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DEPARTMENT OF PLANNING AND PERMITTING
KA ʻOIHANA HOʻOLĀLĀ A ME NĀ PALAPALA ʻAE
CITY AND COUNTY OF HONOLULU

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February 28, 2025

2024/SMA-128(CK)

The Honorable Tommy Waters
Chair and Presiding Officer
and Members
Honolulu City Council
530 South King Street, Room 202
Honolulu, Hawaiʻi 96813

Dear Chair Waters and Councilmembers:

SUBJECT: Special Management Area (SMA) Major Permit
Kaʻiwa Ridge Trail Improvements
Kaʻelepulu Drive – Lanikai
Tax Map Keys 4-2-002: 016 (portion), 017, 048 (portion) and
4-3-007: 018 (portion) and 077 (portion)

Enclosed for your consideration are the Department of Planning and Permitting's (DPP) Report and Recommendation, Draft Resolution, and Exhibits for the SMA Major Permit application to allow the construction of physical improvements to the Kaʻiwa Ridge Trail, commonly referred to as the Lanikai Pillbox Trail, as well as the implementation of a strategic management plan (Project) on portions of five non-shoreline lots in Lanikai.

The DPP recommends that the Project be approved, subject to compliance with recommended conditions, which primarily consist of standard conditions relating to protected species and archaeological resources.

Pursuant to the Revised Ordinances of Honolulu Chapter 25, the City Council must act within 60 calendar days after receipt of our Findings and Recommendation; however, the City Council may extend this period of time upon receipt of a request from the Applicant for an extension.

DEPT. COM. 155

Should you have any questions, please contact me at (808) 768-8000.

Very truly yours,

Dawn Takeuchi Apuna
Director

Enclosures: DPP Report and Recommendation
Draft Resolution
Exhibits A through D, E-1 through E-9, and F through K

APPROVED BY:

Michael D. Formby, Managing Director
Office of the Managing Director

DEPARTMENT OF PLANNING AND PERMITTING
OF THE CITY AND COUNTY OF HONOLULU

STATE OF HAWAI'I

IN THE MATTER OF THE APPLICATION BY STATE OF HAWAI'I DEPARTMENT OF LAND AND NATURAL RESOURCES FOR A SPECIAL MANAGEMENT AREA (SMA) MAJOR PERMIT	FILE NO. 2024/SMA-128(CK)

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDATION

I. APPLICATION

A. Basic Information:

PROJECT NAME:	Ka'iwa Ridge Trail Improvements
LANDOWNER/ APPLICANT:	State of Hawai'i (State) Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW; Marigold Zoll)
AGENT:	PBR Hawai'i and Associates, Inc. (Catie Cullison)
LOCATION:	Ka'elepulu Drive – Lanikai (Exhibit A)
TAX MAP KEY:	4-2-002: 016 (portion), 017, 048 (portion) and 4-3-007: 018 (portion) and 077 (portion)
ZONING:	R-5 Residential District, R-10 Residential District, and P-1 Restricted Preservation District (Exhibit B)
STATE LAND USE:	Urban District and Conservation District (Exhibit C)
DEVELOPMENT PLAN:	Ko'olau Poko Sustainable Communities Plan (KPSCP)

B. Proposal: The Applicant requests approval of an SMA Major Permit to allow the construction of physical improvements to the Ka'iwa Ridge Trail as well as the implementation of a strategic management plan, on approximately 4.6 acres of land covering portions of five non-shoreline lots in the R-5 Residential District, R-10 Residential District, and P-1 Restricted Preservation District, and SMA in Lanikai (Project; see Exhibits A through D). The purpose of the Project is to address erosion and sedimentation of the site, the overall management of the volume and behavior of hikers, and access, liability, and easement concerns. The Project consists of the following components (see Exhibits E-1 through E-9):

- Acquisition of an additional 20-foot (-ft.) -wide easement along the lower hillside to accommodate a wider pathway with switchbacks on the steepest portion of the trail;

- Installation of trail improvements utilizing natural trail design and construction techniques as follows:

  - Re-contouring of the trail using rock and soil sourced from the site;

  - Utilization of slopes, cross slopes, and dips to incrementally move water from the trail during rain events;

  - At steeper slopes, construction of naturally shaped switchbacks anchored and edged with native rock; and

  - Incorporation of stormwater management features into the trail itself by creating mini watersheds along segments of the trail to incrementally move water from the footpath so it does not collect or accumulate in volumes that cause erosion.

- Installation of signage at the trailhead which will establish the Nā Ala Hele Trail program rules;

- Installation of access boundary markers and natural, symbolic fencing along the designated route to discourage hikers from deviating from the trail;

- Installation of interpretive signage at strategic points along the trail that highlight historic accounts and preserve the cultural significance of the area;

- Revegetation of damaged areas outside of the trail pathway with native plants appropriate to the location;

- Initiation of a reservation and fee system to manage the flow of trail users;

- Development and implementation of a scalable, adaptive management plan that addresses specific concerns, including erosion and stormwater, private property trespass, hiker safety and education, native plant restoration; and

- Establishment of a non-profit community stewardship program that will facilitate community involvement and improve access for Native Hawaiian cultural practices

The Project proposes to use existing rocks, soils, and other natural materials from within the Project site to implement most of the physical trail improvements. If necessary for stability or safety, additional rocks, boulders, or other structural support materials may be imported onto the site. No importation of non-structural fill soil is proposed.

Construction of the trail improvements and implementation of the management plan will be phased, and largely dictated by available funding. During the initial phase, which is planned to begin upon receipt of all necessary approvals, construction activities will implement the proposed sustainable trail design measures including switchbacks, out planting, and signage along the trail corridor. These improvements are anticipated to be complete within one year to minimize construction-related impacts, and will utilize $900,000 in Capital Improvement Project funds approved by the State's 31st Legislature in 2021.

All construction staging activities will occur on-site. Temporary and permanent Best Management Practices (BMPs) will be implemented before, during, and after construction to address fugitive dust, on-site stormwater management, construction noise and vibrations, erosion and sediment control, and other issues in compliance with the Department of Planning and Permitting (DPP) *Rules Relating to Water Quality*, *Rules Relating to Storm Drainage Standards*, and other applicable regulations.

Background: According to the application, two artillery observation stations (Podmore Station, or commonly referred to as the Lanikai Pillboxes) were installed by the U.S. Army during World War II at the crest of the Ka'iwa Ridge, and were later decommissioned. The trail leading to the observation stations began as a military access road to transport personnel and equipment. Once decommissioned, the parcel containing the observation stations and the access road were privately owned for several decades until both came under the purview of the DLNR DOFAW Nā Ala Hele Trail and Access Program by Executive Order 3610, signed on February 11, 1994. Executive Order 3610 sets aside land identified *"for the protection and preservation of lands having value as a resource to the State of Hawai'i and for Nā Ala Hele Trail Program purposes..."*

As part of an unrelated action, a second corridor runs parallel to the former military access road. Although parallel to the military access road, it is not

immediately adjacent and a ten-foot strip of private property runs between the two corridors. The City and County of Honolulu (City) required a mauka (toward the mountain) access easement on the Bluestone Condominium (Bluestone) property as a condition of Subdivision File No. 79/SUB-39. The Bluestone public easement, named "Public Access Easement B" on survey maps, follows the eastern boundary of the Bluestone parcel until approximately 500 ft. from the northern boundary of the DLNR owned and managed property.

The DLNR determined that no meaningful improvements could be implemented while there were two access points under different jurisdictional authorities. Therefore, the State engaged with the private property owners impacted by the aforementioned encumbrances to adjust the location of the State easement and gain management rights and authority over the Bluestone easement. On August 13, 2021, the Board of Land and Natural Resources approved the realignment of portions of the State-owned access easement as well as accepted the perpetual easement from Bluestone. On September 14, 2021, the Bluestone AOAO and the State, through the Nā Ala Hele Trail and Access Program, entered into a new easement agreement which allows for the State's management and upkeep of the 10-ft. easement on the Bluestone property.

As the whole of the Project area is now under State management, the Nā Ala Hele Trail and Access Program is now in a position to implement a number of physical improvements to the contiguous trail corridor to address the physical deterioration of the hillside as well as address trail-specific nuisance issues identified by the surrounding community.

II. FINDINGS OF FACT

On the basis of the evidence presented, the Director of the DPP has found:

Project Area	4.6 acres (see Exhibit A)
Project Area Shape	Irregular
Topography	Varying hillside with elevation ranging from approximately 80 ft. above mean sea level (MSL) to 565 ft. above MSL.
Current Development	Two World War II military observation stations (collectively "Podmore Station") and an unimproved hiking trail.
Surrounding Uses	To the west - Condominiums and country club To the south - Open space To the east - Low-density residential To the north - Low-density residential and country club (see Exhibits A through C).

Flood Zone	*Flood Zone X* – An area determined to be outside of the 0.2 percent annual chance floodplain (Federal Emergency Management Agency Flood Insurance Rate Map Panel No. 15003C0290H, revised November 5, 2014, see Exhibit F).
Shoreline Survey	Not applicable. The Project site is not a shoreline lot.
Nearest Body of Water	*Pacific Ocean / Kailua Bay* - Estuarine and Marine Wetland (see Exhibit G).
Soil Classifications	*Stony Steep Land with 40 to 70 percent slopes* - Well-drained very stony clay, with little occurrence of flooding or ponding, and a medium runoff potential; *Papaa Clay with 35 to 75 percent slopes* - Well-drained soils with no ponding or flooding frequency; and *Kokokahi Clay with Six to 12 percent slopes* - Moderately well-drained very stony clay with no ponding or flooding or frequency, rapid permeability, and a high runoff potential (see Exhibits H and I; United States Department of Agriculture - Natural Resources Conservation Service).
Vegetation	Primarily non-native trees, shrubs, and vegetation.
Sea Level Rise (SLR) – Exposure Area	The Project site is not projected to be impacted by SLR or coastal erosion as a result of SLR (see Exhibit J; Hawai'i SLR Viewer).
Shoreline Erosion Rate	Not applicable. The Project site is not a shoreline lot.
Hurricane Storm Surge	The Project site is located outside of the area projected to be subject to flooding during hurricane events up to Category 4 (National Hurricane Center, *Storm Surge Risk Maps*).
Tsunami	The Project site is located within the Green Zone - Safe areas that are anticipated to be outside of the Extreme Tsunami Evacuation Zone (Hawai'i Emergency Management Agency, *Tsunami Aware Mapper*).
Environmental Compliance	Hawai'i Revised Statutes (HRS) Chapter 343 requires that an Environmental Assessment by prepared for any action, such as the Project, that proposes the use of State lands and funds. A Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI) for the Project were prepared by PBR Hawai'i and Associates, Inc. on behalf of the DLNR. The FONSI letter was transmitted to the Office of Planning and Sustainable Development

	(OPSD) on January 26, 2024. The FEA/FONSI were published in the February 8, 2024 edition of the OPSD Environmental Review Program's *The Environmental Notice*.
Other City Permits and Approvals	Construction permits.
Agency Comments	During the HRS Chapter 343 review process, the DLNR routed the proposal to various Federal, State, and City agencies, as well as to community members and other interested parties. Comments received were incorporated into the FEA. During the SMA review process, the DPP also routed the SMA Permit application to various interested parties. All letters and comments received during the SMA review process have been included in the Project file and incorporated into the Analysis Section, as appropriate.
Neighborhood Board/ Community Association Presentation	The Project was presented to the Kailua Neighborhood Board (KNB) No. 31 on November 7, and December 5, 2024. The Project was previously presented to the KNB, the Lanikai Community Association, and other interest groups on numerous occasions during the HRS Chapter 343 review process (see Section G, below).
Public Hearing	The DPP conducted a Public Hearing at 10:30 a.m. on January 15, 2025, at the Fasi Municipal Building, 6th Floor Conference Room. In person and virtual testimony in support of the Project was received from three members of the public. The public hearing is discussed in Section G, below.

III. ANALYSIS

The proposed Project was analyzed in accordance with the objectives, policies, and guidelines established in Revised Ordinances of Honolulu (ROH) § 25-3.1, as well as HRS §§ 205A-2 and 205A-26(1).

A. Recreational Resources

Development within the SMA should provide coastal recreational opportunities to the public. Adequate access, by dedication or other means, to beaches, coastal dunes, recreation areas, and natural reserves must be provided to the extent consistent with sound conservation principles. Adequate and properly located public recreation areas and wildlife preserves must be preserved.

The Project consists of improvements to the existing Ka'iwa Ridge Trail through State-owned open space from which there are panoramic views of the Lanikai coastline. Because the purpose of the Project is to improve and better manage public access, safety, and erosion, Project implementation will result in positive impacts to public coastal recreational opportunities. Project components related to improving public access and preservation include acquiring an additional 20-ft.-wide access easement along the trail entry to incorporate natural-design switchbacks to decrease erosion and increase public safety. The Project also proposes the implementation of a reservation system, docent management, signage to manage congestion and increase public education, and revegetation of damaged off-trail areas with native plant species. Further, as a result of testimony received during the environmental disclosure process, the DOFAW is working on a community-based stewardship program wherein a non-profit entity will work with staff to fully support Native Hawaiian practices at the Project site. Finally, because the Project site is not a shoreline lot, no change to existing beach or fishing access or coastal dunes will occur. Therefore, the Project will increase safe and well-managed public recreational opportunities and no conditions of approval relating to recreational resources are recommended.

B. Historic and Cultural Resources

Development within the SMA should protect, preserve, and restore natural or human-made historical and cultural resources.

An Archaeological Impact Survey (AIS) of the Project site was conducted by TCP Hawai'i. The AIS identified the two World War II concrete fire-control stations (Station Podmore/Lanikai Pillboxes) as State Inventory of Historic Places (SIHP) Site 50-80-11-8196, Features A and B. The Project does not propose any change to these resources. The AIS also included archival research and a field survey of the safely accessible portions of the Project site to determine whether the trail was a traditional trail. The surface survey established that soil throughout the Project site has generally eroded down to bedrock. No new cultural or archaeological properties were identified during the Project AIS, and no signs of a traditional trail or displaced cultural materials were found. Therefore, the AIS concluded that the Project would result in a determination of no historic properties affected. On July 27, 2018, the State Historic Preservation Division (SHPD) issued an acceptance letter pursuant to Hawai'i Administrative Rules § 13-275-7, concurring with the findings of no historic properties affected, and concurring that no further historic preservation documentation is needed for the Project. Therefore, no impacts to known historic properties are anticipated, and no related conditions of approval are recommended.

However, like any activity that requires ground-disturbing activity, there is a possibility that unknown cultural or archaeological resources could be discovered during construction. Therefore, should any cultural or archaeological resources be encountered, the Project should be subject to the standard "stop work"

condition of approval. This will ensure that if, during construction, any previously unidentified archaeological sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, the Applicant must stop work and contact the SHPD. This is recommended as a condition of approval. Provided the Applicant complies with this condition, no adverse impacts to historic or archaeological resources are anticipated.

The DPP also assessed the extent to which Native Hawaiian rights are customarily and traditionally exercised within the Project site, and the extent to which these rights may be affected or impaired by Project implementation. According to the application, the ridgeline and surrounding shoreline area, traditionally known as Ka'ōhao, are culturally significant to Native Hawaiians as a historic fishing ground and home to many traditional and customary practices, including the practice of hula along the ridgeline. Testimony received from Native Hawaiian descendants of the area during the environmental disclosure process notes that they are not opposed to the Project, stating in part that:

> *"the obvious, core benefits – erosion and run-off mitigation, in particular – are unassailable. And the prospect of taking our students along a much safer, visually enhanced, native out-planted trail is highly appealing. We'd probably volunteer to maintain it."*

However, the letter also expresses concern that the proposed cultural interpretive plan with signage to educate visitors will not actually create time and space to carry out cultural practices. Therefore, the authors support a permitting and scheduling system for the trail that also includes trail closure during times when access would only be available to vetted Hawaiian cultural practitioners for specific and appropriate purposes. The application notes that:

> *"Regarding the concerns expressed on native Hawaiian access rights, it is understood that the Hawai'i State Constitution (HSC) Article 12, Section 7, 'reaffirms and protects all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778.'"*

Therefore, in order to minimize these concerns, the DOFAW is working on a community-based stewardship program whereby a non-profit, community organization will help to implement the visitor management measures outlined in the accompanying management plan. The stewardship program will work with DOFAW staff to fully support Native Hawaiian practices conducted by established Hawaiian organizations. Given this, adverse impacts to Native Hawaiian rights are not anticipated, and therefore, no conditions are

recommended in regard to preserving access or opportunities for Hawaiian cultural activities.

C. Scenic and Open Space Resources

Development within the SMA should protect, preserve, and whenever desirable, restore or improve the quality of coastal scenic and open space resources. Alterations to existing land forms and vegetation, other than for the cultivation of coastal dependent crops, must be limited so they result in minimum adverse impacts on water resources, beaches, coastal dunes, and scenic or recreational amenities. Development that is not dependent on the coast is encouraged to locate mauka of the SMA.

According to the application, the Ka'iwa Ridge Trail provides a 360-degree view of the Ko'olau Mountain Range and Mokulua Islands. The trail was created under the Nā Ala Hele Trail and Access Program after residents expressed a concern that private landownership would lead to development of the hillside. The trail was purchased by the State of Hawai'i to keep the ridgeline open for public use and enjoyment in perpetuity for the visual and open space value it provides to the community.

The KPSCP Open Space Map identifies the Project site as a prominent land feature, and as part of the Keolu Hills. The City's 1987 Coastal View Study identifies the Ka'iwa Ridge as an important coastal landform. The Project will not impact scenic and open space resources because it consists of safety, access, and management improvements to the existing recreational trail and open space. Outside of rocks and natural-appearing trail fencing to be installed to direct users along the designated trail and address ongoing erosion, the Project does not propose new structures, and will not intrude into the sightlines of the area or impede access to open space or scenic areas. The Project proposes to restore environmentally damaged areas by addressing current ridgeline erosion rates that are exacerbated by the large volume of hikers that use the trail daily. The Project also proposes to revegetate the hillside with native plant species and work to keep hikers on the designated footpath. Given all of this, no adverse impacts to scenic and open space resources are anticipated, and therefore, no related conditions of approval are recommended.

D. Coastal Ecosystems

Development within the SMA should protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes from disruption, and minimize adverse impacts on all coastal ecosystems. Solid and liquid waste treatment and disposition must be managed to minimize adverse impacts on SMA resources.

The Project proposes improvements to an existing recreational trail that are designed to minimize impacts to coastal ecosystems. Nonetheless, there is

potential for temporary impacts to protected fauna species during Project construction as discussed below.

1. Sensitive Coastal Habitats and Species:

   a. Wetlands and Streams: The Project site does not contain any areas designated as wetlands or streams. Kailua Bay, located downhill to the northeast of the Project site, is identified as Estuarine and Marine Wetland (see Exhibit G). According to the application, a water quality study conducted by The Nature Conservancy indicates that, while the trail is not hydrologically connected to the shoreline, the system of drainage canals and stormwater infrastructure in neighborhood streets transport sediment eroded from the trail to Lanikai Beach, impacting water quality at 'A'alapapa reef. However, the Project is expected to positively impact the municipal drainage systems in the long term by reducing current sediment loads in stormwater. The Sustainable Trail Design will incorporate contours and outslopes to remove water incrementally from the footpath so that it does not collect in puddles or accumulate in volumes that cause erosion. By working incrementally to remove water from the top of the trail down, water will no longer be funneling down the trail as it does under current conditions. Project construction activities will also be required to comply with the City's *Rules Relating to Water Quality, Rules Relating to Storm Drainage Standards*, and other applicable regulations. Compliance with the City's Rules will be confirmed during the building permit review process. Therefore, no conditions related to the protection of wetlands and streams are recommended.

   b. Flora: According to the flora and fauna survey report prepared for the Project by LeGrande Biological Surveys, Inc. (2018), the ridgeline is dominated by non-native plant species with only a few indigenous plants present in small numbers. The ridgeline contains mostly lowland dry weedy plants including invasive grasses and drought tolerant species such as the night-blooming cereus and koa haole. The windward and leeward slopes are dominated by non-native grasses and weeds. Only six percent of surveyed plant species were identified as native, with 'uhaloa, pōpolo, and native mint being the most prevalent. No threatened or endangered plant species were identified. Therefore, the survey report concluded that no botanical resources of particular concern will be impacted by the Project. Further, a letter from the U.S. Fish and Wildlife Service (USFWS) stated that no critical habitat for flora species overlaps the Project site.

Proposed trail improvements include the strategic revegetation of the Ka'iwa Ridge hillside at disturbed locations to decrease current erosion rates and discourage hikers from using undesignated trails. The Project proposes to use native plant species where landscaping is warranted, with special consideration for drought tolerant and hardy native species. Therefore, no impacts to threatened or endangered flora species are anticipated, and no related conditions of approval are recommended.

c. Fauna: According to the flora and fauna survey report, native water and forest birds do not appear on the Ka'iwa Ridge. The 'Iwa or Great Frigate Bird have been observed above the nearby Lanikai coast and the 'ua'u kani have been found to nest on the nearby Mokulua Islands, a seabird nesting sanctuary. Further, a letter from the USFWS stated there is no federally designated critical habitat within the immediate vicinity of the proposed Project.

Federally listed avian species that may occur or transit through the vicinity of the proposed Project site include the endangered Hawaiian petrel, the endangered Hawai'i distinct population segment of band-rumped storm-petrel, and threatened Newell's shearwater (hereafter collectively referred to as Hawaiian seabirds) These species may be impacted by Project implementation, particularly during construction activities. Specifically, artificial lighting can be disruptive to many avifauna species in their navigation, nesting, and reproductive cycles. No lighting is present or proposed at the Project site, and no nighttime construction will occur. Therefore, no impact to Hawaiian seabirds are anticipated, and no conditions of approval are recommended.

Federally listed mammal species that may occur or transit through the vicinity of the proposed Project site include the endangered Hawaiian Hoary Bat. The Hawaiian Hoary Bat has also been seen in nearby hillsides and therefore may be present along Ka'iwa Ridge. A letter from the USFWS noted that Hawaiian Hoary Bat roost in woody vegetation across all islands and will leave their young unattended in trees and shrubs when they forage. If trees or shrubs 15 ft. or taller are cleared during the pupping season, June 1 through September 15, there is a risk that young bats could inadvertently be harmed or killed, since they are too young to fly or move away from disturbance. Hawaiian Hoary Bat forage for insects from as low as three ft. to higher than 500 ft. above the ground and can become entangled in barbed wire used for fencing. Therefore, woody plants, trees, and shrubs greater than 15 ft. tall should not be removed or otherwise disturbed during pup rearing season, and barbless fencing should be used for all fence

construction. The Project does not propose the use of barbed fencing at any time during the execution of construction and post-construction activities. Nonetheless, these measures are recommended as conditions of approval.

d. Invasive Species: According to the O'ahu Invasive Species Committee (OISC) website, there are several invasive flora and fauna species being targeted for eradication on O'ahu. Flora species include cane tibouchina, cape ivy, devil weed, fireweed, glory bush, himalayan blackberry, miconia, naio thrips, pampas grass, and the fungi that cause rapid 'ōhi'a death. Fauna species include coconut rhinoceros beetles, coquí frogs, and little fire ants. The OISC provides protocols for decontamination in the event these species are encountered, as well as protocols to prevent the spread of these species. These measures should be conditions of approval.

Upon implementation of the above-listed conditions, significant impacts related to sensitive flora and fauna species and invasive species are not anticipated to occur.

2. Reefs, Beaches, and Coastal Dunes: The Project's potential impacts to reefs, beaches, and coastal dunes are discussed in Section H, below.

3. Solid and Liquid Waste Treatment and Disposition: The Project will be required to comply with existing regulations and implement BMPs to minimize potential air and water quality impacts associated with soil disturbance and stormwater runoff. The Project does not propose any liquid or solid waste disposal components, and none are present on the site. Therefore, no impacts related to solid and liquid waste removal or disposition are anticipated, and no related conditions of approval are recommended.

Upon implementation of the recommended conditions, along with standard water quality and erosion BMPs, potential impacts to coastal ecosystems will be mitigated.

E. Economic Uses

Development within the SMA should consist of facilities and improvements important to the State's economy, and 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 within the SMA.

Implementation of the Project will result in a temporary increase in jobs and economic activity during construction through the rental and purchase of equipment, materials, and supplies. Should the anticipated reservation system include entry fees, the Project could result in a beneficial effect to the DLNR. Should the Project's safety improvements result in less injuries and rescues, this may also result in a beneficial economic effect. Otherwise, the proposed trail improvements are anticipated to result in minimal changes to the State's economy. Therefore, no related conditions of approval are recommended.

F. Coastal Hazards

Development within the SMA should reduce impacts of coastal hazards on life and property, and must be designed to minimize impacts from landslides, erosion, sea level rise, siltation, or failure in the event of earthquake.

1. Flooding: The Project site is located within Flood Zone X, which is outside of the flood hazard area (see Exhibit F). Development within Flood Zone X is not subject to compliance with ROH Chapter 21A, the Special Flood Hazard Areas Ordinance. Therefore, no flood-related impacts are anticipated, and no conditions of approval specific to flood zone compliance are recommended.

2. SLR: Based on a review of the University of Hawai'i Pacific Island Ocean Observing System Hawai'i SLR Viewer, the Project site is not within an area projected to be impacted by 3.2 ft. of SLR by 2100 or sooner (see Exhibit J). The site is elevated approximately 80 to 565 ft. above MSL. Therefore, no SLR-related impacts are anticipated, and no conditions of approval specific to SLR are recommended.

3. Storm Surge: The National Storm Surge Hazards Maps indicate that the Project site is located outside of the area projected to be impacted by storm surge during hurricane events up to Category 4. As such, implementation of the Project is not anticipated to increase the potential for adverse impacts related to hurricane storm surge over the existing condition. Therefore, no conditions of approval specific to storm surge are recommended.

4. Tsunami: The entirety of the Project site is located outside of the extreme tsunami evacuation zone. During a tsunami warning, evacuation requirements will be enforced based on guidelines issued by the Department of Emergency Management. As such, no conditions specific to tsunami events are recommended.

G. Managed Development and Public Participation

The development review process should stimulate public awareness, education, and participation in coastal management.

The public was made aware of the Project and was given the opportunity to review the proposed Project prior to and during processing of the FEA and the SMA Major Permit application. The results of outreach during the HRS Chapter 343 process, including the natural design of the Project and the creation of a community stewardship program, were incorporated into the FEA/FONSI.

Prior to submittal of the SMA application to the DPP, on November 6, 2024, the Agents sent written notification to all adjoining and nearby property owners that the Project would be presented before the KNB No. 31 on November 7, 2024. The Project was presented at this KNB meeting, and again on December 5, 2024. The presentation addressed the details of the Project that had been incorporated as a result of community input received during the numerous community meetings held on the Project, as well as comments received during the HRS Chapter 343 review process. Board members inquired, and the Applicant responded, about the following items:

- Improvements to the pillboxes themselves (none);
- Project cost (phased with $900,000 allocated for the initial slope stabilization);
- Parking management (out of DLNR jurisdiction, but they will advertise taking the bus or walking from Kailua Beach Park)
- Proposed trail switchback materials (boulders with a hardened trail surface and native plant revegetation); and
- Provision of restrooms or other facilities (none, but will be stated on the website and reservation system, and community stewards will be on-hand to explain this information).

This testimony has been considered in the analysis of this report.

Upon acceptance of the application, the application materials were posted on the DPP website for public review. During the SMA review processes, the DPP

informed neighbors within a 300-ft. radius of the Project site as well as interested community groups and interested parties of the Project and Public Hearing. Three comment letters were received via email, two supporting trail improvements and also expressing ongoing community issues, and one from the Office of Hawaiian Affairs requesting continued involvement with the Native Hawaiian community. These letters and comments received have been included in the Project File and incorporated into the Analysis Section, as appropriate.

The DPP conducted a Public Hearing on the SMA Major Permit application at 10:30 a.m. on Wednesday, January 15, 2025, at the Fasi Municipal Building, 6th Floor Conference Room. Notices of the application and public hearing were published in the December 25, 2024, Honolulu Star-Advertiser. The hearing was attended in person by two Agents, one representative of the Applicant, two members of the public, and DPP staff. A few members of the public attended the hearing by phone. The Agent presented the Project, and described the proposed Project versus the existing condition of the Project site. The two community members in attendance in person expressed support for the Project, and for implementing the erosion control components as soon as possible. One community member in attendance by phone expressed support for the Project with some concerns about alternative access during construction. A recording of the public hearing is available upon request. Additional opportunities for public input will be available during the City Council meetings. No related conditions of approval are recommended.

H. Beach and Coastal Dune Protection

Development within the SMA should facilitate beach management and protection by safeguarding beaches and coastal dunes for public use and recreation, the benefit of ecosystems, and use as natural buffers against coastal hazards. New structures should be located mauka of the shoreline setback line to conserve open space, minimize interference with natural shoreline processes, and minimize the loss of improvements due to erosion.

The Project site is not a shoreline lot or underlain by soils characterized as beaches or coastal dunes. Therefore, no impacts to beaches or coastal dunes are anticipated, and no related conditions of approval are recommended.

I. **Marine and Coastal Resources**

Development within the SMA should promote the protection, use, and development of marine and coastal resources to ensure that these resources are ecologically and environmentally sound and economically beneficial. Impacts on water resources, beaches, coastal dunes, and scenic or recreational amenities resulting from the construction of structures must be minimized. Development within wetland areas should be limited to activities that are dependent on or enhance wetlands, or are otherwise approved by appropriate State and federal agencies.

The Project site is not a shoreline lot, and the Project does not involve the use or management of marine resources. The closest surface and marine waters to the subject property consist of the Pacific Ocean, located approximately a quarter mile to the east of the site. The Pacific Ocean in the Project vicinity is identified as Estuarine and Marine Wetlands (see Exhibit G). The Project is not anticipated to result in adverse impacts to these marine waters or wetlands, as the Project is subject to the City's *Rules Relating to Water Quality, Rules Relating to Storm Drainage Standards*, and other applicable regulations, compliance with which will be confirmed during the building permit review process. Project implementation is intended to manage the use of the existing trail and reduce the erosion and runoff that may eventually wash down into the ocean. Therefore, no conditions of approval are recommended in relation to protection of marine and coastal resources.

J. **Cumulative Impact or Significant Effect and Compelling Public Interest**

Development within the SMA should not have any cumulative impact or significant effect, unless minimized to the extent practicable and clearly outweighed by public health, safety, or other compelling public interest.

Substantial or cumulative negative environmental impacts associated with the implementation of the Project along with other past, present, and reasonably foreseeable projects in the Project vicinity are not anticipated, so long as the recommended conditions of approval are implemented. The Project site and other lots within 500 ft. of the Project site perimeter are zoned for residential and preservation uses and are limited based on the associated development standards of ROH Chapter 21. The subject property along with the surrounding properties in all directions are also located within the SMA, which requires any activity meeting the definition of development to undergo review for impacts to the sensitive coastal resources previously described in this report.

Three past development projects were identified over a five-year span and within a 500-ft. radius of the parcels on which the Project is located (see Exhibit K). These projects include a cafetorium addition at Ka'ohao Elementary School, and two improvement projects at Kailua Beach Park. One reasonably foreseeable

project, the Smythe One-Family Dwelling (Smythe Project), was identified within a 500-ft. radius of the Project site. SMA Major Permit Application No. 2024/SMA-117 for the Smythe Project is being concurrently processed with this SMA Major Permit application. The Smythe Project consists of the construction of a new one-family dwelling near the eastern trailhead on Ka'elepulu Drive. The potential for impacts to SMA resources associated with the Smythe Project and the other development projects are being or have been evaluated during review of their SMA Permit applications. Where necessary, conditions of approval are recommended. The potential for site-specific or cumulatively considerable impacts associated with the Project have been evaluated herein, and where necessary, conditions of approval are recommended. Therefore, upon implementation of the recommended conditions of approval and compliance with applicable regulatory requirements, it is not anticipated that the Project will contribute to a significant cumulative impact to SMA resources.

In regard to the Project combined with other reasonably foreseeable projects in the vicinity, potential cumulative impacts to SMA resources could occur if the projects collectively resulted in damage to the quality of water in the nearby ocean or Lanikai Beach, excessive erosion or alteration of landforms, and/or the loss of unknown historic or cultural resources that may be present in the area. However, because these projects are all required to undergo individual SMA review addressing these issues, and because they must also comply with regulatory requirements and site-specific conditions of approval, their potential contribution to cumulatively significant impacts is considered low. Given this, no conditions of approval specific to cumulative impacts are recommended.

K. Consistency with Plans and Regulations

Development within the SMA must be consistent with the general plan, development plans, sustainable communities plans, and zoning ordinances; provided that a finding of inconsistency does not preclude concurrent processing of amendments to applicable plans or a zone change.

The proposal is generally consistent with the applicable plans and regulations, as detailed below.

1. ROH Chapter 21, Land Use Ordinance (LUO): The Project does not propose the construction of any structures that would be subject to the development standards of the LUO. Any proposed signage would be for directional and educational purposes, and considered "public signs," which do not require sign permits. Should any future structures be proposed as part of implementation of the strategic management plan, a thorough review of the plans for compliance with the Residential and Preservation District development standards and other LUO regulations will be conducted during the building permit review process. Therefore, no conditions of approval related to the LUO are recommended.

2. KPSCP: The Project is generally consistent with the KPSCP. The KPSCP Land Use Map identifies the Project site as "Low-Density Residential Land" within the Community Growth Boundary, and "Preservation Area" outside of the Community Growth Boundary. The most applicable KPSCP policies for open space preservation and historic and cultural resources (i.e. SMA resources) are as follows:

Open Space Preservation:

- Protect endangered species and their habitats;
- Balance the need for public safety, the protection of property, and the desire for architectural embellishments with the need to conserve energy and the protection of wildlife and human health from adverse effects of outdoor night lighting;
- Protect scenic beauty and scenic views and provide recreation;
- Promote access to shoreline and mountain areas; and
- Prevent development in areas susceptible to landslides and similar hazards.

Historic and Cultural Resources:

- Preserve significant historic features from earlier periods;
- Retain significant vistas associated with archaeological features;
- Implement in situ preservation and appropriate protection measures for sites that have high preservation value because of their good condition or unique features; and
- Determine the appropriate treatment for a historic site by the particular qualities of the site and its relationship to its physical surroundings.

The Project site is identified in part as a preservation area, with prominent land features and continuous views toward the Pacific Ocean. The trail is designated as a public trail, and Podmore Station is identified as a singular historic site. No streams or wetlands are identified at the Project site. Project implementation would not result in any change to shoreline or recreational access, and would improve access to a public recreational trail. The proposed trail improvements and strategic management plan are generally consistent with the KPSCP. Therefore, no additional conditions of approval related to KPSCP compliance are recommended.

3. O'ahu General Plan (GP): The Project is generally consistent with the O'ahu GP. The O'ahu GP identifies the Project area as an urban fringe area and a non-designated area. The most applicable O'ahu GP policies for SMA resources are as follows:

Natural Environment and Resource Stewardship

Objective A – To protect and preserve the natural environment.

- Objective A, Policy 1 – Protect O'ahu's natural environment, especially the shoreline, valleys, ridges, watershed areas, and wetlands from incompatible development;

- Objective A, Policy 2 – Seek the restoration of environmentally damaged areas and natural resources;

- Objective A, Policy 4 – Give due consideration to natural features and hazards such as slope, inland and coastal erosion, flood hazards, water-recharge areas, and existing vegetation, as well as to plan for coastal hazards that threaten life and property;

- Objective A, Policy 6 – Design and maintain surface drainage and flood-control systems in a manner which will help preserve natural and cultural resources;

- Objective A, Policy 8 – Protect plants, birds, and other animals that are unique to the State of Hawai'i and O'ahu, and protect their habitats; and

- Objective A, Policy 4 – Increase public awareness, appreciation, and protection of O'ahu's land, air, and water resources.

Objective B – To preserve and enhance natural landmarks and scenic views of O'ahu for the benefit of both residents and visitors as well as future generations.

- Objective B, Policy 1 – Protect the Island's significant natural resources: its mountains and craters; forests and watershed areas; wetlands, rivers, and streams; shorelines, fishponds, and bays; and reefs and offshore islands;

- Objective B, Policy 2 – Protect O'ahu's scenic views, especially those seen from highly developed and heavily traveled areas; and

- Objective B, Policy 4 – Protect and expand public access to the natural and coastal environment for recreational, educational, and

cultural purposes, and maintain access in a way that does not damage natural, historic, or cultural resources.

Culture and Recreation

Objective A – To foster the multi-ethnic culture of Hawai'i and respect the host culture of the Native Hawaiian people.

- Objective A, Policy 1 – To foster the multi-ethnic culture of Hawai'i and respect the host culture of the Native Hawaiian people;
- Objective A, Policy 2 – Promote the preservation and enhancement of local cultures, values and traditions; and
- Objective A, Policy 3 – Encourage greater public awareness, understanding, and appreciation of the cultural heritage and contributions to Hawai'i made by O'ahu's various ethnic groups.

Objective B – To protect, preserve and enhance O'ahu's cultural, historic, architectural, and archaeological resources.

- Objective B, Policy 2 – Identify and, to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance;
- Objective B, Policy 4 – Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts;
- Objective B, Policy 5 – Seek public and private funds, and encourage public participation and support, to protect, preserve and enhance social, cultural, historic, architectural, and archaeological resources; and
- Objective B, Policy 7 – Encourage the protection of areas that are historically important to Native Hawaiian cultural practices and to the cultural practices of other ethnicities, in order to further preserve and continue these practices for future generations.

Objective D – To provide a wide range of recreational facilities and services that are readily available to all residents and visitors alike, and to balance access to natural areas with the protection of those areas.

- Objective B, Policy 2 – Develop, maintain and expand a system of regional parks and specialized recreation facilities, based on the cumulative demand of residents and visitors;

- Objective B, Policy 6 – Ensure that public recreational facilities balance the demand for facilities against capital and operating cost constraints so that they are adequately sized and properly maintained;

- Objective B, Policy 7 – Ensure and maintain convenient and safe access to beaches, ocean environments and mauka recreation areas in a manner that protects natural and cultural resources;

- Objective B, Policy 10 – Utilize our unique natural environment in a responsible way to promote cultural events and activities and maintain cultural practices; and

- Objective B, Policy 12 – Provide for safe and secure use of public parks, beaches, and recreation facilities.

Each of these resource areas are discussed above, and where necessary, conditions of approval are recommended. Given this, the proposed trail improvements and management plan are generally consistent with the O'ahu GP. Therefore, no conditions of approval related to O'ahu GP compliance are recommended.

5. Shoreline Setback Ordinance, ROH Chapter 26: The Project site is not a shoreline lot or otherwise regulated as a shoreline lot. Therefore, no impact regarding compliance with ROH Chapter 26 will occur, and no conditions of approval are recommended.

IV. CONCLUSIONS OF LAW

The proposed development was reviewed under the provisions of ROH §§ 25-3.1 and 25-4.1, and HRS §§ 205A-2 and 205A-26(1), and was found to be consistent with established SMA objectives, policies, and guidelines, provided the appropriate conditions of approval are imposed. Based on the analysis, the proposed Project will not adversely impact SMA resources, provided that appropriate mitigative conditions are implemented as recommended.

V. RECOMMENDATION

Based on the preceding Analysis and Conclusions of Law, it is recommended that this application for a SMA Major Permit be **APPROVED**, subject to the following conditions:

A. Development must be in general conformity with the Project as described in the DPP's findings and recommendation, referenced above, and as depicted in Exhibits A, through D, E-1 through E-9, and F through K, attached hereto and incorporated by reference herein. Any change in the size or nature of the Project that may have a significant effect on coastal resources addressed in ROH Chapter 25, HRS Chapter 205A, or both, will require a new application and SMA Major Permit. Any change that does not have a significant effect on coastal resources will be considered a minor modification and may be permitted under the adopted resolution, upon review and approval by the Director of the DPP.

B. In order to minimize impacts to known and unknown archaeological, historic, and cultural resources that may be present on the Project site, the Applicant shall comply with the following:

If, during construction, any previously unidentified archaeological sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, the Applicant shall stop work, protect the find from further disturbance, and contact SHPD immediately. Work in the immediate area must be stopped until SHPD is able to assess the impact and make further recommendations for mitigative activity.

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

C. In order to minimize impacts to endangered, protected, or threatened avian, fauna that may frequent or traverse the vicinity of the Project site, the Applicant is responsible for the following:

1. All Project site work and construction activities are limited to daylight hours (sunrise to sunset);

2. Barbless fencing must be used for all fence construction to avoid the entanglement of Hawaiian Hoary Bats; and

3. Woody plants greater than 15 ft. in height may not be disturbed, removed, or trimmed during the Hawaiian Hoary Bats birthing and pup rearing season (June 1 through September 15);

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

D. To minimize the spread of invasive pathogens, pests, or plants that may harm native species and ecosystems, the Applicant is responsible for the following:

1. The importation of fill material must be minimized to the extent possible. The Project may require the import of rocks or boulders for structural stability or safety, but no importation of fill soil will be required;

2. Prior to and during construction activities, when personnel, materials, vehicles, or equipment are being relocated from one location to another, and when construction activities have concluded, materials, vehicles, and equipment should be cleaned of excess soil and debris to minimize the risk of spreading invasive species using the current recommendations from the OISC;

3. During the initial pre-construction meeting, or otherwise prior to the initiation of any construction activities, and upon arrival of any new workers to the Project site, the Applicant (or their representative) shall distribute a copy of the most recently updated OISC "Decontamination Protocols for Prevention of Invasive Species" (Protocols) to all workers who will be present at the site, and/or post the Protocols in a visible location accessible to all on-site workers and delivery/haul-out contractors. All on-site workers shall be instructed to review the species photos and inspection/cleaning protocols prior to commencing work; and

4. If species on the OISC invasive species target list are encountered during construction activities, the Applicant shall immediately contact the OISC to report the species found. The current contact email and phone number for the OISC shall be visibly posted at the Project site. The Applicant shall implement any measures recommended by the OISC and/or the responsible State or Federal agency charged with eradication of the invasive species.

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

E. Approval of this SMA Major Permit does not constitute compliance with other City ordinances, including but not limited to the LUO and building and construction codes, or other governmental requirements, including but not limited to LUO-related approvals, and building, grading, and grubbing permit approvals, which are subject to separate review and approval. The Applicant is responsible for ensuring that the final plans for the Project approved under this SMA Major Permit comply with all applicable City ordinances and other governmental provisions and requirements.

Dated at Honolulu, Hawai'i, this 28th day of February, 2025.

Department of Planning and Permitting
City and County of Honolulu
State of Hawai'i

By _____
Dawn Takeuchi Apuna
Director

Enclosures: Exhibits A through D, E-1 through E-9, and F through K



EXHIBIT A - LOCATION MAP
SMA MAJOR PERMIT NO. 2024/SMA-128
for the
State of Hawaii
Department of Land and Natural Resources
KAIWA RIDGE TRAIL IMPROVEMENTS PROJECT

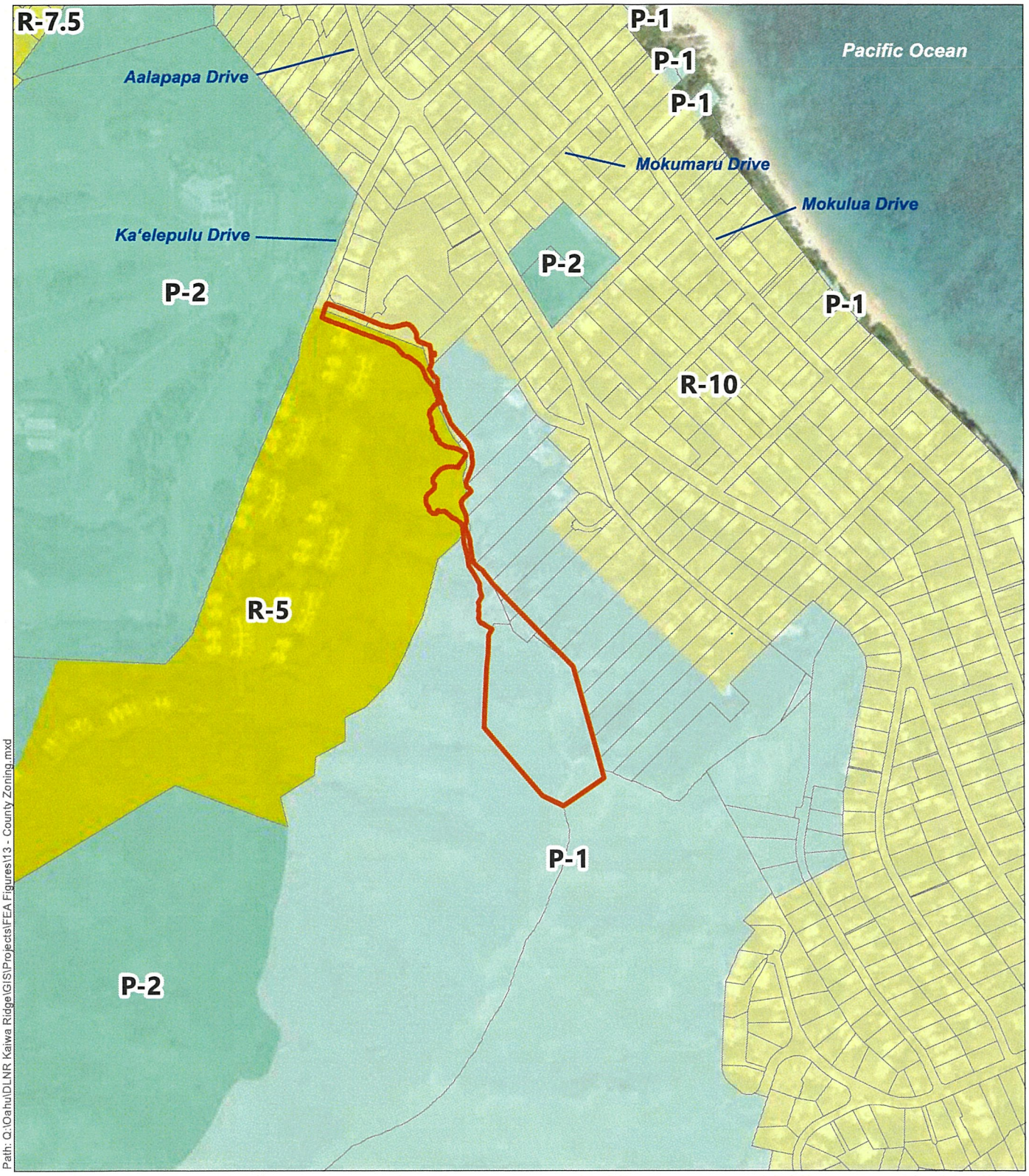
LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

North

Linear Scale (feet)
0 125 250 500

Source: City and County of Honolulu, 2022; Executive Order 3601, Department of Land and Natural Resources; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



Path: Q:\Oahu\DLNR Kaiwa Ridge\GIS\Projects\FEA Figures\13 - County Zoning.mxd

EXHIBIT B - ZONING MAP
2024/SMA-128

KA'IWA RIDGE TRAIL

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

County Zoning

- P-1
- P-2
- R-10
- R-7.5
- R-5

0 250 500

Source: City and County of Honolulu, 2022; ESRI Basemap.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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EXHIBIT C - STATE LAND USE DISTRICTS
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

State Land Use Districts

- Conservation
- Urban

KA'IWA RIDGE TRAIL

0 200 400 800

Source: City and County of Honolulu, 2022; Executive Order 3610, Department of Land and Natural Resources; State Land Use Commission, 2020; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



EXHIBIT D - SPECIAL MANAGEMENT AREA MAP
2024/SMA-128

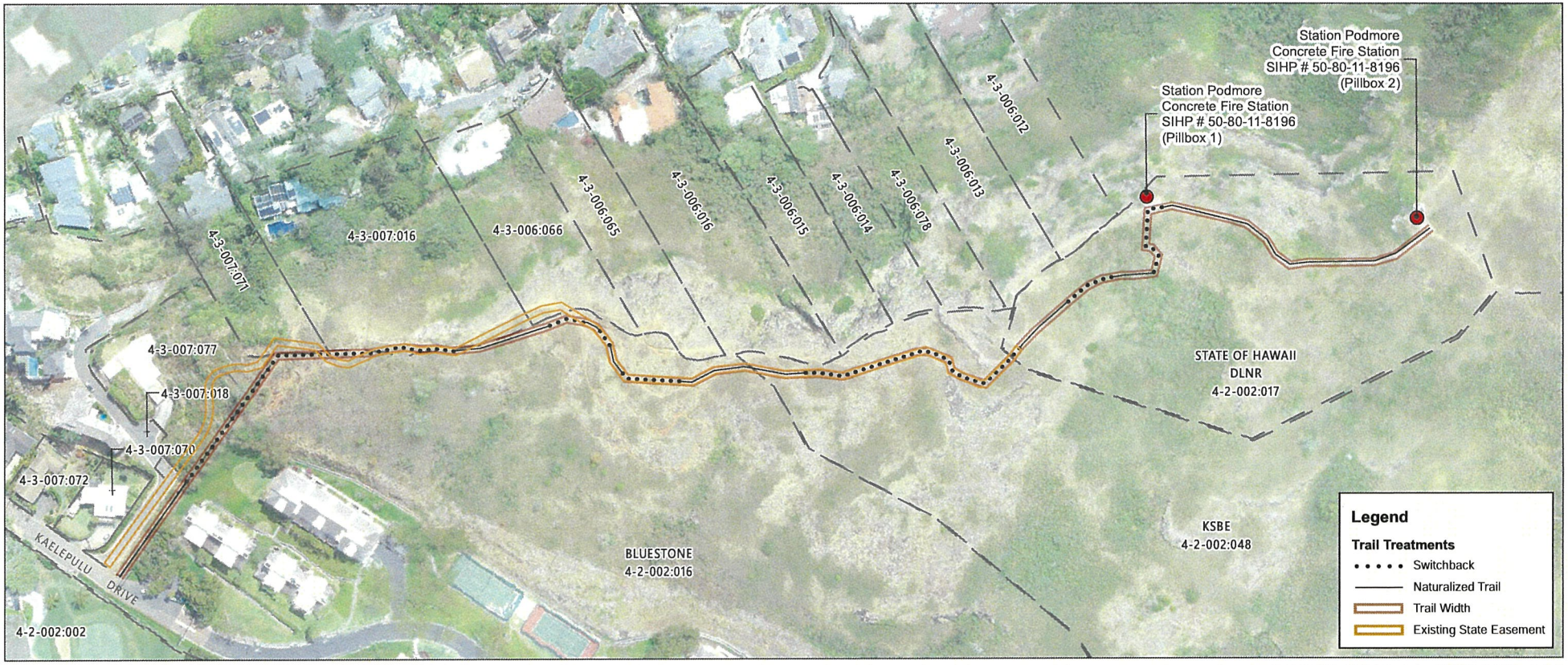
LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Special Management Area
- Tax Map Key Parcels

KA'IWA RIDGE TRAIL

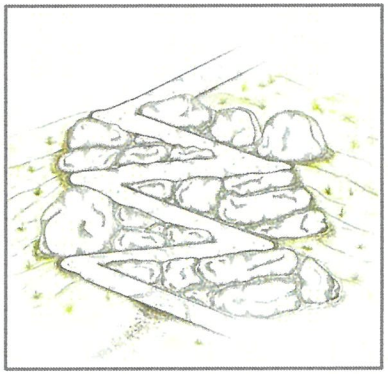
0 250 500 1,000

Source: City and County of Honolulu, 2022 & 2021; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

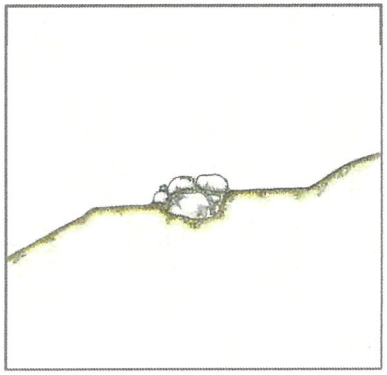




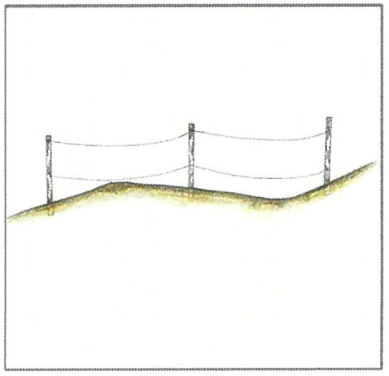
Switchback Type 1



Switchback Type 2



Switchback Trail Section



Naturalized Trail with Rolling Grade Dip & Symbolic Fence Typical Detail

EXHIBIT E-1 - SITE PLAN SUSTAINABLE TRAIL DESIGN 2024/SMA-128

Ka'iwa Ridge Trail

Department of Land and Natural Resources
Division of Forestry and Wildlife
Na Ala Hele

North

0 35 70 140

1 inch = 140 feet

Island of O'ahu

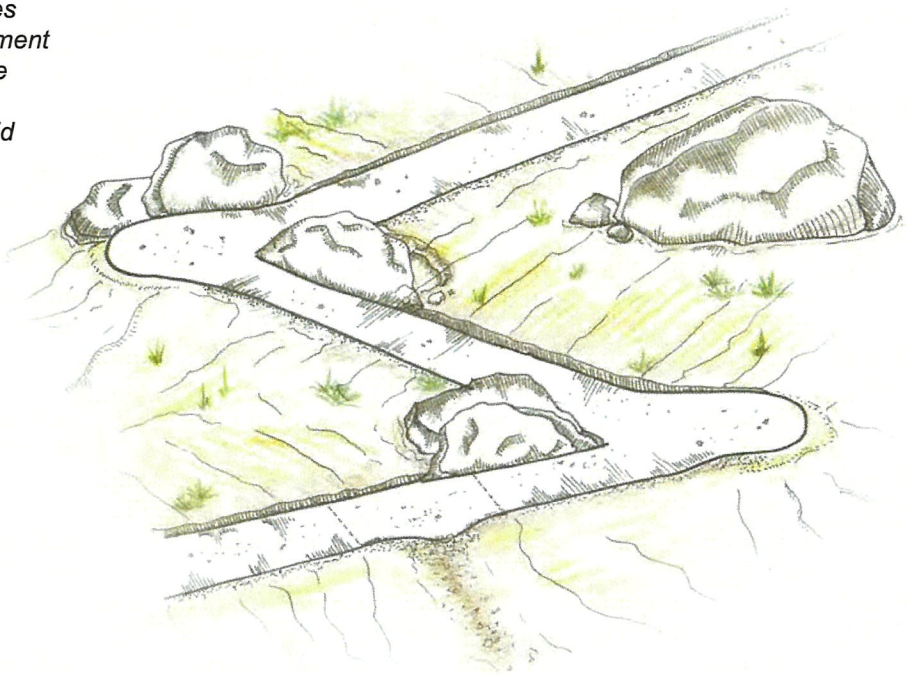
PBR HAWAII & ASSOCIATES, INC.

Credits: Sustainable Resources Group Int'l, Inc. 2019; City and County of Honolulu, 2019; Dudek, 2019.
Coordinate System: NAD 1983 StatePlane Hawaii 3 FIPS 5103 Feet

EXHIBIT E-2: TRAIL SWITCHBACK CONCEPTS
2024/SMA-128

Switchback Type 1

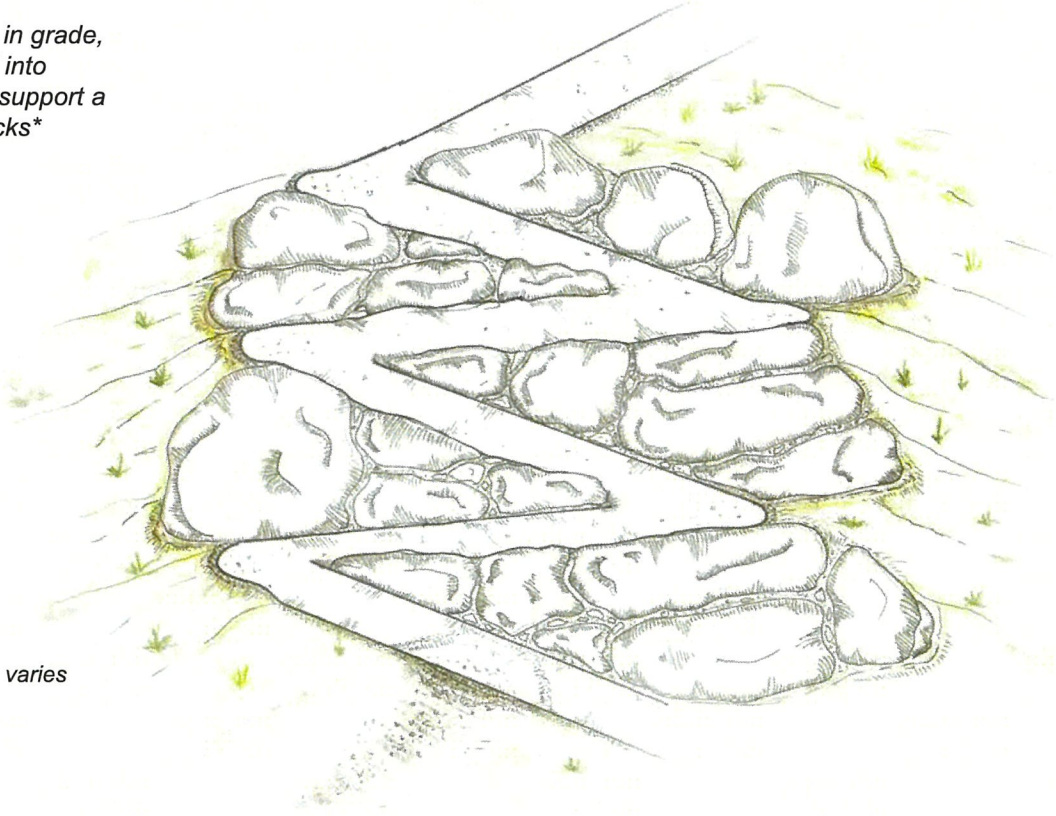
This type of switchback uses large boulders to reinforce varied grades and landings. Other trail management methods such as spillways can be placed in appropriate locations to promote directional run off to avoid worsening erosion.*



**switchback length and grade varies*

Switchback Type 2

*Where terrain may increse in grade, large boulders are stacked into retaining walls that lift and support a steeper series of switchbacks**



**switchback length and grade varies*

FIGURE E-3 - ROLLING GRADE AND SPILLWAY CONCEPTS (1)
2024/SMA-128

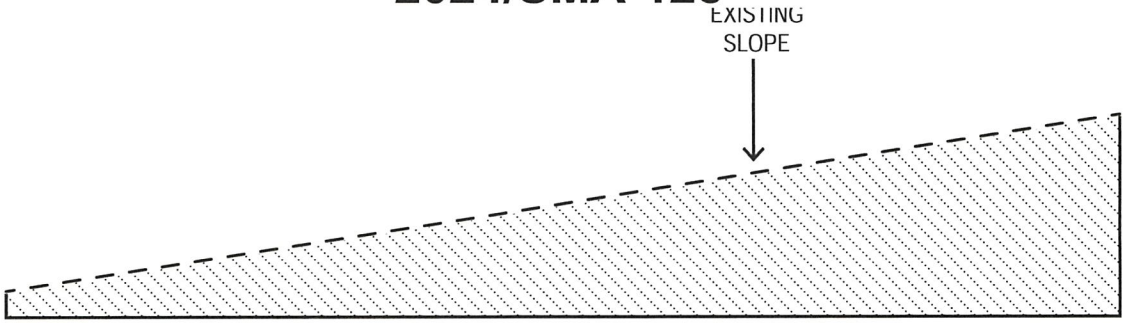


FIGURE A: EXISTING SLOPE SECTION

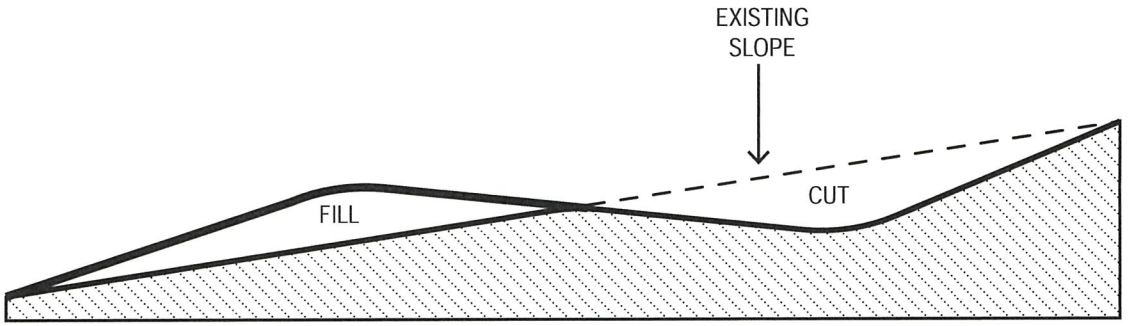


FIGURE B: CUT AND REMOVE MATERIALS FROM EXISTING SLOPE TO USE AS FILL TO CREATE A RAMP.

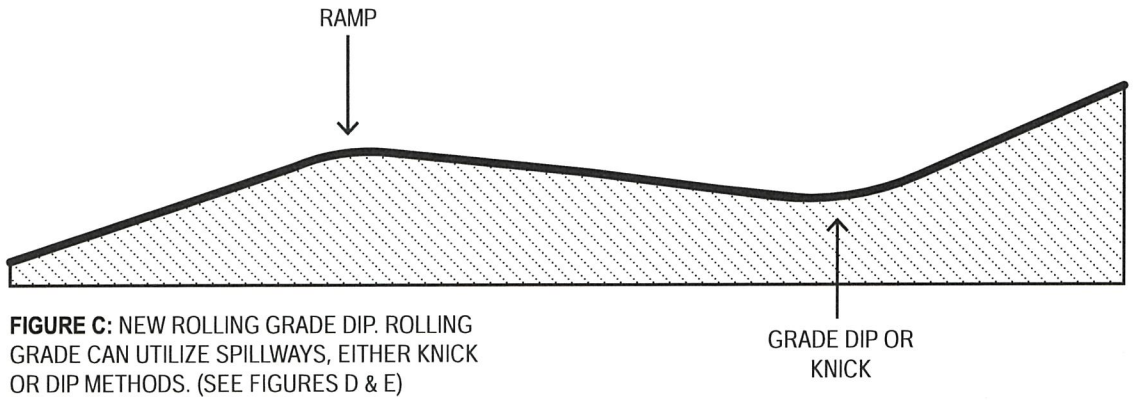


FIGURE C: NEW ROLLING GRADE DIP. ROLLING GRADE CAN UTILIZE SPILLWAYS, EITHER KNICK OR DIP METHODS. (SEE FIGURES D & E)

FIGURE E-4 - ROLLING GRADE AND SPILLWAY CONCEPTS (2)
2024/SMA-128

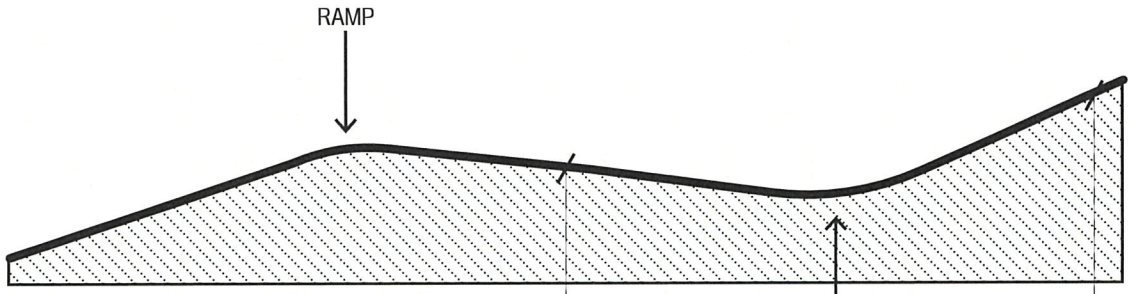


FIGURE C: NEW ROLLING GRADE DIP. ROLLING GRADE CAN UTILIZE SPILLWAYS, EITHER KNICK OR DIP METHODS. (SEE FIGURES D & E)

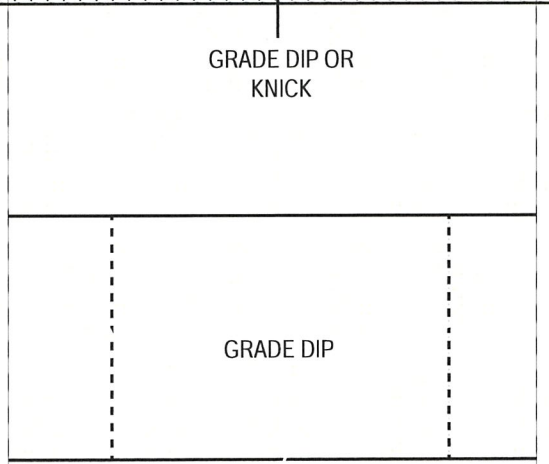


FIGURE D: PLAN VIEW OF A DIP SPILLWAY

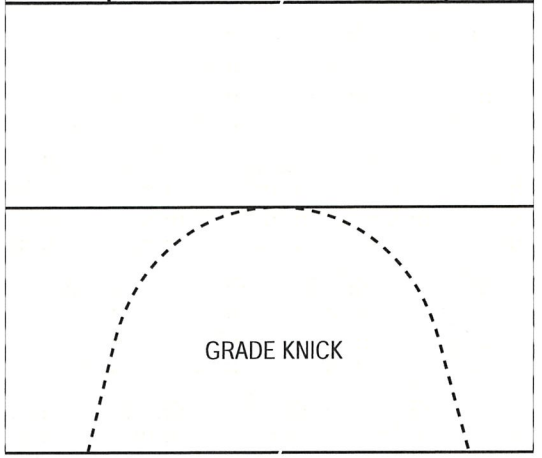


FIGURE E: PLAN VIEW OF A KNICK SPILLWAY

EXHIBIT E-5 - OUTSLOPE CONCEPTS
2024/SMA-128

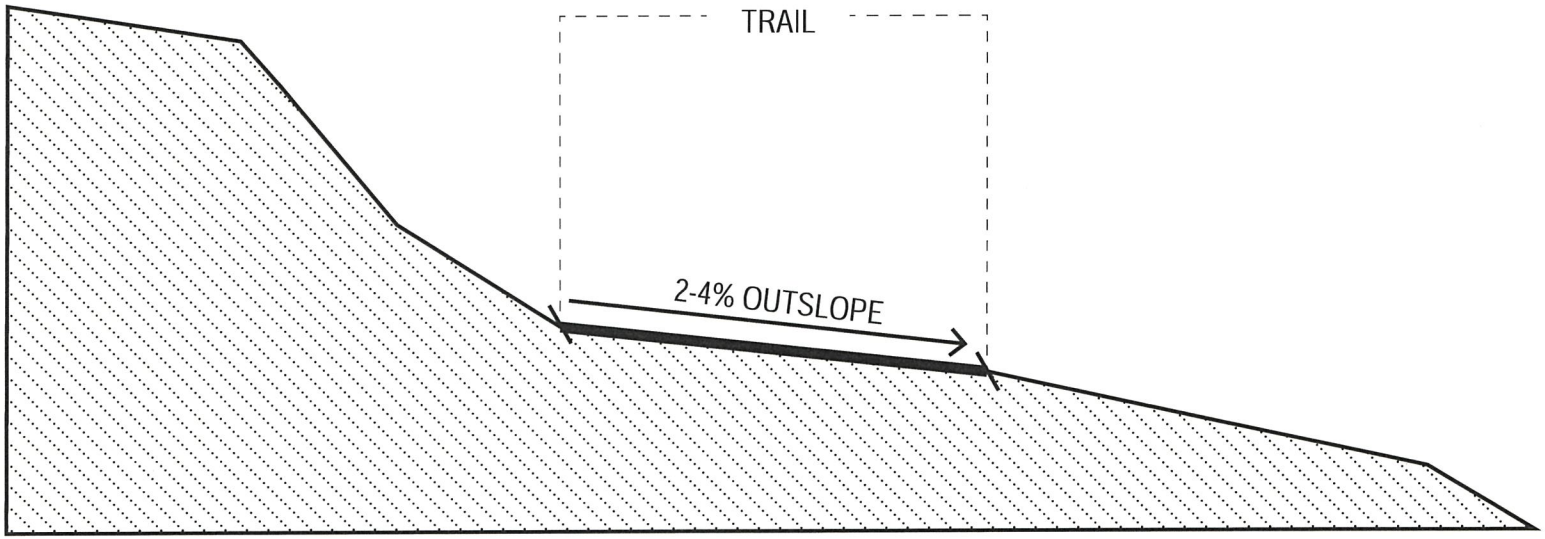


FIGURE F: OUTSLOPES ON A TRAIL ENCOURAGE WATER TO MOVE OFF THE TRAIL INSTEAD OF POOLING OR COLLECTING.

FIGURE E-6 - ROAD PROFILES FOR DRAINAGE AND STABILITY (1)
2024/SMA-128

FIGURE G: CROWNED FILL SECTION

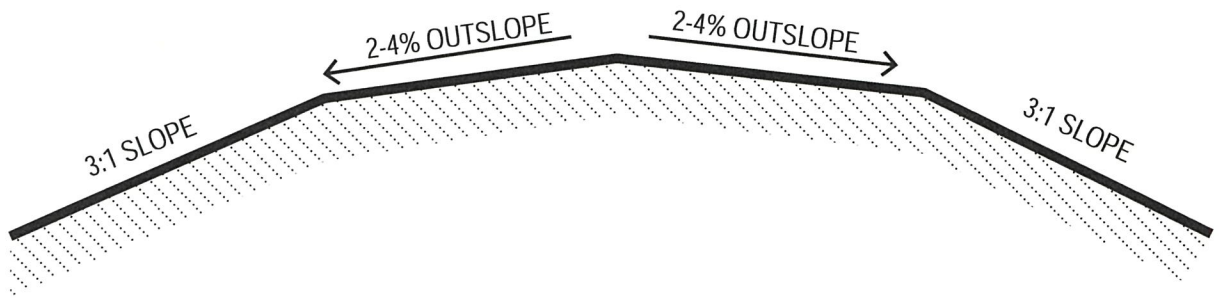


FIGURE H: OUTSLOPE SECTION

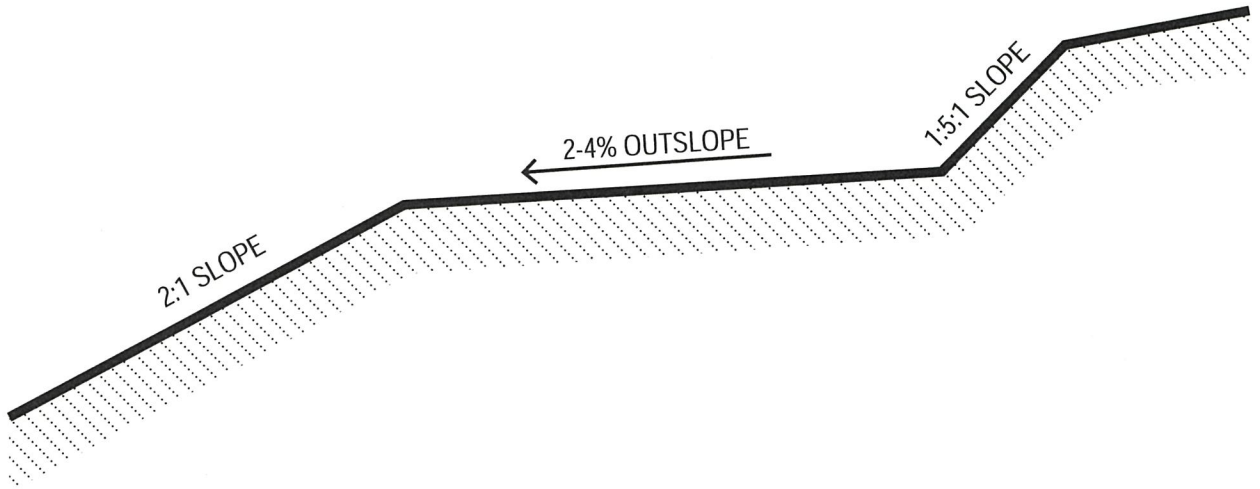


FIGURE E-7 - ROAD PROFILES FOR DRAINAGE AND STABILITY (2)
2024/SMA-128

FIGURE I: INSLOPE WITH DITCH SECTION

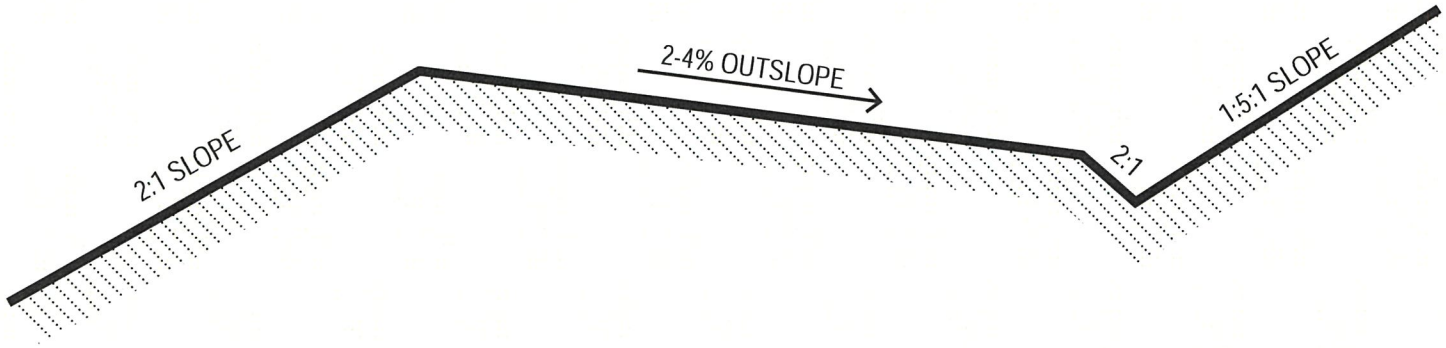


FIGURE J: CROWNED AND DITCHED SECTION

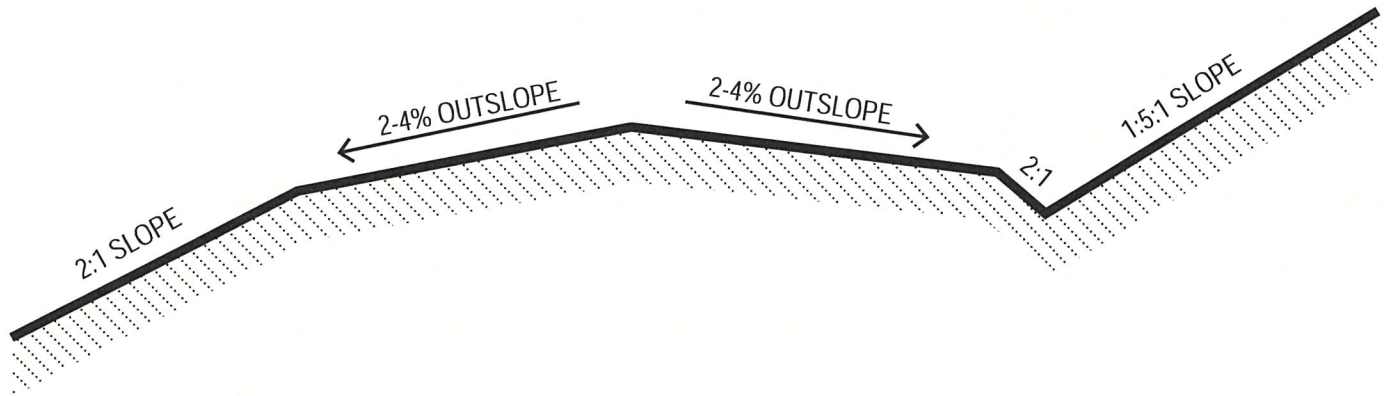
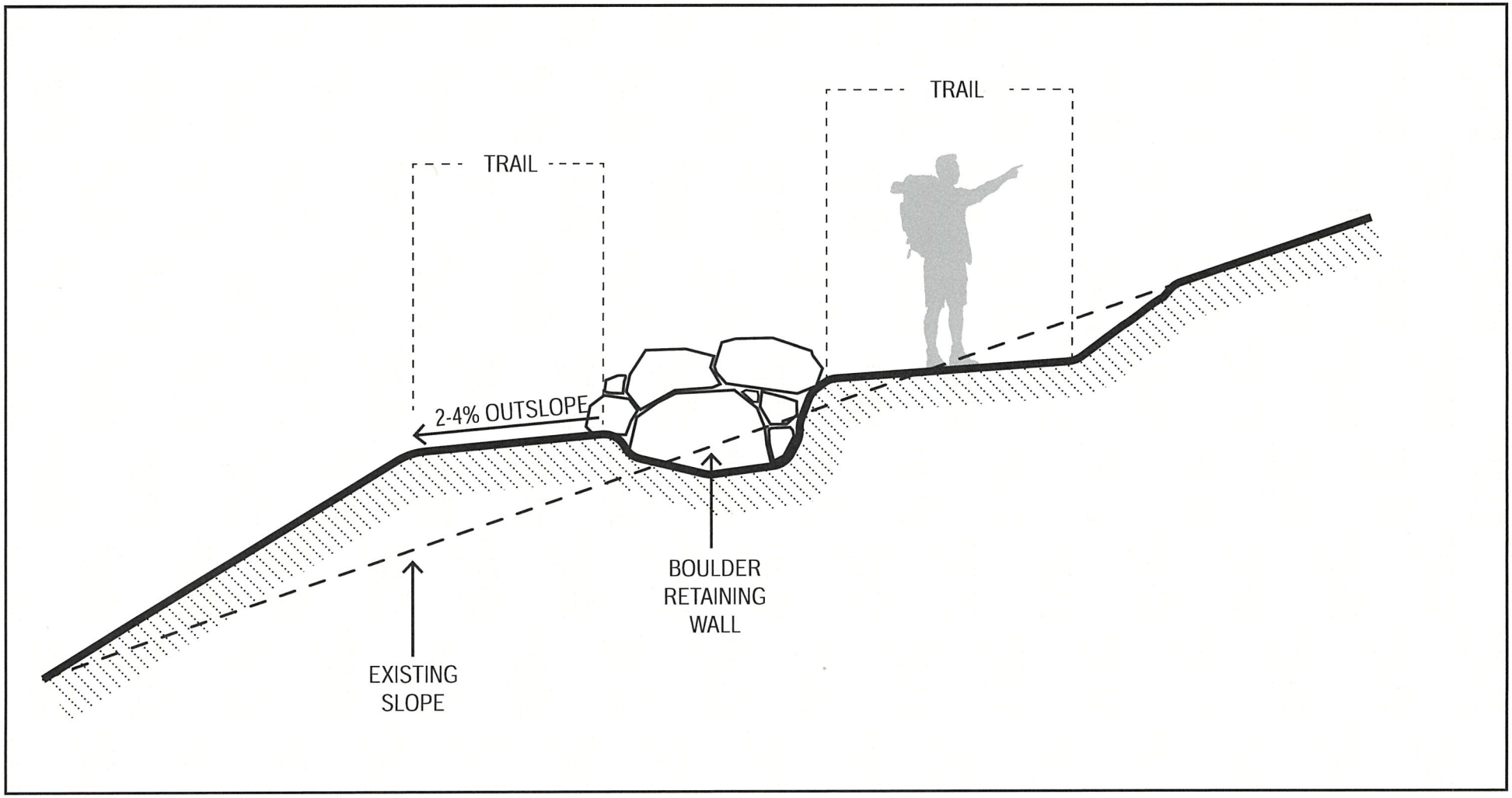


EXHIBIT E-8 - TYPICAL TRAIL SWITCHBACK SECTION
2024/SMA-128



NATIVE PLANT RESTORATION

Scan me

SUBMIT FEEDBACK HERE

BACKGROUND

- Soil conditions and the existing plant communities contribute to Ka'iwa Ridge's erosion problems.
- Vegetation on Ka'iwa Ridge is dominated by non-native, invasive species.
- Native flora constitute a mere 6% of the surveyed vegetation along the trail (LeGrande Biological, 2017).
- Soils on Ka'iwa Ridge are stony and rated "severe" by the National Resource Conservation Service. When interviewed for this project about restoration of the ridge, Kristen Kane of Hui o Ko'olaupoko, noted that soil replenishment will be one of the most challenging factors to re-establishing a native plant community.

RECOMMENDATIONS

- A plant palette consisting of native ground covers, shrubs and trees that can tolerate harsh conditions including drought, wind, and poor soils.
- A planting plan that includes erosion control measures suitable for steep slopes (see images on right side of board)
- Soil management and replenishment to establish out-plantings.
- Frequent trail maintenance and erosion-control measures.
- Continued community engagement and support to execute restoration goals.



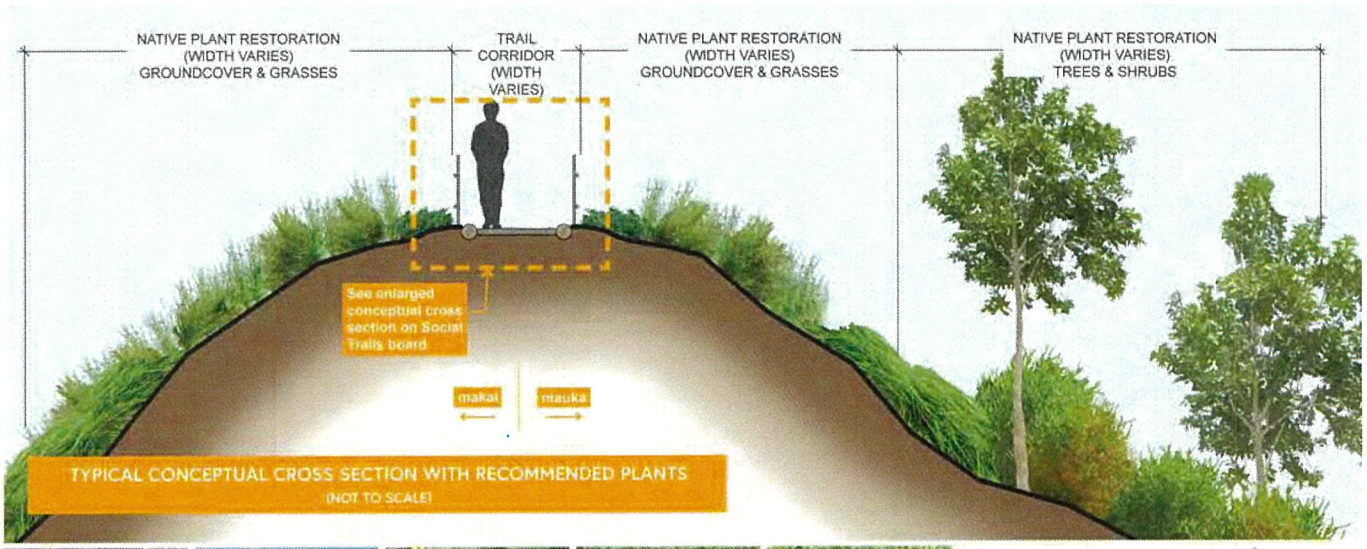
EXISTING CONDITIONS

Invasive plants such as:

- Haole Koa (Leucaena leucocephala)
- Kiawe (Prosopis pallida, Prosopis juliflora)
- Buffelgrass (Cenchrus ciliaris)
- Sourgrass (Digitaria insularis)
- Guinea grass (Panicum maximum)
- Pitaya/DragonFruit (Hylocereus undatus)
- Brazilian Jasmine (Jasminum fluminense)
- Christmas berry (Schinus terebinthifolius)







TYPICAL CONCEPTUAL CROSS SECTION WITH RECOMMENDED PLANTS
(NOT TO SCALE)



Pili Grass
Heteropogon contortus



Kawelu
Eragrostis variabilis



Ilima papa
Sida fallax



Pohinahina
Vitex rotundifolia



Naio
Myoporum sandwicense



Aalii
Dodonaea viscosa



Kou
Cordia subcordata

SUGGESTED PLANT LIST

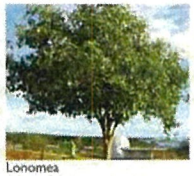
Type	Botanical Name	Common Name	Characteristics	Sun/Shade Requirements	Salt Spray/Wind Tolerance	Water Requirements	For Rainwater Basin
Tree	*Canthium odoratum*	Alani	Height: Medium - 20' to 40'. Width: 15' to 40'	Full Sun	Tolerant of both	dry-medium	
Tree	*Hibiscus tiliaceus*	Hau	Height: Small 15' to 30'. Width: 15' to 30'	Full Sun - Part Shade	Tolerant of both	Medium-wet	x
Tree	*Sapindus oahuensis*	Lonomea	Height: Medium - 30' to 45'. Width: 20' to 30'	Full Sun - Part Shade	Limited salt tolerance, good wind tolerant	dry-medium	
Tree	*Thespesia populnea*	Milo	Height: Medium - 25' to 50'. Width: 25' to 40'	Full Sun	Tolerant of both	dry-medium	
Shrub	*Chenopodium oahuense*	Aweoweo	Height: Small 2' to 5'. Width: 2' to 3'	Full Sun	Tolerant of both	Dry	
Shrub	*Dodonaea viscosa*	Aalii	Height: Medium - 4' to 7'. Width: 3' to 6'	Full Sun	Limited salt tolerance, good wind tolerant	dry-medium	
Shrub	*Myoporum sandwicense*	Naio	Height: Medium - 4' to 7'. Width: 4' to 7'	Full Sun - Part Shade	Tolerant of both	dry-medium	
Shrub	*Vitex rotundifolia*	Pohinahina	Height: Medium 3' to 10'. Width: 5' to 10'	Full Sun	Tolerant of both	dry-medium	
Grass	*Carex wahuensis*	Carex	Height: Low - 1' to 2.5'. Width: 2' - 3'	Part Shade	Limited salt tolerance, good wind tolerant	medium - wet	x
Grass	*Eragrostis variabilis*	Kawelu	Height: Low - 1' to 2'. Width: 1' to 2.5'	Full Sun	Limited salt tolerance, good wind tolerant	dry-medium	
Grass	*Heteropogon contortus*	Pili	Height: Low - 1' to 2'. Width: 1' to 2.5'	Full Sun	Tolerant of both	dry	
Ground cover	*Plumbago zeylanica*	Ilee	Height: Low - 1' to 2'. Width: 2' to 3'.	Full Sun - Part Shade	Tolerant of both	dry-medium	
Ground cover	*Sida fallax*	Ilima papa	Height: Prostrate - 6" to 1'. Width: 1' to 2'	Full Sun	Tolerant of both	dry-medium	
Ground cover	*Akulikuli*	Akulikuli	Height: Low - 1' to 2.5'. Width: 2' - 3'	Full Sun	Tolerant of both	dry-medium	
Ground cover	*Jacquemontia pentantha*	Kauhihuli	Height: Prostrate - 6". Width: 1' to 2'	Full Sun	Tolerant of both	medium-wet	x
Ground cover	*Vitex rotundifolia*	Pohinahina	Height: Low - 1' to 2'. Width: 2' to 3'	Full Sun	Tolerant of both	dry-medium	



Iliee
Plumbago zeylanica



Aweoweo
Chenopodium oahuense



Lonomea
Sapindus oahuensis



Naupaka Kahakai
Scaevola sericea



Akia
Wikstroemia urva-ursi



Milo
Thespesia populnea



Akulikuli
Sesuvium portulacastrum



Carex
Carex wahuensis



Hau
Hibiscus tiliaceus

EXHIBIT E-9 - NATIVE PLANT RESTORATION CONCEPTS
2024/SMA-128

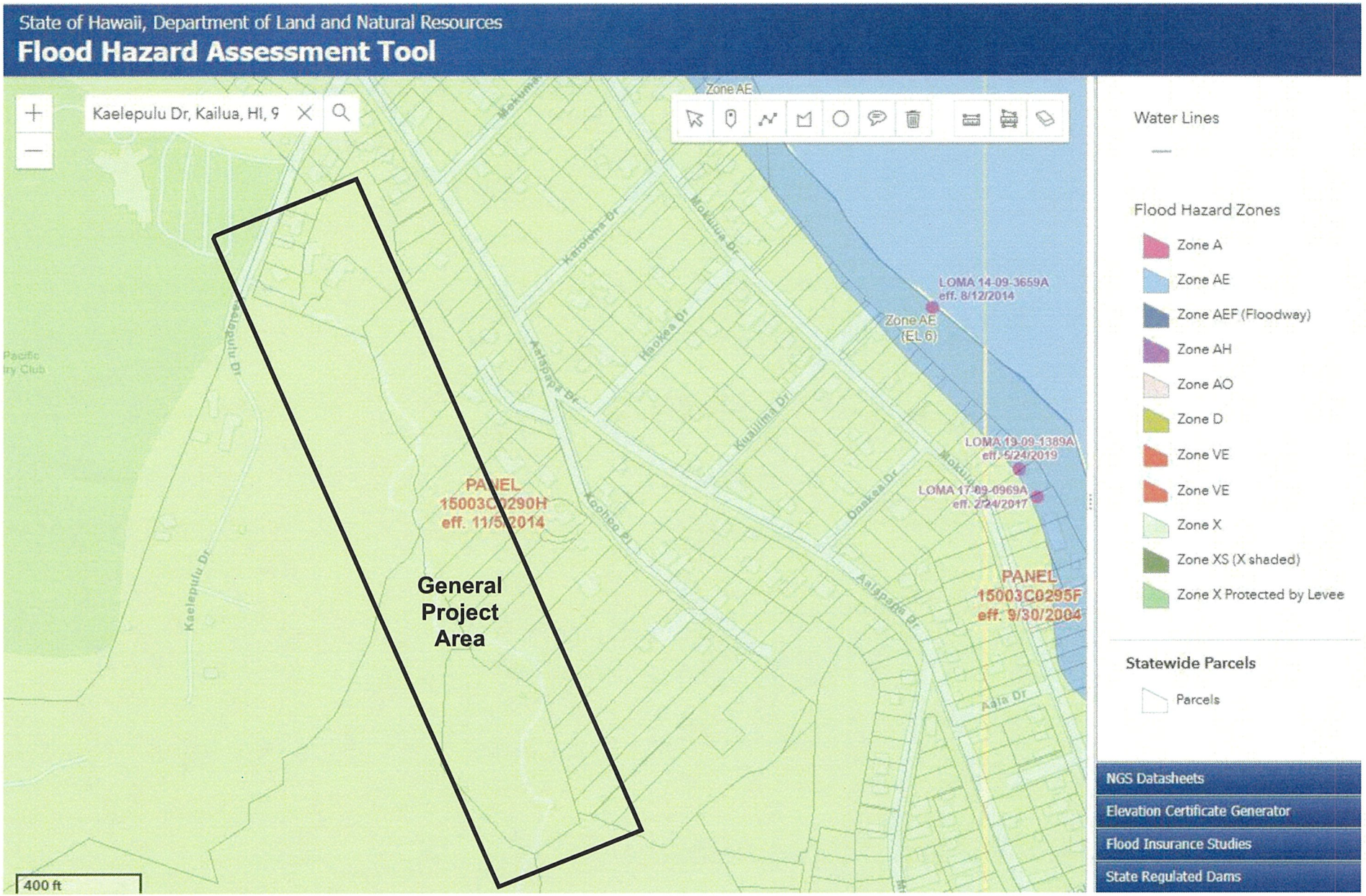


EXHIBIT F - FLOOD ZONE MAP
2024/SMA-128



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EXHIBIT G - WETLANDS
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary

Wetlands

- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Riverine
- Estuarine and Marine Deepwater

KA'IWA RIDGE TRAIL

Department of Land and Natural Resources — Island of Oahu

North

Linear Scale (feet)

0 350 700

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2022; USFWS National Wetland Inventory, 2019; ESRI Basemap

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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LEGEND

- Kaiwa Ridge Trail Action Location Boundary

NRCS Soil Survey

- BS: Beaches
- EmA: Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes
- JaC: Jaucas sand, 0 to 15 percent slopes, MLRA 163
- KTKE: Kokokahi very stony clay, 0 to 35 percent slopes
- KmA: Keaau clay, 0 to 2 percent slopes
- KtC: Kokokahi clay, 6 to 12 percent slopes
- Ms: Mokuleia loam
- Mt: Mokuleia clay loam
- PYF: Papaa clay, 35 to 70 percent slopes
- WkA: Waialua silty clay, 0 to 3 percent slopes
- rSY: Stony steep land

EXHIBIT H - NRCS SOIL MAP 2024/SMA-128

KA'IWA RIDGE TRAIL

0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2022; USDA NRCS, 2020. ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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EXHIBIT I - NRCS SOIL EROSION HAZARD MAP
2024/SMA-128

LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

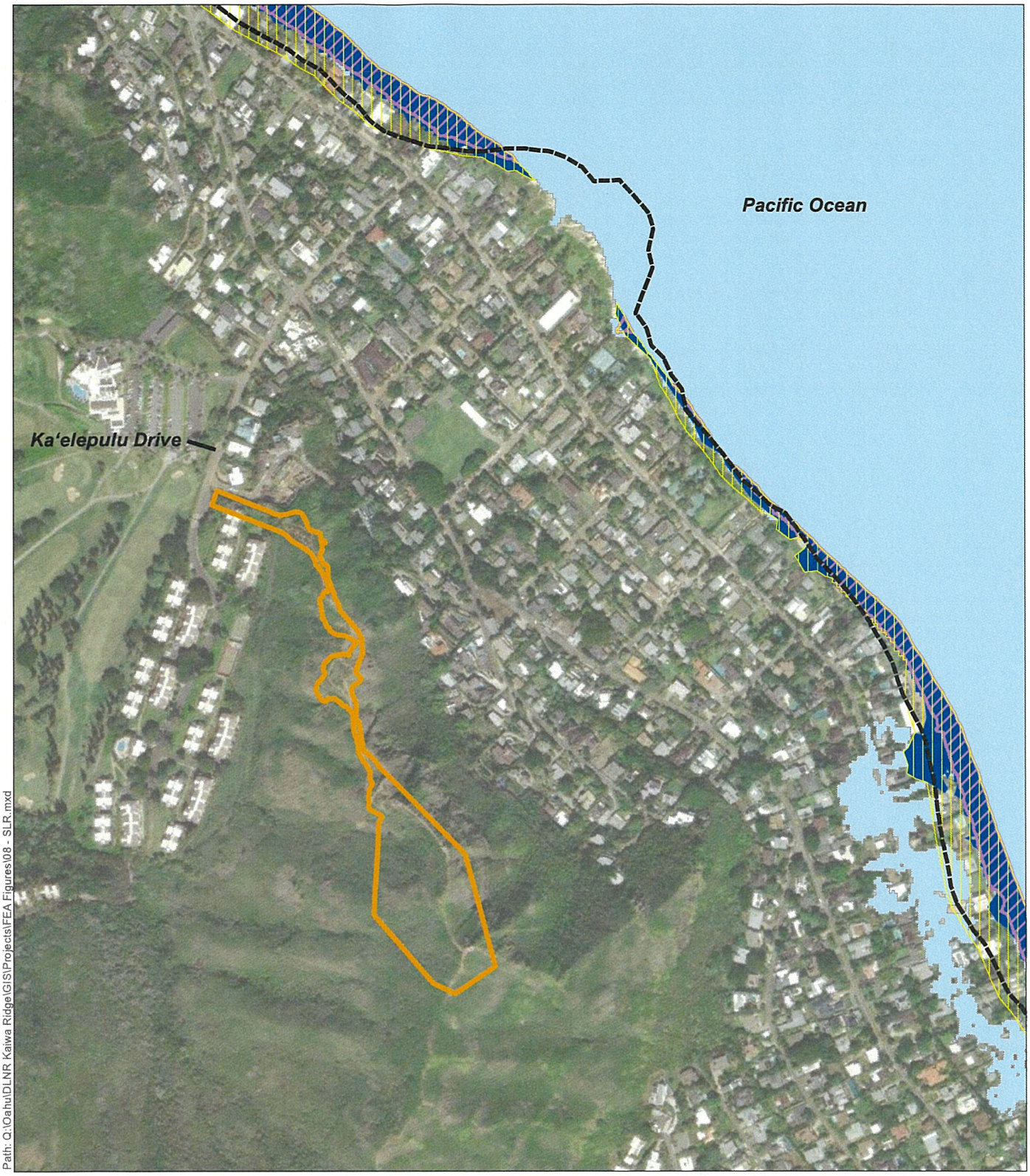
Source: NRCS Web Soil Survey, https://websoilsurvey.nrcs.usda.gov/

Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Department of Land and Natural Resources
North

Island of O'ahu

PBR HAWAII & ASSOCIATES, INC.



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EXHIBIT J - SEA LEVEL RISE EXPOSURE AREA
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Coastal Erosion with 3.2ft. Sea Level Rise
- Passive Flooding with 3.2ft. Sea Level Rise
- Wave Inundation with 3.2ft. Sea Level Rise
- 3.2ft. Sea Level Rise Exposure Area
- NOAA 6ft Sea Level Rise Scenario

KA'IWA RIDGE TRAIL

Department of Land and Natural Resources — Island of Oahu

North

Linear Scale (feet)

0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2021; SOEST, UH CGG, PacIOOS, Tetra Tech, Inc.2017; NOAA, 2018. ESRI Basemap

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



EXHIBIT K - CUMULATIVE PROJECTS MAP
2024/SMA-128

HONOLULU CITY COUNCIL

KE KANIHELA O KE KALANA O HONOLULU

CITY AND COUNTY OF HONOLULU

No._____

RESOLUTION

GRANTING A SPECIAL MANAGEMENT AREA MAJOR PERMIT TO ALLOW THE CONSTRUCTION OF PHYSICAL IMPROVEMENTS AND THE IMPLEMENTATION OF A STRATEGIC MANAGEMENT PLAN AT THE KA'IWA RIDGE TRAIL IN LANIKAI, O'AHU.

WHEREAS, on December 3, 2024, the Department of Planning and Permitting ("DPP") accepted the application (File No. 2024/SMA-128) of the State of Hawai'i ("State") Department of Land and Natural Resources ("DLNR"), Division of Forestry and Wildlife ("DOFAW"; the "Applicant") for a Special Management Area ("SMA") Major Permit to allow for the construction of physical improvements to the Ka'iwa Ridge Trail as well as the implementation of a strategic management plan on approximately 4.6 acres of land covering portions of five lots zoned R-5 Residential District, R-10 Residential District, and P-1 Restricted Preservation District, located at Ka'elepulu Drive in Lanikai, and identified as Tax Map Keys 4-2-002: 016 (portion), 017, 048 (portion) and 4-3-007: 018 (portion) and 077 (portion; the "Project"); and

WHEREAS, on January 15, 2025, the DPP held a public hearing at the Fasi Municipal Building 6th Floor Conference Room, at which there were two agenda items, and which was attended in person by the Applicant, the Applicant's Agent, DPP staff, and two members of the public, and which was attended remotely by a few members of the public, and at which testimony was received from three members of the public regarding the Project; and

WHEREAS, on February 28, 2025, within 45 calendar days after the close of the public hearing, the DPP, having duly considered all evidence and the objectives, policies, and guidelines, as established in Revised Ordinances of Honolulu 2021 ("ROH") §§ 25-3.1 and 25-4.1, and Hawai'i Revised Statutes ("HRS") §§ 205A-2 and 205A-26, completed its report and transmitted its findings and recommendation of approval to the City Council ("Council"); and

WHEREAS, the Council, having received the findings and recommendation of the DPP on _____, by Departmental Communication _____ (2025), and having duly considered all of the findings and reports on the matter, desires to approve the subject application for an SMA Major Permit, subject to the conditions enumerated below; now, therefore,

BE IT RESOLVED by the Council of the City and County of Honolulu that an SMA Major Permit be issued to the Applicant for the Project, subject to the following conditions:

RESOLUTION

A. Development must be in general conformity with the Project as described in the DPP's findings and recommendation, referenced above, and as depicted in Exhibits A through D, E-1 through E-9, and F through K, attached hereto and incorporated by reference herein. Any change in the size or nature of the Project that may have a significant effect on coastal resources addressed in ROH Chapter 25, HRS Chapter 205A, or both, will require a new application and SMA Major Permit. Any change that does not have a significant effect on coastal resources will be considered a minor modification and may be permitted under the adopted resolution, upon review and approval by the Director of the DPP.

B. In order to minimize impacts to known and unknown archaeological, historic, and cultural resources that may be present on the Project site, the Applicant shall comply with the following:

If, during construction, any previously unidentified archaeological sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, the Applicant shall stop work, protect the find from further disturbance, and contact State Historic Preservation Division ("SHPD") immediately. Work in the immediate area must be stopped until the SHPD is able to assess the impact and make further recommendations for mitigative activity.

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

C. In order to minimize impacts to endangered, protected, or threatened fauna that may frequent or traverse the vicinity of the Project site, the Applicant is responsible for the following:

1. All Project site work and construction activities are limited to daylight hours (sunrise to sunset);

2. Barbless fencing must be used for all fence construction to avoid the entanglement of Hawaiian Hoary Bats; and

3. Woody plants greater than 15 feet in height may not be disturbed, removed, or trimmed during the Hawaiian Hoary Bat birthing and pup rearing season (June 1 through September 15);

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

D. To minimize the spread of invasive pathogens, pests, or plants that may harm native species and ecosystems, the Applicant is responsible for the following:

1. The importation of fill material must be minimized to the extent possible. The Project may require the import of rocks or boulders for structural stability or safety, but no importation of fill soil will be required;

2. Prior to and during construction activities, when personnel, materials, vehicles, or equipment are being relocated from one location to another, and when construction activities have concluded, materials, vehicles, and equipment should be cleaned of excess soil and debris to minimize the risk of spreading invasive species using the current recommendations from the O'ahu Invasive Species Council ("OISC");

3. During the initial pre-construction meeting, or otherwise prior to the initiation of any construction activities, and upon arrival of any new workers to the Project site, the Applicant (or their representative) shall distribute a copy of the most recently updated OISC "Decontamination Protocols for Prevention of Invasive Species" (Protocols) to all workers who will be present at the site, and/or post the Protocols in a visible location accessible to all on-site workers and delivery/haul-out contractors. All on-site workers shall be instructed to review the species photos and inspection/cleaning protocols prior to commencing work; and

4. If species on the OISC invasive species target list are encountered during construction activities, the Applicant shall immediately contact the OISC to report the species found. The current contact email and phone number for the OISC shall be visibly posted at the Project site. The Applicant shall implement any measures recommended by the OISC and/or the responsible State or Federal agency charged with eradication of the invasive species.

The requirements enumerated in this condition must be clearly stated under "Environmental Notes" on all Project construction permit plans and building permit plans.

E. Approval of this SMA Major Permit does not constitute compliance with other City ordinances, including but not limited to the Land Use Ordinance ("LUO") and building and construction codes, or other governmental requirements, including but not limited to LUO-related approvals, and building, grading, and grubbing permit approvals, which are subject to separate review and approval. The Applicant is responsible for ensuring that the final plans for the Project approved under this SMA Major Permit comply with all applicable City ordinances and other governmental provisions and requirements; and

HONOLULU CITY COUNCIL

KE KANIHELA O KE KALANA O HONOLULU

CITY AND COUNTY OF HONOLULU

No._____

RESOLUTION

BE IT FINALLY RESOLVED by the Council of the City and County of Honolulu that copies of this Resolution be transmitted to Marigold Zoll, State DLNR DOFAW, 2135 Makiki Heights Drive, Honolulu, Hawai'i 96822; Catie Cullison, PBR Hawai'i and Associates, Inc., 1001 Bishop Street, Suite 650, Honolulu, Hawai'i 96813; Dawn Takeuchi Apuna, Director of the DPP, 650 South King Street, 7th Floor, Honolulu, Hawai'i 96813; and Mary Alice Evans, Director of the Office of Planning and Sustainable Development, Attention: Coastal Zone Management Branch, P.O. Box 2359, Honolulu, Hawai'i 96804-2359.

INTRODUCED BY:

_____

_____

_____

_____

_____

_____

DATE OF INTRODUCTION: _____

_____

_____ _____

Honolulu, Hawai'i Councilmembers

DPP24SMA128



EXHIBIT A - LOCATION MAP
SMA MAJOR PERMIT NO. 2024/SMA-128
for the
State of Hawaii
Department of Land and Natural Resources
KAIWA RIDGE TRAIL IMPROVEMENTS PROJECT

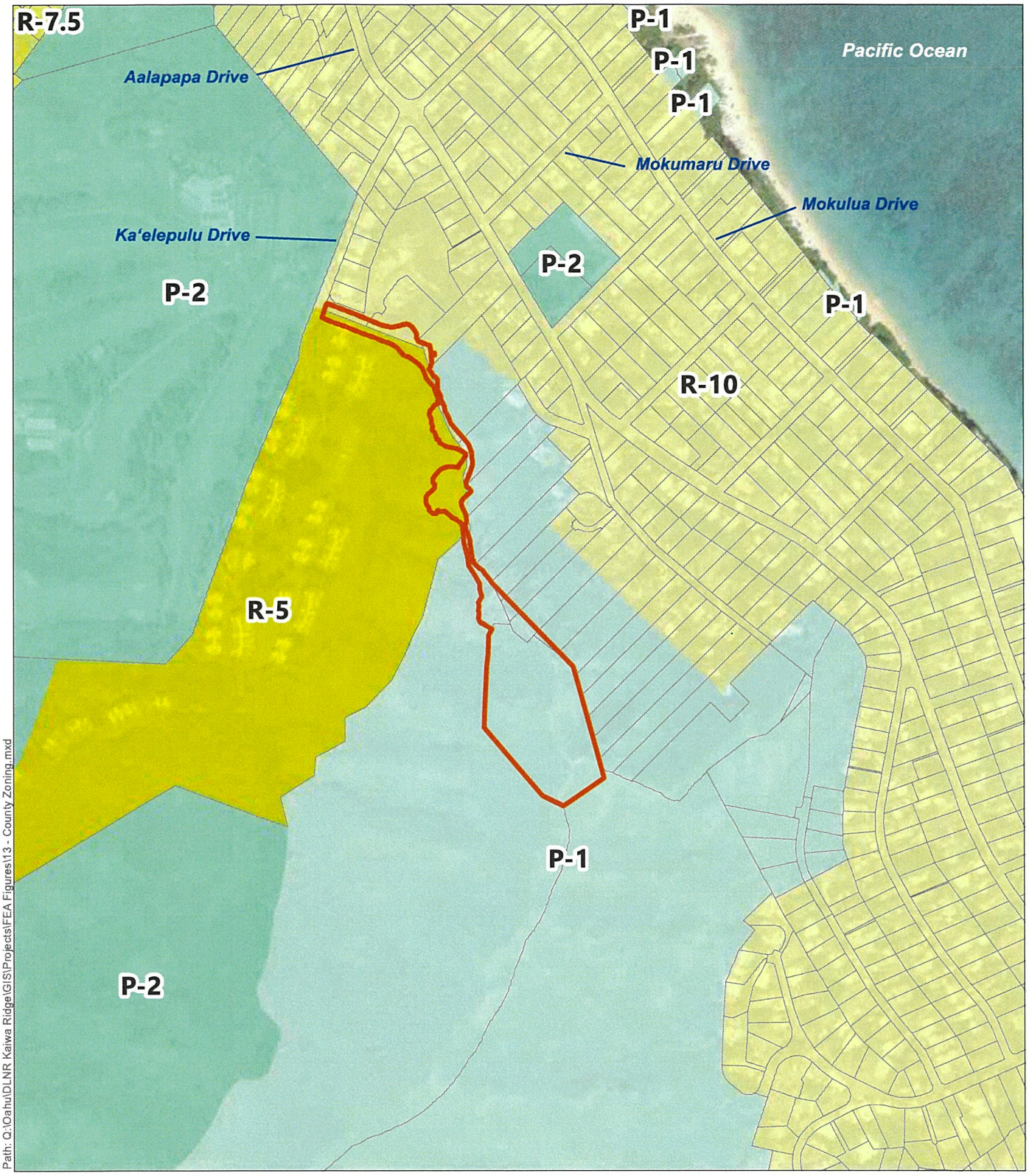
LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

North

Linear Scale (feet)
0 125 250 500

Source: City and County of Honolulu, 2022; Executive Order 3601, Department of Land and Natural Resources; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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EXHIBIT B - ZONING MAP
2024/SMA-128

KA'IWA RIDGE TRAIL

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

County Zoning

- P-1
- P-2
- R-10
- R-7.5
- R-5

0 250 500

Source: City and County of Honolulu, 2022; ESRI Basemap.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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EXHIBIT C - STATE LAND USE DISTRICTS
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Tax Map Key Parcels

State Land Use Districts

- Conservation
- Urban

KA'IWA RIDGE TRAIL

0 200 400 800

Source: City and County of Honolulu, 2022; Executive Order 3610, Department of Land and Natural Resources; State Land Use Commission, 2020; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



EXHIBIT D - SPECIAL MANAGEMENT AREA MAP
2024/SMA-128

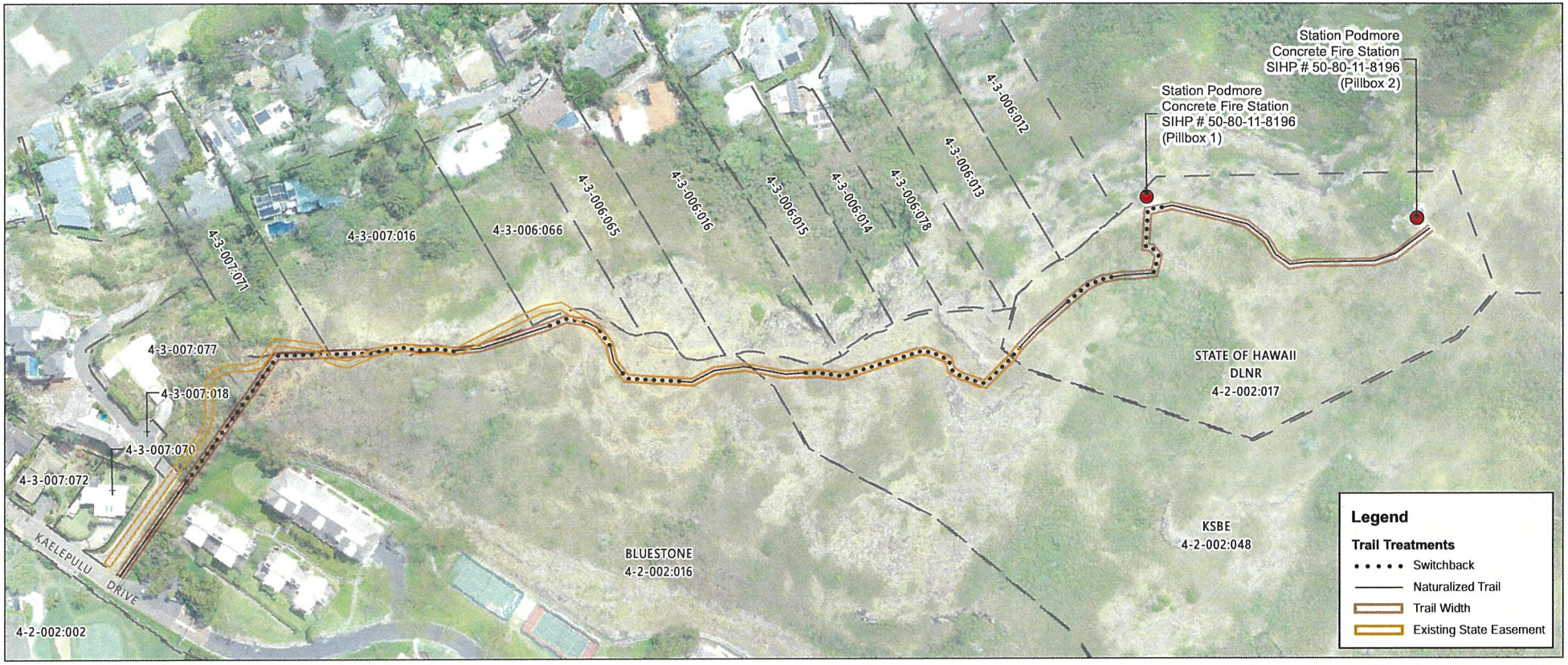
LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Special Management Area
- Tax Map Key Parcels

KA'IWA RIDGE TRAIL

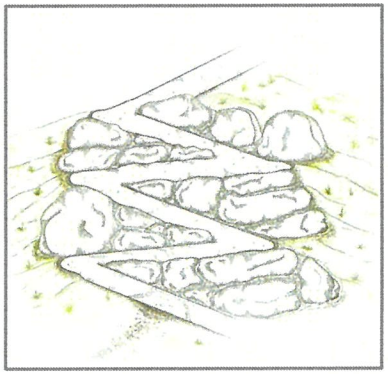
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Source: City and County of Honolulu, 2022 & 2021; ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

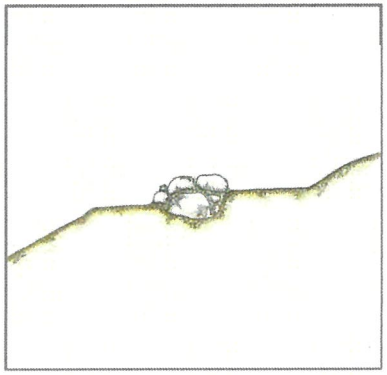




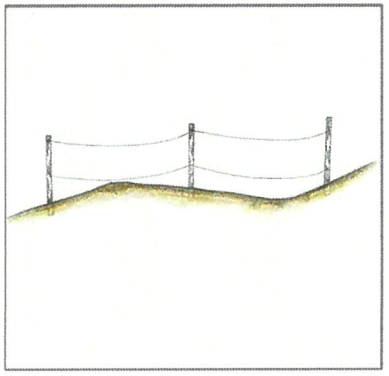
Switchback Type 1



Switchback Type 2



Switchback Trail Section



Naturalized Trail with Rolling Grade Dip & Symbolic Fence Typical Detail

EXHIBIT E-1 - SITE PLAN SUSTAINABLE TRAIL DESIGN 2024/SMA-128

Ka'iwa Ridge Trail

Department of Land and Natural Resources
Division of Forestry and Wildlife
Na Ala Hele

North

0 35 70 140

1 inch = 140 feet

Island of O'ahu

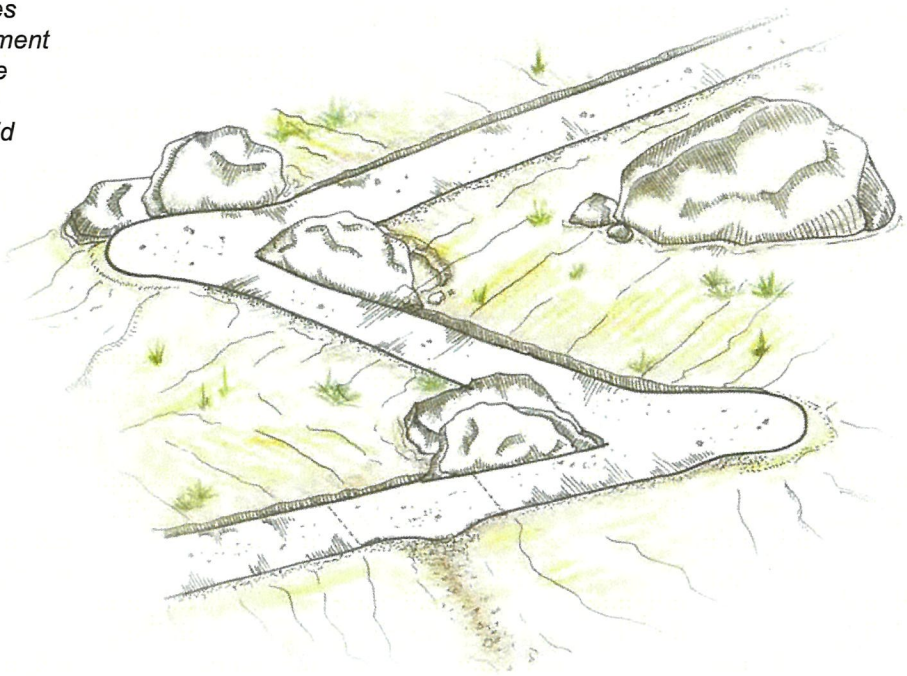
PBR HAWAII & ASSOCIATES, INC.

Credits: Sustainable Resources Group Int'l, Inc. 2019; City and County of Honolulu, 2019; Dudek, 2019.
Coordinate System: NAD 1983 StatePlane Hawaii 3 FIPS 5103 Feet

EXHIBIT E-2: TRAIL SWITCHBACK CONCEPTS
2024/SMA-128

Switchback Type 1

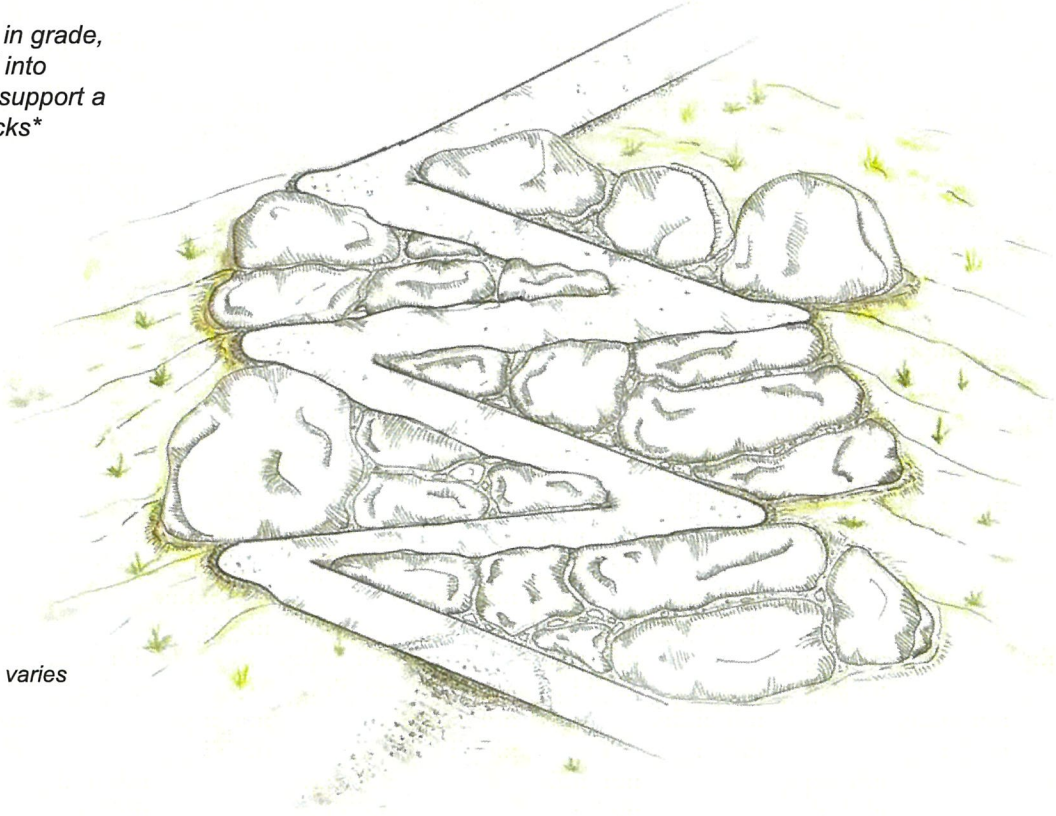
This type of switchback uses large boulders to reinforce varied grades and landings. Other trail management methods such as spillways can be placed in appropriate locations to promote directional run off to avoid worsening erosion.*



**switchback length and grade varies*

Switchback Type 2

*Where terrain may increse in grade, large boulders are stacked into retaining walls that lift and support a steeper series of switchbacks**



**switchback length and grade varies*

FIGURE E-3 - ROLLING GRADE AND SPILLWAY CONCEPTS (1)
2024/SMA-128

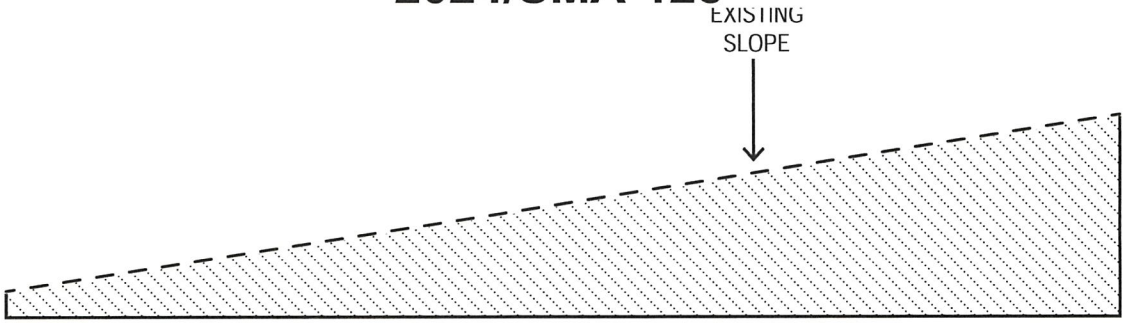


FIGURE A: EXISTING SLOPE SECTION

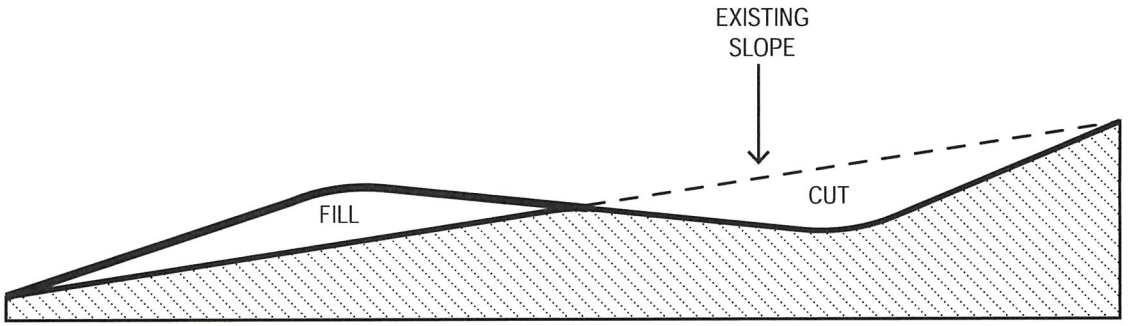


FIGURE B: CUT AND REMOVE MATERIALS FROM EXISTING SLOPE TO USE AS FILL TO CREATE A RAMP.

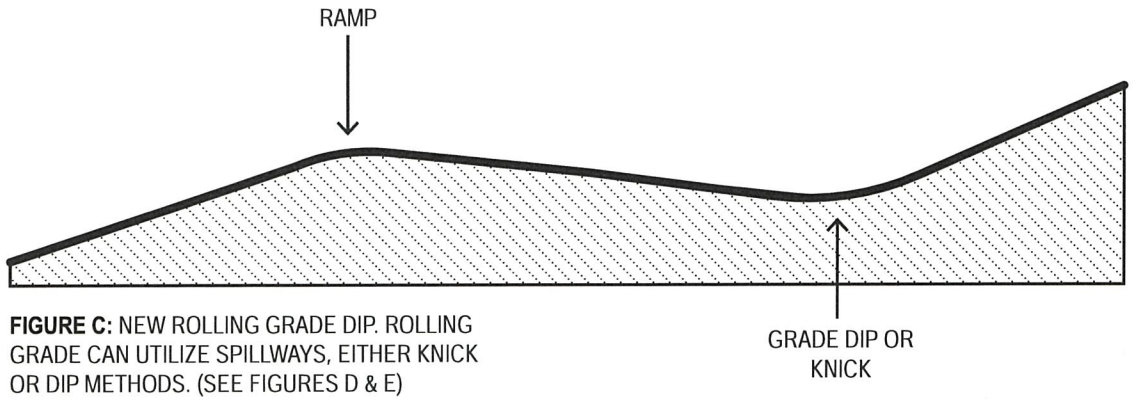


FIGURE C: NEW ROLLING GRADE DIP. ROLLING GRADE CAN UTILIZE SPILLWAYS, EITHER KNICK OR DIP METHODS. (SEE FIGURES D & E)

FIGURE E-4 - ROLLING GRADE AND SPILLWAY CONCEPTS (2)
2024/SMA-128

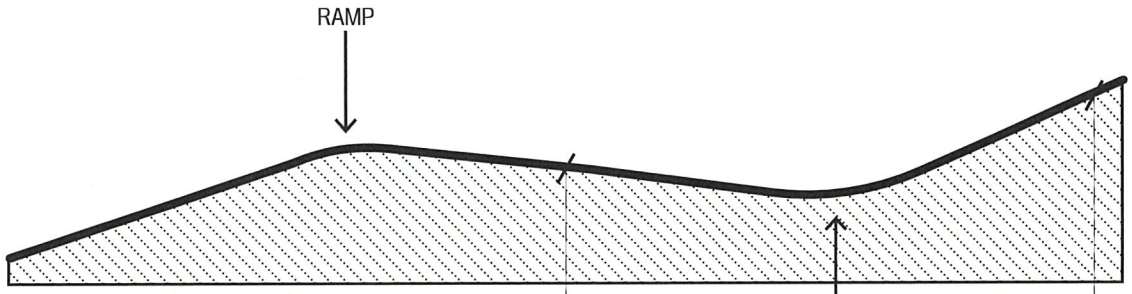


FIGURE C: NEW ROLLING GRADE DIP. ROLLING GRADE CAN UTILIZE SPILLWAYS, EITHER KNICK OR DIP METHODS. (SEE FIGURES D & E)

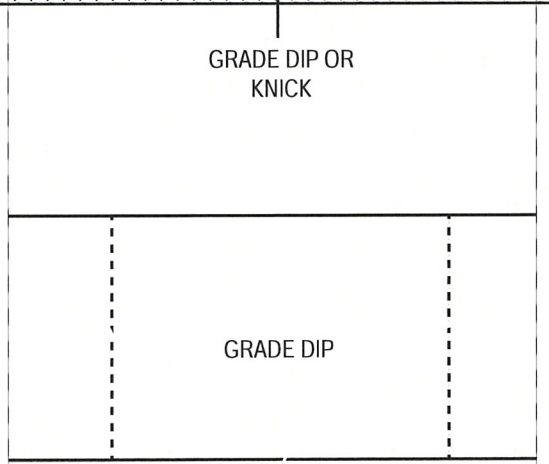


FIGURE D: PLAN VIEW OF A DIP SPILLWAY

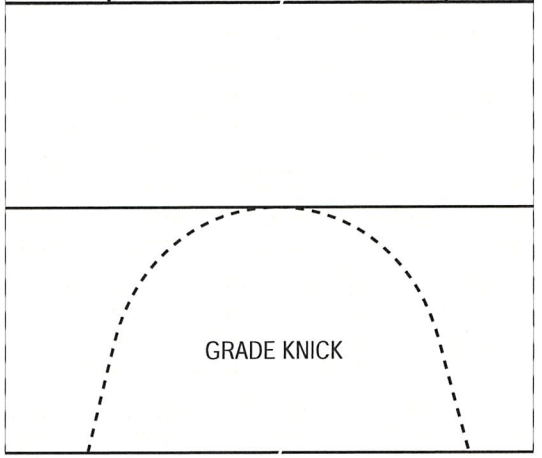


FIGURE E: PLAN VIEW OF A KNICK SPILLWAY

EXHIBIT E-5 - OUTSLOPE CONCEPTS
2024/SMA-128

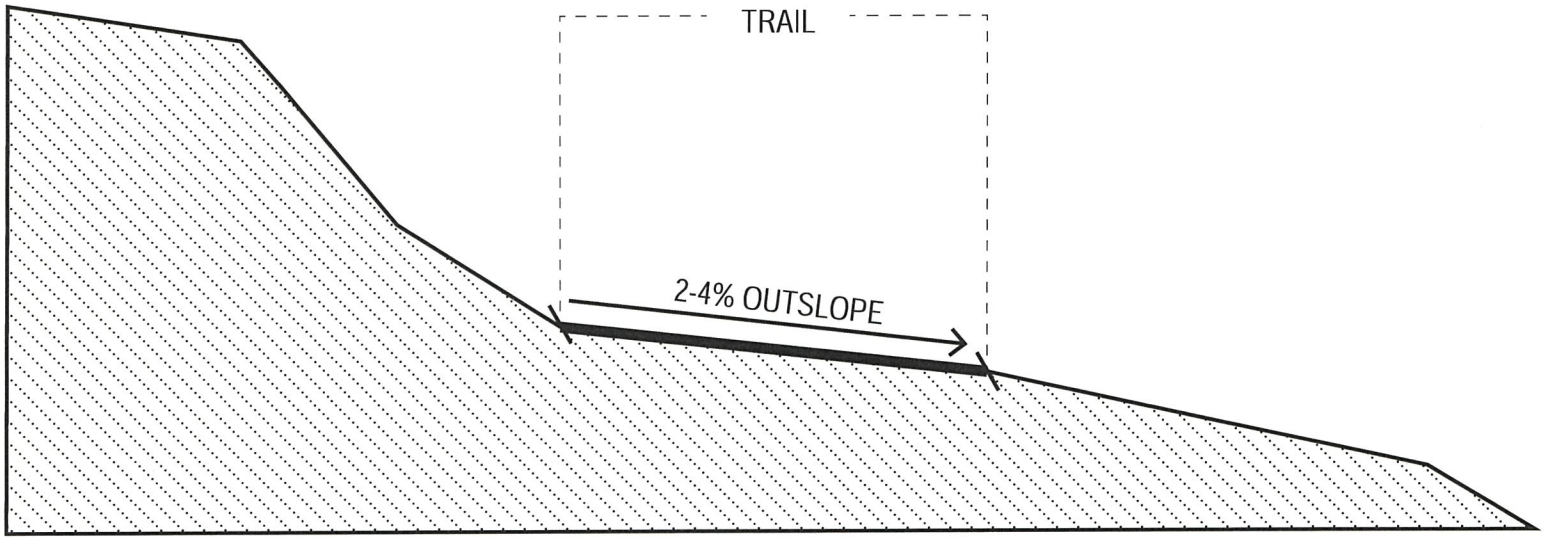


FIGURE F: OUTSLOPES ON A TRAIL ENCOURAGE WATER TO MOVE OFF THE TRAIL INSTEAD OF POOLING OR COLLECTING.

FIGURE E-6 - ROAD PROFILES FOR DRAINAGE AND STABILITY (1)
2024/SMA-128

FIGURE G: CROWNED FILL SECTION

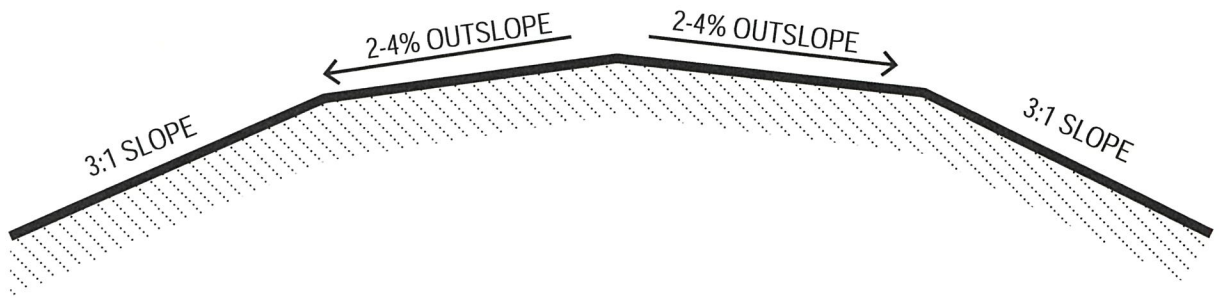


FIGURE H: OUTSLOPE SECTION

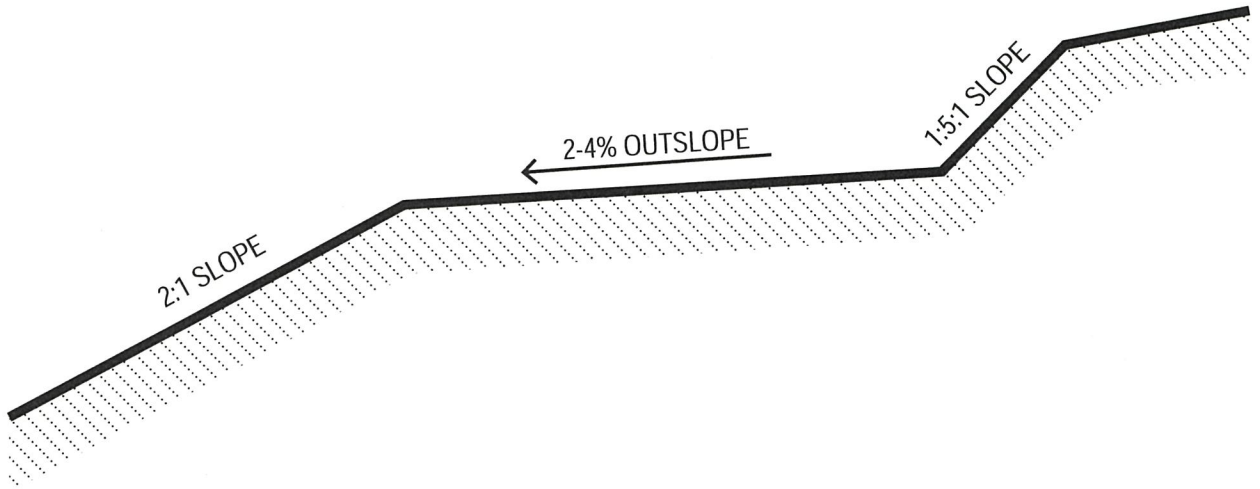


FIGURE E-7 - ROAD PROFILES FOR DRAINAGE AND STABILITY (2)
2024/SMA-128

FIGURE I: INSLOPE WITH DITCH SECTION

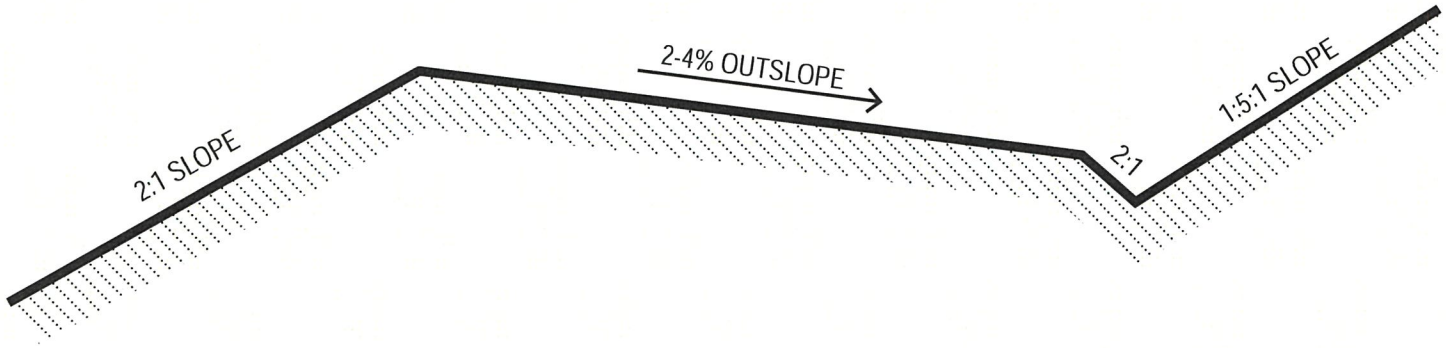


FIGURE J: CROWNED AND DITCHED SECTION

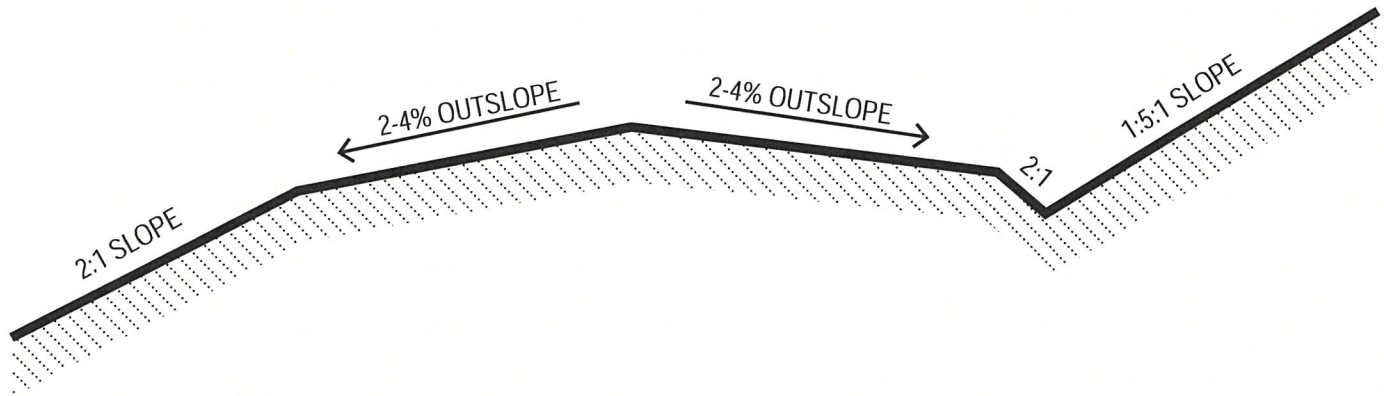
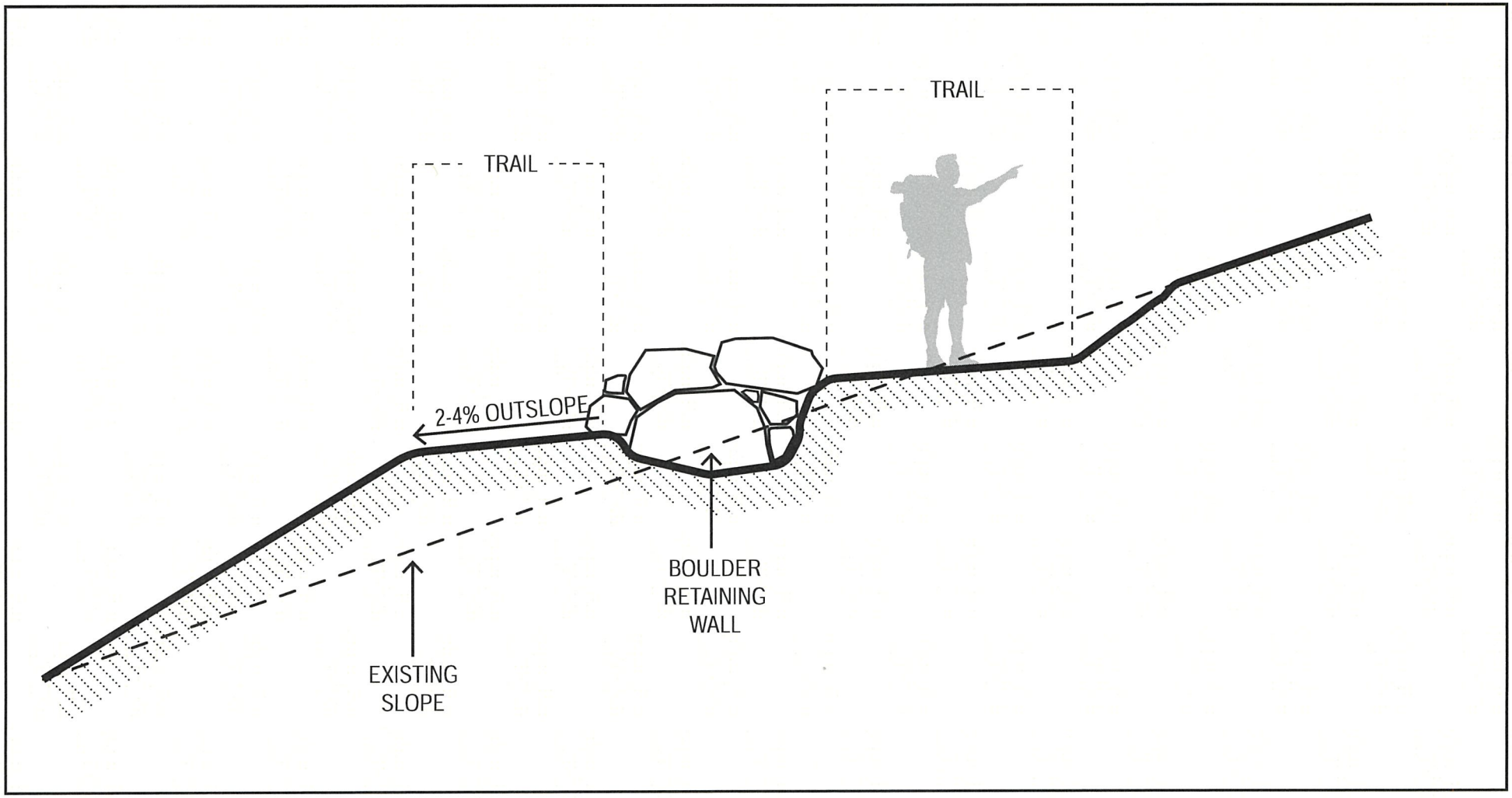


EXHIBIT E-8 - TYPICAL TRAIL SWITCHBACK SECTION
2024/SMA-128



NATIVE PLANT RESTORATION

Scan me

SUBMIT FEEDBACK HERE

BACKGROUND

- Soil conditions and the existing plant communities contribute to Ka'iwa Ridge's erosion problems.
- Vegetation on Ka'iwa Ridge is dominated by non-native, invasive species.
- Native flora constitute a mere 6% of the surveyed vegetation along the trail (LeGrande Biological, 2017).
- Soils on Ka'iwa Ridge are stony and rated "severe" by the National Resource Conservation Service. When interviewed for this project about restoration of the ridge, Kristen Kane of Hui o Ko'olaupoko, noted that soil replenishment will be one of the most challenging factors to re-establishing a native plant community.

RECOMMENDATIONS

- A plant palette consisting of native ground covers, shrubs and trees that can tolerate harsh conditions including drought, wind, and poor soils.
- A planting plan that includes erosion control measures suitable for steep slopes (see images on right side of board)
- Soil management and replenishment to establish out-plantings.
- Frequent trail maintenance and erosion-control measures.
- Continued community engagement and support to execute restoration goals.



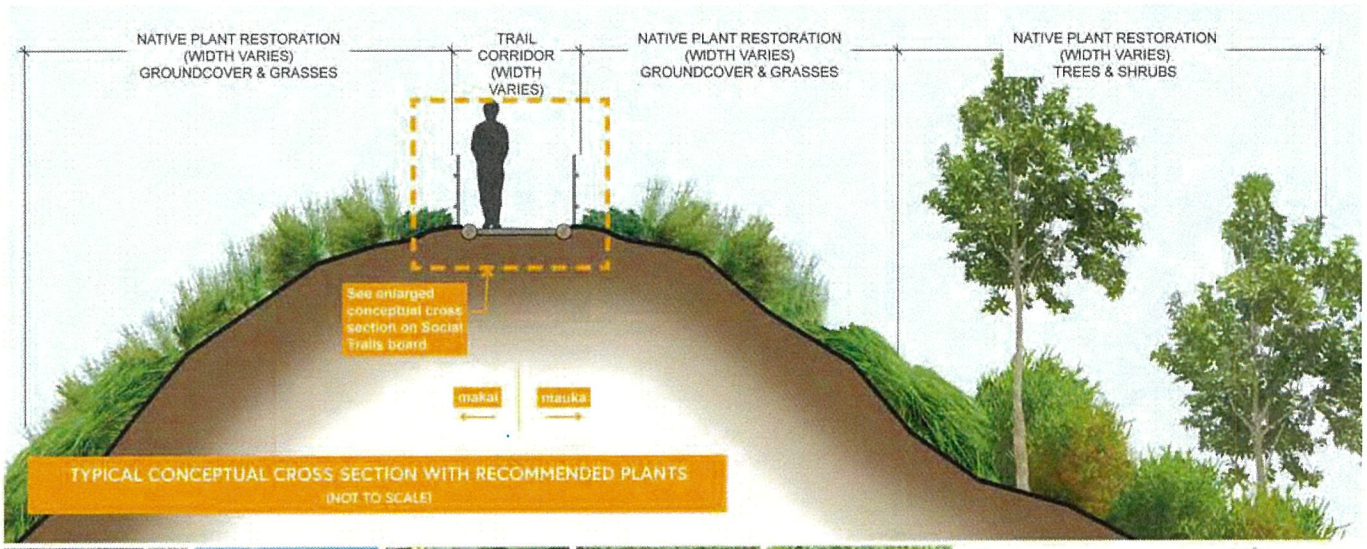
EXISTING CONDITIONS

Invasive plants such as:

- Haole Koa (Leucaena leucocephala)
- Kiawe (Prosopis pallida, Prosopis juliflora)
- Buffelgrass (Cenchrus ciliaris)
- Sourgrass (Digitaria insularis)
- Guinea grass (Panicum maximum)
- Pitaya/DragonFruit (Hylocereus undatus)
- Brazilian Jasmine (Jasminum fluminense)
- Christmas berry (Schinus terebinthifolius)







TYPICAL CONCEPTUAL CROSS SECTION WITH RECOMMENDED PLANTS
(NOT TO SCALE)



Pili Grass
Heteropogon contortus



Kawelu
Eragrostis variabilis



Ilima papa
Sida fallax



Pohinahina
Vitex rotundifolia



Naio
Myoporum sandwicense



Aalii
Dodonaea viscosa



Kou
Cordia subcordata

SUGGESTED PLANT LIST

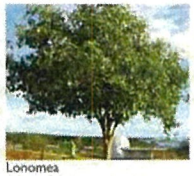
Type	Botanical Name	Common Name	Characteristics	Sun/Shade Requirements	Salt Spray/Wind Tolerance	Water Requirements	For Rainwater Basin
Tree	*Canthium odoratum*	Alani	Height: Medium - 20' to 40'. Width: 15' to 40'	Full Sun	Tolerant of both	dry-medium	
Tree	*Hibiscus tiliaceus*	Hau	Height: Small 15' to 30'. Width: 15' to 30'	Full Sun - Part Shade	Tolerant of both	Medium-wet	x
Tree	*Sapindus oahuensis*	Lonomea	Height: Medium - 30' to 45'. Width: 20' to 30'	Full Sun - Part Shade	Limited salt tolerance, good wind tolerant	dry-medium	
Tree	*Thespesia populnea*	Milo	Height: Medium - 25' to 50'. Width: 25' to 40'	Full Sun	Tolerant of both	dry-medium	
Shrub	*Chenopodium oahuense*	Aweoweo	Height: Small 2' to 5'. Width: 2' to 3'	Full Sun	Tolerant of both	Dry	
Shrub	*Dodonaea viscosa*	Aalii	Height: Medium - 4' to 7'. Width: 3' to 6'	Full Sun	Limited salt tolerance, good wind tolerant	dry-medium	
Shrub	*Myoporum sandwicense*	Naio	Height: Medium - 4' to 7'. Width: 4' to 7'	Full Sun - Part Shade	Tolerant of both	dry-medium	
Shrub	*Vitex rotundifolia*	Pohinahina	Height: Medium 3' to 10'. Width: 5' to 10'	Full Sun	Tolerant of both	dry-medium	
Grass	*Carex wahuensis*	Carex	Height: Low - 1' to 2.5'. Width: 2' - 3'	Part Shade	Limited salt tolerance, good wind tolerant	medium - wet	x
Grass	*Eragrostis variabilis*	Kawelu	Height: Low - 1' to 2'. Width: 1' to 2.5'	Full Sun	Limited salt tolerance, good wind tolerant	dry-medium	
Grass	*Heteropogon contortus*	Pili	Height: Low - 1' to 2'. Width: 1' to 2.5'	Full Sun	Tolerant of both	dry	
Ground cover	*Plumbago zeylanica*	Ilee	Height: Low - 1' to 2'. Width: 2' to 3'.	Full Sun - Part Shade	Tolerant of both	dry-medium	
Ground cover	*Sida fallax*	Ilima papa	Height: Prostrate - 6" to 1'. Width: 1' to 2'	Full Sun	Tolerant of both	dry-medium	
Ground cover	*Akulikuli*	Akulikuli	Height: Low - 1' to 2.5'. Width: 2' - 3'	Full Sun	Tolerant of both	dry-medium	
Ground cover	*Jacquemontia pentantha*	Kauhihuli	Height: Prostrate - 6". Width: 1' to 2'	Full Sun	Tolerant of both	medium-wet	x
Ground cover	*Vitex rotundifolia*	Pohinahina	Height: Low - 1' to 2'. Width: 2' to 3'	Full Sun	Tolerant of both	dry-medium	



Iliee
Plumbago zeylanica



Aweoweo
Chenopodium oahuense



Lonomea
Sapindus oahuensis



Naupaka Kahakai
Scaevola sericea



Akia
Wikstroemia urva-ursi



Milo
Thespesia populnea



Akulikuli
Sesuvium portulacastrum



Carex
Carex wahuensis



Hau
Hibiscus tiliaceus

EXHIBIT E-9 - NATIVE PLANT RESTORATION CONCEPTS
2024/SMA-128

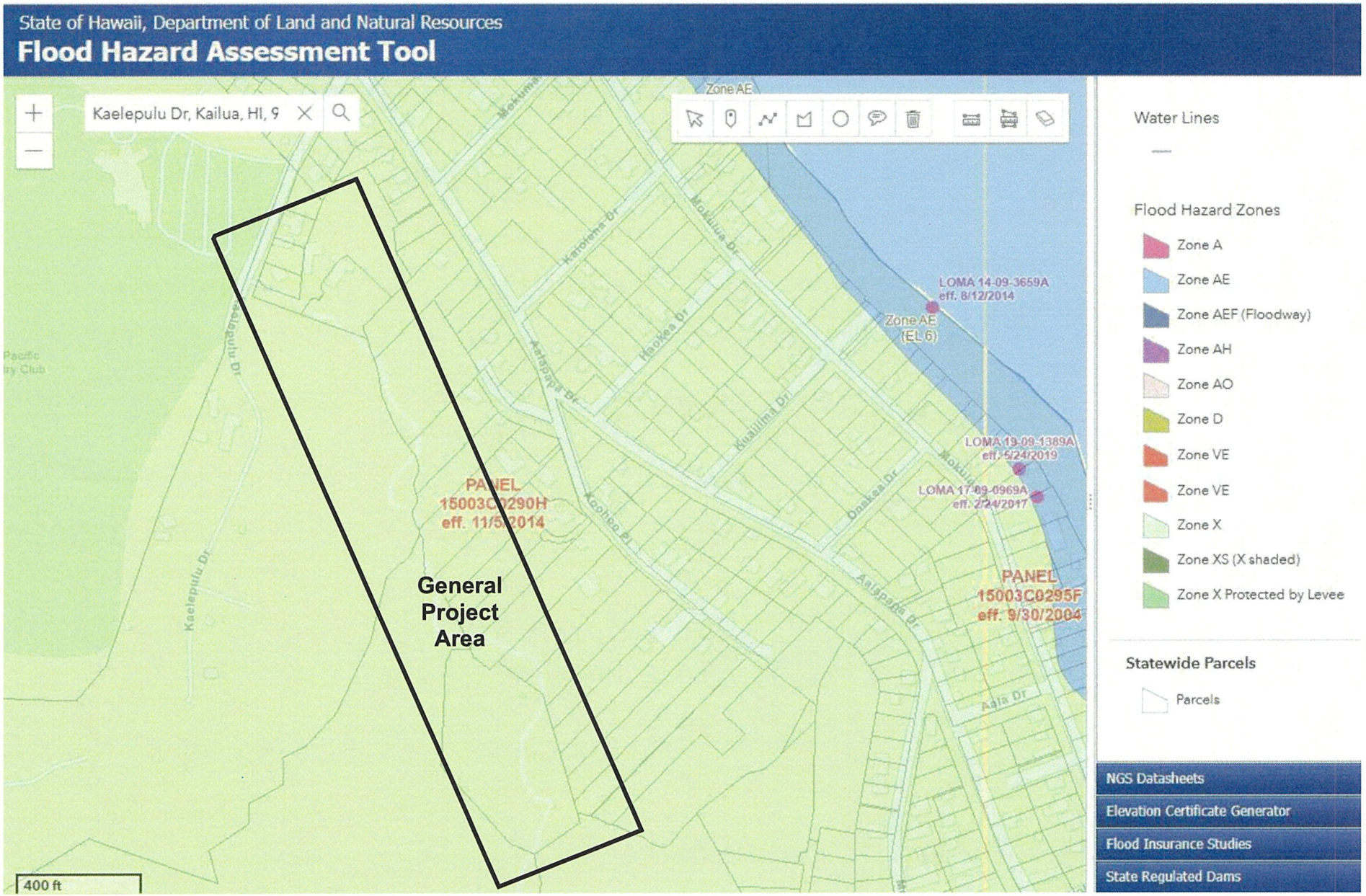


EXHIBIT F - FLOOD ZONE MAP
2024/SMA-128



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EXHIBIT G - WETLANDS
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary

Wetlands

- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Riverine
- Estuarine and Marine Deepwater

KA'IWA RIDGE TRAIL

Department of Land and Natural Resources — Island of Oahu

North

Linear Scale (feet)

0 350 700

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2022; USFWS National Wetland Inventory, 2019; ESRI Basemap

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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LEGEND

- Kaiwa Ridge Trail Action Location Boundary

NRCS Soil Survey

- BS: Beaches
- EmA: Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes
- JaC: Jaucas sand, 0 to 15 percent slopes, MLRA 163
- KTKE: Kokokahi very stony clay, 0 to 35 percent slopes
- KmA: Keaau clay, 0 to 2 percent slopes
- KtC: Kokokahi clay, 6 to 12 percent slopes
- Ms: Mokuleia loam
- Mt: Mokuleia clay loam
- PYF: Papaa clay, 35 to 70 percent slopes
- WkA: Waialua silty clay, 0 to 3 percent slopes
- rSY: Stony steep land

EXHIBIT H - NRCS SOIL MAP 2024/SMA-128

KA'IWA RIDGE TRAIL

0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2022; USDA NRCS, 2020. ESRI Basemap.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



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EXHIBIT I - NRCS SOIL EROSION HAZARD MAP
2024/SMA-128

LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

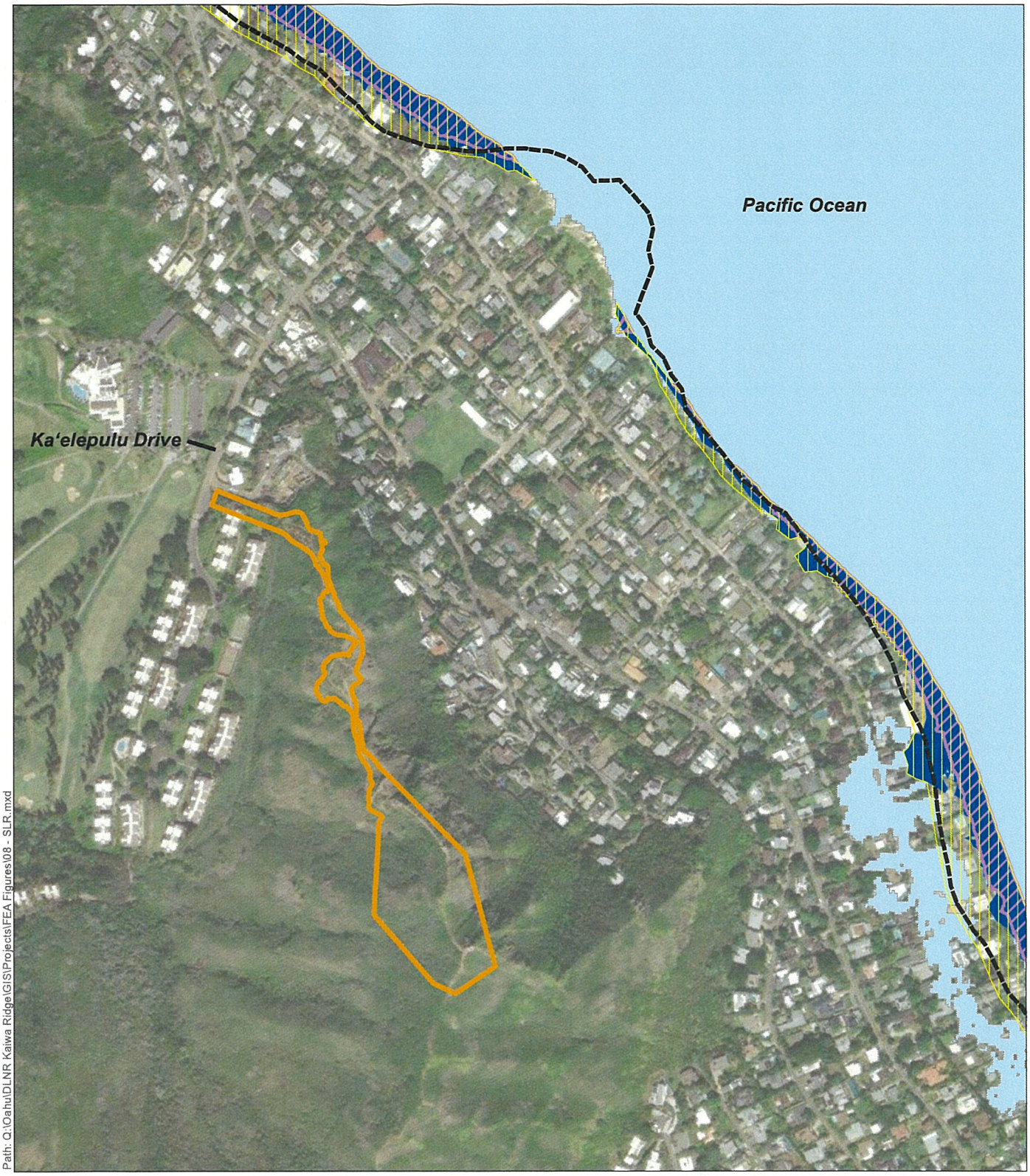
Source: NRCS Web Soil Survey, https://websoilsurvey.nrcs.usda.gov/

Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary interpretations or other spatial analysis beyond the limitations of the data.

Department of Land and Natural Resources
North

Island of O'ahu

PBR HAWAII & ASSOCIATES, INC.



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EXHIBIT J - SEA LEVEL RISE EXPOSURE AREA
2024/SMA-128

LEGEND

- Kaiwa Ridge Trail Action Location Boundary
- Coastal Erosion with 3.2ft. Sea Level Rise
- Passive Flooding with 3.2ft. Sea Level Rise
- Wave Inundation with 3.2ft. Sea Level Rise
- 3.2ft. Sea Level Rise Exposure Area
- NOAA 6ft Sea Level Rise Scenario

KA'IWA RIDGE TRAIL

Department of Land and Natural Resources — Island of Oahu

North

Linear Scale (feet)

0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2021; SOEST, UH CGG, PacIOOS, Tetra Tech, Inc.2017; NOAA, 2018. ESRI Basemap

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



EXHIBIT K - CUMULATIVE PROJECTS MAP
2024/SMA-128