Honoapi'ilani Highway Improvements Project
West Maui: Ukumehame to Launiupoko

Second Final Environmental Impact Statement

Submitted Pursuant to Chapter 343, Hawaii Revised Statutes (HRS)

Hawaii Department of Transportation (HDOT)

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Honoapi'ilani Highway
Improvements

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3.5 PARKLANDS AND RECREATIONAL FACILITIES/BEACH ACCESS

This section presents an assessment of the potential impacts of the Honoapiʻilani Highway Improvements Project (the Project) on parklands, recreational facilities, and beach access. Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to parklands and recreational facilities. Based on those comments, or other information gathered after the publication of the Draft EIS, no revision to the analysis contained within this section was warranted and no further analysis is required as part of this Final EIS.

3.5.1 Regulatory Context

Parks and recreational facilities are community characteristics evaluated in an ~~National Environmental Policy Act~~ Environmental Impact Statement, following long-established guidance found in Federal Highway Administration Technical Advisory T 6640.8A (1987)[1] and the Hawaiʻi Revised Statutes Chapter 343. In addition, because publicly owned public parks, recreation areas, and wildlife or waterfowl refuges are protected under Section 4(f) of the Department of Transportation Act of 1966, a summary of potential 4(f) effects are also provided in Chapter 4, Section 4(f) Evaluation.

3.5.2 Methodology

The County of Maui Department of Parks and Recreation is responsible for developing, operating, and maintaining park facilities in Maui County. The State Department of Land and Natural Resources (DLNR) oversees State beach parks, forest reserves, trails, and other unencumbered State lands.

To identify parks and recreational facilities in the project area, the Hawaiʻi Department of Transportation (HDOT) compiled information through observation, internet research, and reviewing plans and policies for the West Maui region and geographic information systems databases for Maui County. In addition, the coastline is generally publicly accessible; some beaches are identified as parkland even though they are not formally managed or operated as a park by the County of Maui Department of Parks and Recreation.

3.5.3 Affected Environment

TABLE 3.5-1 lists the existing parkland and recreational facilities in the project area, and FIGURE 3.5-1 identifies their locations.

3.5.3.1 Common to Project Area

Common and primarily mauka to the entire project area is the West Maui Forest Reserve, which preserves open spaces in West Maui and provides limited recreational access for activities such as hiking. In March 2023, as part of a broad statewide initiative, the Board of Land and Natural Resources conditionally approved additions to the forest reserve in West Maui extending from the mountains

[1] https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_preparing_env_documents.aspx#land. Accessed December 2023.

toward the coastline exclusive of private lands or public lands with existing active uses, which include areas within Olowalu and Ukumehame (FIGURE 3.5-2).[2] The designation would be finalized by a Governor of Hawaiʻi Executive Order.

TABLE 3.5-1. **Parkland and Recreational Facilities in the Project Area**

RESOURCE NAME	LOCATION	JURISDICTION	SIZE	AMENITIES
COMMON TO PROJECT AREA				
West Maui Forest Reserve Expansion (conditionally approved)	Mauka of Honoapiʻilani Highway at locations in Olowalu and Ukumehame; with new areas pending extending to existing highway	State	1,223.30 acres	—
OLOWALU				
Awalua Beach	Makai of Honoapiʻilani Highway, between Lāhainā Bypass and Olowalu Recycling and Refuse Convenience Center	State	Approximately 4,000 linear feet	—
Olowalu Beach	Makai of Honoapiʻilani Highway, with public access from Camp Olowalu access road to the public parking area at the Olowalu Landing	State	Approximately 2,000 linear feet	Parking at Olowalu Landing
Kaʻiliʻili Beach	Makai of Honoapiʻilani Highway at roughly milepost 14	State	Approximately 4,000 linear feet	—
UKUMEHAME				
Ukumehame Beach Park[1]	Makai of Honoapiʻilani Highway at roughly milepost 13	County of Maui Department of Parks and Recreation	3.5 acres	Picnic tables, barbeque grills, portable restrooms, parking
Ukumehame Firing Range[2]	Mauka of Honoapiʻilani Highway at roughly milepost 13	County of Maui Department of Parks and Recreation	84.1 acres	Four firing ranges, classrooms, parking
Pāpalaua Wayside Park[3]	Makai of Honoapiʻilani Highway between mileposts 11 and 12	County of Maui Department of Parks and Recreation	6.7 acres	Picnic tables, portable restrooms, campgrounds

1 https://www.mauicounty.gov/Facilities/Facility/Details/Ukumehame-Beach-Park-119. Accessed April 2023.

2 https://www.mauicounty.gov/Facilities/Facility/Details/Ukumehame-Firing-Range-411. Accessed April 2023.

3 https://www.mauicounty.gov/Facilities/Facility/Details/Papalaua-Wayside-Park-146. Accessed April 2023.

2 https://dlnr.hawaii.gov/wp-content/uploads/2023/03/C-3.pdf. Accessed December 2023.

FIGURE 3.5-1. **Parkland and Recreational Facilities**

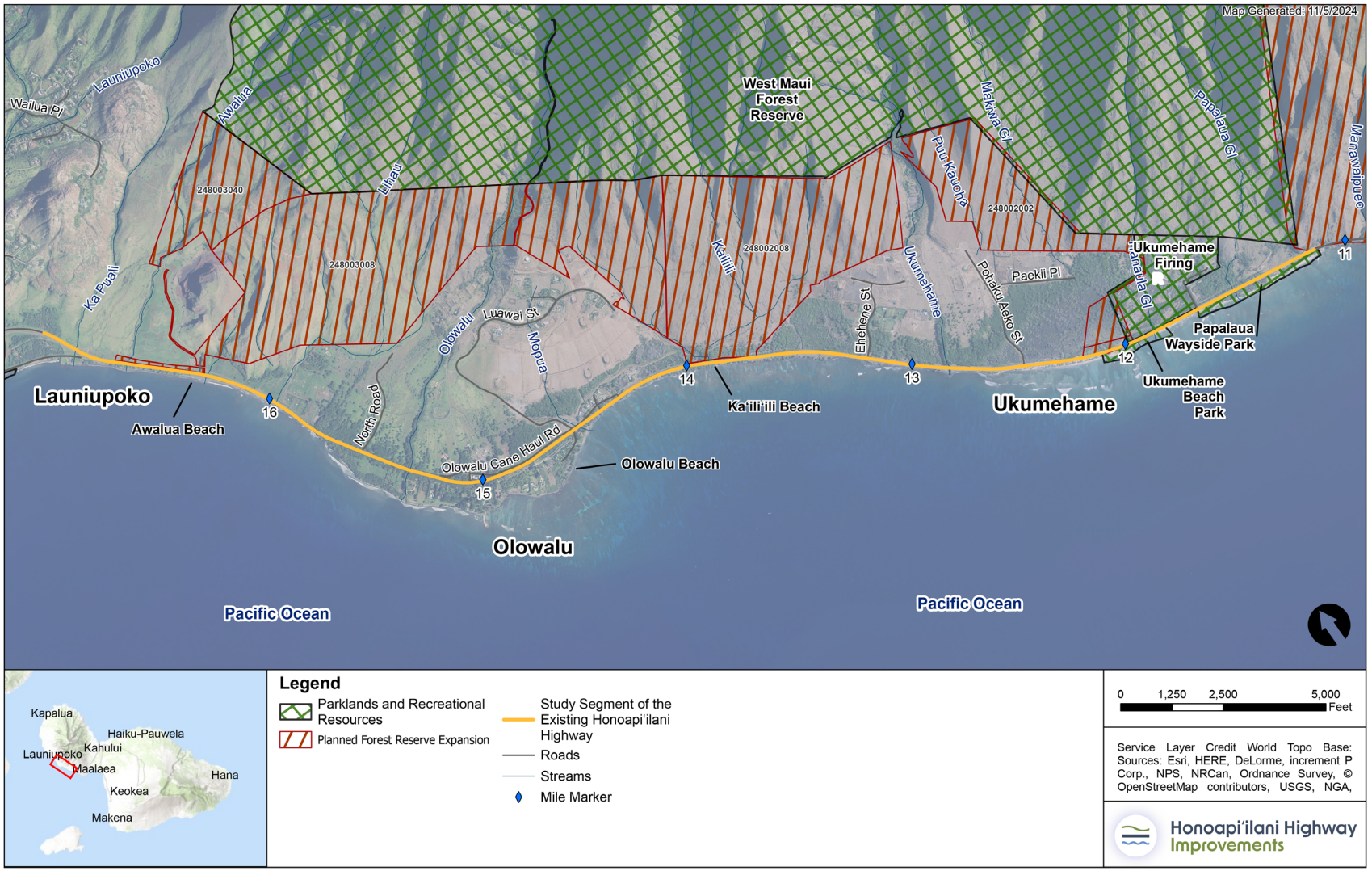


FIGURE 3.5-2. **Ukumehame Firing Range Active Use Areas**

3.5.3.2 Olowalu

In Olowalu, there are three accessible beaches on public land that are not designated as public parks but are frequently used with parking and access from the existing Honoapiʻilani Highway. Because they are not mapped park parcels, there is no overall acreage size. But an approximate linear length of shoreline has been identified. The pending expansion of the State DLNR Forest Reserve includes areas to the north of the Olowalu Subdivision (excluding the former landfill) as well as the land between Olowalu and Ukumehame.

In addition to these public facilities, there is a private greenway easement across multilple tax parcels of about 60 acres. The easement was created as part of the Olowalu Subdivision and is maintained by the homeowners association.

3.5.3.3 Ukumehame

In Ukumehame, there are two public beach parks as well as Ukumehame Firing Range, a County-owned facility. The pending expansion of the DLNR Forest Reserve includes areas to the north of the Ukumehame Subdivision (the land area between Olowalu and Ukumehame) and between the subdivision and firing range properties. Just south of the project area, there is also a small parking facility on the mauka side of the highway that serves as the trailhead for the Lāhainā Pali Trail. This trail climbs steeply away from the highway and heads south toward the Pali with some limited views back toward the project area.

3.5.3.4 Planned Parklands and Recreational Facilities

The County of Maui *Pali to Puamana Parkway Master Plan* (2005) identifies the opportunity to create open space and recreational facilities in conjunction with realigning Honoapiʻilani Highway. Specifically, the plan calls for areas to be designated as open space in the 2022 *West Maui Community Plan*, setting the foundation for future open space and recreational facility development. The plan identifies opportunities to create a beachside green belt park from Puamana Park—which is just south of the Lāhainā center and currently closed after the wildfire—to Pāpalaua Wayside Park. Portions of this proposed park would be located within the project area. However, the plan identifies several independent actions that would be required to facilitate the development of this proposed park, including obtaining Special Management Area permits, an environmental assessment, and a modification to the existing zoning. This coastal open space concept was further identified as policy goals in both the 2022 Maui Municipal Planning Organization's *West Maui Greenway Plan* and the *West Maui Community Plan*.

Separately, in 2017, the County of Maui Department of Parks and Recreation initiated the preparation of a System Plan that would define the future recreation, facility, and park needs, create an overall strategy for park planning, and identify specific countywide capital improvement or land acquisition needs.[3] The Project would be located within the West Maui park district associated with the System Plan.

[3] https://westmaui.wearemaui.org/wp-content/uploads/2022/02/Recreation-Network.pdf.

3.5.4 Environmental Consequences

3.5.4.1 No Build Alternative

The No Build Alternative would not realign the existing highway, so it would continue to provide a direct connection to the immediately adjacent beaches and firing range. While there are long-range plans for the County parks system (described above), there are no known specific implementation actions. By the 2045 analysis year, parklands and recreational uses within the project area are expected to be unchanged from existing conditions.

As detailed in Chapter 1, Introduction, Purpose and Need, and Section 3.13, Climate Change and Sea Level Rise, Honoapi‘ilani Highway is subject to coastal erosion and sea level rise, and potential future road closures and disruptions could compromise access to parklands, which themselves are largely within the projected Sea Level Rise Exposure Area boundary.

3.5.4.2 Build Alternatives

Common to Project Area

The Build Alternatives would extend through a small portion of the DLNR parcels that are intended to be designated as forest reserve lands. This designation has been conditionally approved with an understanding that an accommodation would be made to account for the Project. The Board of Land and Natural Resources affirmed that formal designation by Executive Order would proceed after HDOT defines and acquires the land it needs for the proposed new highway alignment and that this road right-of-way would be excluded from the newly designated reserve area (Board of Land and Natural Resources Public Hearing and Motion March 24, 2023). Accordingly, the Project is not expected to result in adverse effects to the forest reserve extension.

Olowalu

Common to All Build Alternatives

In Olowalu, access to the publicly accessible beaches would be maintained along the existing highway (the highway is proposed to be transferred to Maui County). There would be no noticeable change for Olowalu Beach or Ka‘ili‘ili Beach. However, access to Awalua Beach would be more limited under Build Alternative 1 because this alignment would result in the loss of through travel on the existing highway, resulting in beach access from the north or south but not along the entire existing highway.

Ukumehame

Common to All Build Alternatives

All Build Alternatives would realign Honoapi‘ilani Highway mauka of the existing roadway. Access to beach parks and the firing range would be preserved but with new patterns summarized below. Section 3.14, Transportation, includes more details on the layout of intersections.

For Pāpalaua Wayside Beach and Ukumehame Beach, access would be maintained along the existing highway, which would likely be converted to a local County road. Travelers to and from the south (Central Maui) would access the existing highway via Pōhaku ‘Aeko Street or Ehehene Street, which would have connecting intersections with the new alignment and existing roadway. Travelers to and from the north (Olowalu and Lāhainā) could continue on the former highway or use Pōhaku ‘Aeko

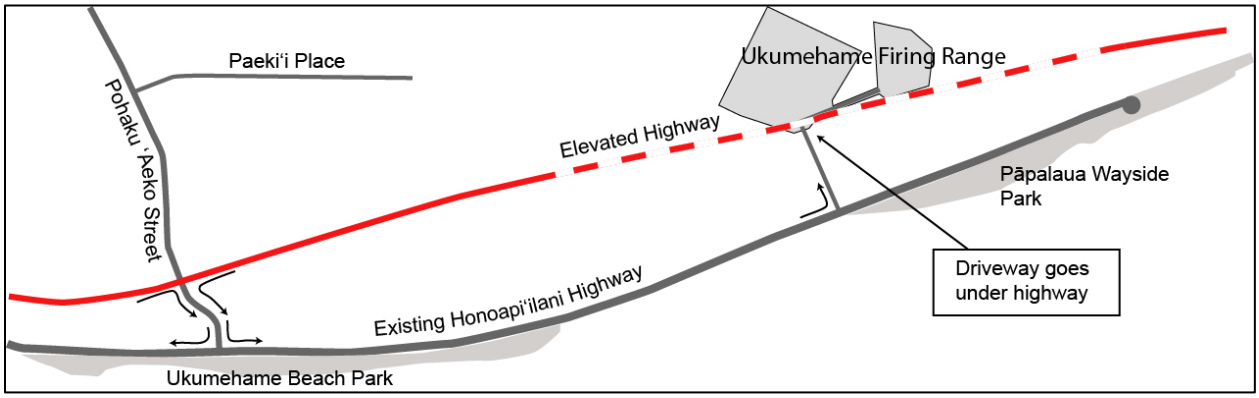
Street or Ehehene Street to access Honoapiʻilani Highway (FIGURE 3.5-3). However, continuous access along the former highway may not be feasible based on coastal erosion and sea level rise. If that occurs, beach access would be maintained or provided through the connector roads from the Build Alternatives.

For the County parks in Ukumehame, the existing roadway would continue to serve as an access driveway to the beaches that would be accessed via Pōhaku ʻAeko Street or from Olowalu along the existing roadway. As such, and consistent with long-range plans, the County of Maui may use the roadway and its right-of-way to implement enhancements to the beaches, such as improved parking, bicycle lanes, and beach access points.

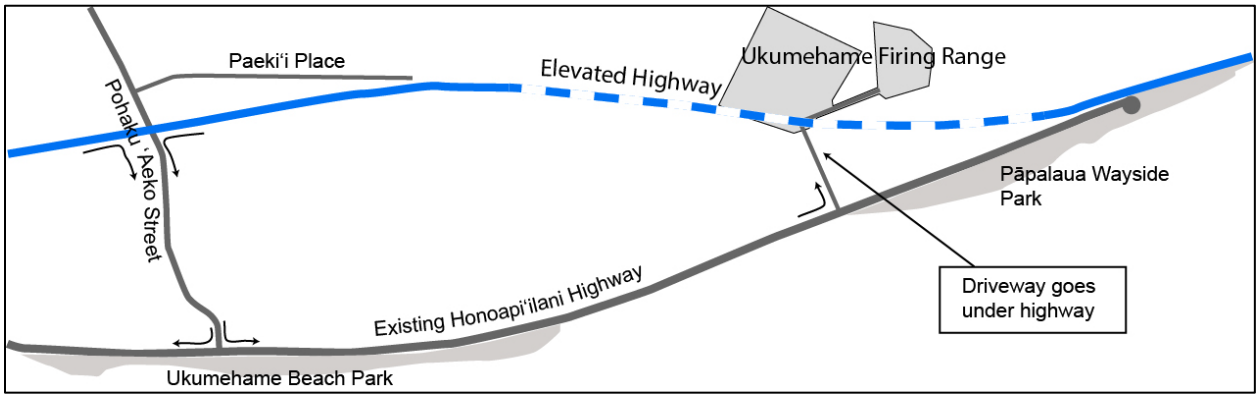
At Ukumehame Firing Range, Build Alternatives 2 and 3 (which follow the same alignment in Ukumehame) would provide a driveway at or near the existing driveway connecting to the higher-elevation at-grade alignment. For Build Alternatives 1 and 4, the new alignment would be elevated and grade separated from the firing range and access would be the same as for the beach parks via Pōhaku ʻAeko Street or Ehehene Street. Active use areas of Ukumehame Firing Range would remain intact for all Build Alternatives.

FIGURE 3.5-3. **Ukumehame Firing Range and Beach Park Access**

Build Alternative 1



Build Alternative 4



3.5.5 Construction Effects

Access to the parklands, recreational facilities, and publicly accessible shoreline would be maintained throughout construction of the Project. As described in Section 3.15, Air Quality and Energy, and Section 3.16, Noise, the Project's construction activities are not likely to adversely affect sensitive receptors, including parklands, recreational facilities, and publicly accessible shorelines within the project area.

3.5.6 Indirect Effects

The Project would not result in an increase in demand for parklands, recreational facilities, or beach access that would overburden existing resources. As described above, upon completion of the Project, HDOT would likely transfer ownership of the existing Honoapiʻilani Highway to the County of Maui. The declassified highway would continue to provide access to the beach parks and publicly accessible shoreline within the project area.

3.5.7 Mitigation

There are no anticipated adverse effects on parklands and recreational resources; therefore, no mitigation would be required. Because access to recreational resources would be provided throughout construction, no mitigation would be required to ensure access is maintained during construction.

3.5.8 Build Alternatives Comparative Assessment

With the exception of Build Alternative 1 in Olowalu, there would be no meaningful variation in terms of the potential effects of the highway realignment on parklands and recreational resources. In Olowalu, access to Awalua Beach could be limited under Build Alternative 1 because the existing Honoapiʻilani Highway would not be a local through road along the coastline.

In Ukumehame, access to the Ukumehame and Pāpalaua Wayside Park beaches and Ukumehame Firing Range would be maintained. For Build Alternatives 1 and 4, access to all these facilities would be through new intersections with Pōhaku ʻAeko or Ehehene Streets and along the existing highway. For Build Alternatives 2 and 3, access to the beaches would be the same as for Alternatives 1 and 4; but for the firing range, a new driveway would be connected to the new highway alignment in a location near the existing driveway.

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3.6 ARCHAEOLOGICAL AND ARCHITECTURAL HISTORIC PROPERTIES

This chapter describes the effects of the Honoapiʻilani Highway Improvements Project (the Project) on archaeological and architectural (built) historic properties, which include historic districts, sites, buildings, structures, and objects that are listed in or eligible for listing in the National Register of Historic Places (NRHP). The chapter summarizes the identification and evaluation efforts and provides an assessment of the No Build Alternative and the effects of the Build Alternatives on these historic properties.

The ~~Draft~~ Executed Programmatic Agreement which includes a memorandum on Hawai'i Revised Statutes (HRS) § 6E among the Federal Highway Administration (FHWA), the Hawai'i Department of Transportation (HDOT), and the Hawai'i State Historic Preservation Officer (SHPO) describes the avoidance, minimization, or mitigation HDOT would implement to eliminate or reduce adverse effects on archaeological or built historic properties. Appendix 3.6 provides a detailed background and more information regarding historic properties and includes reports completed to date, the Executed ~~Draft~~ Programmatic Agreement, and consultation information.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to archaeological and architectural historic properties. As part of this Final EIS, the analysis contained within this section was revised to reflect those comments, or other information gathered after the publication of the Draft EIS.

3.6.1 Regulatory Context

The Project is an undertaking subject to review under Section 106 of the National Historic Preservation Act of 1966, as amended (54 United States Code 300101 et seq.) and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800), *Protection of Historic Properties*. Section 106 requires federal agencies to consider the effects of their actions on historic properties.

In Hawai'i, the Project is also subject to compliance with ~~Hawai'i Revised Statutes~~ HRS § 6E and its administrative provisions at Hawai'i Administrative Rules (HAR) § 13-275, *Rules Governing Procedures for Historic Preservation Review for Governmental Projects Covered Under Sections 6E-7 and 6E-8, HRS*, and guidelines developed by the Hawai'i State Historic Preservation Division (SHPD 2018). Consultation for Section 106 and HRS § 6E compliance are being conducted concurrently to the extent possible. Archaeological research and field investigations will follow HAR § 13-276.

3.6.1.1 Section 106

Section 106 uses National Register Guidance to define historic properties, which are defined as prehistoric and historic sites, buildings, structures, districts, and objects listed in or eligible for listing in the NRHP, as well as artifacts, records, and remains related to such properties. Section 106 requires the lead federal agency, in consultation with the SHPO, to perform the following:

- Initiate the Section 106 process
- Identify historic properties in the Area of Potential Effects (APE)

- Assess the proposed project's effects on historic properties in the APE
- Resolve any adverse effects on the historic properties within the APE

Section 106 regulations require that the lead federal agency consult with the SHPO, Consulting Parties, and the public during planning and development of a proposed project. The Advisory Council on Historic Preservation is also invited to participate in the consultation (but has formally declined to participate in this Project as noted in their letter of February 16, 2024, found in Appendix 3.6). Section 106 is a process that is not required to result in any specific "preservation" outcome. Rather, it is a process where consultation among the parties results in the provision of information for the lead federal agency to consider in decision-making for the Project. These agencies, groups, and individuals may participate in developing a Memorandum of Agreement or Programmatic Agreement to avoid, minimize, or mitigate adverse effects as applicable. ~~As mentioned, a~~ The Executed ~~Draft~~ Programmatic Agreement for the Project between the FHWA, HDOT, and the SHPO is ~~under development and~~ included in Appendix 3.6.

As part of the Section 106 process, agency officials apply the NRHP Criteria for Evaluation. A property is eligible for the NRHP if it is significant under one or more of the following criteria defined in 36 CFR § 60.4 as:

> "the quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:
>
> A: Are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B: Are associated with the lives of persons significant in our past; or
>
> C: Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D: Have yielded, or are likely to yield, information important in prehistory or history."

Built resources are typically evaluated under Criteria A, B, and C; Criterion D applies primarily to archaeological resources. According to guidance in the NRHP bulletin, *How to Apply the National Register Criteria for Evaluation*, different aspects of integrity may be more or less relevant, depending on why a specific historic property was listed in or determined eligible for listing in the NRHP. Generally, only properties that are 50 years or older are identified and evaluated for NRHP eligibility.

Once historic properties have been identified, project effects are assessed by applying the criteria of adverse effect through the process described in 36 CFR § 800.5:

> "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish

> the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

Following the effects assessment, the federal agency would make one of the following findings of effect:

- **No Historic Properties Affected**. Per 36 CFR § 800.4(d)(1), an undertaking may have no effect to historic properties in the APE, and a finding of "No Historic Properties Affected" may be determined for an undertaking. This finding indicates that an undertaking would not alter any aspects of integrity for any historic properties.
- **No Adverse Effect**. Per 36 CFR § 800.5(b), an undertaking may be determined to have "No Adverse Effect" to historic properties if the undertaking's effects do not meet the criteria of adverse effect as described above. If project implementation would not alter a characteristic that qualifies the historic property for inclusion in the NRHP in a manner that diminishes the aspect(s) of integrity, then the finding is "No Adverse Effect."
- **Adverse Effect**. Per 36 CFR § 800.5(a)(1), an "Adverse Effect" is determined if the undertaking would alter a characteristic that qualifies the historic property for inclusion in the NRHP in a manner that diminishes the aspect(s) of integrity.

Consultation would continue with the SHPO and Consulting Parties to seek ways to avoid, minimize, or mitigate adverse effects. This may include developing a project-specific Memorandum of Agreement or, as developed for this Project, a Programmatic Agreement to memorialize these decisions and conclude the Section 106 process.

3.6.1.2 Hawaii Revised Statutes HRS § 6E

The Hawaii HRS § 6E requirements are an equivalent, but not identical, compliance process to Section 106. Under the statue's implementing regulations at HAR § 13-275, historic properties are defined as any building, structure, object, district, area, or site, including heiau and underwater site, which is over 50 years old. Significant historic properties are defined as any historic property that meets the criteria of the Hawaii Register of Historic Places (SRHP) or the criteria enumerated in subsections 13-275-6(b) or 13-284-6(b). The regulations require the State agency, in consultation with the SHPD, to perform the following:

- Notify the SHPD of the Project
- Identify significant historic properties within the project area
- Determine the Project's effects to significant historic properties
- Mitigate effects

Like Section 106, HRS § 6E requires the agency to consult with the SHPD, Consulting Parties, and the public throughout project planning and development.

To determine whether an identified historic property is a significant historic property, the agency evaluates significance according to the criteria described at HAR § 13-275-6. These criteria are equivalent to those found in federal law, are denoted using lowercase letters, and include one additional criterion (criterion "e") specific to Hawaii:

> "Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity."

Once significant historic properties are identified, the agency determines effects to these properties and applies one of the following effect determinations:

No historic properties affected. Per HAR § 13-275-7(1), the Project would have no effect on significant historic properties.

Effect, with proposed mitigation commitments. Per HAR § 13-275-7(2), the Project would have potential effects on one or more significant historic properties. HAR § 13-275 allows for five types of mitigation: preservation, recordation, archaeological data recovery, historical data recovery, and ethnographic documentation.

TABLE 3.6-1 below provides a comparison of the federal Section 106 and State HRS § 6E processes and terminology.

TABLE 3.6-1. **Section 106 and 6E Summary Table**

SECTION 106	6E
Consulting Parties: SHPD, Agencies, Native Hawaiian Organizations, Public	Participants: SHPD, Agency, Interested Parties. For Archaeology – Native Hawaiians
Initiate the Section 106 Process	Notify the SHPD of the Project
Determine the Area of Potential Effects	Propose a Project Area focused on the Selected Alternative
Identify Historic Properties/Apply Criteria for Evaluation	Identify and Inventory Historic Properties/Evaluate Significance
Assess Effects	Determine Effects
Resolve Adverse Effects	Propose Mitigation

3.6.1.3 Area of Potential Effects

As defined at 36 CFR § 800.16(d), the APE is "the geographic area or areas which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." The lead federal agency is responsible for defining the APE.

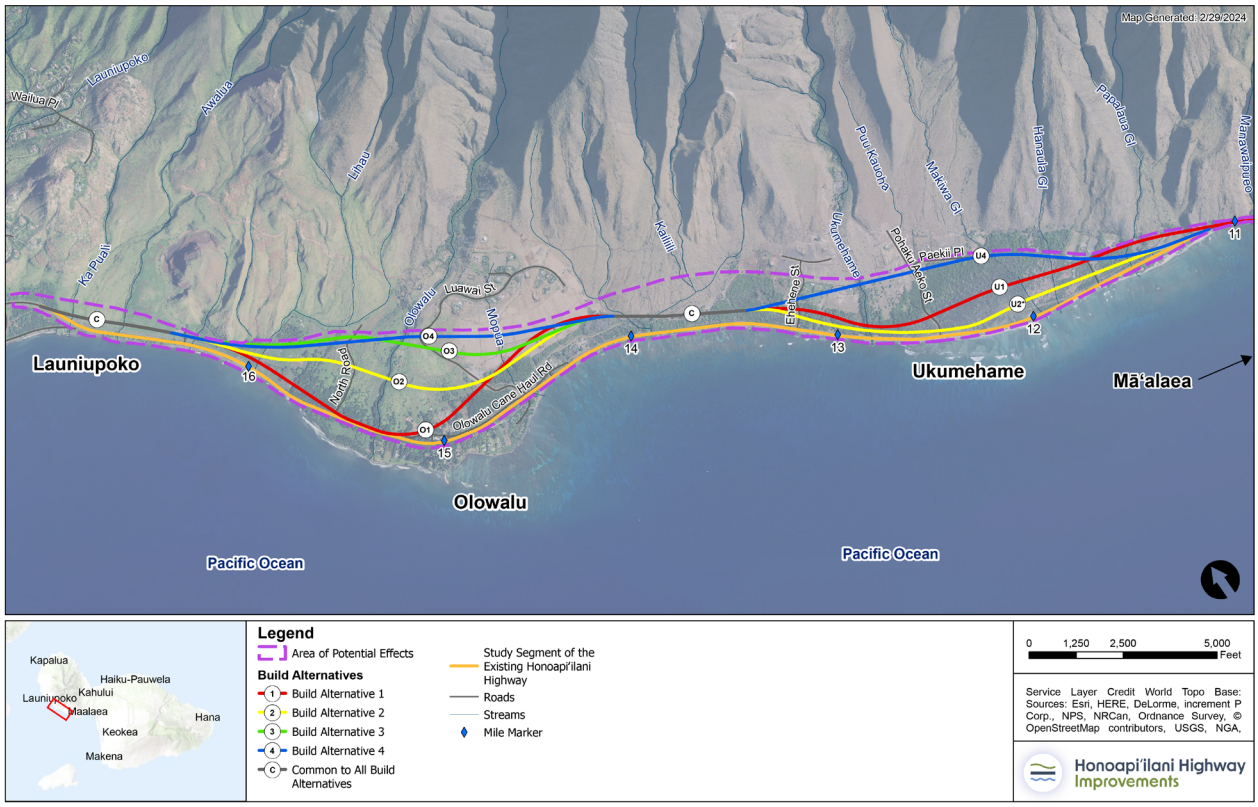
The APE considers both direct and indirect effects that may occur as a result of project implementation and encompasses the No Build Alternative and the Build Alternatives. Direct project effects may

include a physical impact in a particular area in addition to visual, noise, vibration, or other atmospheric effects. Indirect effects may include those that occur later or are farther away but are still reasonably foreseeable.

The APE extends inland up to three-quarters of a mile along the 6-mile highway corridor and from the base of the West Maui Mountains to the existing Honoapi‘ilani Highway along the coastline (FIGURE 3.6-1). The APE is composed predominantly of a coastal plain, which includes the ahupua‘a of Launiupoko, Olowalu, and Ukumehame. The broad APE encompasses all Build Alternatives and considers potential visual changes, areas of anticipated ground-disturbing activities and construction staging, and indirect effects caused by relocating the highway mauka and away from the developed coastline areas.

The APE was developed in consultation with the SHPO prior to and at the onset of the Project’s NEPA process, which included a Notice of Intent being published in November 2022 and three public scoping meetings. Two virtual meetings were held on December 14, 2022, and one in-person meeting was held on December 15, 2022. Consulting Parties were also given the opportunity to comment on the proposed APE, but no changes were requested. The APE was submitted to the SHPD on January 25, 2023, and the SHPD responded in a letter dated March 21, 2023, that it had no objections to the proposed APE as defined. However, the SHPD did request that the APE be refined based on the Preferred Alternative prior to any subsurface archaeological testing to decrease the area disturbed. As a result, the HRS § 6E-8 project area would coincide with the Preferred Alternative, once selected, to limit the area required for subsurface archaeological testing. ~~To reduce redundancy, the HRS § 6E-8 project area would coincide with the APE once the Preferred Alternative is selected.~~

FIGURE 3.6-1. **Area of Potential Effects**



3.6.2 Methodology

The FHWA, in consultation with the SHPO, initiated the Section 106 process and determined it would not be possible to satisfy the Section 106 requirements prior to completing the Final EIS/ROD and the deadline to obligate funding for the Project. As a result, the FHWA proposed to enter into a Programmatic Agreement in accordance with 36 CFR § 800.14(b)(1)(ii), which allows the project team to conduct archival research and fieldwork sufficient to identify and evaluate historic properties to make decisions for this EIS. Complete inventory, evaluation, assessment, and resolution of adverse effects on historic properties would be deferred to during the design-build process ~~a time~~ prior to the initiation of construction. As the project sponsor, HDOT participates in project consultation, ~~would be~~ is a signatory to the Programmatic Agreement, and would be responsible for implementing its stipulations. The FHWA, in coordination with HDOT, has consulted and would continue to consult with interested parties, members of the public, and Native Hawaiian Organizations (NHOs) and recognized descendants to whom the ahupua'a of Launiupoko, Olowalu, and/or Ukumehame have religious and/or cultural significance, and ~~would~~ has invited them to become concurring parties to the Programmatic Agreement.

Project team members who meet Secretary of the Interior (SOI) Professional Qualifications Standards (36 CFR Part 61, Appendix A) undertook both archaeological and architectural literature reviews and field inspections for the Project. These studies support a historic preservation review and compliance with both Section 106 of the National Historic Preservation Act of 1966, as amended, and the Hawai'i

Revised Statutes Chapter 6E. Consultation with NHOs, as well as other parties and individuals identified as having a demonstrated interest in the Project's historic and/or cultural issues (Appendix 3.6 includes the full list), assisted in identifying historic properties and further clarifying the history of the project area.

An aboveground archaeological survey was completed, which included pedestrian inspections of the Build Alternatives (with a 300-foot buffer along the centerline of each alternative). Global positioning system (GPS) data for sites and features were also collected within the overall APE. A 300-foot corridor width was selected to allow for the new highway, leaving room to avoid sites or include grading needed beyond the highway itself. ~~Surveys and analysis would be updated as needed in the Final EIS for any design refinements made for the Preferred Alternative.~~

In addition to standard background research as required by HAR § 13-276-5, the project team met with consulting parties during scoping to get information on the project area (Appendix 3.6). The team was asked to incorporate kuleana properties into project maps. This was done and adjustments were made to avoid or minimize project effects on kuleana properties.

The Build Alternatives were evaluated to determine their effects on architectural and archaeological historic properties, and opportunities to avoid potential adverse effects were identified where possible. Where it is not possible to entirely avoid a historic property, opportunities to minimize effects were studied. In those cases where an adverse effect cannot be avoided, the process for determining appropriate mitigation ~~would be addressed~~ is defined in the Programmatic Agreement. The ability to avoid potential adverse effects is one of the criteria used to in the Draft EIS to select a Preferred Alternative ~~as described in Chapter 5, Preferred Alternative.~~

As described in the Executed ~~Draft~~ Programmatic Agreement (included in Appendix 3.6), an archaeological inventory survey with subsurface testing would be conducted after the completion of the Final EIS/ROD for the Selected ~~Preferred~~ Alternative as described in Chapter 5, Selected ~~Preferred~~ Alternative.

The Executed ~~Draft~~ Programmatic Agreement also specifies the procedures that would be implemented to mitigate potential adverse effects to known aboveground resources as well as any sites or properties identified during the subsurface archaeological testing. ~~The Programmatic Agreement would be executed before the Final EIS/ROD.~~

3.6.2.1 Literature Review and Research

After developing the APE, SOI-qualified professionals completed a review of environmental, cultural, historic, archaeological, and other background information to identify potential historic properties that are present within the APE (Appendix 3.6). As part of these investigations, the professionals obtained information from the SHPD and other Consulting Parties of known historic properties within the APE as well as information on previously surveyed properties within the APE, including those previously determined NRHP-eligible (TABLE 3.6-2). In addition to the literature review, detailed archival research was conducted. Archival research, which included local histories, historic maps, aerial photographs, property assessor records, and other pertinent information, identified specifications of existing buildings, structures, and landscape features and provided a better understanding of the history and development within the APE.

3.6.2.2 Public Outreach and Consultation

Public outreach and consultation have occurred since a pre-NEPA/HEPA early scoping period began in December 2021. Outreach included news releases, meetings, letters, and the project website.[1] Early scoping meetings were specifically conducted to provide information to interested area NHOs and individuals, as well as other interested individuals or organizations. The meetings also helped in gathering information about area historic and cultural properties.

A public scoping period beginning in November 2022 followed publication of the Project's Notice of Intent to prepare an EIS in the *Federal Register* and a Hawai'i EIS Preparation Notice in the State's *The Environmental Notice* on November 23, 2022.

As a part of the NEPA scoping process and in accordance with 36 CFR § 800.2, HDOT identified potential Consulting Parties and held Section 106 Consulting Party meetings beginning on March 28 and 29, 2023. Attendees included NHOs, agency representatives, property owners, and other parties and individuals identified as having a demonstrated interest in the project's historic and/or cultural resources (Appendix 3.6 contains the full list). ~~Comments were~~ Consulting party input was gathered on the project area, the No Build Alternative and the Build Alternatives, and the use of a Section 106 Programmatic Agreement. Since that time, additional meetings and field visits have occurred to address specific concerns raised by Consulting Parties. These meetings are listed in TABLE 3.6-2. Specific comments from consulting parties are presented in Appendix 3.6 along with agency responses.

[1] https://www.honoapiilanihwyimprovements.com/.

TABLE 3.6-2. **Public Outreach and Section 106 Consultation**

DATE	LOCATION
EARLY PROJECT SCOPING PERIOD MEETINGS	
April 7 and 8, 2022	In-person at Nā ʻAikāne o Maui Cultural Center of Lāhainā
PUBLIC SCOPING PERIOD MEETINGS	
December 14 and 15, 2022	Virtual and In-person
SECTION 106 CONSULTING PARTIES MEETINGS	
March 29 and 30, 2023	Virtual
May 31, 2023	NHO, FHWA Field Visit
June 1, 2023	Presentation to Maui Cultural Resources Commission
July 27, 2023	Virtual: Archaeology/Cultural
August 2, 2023	Virtual: Architectural
November 2, 2023	Virtual: FHWA, SHPD, HDOT (Programmatic Agreement)
November 18, 2023	NHO Field Visit
November 20, 2023	Virtual: Archaeology/Cultural
March 28, 2024	SHPD Field Visit
September 22, 2024	Presentation to Na Kupuna o Lahaina Advisory Board, NHOs and other Consulting Parties (Archaeology and Programmatic Agreement)
September 26, 2024	Virtual: NHOs and other Consulting Parties (Archaeology and Programmatic Agreement)
January 23, 2025	Public hearing on the Draft EIS, Draft Section 4(f) Assessment, and Draft Section 106 Programmatic Agreement, in-person, Lahainaluna High School, Lahaina
January 28, 2025	Virtual: Public hearing on the Draft EIS, Draft Section 4(f) Assessment, and Draft Section 106 Programmatic Agreement
February 12, 2025	Presentation to NHOs and other Consulting Parties (Programmatic Agreement)
April 4, 2025	Presentation to NHOs and other Consulting Parties (Programmatic Agreement)
May 22, 2025	Virtual: SHPD and FHWA (Programmatic Agreement)
May 28, 2025	Virtual: SHPD and FHWA (Programmatic Agreement)
June 4, 2025	Virtual: SHPD and FHWA (Programmatic Agreement)

3.6.3 Affected Environment

3.6.3.1 Archaeology

This ~~Draft~~ Final EIS summarizes the review and assessment of archaeological resources in the APE. This includes previously identified sites as well as new sites and locations as developed through research and field reconnaissance. These sites are summarized, and for the newly identified resources, there is an evaluation to determine NRHP and Hawai'i Register of Historic Places (HRHP or SRHP) eligibility.

Previously Surveyed Archaeological Properties within Area of Potential Effects

The SHPD provided information on February 24, 2023, identifying previously surveyed properties that are within the APE, including four properties within the ahupua'a of Olowalu and two within the ahupua'a of Launiupoko. These properties are summarized in TABLE 3.6-3. If located within the archaeological survey corridors developed for the Project, the property was field verified, surveyed, and reevaluated before NRHP eligibility. TABLE 3.6-4 and TABLE 3.6-5 provide a summary of potential archaeological historic properties identified within the archaeological survey corridors.

TABLE 3.6-3. **Previously Surveyed Archaeological Properties within Area of Potential Effects**

AHUPUA'A	SIHP NO. 50-50-08-	AGE RANGE	FORMAL TYPE	NRHP STATUS
Olowalu	04699	Precontact	Rock Shelters, Modified Outcrop, Wall	Eligible
Olowalu	04700	Precontact	Rock Shelters, C- shape, Wall	Eligible
Olowalu	04701	Precontact	Modified Outcrop and Platform	Eligible
Olowalu	04718	Precontact	Heiau	Eligible
Launiupoko	05954	19th-20th Century Ranching	Wall	Eligible
Launiupoko	05955	Precontact	Terraces, Circular Alignment, Enclosures, Alignments, Mound, Modified Outcrops	Eligible

Source: SHPD

Field Investigations and Evaluations

To fulfill the requirements for identifying aboveground archaeological sites and features that could be impacted by ~~The~~ the Project, a systematic survey of the four Build Alternatives was completed in 2022 and throughout 2023. Additional field evaluations conducted in 2025 are summarized in Chapter 5, Selected Alternative.

To allow for adjustments to avoid potentially significant archaeological sites and/or account for possible grading needs beyond the highway itself (for example, slope easements), the archaeological survey area was defined by a 300-foot-wide corridor along the centerline of each proposed alternative. This survey area encompassed a total approximate area of 464 acres, the coverage of which included both a pedestrian survey and targeted drone flyovers. The pedestrian survey for this study was accomplished through systematic sweeps along survey transects that were spaced 10 meters apart in areas of open vegetation and narrowed to 5 meters or less in areas of dense vegetation and low visibility.

Archaeological sites and features encountered during this initial survey were documented at a reconnaissance level. This included a summary description of site and feature formal types, initial interpretations of function and interrelationships, and ground-level high-resolution digital photographs of representative formal types and construction styles within each site and site complex along with site and/or feature overviews and viewsheds where relevant.

Geographic location information for identified archaeological sites and features was acquired using either a GPS or the Trimble Connect Application on an Apple device Antenna and post processed for

ArcGIS. Where necessary, site extents for large, multicomponent archaeological complexes were further determined via high-resolution drone survey. Ground Control Points were placed within high-density site and feature areas and located utilizing the above noted GPS methods for incorporation during processing of the imagery to maximize accuracy of orthomosaic imagery when pulled into ArcGIS for delineation of the approximate site extents.

Identified Potential Archaeological Historic Properties within Field Survey Corridors

From the collection and evaluation of this information, TABLE 3.6-4 and TABLE 3.6-5 summarize the identification of preliminarily eligible resources for Launiupoko, Olowalu, and Ukumehame, respectively. In total, there are 10 sites locations identified in Olowalu and Launiupoko as part of this ~~Draft~~ Final EIS research, including five previously identified resources. In Ukumehame, there were no previously identified sites and 28 sites identified from the current evaluation. ~~In a letter dated October 11, 2024, the SHPD concurred with the FHWA determinations of eligibility for 11 archaeological resources, denoted below with an asterisk (*).~~The SHPO concurred with eleven (11) of these eligibility determinations in a letter dated October 11, 2024, and provided concurrence on the remaining twenty-seven (27) archaeological historic properties in a letter dated May 16, 2025. Updated information on additional areas of field surveys is found in Chapter 5, Selected Alternative.

TABLE 3.6-4. **Field Identified Preliminary Eligible Archaeological Resources in Olowalu**

AHUPUA'A	SURVEY NO.	POSSIBLE AGE RANGE	FORMAL TYPE
Olowalu	AA2216-028~~*~~	Early 20th Century Ranch	Wall, Fenceline
Olowalu	AA2216-036	Precontact	Surface Scatter
Olowalu	AA2216-106~~*~~	Precontact	Terraces, Circular Alignments, Small Semi-Circular Terraces, Enclosures
Olowalu	AA2216-107~~*~~	Precontact to Early Historic	Alignment, C- Shape, Enclosure, Modified Outcrop, Terrace
Olowalu	SIHP -04700~~*~~	Precontact	Rock Shelters, C-shape, Wall
Olowalu	SIHP -04701	Precontact	Modified Outcrop and Platform
Olowalu	SIHP -04718	Precontact	Heiau
Launiupoko	AA2216-023~~*~~	Precontact and Possible Historic Military	Alignment, C-shape, Enclosure, Mound, Terrace
Launiupoko	SIHP -05954	Early 20th Century Ranch	Wall
Launiupoko	SIHP -05955	Precontact	Terraces, Circular Alignment, Enclosures, Alignments, Mound, Modified Outcrops

Note: Previously identified SIHP-04699 is located within the APE but outside of the field survey corridors.

TABLE 3.6-5. **Field Identified Preliminary Eligible Archaeological Resources in Ukumehame**

AHUPUA'A	SURVEY NO.	POSSIBLE AGE RANGE	FORMAL TYPE
Ukumehame	AA2216-009	Precontact	Surface Scatter
Ukumehame	AA2216-015	Late Precontact – Early Historic	Surface Scatter
Ukumehame	AA2216-017~~*~~	Precontact	Surface Scatter

AHUPUA'A	SURVEY NO.	POSSIBLE AGE RANGE	FORMAL TYPE
Ukumehame	AA2216-018~~*~~	Late Precontact – Early Historic	Surface Scatter
Ukumehame	AA2216-020	Precontact to Early Historic	Surface Scatter
Ukumehame	AA2216-022~~*~~	Historic	Stone Well
Ukumehame	AA2216-046	Precontact	Habitation Complex
Ukumehame	AA2216-050	Precontact	Agricultural and Ceremonial Complex
Ukumehame	AA2216-068	Precontact	C-Shape, Mound, Platform, Surface Scatter, Terrace
Ukumehame	AA2216-070	Precontact	C-Shape, Mound, Terrace
Ukumehame	AA2216-072~~*~~	Precontact	Enclosure, Mound, Wall
Ukumehame	AA2216-073	Precontact	Enclosure and Ahu
Ukumehame	AA2216-075	Precontact	Surface Scatter
Ukumehame	AA2216-088	Precontact	Terrace, Ahu, Modified Outcrop
Ukumehame	AA2216-089	Precontact	Enclosure, Modified Outcrop, Terrace
Ukumehame	AA2216-090	Precontact	Surface Scatter
Ukumehame	AA2216-091~~*~~	Precontact to 19th-20th Century	Surface Scatter
Ukumehame	AA2216-092	Precontact to 19th-20th Century	Surface Scatter
Ukumehame	AA2216-095	Precontact	Modified Outcrop, Mound, Surface Scatter, Terrace
Ukumehame	AA2216-096	Precontact	Modified Outcrop, Pavement, Petroglyph, Surface Scatter, Terrace
Ukumehame	AA2216-097	Historic	Wall
Ukumehame	AA2216-098	Continuous Occupation	Rock Shelter
Ukumehame	AA2216-099	Precontact	Modified Outcrop and Surface Scatter
Ukumehame	AA2216-100~~*~~	19th-20th Century	Rock Shelter
Ukumehame	AA2216-101	Precontact to Early Historic	Rock Shelter
Ukumehame	AA2216-103	Precontact	Surface Scatter
Ukumehame	AA2216-105	Precontact	Temporary Habitation and Ceremony
Ukumehame	AA2216-108	Precontact	Heiau

3.6.3.2 Architecture

FIGURE 3.6-2 and FIGURE 3.6-3 present the identified architectural properties evaluated as part of this ~~Draft~~ Final EIS for Olowalu (including Launiupoko) and Ukumehame, respectively. This includes previously identified properties as well as new properties and locations as developed through research and field reconnaissance. These architectural properties are described in greater detail in Chapter 4 of the Reconnaissance level Architectural Historic Resource Survey included in Appendix 3.6.

Previously Surveyed Architectural Properties

The SHPD provided information on February 24, 2023, including known and listed resources, as well as previously surveyed properties that are within the APE of which seven were determined

NRHP-eligible as part of prior surveys (TABLE 3.6-6). These are all in the Olowalu area of the APE. As if shown in TABLE 3.6-6, nine previously surveyed and evaluated (and reevaluated as part of the Project) architectural properties were identified, including a cemetery, a church and cemetery complex, stone walls, a road, a water reservoir, and the ruins of a sugar mill. Notably, a reservoir (CSH 4) was documented but not evaluated in 2012 by Cultural Surveys Hawai‘i, Inc. (CSH); however, it had ~~s~~ not received a State Inventory of Historic Places designation number and was designated only by a field site number.

TABLE 3.6-6. **Previously Surveyed Architectural Properties in Olowalu**

SIHP NO.	NAME/ADDRESS	STYLE/FORM/TYPE	NRHP STATUS
01602	Olowalu Company Sugar Mill Complex (Olowalu Landing, houses, and Wharf)/810 Olowalu Road	Agricultural Processing/ Industrial Facility	Eligible
01603	Lanakila Historic Church (Olowalu Church and Cemetery)/801 Olowalu Village Road	Church and Cemetery	Eligible
04695	Retaining Wall	Erosion Control	Eligible
04696	Road/Old Government Road	19th–20th Century Road	Not Eligible
04717	Rock Wall	Boundary Demarcations	Eligible
04719	Rock Wall	Boundary Demarcations	Eligible
04720	Rock Wall	Boundary Demarcations	Eligible
04758	Awalua Cemetery	Cemetery	Eligible
CSH 4	Reservoir	Water Control	Unassessed

Source: State Historic Preservation Division

SIHP = State Inventory of Historic Places; NRHP = National Register of Historic Places; CSH = Cultural Surveys Hawai‘i, Inc Field site number

FIGURE 3.6-2. **Architectural Properties: Olowalu**

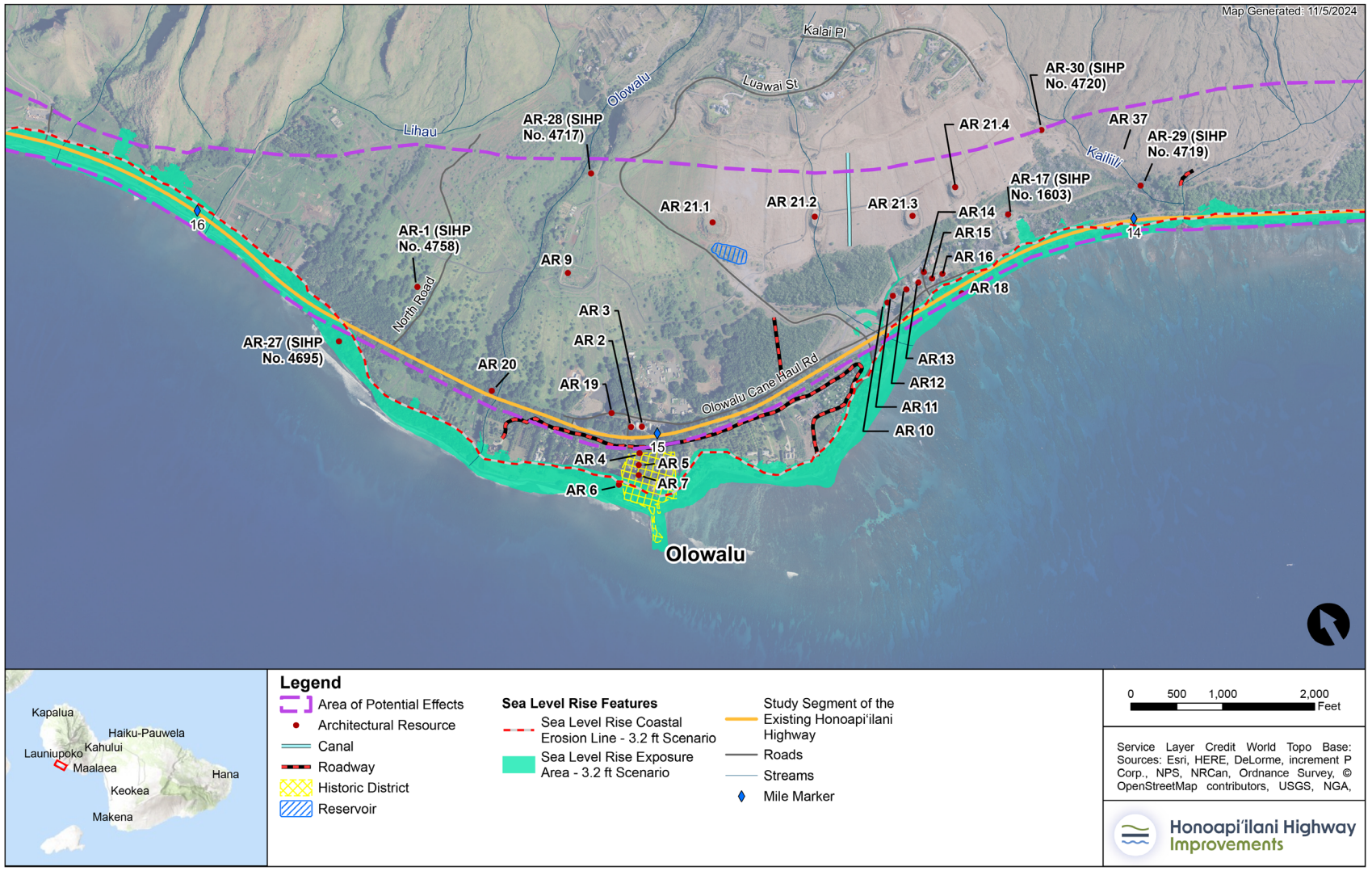
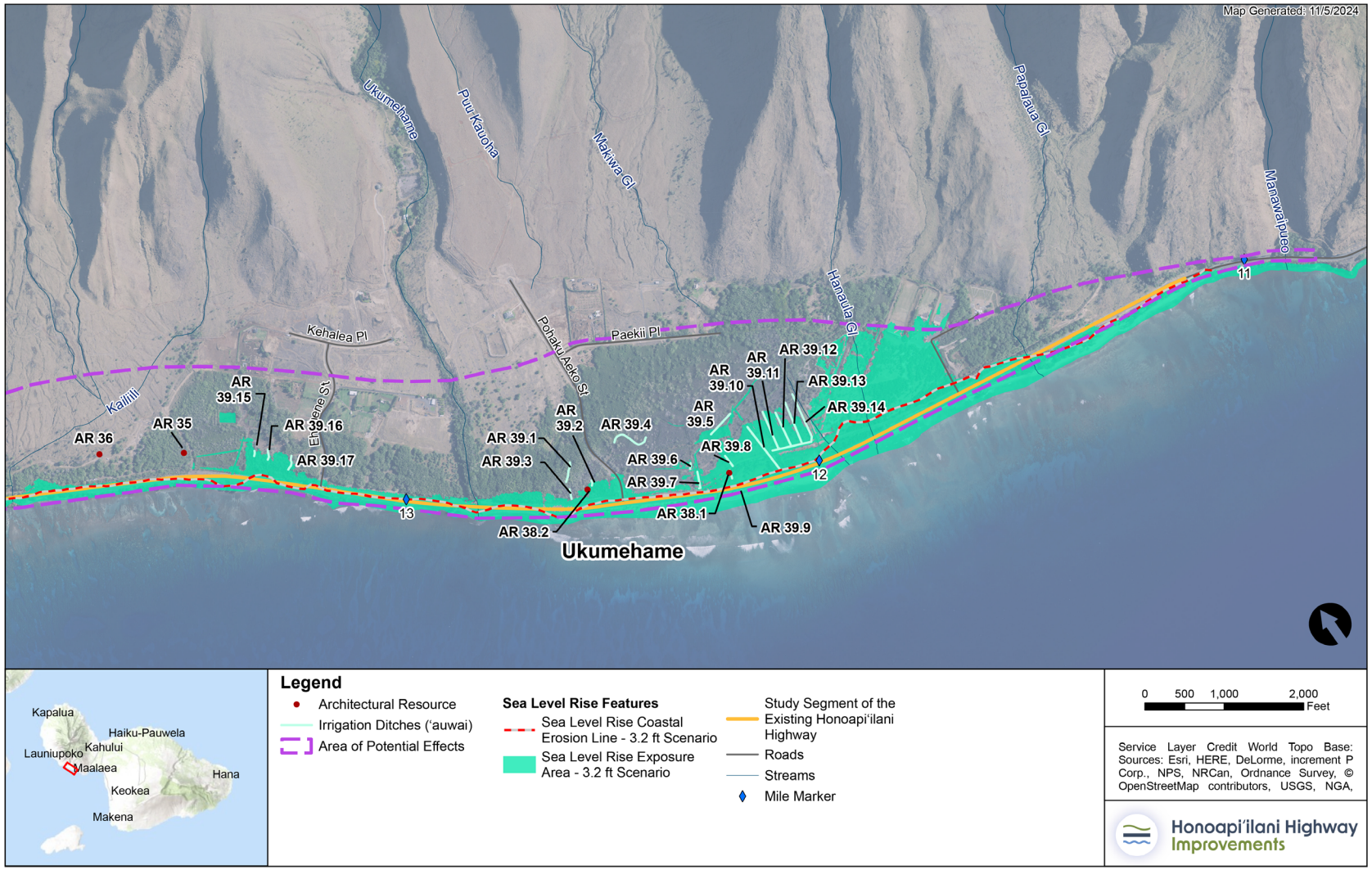


FIGURE 3.6-3. **Architectural Properties: Ukumehame**



Field Investigations and Evaluations

A qualified architectural historian conducted survey fieldwork April 3 through 7, 2023, in coordination with project archaeologists. As summarized in Appendix 3.6, 40 architectural resources (AR) 35 years or older were identified within the APE. Of these resources, nine were previously surveyed and 31 were newly identified. These 40 resources comprise 13 residential and commercial buildings, one cemetery, one religious building/cemetery complex, two landings/wharfs, one bridge, two roadways, six boundary wall structures, two freight corridors, one water tower, one well, one series of agricultural clearing push piles, and nine water control structures or series of structures.

As a result of evaluations, three of the 40 surveyed architectural properties were determined individually eligible for listing in the NRHP; 10 of the surveyed architectural properties were determined to be contributing resources within the NRHP-eligible Olowalu Sugar Plantation Historic District, which is an expansion of the previously identified Olowalu Sugar Mill Complex. On March 25, 2024, the FHWA provided the *Reconnaissance Level Architectural Inventory Survey for the Honoapi'ilani Highway Improvements, West Maui, from Launiupoko to Ukumehame* (RLS) to the SHPD, which included the results of efforts to identify and evaluate architectural historic properties within the APE. In a letter dated July 9, 2024, the SHPD concurred with the FHWA determinations of eligibility described in the Reconnaissance Level Survey.

Identified Historic Properties

As described in the Reconnaissance Level Survey, and following survey and evaluation, three individually eligible or contributing architectural historic properties were identified within the Olowalu segement of the APE (TABLE 3.6-7) out of the 40 properties evaluated. In addition, field survey affirmed that one of the previously identified resources (CSH 4 Reservoir) that had not been assessed should be included as a contributing resource. Field assessment also confirmed the prior determination that Old Government Road (SIHP 04696) is not eligible, and the previously surveyed retaining wall and rock walls are not individually eligible or contributing resources.

Although architectural historic properties related to the plantation era were identified within Ukumehame and Launiupoko, the landscape no longer reflects the influence of the local sugar industry in the way the interconnected resources do in Olowalu. Many of the buildings and structures related to the period are no longer extant, and the remaining landscape features hold less historical and architectural significance and have lost integrity of materials, workmanship, design, setting, feeling, and/or association. Therefore, a historic district was not recommended for Launiupoko or Ukumehame under the architectural property assessment (nor were any eligible resources identified).

Olowalu Sugar Plantation Historic District

Based on the existing Olowalu Sugar Mill Complex (SIHP 01602), including the wharf, landing, and plantation manager house (as previously determined NRHP-eligible as a small historic district), and as shown in FIGURE 3.6-4, this complex has been expanded into a larger Olowalu Sugar Plantation Historic District. The district encompasses both the Olowalu Sugar Company (1880-1931) resources comprising SIHP 01602 and those of the later Pioneer Mill Company (1931-1951). Olowalu Sugar Plantation Historic District is eligible for listing in the NRHP/SRHP as a historic district under Criterion A/a and Criterion D/d. The areas of significance represented in the historic district include agriculture, architecture, archaeology, engineering, and industry. Moreover, 10 contributing resources comprising

the Olowalu Sugar Plantation Historic District retain sufficient integrity of setting, location, materials, feeling, and association to accurately convey the significance of the historic Olowalu sugar plantation era.

TABLE 3.6-7. **Field Identified Eligible and/or Contributing Architectural Resources in Olowalu**

SURVEY NO.	ADDRESS/NAME	STYLE/FORM/TYPE	NRHP STATUS
AR 1 SIHP - 04758	Awalua Cemetery	Cemetery	Individually Eligible Contributing to the Olowalu Sugar Plantation Historic District
AR 4 SIHP - 01602	807 Olowalu Road	Plantation/Bungalow	Contributing to the Olowalu Sugar Plantation Historic District
AR 5 SIHP - 01602	808 Olowalu Road	Plantation/Bungalow	Contributing to the Olowalu Sugar Plantation Historic District
AR 6 SIHP - 01602	810 Olowalu Road (Olowalu Plantation House)	Plantation/Bungalow	Contributing to the Olowalu Sugar Plantation Historic District
AR 7 SIHP - 01602	810 Olowalu Road	Plantation/Bungalow	Contributing to the Olowalu Sugar Plantation Historic District
AR 8 SIHP - 01602	Olowalu Company Sugar Mill Complex (Olowalu Landing and Wharf)	Agricultural Processing/Industrial Facility	Contributing to the Olowalu Sugar Plantation Historic District
AR 8, Expanded SIHP - 01602	Olowalu Sugar Plantation Historic District	Sugar Plantation Infrastructure	Eligible
AR 16	802 Olowalu Village Road	Plantation/Bungalow	Individually Eligible Contributing to the Olowalu Sugar Plantation Historic District
AR 17 SIHP - 01603	Lanakila Historic Church (Olowalu Church and Cemetery)	Church and Cemetery	Individually Eligible
AR 19	Water Tower	Late 19th-century water storage structure	Contributing to the Olowalu Sugar Plantation Historic District
AR 20	Bridge	Early 20th-century-steel-stringer/multibeam bridge	Contributing to the Olowalu Sugar Plantation Historic District
AR 31 CSH-4	Reservoir	Water Control	Contributing to the Olowalu Sugar Plantation Historic District

FIGURE 3.6-4. **~~Contributing Resources to the~~ Olowalu Sugar Plantation Historic District <u>Identified Historic Properties</u>**

3.6.4 Environmental Consequences

3.6.4.1 No Build Alternative

The No Build Alternative would continue use of the existing Honoapi‘ilani Highway. Because no project activities would occur within the APE under this alternative, there would be no effect on archaeological or architectural historic properties.

3.6.4.2 Build Alternatives

Archaeology

As shown in TABLE 3.6-8, one or more of the Build Alternatives in Olowalu could directly, physically affect the preliminarily eligible archaeological resources previously identified or as identified through field assessment in this ~~Draft~~ Final EIS. As shown in TABLE 3.6-9, one or more of the Build Alternatives in Ukumehame could physically affect the preliminarily eligible resources previously identified or as identified through field assessment in this ~~Draft~~ Final EIS. As described in the Executed Programmatic Agreement, Effects on archaeological historic properties including identified eligible resouces as well as any newly identified resources would be ~~have not been~~ presented to the SHPD after completion of the subsurface Archaeology Inventory Survey of the Preferred Alternative during the design-build process ~~at this time~~.

TABLE 3.6-8. **Archaeological Resources with Potential Effects by Build Alternative - Olowalu Segment (including Launiupoko)**

AHUPUA‘A	BUILD ALTERNATIVES WITH POTENTIAL EFFECTS	SURVEY NO.	FORMAL TYPE
Olowalu	All	AA2216-028	Wall, Fenceline
Olowalu	1, 2	AA2216-036	Surface Scatter
Olowalu	All	AA2216-106	Terraces, Circular Alignments, Small Semi-Circular Terraces, Enclosures
Olowalu	All	AA2216-107	Alignment, C- Shape, Enclosure, Modified Outcrop, Terrace
Olowalu	All	SIHP -04700	Rock Shelters, C-shape, Wall
Olowalu	All	SIHP -04701	Modified Outcrop and Platform
Olowalu	3	SIHP -04718	Heiau
Launiupoko	All	AA2216-023	Precontact and Possible Historic Military
Launiupoko	All	SIHP-05954	Early 20th Century Ranch
Launiupoko	All	SIHP- 05955	Precontact

TABLE 3.6-9. **Archaeological Resources with Potential Effects by Build Alternative – Ukumehame Segment**

AHUPUA'A	BUILD ALTERNATIVES WITH POTENTIAL EFFECTS	SURVEY NO.	FORMAL TYPE
Ukumehame	2/3	AA2216-009	Surface Scatter
Ukumehame	2/3	AA2216-015	Surface Scatter
Ukumehame	All	AA2216-017	Surface Scatter
Ukumehame	All	AA2216-018	Surface Scatter
Ukumehame	All	AA2216-020	Surface Scatter
Ukumehame	All	AA2216-022	Stone Well
Ukumehame	All	AA2216-046	Habitation Complex
Ukumehame	All	AA2216-050	Agricultural and Ceremonial Complex
Ukumehame	1, 2/3	AA2216-068	C-Shape, Mound, Platform, Surface Scatter, Terrace
Ukumehame	1, 2/3	AA2216-070	C-Shape, Mound, Terrace
Ukumehame	All	AA2216-072	Enclosure, Mound, Wall
Ukumehame	All	AA2216-073	Enclosure and Ahu
Ukumehame	2/3, 4	AA2216-075	Surface Scatter
Ukumehame	1, 2/3	AA2216-088	Terrace, Ahu, Modified Outcrop
Ukumehame	All	AA2216-089	Enclosure, Modified Outcrop, Terrace
Ukumehame	1	AA2216-090	Surface Scatter
Ukumehame	1, 2/3	AA2216-091	Surface Scatter
Ukumehame	2/3	AA2216-092	Surface Scatter
Ukumehame	1, 2/3	AA2216-095	Modified Outcrop, Mound, Surface Scatter, Terrace
Ukumehame	1, 2/3	AA2216-096	Modified Outcrop, Pavement, Petroglyph, Surface Scatter, Terrace
Ukumehame	All	AA2216-097	Wall
Ukumehame	1, 2/3	AA2216-098	Rock Shelter
Ukumehame	2/3	AA2216-099	Modified Outcrop and Surface Scatter
Ukumehame	1, 2/3	AA2216-100	Rock shelter
Ukumehame	1, 2/3	AA2216-101	Rock shelter
Ukumehame	1, 2/3	AA2216-103	Surface Scatter
Ukumehame	All	AA2216-105	Temporary Habitation and Ceremony
Ukumehame	All	AA2216-108	Heiau

3.6.4.3 Architecture

Portions of Build Alternatives 1 and 2 would be within the ~~mauka~~ boundary of the Olowalu Sugar Plantation Historic District. Build Alternative 1 could potentially physically affect two contributing resources within the Olowalu Sugar Plantation Historic District (SIHP 19 Water Tower and SIHP 20 Bridge). Build Alternative 2 would not ~~but would not directly,~~ physically affect any contributing resources within the district. Additionally, the district's integrity of setting has been previously diminished through nearby development during the 20th century and areas comprising former agricultural fields were identified as non-contributing. TABLE 3.6-10, summarizes the effects on individual architectural historic properties ~~are not anticipated~~, and effects on the Olowalu Sugar Plantation Historic District are not anticipated to be adverse. ~~Effects on architectural historic properties have not been presented to the SHPD at this time but would be presented during the design-build phase of the project~~. Effects on architectural historic properties were assessed for the Preferred Alternative (Build Alternative 2 in Olowalu, see Chapter 5, Selected Alternative). In a letter to SHPO dated August 8, 2025, FHWA determined the Project's Preferred Alternative would result in no adverse effect on architectural historic properties. SHPO concurred with FHWA's determination in a letter dated August 13, 2025 (see Appendix 3.6), see Chapter 5, Selected Alternative.

TABLE 3.6-10. **Potential Adverse Effects on Architectural Resources by Build Alternative - Olowalu**

AHUPUA'A	ALTERNATIVES WITH POTENTIAL EFFECTS	SURVEY NO.	ADDRESS/NAME
Olowalu	None	AR 1 SIHP -04758	Awalua Cemetery
Olowalu	None	AR 4 SIHP -01602	807 Olowalu Road
Olowalu	None	AR 5 SIHP -01602	808 Olowalu Road
Olowalu	None	AR 6 SIHP -01602	810 Olowalu Road (Olowalu Plantation House)
Olowalu	None	AR 7 SIHP -01602	810 Olowalu Road
Olowalu	None	AR 8 SIHP -01602	Olowalu Company Sugar Mill Complex (Olowalu Landing and Wharf)
Olowalu	None	AR 16	802 Olowalu Village Road
Olowalu	None	AR 17 SIHP -01603	Lanakila Historic Church (Olowalu Church and Cemetery)
Olowalu	None	AR 19	Water Tower
Olowalu	None	AR 20	Bridge
Olowalu	None	AR 31 (CSH-4)	Reservoir

Note: AR 17 is individually eligible and is not a contributing resource to the Olowalu Sugar Plantation Historic District. AR 1 and AR16 are individually eligible as well as contributing to the Olowalu Sugar Plantation Historic District.

3.6.5 Construction Effects

Only the No Build Alternative avoids construction effects to identified archaeological historic properties. Construction-related activities related to the Build Alternatives could result in adverse effects to archaeological historic properties. Construction of the Build Alternatives includes several pinch points or merges where the Build Alternatives overlap and intersect; these areas may require partial removal of some archaeological historic properties (see the Executed ~~Draft~~ Programmatic Agreement for additional description of treatment measures). The Build Alternatives would not adversely affect any architectural historic property as they all avoid the individually eligible properties and all contributing resources within the proposed Olowalu Sugar Plantation Historic District. Refinements to the Preferred Alternative ~~would be made during the~~ were made between publication of the Draft EIS and Final EIS, and the potential effects from the refined Preferred Alternative ~~would be~~ are documented in Chapter 5 of ~~the~~ this Final EIS/ROD. The refined Preferred Alternative would continue to be studied under the Programmatic Agreement.

3.6.6 Indirect Effects

Because ~~Based on the localized potential adverse effects of the Project on archaeological resources combined with the understanding that~~ the Project would not result in any zoning or other land use changes, there would be no indirect effects on archaeological and architectural resources.

3.6.7 Mitigation

In accordance with 36 CFR § 800.14(b), the FHWA, the SHPD~~, the Advisory Council on Historic Preservation~~, and HDOT ~~would~~ have consulted with other parties and entered into a Programmatic Agreement to govern Section 106 compliance for the Project, including identification of archaeological historic properties within the limits of disturbance for the Preferred Alternative. The Programmatic Agreement including its memorandum on HRS §6E compliance attached to the agreement as Appendix 1, provides for ~~would~~ treatment measures to avoid, minimize, and mitigate adverse effects to historic properties; provides protocols for continued consultation during project implementation; and describes processes for project changes and unanticipated discoveries.

3.6.7.1 Archaeology

The Executed ~~Draft~~ Programmatic Agreement includes protocols to avoid, minimize, or mitigate adverse effects on archaeological historic properties and burials. There would be continued consultation with the SHPO, the Maui/Lāna‘i Island Burial Council, recognized Descendants, and NHOs during investigations and analysis.

According to the Executed ~~Draft~~ Programmatic Agreement, if the Project results in an adverse effect on an archaeological historic property, HDOT and the FHWA would consult to develop and implement any modifications or conditions to avoid or minimize the adverse effects, as agreed upon and as feasible. Chapter 5, Preferred Alternative, summarizes avoidance opportunities evaluated as part of this ~~Draft~~ Final EIS.

If adverse effects cannot be avoided, data recovery excavations may be considered following consultation. This would include development of a data recovery plan for each affected archaeological historic property or burial consistent with State of Hawaiʻi and federal laws.

If adverse effects cannot be fully avoided and data recovery is determined not appropriate through consultation, the FHWA and HDOT would continue to consult and would prepare a treatment plan for each affected archaeological historic property. With respect to unmarked Native Hawaiian burials, burial treatment plans would be consistent with State of Hawaiʻi law and would be developed in consultation with the Maui/Lānaʻi Island Burial Council.

HDOT, in coordination with the SHPO, would curate recovered materials in accordance with applicable State of Hawaiʻi and federal laws.

3.6.7.2 Architecture

While the preliminary analysis of the four Build Alternatives supported a determination of no recommendation of no adverse effect on architectural historic properties, with the exeption of Alternative 1 in Olowalu. A formal effect determination for the Preferred Alternative was made by FHWA in a letter to SHPO dated August 8, 2025, and SHPO concurred with the determination in a letter dated August 13, 2025 (see Chapter 5, Selected Alternative). Because changes to the Project may occur that could affect architectural historic properties, or additional architectural historic properties could be discovered during construction activities, the Executed ~~Draft~~ Programmatic Agreement includes treatments to avoid, minimize, or resolve potential adverse effects architectural historic properties.. HDOT and the FHWA would engage the SHPO and Consulting Parties to develop and implement modifications or conditions to avoid, minimize, or, if necessary, resolve an adverse effect. Should an adverse effect result, the following treatment measures may be applied to resolve adverse effects:

- **Educational Interpretation**. HDOT, in coordination with the FHWA, may develop educational interpretation elements on one or more historic properties within the APE. These elements may include displays, markers, educational pamphlets, brochures or booklets, posters, websites, or other accessible information.
- **Photogrammetry**. HDOT may hire a consultant to conduct historic property documentation through photogrammetry, which would allow construction of a 3D model using high-resolution photographs and details of historic materials.
- **Recordation**. Prior to alterations or demolition of an architectural historic property, HDOT and the FHWA, in consultation with the SHPO and Consulting Parties, may record the adversely affected property through a digital photography package or Historic American Buildings Survey (HABS)/Historic American Engineering Record/Historic American Landscapes Survey Level III recordation (68 Federal Register 43159), as appropriate.

3.6.8 Build Alternatives Comparative Assessment

The Build Alternatives could potentially result in direct, physical effects on archaeological resources: between 8 and 9 in Olowalu and between 13 and 27 in Ukumehame (TABLE 3.6-11). Build Alternative 1 could potentially result in direct, physical effects on architectural resources at three locations : in

Olowalu including the expanded Olwalu Sugar Plantation Historic Destrict and two of its contibuting resources (TABLE 3.6-12). None of the other Build Alternatives have an effect on these resources

TABLE 3.6-11. **Summary of Potential Adverse Effects on Archaeological Resources**

SEGMENT	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Olowalu (including Launiupoko)	9	9	9	8
Ukumehame	23	27	27	13

TABLE 3.6-12. **Summary of Potential Adverse Effects on Architectural Resources**

SEGMENT	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Olowalu (including Launiupoko)	3	0	0	0
Ukumehame	0	0	0	0

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3.7 CULTURAL RESOURCES

This section provides an analysis of the Honoapi‘ilani Highway Improvements Project’s (the Project’s) impact on customary and traditional Native Hawaiian practices in the project area as required by the Hawai‘i Revised Statutes (HRS) § 343-2. This analysis is separate from, but complements, the federally mandated review under Section 106 of the Historic Preservation Act (Section 3.6, Archaeological and Architectural Historic Properties). HDOT, the State agency leading the Project’s action, bears responsibility for this obligation as well as any mitigation deriving from this analysis.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to cultural resources. Based on those comments, or other information gathered after the publication of the Draft EIS, no revision to the analysis contained within this section was warranted and no further analysis is required as part of this Final EIS.

3.7.1 Regulatory Context

The obligation of the State to protect Native Hawaiian traditional and customary practices is based first upon Article XII, Section 7 of the Hawai‘i Constitution, which requires the State of Hawai‘i to protect all rights of Native Hawaiians to exercise customary and traditional practices for subsistence, cultural, and religious purposes.

Subsequent legislative acts, as codified in the HRS, as well as the State constitution and statutes through case law, describe how the State seeks to integrate and protect Native Hawaiian traditional and customary practices in a western system of private property ownership.

Section 7-1 of the HRS specifically protects the right to gather, although the right is limited in scope to the enumerated items that are primarily used for constructing a house or starting a fire. Section 1-1 of the HRS offers broader protection for the exercise of traditional and customary rights. By codifying “Hawaiian usage” as an exception to the common law of the State, this statutory provision provides “a vehicle for the continued existence of those customary rights which continued to be practiced” after November 25, 1892.[1]

In a series of landmark cases beginning with *Kalipi*, the Hawai‘i Supreme Court reaffirmed the customary and traditional gathering rights of ahupua‘a[2] tenants, particularly under Article XII, Section 7 of the Hawai‘i Constitution.[3] Through this line of cases, the Supreme Court established the manner in which State agencies must apply constitutional protections of Native Hawaiian gathering rights in the development of private real property.

[1] Kalipi v. Hawaiian Trust Co., 66 Haw. 1, 10, 656 P.2d 745, 750–51 (1982).

[2] An ahupua‘a is a traditional Hawaiian land division.

[3] Kalipi, 66 Haw. at 10–12, 656 P.2d at 750–52; Pele Defense Fund v. Paty, 73 Haw. 578, 837 P.2d 1247 (1992), cert. denied, 507 U.S. 918 (1993); Public Access Shoreline Haw. v. Haw. Cnty. Planning Comm’n, 79 Hawai‘i 425, 903 P.2d 1246 (1995), cert. denied, 517 U.S. 1163 (1996) (commonly known as “PASH”); Ka Pa‘akai O Ka ‘Āina v. Land Use Com’n, State of Hawai‘i, 94 Hawai‘i 31, 7P.3d 1068 (2000).

In *Kalipi*, the Hawai‘i Supreme Court ruled that “any argument for the extinguishing of traditional rights based simply upon the possible inconsistency of purported native rights with our modern system of land tenure must fail.”[4] In *Pele Defense Fund v. Paty*, the Court held that “Native Hawaiian rights protected by article XII, section 7 may extend beyond the ahupua‘a in which a Native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner.”[5] In the *Public Access Shoreline Highway (PASH) v.* Hawai‘i County Planning Commission case, the court stated that “legitimate customary and traditional practices must be protected to the extent feasible in accordance with article XII, section 7.”[6]

The court in *PASH* stated that the “State retains the ability to reconcile competing interests under article XII, section 7.”[7] As part of this balance of interests, the court stated: (a) “[although access is only guaranteed in connection with undeveloped lands, and article XII, section 7 does not require the preservation of such lands, the State does not have the unfettered discretion to regulate the rights of ahupua‘a tenants out of existence,”[8] and (b) “the balance of interests and harms clearly favors a right of exclusion for private property owners as against persons pursuing non-traditional practices or exercising otherwise valid customary rights in an unreasonable manner,” although, “[o]n the other hand, the reasonable exercise of ancient Hawaiian usage is entitled to protection under article XII, section 7.”[9]

In *Ka Pa‘akai O Ka ‘Āina*, the Supreme Court reaffirmed the constitutional and statutory responsibility of State agencies to preserve and protect the rights of Native Hawaiians to carry-out their traditional and customary practices to the extent feasible and, in so doing, “the Court introduced an analytical three part framework that governmental agencies must specifically consider when balancing their obligations to protect traditional and customary practices against private property (as well as competing public) interests.”[10] These include the following:

1. Identify the scope of “valued cultural, historical, or natural resources” in the petition area, including the extent to which traditional and customary Native Hawaiian practices are exercised in the affected area

2. Determine the extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action

3. Identify feasible actions, if any, to be taken by the State to reasonably protect Native Hawaiian rights if they are found to exist

These court decisions overall affirm and seek “to effectuate the State’s obligation to protect Native Hawaiian customary and traditional practices while reasonably accommodating competing private

[4] Kalipi, 66 Haw. at 4, 656 P.2d at 748.

[5] Pele Defense Fund v. Paty, 73 Haw. at 620, 837 P.2d 1272.

[6] Public Access Shoreline Highway (PASH) v. Hawai’i County Planning Commission, 79 Hawai‘i at 451, 903 P.2d at 1272.

[7] Public Access Shoreline Highway (PASH) v. Hawai’i County Planning Commission, 79 Hawai‘i at 447, 903 P.2d at 1268.

[8] Id. at 451, 903 P.2d at 1272.

[9] Id. at 442, 903 P.2d at 1272.

[10] MacKenzie, 2015.

[property] interests."[11] The three-part framework provides specific direction to State and County agencies when considering land use and development projects on previously undeveloped land and should provide guidance to developers with respect to the record that must be prepared for a discretionary land use authorization or permit.

The contents of this chapter relies upon findings from the Cultural Impact Assessment (CIA), which includes a discussion of the above three criteria, and fulfills HDOT's obligations pursuant to *Ka Pa‘akai O Ka ‘Āina.*

3.7.2 Methodology

In July 2023, ‘Āina Archaeology, Inc. completed a CIA Report for the Project that included an ethnographic study.[12]

The CIA was prepared through research of archives and legal documents, including Land Commission Awards and census counts, as well as an examination of culturally significant wahi pana (storied places) and their treatment in mele (songs and chants), mo‘olelo (stories and history), ka‘ao (myths), and other oral history traditions. From the information found via documentary research, ‘Āina Archaeology was able to hold focused interviews with organizations and individuals having knowledge of the Project.

To identify individuals with knowledge of the traditional cultural practices within and adjacent to the Project as it relates to this study, government agencies, advisory councils, local community organizations, traditional cultural practitioners, and kama‘āina (residents) and kupuna (elders) with generational ties to the project area were contacted. The project team then made good-faith attempts to follow up with everyone on the initial mailing list with letters and Olowalu (including Launiupoko)/Ukumehame project area maps. Table 4-1 in the CIA presents a more detailed list of the community consultation effort conducted with kama‘āina, Hawaiian cultural advisers, and Hawaiian organizations. And Section 3.7.4, Interviews and Consultation, summarizes the findings of the document research and interviews with individuals who expressed personal knowledge of the project area and gave their consent to share their mana‘o (thoughts).

While research revealed that the number of records that mention Olowalu versus Ukumehame are not equal, Ukumehame has traditionally been considered a part of Olowalu. Therefore, to glean information about cultural practices in Ukumehame and Launiupoko, additional information about practices in Olowalu and across the broader land division of Lāhainā is often utilized. Therefore, this chapter does not discuss impacts ahupua‘a by ahupua‘a separately (like other chapters in this ~~Draft~~ Final EIS). Instead, this chapter is designed to better consider the Project from a Kānaka Maoli (Native Hawaiian) viewpoint based on research and interviews that fulfill the requirements of Ka Pa‘akai O Ka ‘Āina.

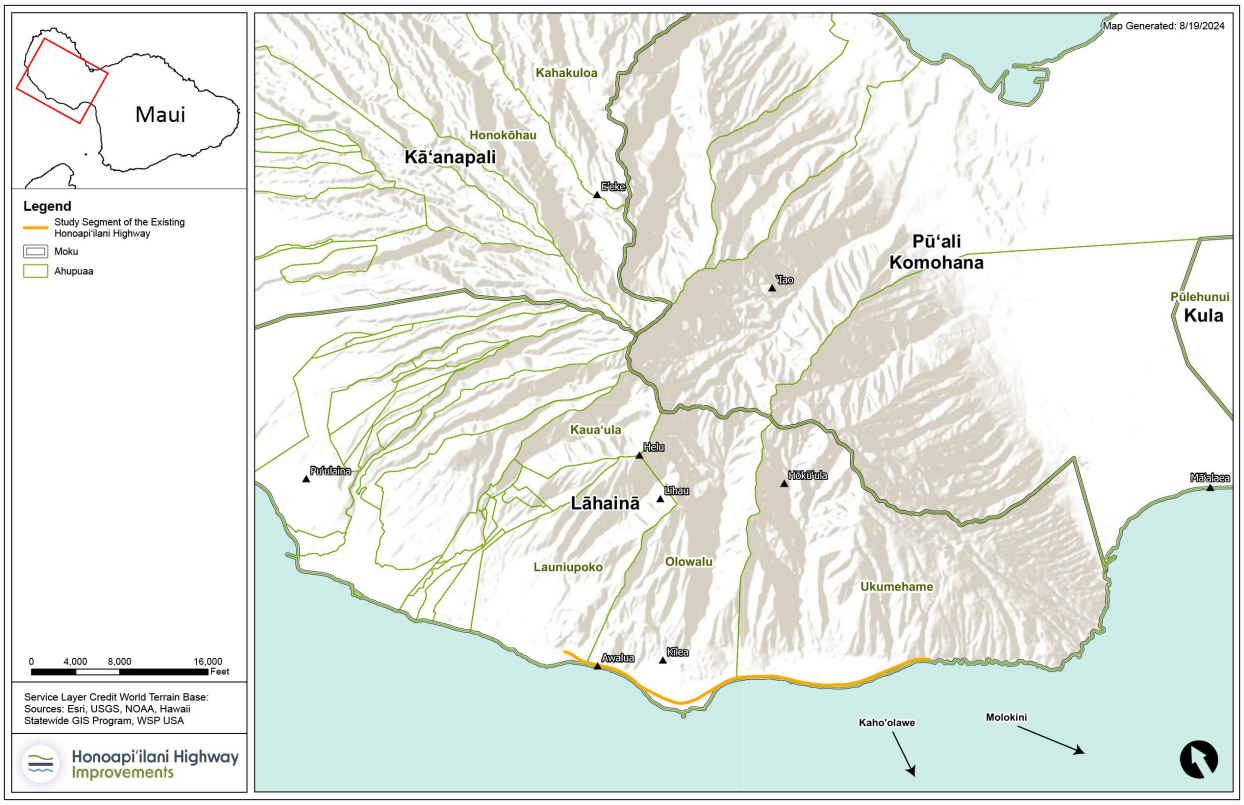
[11] Id. at 46-47, 7 P.3d at 1083-84.

[12] ‘Āina Archaeology, Inc. 2023. Cultural Impact Assessment Report.

3.7.3 Cultural, Historical, and Natural Resources in the Affected Environment

The project area includes the entire ahupua'a of Olowalu (and the project area extends into a small portion of the ahupua'a of Launiupoko) and Ukumehame, land divisions which abut one another on the leeward slopes of Mauna Kahalawai in the moku (land section) of Lāhainā. Olowalu's mauka boundaries follow the ridge separating the headwall of 'Īao Valley from Olowalu Valley, extending makai toward Helu and Līhau, ending at Awalua on the Launiupoko side and Pakala on the Ukumehame side. The mauka border of Ukumehame ahupua'a stretches across the ridgeline toward Waikapu with the coastal border marked at Mā'alaea (FIGURE 3.7-1).

FIGURE 3.7-1 **Project Area Moku and Ahupua'a**



3.7.3.1 Traditional Hawaiian Subsistence Practices

The allure and notable history of the Lāhainā district stems from its abundant natural resources and strategic geographic location.[13] Olowalu Stream, along with Ukumehame, Launiupoko, and Kaua'ula, stream, offered a fertile leeward setting conducive to cultivating a diverse array of agricultural products. This history is confirmed when examining land claims in the area to traditional resources and agricultural lands during the Māhele period, which included claims regarding specific agricultural resources such as kalo (taro) grown in both dry land and wetlands or pond fields, banana, sweet potato, breadfruit, and paper mulberry. Other land types and garden areas were also found as explicit claims presented to the Land Commission for screwpine, hibiscus, coconut, beach cordia, and candlenut. Of particular interest are kuleana claims for screwpine, which were directly associated with

[13] Handy and Handy, 1972. Native Planters in Old Hawaii: Their Life, Lore, and Environment.

specific uses such as lei making or the weaving of sleeping mats (Helu [Claim Number] 3726 to Malaea, 3772 to Alapaʻi, 3811 to Lupe [FIGURE 3.7-1], 3877 to Pikao, 3934 to Niʻau, and 4376 to Keahi). Limited agriculture still exists to this day on certain residential parcels, as discussed in the interviews below.

The greatest treasure trove of descriptions regarding Native fishing traditions was compiled by the Hon. Daniel Kahāʻulelio, born in Lāhainā at Wailehua in 1835, for Ka Nupepa Kuokoa and ran as a series of newspaper articles for five months in 1902. As a Native son of Lāhainā, the majority of Kahāʻulelio's traditions have an intimate relationship with that place. One such tradition describes the communal, cooperative pakū (curtain) net fishing that was practiced at Unahi in Olowalu to catch akule (*Selar crumenophthalmus*). Although they are usually known as deep sea fish, akule occasionally came close to shore in Unahi at Olowalu and could be seen from shore, making the waters red.

Kahāʻulelio attested to further fishing traditions in the Olowalu area where the ocean from Lāhainā to Maʻalaea was referred to as Kai-o-Haui, noting the people were also known for mamali ʻōʻio (juvenile *Albula glossodonta*) fishing along the reefs and shorelines.[14] They used hooks for this type of fishing, unlike other places where nets were used to catch ʻōʻio.[15] Aku (*Katsuwonus pelamis*) fishing for those of Ukumehame, Olowalu, and all of Lāhainā, prior to the arrival of the missionaries, was carried out 5 to 7 miles from the coast with the pā (hook) and a malau (bait carrier) filled with ʻiao (*Pranesus insularum*).[16] Koʻa (fishing grounds) and triangulation points based on landmarks that fishermen could see while on the ocean were extremely important to the success of a catch. Marine fishing practices like diving, pole fishing, spear fishing, basket trapping, laying net, hukilau (pulling nets), limu gathering, ʻopihi picking, crab hunting, and more have been occurring for generations in the coastal regions of the project areas.[17] Shore fishing and deep sea fishing (to a certain extent) is still practiced today as discussed in the interviews below.

In the mountain streams, freshwater fish and shrimp species are known to inhabit both Olowalu and Ukumehame Streams. Kamakau explains that ʻōpae (shrimp) and ʻoʻopu (freshwater gobies) were sometimes found in loʻi kalo (wetland taro patches), such that they would also function as fish ponds.[18]

Shoreline fishponds, or loko iʻa, were also important parts of the subsistence of Olowalu. Ka Loko Iʻa o Kapāʻiki was an aquaculture resource that was meant for the aliʻi. The location of the fishpond is mentioned as being near the Olowalu shoreline" and "the land where Kalola's kauhale (house compound) stood in Olowalu is on Saffery land, near the Loko o Kapāiki."[19] Fishponds and other types of fisheries, like the oʻopu fishery in the project area, provided further sustainable sources of fish protein for the aliʻi (chiefs) and people of the Olowalu area.

[14] Sterling. 1998.
[15] Kahāʻulelio. 2006.
[16] Ibid.
[17] Ibid.
[18] Kamakau. 1976.
[19] Smith. 2011.

A network of overland trails facilitated pedestrian passage from Lāhainā to the north coast of West Maui and into the higher forests for activities such as bird-catching and gathering wild plants. According to Handy, et al., one trail extended mauka in Olowalu Valley to the highest point of the West Maui summit at Pu‘u Kukui, then descended to Waiehu on the northern side and also into Wailuku.[20,21] Bird catching is likely no longer in practice. More recently, nēnē (Hawaiian geese) have returned to nest in the mauka regions of the project area where water is prevalent and light, noise, and crowds of people are scarce. Although gathering of plant materials has not been identified as by interview participants as a continuing practice, it is a possibility.

Ukumehame was once a natural marshy area, plentiful with pa‘akai (sea salt) and a regular place for visiting ali’i to stop their large fleets, to come ashore, and be welcomed in a bountiful environment. Kealaloloa, situated within the confines of Ukumehame ahupua‘a, constitutes a broad ridge on the southeast flank of West Maui, rising mauka from a traditional Hawaiian coastal settlement.[22] Proceeding along the ridge mauka, it offers a direct and easily navigable route to the West Maui summit region, where the headwaters of Pohakea Stream on the east and Ukumehame Stream on the west converge. It was also a place for nesting koa’e (*Phaethon lepturus dorotheae*) in the high cliffs that line the pali (cliffs). There is conjecture that from this juncture, known as Hana‘ula, the trail likely continued along the summit ridge to intersect with the inland Olowalu- Pu‘u Kukui-Waiehu "overland" trail.[23] Beyond its utility in traversing the West Maui Mountain range, Folk and Hammatt propose that Kealaloloa may have granted access to more environments conducive to agriculture.[24] Mauka to makai trails have been observed on adjacent ridges of Kealaloloa.[25] However, it appears that the more accessible portions of the Kealaloloa trail itself have been obliterated by modern usage.

3.7.3.2 Mo‘olelo (Stories)

There are many ka'ao (myths) about the landscape that reflect both Hawaiian familial relationships with the land around them and to their sense of how different parts of the land relate to each other. These are important because the Project could alter the relationships between the people and the landscape or between objects in the landscape.

Mythology recounts that Pele’s initial arrival on Maui occurred at Lāhainā, where she left her footprint on the hill of Lāina.[26] The various mountain peaks and ridges of Lāhainā are associated with Lāina’s mother, Līhau (Mauna Līhau), his father (‘E‘eke), and Līhau’s sister (Pu‘uwaiohina). Additionally, the two ridges shaping Ukumehame valley are linked with celestial bodies. Hoku‘ula, the highest mountain ridge on the west side of Ukumehame, translates to “sacred star,” while Hoku Waiki, a smaller ridge

[20] Handy. 1991.
[21] Sterling. 1998.
[22] Walker. 1941.
[23] Handy, and Handy. 1972.
[24] Hammatt. 1991.
[25] Robins. 1994.
[26] Ashdown. 1970.

traversing the center of Ukumehame valley, derives its name from the smaller stars within the Taurus constellation.[27]

The CIA identified two additional moʻolelo set specifically in Olowalu.

Puʻulaina, ʻEʻeke, and Līhau – Mountainous Moʻolelo

The origins of the previously mentioned prominent mountain peak, Līhau, (Section 3.7.2, Methodology) located at the back of Olowalu ahupuaʻa, can be found in the story of Puʻulaina, a hill located in the ahupuaʻa of Wahikuli. The moʻolelo also connects Līhau to the formation of Puʻu ʻEʻeke and the islet of Molokini in the ʻAlalākeiki Channel.

The story involves Līhau and her adulterous husband, ʻEʻeke, who had a son they named Lāina.[28] Angry at her husband for cheating with her sister, Puʻuwaiohina, Līhau attempts to strangle her son and free herself to also be adulterous, but she fails to kill the child. ʻEʻeke takes the boy to live with his mother, Maunahoʻomaha, where he is well cared for and grows to be a handsome young man. Upon the delivery of the boy to his grandmother, the god of ʻEʻeke and Līhau, Hinaikauluau, forbids the couple to live together and to engage in sexual relations with any others. Unable to abide by this rule, ʻEʻeke once again lays with Puʻuwaiohina, and the punishment for this infraction was immediately meted out; ʻEʻeke was turned into a mountain and Puʻuwaiohina was transformed into a ridge at Kauaʻula.

After the punishment of her husband and sister, Līhau felt an upwelling of fondness for her son and asked her mother-in-law to once again see her child. Līhau and Lāina were reunited and soon he was married to the beautiful Molokini. At the same time, Pele was making her way through the island chain along with her sisters, one of whom saw how handsome Lāina was and asked Molokini to have him, to which the reply was no. For her refusal, Molokini was changed into the little islet that remains in the channel between Kahoʻolawe and Maui, and her beloved Lāina was made the husband of Pele's sister. Līhau greatly grieved her daughter-in-law and consulted Pele on the matter, at which point the goddess changed the woman into the hill we see at Olowalu. And even though her sister begged for Lāina to be spared, Pele angrily turned him into a hill where he, too, remains to this day.

Drought and the Lesson of Hua

Fornander offers another moʻolelo with the mountains of Olowalu as the backdrop. The uaʻu (Hawaiian Petrel, *Pterodroma sandwicensis*) that nest there are also central to the story regarding a Lāhainā aliʻi who, having forsaken his kahuna (priest), Luahoʻomoe, caused a drought that impacted the entire island chain.

There lived here in Lahaina a chief named Hua… he desired to get some uaʻu squabs to eat; he sent some men up to the mountains above Oloalu [*sic*] to get some uaʻu squabs to satisfy his desire. He did not wish for birds from the beach. When the birds were obtained, they were to be taken to the priest for him to ascertain where the birds came from; if he should give out the same information as the men had given to the chief as to the source of the birds, then he would be safe; if he should give a contrary answer, he would be killed. The name of this priest was Luahoomoe and he also had children. When

[27] Ibid.

[28] Fornander, A. 1919b. *Collection of Hawaiian Antiquities.*

the men went up, they could not find any mountain birds at all, so they decided to get some shore birds. When they caught some, they daubed the feathers red with dirt so that the chief would think the birds came from the mountain. When they returned and handed the birds to the chief, he was exceedingly glad because he thought the birds came from the mountain. The chief told the men to take them to the priest for his inspection. The priest perceived, however, that the birds came from the seashore. Then the chief said to the priest: "You shall not live, for you have guessed wrongly. I can very well see that these are mountain birds." Then and there an imu was prepared in which to bake the priest. Before he was placed in the imu, however he said to his children: "You two wait until the imu is lighted, and when the smoke ascends, should it break for the Oloalu mountains, that indicates the path; move along; and where the smoke becomes stationary, that indicates where you are to reside… Then the priest was cast into the oven and the opening closed up tightly. The smoke arose and darkened the sky… after the priest had been in the imu for two days, he reappeared and sat by the edge of the imu unknown to anyone; the chief thinking all the time that he was dead; but it was not so. When the smoke ascended and leaned towards the Oloalu mountains, the two sons went off in that direction; the cloud pointed towards Hanaula, and there it stood still, so the two sons ascended to the place and resided there… Then the whole of Maui became dry; no rain, not even a cloud in the sky, and people died from lack of water. The smoke that hung over Hanaula became a cloud, and rain fell there. Hua, the chief, lived on, and because of the lack of water and food he sailed for Hawai'i, the home of his elder brother; but because Hawai'i also suffered from lack of water and food he came back and lived at Wailuku. Wailuku also did not have any water, and that caused the chief to be crazed, so he leaned against the edge of the precipice and died, and that was the origin of the saying "The bones of Hua rattle in the sun."[29]

Fornander additionally observes that the phrase, "The bones of Hua rattle in the sun," symbolizes the fate of a chief whose malevolent actions provoked the ire of his community. As a final act of disdain, they left his remains exposed to the elements, allowing his bones to bleach under the sun and rustle in the wind. This proverb serves as a cautionary tale, urging others not to emulate Hua's destructive deeds, which led to the suffering of Luaho'omoe and inflicted great harm upon the people of Hawai'i, culminating in the ultimate disrespect of his remains by his own people.

Historic Accounts

The lands of Lāhainā, including the project area, stretching from Ukumehame to Māla became the backdrop of a pivotal war in the early 18th century. After the death of the chief of Maui, Kekaulike, one of his sons (Kauhi'aimokuakama) attempted to usurp the island from his brother (Kamehamehanui) who was the rightful heir. Later, Kahekili, another son of Kekaulike, once again took up the bloody mantle of war. Two battles connected with the project area are noteworthy for their significance to the entirety of Maui, as well as the unification of all the Hawaiian Islands. The first great battle was "Ahulau ka piipii I Kanikanilua," in which the defeated chief, Kalaniopu'u, sent his great warrior, Kamehameha, who would later unite the Hawaiian Islands under a single ruler, to the

[29] Fornander. 1919a.

pu‘uhonua (sanctuary) of Olowalu where the sister of Kahekili and the wife of Kalaniopu‘u, high chiefess Kalola Pupukahonokawailani, resided.[30, 31]

The second battle occurred many years later, after the ascension of Kamehameha to ruler of Hawai‘i Island, the ambitious chief returned to Wailuku with thousands of warriors to further the conquest of the islands and avenge Kalaniopu‘u’s previous defeat.[32] This battle is known as Kepaniwai (the dammed waters) because the many bodies of the slain Maui warriors and commoners dammed the river of Īao Valley.[33, 34] The high chiefess, Kalola watched the battle from an area in the back of ‘Īao Valley called Manienie. When the sacred valley was penetrated by Kamehameha’s forces, Kalola, her family and seven high chiefs of Maui escaped through the pass to Olowalu, where they boarded canoes for Moloka‘i and O‘ahu.[35] Some versions of the story related that among those that escaped from the battle through the overland pass to Olowalu was the young granddaughter of Kalola, Keōpūolani, who would later become the most sacred wife of Kamehameha.

In February 1790, the ship Eleanora with her captain, Simon Metcalfe, arrived from Liverpool, England, and found anchorage off the shore of Honua‘ula.[36] While docked there, the Eleanora’s skiff was stolen and watchmen killed. Subsequently, Captain Metcalfe sailed to Olowalu Bay, just offshore of the project area; and as the people of Olowalu came to trade with the Eleanora, Metcalfe opened fire on these innocent people. This notorious event is known as the “Olowalu Massacre.”

Historic Resources

Olowalu was considered a pu‘uhonua for all of Maui and, in the case of Kamehameha after the battle of Kakanilua, for visiting chiefs, as well. As defined by Pukui and others, a pu‘uhonua is a “place of refuge, sanctuary, asylum, place of peace and safety.”[37] The pu‘uhonua of Olowalu is mentioned, along with many others including Lahaina, as a place where people could escape (pakele) and enter freely (ke komo).[38]

Olowalu and Ukumehame are also home to several different types of religious sites, including heiau, burial grounds, and petroglyphs. These Historic Resoruces are discussed in further detail in Section 3.6, Archaeological and Architectural Historic Properties.

3.7.4 Interviews and Consultation

In order to identify individuals with knowledge of the traditional cultural practices within and adjacent to the project area as it relates to this study, contact with 24 individuals was initiated. These individuals

[30] Kamakau. 1961.
[31] Smith. 2011.
[32] Nakuina. 1904.
[33] Ibid.
[34] Kamakau. 1961.
[35] Smith. 2011.
[36] Kamakau. 1961.
[37] AUTHOR. 1986.
[38] Pogue. 1858.

have ties to government agencies, advisory councils, local community organizations, as well as traditional cultural practitioners, kama'āina (residents), and kupuna (elders) with generational ties to the project area. The project team then made good-faith attempts to follow up with everyone on the initial mailing list. Of the 24 individuals contacted, 13 did not respond. The remaining 11 individuals provided input via conversation (interview) or via email about the cultural practices that they are aware of that occur in the project area. Conversations and interviews in their entirety were recorded as a part of the CIA (Appendix 3.7). TABLE 3.7-1 summarizes the number of participants that mentioned specific cultural practices.

TABLE 3.7-1. **Cultural Practices Mentioned by Interview Participants**

PRACTICE	NUMBER OF PARTICIPANTS THAT MENTIONED PRACTICE
Agricultural Practices	6
Fishing/Limu Gathering	6
Physical Access/Trails	4
Forest Resources	3
Fauna	4
Historic/Cultural Sites	6
View Planes for navigation	3
Streams/Surface Waters	6

3.7.5 Effects on Cultural, Historic, and Natural Resources

Traditional cultural practices and resources in the ahupua'a of Launiupoko, Olowalu, and Ukumehame were numerous, ranging from mauka to makai. We see traditional cultural practices in the form of farming, gathering, ceremonial, and spiritual activity, as well as the resources needed to support these practices within the project area. Some of these past practices and resources continue to this day and are discussed below.

3.7.5.1 Agricultural Practices

Agricultural practices, in particular growing lā'ī and kalo, are no longer practiced to the scale of pre-western contact. The sugar plantation also destroyed or significantly modified the 'auwai (irrigation) system when building its own irrigation system, so the vast network of lo'i are no longer able to be supported. Section 3.2, Agriculture and Farming, examines agricultural practices but focuses on commercial practices (as opposed to cultural practices).

Any cultural agricultural practices that still exist are mostly small and on kuleana parcels or on Kipuka Olowalu property. Most of these areas, including Kipuka Olowalu, would be avoided by the alignment of the highway (all alternatives); however, the makai side of one Land Commission Award parcel where agricultural practices still exist would be directly affected by the highway realignment (Build Alternatives 1 and 2/3; Section 3.4, Land Acquisition, Displacement, and Relocation). While the road itself would not displace any traditional cultural agricultural practices, required changes to property access and the proximity of the new roadway alignment may have a perceived adverse effect on these practitioners.

3.7.5.2 Fishing/Limu Gathering

Historic accounts of shoreline and deep-ocean fishing traditions in the project area are prevalent and continue today, as mentioned in many of the informant interviews. Fishing grounds and triangulation points based on landmarks that fishermen could see while on the ocean were extremely important to the success of a catch. Should the highway realignment alter viewplanes from the ocean to the land, this could ~~have~~ adversely effect deep sea fishing practices. However, the visual analysis in Section 3.8, Visual and Scenic Character, did not identify any impacts on views from the ocean and identified environmental standards (that is, down shielded lighting) that would minimize adverse changes.

The Project could impair both freshwater and ocean fishing practices and gathering of other marine resources, such as limu or wana and other shell fish in the area, if runoff during construction were to enter the streams and ocean. In one of the informant interviews, it was noted that previous construction in the area caused sediment runoff that smothered the reef and damaged the fragile marine ecosystem. These concerns have also been shared with HDOT and the FHWA throughout the scoping process and in consultation with State and federal resource agencies in preparation of this ~~Draft~~ EIS.

As described in Section 3.9, Water Resources, Wetlands, and Floodplains, permanent and construction best management practices (BMPs) would lessen the effects to water quality caused by stormwater discharged from roadway operations. In particular, the preservation of the existing HDOT Pāpalaua sediment retention basin is one of the key methods to hold back sediment in the near term, as outlined in the *West Maui Community Plan* (2022). In addition, HDOT Standard Specifications for Road and Bridge Construction (Section 209) Temporary Water Pollution, Dust, and Erosion Control would be adhered to regarding management of storage, stockpiling of materials, and equipment staging. With the design standards described above, no additional mitigation would be required.

3.7.5.3 Physical Access and Trails

Traditionally, access to the Olowalu area along was along the Ke Alaloa O Maui (Piʻilani trail), which was the only ancient pathway to encircle any Hawaiian island and existed along the makai coast, where the current Honoapiʻilani Highway is located as well as a mauka route through the ʻĪao Valley bypass starting near Mānienie and ending in the Olowalu Valley where Kīpuka Olowalu exists today. The presence of large and eclectic petroglyphs near Puʻu Kīlea mark those interactions over time. Trails and traditional pathways for night marchers and other spiritual entities are also located in the area.

In Build Alternatives 2, 3, and 4, an additional bridge structure would be constructed to allow an existing road (a historic trail) to pass under the highway to allow continued access to kuleana land parcels and cultural sites mauka of the Build Alternatives. With this structure, there should be no effect to this trail. Because the Build Alternatives would largely leave the existing Honoapiʻilani Highway in place, no new impacts are anticipated to the Piʻilani trail.

Specific to coastal access, the community raised concerns about the current alignment and transferring right-of-way to the County. They expressed a desire to improve safety and mitigate environmental concerns. Instances of encroachment, such as junk cars, debris, and increased encampments of the unhoused, have been noted since the opening of the Lāhainā Bypass at Launiupoko, particularly in areas between the current bypass alignment and the shoreline and under

culvert crossings. Independent of the proposed project, the State and County collaborate to monitor and maintain land near the right-of-way.

3.7.5.4 Forest Resources

Traditionally, ferns, fruits, seeds, and leaves were gathered for traditional medicine making and for use as dye plants: wauke was harvested for kapa; pūhala was harvested for making mats and lei; and olonā was used for kaula (rope making). The overharvesting of sandalwood, mehame wood, and ‘ōhi‘a in these valley areas has caused an environmental shift, which raised temperature levels and dropped rainfall statistics over time. While gathering practices of mauka resources may still occur today, no continuing practice was identified during the preparation of the CIA and no impacts to cultural practices are anticipated.

3.7.5.5 Fauna

In the mauka region, there are historic tales of birds being trapped and released for feather harvesting for the creation of lei hulu (feather) work. Other birds, such as koa’e (Tropicbird, *Phaethon lepturus*), were seen nesting in zones along the rocky Pali coastline and throughout the Pali caves as well as along the marshy areas in Ukumehame. The ‘ua‘u (Hawaiian Petrel, *Pterodroma sandwicensis*) are also known to have inhabited the area, as told in the mo’olelo (story) of Hua. Historical research documented above also found the project area was inhabited by the koa‘e and the ‘iwa (Great Frigatebird, *Fregata minor*).

Interviewees for this study have noted that more recently, nēnē (Hawaiian goose, *Branta sandvicensis*) have returned to nest in the mauka regions outside of the project area, where water is prevalent and light, noise, and crowds of people are scarce. While the alternatives do not reach mauka enough to affect the birds nesting in the cliffs behind the project area, the alignments of Build Alternatives 1 and 4 do go near sites where nēnē have been observed loafing (a scientific term for a bird displaying relaxed behaviors) at Ukumehame Firing Range. Section 3.10, Flora and Fauna, Endangered Species, includes avoidance and minimization measures that are incorporated into the design and construction commitments. These commitments have developed in consultation with United States Fish and Wildlife Service and State of Hawai‘i Department of Land and Natural Resources.

3.7.5.6 Historic/Cultural Sites

Based on the long history of settlement and cultural practices in the project area, there are a number of historic sites includinge heiau, burial grounds and cemeteries, petroglyphs, irrigation ditches and kalo (taro) patches (or lo’i), and fishponds. As summarized in Section 3.6, Archaeological and Architectural Historic Properties, all the Build Alternatives have some potential to result in adverse effects for some of these archaeological historic properties. Construction of the Build Alternatives includes several pinch points or merges where the alternatives overlap and intersect. These areas may require partial demolitions of some archaeological historic properties. If archaeological historic properties are impacted, mitigation will be addressed in accordance with Section 3.6.7.1 (Mitigation, Archaeology) and 3.6.8 (Build Alternatives Comparative Assessment). As shown in Chapter 5, the Preferred Alternative has been refined to largely avoid the most important resources identified in the impact assessment and as further refined between the Draft EIS and Final EIS. ~~As a part of the Final EIS, when a more refined Preferred Alternative is analyzed, the cultural and ceremonial sites will be evaluated for potential effects to the setting and feeling.~~

To address the traditional Hawaiian archaeology in the current project area, the community would like to see the mo‘olelo of the land preserved and shared, either through the physical preservation of identified historic properties or interpretation and education to maintain a sense of place. These concerns will be further discussed to the extent feasible and/or practicable, and HDOT, with the FHWA, have developed a Continued Community Dialogue Plan (as part of the Section 106 Programmatic Agreement, see Appendix 3.6) to address the need for continued community consultation through planning, design, and construction of this project.~~as a part of the Section 106 consultation process.~~

3.7.5.7 Views for Navigation

Additionally, navigation and wayfinding is a traditional practice that harkens back to the time of Native Hawaiian rule—when they traveled from other islands to Maui frequently, where valley topography that can be seen out at sea allowed for a pathway and navigational view that could be followed. In Section 3.8, Visual and Scenic Character, visual analysis examines the impact of the Project from an ocean-to-mountain view (Key Viewpoint 13). The simulation shows that there would be no impacts on views from the ocean to the mountains as a result of the highway realignment.

3.7.5.8 Streams

One family’s cultural practice is the clearing of streams in the area to ensure the health of the riparian habitat and gathering of freshwater fish (o’opu and hihiwai, two native freshwater stream species). This is a common practice among Native Hawaiian families. As summarized in Section 3.10, Flora and Fauna, Endangered Species, the Build Alternatives would not create any permanent effects to the stream. The Project could impair stream clearing practices during construction, but these effects would be temporary. BMPs would be used to manage discharge into the streams and all abutments would be built above the high-water mark.

Stream crossings would be designed to preserve the life cycle of the flora and fauna living in and around the stream crossings by remaining outside the typical high-water level (Chapter 2, Alternatives, and Section 3.9, Water Resources, Wetlands, and Floodplains). Hardening the stream crossings would be avoided, and bridge design would consider keeping the stream cool and oxygenated. The crossings at Olowalu, Ukumehame, and intermittent Pāpalaua streams would be designed for water flow to preserve and maintain biological processes, as juvenile fish and other invertebrates must migrate upstream for population success. Continuous access along Olowalu and Ukumehame Streams will also be maintained within the HDOT ROW..

With the design standards described above, no additional mitigation would be required.

3.7.6 Mitigation

One of the most beloved ‘ōlelo no‘eau is:

‘A‘ohe pau ka ‘ike i ka hālau ho‘okahi.

All knowledge is not taught in the same school.

We acknowledge this wisdom remembering that during data collection, this community faced multiple challenges, and therefore not all cultural practitioners in the area may have provided input.

Additionally, transmission of cultural knowledge is often private and not willingly shared to outsiders, especially government representatives. We make our findings proceeding with the understanding that we may hold only a narrow snapshot of cultural practices in the area. Therefore, it is not the intent of the CIA or this ~~Draft~~ Final EIS to judge the validity of the concerns or rank their importance and priority. Instead, the CIA tried to comprehensively capture the concerns of the cultural practitioners in the area and the surrounding community, in particular the native Hawaiian community. This section of the ~~Draft~~ Final EIS attempts to categorize the concerns identified in the CIA via an “impact assessment” lens. Where a particular category of cultural impact overlaps another ~~Draft~~ Final EIS impact topic and its mitigation (for example, archaeological resource, water resources, flora and fauna) we reference that section of the ~~Draft~~ Final EIS to prevent redundancy. In the case of the sections below, the cultural impacts and potential mitigation either do not directly overlap because the scale of impacts do not match (for example, agricultural) or there is no other place within the ~~Draft~~ Final EIS where the topic is addressed (for example, continued community dialogue).

3.7.6.1 Agricultural Practices

Unlike Section 3.7.2, Methodology, which discusses larger-scale commercial agricultural practices, this section focuses on subsistence agricultural practices by a Native Hawaiian family on TMK 48002068, a kuleana parcel to Kaleiki. While the parcel fee belongs to the County, the residents claim that they own the Kuleana and have resided and continued Native Hawaiian practices there for many years. The Build Alternatives would take a portion of the parcel and a larger four-lane bridge will be built where there is now a two-lane bridge. Access to the parcel may also be compromised.

Native Hawaiian cultural practices happen on this property on a regular basis as the people who live there ~~ir~~ practice their kuleana as a way of life. They have a large mala, or garden with dry-land taro, sweet potato, native trees and introduced fruit trees. In discussion with this family, they requested that HDOT go as far makai as possible (Build Alternatives 1 and 2/3) rather than moving the road mauka (Build Alternative 4) of their property. Build Alternatives 1 and 2/3 would likely impact their agricultural practices, as the road would go very close to their mala and may have to take a portion.

Another important consideration is that the main access to their property is currently via the existing Honoapi‘ilani Highway and this could be eliminated for Build Alternatives 1 and 2/3. Options for continued ability to access the parcel would be essential to ensure continued use of the property as a residence and a cultural practice site. ~~These access options or mitigation measures, if not achievable are discussed in Chapter 5, Preferred Alternative, of this Draft EIS and will be explored specific to the Preferred Alternative as in the Final EIS~~.

3.7.6.2 Continued Community Dialogue

As part of the assessment, a good-faith effort was made to contact as many people as possible with knowledge of the project area. But given the constraints of the project schedule and other challenging circumstances, including COVID and the Lāhainā wildfire, there could be cultural practices within the area that have yet to be identified. Therefore, it is highly recommended to continue to listen to those who are kama‘āina (familiar) with the place, to highlight the stories of the lineal descendants, to champion and teach about the area’s history, and to remember the deep importance of the pu‘uhonua and the burgeoning ahupua‘a that this place used to be. To see that it was a rest stop on the path from

Wailuku to Lahaina for many reasons, and the access to land and ocean spaces in this area is paramount to allowing the descendants of this place to always feel connected.

HDOT and FHWA will commit to continued dialogue with the community throughout the design process and up through completion of construction ~~for the purposes of 1) obtaining more information about the cultural practices and history of the area and 2) mitigating any impacts the design and/or construction project may have on those practices~~. This effort ~~will be~~ has been memorialized as a Continued Community Dialogue Plan in the Executed Programmatic Agreement for the Project prepared pursuant to the NHPA Section 106 process (Appendix 3.6). The Continued Community Dialogue Plan will describe details and manage logistics of the continued community engagement.

3.7.6.3 Cultural Training and Construction Monitoring

The community recommends that educational initiatives that perpetuate a sense of place are critical for fostering the continuous and vibrant presence of Native Hawaiians across the lands of their kūpuna. Equally important is ensuring that individuals involved in project construction receive culturally appropriate training on the history of the lands and the traditional cultural significance of the spaces the Project will traverse. To this end, the State will include language language in the HRS § 6E compliance memorandum requiring the selected contractor to provide a culturally focused training program prior to fieldwork. This would be in addition to any standard safety or project-related training in the procurement notice.

Further, the community recommends that cultural monitoring occur during construction, as archaeological monitoring typically focuses on a single discipline. As demonstrated in this report, traditional Hawaiian cultural resources extend beyond archaeology to include natural resources and their surrounding environments. Therefore, the State will include language in the HRS § 6E compliance memorandum requiring that the selected contractor provide a cultural monitoring program in the procurement notice.

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3.8 VISUAL AND SCENIC CHARACTER

This section describes the potential adverse effects of the No Build Alternative and the Build Alternatives on the visual character of the project area. Hawaiʻi's visual resources are important to native Hawaiian cultural practitioners, traditional navigators, the quality of life enjoyed by local residents, and the state's tourism industry. In the project area, visual resources include ocean views, views of key mountain peaks, and the islands of Lānaʻi and Kahoʻolawe.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to visual and scenic character. As part of this Final EIS, the analysis contained within this section was revised to reflect those comments, or other information gathered after the publication of the Draft EIS.

3.8.1 Regulatory Context

The *County of Maui 2030 General Plan* includes a "Character & Context" map that identifies scenic corridors throughout Maui. The County of Maui rated all corridors as either Exceptional, High, Medium, or Low, with corridors ranking Exceptional or High being classified as Scenic Resource Corridors. The segment of the existing Honoapiʻilani Highway between Launiupoko and Olowalu is categorized as High. The segment of the existing Honoapiʻilani Highway between Olowalu and Māʻalaea is categorized as Exceptional.

A Visual Impact Assessment was prepared for the Honoapiʻilani Highway Improvements Project (the Project). This assessment was consistent with the FHWA *Guidelines for the Visual Impact Assessment of Highway Projects*[1] issued in 2015, which are a broadly accepted approach to analyzing visual impacts—particularly for transportation projects.

3.8.2 Methodology

As described in TABLE 3.8-1 and depicted in FIGURE 3.8-1, the FHWA Visual Impact Assessment process is performed in four phases: establishment, inventory, analysis, and mitigation. In this methodology, visual effects occur as a result of an interaction between viewers and the environment that surrounds them.

[1] https://www.environment.fhwa.dot.gov/guidebook/documents/VIA_Guidelines_for_Highway_Projects.asp.

FIGURE 3.8-1. **Visual Impact Assessment Process Flowchart**

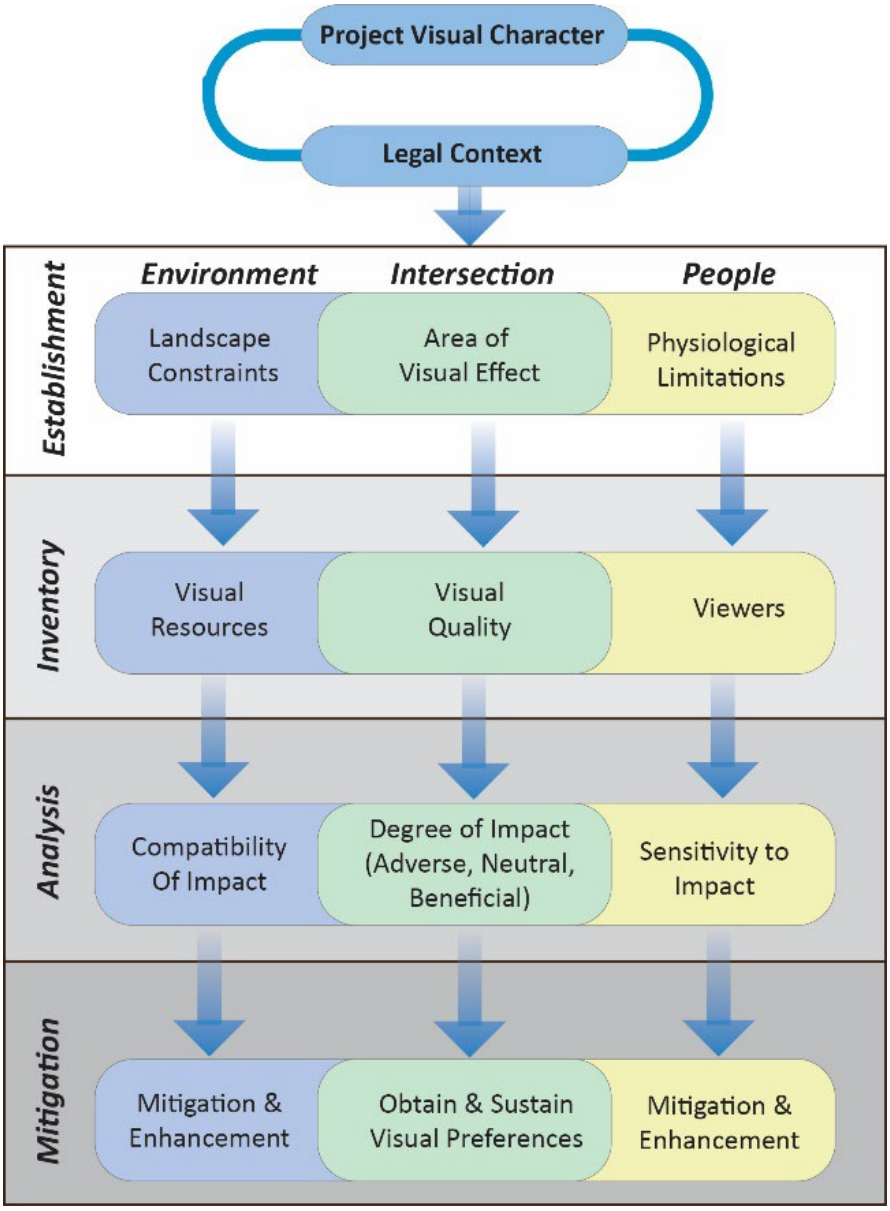


TABLE 3.8-1. **FHWA Visual Impact Assessment Process**

PHASE	DESCRIPTION
Establishment	• Establish a project's regulatory context with respect to visual impacts per Section 4.3 of the FHWA Guidelines for the Visual Impact Assessment of Highway Projects • Identify a project's Area of Visual Effect (AVE), which includes the visual range of proposed alternatives • Map a project's viewshed, accounting for local topography and visual obstructions • Define the visual character of a project's AVE by landscape units, or areas that have the same or similar types of visual character and land use
Inventory	• Inventory and evaluate existing visual resources and viewer groups, and consider the relationship between viewers and their environment • Describe the appearance and compatibility of the visible components of a project • Establish viewer preference • Select key views for visual assessment and determining visual quality
Analysis	• Evaluate potential visibility through visual simulation of proposed components, including design elements being considered for incorporation into a project • Assess changes to visual quality caused by a project's impacts
Mitigation	• Describe measures to be implemented, if necessary, to mitigate adverse visual effects and identify opportunities for visual enhancements in a project area

3.8.3 Affected Environment

3.8.3.1 Establishment Phase

The initial establishment phase of the Visual Impact Assessment defines the AVE through an understanding of its components and an assessment of potential viewsheds.

Components of Area of Visual Effect

The determination of the AVE considers existing physical limitations and visual distances, as described in TABLE 3.8-2 and TABLE 3.8-3, respectively. Some views of the Project are static—that is, what a neighbor would see from a single stationary location. Other views are dynamic, which are defined as views that are available to a traveler as they move through a landscape.

TABLE 3.8-2. **Environmental Constraints**

VISUAL CONSTRAINT	DESCRIPTION
Landform	The coastal plain where the existing highway is located (and where the Build Alternatives would be) is generally 0.25 mile to 0.75 mile wide. Mauka of this area, hills and mountains rising from the coastal plain can be very steep and rise to over 4,000 feet in elevation in the West Maui Natural Area Reserve. The mountains are cut by streams and gulches with steep side slopes. The mountains define views to the north and east of the highway corridor.
Land Cover	Land cover is defined as vegetation and human-made structures that exist on the landform. Land cover often determines the physical constraints and character of the visual environment. It can either obscure views (fences, walls, and trees) or highlight views (decks or viewing platforms). The highway is lined with open grasslands, broadleaf trees, palm trees, and undergrowth typical of the leeward climate of West Maui. Residential areas along Luawai Street above the Olowalu community (as well as the handful of homes that have been built in Ukumehame) are on bluffs above the coastal plain and potentially have more extended views, but landforms and extensive planted landscapes obscure views of the Project.
Atmospheric Conditions	The usual weather patterns in the leeward regions of West Maui are characterized by dry and unobstructed skies. Extensive panoramic vistas have historically been the prevalent feature. Nevertheless, certain atmospheric phenomena, notably the gentle Pāpalaua rain, have the potential to add their own visual effect and obscure or diminish visibility in the area. These atmospheric conditions primarily affect distant objects.

Physiological Constraints

The visual environment is also limited by distance, or proximity, from which viewers can see the Project with any discernible detail. As described in TABLE 3.8-3, proximity can be defined using three distinct zones: foreground, middle-ground, and background. Due to the steep hillsides mauka and the ocean makai, all Build Alternatives would encompass approximately the same topography, development, and visual characteristics within their distance zones. As a result, the visual distance zones would be consistent across all Build Alternatives.

TABLE 3.8-3. **Visual Distance Zones**

VISUAL ZONE	DESCRIPTION
Foreground	The foreground comprises views from 0 miles (project limits) to 0.25 mile. Changes to the visual environment are mostly discernible in this zone. Foreground views tend to be the most affected by changes in visual quality, and views are generally not limited by atmospheric conditions. Views of the Project would consist primarily of views from the foreground zone. Specific foreground views are identified and discussed in the analysis phase.
Middle-Ground	The middle-ground comprises views from 0.25 mile to 3.0 miles. In this zone, most views are greatly reduced by landform (hills and mountains) and land cover (such as buildings, structures, signage, and other physical objects), as well as existing vegetation that limits the line-of-sight for viewers. In the middle-ground, changes in visual details are generally not discernible. A small number of viewers on ridges above the elevation of the highway may have views of the Project from the middle-ground zone; however, viewer numbers would be small and visual details are generally not discernible in this zone due to the distance of the middle-ground zone from the viewers. Atmospheric conditions typical of islands, including low clouds, mist, and precipitation, are visual effects themselves and can further obscure visual elements.
Background	Background comprises views beyond 3.0 miles. Few, if any, viewers in the background distance zone would have unobstructed views of the Project, and project details and changes to visual quality would generally not be discernible from this distance. Landform, land cover, and existing vegetation are expected to completely obscure the Project (including nighttime light emissions, though this might still be visible from a background zone). Furthermore, atmospheric conditions could easily affect or obscure any available views from the background distance zone.

Identification of Viewsheds

Viewsheds are what people would see as they interact with the physical constraints in the environment and the physiological limitations of human perception. Whereas most elements within the AVE could change, landforms are the least likely to change. Landforms are the bare-earth topographic features of the project area and define extent and limitations of viewsheds. FIGURE 3.8-2 highlights how the mountains, hills, valleys, and plains provide a visual perspective from some locations and obscure it from others.

Project Area of Visual Effect

The AVE for the Project refers to the area where viewers generally have sightline views at a close enough proximity that allows them to visually discern the Project's physical characteristics. The natural constraints imposed by the surrounding landform and land cover restrict visual impacts—including potential nighttime light and glare effects—to within the middle-ground distance zone and prevent them from extending beyond it.

Views of the Project may be available throughout the AVE based on landform; however, land cover such as existing trees, vegetation, buildings, fences, signs, and other human-made elements can block or obscure the Project from locations within the foreground and middle-ground distance zones. Therefore, the AVE for the Project includes the area of the foreground and middle-ground distance zones from which the Project would have the potential to be seen (FIGURE 3.8-3).

FIGURE 3.8-2. **Bare-Earth Viewshed Visibility**

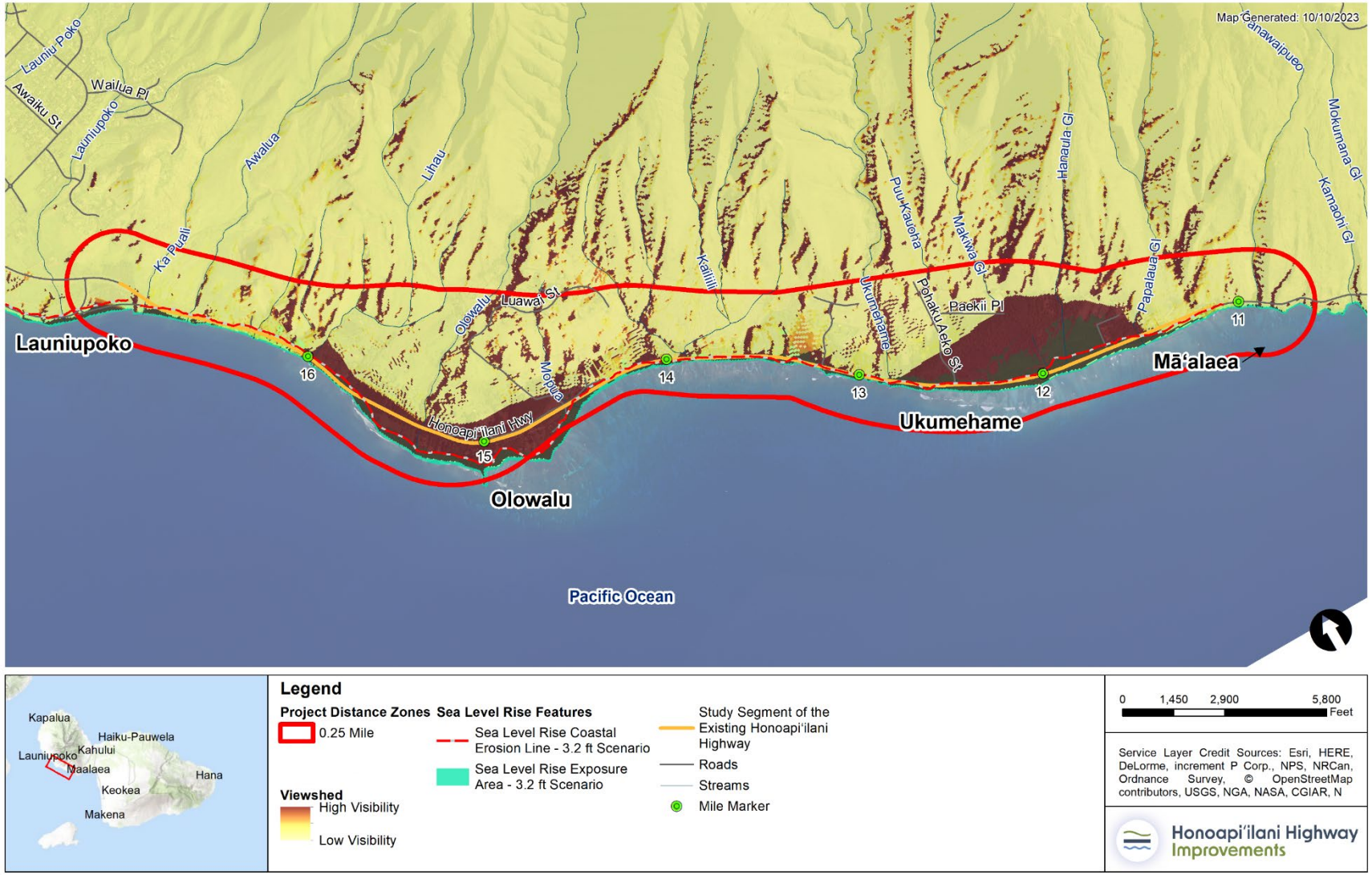
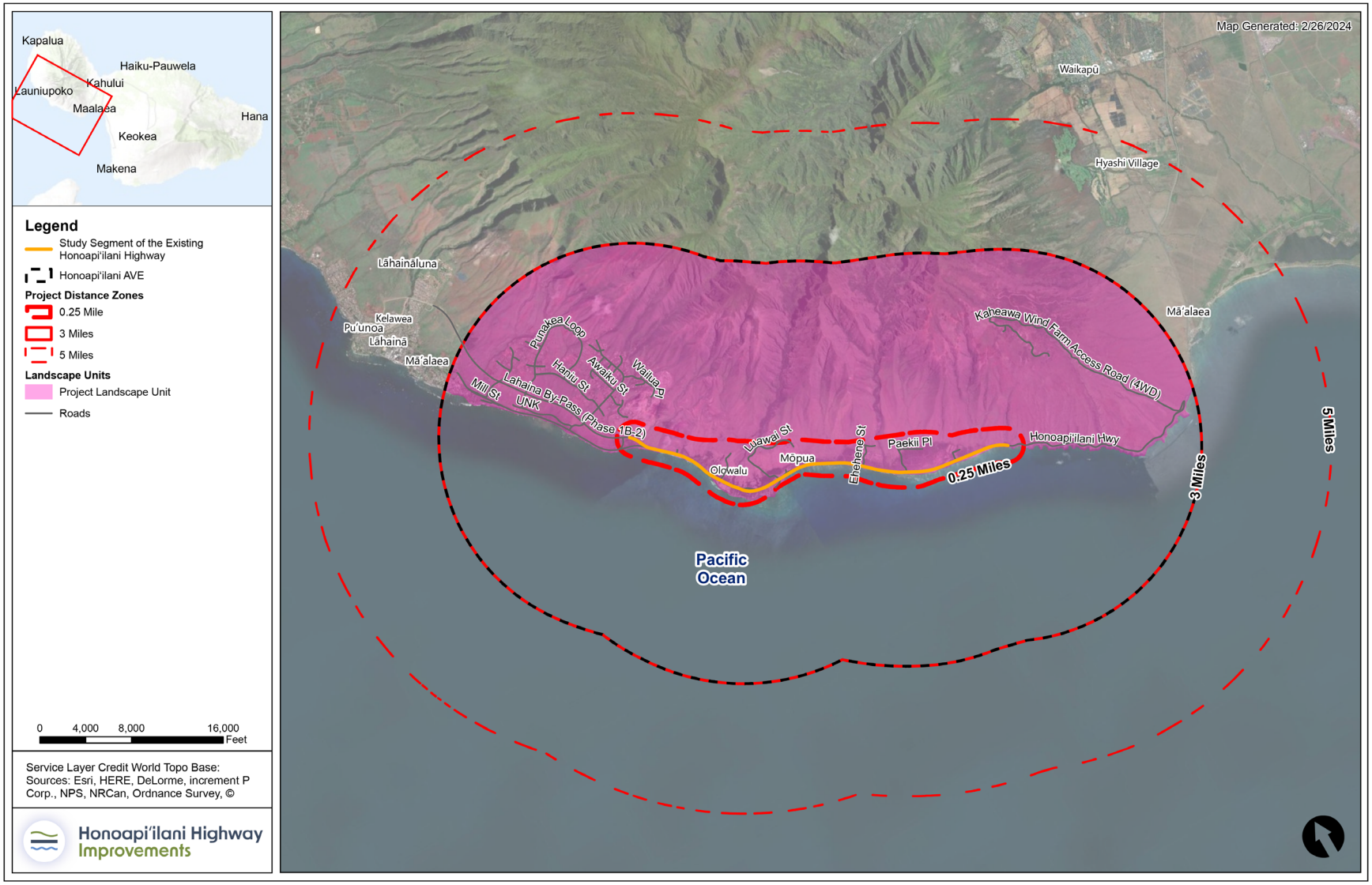


FIGURE 3.8-3. **Honoapi'ilani Highway Landscape Units and Area of Visual Effect**



The FHWA Visual Guidelines methodology establishes guidance to divide the AVE of a project into distinct geographic units called "landscape units" (or "outdoor rooms"), where appropriate. For the Project, the AVE consists of areas with a fairly consistent rural-island landscape and a visual character composed of beaches, open grasslands, farms, and dispersed residential, retail, and agricultural structures. There is a fairly consistent visual quality common throughout the project area; therefore, it is considered as one landscape unit.

The existing highway itself is characterized by two lanes of asphalt pavement and shoulders of varying width, existing bridges over perennial and intermittent streams, signage, and at times heavy vehicular traffic and congested parking on roadway shoulders in areas of public access to beaches and the coastline. Indoor and outdoor electrical lighting is commonly visible from the highway corridor. Overhead utility lines are common within the highway corridor and are observable on both the makai and the mauka sides of the highway.

The Olowalu Petroglyphs are on a culturally sensitive site at the base of the large Olowalu Stream. Large rock outcrops and a small stream running through the valley characterize this area, which provides views extending both north and west into the middle and background distance zones; however, topography and vegetation obscure most views toward the ocean and toward the existing highway (FIGURE 3.8-4).

FIGURE 3.8-4. **Makai Views from Olowalu Petroglyphs**

View of petroglyph site

View looking southwest from the petroglyph area

3.8.3.2 Inventory Phase

The purpose of the inventory phase is to examine the existing visual quality of the affected environment by creating an inventory of its visual components. The existing visual character of the project area environment is assessed based on an inventory of visual resources divided by natural and cultural (built environment) characteristics. The natural realm includes land, water, vegetation, animals, and atmospheric conditions. The cultural realm includes buildings, infrastructure, structures, artifacts, and art. These were assessed for the single landscape unit of the AVE and are summarized in TABLE 3.8-4.

TABLE 3.8-4. **Affected Environment within the Area of Visual Effect**

VISUAL RESOURCES	DESCRIPTION
Natural	Land in the existing highway corridor ranges from 5 feet to 30 feet in elevation above sea level with highest point near the Olowalu Recycling and Refuse Convenience Center. Land within the project area and the 0.25-mile foreground rises steadily from the coastline to elevations generally below 100 feet above sea level, with some elevations reaching about 120 feet in the area of Olowalu just below the mauka residential subdivision. Available views are primarily limited to the coastal plain, with hills limiting views north and west; however, views in some locations are obstructed by trees, palms, coconut trees, and tropical vegetation lining the roadway. Natural elements such as ornamental landscaping are associated with human development in the Olowalu area. Beaches along the highway offer scenic and natural visual elements. Mauka of the highway, the area is also characterized by its open and undeveloped environment with natural vegetation on mountains and hillsides north and west of the highway. Open grasslands and open areas remnant of plantation-era clearing exist throughout the project area. These areas offer longer views but are also limited by the topography. The AVE includes two primary perennial streams (Olowalu and Ukumehame Streams) and other smaller, intermittent streams, with increasing steep slopes toward the mountains. Natural visual elements include trees, palms, understory vegetation, and stone outcroppings. Views are also available of the mountains west of the project area in the middle and background distance zones against the horizon and open skies.
Cultural (Built)	The built environment is very rural in character, with small areas of residential and commercial uses along the existing highway and lower-density residential in newer, large-lot subdivisions. Residential structures on the mauka and makai side are typically one- to two-story structures along the highway. Minor, modern human-made elements such as outbuildings, plantation-era irrigation infrastructure, access roads, and overhead utilities are throughout the AVE. Few roadways are in the built environment. The existing Honoapiʻilani Highway is a two-lane paved highway with variable shoulders. Speed limits along the highway range between 35 and 55 miles per hour, but heavy traffic often reduces the speed of vehicles along the highway. At Awalua and Ukumehame beaches, riprap retains the area under Honoapiʻilani Highway for approximately 24 inches to 36 inches below the road grade and then drops directly onto the beach. Overhead utility lines are on poles on the mauka side, makai side, or on both sides of the highway. Road signs include those displaying the speed limit, “no parking” instructions, or other small-scale signs. Mauka of the existing highway are narrow two-lane paved roads with limited shoulders that access the Olowalu and Ukumehame Subdivisions, as well as remnant cane haul roads and some longer access driveways to homes, which are mostly unpaved.

Affected Population

Viewers can generally be categorized into two distinct groups: neighbors and travelers. Both groups may be further subdivided to establish viewer preference and their sensitivity to changes in visual resources. Although each viewer has individual preferences and sensitivities, the FHWA Visual Guidelines recognize three basic responses to visual environments:

- When viewing the natural environment, viewers evaluate the natural harmony of the existing scene and determine whether the composition is harmonious or inharmonious
- When viewing the cultural environment, viewers evaluate the human order and determine whether the composition is orderly or disorderly
- When viewing the project environment, viewers evaluate the coherence of a project's components and determine whether a project's composition is coherent or incoherent

Types of Neighbors

Neighbors are viewers who typically view a project from a stationary location. The types of neighbors identified in TABLE 3.8-5 generally share common visual preferences, including the maintenance of the existing landscape character, natural harmony, and cultural order. The types of neighbors described in TABLE 3.8-5 are included in the AVEs for the Project.

TABLE 3.8-5. **Types of Neighbors**

TYPE OF NEIGHBOR	DESCRIPTION
Residential	Residential neighbors include single-family residences along the highway and mauka of the existing highway. There are approximately ~~20~~ 24 residences along the existing highway in Olowalu, of which ~~18~~ 21 are located within subdivisions (13 in the Olowalu Subdivision and ~~five~~ 8 in the Ukumehame Subdivision).
Recreational	Recreational neighbors participate in recreation or cultural activities and tend to be transitory. In the Project's AVE, this is primarily characterized by the well-utilized beaches along the shoreline, particularly the Maui County Ukumehame Beach and Pāpalaua Wayside Park.
Commercial/ Retail	Commercial and retail neighbors are merchants and their customers. Commercial and retail businesses in Olowalu include road-front uses that are retail-oriented and based on visits from travelers on the existing highway, as well as destination locations at Camp Olowalu and the Olowalu Plantation House.
Agricultural	Agricultural neighbors are farmers and workers of crops or herd animals. These neighbors often work in fields and pastures and may include permanent and transient workers. There is little active agriculture in the project area, and the existing agriculture is limited to small-scale farming in the northern area of Olowalu and a commercial sod farm in the Ukumehame area. Neither are visually connected with the existing highway corridor.
Cultural/ Institutional	Cultural and institutional neighbors—who provide and receive services from a variety of institutions including schools, hospitals, or Native Hawaiian Organizations—visit or use culturally important locations in the project area, such as heiau and cemeteries within view of the Project. Viewers would be considered as visitors and are transitory. There are two defined cemeteries in Olowalu including Awalua Cemetery (a very lightly visited plantation-era cemetery) and the ruins of the Lanakila Hawaiian Church and its cemetery. There are heiau and other important cultural practices sites throughout the project area (Section 3.6, Archaeological and Architectural Historic Properties).

Types of Travelers

Travelers are those who perceive the view as they move along a corridor, such as a road or a highway. Viewsheds are dynamic and change as a series of views reveals different scenes. TABLE 3.8-6 describes the types of travelers that are included in the AVEs for the Project. These types of travelers generally share common visual preferences, including natural and human harmony, and coherence.

TABLE 3.8-6. **Types of Travelers**

TYPE OF TRAVELER	DESCRIPTION
Pedestrian	Pedestrians use self-propelled means (walking, wheelchair, other mobility aids) to move through a site on roadways, sidewalks, or trails. In the existing highway corridor, there are no pedestrian amenities and only a limited number of pedestrians use the highway shoulders, most notably in and around the Olowalu village business area as well as at local transit stops. Within the Olowalu Subdivision, multiuse paths provide pedestrian amenities.
Bicycling	Bicycles or other similar self-propelled devices travel through a site at a higher speed than pedestrians but much slower than vehicular travel. Few bicyclists use either the existing Honoapiʻilani Highway or other local roads in the project area.
Motoring	Motorists travel in vehicles propelled by engines (cars, trucks, buses, motorcycles). The existing highway corridor is renowned for its picturesque qualities and aesthetic charm, offering extensive vistas of the ocean and mountains. The highway also represents a transition from the largely undeveloped regions to south of the project area, leading into Olowalu and ultimately connecting to the more densely populated Lāhainā area. In contrast to the relatively small neighboring population, which is defined as residents and workers not exceeding 200 people, the existing highway accommodates approximately 20,000 vehicles daily. Consequently, travelers in these vehicles form the overwhelmingly dominant population when it comes to viewing the project area.

Key Viewpoints

A set of key viewpoints (KVPs) were identified and used to generally define the existing visual character and visual quality. KVPs were selected because they either represent a common or typical view from within that different users would experience, or because they are a view of a defining feature of the project area. The KVPs identified for this assessment also consider community feedback received during the early scoping and EIS scoping periods. FIGURE 3.8-5 and FIGURE 3.8-6 show the locations of key viewpoints, and FIGURE 3.8-7 through FIGURE 3.8-20 provide baseline viewshed photographs keyed to the direction of the viewshed.

FIGURE 3.8-21 and FIGURE 3.8-22 provide references to the project area from the ocean looking back to Maui which, in this area, has been a critical location for traditional navigation using the Maui mountains. The first image provides a closer perspective toward the north end of the project area while the second image conveys the more traditional “navigator’s chair” image from Kahoʻolawe Island, indicating that the project area is virtually indistinguishable from this broader perspective.

FIGURE 3.8-5. **Area of Visual Effect Key Viewpoints - Olowalu**

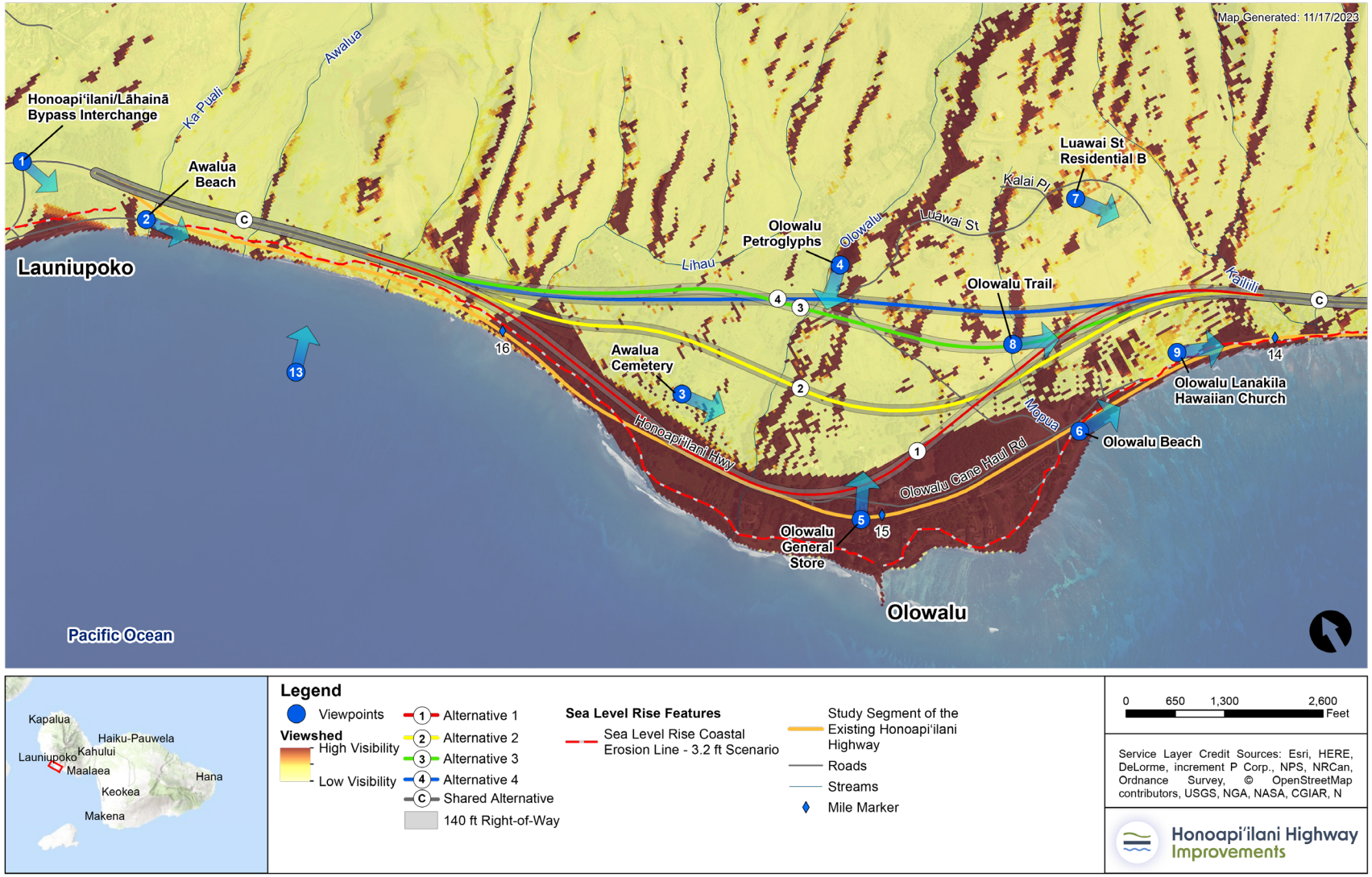


FIGURE 3.8-6. **Area of Visual Effect Key Viewpoints - Ukumehame**

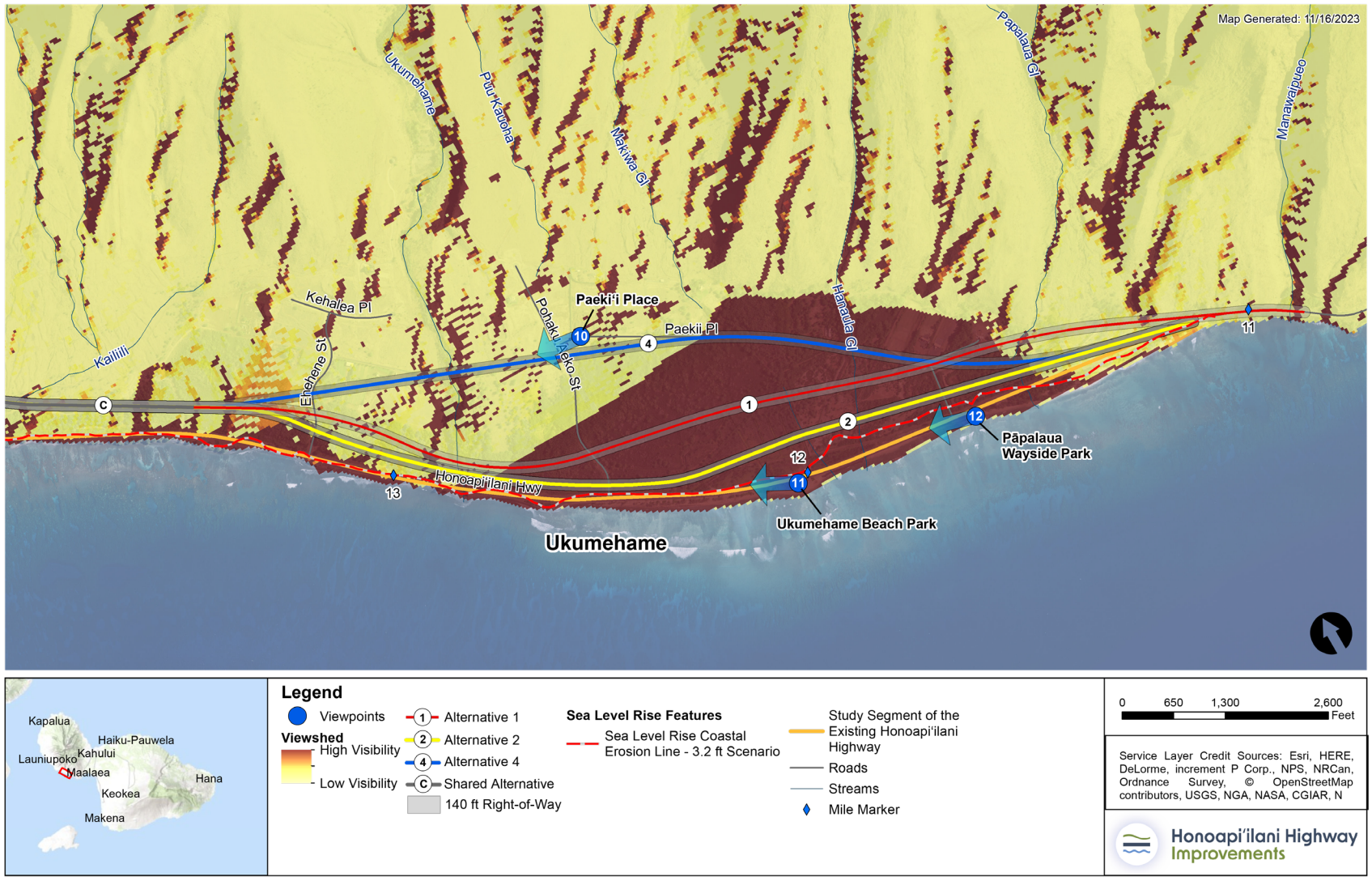


FIGURE 3.8-7. **Key Viewpoint 1: Honoapi'ilani/Lāhainā Bypass Interchange (looking southeast)**

FIGURE 3.8-8. **Key Viewpoint 2: Awalua Beach (looking southeast)**

FIGURE 3.8-9. **Key Viewpoint 3: Awalua Cemetery in Foreground (looking east)**

FIGURE 3.8-10. **Key Viewpoint 4: Olowalu Petroglyphs (looking southwest)**

FIGURE 3.8-11. **Key Viewpoint 5: Olowalu General Store (looking northeast)**

FIGURE 3.8-12. **Key Viewpoint 6: Olowalu Beach (looking east)**

FIGURE 3.8-13. **Key Viewpoint 7: Luawai Street Residential A (looking southeast)**

FIGURE 3.8-14. **Key Viewpoint 7: Luawai Street Residential B (night, looking southeast)**

FIGURE 3.8-15. **Key Viewpoint 8: Olowalu Trail (looking southeast)**

FIGURE 3.8-16. **Key Viewpoint 8: Olowalu Trail (night, looking southeast)**

FIGURE 3.8-17. **Key Viewpoint 9: Olowalu Lanakila Hawaiian Church (looking southeast)**

FIGURE 3.8-18. **Key Viewpoint 10: Paeki'i Place (looking west)**

FIGURE 3.8-19. **Key Viewpoint 11: Ukumehame Beach Park (looking northwest)**

FIGURE 3.8-20. **Key Viewpoint 12: Pāpalaua Wayside Park (looking northwest)**

FIGURE 3.8-21. **Key Viewpoint 13: 'Au'au Channel Offshore (looking northeast)**

Source: Google Maps, 2023

FIGURE 3.8-22. **View from the Navigator's Chair on Kaho'olawe Island (looking at Maui)**

Source: Hofschneider, A. 2014. Honolulu Civil Beat. "Promised Land: 'Where Beauty Is Alongside the Ugliness.'" https://www.civilbeat.org/2014/10/promised-land-where-beauty-is-alongside-the-ugliness/.

TABLE 3.8-7 summarizes key characteristics of these locations. Viewpoints presented with an asterisk are the viewsheds selected for visual simulations as presented in Section 3.8.4, Environmental Consequences. For the purposes of this ~~Draft~~ Final EIS, the viewsheds selected for visual simulations generally represent locations where the distinction between the Build Alternatives would be the most prevalent or observable.

TABLE 3.8-7. **Key Viewpoints by Type and Preference within the Area of Visual Effect**

MAP KEY	LOCATION DESCRIPTION	VIEWER TYPE	VISUAL PREFERENCE
OLOWALU (FIGURE 3.8-5)			
1	Lāhainā Bypass Intersection	Traveler	Coherence
2*	Awalua Beach	Traveler, Recreational	Natural Harmony, Cultural Order
3	Awalua Cemetery	Cultural	Natural Harmony, Cultural Order
4*	Olowalu Petroglyphs	Cultural	Natural Harmony, Cultural Order
5	Olowalu General Store	Traveler, Commercial/Retail	Coherence
6	Olowalu Beach	Traveler, Residential	Coherence, Cultural Order
7*	Luawai Street	Residential	Natural Harmony, Cultural Order
8*	Olowalu Trail	Residential, Recreational	Natural Harmony, Cultural Order
9	Olowalu Lanakila Hawaiian Cemetery	Cultural, Residential, Traveler	Natural Harmony, Cultural Order
13*	ʻAuʻau Channel	Cultural, Recreational, Traveler	Natural Harmony, Cultural Order
UKUMEHAME (FIGURE 3.8-6)			
10	Paekiʻi Place	Residential	Natural Harmony, Cultural Order
11	Ukumehame Beach Park	Traveler, Recreational	Natural Harmony, Cultural Order
12*	Pāpalaua Wayside Park	Traveler, Recreational	Natural Harmony, Cultural Order

Note: Asterisk indicates viewshed selected for visual simulation.

3.8.4 Environmental Consequences

The Project is anticipated to result in changes to physical characteristics of the AVE as a result of the potential highway alignments mauka of the existing Honoapiʻilani Highway where there is less vegetation and more open viewsheds.

While the form and materials of the Build Alternatives would be consistent with the existing highway, all the alternatives would be larger in scale with a wider right-of-way and medians between moving

lanes. Further, all the alternatives would meet modern roadway design standards, including roadway width, shoulders, turning lanes, and other highway elements.

3.8.4.1 Analysis Phase

The analysis phase aims to evaluate the influence of project-related environmental modifications on visual quality. As described in TABLE 3.8-8, this stage entails a qualitative assessment, encompassing changes in the compatibility of these changes, their impact on viewers, the degree of visual quality, and whether they result in positive, negative, or neutral outcomes.

TABLE 3.8-8. **Analysis Phase Elements**

ELEMENT FOR ASSESSMENT	DESCRIPTION
Compatibility	Compatibility is evaluated based on the environment's capacity to absorb the visual attributes introduced by a project. This factor is classified as either compatible or incompatible. Planning documents were examined to establish scenic goals and objectives, against which the Project’s compatibility was measured within the AVE.
Viewer Sensitivity	Viewer sensitivity to potential visual impacts refers to concerns about alterations in the visual environment. Viewer sensitivity was assessed and documented to establish a baseline for analyzing potential visual impacts. Generally, resources closer to viewers hold a more prominent role in their perception and bear greater significance to them. How fast a viewer is moving can also affect viewer sensitivity. The faster a viewer moves, the more dynamic the views are and the smaller the area on which they can focus their attention. Viewers in vehicles move quickly, creating dynamic views that change as they travel through the project area.
Degree of Visual Quality Impact	Degree of visual quality impact is defined as beneficial, adverse, or neutral. The qualitative assessment discusses the degree of change for each of the 13 KVP locations. In addition, photographic simulations and rendered cross sections have been prepared for select KVPs to illustrate visual conditions with the Project and likely variation by Build Alternative.

3.8.4.2 No Build Alternative

The scale, form, materials, and visual character of the existing roadway would remain. However, visual conditions are expected to deteriorate as existing hazards and disruptions—closures, detours, and temporary or longer-term repairs and stabilization measures—create visual changes along the existing roadway. Anticipated growth in traffic would also increase the number of vehicles and the potential for disruptions; the combination would be expected to have an adverse visual effect.

3.8.4.3 Build Alternatives

The roadway improvements would alleviate vehicle congestion and pedestrian conflicts, but vehicles moving at higher speeds would have a different character of visibility. The visual coherence in the project environment would improve as a consistent roadway is identified, avoiding erosion-prone areas and temporary fixes like concrete barriers and improving traffic conditions.

For all the Build Alternatives in both Olowalu and Ukumehame, the Project could be expected to change viewer sensitivities as summarized in TABLE 3.8-9.

TABLE 3.8-9. **Viewer Sensitivity**

VIEWER TYPE	EXPOSURE	AWARENESS	DISTANCE	OVERALL SENSITIVITY
HIGHWAY CORRIDOR				
Residential	• Low numbers of residential structures would be along the new highway. • Existing fences, gates, and vegetation would block most views. • As Build Alternatives move mauka of the existing highway, there would less exposure for residences along existing roadway but more exposure for viewers above Olowalu.	• Attention and focus would change as the highway moves away from most residences. • Views would be of long duration but would become routine. • Awareness would increase for viewers in the mauka Olowalu and Ukumehame Subdivisions, particularly for the most mauka Build Alternatives.	Mauka residential viewers would be closer to the Build Alternatives, particularly Build Alternative 4 in both Ukumehame and Olowalu.	Moderate
Commercial	Most commercial viewers would be adjacent to the existing highway in Olowalu and would be exposed to reduced traffic volumes along the existing highway.	• Commercial viewers would be aware of reduced traffic along the existing highway. • Views would typically be of short duration as viewers focus on shopping, dining, or other activities.	The Build Alternatives would move away from commercial viewers and behind existing vegetation.	Low
Motorist	High numbers of viewers would be exposed to the new alignment and improved traffic conditions.	• Drivers and passengers may be aware of a new alignment and improved traffic conditions. • Views would be of short duration as motorists travel through the site.	Travelers would be in the immediate right-of-way.	Low
Bicycle/ Pedestrian	• Traffic conditions and vehicular conflicts with vehicles would be reduced for bicyclists and pedestrians along the existing highway. • Few pedestrians would be on the new highway. • Touring bicyclists would be more likely to use the existing highway for scenic value and reduced traffic volumes.	• Bicyclists and pedestrians would be aware of improved visual conditions as traffic conditions improve but typically focus on recreational activities. • Views would be of short duration.	Bicyclists and pedestrians would primarily use the existing highway within the project limits.	Low

VIEWER TYPE	EXPOSURE	AWARENESS	DISTANCE	OVERALL SENSITIVITY
CULTURAL SITES				
Recreational	Most viewers from the cultural sites in Olowalu and Ukumehame would not have a direct view of the new alignment (except for Build Alternative 4 at the Olowalu Petroglyphs).	• Views would be scenic but not protected. • Views would be of short duration. • Viewers may be aware of decreased traffic. • Attention and focus on scenic/cultural amenities would likely not change.	Recreational viewers would vary in distance from the existing highway but would be within the foreground distance zone.	Low

Olowalu

Common to All Build Alternatives

All Build Alternatives share a common alignment from the northernmost connection with the Lāhainā Bypass extending through to the area just south of the Olowalu Recycling and Refuse Convenience Center. Therefore, the visual effect on all users would be similar, and the alignment mauka of the existing highway and the visual coherence in the project environment would improve as a consistent roadway is identified.

Bicyclists and pedestrians would likely continue to use the existing highway and potential conflicts with vehicles would be minimized as most vehicles would be on the new Build Alternative. This change would have a positive impact on the visual environment for bicyclists and pedestrians. Similarly, recreational beach users are viewers near the existing highway that would benefit from the reduced volume of traffic adjacent to the shoreline with moderate sensitivity to visual changes (KVPs 2 and 6).

Build Alternative 1

In Olowalu, Build Alternative 1 would be generally just mauka of the existing highway from the north end of the project area to just north of the Olowalu village center. (It would overlap the exiting right-of-way for a small portion, resulting in a partial loss of the monkeypod tree canopy.) Between the village center and the south end of Olowalu, the alignment would move more mauka, behind the commercial center and the existing homes at Kapāiki Place neighborhood along the Olowalu Village Road.

The project environment, which includes roadway geometrics, grading, constructed elements, vegetative cover, and other ancillary visual elements, would be similar to the type, shape, and form of the existing roadway (though much wider) and would benefit from a more resilient location and current standards of design. Visual coherence for the highway users in the project environment would be improved, other than the noticeable gap created by the monkeypod tree loss. The existing viewshed through the tree canopy is important to travelers and recreational uses and the disruption of the canopy would be considered an adverse effect of Build Alternative 1.

Views of the beach and open grasslands would be different, and some existing vegetation would be affected. While cut-and-fill slopes would be revegetated, the overall project would be considered not to be in natural harmony while, overall, the human environment would remain orderly, as the Project would be anticipated to involve only minor changes to existing structures, fencing, or other human-made elements (TABLE 3.8-9). Topography and existing vegetation would obscure views of Build Alternative 1 from the Olowalu Petroglyphs, and the impact on the existing cultural environment is expected to be beneficial for highway neighbors and users. Recreational, commercial, retail, and some residential viewers would benefit from reduced exposure to vehicular traffic and conflicts associated with the highway. Visual coherence in the project environment would be improved.

The scale and extent of the existing form, material, and visual character of the current roadway would likely increase for most viewers with Build Alternative 1; however, existing periodic heavy traffic conditions associated with the existing highway would be reduced or eliminated. These changes to the visual environment would be neutral for traveling motorists for Build Alternative 1.

Visual elements would shift away from most residential observers currently along the existing highway, which would be much less traveled. Existing vegetation would act as a screen in both daytime and nighttime conditions. These changes would have a beneficial impact on these viewers; however, the new roadway would be closer to mauka residents (KVPs 7 and 8), where they would have an increased visual awareness that would be considered an adverse visual effect.

Build Alternative 2

Build Alternative 2 would be mauka of Build Alternative 1, but generally below the open areas of the landscape below residences in the Olowalu Subdivision. This would result in the displacement of fewer trees and woody vegetation and would not affect the iconic monkeypod tree canopy. Build Alternative 2 would generally be at a higher elevation than the existing roadway or Build Alternative 1 and would provide more open views in the Olowalu area.

Build Alternative 2 would have little or no visual effect for commercial/retail viewers because the roadway would be farther setback from the Olowalu village center and would not result in the removal of the monkeypod trees in Olowalu. The human environment would remain orderly because the Project would not be anticipated to involve substantial changes to existing structures, fencing, or other human-made elements. Build Alternative 2 would be largely screened from the Olowalu Petroglyphs area by change in elevation and vegetation.

Build Alternative 2 would be expected to be more visible to the mauka subdivision residences. The scale and extent of roadways, cut-and-fill areas, vehicle lights, and other visual elements associated with Build Alternative 2 would increase visibility for viewers who are typically more sensitive to changes in the visual environment (for example, residential and cultural neighbors). As a result, Build Alternative 2 may have less cultural order for a subset of residential neighbors.

Visual elements would shift away from most residential observers along the existing highway, and existing vegetation would act as a screen in both daytime and nighttime conditions. These changes would have a beneficial impact on these viewers; however, they would move closer to residents on the upper elevation residences of the Olowalu Subdivision (KVPs 7 and 8), where they would have an adverse impact compared to the No Build Alternative.

Build Alternative 3

In Olowalu, Build Alternative 3 would be positioned mauka of and higher in elevation above Olowalu than Build Alternatives 1 and 2. The elevated position would provide extended views of mountains, oceans, and distant islands that are not easily visible from lower elevations because existing vegetation screens the views.

While most areas of Build Alternative 3 would be compatible with the natural environment, the impacts on the grassland and cut-and-fill slopes would be less harmonious with the existing natural surroundings. Impacts to cultural order with Build Alternative 3 would be similar to Build Alternative 2, but its mauka position would place the alignment closer to the mauka residences and the Olowalu Petroglyphs. Nevertheless, topography and existing vegetation would likely obstruct most views of the roadway from this location. The alignment would be more visible to upper elevation residences of the Olowalu Subdivision (KVPs 7 and 8), particularly as the alignment crosses into the central part of the

Olowalu Peninsula in the open area below these residences. This would be considered an adverse visual effect compared to the No Build Alternative.

Build Alternative 4

In Olowalu, Build Alternative 4 would be the most mauka alignment, farther inland and higher in elevation than Build Alternative 3. Build Alternative 4 would result in comparable natural, cultural, and project visual effects as Build Alternative 3, with the only difference being that it would be more visible to sensitive recreational and cultural viewers in the Olowalu Cultural Reserve and at the Olowalu Petroglyphs. Build Alternative 4 would be just makai of the existing homes, and undeveloped lots of the Olowalu Subdivision along Luawai Street. Build Alternative 4 would be anticipated to have an adverse visual effect in Olowalu compared to the No Build Alternative.

Ukumehame

Common to All Build Alternatives

All Build Alternatives share a common alignment through the area just south of Olowalu. As a consequence of moving the roadway inland, some direct views of the beaches would be diminished at various locations. However, the somewhat higher elevation and being above the thickest coastline vegetation would offer more open views of the ocean, distant islands, and mountains. The visual coherence in the project environment would improve as a consistent roadway is identified but would be somewhat more noticeable from higher elevations.

Bicyclists and pedestrians are likely to continue using the existing highway and potential conflicts with vehicles would be minimized as most vehicles would be on a new highway. This change would have a positive impact on the visual environment for bicyclists and pedestrians. Similarly, recreational beach users would be viewers close to the existing roadway—with moderate sensitivity to visual changes (KVPs 11 and 12)—and would benefit from the alterations in the visual environment, with less sustained traffic volumes immediately adjacent to the beach.

Build Alternative 1

In Ukumehame, Build Alternative 1 would be the most mauka alignment at the southernmost end of the project area with its connection to the Pali. This would have a high degree of visibility from the motorist's perspective as it would have the earliest separation from the existing highway. The alignment would be on a viaduct over Ukumehame Firing Range and then would traverse Ukumehame along public lands between the existing road and the mostly undeveloped area of the Ukumehame Subdivision. Build Alternative 1 would bisect one agricultural use in Ukumehame (El Toro Soysia Turf-Maui Grass Farm). While cut-and-fill slopes would be revegetated, the alignment would be considered adverse to natural harmony. Overall, the human environment would remain orderly.

As a consequence of moving the roadway inland, direct views of the beaches would be diminished at various locations. However, the higher elevation would offer extended views of the ocean, distant islands, and mountains. The visual coherence in the project environment would improve as a consistent roadway is identified, avoiding erosion-prone areas. The impact on visual quality would be beneficial for neighboring areas and travelers. Existing landforms, trees, and vegetation would block or obscure potential light sources (for example, vehicle headlights and taillights) for most viewers.

Recreational viewers (KVPs 11 and 12) may experience beneficial impacts like those in the Olowalu area due to changes in the visual environment compared with the No Build Alternative; however, the viaduct would likely have an adverse impact on recreational viewers at the Ukumehame Firing Range. But the number of these viewers would be low as would awareness or sensitivity to the roadway.

Overall, the impact on visual quality would be beneficial for neighboring areas and travelers. Existing landforms, trees, and vegetation would block or obscure proposed light sources (for example, vehicle headlights and taillights) for most viewers.

Build Alternatives 2 and 3

In Ukumehame, Build Alternatives 2 and 3 would be the most makai alignment and at a lower elevation that would minimize visual changes from either the public areas along the coastline or from higher elevations looking down toward the ocean. High traffic volumes would be shifted mauka of the existing public beaches, improving the visual quality from a recreational viewers perspective.

Given the absence of development, the human environment would remain orderly because the Project is not anticipated to involve substantial changes to existing structures, fencing, or other human-made elements. Recreational viewers (KVPs 11 and 12) would experience beneficial impacts based on the reduced volumes on the existing highway. At the firing range, Build Alternatives 2 and 3 would be the most makai and would have little or no viewer effects from users of the firing range (other than a rebuilt driveway entrance).

Overall, the impact on visual quality would be beneficial for neighboring areas and travelers. Existing landforms, trees, and vegetation would block or obscure proposed light sources (for example, vehicle headlights and taillights) for most viewers.

Build Alternative 4

In Ukumehame, Build Alternative 4 would be the most mauka and at the highest elevation. The alternative alignment would traverse the HDOT retention basin, across the parking lot area of the Ukumehame Firing Range, continuing through the Ukumehame Subdivision, and bisecting active agricultural uses before rejoining the common alignment between Ukumehame and Olowalu.

The effects on the natural environment would adversely affect the natural harmony for the handful of houses, the existing sod farms, and undeveloped residential lots of the subdivision based on the new alignment’s proximity to Paeki‘i Place and to existing and undeveloped lots.

3.8.4.4 Selected Simulations

Six KVPs were selected to provide representational simulations of how the Build Alternatives would compare from different vantage points, including areas containing important public realm considerations (beaches and parks) as well as various vantage points where the potential alignments would be newly visible.

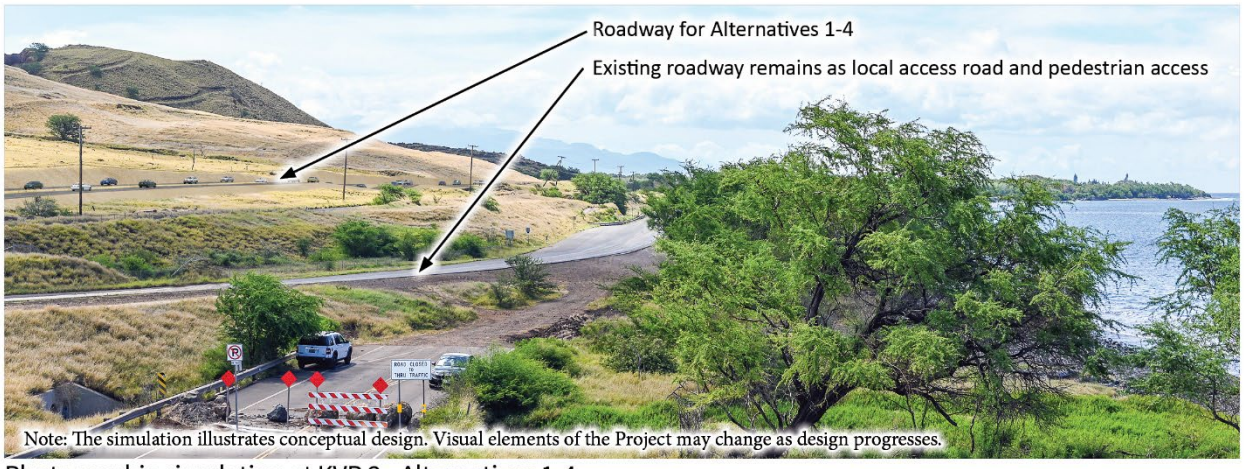
Key Viewpoint 2 – Awalua Beach

This vantage point within Olowalu was selected to observe the point where all the Build Alternatives are in a common alignment coming toward the point of reconnection with the existing Lāhainā Bypass.

As shown in FIGURE 3.8-23, the Project would be visible but somewhat fading into the background in its alignment mauka of the existing highway, which would remain in the foreground.

FIGURE 3.8-23. **Key Viewpoint 2 – Awalua Beach: Existing Conditions/No Build Alternative and Build Alternatives 1 through 4 (looking south)**

Existing Conditions KVP 2



Photographic simulation at KVP 2 - Alternatives 1-4

Key Viewpoint 4 – Olowalu Petroglyphs

This vantage point is south of the Olowalu Petroglyphs where the local access road begins to have an open view toward the ocean. All Build Alternatives would be at different distances from KVP 4, with Build Alternative 1 being the most makai alternative and Build Alternatives 3 and 4 being the most mauka and visually apparent to a viewer looking out from this location. FIGURE 3.8-24 shows this contextual relationship with KVP 4.

Build Alternatives 1 and 2 would generally not be visible because they would be too far, lower in elevation, and obscured by vegetation, which would limit visual access from KVP 4. This is most clearly evident as shown in FIGURE 3.8-25, which shows a cross section of the terrain from KVP 4 to the ocean, and each Build Alternative is shown by its relative location and elevation along this profile.

Key Viewpoint 7 – Luawai Street

This is the most mauka KVP included in the analysis. It is from the upper portions Luawai Street with viewpoints toward the ocean and to the north and south. As presented in FIGURE 3.8-26, all four Build Alternatives would have a slightly different alignment as they join into a common alignment through the area more in the background toward the center of the viewshed and into the middle-ground as the roadway gets closer to the KVP to the viewer's right. All alternatives would generally be similar in its visual effect in the background of the viewshed just mauka of the existing highway.

Key Viewpoint 8 – Multiuse Trail Near Push Piles 3 and 4

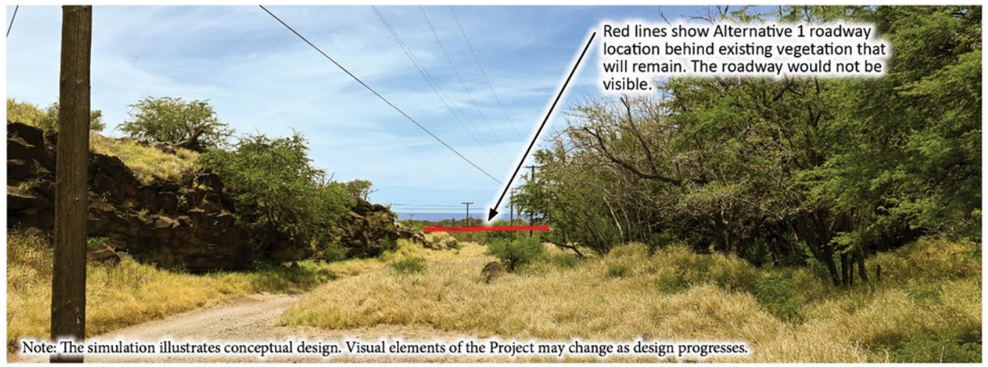
From KVP 8 along the multiuse path within the Olowalu Subdivision, there would be a wide variety of visual change associated with the Build Alternatives (FIGURE 3.8-27). While clearly visible, Build Alternatives 1 and 2 would be mostly off the viewers' right, primarily in the middle-ground. Build Alternative 3 would essentially be directly in the pathway of the KVP with a substantial adverse effect in the viewshed, essentially eliminating the path and the viewpoint itself (Section 3.1, Land Use and Zoning, and Section 3.4, Land Acquisition, Displacement, and Relocation). Build Alternative 4 would largely be to the viewers left or mauka of KVP 8. And while the alternative would be visible, it would be somewhat obscured by grading of the highway. As a result, the paved area would not be visible but vehicles would be.

Key Viewpoint 12 – Pāpalaua Wayside Park

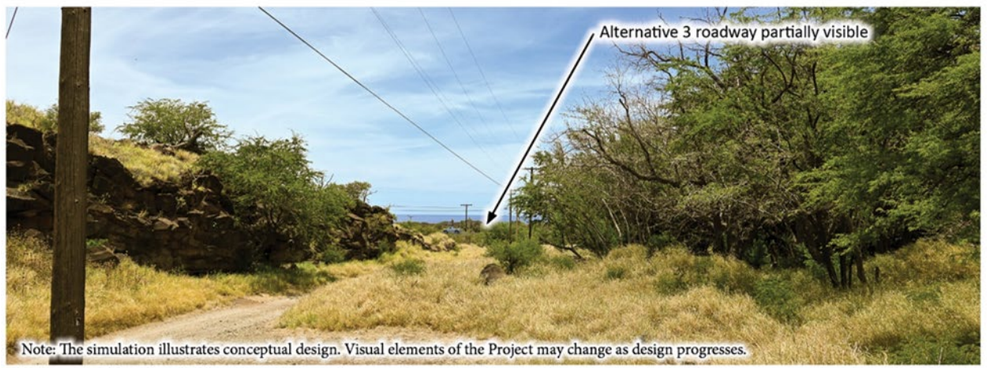
KVP 12 in Ukumehame is important to show the perspective from a public park and beach user's perspective. As shown FIGURE 3.8-28, the Build Alternatives would largely not be visible based on the elevation, distance, and intervening vegetation along the existing highway corridor. FIGURE 3.8-29 provides a section profile of the area from the Ukumehame Beach mauka to Ukumehame Firing Range, and each Build Alternative can be seen relative to its distance and elevation compared to KVP 12.

FIGURE 3.8-24. **Key Viewpoint 4 – Olowalu Petroglyphs: Existing Conditions/No Build Alternative and Build Alternatives 1 through 4 (looking makai)**

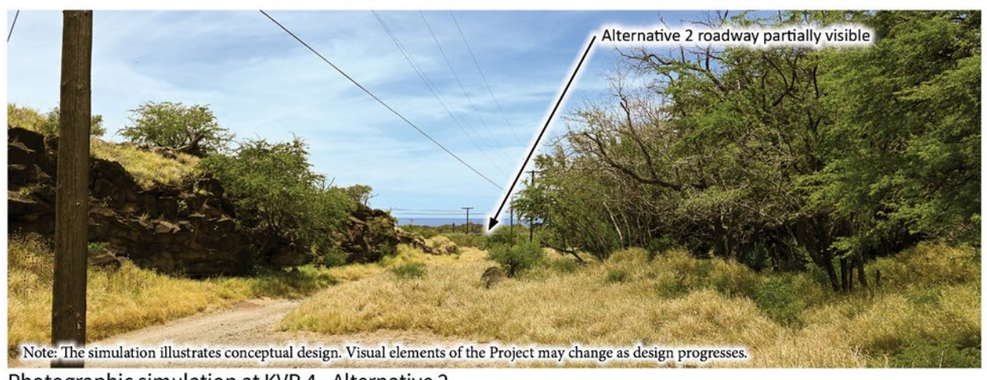
Existing Conditions KVP 4



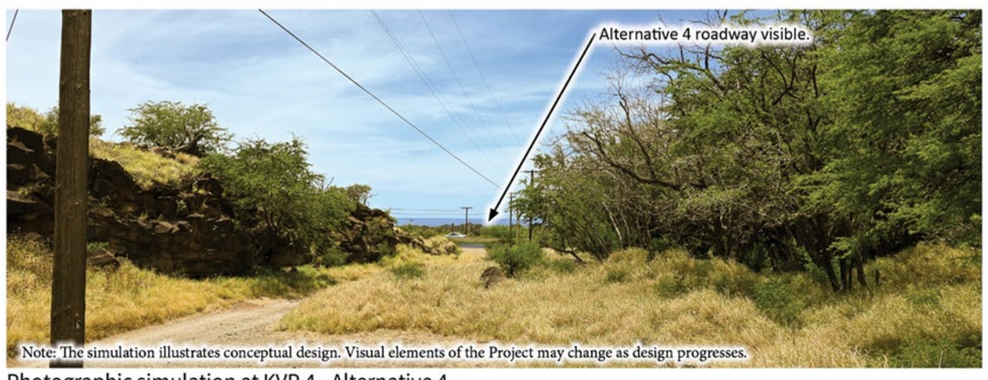
Photographic simulation at KVP 4 - Alternative 1



Photographic simulation at KVP 4 - Alternative 3



Photographic simulation at KVP 4 - Alternative 2



Photographic simulation at KVP 4 - Alternative 4

FIGURE 3.8-25. **Key Viewpoint 4 – Olowalu Petroglyphs: Sectional Profile of Existing Conditions/No Build Alternative and Build Alternatives 1 through 4**

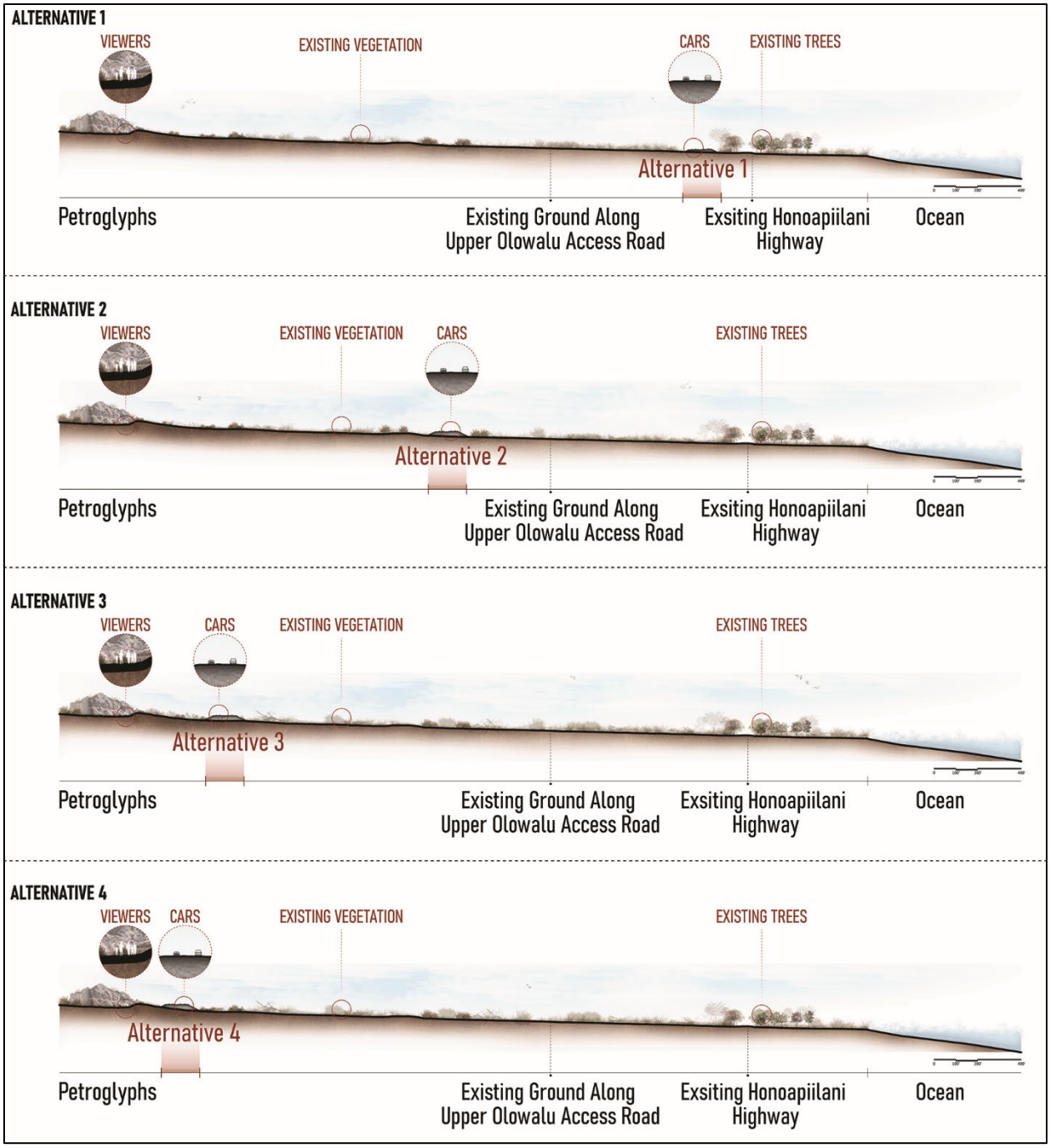


FIGURE 3.8-26. **Key Viewpoint 7 – Luawai Street: Existing Conditions/No Build Alternative and Build Alternatives 1 through 4 (looking south)**

Existing Conditions KVP 7

Photographic simulation at KVP 7 - Alternative 1

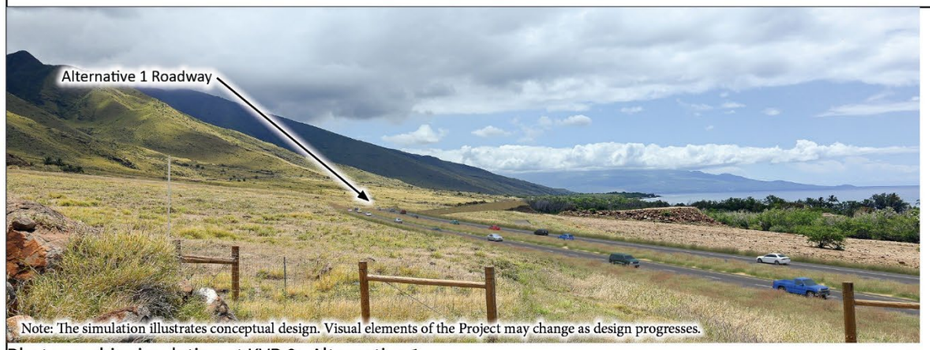
Photographic simulation at KVP 7 - Alternative 3

Photographic simulation at KVP 7 - Alternative 2

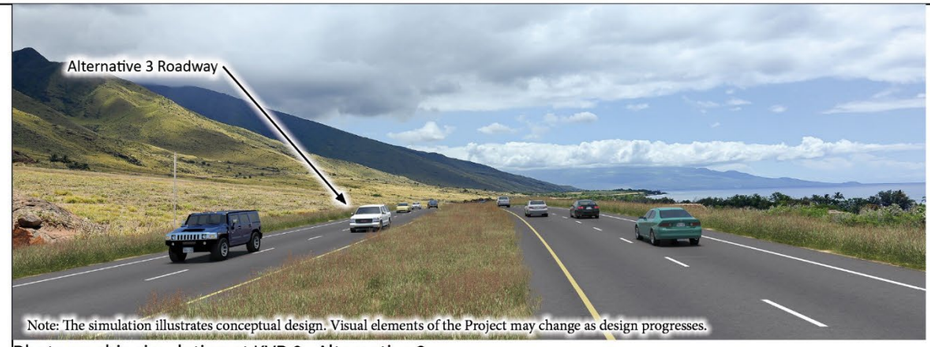
Photographic simulation at KVP 7 - Alternative 4

FIGURE 3.8-27. **Key Viewpoint 8 – Multiuse Trail Near Push Piles 3 and 4: Existing Conditions/No Build Alternative and Build Alternatives 1 through 4 (looking south)**

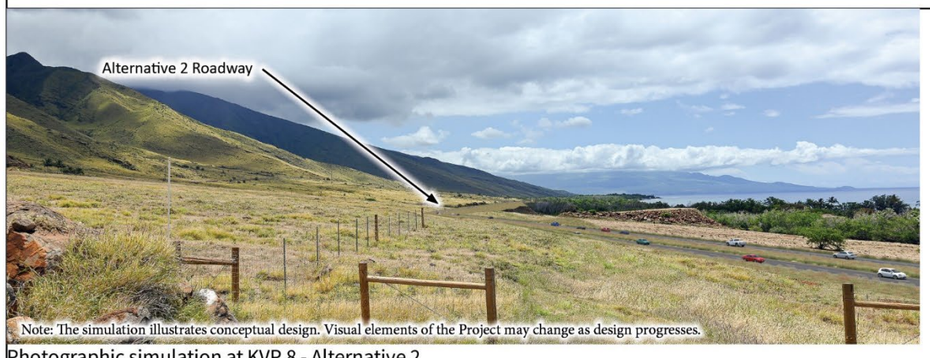
Existing Conditions KVP 8



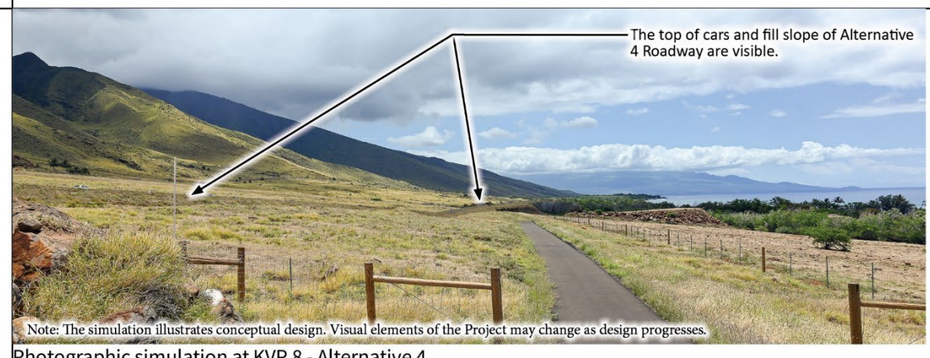
Photographic simulation at KVP 8 - Alternative 1



Photographic simulation at KVP 8 - Alternative 3



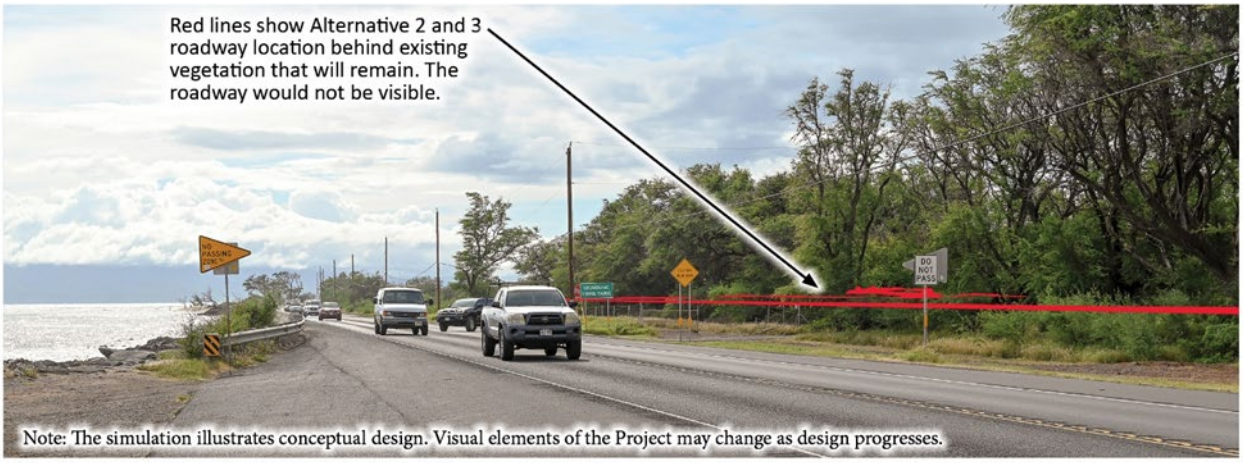
Photographic simulation at KVP 8 - Alternative 2



Photographic simulation at KVP 8 - Alternative 4

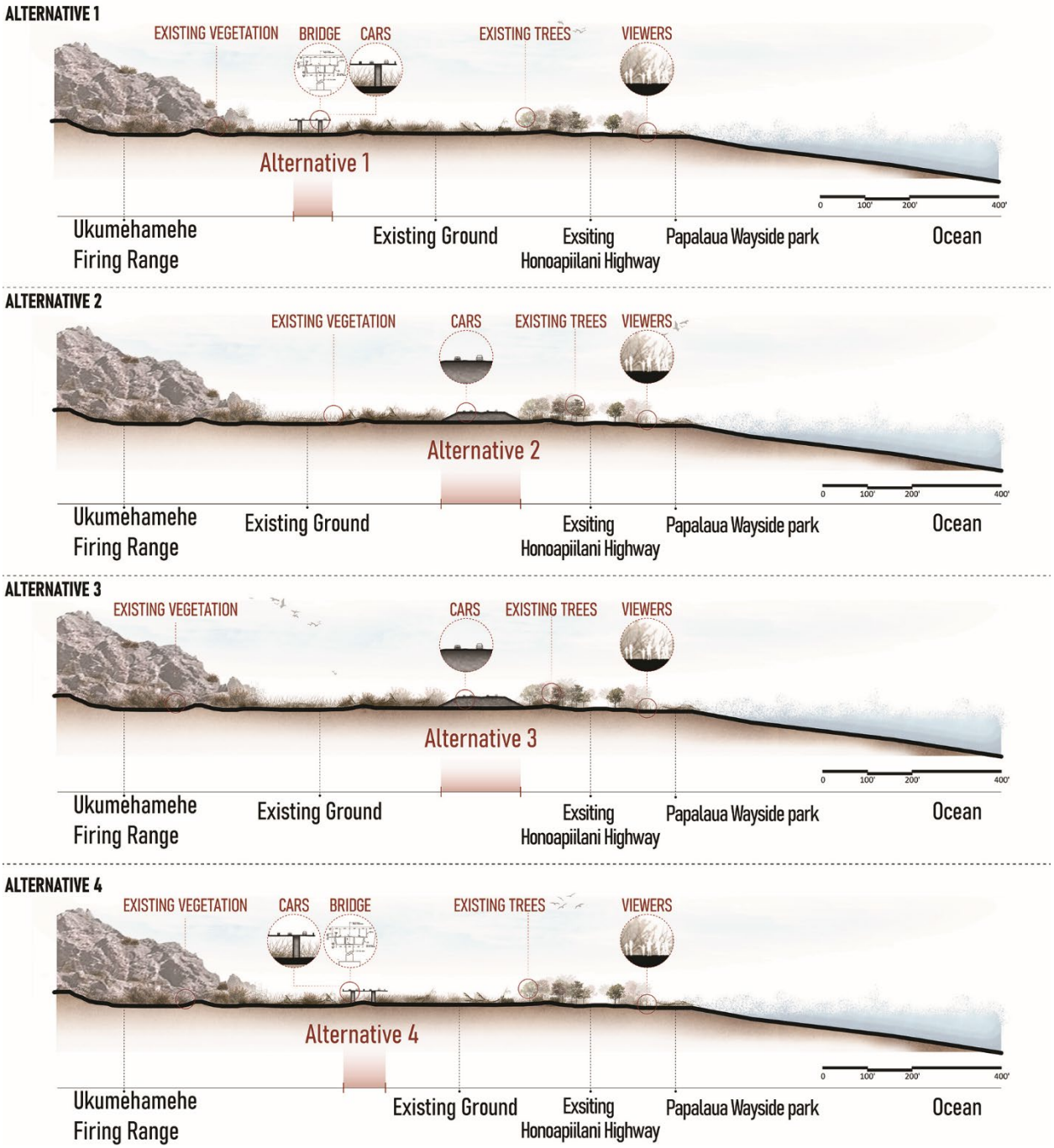
FIGURE 3.8-28. **Key Viewpoint 12 – Pāpalaua Wayside Park: Existing Conditions/No Build Alternative and Build Alternatives 2 and 3 (looking west)**

Existing Conditions KVP 12



Photographic simulation at KVP 12 - Alternatives 2-3

FIGURE 3.8-29. **Key Viewpoint 12 – Pāpalaua Wayside Park: Sectional Profile Relative to Build Alternatives 1 through 4**



Key Viewpoint 13 – ‘Au‘au Channel toward Awalua Beach

From key navigation points offshore, namely from Kaho‘olawe Island, the Build Alternatives would be indistinguishable and would not alter the higher elevation mountain tops essential for navigation (FIGURE 3.8-22). KVP 13 demonstrates the relative effects of the Project from a closer viewpoint by using a publicly available geo-coded photograph from Google Earth. The view is toward the north end of the project area because the Build Alternatives would merge into a common right-of-way before merging with the existing Lāhainā Bypass.

As shown in FIGURE 3.8-30, the common alignment would be visible mauka of the existing roadway, which is seen along hardened shoreline. The most notable feature would be the change in grade necessary to create the “bench” where the road would be built; therefore, the pavement itself would not be visible but the vehicles would be, and the most notable feature would be the new graded roadway. Once stabilized, the alignment would be less visually prominent because fewer cars would be on the existing highway, which would be more directly in the forefront of the view toward land. This would be true at night as well, when the car lights of most traffic would be shielded by the bench cut into the grade for the new alignment.

FIGURE 3.8-30. **Key Viewpoint 13 – ‘Au‘au Channel: Existing Conditions/No Build Alternative and Build Alternatives 1 through 4 (looking east)**

Existing Conditions KVP 13

Photographic simulation at KVP 13 - Alternatives 1-4

3.8.5 Construction Effects

Construction activities associated with the No Build Alternative would involve recurrent maintenance and would likely include roadway repairs, construction equipment, traffic control devices, and impacts to vehicular, bicycle, and pedestrian congestion.

Construction equipment and activities for all Build Alternatives would be similar. The most notable variation in Ukumehame would be with Build Alternative 1, where the Pali connection would involve grading and slope stabilization that would create a more visible construction area. In Olowalu, the construction effects of Build Alternative 1 would be more visible and intrusive to motorists and local traffic because the new alignment would come close to the village center and would overlap with the existing highway for a small length of roadway north of the Olowalu village center.

Activities and equipment may be noticeable throughout active construction, which is estimated to last approximately four years. Construction equipment is likely to include heavy trucks, earth-moving equipment, cranes, graders, compactors, and other heavy equipment. This equipment is often brightly colored to promote visibility and safety. Other sources of visual changes during construction would include staging areas, material storage, trailers, fencing, vehicular and pedestrian detours, construction signing, flashing safety lights, and work lighting. Visual detractions from construction activities would be removed when the Project is completed.

As presented in Section 3.8.7, Mitigation, the Project would minimize short-term adverse effects during construction by adhering to the FHWA Visual Guidelines.

3.8.6 Indirect Effects

From a visual perspective, the continuing effects of rising sea levels and coastal hazards would continue to be an indirect influence on changes within the project area. These effects would be most noticeable for the No Build Alternative because the highway would be the most likely to experience the adverse effects from chronic erosion, seasonal wave overtopping, flooding, and storm surges that are anticipated to degrade the roadway base and beach slopes. Additional efforts to stabilize the beach and roadway could cause visual and environmental degradation and could include visual impacts.

With the Build Alternatives, the visual degradation noted previously would be seen by fewer motorists or other viewers because the new roadway alignments would be mauka of the most vulnerable areas. In addition, with transfer of the existing highway to the County of Maui and with less demand to function as the key regional arterial, the maintenance of the roadway could incorporate fewer intensive measures and more opportunities to use more environmentally sensitive road maintenance practices.

3.8.7 Mitigation

The mitigation phase of the FHWA Visual Guidelines provides guidance on measures and commitments to avoid, minimize, and mitigate adverse effects. TABLE 3.8-10 summarizes measures to minimize effects, TABLE 3.8-11 summarizes commitments to minimize visual prominence, and TABLE 3.8-12 summarizes project commitments to minimize short-term effects during construction.

TABLE 3.8-10. **Measures to Minimize Potential Visual Effects**

MEASURE	DESCRIPTION
Avoidance	Avoid adverse impacts by not taking a certain action or parts of an action. Avoidance may mean selecting alternatives that do not incur the impact or degree of adverse impact
Minimization	Minimize impacts by limiting the degree or magnitude of the action and its implementation
Rectification	Repair, rehabilitate, or restore the affected environment
Reduction	Reduce or eliminate the impact by preservation and maintenance operations during the life of the action
Compensation	Compensate for the impact by replacing or providing substitute resources or environments

TABLE 3.8-11. **Project Commitments to Minimize Visual Prominence**

PROJECT COMMITMENT	DESCRIPTION
Natural Resources	• Adjust proposed roadway alignments to avoid large trees, native plantings, or visually pleasing features, particularly adjacent to the stream riparian corridors • Plant and revegetate disturbed areas; however, additional plantings, particularly between residential viewers and the proposed roadway, would provide additional screening
Lighting	Shield streetlights to direct light to roadway surfaces, minimize light spill to surrounding areas, and minimize light and glare impacts, particularly where visible from the cultural site
Fencing	Provide or expand opaque fencing and visual screening for adjacent residential and commercial viewers as a part of final design

TABLE 3.8-12. **Project Commitments During Construction**

PROJECT COMMITMENT	DESCRIPTION
Natural Resources	• Preserve existing vegetation and minimize clearing for storage and laydown areas, using existing hard/paved areas for project staging where practical • Restore landscaping disturbed by construction-related activities after completion of work
Lighting	• Limit construction to daylight hours whenever possible • Include directional work and safety lighting and direct lights away from residential areas where nighttime construction is necessary • Reduce temporary construction light and glare impacts by shielding and aiming light sources downward and toward work areas to avoid light spillover
Shielding	Screen views of construction equipment and materials from pedestrians and residential areas, as practical

Overall, while the Project would result in visual changes that would be discernible from specific viewpoints or for specific viewers, the Project would not constitute an adverse effect given the existing and future setting. TABLE 3.8-13 summarizes those instances where adverse effects were noted and identifies potential measures to avoid, minimize, and mitigate effects based on the FHWA Visual Guidelines.

TABLE 3.8-13. **Mitigation Levels for Identified Adverse Effects**

ALTERNATIVE	ADVERSE EFFECT	AVOIDANCE/MINIMIZATION	MITIGATION
OLOWALU			
Build Alternative 1	Loss of tree canopy	Assess final design for ability to refine alignment using identified criteria	Plant and revegetate disturbed areas
	Increased visual awareness for approximately 13 mauka residences	Assess final design for minimization of adverse effects	Plant and revegetate disturbed areas; create visual barriers
Build Alternative 2	Increased visual awareness for mauka residences similar to Build Alternative 1	Assess final design for minimization of adverse effects	Plant and revegetate disturbed areas; create visual barriers
Build Alternative 3	Increased visual awareness for mauka residences with more visual awareness based on proximity	Assess final design for minimization of adverse effects	Plant and revegetate disturbed areas; create visual barriers
Build Alternative 4	Increased visual awareness for mauka residences and from Olowalu Petroglyphs with more visual awareness based on proximity	Assess final design for minimization of adverse effects	Plant and revegetate disturbed areas; create visual barriers
UKUMEHAME			
Build Alternative 4	• High level of visual awareness based on proximity to mauka residences and businesses • Directly disrupts existing subdivision street	Assess final design for minimization of adverse effects	• Plant and revegetate disturbed areas; create visual barriers. • Potentially compensate residents by providing visual screening resources to property owners

3.8.8 Build Alternatives Comparative Assessment

In Olowalu, all the Build Alternatives (except Build Alternative 1) would reflect an overall improved visual condition compared with the No Build Alternative for the residential and commercial areas along the existing highway corridor—primarily by removing the highest traffic flows from the existing highway—as well as for recreational users accessing the public shoreline in Olowalu. The adverse effects are summarized below:

- Build Alternative 1 is the most makai alignment including where it overlaps with the existing highway, which causes an adverse visual effect from the loss of a portion of the monkeypod tree canopy.
- Build Alternative 2 reflects the least amount of adverse change, with an overall modest beneficial effect across the KVPs—although it would be more visible to the mauka residences.
- Build Alternatives 3 and 4 are the most mauka and would increase the adverse visual effects to mauka residents and, in the case of Build Alternative 4, would create adverse visual effects for visitors to the Olowalu Petroglyphs.

In Ukumehame, Build Alternatives 1 and 2/3 would reflect an overall improved visual condition compared with the No Build Alternative—primarily by removing the highest traffic flows from the existing highway—thereby improving the visual environment for beach users. Build Alternative 4 would have this same beneficial effect but results in a noticeable adverse visual effect as it traverses the Ukumehame Subdivision where the alignment would touch or displace portions of Paekiʻi Place, would be substantially closer to mauka residences, and would bisect and potentially displace the active sod farms present in the subdivision north of the Ukumehame Stream.

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3.9 WATER RESOURCES, WETLANDS, AND FLOODPLAINS

This section presents the potential effects of the Honoapiʻilani Highway Improvements Project (the Project) to water resources, which include wetlands, surface waters (including mapped streams and other waterbodies), groundwater, drainage areas, and surface flow.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to water resources, wetlands, and floodplains. As part of this Final EIS, the analysis contained within this section was revised to reflect those comments, or other information gathered after the publication of the Draft EIS.

3.9.1 Regulatory Context

Implementation of the Project would require coordination with federal, State, and County authorities for permits or approvals. TABLE 3.9-1 summarizes the water resource-specific permits and approvals. (See Chapter 1, Introduction, Purpose and Need, for Project-wide permits and approvals.)

TABLE 3.9-1. **Potential Permits and Approvals**

PERMIT/APPROVAL	ISSUING/APPROVING AGENCY
FEDERAL	
Department of Army Permit, Clean Water Act, Section 404	U.S. Army Corps of Engineers
Flood Map Change Request (if "no-rise" condition cannot be achieved)	Federal Emergency Management Agency (FEMA), County of Maui Emergency Management Agency
STATE OF HAWAIʻI	
Coastal Zone Management Act Consistency Determination (Section 3.12, Coastal Zone Management Act)	Department of Business, Economic Development and Tourism, Office of Planning and Sustainable Development, Coastal Zone Management Program
Clean Water Act, Section 401, Water Quality Certification	State of Hawaiʻi, Department of Health, Clean Water Branch
Clean Water Act, Section 402, National Pollutant Discharge Elimination System Permit	Department of Health (HDOH), Clean Water Branch
Stream Channel Alteration Permit	Department of Land and Natural Resources, Commission on Water Resource Management
COUNTY OF MAUI	
Maui County Ordinance 5421 Compliance[1]	Maui County Council
Map Change Request (if "no rise" condition cannot be achieved)	County of Maui Emergency Management Agency, FEMA

[1] County-issued permits (Special Management, subdivision) contingent on Ord. 5421 compliance. No specific approval associated with Ord. 5421.

3.9.1.1 Federal Regulations

Clean Water Act

The objective of the Clean Water Act (CWA), 33 U.S.C. § 1251 et. seq. (1972) is to restore and maintain the chemical, physical, and biological integrity of Waters of the U.S.[1] The CWA regulates point sources of water pollution (for example, discharges of municipal sewage, industrial wastewater, and construction-related fill) and nonpoint source pollution (for example, runoff from streets, agricultural fields, construction sites, and mining). TABLE 3.9-2 describes important CWA sections.

Waters of the U.S.

Waters of the U.S. is a threshold term in the CWA[2] and describes which bodies of water are subject to federal regulations (jurisdictional). At the federal level, the definition of this term has undergone consequential changes. In January 2023, the definition was revised, introducing the relatively permanent standard or significant nexus standard for Waters of the U.S. This rule became effective in March 2023 but was closely followed in May by the Supreme Court case *Sackett v. EPA (Sackett). Sackett* invalidated parts of the January 2023 rule, further reducing what would federally be considered jurisdictional Waters of the U.S. The *Sackett* decision was followed by an announcement by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) that a new "conforming" rule would be issued. This conforming rule was signed in August 2023,[3] was published in the *Federal Register*, and took effect in September 2023.[4] Title 40 Code of Federal Regulations (CFR) 120 and 33 CFR 328.3 list the USEPA and USACE concurring regulatory definitions of Waters of the U.S.[5,6] These definitions describe Waters of the U.S. specifically as relatively permanent, standing, or continuously flowing bodies of water (such as streams, oceans, rivers, and lakes). Under the revised definition, the significant nexus standard no longer applies and wetlands are considered adjacent and thus Waters of the U.S. only when they have a continuous surface connection to waterbodies that are Waters of the U.S. More recently, USEPA and Assistant Secretary of the Army for Civil Works (ASA(CW)) joint guidance published on March 12, 2025 establishes that culverts as discrete features no longer constitute a continuous surface connection to the ocean.

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1 U.S. Environmental Protection Agency. June 22, 2023. Summary of the Clean Water Act. EPA Laws and Regulation. https://www.epa.gov/laws-regulations/summary-clean-water-act. Accessed December 2023.

2 U.S. Environmental Protection Agency. September 12, 2023. Public Webinar: Updates on the Definition of "Waters of the United States." https://www.epa.gov/system/files/documents/2023-09/FINAL%20WOTUS%20Public%20Webinar%20Slides_9-12-23.pdf. Accessed December 2023.

3 U.S. Environmental Protection Agency. September 8, 2023. Revising the Definition of "Waters of the United States." Waters of the United States. https://www.epa.gov/wotus/revising-definition-waters-united-states. Accessed December 2023.

4 *Federal Register*. September 8, 2023. Revised Definition of "Waters of the United States"; Conforming. https://www.federalregister.gov/documents/2023/09/08/2023-18929/revised-definition-of-waters-of-the-united-states-conforming. Accessed December 2023.

5 40 CFR Part 120: Definition of Waters of the United States. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-120. Accessed December 2023.

6 33 CFR Part 328.3: Definitions. https://www.ecfr.gov/current/title-33/chapter-II/part-328/section-328.3. Accessed December 2023.

TABLE 3.9-2. **Clean Water Act Sections**

CATEGORY	DESCRIPTION
Sections 303 and 304 –Water Quality Standards and Classification[1,2]	• States are required to issue water quality standards, criteria, and guidelines under Sections 303 and 304 of the Clean Water Act (CWA). State compliance with Sections 303 and 304 are found in Hawaii Administrative Rules (HAR) Chapter 11-54 and 11-55. These chapters include requirements regarding water pollution control and water quality standards. Requirements include a general policy of water quality antidegradation; classification of state waters and their uses, which must be maintained; water quality standards, which must be met during construction and operation; and permitting requirements. • Standards set forth the maximum allowable levels of pollutants, which are used as the regulatory targets for permitting, compliance enforcement, and assessing the quality of the state's waters. These standards can be either narrative (for example, "absolute minimum of pollution…") or numeric (for example, "0.001 µg/L") and are found in HAR Chapter 11-54, Appendix E.
Sections 303(d) and 305(b) - Impaired Waters and Integrated Report[3,4]	• Section 303(d) requires states to identify waterbodies that are determined to be impaired. "Impaired" means the waterbodies exceed State water quality standards. These waterbodies are listed on the CWA 303(d) "impaired waters" list and are submitted to the U.S. Environmental Protection Agency (USEPA) every two years. States must develop total maximum daily loads (TMDLs) plans for waterbodies on the Section 303(d) list to reduce pollutant loads entering impaired waterbodies. A TMDL calculates the maximum amount of a single pollutant that a waterbody can receive and still meet water quality standards. • Additionally, Section 305(b) requires the State to produce a report on the water quality of all navigable waters in the state, the extent to which they support aquatic life, sources and causes of impairments, and actions needed to restore and maintain water quality standards. The 305(b) report is submitted to the USEPA every two years. • The 303(d) list and 305(b) report are combined into the State of Hawaii Water Quality Monitoring and Assessment Report, also known as the Integrated Report. This report provides a comprehensive picture of the status and trends of water quality in the state. In Hawaii, the Integrated Report is developed by the State of Hawai‘i, Department of Health (HDOH), Clean Water Branch.
Section 401- Water Quality Certification of Compliance[5]	Under Section 401, any applicant for a federal permit or license for an activity that may result in a discharge to navigable waters must provide to the federal agency issuing a permit a certificate (either from the state where the discharge would occur or from an interstate water pollution control agency) that the discharge would comply with CWA, Sections 301, 302, 303, 306, and 307. The HDOH Clean Water Branch issues this certificate and is most frequently required in tandem with a Section 404 permit request. To address permanent and temporary discharges associated with individual projects, the HDOH Clean Water Branch may issue a set of requirements that outline water quality protection measures that must be taken.
Section 402 – National Pollutant Discharge Elimination System (NPDES)[6,7]	• Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate the discharge of pollutants into Waters of the U.S. NPDES permits are issued by the HDOH Clean Water Branch and include conditions to ensure compliance with water quality standards and other requirements of the CWA. As part of NPDES permit compliance, Storm Water Pollution Prevention Plans are often required and implemented by general contractors to mitigate the potential for sedimentation impacts downstream and to near-shore waters and marine ecosystems. • Additionally, NPDES permits are required for stormwater discharges associated with various activities, including construction and municipal separate stormwater systems. Stormwater runoff can carry pollutants such as sediment, nutrients, metals, bacteria, and chemicals into waterways, affecting water quality. To address these threats, the NPDES permits must include best management practices and other measures to reduce or prevent stormwater pollution.

CATEGORY	DESCRIPTION
Section 404 – Discharge of Dredged or Fill Material	• Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into Waters of the U.S., including wetlands. Under Section 404 of the CWA, dredged and fill material may not be discharged into jurisdictional waters (including wetlands) without a permit. U.S. Army Corps of Engineers issues Section 404 permits with oversight by the USEPA. • U.S. Army Corps of Engineers decision-making under Section 404 of the CWA would also have to comply with the USEPA 404(b)(1) Guidelines to determine whether a proposed project (preferred alternative) represents the Least Environmentally Damaging Practicable Alternative.

1 State of Hawaii, Department of Health. (2023). HAR 11-54. DOH Clean Water Branch. https://health.hawaii.gov/cwb/hawaii-administrative-rules-har/har-11-54/. Accessed December 2023.

2 State of Hawaii, Department of Health. (2023). HAR 11-55. DOH Clean Water Branch. https://health.hawaii.gov/cwb/hawaii-administrative-rules-har/har-11-55/. Accessed December 2023.

3 State of Hawaii, Department of Health. (2023). Integrated Report and Total Maximum Daily Loads. HDOH Clean Water Branch. https://health.hawaii.gov/cwb/clean-water-branch-home-page/integrated-report-and-total-maximum-daily-loads/. Accessed December 2023.

4 USEPA. (2000). National Water Quality Inventory Report. Office of Water. https://archive.epa.gov/water/archive/web/pdf/2003_02_28_305b_2000report_toc.pdf. Accessed December 2023.

5 USEPA. (Dec. 27, 2022). CWA Section 401: State Certification of Water Quality. CWA Section 401 Certification. https://www.epa.gov/cwa-401/clean-water-act-section-401-state-certification-water-quality. Accessed November 2023.

6 USEPA. (Nov. 1, 2023). CWA, Section 402: National Pollution Discharge Elimination System. Section 404 of the CWA. https://www.epa.gov/cwa-404/clean-water-act-section-402-national-pollutant-discharge-elimination-system#top. Accessed December 2023.

7 USEPA. (August 14, 2008). Clean Water Act Overview: Spotlight on Stormwater (CWA Section 402) https://archive.epa.gov/region9/water/archive/web/pdf/cwaoverview.pdf. Accessed December 2023.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act of 1899[7] protects navigation and navigable channels and regulates any structures—such as pilings, piers, or bridge abutments up to the mean high-water line—placed in, under, or over navigable waters. Within the project area, no streams are considered navigable waters by the U.S. Coast Guard or the USACE consistent with Sections 9 and 10 of the Rivers and Harbors Act of 1899.

Federal Executive Orders

TABLE 3.9-3 describes the federal Executive Orders (EOs) with relevant authority over water resources.

TABLE 3.9-3. **Federal Executive Orders on Water Resources**

CATEGORY	DESCRIPTION
Federal Executive Order 11988, Floodplain Management[1]	This Executive Order (EO) requires federal agencies to avoid, to the greatest extent possible, the long- and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. U.S. Department of Transportation (USDOT) Order 5650.2, Floodplain Management and Protection, contains policies and procedures for implementing EO 11988. For actions with a significant encroachment in the floodplain, USDOT Order 5650.2 requires the Federal Highway Administration (FHWA) to find that a proposed action is the only practicable alternative and that an evaluation was conducted to identify whether other alternatives are available to avoid or reduce adverse impacts on the floodplain. Chapter 23, Code of Federal Regulations (CFR) Section 650, Subpart A Location and Hydraulic Design of Encroachments in Flood Plains, describes policies and procedures for the location and hydraulic design of highway encroachments on floodplains.
Federal Executive Order 11990, Protection of Wetlands[2]	In accordance with EO 11990, Protection of Wetlands, and USDOT Order 5660.1a[3], Preservation of the Nation's Wetlands, federal agencies must avoid undertaking or assisting new construction in jurisdictional wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland. For this action, the FHWA issues a "Finding" regarding the compliance of the action with EO 11990. Also, the FHWA regulations at 23 CFR 777 require federal-aid projects to mitigate wetland impacts (goal of net gain on a program-wide basis) (23 CFR 777.11(g)).

1 USEPA. (Feb. 17, 2023). Floodplain Management (EO 11988). https://www.epa.gov/cwa-404/floodplain-management-executive-order-11988. Accessed July 2023.

2 USEPA. (Feb. 17, 2023). Protection of Wetlands (EO 11990). https://www.epa.gov/cwa-404/protection-wetlands-executive-order-11990. Accessed July 2023.

3 USDOT Order 5660.1a is applicable only to federal-aid transportation projects.

3.9.1.2 Hawaii State Regulations

Hawaii State water regulations are governed by various statutes and rules and overseen by several agencies. The Hawai'i Revised Statutes (HRS) and the Hawai'i Administrative Rules contain State statutes and rules concerning water quality. The public agencies involved are the State of Hawai'i, Department of Health (HDOH), the State Department of Land and Natural Resources, the Hawaii Department of Agriculture, and the four Hawaiian counties. TABLE 3.9-4 describes the main statutes,

7 Rivers and Harbors Appropriation Act of 1899, 33 U.S.C. § 403 (1899). https://www.govinfo.gov/content/pkg/COMPS-5399/pdf/COMPS-5399.pdf. Accessed July 2023.

rules, plans, and programs related to water resources in Hawai'i. TABLE 3.9-5 summarizes the State agencies involved in water quality requirements.

TABLE 3.9-4. **Hawai'i State Water Resources Regulations**

STATUTES AND RULES	PLANS AND PROGRAMS	DESCRIPTION
Hawai'i Revised Statutes (HRS) Chapter 174C	Hawai'i State Water Code - Hawai'i Water Plan	• The Hawai'i State Water Code, codified in HRS Chapter 174C, establishes the Hawai'i Water Plan. • The Hawai'i Water Plan is an integrated program for protecting, conserving, and managing the waters of Hawai'i. It serves as a long-range guide for water resource management and establishes provisions for each county in Hawai'i.[1] It consists of plans prepared and implemented by the State of Hawai'i, Department of Health (HDOH), Department of Land and Natural Resources, and Hawaii Department of Agriculture and the four counties of Hawai'i.[2]
Hawai'i Administrative Rules (HAR) Chapter 11-54	Water Quality Standards Clean Water Act Sections 305(b) and 303(d)	• HAR Chapter 11-54 establishes State water quality standards and pollutant limits, classifies State waterbodies, and outlines prohibition of unauthorized discharge to all waters regardless of source.[3] • The chapter, administered by the HDOH Clean Water Branch, includes water quality monitoring and assessment, engineering and permitting, water quality violation enforcement, and polluted runoff control management.
HAR Chapter 11-55	Water Pollution Control Clean Water Act Sections 305(b) and 303(d)	• HAR Chapter 11-55 establishes State policy and implementation of Hawai'i's water pollution control through National Pollutant Discharge Elimination System (NPDES) permitting.[4] • This chapter, administered by the HDOH Clean Water Branch, includes policy to prevent, abate, and control water pollution from point and nonpoint sources. It includes permitting and permit compliance, identification of impaired waters, and development of total maximum daily loads.
HRS Chapter 342D and HRS Chapter 342E	Water pollution Nonpoint Source Pollution Management and Control	HRS Chapters 342D and 342E address point and nonpoint source pollution in Hawai'i. Under these chapters, pollutant discharges or allowance of pollutants to State waters are strictly prohibited unless compliant with chapter rules or the HDOH Clean Water Branch issues a NPDES permit.

1 https://dlnr.hawaii.gov/cwrm/planning/hiwaterplan/. Accessed July 2023.

2 Hawaii State Water Code, Haw. Rev. Stat. § 174C (1987). https://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf. Accessed July 2023.

3 USEPA. (Oct. 25, 2023). Water Quality Standards Regulations: Hawaii. https://www.epa.gov/wqs-tech/water-quality-standards-regulations-hawaii. Accessed December 2023.

4 USEPA. (Oct. 25, 2023). Water Quality Standards Regulations: Hawaii. https://www.epa.gov/wqs-tech/water-quality-standards-regulations-hawaii. Accessed December 2023.

TABLE 3.9-5. **Hawaiʻi State Water Agency and County Involvement – Water Quality**

AGENCY	AUTHORITY/INVOLVEMENT[1,2]	PLANS & PROGRAMS
State of Hawaiʻi, Department of Health	State of Hawaiʻi, Department of Health is the lead agency responsible for protecting the State's surface and groundwater quality. It establishes the State's water quality standards and administers the State's water quality assessment, management, permitting, and enforcement programs through the Environmental Management Division, which consists of the Clean Water Branch, the Safe Drinking Water Branch, and the Wastewater Branch.	• Water Quality Plan • 401 Certification • 402 Permitting • 303(d) List • 305(b) Report
State of Hawaiʻi Department of Land and Natural Resources	The State Department of Land and Natural Resources is the agency responsible for the development, conservation, and use of water resources in the State. It provides the overall legal and policy framework that guides the water resource planning and management through the Water Resource Protection Plan and the State Water Projects Plan.	• Water Resource Protection Plan • State Water Projects Plan
State of Hawaiʻi Department of Agriculture	The State Department of Agriculture is the agency responsible for the agricultural water needs and development in the State. It provides guidance for agricultural water use and development through the Agricultural Water Use and Development Plan.	Agricultural Water Use and Development Plan
Four Hawaiʻi Counties	Each county is responsible for the broad allocation of water use within its borders. They integrate the information from the State plans into the County Water Use and Development Plans.	County Water Use and Development Plans

1 State of Hawaiʻi, Department of Health. (2023). Water Quality Standards. https://health.hawaii.gov/cwb/clean-water-branch-home-page/water-quality-standards/. Accessed December 2023.

2 State of Hawaiʻi, Department of Health. (March 29, 2019). Water Quality. https://health.hawaii.gov/water/. Accessed December 2023.

Hawaiʻi Water Plan

Established by Hawaiʻi Revised Statutes 174(C), the Hawaiʻi Water Plan[8] is a comprehensive program that addresses the problems of water supply and conservation in Hawaiʻi. The plan consists of five constituent parts:

- Water Resource Protection Plan prepared by the Commission on Water Resource Management
- Water Quality Plan prepared by the DOH
- State Water Projects Plan prepared by the Commission
- Agricultural Water Use and Development Plan prepared by the Hawaii Department of Agriculture
- Water Use and Development Plans prepared separately by each county

The Water Resource Protection Plan and the Water Quality Plan provide the overall legal and policy framework that guide the development, conservation, and use of water resources. The State Water Projects Plan and Agricultural Water Use and Development Plan provide information on State and agricultural water needs and development plans. All this information is then integrated into the County

8 Department of Land and Natural Resources, Commission on Water Resource Management. (2023). Hawaii Water Plan. https://dlnr.hawaii.gov/cwrm/planning/hiwaterplan/. Accessed December 2023.

Water Use and Development Plans, which set forth the broad allocation of land to water use within each county.

Memorandum of Understanding NEPA and CWA Section 404

In 1994, a Memorandum of Understanding (MOU) was drafted to improve interagency coordination and integrate the NEPA and CWA Section 404 procedures in the State of Hawai'i. This MOU, the *NEPA and CWA Section 404 Integration Process for Surface Transportation Projects in the State of Hawai'i*, is intended to coordinate the NEPA process with the permit process for individual permits issued under Section 404 of the CWA. The MOU states that the Hawai'i Department of Transportation (HDOT) will invite those agencies involved in a Section 404 individual permit to actively participate in the project development process prior to permitting. Section 404 agencies include the USACE, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the USEPA.

As of this Final EIS/ROD, the preliminary agreement with USACE is that Section 404 compliance would be through a series of Nationwide Permits. The ultimate required Section 404 permitting type for the Project is still in coordination with the USACE and will be resolved with the final design, final mitigation plan and implementation schedule, and initiation of ROW acquisition during the design build process. NEPA-404 partner agencies have continued to be informed and invited to provide comment at critical steps and decisions throughout project development to remain in adherence to the MOU, should an individual Section 404 permit be necessary. Therefore, the Project will continue to comply with the MOU beyond this Final EIS/Record of Decision and into permitting and construction. Such compliace will include USACE verification of the jurisdictional determination and determination of potential Section 404 permit requirements.

~~The Project is and will continue to comply with several other components of the MOU through the publication of the Final EIS/Record of Decision and into permitting and construction, such as the USACE verification of jurisdictional determination, preparation of a biological assessment for identified threatened and endangered species, development of Section 404 resource/endangered species mitigation options, and initiation of consultation with the HDOH on Section 401 certification prior to Final EIS/ROD publication.~~

3.9.1.3 Maui County Regulations

Maui County adopted Ordinance 5421, effective October 4, 2022, to conserve and protect sensitive ecosystems and the natural environment, to mitigate climate change, and to work toward building environmental resilience by establishing a policy for wetlands restoration and protection in Titles 2, 18, and 19 of the Maui County Code.[9] Compliance with Ordinance 5421 may affect the approval of other Maui County permits, such as Special Management Area permits and property subdivision permits. As of the writing of this ~~document~~ Final EIS, the Maui County Planning Department has not yet determined compliance measures regarding Ordinance 5421.

[9] https://www.mauicounty.gov/DocumentCenter/View/137562/Ord-5421. Accessed July 2023.

Maui County also issues flood development permits, which regulate construction in areas subject to flood hazards. Through these permits, Maui County qualifies for participation in the National Flood Insurance Program.[10]

3.9.2 Methodology

The methods used to assess potential effects of the Project on water resources, described here and in Appendix 3.9, follow established guidance to support USACE determinations under the current regulatory regime. Coordination with the USACE has suggested the potential jurisdictional status of water resources in the project area; however, the ~~Draft~~ Final EIS assessment of potential effects ~~will~~ considers all water resources and aquatic features delineated as part of the Project regardless of jurisdictional status. ~~Any reference to the jurisdictional status of specific features (including acreages) in both this Draft EIS and Appendix 3.9, should be considered preliminary.~~

Wetlands and other waters were delineated, which involved surveying ~~902~~ 933 acres, including a 300-foot swath centered around each of the four Build Alternatives and an additional 37 acres outside of these alternatives between January and September 2023. Additional surveys were conducted in March 2025 between the Draft and Final EIS to expand survey coverage based on design refinements to the Preferred Alternative. Appendix 3.9 presents findings from these additional surveys and any additional modifications of the features as summarized in maps and tables focusing on the Preferred Alternative. The technical determination was performed in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). In addition, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawai‘i and Pacific Region (Version 2.0)* (Regional Supplement) was followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology (USACE 2012).[11] Wetlands and other waters depicted in this ~~Draft~~ Final EIS are the extent of delineations performed for the Project. Wetlands and other waters beyond the boundaries of these delineations may exist. ~~Boundaries of select features may be adjusted as a part of ongoing delineation review in Ukumehame.~~

Water resource and aquatic feature investigations were performed per *Regulatory Guidance Letter No. 05-05* (USACE 2005) guidance and the *National Ordinary High-Water Mark (OHWM) Field Delineation Manual for Rivers and Streams: Interim Version* (David et al. 2022) to delineate Waters of the U.S.

Under the CWA, aquatic resources are described as wetlands or other waters. Wetlands are defined in 40 CFR 120 and 33 CFR 328.3 and generally include swamps, marshes, bogs, and similar areas. “Other waters” are identified by the presence of Mean High Water and OHWM for tidal and non-tidal waters, respectively. ~~the (seasonal or perennial)[12] presence of standing or running water and generally~~

[10] Maui County (n.d.). ZAED Flood Development Application. https://mapps.mauicounty.gov/251/ZAED-Flood-Development-Application#:~:text=How%20to%20Apply,the%20State%20of%20Hawai’i. Accessed December 2023.

[11] https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/. Accessed July 2023.

~~[12] “Seasonal” and “Perennial” are categories of relatively permanent waters per regulatory definition of Waters of the U.S.~~

~~lack hydrophytic vegetation. They~~ These include lakes, streams, slough channels, seasonal ponds, tributary water, non-wetland linear drainages, and salt ponds.

On May 2, 2024, in response to an inquiry from the USACE, members of the project team visited the project site to investigate potential surface connection of the initially proposed jurisdictional and the potentially non-jurisdictional wetlands to the ocean via several buried or blocked culverts. ~~This field visit revealed that many of the delineated aquatic features in Ukumehame had no functional continuous surface connection to the Pacific Ocean due to blocked and buried culverts.~~ However, as noted above, the March 12, 2025, guidance from ~~USACE and~~ USEPA and ASA(CW) states culverts as discrete features no longer constitute continuous surface connections, restricting jurisdiction to relatively permanent waters consistent with the U.S. Supreme Court's May 25, 2023, decision in *Sackett* and the September 2023 Conforming Rule. ~~subsequent guidance from the USACE has suggested that the physical presence of a connecting feature is enough to constitute a continuous surface connection regardless of functionality, under the conforming rule. Therefore, all wetlands and other waters (including ditches and gulches) in Ukumehame are assumed to be preliminary jurisdictional features.~~ Appendix 3.9 includes the findings of all ~~this~~ field investigations, and Sections 3.9.3 and 3.9.5 include discussions of the preliminary jurisdictional status of wetlands and other waters within the project area.

3.9.3 Affected Environment

The project area crosses the Launiupoko, Ukumehame, and Olowalu watersheds. None have received grant funds from USEPA Section 319, a federal grant program that provides money to states for developing and implementing nonpoint source pollution management programs.[13] Appendix 3.9 identifies the extent of all aquatic resources within the project limits regardless of jurisdictional status. There are ~~11~~ 12 wetlands, nine (9) streams and gulches, 15 ditches, and four (4) culvert features ~~and 21 other waters~~ delineated in the project area (it is noted that the Final EIS identified one additional wetland, three additional ditches, and four culvert features) ~~all of which are assumed to be jurisdictional features except for two ditches in Olowalu~~. The jurisdictional status of all features is discussed in Appendix 3.9. ~~The 21 other waters include 12 ditches, two gulches, and seven streams.~~

3.9.3.1 Wetlands

In addition to the parameters for wetlands to be considered Waters of the U.S. in 40 CFR 120 and 33 CFR 328.3. Regardless of jurisdictional status, the term "wetland" means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."[14] This definition outlines the three-part test to identify wetlands: presence of hydrophytic (water-loving) vegetation, hydrology (presence of water), and hydric soils (soils formed during saturation/inundation).

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13 University of Hawaii at Manoa. (n.d.). Maui Watersheds. Hawaii Water Quality Extension Program. https://www.ctahr.hawaii.edu/wq/nps319/maui/mauiwatersheds.htm. Accessed December 2023.

14 33 CFR Part 328.3: Definitions. https://www.ecfr.gov/current/title-33/chapter-II/part-328/section-328.3. Accessed December 2023.

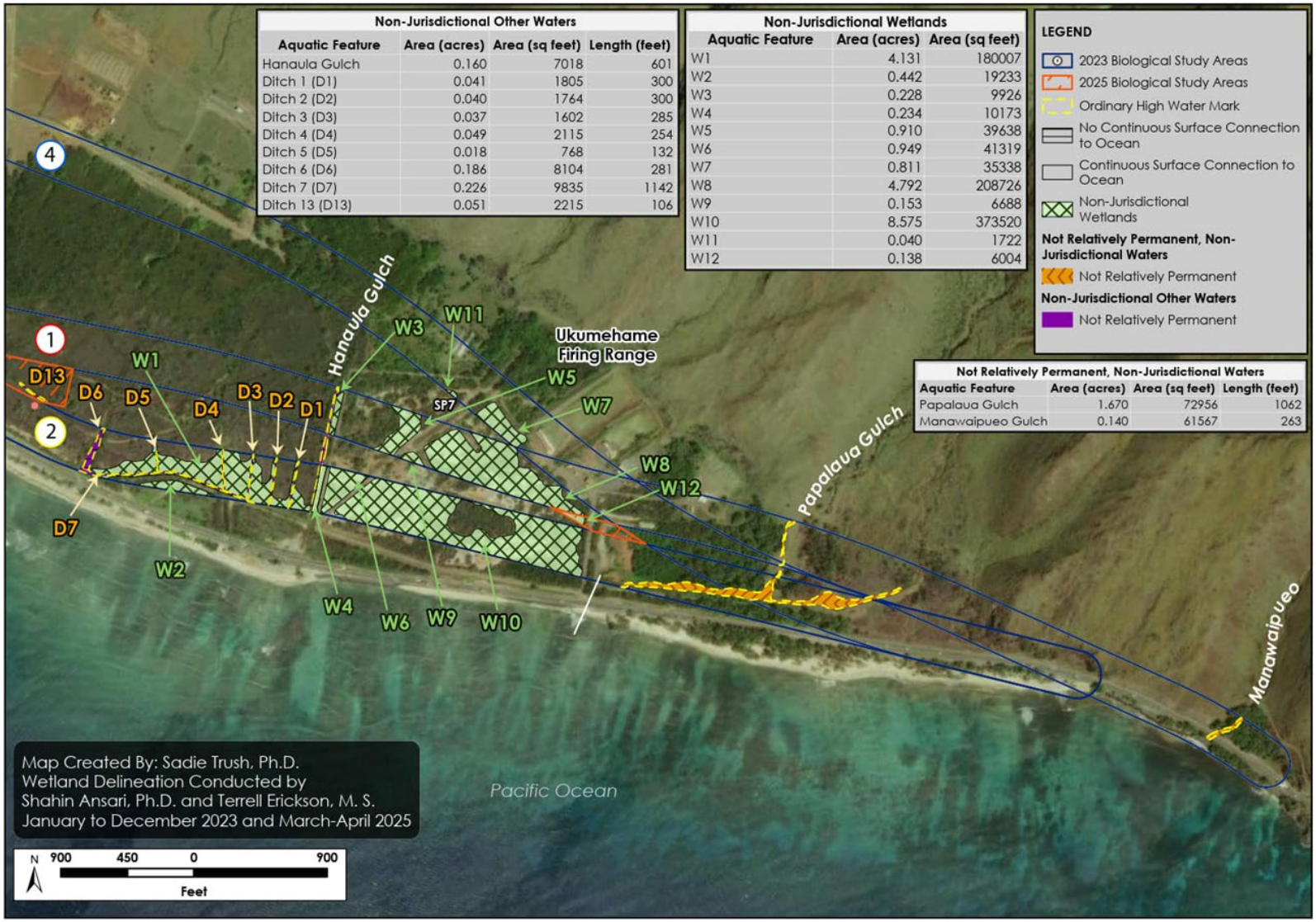
Wetlands are vital as habitats, ecosystems, and areas to settle and retain land-based sediments and remove pollutants, nitrates, and bacteria. In Hawaiʻi, human activities have led to the loss of large portions of wetlands, with areas being filled and drained for agriculture, residential developments, hotels, and golf courses. The wetlands that remain are often degraded due to changes in water flow, invasive species, human encroachment, and pollutants.[15] Wetlands at Pāpalaua and Ukumehame provide both floodwater and sediment retention and have historically been a part of the Ukumehame watershed hydrologic system.

All wetlands are situated in a floodplain that undergoes seasonal flooding during the winter/rainy season. Delineations identified a total of ~~11~~ 12 wetlands, all found in the Ukumehame area around the Ukumehame Firing Range and totaling approximately 21.403 acres. FIGURE 3.9-1 identifies these 12 wetlands and their jurisdicational status. None of the wetlends identified in the project area are considered jurisdictional. ~~W1 to W11, while W12 is identified in Appendix 3.9). and totaling approximately 21.27 21.403 acres.~~ Wetlands W1-W6 and W11 form a complex with likely connections to each other and the interconnected ditch system associated with the Hanaʻula Gulch via surface hydrology although with no continous surface connetion to the ocean. Wetlands W7-W10 and W12 form another distinct complex of likely interconnected wetlands separate from the other complex via a built up firebreak road running diagonally across the landscape, also with no continuous surface connection to the ocean. While likely interconnected (connected with each other), these wetlands do not have a continuous surface connection to any jurisdictional features.

Several buried or blocked culverts were identified during field visits which may have previously served as connections to the Pacific Ocean. However, under the March 12, 2025 USEPA/USACE guidance, culverts no longer constitute continuous surface connections. Therefore, due to the lack of continuous surface connection to any jurisdictional water feature, none of the wetlands identified in the project are considered jurisdictional. The jurisdictional status and additional wetland features have been updated based on the Final EIS assessment of the Preferred Alternative. See Appendix 3.9.

[15] USFWS. 2011. Recovery Plan for Hawaiian Waterbirds. Second revision. USFWS, Portland, Oregon. Accessed November 2023.

FIGURE 3.9-1. **Preliminary Waters of the U.S. Delineation – Ukumehame Area[1]**



[1]~~Jurisdictional status of features shown is assumed preliminary. Boundaries of Pāpalaua Gulch may be adjusted as part of ongoing delineation review.~~

3.9.3.2 Surface Waters

Surface waters are generally defined as "other waters" of the U.S. in 40 CFR 120 and 33 CFR 328.3. Within the project area, a total of 28 other waters were determined: nine (9) named surface waters, ~~and 12~~ 15 unnamed ditches, and four (4) culvert features were identified (FIGURE 3.9-2 and FIGURE 3.9-3 identifies these surface waters and their jurisdictional status. , and 13 previously identified unnamed ditches, while the three additional unnamed ditches and four culvert features are identified in Appendix 3.9). Of these features, only the Ukumehame Stream, Olowalu Stream, Ditch 9, and Ditch 14 are jurisdictional, totaling approximately 0.96 acre. The remaining other waters are all non-jurisdictional and total approximately 3.85 acres.

Of the named surface waters, the Olowalu Stream and Ukumehame Stream are the only perennial streams, meaning that water flows continuously throughout the year except during droughts, and are likely jurisdictional (TABLE 3.9-6).[16] The Olowalu Stream is the main drainage of the western portion of the project area, channeling water from the mauka regions of the West Maui watershed through the Olowalu Valley to the Pacific Ocean.[17] The Ukumehame Stream is the main drainage of the eastern portion of the project area, channeling water from the Ukumehame watershed through the Ukumehame Gulch to the Pacific Ocean.[18] The Hana'ula Gulch supports the hydrology of the ditch system (D1-D7) and the associated wetland complex described above in Section 3.9.3.1.

TABLE 3.9-6. **Named Surface Waters in Project Area**

NAME	PROJECT SECTION	TYPE
Hana'ula Gulch	Ukumehame	~~Seasonal Drainage~~ Not Relatively Permanent
Pāpalaua Gulch	Ukumehame	~~Seasonal Drainage~~ Not Relatively Permanent
Manawaipueo Stream	Ukumehame	~~Seasonal Drainage~~ Not Relatively Permanent
Ukumehame Stream	Ukumehame	Perennial
Kapū'ali Stream	Olowalu	~~Seasonal Drainage~~ Not Relatively Permanent
Awalua Stream	Olowalu	~~Seasonal Drainage~~ Not Relatively Permanent
Līhau Stream	Olowalu	~~Seasonal Drainage~~ Not Relatively Permanent
Olowalu Stream	Olowalu	Perennial

16 USEPA. (Feb. 17, 2023). Streams under CWA Section 404. https://www.epa.gov/cwa-404/streams-under-cwa-section-404. Accessed December 2023.

17 State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resource Management (March 2018). Instream Flow Standard Assessment Report, Island of Maui, Hydrologic Unit 6005 Olowalu. https://files.hawaii.gov/dlnr/cwrm/ifsar/PR201802-6005-Olowalu.pdf. Accessed October 2024.

18 State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resource Management (March 2018). Instream Flow Standard Assessment Report, Island of Maui, Hydrologic Unit 6004 Ukumehame. https://files.hawaii.gov/dlnr/cwrm/ifsar/PR201801-6004-Ukumehame.pdf. Accessed October 2024.

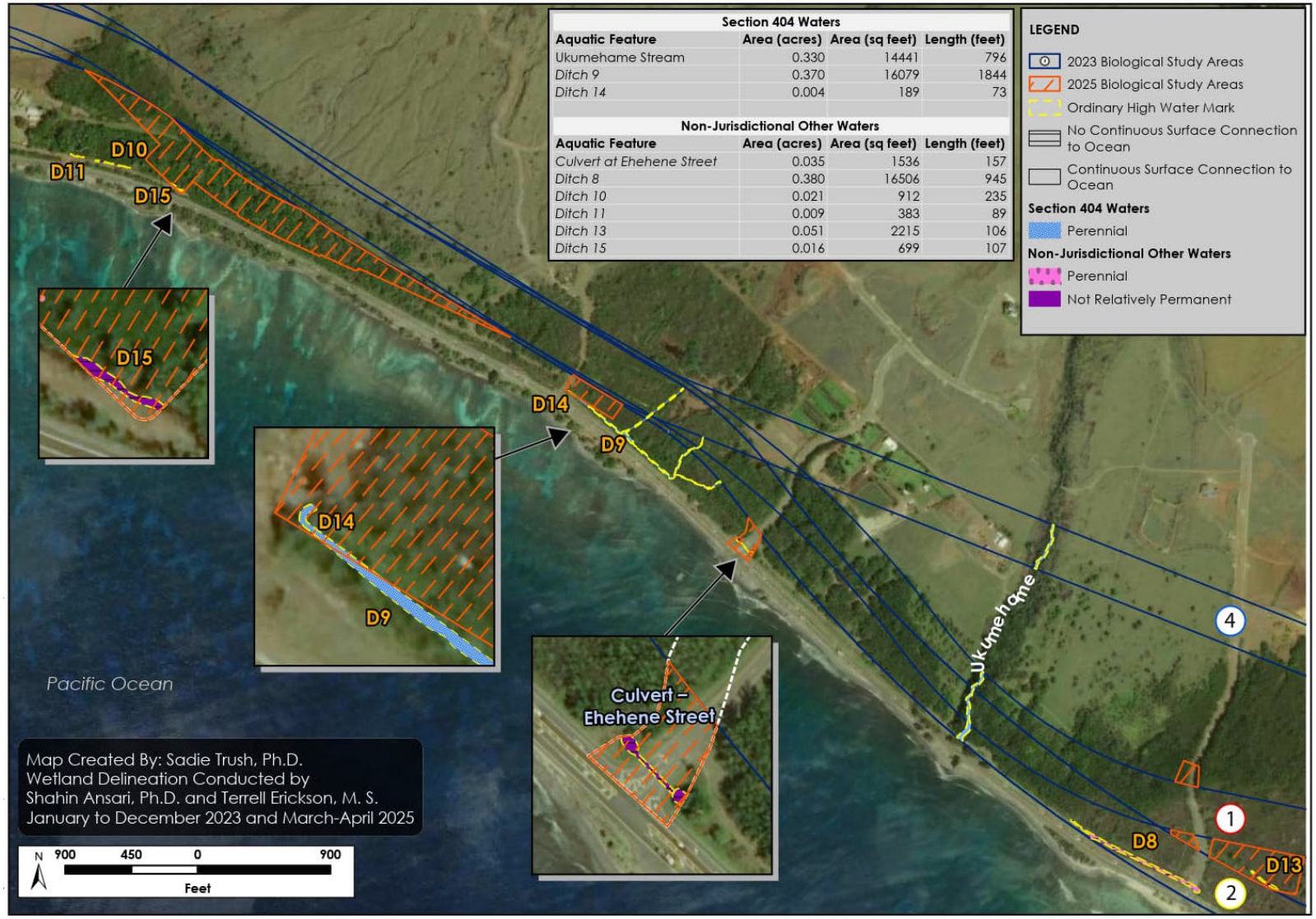
NAME	PROJECT SECTION	TYPE
Mōpua Stream	Olowalu	~~Seasonal Drainage~~ Not Relatively Permanent

Water Quality

All State waters are required to meet Hawai‘i Administrative Rules 11-54 Water Quality Standards. The 2022 Integrated Report identifies only the Ukumehame Stream as impaired. The Ukumehame Stream is impaired due to nitrates and nitrogen dioxide and is listed as low total maximum daily load priority.[19] Water quality monitoring would be performed in accordance with the 401 Water Quality Certification that would be sought from the HDOH Clean Water Branch.

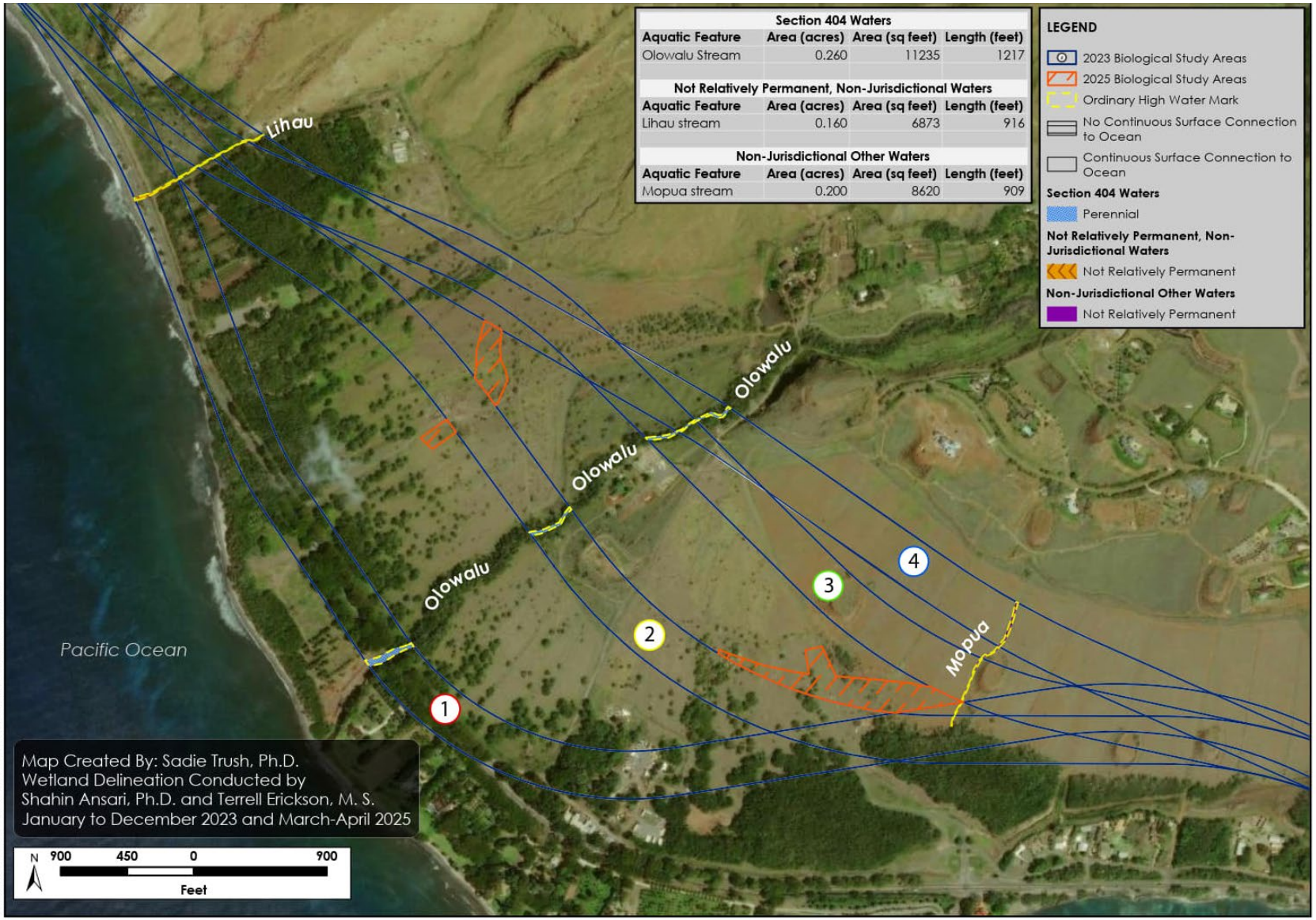
[19] State of Hawai‘i, Department of Health, Clean Water Branch. (April 6, 2022). 2022 State of Hawaii Water Quality Monitoring and Assessment Report. https://attains.epa.gov/attains-public/api/documents/cycles/11424/206016. Accessed December 2023.

FIGURE 3.9-2. **Preliminary** Other Waters of the U.S. Delineation – Common Alignment and Ukumehame Area[1]



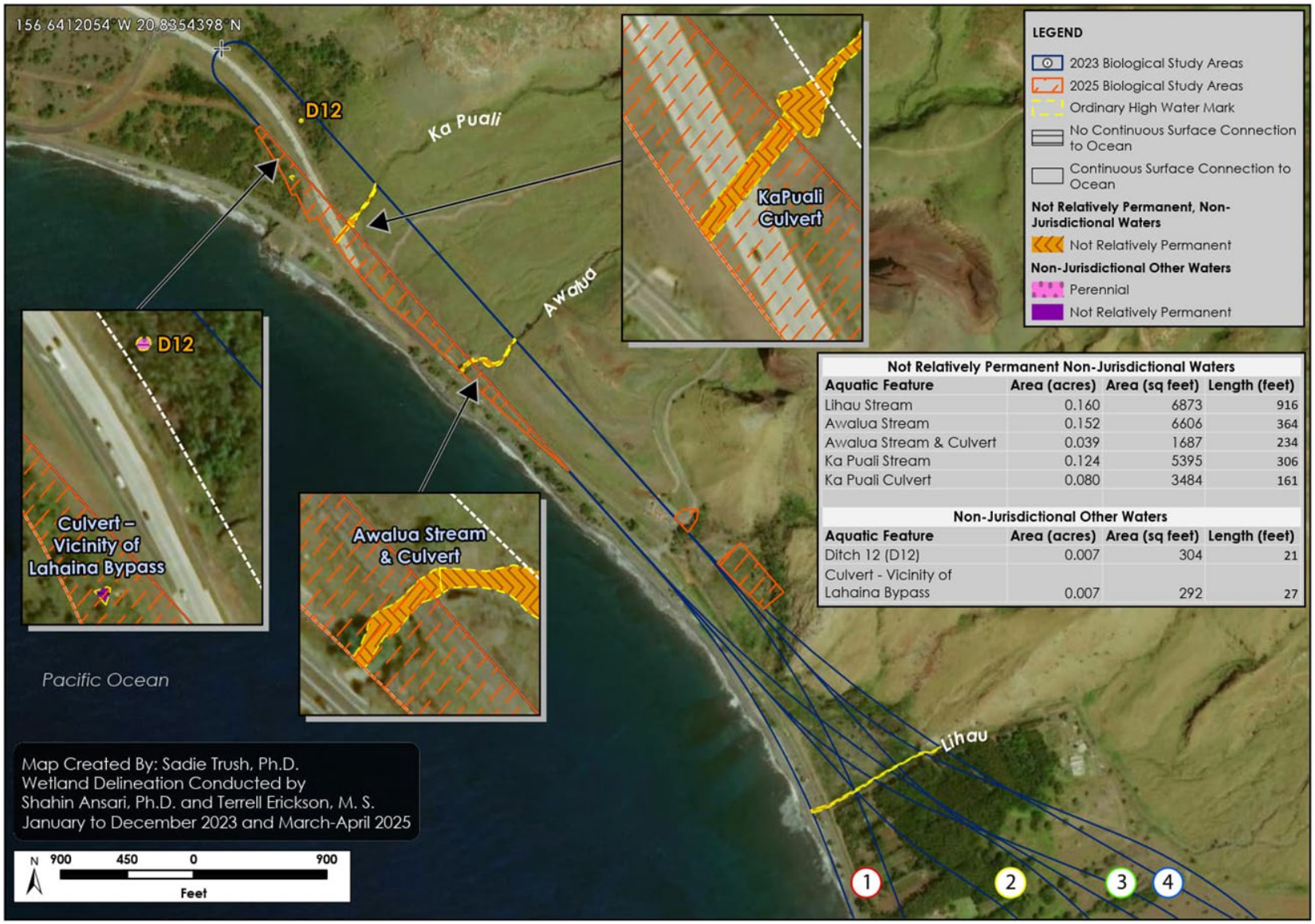
[1]Jurisdictional status of features shown is assumed preliminary.

FIGURE 3.9-3. **Preliminary Jurisdictional Other Waters of the U.S. Delineation – Olowalu[1]**



[1]~~Jurisdictional status of features shown is assumed preliminary.~~

FIGURE 3.9-4. **Preliminary Non-jurisdictional Other Waters of the U.S. Delineation – Olowalu and Launiupoko[1]**



Not Relatively Permanent Non-Jurisdictional Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Lihau Stream	0.160	6873	916
Awalua Stream	0.152	6606	364
Awalua Stream & Culvert	0.039	1687	234
Ka Puali Stream	0.124	5395	306
Ka Puali Culvert	0.080	3484	161

Non-Jurisdictional Other Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Ditch 12 (D12)	0.007	304	21
Culvert - Vicinity of Lahaina Bypass	0.007	292	27

[1]Jurisdictional status of features shown is assumed preliminary.

In addition to the HDOH Clean Water Branch, Hui O Ka Wai Ola (Hui), a West Maui community-based water quality monitoring initiative, routinely samples waters and documents the results in a publicly available database. High turbidity, a measure of water quality and presence of sediment, and elevated nutrients—in particular, nitrates and nitrites—are the most problematic of the water quality parameters tested in West Maui. Data from Hui show that all the coastal areas in the Olowalu-Ukumehame region are impaired and have turbidity levels above the State coastal turbidity standard. The two main sources are stormwater runoff and coastal erosion.[20] Section 3.9.8 and Section 3.13, Climate Change and Sea Level Rise, include measures to avoid, minimize, and otherwise mitigate effects from erosion. Section 3.9.8 also discusses stormwater runoff.

HDOT constructed the Pāpalaua sedimentation basin in 1971. The basin manages water volume and captures sediment heavy flows moving to the ocean from inland sources. It was constructed on the northern side of and parallel to the existing Honoapi'ilani Highway, next to the Ukumehame Firing Range. The boundary of the sedimentation basin ~~will~~ may be finalized as part of permitting coordination ~~ongoing delineation review~~ with USACE.

In addition, HDOT has been coordinating and providing funding for work by The Nature Conservancy in the project area. The Nature Conservancy is currently working in the Ukumehame and Olowalu areas on three separate projects:

- Reducing sedimentation to the 939-acre coral reef
- Conducting reef and sediment studies
- Planning with HDOT, other partners, and the community to implement nature-based solutions for preservation and restoration of the coral reef, shorelines, wetlands, recreational spaces, and infrastructure for people and nature

Comments have been provided by The Nature Conservancy, in coordination with HDOT, on the Draft EIS (2025) and EIS Preparation Notice (2023). These comments have been incorporated as best as practicable into the Project. These comments call for ensuring shoreline and wetland restoration to reduce sedimentation and pollutants while creating recreational spaces and native habitat, and prioritizing green infrastructure for stormwater management, including ecologically sensitive stream crossings at the Ukumehame and Olowalu streams.

3.9.3.3 Groundwater

Groundwater in the project area is in the Lāhainā Aquifer, a freshwater aquifer that provides water for West Maui from Ukumehame to Honokōhau.[21] Rain and fog account for the majority of groundwater

[20] USACE. (May 2023). West Maui Watershed Study. Final Watershed Management Plan. https://www.poh.usace.army.mil/Portals/10/docs/Civil%20Works/West%20Maui%20Watershed%202021/2023%20West%20Maui%20WMP-Final%20Report.pdf?ver=LpXdfFUZIvArD2tJWw9tyQ%3d%3d. Accessed December 2023.

[21] State Department of Land and Natural Resources. (June 15, 2022). Entire Lahaina Aquifer Sector Area Designated as Surface & Ground Water Management Area. https://dlnr.hawaii.gov/blog/2022/06/15/nr22-085/. Accessed December 2023.

recharge. Rainwater seeps through the highly permeable basalt of the volcanic West Maui mountains and is stored in aquifers floating on the underlying saltwater.[22]

The Lāhainā ~~Lahaina~~ Aquifer consists of two subunits: the Olowalu and Ukumehame Aquifers, located beneath the project area. As of December 2021, each aquifer has a sustainable yield of about 2 million gallons per day. Current withdrawals are below this limit, with Olowalu wells pumping about 8% of their sustainable yield daily, while Ukumehame wells are pumping approximately 57% of their sustainable yield daily.[23]

In June 2022, the Commission on Water Resource Management designated the Lāhainā Aquifer Sector Area as both a Surface and Ground Water Management Area. This designation requires users of surface and ground water sources to obtain permits to withdraw and use the water.[24] It is not anticipated that the Project would use these resources, nor require a permit.

This Project includes geotechnical investigation to support conceptual designs that includes 12 boring locations in the project area. Depth to groundwater will be recorded at each location if encountered.

3.9.3.4 Floodplains

Portions of the existing Honoapiʻilani Highway are in flood-prone areas, as defined by the Federal Emergency Management Agency (FEMA). FEMA defines a floodplain as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding in any given year."[25] These areas are shown as flood zones on FEMA Flood Insurance Rate Maps. TABLE 3.9-7 describes how FEMA defines the Flood Zone Designations within the project area.

TABLE 3.9-7. **Project Area Flood Zone Designations**

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. Average flood depths derived from detailed analyses are shown within these zones.
VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves.

22 Maui County Planning Department. (n.d.). West Maui Region (Lahaina Aquifer Sector). https://waterresources.mauicounty.gov/DocumentCenter/View/250/West-Maui-Region-Description-PDF. Accessed December 2023.

23 State of Hawaii Commission on Water Resource Management. (June 8, 2022). Surface and Ground Water Management Area Designation Findings of Fact Report. https://files.hawaii.gov/dlnr/cwrm/gwma/lahaina/20220608_Lahaina_FinalFOF.pdf. Accessed October 2024.

24 Department of Land and Natural Resources, Commission on Water Resource Management. (2023). Water management Area Designation: Lahaina Aquifer Sector Area. https://dlnr.hawaii.gov/cwrm/groundwater/gwma/lahaina/. Accessed December 2023.

25 28 CFR Part 63 (2023). https://www.ecfr.gov/current/title-28/chapter-I/part-63. Accessed December 2023.

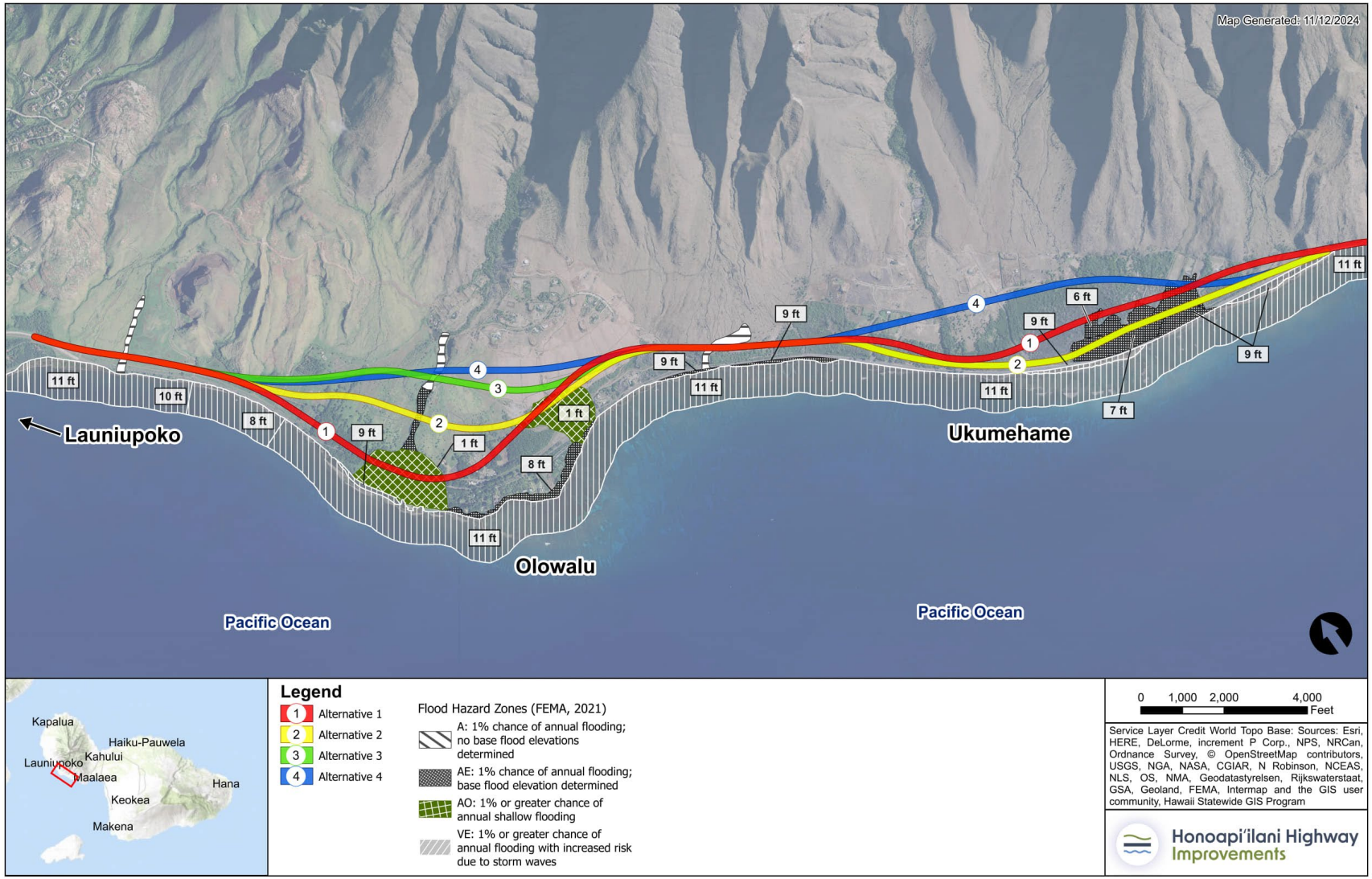
FIGURE 3.9-5 shows FEMA Flood Insurance Rate Map flood zones with base flood elevations (BFE), determined only for zones AE, AO, and VE. BFE is the height above sea level that floodwaters are expected to reach during a flood that has a 1% chance of occurring in a given year (100-year flood).[26] As sea level rises, these flooding areas are likely to be modified. Section 3.9.8 includes measures to avoid, minimize, and mitigate potential effects.

Floodplains and climate change are interconnected. Climate change influences the behavior and effect of flooding events on these low-lying areas, with far-reaching consequences. These include damage to infrastructure, loss of agricultural land, destruction of property, and increased risks to human lives. Additionally, the prolonged inundation of floodplains can lead to soil erosion and sediment deposition that alters the landscape and affects local biodiversity.

Furthermore, rising sea levels, which are a direct consequence of melting glaciers and ice caps, pose a serious threat to coastal floodplains. Higher sea levels increase the risk of tidal surges and saltwater intrusion, exacerbating flooding and affecting delicate ecosystems in these regions.

[26] FEMA. (March 5, 2020). Base Flood Elevation. https://www.fema.gov/node/404233. Accessed December 2023.

FIGURE 3.9-5. **FEMA Flood Insurance Rate Map Flood Zones with Base Flood Elevation**



3.9.4 Environmental Consequences

3.9.4.1 No Build Alternative

Sea level rise is expected to expand wetlands, create new areas of brackish wetlands, and raise the groundwater level. Salinity may increase in wells close to the shoreline. Flood zones would change and move farther inland.

3.9.4.2 Build Alternatives

Common to All Build Alternatives in Olowalu and Ukumehame

None of the Build Alternatives would cross over the VE Flood Hazard Zone (FIGURE 3.9-5). The Build Alternatives would have approximately the same number of stream crossings and would require six bridges and approximately seven or eight culverts. All the bridge structures would be built outside of the ordinary high-water mark, avoiding in-water work.

All Build Alternatives would increase the amount of impervious surface area, resulting in additional erosional forces and stormwater discharge reaching inland and near-shore waters and wetlands. Additional contaminants would further impair 303(d) list streams (Ukumehame) and Ukumehame-Olowalu coastal areas identified by Hui, though no total maximum daily loads have been established. Build Alternatives do, however, offer possibilities to act as firebreaks and utilize fire-resistant vegetation, limiting the amount of nutrients and sediment runoff to these waters (see Chapter 3.11, Geology, Soils, and Natural Hazards).

All Build Alternatives cross flood hazard zones and therefore have the potential to alter hydrology, potentially increasing flooding. There is potential risk of constructing the Build Alternatives in flood hazard zones with possibility of rise due to shallow flooding or wide AE floodplain. ~~This will be further evaluated for the Preferred Alternative in the Final EIS.~~ FEMA requires the design-build contractor to design for a no-rise scenario in the regulatory floodway or, if a no-rise is not attainable, the FEMA process to revise National Flood Insurance Program Maps and show changes to floodplains, regulatory floodways, or flood elevations would be followed (per Title 44, Parts 60, 65, and 72 of the CFR). While crossing streams can require channelization, alteration, and adverse effects to streambeds, no in-water work or stream channel alteration is anticipated. Should the final design of a bridge include effects to the stream channel, as defined by DLNR, a Stream Channel Alteration Permit may be required during the design-build phase of the project.

Common to All Build Alternatives in Olowalu

To some extent, all Build Alternatives would cross all other waters in Olowalu, except for Ditch 10 and Ditch 11: Ka Pūʻali Stream, Awalua Stream, Līhau Stream, Olowalu Stream, and Mōpua Stream (FIGURE 3.9-2,, FIGURE 3.9-4). Additionally, all Build Alternatives would cross flood hazard zones on the Awalua Stream (Zone A) and the Olowalu Stream (multiple zones) and a third flood hazard zone on the Mōpua Stream at the southern end of Olowalu (Zone A) (FIGURE 3.9-5). None of the Build Alternatives in Olowalu cross the additional other waters identified in Appendix 3.9 as part of refinements to the Preferred Alternative: the Ka Pūʻali Culvert, the Culvert near the Lāhainā Bypass, and the Awalua Stream Culvert. There are no mapped wetlands in Olowalu.

Olowalu

Build Alternative 1

Build Alternative 1 crosses over the AO flood hazard zone at the mouth of the Olowalu Stream (1-foot BFE) and near the mouth of the Mōpua Stream (1-foot BFE). It crosses the most flood hazard areas of any Build Alternative in Olowalu. It is the closest to the Pacific Ocean connections of the Līhau and Olowalu Streams and is only slightly crossed by the Mōpua Stream. Build Alternative 1 crosses 0.72 acre of other waters.

Build Alternative 2

Build Alternative 2 crosses over the AE flood hazard zone along the Olowalu Stream and the AO flood hazard zone near the mouth of the Mōpua Stream (1-foot BFE). It crosses 0.53 acre of other waters and overlaps the least with the Mōpua Stream.

Build Alternative 3

Build Alternative 3 crosses over the A flood hazard zone along the Olowalu Stream and 0.54 acre of other waters.

Build Alternative 4

Build Alternative 4 crosses over the A flood hazard zone along the Olowalu Stream and 0.61 acre of other waters.

Common to All Build Alternatives in Ukumehame

To some extent, all Build Alternatives cross multiple wetlands and the following other waters in Ukumehame: Ditch 9, Ukumehame Stream, Pāpalaua Gulch, and Manawaipueo Stream (FIGURE 3.9-1). Additionally, all Build Alternatives cross over, to some extent, the AE Zone at the southeast end of the project area around Ukumehame Firing Range. This area has a BFE between 6 and 9 feet (FIGURE 3.9-5). None of the Build Alternatives in Ukumehame cross the additional other waters or wetlands identified in Appendix 3.9 as part of refinements to the Preferred Alternative: the Ehehene Street Culvert, Ditch 13, Ditch 14, Ditch 15, and W12.

Ukumehame

Build Alternative 1

In Ukumehame, Build Alternative 1 crosses over the A flood hazard zone at the Pali connection, and the AE flood hazard zone just before the firing range area (6-foot BFE). The Hanaʻula Gulch crosses the alternative just before Ukumehame Firing Range. And four wetlands (W3, W5, W8, W9) are crossed, totaling 6.08 acres (FIGURE 3.9-1).

Build Alternative 2 and Build Alternative 3

In Ukumehame, Build Alternative 2 crosses over the A flood hazard zone at the Pali connection, and the AE flood hazard zone through the firing range area (6- to 9-foot BFE). These Build Alternatives cross the most flood hazard zone area in Ukumehame. Ditch 8, Hanaʻula Gulch and its seven associated ditches (D1-D7), cross these Build Alternatives prior to the Sedimentation Basin area, totaling 1.57

acres of other waters. Five wetlands (W1, W2, W4, W6, W10) are crossed, totaling 14.30 acres (FIGURE 3.9-1).

Build Alternative 4

In Ukumehame, Build Alternative 4 crosses over the A flood hazard zone at the Pali connection and a small portion of the AE flood hazard zone just north of the firing range. Two wetlands cross Build Alternative 4 in the firing range area (W11, W7), totaling 0.85 acre (FIGURE 3.9-1).

3.9.5 Agency Consultation

3.9.5.1 U.S. Army Corps of Engineers – Section 404

Upon review of the initial wetland delineation report, Appendix 3.9, the USACE requested further evidence clarifying surface connections of wetlands to the ocean under the CWA conforming rule of September 2023. The May 2, 2024, field visit was the result of this inquiry by the USACE and results are detailed in the Connectivity Memo (Appendix 3.9). Based on USEPA and ASA(CW) joint guidance published on March 12, 2025, culverts as discrete features no longer constitute a continuous surface connection to the ocean. As such, the Section 404 permitting pathway would consider this new guidance in the overall applicability of permit requirements for the Project.

The Project is not anticipated to affect greater than 0.1 acre of wetlands and/or other waters that may be determined to be within federal jurisdiction at any individual crossing. While acknowledging the potential footprint of all Build Alternatives in mapped wetlands and other waters, as noted above, all Build Alternatives cross over areas that were delineated as wetlands and other waters. Anticipated permanent effects would be permitted with a series of Nationwide Permits, as required, pursuant to the USACE Honolulu District Regional Conditions to Nationwide Permits. If impact thresholds are exceeded at any individual crossing, an individual Section 404 permit would be required.[27] The final acreage of permanent effect would be determined by the designer of record during final design, after the EIS is complete. Any required Section 404 permitting will occur during the design-build phase of the project.

~~The results of ongoing coordination with the USACE regarding the CWA permitting pathway and delineation review will be reported in the Final EIS. Appendix 3.9 includes correspondence.~~

3.9.6 Construction Effects

Roadway construction generates a series of potential effects on water resources (TABLE 3.9-8).

[27] USACE. Honolulu District. (Feb. 1, 2022). Honolulu District Regional Conditions to the 2021 Nationwide Permits. https://www.poh.usace.army.mil/Portals/10/40_1%20Final%202021%20PN%20NWP%20RC%20%20.pdf. Accessed October 2024.

TABLE 3.9-8. **Potential Construction Effects on Water Resources**

ADVERSE EFFECT	EFFECTS ON WATER RESOURCES
Sediment/Turbidity	An abundance of sedimentation can harm underwater ecosystems. When sediment is suspended in water, it makes the water murkier and can hinder the growth of aquatic plants. Moreover, this suspended sediment can lead to a decrease in the levels of dissolved oxygen in the water, which can be lethal to aquatic life.
Nutrients	An overabundance of nutrients, especially nitrogen and phosphorous, can lead to rampant growth of algae, which can be harmful to some marine creatures. The proliferation and subsequent decay of algae can cause fluctuations in the levels of dissolved oxygen, which in some instances can result in the death of fish.
General Construction	Machinery used in construction can strip away plant life and leave sediment on nearby roads. This can eventually lead to erosion and the transport of sediment into bodies of water. If not properly managed or routinely cleared, debris from the construction site can be carried off by wind or water runoff into waterways.
Stormwater	The removal of plant life and the expansion of nonabsorbent surfaces at construction sites can lead to a rise in the speed and quantity of stormwater runoff, which in turn can speed up erosion. The enlarged nonabsorbent area gathers more pollutants. The increased speed in canalized waterways intensifies erosion and sedimentation. The amalgamation of these elements can lead to the conveyance of more pollutants into bodies of water.
Metals	Metals that attach to particles suspended in water and decomposing organic material can remain in the environment for an extended duration. These metals have the potential to move from one aquatic organism to another, leading to the pollution of water resources.

3.9.7 Indirect Effects

The Project is not anticipated to induce growth or development that would have the potential to adversely affect water resources, wetlands, or floodplains; therefore, the Project is not anticipated to result in indirect effects on water resources, wetlands, and floodplains.

3.9.8 Mitigation

Adherence to the following BMPs, avoidance, and mitigation measures would ensure effects to water resources are minimized as best as practicable. Section 3.10, Flora and Fauna, Endangered Species, includes a series of BMPs and avoidance and minimization measures related to aquatic environments. To avoid redundancy, see Section 3.10.9, Mitigation, for a complete list.

According to U.S. Department of Transportation Order 5660.1A and Order 5650.2, 23 CFR 650, Subpart A, 23 CFR 777, EO 11990, and EO 11988, new construction in wetlands and floodplains is to be avoided unless there is no practicable alternative to the construction and the proposed action includes all practicable measures to avoid ~~mitigate~~ and minimize harm. Because of the design requirements of a highway and the terrain within the project area, totally avoiding wetlands and floodplains may not be possible.

The anticipated use of Nationwide Permit 14 includes a ~~The Project would require and adhere to a~~ Section 401 Water Quality Certification, and a certified Section 402 National Pollutant Discharge

Elimination System General Permit with a Stormwater Pollution Prevention Plan. ~~, Section 404 Permit, and potentially a Stream Channel Alteration Permit (TABLE 3.9-1). C~~ Post Final EIS/ROD, coordination with the USACE would be conducted for the Section 404 permit requirements associated with the stream crossings and any other unavoidable effects to Waters of the U.S. If it is determined that an individual ~~When work requires a~~ Section 404 permit is required, a Section 401 certification is also required to regulate discharges into Waters of the U.S.

In lieu of having detailed drainage and roadway design completed (which is typically achieved during final design) and detailed geotechnical subsurface information to determine appropriate infiltration rates to design infiltration systems, a conceptual study was performed to evaluate the potential need for non low-impact development based permanent BMPs. The results of this conceptual study estimate worst-case scenarios for right-of-way needs to treat pollution laden runoff. This conceptual study identified potential locations for permanent BMPs adjacent to the highway alignment that could be used to treat polluted highway runoff should the inclusion of low-impact development practices be found less feasible during final design.

A second conceptual study was performed, which focused on bridge and culvert riverine surface hydrology and hydraulics analyses at proposed stream crossings where the off-site drainage areas contributing to flow through these crossings is greater than 40 acres. These analyses provide estimates of concentrated stream flows at anticipated stream/culvert crossings, as well as determining preliminary sizing of structures at each stream/culvert crossing.

A third study was performed using a desktop review of available geotechnical information to develop an overview of potential subsurface conditions. This study facilitated conceptual foundation evaluations for culverts and bridge structures within the project alignments. Existing soil studies available through the U.S. Geological Survey were utilized to estimate design parameters that would be utilized for the design of structures, including load-bearing capacity and considerations for seismic design.

Impervious areas associated with highways are generally considered as pollution generating due to these surfaces being subject to high volumes of vehicle traffic. However, the Project is in a rural area that is not currently subject to Municipal Separate Storm Sewer System permit requirements. Nonetheless, HDOT has a comprehensive approach to the management of stormwater runoff associated with its highways as documented in HDOT's *Storm Water Post-Construction Best Management Practices Manual*, as amended in February 2022. This manual outlines HDOT's policy to prioritize the utilization of low-impact development practices to address polluted runoff from highway surfaces.

As a part of HDOT's comprehensive approach to stormwater management, permanent BMPs would be incorporated to lessen effects to water quality caused by stormwater discharged from roadway operations. Each Build Alternative would set aside about an acre (on average) at eight natural low points close to proposed alignments for stormwater management infrastructure to capture and detain roadway stormwater. These BMPs could include detention ponds to promote infiltration and treatment of discharge generated on-site using industry standard low-impact development practices, such as vegetated swales, vegetated buffers, and bioswales as appropriate (including use of the median, where applicable). Permanent BMPs would be designed to treat stormwater generated by the

impervious area of the new roadway as it collects at natural low points along the roadway as defined by the final roadway profile. These set asides are conservatively sized for a maximum potential area of disturbance and the final locations and size of the infrastructure may vary depending on the treatment strategies as identified through final design as part of the design-build process, which is assumed to be fully within the right-of-way analyzed as part of this environmental review and through the Record of Decision.

The implementation of linear low-impact development elements along the highway corridor may reduce the required footprints of these conceptual permanent BMPs. Opportunities for low-impact development BMPs would be evaluated once the geotechnical information is gathered to validate and refine the footprint of the conceptual permanent BMPs provided in this ~~Draft~~ Final EIS (Chapter 2, Alternatives, includes proposed locations). Final grading and vertical profiles would be identified during final design. The final selection of BMP devices would be done by the design-build contractor as they would be incorporated into the overall design of highway drainage systems.

Project construction would adhere to the *HDOT Standard Specifications for Road and Bridge Construction (Section 209) Temporary Water Pollution, Dust, and Erosion Control*. Construction BMPs that have been either preapproved or coordinated with regulatory agencies, which are included in *An Integrated Storm Water Management Approach and a Summary of Clear Water Diversion and Isolation Best Management Practices for Use in the State of Hawai‘i*, would be utilized to minimize the potential for water quality impacts to the streams. Additionally, the HDOT *Construction Best Management Practices Field Manual* (October 2021) would be used for land-based BMPs. Stream crossings would be designed to preserve water flow and the biological processes of the fauna living in them. Hardening the stream crossings would be avoided, and bridge design would consider keeping the stream cool and oxygenated. HDOT’s Design Criteria for Highway Drainage requires all bridges to be designed for 100-year storm events and all culverts to be designed for 50-year storm events (unless they involve FEMA flood zones, where they will be designed for 100-year storm events).

Site-specific construction stormwater BMPs would be implemented or installed at the staging and work areas to prevent water quality degradation associated with stormwater runoff. Construction stormwater BMPs would include maintaining equipment in good working order, storing equipment and materials away from the ocean or stream banks with strategic placement of absorbent material (such as fiber rolls) as a buffer between equipment and nearby waterbodies. Drip pans would also be maintained beneath construction equipment. The contractor would be required to prevent any debris from falling into the water. Storm drain inlet and catch basin protection devices would be installed in accordance with the Stormwater Pollution Prevention Plan as appropriate.

Water quality treatment solutions and adherence to State and County water quality regulations governing grading, excavation, and stockpiling would be developed in coordination with the contractor. Stockpiling, storage, and equipment staging would utilize appropriate BMPs to prevent potential surface runoff from entering streams. No stockpiling, storage, or heavy equipment would be located within streams. The effectiveness of sediment control devices is to be inspected regularly by the contractor. If a device proves inadequate, it would immediately be redesigned or replaced until it is effective.

The contractor may be required to obtain a floodplain development permit. Additionally, the contractor would maintain and require a copy of all permits, notifications, and compliance reporting requirements—as well as all records demonstrating compliance with every permit requirement—on the construction site or at a nearby field office.

3.9.9 Build Alternatives Comparative Assessment

The comparison tables below, TABLE 3.9-9 and TABLE 3.9-10, include the approximate acreage of delineated wetlands and other waters that would be crossed by each Build Alternative alignment (conservatively measured as the total highway right-of-way coverage and not limited to pier and column disturbance with viaduct structure). This comparison does not factor in potential jurisdiction under Section 404, as that will be determined with final design during the design-build process.

TABLE 3.9-9. **Build Alternatives Comparison - Olowalu**

BUILD ALTERNATIVE	WETLANDS (ACRES)	OTHER WATERS (ACRES)	TOTAL WATER RESOURCES(ACRES)
Build Alternative 1	0	0.72	0.72
Build Alternative 2	0	0.53	0.53
Build Alternative 3	0	0.54	0.54
Build Alternative 4	0	0.61	0.61

TABLE 3.9-10. **Build Alternatives Comparison - Ukumehame**

BUILD ALTERNATIVE	WETLANDS (ACRES)	OTHER WATERS (ACRES)	TOTAL WATER RESOURCES (ACRES)
Build Alternative 1	6.08	0.28	6.36
Build Alternatives 2 and 3	14.30	1.57	15.87
Build Alternative 4	0.85	1.11	1.96

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3.10 FLORA AND FAUNA, ENDANGERED SPECIES

This section includes an assessment of potential effects to flora and fauna, as well as identifies and documents biological issues of concern, including the presence of any taxa State or federally listed as threatened or endangered, candidate species for listing, or sensitive habitats, including designated critical habitat. This assessment describes the potential effects of implementing the Honoapiʻilani Highway Improvements Project (the Project) on flora and fauna and conservation measures for avoidance and minimization of possible effects that may be considered for inclusion into the planning and design phase for sensitive species and habitats present in the project area. The potential synergistic and additive effects of climate change on flora and fauna are also described. A more detailed description of the flora, fauna, and other biological communities within the project area can be found in Appendix 3.10.1, which provides additional information to support this evaluation.

The Federal Highway Administration (FHWA) and the Hawaiʻi Department of Transportation (HDOT) are committed to conserving and maintaining the state's natural resources. This includes proactive planning to reduce adverse effects to all biological communities—especially sensitive, rare, threatened, and endangered species—and critical habitat.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to flora and fauna as well as endangered species. As part of this Final EIS, the analysis contained within this section was revised to reflect those comments, or other information gathered after the publication of the Draft EIS.

3.10.1 Regulatory Context

Various regulatory frameworks exist at the federal, State, and local levels to address flora, fauna, and endangered species and mitigate the Project's potential effects to these resources. TABLE 3.10-1 describes the rules and regulations at these various levels.

TABLE 3.10-1. **Flora, Fauna, Endangered Species Regulatory Context**

LEVEL	RULES AND REGULATIONS	DESCRIPTION
FEDERAL	**Endangered Species Act of 1973 (ESA) (16 U.S.C. § 1531-1544)**[1]	The purpose of the ESA is to provide a program for the conservation of endangered and threatened species and their ecosystems. It is the policy of Congress that federal agencies utilize their authorities to further the purposes of the ESA. Section 9 of the ESA prohibits the taking of endangered and threatened species. Section 7 of the ESA requires federal agencies to insure, in consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), that any federal agency action is not likely to jeopardize the continued existence of any proposed or listed species or destroy or adversely modify proposed or designated critical habitat. Procedures implementing Section 7 are codified in regulation (50 CFR § 402). If an agency determines an action "may affect" a listed species or critical habitat, then Section 7 consultation is required and can result in one of two effect determinations: "may affect, not likely to adversely affect," or "may affect, likely to adversely affect." The following descriptions are provided in the 1998 USFWS and NOAA NMFS *Endangered Species Consultation Handbook*.[1] A "no effect" determination is made by the action agency when it determines its proposed action will not affect listed species or critical habitat. The term "may affect, not likely to adversely affect" is used when effects on listed species are expected to be discountable, insignificant, or wholly beneficial. "May affect, likely to adversely affect" is chosen if any adverse effect to listed species may occur as a result of the proposed action.
	Migratory Bird Treaty Act (MBTA) (16 U.S.C. § 703-712)	The MBTA[2] was implemented for the protection of birds migrating between the United States and Canada. Subsequent amendments implemented treaties between the United States and Mexico, the United States and Japan, and the United States and the former Soviet Union. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, or sell birds listed therein. The statute applies equally to both live and dead birds, and grants full protection to any bird parts, including feathers, eggs, and nests. The USFWS implements the MBTA.
	Bald and Golden Eagle Protection Act (16 U.S.C. § 668-668d)	The Bald and Golden Eagle Protection Act (BGEPA) of 1940[3] prohibits anyone without a permit issued by the Secretary of the Interior, acting through the USFWS, from "taking" bald or golden eagles, including their parts, nests, or eggs. BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." While both species are uncommon in Hawaiʻi, vagrant Golden Eagles have been observed in Hawaiʻi.
	Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 *et. seq.*)	The Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. § 1855(b))[4] establishes provisions relative to Essential Fish Habitat to identify and protect important habitats for federally managed marine and anadromous fish species. Federal agencies must consider project effects to those waters and substrate needed for fish spawning, breeding or maturing such as coral reefs.
	Executive Order 13112, Invasive Species	In accordance with Executive Order 13112, Invasive Species[5], federal agencies must prevent, to the extent practicable and permitted by law, the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health effects that invasive species cause.

1 USFWS. (March 1998). Endangered Species Consultation Handbook. https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf. Accessed February 2024.

LEVEL	RULES AND REGULATIONS	DESCRIPTION
STATE	**Hawai'i Revised Statutes (HRS) - Chapter 195D**	HRS Chapter 195D[6] is the State endangered-species law that complements the federal ESA. HRS 195D consists of a consultation process that addresses potential harm to threatened and endangered species in Hawai'i during project development. This is done by issuing an Incidental Take License and overseeing the development and implementation of Habitat Conservation Plans. The goal of these measures is to minimize and mitigate the negative effects of such projects. The State of Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife and Division of Aquatic Resources conducts project consultations under HRS Chapter 195D to provide guidance and protections for endangered and threatened species in Hawai'i. HRS Chapter 195D defines the necessity to protect and enhance the survival prospects of endangered and threatened species in Hawai'i. As described in HRS Chapter 195D-4(g), the Board of Land and Natural Resources may issue a temporary license to allow a take otherwise prohibited, so long as the take is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.
	Hawai'i Revised Statutes – Chapter 58 (Act 105 – The Exceptional Tree Act)	In 1975, the Hawai'i State Legislature found that rapid development had led to the destruction of many of the state's exceptional trees and therefore passed Hawaii Revised Statutes Chapter 58 (Act 105, Session Laws of Hawaii 1975) - The Exceptional Tree Act. The Act recognizes that trees are valuable for their beauty and crucial ecological functions. An exceptional tree is designated by a county arborist advisory committee and is a "tree or stand or grove of trees with historic or cultural value, or that by reason of age, rarity, location, size, aesthetic quality or endemic status is worthy of preservation." In Maui County, the Maui County Arborist Committee reviews all actions deemed by the County Council to endanger exceptional trees. The Maui County Arborist Committee rules of practice and procedures are codified in Title MC-10, Subtitle 3, Chapter 3[7]. Pruning, removal, and anything that would change the surroundings of the tree to its detriment requires a permit from the Director of Parks and Recreation, with review by the Maui County Arborist Committee. If an Exceptional Tree is approved for removal, the Arborist Committee may recommend to the Director of Parks and Recreation that the owner plant an appropriate replacement(s) or relocate the Exceptional Tree. If replacement or relocation is not possible, the Committee should identify another tree of the kind for Exceptional Tree classification[8].

[1] https://www.fws.gov/sites/default/files/documents/endangered-species-act-accessible_7.pdf. Accessed July 2023.
[2] https://www.govinfo.gov/content/pkg/USCODE-2020-title16/pdf/USCODE-2020-title16-chap7-subchapII-sec703.pdf. Accessed July 2023.
[3] https://www.govinfo.gov/content/pkg/USCODE-2010-title16/pdf/USCODE-2010-title16-chap5A-subchapII.pdf. Accessed July 2023.
[4] https://media.fisheries.noaa.gov/dam-migration/msa-amended-2007.pdf. Accessed July 2023.
[5] https://www.govinfo.gov/content/pkg/FR-1999-02-08/pdf/99-3184.pdf. Accessed July 2023.
[6] https://www.capitol.hawaii.gov/hrscurrent/vol03_ch0121-0200d/hrs0195d/hrs_0195d-.htm. Accessed July 2023.
[7] https://www.mauicounty.gov/DocumentCenter/View/8701/Practices--Procedures-Arborist-Committee?bidId=. Accessed July 2023.
[8] https://www.mauicounty.gov/DocumentCenter/View/11115/MAUI-COUNTY-PLANTING-PLAN-WHOLE-3rd-Revision?bidId=. Accessed December 2023.

3.10.2 Methodology

Biological reviews consider the scientific findings of a field survey to evaluate a project's potential effects on protected flora and fauna. These evaluations inform conclusions on whether a project would have an effect, positive or negative, and the anticipated degree of effect. Typically, such as in the case of Endangered Species Act (ESA) Section 7 consultation, conclusions on project effects to protected flora and fauna can be grouped in some variation of either no effect, potential effect, or anticipated effect. If an effect is considered potential or anticipated, adoption of appropriate avoidance and minimization measures can often render such an effect negligible.

Prior to conducting field surveys, possible flora and fauna in the project area were identified from data available at various sources, listed in TABLE 3.10-2.

TABLE 3.10-2. **Flora and Fauna Sources by Agency**

AGENCY	SOURCE
U.S. Fish and Wildlife Service	National Wetlands Inventory maps
	Information for Planning and Consultation System list of federally endangered, threatened, proposed, and candidate species, plus critical habitat, which may occur within the boundary of a proposed project and that may be affected by project-related actions
National Oceanic and Atmospheric Administration	Endangered Species Act Section 7 Mapper
	National Marine Fisheries Service Essential Fish Habitat Mapper

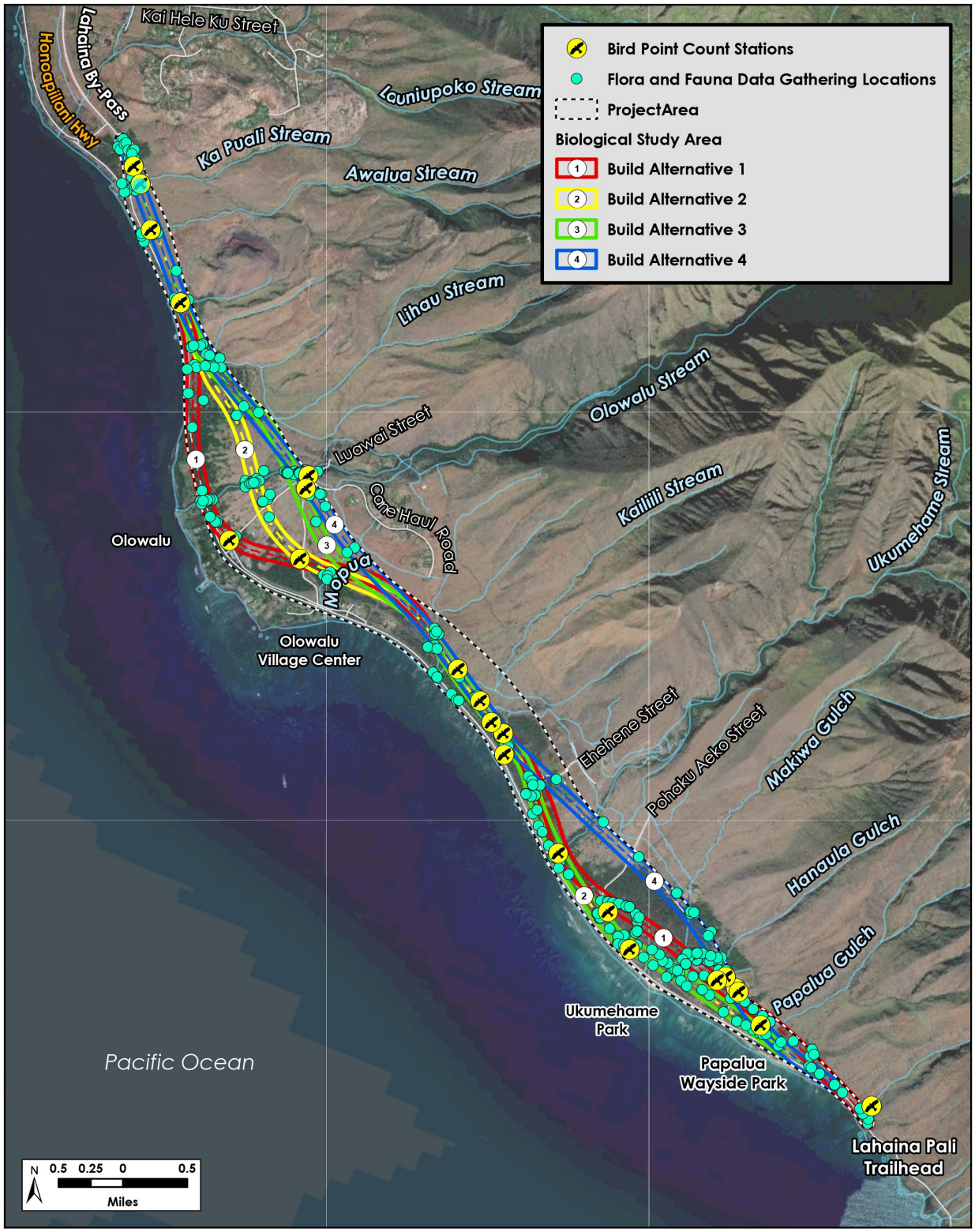
A field survey of the Biological Study Area was conducted on the following dates in 2023: January 2, 3, 4, 5, 6, and 7; March 21, 22, 23, 24, and 25; April 28; May 1, 9, 14, 16, and 22; and July 13 and 18. Two botanists and one wildlife biologist (hereafter referred to as "biologists") conducted the survey together. Additional surveys were conducted in March 2025 between the Draft and Final EIS to expand survey coverage based on design refinements to the Preferred Alternative. The biologists walked the accessible areas of the Biological Study Area and documented the vegetation communities, plants, birds, and mammals using visual and auditory detection, as well as secondary indicators (for example, nests/tracks). Observations made during site reconnaissance conducted between January and July 2023 were used to confirm and characterize the presence of flora and fauna in the project area. Additionally, biologists observed an individual of a listed bird species in the field on March 23, 2023, when conducting wetland delineation. Appendix 3.10 includes the full biological resources report.

The Biological Study Area for the flora and fauna studies consisted of a 150-foot swath centered around each Build Alternative (FIGURE 3.10-1). This distance was determined to account for variability along the 140-foot right-of-way and is therefore slightly larger than the established project area depicted in the four Build Alternative alignments.

In addition, other species of concern in the vicinity of the Biological Study Area were identified during informal pre-consultation meetings with USFWS staff (Appendix 3.10). Biologists also conducted a project site visit with USFWS staff on March 22, 2023, to help familiarize USFWS staff with the scope

of this highway realignment project and document any concerns that they might identify regarding species and habitats.

FIGURE 3.10-1. **Biological Study Area and Data Gathering Points**



3.10.3 Affected Environment

In general, the vegetation in the project area consists mainly of coastal dry communities typical of Hawaiʻi's leeward sides.[2] These areas receive limited rainfall, resulting in open to semi-open shrublands or woodlands. Human activities have drastically altered the vegetation, with alien species now dominating. The project area comprises 15 identified habitat or vegetation types, detailed from north to south where proposed Build Alternatives merge with the existing alignment near the Pali (FIGURE 3.10-2).

Appendix 3.10 contains a comprehensive list of bird, mammal, and plant species observed in the project area with qualitative estimates of their relative abundance. Floral relative abundance is based on proportion of observations within the Biological Study Area. Avian (bird) relative abundance is based on the proportion of point count stations where species were observed. The USFWS Information for Planning and Consultation (IPaC) list was also used to identify flora and fauna species potentially present in the project area.

3.10.3.1 Flora

No rare native Hawaiian plant species or taxa that are State or federally listed as threatened, endangered, or taxa that are candidates for listing were observed in the Biological Study Area. Appendix 3.10 provides a list of the plant species observed and their relative abundance in the project area. A total of 56 plant taxa were found, of which 8 (approximately 14%) are native (indigenous) and 48 (approximately 86%) are either Polynesian introduced or alien species.[3] Native species include ʻilima (*Sida fallax*), ʻiliahialoʻe (*Santalum ellipticum*), ʻaʻaliʻi (*Dodonaea viscosa*), hoary abutilon (*Abutilon incanum*), akulikuli (*Sesuvium portulacastrum*), milo (*Thespesia populnea*), and naupaka (*Scaevola taccada*). Removal of any of these seven plant species is not expected to have an adverse effect on species' populations (locally or regionally) as distribution of these native species on Maui are widespread.[4] Detailed below are the distribution and composition of vegetation communities within the Biological Study Area, starting from the northern Lahaina side to the southern end where all the proposed Build Alternatives merge with the existing alignment near the Pali. Appendix 3.10 includes detailed descriptions of the Biological Study Area vegetation.

The Maui County Arborist Committee has designated the monkeypod trees (*Samanea saman*) forming a tree tunnel in the right-of-way of the existing Honoapiʻilani Highway as "Exceptional Trees."[5] These trees are not federally listed.

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2 Gagne, W. C., and L. W. Cuddihy. 1999. Vegetation. Pages 45–114 In W. L. Wagner, D. R. Herbst, and S. H. Sohmer, Manual of the Flowering Plants of Hawaiʻi. Revised edition. Bishop Museum Special Publication, University of Hawaiʻi Press, Honolulu.

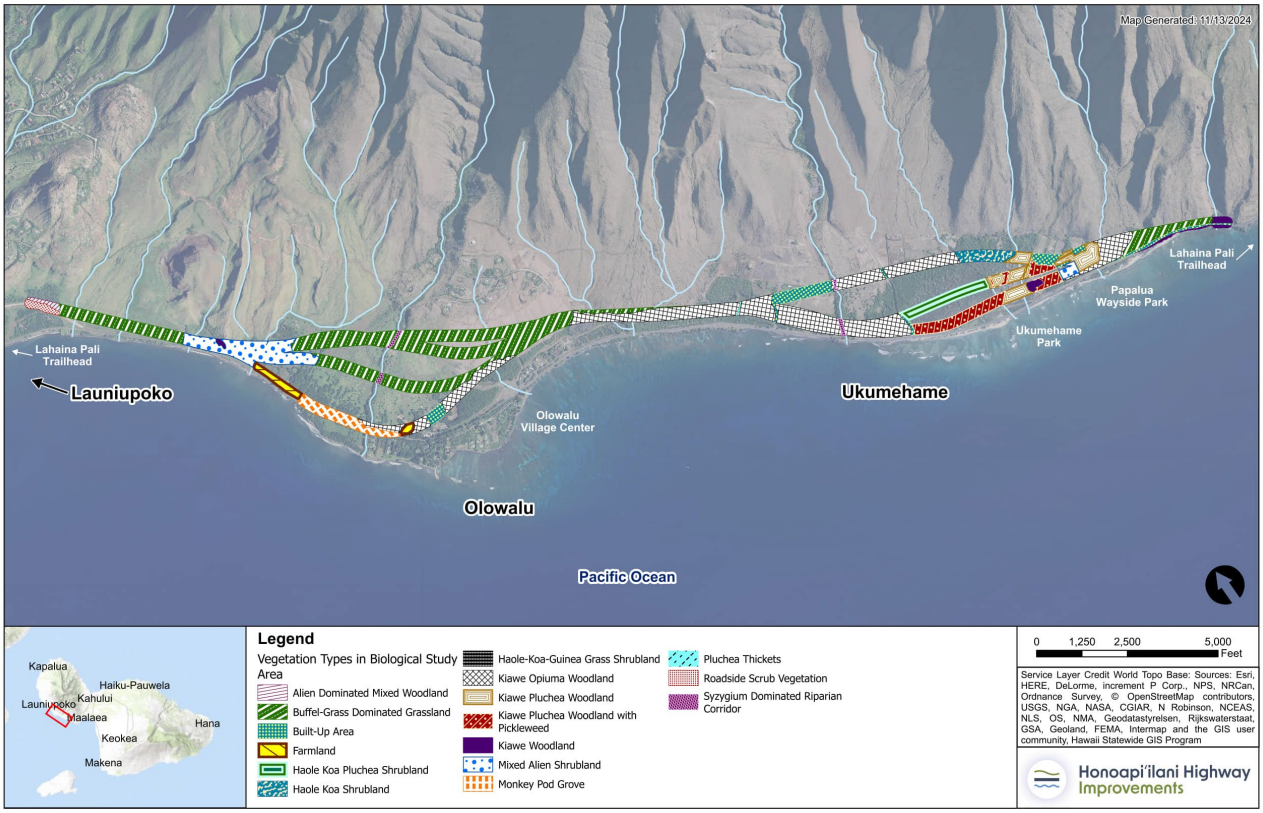
3 Imada, C. T. 2019. Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. <http://hbs.bishopmuseum.org/publications/pdf/tr69.pdf>. Accessed August 25, 2023.

4 Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1999. Manual of the Flowering Plants of Hawaiʻi. Two volumes. Revised edition. University of Hawaiʻi Press and Bishop Museum Press, Honolulu.

5 Maui County. (June 9, 2021). Exceptional Trees of Maui County. Maui County Arborist Committee. Meeting Agenda. https://www.mauicounty.gov/ArchiveCenter/ViewFile/Item/28269. Accessed October 2023.

The vegetation throughout the Biological Study Area has been heavily modified by prehistoric and modern human activities, climate change, and wildfires, and is now largely dominated by alien species. Projections by the Pacific Islands Climate Adaptation Science Center show that climate change could result in a range contraction of 60% of Hawai'i's native plant species by the end of the century.[6] Climate change works synergistically to allow invasive species to establish and further disrupt ecosystems while reducing suitable habitat for native species. Additionally, wildfires, changing climatic conditions, and land use changes alter vegetation patterns, which affects native species and increases disturbed habitat for alien species.

FIGURE 3.10-2. **Habitat/Vegetation Types – Honoapi'ilani Highway**



3.10.3.2 Fauna

The reconnaissance survey documenting the wildlife observed in the Biological Study Area identified a variety of avian (bird) and mammal species. No terrestrial reptiles, amphibians, or invertebrates were recorded in the survey. As the Project is entirely terrestrial, no observations of marine species were made. Within the scope of the biological survey, no in-water surveys were conducted because no in-water work is anticipated for the Project. Consultation on the following marine species, Hawaiian monk seal (*Neomonachus schauinslandi*), hawksbill sea turtle or honu'ea (*Eretmochelys imbricata*), and

6 Camp, R.J., Berkowitz, S.P., Brinck, K.W., Jacobi, J.D., Loh, R., Price, J., and Fortini, L.B., 2018, Potential impacts of projected climate change on vegetation-management strategies in Hawai'i Volcanoes National Park: U.S. Geological Survey Scientific Investigations Report 2018–5012, 151 p., 3 appendixes, https://doi.org/10.3133/sir20185012. Accessed September 2023.

Central North Pacific green sea turtle or honu (*Chelonia mydas*), was conducted with the NMFS and is discussed in Section 3.10.5.

There were observations of several ESA listed species within the project area. A summary of the fauna observed or known to exist in the project area is included below. Appendix 3.10 includes a more detailed description of these species and their habitats.

Corals are especially sensitive to stressors such as marine pH levels, temperature, and pollution, which are altered by climate change through various synergistic and additive effects. Increasing ocean acidity reduces the ability of coral to build their skeletons, and warming ocean temperatures disrupt symbiotic relationships with algae that live in their tissues. Pollution-laden runoff resulting from more intense storm and wildfire events enter marine ecosystems, further stressing coral reefs. This disruption leads to coral bleaching (named for the white color the coral turn) and increased mortality.[7] Coral bleaching reduces the resiliency of coastal communities to storm surges, high-wave events, coastal erosion, flooding, and sea level rise, as well as the ability of reefs to serve as natural infrastructure responsible for wave dissipation that protects shorelines, such as those in West Maui. Loss of reef-building corals due to climate change has reduced reef height and complexity, resulting in reduced wave energy dissipation in deeper waters.[8]

Birds

Avian point counts were conducted, identifying 301 individuals representing 17 species. These point counts were conducted using 10-minute point counts at 21 different locations within the Biological Study Area. Most of the data was collected between 6:00 a.m. and 11:00 a.m. These 21 locations were strategically chosen to represent various habitats within the Biological Study Area. Point counts were taken in January, March, April, May, and July, all months in nesting seasons for listed bird species. TABLE 3.10-3 includes the full list with common and scientific names of the individual species, the legal regulatory status, the average number of individuals detected per count station, and how many count stations were occupied. The last two metrics were used to provide a qualitative relative abundance of observed bird species.

Of these 17 species, 14 are nonnative and three are native. Of the three native species, two are State or federally listed as threatened or endangered: Hawaiian goose or nēnē (*Branta sandvicensis*) and Hawaiian stilt or ae‘o (*Himantopus mexicanus knudseni*). These species were observed during and outside of the point count stations.

During the study, nēnē and ae‘o were observed both within and outside the point count stations. On January 3, 2023, four nēnē were spotted loafing, a scientific term for when a bird is displaying relaxed behaviors, at Ukumehame Firing Range near a newly formed muddy pond due to heavy rains. Two of the four nēnē were banded individuals. Three ae‘o were also seen feeding and loafing next to the nēnē.

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7 Marra, J., Kruk, M. (2017). State of Environmental Conditions in Hawaii and the U.S. Affiliated Pacific Islands under a Changing Climate: 2017. https://coralreefwatch.noaa.gov/satellite/publications/state_of_the_environment_2017_hawaii-usapi_noaa-nesdis-ncei_oct2017.pdf. Accessed September 2023.

8 Toth, L.T., Storlazzi, C.D., Kuffner, I.B. et al. The potential for coral reef restoration to mitigate coastal flooding as sea levels rise. Nat Commun 14, 2313 (2023). https://doi.org/10.1038/s41467-023-37858-2.

Nēnē and aeʻo were also observed in the same location on January 4. Later, on March 22 and April 28, 2023, two additional nēnē were observed loafing near the classroom building at Ukumehame Firing Range.

Additionally, one nēnē was observed in the open grassy area at the intersection of Pōhaku ʻAeko Street and Paekiʻi Place in the Ukumehame Subdivision, and it was banded. Although no nēnē were seen in the Olowalu area, they are known to frequent grasslands near the water reservoir outside the project area. A second sighting of an aeʻo occurred on March 23, 2023, when conducting wetland delineation at a ditch in Ukumehame, with one individual feeding in the ponded ditch.

Hawaiian coots (*Fulica alai*) were not observed during the field studies. The closest records of Hawaiian coots to the project area are to the north in the vicinity of Lahaina (approximately 6.5 miles to the northern terminus and to the south in the vicinity of Maalaea (approximately 9.4 miles to the southern terminus) (ebird 2024). Nonetheless, some potential habitat in the form of agricultural reservoirs (in Olowalu Reservoir) and taro fields and ditches (in the Ukumehame area) does exist within the project area and it is possible that the Hawaiian coots could visit the project area. However, this potential habitat does not appear to provide quality nesting habitat and it is most likely that an on-site Hawaiian coot would be utilizing the wetlands as merely a temporary foraging area, if water depths are suitable (Appendix 3.10-1).

TABLE 3.10-3. **Avian Species Observed in the Project Area**

COMMON NAME	SCIENTIFIC NAME	STATUS*	QUALITATIVE RELATIVE ABUNDANCE**
Common myna	*Acridotheres tristis*	X	Common
Hawaiian goose (nēnē)	*Branta sandvicensis*	ES, I, M	Rare
Cattle egret	*Bubulcus ibis*	X, IW, M	Rare
Northern cardinal	*Cardinalis cardinalis*	X, M	Common
House finch	*Carpodacus mexicanus*	X, M	Common
Common waxbill	*Estrilda astrild*	X	Common
Grey francolin	*Francolinus pondicerianus*	X	Uncommon
Red junglefowl	*Gallus gallus*	X	Rare
Zebra dove	*Geopelia striata*	X	Common
Hawaiian stilt (ae'o)	*Himantopus mexicanus knudseni*	ES, I, M	Rare
Northern mockingbird	*Mimus polyglottos*	X, M	Rare
Black-crowned night heron	*Nycticorax nycticorax hoactli*	I, M	Rare
Red-crested cardinal	*Paroaria coronata*	X, M	Uncommon
House sparrow	*Passer domesticus*	X	Rare
Spotted dove	*Streptopelia chinensis*	X, IW	Rare
Mourning dove	*Zenaida macroura*	X, M	Rare
Warbling white-eye	*Zosterops japonicus*	X, IW	Abundant

* Status:
ES = State or federally listed as Threatened or Endangered
I = indigenous (native to the Hawaiian Islands and elsewhere)
IW = State (HAR 12-124, Exhibit 5) or Federal (18 U.S.C. § 42) injurious wildlife species
X = introduced or alien (nonnative species)
M= Listed as a Migratory Bird Treaty Act Protected Species (10.13 List)

** Abundance indices based on the proportion of point count stations where species were observed, as follows:
Abundant = ≥ 0.75; Common = 0.50 to 0.74; Uncommon = 0.25 to 0.49; Rare = ≤ 0.24

One indigenous species, the Black-crowned night heron (*Nycticorax nycticorax*), was observed at Ukumehame Stream, perched on a branch above the flowing water. The typical habitat for this species is streams, lowland ponds and estuaries, so it has the potential to occur in other areas along Honoapi'ilani where stream flow and ponding is present.

No native or indigenous birds were observed exhibiting nesting behavior and no nests were documented during the point counts. The most common bird species throughout various habitat types in the project area was the warbling white-eye (*Zosterops japonicus*), an introduced species, frequently found in kiawe opiuma woodland and grassland habitats. They often move in small groups between trees and are considered harmful to agriculture, aquaculture, or indigenous wildlife and plants.

Mammals

Four feral mammal species or signs indicating their presence were observed during the biological survey. Most common were signs of Axis deer (*Axis axis*), which are an invasive ungulate species in Hawai'i. Deer tracks and droppings were abundant in the wetland area at Ukumehame Firing Range, and deer bones were also found throughout the project area. Wallows of feral pig, scat, and evidence

of rooting were seen but no pigs were seen. One mongoose (*Herpestes javanicus)* was observed along the roadway. Several presumably feral cats (*Felis catus*) were observed in the dry grass areas.

Although the Hawaiian hoary bat was not surveyed for during this reconnaissance-level survey, no Hawaiian hoary bats were incidentally observed during this field study. There are records for this species on Maui, and their potential presence is assumed within the project area.[9] No terrestrial critical habitat has been designated for the Hawaiian hoary bat. Section 3.10.9 includes avoidance and minimization measures for Hawaiian hoary bats.

There is possible presence of endangered Hawaiian monk seal in offshore environments, and some have been known to haul out on beaches in West Maui. The entire Maui coastline is NMFS-designated critical habitat for the Hawaiian monk seal, and the project area overlaps with this critical habitat. However, according to consultation with the NMFS, given the implementation of best management practices (BMPs), exposure of Hawaiian monk seal and its critical habitat to effects of project activities is not anticipated. Section 3.10.5 includes consultation with the NMFS and Section 3.10.9 includes BMPs and general project design guidelines for avoiding any potential effects to these species.

Reptiles

Hawai‘i does not have native amphibians and terrestrial reptiles. However, several marine turtles have coastal habitat in West Maui. These species are the honu'ea and honu. No honu‘ea or honu were observed in the project area during reconnaissance-level surveys, but proposed critical habitat does exist in the project area for honu and it is possible that these species may visit the nearshore reefs along the coast. While exposure of effects to honu (and its critical habitat) and honu‘ea could occur, according to consultation with the NMFS, given the implementation of BMPs, exposure is not anticipated. Section 3.10.5 includes consultation with the NMFS and Section 3.10.9 includes BMPs and general project design guidelines for avoiding any potential effects to these species.

Honu and honu‘ea face salient threats from climate change-induced sea level rise. Given projected sea level rise estimates, the likelihood of increase in storm surge intensity, and other factors associated with climate change, beach erosion is likely to increase. Erosion can result in sedimentation in nearshore habitats, reducing habitat suitability for sea turtles.

Fish

The Atlas of Hawaiian Watersheds & Their Aquatic Resource (Hawaii Division of Aquatic Resources 2008) indicates the following species in association with Ukumehame and Olowalu Streams (TABLE 3.10-4).

[9] Tomich, P. Q. 1986. Mammals in Hawaii. Second edition. Bishop Museum Special Publication 76. Bishop Museum Press, Honolulu, Hawaii.

TABLE 3.10-4. **Fish Species of the Ukumehame and Olowalu Streams**

STREAM	SCIENTIFIC NAME	COMMON NAME
Ukumehame Stream	*Awaous guamensis*	'O'opu nākea
	Eleotris sandwicensis	'O'opu akupa
	Lentipes concolor	Hawaiian 'o'opu
	Kuhlia spp.	Āholehole
	Sicyopterus stimpsoni	'O'opu nopili
	Estrilda astrild	'O'opu nākea
Olowalu Stream	*Eleotris sandwicensis*	'O'opu akupa
	Lentipes concolor	Hawaiian 'o'opu
	Sicyopterus stimpsoni	'O'opu nopili

Within the scope of the biological survey, no directed effort to characterize the fish community composition was conducted because no in-water work is planned in the project area. Although the biologists were watchful for the presence of fish in streams, none were documented. However, it is likely the streams have fish. As there is no in-water work planned for the Project and perennial streams will ~~would~~ be bridged outside the Ordinary High-Water Mark, the Project will ~~would~~ not affect fishes.

Crustaceans

Mountain shrimp, or 'Ōpaekala'ole (*Atyoida bisulcate*), is a small spineless shrimp, approximately 2 inches long, found on Maui. They feed by filtering small particles from fast-flowing streams and scavenging in slower-flowing areas. Reproduction occurs year-round, and larvae are washed downstream into the ocean, growing to about 5 millimeters in size before returning to streams during the rainy season. They are skilled climbers and are typically found in high numbers in good-quality streams.

Habitat degradation and pollution from development, agriculture, stream channelization, and diversions pose salient threats to this species. In the project area, no specific survey for *Atyoida bisulcate* was conducted, and no incidental sightings were reported during the study. As there is no in-water work planned, the Project will ~~would~~ not affect mountain shrimp.

Insects

The Hymenoptera order includes various species like ants, bees, and wasps, but Hawai'i's native Hymenoptera fauna mainly consists of nonsocial bees and wasps, particularly the *Hylaeus* (Colletidae) or yellow-faced bees. These bees are vital pollinators for native plants but face threats from nonnative bees (*Ceratina* spp.), competition with European honeybees (*Apis mellifera*), and invasive ants. No survey for *Hylaeus* was conducted in the project area, although biologists were watchful for any indications of their presence. None were documented.

The Orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*) is adaptable and found near standing pools or slow-moving streams. This species was not listed by the USFWS IPaC as potentially occurring in the project area, and the USFWS does not note critical habitat present for the species in the project area. There was a prior occurrence of Orangeblack Hawaiian damselfly recorded mauka of

the Ukumehame firing range, beyond the project footprint, as noted by the USFWS in May 2023, prompting its inclusion in this discussion of fauna and in Appendix 3.10-1. However, because they were not listed as potentially occurring in the project area, no specific survey for *Megalagrion xanthomelas* was conducted, and none were documented.

Eggs and larvae of the endangered Blackburn's sphinx moth (BSM) can occur between August and May—primarily on two specific host plants of the genus *Nothocestrum*. These host plants, (*N. latifolium* and *N. brevifolium*), were not found in the Biological Study Area. BSM larvae can also feed on tree tobacco (*Nicotiana glauca*) and other plants including the indigenous pōpolo. On March 25, 2023, three individual (potential host) plants of tree tobacco about 5-6 feet tall were observed in the Mixed Alien Shrubland in the vicinity of the Olowalu Recycling and Refuse Center in the project area, but no BSM eggs or larvae and no signs of feeding damage indicative of the presence of the BSM moth were found (Appendix 3.10-1).

Project activities are unlikely to have an adverse effect on BSM adults or larvae. However, ongoing threats to the species include habitat loss, invasive species, human development, and wildfire. BSM populations can also be affected by natural variations in rainfall, reducing food availability.

Tree tobacco, a potential host plant for BSM, could recruit in the project area. Recommended conservation measures to avoid and minimize effects to BSM have been provided by the USFWS and will ~~would~~ be incorporated into the Project's construction and operations and maintenance phases. These measures include the removal of tree tobacco higher than 3 feet and regular monitoring for new tree growth (Appendix 3.10).

3.10.4 Threatened or Endangered Species and Significant Ecological Communities

TABLE 3.10-5 includes federal (USFWS) definitions to describe the status designations of the species in this section.[10]

[10] Endangered Species Act of 1973. 16 USC §1532. Definitions. https://uscode.house.gov/view.xhtml?path=/prelim@title16/chapter35&edition=prelim. Accessed October 2023.

TABLE 3.10-5. **U.S. Fish and Wildlife Service Species Designations**

DESIGNATION	DEFINITION
Endangered	Any species considered by the USFWS as being in danger of extinction throughout all or a significant portion of its range. The ESA specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.
Threatened	Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The ESA includes additional protections against the take (see definition above) of a species listed as threatened.
Critical Habitat	The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species.
Proposed	Any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under Section 4 of the ESA. Any specific area that is proposed in the *Federal Register* to be designated as critical habitat under Section 4 of the ESA

3.10.4.1 Flora

The USFWS IPaC List of Threatened and Endangered Species identified nine endangered plant (flora) species that may occur in the project area and may have the potential to be affected by the Project (TABLE 3.10-6). None of these species were observed during the field survey and there is no overlap of designated critical habitat for any listed plant species. Based on the findings of the biological resource report, it is highly unlikely that the Biological Study Area contains the nine ESA-protected endangered plant taxa. Appendix 3.10 lists detailed descriptions of these species and their habitats.

3.10.4.2 Fauna

The USFWS IPaC List of Threatened and Endangered Species identified ~~11~~ 12 endangered animal (fauna) species that that are either known or expected to be in the project area (TABLE 3.10-7). Other than the nēnē and ae‘o, none of the other nine endangered animals were observed in the project area during the biological resources study. NOAA-NMFS identified one additional marine species, the Hawaiian monk seal.

Critical habitat has been designated by for Hawaiian monk seal, and BSM, and has been proposed for honu (Table 3.10-7). There is no overlap with BSM critical habitat. The project area does overlap with the proposed critical habitat for honu and designated critical habitat for Hawaiian monk seal. However, according to the NMFS, based on the implementation of BMPs, the likelihood of critical habitat of Hawaiian monk seal and honu exposure to project activities is not anticipated, as is exposure of honu’ea to project activities. Appendix 3.10 lists detailed descriptions of these species and their habitats. Section 3.10.5 includes consultation with the NMFS and Section 3.10.9 includes BMPs and general project design guidelines for avoiding any potential effects to these species.

TABLE 3.10-6. **Listed Flora Species List**

SPECIES	LISTING	CRITICAL HABITAT (Y/N)
‘Ena‘ena (*Pseudognaphalium sandwicensium* var. *molokaiense*)	Federally endangered	N
‘Āwiwi (*Schenkia sebaeoides*)	Federally endangered	N
Carter’s Panicgrass (*Panicum fauriei var. carteri*)	Federally endangered	Y, but not overlapping with project area
Dwarf Naupaka (*Scaevola coriacea*)	Federally endangered	N
‘Ihi (*Portulaca villosa*)	Federally endangered	N
Ko‘oloa‘ula (*Abutilon menziesii*)	Federally endangered	N
‘Ōhai (*Sesbania tomentosa*)	Federally endangered	Y, but not overlapping with project area
Round-leaved Chaff-flower (*Achyranthes splendens var. rotundata*)	Federally endangered	Y, but not overlapping with project area
Vigna o-wahuensis (no common name)	Federally endangered	Y, but not overlapping with project area

TABLE 3.10-7. **Listed Fauna Species List**

SPECIES	LISTING	CRITICAL HABITAT (Y/N)
Hawaiian Hoary Bat (ōpe‘ape‘a) (*Lasiurus cinereus semotus*)	Federally and State endangered	N
Hawaiian Goose (nēnē) (*Branta sandvicensis*)	Federally threatened, State endangered	N
Hawaiian Stilt (ae‘o) (*Himantopus mexicanus knudseni*)	Federally and State endangered	N
Hawaiian Coot (*Fulica alai*)	Federally and State endangered	N
Hawaiian Duck (*Anas wyvilliana)*	Federally and State endangered	N
Hawaiian Petrel (*Pterodroma sandwichensis*)	Federally and State endangered	N
Newell’s Townsend’s shearwater (*Puffinus auricularis newelli*),	Federally and State threatened	N
Short-tailed Albatross (*Phoebastria albatrus),*	Federally and State endangered	N
Band-rumped Storm-petrel (*Hydrobates castro*)	Federally and State endangered	N
Green Sea Turtles (honu) (*Chelonia mydas*)	Federally and State threatened	Y, proposed
Hawksbill Sea Turtle (honu’ea) (*Eretmochelys imbricata)*	Federally and State endangered	N
Hawaiian Monk Seal (*Neomonachus schauinslandi)*	Federally and State endangered	Y, designated
Blackburn’s Sphinx Moth (*Manduca blackburni*)	Federally and State endangered	Y, designated but not overlapping with project area

Essential Fish Habitat

Essential Fish Habitat (EFH) is broadly defined by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Sustainable Fisheries Act to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."[11]

The marine area extending from the shoreline to a depth of 3,280.8 feet (1,000 meters) and from the shoreline to 2,296.6 feet (700 meters) around each Hawaiian Island is designated as EFH. This includes the waters around Maui, which support various life stages of managed species under the Western Pacific Fishery Management Council's plans. These life stages encompass eggs, larvae, juveniles, and adults of bottomfish, crustacean, and pelagic species. EFH types comprise coral reefs, patch reefs, hard and artificial substrates, seagrass beds, soft substrate, lagoons, estuaries, surge zones, deep-slope terraces, and pelagic/open ocean. However, these specific EFH are too geographically distant to experience potential effects from the Project.

Olowalu reef, spanning from Ukumehame to Launiupoko, is an important feature directly offshore of planned activities. Covering approximately 1,000 acres, the reef hosts some of the healthiest and oldest corals in the main Hawaiian Islands, including large coral (Porites spp.) colonies in shallow waters. These corals are integral for shoreline protection from a variety of natural and coastal hazards (Section 3.11, Geology, Soils, and Natural Hazards). Olowalu reef holds cultural and ecological importance, having been designated as the first Hawaiian Hope Spot by Mission Blue, a nonprofit organization focused on conserving high-quality marine areas. This region has a history of water quality issues marked by high turbidity due to runoff, particularly off Olowalu and Ukumehame, where turbidity levels have often exceeded HDOH standards, as shown by Hui O Ka Wai Ola's nearshore water sampling. There are no known ESA-listed coral species found in the Hawaiian Archipelago.

The 2009 Hawai'i Fishery Ecosystem Plan describes the physical limits of EFH for each Management Unit Species and possible sources of adverse effects to the EFH from non-fishing activities. These possible sources identified in the Fishery Ecosystem Plan with possible relevance to the Project include coastal construction and nutrient loading. TABLE 3.10-7 provides EFH conservation recommendations.

3.10.5 Agency Consultation

3.10.5.1 NOAA NMFS Consultation

On November 30, 2022, the FHWA invited the NOAA NMFS to become a Participating and Cooperating Agency for the Project. HDOT and the FHWA were seeking input on the Project and information related to any environmental, social, or economic concerns about resources within the project footprint. NMFS replied in a letter agreeing to be a Cooperating Agency on December 27, 2022. Appendix 3.10 includes the correspondence.

[11] Magnuson-Stevens Fishery Conservation and Management Act As Amended through January 12, 2007. 16 USC § 1802. https://media.fisheries.noaa.gov/dam-migration/msa-amended-2007.pdf. Accessed October 2022.

Essential Fish Habitat

After reviewing the proposed actions, the NMFS decided to provide a list of Conservation Recommendations for potential construction over streams. These recommendations follow 50 CFR § 600.920 and would help to avoid and minimize potential adverse effects to EFH resulting from the Project and in consideration of poor weather and potential erosion associated with the proposed actions. TABLE 3.10-16 provides these recommendations and corresponding actions.

Additional BMPs were proposed by the FHWA in a June 30, 2023, letter. These BMPs are consistent with those provided by the USFWS as the recommended standard BMPs for aquatic environments in TABLE 3.10-15.

On October 10, 2023, the NMFS concurred that adhering to its Conservation Recommendations and implementing the BMPs and minimization measures proposed in the June 2023 letter would result in no more than minimal adverse effects to EFH (Appendix 3.10).

Endangered Species Act – Section 7

On June 30, 2023, the FHWA requested concurrence from NOAA that *the Project may affect but is not likely to adversely affect* federally protected species or their designated critical habitat under NOAA jurisdiction. NOAA responded with a series of comments and questions. These comments included limiting the species considered to only those reasonably certain to occur in the project area that may be affected by the proposed activities: Central North Pacific green sea turtles, Hawksbill sea turtles, Hawaiian monk seals, and monk seal critical habitat.

Having gathered the requisite information, the NOAA officially accepted the determination concurrence request on October 10, 2023, with a 60-day response timeline.

On November 27, 2023, NOAA concurred that with the implementation of the avoidance and minimization measures described in Appendix 3.10, the Project may affect but is not likely to adversely affect the following listed species and designated critical habitats: Hawaiian monk seals; Central North Pacific green sea turtles; Hawksbill sea turtles; and designated critical habitat for Hawaiian monk seals with a list of additional BMPs provided (TABLE 3.10-19) (Appendix 3.10).

3.10.5.2 USFWS Consultation

On November 13, 2023, the FHWA submitted a Biological Survey Report to USFWS with an informal consultation request pursuant to Section 7 of the ESA. USFWS responded in February 2024 that additional information was required to support an analysis of effects. The FHWA prepared and submitted a supplemental analysis to USFWS in October 2024. Following review of the supplemental analysis, the USFWS recommended consultation be elevated to formal specific to Hawaiian stilt and Hawaiian goose or nēnē. On May 16, 2025, formal consultation was initiated between the USFWS and the FHWA. Throughout June and July 2025, the USFWS and FHWA conducted several rounds of information sharing. This information sharing culminated in the USFWS finalizing and sharing the Biological Opinion on July 16, 2025. Appendix 3.10 includes correspondence.

Endangered Species Act – Section 7

The Project has received technical assistance from the USFWS PIFWO regarding ESA Section 7 compliance for the following federally listed species:

- Hawaiian hoary bat or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*)
- Four (4) Hawaiian waterbird taxa -
  - Hawaiian stilt or aeʻo (*Himantopus mexicanus knudseni*)
  - Hawaiian coot or ʻalae keʻokeʻo (*Fulica alai)*
  - Hawaiian duck or koloa maoli (*Anas wyvilliana*)
  - threatened Hawaiian goose or nēnē (*Branta sandvicensis*);
- Four (4) Hawaiian seabirds -
  - Hawaiian petrel or ʻua'u (*Pterodroma sandwichensis)*
  - Band-rumped-storm-petrel orʻakēʻakē (*Hydrobates castro*)
  - Short-tailed albatross (*Phoebastria albatrus)*
  - threatened Newell's shearwater or ʻaʻo (*Puffinus newelli*);
- Two (2) reptiles—
  - Green sea turtle or honu (*Chelonia mydas*)
  - Hawskbill sea turtle or honu ʻea (*Eretmochelys imbricata*)
- Two (2) insects—
  - BSM (*Manduca blackburni*)
  - Assimulans yellow-faced bee (Hylaeus assimulans)

~~Hawaiian hoary bat (*Lasiurus cinereus semotus*); four Hawaiian waterbird taxa – Hawaiian stilt or aeʻo (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai),* Hawaiian duck (*Anas wyvilliana*), and the threatened Hawaiian goose or nēnē (*Branta sandvicensis*); four Hawaiian seabirds– Hawaiian petrel (*Pterodroma sandwichensis),* Band-rumped-storm-petrel (*Hydrobates castro*), Short-tailed albatross (*Phoebastria albatrus),* and the threatened Newell's shearwater (*Puffinus newelli*); one reptile– the green sea turtle or honu (*Chelonia mydas*), and one insect– BSM (*Manduca blackburni*).~~

The Project is not anticipating effects to individuals or critical habitat of any threatened or endangered species, apart from potential minor effects to Hawaiian hoary bat, aeʻo, Hawaiian coot, nēnē, and BSM, owing to construction activities near species observations and potentially suitable habitat. Coordination with the USFWS PIFWO ~~will~~ supported the ~~analyze~~ analysis and defined the likelihood of these potential effects~~ the results of which may elevate the consequence of potential effects~~ and ~~will~~ provided measures to avoid and minimize any potential effects to individuals or critical habitat (see Biological Opinion in Appendix 3.10). ~~The results of this coordination and ESA compliance will be reported in the Final EIS.~~

3.10.5.3 Division of Forestry and Wildlife Scoping Letter

In December 2022, the State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife (DOFAW) was invited to become a Participating Agency to identify any issues of concern regarding the Project's potential environmental or socioeconomic effects that could substantially delay or prevent an agency from granting a permit or other approval that is needed for the Project. DOFAW accepted this invitation and provided a series of recommendations which will be incorporated into the Project to the greatest extent practicable (Appendix 3.10).

Additional recommendations are species-specific for the Hawaiian hoary bat, BSM, Hawaiian monk seal, noted seabirds, honu, nēnē, invasive species, and a variety of listed plants, which are consistent with measures to avoid and minimize adverse effects to ESA-listed species discussed in Section 3.10.9. Not included above is a recommendation by DOFAW to consider effects to the federal- and state-endangered Assimulans yellow-faced bee (*Hylaeus assimulans*). While the yellow-faced bee was not identified by the USFWS IPaC list for ESA consultation, biologists kept alert for any indications of their presence—but none were documented during the study. Based on the implementation of avoidance and minimization measures and BMPs, concurrence was provided by DOFAW on April 17, 2024, that these actions would sufficiently aid in the protection of yellow-faced bee populations, and that take is not expected of this species (Appendix 3.10). Section 3.10.9 includes additional avoidance and minimization provided by the USFWS. This species is described below.

Assimulans Yellow-faced Bee (*Hylaeus assimulans*)

The federal- and state-endangered Assimulans yellow-faced bee has been documented at several locations in West Maui according to DOFAW. These small, solitary invertebrates are pollinators, which contribute to the reproductive success of Hawai'i's native plants such as naupaka (*Scaevola sericea*), 'ilima (*Sida Fallax*), 'akoko (*Chamaesyce spp.*), and naio (*Myoporum sandwicense*). Protecting this vegetation not only preserves the yellow-faced bee habitat but also helps to slow the progression of shoreline erosion. The biological study did not find any concerns for plants found in the Biological Study Area, including 'ilima, noting that removal of ilima is not expected to have an adverse effect on its population locally or regionally, as it is widely distributed. Additionally, the Project would follow County of Maui Planting Guidelines, which prioritizes use of native species such as 'ilima, naupaka, and naio.

3.10.6 Environmental Consequences

3.10.6.1 No Build Alternative

Implementation of the No Build Alternative would result in a continuation of existing roadway conditions as well as routine maintenance activities. The No Build Alternative would not result in any activities or adverse effects to terrestrial plant or wildlife species that differ from existing conditions.

The No Build Alternative would allow erosion to continue and be a source of sediment affecting the offshore environment, including the coral reef, unless measures are taken to prevent the loss of the shoreline.

3.10.6.2 Build Alternatives

While there are minor distinctions between Build Alternatives and possible effects as discussed below, given the adoption of the avoidance and minimization, conservation measures, and BMPs proposed in Section 3.10.9—regardless of which Build Alternative in either Olowalu or Ukumehame is selected as the Preferred Alternative—effects to any listed species or critical habitats would be minor and are generally not anticipated across all Build Alternatives.

Common to All Build Alternatives in Both Olowalu and Ukumehame

Flora

Activities such as the use of construction equipment and vehicles and increased human traffic can cause ground disturbance, erosion, and/or soil compaction that decrease absorption of water and nutrients and damage plant root systems and may result in reduced growth and/or mortality of listed plants.

Despite these possible effects, there are no botanical concerns in the project area. It is unlikely that the Project would result in an adverse effect on any plant species that is State or federally listed as threatened or endangered, a candidate species for listing, a rare native plant species, or a native plant species of concern. The project area encompasses a highly disturbed area, and all but seven plant species found in the project area are nonnative. Removal of any of these seven plant species is not expected to have an adverse effect on species' populations locally or regionally, as these native species are known to have a widespread distribution on Maui as well as in the state.[12]

Based on the findings of the biological resource report, it is highly unlikely that the project area contains the nine endangered plant taxa identified in the IPaC resource list, and therefore no avoidance and minimization measures are proposed at this time.

Fauna

TABLE 3.10-8 provides a summary of potential effects to fauna within the project area and accounts for measures listed in Section 3.10.9.

Climate change poses a threat to Maui fauna. Temperature and precipitation variability alters conditions for many species on the island, which limits their suitable habitat. Shifts in species ranges, shrinking body size, changes in predator-prey relationship, new spawning and seasonal patterns, and modification in the population and age structure of fauna species can all be linked to a changing climate.[13]

The July 16, 2025 USFWS Biological Opinion determined that, based on USFWS review, the Project may affect but is not likely to adversely affect any listed terrestrial or marine fauna species, with exception of Hawaiian stilt and Hawaiian goose. The USFWS determined that adverse effects to Hawaiian stilt and Hawaiian goose are likely in the form of harm due to injury or mortality from accidental crushing by a vehicle or heavy equipment, disturbance of nests or broods, attractive nuisance, and/or emaciation or starvation. However, these effects are not likely to appreciably reduce the likelihood of both the survival and recovery of either species in the wild, and that the Project is not likely to jeopardize the continued existence of either species(see Biological Opinion in Appendix 3.10). Conservation measures in Section 3.10.9 include those provided by the USFWS to avoid and minimize adverse effects to the greatest extent practicable.

12 Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1999. Manual of the Flowering Plants of Hawaii. Two volumes. Revised edition. University of Hawaii Press and Bishop Museum Press, Honolulu.

13 Scheffers, B.R., et al. (2016) The broad footprint of climate change from genes to biomes to people. Science, Nov., DOI: 10.1126/science.aaf7671.

The Incidental Take Statement of the Biological Opinion includes the following anticipated take:

- Hawaiian Goose
    - Eight (8) adults and twelve (12) nests or twenty-four (24) eggs or goslings may be taken during all phases of the duration (2026 through 2031) of the Project.
- Hawaiian Stilt
    - Two (2) adults and seventeen (17) nests or sixty-eight (68) eggs or chicks may be taken during all phases of the duration (2026 through 2031) of the Project.

Terrestrial Fauna

TABLE 3.10-9 summarizes potential effects to terrestrial fauna.

Despite these potential effects, given the adoption of the avoidance and minimization measures listed below, effects to any listed terrestrial fauna species or critical habitats would be minor and would often not be anticipated.

Marine Fauna

TABLE 3.10-10 summarizes potential effects to marine fauna.

Despite these potential effects, it is highly unlikely that project actions would affect nearshore and offshore marine environments, including Hawaiian monk seal and its designated critical habitat, sea turtles, and coral reef. Potential effects to nearshore and offshore marine environments would be further avoided and minimized through measures listed in Section 3.10.9.

Invasive Species

A possible effect of implementing the Project is the introduction and spread of invasive species during the construction phase. Several invasive species occur on Maui but are restricted in distribution and are targeted for containment or eradication (for example, fountain grass [*Cenchrus setaceus],* little fire ants [*Wasmannia auropunctata*], and coqui frogs [*Eleutherodactylus coqui*]) as well as invasive species that are not yet present on Maui (for example, Coconut rhinoceros beetle [*Oryctes rhinoceros*] on O'ahu) but that could be introduced or inadvertently spread to or from the project area. Additionally, several weed tree tobacco plants were observed during surveys, which could serve as BSM host plants. Section 3.10.9 presents avoidance and minimization measures for addressing invasive species, including tree tobacco.

TABLE 3.10-8. **Summary of Potential Effects to Fauna**

FAUNA	COMMON NAME (SCIENTIFIC NAME)	STATUS	OBSERVED IN PROJECT AREA	POTENTIAL EFFECTS
Mammals	Hawaiian hoary bat (*Lasiurus cinereus semotus*)	Endangered	Assumed present	Effects to individuals would be minor, and effects to its critical habitat are not anticipated.
	Hawaiian monk seal (*Neomonachus schauinslandi*)	Endangered	Assumed present in region but not project area	Effects to individuals and critical habitat are not anticipated.
Birds	Hawaiian stilt or aeʻo (*Himantopus mexicanus knudseni*)	Endangered	Yes	Effects to individuals and habitat would be minor.
	Hawaiian coot (*Fulica alai)*	Endangered	No	Effects to individuals and habitat would be minor.
	Hawaiian duck (*Anas wyvilliana*)	Endangered	No	Effects to individuals and habitat are not anticipated.
	Hawaiian goose or nēnē (*Branta sandvicensis*)	Threatened	Yes	Effects to individuals and habitat would be minor.
	Hawaiian petrel (*Pterodroma sandwichensis)*	Endangered	No	Effects to Hawaiian seabirds and their habitat are not anticipated.
	Band-rumped-storm-petrel (*Hydrobates castro*)	Endangered	No	
	Newell's shearwater (*Puffinus newelli*)	Threatened	No	
	Short-tailed albatross (*Phoebastria albatrus*	Endangered	No	
Reptiles	Green sea turtle or honu (*Chelonia mydas*)	Threatened	No	Effects to individuals and habitat are not anticipated.
	Hawksbill sea turtles or honuʻea (*Eretmochelys imbricata)*	Endangered	No	Effects to individuals and habitat are not anticipated.
Insects	Blackburn's sphinx moth (*Manduca blackburni*)	Endangered	Assumed present	Effects to individuals and habitat would be minor.
	Assimulans Yellow-faced Bee (*Hylaeus assimulans*)	Endangered	No	Effects to individuals and habitat are not anticipated.

TABLE 3.10-9. **Potential Terrestrial Fauna Effects**

CATEGORY	DESCRIPTION
Disturbance from Human Activity	Disturbances may include visual disturbances from land-based equipment operations (for example, excavator, bulldozer) and the presence of construction workers, as well as potential habitat loss from construction activities such as clearing and grubbing. This presence of workers and equipment could potentially result in vehicle collisions with terrestrial fauna. Additionally, noise from construction activities could cause species to avoid the area, though this may be beneficial as it would discourage bird species from nesting or other terrestrial fauna from moving through the project area. Adherence to BMPs and measures listed in Section 3.10.9 would avoid and minimize disturbance from human activity.
Invasive Species	Invasive species can be introduced intentionally or unintentionally via transportation vehicles/vessels, equipment, clothing and worker gear, and construction materials originating off-site. Their populations can increase dramatically and eventually outcompete and dominate native species, which increase ecological issues to species and ecosystem functions and services. Invasive species can reduce species diversity, alter trophic structures, and degrade physical habitats. However, the negative impacts vary greatly and depend on the specific species involved. Adherence to invasive species BMPs and guidelines in Section 3.10.9 would avoid adverse effects.
Light Pollution	Artificial lighting can negatively affect seabirds flying through the area at night by disorienting them. This disorientation can lead to collisions with human-made structures or cause the birds to become grounded. Once grounded, seabirds may have higher mortality due to collisions with vehicles, starvation, and predation. Adoption of BMPs in Section 3.10.9 would avoid adverse effects from light pollution during construction.
Extreme Weather Events	Extreme weather events, such as tropical storms and hurricanes, may potentially cause stormwater runoff and erosion, as well as habitat degradation should equipment or materials be blown/swept off-site. Additionally, wildfires (though often started due to human activity) can seriously degrade habitat and further contribute to spread of invasive species, erosion, and stormwater runoff.

TABLE 3.10-10. **Potential Marine Fauna Effects**

CATEGORY	DESCRIPTION
Disturbance from Human Activities	Disturbances may include visual disturbances from land-based equipment operations (for example, excavator, bulldozer) and the presence of construction workers. While these potential effects could disturb marine fauna, the most common reaction to this type of interaction is low-energy behavioral avoidance, resulting in a temporary disruption of feeding and resting activities. Disturbances from human activities would, therefore, not harm marine fauna.
Increased turbidity	While no in-water work will occur, potential effects of construction activities and machinery include increased turbidity in surface water bodies and potentially the ocean, if turbidity were to travel downstream to the coast. This increase in turbidity would be localized and temporary and listed marine species (sea turtles and seals) breathe air so increased turbidity would not affect respiration. Additionally, marine species, including fish, are highly motile (capable of movement) and would quickly avoid or leave turbid areas, thus reducing risk of exposure. Combined with BMPs, marine fauna exposure to appreciably increased turbidity is extremely unlikely.
Exposure to Waste and Discharge	Construction debris and accidental spills from construction equipment could enter the water, but with the adopted plans and contingencies, discharges and spills are extremely unlikely. If they do occur, they would be infrequent, small, and quickly cleaned.
Exposure to Elevated Noise	In-air noise would be produced by land-based construction activities and operation of equipment. Marine fauna would face temporary displacement or avoidance of loud areas as a result of noise pollution. However, as the Project is entirely terrestrial, a buffer distance from the beach would attenuate sound waves moving from the air to the water column. Additionally, streams in the project area are shallow with numerous rocky riffles. These obstacles also serve to block sound waves from reaching marine environments. Therefore, marine fauna exposure to elevated noise from construction activities is extremely unlikely.
Sedimentation and Erosion	Construction activities could result in increased sedimentation from runoff and erosion, affecting water quality for marine species. However, a Storm Water Pollution Prevention Plan and permanent BMPs would be implemented to impound sediment, control erosion, and prevent debris from entering water bodies.
Invasive Species	Invasive marine species can be introduced intentionally or unintentionally from shipping vessels, ballas waters, or on equipment originating off-site. However, measures to prevent the spread of invasive species would avoid adverse effects from invasive marine species.

Olowalu

Common to All Build Alternatives - Olowalu

It is unlikely that the Project would result in an adverse effect to any plant species that is State or federally listed as threatened or endangered, a candidate species for listing, a rare native plant species, or a native plant species of concern.

There were no listed species or terrestrial critical habitat observed within Olowalu. This includes all Critical habitat exists for the Hawaiian monk seal along the entirety of the West Maui coast. However, with implementation of BMPs and measures in Section 3.10.9, effects are not anticipated to its critical habitat nor any fauna on the USFWS IPaC species list.

Build Alternative 1

In Olowalu, monkeypod trees—recognized as Exceptional Trees by the Maui County Arborist Committee—are along the existing Honoapi‘ilani Highway. Build Alternative 1 would likely necessitate the removal of some of these trees, but the other Build Alternatives would avoid the monkeypod trees in Olowalu.

Ukumehame

Common to All Build Alternatives

No botanical concerns were found in Ukumehame. It is unlikely that the Project would result in an adverse effect to any plant species that is State or federally listed as threatened or endangered, a candidate species for listing, a rare native plant species, or a native plant species of concern.

Two State and federally endangered waterbird species, ae‘o and nēnē, were seen multiple times near the classroom building in the Ukumehame Firing Range area during field surveys. Nēnē have been observed with goslings at Ukumehame Firing Range. Neither species exhibited nesting behavior and no nests were found; however, nesting cannot be ruled out. Measures and BMPs are discussed below to avoid and minimize potential adverse effects to these species.

3.10.7 Construction Effects

TABLE 3.10-11 lists the potential construction effects on both flora and fauna. These effects would be unlikely and discountable because avoidance and minimization measures, and BMPs described in Section 3.10.9, will ~~would~~ be in place. Cumulative effects to listed bird species are discussed in Section 3.20, Cumulative Effects.

TABLE 3.10-11. **Potential Construction Effects on Flora and Fauna**

	POTENTIAL CONSTRUCTION EFFECTS
Flora	• Removal of vegetation within project area for each Build Alternative • Native plant species removal, but not expected to result in an adverse effect to any local or regional populations due to widespread distribution on Maui Island and in the state • Introduction and spread of invasive species during construction
Fauna	• Land clearing, roadbed excavation, and infrastructure installation can lead to habitat loss or modification. • Terrestrial animals may face displacement, reduced foraging areas, or habitat loss. • Noise and disturbance during construction can deter wildlife from nesting or foraging in or near the project area. • Noise and lighting presence may also affect species in adjacent habitats or during overflight. • Light pollution may cause confusion and behavioral effects in sea birds and sea turtles. • Vehicle interactions during construction.

3.10.8 Indirect Effects

Indirect effects can occur from the accidental introduction of sediments, contaminants, or construction-related debris into marine environments. However, these effects will ~~would~~ be unlikely because conservation measures, such as those described in Section 3.10.9, will ~~would~~ be in place to minimize the potential for siltation, spills, and contamination. Most notably, this will include low-impact stormwater management BMPs that minimize Project's potential to add pollutants to the larger watershed and adjacent marine environment.

A beneficial indirect effect relates to the ability of Build Alternatives to serve as a firebreak, detailed in Section 3.11, Geology, Soils, and Natural Hazards. Minimizing the intensity of wildfires will ~~would~~ reduce the potential introduction of invasive species to disturbed soils. This will ~~would~~ allow for greater abundance of native vegetation and the subsequent fauna who relies on it for food and shelter.

3.10.9 Avoidance and Minimization Measures

BMPs to manage stormwater will ~~would~~ be integrated into the National Pollutant Discharge Elimination System permit, the Storm Water Pollution Prevention Plan, and the Section 401 Water Quality Certification to protect the marine environment. For the Preferred Alternative, as discussed in Chapter 5, Selected Alternative of the Final EIS, the comprehensive determination of environmental

commitments is provided in Section 5.5 (including final commitments as established by the Biological Opinion).

TABLE 3.10-12 lists additional avoidance and minimization measures to protect threatened or endangered species and native flora and includes a summary by source and topic. Given the adoption of the avoidance and minimization measures listed below, the effects to any listed species or critical habitats are anticipated to be minor and will ~~would~~ often not be anticipated across all Build Alternative alignments.

TABLE 3.10-12. **Avoidance and Minimization Measures**

SOURCE	TITLE	TOPIC
U.S. Fish & Wildlife Service	General Project Design Guidelines (Appendix 3.10)	Endangered Species Act listed species potentially occurring in the project area
U.S. Fish & Wildlife Service	2025 Final Biological Opinion (Appendix 3)	Nēnē and Ae'o
U.S. Fish & Wildlife Service	Recommended Standard Best Management Practices for Aquatic Environments[1]	Aquatic habitats
Hawai'i Dept. of Transportation	Construction Best Management Practices Field Manual[2]	Water quality, aquatic habitats
Hawai'i Dept. of Transportation	Storm Water Post-Construction Best Management Practices Manual[3]	Water quality, aquatic habitats
U.S. Environmental Protection Agency	National Pollution Discharge Elimination System – Stormwater Pollution Prevention Plan	Water quality, aquatic habitats
National Oceanic and Atmospheric Administration – National Marine Fisheries Service	Conservation Recommendations and Project BMPs (Appendix 3.10)	Aquatic environments, essential fish habitat
Coordination Group on Alien Pest Species	BMPs for Invasive Species Prevention[4]	Invasive species
Pacific Islands Fish and Wildlife Office	Invasive Species Protocol (Appendix 3.10)	Invasive species
Biological Survey Report Supplement	Project-Specific Avoidance and Minimization Measures (Appendix 3.10)	All flora and fauna
HT Harvey & Associates	General Invasive Species BMPs (Appendix 3.10)	Invasive species
HT Harvey & Associates	Biological Resources Discussion and Recommendations (Appendix 3.10)	All flora and fauna

1 USFWS. (April 2022). Recommended BMPs for Aquatic Environments. https://www.fws.gov/media/best-management-practices-work-or-around-aquatic-environments-bmps. Accessed September 2023.

2 HDOT. (January 2008). Construction BMPs Field Manual. https://www.stormwaterhawaii.com/wp-content/uploads/2020/11/app_e6.pdf. Accessed October 2023.

3 HDOT. (February 2022). Storm Water Post-Construction BMPs Manual. https://www.stormwaterhawaii.com/wp-content/uploads/2022/07/PC-BMP-Manual_220718-FULL.pdf. Accessed October 2023.

4 CGAPS. (2023). BMPs For Invasive Species Prevention. https://dlnr.hawaii.gov/hisc/files/2023/09/BMPs-for-Invasive-Species-Prevention-091223.pdf. Accessed October 2023.

3.10.9.1 Flora

No threatened, endangered, or rare plants were observed in the project area. The project area is highly disturbed with a history of vegetation disturbance and landscape level modification. The project area has an approximately 86% cover of alien or Polynesian introduced plants species and contains other direct threats to the nine endangered plants described above, such as feral ungulates, rodents, nonnative snails and slugs, fire, and is regularly subject to drought. Based on these findings, it is highly unlikely that the project area contains the nine endangered plant taxa identified in the IPaC resource list; therefore, no mitigation measures are proposed at this time for these species.

Monkeypod Trees

In Olowalu, Build Alternative 1 would likely necessitate the removal of some of the monkeypod trees, recognized as Exceptional Trees by the Maui County Arborist Committee. Removal would require a permit from the Director of Parks and Recreation, with review by the Maui County Arborist Committee (Hawaiʻi Revised Statutes Chapter 58 1-5) that shows the tree is dead, diseased, irretrievably damaged, or is a hazard to public safety or welfare. If an Exceptional Tree is approved for removal, the Arborist Committee may recommend to the Director of Parks and Recreation that the owner plant an appropriate replacement(s) or relocate the Exceptional Tree. If replacement or relocation is not possible, the committee should identify another tree of the kind for Exceptional Tree classification.[14]

In January 2023, approval was granted to remove five monkeypod trees and prune one along the existing Honoapiʻilani Highway in the vicinity of the Maui Tropical Plantation due to fire damage.[15]

3.10.9.2 Fauna

TABLE 3.10-13 lists general project avoidance and minimization measures by topic. TABLE 3.10-14 lists species-specific avoidance and minimization measures for fauna.

Invasive Species

All activities, including site surveys, risk introducing nonnative species into project areas. Specific attention will ~~would~~ be made to ensure that all equipment, personnel, and supplies are properly checked and are free of contamination (weed seeds, organic matter, or other contaminants) before entering the project area. Quarantines and or management activities occurring on specific priority invasive species proximal to the project area will ~~would~~ be considered and adequately addressed. Protecting native vegetation not only preserves habitat for protected species but also helps to slow the progression of shoreline erosion. TABLE 3.10-15 lists general invasive species BMPs.

The contractor will ~~would~~ address quarantines and or management activities occurring on specific priority invasive species proximal to project areas before physical construction occurs in accordance with HDOT Standard Specifications Section 621 – Invasive Species Management (2021).

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14 County of Maui. (Mark 9, 2016). Maui County Planting Plan – Third Edition. https://www.mauicounty.gov/DocumentCenter/View/11115/MAUI-COUNTY-PLANTING-PLAN-WHOLE-3rd-Revision?bidId=. Accessed December 2023.

15 County of Maui Department of Parks and Recreation. (January 20, 2023). Permit to Remove Monkey Pod Trees Along Honoapiʻilani Highway. https://www.mauicounty.gov/DocumentCenter/View/139063/Removal-of-Exceptional-Trees-Honoapiilani-Hwy-Imua-Landscaping-012023. Accessed December 2023.

The Coordination Group on Alien Pest Species in Hawai‘i has outlined BMPs for specific high-risk species, and the Pacific Islands Fish and Wildlife Office has recently updated their invasive species biosecurity protocols. These will be implemented and are included in Appendix 3.10.

Additional Best Management Practices

BMPs will ~~would~~ be implemented during construction to minimize the potential for effects to water quality. The Project will ~~would~~ obtain a Notice of General Permit Coverage from the National Pollution Elimination Discharge System accompanied by a Storm Water Pollution Prevention Plan. BMPs will ~~would~~ be implemented in accordance with the documented approach detailed in the *Construction Best Management Practices Field Manual by the State of Hawai‘i Department of Transportation* (2008).

TABLE 3.10-13. **General Project Avoidance and Minimization Measures**

TOPIC	AVOIDANCE AND MINIMIZATION MEASURES
Construction Activities	Contractor will~~should~~ prioritize previously disturbed and bare areas for use as staging and lay-down yards, disposal and borrow sites, and concrete batch plants.
	Contractor design of bridge, culvert, and viaduct structures will avoid fill to wetland habitats~~Bridge, culvert, and viaduct structures to avoid fill to wetland habitats.~~
	Contractor will ~~would~~, in coordination with and approved by HDOT, avoid placing staging areas in or directly adjacent to delineated wetland habitat and streambanks to avoid and minimize adverse effects to habitat that may support listed waterbirds and nēnē.
	Drilled shaft foundations will be used by the Contractor for pier bents, as appropriate, to minimize potential construction-related noise and vibrations. ‡~~Drilled shaft foundations would be used in areas sensitive to vibration and noise and would be an efficient technique at selected pier bents.~~
	Neither HDOT nor the Contractor will ~~would~~ not use barbed wire fencing.
	Contractor shall maintain and require a copy of the approved Biological Assessment and the approved Biological Opinion in the on-site construction office~~Contractor would maintain and require a copy of Section 7 regulations and requirements in the on site office~~.
	Contractor will incorporate permanent highly visible signs placed along the new Honoapi'ilani Highway through Ukumehame during construction and operation of the new roadway. These signs will alert workers and drivers to the presence of listed birds known to be in the area to reduce the chance of vehicle collisions. ‡~~The contractor will incorporate permanent highly visible signs placed along the road through the Ukumehame area alerting workers and drivers of the presence of listed birds known to be in the area to reduce the chance of vehicle collisions.~~
	Contractor will also secure all temporary structures to avoid them blowing over during heavy winds and hitting listed bird species.
	Speed limits of 15 miles per hour (mph) on active construction roadways within the project site will be posted by HDOT through the Olowalu area and 10 mph within the Ukumehame area. These speed limits are applicable to all construction access roads within the Project Area and do not apply to the existing Honoapi'ilani Highway alignment. All construction personnel including contractors, cultural monitors, and subcontractors shall adhere to the posted speed limits at all times~~Reduced speed limits signs of 15 mph through the Olowalu area and 10 mph in the Ukumehame area will be posted at the project site during construction. Dedicated personnel will enforce speed limits.~~
	All permanent lighting by the Contractor will ~~would be required to~~ adhere to the 2022 Maui Dark Skies Ordinance 5434.[16]
	Contractor will utilize DLNR seabird-friendly light styles for all permanent lighting design.[17]
	No portable jobsite radios or other music equipment shall be used within the construction footprint at anytime and enforced by the Contractor.

[16] Maui County. (2022). Ordinance No. 5434. https://mcclibraryfunctions.azurewebsites.us/api/ordinanceDownload/16289/1187880/pdf#:~:text=5434-,BILL%20N0.21%2C%20CD2%2C%20FD2%20(2022),amphibians%2C%20mammals%2C%20and%20invertebrates. Accessed November 2024.

[17] DLNR. (2016). Seabird-friendly light style guide. https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf

TOPIC	AVOIDANCE AND MINIMIZATION MEASURES
	Night work by the Contractor is not be allowed during the sea turtle nesting/hatching period and seabird fledgling period (May 1 - December 15); to be enforced by the Contractor.
	In areas of known nēnē or ae'o habitat (Ukumehame wetlands near Firing Range), the contractor will be responsible for predator trapping and will develop a predator control plan for approval by HDOT.
	On-site staff will practice good project-site hygiene to avoid litter and garbage from attracting rodents, feral cats, mongoose, and other wildlife
	Contractor will provide covered waste bins and ensure they are emptied weekly
	Contractor will ensure that all food waste is properly disposed of in covered waste bins
	When engaging in activities that have a high risk of starting a wildfire—like welding in/near tall grass, the Contractor will wet down the area before starting the task, continuously wet down the area as needed, have a fire extinguisher on hand, and in the event that vision is impaired, (*i.e.,* welding goggles) have a spotter to watch for fire ignitions.
	Contractor will install permanent bird diversion poles along both sides of the viaduct. Poles will extend approximately 6 feet (1.8 meters) above the 54-inch (137 centimeters) rail and spaced approximately 12 feet (3.7 meters) apart, a maximum pole height of 9 feet above the 54-inch-tall rails will be applied, which corresponds to the typical height of a tractor trailer truck of 13.5 feet
	~~Speed limits of 15 mph on active construction roadways within the project site would be posted by HDOT through the Olowalu area and 10 mph within the Ukumehame area. These speed limits are applicable to all construction access roads within the project and do not apply to the existing Honoapi'ilani Highway alignment.‡~~
Surveys and Monitoring[18]	Contractor will ensure that the State's qualified biologist will be on-call throughout the duration of construction to assist in monitoring, surveys, and in an advisory capacity.~~Additional biological surveys will be performed by trained biologists in areas of "permanent BMPs" that were not included in previous surveys as they are outside of the initially defined Biological Survey Area (Appendix 3.10). The objective is to determine if suitable habitat for listed species exists in these areas. Survey protocols will adhere to those described in Section 3.10.2 and Appendix 3.10.~~
	~~Prior to the initial clearing and grubbing phase of the Project, a qualified biologist would be on site to perform visual surveys for listed species and nests. Should individuals or nests be observed, then species specific buffers and protocol would apply.A trained biologist will be present on site each workday throughout the duration of construction to assist in monitoring, surveys, and in an advisory capacity.~~

~~[18] Final biological surveying and monitoring protocols will be reported in the Final EIS, as coordination with the USFWS is ongoing.~~

TOPIC	AVOIDANCE AND MINIMIZATION MEASURES
	Contractor will ensure that prior to the start of any construction activities, a qualified biologist will produce a handout on listed species that occur within the Action Area and present a mandatory Environmental Awareness Program (developed by the state) to on-site personnel, including contractors, contractor's employees, supervisors, inspectors, and all subcontractors that educates Project personnel about the presence of endangered species on-site and associated avoidance and minimization measures. A list of attendees will be produced by the Contractor and the engineer to ensure comprehensive compliance. A hardhat sticker will be produced by the Contractor to display completion of State’s Environmental Awareness Program.~~The contractor will assign dedicated personnel to perform daily visual monitoring and nest surveys prior to the start of and during construction work to check for listed species bird nests.~~ The State’s Environmental Awareness Program will contain, at minimum, information concerning the biology and distribution of Hawaiian geese, Hawaiian stilt, Hawaiian coot, and Least Terns including recognition of various behaviors, such as nesting, breeding, and molting; their occurrence in the area; measures to avoid impacts; and procedures to follow if encounters with these species occur. The State’s Environmental Awareness Program will also have information on invasive species and predator species including BMPs to reduce the likelihood of predators being attracted to the construction footprint. HDOT will contact USFWS to review the awareness program prior to the Contractor administering to on-site personnel. The State’s qualified on-call biologist will be present on-site once every three weeks, or as needed, to provide training to new on-site personnel.‡~~The daily monitoring protocol would include designated personnel to walk the project site every morning prior to the start of construction work to determine if any ESA listed species nests are present at the work site and note if any listed individuals were present.~~
	~~Should work be halted for more than 72 hours, the on-call biologist shall be contacted by the contractor to survey the area prior to resumption of work. If listed birds are observed during daily monitoring, then music will be prohibited on the work site~~.
	Feeding any wildlife or feral cats shall be prohibited in all active work areas and enforced by contractor-dedicated personnel during daily monitoring.‡~~Cat feeding stations will be prohibited in the Action Area and enforced by dedicated personnel during daily monitoring.~~
	Following initial clearing and grubbing phases, if any ESA-listed species is observed the State’s qualified on-call biologist will be contacted by the contractor to evaluate and advise on next steps in accordance with the Biological Opinion.~~Should nests be observed during daily surveys or if listed species are observed within the project area, then buffer zones will be established, with their distance and what work (if any) can be done around them determined on a species specific basis.~~

TOPIC	AVOIDANCE AND MINIMIZATION MEASURES
	If nēnē or ae‘o (or other listed species) become injured in the Action Area, Contractor’s on-site staff will contact the on-call biologist immediately who will arrange for the bird(s) (or other listed animal species) to be picked up by DOFAW and provide guidance on temporary handling prior to DOFAW pickup. Injuries to listed animals (e.g., nēnē or ae‘o) resulting from project actions may require care from the Hawai‘i Wildlife Center (HWC) on the island of Hawai‘i. Should transport to and care at the HWC be necessary, HDOT will provide funds to facilitate necessary and appropriate actions - The on-call biologist will use USFWS’s Standard Operating Procedure (SOP) for handling and transporting injured birds or other listed animal species. - The on-call biologist will complete USFWS’s Avian Injury/Mortality Form (Appendix D of the BO) and submit it to the Service within 72 hours of the incident.
Reinition of ESA Section 7 Consultation	Any significant changes made during final design will be evaluated by the State’s on-call biologist in coordination with the Contractor and HDOT for any impacts not previously considered in the Biological Assessment. HDOT will work with FHWA to coordinate with USFWS and reinitiate Section 7 Consultation if needed.
	If take is exceeded, reinitiation of consultation and review of reasonable and prudent measures is required by FHWA in coordination with HDOT. See Biological Opinion for Incidental Take Statement.

TABLE 3.10-14. **Fauna Avoidance and Minimization Measures**

SPECIES	AVOIDANCE AND MINIMIZATION MEASURES
Hawaiian Hoary Bat	• To the greatest extent possible, large [> 15 foot tall (4.6m)] trees will ~~would~~ be preserved in place by the Contractor. If the Contractor must remove large trees, ~~must be removed,~~ they will ~~would~~ be cut down outside of the bat birthing and pup rearing season of June 1 to September 15. • Neither HDOT nor the Contractor will use barbed wire for fencing. ~~The Project would not use barbed wire for fencing.~~

Hawaiian Goose (nēnē)	• ~~Crew~~ On-site workers will ~~would~~ not approach, feed, or disturb Hawaiian geese, if observed in the project area; to be enforced by the Contractor. • Prior to the initial clearing and grubbing phase of the Project, the State's qualified biologist will be on-site to perform visual surveys for listed species and nests. Should individuals or nests be observed, then species specific buffers and protocol will apply. The State's on-call biologist shall be contacted by the contractor to repeat surveys within 72 hours of initial clearing and grubbing phase of the Project, and after any subsequent delay of work of 72 or more hours.‡ • Whether during initial surveys prior to initiating work, after a delay of 72 hours or more, or in the middle of construction, if nēnē are observed loafing or foraging within the project area during the breeding season (September through April), a 150-ft (45.7 m) buffer will be established by the Contractor and maintained around the bird(s) and no work will occur within the buffer zone until the birds leave on their own. - If not already on site, the State's on-call biologist familiar with nēnē nesting behavior will be contacted by the contractor to survey for nests in and around the buffer zone prior to the resumption of any work in the area. • ~~If a Hawaiian goose is observed loafing or foraging within the project site during the breeding season (September through April), then an on-call biologist familiar with Hawaiian goose nesting behavior would be contacted by the contractor to advise on next steps biologist familiar with Hawaiian goose nesting behavior would survey for nests in and around the project site prior to the resumption of any work. Repeat surveys would be performed after any subsequent delay of work of three or more days (during which the birds may attempt to nest).~~ • If a nest or active brood is discovered, the Contractor will immediately establish and maintain a 150-foot buffer around all active nests and/or broods until the chicks have fledged. No work would occur within this buffer ~~If a nest or active brood is found the biological monitor would contact the USFWS, or would immediately inform the Project manager, either of which would do the following~~. – The State's on-call biologist will be contacted by the contractor, who will then contact the USFWS and DOFAW within 48 hours upon discovery for further guidance ~~– Contact the USFWS within 48 hours upon discovery of the nest for further guidance.~~ ~~– Upon discovery of an active nest or nests, immediately establish and maintain a 150-foot buffer around all active nests and/or broods until the chicks have fledged. No work would occur within this buffer.~~ • The project site will ~~would~~ be adequately signposted by HDOT with high-visibility signs alerting crew to the presence of Hawaiian geese in Ukumehame. – HDOT will install temporary signs that will be orange during construction and then permanent operating signs in yellow following protocols for warning signs in the Manual on Uniform Traffic Control Devices • To prevent nesting, the State's ~~dedicated~~ on-~~site biological monitor~~call biologist (not construction crew) may perform hazing or other deterrent measures as long as such actions conform to ~~said rule~~ the nēnē 4(d) rule (84 FR 69918; December 19, 2019, 50 CFR 17.41). ~~(USFWS, 2019)~~. Any hazing that occurs to nēnē must follow the 4(d) rule. The Contractor will ~~would~~ maintain and require a copy of the 4(d) regulations on-site. • Work within 150 feet (45.7 meters) of a loafing or foraging Hawaiian goose can begin only after the birds have left on their own, to be enforced by the Contractor. • ~~If nēnē or aeʻo (or other listed species) become injured in the Action Area on-site staff will contact the on-call biologist immediately, who will arrange for the bird(s) (or other listed animal species) to be picked up by DOFAW and provide guidance~~

SPECIES	AVOIDANCE AND MINIMIZATION MEASURES
	~~on temporary handling prior to DOFAW pickup. Injuries to listed animals (e.g., nēnē or aeʻo) resulting from project actions may require care from the Hawaiʻi Wildlife Center (HWC) on the island of Hawaiʻi. Should transport to and care at the HWC be necessary, HDOT would provide funds to facilitate necessary and appropriate actions..If nēnē or aeʻo become injured in the Action Area or periphery due project actions, on-site staff will contact the on-call biologist immediately who will arrange for the bird(s) to be picked up by DOFAW and provide guidance on temporary handling prior to DOFAW pickup. Injuries to nēnē or aeʻo resulting from project actions may require care from the Hawaiʻi Wildlife Center (HWC) on the island of Hawaiʻi. Should transport to and care at the HWC be necessary, HDOT would provide funds to facilitate necessary and appropriate actions For alignment activities near an observed Hawaiian goose, fencing around the work site would be used where practicable to maintain a distance buffer and reduce vehicle strikes. If observations occur within an identified buffer, the contractor will assign a dedicated monitor to alert construction vehicle drivers of their presence and reduce accidental vehicle strikes.~~

Hawaiian Stilt (ae‘o)	• Crew will not approach, feed, or disturb Hawaiian stilt, if observed in the project area, to be enforced by the contractor. • Prior to the initial clearing and grubbing phase of the Project, a biological monitor familiar with the species' biology will perform visual surveys for Hawaiian waterbird nests where appropriate habitat occurs within the vicinity of the proposed project site (Ukumehame wetlands). Surveys will be repeated within 72 hours of initial clearing and grubbing phase of the Project and after any subsequent delay of work of 72 or more hours. If a nest or active brood is found at any time during the duration of the Project, the following measures will apply: ‡ - The State’s on-call biologist will be contacted by the contractor, who will then contact the Service and DOFAW within 48 hours upon discovery for further guidance. - Contractor will immediately establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks have fledged. No potentially disruptive activities or habitat alteration will be conducted within this buffer. - Contractor’s biological monitor or State’s on-call biologist that is familiar with the species’ biology will be present on the project site during all construction or earth moving activities until the chicks fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted. • If a Hawaiian stilt ~~or Hawaiian coot~~ is observed exhibiting nesting behavior within the Action Area~~project site~~ during the nesting season (mid-February to August), then the State’s on-call biologist familiar with Hawaiian stilt nesting behavior will be contacted by the contractor to advise on next steps. • ~~If a nest or active brood is discovered, immediately establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks have fledged. No work would occur within this buffer~~ ~~– The on-call biologist would be contacted by the contractor, who would then contact the USFWS and DOFAW within 48 hours upon discovery for further guidanceA qualified biological monitor familiar with the species’ identification and biology would conduct a pre-construction survey for Hawaiian stilt nests (and Hawaiian coot nests) where appropriate habitat occurs within the vicinity of the work site, within three days of the initiation of project work. These nest surveys would be repeated within three days of project initiation, and after any subsequent delay of work of three or more days following the initiation of project construction (during which the birds may attempt to nest).~~ ~~– If a nest or active brood is found, the biological monitor would contact the USFWS, or would immediately inform the Project manager, either of which would do the following:~~ ~~– Contact the Service within 48 hours upon discovery of the nest for further guidance.~~ ~~– Upon discovery of an active nest or nests, immediately establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks have fledged. No potentially disruptive activities or habitat alteration would occur within this buffer.~~ ~~– Have a biological monitor that is familiar with the species’ biology present on the project site during all construction or earth-moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.~~ • If observed after work has begun, work in the vicinity of a loafing or foraging Hawaiian stilt ~~and Hawaiian coot~~ can begin only after the birds have left on their own and a 100-foot buffer maintained by the contractor until that time • ~~Reduced speed limit signs of 15 mph through the Olowalu area and 10 mph in the Ukumehame area would be posted at the project site during construction, as requested by USFWS in an email on February 29, 2024.~~

SPECIES	AVOIDANCE AND MINIMIZATION MEASURES
	• ~~If nēnē or ae'o become injured in the Action Area or periphery due project actions, on site staff will contact the on-call biologist immediately who will arrange for the bird(s) to be picked up by DOFAW and provide guidance on temporary handling prior to DOFAW pickup. Injuries to nēnē or ae'o resulting from project actions may require care from the Hawai'i Wildlife Center (HWC) on the island of Hawai'i. Should transport to and care at the HWC be necessary, HDOT would provide funds to facilitate necessary and appropriate actions~~ ~~If observed during daily visual surveys or after work has begun, work in the vicinity of a loafing or foraging Hawaiian stilt and Hawaiian coot can begin only after the birds have left on their own and a 100-foot buffer maintained until that time.~~ • Border slopes of the permanent BMPs will be designed by the Contractor to have a slope greater than 6:1 to deter ae'o from nesting adjacent to the ponds. ‡
Hawaiian Coot	The Project would adopt the same AMMs for the Hawaiian coot as listed above for the Hawaiian stilt.
Hawaiian Ducks	• To the greatest extent possible, the contractor will preserve suitable habitat such as wetlands, streams, and open water features in their natural condition. • Through the State's Environmental Awareness Program, the on-call biologist will inform project personnel and contractors about the potential presence of endangered species on-site. • HDOT will post and enforce speed limits in areas where waterbirds are known to be present. • Contractor will incorporate the USFWS BMPs for Work in Aquatic Environments into the project design. • If a nest or active brood is discovered, the Contractor will immediately establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks have fledged. No work would occur within this buffer • The State's on-call biologist would be contacted by the Contractor, who would then contact the USFWS within 48 hours upon discovery for further guidance.~~If a nest or active brood is found:~~ ~~– Contact the USFWS within 48 hours for further guidance.~~ ~~– Establish and maintain a 100 foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.~~ ~~– Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.~~

SPECIES	AVOIDANCE AND MINIMIZATION MEASURES
Hawaiian Seabirds	~~• No night work is anticipated for this Project. However, should night work be required, then lighting should be configured to be “dark sky friendly,” in compliance with Hawai‘i Revised Statute § 201-8.5, as well as the design-build contractor contacting the USFWS several months in advance of any nighttime work, particularly during seabird fallout season. These additional measures would be incorporated into the Project to avoid and minimize potential project effects to Hawaiian seabirds:~~ • Night work will not be allowed during the sea turtle nesting/hatching period and seabird fledgling period (May 1 - December 15), to be enforced by the Contractor. • Should night work be required (outside of seabird fledgling periods and sea turtle nesting/hatching periods), then lighting will be configured by the contractor to be “dark sky friendly,” in compliance with Hawai‘i Revised Statute § 201-8.5. These additional measures will be incorporated into the Project by the Contractor if night work is required to avoid and minimize potential project effects to Hawaiian seabirds: The Contractor will fully shield all outdoor lights so the bulb can only be seen from below. The Contractor will install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area. ~~Avoid nighttime construction during the seabird fledging period (September 15 to December 15).~~ - To avoid collisions for seabirds, where fences extend above vegetation, the contractor will integrate three strands of polytape into the fence. For powerlines, guy-wires and other cables, the contractor will minimize exposure above vegetation height and vertical profile as best as practicable~~ the tops of monopoles, cranes and crane wire/cables, and fencing that extends above vegetation will be flagged~~.

Sea Turtles	• There would be no vehicle use on or modification of the beach/dune environment during the sea turtle nesting or hatching season (May to December), to be enforced by the Contractor. Notably, there was no such habitat observed in the project area. • Contractor will not remove native dune vegetation. Prior to any dune vegetation removal, a botanist familiar with native species will ~~would~~ be consulted to identify native dune vegetation. Notably, there was no dune vegetation observed in the project area. • Contractor will incorporate applicable best management practices regarding Work in Aquatic Environments into the project design. • Contractor will ~~would~~ not stockpile project-related materials in the intertidal zone, reef flats, sandy beach and adjacent vegetated areas, or stream channels. Notably, there are no such resources observed in the project area. • The Contractor will ~~would~~ remove any project-related debris, trash, or equipment from the beach or dune if not actively being used. Notably, there was no such habitat observed within the project area. • When mechanical or construction activities are performed directly adjacent to or on top of the existing Honopiilani Highway, the Contractor will assign a competent observer who has undergone State's Environmental Awareness Program training to perform visual surveys for basking sea turtles. • If a basking sea turtle is observed within the project area, the Contractor will not permit mechanical or construction activities ~~would not be permitted~~ within 164 ~~100~~ feet (50m) of the animal, and no such activities would be permitted in the area between the basking sea turtle and the ocean. Construction activities would not resume in such areas until the animal voluntarily leaves the area. ‡ • Night work will not be allowed by the Contractor during the sea turtle nesting/hatching period and seabird fledgling period (May 1 -December 15). • Should night work be required (outside of sea turtle nesting/hatching periods and seabird fledgling periods), then lighting will be configured by the Contractor to be "dark sky friendly," in compliance with Hawai'i Revised Statute § 201-8.5. These additional measures will be incorporated into the Project by the Contractor to avoid and minimize potential project effects to sea turtles: – Contractor will minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from any beach. – If lights cannot be fully shielded or if headlights must be used, the Contractor will fully enclose the light source with light filtering tape or filters. – Contractor will reduce the height of exterior lighting to below 3 feet (0.9 meters) and point downward or away from the beach. – Contractor will minimize light intensity to the lowest level feasible and, when possible, include timers and motion sensors. • Contractor will incorporate the following design measures into the construction or operation of buildings adjacent to the beach to reduce ambient outdoor lighting. Notably there will be no buildings constructed adjacent to the beach: – tinting or using automatic window shades for exterior windows that face the beach; – reducing the height of exterior lighting to below 3 feet and pointed downward or away from the beach; and – minimize light intensity to the lowest level feasible and, when possible, include timers and motion sensors.

SPECIES	AVOIDANCE AND MINIMIZATION MEASURES
Blackburn's Sphinx Moth	• The State's biologist familiar with BSM will ~~would~~ survey for the species and its larval host plants during the wettest portion of the year (November to April or several weeks after a significant rain) and within four to six weeks prior to construction. Surveys will ~~would~~ include searches for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). • If moths, eggs, larvae, or native 'aiea or tree tobacco over 3 feet tall, are found during the survey ~~aiea or tree tobacco over 3 feet (0.9m), or adult BSM moths are found during surveys~~, then the State's on-call biologist will ~~the USFWS~~ would be informed by the Contractor who would then inform USFWS within 48 hours for additional guidance. Sometimes the pupating larvae are less visible on mature plants and when uprooting the mature plant larvae could also dislodge and remain in the ground typically within 33 ft (10m) of the parent plant. In this scenario, the ~~Project~~ Contractor would create a 33-ft (10m), disturbance-free buffer where no work activities at all would be performed around the woody host plant to prevent disturbance to any pupating larvae. The plant roots will ~~would~~ be removed by the Contractor with guidance from the State's on-call biologist 90 days following the initial survey to prevent resprouting. ‡ • If no BSM, aiea, or tree tobacco are found during survey, then the ~~project site staff~~ Contractor would take measures to ensure that tree tobacco plants do not establish in the project site. If tree tobacco grows more than 3 feet (0.9m) tall, it may become a host plant for BSM larvae, which can occur in as few as six weeks. Therefore, to ensure that tree tobacco does not get established in the project site, dedicated staff with prior completion of the State's Environmental Awareness Program training and visual aids of tree tobacco at various life stages ~~the on-site biologist~~ would survey for tree tobacco every six weeks before, during, and after ~~construction and before~~ ground disturbing construction activities within a 33-foot (10m) buffer. If tree tobacco is found, the dedicated staff will ~~on-site biologist would~~ remove and dispose of the pulled tree tobacco per guidance provided by the State's on-call biologist. ‡
Assimulans Yellow-faced Bee	• If yellow-faced bee nests are observed by the State's on-call biologist during pre-construction surveys, the State's on-call biologist would contact USFWS ~~would be contacted~~ for further guidance. • If any ground disturbing activities will occur in or adjacent to known occupied habitat (on the beach or makai side of the highway), a buffer area around the habitat will be required and determined on a site-specific basis through consultation with the USFWS. The Contractor would inform HDOT who would consult USFWS for this site-specific buffer area ‡ • ~~No fires or wood collecting.~~The contractor will not collect wood nor have any fires • The contractor will restrict vehicles to existing and temporary construction roads and trails. • Following completion of the State's Environmental Awareness Program training, the contractor will post educational signs to inform people of the presence of sensitive species.

Reasonable and Prudent Measures (nēnē, aeʻo)	The Project would implement the following Reasonable and Prudent Measures to minimize the potential for injury and mortality of nēnē and aeʻo during project activities, as listed in the Biological Opinion (See Appendix 3): • The State's on-call biologist will be notified by telephone and email immediately by the contractor upon the discovery of an injured or dead nēnē or aeʻo in the Action Area. • The State's on-call biologist will arrange for the bird(s) (or other listed animal species) to be picked up by DOFAW and provide guidance on temporary handling prior to DOFAW pickup. • The State's on-call biologist will use the USFWS's SOP for handling and transporting injured birds or other listed animal species. • The State's on-call biologist will provide PIFWO with a written notification using the Avian Injury/Mortality Form in Appendix D of the Biological Opinion, summarizing the event, within 3 calendar days and will contact and arrange for care from the Hawaiʻi Wildlife Center (HWC) or other permitted rehabilitation facility for any injured bird. • Should transport to and care at the HWC or other permitted rehabilitation facility be necessary, HDOT will provide funds to facilitate necessary and appropriate actions. Care must be taken in handling any dead or injured specimens of proposed or listed species to preserve biological material in the best possible state. • In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead or injured specimens does not imply enforcement proceedings pursuant to the Endangered Species Act. • FHWA shall submit an annual report to be drafted by HDOT in coordination with the Contractor PIFWO within 45-calendar days after each year-end in which Project actions occur. This reporting requirement enables the Service to determine if take has been reached or exceeded and to ensure that the terms and conditions are appropriate and effective. - Annual reports will include all nēnē hazing activities, including the number of birds hazed during each hazing incident, the date and time, banding information (if available), and any other noteworthy behavioral observations and/or physical features and environmental conditions at the time. - Annual reports will also include all observations of nēnē, aeʻo, and/or other listed birds (and any other listed species) in the Action Area, including number of individuals and/or nests, life stage, banding information (if relevant), brood structure (if relevant), date and time, any noteworthy behavioral observations or physical features on the species, environmental conditions at the time, and a detailed description of any incident(s) that resulted in take in the form of harm (injury), mortality, and capture using the Injury/Mortality Form in Appendix D of the Biological Opinion. - Lastly, the annual reports should include all of the conservation measures implemented each year. - Upon the final year during which Project actions occur, a final report will be submitted to PIFWO within 45-days after the Project has been completed containing the annual report for the last year, followed by an analysis and summary of all the annual reports combined. - The depository designated to receive specimens that are found is the B.P. Bishop Museum, 1525 Bernice Street, Honolulu, Hawaiʻi, 96817 (telephone: 808/847-3511). If the B.P. Bishop Museum does not wish to accession the specimens, contact the Service's Division of Law Enforcement in Honolulu, Hawaiʻi (telephone: 808/861-8525; fax: 808/861-8515) for instructions on disposition.

TABLE 3.10-15. **General Invasive Species Best Management Practices**

SUBJECT	DESCRIPTION
Cleaning & Treatment	Prior to entry into a projet site, project materials, vehicles, machinery, and equipment will be pressure-washed by the Contractor thoroughly (preferably with hot water) in a designated cleaning area. Project materials, vehicles, machinery, and equipment should be visibly free of mud/dirt (excluding aggregate), seeds, plant debris, insects, spiders, frogs (including frog eggs), other vertebrate species (*e.g.*, rodents, mongoose, feral cats, reptiles, etc.), and rubbish. Areas of particular concern include bumpers, grills, hood compartments, wheel wells, undercarriage, cabs, and truck beds. Truck beds with accumulated material are prime sites for hitchhiking invasive species~~All construction equipment and vehicles should arrive at the work site for the first time in clean condition and free of the following: any soil; plants or plant parts, including seeds; insects, including eggs; and reptiles and amphibians, including their eggs. Similarly, all construction equipment and vehicles should be cleaned after use in the project area and before leaving the site. This would be particularly important for equipment movement between the project area and the other islands.~~
	The Contractor will ensure the interior and exterior of vehicles, machinery, and equipment be free of rubbish and food, which can attract pests (*i.e.*, rodents and insects). The interiors of vehicles and the cabs of machinery should be vacuumed clean particularly for any plant material or seeds
Inspection	Following Contractor cleaning and/or treatment, project materials, vehicles, machinery, and equipment, will be visually inspected by its user, and be free of mud/dirt (excluding aggregate), debris, and invasive species prior to entry into a project site. For example, careful visual inspection of a vehicle's tires and undercarriage is recommended for any remaining mud that could contain invasive plant seeds ~~All materials imported to the project area, including gravel, soil, rock, and sand, should be certified weed free. Invasive species found on stockpiled materials should be removed either chemically or mechanically.~~
	All materials imported to the project area should be certified weed-free. The Contractor will ensure that any project materials, vehicles, machinery, or equipment found to contain invasive species (*e.g.*, plant seeds, invertebrates, rodents, mongoose, cats, reptiles, etc.) must not enter the project site until those invasive species are properly removed/treated.
For all on-site personnel	Prior to entry into the project site, all on-site personnel will visually inspect and clean their clothes, boots or other footwear, backpack, radio harness, tools and other personal gear and equipment for insects, seeds, soil, plant parts, or other debris. Seeds found on clothing, footwear, backpacks, etc., will be placed in a secure bag or similar container and discarded in the trash rather than being dropped to ground at the project site or elsewhere.
Revegetation	Only weed-free seed mixtures will ~~should~~ be used for hydroseeding and hydromulching on the project area. The State's qualified botanist should inspect the seeded areas a minimum of 60 calendar days after the hydroseed/hydromulch is applied. Any species of plant other than those intended to be in the hydroseed/hydromulch will ~~should~~ be removed. In particular, plant species that are not known to occur on Maui and those that are actively being controlled on the island will ~~should~~ be removed.

SUBJECT	DESCRIPTION
	~~The Project would use only native plants for revegetation or landscaping purposes. Species included in the Biological Survey Report would be prioritized.~~ Revegetation and landscaping will include native plants found in the action area during biological surveys, native plants historically known from the area, as well as native and possibly nonnative plants not considered invasive species that are fire resistant and recommended by the Pacific Fire Exchange, Plant Pono website, and following County of Maui Planting Guidelines. These species include, but are not limited to ‘iliahialo‘e (*Santalum ellipticum*), ‘a‘ali‘i (*Dodonaea viscosa*), hoary abutilon (*Abutilon incanum*), akulikuli (*Sesuvium portulacastrum*), milo (*Thespesia populnea*), ‘ilima (*Sida fallax*), naupaka (*Scaevola taccada*), and uhaloa (*Waltheria indica*). An additional three species are included for consideration in revegetation: Pōhinahina (*Vitex rotundifolia*), ‘Ūlei (*Osteomeles anthyllidifolia*), and ‘Āweoweo (*Chenopodium oahuense*).‡ ~~If these plants do not meet revegetation or landscaping objectives, then other native plants may be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the Plant Pono website and following County of Maui Planting Guidelines.. As best as practicable, disturbance to endemic plant species such as ‘iliahialo‘e will be avoided.~~ ~~If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the Plant Pono website and following County of Maui Planting Guidelines.~~
	Vegetation and landscaping will follow all applicable guidelines set forth in the HDOT Highway Manual for Sustainable Landscape Maintenance including an annual comprehensive inspection (HDOT 2011)
	As best as practicable, disturbance to endemic plant species such as ‘iliahialo‘e will be avoided.
	Only plants grown on Maui will be used for landscaping purposes to the extent praticable. If locally grown plants are unavailable, then imported plants may be used, but they should be thoroughly inspected or quarantined if necessary to ensure that they are free from invasive pests, such as little fire ants, and invasive plant seeds and seedlings that could arrive inadvertently.
Little Fire Ant	Vehicles infested with little fire ants will be treated by the Contractor following recommendations by the Hawaii Ant Lab outlined in the 2024 PIFWO Biosecurity Protocols.
	The Contractor will adhere to little fire ant baiting recommendations for vehicles, materials, and storage areas as outlined in the 2024 PIFWO Biosecurity Protocols.
	If little fire ants are detected, the contractor will report it to 808-643-PEST
Coconut Rhinoceros Beetle (CRB)	Contractor will adhere to Hawaii Department of Agriculture Plant Quarantine Interim Rule 24-1 prohibiting the movement of CRB-host material from the island of O‘ahu. Host material for the beetle specifically includes: 1) entire dead trees, 2) mulch, compost, trimmings, fruit and vegetative scraps, and 3) decaying stumps.
	If felling or trimming palms, the Contractor will contact CRB Response for a free inspection ((808) 679-5244 or email at info@crbhawaii.org).
	Contractor will keep green waste whole until it is ready to be treated and removed. Green waste will be chipped on site and transported on the same day to a secure and managed green waste disposal site/facility.
	Contractor will minimize accumulations of green waste by regularly treating mulch piles or depositing it in sealed green waste bins.

SUBJECT	DESCRIPTION
	If injured or dying coconut palm trees are observed or if CRB are detected, Contractor will contact the on-call biologist who would then contact CRB Response at (808) 679-5244 or email at info@crbhawaii.org or online at https://www.crbhawaii.org/report

Source: H.T. Harvey & Associates (2023), Pacific Islands Fish and Wildlife Office (2024), DOFAW (2025)

USFWS Recommended Standard Best Management Practices for Aquatic Environments

Measures listed in TABLE 3.10-16 and Appendix 3.10 would be implemented, which include applicable measures from the USFWS list of recommended standard BMPs for aquatic environments.

NOAA NMFS Conservation Recommendations

The following conservation recommendations (TABLE 3.10-17), provided by NOAA NMFS on July 26, 2023, will ~~would~~ be implemented. Recommendations were ~~are~~ followed by responses on October 6, 2023 ~~provided~~ to NOAA NMFS which described measures or actions taken to address the July 26, 2023 conservation recommendations (Appendix 3.10). TABLE 3.10-17 includes a list of BMPs provided to NOAA NMFS on June 30, 2023, which will be incorporated into the overall design and construction methods to minimize and reduce potential effects to water quality. TABLE 3.10-17 includes a final list of BMPs provided by NOAA NMFS on November 27, 2023.

3.10.10 Build Alternatives Comparative Assessment

Build Alternative 1 in Olowalu may require the removal of multiple monkeypod trees. Additionally, Build Alternative alignment options closer to the ocean inherently carry a higher risk of affecting coastal ecosystems, attributed to factors like light pollution, sediment-laden runoff, and human-induced accidents. However, with strict adherence to BMPs, conservation measures, and avoidance and minimization measures from the USFWS, the U.S. Environmental Protection Agency, NOAA NMFS, HDOT, and State agency partners, it is anticipated that effects to any listed species or critical habitats will ~~would~~ be minor and will ~~would~~ often not be anticipated across all Build Alternative alignments.

TABLE 3.10-16. **USFWS Recommended Standard Best Management Practices for Aquatic Environments**

BMP	DESCRIPTION
1.	Construction staff will ~~would~~ be informed of the potential presence of threatened and endangered species, including being provided materials to assist in species identification and appropriate actions if a species enters the work area.
2.	Good housekeeping practices and erosion-control device(s) shall be employed at the job site to prevent debris and soil from leaving the site.
3.	Upon completion of the Project, all construction-related debris and sediment containment devices shall be removed and disposed of at an approved site.
4.	A litter-control plan shall be developed by the Contractor prior to start of construction and implemented to prevent attraction and introduction of nonnative species.
5.	Invasive species controls shall be maintained to ensure that all materials transported from off-site are free of such species.
6.	Project construction-related materials shall not be stockpiled in (or in proximity to) aquatic habitats and shall be protected from erosion (for example, with filter fabric) to prevent materials from being carried into waters by wind, rain, or high surf.
7.	Fueling of project-related vehicles and equipment by the Contractor shall take place away from the aquatic environment and within a containment area, preferably over an impervious surface.. A contingency plan will be prepared by the Contractor for HDOT approval prior to the start of construction to control petroleum products accidentally spilled during the Project shall be developed. The plan shall be retained on-site by the Contractor with the person responsible for its compliance. Absorbent pads and containment booms shall be stored on-site by the Contrator to facilitate the clean-up of accidental petroleum releases.
8.	All deliberately exposed soil or under-layer materials used in the Project near water shall be protected from erosion and stabilized as soon as possible with geotextile, filter fabric, or native or noninvasive vegetation matting, hydroseeding, or something similar.

TABLE 3.10-17. **NOAA NMFS Conservation Recommendations**

RECOMMENDATION
Conservation Recommendation 1: If at all possible, avoid placing bridge footings, foundations, or other structural elements in streambeds. Seek engineering solutions that place bridge structural elements outside a streambed.
Conservation Recommendation 2: Although designs of the Build Alternatives will ~~would~~ consider potential future effects of inundation and sea level rise, also plan to accommodate increased water that could come from the land through riparian corridors and flooding pathways. Do not plan bridges or culverts that will ~~would~~ restrict the flow of water and could raise water flow rates and increase scour. Consider incorporating low impact design elements into plans that slow water flow, impound sediment, and filter runoff from impermeable surfaces.
Conservation Recommendation 3: Develop a plan for managing equipment, materials, and job site conditions in the event of approaching foul weather (tropical storms and hurricanes). Equipment and materials may need to be removed from the project site or adequately secured. Stormwater runoff and erosion may require heightened management during storm events.

TABLE 3.10-18. **FHWA-Proposed BMPs to NOAA NMFS**

TOPIC	BMP
Waste Management	Concrete wastes, solid wastes, and any sanitary/septic wastes will ~~would~~ be located away from and managed to assure no contamination to the ocean or critical habitats.
Vehicle and Equipment Management	All vehicles and equipment cleaning, maintenance, and refueling done by the State or the Contractor will ~~would~~ be located away from and managed to assure no contamination to the critical habitats. Notably, there is no critical habitat in the project area. Invasive species controls shall be maintained by the Contractor to ensure that all materials transported from off-site are free of such species.
Stormwater Management and Erosion Control	The project will ~~would~~ require an NPDES permit with a Storm Water Pollution Prevention Plan. The Contractor will ~~would~~ be required to install and maintain BMPs as part of the Project. Site-specific stormwater BMPs would be implemented and/or installed at the staging and work areas to prevent water quality degradation associated with stormwater runoff. Stormwater BMPs will ~~would~~ include maintaining equipment in good working order, storing equipment and materials away from the ocean or stream bank with strategic placement of absorbent material, such as fiber rolls, as a buffer between equipment and nearby waterbodies. Drip pans shall also be maintained beneath construction equipment. The Contractor will ~~would~~ be required to prevent any debris from falling into the water.
Water Pollution	The HDOT Standard Specifications for Road and Bridge Construction Section 209 Temporary Water Pollution, Dust, and Erosion Control will ~~would~~ be followed.
Construction	The Project will ~~would~~ require temporary construction laydown areas. Stockpiling, storage, and equipment staging will ~~would~~ utilize appropriate BMPs to prevent potential surface runoff from entering the stream. No stockpiling, storage, or heavy equipment will ~~would~~ be placed in the streams.

TOPIC	BMP
For Physical Impacts to Benthic Communities	1. Prevent trash and debris from entering the marine environment during the project. 2. For anticipated stream crossings, all temporary structures must be removed at the completion of in-water work. 3. For anticipated stream crossings, do not stockpile or stage materials in the marine environment unless absolutely necessary. Place material that is stored in the marine environment on unconsolidated sediments devoid of coral and seagrass.
For Increase in Sedimentation and/or Turbidity	1. Install sediment, turbidity, and/or pneumatic curtains, and use real-time monitoring (automated or manual) to detect failure and implement stop-work processes if pre-determined project thresholds are reached (use standards from Clean Water Act 401 water quality certification). In areas of soft sediment, consider partial length turbidity curtains to reduce resuspension of sediment during high winds and currents. 2. Maintain baseline water flow, volume, and velocity of the waterbody. 3. Use natural or bio-engineered solutions when feasible. 4. Fully stabilize disturbed upland areas prior to removing silt fences and erosion prevention measures. 5. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction conditions and elevations. 6. Minimize disturbances to stream banks, and place abutments outside of the floodplain whenever possible. Seek to maintain baseline water flow volume and velocity within the system. 7. Design the structure to maintain or replicate natural stream channel and flow conditions to the greatest extent practicable. 8. Revegetate shoreline areas with appropriate native species and fully stabilize disturbed upland areas prior to removing silt fences and erosion prevention measures.
For Increase in Nutrients, Pollution, Contaminants, and Freshwater	1. Conduct work during the dry season when possible; stop work during storms or heavy rains. 2. Prevent discharges into the water. 3. Inspect all equipment prior to beginning work each day to ensure the equipment is in good working condition, and there are no contaminant (for example, oil, fuel) leaks. Work must be stopped until leaks are repaired, and equipment is cleaned. Equipment should always be stored in appropriate staging area designed to be preventative in terms of containing unexpected spills when equipment is not in use or during fueling. 4. All fueling or repairs to equipment must be done in a location with the appropriate controls that prevent the introduction of contaminants to marine environment. 5. Fueling of project-related vehicles and equipment shall take place at least 50 feet, or the maximum distance possible, from the water and within a containment area, preferably over an impervious surface. 6. Use of treated wood that would be in contact with the water is not authorized. 7. Use materials that are nontoxic to aquatic organisms, such as untreated wood, concrete, or steel (avoid pressure treated lumber). 8. Prevent bentonite and other drilling fluids from contacting benthic organisms. 9. Prevent discharges of chemicals and other fluids dissimilar from seawater into the water column.

TABLE 3.10-19. **Final NOAA NMFS Proposed BMPs**

TOPIC	BMP
Observations and Monitoring	Contractors will monitor for the presence of ESA-listed species during all aspects of the permitted action. • A responsible party (permittee, site manager, project supervisor) will designate a competent observer to search/monitor work sites and the areas adjacent to the authorized work area for ESA-listed species. • Observers will survey the area before the start of work each day, including before resumption of work following any break of more than one-half hour.
Monitoring Plan	The State and FHWA ~~action agency~~ will ensure that a monitoring plan developed by the Contractor prior to start of construction, identifies the methods, equipment, communication, and all necessary measures to adequately observe ESA-listed marine species in the affected areas and communicate with workers. • Contractor will ensure that trained, competent observers are exclusively looking for ESA-listed marine species at the work site during active construction adjacent to marine habitat and not assigned to other tasks. • Trained competent observers shall report to the Contractor ~~workers~~ when motile ESA-listed marine species are within 50 meters (54.7 yards, 164 feet) of the proposed work and halt work and shall only begin/resume after the animals have voluntarily departed the area. • If Hawaiian green sea turtle, Hawksbill sea turtle, or Hawaiian monk seal ~~listed species~~ are noticed in the area after work has already begun, that work may continue only if, in the best judgment of the Contractor's project supervisor, there is no way for the activity to adversely affect the animal(s).
Human Interaction	Contractor will ensure that project-related personnel will not attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
Inspections	Contractor's project manager or heavy equipment operators will perform daily pre-work equipment inspections for leaks. Detection of leaks will result in postponing or halting the use of heavy equipment until the leak is repaired and the equipment cleaned. The action agency will ensure that observers are exclusively looking for ESA-listed marine species at the work site and not assigned to other tasks. • Contractor's worksite will have sufficient materials to contain and clean possible spills. • Contractor's equipment storage will occur in an appropriate staging area designed to prevent unexpected spills when equipment is not in use or during fueling. • Drip pans will also be maintained beneath construction equipment. The contractor must keep the water free of debris.
Night Work	Night work will not be allowed during the sea turtle nesting/hatching period and seabird fledgling period (May 1 -December 15). ~~Avoid nighttime work during the nesting and hatching season, which extends from May through December.~~

TOPIC	BMP
Turbidity and Sedimentation Control	Turbidity and sediment from project-related work will be minimized and contained to the immediate vicinity of the project through the appropriate use of effective sediment containment devices and the curtailment of work during adverse tidal and weather conditions. • All silt fences, curtains, and other structures will be installed properly and maintained in a functioning manner for the life of the construction period and until the impact area is permanently stabilized, self-sustaining, and/or turbidity levels, elevated due to construction, return to ambient levels. • Use real-time monitoring (automated or manual) to detect failure and implement stop-work processes if predetermined project thresholds are reached (use standards from Clean Water Act 401water quality certification). • In areas of soft sediment, consider partial-length turbidity curtains to reduce the resuspension of sediment during high winds and currents.
Streambank Disturbance	Minimize disturbances to stream banks. Seek to maintain baseline water flow volume and velocity within the system.
Revegetation	Revegetate shoreline areas with appropriate native species and fully stabilize disturbed upland areas before removing silt fences and erosion prevention measures.
Material Handling	Project construction-related materials (fill, revetment rock, pipe) will not be stockpiled in or near aquatic habitats, to prevent materials from being carried into waters by wind, rain, or high surf.
Stream Crossings	For anticipated stream crossings, removal of all temporary structures will occur at the completion of in-water work.
Stream Crossing and Construction Materials	For anticipated stream crossings, do not stockpile or stage materials in the marine environment unless necessary.
Wood Material	The use of treated wood for in-water work is not authorized.
Discharge into Water	Prevent discharges of chemicals and other fluids dissimilar from seawater into the water column. • Concrete wastes, solid wastes, and any sanitary/septic wastes will ~~would~~ be located away from and managed to ensure no contamination of the ocean or marine critical habitats. • Site-specific stormwater BMPs will be implemented and/or installed at the road staging and work areas to prevent water quality degradation associated with stormwater runoff. • Project-related materials and equipment placed in the water will be free of pollutants.

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3.11 GEOLOGY, SOILS, AND NATURAL HAZARDS

This section presents an overview of the geologic and soil characteristics of the project area and provides an assessment of natural hazards potentially affecting the Honoapiʻilani Highway Improvements Project (the Project), as well as the Project's consistency with federal, State, and local plans, and policies guiding infrastructure development relative to natural hazards. This section examines a comprehensive range of hazards, including earthquakes, hurricanes, tsunamis, coastal erosion, wildfires, and volcanic hazards. These natural hazards have some relationships with water resources, wetlands, and floodplains, and potential project effects on water resources, wetlands, and floodplains are presented in Section 3.9, Water Resources, Wetlands, and Floodplains. The same is true of climate change and sea level rise, which are mentioned in this section but more fully assessed in Section 3.13, Climate Change and Sea Level Rise. Coastal erosion hazards are discussed in this chapter, with a discussion in the context of sea level rise. Qualitative discussions on how climate change and sea level rise may affect the intensity, duration, spatial extent, and probability of related hazards are included in respective subsections.

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to geology, soils, and natural hazards. Based on those comments, or other information gathered after the publication of the Draft EIS, no revision to the analysis contained within this section was warranted and no further analysis is required as part of this Final EIS.

3.11.1 Regulatory Context

Regulatory frameworks at the federal, State, and local levels address natural hazards and require mitigation measures for potential impacts. TABLE 3.11-1 describes the various agencies, regulations, and guiding documents that pertain to natural hazards.

TABLE 3.11-1. **Natural Hazard Regulatory Context**

LEVEL	AGENCY, REGULATION, DOCUMENT RESPONSIBILITIES
Federal	At the federal level, agencies such as the Federal Emergency Management Agency (FEMA), the U.S. Geological Survey (USGS), and the U.S. Army Corp of Engineers provide guidance and regulations pertaining to natural hazards. The Coastal Zone Management Act, 16 United States Code [U.S.C.] 1451 et seq., administered by the Hawaiʻi Office of Planning and Sustainable Development, regulates development activities in the coastal zone to protect against coastal hazards, including coastal erosion, flooding, and sea level rise. The Coastal Zone Management Act guides land use planning, shoreline setbacks, and coastal development permits. Guidance for consideration of the Project's ability to plan for and mitigate the impacts of natural hazards fall under Title 44 Code of Federal Regulations [CFR] Part 201,[1] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. Sections 5121 through 5207; Homeland Security Act of 2002, 6 U.S.C. Section 101; National Flood Insurance Act of 1968, 42 U.S.C. Section 4104c, and the County of Maui Hazard Mitigation Plan.
State	At the State level, the *2018 State of Hawaiʻi Hazard Mitigation Plan* guides decision-making both for mitigation and for repairing State-owned infrastructure damage in federally declared disasters. To maintain State eligibility for federal assistance and funding, the 2018 Plan complies with the Stafford Act, the Disaster Mitigation Act of 2000 (P.L. 106-390), and Title 44 CFR Part 201. The Hawaiʻi Emergency Management Agency and the State Hazard Mitigation Officer, along with a multidisciplinary group of local, State, and federal stakeholders, developed the plan. There was also input from the public and a review by FEMA. The 2018 Plan serves as a "living document." It is updated every five years and County hazard mitigation plans use it as a technical reference. The 2023 update of the State Plan became available in August 2023.[2] The Hawaiʻi State Building Codes, enforced by the Department of Accounting and General Services, establish standards for construction and structural design to ensure buildings can withstand natural hazards such as hurricanes, earthquakes, and high winds. All assessments of natural hazard risk, particularly those of climate change and sea level rise are consistent with the Hawaiʻi Sea Level Rise Vulnerability and Adaptation Report mandated by Act 83, Session Laws of Hawaiʻi 2014, and Act 32, Session Laws of Hawaiʻi 2017. The Hawaiʻi Department of Transportation (HDOT) is also guided by the *Hawaiʻi Highways Climate Adaptation Action Plan* (May 2021), which helps the agency better understand how changing climate conditions could impact the State highways and the exposure assessments of State highway facilities to rockfall and landslide, sea level rise, annual high-wave flooding, coastal erosion, storm surge, tsunami, wildfire, and lava flow.
Local	The County of Maui Emergency Management Agency is responsible for developing, implementing, and updating a local hazard mitigation plan in accordance with Title 44 CFR Section 201.6(c)(5). This plan, the *2020 Maui County Hazard Mitigation Plan*, is reviewed and approved on a semiannual basis by the Steering Committee, a County administered volunteer body of experts that oversees development and implementation of the hazard mitigation plan and following any major disasters. Updates are submitted for pre-adoption review to Hawaiʻi State Civil Defense, FEMA Region IX, and the Insurance Service Office prior to adoption.[3]

[1] 44 CFR Part 201: Mitigation Planning. https://www.ecfr.gov/current/title-44/chapter-I/subchapter-D/part-201. Accessed July 2023.

[2] Hawaiʻi Emergency Management Agency. (August 2023). State of Hawaiʻi 2023 Hazard Mitigation Plan. https://dod.hawaii.gov/hiema/final-2023-hazard-mitigation-plan/. Accessed February 2024.

[3] Maui Emergency Management Agency. (August 2020). 2020 Maui County Hazard Mitigation Plan. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed July 2023.

3.11.2 Methodology

This section identifies the natural hazards and risks posed by natural disasters, as well as a description of the geology and soils of the project area. Hazard mitigation actions and activities to reduce losses from such disasters are also identified. The No Build Alternative and the Build Alternatives are then evaluated for their susceptibility to natural hazards. The Project would be designed consistent with applicable construction codes to increase resilience to natural hazards to the extent practicable. These design considerations are described in the analysis of natural hazards.

3.11.3 Affected Environment

Maui, the second largest island in the Hawaiian group, was created by two volcanoes, Haleakalā in the east and Kahālāwai in the west. Kahālāwai, also known as the West Maui Mountains, is a deeply dissected volcano with an elevation of 5,788 feet. These features have helped shape the underlying geology and soils found within the project area, which in turn factor into the susceptibility of the project area to natural hazards. On Maui, the proposed stretch of existing highway sits within the West Maui Community Planning Area, an area characterized by its diverse topography comprising valleys, mountains, and coastal terrains. The project area is in the moku (traditional district) of Lāhainā and spans three ahupuaʻa: Ukumehame, Launiupoko, and Olowalu.

3.11.3.1 Geology

FIGURE 3.11-1 provides an overview map of the geologic characteristics of the project area. The oldest rocks on West Maui are the very permeable (where water can easily seep through) primitive Wailuku basalts. The sedimentary rocks comprise landslide debris, delta deposits, and valley fills, mostly of poorly permeable (where water cannot easily seep through) and bouldery alluvium (clays, silts, sand, and gravel).

3.11.3.2 Soils

The Natural Resource Conservation Service identifies and maps soil associations for the dominant soil types of an area. Soil associations are groups of related soils that occur in landscapes with characteristic topographic features, slopes, and parent materials, and give an overview of the soils present.[1]

TABLE 3.11-2 lists the soil associations and their primary characteristics in the project area. FIGURE 3.11-2 shows how these soil types are mapped throughout the project area. At the Pali end of the project area, the rock land formation is reflective of the rugged and rocky topography of the area and is notable for the presence of rock slides, as evidenced by rock fall protection along Honoapiʻilani Highway. In addition, along the immediate coastline in the area (and including) the existing highway, there is a potential for more erodible soil conditions.

[1] U.S. Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI (2012). https://directives.sc.egov.usda.gov. Accessed July 2023.

TABLE 3.11-2. **Soil Associations**

ASSOCIATION NAME	CHARACTERISTICS[2]
Pulehu-Mala-Kealia-Ewa	Deep, nearly level to moderately sloping, well-drained and excessively drained soils that have a moderately fine textured to coarse-textured subsoil or underlying material; on alluvial fans and in basins
Waianee-Waiakoa	Deep, gently sloping to very steep, well-drained soils that have a moderately fine textured or medium-textured subsoil; on intermediate and high uplands
Ustorthents-Rock Outcrop-Lithic Ustorthents	Rough mountainous land association; very shallow, steep and very steep, rock land and rough mountain land

Cinder cone locations have been mapped, showing areas where underlying conditions may require design considerations. Cinder cones are conical hills formed by a buildup of glassy lava fragments that fall following an eruption.[3] The cinder cone in the northwest corner of Olowalu is unavoidable and would be crossed by all Build Alternatives.

[2] U.S. Department of Agriculture Soil Conservation Service. (January 1971). General Soil Map Maui Island, Hawai'i. University of Hawai'i Agricultural Experiment Station. https://esdac.jrc.ec.europa.eu/content/general-soil-map-maui-island-Hawaii. Accessed July 2023.

[3] US Geological Survey. (June 2015). Volcano Hazard Program. Glossary – Cinder Cone. https://volcanoes.usgs.gov/vsc/glossary/cinder_cone.html. Accessed November 2023.

FIGURE 3.11-1. **Geologic Formations**

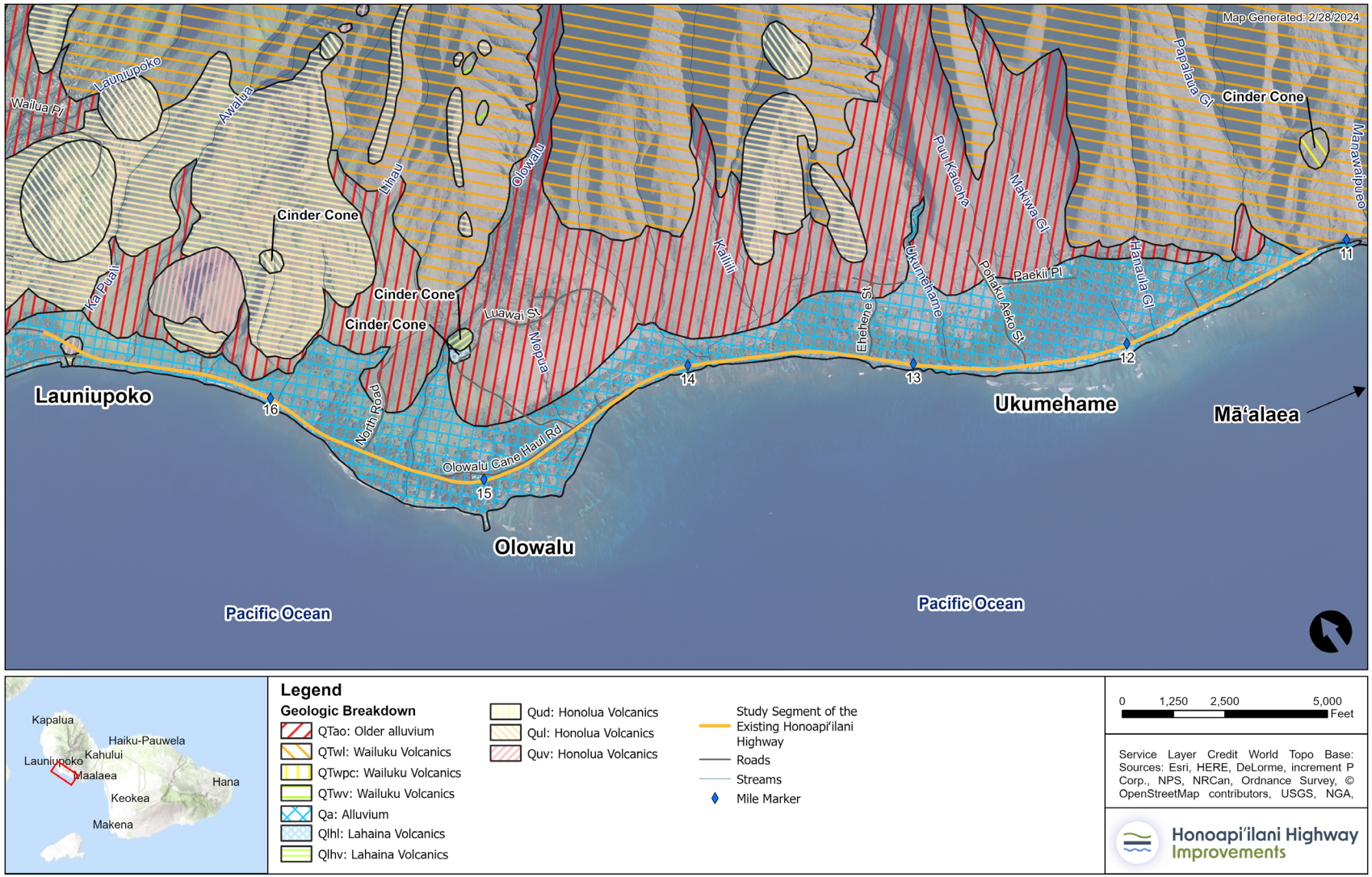
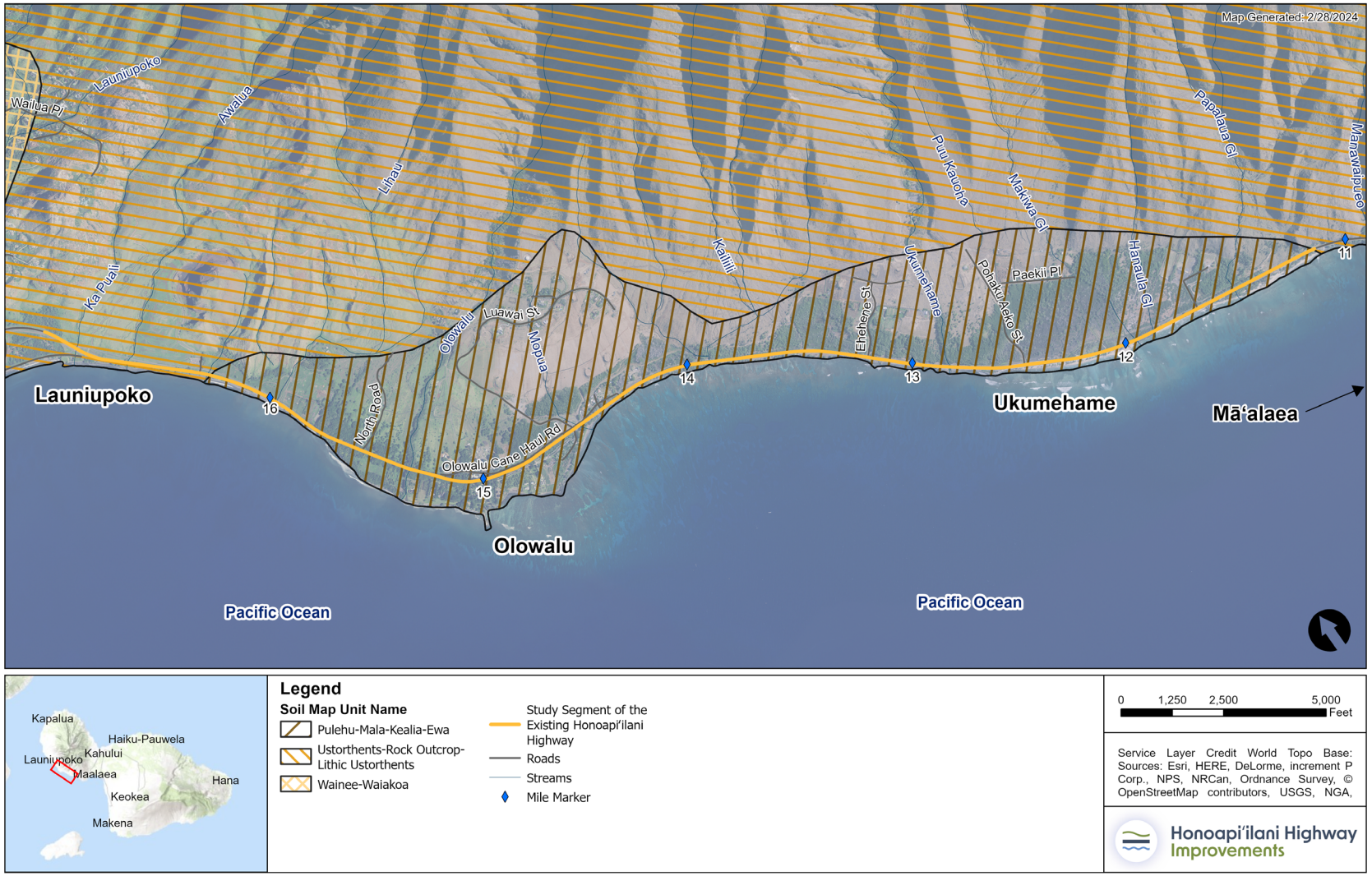


FIGURE 3.11-2. **Soil Associations**



3.11.3.3 Natural Hazards Overview

Maui is susceptible to natural hazards including earthquakes, hurricanes, tsunamis, coastal erosion, wildfires, and volcanic hazards. TABLE 3.11-3 provides a summary of the Priority Risk Index for natural hazards completed for West Maui by the Maui Emergency Management Agency. See the *2020 Maui County Hazard Mitigation Plan* for a full explanation of the Priority Risk Index. The Priority Risk Index results do not include climate change and sea level rise.

TABLE 3.11-3. **Priority Risk Index Results for West Maui[4]**

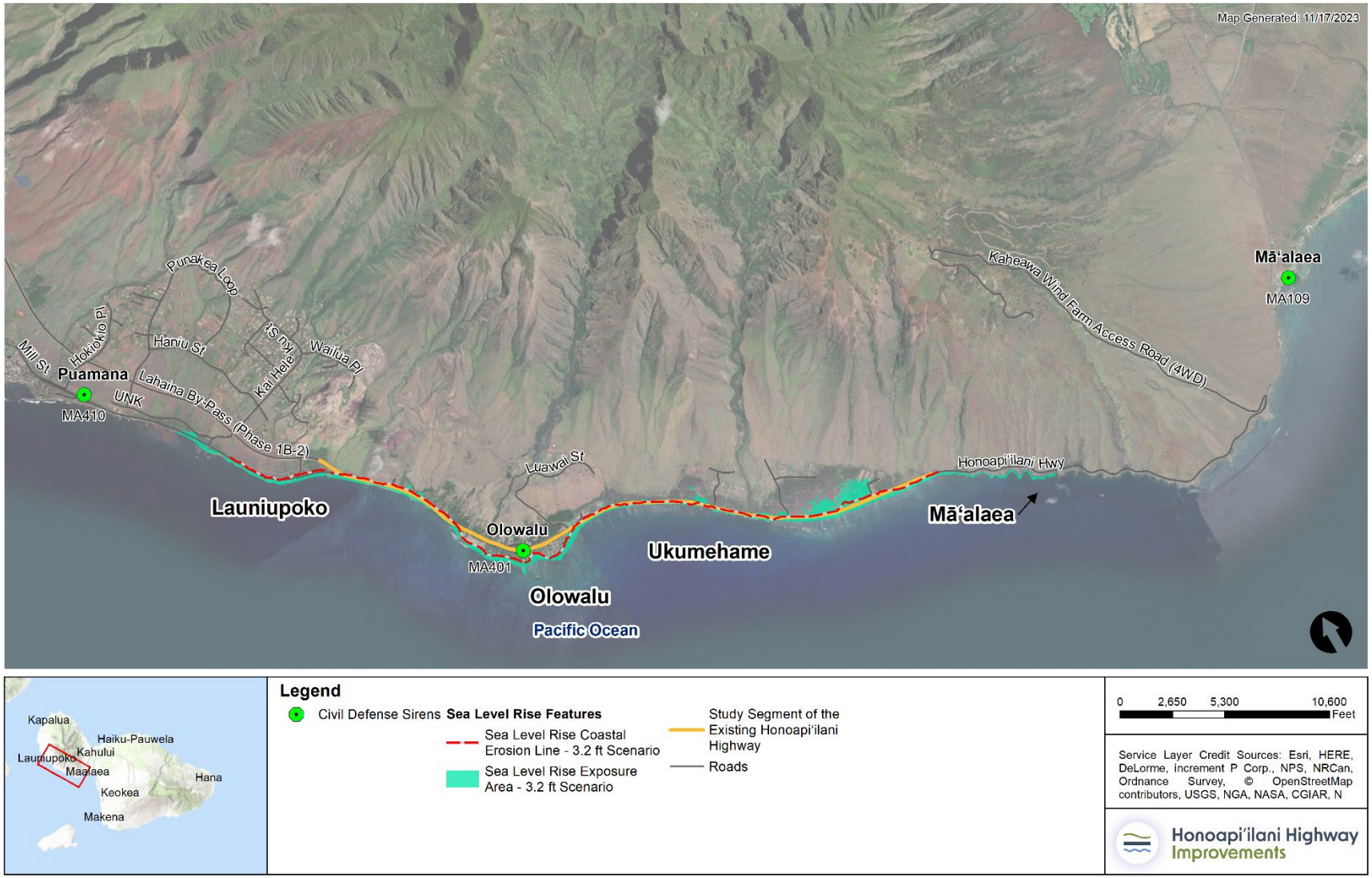
HAZARD	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION
Earthquake	Possible	Critical	Moderate	Less than 6 hours	Less than 6 hours
Hurricanes	Possible	Catastrophic	Large	More than 24 hours	Less than 1 week
Tsunami	Likely	Critical	Moderate	Less than 6 hours	Less than 6 hours
Coastal Erosion	Highly Likely	Limited	Moderate	More than 24 hours	More than 1 week
Wildfires	Highly Likely	Critical	Moderate	12 to 24 hours	Less than 1 week
Volcanic Hazards	Possible	Minor	Small	More than 24 hours	Less than 1 week
Flooding	Highly Likely	Critical	Moderate	12 to 24 hours	Less than 24 hours

The Hawaiʻi Emergency Management Agency utilizes a system of civil defense sirens throughout the state to alert the public of emergencies and natural hazards. Both natural and human-caused events can trigger the all-hazard siren, including tsunamis, hurricanes, dam breaches, flooding, wildfires, volcanic eruptions, terrorist threats, and hazardous material incidents. The only siren within the project area is just mauka of the Olowalu Landing.[5] The Olowalu siren serves as the most immediate response system to relevant natural hazards within the project area. The next closest sirens are to the north at Puamana and to the south at Māʻalaea (FIGURE 3.11-3).

[4] Maui Emergency Management Agency. (August 2020). *2020 Maui County Hazard Mitigation Plan*. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed July 2023.

[5] State of Hawai'i. 2019. Hawai'i Open Data. Department of Defense – State Civil Defense Emergency Siren Locations. Department of Defense - State Civil Defense Emergency Siren Locations - Department of Defense - State Civil Defense Emergency Siren Locations (CSV) - Hawaii Open Data. Accessed July 2023.

FIGURE 3.11-3. **Civil Defense Siren Locations**



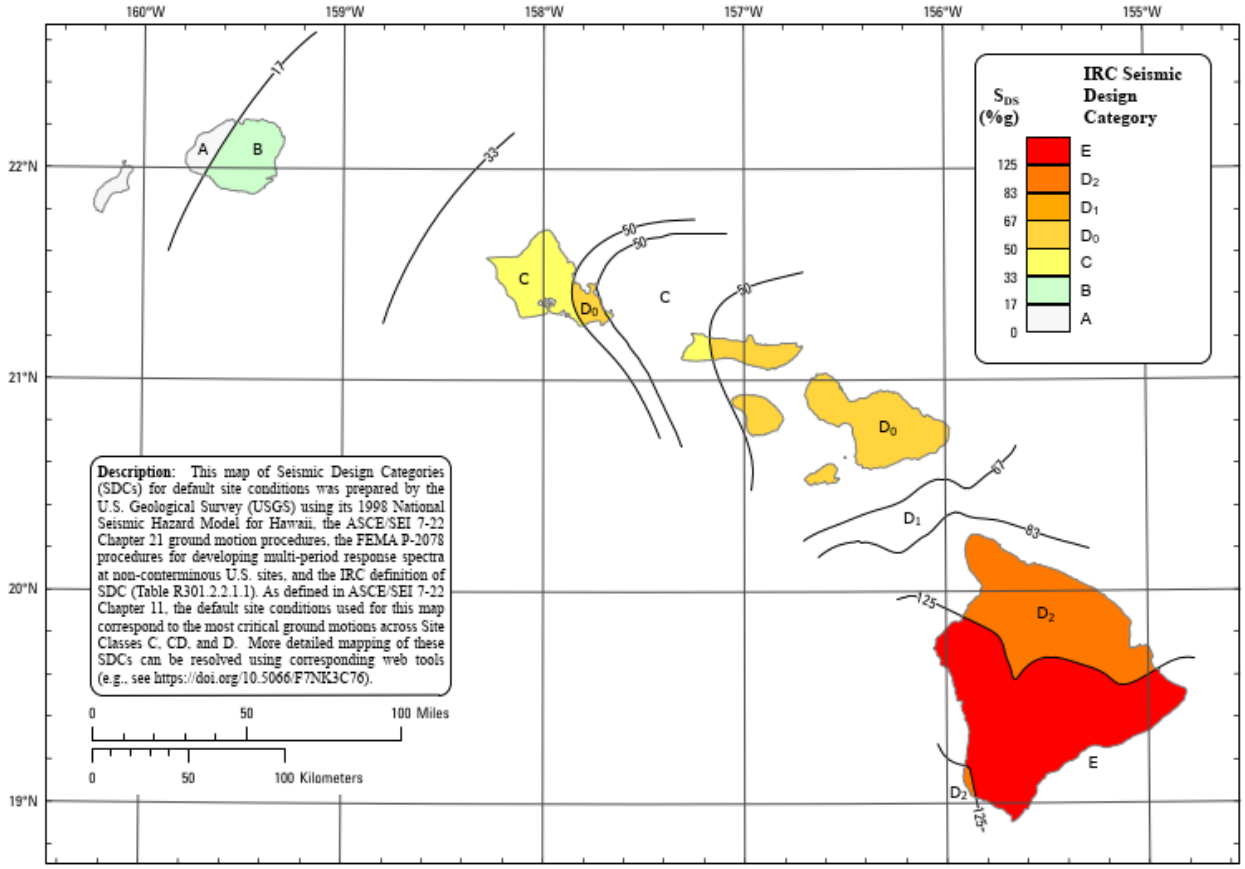
Source: State of Hawai'i (2019)

3.11.3.4 Earthquakes

Hazard Assessment

USGS peak ground acceleration is a method of measuring earthquake intensity appropriate for infrastructure and shorter buildings (FIGURE 3.11-4).[6] Peak ground acceleration values correspond with seismic design categories (SDC). SDCs indicate the level of seismic resistance required for new buildings and consider the soil type at the site.[7] TABLE 3.11-4 describes the hazard level associated with each SDC and the associated levels of shaking. The project area is in the D_0 category, indicating that the area could experience strong shaking but less than D_1 and D_2 areas (TABLE 3.11-4).

FIGURE 3.11-4. **Seismic Design Category Hazard Levels**



Source: 2020 NEHRP Recommended Seismic Provisions: Seismic Design Category Maps for 2024 International Residential Code (IRC) and International Building Code (IBC). (April 2023). Accessed on FEMA.gov July 2024.

6 Western Washington University. (n.d.). Geology Department. Peak Ground Acceleration. http://kula.geol.wwu.edu/rjmitch/pga_maps.pdf. Accessed July 2023.

7 Federal Emergency Management Agency. (2020). Risk Management: Earthquake Hazard Maps. Earthquake Hazard Maps | FEMA.gov. Accessed July 2023.

TABLE 3.11-4. **Seismic Design Category Hazard Levels[8]**

SDC/MAP COLOR	EARTHQUAKE HAZARD	POTENTIAL EFFECTS OF SHAKING
A/White	Very small probability of experiencing damaging earthquake effects	N/A
B/Gray	Could experience shaking of moderate intensity	Moderate shaking: felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
C/Yellow	Could experience strong shaking	Strong shaking: damage negligible in buildings of good design and construction; slight to moderate in well-built, ordinary structures; considerable damage in poorly built structures.
D_0/Light Orange **D_1/Darker Orange** **D_2/Darkest Orange**	Could experience very strong shaking (the darker the color, the stronger the shaking)	Very strong shaking: damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures.
E/Red	Near major active faults capable of producing the most intense shaking	Strongest shaking: damage considerable in specially designed structures; frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Shaking intense enough to destroy buildings.

Earthquake damage can be intensified by soil factors. Saturated soils amplify earthquake motions and can result in mudflows on steep slopes.[9] Saturated soils also can be subject to soil liquefaction. Soil liquefaction is when "the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading."[10] When the ground shakes, liquefaction causes the soil to act like a fluid, resulting in ground failure.[11] All the soil associations in the project area (TABLE 3.11-2) are listed as National Earthquake Hazard Reduction Program Class D soils (that is, they are among the most susceptible to liquefaction).

Vulnerability

Maui County infrastructure is susceptible to earthquake hazards, including pipes, roads, bridges, dams, water and wastewater treatment facilities, and utility poles. Belowground infrastructure faces heightened vulnerability. The potential damage to roads can disrupt access to vital resources for specific populations. Infrastructure in areas with liquefaction-prone soils may experience sinking. Secondary impacts of earthquakes, such as rock falls or fires, can also damage infrastructure and present hazards to the surrounding community. A significant portion of Maui County's infrastructure

8 Federal Emergency Management Agency. (2020). Risk Management: Earthquake Hazard Maps. Earthquake Hazard Maps | FEMA.gov. Accessed July 2023.

9 U.S. Geological Survey. (n.d.). Damaging Earthquakes – A Common Hazard in Hawai'i. Hawaiian Volcano Observatory. https://www.usgs.gov/observatories/Hawaiian-volcano-observatory/damaging-earthquakes-common-hazard-Hawaii. Accessed July 2023.

10 University of Washington. (n.d.). What is soil liquefaction? http://www.ce.washington.edu/~liquefaction/html/what/what1.html. Accessed July 2023.

11 Earthquake Basics: Liquefaction: Earthquake Engineering Research Institute. (n.d.). https://eeri.org/wp-content/uploads/store/Free%20PDF%20Downloads/LIQ1.pdf. Accessed July 2023.

was built in the 1970s and potentially lacks seismic construction or retrofitting to withstand earthquakes. The Project would be constructed to the American Association of State Highway and Transportation Officials (AASHTO) standards.

3.11.3.5 Tsunamis

Hazard Assessment

Tsunamis pose a significant natural hazard to coastal regions, including the project area. Strong currents, flooding, and the overall force of the water can destroy buildings and devastate coastal communities. Of all natural hazards facing the Hawaiian Islands, tsunamis have been the deadliest.[12]

West Maui has the greatest amount of tsunami exposure of any community planning area in Maui County, as development tends to occur along the coast.[13] If a tsunami were to come ashore, the coastal areas and parts of the existing highway could certainly be rendered impassable and transportation in and out of West Maui would be cut off, resulting in economic and physical damage for as long as it takes to make repairs.

The National Oceanic and Atmospheric Administration (NOAA) operates two tsunami warning centers (24 hours a day, 7 days a week) that monitor and forecast potential tsunami activity and coordinate warning and public outreach operations. More locally, the State of Hawaiʻi receives official tsunami warnings, watches, advisories, and information statements from the Pacific Tsunami Warning Center.[14] A description of the variety of tsunami warnings can be found in the *2023 State of Hawaiʻi Hazard Mitigation Plan*.[15]

Vulnerability

In Maui County, a tsunami resulting in damage or death occurs approximately every three and a half years, on average.[16] The *Maui County Hazard Mitigation Plan* lists West Maui as having a 1% to 10% annual chance of tsunami hazards. Unlike hurricanes and tropical storms, there is no tsunami season during which they occur with frequency. Because they are dependent on seismic activity, tsunamis can occur year-round and at any time.

NOAA collects data on and maps areas at risk of tsunamis, which are labeled tsunami evacuation zones and extreme tsunami evacuation zones. Tsunami evacuation zone maps detail where inundation and effect would be felt as well as tsunami safe zones.

There are no potentially at-risk critical facilities within the project area other than the existing highway, reducing the overall risk from tsunami damage. The existing highway does include three bridges, from

12 *Maui Island Plan*. (2012). Chapter 3: Natural Hazards. https://www.mauicounty.gov/1503/Maui-Island-Plan.

13 Maui Emergency Management Agency. (August 2020). *2020 Maui County Hazard Mitigation Plan*. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed July 2023.

14 NOAA. (2020). U.S. Tsunami Warning System. National Weather Service. https://www.tsunami.gov/.

15 *State of Hawaiʻi Hazard Mitigation Plan Update (2023*). Chapter 4.13 OTIC Tsunami. https://dod.hawaii.gov/hiema/files/2023/01/2023_Hawaii_SHMP_Final_Approved_Adopted_508Compliant-10.27.23.pdf. Accessed February 2024.

16 Hawaiʻi Department of Transportation. (2023). HDOT Asset and Hazard Map, Hawaiʻi Highways Climate Insights for Infrastructure. https://climate-resilience.hidot.hawaii.gov/map/information/info. Accessed September 2023.

north to south: Bridge 009000300301971 (Olowalu B Stream Bridge), Bridge 009000300302100 (Olowalu Stream Bridge), and Bridge 009000300302351 (Ukumehame Stream Bridge), all of which are along potentially tsunami-inundated segments of the highway according to the HDOT Asset and Hazard Map (FIGURE 3.11-5).[17, 18] The Olowalu B Stream Bridge crosses an offshoot of the Olowalu Stream just after the Lahaina Bypass. The Olowalu Stream Bridge crosses the main branch of the Olowalu Stream just northwest of Olowalu town center. The Ukumehame Stream Bridge crosses the main branch of the Ukumehame Stream in between Ehehene Street and Pōhaku 'Aeko Street.

FIGURE 3.11-6 depicts the tsunami evacuation zone for the project area. Nearly the entire existing highway falls within the current tsunami evacuation zone in this section. This zone extends nearly 0.5-mile mauka from of the existing highway in some areas, with the largest coverage just north of Olowalu and just north of Pāpalaua Wayside Park.

Although the direct effect of climate change on tsunami sources such as earthquakes, landslides, and volcanoes are not yet fully understood, it is important to recognize that climate change could heighten the vulnerability of Maui County to tsunami impacts. Rising sea levels have the potential to extend the reach of tsunamis inland. Additionally, the warming of ocean waters contributes to coral bleaching events. Coral reefs act as natural barriers, safeguarding against tsunamis by dissipating wave energy offshore. Therefore, the implications of climate change on these protective coral reef ecosystems should be considered in the overall susceptibility of the project area to tsunamis.

3.11.3.6 Volcanic Hazards

Hazard Assessment

The only active volcano on Maui is Haleakalā, with its last eruption having occurred between 400 and 600 years ago.[19] Active volcanoes can produce several types of natural hazards: lava flows, volcanic ash and tephra fall, and volcanic gas or smog.[20]

Volcanic hazards on Maui are highly location dependent. Haleakalā sits in the southeastern portion of Maui; therefore, the project area is unlikely to face any hazards from lava flow. However, the project area may be affected by volcanic smog brought by storms or non-trade-wind conditions. The presence of acidic aerosols in volcanic smog increases the corrosion rate of exposed metals along the downwind path of the volcanic smog plume.[21] However, these effects are considered minor.

Vulnerability

Over the last 1,000 years, Haleakalā has erupted approximately 10 times, resulting in lava flow events every few hundred years. Volcanic gas or smog events, however, affect Maui every couple of years due

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17 Hawai'i Department of Transportation. (2023). HDOT Asset and Hazard Map, Hawai'i Highways Climate Insights for Infrastructure. https://climate-resilience.hidot.hawaii.gov/map/information/info. Accessed September 2023.

18 Hawai'i Department of Transportation. (2013). State Historic Bridge Inventory and Evaluation, Chapter 5 Maui. https://historichawaii.org/library/bridge/SHBIE2014_06_Ch5.pdf. Accessed October 2024.

19 U.S. Geological Survey. (2023). Active Volcanoes of Hawai'i. Hawaiian Volcano Observatory. https://www.usgs.gov/observatories/hvo/active-volcanoes-Hawaii. Accessed July 2023.

20 Fisher, R. (1997). Hazardous Volcanic Events. http://volcanology.geol.ucsb.edu/hazards.htm. Accessed July 2023.

21 Maui Emergency Management Agency. (August 2020). *2020 Maui County Hazard Mitigation Plan*. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed June 2023.

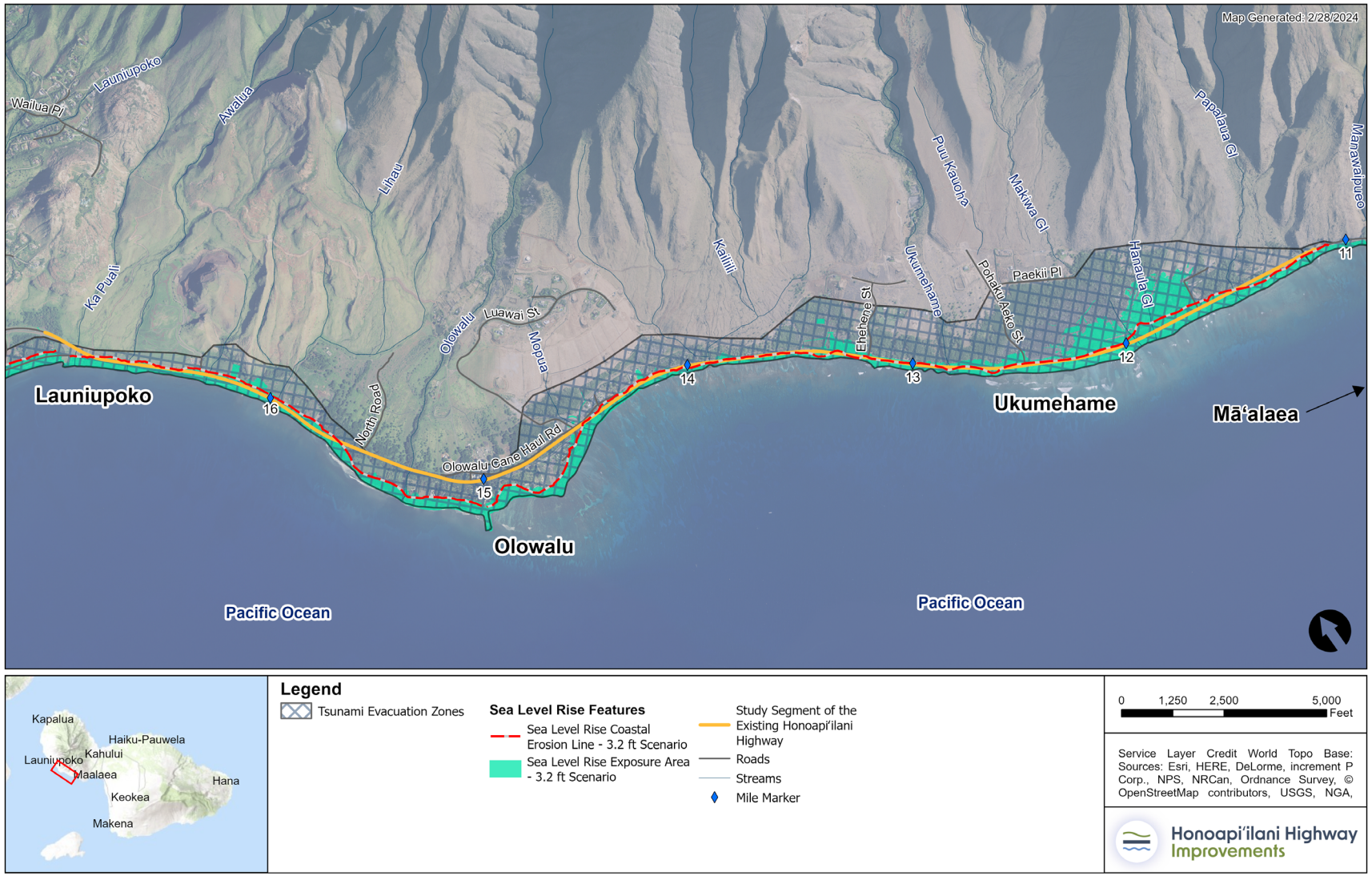
to eruptions on the Island of Hawaiʻi. The *Maui County Hazard Mitigation Plan* lists West Maui as having a 1% to 10% annual chance of volcanic hazards.[22]

[22] Maui Emergency Management Agency. (August 2020). *2020 Maui County Hazard Mitigation Plan*. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed July 2023.

FIGURE 3.11-5. **Existing Honoapi‘ilani Highway Potentially Tsunami-Inundated Bridges**

Source: Hawai‘i Department of Transportation (2022).

FIGURE 3.11-6. **Tsunami Evacuation Zone**



3.11.3.7 Wildfires

Hazard Assessment

Hawaiian wildfires are most common during the dry months from April to October.[23] Leeward sides of the islands tend to be drier, increasing the risk for fire. More than 1,000 fires occur annually in Hawai'i, burning more than 20,000 acres.[24] Intensifying development and travel to the islands have resulted in increased frequency and intensity of wildfires in the state. Human actions such as improperly extinguished campfires or cigarettes, intensifying land use, and sparks and heat from vehicles most often provide the ignition. It is estimated that 87% of wildfires are ignited by human activity.[25] TABLE 3.11-5 lists contributing factors to wildfire intensity and frequency in Hawai'i.

Wildfires can cause significant damage to buildings and infrastructure, as well as death and serious injury to people. The extreme heat and smoke risks are coupled with aftereffects such as soil destabilization, aggradation, dust storms, and landslides and rockfalls.[26]

In 2023, Lāhainā, just north of the project area, experienced a devastating wildfire that resulted in significant human and economic impacts. The 2023 Lāhainā wildfire marked one of Hawai'i's worst natural disasters and the deadliest in the United States since 1918. TABLE 3.11-6 includes information on recent wildfires.

TABLE 3.11-5. **Contributing Factors to Wildfire Intensity and Frequency in Hawai'i**

FACTOR	CONTRIBUTION
Invasive and Nonnative Vegetation	Invasive species and nonnative grasses and shrubs provide large amounts of fuel for fires, as they are now the predominant vegetation in the state.
Climate Change[1]	• Climate change leads to greater dryness and elevated temperatures, both of which are significant factors contributing to the heightened intensity of wildfire conditions. • Longer draughts and high rainfall variability create conditions for non-fire-resistant vegetation to ignite.
El Niño-Southern Oscillation	Warm El Niño years provide long growth periods for vegetation (fuel) followed by drought, increasing high-risk fire conditions.[2]

1 Section 3.13, Climate Change and Sea Level Rise.

2 State of Hawai'i. (August 6, 2018). Hazard Mitigation Plan. https://dod.Hawaii.gov/hiema/files/2018/11/State-of-Hawaii-2018-Mitigation-Plan.pdf. Accessed July 2023.

Changing conditions in Hawai'i are increasing the risk of wildfires. Climate change is anticipated to bring more intense precipitation to certain regions while increasing the risk of drier conditions in others, heightening the susceptibility to both natural and human-induced wildfires. Areas experiencing

23 State of Hawai'i. (August 6, 2018). Hazard Mitigation Plan. https://dod.Hawaii.gov/hiema/files/2018/11/State-of-Hawaii-2018-Mitigation-Plan.pdf. Accessed July 2023.

24 Trauernicht, C., and M. P. Lucas. (September 2016). "Wildfire ignition density maps for Hawai'i." Forest and Natural Resource Management Series RM-21, University of Hawai'i Cooperative Extension Service.

25 National Interagency Fire Center. (2023). Human-caused and lightning-caused wildfire summary. Statistics. https://www.nifc.gov/fire-information/statistics. Accessed September 2023.

26 U.S. Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI (2012). https://directives.sc.egov.usda.gov. Accessed July 2023.

heavier precipitation may witness amplified vegetation growth, potentially serving as future wildfire fuel. In 2018, Hawaiʻi recorded 627 wildfires that scorched 32,386 acres of land. These fires primarily ignited in the drier, leeward island areas—often near population centers, roads, and vehicles—which are common sources of fire ignition.[27]

Concerns loom over escalating wildfire risks in the coming decades. This stems from the ongoing expansion of grasslands and shrublands, population growth, increasing arid conditions in lowland areas, and heightened year-to-year rainfall variability, which includes more frequent droughts. While arid lowlands may eventually become less flammable due to reduced vegetation growth in extremely dry conditions, wildfires on Maui are becoming more frequent, and this trend is anticipated to escalate with the warming of the climate.[28]

Vulnerability

West Maui has a probability of "Highly Likely" (greater than 90% annual chance) of experiencing a wildfire in a given year. The HDOT Climate Insights for Infrastructure platform includes a variety of resources, including the 2021 *Hawaiʻi Highways Climate Adaptation Action Plan* and the Climate Insights for Infrastructure mapping tool, to analyze and assess hazard impacts, such as wildfires. Previous data and work from the 2021 plan include concerns that wildfire risk would increase over the coming decade, partially due to expansions of grass and shrublands, climate change-related temperature and precipitation variability, and population growth.[29] The mapping tool indicates that from 2013 to 2020, all wildfire ignitions within the project area were within 400 feet of an existing roadway.[30]

The areas of Olowalu and Ukumehame have historically been among the most wildfire-prone areas in West Maui. From 2016 to 2019, four wildfires in these areas burned 1,955 acres. Honoapiʻilani Highway itself was within a 2016 fire that burned 203 acres.[31] Firebreaks have been installed between Olowalu and Ukumehame, as well as on the plateau on the southern flank of Pāpalaua stream. TABLE 3.11-6 lists recent fires in and overlapping the project area.

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27 Pacific Fire Exchange. 2019. 2018 Wildfires in Hawaiʻi | PFX Annual Summary. Accessed April 6, 2020, from: https://www.pacificfireexchange.org/research-publications/category/2018-annual-wildfire-summary-hawaii-pefkz.

28 Rezaie, F., Panahi, M., Bateni, S. M., Lee, S., Jun, C., Trauernicht, C., & Neale, C. M. U. (2023). Development of novel optimized deep learning algorithms for wildfire modeling: A case study of Maui, Hawaiʻi. *Engineering Applications of Artificial Intelligence*, *125*, 106699-. https://doi.org/10.1016/j.engappai.2023.106699.

29 Hawaiʻi Department of Transportation. (April 2021). Wildfire Exposure Assessment. *Hawaiʻi Highways Climate Adaptation Action Plan*. Accessed September 2023.

30 Hawaiʻi Department of Transportation. (2022). Climate Insights for Infrastructure Tool. https://climate-resilience.hidot.hawaii.gov/map/information/info. Accessed September 2023.

31 Hawaii Wildfire Management Organization. (2019). Hawaiʻi State Wildfire History Data Set. University of Hawaiʻi College of Tropical Agriculture and Human Resources. http://gis.ctahr.hawaii.edu/WildfireHistory#acks. Accessed July 2023.

TABLE 3.11-6. **2023 Fires in and Around Project Area**

YEAR	ACRES BURNED	IMPACT
June 2023	120	In June 2023, a wildfire burned in Olowalu mauka of the highway. Smoke and fire conditions threatened homes and properties in the area of the Olowalu Stream and created roadway closures for this important link to West Maui. **FIGURE 3.11-7. June 2023 Olowalu Fire**
August 2023	2,170	The 2023 Lāhainā wildfire marked one of Hawai‘i's worst natural disasters and the deadliest in the United States since 1918. The County of Maui estimates the wildfire burned 2,170 acres.[1] The cause of the fire remains debated, with possibilities including fallen power lines and worsening drought conditions.[2] Climate change was cited as a long-term concern for wildfires, as Hawai‘i has experienced an increase in acreage burned by wildfires due to invasive grasses and worsening dry conditions, symptoms attributed to climate change. Heavy winds from Hurricane Dora moving across the Pacific Ocean south of the Island fanned flames and propelled the fire’s movement. The wildfires caused significant road closures and evacuations that impacted project efforts to access the project area for field surveys and data collection. No portions of the proposed 6-mile stretch of the existing Honoapi‘ilani Highway were damaged.

1 Maui County. (August 21, 2023). County of Maui Wildfire Disaster Update. Press Releases. https://www.mauicounty.gov/CivicAlerts.aspx?AID=12744. Accessed September 2023.

2 Trauernicht, Clay, & Elizabeth Pickett (2016) Pre-fire planning guide for resource managers and landowners in Hawai‘i and Pacific Islands, Forest and Natural Resource Management, College of Tropical Agriculture and Human Resources, https://www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-20.pdf. Accessed September 2023.

FIGURE 3.11-8 shows ignition density or number of ignitions per square mile per year across the state. The University of Hawai'i at Mānoa's Pacific Fire Exchange, in conjunction with the Hawai'i Wildfire Management Organization, provide and update datasets on wildfires in the islands. Within the project area, the greatest densities occur in Olowalu, though pockets of ignitions can be seen along the coastline spanning the whole project area.

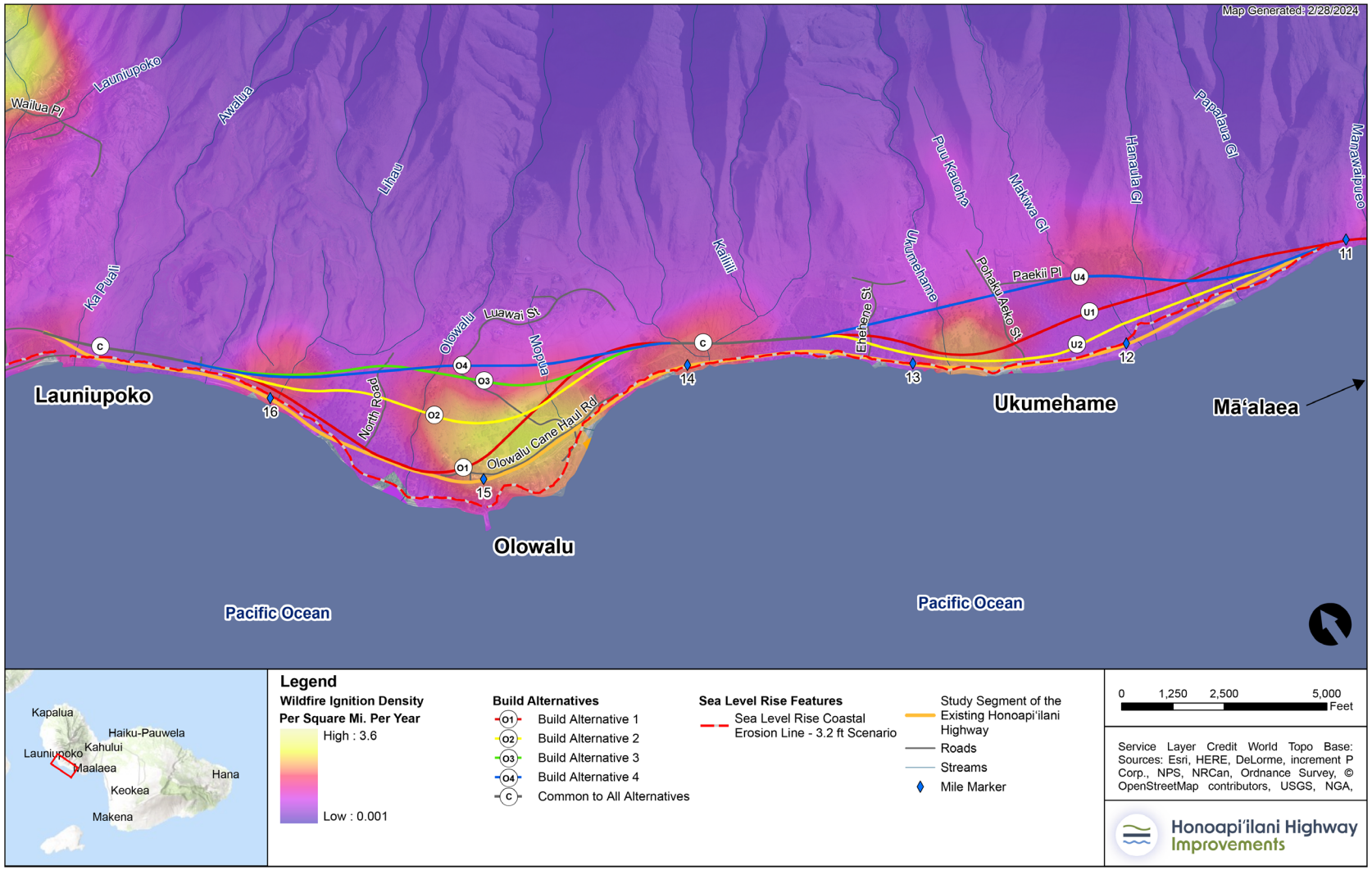
The HDOT Asset and Hazard Assessment tool indicates that the project area faces a less than or equal to one wildfire ignition event per square mile per year.[32] Several small breaks in the coverage exist along the existing highway, including a small break at Ukumehame Beach Park. Regardless of these breaks, the existing highway faces annual threats of wildfire exposure. Additionally, the HDOT Climate Insights for Infrastructure mapping tool presents Wildfire Risk Zone and wildfire events per square mile, per year data.

The project area is on the leeward side of the island with steep slopes nearby and a history of wildfires. Mauka streams in Olowalu and Ukumehame present the added risk of sedimentation and water pollution associated with the aftereffects of wildfires.[33]

[32] Hawai'i Department of Transportation. (April 27, 2021). Wildfire Exposure Assessment. HDOT Asset and Hazard Assessment. https://histategis.maps.arcgis.com/apps/MapSeries/index.html?appid=fb60bffa652c453d96b89d9f4aa9f756. Accessed July 2023.

[33] Hawai'i Wildfire Management Organization. (2017). Prevent Wildfires to Protect Oceans. https://www.Hawaiiwildfire.org/home. Accessed July 2023.

FIGURE 3.11-8. **Maui County Wildfire Ignitions**



Source: Pacific Fire Exchange. (n.d.) Wildfire Ignition Density Map for Hawai'i. Hawai'i Wildfire Management Organization and University of Hawai'i at Mānoa. https://pacificfireexchange.org/map_tool_topic/wildfire-ignition-density-maps-for-hawaii/. Accessed September 2023.

3.11.3.8 Hurricanes and Tropical Storms

Hazard Assessment

Hurricanes are classified from one to five on the Saffir-Simpson Scale, based on the speed of sustained wind and subsequent damage level. Category 1 storms are the weakest, with minimal damage. Category 5 storms are the strongest, with catastrophic damage.[34]

The majority of hurricanes and tropical storms form between June 1 and November 30, commonly referred to as hurricane season. August to October is particularly notable as the peak period for hurricane development. To ensure effective monitoring and response, the Central Pacific Hurricane Center takes charge of monitoring hurricanes specifically in Hawaiʻi.[35]

In the central Pacific region, climate warming scenarios indicate a projected increase in both the frequency and intensity of hurricanes and tropical storms. These changes are potentially driven by warmer ocean waters, which contribute to the development of tropical cyclones. Furthermore, the occurrence of hurricanes and tropical storms in Maui County exhibits significant variability based on El Niño-Southern Oscillation patterns. El Niño years tend to have a higher likelihood of hurricanes affecting Hawaiʻi. Although the exact changes in the timing and intensity of El Niño-Southern Oscillation patterns in the future remain uncertain, climate models suggest a doubling of El Niño and La Niña extremes in the 21st century compared to the 20th century. Consequently, projected sea level rise, in combination with storm surges, could lead to the inland expansion of hurricane impacts over time, exacerbating the impacts on coastal communities.[36]

Vulnerability

Coastal areas face the greatest effect because hurricanes weaken the longer they are over land. Roads are particularly vulnerable to hurricanes and tropical storms because surges combined with heavy rainfall led to flooding, erosion, or undermining of coastal highways. Heavy rains combined with winds may trigger landslides that can damage roadways. Strong winds can create conditions for additional hazards, such as spreading wildfires (in 2023, Hurricane Dora produced winds that contributed to the Lāhainā wildfire).

Estimates of storm surge heights and inundation areas come from the NOAA Sea, Lake, and Overland Surges from Hurricanes model. Per the model, the southern portion of the project area from Olowalu to Pāpalaua Wayside Park is within a designated Area of Potential Effects for storm surge inundation by Category 3 hurricanes. FIGURE 3.11-9 shows estimated inundation areas by hurricane category within the project area, based on the Saffir-Simpson Scale.

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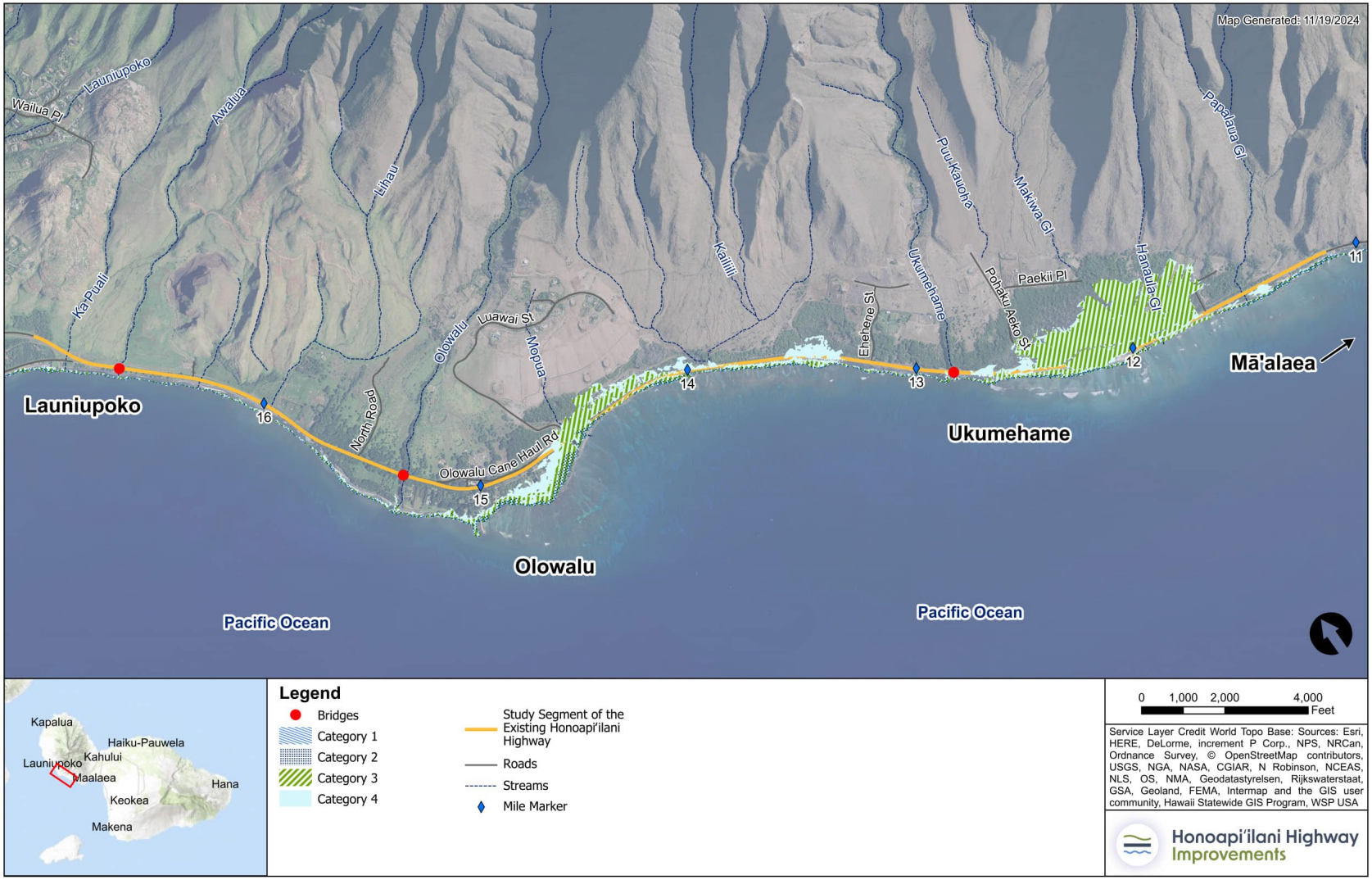
34 National Hurricane Center. (n.d.). Saffir-Simpson Hurricane Wind Scale. NOAA Central Pacific Hurricane Center. https://www.nhc.noaa.gov/aboutsshws.php. Accessed July 2023.

35 Hawaiʻi Department of Health. (2023). Hurricane Season. Issues and Advisories. Office of Public Health Preparedness | Hurricane Season (Hawaii.gov). Accessed July 2023.

36 U.S. Global Change Research Program (2018). Fourth National Climate Assessment. Chapter 27: Hawaiʻi and U.S.-Affiliated Pacific Islands. https://nca2018.globalchange.gov/chapter/27/. Accessed July 2023.

FIGURE 3.11-9. **Estimated Storm Surge Inundation for the Island of Maui**



3.11.3.9 Coastal Erosion

Hazard Assessment

Coastal erosion occurs due to a combination of natural processes such as wave action, sediment transport, and sea level changes. Factors such as wave energy, shoreline dynamics, sediment availability, and the influence of storms and climate change work to wear away coastal rocks, soils, and sands. While shorelines can naturally recover from erosion, it takes a long time to do so. This is the case in shorelines with heavy development, causing damage to infrastructure and the environment by a receding coast.[37]

While a natural process, some human activities can exacerbate coastal erosion. One such activity is shoreline hardening. Also known as coastal armoring, this process can provide immediate protection against coastal erosion by shielding the land behind them from wave energy. But the process can also disrupt natural sand movement and deposition processes, hastening erosion on the seaward side. Notably, the protective benefits of hardening structures often come at the expense of losing beaches and impacting coastal habitats.[38]

Coral reefs play a major role in controlling coastal erosion. They protect coastlines by providing a natural buffer but expose coastlines when degraded. Warming oceans, water pollution, and increases in turbidity all constitute human impacts that degrade coral reefs.[39]

Vulnerability

The project area sits along the western coast of West Maui, exposing it to year-round natural erosion factors. The *Maui County Hazard Mitigation Plan* lists the probability for coastal erosion in West Maui as "Highly Likely" (greater than 90% annual chance).[40] Transportation infrastructure faces risk of undermining, structural failure, and flooding resulting from coastal erosion. To protect the existing roadway, the State of Hawaiʻi has taken measures to harden the shoreline at several locations, such as in early 2003, when HDOT realigned the highway mauka north of Olowalu.

The 2019 HDOT Statewide Coastal Highway Program Report evaluated over 300 discrete coastal highway sites across the state that are threatened by coastal hazards and climate change and prioritized them using a ranking system called the Coastal Road Erosion Susceptibility Index. The report ranked a section of Olowalu (known as Mōpua) as second in priority statewide with the recommendation to harden or relocate the highway. Ukumehame is ranked 11th in priority with a recommendation to elevate or relocate that section of road.[41]

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37 U.S. Global Change Research Program. (April 1, 2021). Coastal Erosion. U.S. Climate Resilience Toolkit. https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion. Accessed July 2023.

38 U.S. Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI (2012). https://directives.sc.egov.usda.gov. Accessed July 2023.

39 NOAA. (2019). How do coral reefs protect lives and property? https://oceanservice.noaa.gov/facts/coral_protect.html. Accessed July 2023.

40 Maui Emergency Management Agency. (August 2020). *2020 Maui County Hazard Mitigation Plan*. Multi-Hazard Mitigation Plan | Maui County, HI - Official Website. Accessed July 2023.

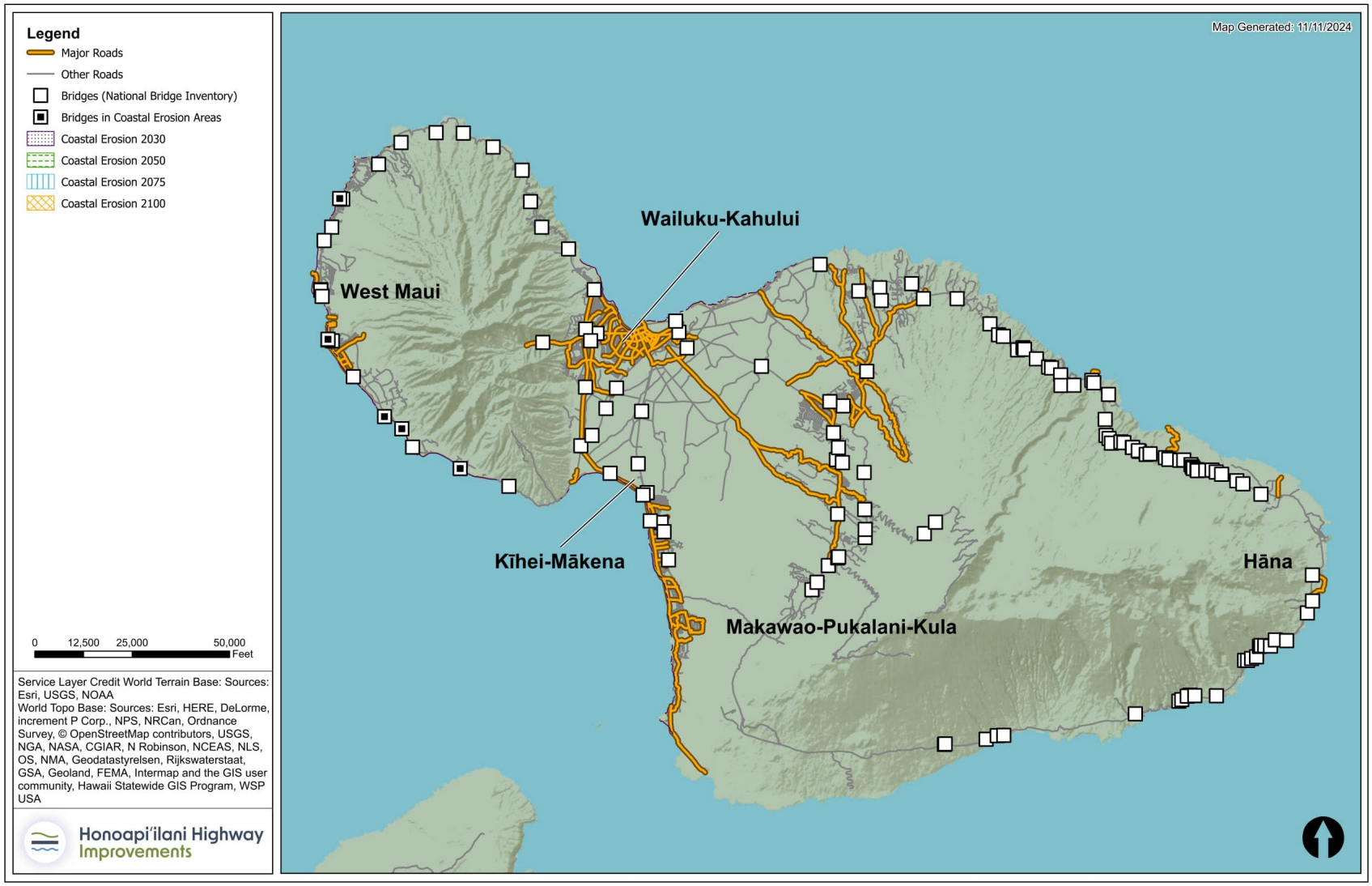
41 Francis, O., Horst, B., Zhang, G., Ma, D. (August 21, 2019). State of Hawaiʻi Statewide Coastal Highway Program Report. Hawaiʻi Department of Transportation Highways Division. Accessed July 2023.

The University of Hawai'i School of Ocean and Earth Science and Technology Coastal Geology Group has studied shoreline erosion trends across the state by evaluating mosaics of aerial photography that date back to 1912. In general, portions of the shoreline areas abutting the highway near Launiupoko and between Ukumehame Park and Pāpalaua Wayside Park are experiencing significant rates of erosion at an average of -1.4 feet/year and -1.9 feet/year, respectively. For comparison, adjacent transects within the same study areas lose roughly -0.3 feet/year and -0.7 feet/year.[42]

Two of the three bridges in the project area are within coastal erosion areas (FIGURE 3.11-10). Should coastal erosion continue or increase in intensity, impacts to these bridges could render this stretch of highway impassible. The first affected bridge lies just north of Awalua Beach, and the second is just northwest of Ukumehame Park.

[42] University of Hawai'i (July 2021). Historical Mosaics. School of Earth Science and Technology. Coastal Geology Group. http://www.soest.Hawaii.edu/crc/index.php/resources-2/historical-mosaics/. Accessed July 2023.

FIGURE 3.11-10. **Bridges in Coastal Erosion Areas on Maui Island**



3.11.4 Environmental Consequences

Implementation of the Project would not increase the incidence or likelihood of earthquakes, tsunamis, volcanic hazards, hurricanes and tropical storms, or broader consequences of coastal erosion. Nonetheless, the Project’s design would adhere to applicable regulations and best practices to manage and minimize risk to the roadway and the surrounding environment associated with these hazards.

3.11.4.1 No Build Alternative

The No Build Alternative reflects future conditions assuming the existing Honoapi‘ilani Highway remains in its current configuration and would remain vulnerable to the natural hazards discussed in this section. The existing highway was constructed prior to current design standards in terms of bridges, culverts, stormwater management infrastructure, and seismic stability, and may not be seismically constructed or retrofitted to withstand strong earthquakes.[43]

While the underlying geology and soil characteristics would remain unchanged, the No Build Alternative would continue to be subject to coastal storms and erosion (combined with sea level rise as discussed in Section 3.13, Climate Change and Sea Level Rise) that have already created unstable conditions and resulted in multiple breaches and washouts. Nature-based solutions, revetments, and seawalls, or a combination of these protections combined with elevating the road are short- to mid-term fixes. But the long-term effects of coastal storms and erosion would continue to diminish the reliability and resiliency of the transportation corridor—both temporary and permanent closures of sections of the roadway would be a potential outcome of the No Build Alternative.

The No Build Alternative would remain susceptible to earthquakes, tsunamis, volcanic hazards, wildfires, hurricanes, and tropical storms. The No Build Alternative has the greatest percentage of alignment within the tsunami evacuation zone, making it the most susceptible to impact.

3.11.4.2 Build Alternatives

The Build Alternatives have potential environmental benefits and adverse effects regarding geology, soils, and natural hazards. This section summarizes this information for each of the alternatives.

Common to All Build Alternatives in Olowalu and Ukumehame

The Build Alternatives would provide an opportunity to construct a new roadway that would minimize potential damage and disruption from natural hazards. Roadway design and construction would adhere to applicable local ordinances and statutes regarding the movement of sand and unintended consequences of protective measures, such as shoreline hardening (Section 3.13, Climate Change and Sea Level Rise, includes further discussion on coastal erosion). While the Project would be constructed to satisfy the applicable AASHTO standards, floodplains may be affected. This effect, along with the potential for the Project to result in impacts to coastal ecosystems, including coral reefs, is

[43] Hawai‘i Department of Transportation. (2023). HDOT Asset and Hazard Map, Hawai‘i Highways Climate Insights for Infrastructure. https://climate-resilience.hidot.hawaii.gov/map/information/info. Accessed September 2023.

evaluated separately in Section 3.9, Water Resources, Wetlands, and Floodplains, and Section 3.10, Flora and Fauna, and Endangered Species.

Regarding geology and soils, the Build Alternatives would generally be constructed on alluvium and old alluvium, with some areas of various alignments consisting of outcrops of basalt rock formations and clinkers (jagged volcanic rocks). The far west portion of the alignments cross a cinder cone and the far east portion of the alignments cross through Wailuku Volcanics, which would require stabilization considerations by the contractor during design-build. In the vicinity of the termini of the alignments to the far east and far west, basalt outcrops exist. Based upon existing available geotechnical information, it is anticipated that construction requirements for the various alignments would be essentially similar, with the exception of the southeast end of Build Alternative 1 in Ukumehame, which consists of significantly more excavation in basalt than the other Build Alternatives. Rock outcroppings are known in the project area, as identified by the USGS geologic maps, and would be confirmed as part of final design for the Preferred Alternative.

The Project would be designed consistent with applicable construction codes to increase resilience to natural hazards to the extent practicable. New bridges would be designed in accordance with AASHTO Load and Resistance Factor Design Bridge Design Specifications, which include seismic provisions. Roadway design and construction would adhere to applicable local ordinances and statutes regarding coastal erosion (that is, the movement of sand and unintended consequences of protective measures).

Based on this information, while portions of each Build Alternatives may be susceptible to natural hazards, the Project would represent an improvement in susceptibility to natural hazards as compared to the No Build Alternative.

Olowalu

Build Alternatives 1 and 2

These alignments pass through the area of high wildfire ignition density in Olowalu near mile marker 15, presenting opportunities to act as potential firebreaks (FIGURE 3.11-8).

Build Alternatives 3 and 4

Neither of these alignments pass through the high wildfire ignition density area in Olowalu near mile marker 15, offering relatively minimal benefit as potential firebreaks (FIGURE 3.11-8).

Ukumehame

Common to All Build Alternatives

All these alignments pass through areas of high wildfire ignition density, presenting opportunities to act as potential firebreaks (FIGURE 3.11-8).

At the connection point with the existing Honoapi‘ilani Highway at the Pali, the existing roadway is very close to the water and overlaps with erosion hazard areas and erodible soil conditions. Therefore, it is assumed that shoreline protection would be required at the point of the Pali connection. To avoid encroachment beyond existing highway’s paved area, a design commitment would be to use cutoff walls constructed within the highway’s makai shoulder.

Build Alternative 1

In Ukumehame, geology and soils at the Pali connection would cut into steeper and rockier areas, which would require more grading and/or retaining walls to ensure the soil is stable and to minimize rock falls.

3.11.5 Construction Effects

Construction activities can pose a fire risk during highway construction. Several factors contribute to this risk. Construction sites often involve the use of heavy machinery and equipment that can generate heat, sparks, or friction, leading to potential ignition sources. Similarly, on-site flammable materials increase the risk of fire hazards.

3.11.6 Indirect Effects

The only natural hazard that the Project may have reasonably foreseeable indirect effects on is wildfire. Improvements to the Honoapi'ilani Highway have implications for increased number of trips and miles traveled on the roadway. As described in Section 3.11.3.7, interaction between humans and fuel sources can trigger wildfires. Relocating portions of the highway to new areas may create new wildfire hazards (sparks and heat from vehicles, new trash, and still burning cigarettes and matches) based on proximity of relocated roadway traffic, particularly where alignments are in more arid environments compared to the existing coastal highway alignment. Wildfire mitigation is described below.

3.11.7 Mitigation

Mitigation to keep soil from eroding in the project area is imperative to prevent sediment from reaching the ocean. Accordingly, during construction of the Project, plants would be preserved to the greatest extent possible, and fire prevention would be emphasized. Construction best management practices would be defined in a National Pollutant Discharge Elimination System permit.

Erosion mitigation measures include preserving plants to the greatest extent possible and adhering to National Pollutant Discharge Elimination System best management practices.

The new highway could potentially be used as a belowground utility corridor for Maui Electric Company and offers the opportunity to upgrade utility infrastructure to minimize wildfire risks associated with power lines and other electric transmission. Maui Electric Company would be involved in the design, and all applicable rules and regulations would be followed.

To mitigate potential effects of wildfires, the Project would represent an opportunity to provide a fire break based on the width of the right-of-way, with discontinuous vegetated areas and through the routine clearing of debris and vegetation within High Wildfire Risk Areas. Fire-resistant vegetation may also be incorporated to further reduce wildfire risk, as recommended in the HDOT *Hawai'i Highways Climate Adaptation Action Plan* (2021) and was used in the evaluation of the Preferred Alternative. ~~Input from the Hawai'i Wildfire Management Organization and local authorities, including fire departments, would be integrated as part of the Final EIS evaluation of the proposed Preferred Alternative as well as into the final design and wildfire mitigation activities of the Project.~~

The 2021 HDOT *Hawaiʻi Highways Climate Adaptation Action Plan* includes several recommended actions for highways to improve resilience to wildfires, as does the City of Honolulu Climate Change Commission. Additionally, throughout the scoping process, public input identified several mitigation measures that the Project can take to reduce wildfire impacts (TABLE 3.11-7).

TABLE 3.11-7. **Wildfire Impact Mitigation Measures**

MEASURES
Increase shoulder areas to increase the distance between road users and roadside vegetation.
Routinely clear debris and vegetation along roads to reduce wildfire fuel sources.
Strengthen partnerships with the Hawaiʻi Wildfire Management Organization and local authorities to support wildfire education, particularly risk along roadways.
Use new alignments as a firebreak through wildfire hotspots.
Utilize fire-resistant vegetation and place a greater emphasis on native vegetation along roadways.
Require the contractor to have a fire extinguisher within every vehicle, including large construction equipment. The fire department phone number will be on every supervisor's contact list and fire prevention and control methods will be discussed at site safety meetings.

3.11.8 Build Alternatives Comparative Assessment

TABLE 3.11-8 and TABLE 3.11-9 summarize the comparison of potential environmental effects for the Build Alternatives in Olowalu and Ukumehame, respectively.

TABLE 3.11-8. **Build Alternatives Comparison - Olowalu**

HAZARD AREA	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Geologic or Soils Constraints	None	None	None	None
Built to Current Seismic Standards	Yes	Yes	Yes	Yes
Percentage within Tsunami Evacuation Zone	89%	53%	52%	37%
Volcanic Hazards	No increase in susceptibility	No increase in susceptibility	No increase in susceptibility	No increase in susceptibility
Wildfires	Potential firebreak benefit	Potential firebreak benefit	Minimal benefit	Minimal benefit
Hurricane and Tropical Storms	Improved reliability	Improved reliability	Improved reliability	Improved reliability

TABLE 3.11-9. **Build Alternatives Comparison - Ukumehame**

HAZARD AREA	BUILD ALTERNATIVE 1	BUILD ALTERNATIVES 2 AND 3	BUILD ALTERNATIVE 4
Geologic or Soils Constraints	Requires more slope stabilization in Pali	None	None
Built to Current Seismic Standards	Yes	Yes	Yes
Percentage within Tsunami Evacuation Zone	95%	100%	87%
Volcanic Hazards	No increase in susceptibility	No increase in susceptibility	No increase in susceptibility
Wildfires	Potential firebreak benefit	Potential firebreak benefit	Potential firebreak benefit
Hurricane and Tropical Storms	Improved reliability	Improved reliability	Improved reliability

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3.12 COASTAL ZONE MANAGEMENT ACT, HAWAI‘I SPECIAL MANAGEMENT AREAS

This section of the ~~Draft~~ Final Environmental Impact Statement (EIS) discusses compliance with federal and State of Hawai‘i coastal zone management regulations. The concerns under coastal zone management are twofold: ensuring that the Honoapi‘ilani Highway Improvements Project (the Project) is consistent with acceptable uses in the coastal area, and analyzing the Project’s consistency with federal coastal zone management goals and policies.

Following publication of the Draft EIS, the public was afforded an opportunity to review and comment on the effects of the Project with respect to the coastal zone management act and Hawai‘i special management areas. Based on those comments, or other information gathered after the publication of the Draft EIS, no revision to the analysis contained within this section was warranted and no further analysis is required as part of this Final EIS.

3.12.1 Regulatory Context

In 1972, the U.S. Congress passed the federal Coastal Zone Management Act to encourage coastal states to manage development within their designated coastal areas and to balance conflicts between coastal development and the protection of resources within the coastal zone. As a part of the act, each coastal state was mandated to create a Coastal Zone Management program that set forth the state’s actions to implement the rules and regulations of the act. The act also requires that federal actions within a state’s coastal zone are consistent with that State’s Coastal Zone Management program. Section 3.12.4 includes the analysis of the Project’s consistency with the Coastal Zone Management Act.

The State of Hawai‘i Coastal Zone Management Program is codified in Hawai‘i Revised Statutes (HRS) Chapter 205A, which is administered by the Office of Planning and Sustainable Development. As codified, the State’s Coastal Zone Management Program establishes objectives and policies for the preservation, protection, and restoration of coastal resources in Hawai‘i. In Hawai‘i, "coastal zone management area" means all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea.

A Special Management Area (SMA) is the area of an island close to the shoreline. HRS Chapter 205A places special controls on developments along the shoreline to avoid permanent losses of valuable resources and to ensure that adequate access to publicly owned or used beaches, recreation areas, and natural resources. The SMA permitting system is part of the federally and State-approved Coastal Zone Management Program. HRS Chapter 205A designates the County of Maui as the regulatory authority for SMAs on the island of Maui.

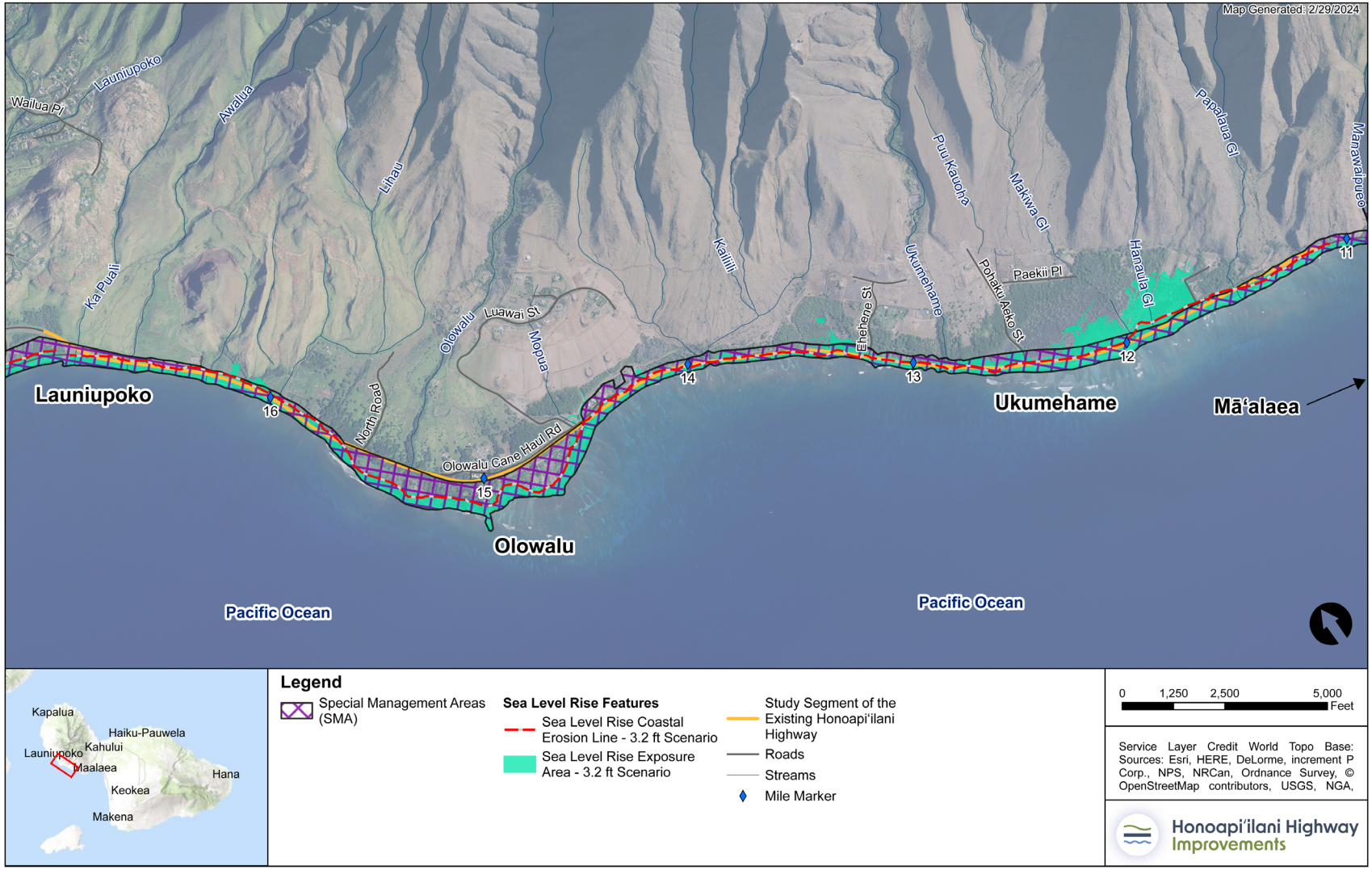
To ensure beach access, HRS Chapter 205A further prohibits development within the most coastal part of the SMA, which is referred to as the “shoreline setback area” (there are rare exceptions where a variance is granted). ~~Following public meetings held by the Maui County Planning Department in May 2023, the Project anticipates that Maui County may enact a new ordinance before construction would begin. These new proposed rules would~~ In 2024, Maui County enacted a new ordinance ~~define~~ defining the shoreline setback area as the portion of the SMA seaward of the Pacific Islands Ocean Observing

System 3.2-foot coastal erosion line.[1] The 3.2-foot coastal erosion line is generally more mauka than the currently defined shoreline, so a project complying with the new rules would also be compliant with the old rules. FIGURE 3.12-1 shows the SMA and the coastal erosion line.

Maui County Administrative Rules § 12-202 states that any "development" within the SMA requires an SMA Use Permit. The Maui County Code defines SMA Use Permit procedures for Maui but does not define "development." Instead, the definition of "development" is found in the State's HRS Chapter 205A and presumes that the construction of a new roadway would constitute "development" and therefore requires an SMA Use Permit.

[1] https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/.

FIGURE 3.12-1. **Special Management Area and Shoreline Setback Map**



3.12.2 Methodology

The Project and the Build Alternatives are analyzed in terms of any potential impacts they may have on coastal processes that are protected under HRS Chapter 205A. This analysis has two components:

- The anticipated extent and need for SMA permits.
- Compliance with Hawai‘i’s 10 coastal policies based on the analyses of project impacts presented throughout this ~~Draft~~ Final Environmental Impact Statement.

3.12.3 Environmental Consequences

3.12.3.1 Special Management Area

The existing Honoapi‘ilani Highway is largely located within the SMA with portions that are seaward of the 3.2-foot coastal erosion line. As described below, portions of all the Build Alternatives would occur within the SMA. In addition, the Project may affect portions of the Olowalu subdivision greenway which was established as part of the subdivision’s SMA permit conditions from the year 2000.

No Build Alternative

The No Build Alternative would result in no change to the existing Honoapi‘ilani Highway alignment. This existing alignment is mostly located within the coastal erosion line (with the exception of Olowalu village center where the highway is mauka of the coastline and a small area at the southern end of the highway before its connection with the Pali section of roadway). As a result, the No Build Alternative would leave the highway almost completely within the SMA. This would add uncertainty about the regulatory requirements of ongoing repairs and future investments necessary to maintain the highway, including shoreline hardening that can contribute to beach loss.

Build Alternatives

The Build Alternatives are located largely outside of the SMA and almost entirely mauka of the coastal erosion line in both Olowalu and Ukumehame. Since a portion of each alternative would occur within the SMA, it is anticipated that an SMA major permit would be required. The SMA permit would need to be obtained from the County of Maui during the design-build phase of the project, after the completion of NEPA/HEPA process, ~~but~~ and before construction can begin. ~~New rule making by the County is expected to require 3.2 SLR-XA assessment as part of the permit and the~~ Consistent with the new SMA ordinance from Maui County in 2024, the following section highlights 3.2 SLR-XA characteristics of the Build Alternatives.

Olowalu

COMMON TO ALL BUILD ALTERNATIVES
All of the alignments are located mauka of the coastal erosion line in Olowalu.

Build Alternatives 2, 3, and 4 would all require acquisition of portions of the existing Olowalu Mauka Subdivision greenway. The greenway was a condition of the SMA permit obtained for that development and it is anticipated that the Project would require a modification to the original SMA permit.

BUILD ALTERNATIVE 1
Approximately 13% of Build Alternative 1 in Olowalu occurs within the SMA. This alignment is generally closer to the SMA than other alternatives in Olowalu.

BUILD ALTERNATIVE 2
Approximately 9% of Build Alternative 2 in Olowalu occurs within the SMA. The portion of the alignment that occurs with the SMA is the northern portion where all the alignments merge near Launiupoko. Build Alternative 2 would require relocation or realignment of a portion of the subdivision greenway which would require an amendment to the existing Olowalu subdivision or would be part of a Project-specific SMA.

BUILD ALTERNATIVES 3 AND 4
Less than 1% of Build Alternatives 3 and 4 in Olowalu occur within the SMA. The portion of these alignments that occur with the SMA are the northern portions where all the alignments merge together near Launiupoko. Build Alternatives 3 and 4 would require relocation, realignment, or elimination of a portion of the subdivision greenway which would require an amendment to the existing Olowalu subdivision or would be part of a Project-specific SMA.

FIGURE 3.12-2 shows the Build Alternatives in Olowalu relative to the SMA.

Ukumehame

COMMON TO ALL BUILD ALTERNATIVES
All of the alignments are located mauka of the coastal erosion line except where all Build Alternatives would join with the existing highway at the Pali. Connecting with the existing highway at the Pali could involve some work adjacent to and makai of the erosion line to protect the roadway from potential erodible soil conditions and from future coastal erosion. To avoid encroachment beyond existing highway’s paved area, a design commitment would be to use cutoff walls constructed within the highway’s makai shoulder. According to the new Maui County SMA rules, the erosion line would serve as the coastline setback line. Therefore, the need for a shoreline variance would need to be evaluated by the County of Maui once the highway design is completed.

BUILD ALTERNATIVE 1
Approximately 11% of Build Alternative 1 in Ukumehame occurs within the SMA. The County of Maui’s Pali to Puamana Plan calls for open space makai of the realigned Honoapi‘ilani Highway. Build Alternative 1 provides potential for open space makai of the realigned highway, as compared to the existing Highway and the co-located Build Alternatives 2 and 3.

As described in Section 3.6, Archaeological and Architectural Historic Properties, Build Alternative 1 would impact historic properties located in the vicinity of the Pali.

BUILD ALTERNATIVES 2 AND 3
Approximately 27% of Build Alternatives 2 and 3, which are the same in Ukumehame, occur within the SMA. These alignments are more coastal than the other alignments in Ukumehame.

BUILD ALTERNATIVE 4

Approximately 6% of Build Alternative 4 occurs within the SMA in Ukumehame. Build Alterative 4 provides the potential for open space makai of the realigned highway.

The alternatives in Ukumehame are shown relative to the SMA in FIGURE 3.12-3.

FIGURE 3.12-2. **Alternatives and Special Management Area in Olowalu**

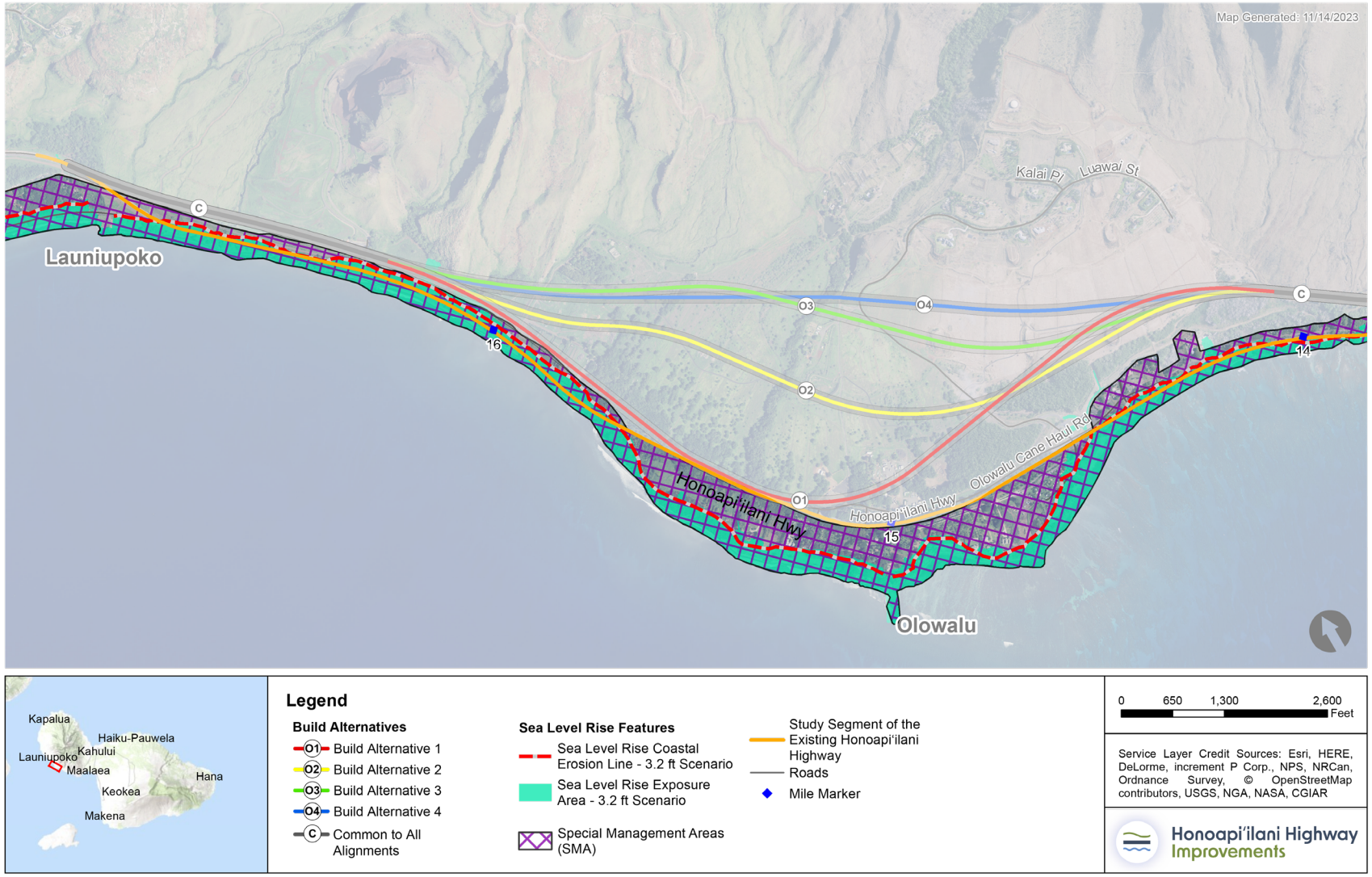
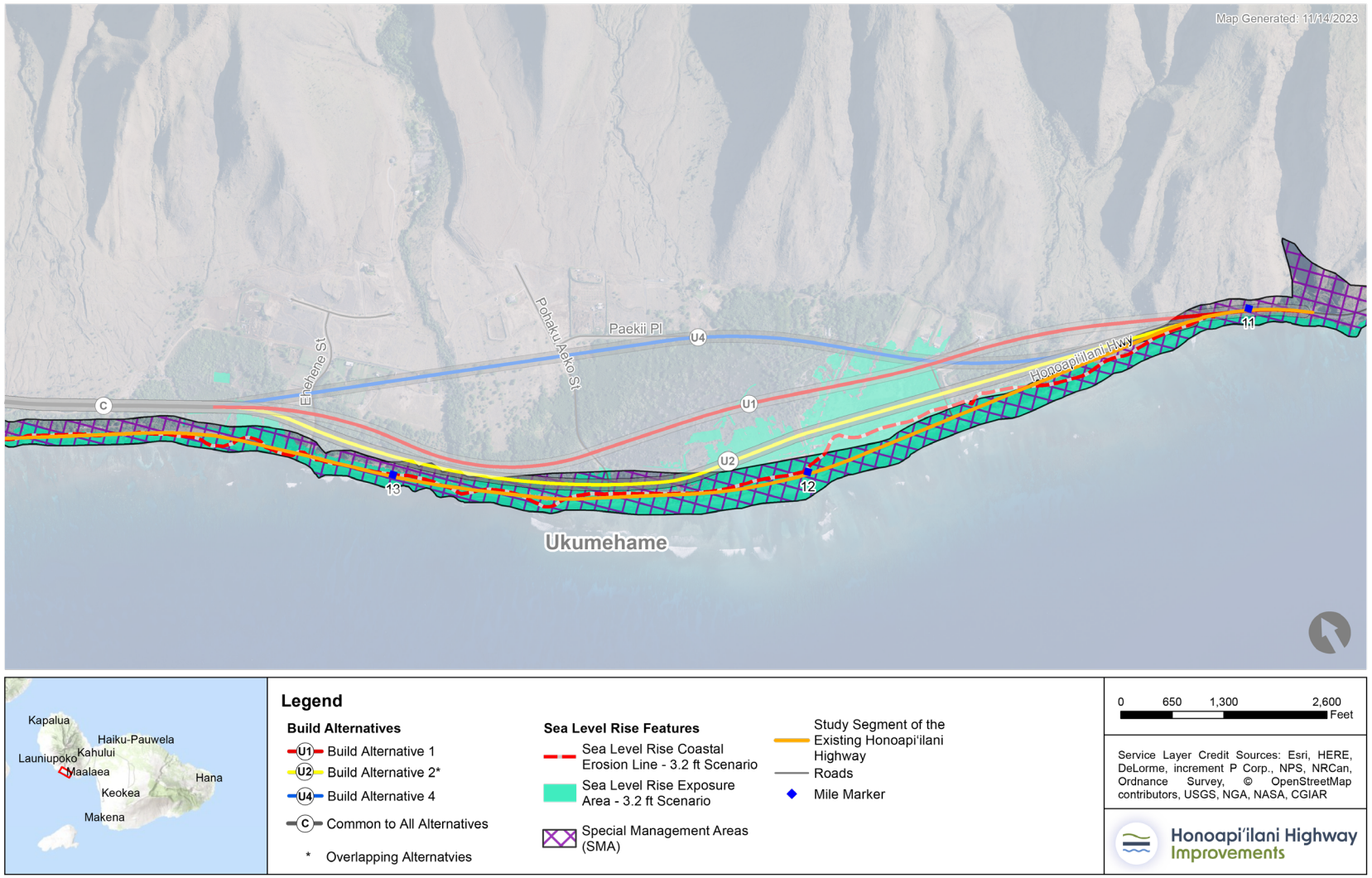


FIGURE 3.12-3. **Alternatives and Special Management Area in Ukumehame**



3.12.4 Coastal Zone Management Federal Consistency Review

HRS Chapter 205A requires lead federal agencies to review federal programs, permits, licenses, and development proposals for consistency with the Coastal Zone Management Program. The Project would require approvals from federal and State agencies; therefore, it is subject to consistency review in accordance with the policies set forth to implement the Coastal Zone Management Program.

The federal review evaluates a project's consistency with objectives and policies in 10 categories:

- Recreational resources
- Historic resources
- Scenic and open space resources
- Coastal ecosystems
- Economic uses
- Coastal hazards
- Managing development
- Public participation
- Beach and coastal dune protection
- Marine and coastal resources

The following is an analysis of the consistency of the Project with Coastal Zone Management Program objectives and policies. The formal consistency review would begin during the design build process upon completion of the final design.

TABLE 3.12-1 **CZM Federal Consistency Analysis**

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
RECREATIONAL RESOURCES			
Objective: Provide coastal recreational opportunities accessible to the public.			
Policies:			
Improve coordination and funding of coastal recreational planning and management.	N/A		
Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:		S	
a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.		S	
b) Requiring restoration of coastal resources that have significant recreational and ecosystem value, including but not limited to coral reefs, surfing sites, fishponds, sand beaches, and coastal dunes, when these resources will be unavoidably damaged by development; or requiring monetary compensation to the State for recreation when restoration is not feasible or desirable.	N/A		

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.		S	
d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation.	N/A		
e) Ensuring public recreational uses of County, State, and federally owned or controlled shoreline lands and waters that have recreational value consistent with public safety standards and conservation of natural resources.	N/A		
f) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.		S	
g) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing.	N/A		
h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and County authorities; and crediting that dedication against the requirements of Hawai'i Revised Statutes, Section 46-6.	N/A		
Consistency Analysis			
The No Build Alternative would retain public access to beaches and parks along the corridor, although the reliability of the roadway could jeopardize continuous access. Closures and repairs are already frequent, and future sea level rise and continued coastal erosion would further impair the roadway's reliability. In addition, the busy roadway has service disruptions from traffic turning on, off, and across the highway. The Build Alternatives would be consistent with the Hawai'i Coastal Zone Management Recreational Resources policies and would not adversely affect existing coastal recreation areas such as Pāpalaua Wayside Park, Ukumehame Firing Range, and Ukumehame Beach Park. Furthermore, the Project would be consistent with the County of Maui's 2005 *Pali to Puamana Parkway Master Plan*, which proposes recreation and open space development makai of the relocated Honoapi'ilani Highway and the 2022 *West Maui Community Plan*, which calls for the balanced distribution of parks and the development of a network of trails and greenways. The Project would include connection routes that maintain existing access to resources. Relocating the highway would allow for the development of open space makai of the newly constructed highway. Because community plans call for open space makai of the realigned highway in Ukumehame, Build Alternatives 1 and 4 would provide more opportunity for open space than the more coastal alignment of Build Alternatives 2 and 3. Section 3.1, Land Use and Zoning, and Section 3.5, Parklands and Recreational Resources/Beach Access, contain more detailed discussions.			
HISTORIC RESOURCES			
Objective: Protect, preserve, and, where desirable, restore those natural and human-made historic and prehistoric resources in the coastal zone management area that are significant to Hawaiian and American history and culture.			
Policies:			
1. Identify and analyze significant archaeological resources.		S	
Maximize information retention through preservation of remains and artifacts or salvage operations.		S	
Support State goals for protection, restoration, interpretation, and display of historic resources.		S	
Consistency Analysis			
The No Build Alternative would make no changes to the existing right-of-way and would have no adverse or beneficial effects on historic resources identified in the project area.			

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
The Build Alternatives would have potential adverse effects on archaeological and historic resources, but such effects would be minimized or avoided to the extent practicable. An ~~Draft~~ Executed Programmatic Agreement (PA) ~~is being~~ has been developed ~~during~~ as part of the Section 106 consultation process to define additional testing requirements and development of mitigation as appropriate. ~~Timed for completion by the Final EIS/Record of Decision,~~ The Executed PA ~~will be~~ was signed by key participating parties including the Federal Highway Administration, the Hawaiʻi Department of Transportation, and the Hawaiʻi State Historic Preservation Department. With the PA in place, the Build Alternatives would be consistent with this policy. Build Alternative 1 in Ukumehame would impact historic properties in the vicinity of the Pali. For a more detailed discussion, see Section 3.6, Archaeological and Architectural Historic Properties.			
SCENIC AND OPEN SPACE RESOURCES			
Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.			
Policies:			
1. Identify valued scenic resources in the coastal zone management area.		S	
Ensure that new developments are compatible with their visual environment by designing and locating those developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.	N/A		
Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources.		S	
Encourage those developments that are not coastal dependent to locate in inland areas.	N/A		
Consistency Analysis			
The No Build Alternative would result in no new construction and limited changes to the scenic resources in the area. To the extent that continued repair and hardening of the existing highway (that is, new seawalls or barriers) could impair scenic resources, the No Build Alternative would be incompatible with this policy. The Build Alternatives would move Honoapiʻilani Highway farther mauka of the existing highway and coastline. The existing roadway is proposed be transferred to the County of Maui to serve as a local connecter and access to waterfront recreational resources and beaches. The new alignments would be higher in elevation, including some portions on elevated viaducts and bridges. However, while the new alignments could be visible in a mauka viewshed from coastal areas, grade changes and vegetation would likely minimize the views of the new roadway from the beaches and shoreline (see Section 3.8, Visual and Scenic Character). The roadway—providing local access to beaches, shorelines, residences, and businesses—would carry substantially less traffic (see Section 3.14, Transportation). No development is associated with the Project, but it would remove volumes of traffic away from the coastline, making it compatible with the policy of seeking to move noncoastal dependent development inland of the coast.			
COASTAL ECOSYSTEMS			
Objective: Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.			
Policies:			
1. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources.		S	
Improve the technical basis for natural resource management.		S	
Preserve valuable coastal ecosystems of significant biological or economic importance, including reefs, beaches, and dunes.		S	
Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land water uses, recognizing competing water needs.		S	

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems, and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.		S	
Consistency Analysis			
The No Build Alternative would retain the existing Honoapi'ilani Highway in its current alignment, thereby minimizing changes to coastal conditions that could adversely affect coastal resources. However, the current alignment has numerous conditions that are inconsistent with this policy. Preservation of the roadway from coastal erosion has required shoreline hardening and seawalls that have been identified as a potential source of coastal resource degradation. The existing roadway has no stormwater management infrastructure and has limited potential to enhance efforts to minimize sediment loading to the offshore reefs. The Build Alternatives would be consistent with this policy and would incorporate a mauka alignment to minimize direct effects on the coastal ecology. The Build Alternatives would also be designed with best practices in terms of stormwater management to capture and treat runoff from the roadway. A segment of Build Alternatives 2 and 3 in Ukumehame is within the Special Management Area and within potential County-designated wetlands. The Pali end of the Project would occur within a conservation district designated as "general." The roadway use, similar to the existing highway, would be consistent with the conservation district uses allowed by this designation. While the Lāhainā Bypass terminus would also be within the Special Management Area, it would be outside of the Sea Level Rise Exposure Area 3.2-foot sea level rise erosion line that the County of Maui has designated as the shoreline setback area.			
ECONOMIC USES			
Objective: Provide public or private facilities and improvements important to the state's economy in suitable locations.			
Policies:			
1. Concentrate coastal development in appropriate areas.	N/A		
Ensure that coastal dependent development and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area.	N/A		
Direct the location and expansion of coastal development to areas designated and used for that development and permit reasonable long-term growth at those areas, and permit coastal development outside of designated areas when:	N/A		
1. Use of designated locations is not feasible;			
2. Adverse environmental effects and risks from coastal hazards are minimized; and			
3. The development is important to the state's economy.			
Consistency Analysis			
The No Build Alternative would not be compatible with this policy because it would not improve the reliability of this critical transportation link to West Maui, which is critical to Maui's economy. For the Build Alternatives, improving the reliability of the highway would have an economic benefit for West Maui and for the entire county. Access to coastal resources would be more reliable. This improvement would facilitate more reliable transportation of people and goods, including tourists, tourist related goods, and workers who commute between Central Maui and West Maui.			
COASTAL HAZARDS			
Objective: Reduce hazard to life and property from coastal hazards.			
Policies:			
1. Develop and communicate adequate information about the risks of coastal hazards.		S	
Control development, including planning and zoning control, in areas subject to coastal hazards.	N/A		

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
Ensure that developments comply with requirements of the National Flood Insurance Program.	N/A		
Prevent coastal flooding from inland projects.	N/A		
Consistency Analysis			
The No Build Alternative would not be compatible with this policy because it would not improve the reliability of this critical transportation link to West Maui with regular disruptions that could affect the ability of residents and workers to move away from hazardous conditions and to allow access for first responders to get to emergency locations. For the Build Alternatives, improving the reliability of the highway would allow for safer and more reliable travel with continues access through the project area.			
MANAGING DEVELOPMENT			
Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.			
Policies:			
1. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development.	N/A		
Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements.	N/A		
Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.	N/A		
Consistency Analysis			
Overall, the Project would be consistent with this policy because it is subject to an environmental impact review process pursuant to State and federal regulations. The Project had extensive coordination with all levels of government and an active public engagement process. Agencies, stakeholders, and members of the public reviewed and gave input on the purpose and need for the Project, which is to improve the highway by reducing its vulnerability to coastal hazards including sea level rise and storm surge.			
PUBLIC PARTICIPATION			
Objective: Stimulate public awareness, education, and participation in coastal management.			
Policies:			
1. Promote public involvement in coastal zone management processes.		S	
Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for people and organizations concerned with coastal issues, developments, and government activities.		S	
Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.		S	
Consistency Analysis Development			
Project stakeholders—including agencies, area residents, area lineal descendants, and other interested parties and individuals—were engaged in the Project's planning and evaluation by attending public meetings, participating in stakeholder engagement activities, and reviewing documents on the project website. These stakeholders were provided an opportunity to review and comment on the environmental planning documents throughout the project planning and development process, including pre-National Environmental Policy Act (NEPA) scoping, after the publication of the NEPA Notice of Intent and State Environmental Impact Statement Preparation Notice, and throughout Section 106 consultation. Chapter 8, Public Involvement and Agency Coordination, contains more details about Public and Agency outreach for the Project.			

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
BEACH AND COASTAL DUNE PROTECTION			
Objective: 1. Protect beaches and coastal dunes for: a) Public use and recreation; b) The benefit of coastal ecosystems; and c) Use as natural buffers against coastal hazards; and Coordinate and fund beach management and protection.			
Policies:			
1. Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion.		S	
Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites that have sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.	N/A		
Minimize the construction of public shoreline hardening structures, including seawalls and revetments, at sites that have sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.	N/A		
Minimize grading of and damage to coastal dunes.		S	
Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor.	N/A		
Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.	N/A		
Consistency Analysis			
The No Build Alternative would be inconsistent with this policy because the continued need to maintain the roadway would conflict with policies No. 1 and No. 3 above—seawalls and shoreline hardening are now and would continue to be needed within the shoreline area to ensure the continued operation of the highway. The Project would be consistent with this policy by proposing to move the highway away from the coast, and the Project's purpose and need are consistent with the protection of beach resources. The existing roadway would be transferred to the County of Maui and would be used for access to the coastline, beaches, and local businesses and residents. This reduced demand on the existing roadway would minimize the improvements necessary to ensure its operation as the key link to and from West Maui. Overall, the use of lands makai of the relocated highway would be consistent with the County of Maui's 2005 *Pali to Puamana Parkway Master Plan*, which calls for open space and recreational areas makai of the Build Alternatives in Ukumehame.			

POLICY	NOT APPLICABLE (N/A)	SUPPORTS (S)	DOES NOT SUPPORT (NS)
MARINE AND COASTAL RESOURCES			
Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.			
Policies:			
1. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial.	N/A		
Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency.	N/A		
Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone.		S	
Promote research, study, and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources.	N/A		
Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.	N/A		
Consistency Analysis			
By maintaining the existing highway alignment, the No Build Alternative would not introduce new competing uses for marine or coastal uses. But as a coastal roadway that has required extensive shoreline hardening to maintain its usability, the No Build Alternative would be less compatible with the policy's directive for better stewardship of these resources. The Build Alternatives, with associated stormwater and erosion control facilities, would be consistent with the policy's intent to provide for the best management of marine and coastal resources. As a separate project, The Nature Conservancy is studying nature-based solutions that can be implemented along the existing Honoapiʻilani Highway.			

3.12.5 Construction Effects

During construction, stormwater best management practices would ensure that water quality is not adversely impacted. Some noise impacts to area beaches are anticipated during construction, but these impacts would be temporary. Similarly, access to Pāpalaua Wayside Park may be temporarily impacted during construction.

3.12.6 Indirect Effects

For a separate project, The Nature Conservancy is researching nature-based solutions that could be implemented along the existing Honoapiʻilani Highway. This could inform the County of Maui on potential uses of the existing highway and also methods to preserve wetlands and water resources in the area.

The relocation of the highway would allow the County of Maui to continue to develop their plans for open space in the area consistent with the *Pali to Puamana Parkway Master Plan*.

3.12.7 Build Alternatives Comparative Assessment

3.12.7.1 Olowalu

In Olowalu, Build Alternative 1 would have the highest percentage of alignment within the SMA (13%), and Build Alternatives 3 and 4 would have the lowest, with less than 1% occurring within the SMA.

As described above, Build Alternatives 2, 3, and 4 would require acquisition of portions of the existing Olowalu Mauka Subdivision greenway.

3.12.7.2 Ukumehame

All the Build Alternatives in Ukumehame have portions in the SMA, particularly at the Pali where they connect with the existing highway. Approximately 27% of Build Alternatives 2 and 3 would be within the SMA in the vicinity of Pōhaku 'Aeko Street.

The Pali end of the Project would occur within a conservation district designated as "general." The roadway use, similar to the existing highway, would be consistent with the conservation district uses allowed by this designation.

The County requires a Major SMA permit for projects whose construction costs exceed $500,000, therefore, the Project would require a Major SMA permit, which would be obtained during the design-build phase of the project. Further, given that all the alternatives would be makai of the erosion line at the Pali, a shoreline variance may also be required.

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3.13 CLIMATE CHANGE AND SEA LEVEL RISE

This chapter summarizes the anticipated long-term effects of climate change and sea level rise in the project area and how the No Build Alternative and Build Alternatives are set in the context of these changes. Each alternative is also evaluated for how it could alter localized conditions, building on the 2017 Hawai‘i Sea Level Rise Vulnerability and Adaptation Report’s Sea Level Rise Exposure Area (SLR-XA). Appendix 3.13 presents a more detailed description of future conditions and the modeling results for the No Build Alternative and Build Alternatives.

The Federal Highway Administration (FHWA) and the Hawai‘i Department of Transportation (HDOT) are committed to improving infrastructure resilience. Resilient and sustainable infrastructure improves public safety, reduces closures and maintenance costs, and facilitates the more efficient movement of people and goods. Particularly in coastal areas, climate change and sea level rise are key considerations and a principal component of the Honoapi‘ilani Highway Improvements Project’s (the Project’s) purpose and need (Chapter 1, Introduction, Purpose and Need).

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to climate change and sea level rise. Based on those comments, or other information gathered after the publication of the Draft EIS, no revision to the analysis contained within this section was warranted and no further analysis is required as part of this Final EIS.

3.13.1 Regulatory Context

3.13.1.1 Federal

~~Executive Order 13653, Preparing the United States for the Impacts of Climate Change, encourages agencies to identify opportunities to support and encourage smarter, more climate-resilient investments.[1]~~

~~In January 2023, the Council on Environmental Quality issued interim National Environmental Policy Act Guidance on Greenhouse Gas Emissions and Climate Change. This guidance offers clarity on incorporating greenhouse gas (GHG) emissions and climate change considerations into project analyses. Key guidance includes using early planning processes to integrate GHG emissions and climate change into the development of alternatives and identifying potential mitigation and resilience measures.[2]~~

On January 20, 2025, President Trump signed Executive Order (E.O.) 14148 –Initial Rescissions of Harmful Executive Orders and Actions and E.O. 14154 – Unleashing American Energy. The E.O.s

~~[1] Executive Office of the President. (Nov. 1, 2013). *Preparing the United States for the Impacts of Climate Change* (Executive Order No. 13653). https://www.federalregister.gov/documents/2013/11/06/2013-26785/preparing-the-united-states-for-the-impacts-of-climate-change. Accessed September 2023.~~

~~[2] Council on Environmental Quality. (Jan. 9, 2023). National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate. Accessed September 2023.~~

revoked E.O. 13990 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (January 20, 2021) and E.O. 14008 – Tackling the Climate Crisis at Home and Abroad (January 27, 2021). Subsequently on January 29, 2025, Secretary Duffy signed a Memorandum for Secretarial Offices and Heads of Operating Administrations – Implementation of Executive Orders Addressing Energy, Climate Change, Diversity, and Gender. On February 25, 2025, the Council on Environmental Quality (CEQ) published an Interim Final Rule removing the CEQ's National Environmental Policy Act (NEPA) implementing regulations, effective April 11, 2025 (90 Fed. Reg. 10610). As a result of these actions, FHWA will not include greenhouse gas emissions and climate change analyses in the federal environmental review process. Any purported greenhouse gas emissions and climate change impacts were not considered in the federal decision.

~~The 2014 FHWA Order 5520, Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events, makes resilience a part of FHWA policy and integrates climate change and the consideration of extreme weather risks into its planning, operations, policies, and programs in order to promote preparedness and resilience.[3]~~

3.13.1.2 State of Hawai'i

Former State of Hawai'i Governor David Ige identified "Climate Action" as one of several goals in the 2018 Executive Order 18-06, by recognizing the importance of "reducing human and economic loss caused by natural disasters" by "strengthening capacity to [sic] climate-related hazards and natural disasters; integrating climate change into policies and planning; improving information processes regarding climate change and natural disasters."

Hawai'i Revised Statutes (HRS), Chapter 226-65, establishes the *Hawai'i 2050 Sustainability Plan* as the State of Hawai'i's climate and sustainability and action plan, which defines the State's climate adaptation goals, principles, and policies. The intent is for this plan to guide future State actions.

By State law, all government actions trigger an environmental review in consultation with appropriate regulatory agencies, including socioeconomic and historic preservation considerations. All roadway projects, even emergency actions that are exempted from certain reviews and approvals, require some level of environmental review.

Effective July 2019, the State of Hawai'i required all new projects undergoing environmental review under the Hawai'i Environmental Policy Act (also known as HRS, Chapter 343) to consider whether the project is likely to have an adverse effect or be vulnerable to a SLR-XA, as defined by the 2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report.

In May 2021, HDOT published the *Hawaii Highways Climate Adaptation Action Plan*. The plan assesses the effects of climate change on the National Highway System in the region and provides a roadmap for enhancing the resilience of Hawai'i's highways. The National Highway System refers to the

~~[3] Federal Highway Administration. (Dec. 15, 2014). *Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events* (Report No. 5520). https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm. Accessed September 2023.~~

Interstate Highway System as well as other roads that are important to the nation's economy, defense, and mobility.[4]

The action plan emphasizes developing a climate-resilient highway system with urgency, building institutional capacity, and using data-driven decision-making to prioritize resilient infrastructure investments.[5] Additionally, the plan seeks to complement and support climate-related policies, rules, and initiatives that guide the overall development of the State (and are therefore relevant to HDOT and the State Highway System). This includes consistency with the 2017 *Hawai‘i Sea Level Rise Vulnerability and Adaptation Report*, particularly in utilizing the SLR-XA as a standard for evaluating exposure of HDOT assets to coastal hazards.

In August 2019, HDOT developed the *Statewide Coastal Highway Program Report* to assess and rank the susceptibility of State coastal roads to hazards such as erosion and structural degradation from waves, currents, and sea level rise. The report includes a scientifically rigorous methodology for the Coastal Road Erosion Susceptibility Index (CRESI), which identified the 20 most critical road locations statewide in terms of their susceptibility to structural degradation. Additionally, the report addresses how climate change and ocean hazards can affect the NHS and provides decision-making guidance to minimize these effects and increase resiliency.[6]

Last updated in 1996, the *West Maui Community Plan* and its accompanying maps was updated in 2022. This update incorporates new components mandated by Maui County Code Chapter 2.80B and aligns with the *Countywide Policy Plan* and the *Maui Island Plan*. It includes a vision statement, objectives, policies, and action steps designed to steer development and conservation efforts in West Maui. The updated plan identifies strategies that would help West Maui adapt to climate change and build a more resilient and self-sustaining community.[7]

Each of the Build Alternatives was adapted from the County of Maui’s 2005 *Pali to Puamana Parkway Master Plan*. And while this plan predates subsequent State plans, such as the 2021 *Hawaii Highways Climate Adaptation Action Plan*, they are consistent in focus and purpose. Both plans serve to enhance the resiliency of transportation assets to coastal hazards while committing to working with all stakeholders in addressing shared climate change and coastal hazard challenges.

Separately, a settlement agreement was reached to resolve the matter of *Navahine v. Hawai‘i Department of Transportation*. The agreement sets forth a framework that encourages moving from a transportation system that depends on fossil fuels to a cleaner, and safer system that supports a transition to vehicles that run on clean electricity or alternative fuels and gives people more choices

4 Federal Highway Administration. (June 29, 2017). National Highway System. https://www.fhwa.dot.gov/planning/national_highway_system/. Accessed December 2023.

5 Hawai‘i Department of Transportation. (May 2021). Hawaii Highways Climate Adaptation Action Plan. HDOT Highways Division. https://hidot.hawaii.gov/wp-content/uploads/2021/07/HDOT-Climate-Resilience-Action-Plan-and-Appendices-May-2021.pdf. Accessed September 2023.

6 Francis, O., H. Brandes, G. Zhang, D. Ma, L. Yang, O. Doygun, H. Togia, C. Rossi, G. Costanzo (2019). State of Hawaii Statewide Coastal Highway Program Report. Prepared for the State of Hawai’i Department of Transportation, Project Number HWY-06-16, August 21, 2019.

7 County of Maui. (January 2022). West Maui Community Plan Update 2022. Long Range Planning. https://www.mauicounty.gov/2476/West-Maui-Community-Plan-Update-2022. Accessed September 2023.

to get around by walking, cycling/scootering, and riding public transit. As part of the resolution, HDOT agreed to "Improving the state transportation infrastructure budgeting process to prioritize reduction of GHG and vehicles miles traveled (VMT) and transparently analyze and disclose the GHG and VMT impacts of each project and the overall program."[8]

Following publication of the Draft EIS, refinements were made to the Project to support multimodal opportunities, and the Selected Alternative now includes a bi-directional paved 10-foot wide shared-use pathway (see Chapter 5, Selected Alternative for additional details). As the state project sponsor and lead agency, it is the policy of HDOT that the methodologies developed as part of the Navahine resolution would apply to new planning projects initiated after April 2025. Accordingly, because planning for the Project occurred well before April 2025, and because the Draft EIS was published in December 2024, these methodologies would not be applicable to the Project.

3.13.2 Methodology

Climate change is interconnected with ecological systems and processes. The synergistic and additive effects of climate change influence a variety of factors including floodplain function, biodiversity, and natural hazards. For discussions on climates effects on floodplains, flora and fauna, and natural hazards, see Chapters 3.09, 3.10, and 3.11, respectively.

The 2017 *Hawai'i Sea Level Rise Vulnerability and Adaptation Report* introduces an SLR-XA to illustrate regions within the state that are vulnerable to persistent flooding. By modeling annual high-wave flooding, coastal erosion, and passive flooding, the report presents multiple projections for sea level rise: 0.5-foot, 1.1-foot, 2.0-foot, and 3.2-foot. In Hawai'i, there is accepted guidance to use a 3.2-foot sea level rise as a planning target for 2100, with discussion of a 6-foot target in that time frame.[9] The 2013 Intergovernmental Panel on Climate Change (IPCC) *Fifth Assessment Report* was referenced for these guidelines. While there is a *Sixth Assessment Report*, the *Fifth Assessment Report* is still considered acceptable for planning purposes, and a 6-foot scenario is still appropriate for considering far-reaching potential effects (according to Sea Engineering, Inc. [2023]).

The most aggressive sea level rise curve, resulting from the highest warming scenario (RCP8.5), was used to project this sea level rise elevation (3.2 feet) in the year 2100. The 3.2-feet scenario is also approximately aligned with the Intermediate regional projection for Hawaii from the 2022 *Interagency Task Force Report*. The discussion for a 6-foot scenario as an additional safety factor was developed around the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force Intermediate to High regional projection for Hawai'i, which projected approximately 6 feet of sea level rise by 2100. The SLR-XA does not include effects from storm surge, tsunami, or other natural hazards. Analysis of these hazards can be found in Section 3.11, Geology, Soils and Natural Hazards. The SLR-XA consists of the three impact vulnerabilities: passive flooding, annual high-wave flooding, and coastal erosion TABLE 3.13-1).

[8] https://governor.hawaii.gov/newsroom/office-of-the-governor-news-release-historic-agreement-settles-navahine-climate-litigation/ (Date Accessed: June 2025)

[9] Sea Engineering Inc. (September 2023). Sea Level Rise Wave Inundation Study – Honoapi'ilani. Prepared for WSP USA.

As a companion to the 2017 *Hawaiʻi Sea Level Rise Vulnerability and Adaptation Report*, the State of Hawaiʻi Sea Level Rise Viewer was developed to offer map data illustrating future projections of hazard exposure and evaluate vulnerabilities stemming from sea level rise.[10] The State of Hawaiʻi Sea Level Rise Viewer uses a projection of 3.2 feet of global mean sea level rise, based on projections from the 2013 IPCC *Fifth Assessment Report*. It was developed by the Pacific Islands Ocean Observing System, the University of Hawaiʻi Sea Grant College Program, the Hawai'i Department of Land and Natural Resources (DLNR), and the State of Hawaiʻi Office of Planning and Sustainable Development (OPSD). Act 83 of the Session Laws of Hawaiʻi 2014 and Act 32 of Session Laws of Hawaiʻi 2017 mandated the 2017 *Hawaiʻi Sea Level Rise Vulnerability and Adaptation Report* and developing the State of Hawaiʻi Sea Level Rise Viewer. Unless otherwise noted, any references to the SLR-XA boundary assumes the 3.2-foot sea level rise scenario.

[10] Hawaiʻi Climate Change Mitigation and Adaptation Commission. 2021. State of Hawaiʻi Sea Level Rise Viewer. Version 1.11. Prepared by the Pacific Islands Ocean Observing System (PacIOOS) for the University of Hawaiʻi Sea Grant College Program and the State of Hawaiʻi Department of Land and Natural Resources, Office of Conservation and Coastal Lands, with funding from National Oceanic and Atmospheric Administration Office for Coastal Management Award No. NA16NOS4730016 and under the State of Hawaiʻi Department of Land and Natural Resources Contract No. 64064. http://hawaiisealevelriseviewer.org. Accessed July 2023.

TABLE 3.13-1. **SLR-XA Components**

COMPONENT	DESCRIPTION
Passive Flooding Area	The passive flooding area within the SLR-XA indicates lands that are projected to experience daily or more frequent flooding during high tide under specific sea level rise scenarios (for example, 3.2-foot rise). As sea levels rise, passive flooding resulting from sea level increase would also exacerbate the impact of less frequent flood events with a 1% annual chance depicted in Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. This exacerbation occurs through higher water levels caused by direct marine inundation, rising groundwater, and impaired drainage. Notably, the passive flooding model does not explicitly account for the effects of rising groundwater tables, which can further contribute to the frequency and severity of flooding in many low-lying coastal areas. Nonetheless, the model serves as a useful initial assessment by identifying vulnerable low-lying areas where groundwater flooding is likely to occur.[11]
Annual High-Wave Flooding	The annual high-wave flooding area within the SLR-XA depicts lands that are projected to experience flooding at least once a year (or more frequently) due to high waves that wash over the shoreline. Within this hazard zone, lands at the seaward end would be subject to more frequent flooding, occurring multiple times per year, and with greater depth and velocity compared to lands toward the back of the zone. Unlike passive flooding, the annual high-wave flood zone poses additional risks to both land and structures. The exposure to wave velocity and currents within this zone can lead to scouring and damage, which effects the integrity of the land and structures.[12]
Coastal Erosion	The coastal erosion model indicates that areas landward of the boundary have an 80% probability of being safe from erosion at the specified sea level rise height (for example, 3.2 feet). The erosion model estimates shoreline change resulting from a combination of the historic erosion trends, and the modeled changes in beach profile with rising water levels. This model highlights areas that are susceptible to future land loss and would become unsuitable for construction, assuming that the shoreline is allowed to naturally retreat. However, in many instances, natural shoreline migration may not be permitted, which can have negative implications for the beach environment in the form of beach narrowing and loss.[13, 14]

11 Habel, S., Fletcher, C. H., Rotzoll, K., El-Kadi, A. I., & Oki, D. S. 2019. Comparison of a simple hydrostatic and a data-intensive 3D numerical modeling method of simulating sea-level rise induced groundwater inundation for Honolulu, Hawai'i, USA. Environmental Research Communications, 1(4), 041005.

12 Romine, B.M.; Habel, S.; Lemmo, S.J.; Pap, R.A.; Owens, T.M.; Lander, M.; Anderson, T.R. 2020. Guidance for Using the Sea Level Rise Exposure Area in Local Planning and Permitting Decisions. Prepared by the University of Hawai'i Sea Grant College Program with the Hawai'i Department of Land and Natural Resources - Office of Conservation and Coastal Lands for the Hawai'i Climate Change Mitigation and Adaptation Commission - Climate Ready Hawai'i Initiative. (Sea Grant Publication TT-20-01).

13 Fletcher, C.H., Romine, B.M., Genz, A.S., Barbee, M.M., Dyer, Matthew, Anderson, T.R., Lim, S.C., Vitousek, Sean, Bochicchio, Christopher, and Richmond, B.M., 2012, National assessment of shoreline change: Historical shoreline change in the Hawaiian Islands: U.S. Geological Survey Open-File Report 2011–1051, 55 p. (Also available at https://pubs.usgs.gov/of/2011/1051).

14 University of Hawai'i Coastal Geology Group. 2020, updated 2023. Sea Level Rise – Coastal Erosion. Version 2.1. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed [date]; University of Hawai'i Coastal Geology Group. 2017. Sea Level Rise – Vegetation Line. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed July 2023.

The *National Oceanic and Atmospheric Administration (NOAA) Technical Report NOS CO-OPS 083* (2017) emphasizes that coastal planners making critical decisions should weigh several factors when choosing which SLR scenario to use. These factors include the type of decision to be made, expected future performance, and overall risk tolerance.[15] For example, when designing a patio for a home or a bike path, a lower SLR scenario could be used for the design because it does not support any critical functions or may more easily adapt to rising water levels and therefore may have a higher-risk tolerance. In contrast, when designing a hospital or power plant with a low-risk tolerance and high criticality of the asset, a higher SLR scenario could be selected to design for future conditions. Scenarios help serve as a starting point for on-the-ground coastal preparedness planning and risk management processes needed to ensure that U.S. coastal communities remain vibrant and resilient to ongoing future changes in sea level.

Because Honoapiʻilani Highway is considered critical infrastructure, the risk tolerance is low; therefore, considerations of sea level rise hazards at and beyond the current 3.2-foot boundary are included in project evaluations to adhere to IPCC and NOAA planning recommendations. For this purpose, a passive flooding with 6-foot sea level rise projection prepared by NOAA is used in this evaluation in addition to the 3.2-foot boundary for considering far-reaching, potential effects. The description, assumptions, and limitations of a 6-foot sea level rise projection are the same as those above in the 3.2-foot passive flooding in that it does not explicitly account for the effects of rising groundwater tables, waves, or coastal erosion.[16,17] Current projections of sea level rise may underestimate inundation areas.

Sea Engineering Inc., was contracted to conduct a sea level rise and wave inundation study for the Project. Included in Appendix 3.13, Climate Change and Sea Level Rise, the 2023 *Sea Level Rise Wave Inundation Study, Honoapiʻilani Highway Realignment*, includes a comprehensive summary of the current sea level rise projections, a review of the Hawaiʻi SLR-XA, numerical modeling of wave-induced flooding for a future sea level of 3.2 feet for existing topography and each of the Build Alternatives, and a summary of project area FEMA flood hazard zones. The study used the XBeach nonhydrostatic numerical model, which includes the same annually recuring wave parameters as the SLR-XA (but it is two-dimensional and higher resolution).

TABLE 3.13-2 describes the various assessment parameters (3.2 feet and 6 feet). The No Build Alternative and the Build Alternatives are evaluated by modeling localized changes to SLR-XA core elements described above.

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15 Hall, J.A., S. Gill, J. Obeysekera, W. Sweet, K. Knuuti, and J. Marburger (2016) Regional Sea Level Scenarios for Coastal Risk Management: Managing the Uncertainty of Future Sea Level Change and Extreme Water Levels for Department of Defense Coastal Sites Worldwide. U.S. Department of Defense, Strategic Environmental Research and Development Program. 224 pp.

16 Hawaiʻi Climate Change Mitigation and Adaptation Commission. 2021. State of Hawaiʻi Sea Level Rise Viewer. Version 1.11. Prepared by the Pacific Islands Ocean Observing System (PacIOOS) for the University of Hawaiʻi Sea Grant College Program and the State of Hawaiʻi Department of Land and Natural Resources, Office of Conservation and Coastal Lands, with funding from National Oceanic and Atmospheric Administration Office for Coastal Management Award No. NA16NOS4730016 and under the State of Hawaiʻi Department of Land and Natural Resources Contract No. 64064. http://hawaiisealevelriseviewer.org.

17 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/. Accessed September 2023.

TABLE 3.13-2. **Sea Level Rise Assessment Overview**

ASSESSMENT METRIC	DESCRIPTION	PURPOSE	CONSISTENT WITH	SOURCE
SLR-XA (3.2 ft)	Overlay of three hazards: passive flooding, annual high-wave flooding, costal erosion modeled for a 3.2-foot sea level rise scenario.	Serves as the primary planning criteria for existing and future development.	• IPCC Fifth Assessment Report, IPCC Sixth Assessment Report • HDOT Climate Resilience Adaptation Action Plan • Hawai'i Sea Level Rise Vulnerability and Adaptation Report • Honolulu Climate Change Commission's Sea Level Rise Guidance	Pacific Islands Ocean Observing System (PacIOOS)
XBeach Non-Hydrostatic Numerical Model (3.2 ft)	Modeling of wave induced flooding given 3.2 feet of sea level rise for existing topography and each of the four highway realignment alternatives.	Provides higher-resolution site-specific inundation modeling to better define the hazards associated with passive and annual high-wave flooding for 3.2 ft of sea level rise.	• IPCC Fifth Assessment Report, IPCC Sixth Assessment Report • HDOT Climate Resilience Adaptation Action Plan • Hawai'i Sea Level Rise Vulnerability and Adaptation Report • Honolulu Climate Change Commission's Sea Level Rise Guidance	Sea Engineering Inc.
Passive Flooding 6-feet	A sea level rise projection of 6 feet above a local mean higher high water (MHHW).	Passive flooding with 6 feet of sea level rise is provided to support assessment of sea level rise hazards, particularly for critical infrastructure and for other development with low tolerance for risk.	• IPCC Fifth Assessment Report • Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force Intermediate-High Scenario • Hawai'i Sea Level Rise Vulnerability and Adaptation Report • Honolulu Climate Change Commission's Sea Level Rise Guidance (Directive No. 18-02)	National Oceanic and Atmospheric Administration (NOAA)

3.13.3 Affected Environment

West Maui ~~has a mild tropical climate that~~ is characterized by abundant sunshine, persistent northeast trade winds, relatively constant temperatures, and moderate humidity. Severe storms have historically been infrequent in this region of Maui. Mean monthly temperatures range from mid-80 degrees Fahrenheit in the summer months, to low-70 degrees Fahrenheit during the winter. Annual average rainfall is less than 30 inches, with most of the rainfall occurring between October and March.

Hawai'i's geographical location in the Pacific Ocean makes the state particularly susceptible to adverse and extreme weather events. The rise in global temperatures and the associated rise in sea levels is

primarily attributed to the emission of GHGs.[18] In Hawaiʻi, average air temperatures have risen approximately 1.1 degree Celsius (2 degrees Fahrenheit) since 1950, with a sharp increase in warming over the last decade.[19] Additionally, since the 1960s, the frequency of days per year with high-tide flooding in Honolulu has nearly doubled.[20] The United Nations Environment Programme *Emissions Gap Report 2022* points to a likely warming of 2.8 degrees Celsius (5 degrees Fahrenheit) by 2100.[21] As GHGs raise global surface temperatures, ice sheets melt and ocean heat uptake increases, contributing to long-term sea level rise. Section 3.15 includes additional discussion on potential project contributions to GHG emissions.

The changing climate patterns resulting from global warming pose various potential effects beyond sea level rise, including storm surges and heightened flooding risks. In the event of heavy rainfall, the water level in adjacent streams may rise rapidly. Sea level rise would also increase the severity of coastal flooding during less-frequent but more severe events such as extreme rainfall and storm surge.

Flood probability comes from a combination of historic events and projected future conditions. The Maui County *Hazard Mitigation Plan* lists West Maui as having a greater than 90% annual chance of an inland or coastal flooding event within any given year, based on historic data and projections from the NOAA National Center for Environmental Information database.[22] Official data on the frequency of flooding of Honoapiʻilani Highway does not exist, but West Maui residents report that the highway becomes flooded frequently with the seasonal high surf with south swells and king tides. Moderate storms often wash hazardous debris onto segments of the highway. And during severe storm events, the highway is closed to traffic to safeguard motorists. Moreover, as climate change progresses, the frequency and magnitude of flood events is expected to increase. This can be attributed to an increase in extreme weather phenomena associated with El Niño-Southern Oscillation, leading to a greater occurrence of heavy rainfall events, including hurricanes and Kona storms.[23]

Over the past 10 years, the portion of the highway that is proposed to be realigned has been repaired three times after storm and high-wave events undermined pavement sections and overtopped the roadway, rendering it impassable. Repairs include a project to address erosion where approximately 4,100 feet of highway fronting Ukumehame and approximately 1,000 feet of highway fronting Olowalu would be shifted 8 to 12 feet mauka within the existing roadway right-of-way. These projects are

18 City and County of Honolulu Climate Change Commission. (March 31, 2023). Climate Change Brief. https://static1.squarespace.com/static/5e3885654a153a6ef84e6c9c/t/64374370c0631e3ac922692a/1681343347345/Climate+Change+Brief+2023.pdf. Accessed September 2023.

19 NOAA National Centers for Environmental Information (2022) State Climate Summaries 2022: Hawaiʻi.

20 Marra, J.J., and Kruk, M.C. (2017) State of Environmental Conditions in Hawaiʻi and the U.S. Affiliated Pacific Islands under a Changing Climate: https://coralreefwatch.noaa.gov/satellite/publications/state_of_the_environment_2017_hawaii-usapi_noaa-nesdis-ncei_oct2017.pdf.

21 United Nations Environment Programme (2022). Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies. Nairobi. https://www.unep.org/emissions-gap-report-2022.

22 County of Maui. 2020. Maui County Multi-Hazard Mitigation Plan. August 2020. https://www.mauicounty.gov/1832/Multi-Hazard-Mitigation-Plan.

23 Chu, P., Y. R. Chen, and T. A. Schroeder, 2010: Changes in Precipitation Extremes in the Hawaiian Islands in a Warming Climate. J. Climate, 23, 4881–4900, https://doi.org/10.1175/2010JCLI3484.1.

short-term fixes because they address only the most severe locations where the road is already undermined.

3.13.3.1 Sea Level Rise Exposure Area Overview for Project Area

The hazards presented by sea level rise include a combination of passive flooding, annual high-wave flooding, and coastal erosion.

FIGURE 3.13-1 and FIGURE 3.13-2 show SLR-XA 3.2-foot results for Olowalu and Ukumehame, respectively, for each of the Build Alternatives.[24] It also shows the portions of the existing Honoapiʻilani Highway that are exposed to the SLR-XA.[25] The SLR-XA encroaches on approximately 4 miles out of the total 6 miles of the existing highway corridor. Of the roughly 2 miles outside of the SLR-XA, most of that occurs in Olowalu, while the Ukumehame area is largely within the SLR-XA. Overall, the project area is expected to experience direct effects of sea level rise associated with passive flooding, annual high-wave flooding, and coastal erosion into the future.[26,27,28]

Additionally, sea level rise may exceed the 3.2-foot projections, which requires considering a 6-foot projection as modeled by the NOAA Sea Level Rise Viewer (FIGURE 3.13-3 and FIGURE 3.13-4 ~~FIGURE 3.13-5~~).[29] This 6-foot projection only considers passive flooding, not wave action or coastal erosion. These omissions increase the likelihood that the extent of the flooded area is underestimated. Included in the 6-foot projection are high- and low-confidence areas of inundation. While high-confidence areas are those that may be correctly mapped as "inundated" more than 8 out of 10 times, low-confidence areas may be mapped correctly as "inundated" less than 8 out of 10 times.[30]

There are many unknowns when mapping future conditions, including natural evolution of the coastal landforms as well as the data used to predict changes. The presentation of confidence in FIGURE 3.13-3 and FIGURE 3.13-4 ~~FIGURE 3.13-5~~ only represent~~s~~ the known error in the elevation data and tidal corrections. It is important to include both areas of high and low mapping confidence to consider the full potential scale of a 6-foot passive flooding scenario, as areas that are potentially affected under the 6-foot passive flooding scenario are similar to those potentially affected by the SLR-XA. These areas include the southern portion of Olowalu through to Pāpalaua Wayside Park, with larger

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24 Tetra Tech, Inc. and University of Hawaiʻi Coastal Geology Group. 2017. Sea Level Rise – Exposure Area. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed September 2023.

25 Tetra Tech, Inc. 2017. Sea Level Rise – Flooded Highways. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed September 2023.

26 University of Hawaiʻi Coastal Geology Group and Tetra Tech, Inc. 2017. Sea Level Rise – Passive Flooding. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed July 2023.

27 University of Hawaiʻi Coastal Geology Group and Tetra Tech, Inc. 2017. Sea Level Rise – Annual High Wave Flooding. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed July 2023.

28 University of Hawaiʻi Coastal Geology Group. 2020, updated 2023. Sea Level Rise – Coastal Erosion. Version 2.1. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed July 2023; University of Hawaiʻi Coastal Geology Group. 2017. Sea Level Rise – Vegetation Line. https://planning.hawaii.gov/gis/download-gis-data-expanded/. Accessed July 2023.

29 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/. Accessed July 2023.

30 Schmid, K., Hadley, B., & Waters, K. (2014). Mapping and Portraying Inundation Uncertainty of Bathtub-Type Models. Journal of Coastal Research, 30(3), 548–561. https://doi.org/10.2112/JCOASTRES-D-13-00118.1.

potentially affected areas just northwest of Ehehene Street after the common alignment, and the Ukumehame Firing Range.

The Sea Engineering Inc. XBeach non-hydrostatic numerical (XBeach) modeling of wave-induced flooding for a future sea level of 3.2 feet, which includes the same annually recuring wave parameters as the SLR-XA (but it is two-dimensional and higher resolution), was done for the existing topography in the project area and each of the Build Alternatives.

The model encompasses the existing topography and bathymetry of all Build Alternatives and proposed changes in ground elevation for all Build Alternatives that result from the construction of structures and embankments. For the existing ground results, drainage culverts and bridge/causeway areas within each alignment were not adjusted and left as the existing ground level to allow modeled flood waters to pass freely through these areas. Road and bridge deck elevations for these areas are not included in the model. The model topography uses a bare-earth digital elevation model where buildings and vegetation are not included. Ground elevations for these areas are interpolated using the surrounding ground levels. The model does not account for flooding/drainage through underground utilities or groundwater intrusion. Erosion is also not included in the model.

Sea Engineering Model results include existing ground flood extents and corresponding depths and elevations. Max flood depth refers to the depth of flood water above the ground elevation, while max flood elevation refers to the height of elevation above mean sea level (msl). Both are important to incorporate into highway design to avoid flooding. Notably, XBeach modeling results are representative of an annually occurring south swell wave event and does not account for mitigation, such as elevating the highway. Flooding may be more severe for less frequent but larger wave events combined with higher sea levels.

The results of this study show that due to the low-lying nature of this portion of the West Maui coastline, the Build Alternatives may be susceptible to future wave flooding with sea level rise. Appendix 3.13 provides more details about the modeling, and Section 3.13.4.2 provides key findings of the study.

FIGURE 3.13-1. **3.2-Foot Sea Level Rise Exposure Area (SLR-XA) in Olowalu Scenario**

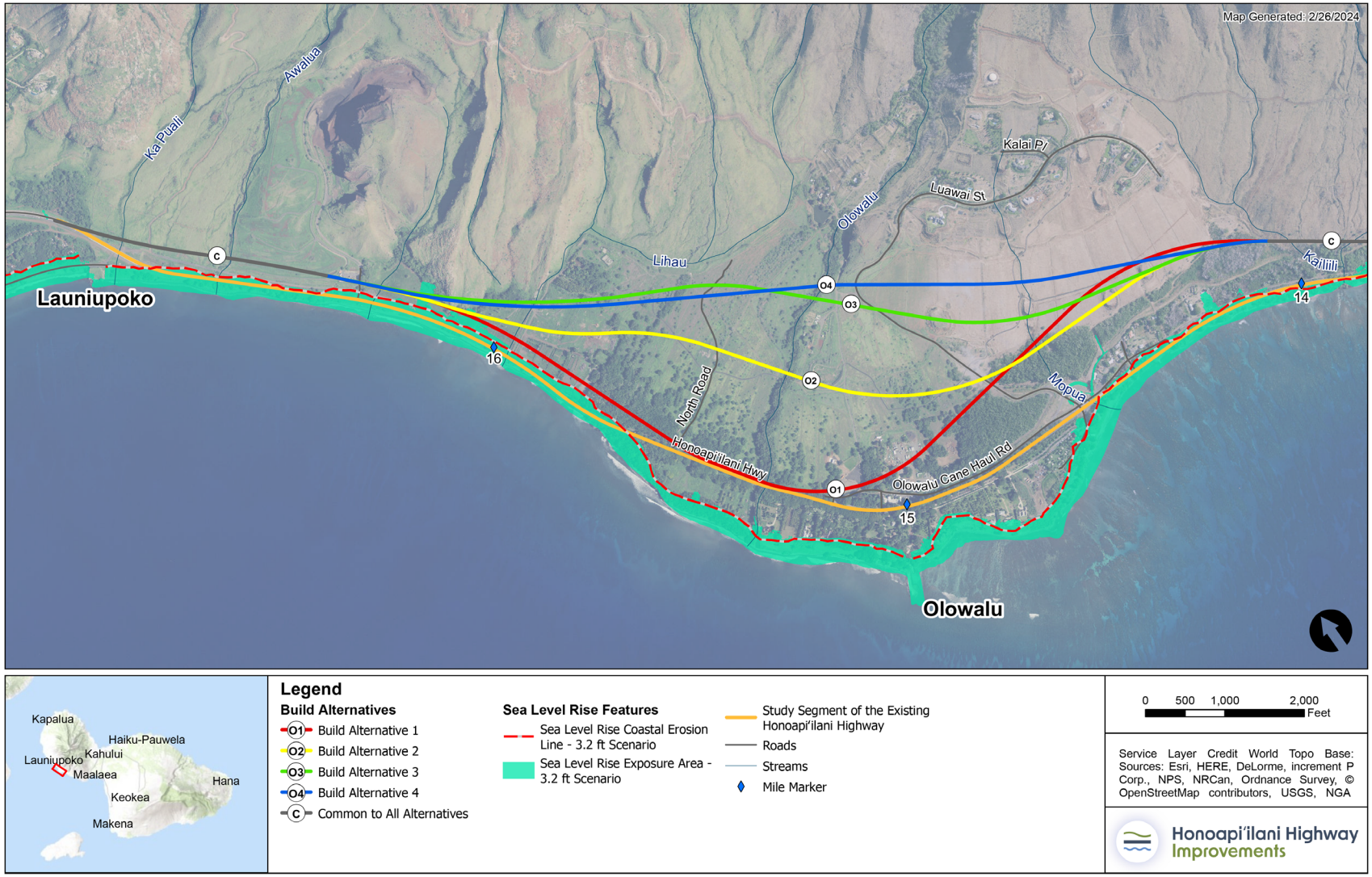


FIGURE 3.13-2. **3.2-Foot Sea Level Rise Exposure Area (SLR-XA) in Ukumehame Scenario**

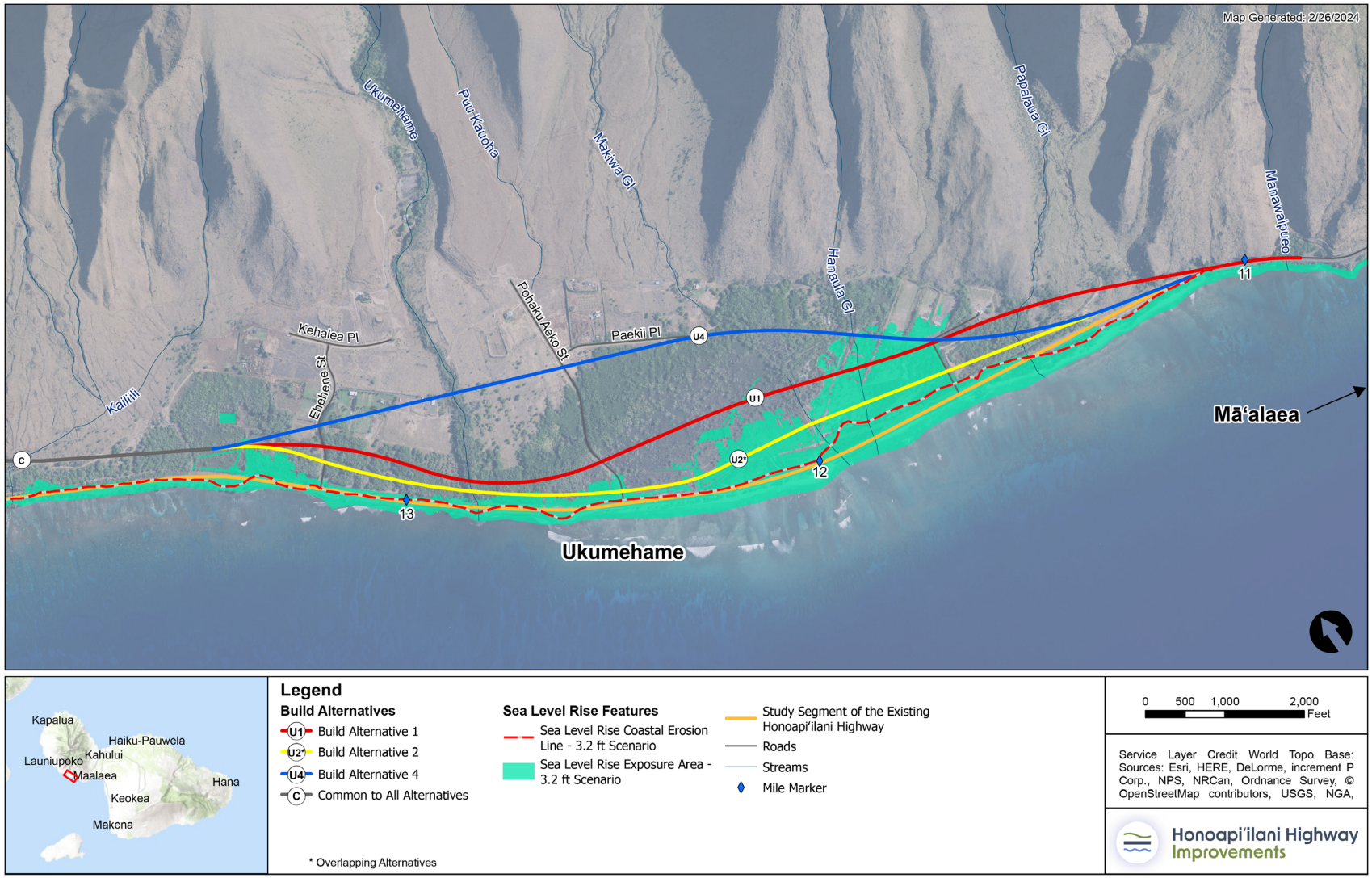


FIGURE 3.13-3. **6-Foot Passive Flooding Scenario in Olowalu**

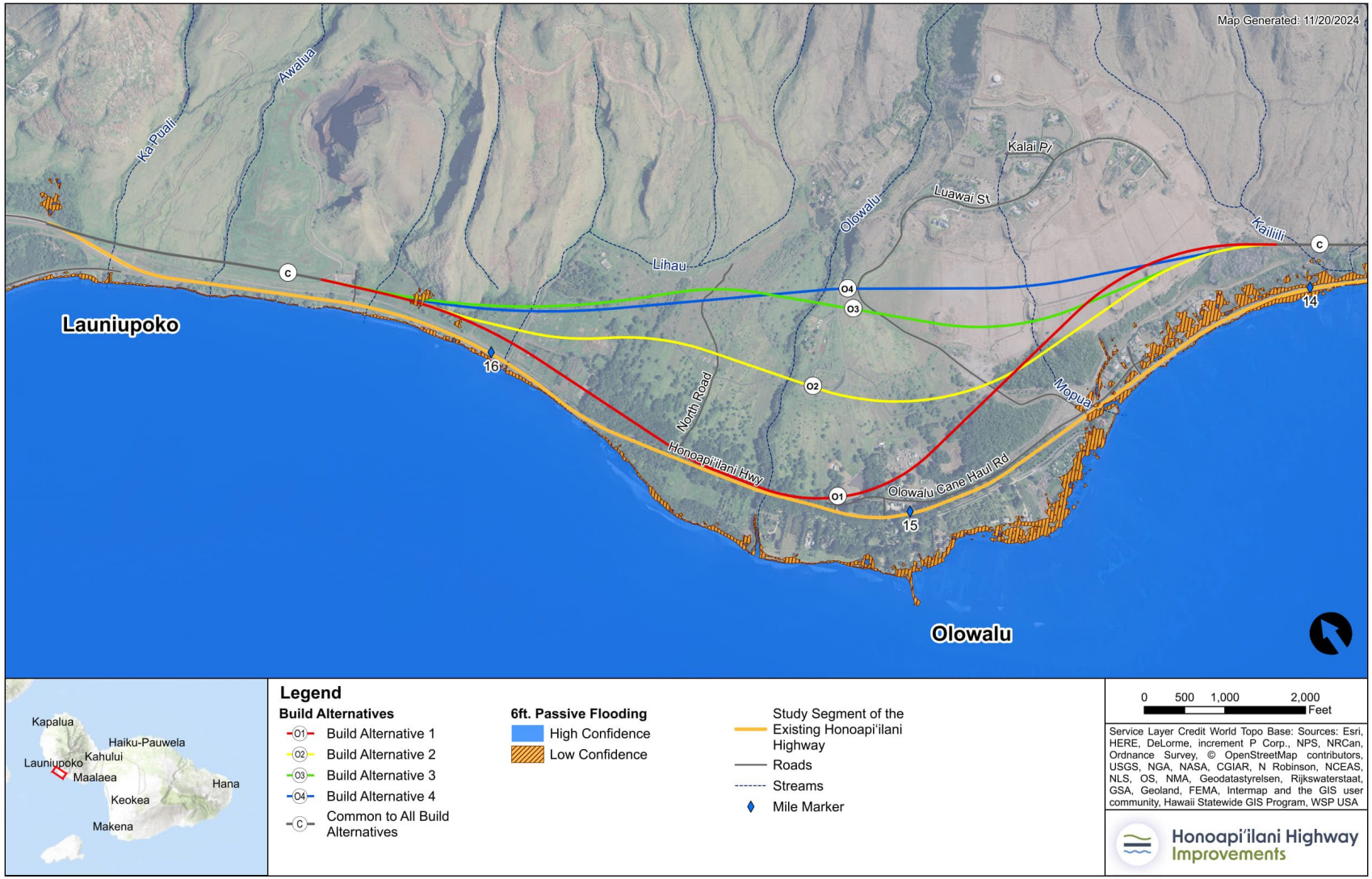
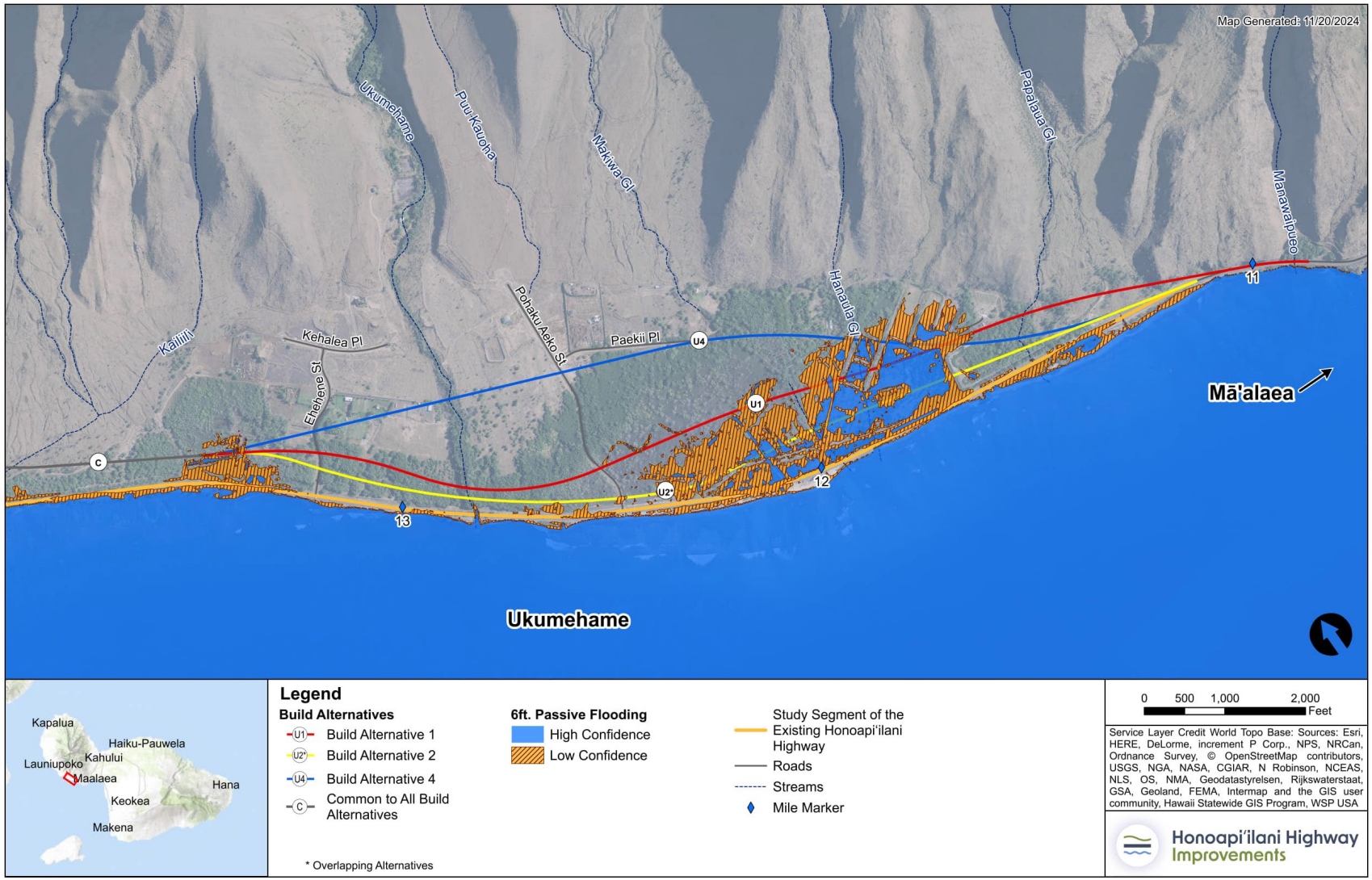


FIGURE 3.13-4. **6-Foot Passive Flooding Scenario in Ukumehame**

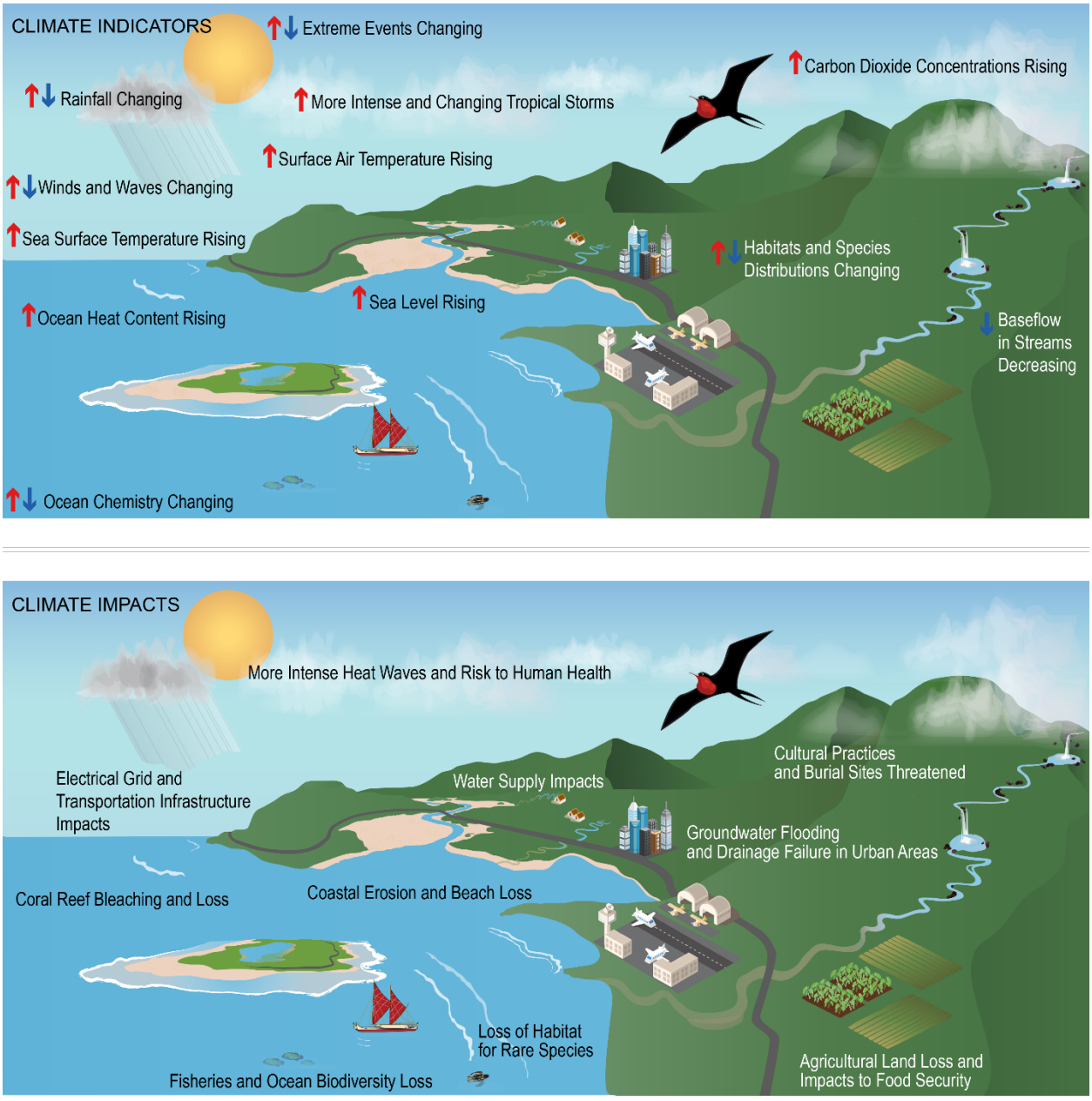


3.13.4 Environmental Consequences

Climate change and sea level rise have a cascading effect that can affect all elements within the project area. They affect water quality, through increased wildfires and storms, and people through increased heat waves, droughts, floods, and storms. TABLE 3.13-5 describes some of these interconnected effects resulting from climate hazards from the 2018 *Fourth National Climate Assessment*.[31] While these effects are synergistic and additive, most of them are not directly related to the Project. The Build Alternatives and appropriate mitigation measures can improve the resilience of Hawai'i's transportation system to such effects, primarily those associated with the SLR-XA. See Section 3.15, Air Quality and Energy, for additional discussion on potential project contributions to GHG emissions.

[31] U.S. Global Change Research Program. (2018). Fourth National Climate Assessment. Ch. 27 – Hawaii and U.S.-affiliated Pacific Islands. https://nca2018.globalchange.gov/chapter/27/.

FIGURE 3.13-5. **Climate Hazards Cascading Effects**



Source: Fourth National Climate Assessment – Ch. 27: Hawaii and U.S.-Affiliated Pacific Islands (2018)

3.13.4.1 No Build Alternative

As TABLE 3.13-1 shows, the No Build Alternative (that is, no changes to existing conditions) faces a greater threat from sea level rise than any of the Build Alternatives. The 3.2-foot SLR-XA encroaches on roughly 4 out of the total 6 miles of the existing highway in the study area. Of the roughly 2 miles outside of the SLR-XA, most of that section occurs in Olowalu just south of the Maui Paintball facility extending to Luawai Street (FIGURE 3.13-1). Service disruptions (such as closures) and the need for emergency repairs are expected to increase as the frequency and magnitude of these flood occurrences are exacerbated by climate change and sea level rise.

Nature-based solutions, revetments and seawalls, or a combination of those protections combined with elevating the road are short- to mid-term fixes that are assumed with the No Build Alternative due to the current state of the road and chronic effects from coastal hazards.

3.13.4.2 Build Alternatives

Common to All Build Alternatives in both Olowalu and Ukumehame

Based on the limitations of alignment options at each end of the project area, a portion of all Build Alternatives in Olowalu as well as in Ukumehame are likely to remain within the SLR-XA (TABLE 3.13-3, TABLE 3.13-4). If the Build Alternatives were constructed at the existing ground level elevation, they would be within the horizontal plane of the SLR-XA in certain areas. But elevating the vertical profile would minimize adverse effects from sea level rise.

As all the Build Alternatives cross flood hazards areas, freeboard would be required. Freeboard is an additional amount of height above Base Flood Elevation where a structure must be elevated or floodproofed to comply with floodplain management regulations.[32] Freeboard height would be determined in final design.

Max flood depth and max flood elevations for each Build Alternative in each region are listed in TABLE 3.13-5 and TABLE 3.13-6. For each Build Alternative, flood depths and elevations may vary at different points along the alignment. To account for this, the greatest max flood depths and max flood elevations are presented to identify the high end of alignment elevation needed to avoid flooding. Appendix 3.13 provides more detailed information.

[32] FEMA. (July 8, 2020). Freeboard. https://www.fema.gov/glossary/freeboard#:~:text=Freeboard-,a.,or%20community%20floodplain%20management%20regulations. Accessed December 2023.

FIGURE 3.13-6. **XBeach-NH Modeled Maximum Flood Extent**

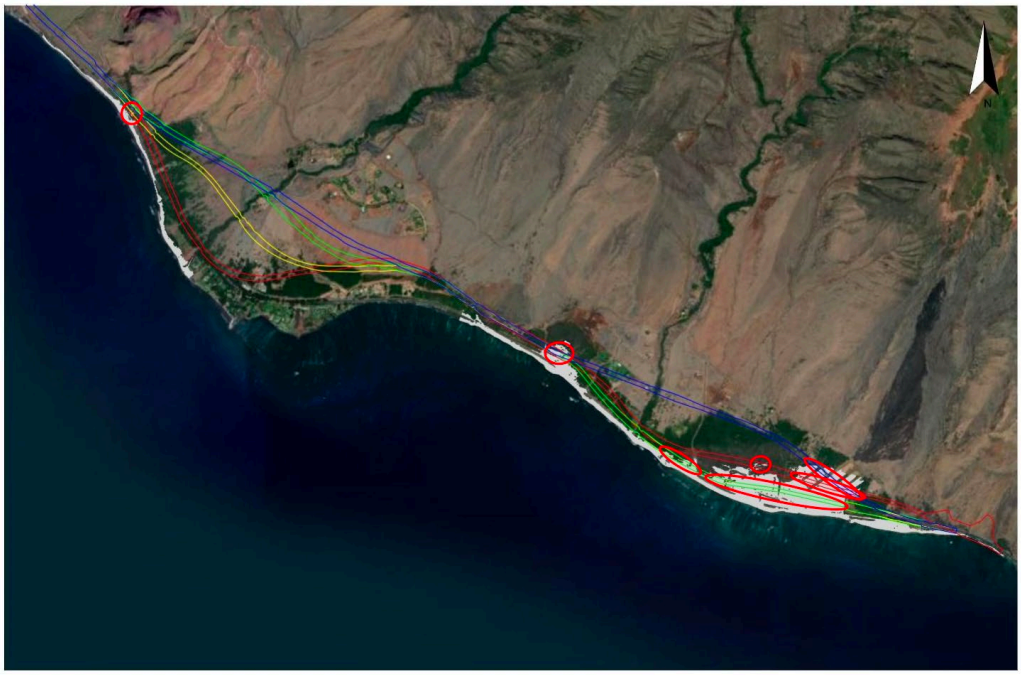


Figure 5-5. XBeach-NH modeled maximum flood extent (gray) for existing ground relative to alternatives 1 (red), 2 (yellow/green), 3 (green), and 4 (blue) alignments. Overlapping flooded areas are outlined in red.

Olowalu

Common to All Build Alternatives in Olowalu

In Olowalu, XBeach modeled flooding of the Build Alternatives at existing ground elevation is only present for Build Alternatives 1 and 2, at the alignment divergence point in the northern portion of the project area (FIGURE 3.13-6). All Build Alternatives are within the SLR-XA at this location just south of the Olowalu Recycling and Refuse Convenience Center. In this location, SLR-XA covers a larger area than XBeach modeled flooding, incorporating parts of Build Alternative 3 and Build Alternative 4. FIGURE 3.13-7 depicts where XBeach modeling identifies areas at existing ground elevation that are susceptible to potential flooding for a 3.2-foot sea level rise scenario in Olowalu.

All Build Alternatives share approximately the same area within the low-confidence area of passive flooding with 6 feet of sea level rise. This is a small area just south of the recycling center. No portions of the Build Alternatives in Olowalu are within the high-confidence area of passive flooding with 6 feet of sea level rise (TABLE 3.13-3).

Build Alternative 1

Build Alternative 1 is the largest area within the SLR-XA in Olowalu. XBeach modeling indicates flooding in the same general area as within the SLR-XA, just south of the Olowalu Recycling and Refuse Convenience Center (Appendix 3.13, Figure 5-5). To avoid flooding, Build Alternative 1 needs to be raised 1.0 foot above ground elevation and 6.7 feet above msl with freeboard (TABLE 3.13-5).

Build Alternative 2

Build Alternative 2 is the second largest area within the SLR-XA in Olowalu. XBeach modeling indicates flooding in the same general area as within the SLR-XA, just south of the Olowalu Recycling and Refuse Convenience Center (Appendix 3.13, Figure 5-5). To avoid flooding, Build Alternative 2 needs to be raised 0.8 feet above ground elevation and 6.7 feet above msl with freeboard (TABLE 3.13-5).

Build Alternative 3 and Build Alternative 4

Build Alternative 3 and 4 are tied for the smallest area within the SLR-XA in Olowalu. XBeach modeling indicates no flooding for Build Alternatives 3 and 4 in Olowalu (Appendix 3.13).

FIGURE 3.13-7. **XBeach-NH Modeled Maximum Flood Extent - Olowalu**

Source: Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapi'ilani Highway Realignment.

Ukumehame

Common to all Build Alternatives in Ukumehame

In Ukumehame, all Build Alternatives traverse flood prone areas identified by SLR-XA, XBeach modeling at existing ground elevation, and both high- and low-confidence areas of passive flooding with 6-feet of sea level rise, largely on viaduct.[33] There is slightly greater coverage of low-confidence areas of

[33] As described in Chapter 2, an at-grade embankment was evaluated as an alternative to a viaduct through Ukumehame around the firing range and would have greater environmental effects for all the Build Alternatives.

passive flooding with 6-feet of sea level rise than high confidence for all Build Alternatives in Ukumehame (TABLE 3.13-4).

Common flood prone areas for all Build Alternatives include at the southern end of the common alignment, through the Ukumehame Firing Range, and at the Pali.

Build Alternative 1

Build Alternative 1 has the third largest area within SLR-XA, as well as third largest area within both high- and low-confidence areas of passive flooding with 6-feet of sea level rise in Ukumehame (TABLE 3.13-4). This overlap occurs, generally, just northwest of Ehehene Street at the southern end of the common alignment, then just before the Ukumehame Firing Range, and a third portion through the Ukumehame Firing Range. XBeach modeling indicates flooding in same general areas as within the SLR-XA, with a greater area facing flooding at the southern end of the common alignment (Appendix 3.13, Figure 5-6). To avoid XBeach modeled flooding, Build Alternative 1 needs to be raised 4.7 feet above ground elevation and 7.1 feet above msl with freeboard (TABLE 3.13-6).

Build Alternatives 2 and 3

Build Alternatives 2 and 3 have the largest area within SLR-XA, as well as largest area within both high- and low-confidence areas of passive flooding with 6-feet of sea level rise in Ukumehame (TABLE 3.13-4). This overlap occurs, generally, just northwest of Ehehene Street at the southern end of the common alignment, makai of Build Alternative 1 extending north of Pōhaku 'Aeko Street, then through to the Ukumehame Firing Range driveway. XBeach modeling indicates flooding for Build Alternative 2 in the same general areas as within the SLR-XA in Ukumehame (Appendix 3.13, Figures 5-8 and 5-10). To avoid XBeach modeled flooding, Build Alternative 2 needs to be raised 4.7 feet above ground elevation and 7.1 feet above msl with freeboard (TABLE 3.13-6).

Build Alternative 4

Build Alternative 4 has the smallest area within SLR-XA, as well as least area within both high- and low-confidence areas of passive flooding with 6-feet of sea level rise in Ukumehame (TABLE 3.13-4). Generally, this overlap occurs just northwest of Ehehene Street at the southern end of the common alignment, and the most mauka portion of the Ukumehame Firing Range. XBeach modeling indicates flooding in the same general areas as within the SLR-XA in Ukumehame (Appendix 3.13, Figure 5-12). To avoid flooding, Build Alternative 4 needs to be raised 3.0 feet above ground elevation and 6.8 feet above msl with freeboard (TABLE 3.13-6).

FIGURE 3.13-8. **XBeach-NH Modeled Maximum Flood Extent - Ukumehame**

Source: Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapi‘ilani Highway Realignment.

3.13.5 Construction Effects

Highway service disruptions are expected to increase as climate change and sea level rise increase the frequency and magnitude of flood occurrences. There are no anticipated direct adverse construction effects of the Build Alternatives on climate change and sea level rise. However, the No Build Alternative would result in a future condition where the vulnerabilities from climate change, sea level rise, and coastal erosion remain a threat to Honoapi‘ilani Highway’s reliability as a critical highway link to and from West Maui.

For the No Build Alternative and the Build Alternatives within the SLR-XA, it is likely that steady interventions and repairs would be required to maintain the existing highway. Soft protections such as nature-based solutions, hard protections such as revetments and seawalls, or a combination of protections are only short- to mid-term fixes and would be continually needed to address the chronic effects from coastal hazards. Over the long term, the costs of these short- to mid-term fixes would increase and design accommodations to elevate portions of alignments above the SLR-XA would be required.

3.13.6 Indirect Effects

Shoreline hardening associated with the No Build and Build Alternatives within the SLR-XA can lead to scouring effects that hasten erosion on the seaward side of revetments and seawalls.

3.13.7 Mitigation

The Build Alternatives would provide an opportunity to reduce the highway's exposure to the SLR-XA and to storm surge and other event-based coastal effects. As portions of the highway are anticipated to remain within the SLR-XA based on limitations of alignment options at each end of the project area, these sections would require mitigation in the form of designs to elevate the roadway above the SLR-XA. Without this mitigation, the highway would be a less reliable transportation asset with anticipated closures and restrictions to the full use of the roadway. Strengthening and reinforcing the highway's reliability would improve the efficiency of not only the critical daily travel demands of Maui residents, businesses, and visitors, but also of critical emergency response services.

As noted in Section 3.13.4.2 ~~2.3~~, Build Alternatives, there are two areas (both less than 0.5 acre) in Olowalu that cannot avoid SLR-XA. Located just south of the Olowalu Recycling and Refuse Convenience Center (FIGURE 3.13-7 ~~Figure 2.7~~), these areas would require armoring to protect future shorelines from wave-runup.

According to The Nature Conservancy (2017), natural ~~climate~~ solutions can be used to further mitigate climate change effects through several pathways. Additional carbon sequestration can be achieved through the integration of trees into landscaping in woodland, grassland, and shrubland communities. Other natural ~~climate~~ solutions include avoiding the degradation and loss of wetlands and forest conversion, which in turn avoids emissions of aboveground and belowground biomass and soil carbon.[34]

In accordance with the *West Maui Greenway Plan*, mitigation opportunities for effects of climate change and sea level rise include utilizing the existing highway as a bicycle and pedestrian path. Green infrastructure, along with enhanced alternative transportation options, can reduce emissions, provide native habitat being lost to climate change, more effectively manage runoff and flooding through climate-ready design elements, and offer opportunities for a healthier lifestyle.[35]

To follow recommended actions for highways outlined in the 2021 *Hawaii Highways Climate Adaptation Action Plan*, technical studies produced for this Project can be used to mitigate the effects of climate change in future HDOT projects. Because hazards such as coastal erosion are site-specific, they require field visits. These visits would be important in the validation of areas identified in this current work as being exposed to coastal erosion.

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[34] Griscom, B. W., Adams, J., Ellis, P. W., Houghton, R. A., Lomax, G., Miteva, D. A., Schlesinger, W. H., Shoch, D., Siikamäki, J. V., Smith, P., Woodbury, P., Zganjar, C., Blackman, A., Campari, J., Conant, R. T., Delgado, C., Elias, P., Gopalakrishna, T., Hamsik, M. R., … Fargione, J. (2017). Natural climate solutions. Proceedings of the National Academy of Sciences - PNAS, 114(44), 11645–11650. https://doi.org/10.1073/pnas.1710465114

[35] Maui County. (September 2022). West Maui Greenway. https://issuu.com/mauimpo/docs/220920_wmg_final_report?fr=sNGIwNTMwNzgwNTg. Accessed September 2023.

3.13.8 Build Alternatives Comparative Assessment

TABLE 3.13-3 and TABLE 3.13-4 provide a comparative overview of approximate Build Alternative percentages within the SLR-XA, both high- and low-confidence areas of passive flooding with 6 feet of sea level rise, and a breakdown for each hazard contributing to SLR-XA in Olowalu and Ukumehame, respectively. TABLE 3.13-5 and TABLE 3.13-6 provide max flood depths and max flood elevations for each Build Alternative in Olowalu and Ukumehame, respectively, resulting from XBeach modeling. Additionally, TABLE 3.13-7 and TABLE 3.13-8 provide overall results of XBeach modeling for the length of highway impacted by modeled flooding for each Build Alternative in Olowalu and Ukumehame, respectively.

TABLE 3.13-3. **Build Alternatives Coastal Hazard Exposure Compared to the No Build Alternative - Olowalu**

TOPIC	NO BUILD ALTERNATIVE	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Percentage within SLR-XA (3.2 ft)	51%	3%	2%	1%	1%
Percentage makai of Coastal Erosion Line	38%	0%	0%	0%	0%
Percentage within Annual High-Wave Flooding Area	29%	3%	2%	1%	1%
Percentage within Passive Flooding Area	5%	0%	0%	0%	0%
Percentage within 6-foot Passive Flooding Scenario (High Confidence)[36]	5%	0%	0%	0%	0%
Percentage within 6-foot Passive Flooding Scenario (Low Confidence) [37]	9%	1%	1%	1%	1%

TABLE 3.13-4. **Build Alternatives Coastal Hazard Exposure Compared to the No Build Alternative - Ukumehame**

TOPIC	NO BUILD ALTERNATIVE	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Percentage within SLR-XA (3.2 ft)	73%	12%	35%	35%	8%

36 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/#/layer/cof/0/17429880.518077355/2368286.2582530957/14/satellite/128/0.8/2050/interHigh/midAccretion. Accessed October 2023.

37 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/#/layer/cof/0/17429880.518077355/2368286.2582530957/14/satellite/128/0.8/2050/interHigh/midAccretion. Accessed October 2023.

TOPIC	NO BUILD ALTERNATIVE	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Percentage makai of Coastal Erosion Line	42%	0%	1%	1%	1%
Percentage within Annual High-Wave Flooding Area	62%	9%	32%	32%	6%
Percentage within Passive Flooding Area	14%	9%	24%	24%	5%
Percentage within 6-foot Passive Flooding Scenario (High Confidence) [38]	11%	8%	13%	13%	3%
Percentage within 6-foot Passive Flooding Scenario (Low Confidence) [39]	27%	12%	17%	17%	9%

TABLE 3.13-5. **Build Alternatives Max Flood Depth and Max Flood Elevation - Olowalu[40]**

TOPIC	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Max Flood Depth (ft above ground elevation)	1.0 ft	0.8 ft	0 ft	0 ft
Max Flood Elevation (ft above msl)	6.7 ft	6.7 ft	0 ft	0 ft

TABLE 3.13-6. **Build Alternatives Max Flood Depth and Max Flood Elevation - Ukumehame[41]**

TOPIC	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Max Flood Depth (ft above ground elevation)	4.7 ft	4.7 ft	4.7 ft	3.0 ft
Max Flood Elevation (ft above msl)	7.1 ft	7.1 ft	7.1 ft	6.8 ft

38 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/#/layer/cof/0/17429880.518077355/2368286.2582530957/14/satellite/128/0.8/2050/interHigh/midAccretion. Accessed October 2023.

39 NOAA Office for Coastal Management. Sea Level Rise Viewer. https://coast.noaa.gov/slr/#/layer/cof/0/17429880.518077355/2368286.2582530957/14/satellite/128/0.8/2050/interHigh/midAccretion. Accessed October 2023.

40 Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapi'ilani Highway Realignment.

41 Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapi'ilani Highway Realignment.

TABLE 3.13-7. **Comparison of Build Alternatives based on XBeach Model Results - Olowalu[42]**

Highway Alignment	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Length of Highway Impacted by Modeled Flooding	148 ft	142ft	0 ft	0 ft

TABLE 3.13-8. **Comparison of Build Alternatives based on XBeach Model Results - Ukumehame[43]**

Highway Alignment	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4
Length of Highway Impacted by Modeled Flooding	1,291 ft	2,741 ft	2,715 ft	745 ft

[42] Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapiʻilani Highway Realignment.

[43] Sea Engineering Inc. (December 2023). Sea Level Rise Wave Inundation Study Honoapiʻilani Highway Realignment.

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3.14 TRANSPORTATION

This section documents the regulatory background of the Honoapi‘ilani Highway Improvements Project (the Project), details the operational configurations of access points, and summarizes highway traffic operations within the project area. Additionally, this section includes an evaluation of existing conditions and the projected Future Year 2045 conditions for the No Build Alternative and the Build Alternatives, as well as a discussion of the safety implications of the No Build Alternative compared to the Build Alternatives. FIGURE 3.14-1 identifies the project area and the existing highway alignments and intersections with local streets and driveways.

The Lāhainā wildfire and rebuilding efforts are having a dramatic effect on current traffic conditions in West Maui. To maintain consistency with long-range planning efforts, this ~~Draft~~ Final Environmental Impact Statement (EIS) utilizes the Maui Metropolitan Planning Organization’s (Maui MPO’s) Year 2045 pre-Lāhainā wildfire traffic projections. Based on coordination with the MPO and given the extended period of reconstruction and rebound in economic activity, these traffic demand projections are considered to be appropriate over the long term but are likely conservatively high for the 2045 analysis year. The implications of this are discussed in Section 3.14.4.6 and Section 3.14.4.7, which evaluate the future operations of the alternatives.

Following publication of the Draft EIS, the public was afforded an opportunity to review and comment on the effects of the Project with respect to transportation. Based on those comments and continued design considerations, there have been several refinements to the Preferred Alternative. These are described and evaluated in Chapter 5, Preferred Alternative, along with supporting traffic impact assessment found in Appendix 3.14. Specific to the Draft EIS assessment of the Build Alternatives, there are no Final EIS revisions to the analysis contained within this section.

3.14.1 Regulatory Context

The design, operations, and safety of Honoapi‘ilani Highway in the project area are regulated by several agencies, primarily the State of Hawai‘i Department of Transportation (HDOT) and the Federal Highway Administration (FHWA).

3.14.2 Methodology

The Project is a new two-lane, divided highway that would be constructed to allow for upgrading to a four-lane, divided highway—if future conditions are appropriate and funds are available. This new two-lane, divided highway would replace the existing two-lane, undivided highway as the primary regional arterial roadway. The existing two-lane highway would become a local roadway, which would be transferred to the jurisdiction of Maui County and primarily provide access to existing uses. The transportation impacts evaluated in this section focus on a two-lane highway configuration for both the existing and future conditions.

The evaluation of both existing and future conditions includes documentation of existing and future roadway and intersection configurations, documentation of existing and projected future traffic volumes, and analysis of peak-hour roadway segment and intersection operations. Additionally, public

transit, bicycle, and pedestrian conditions for existing and future conditions are documented. Traffic crash information is summarized for existing conditions and the potential safety benefits of the Project are forecast.

Industry-accepted methodologies for roadway capacity, intersection operational analyses, and traffic safety were used to evaluate existing and future traffic conditions:

- Roadway segment level of service was determined using ranges of volume/capacity ratios based on guidance contained in the *Highway Capacity Manual, Seventh Edition: A Guide for Multimodal Mobility Analysis*.
- Intersection operational analyses utilized methodologies documented in the *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis*—Chapter 19 was referenced for signalized intersections and Chapter 20 was referenced for unsignalized intersections. Cubic Transportation Systems Synchro Studio 11 traffic analysis software was used to apply these methodologies.
- Evaluation of traffic signal warrants were based on procedures documented in the FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition* (Chapter 4C, Traffic Control Signal Needs Studies, was applied).
- Intersection configuration recommendations were based on guidelines in *A Policy on Geometric Design of Highways and Streets,* 7th Edition, 2018—commonly referred to as the Green Book—from the American Association of State Highway and Transportation Officials (AASHTO).
- Safety analyses utilized methods documented in the AASHTO *Highway Safety Manual*, Part C – Predictive Method. And crash modification factors obtained from the Oregon DOT *Crash Reduction Factor Manual* were used to estimate benefits of the proposed divided Honoapi‘ilani Highway.

Appendix 3.14 provides additional detailed information on the analyses conducted using these methodologies.

FIGURE 3.14-1. **Project Area and Existing Traffic Study Area Intersections**

3.14.3 Affected Environment

As shown in FIGURE 3.14-1, the Honoapi‘ilani Highway Improvements Project area is in West Maui between Ukumehame (milepost 11) and Launiupoko (milepost 17). The southeastern terminus would connect to the existing Honoapi‘ilani Highway in the vicinity of the Pali. The northwestern terminus in Launiupoko would connect to the existing Lāhainā Bypass.

3.14.3.1 Existing Roadways

Honoapi‘ilani Highway

Honoapi‘ilani Highway is a two-lane, undivided principal arterial that is part of the National Highway System and the Primary Highway Freight System. It is the primary roadway connecting West Maui to the rest of the island of Maui. The posted speed limit varies between 35 miles per hour (mph) in areas with high driveway density and 55 mph with infrequent formal access. Passing is allowed on selected segments of Honoapi‘ilani Highway. Intersections within the project area are unsignalized with stop-control on the minor-street approaches.

Olowalu Area

Olowalu Recycling and Refuse Convenience Center Driveway

This driveway is a two-lane, paved mauka-makai road originating at Honoapi‘ilani Highway between Launiupoko and Olowalu. It provides access to both the Olowalu Recycling and Refuse Convenience Center and a former cinder mining quarry, which is currently a temporary storage site for ash and debris from the Lāhainā wildfire.

Honoapi‘ilani Highway Frontage Road

This is a private, partially paved, two-lane frontage road located mauka of and parallel to Honoapi‘ilani Highway. It begins at the Olowalu Recycling and Refuse Convenience Center driveway and ends at the north terminus of the Olowalu Village Road. The frontage road, also referred to as a cane haul road, provides access to a farm and the Maui Paintball site. There are gates on this roadway located just south of the farm driveway and at its southern terminus. These gates are often locked, restricting public access to this segment of the frontage road.

Upper Olowalu Access Road

This partially paved two-lane road provides access to the Olowalu Petroglyphs site and residences that are makai and mauka of the site. The roadway begins at Olowalu Village Road and terminates at the driveways into mauka properties and the Olowalu Cultural Reserve area.

Olowalu Village Road

Olowalu Village Road is a paved, two-lane roadway located mauka of and generally parallel to Honoapi‘ilani Highway. The drivable segment of this roadway begins approximately at the Upper Olowalu Access Road—north of the Olowalu General Store area—and ends south of Olowalu Village. It provides traffic circulation within Olowalu Village and in the Olowalu General Store area. On the makai side of Honoapi‘ilani Highway, the roadway leading to Olowalu Landing and Camp Olowalu is also designated as Olowalu Village Road. This roadway intersects Honoapi‘ilani Highway opposite the main

driveway into the Olowalu General Store area and provides access to private driveways to the Olowalu Plantation House and a residential neighborhood located makai of Honoapiʻilani Highway.

Luawai Street

Luawai Street is a paved, two-lane, mauka-makai road originating at Honoapiʻilani Highway in the vicinity of Olowalu Village. It provides access to a large-lot residential subdivision and can be used to access the Olowalu Petroglyphs.

Ukumehame Area

Ehehene Street

Ehehene Street is a paved, two-lane, mauka-makai road originating at Honoapiʻilani Highway in the Ukumehame area. It provides access to the Ukumehame Sod Farm, Maui Island Sod, and a large-lot residential subdivision.

Pōhaku ʻAeko Street

Pōhaku ʻAeko Street is a paved, two-lane, mauka-makai road originating at Honoapiʻilani Highway in the Ukumehame area. It provides access to a large-lot residential subdivision with an internal street, Paekiʻi Place.

Ukumehame Firing Range Driveway

The Ukumehame Firing Range driveway is a paved, two-lane, mauka-makai road originating at Honoapiʻilani Highway in the Ukumehame area. It provides access to Ukumehame Firing Range and maintenance access to the HDOT sedimentation basin.

3.14.3.2 Existing Intersections

Eleven intersections, all unsignalized, were included in the evaluation of existing conditions. FIGURE 3.14-2 shows their locations on the existing Honoapiʻilani Highway and FIGURE 3.14-3 shows their lane configurations. These intersections are the defined intersections on the existing Honoapiʻilani Highway.

In addition to these defined intersections, there is semicontinuous beach access along the makai side of Honoapiʻilani Highway. FIGURE 3.14-4 shows the existing access points and beach access. Although some beaches have designated parking areas, large segments of the beaches allow unrestricted vehicular maneuvers directly on and off Honoapiʻilani Highway. As shown in FIGURE 3.14-4, much of this unrestricted beach access occurs in the Launiupoko and Ukumehame areas.

FIGURE 3.14-2. **Location of Existing Intersections**

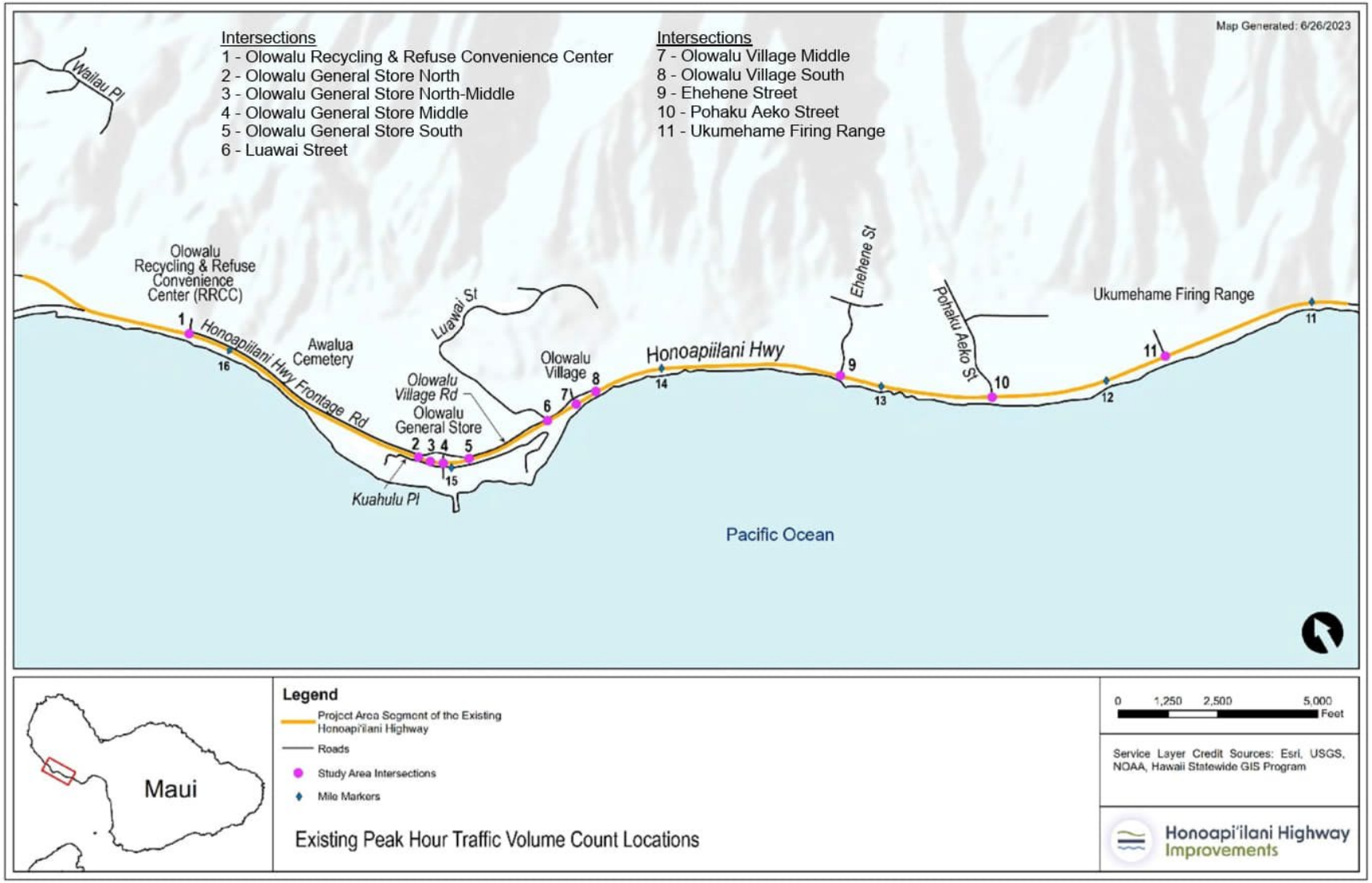


FIGURE 3.14-3. **Existing Lane Configurations**

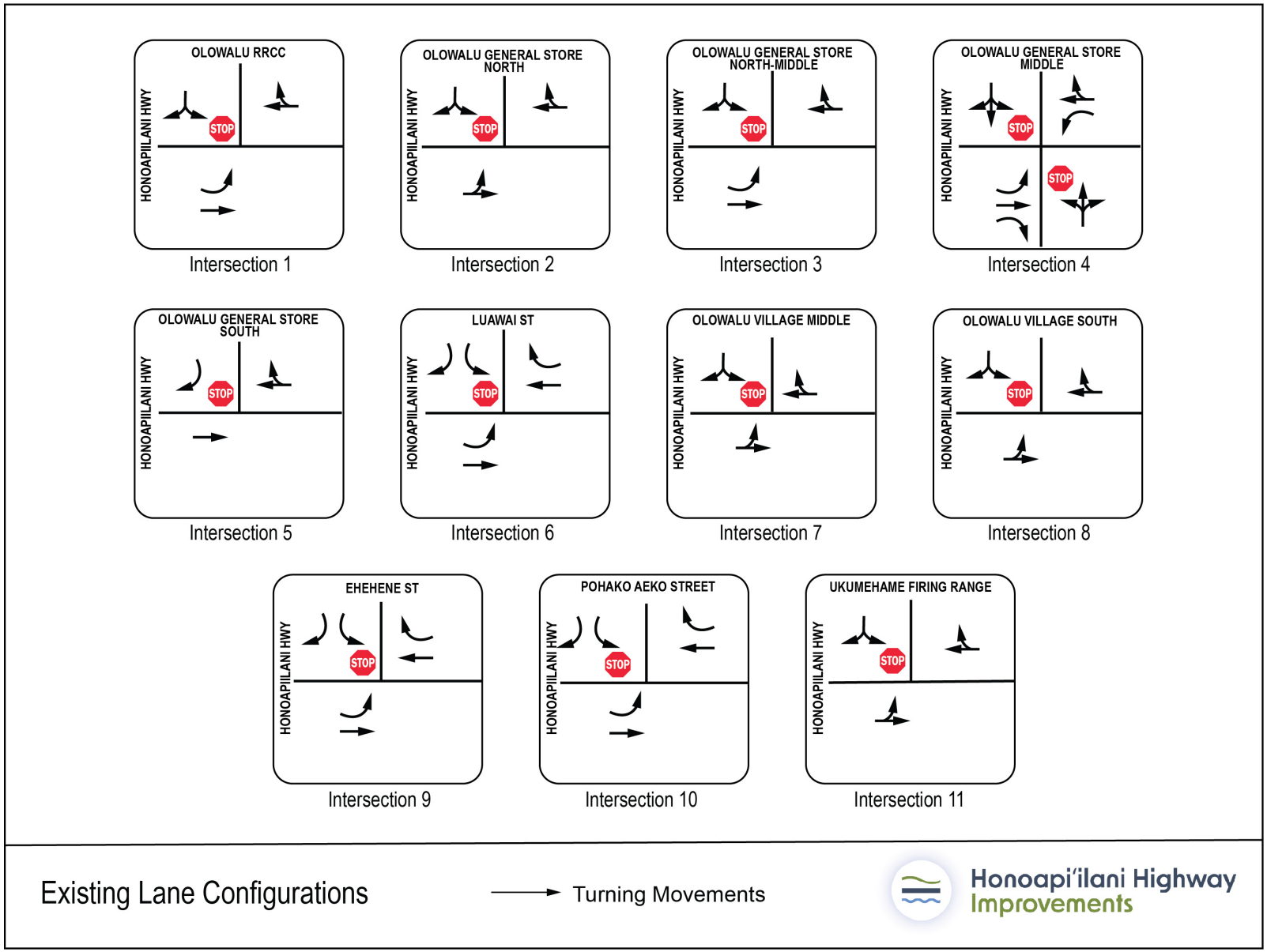
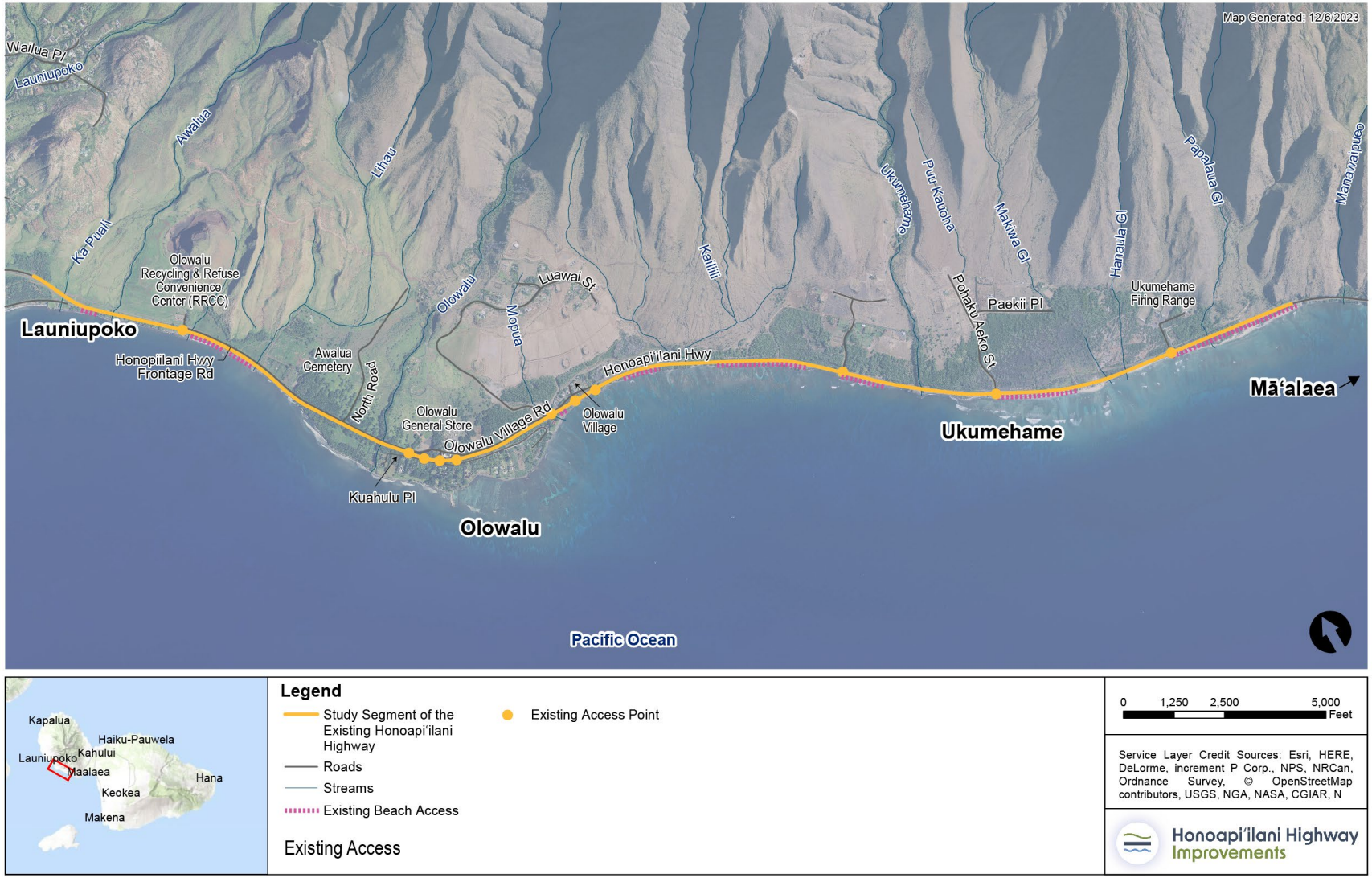


FIGURE 3.14-4. **Existing Access along Honoapi'ilani Highway**



Honoapiʻilani Highway and Refuse Convenience Center

The Olowalu Recycling and Refuse Convenience Center driveway to the Honoapiʻilani Highway is controlled by a stop sign and has one departing lane for both right and left turns. An exclusive left-turn lane is provided for the southbound Honoapiʻilani Highway approach.

Olowalu Area

Honoapiʻilani Highway/Olowalu General Store Area

There is one major driveway and three minor driveways into this commercial area.

The major access driveway is across from the roadway that provides access to the makai area of Camp Olowalu, Olowalu Landing, and the Olowalu Plantation House. This four-legged, unsignalized intersection has exclusive left-turn lanes on both Honoapiʻilani Highway approaches. An exclusive right-turn lane into the makai roadway is provided on the southbound Honoapiʻilani Highway approach. Both driveway approaches from the Olowalu General Store area and the makai roadway are STOP-sign controlled.

All of the minor-street accesses are unsignalized T-intersections and have either explicit (signed) or implicit (unsigned driveway) STOP-control on the driveway approach. The northernmost minor access is near the northern terminus of Olowalu Village Road. A second minor access is just to the south, in the parking area fronting the Olowalu Farmer's Market and Kamala's Kitchen. These two minor accesses are full-movement T-intersections with no turn movement restrictions. The third minor access is a right-in/right-out driveway located south of Leoda's Kitchen and Pie Shop.

Honoapiʻilani Highway/Luawai Street

The Honoapiʻilani Highway/Luawai Street intersection is an unsignalized T-intersection with STOP-sign control on the Luawai Street approach. An exclusive left-turn lane is provided for the southbound Honoapiʻilani approach, and a right-turn deceleration lane is provided for the northbound Honoapiʻilani approach. A left-turn refuge is provided in the median for vehicles turning left out of Luawai Street. The Luawai Street approach is channelized with separate left- and right-turn lanes.

Honoapiʻilani Highway/Olowalu Village

Two Olowalu Village access points are provided south of Luawai Street. Both access points are unsignalized and have no stop signs for traffic seeking to get on to the highway. Neither access point has delineated left- or right-turn lanes.

Ukumehame Area

Honoapi‘ilani Highway/Ehehene Street

The Honoapi‘ilani Highway/Ehehene Street intersection is an unsignalized T-intersection with STOP-sign control on the Ehehene Street approach. An exclusive left-turn lane is provided for the southbound Honoapi‘ilani approach, and right-turn deceleration and acceleration lanes are provided on northbound Honoapi‘ilani Highway. A left-turn refuge is provided in the median for vehicles turning left out of Ehehene Street. The Ehehene Street approach is channelized with separate left- and right-turn lanes.

Honoapi‘ilani Highway/Pōhaku ‘Aeko Street

The Honoapi‘ilani Highway/Pōhaku ‘Aeko Street intersection is an unsignalized T-intersection with STOP-sign control on the Pōhaku ‘Aeko Street approach. An exclusive left-turn lane is provided for the southbound Honoapi‘ilani approach, and right-turn deceleration and acceleration lanes are provided on northbound Honoapi‘ilani Highway. A left-turn refuge is provided in the median for vehicles turning left out of Pōhaku ‘Aeko Street. The Pōhaku ‘Aeko Street approach is channelized with separate left- and right-turn lanes.

Honoapi‘ilani Highway/Ukumehame Firing Range Driveway

The Ukumehame Firing Range driveway is an unsignalized T-intersection with STOP-sign control on the driveway approach. No turn lanes are provided on Honoapi‘ilani Highway, and there is no channelization of the driveway approach.

3.14.3.3 Existing Public Transit

The Maui County Department of Transportation works with Roberts Hawaii to provide Maui Bus, which is an island-wide public bus transit system. The Lāhainā Islander Route, which connects the Kahului-Wailuku Area to Lāhainā, passes through the project area on Honoapi‘ilani Highway. No bus stops are located within the project area.

3.14.3.4 Existing Bicycle/Pedestrian Facilities

While no separate bike lanes or pedestrian facilities are currently provided within the project area, Honoapi‘ilani Highway is considered a shared access roadway. Bicyclists and pedestrians can use the highway’s paved shoulders.

3.14.3.5 Existing Roadway Data

Existing roadway data was identified and documented:

- Number of lanes and shoulder widths
- Intersection Lane configurations
- Bicycle facilities
- Pedestrian facilities and crosswalk locations
- Intersection traffic control
- Posted speed limits

3.14.3.6 Existing Segment Operations

With the purpose of identifying the relative quality of flow on the existing Honoapiʻilani Highway given the current traffic volume demand, traffic volumes on Honoapiʻilani Highway were collected and general segment operations were evaluated.

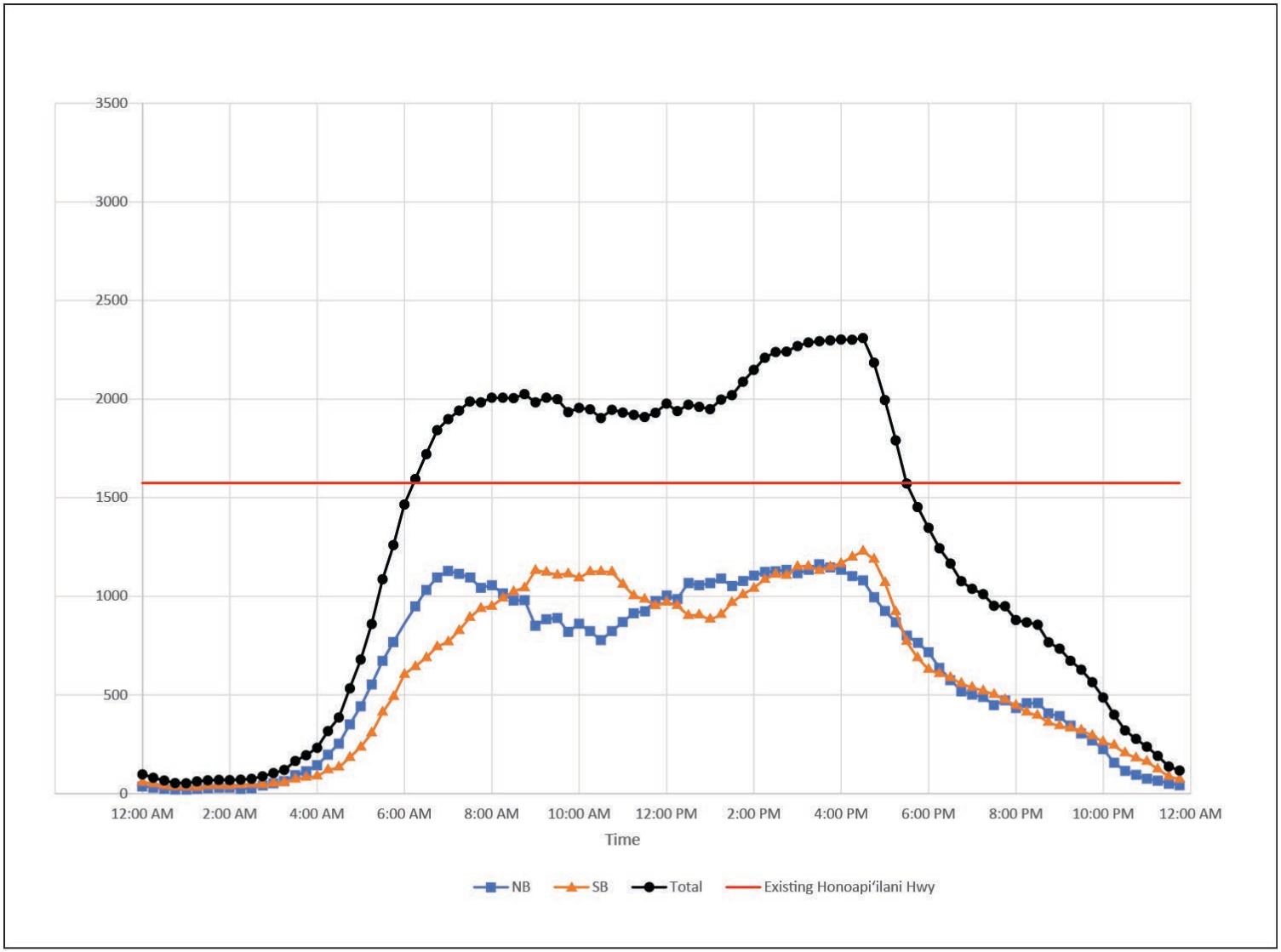
Corridor Traffic Volumes

Existing Honoapiʻilani Highway traffic volumes obtained from HDOT were augmented with counts recorded for the Project over 24 hours—May 3 through May 4, 2023—at the driveways of the Olowalu Recycling and Refuse Convenience Center and the Ukumehame Firing Range. For this analysis, these two intersections represent traffic volumes at the north and south ends of the project area, respectively, and FIGURE 3.14-5 and FIGURE 3.14-6 show their distributions—including both directional traffic volumes and the two-way totals. Additionally, reference lines indicate the maximum directional operational volume of Honoapiʻilani Highway based on its current level of access management and roadway geometrics. These maximum directional operational volumes are used as a measure of capacity, because through traffic on Honoapiʻilani Highway is largely unconstrained by intersecting street traffic.

Corridor Evaluation

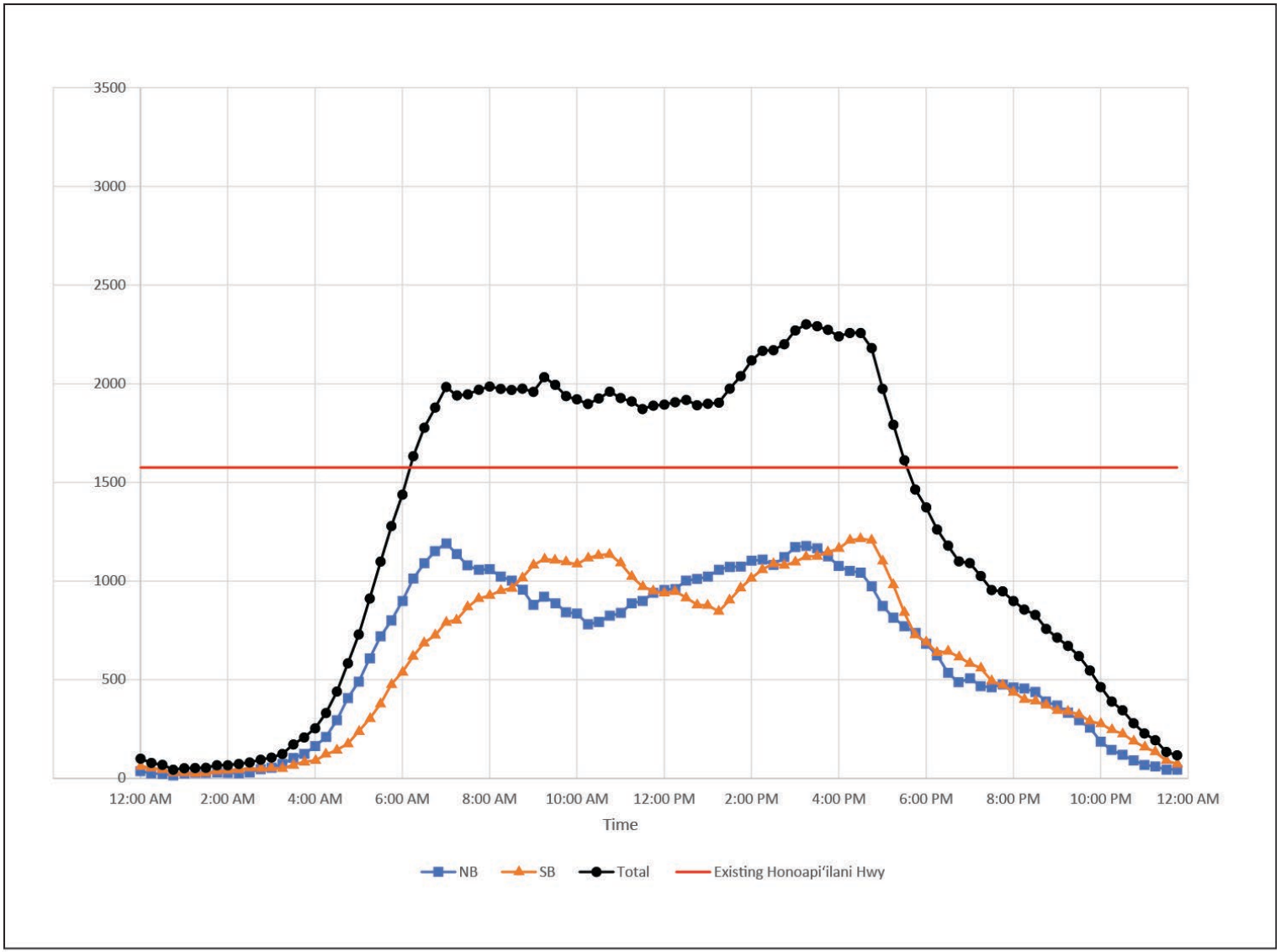
FIGURE 3.14-5 and FIGURE 3.14-6 show that both the Launiupoko and Ukumehame ends of Honoapiʻilani Highway within the project area experience peak-hour traffic volumes below the maximum directional operational volume. This is consistent with observations indicating that traffic on the highway is substantial but mostly flows well. Occasionally, and especially during the PM peak-hour in the southbound direction, there are minor operational disruptions at intersections that trigger congestion and result in vehicles queuing on Honoapiʻilani Highway. These events are intermittent and traffic flows well between them.

FIGURE 3.14-5. **Existing 2023 Honoapi'ilani Highway Traffic Volumes at Launiupoko in the Vicinity of Milepost 16.5**



Existing 2023 Hourly Honoapiilani Highway Traffic Volume North of Project

FIGURE 3.14-6. **Existing 2023 Honoapi'ilani Highway Traffic Volumes at Ukumehame in the Vicinity of Milepost 11.5**



Existing 2023 Hourly Honoapiilani Highway Traffic Volume South of Project

3.14.3.7 Existing Intersection Operations

At 11 intersections on Honoapi‘ilani Highway, traffic turning-movement volumes were collected and peak-hour intersection operations were evaluated (FIGURE 3.14-2).

Intersection Turning Movement Traffic Volumes

Traffic turning-movement counts and pedestrian/bicycle counts for the Project were conducted on Wednesday, May 3, 2023, at the following numbered intersections:

1. Honoapi‘ilani Highway/Olowalu Recycling and Refuse Convenience Center
2. Honoapi‘ilani Highway/Olowalu General Store area, north driveway
3. Honoapi‘ilani Highway/Olowalu General Store area, north-middle driveway
4. Honoapi‘ilani Highway/Olowalu General Store area, middle/Camp Olowalu driveway
5. Honoapi‘ilani Highway/Olowalu General Store area, south driveway (right-in/right-out)
6. Honoapi‘ilani Highway/Luawai Street
7. Honoapi‘ilani Highway/Olowalu Village, middle access
8. Honoapi‘ilani Highway/Olowalu Village, south access
9. Honoapi‘ilani Highway/Ehehene Street
10. Honoapi‘ilani Highway/Pōhaku ‘Aeko Street
11. Honoapi‘ilani Highway/Ukumehame Firing Range Driveway

The AM and PM peak hours occurred from 8:45 a.m. to 9:45 a.m. and 3:15 p.m. to 4:15 p.m., respectively. FIGURE 3.14-7 shows the existing peak-hour traffic volumes at these intersections. The intersection numbers in this figure correspond to the intersection numbers shown in the intersection location map in FIGURE 3.14-2 and the list above.

Bicycle and pedestrian volumes were very low—less than five each per hour at any intersection during the peak-hour periods.

Intersection Peak-Hour Operations

The study intersections were analyzed with Synchro Studio 11 software using the methodologies for unsignalized intersections documented in the *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis*. Because of the very low bicycle and pedestrian volumes, only vehicular mode operational analyses were conducted.

Unsignalized intersection analyses characterize operating conditions by assigning a scaled qualitative measure, level of service (LOS), to key traffic movements at an intersection. LOS ranges from A to F, with LOS A representing operations with low vehicular delays and LOS F representing operations with relatively high vehicular delays. TABLE 3.14-1 shows the scale of delays in terms of average number of seconds pe vehicle by unsignalized LOS levels.

FIGURE 3.14-7. **Existing Peak-Hour Traffic Volumes**

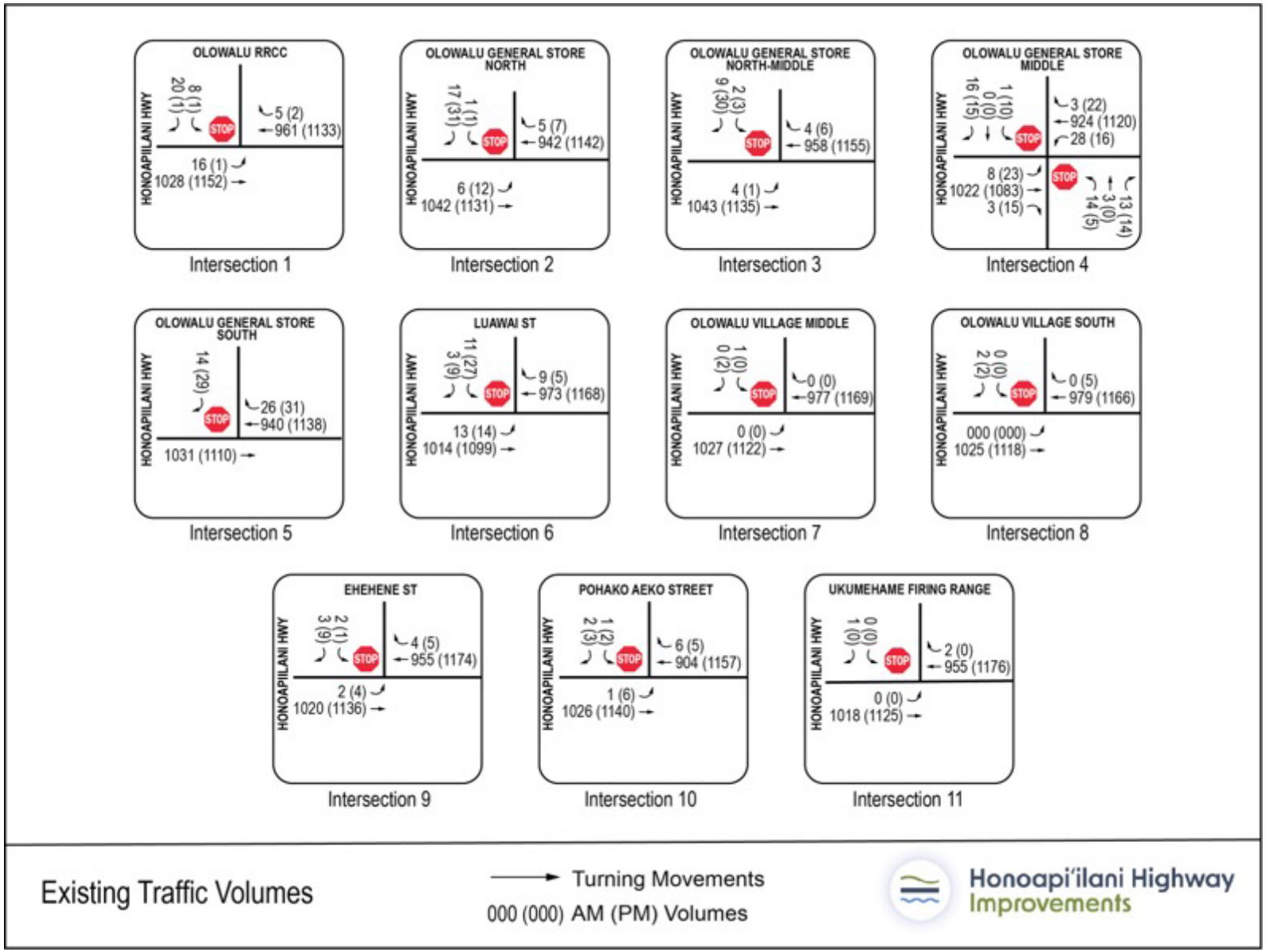


TABLE 3.14-1. **Unsignalized Intersection Level of Service Definition**

LEVEL OF SERVICE (LOS)	UNSIGNALIZED LOS DELAY THRESHOLDS (SECONDS/VEHICLE)
A	≤10
B	>10 to 15
C	>15 to 25
D	>25 to 35
E	>35 to 50
F	>50

Note: Highway Capacity Manual, Sixth Edition

All intersections analyzed for the Project are unsignalized two-way STOP-control (TWSC) with uninterrupted flow on Honoapi‘ilani Highway and STOP-control on the intersecting street approaches.

TABLE 3.14-2 displays key existing conditions operating LOS for each intersection. As shown in this table, the bolded intersections operate at LOS E or LOS F. The LOS shown relate to the left-turn movements out of the minor streets onto Honoapi‘ilani Highway. This is usually the most difficult movement to execute at an unsignalized intersection, especially when there is substantial traffic volume on the main roadway, as is the case with Honoapi‘ilani Highway. Appendix 3.14 includes tables with all of the evaluated traffic movements.

These intersections are incurring LOS E or F because they do not provide median refuge lanes for left turns out from the minor streets. Median refuge would allow these left-turning vehicles to execute the movement in two steps: first from the minor street into the median, and then from the median into the through traffic lane on Honoapi‘ilani Highway. Without this feature, traffic turning out from the minor street needs to feel comfortable in clearing traffic coming from both directions on Honoapi‘ilani Highway—a much more difficult task. Still, while delays result in LOS E or LOS F for these minor-street approaches, the movements involve a relatively small numbers of vehicles.

Intersections such as the Luawai Street, Ehehene Street, and Pōhaku ‘Aeko Street provide median refuge lanes and therefore operate at LOS D or better during both peak periods. Overall, traffic movements on mainline Honoapi‘ilani Highway operate well with very little delay.

TABLE 3.14-2. **Existing Year 2023 Intersection Level of Service**

			AM PEAK HOUR			PM PEAK HOUR		
INTERSECTION	TRAFFIC CONTROL	MOVEMENT	LOS	DELAY	V/C	LOS	DELAY	V/C
Honoapi‘ilani Highway/ Olowalu Recycling and Refuse Convenience Center	TWSC	Highest Delay Minor-Street Movement	E	40	0.22	F	75	0.17
Honoapi‘ilani Highway/ Olowalu General Store North	TWSC	Highest Delay Minor-Street Movement	D	34	0.16	E	45	0.30
Honoapi‘ilani Highway/ Olowalu General Store North-Mid	TWSC	Highest Delay Minor-Street Movement	D	33	0.06	D	31	0.21
Honoapi‘ilani Highway/ Olowalu General Store Middle	TWSC	Highest Delay Minor-Street Movement	F	151	0.63	F	254	0.83
Honoapi‘ilani Highway/ Olowalu General Store South	TWSC	Highest Delay Minor-Street Movement	C	18	0.05	C	24	0.14
Honoapi‘ilani Highway/ Luawai Street	TWSC	Highest Delay Minor-Street Movement	C	20	0.05	D	26	0.14
Honoapi‘ilani Highway/ Olowalu Village Middle	TWSC	Highest Delay Minor-Street Movement	E	48	0.11	F	77	0.18
Honoapi‘ilani Highway/ Olowalu Village South	TWSC	Highest Delay Minor-Street Movement	E	48	0.11	F	77	0.18
Honoapi‘ilani Highway/ Ehehene Street	TWSC	Highest Delay Minor-Street Movement	C	19	0.02	C	24	0.03
Honoapi‘ilani Highway/ Pōhaku ‘Aeko Street	TWSC	Highest Delay Minor-Street Movement	C	18	0.02	C	23	0.03
Honoapi‘ilani Highway/ Ukumehame Firing Range	TWSC	Highest Delay Minor-Street Movement	E	46	0.11	F	79	0.18

Note: Delay shown in seconds per vehicle
TWSC = Two-Way STOP-Controlled

3.14.3.8 Existing Crash Data

The Traffic Branch of HDOT’s Highways Division provided traffic crash data from 2020, 2021, and 2022. TABLE 3.14-3 shows the first and second actions of the crashes identified in the project area. In addition, a traffic crash inventory within the project area (milepost 11 to milepost 17) for the three most recent years of data available in a memorandum dated August 17, 2023.

TABLE 3.14-3. **Existing Crash Data First and Second Actions (2020, 2021, 2022)**

ACTION	SECOND ACTION											
	Overturn/Rollover off Roadway	Ran off Roadway	Cross Median	Collision with Guardrail	Collision with Tree	Collision with Other	Head On	Rear End	Angle (Opposite Direction)	Sideswipe (Opposite Direction)	None	TOTAL
Overturn/Rollover off Roadway											2	**2**
Ran off Roadway	1				1							**2**
Fell/Jumped from Motor Vehicle						1					2	**3**
Cross Centerline				1	1		4		2	3		**11**
Collision with Guardrail					1						1	**2**
Collision with Tree	1											**1**
Ped Darting Out											1	**1**
Rear End			1					5			12	**18**
Angle (Same Direction)											1	**1**
Broadside		1									1	**2**
Collision with Parked Motor Vehicle											1	**1**
Total	**2**	**1**	**1**	**1**	**3**	**1**	**4**	**5**	**2**	**3**	**21**	**44**

Of these 44 major traffic crashes reported, five were motorcycle crashes, one involved a pedestrian, and there were no bicycle crashes. There were 18 lane departure crashes, of which nine crashes involved speeding. There were two fatalities and 13 serious injuries.

As shown in TABLE 3.14-3, the two most prominent categories of crashes were rear end, with 18 occurrences, and crossing of the centerline, with 11 occurrences. Both reflect the characteristics of the existing Honoapi'ilani Highway as an undivided, two-lane roadway with low management of access and limited intersections with turning-movement lanes.

Rear-end crashes had the highest occurrence, 18 of the 44 reported incidents. Three of these 18 accidents were attributed to speeding and seven were attributed to distracted driving. Rear-end accidents could potentially be reduced by providing turning-movement turn lanes at intersections and providing more management of access.

There were 11 occurrences of vehicles crossing the centerline. Of these, four resulted in head-on collisions—potentially the most severe type of motor vehicle accident.

Finally, fourteen of the 44 major traffic crashes reported occurred at night. The existing highway is in a rural area and does not provide street lighting.

3.14.4 Environmental Consequences

This section discusses the data inputs and analyses used to evaluate the No Build and Build Alternatives for the Future Year 2045. For this analysis year, future traffic volumes used in the evaluation are established, and the No Build Alternative and the Build Alternatives are described, evaluated, documented, and summarized.

This section analyzes conditions with these future traffic volumes for the No Build Alternative (retaining the existing highway in its current configuration) as well as four build alternatives in Olowalu and three build alternatives in Ukumehame, which were grouped together as the four Build Alternatives for the Project. FIGURE 3.14-8 illustrates the Build Alternatives.

All of the evaluated roadway alternatives are approximately 6 miles long and extend from Ukumehame near the Pali to Launiupoko, where it joins the existing Lāhainā Bypass. The Build Alternatives would be constructed as principal arterials with paved shoulders—8-foot outside and 6-foot inside. The posted speed limit for the Build Alternatives would be 45 miles per hour to maintain consistency with the existing Lāhainā Bypass that has a posted speed limit of 45 miles per hour.

3.14.4.1 Future Year 2045 Travel Demand

The purpose and need for this project is to increase the resilience of Honoapi‘ilani Highway between Ukumehame and Launiupoko, and the primary way to accomplish this is to relocate the highway mauka out of the project sea-level rise areas. This relocated highway segment is proposed as a two-lane divided highway. However, to assure future reliability for handling unanticipated increases in traffic volumes, it is proposed to acquire enough right-of-way for expansion to a four-lane highway facility (depending on travel demand and the availability of funding).

Future Year 2045 was used to forecast travel demand within the project area to be consistent with the Maui MPO’s current updated travel demand model forecast, which is a component of the *Hele Mai Maui Long-Range Transportation Plan 2040*. This forecast includes assumptions of future land use that have been adopted for use in the model. A review of the model input indicated minimal growth in population and employment within the project area. Therefore, most of the growth in traffic volume forecast for the project area is attributable to regional traffic that is not directly associated with the project area. Should traffic volumes in the long-range future exceed the Future Year 2045 forecast, the corridor studied for this project has the ability to accommodate the increased volumes.

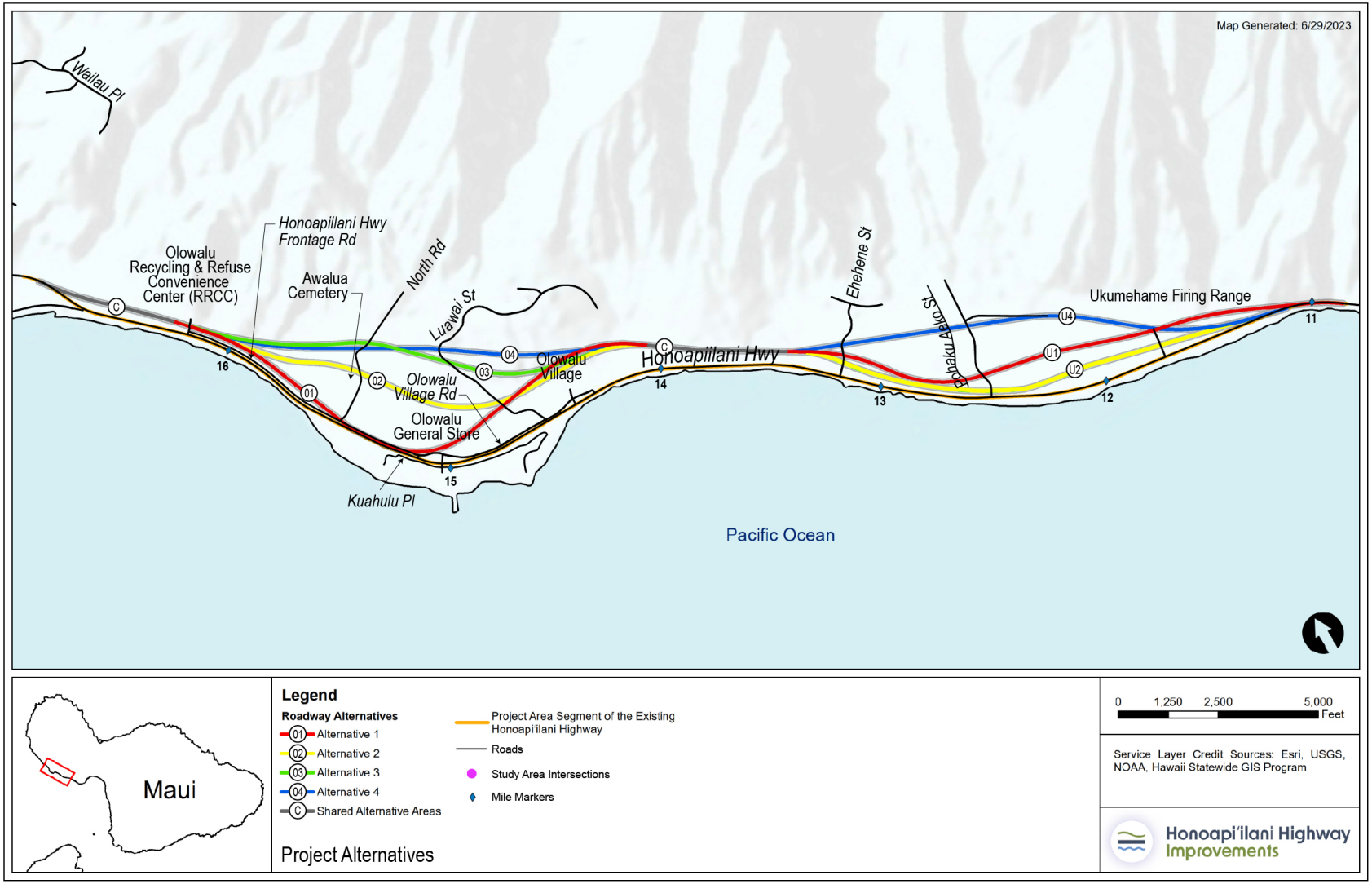
The Maui MPO travel demand forecasts were developed prior to the Lāhainā wildfire. Based on coordination with the MPO and given the extended period of reconstruction and rebound in economic activity, these projections are considered to be appropriate over the long-term. Still, the projections are likely conservatively high for the Future Year 2045, when future traffic volumes will likely be lower than the volumes used in the ~~Draft~~ Final EIS impact assessment.

3.14.4.2 Evaluation of the No Build Alternative and the Build Alternatives

Because of similar access configurations across the alternatives in Olowalu and Ukumehame, it would be feasible to combine an alternative in the Olowalu area with another one in the Ukumehame area to produce a composite Preferred Alternative. Therefore, to summarize the evaluation, four alternatives in Olowalu and three alternatives in Ukumehame were grouped as the Project’s Build

Alternatives. These five alternative roadway configurations, the No Build Alternative and the Build Alternatives, are illustrated in FIGURE 3.14-8 and described in the following sections.

FIGURE 3.14-8. **Build Alternatives**



No Build Alternative

The No Build Alternative reflects future conditions if the Project were not constructed. In this alternative, Honoapi‘ilani Highway would remain in its current alignment and configuration, and existing intersections and traffic control would remain unchanged.

Build Alternatives

Future Roadway Network and Access Assumptions Common to All Build Alternatives

The Build Alternatives differ primarily in roadway alignment but are similar in terms of design parameters and access. All the alternatives would construct a new, divided, two-lane highway with grading, drainage, and roadway structures designed for future expansion to four lanes (if conditions are appropriate and funding is available). Based on the project’s rural setting and applicable AASHTO standards in the AASHTO Roadway Lighting Design Guide, there is no continuous street lighting (although all intersections would include street lighting).

The Build Alternatives would be access-managed roadway facilities with access only allowed at designated intersections. The existing Honoapi‘ilani Highway would remain in place and be accessible from the new highway via cross streets that intersect the Build Alternatives. The existing highway would continue to provide access to adjacent properties and the beaches. All the Build Alternatives would intersect existing cross streets at Olowalu Recycling and Refuse Convenience Center, Luawai Street, Ehehene Street, and Pōhaku ‘Aeko Street.

The following are differences among the Build Alternatives:

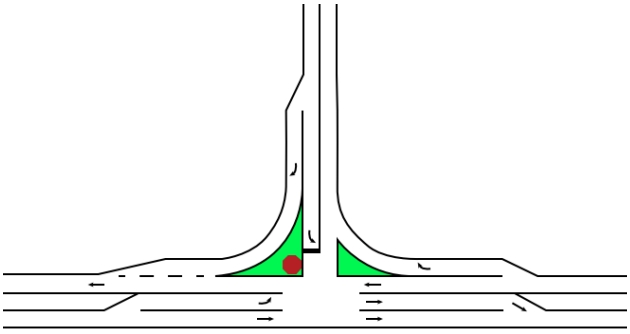
- Build Alternatives 2, 3, and 4 would intersect the new North Road, a subdivision roadway that is currently under construction north of the Olowalu General Store area. Build Alternative 1 would not intersect North Road.
- In Olowalu, to take advantage of the proximity of Build Alternative 1 to the Olowalu General Store area, there would be a four-legged intersection at a new roadway aligned to intersect the existing Honoapi‘ilani Highway near the existing main driveway to the store. To maintain intersection spacing, Build Alternative 1 would not have an intersection at the new North Road. So, Build Alternative 1 has the same number of intersections as the other Build Alternatives.
- While Build Alternatives 2 and 3 intersect the Ukumehame Firing Range driveway, Build Alternatives 1 and 4 do not. This is due to elevation differences between the viaducts in Build Alternatives 1 and 4 and the Ukumehame Firing Range access that make a direct connection difficult. As a result, Build Alternatives 1 and 4 would utilize the intersection at Pōhaku ‘Aeko Street to access the existing Honoapi‘ilani Highway, which would then allow access to the existing Ukumehame Firing Range Driveway.

Additional transportation analyses were conducted between the Draft and Final EIS to assess refinements of the Selected Alternative based on public comments received at the public hearing. The supplemental traffic analysis is in Appendix 3.14 and is discussed in more detail in Chapter 5, Selected Alternative.

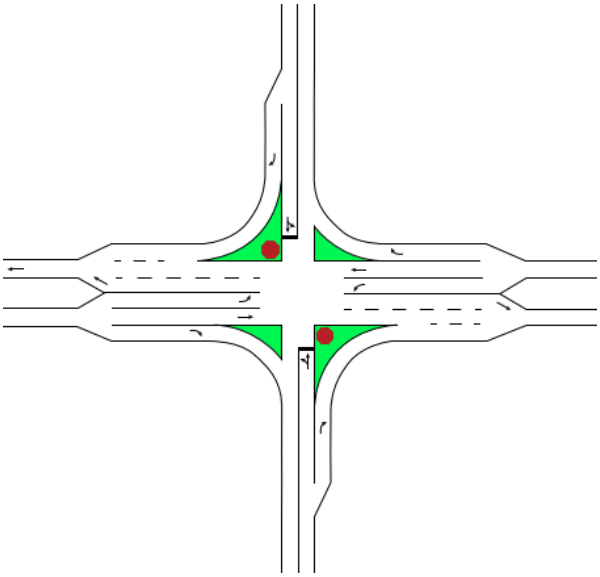
3.14.4.3 Evaluation of Intersections for the Build Alternatives

All intersections in the Build Alternatives would provide channelized minor-street approaches with separate left- and right-turn lanes. Exclusive right- and left-turn lanes would be part of the new Honoapi‘ilani Highway, as would median left-turn refuge lanes at all unsignalized intersections. FIGURE 3.14-9 shows typical layouts for three-legged (that is, T-intersections) and four-legged intersections.

FIGURE 3.14-9. **Build Alternatives – Typical Unsignalized Intersection Configuration**



Typical T-Intersection



Typical Four-Legged Intersection

The signal warrant analysis (Appendix 3.14) projects that one signalized intersection would be warranted for each of the Build Alternatives. For Build Alternative 1, this would be at the intersection with the proposed new road in the Olowalu General Store area. For Build Alternatives 2, 3, and 4, the signalized intersection would be at Luawai Street. The signalized intersections would help to accommodate the projected traffic that would be consolidated on the Luawai Street connection between the new highway and the existing highway.

FIGURE 3.14-10 through FIGURE 3.14-13 show the locations of the access intersections for each Build Alternative.

FIGURE 3.14-14 through FIGURE 3.14-24 illustrate the access intersections in more detail for each Build Alternative along with the detailed study area limits.

FIGURE 3.14-10. **Build Alternative 1: Access from Launiupoko to Ukumehame**

Legend

Alternative 1

Detailed Study Area Limits

Roads (road is light gray over aerial)

Alternative 1 Intersections

0 500 1000 2000 3000 Feet

Service Layer Credit Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N

Honoapi'ilani Highway Improvements

FIGURE 3.14-11. **Build Alternative 2: Access from Launiupoko to Ukumehame**

Legend

Alternative 2

Detailed Study Area Limits

Roads (road is light gray over aerial)

Alternative 2 Intersections

0 500 1000 2000 3000 Feet

Service Layer Credit Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N

Honoapi'ilani Highway Improvements

FIGURE 3.14-12. **Build Alternative 3: Access from Launiupoko to Ukumehame**

Legend

Alternative 3

Detailed Study Area Limits

Roads (road is light gray over aerial)

Alternative 3 Intersections

0 500 1000 2000 3000 Feet

Service Layer Credit Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N

Honoapi'ilani Highway Improvements

FIGURE 3.14-13. **Build Alternative 4: Access from Launiupoko to Ukumehame**

FIGURE 3.14-14. **Olowalu – Build Alternatives 1 through 4: Olowalu Recycling and Refuse Convenience Center Access**

FIGURE 3.14-15. **Olowalu –Build Alternative 1: Access between North Road and Luawai Street Intersections**

FIGURE 3.14-16. **Olowalu – Build Alternative 2: Access between North Road and Luawai Street Intersections**

FIGURE 3.14-17. **Olowalu – Build Alternative 3: Access between North Road and Luawai Street Intersections**

FIGURE 3.14-18. **Olowalu – Build Alternative 4: Access between North Road and Luawai Street Intersections**

FIGURE 3.14-19. **Ukumehame – Build Alternative 1: Access between Ehehene Street and Pōhaku 'Aeko Street Intersections**

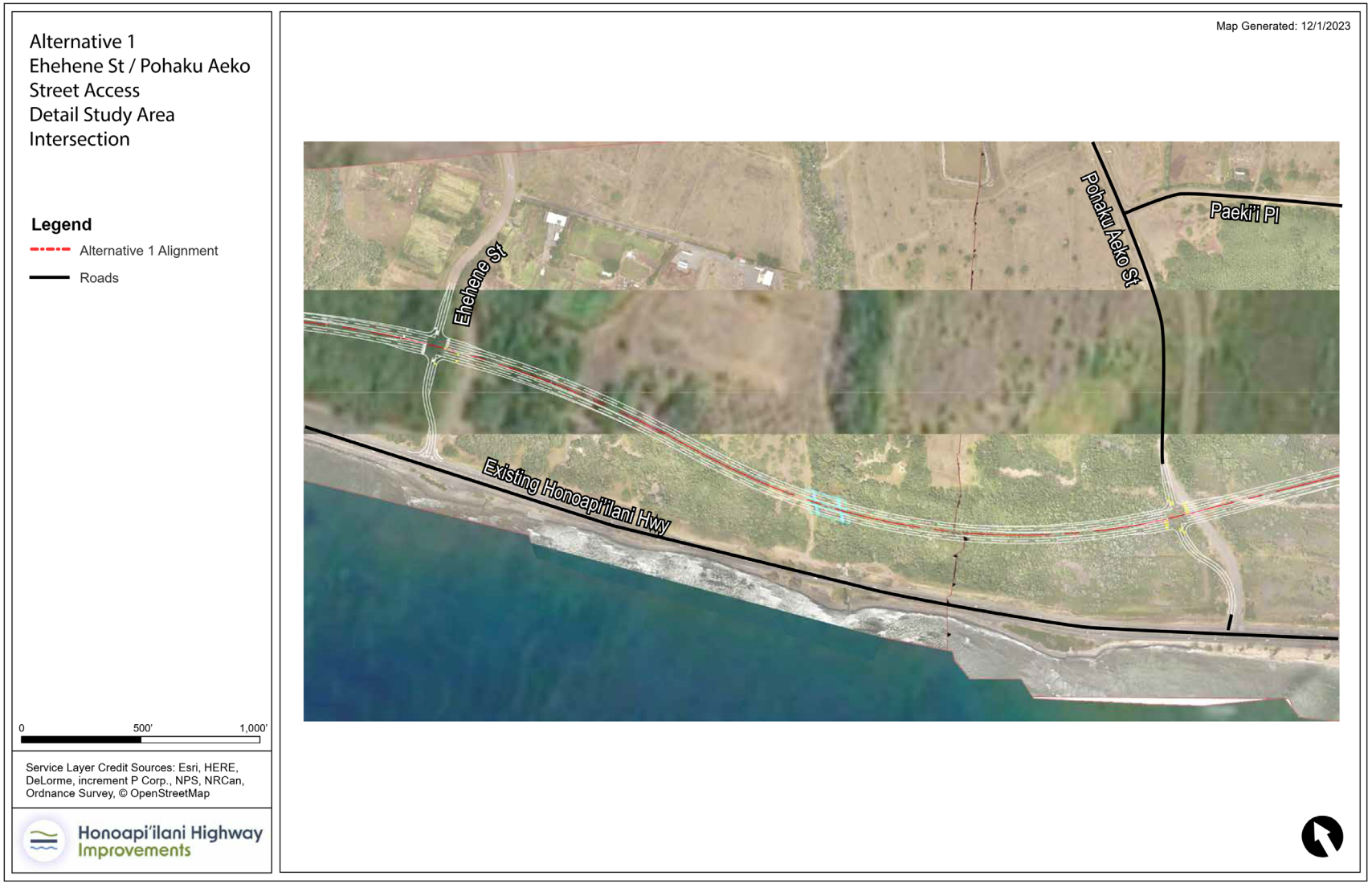


FIGURE 3.14-20. **Ukumehame – Build Alternatives 2 and 3: Access between Ehehene Street and Pōhaku 'Aeko Street Intersections**

FIGURE 3.14-21. **Ukumehame – Build Alternative 4: Access between Ehehene Street and Pōhaku 'Aeko Street Intersections**

FIGURE 3.14-22. **Ukumehame – Build Alternative 1: Ukumehame Firing Range Access**

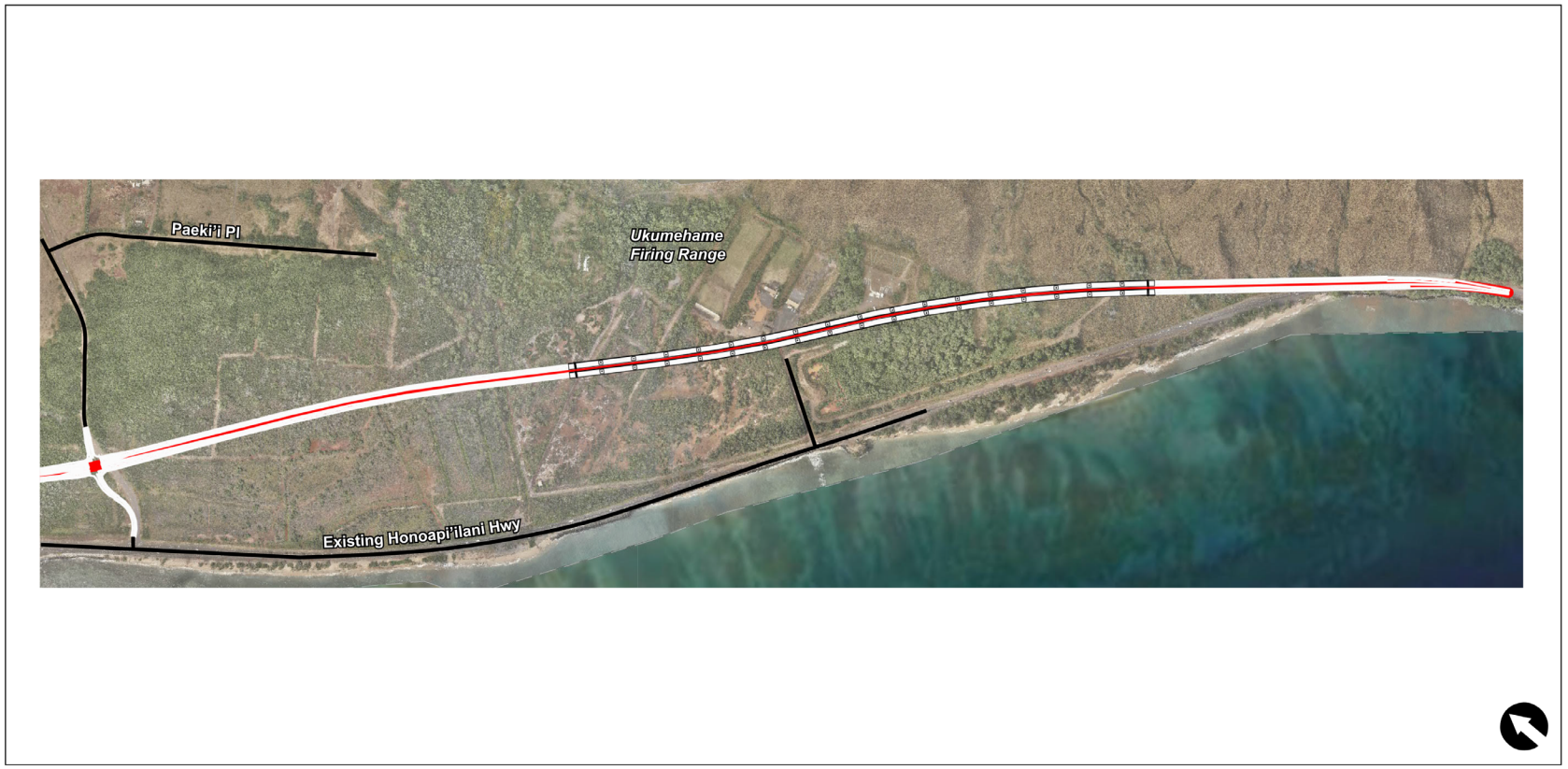


FIGURE 3.14-23. **Ukumehame – Build Alternatives 2 and 3: Ukumehame Firing Range Access**

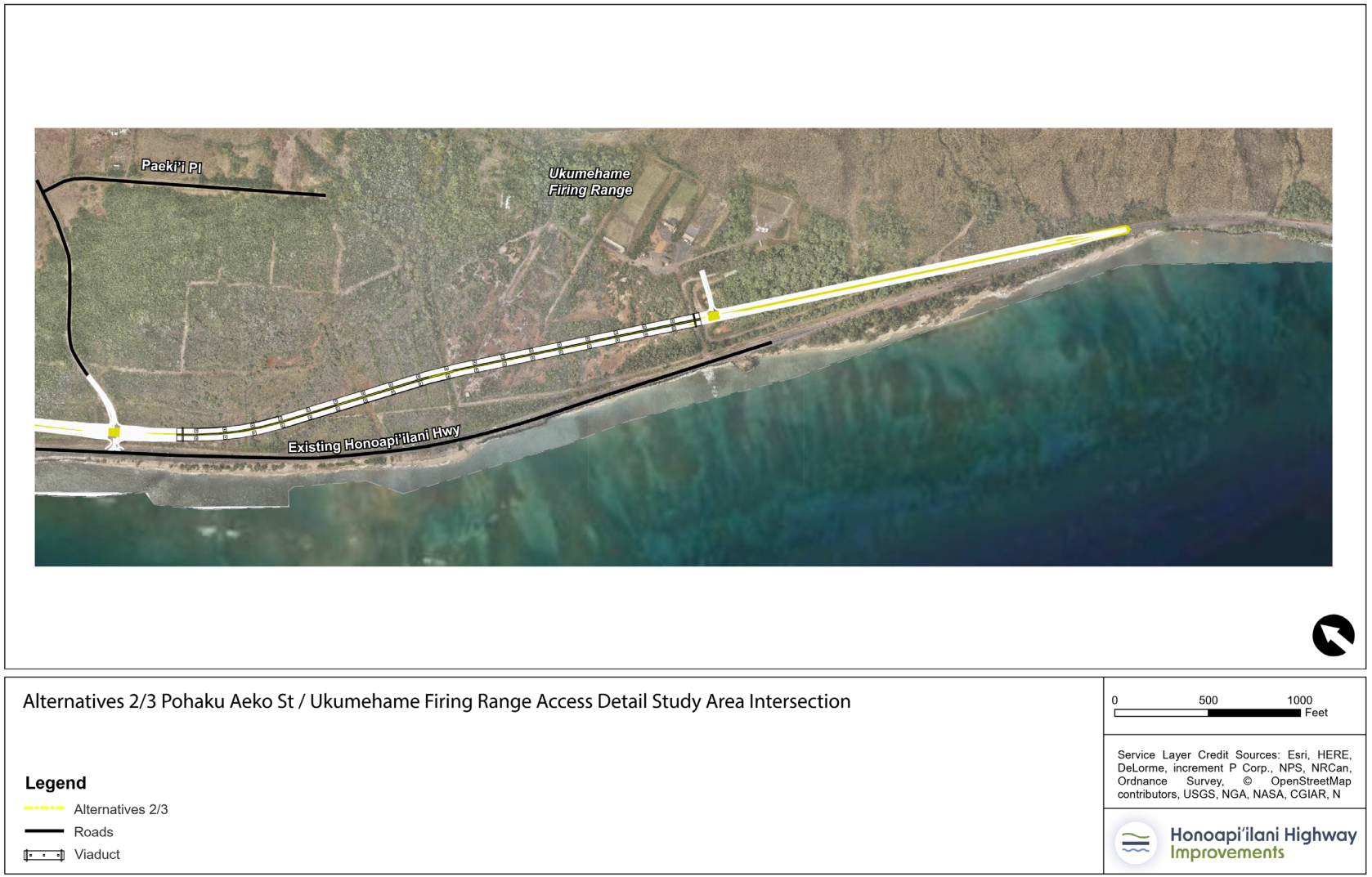
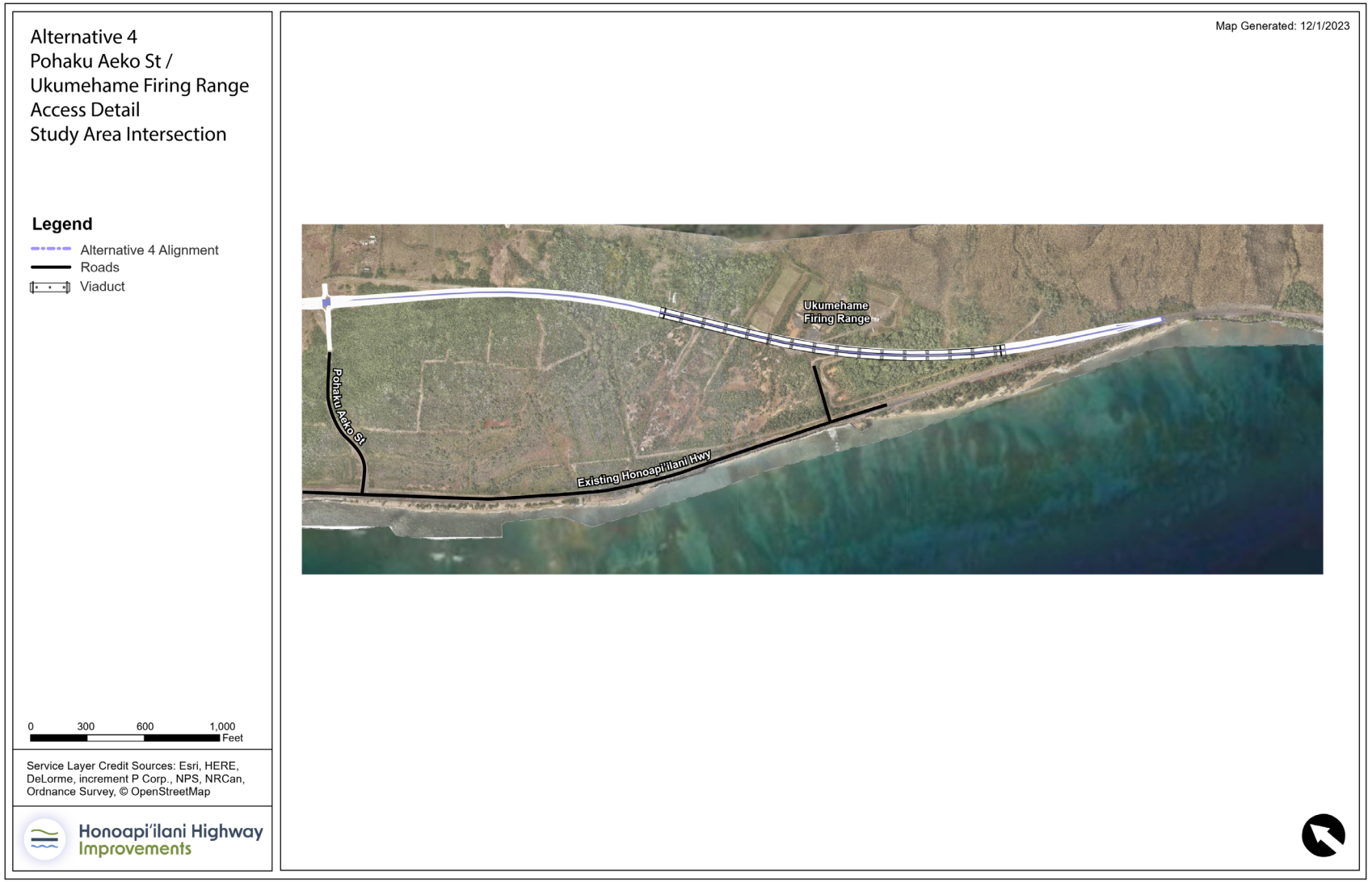


FIGURE 3.14-24. **Ukumehame – Build Alternative 4: Ukumehame Firing Range Access**



3.14.4.4 Transit Service

No significant changes to transit service are anticipated within the project area.

3.14.4.5 Bicycle/Pedestrian Facilities

The ~~Project does not~~ Draft EIS did not include bicycle lanes or other bicycle or pedestrian facilities for any of the Build Alternatives. The Build Alternatives are intended to reallocate regional traffic from the existing Honoapiʻilani Highway to the new Honoapiʻilani Highway, thereby substantially reducing traffic on the existing highway and making it more conducive to biking on a shared road basis (as it is currently designated).

Further, the *West Maui Greenway Plan* currently being developed by the Maui County Department of Parks and Recreation includes concepts of a greenway trail roughly paralleling the existing Honoapiʻilani Highway. Although formal plans have not been developed, the proposed greenway could provide opportunities for new bicycle and pedestrian facilities.

Comments were received at the public hearings requesting that a shared-use path be included as part of the project (see Chapter 8 Public Involvement and Agency Coordination). Based on these comments, this Final EIS includes a parallel shared use path adjacent to the relocated highway as well as two intersections with the relocated highway that support multimodal crossings (see Chapter 5, Selected Alternative).

3.14.4.6 Projected Segment Operations

Projected Future Year 2045 roadway segment and intersection turning-movement volumes for the AM and PM peak-hour periods were used to evaluate highway and intersection operations on both the existing and future Honoapiʻilani Highway.

Project Area Traffic Volumes

Future traffic volumes were based on the Maui MPO 2045 modeled travel demand. This model forecast an average annual traffic growth rate of 0.8%. The 2023 pre-Lāhainā wildfire traffic volumes were used as a baseline and the Maui MPO model growth rate was applied to develop the future condition. The Maui MPO model land use data forecast minimal growth within the project area, so this growth in traffic volume is attributable primarily to regional through traffic. The same traffic volumes projected for the project area were used for the No Build Alternative and the Build Alternatives. However, there are minor localized differences among the Build Alternatives as alignments differ slightly in where and how they would intersect with existing cross streets.

FIGURE 3.14-25 and FIGURE 3.14-26 illustrate the projected Future Year 2045 traffic volumes at the Olowalu Recycling and Refuse Convenience Center and Ukumehame Firing Range driveways, respectively. As described in Section 3.14.3, these figures illustrate the distribution of hourly traffic volumes over a 24-hour period by direction as well as for the two-way total. Reference lines indicate the maximum directional operational volumes for both the existing Honoapiʻilani Highway—based on its current level of access management and roadway geometrics—and for the new Honoapiʻilani Highway, with improved access management and roadway geometrics. Because through traffic on Honoapiʻilani Highway is largely unconstrained by intersecting street traffic, these maximum

directional operational volumes were assumed to be a measure of through capacity. Signalized intersections, if implemented, would be timed to prioritize movement and maintain capacity for this though traffic on the new Honoapi‘ilani Highway.

Project Area Evaluation

As shown in FIGURE 3.14-25 and FIGURE 3.14-26, both AM and PM peak-hour Future Year 2045 volumes on Honoapi‘ilani Highway are projected to be less than the maximum directional operational volume for both the existing and new Honoapi‘ilani Highway. The maximum directional operational volume is estimated at 1,575 vehicles per hour (vph) for the existing Honoapi‘ilani Highway and 1,900 vph for the new Honoapi‘ilani Highway. This higher maximum directional operational volume for the new highway is projected because of better management of the number of accesses and improved roadway segment and intersection configurations. These design elements are recommended to ensure that future volumes and associated LOS are maintained by managing the number of future accesses along the new highway to minimize traffic conflicts. This will assist in maintaining the integrity of the highway's functional classification.

The ratio of this demand volume to the maximum directional operational volume is analogous to a volume/capacity (V/C) ratio. Using the projected Future Year 2045 traffic volumes, the maximum directional operational volume for existing Honoapi‘ilani Highway at 1,440 vph, and the maximum directional operational volume for the new Honoapi‘ilani Highway at 1,900 vph, the V/C for the alternatives would be as follows:

- No Build Alternative: V/C = 0.91 LOS E
- All Build Alternatives: V/C = 0.76 LOS C

This indicates that while the existing Honoapi‘ilani Highway could accommodate projected Future Year 2045 traffic volumes, compared to any of the Build Alternatives, it will experience higher delays and be more vulnerable to any traffic event that interferes with the flow of through traffic.

3.14.4.7 Projected Future Year 2045 Intersection Traffic Operations

FIGURE 3.14-27 through FIGURE 3.14-31 show the intersection numbering used for each alternative to evaluate intersections in the operational summary. The intersections were analyzed using Synchro Studio 11 software and methodologies for signalized and unsignalized intersections outlined in the *Highway Capacity Manual (Sixth Edition)*.

FIGURE 3.14-32 summarizes the projected Year 2045 AM and PM peak hour intersection turning movements at these intersections.

FIGURE 3.14-4 and FIGURE 3.14-5 compare the projected Future Year 2045 peak-hour LOS for each intersection by alternative for the AM and PM peak hours, respectively. For the Build Alternatives, both proposed and existing Honoapi‘ilani Highway intersections are evaluated, with the greatest difference in operations projected to occur at the intersections on the existing highway. For the unsignalized intersections, the LOS shown relate to the left-turn movements out of the minor streets onto Honoapi‘ilani Highway. This is usually the most difficult movement to execute at an unsignalized intersection, especially when there is substantial traffic volume on the main roadway (as is the case

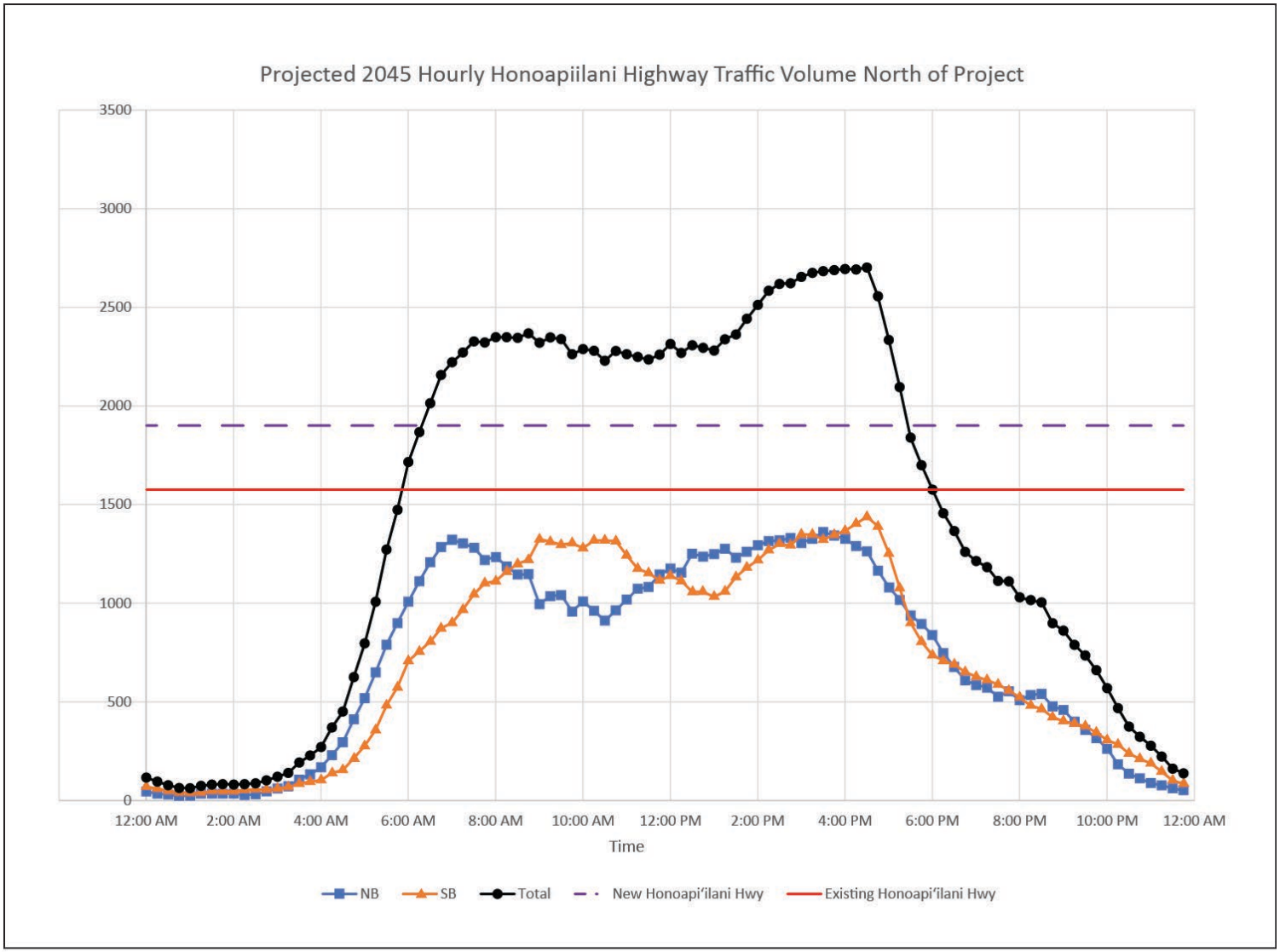
with both the existing and future highway). Appendix 3.14 includes tables with all of the evaluated traffic movements.

Future through traffic is projected to primarily utilize the alignments of the Build Alternative, thereby substantially reducing the traffic volume on the existing Honoapiʻilani Highway. This reduced traffic volume on the existing highway would in turn reduce side-street delays for vehicles accessing the highway from locations like beaches and the Olowalu General Store.

For the No Build Alternative, through traffic would remain on the existing Honoapiʻilani Highway, which would result in increased delays on side-street approaches of intersections and increased LOS E and F operations for minor-street traffic movements.

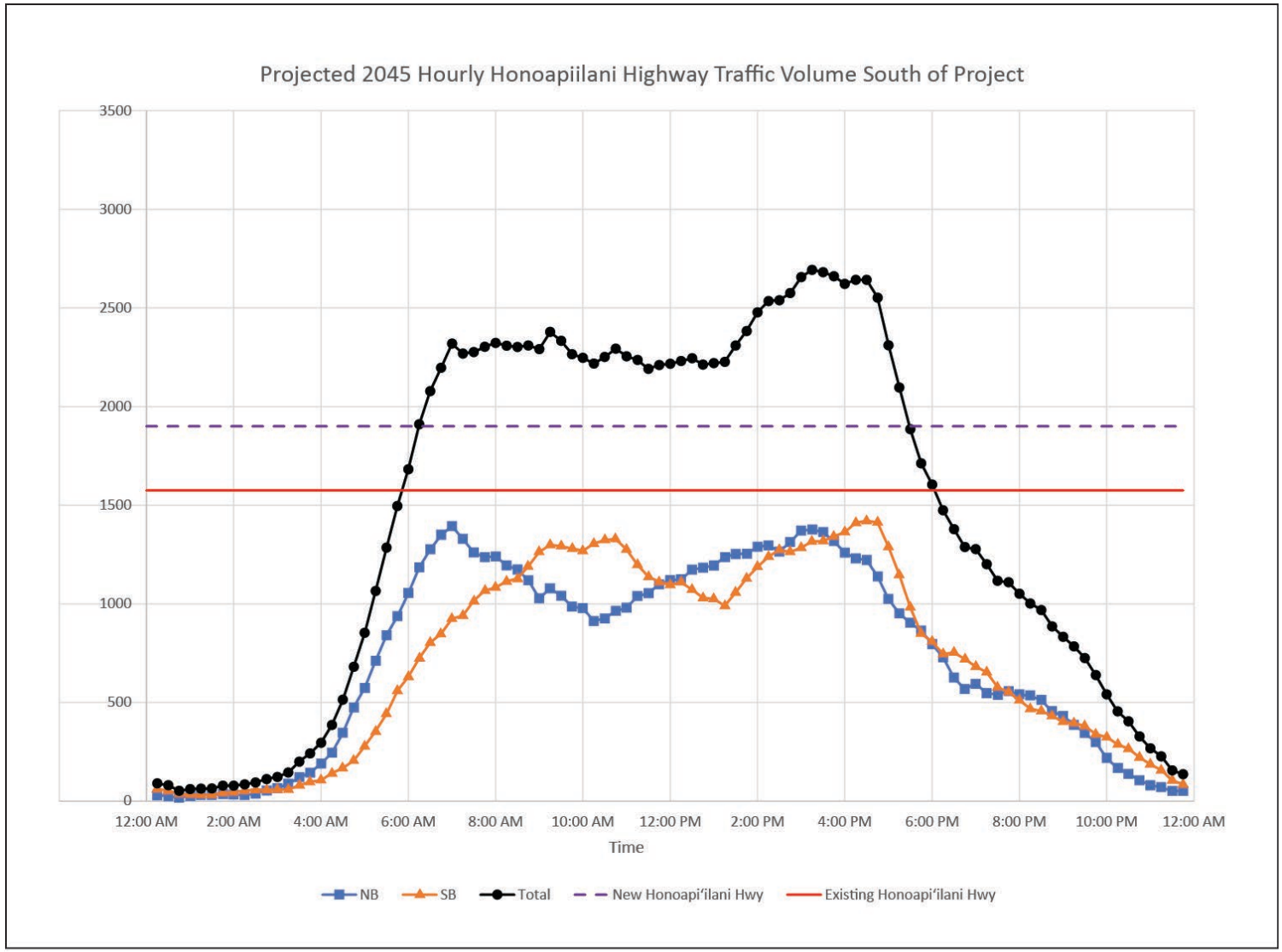
For the Build Alternatives, all intersections on the new Honoapiʻilani Highway are projected to operate during the peak-hour periods at LOS D or better, which are typically considered acceptable intersection operational levels for peak-hour conditions. This includes the overall LOS D for the one proposed signalized intersection at the Olowalu General Store intersection for Build Alternative 1 and the Luawai Street intersection for Build Alternatives 2, 3, and 4.

FIGURE 3.14-25. **Future Year 2045 Honoapi'ilani Highway Traffic Volumes at Launiupoko in the Vicinity of Milepost 16.5**



Projected 2045 Hourly Honoapiilani Highway Traffic Volume North of Project

FIGURE 3.14-26. **Future Year 2045 Honoapi'ilani Highway Traffic Volumes at Ukumehame in the Vicinity of Milepost 11.5**



Projected 2045 Hourly Honoapiilani Highway Traffic Volume South of Project

FIGURE 3.14-27. **Future Year 2045 No Build Alternative Intersection Locations**

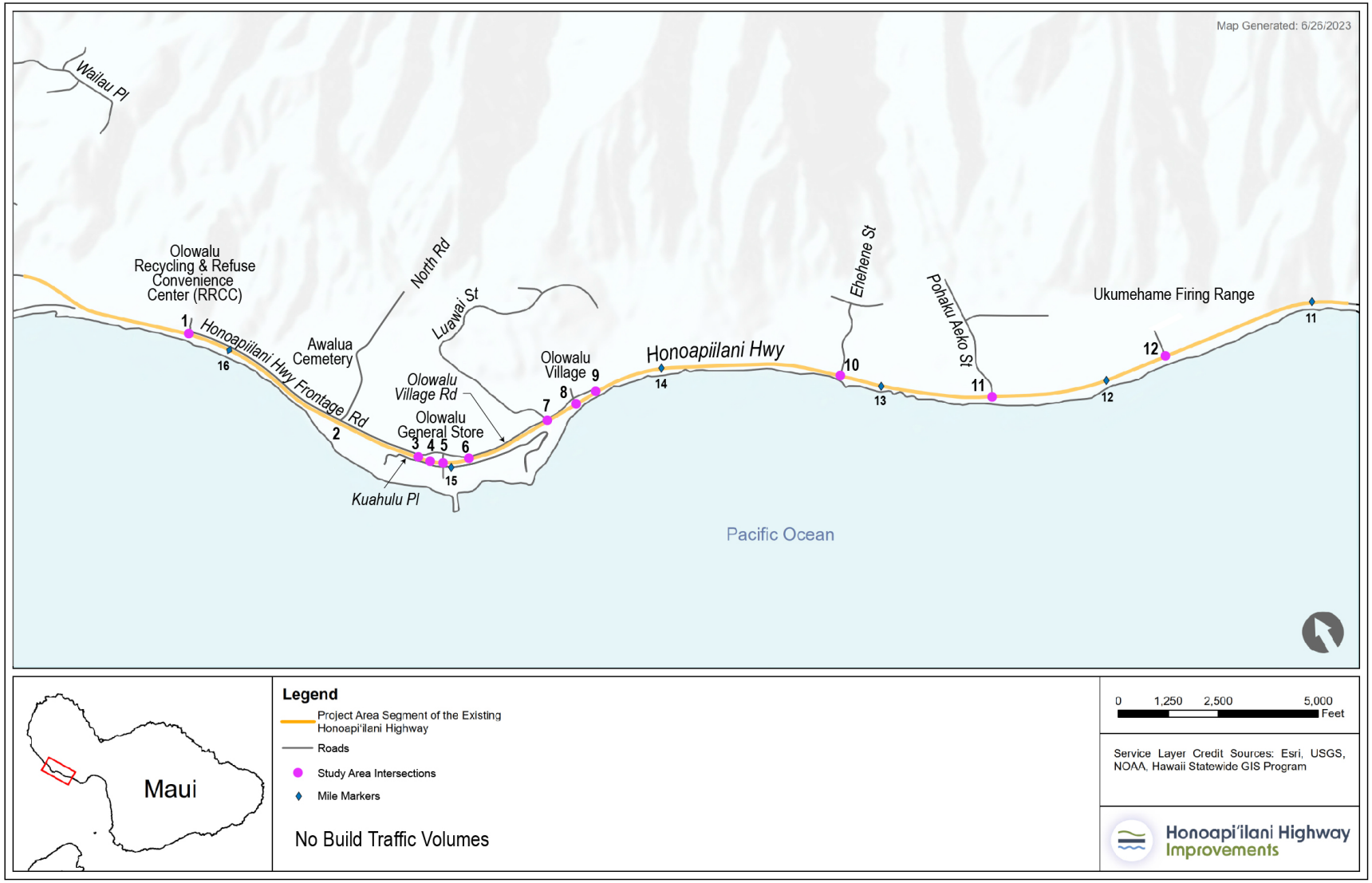


FIGURE 3.14-28. **Future Year 2045 Build Alternative 1 Intersection Locations**

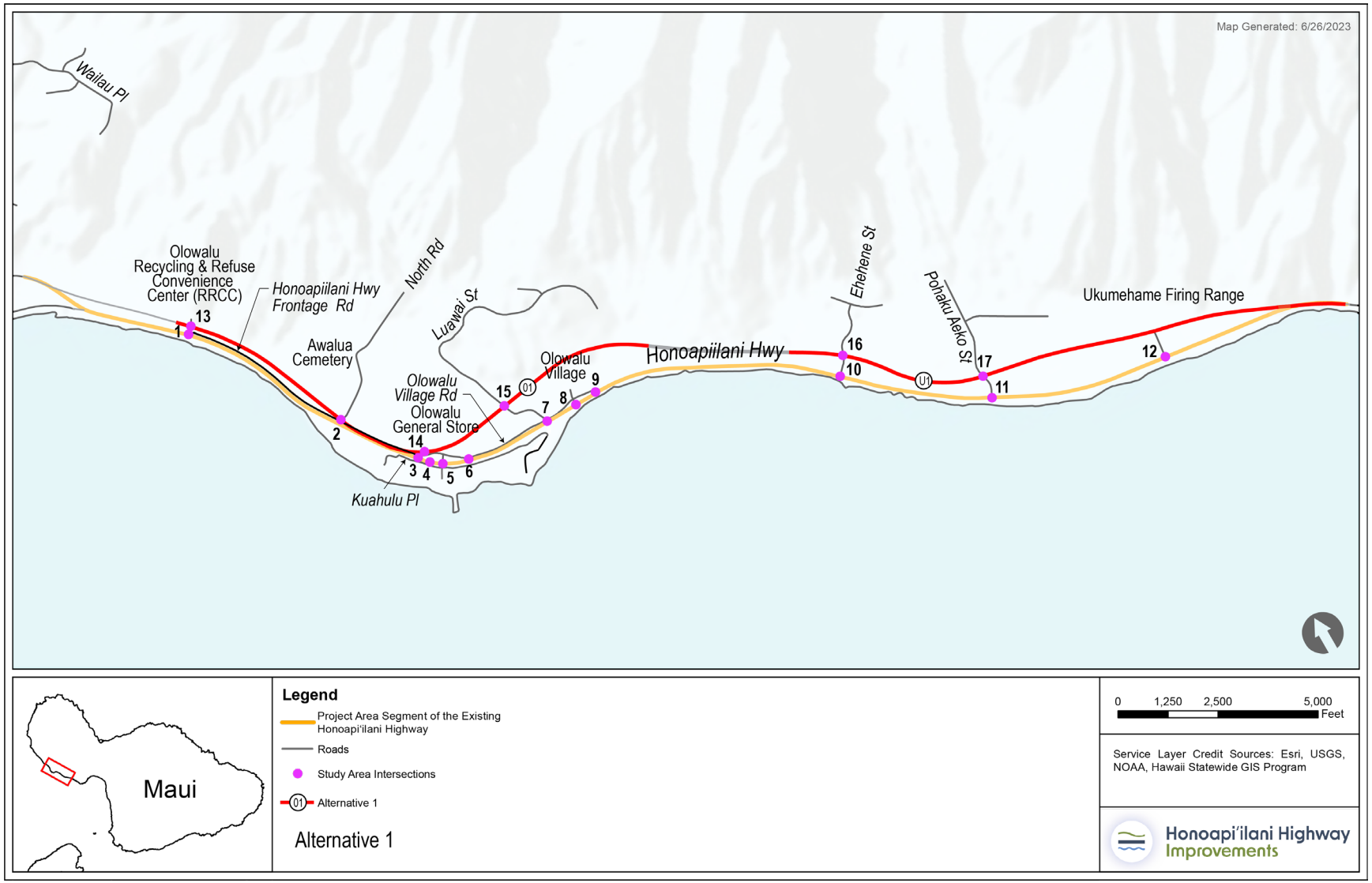


FIGURE 3.14-29. **Future Year 2045 Build Alternative 2 Intersection Locations**

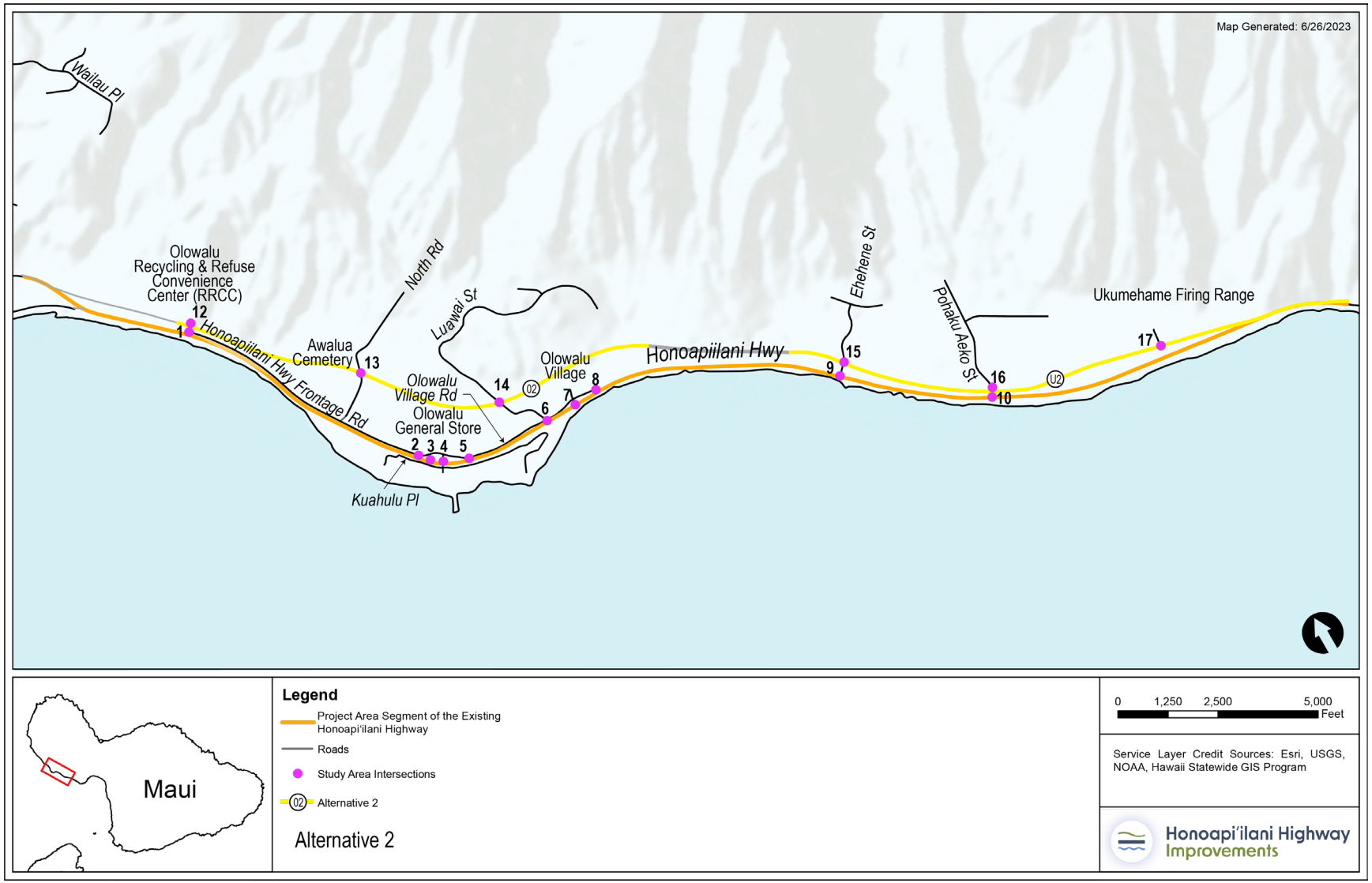


FIGURE 3.14-30. **Future Year 2045 Build Alternative 3 Intersection Locations**

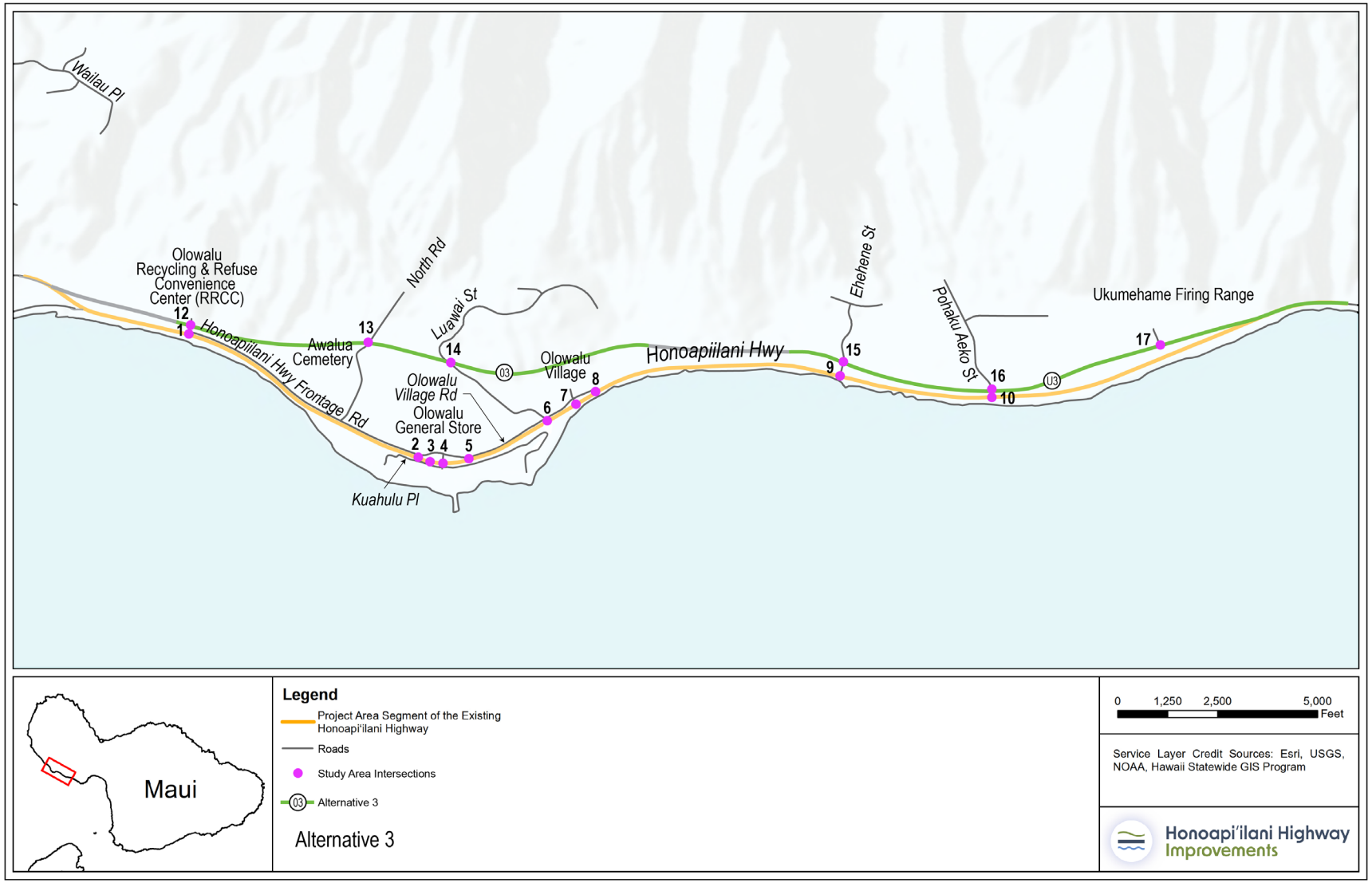


FIGURE 3.14-31. **Future Year 2045 Build Alternative 4 Intersection Locations**

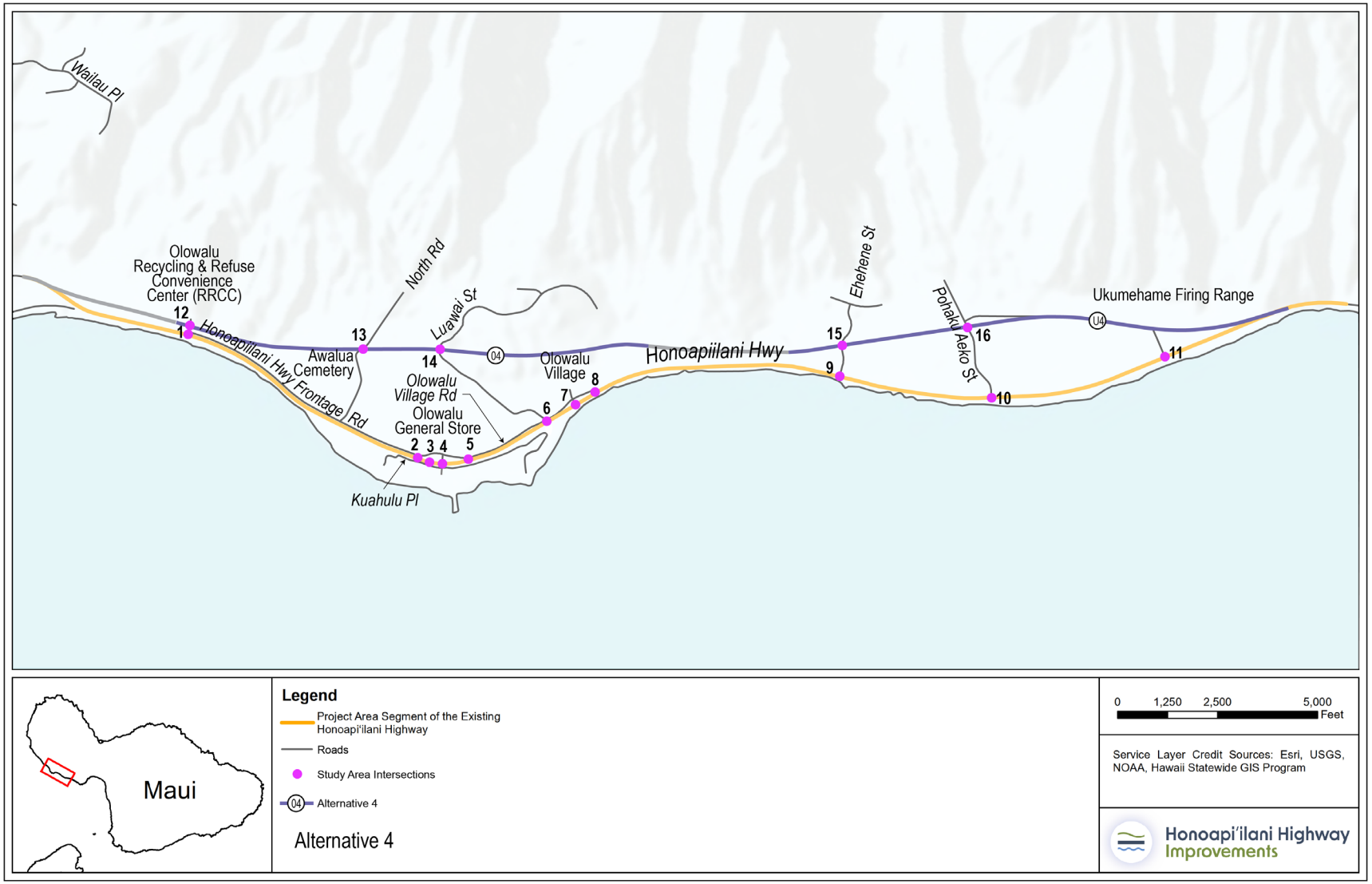


FIGURE 3.14-32 **Projected Year 2045 No Build Peak Hour Traffic Volumes**

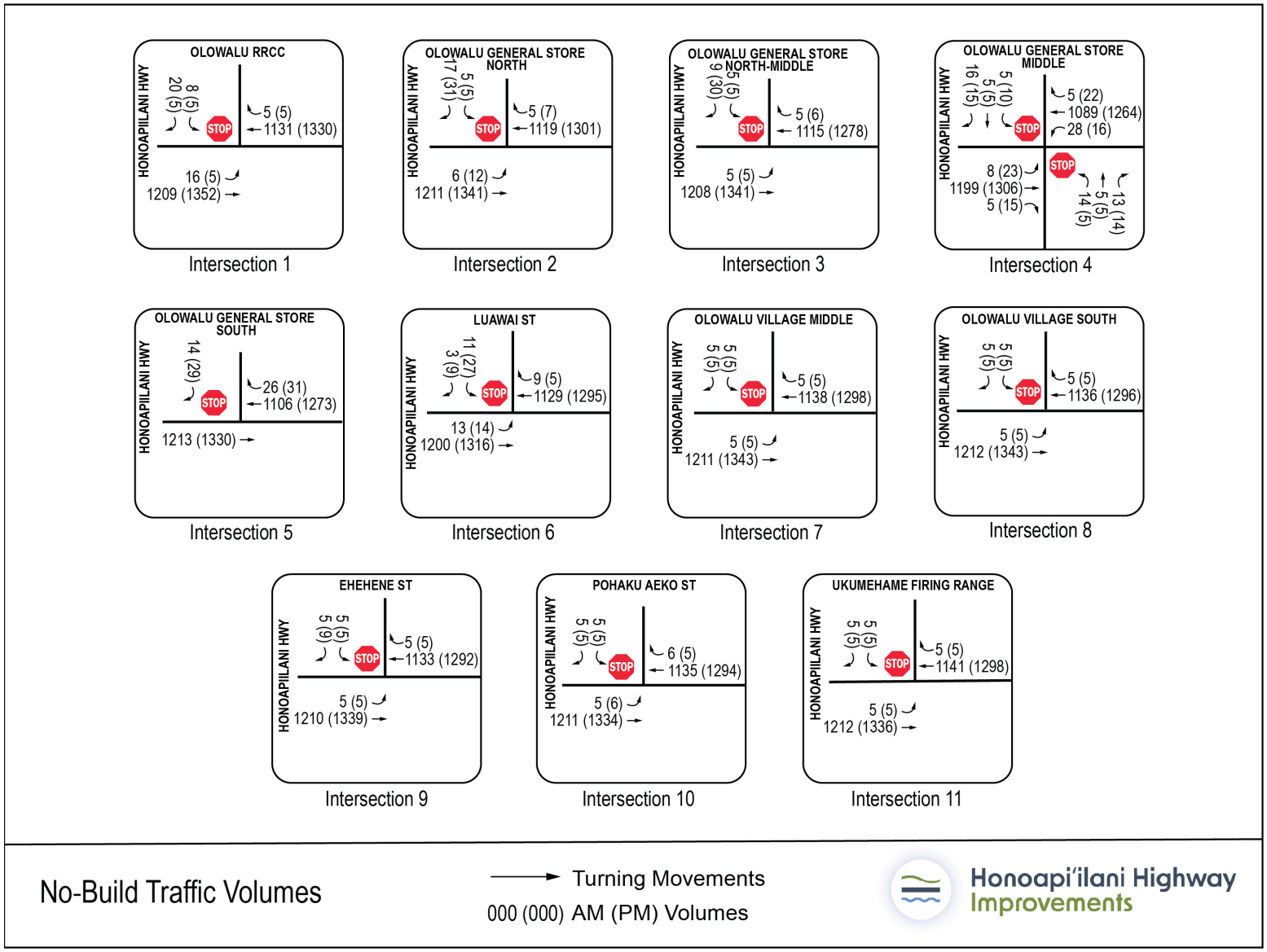


FIGURE 3.14-33. **Projected Year 2045 Alternative 1 Peak Hour Traffic Volumes**

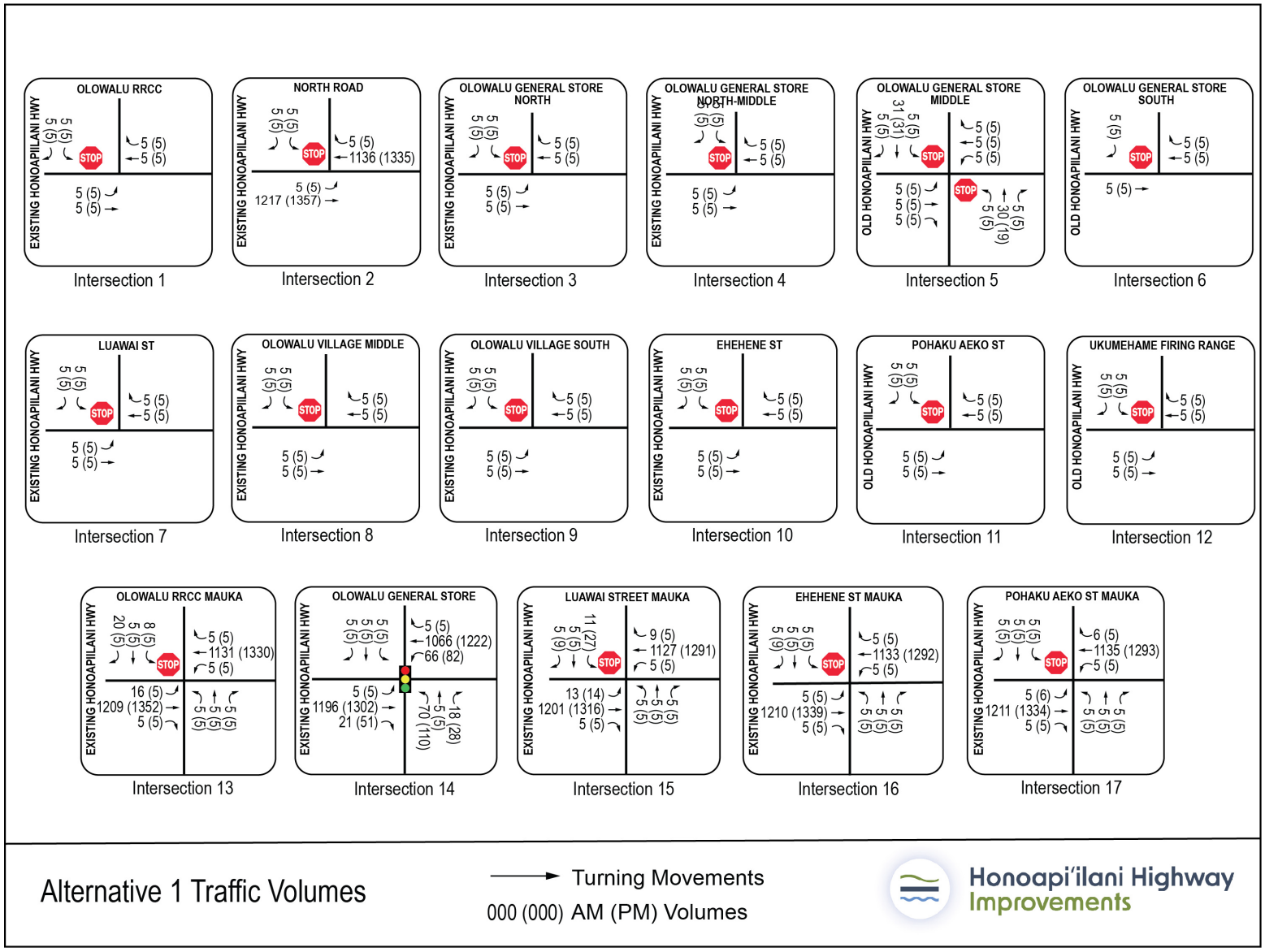


FIGURE 3.14-34. **Projected Year 2045 Alternative 2 Peak Hour Traffic Volumes**

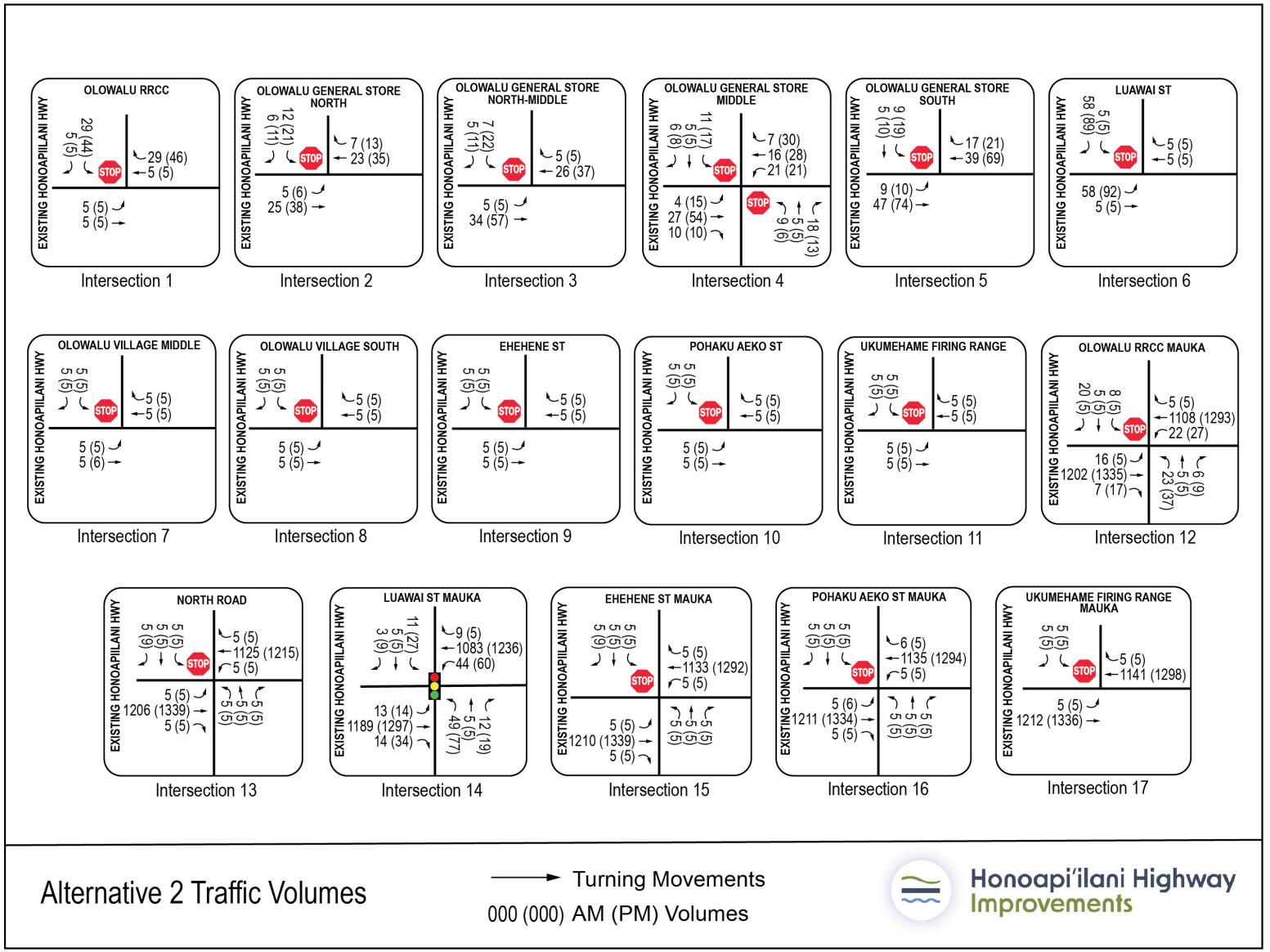


FIGURE 3.14-35. **Projected Year 2045 Alternative 3 Peak Hour Traffic Volumes**

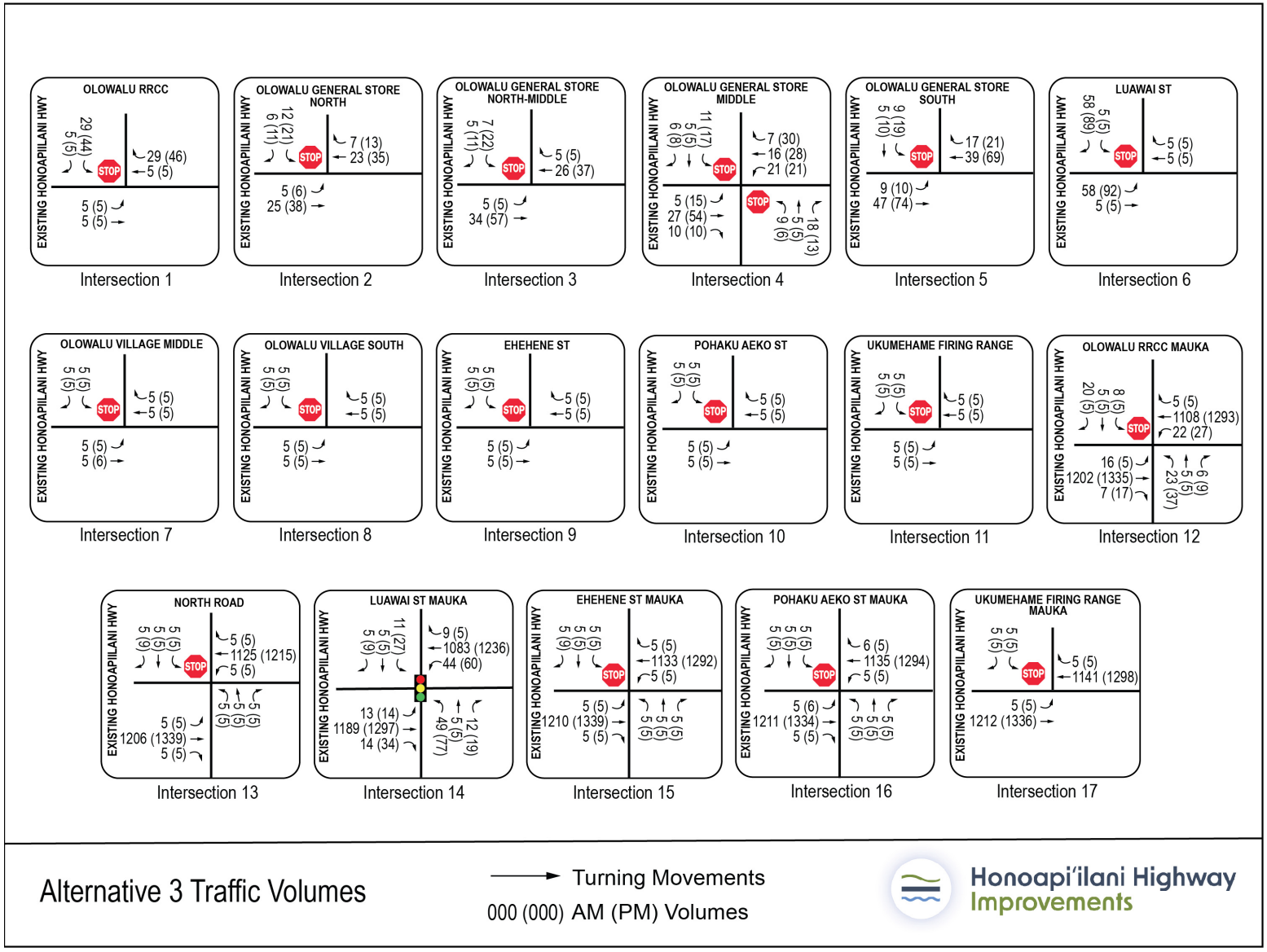


FIGURE 3.14-36. **Projected Year 2045 Alternative 4 Peak Hour Traffic Volumes**

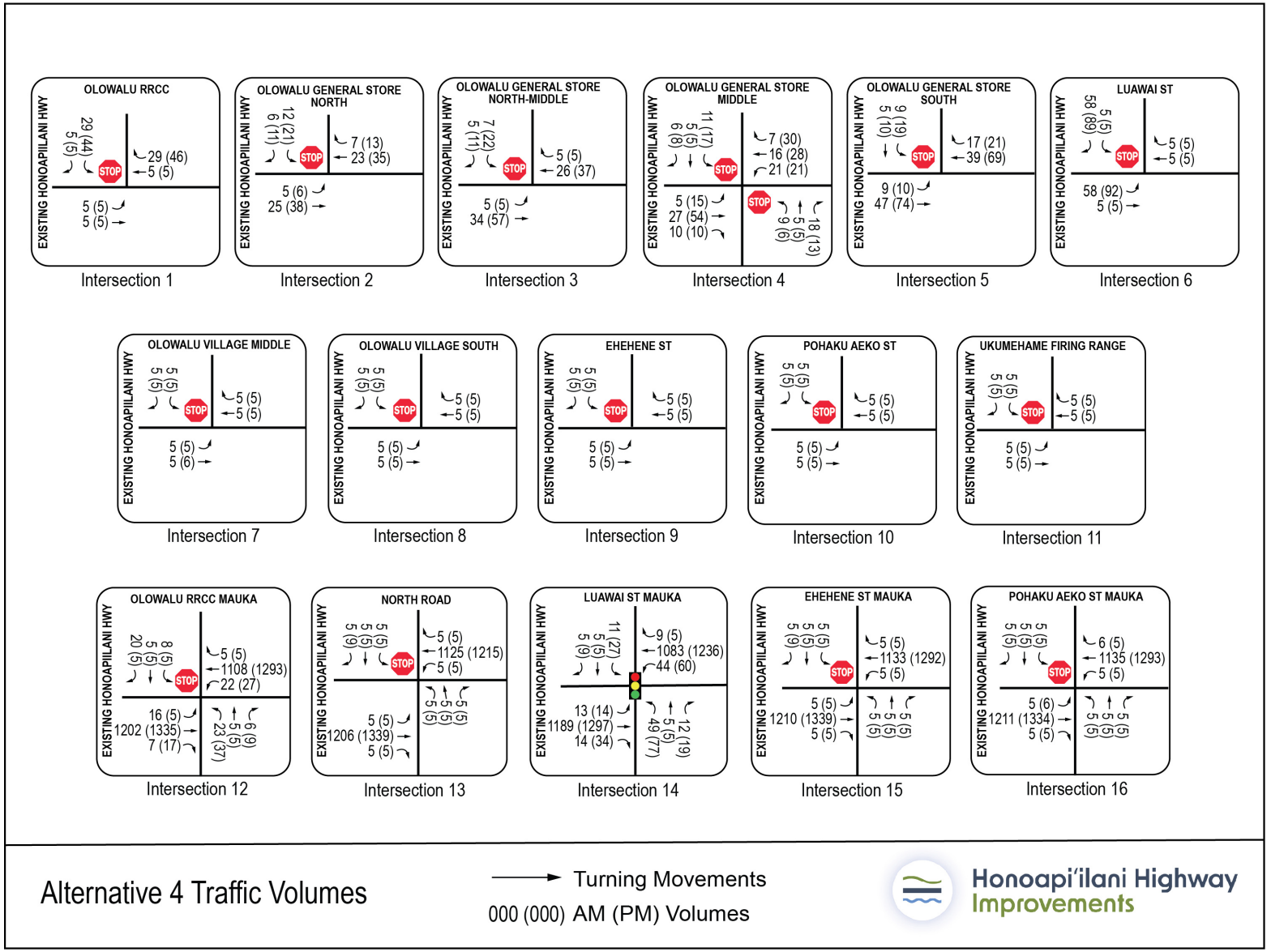


TABLE 3.14-4. **Year 2045 No Build Alternative and Build Alternatives AM Peak-Hour LOS Comparison**

INTERSECTION	TRAFFIC CONTROL	MOVEMENT	NO BUILD	ALT 1	ALT 2	ALT 3	ALT 4
Honoapi'ilani Highway/Olowalu Recycling and Refuse Convenience Center	TWSC	Highest Delay Minor Street	**F**	C	C	C	C
Honoapi'ilani Highway/North Road	TWSC	Highest Delay Minor Street	N/A	N/A	C	C	C
Honoapi'ilani Highway/Olowalu General Store	Traffic Signal*	Overall*	N/A	B*	N/A	N/A	N/A
Honoapi'ilani Highway/Luawai Street	TWSC/ Traffic Signal*	Highest Delay Minor Street/ Overall*	C	C	B*	B*	B*
Honoapi'ilani Highway/Ehehene Street	TWSC	Highest Delay Minor Street	C	C	C	C	C
Honoapi'ilani Highway/Pōhaku 'Aeko Street	TWSC	Highest Delay Minor Street	C	C	C	C	C
Honoapi'ilani Highway/Ukumehame Firing Range	TWSC	Highest Delay Minor Street	**F**	N/A	C	C	N/A
Old Honoapi'ilani Highway/Olowalu Recycling and Refuse Convenience Center	TWSC	Highest Delay Minor Street	**F**	A	A	A	A
Old Honoapi'ilani Highway/Olowalu General Store North	TWSC	Highest Delay Minor Street	**F**	A	A	A	A
Old Honoapi'ilani Highway/Olowalu General Store North-Mid	TWSC/Alt 1 Traffic Signal	Highest Delay Minor Street	**E**	B*	A	A	A
Old Honoapi'ilani Highway/Olowalu General Store Middle	TWSC	Highest Delay Minor Street	**F**	A	A	A	A
Old Honoapi'ilani Highway/Olowalu General Store South	TWSC	Highest Delay Minor Street	C	A	A	A	A
Old Honoapi'ilani Highway/Luawai Street	TWSC	Highest Delay Minor Street	C	A	A	A	A
Old Honoapi'ilani Highway/Olowalu Village Middle	TWSC	Highest Delay Minor Street	**F**	A	A	A	A
Old Honoapi'ilani Highway/Olowalu Village South	TWSC	Highest Delay Minor Street	**F**	A	A	A	A
Old Honoapi'ilani Highway/Ehehene Street	TWSC	Highest Delay Minor Street	C	A	A	A	A
Old Honoapi'ilani Highway/Pōhaku 'Aeko Street	TWSC	Highest Delay Minor Street	C	A	A	A	A
Old Honoapi'ilani Highway/Ukumehame Firing Range	TWSC	Highest Delay Minor Street	**F**	A	N/A	N/A	A

Note: TWSC = Two-Way STOP-Controlled, NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound, * = signalized intersection, N/A=not applicable

TABLE 3.14-5. **2045 No Build Alternative and Build Alternatives PM Peak-Hour LOS Comparison**

INTERSECTION	TRAFFIC CONTROL	MOVEMENT	NO BUILD	ALT 1	ALT 2	ALT 3	ALT 4
Honoapi'ilani Hwy/Olowalu Recycling and Refuse Convenience Center	TWSC	Highest Delay Minor Street	F	D	D	D	D
Honoapi'ilani Hwy/North Road	TWSC	Highest Delay Minor Street	N/A	N/A	D	D	D
Honoapi'ilani Hwy/Olowalu General	Traffic Signal*	Overall*	N/A	C*	N/A	N/A	N/A
Honoapi'ilani Hwy/Luawai Street	TWSC/ Traffic Signal*	Highest Delay Minor Street/ Overall*	D	D	C*	C*	C*
Honoapi'ilani Hwy/Ehehene Street	TWSC	Highest Delay Minor Street	D	D	D	D	D
Honoapi'ilani Hwy/Pōhaku 'Aeko Street	TWSC	Highest Delay Minor Street	D	D	D	D	D
Honoapi'ilani Hwy/Ukumehame Firing Range	TWSC	Highest Delay Minor Street	F	N/A	D	D	N/A
Old Honoapi'ilani Hwy/ Olowalu Recycling and Refuse Convenience Center	TWSC	Highest Delay Minor Street	F	A	A	A	A
Old Honoapi'ilani Hwy/Olowalu General Store North	TWSC	Highest Delay Minor Street	F	A	A	A	A
Old Honoapi'ilani Hwy/Olowalu General Store North-Mid	TWSC	Highest Delay Minor Street	E	A	A	A	A
Old Honoapi'ilani Hwy/Olowalu General Store Middle	TWSC	TWSC/Alt 1 Traffic Signal	F	C*	A	A	A
Old Honoapi'ilani Hwy/Olowalu General Store South	TWSC	Highest Delay Minor Street	D	A	A	A	A
Old Honoapi'ilani Hwy/Luawai Street	TWSC	Highest Delay Minor Street	D	A	A	A	A
Old Honoapi'ilani Hwy/Olowalu Village Middle	TWSC	Highest Delay Minor Street	F	A	A	A	A
Old Honoapi'ilani Hwy/Olowalu Village South	TWSC	Highest Delay Minor Street	F	A	A	A	A
Old Honoapi'ilani Hwy/Ehehene Street	TWSC	Highest Delay Minor Street	D	A	A	A	A
Old Honoapi'ilani Hwy/Pōhaku 'Aeko Street	TWSC	Highest Delay Minor Street	D	A	A	A	A
Old Honoapi'ilani Hwy/Ukumehame Firing Range	TWSC	Highest Delay Minor Street	F	A	N/A	N/A	A

Note: TWSC = Two-Way Stop-Controlled, NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound, * = signalized intersection, NJ/A=not applicable

3.14.4.8 Crash Data Discussion

A safety analysis was performed on the Honoapi'ilani Highway corridor using the AASHTO *Highway Safety Manual* predicted crash frequency methodology. This analysis focused on the existing Honoapi'ilani Highway as this is where the difference between the No Build Alternative and the Build Alternatives can be best evaluated. The analysis primarily focused on vehicular safety as there are few non-vehicular users (as described in Table 3.8-6, Types of Travelers).

The predicted average crash frequency represents the number of crashes a similar intersection or roadway segment is anticipated to experience on average. It is calculated with safety performance functions, which are equations derived from empirical data based on a facility's characteristics such as geometry, lighting, traffic control, and traffic volumes.

The safety analysis was conducted using existing and projected Future Year 2045 traffic volumes applied to the No Build and Build Alternatives. Build Alternative 1 was evaluated separately from the other Build Alternatives because it has a unique access plan for the Olowalu General Store area. Build Alternatives 2, 3, and 4 are combined into a single set of values due to their similarity. TABLE 3.14-6 Predicted Crash Frequency shows these results.

TABLE 3.14-6. **Predicted Crash Frequency**

	PREDICTED AVERAGE CRASH FREQUENCY (CRASHES/YEAR)		
	NPREDICTED (TOTAL)	*NPREDICTED (FI)*	*NPREDICTED (PDO)*
Existing Conditions	*56.4*	*19.1*	*37.2*
Future Year 2045 No Build Alternative	*66.7*	*22.7*	*44.0*
Build Alternative 1	*0.7*	*0.3*	*0.5*
Build Alternatives 2, 3, 4	*1.8*	*0.7*	*1.1*

FI: Fatalities/Injuries; PDO: Property Damage Only

While the No Build Alternative shows an increase in predicted crashes from existing conditions, the Build Alternatives show a clear reduction—with Build Alternative 1 predicted to show the greatest reduction. The reduction in crashes for the Build Alternatives is due to the projected reduction in through traffic volumes on the existing Honoapi'ilani Highway. Even under existing conditions, the number of expected crashes is lower than the number of predicted crashes, which indicates that the highway's safety performance is better than that of similar facilities. Note that expected crash frequencies were determined based on the reported and available crash data.

While all of the Build Alternatives would shift traffic volume from the existing highway to the new highway, this is not equivalent to shifting expected crashes to the new highway—because the new highway will be constructed in ways that improve safety. While the existing Honoapi'ilani Highway is undivided, the new highway will be divided with opposite directions of travel separated by a median, which has the potential to reduce crashes by 30% (based on the applicable crash reduction factor).

3.14.5 Construction Effects

The Project is in a section of Honoapiʻilani Highway designated as rural principal arterial that has limited multimodal infrastructure and transit accessibility. During project construction, the existing highway would remain open and operational because the Build Alternatives are not on the existing alignment with one exception, Build Alternative 1 in the Olowalu area.

Build Alternative 1 differs from the other alternatives because its alignment would overlap a segment of the existing Honoapiʻilani Highway north of Olowalu. As a result, approximately 2.5 miles of Build Alternative 1 will be constructed in sub-phases requiring lane closures and causing some traffic congestion along the highway corridor.

Additionally, all Build Alternatives will have lane closures and construction phasing when construction occurs at intersections and where at the north and south ends of the project area, where the new roadway would connect to the existing roadway.

Construction of intersections, bridges and viaducts (where proposed) would cause temporary disruption of traffic on the cross streets. Best practices for maintenance of traffic would be employed during construction.

While construction-related vehicles (including for commuting) would temporarily increase traffic on the existing Honoapiʻilani Highway, there will be measures in place to optimally focus these increases during non-peak-hour periods.

During project construction, the design-builder would develop a traffic management plan to minimize traffic congestion and maintain efficiency in the project area.

3.14.6 Indirect Effects

Most of the indirect effects on traffic from the Build Alternatives would be beneficial, attributed to a reduction in through traffic volume on the existing Honoapiʻilani Highway. Qualitative indirect effects could include enhanced experiences for visitors to the beach parks that are adjacent to the existing highway. And while destinations such as the Olowalu General Store could see a reduction in drive-by business, reduced traffic volumes in the area would improve the store's visitor experience (Section 3.19, Environmental Justice and Socioeconomic Conditions).

3.14.7 Anticipated Beneficial Effects

The Build Alternatives are designed to optimize traffic operations and safety, including the following:

- All intersections on the new Honoapi‘ilani Highway would have exclusive turn lanes and channelized minor-street approaches that separate right-turn movements from left-turn and through movements. The intersections would also incorporate improved geometric features such as median left-turn refuges at unsignalized intersections, which would mitigate the delays that are currently experienced at some of the intersections.
- To maintain operational delays and improve safety for minor-street vehicles, traffic signals are projected to be warranted on the realigned Honoapi‘ilani Highway at its intersection with Luawai Street for Build Alternatives 2, 3, and 4, and at its intersection with the Olowalu General Store Driveway for Build Alternative 1.
- Regional through traffic on the existing highway would be reallocated to a new, divided, access-managed Honoapi‘ilani Highway, which would improve intersection operations on the existing highway and in turn substantially reduce vehicle delays on the minor-street approaches for the Build Alternatives.
- The volume of traffic would be greatly reduced on the existing Honoapi‘ilani Highway—which would remain as a local road—improving operations and increasing safety with a substantial reduction in predicted traffic crashes.
- The Build Alternatives would construct a new divided highway with opposite directions of travel separated by a median, which has the potential to reduce crashes by 30% (based on the applicable crash reduction factor).

As a result, and as evaluated in this ~~Draft~~ Final EIS, there are no adverse effects anticipated with any of the Build Alternatives and no additional mitigation is required.

3.14.8 Build Alternatives Comparative Assessment

The evaluation of alternatives indicates that all the Build Alternatives are projected to perform better than the No Build Alternative based on roadway operations, intersection operations, and traffic safety.

Roadway operations, intersection operations, and traffic safety are comparable across the Build Alternatives. Build Alternatives 2, 3, and 4 appear to be less disruptive during construction because their alignments interact less with the existing Honoapi‘ilani Highway. On the other hand, Build Alternative 1 would require substantial coordination during construction to maintain regional traffic flow because part of its alignment is shared with the existing Honoapi‘ilani Highway, between Olowalu and Launiupoko.

Both the No Build Alternative and the Build Alternatives would be able to accommodate the projected Future Year 2045 peak-hour traffic volumes within the project area. The Build Alternatives are projected to operate at LOS C—compared to LOS E for the No Build Alternative on a segment capacity basis—indicating that the No Build Alternative would be more susceptible to disruption to regional traffic flow from events within the corridor.

The Build Alternatives are projected to reallocate regional traffic from the existing Honoapi‘ilani Highway to the new Honoapi‘ilani Highway. This would result in a substantial reduction in future traffic volume on the existing Honoapi‘ilani Highway, directly benefitting its intersections operations. For the No Build Alternative, regional traffic would only increase from current levels, resulting in increased delays for minor-street vehicles.

Reduced future traffic volumes on the existing Honoapi‘ilani Highway also reduces the number of predicted traffic crashes for the Build Alternatives, while the No Build Alternative is projected to experience a slight increase from current levels. The overall predicted number of highway crashes is expected to be reduced substantially due to the enhanced safety design features of the new roadway alignment. Given that there are relatively low fatalities as reported in Section 3.14.3 (two over a three-year period), the predicted reduction in overall crashes would minimize the potential for fatalities.

All Build Alternatives are projected to be similar from a traffic operational perspective. As noted in Section 3.14.5, Build Alternative 1 has greater construction impacts than the other Build Alternatives. Chapter 5, Selected ~~Preferred~~ Alternative, includes a discussion that results in a recommendation for a preferred Build Alternative.

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3.15 AIR QUALITY AND ENERGY

This section assesses the potential adverse effects of the Honoapi‘ilani Highway Improvements Project (the Project) on air quality. Additionally, the section evaluates the energy demand associated with construction and operation of the Project.

“Air pollution” generally refers to one or more chemical substances that degrade the quality of the atmosphere. Air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, and reducing human or animal health. “Air quality” describes the degree to which the ambient air is pollution-free, which is assessed by the measured or calculated amount of air pollution the public is exposed to in the environment.

Energy consumed during the construction and operation of transportation projects is closely tied to air quality because it generates emissions. Energy is used during construction to manufacture materials, transport materials, and operate machinery. Energy used during a project includes fuel consumed by vehicles in a project area and energy for signals, lighting, and maintenance. Operational energy consumption depends on the number of vehicle-miles traveled (VMT) and travel conditions such as vehicle type, speed of travel, roadway grade, and pavement type (including the intent to use carbon injected concrete pavement).

Following publication of the Draft Environmental Impact Statement (EIS), the public was afforded an opportunity to review and comment on the effects of the Project with respect to air quality and energy. As part of this Final EIS, the analysis contained within this section was revised to reflect those comments, or other information gathered after the publication of the Draft EIS.

3.15.1 Regulatory Context

Air quality in the United States is governed by the federal Clean Air Act, as amended, 42 U.S.C. §7401-7671q, and is administered by the United States Environmental Protection Agency (USEPA). The Clean Air Act directs the USEPA to implement environmental policies and regulations that will ensure acceptable levels of air quality. Air quality within Hawai‘i is further regulated by the State of Hawai‘i Department of Health (HDOH).

3.15.1.1 Criteria Pollutant Ambient Air Quality Standards

To protect public health and welfare, the USEPA and HDOH developed National and State Ambient Air Quality Standards (NAAQS, SAAQS) for the following criteria pollutants:

- Ozone
- Nitrogen dioxide
- Carbon monoxide
- Particulate matter less than 10 microns and 2.5 microns in aerodynamic diameter (PM_{10} and $PM_{2.5}$, respectively)[1]
- Sulfur dioxide

[1] National standard only

- Lead
- Hydrogen sulfide[2]

TABLE 3.15-1 presents the ambient air quality standards. These are the maximum pollutant concentration levels the USEPA and HDOH deemed to be protective of human health and the environment.

TABLE 3.15-1. **State and National Ambient Air Quality Standards**

AIR POLLUTANT	AVERAGING TIME	AMBIENT AIR QUALITY STANDARDS		
		HAWAI'I STATE STANDARD	NATIONAL PRIMARY STANDARD[A]	NATIONAL SECONDARY STANDARD[B]
Carbon Monoxide	1-hour	9 ppm	35 ppm	None
	8-hour	4.4 ppm	9 ppm	
Nitrogen Dioxide	1-hour	—	100 ppb	—
	Annual	0.04 ppm	53 ppb	0.053 ppm
PM_{10}	24-hour	150 µg/m³	150 µg/m³	150 µg/m³
	Annual[c]	50 µg/m³	—	—
$PM_{2.5}$	24-hour	—	35 µg/m³	35 µg/m³
	Annual		~~12~~ 9 µg/m³ [d]	15 µg/m³
Ozone	8-hour	0,.08 ppm	0.070 ppm	0.070 ppm
Sulfur Dioxide	1-hour	—	75 ppb	—
	3-hour	0.5 ppm	—	0.5 ppm
	24-hour	0.14 ppm	—	—
	Annual	0.03 ppm	—	—
Lead	Rolling 3-month	1.5 µg/m³ [d e]	0.15 µg/m³	0.15 µg/m³
Hydrogen Sulfide	1-hour	25 ppb	None	None

Source: State of Hawai'i Department of Health. 2022. *State of Hawaii Annual Summary: 2021 Air Quality Data*. December. https://health.hawaii.gov/cab/files/2022/12/aqbook_2021.pdf.

[a] Federal Primary Standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.

[b] Federal Secondary Standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

[c] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM_{10} standard effective December 17, 2006. However, the State of Hawai'i still has an annual standard.

[d] USEPA revised the primary annual $PM_{2.5}$ standard from 12.0 mg/m³ to 9.0 mg/m³, effective May 6, 2024 (40 CFR 50.20).

[d e] The State of Hawai'i standard is based on calendar quarter.

ppb = parts per billion

ppm = parts per million

The Clean Air Act, Section 107, requires the USEPA to publish a list of geographic areas that are not in compliance with the NAAQS. These are called nonattainment areas. Unclassified areas have

[2] State standard only

insufficient data for a determination and are treated as attainment areas (areas that are compliant with the NAAQS) until proven otherwise. An area’s designation is pollutant specific.

The HDOH also regulates emissions of fugitive dust. Per Hawai‘i Administrative Rules (HAR) Chapter 11-60.1-33(a) and (b), Fugitive Dust, “no person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions,” and “no person shall cause or permit the discharge of visible fugitive dust beyond the property lot line on which the fugitive dust originates.”

3.15.1.2 Greenhouse Gases

In addition to criteria pollutants, emissions of greenhouse gases (GHGs) are regulated to protect public health and welfare. GHGs trap heat in the earth’s atmosphere and can occur naturally or be caused by human activity. Scientific evidence indicates a trend of increasing global temperatures over the past century due to an accumulation of GHG emissions in the atmosphere. Quantitatively, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types). Each source of emissions makes a relatively small addition to global atmospheric GHG concentrations.

~~The USEPA signed the Final Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act on December 7, 2009. The endangerment finding states that “current and projected concentrations of the six key well-mixed GHGs—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.” And the cause or contribute finding states that “the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.”~~

~~The USEPA subsequently implemented GHG standards for vehicles to reduce future GHG emissions from mobile sources.~~

~~In January 2023, the Council on Environmental Quality (CEQ) issued interim guidance to assist agencies in analyzing GHGs and the climate change effects of their proposed actions under the National Environmental Policy Act (NEPA).[3] CEQ issued interim guidance so that agencies could use it immediately (while CEQ seeks public comment on the guidance). Until CEQ issues new guidance, the interim guidance is used to analyze GHGs and climate change effects.~~

The State of Hawai‘i has ~~also~~ set the following goals to bring vehicle emissions down:

- 100% zero-emission vehicle new light-duty sales by 2035
- 100% zero-emission light-duty public fleets by 2035
- 100% zero-emission public/government-owned transit bus fleets by 2030

~~[3] Council on Environmental Quality. January 2023. *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. https://ceq.doe.gov/guidance/ceq_guidance_nepa-ghg.html.~~

- 100% zero-emission med- and heavy-duty public fleets by 2040 (where technically feasible)[4]

3.15.1.3 Mobile Source Air Toxics

The USEPA also regulates the following mobile source air toxics (MSATs), which are compounds known or suspected of causing cancer or other serious health effects:

- 1,3-butadiene
- Acetaldehyde
- Acrolein
- Benzene
- Diesel particulate matter
- Ethylbenzene
- Formaldehyde
- Naphthalene
- Polycyclic organic matter

Most air toxics originate from the following human-made sources:

- On-road mobile sources
- Nonroad mobile sources (for example, airplanes)
- Area sources (for example, dry cleaners)
- Stationary sources (for example, factories or refineries)

The USEPA set standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers with the aim of reducing MSAT emissions.

The Federal Highway Administration (FHWA) released its *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* in January 2023.[5] Using the USEPA MOVES3 model (FIGURE 3.15-1), the FHWA estimates that even if national VMT increases by 31% from 2020 to 2060 as forecast, a combined reduction of 76% in the total annual emissions for the priority MSAT is projected for the same period.

The National Highway Traffic Safety Administration (NHTSA) Corporate Average Fuel Economy (CAFE) standards regulate how far vehicles must travel on a gallon of fuel. The NHTSA sets CAFE standards

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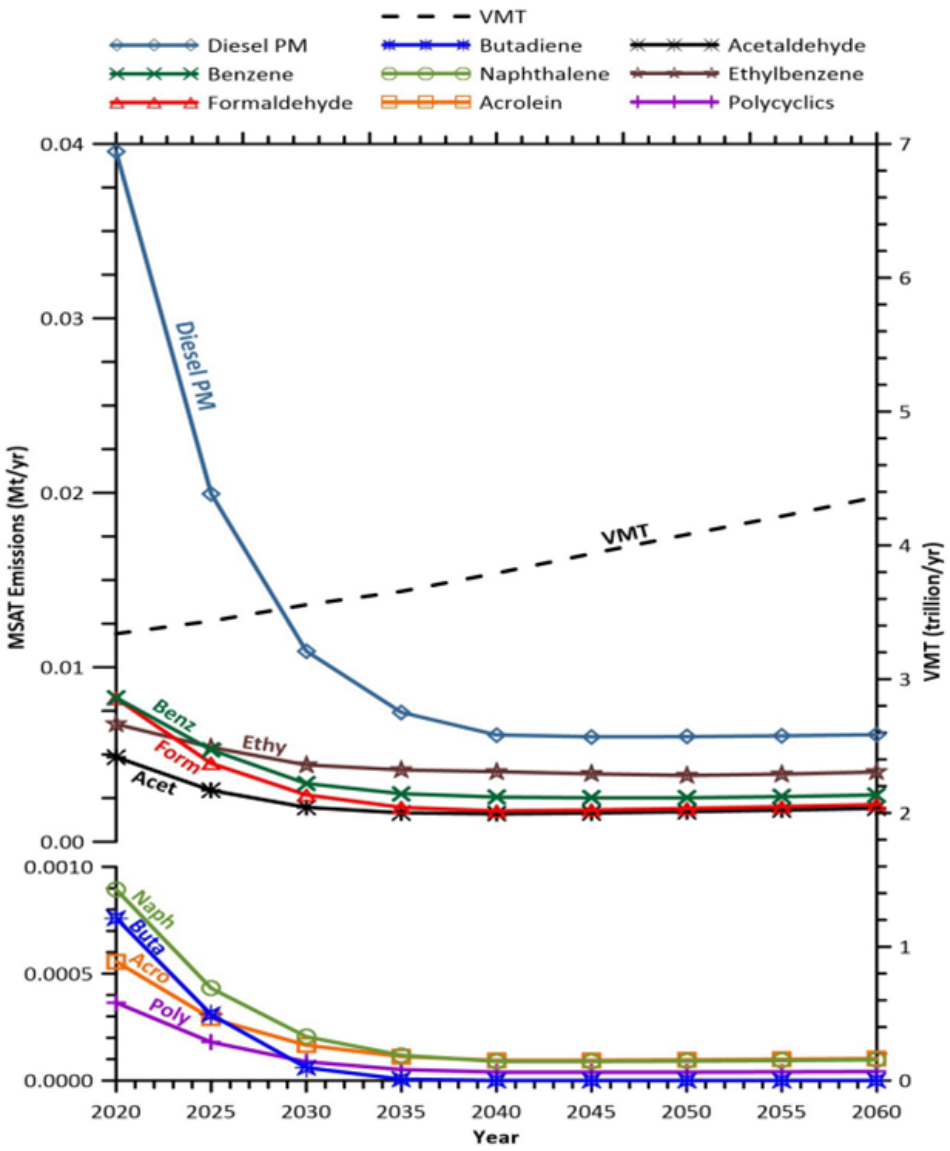
4 State of Hawai'i. Hawai'i's High Impact Actions to Address the Climate Emergency. Accessed December 2023. https://climate.hawaii.gov/hi-mitigation/goals-and-progress/.

5 Federal Highway Administration. January 2023. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_memorandum_2023.pdf.

for passenger cars and for light trucks (collectively, light-duty vehicles), and separately sets fuel consumption standards for medium- and heavy-duty trucks and engines. CAFE standards were finalized in 2022 and require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026. This will be accomplished by increasing fuel efficiency 8% annually for model years 2024 and 2025, and 10% annually for model year 2026.[6]

FIGURE 3.15-1. **FHWA-Projected National MSAT Emission Trends for Vehicles Operating on Roadways (2020 to 2060)**



Source: EPA MOVES3 model runs conducted by the FHWA, March 2021. See footnote 4.

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles traveled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

[6] National Highway Traffic Safety Administration. 2023. Corporate Average Fuel Economy. Accessed June 2023. https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy.

~~In 2022, revised fuel economy standards for passenger cars and light trucks were adopted by the NHTSA as directed by President Biden's January 20, 2021, Executive Order 13990, Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis.~~[7]

3.15.2 Methodology

3.15.2.1 Operations

Long-term impacts on air quality associated with the Project could result from future vehicle operation on the roadway. Motorized vehicles require energy to operate and affect air quality by emitting airborne criteria pollutants, GHGs, and MSATs. Changes in traffic volumes, travel patterns, vehicle mix, and roadway locations affect air quality and energy consumption by changing the number of vehicles and the congestion levels in a given area.

Regional criteria pollutant emissions and energy use associated with the Project were assessed qualitatively. In addition to potentially affecting regional criteria pollutant concentrations and energy use, realignment of the highway could place vehicles farther from or closer to existing or planned sensitive receptors. Sensitive receptors in the project area are limited to individual residences but more broadly can also include hospitals, schools, day care facilities, elderly housing, and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants. Extra care must be taken when dealing with contaminants and pollutants in proximity to sensitive receptors. Potential localized impacts to sensitive receptors were also assessed qualitatively.

The MSAT analysis was conducted according to the FHWA's latest guidance, *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.[8] The Project was analyzed qualitatively as a Tier 2 project, based on the FHWA's recommended tiering approach for projects with low potential for MSAT effects. This category includes projects that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions.

~~A qualitative GHG analysis was conducted according to CEQ's recent guidance, *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*.[9] As discussed in this guidance, agencies conducting climate change analyses in NEPA reviews should consider the following:~~

- ~~The potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action~~

~~[7] 87 Federal Register (FR) 25710. Accessed February 2024. https://www.federalregister.gov/documents/2022/05/02/2022-07200/corporate-average-fuel-economy-standards-for-model-years-2024-2026-passenger-cars-and-light-trucks.~~

[8] Federal Highway Administration. January 2023. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_memorandum_2023.pdf.

~~[9] Council on Environmental Quality. January 2023. *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. https://ceq.doe.gov/guidance/ceq_guidance_nepa-ghg.html.~~

- ~~The effects of climate change on a proposed action and its environmental impacts~~

A~~n~~ qualitative assessment of GHG emissions and the effects of the Project on climate change is included below. Resilience and the effects of climate change on the Project are addressed in Section 3.13, Climate Change and Sea Level Rise.

3.15.2.2 Construction

Air quality effects during roadway construction generally consist of short-term increases in fugitive dust and mobile source exhaust emissions from construction equipment. Additionally, construction requires short-term increases in energy consumption to power construction equipment, produce materials, and transport materials to a project site.

Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Haul trucks, concrete trucks, delivery trucks, and earth-moving vehicles operating around construction sites generate construction-related fugitive dust. Particulate matter that is resuspended by vehicle movement over paved and unpaved roads, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks generate fugitive dust.

3.15.3 Affected Environment

The regional and local climate, as well as human activity and emission sources in the area, influence the air quality in a given location. Abundant sunshine, regular northeast trade winds, relatively constant temperatures, and moderate humidity characterize leeward Maui’s mild tropical climate. ~~Severe storms are infrequent in this downwind region of Maui.~~ Mean monthly temperatures range from mid-80 degrees Fahrenheit in the summer months to low-70 degrees Fahrenheit during the winter. Annual average rainfall is less than 30 inches with most of the rainfall occurring between October and March.

The HDOH monitors the ambient air in Hawai‘i to confirm that the NAAQS and SAAQS are met and then publishes an annual report. The HDOH operates two air monitoring stations on Maui, in Kīhei and Kahului, which measure the air quality impacts from commercial, industrial, transportation, and agricultural activities. The latest year of available data is 2021, and Hawai‘i was in attainment of all NAAQS and SAAQS. This includes the project area.[10]

However, as the project area is prone to wildfires and the effects of statewide volcanic activity, localized conditions can create air quality concerns associated with temporarily elevated concentrations of particulates and other pollutants resulting from natural events. When pollutant concentrations are elevated, the State of Hawai‘i and the USEPA issue air quality alerts as appropriate.[11] The USEPA may exclude these types of natural events from attainment determinations. Therefore, as specific occurrences, they are not expected to alter the overall attainment status for the project area or Hawai‘i.

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10 State of Hawai‘i Department of Health. 2022. *State of Hawaii Annual Summary: 2021 Air Quality Data*. Accessed June 2023. https://health.hawaii.gov/cab/files/2022/12/aqbook_2021.pdf.

11 Hawai`i Short Term SO2 Advisory (hiso2index.info) and http://www.airnow.gov/.

$PM_{2.5}$ is the only pollutant monitored at the air monitoring stations on Maui. Monitored concentrations of $PM_{2.5}$ near the project area are well below the NAAQS (TABLE 3.15-2). As summarized in Appendix 3.15, the FHWA provides a methodology to complete air quality evaluations when there is incomplete or unavailable data given that overall air quality in the project area is affected primarily by emissions from vehicles, which generate criteria pollutant, GHG, and MSAT emissions.

TABLE 3.15-2. **Maui Ambient Air Monitoring Data**

POLLUTANT	AVERAGING TIME	FORM	2019	2020	2021	SAAQS	NAAQS
KĪHEI (KH) A							
$PM_{2.5}$ [µg/m³]	24-hour	98th percentile	16.9	7.2	5.7	N/A	35
		3-year average		9.9			
	Annual	Annual average	4.1	2.9	2.5	N/A	12
		3-year average		3.2			
KAHULUI (KL) B							
$PM_{2.5}$ [µg/m³]	24-hour	98th percentile	7.6 c	7.1	7.3	N/A	35
		3-year average		N/A			
	Annual	Annual average	3.4 c	3.9	3.9	N/A	12
		3-year average		N/A			

Sources: State of Hawai'i Department of Health. 2022. State of Hawaii Annual Summary: 2021/2020/2019 Air Quality Data. https://health.hawaii.gov/cab/files/2022/12/aqbook_2021.pdf
https://health.hawaii.gov/cab/files/2022/02/aqbook_2020_.pdf
https://health.hawaii.gov/cab/files/2021/07/aqbook_2019.pdf

[a] Monitoring data from the Kīhei station is used to make the annual attainment determination.

[b] The Kahului station is a Special Purpose Monitoring Station not used for attainment determination. Three-year average values are not available.

[c] Does not meet summary criteria, less than 75% data recovery in the first quarter, substitution test valid.

The HDOH publishes updated GHG emissions inventories and reports showing progress toward achieving statewide GHG reduction goals. GHG emissions data for 2019, the most recent year available, shows that the transportation sector accounted for 49% of statewide GHG emissions. Ground transportation specifically accounted for 18% of statewide GHG emissions.[12]

The United States Energy Information Administration publishes annual comprehensive state energy statistics via its State Energy Data System, which lists Hawai'i as having the fourth-lowest total energy

[12] State of Hawai'i Department of Health. 2023. *Hawai'i Greenhouse Gas Emissions Report for 2005, 2018, and 2019*. April. https://health.hawaii.gov/cab/files/2023/05/2005-2018-2019-Inventory_Final-Report_rev2.pdf.

use among the states and the third-lowest per capita energy consumption.[13] In 2021, the transportation sector accounted for 53% of the energy consumed in Hawaiʻi, mostly in the form of jet fuel and motor gasoline.

3.15.4 Environmental Consequences

3.15.4.1 No Build Alternative

Under the No Build Alternative, no changes to the existing roadway would occur. Overall annual average daily traffic (AADT) is projected to increase as a result of regional growth; however, emissions of criteria pollutants, GHGs, and MSATs are expected to decrease as a result of increased fuel economy and improved vehicle technology.

3.15.4.2 Build Alternatives

Common to All Build Alternatives for both Olowalu and Ukumehame

On a regional basis, the Project would not change travel demand, vehicle mix, and AADT. With total new roadway lengths of 5.1 to 5.9 miles, there is little variation among the Build Alternatives and they would be either the same length or shorter than the 5.9-mile No Build Alternative. Thus, while local trip length may vary slightly between the No Build Alternative and each of the Build Alternatives, this results in negligible differences in total VMT and emissions.[14] Additionally, the Project would include exclusive left-turn lanes, which would increase vehicle speeds, reduce congestion, and decrease criteria pollutant and GHG emissions when compared to the No Build Alternative. The effects of these differences would be minor, and compared to the No Build Alternative, the Project would not result in a material change in regional criteria air pollutant or GHG burdens.

Based on this information, and accounting for Hawaiʻi's overall attainment status, the Project would not result in an adverse impact to regional air quality or climate change. Similarly, the Project would not materially change energy consumption.

While the Project alone would not change regional travel demand, realignment of the highway could place vehicles farther from or closer to existing or planned sensitive locations such as residences. Therefore, realignment could change the level of traffic-related emissions at nearby sensitive receptors. Effects at individual sensitive receptors would vary because realignment would move the roadway closer to some receptors and farther from others. FIGURE 3.15-2 and FIGURE 3.15-3 map the receptor sites for Olowalu and Ukumehame, respectively.

As shown in TABLE 3.15-3, the distance between the highway and the closest sensitive receptor or receptors in either Olowalu or Ukumehame would increase with all the Build Alternatives when compared to the closest residences to the existing highway~~, which are located in Olowalu~~. Following publication of the Draft EIS, four new residences were identified in Ukumehame, two of which are located in close proximity to Build Alternative 4. Due to their proximity, both of these properties would

[13] U.S. Energy Information Administration. 2023. State Energy Data System: Hawaiʻi State Profile and Energy Estimates. https://www.eia.gov/state/?sid=HI.

[14] As calculated in EPA's MOVES emissions model used for regional analysis, criteria air pollutant and GHG emissions are a function of traffic volume, vehicle type, population mix, and speed.

be acquired in full to accommodate the right-of-way requirements for the Build Alternative 4 alignment and would therefore no longer be considered residential sensitive receptors. The distance between the existing highway and the other two new residences identified in Ukumehame would increase with all the Build Alternatives. Accordingly, given the state's attainment status, there are no expected air quality effects and the purpose of this data is to show that no individual receptor would be any closer to high traffic volumes than already exists for the closest receptors. Thus, relative air quality would not be worse and localized concentrations of traffic-related emissions at sensitive receptors are expected to be lower for the Build Alternatives when compared to the closest residences in the No Build Alternative.

FIGURE 3.15-2. **Comparison of Distance to Residences in Olowalu**

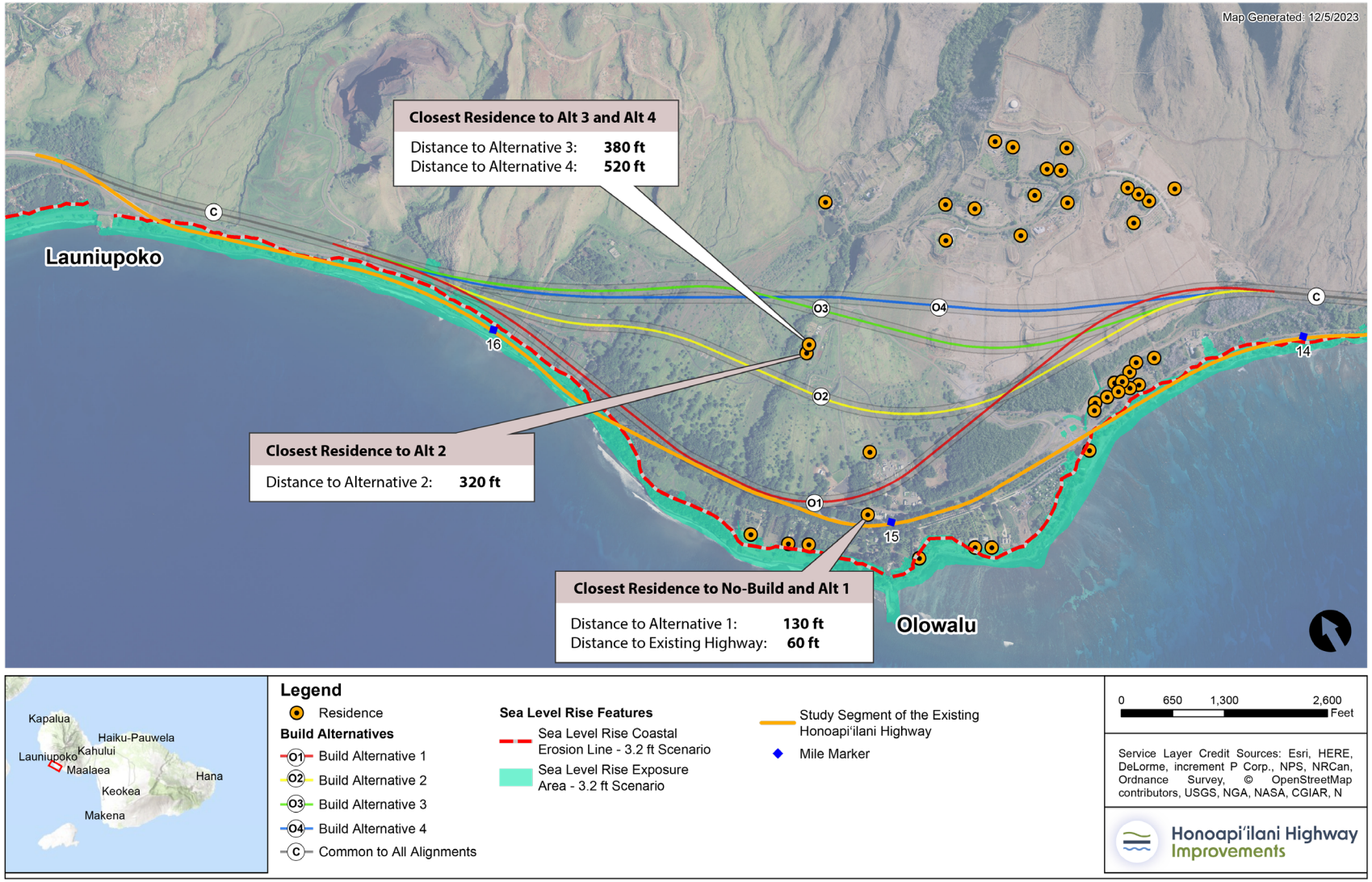

FIGURE 3.15-3. **Comparison of Distance to Residences in Ukumehame**

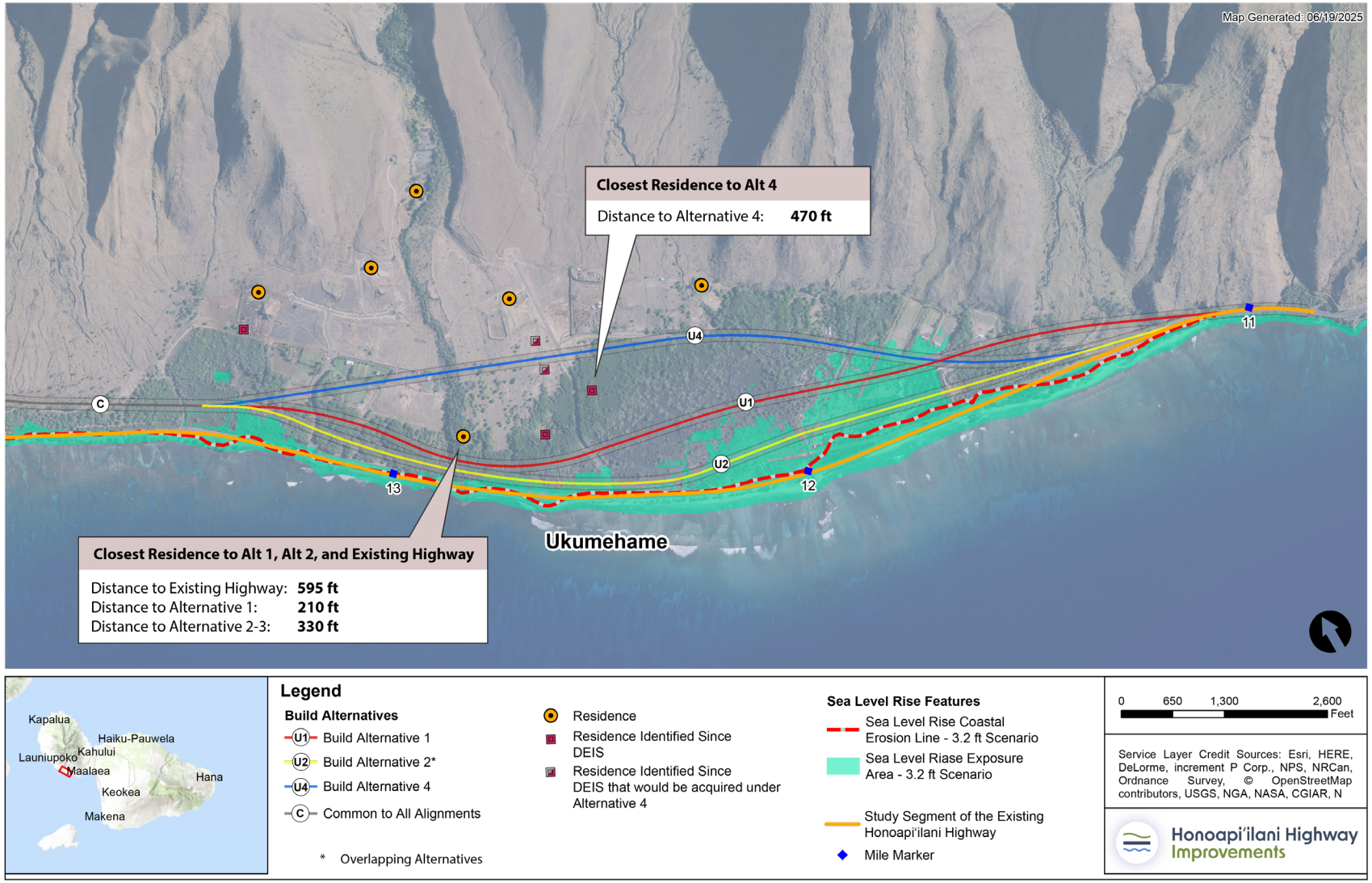

TABLE 3.15-3. **Distance to the Closest Sensitive Receptor**

ALTERNATIVE	RECEPTOR TYPE	APPROXIMATE DISTANCE (FEET)
Closest Existing/ No Build Receptor	Residence	60
OLOWALU		
~~No Build Alternative~~	~~Residence~~	~~60~~
Build Alternative 1	Residence	130
Build Alternative 2	Residence	320
Build Alternative 3	Residence	380
Build Alternative 4	Residence	520
UKUMEHAME		
~~No Build Alternative~~	~~Residence~~	~~595~~
Build Alternative 1	Residence	210
Build Alternatives 2 and 3	Residence	330
Build Alternative 4	Residence	~~520~~470

Source: ESRI GIS Data

USEPA regulations for vehicle engines and fuels are anticipated to reduce overall emissions of criteria pollutants significantly over the next several decades, further reducing regional vehicle emissions and expected concentrations at nearby sensitive receptors. Hawai‘i’s zero-emission vehicle goals are also expected to contribute to vehicle emission reductions.

For each alternative, the quantity of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. As described above, vehicle mix would be the same for all alternatives and differences in VMT would be minor. Therefore, no appreciable difference in overall MSAT emissions among the various alternatives is expected. Additionally, MSAT emission rates would be lower for the Build Alternatives due to small increases in vehicle speeds resulting from reduced congestion; according to the USEPA’s MOVES3 model, emissions of all of the priority MSATs decrease as speed increases. Appendix 3.15 presents information on the assessment of MSAT impacts, including information regarding the health impacts.

Regardless of the alternative chosen, the FHWA’s *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* indicates that emissions will likely be lower than present levels in future years as a result of USEPA national control programs. These programs are projected to reduce annual MSAT emissions by over 76% between 2020 and 2060, based on USEPA MOVES3 modeling.[15] Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions

[15] Federal Highway Administration. January 2023. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_memorandum_2023.pdf.

is so significant (even after accounting for VMT growth) that MSAT emissions are anticipated to be lower in nearly all locations.[16]

Under each alternative, there may be localized areas where VMT would increase and others where VMT would decrease. Accordingly, it is possible that localized increases and decreases in MSAT emissions may occur. But even if these increases do occur, they would be substantially reduced by USEPA vehicle and fuel regulations. Therefore, the Project would not result in adverse long-term air quality, GHG, or energy impacts.

3.15.5 Construction Effects

Project construction would result in short-term increases in fugitive dust and mobile source exhaust emissions from construction vehicles and equipment. Additionally, construction would require short-term increases in energy consumption to power construction equipment, produce materials, and transport materials to the project site. Construction duration, methods, and activities would be similar for all of the Build Alternatives, resulting in similar emissions.

Airborne, visible fugitive dust during construction would be controlled at the project site by the contractor in accordance with the provisions of HAR Chapter 11-60.1-33, Fugitive Dust, HDOT's Standard Specifications, and HDOT's *Construction Best Management Practices Field Manual* (BMP SM-19).[17]

Exhaust emissions and energy consumption from construction vehicles and equipment would be reduced through the following control measures:

- Keeping construction equipment and vehicles properly tuned and maintained
- Avoiding idling of diesel equipment, particularly near the air intake of any building heating, ventilation, and air conditioning systems
- Avoiding the use and routing of construction equipment near residential areas and clusters of sensitive receptors like hospitals, schools, day care facilities, elderly housing, and convalescent facilities
- Timing the assembly of construction crews, equipment, and work to minimize conflicts with typical commuting hours

Increased truck traffic associated with the Lāhainā wildfire cleanup and recovery may coincide with construction. Due to uncertainty in the timing, duration, and magnitude of additional truck travel associated with cleanup and recovery, traffic volumes have not been estimated at this time. Truck traffic associated with the Lāhainā wildfire cleanup and recovery would remain on the existing highway—largely separated from project construction areas—and therefore would not result in additional localized air quality effects. Section 3.20, Cumulative Effects, includes more information.

16 Ibid.

17 Hawai'i Department of Transportation. 2021. *Construction Best Management Practices Field Manual*. October.

Air quality, GHG, and energy impacts from construction of the Project would be minor because the construction period would be limited, and impacts would be minimized by implementing the control measures described above. Additionally, Maui is in attainment for all criteria pollutants, and maximum pollutant concentrations measured at HDOH air monitoring stations are well below the SAAQS and NAAQS. As such, additional pollutants temporarily generated by construction would not cause an exceedance of these standards. Therefore, construction of the Project would not result in adverse short-term air quality, GHG, or energy impacts.

3.15.6 Indirect Effects

Air quality effects and energy demand from construction or future operation of the Project would not result in indirect effects that would create new or different air quality and energy impacts associated with future activities that could be generated over time. The Project would not create changes in regional travel demand or create new development opportunities tied to the highway project.

3.15.7 Mitigation

No mitigation measures are proposed for any of the Build Alternatives because no violations of the NAAQS or SAAQS are anticipated, and the Project would not require substantial energy consumption or emit substantial GHGs. Air quality and energy mitigation measures for long-term, traffic-related impacts would be unnecessary and unwarranted because no significant variation of VMT, vehicle hours of travel, and vehicle mix would occur between the Build Alternatives. As described above, fugitive dust generated during construction of the Project would be controlled at the site of construction activity by the contractor and in accordance with the provisions of HAR Chapter 11-60.1-33, Fugitive Dust, HDOT's Standard Specifications, and HDOT's *Construction Best Management Practices Field Manual* (BMP SM-19). Exhaust emissions and energy consumption from construction vehicles and equipment would be reduced through implementation of the control measures listed in Section 3.15.5.

3.15.8 Build Alternatives Comparative Assessment

The No Build Alternative and the Build Alternatives would not cause or exacerbate a violation of the SAAQS or NAAQS, require substantial energy consumption, or emit substantial GHGs.

Air quality and energy impacts from construction activities associated with the Project would be similar for all of the Build Alternatives and would be minor because the construction period would be limited, and standard emission control measures would be implemented.

When compared to the No Build Alternative, the Build Alternatives would not result in any significant changes in traffic volumes, travel patterns, vehicle mix, or any other factor that would cause an increase in long-term regional emissions or energy consumption. With the exception of the two residences that would be acquired and removed as part of Build Alternative 4, the Build Alternatives would locate the roadway farther from the closest sensitive receptors and would reduce concentrations of traffic-related criteria pollutant, GHG, and MSAT emissions when compared to the No Build Alternative. Air quality and energy impacts from operation would be similar for all of the Build Alternatives.

As described above, the Build Alternatives would improve the overall Level of Service and would not result in an adverse impact to air quality, emit substantial GHGs, or result in a material change in energy consumption compared to the No Build Alternative.