, including standard operating procedures (SOP’s) for safety and work practices. The documents are expected to be finalized by early 2025. Sessions will be scheduled with each District to introduce the documents and help staff develop a good understanding of proper operating procedures.

#### Finding 4: Undefined Roles and Responsibilities

This finding suggests that lack of clearly defined roles and responsibilities within the DPW organization arises from a lack of communication and coordination within DPW divisions, coupled with lack of consistency perhaps between position descriptions and actual

responsibilities regarding various bridge and culvert maintenance elements. The causes of this are likely historical differences amongst divisions in authority and responsibility assigned for completing work assignments.

DPW acknowledges the need to improve processes and establish better structure and clearly assigned roles so that work can be assigned, performed, and monitored in a manner that continues to ensure the public's safety. DPW is working to improve in defining roles and responsibilities throughout the department and County.

#### Finding 5: Lack of Interdepartmental Communication

The Audit found the need to improve interdepartmental communication, as current weaknesses in the area have the potential to delay or cause regular maintenance to be missed. Much of this appears to be due to silos which have developed through many years of DPW work, likely caused by management styles and personalities of division leaders.

DPW acknowledges the need to improve communication amongst its staff tasked with planning, scheduling, performing, and checking maintenance of culverts and bridges. Some of the ways to improve could include joint training in the updated SOP's; improving the work order system; joint use of the asset management tools for scheduling maintenance by Engineering and Highways; and formal process to document that maintenance work meets applicable State and Federal standards.

#### Finding 6: Lack of Routine Maintenance and Repairs

This finding states that "DPW lacks a maintenance schedule and clear deadlines to effectively manage the County's bridges and culverts." This comment likely comes from the current practice of the Engineer Division writing work orders for Highways, not assigning a "due by date," and not having a process to check that the work has been completed sufficiently.

DPW acknowledges the need to develop a better process for scheduling bridge and culvert maintenance. DPW will utilize Highways' asset management system (iWorQ), train field personnel, and create consistency in work practices using updated SOP's, which will go a long way toward improvement.

#### Finding 7: Reliance on Contractors

The Audit indicates that DPW should "establish a process for independent reviews to verify and confirm accuracy and continuity in contracted bridge inspections." It seems that DPW Engineering is not as engaged in the inspection process as it should be, not accompanying contracted engineers on inspections to confirm what is being reviewed.

DPW acknowledges that this is an area for improvement. Engineering has recently awarded another consultant to review bridges. Engineering completed a review of the contract to ensure that the scope of work is complete, and expectations for work products

are clear. Further, Engineering will develop a process to accompany the contracted inspectors on up to twenty percent of site visits. The recent addition of a second bridge engineer provides the additional capacity to accompany inspectors.

### Final Thoughts

While the results of the Audit Report have identified a number of issues, it is important to note that despite the identified areas for improvement, DPW continues to maintain infrastructure and the safety of the public has not been compromised. There is always room for improvement in areas of inter-departmental communication, inventorying of assets, documentation of standard operating procedures, consistency of maintenance practices, use of automation to improve efficiency of work practices, and better management of staff and consultants.

Thank you for the opportunity to provide this response.

Very truly yours,



Stephen M. Pause, PE  
Director

cc. M. Kekai, Deputy Director, DPW

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*Tyler J. Benner*  
County Auditor

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