

Conservation District Use Application (CDUA)

**Kawailoa Road Drainage Improvements
Kailua Ahupuaa, Koolaupoko District, Oahu, Hawaii
TMK 4-3-009:001, 4-3-010:084, 4-3-010:088
Job No. 24-18**

Prepared for:



**City and County of Honolulu
Department of Design and Construction
650 South King Street, 15th floor
Honolulu, HI 96813**

October 2019

ATTACHMENTS

A – DLNR-OCCL letter to DDC, COR: OA-18-08c, dated April 24, 2018

B - CONSTRUCTION PLANS, November 2018

Sheet	Dwg	Description
7	C-6	Erosion and Sediment Control Plan Notes
8	C-7	Erosion and Sediment Control Plan Notes
10	C-9	Erosion and Sediment Control Plan Details
12	C-11	Erosion and Sediment Control Plan
13	C-12	Demolition Plan
15	C-14	Grading Plan
19	C-18	Outlet Plan
20	C-19	Outlet Sections
21	C-20	Drainage Details - 1
52	S-5	Retaining Wall and Outlet Structure Details

C - DRAFT FINAL ENVIRONMENTAL ASSESSMENT, September 2019



CONSERVATION DISTRICT USE APPLICATION (CDUA)

All permit applications shall be prepared pursuant to HAR 13-5-31

File No.:

Acceptance Date:

180-Day Expiration Date:

Assigned Planner:

for DLNR Use

PROJECT NAME Kawaiiloa Road Drainage Improvements

Conservation District Subzone: Resource

Identified Land Use: P-6 Public Purpose Uses (D-1)

(Identified Land Uses are found in Hawai'i Administrative Rules (HAR) §13-5-22 through §13-5-25)

Project Address: 450 Kawaiiloa Road

Kailua, Hawaii 96734

Tax Map Key(s): 4-3-009: 001, 4-3-10:084, 4-3-10:088

Ahupua'a: Kailua

District: Koolauapoko

County: Honolulu

Island: Oahu

Proposed Commencement Date: Aug 2020

Proposed Completion Date: Aug 2021

Estimated Project Cost: \$1.5 million

TYPE OF PERMIT SOUGHT



Board Permit



Departmental Permit

ATTACHMENTS

\$ _____ Application Fee. 2.5% of project cost for Board Permits, but no less than \$250, up to a maximum of \$2500; \$250 for Departmental Permits (*ref §13-5-32 through 34*).

\$ _____ Public Hearing Fee (*\$250 plus publication costs; ref §13-5-40*)

☒ 20 copies of CDUA (*5 hard + 15 hard or digital copies*)

☒ Draft / Final Environmental Assessment (EA) or Draft / Final Environmental Impact Statement (EIS) or Statement of Exemption

☒ State Historic Preservation Division HRS 6E Submittal Form
(dlnr.hawaii.gov/shpd/review-compliance/forms)

☐ Management Plan or Comprehensive Management Plan (*ref §13-5-39*) if required

☐ Special Management Area Determination (*ref Hawai'i Revised Statutes 205A*)

☐ Shoreline Certification (*ref §13-5-31(a)(8)*) if land use is subject to coastal hazards.

☐ Kuleana documentation (*ref §13-5-31(f)*) if applying for a non-conforming kuleana use.

☐ Boundary Determination (*ref §13-5-17*) if land use lies within 50 feet of a subzone boundary.

REQUIRED SIGNATURES

Applicant

Name: Robert J. Kroning, P.E.

Title; Agency: Director, Department of Design and Construction, City and County of Honolulu

Mailing Address: 650 S King St, 15th floor
Honolulu, HI 96813

Contact Person & Title: Brent Uechi, Project Manager

Phone: (808) 768-8819

Email: buechi@honolulu.gov

Interest in Property: Lessee

Signature: [Signature] Date: 10/24/19
Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization

Landowner (if different than the applicant)

Name: Suzanne Case

Title; Agency: Chairperson, Hawaii Department of Land and Natural Resources

Mailing Address: 1151 Punchbowl St
Honolulu, HI 96813

Phone: (808) 587-0400

Email: dlncr@hawaii.gov

Signature: _____ Date: _____
For State and public lands, the State of Hawai'i or government entity with management control over the parcel shall sign as landowner.

Agent or Consultant

Agency: Oceanit Laboratories, Inc. Contact
Person & Title: Cris Takushi, P.E.

Mailing Address: 828 Fort Steet Mall, #600
Honolulu, HI 96813

Phone: (808) 531-3017

Email: ctakushi@oceanit.com

Signature: [Signature] Date: 10/25/19

For DLNR Managed Lands

State of Hawai'i

Chairperson, Board of Land and Natural Resources

State of Hawai'i

Department of Land and Natural Resources

P.O. Box 621

Honolulu, Hawai'i 96809-0621

Signature: _____ Date: _____

PROPOSED USE

Total size/area of proposed use (indicate in acres or sq. ft.): 0.78 acres (area to be disturbed), 0.46 acres (area to be graded). See attached Construction Plan: "Grading Plan", Sheet 15, drawing C-14.

Please provide a detailed description of the proposed land use(s) in its entirety. Information should describe what the proposed use is; the need and purpose for the proposed use; the size of the proposed use (provide dimensions and quantities of materials); and how the work for the proposed use will be done (methodology). If there are multiple components to a project, please answer the above for each component. Also include information regarding secondary improvements including, but not limited to, grading and grubbing, placement of accessory equipment, installation of utilities, roads, driveways, fences, landscaping, etc.

Attach any and all associated plans such as a location map, site plan, floor plan, elevations, and landscaping plans drawn to scale (*ref §13-5-31*).

The project will minimize ponding, flooding and storm water runoff entering residential properties in the areas along Kawaihoa and Alala Roads and within Kailua Beach Park. Improvements proposed within the lands in the State Land Use (SLU) Urban District include a new 5 foot wide concrete sidewalk with 6-inch high curb and 2 new concrete curb ramps between Alala Road and the existing bikeway in Kailua Beach Park, 5 new concrete culverts that cross under the new sidewalk, a new 3 foot by 2 foot concrete box culvert, new 8- inch thick CRM lining, a new graded grass swale and a new 4 foot wide concrete lined swale with retainingwalls and a chain link fence.

A portion of the proposed new box culvert and the outlet structure it discharges into are the only structures that may extend into the SLU Conservation District. Temporary erosion control measures and Best Management Practices shall be place prior to demolition and removal of the existing CRM outlet headwall and approximately 105 lineal feet of the existing 24" reinforced concrete pipe. The new box culvert shall be a 3' wide by 2' high reinforced box drain outlet structure installed in an open trench on an aggregate stabilization layer. The new outlet will consist of a 3-foot thick dumped riprap apron that is bordered by a pair of flared CRM walls.

See Attachment B - Construction Plans showing dimensions of proposed improvements.

Sheet 19, drawing C-18: "Outlet Plan" shows limits of grading, dumped riprap apron and outlet structure dimensions.

Sheet 20, drawing C-19: "Outlet Sections" shows outlet plan and sections including CRM walls, chain link fence and a typical section of CRM walls bordering the apron.

Sheet 21, drawing C-20: "Drainage Details -1" riprap apron and CRM wall sections, tie-in with box culvert and protective four-foot high chain link fence and backfill, compaction and geotextile fabric layers and requirements supporting the structures. Sheet 52, drawing S-5: "Retaining Wall and Outlet Structure Details" contains reinforcing steel and other structural details.

EXISTING CONDITIONS

Please describe the following, and attach maps, site plans, topo maps, colored photos, and biological or archaeological surveys as appropriate:

Existing access to site:

Access to the proposed drain outlet site is from the parking lot at the northeast side of Kailua Beach Park

Existing buildings/structures:

DLNR identified the existing boat ramp and portions of the existing parking lot as illegal encroachments. Because of these encroachments, DLNR was unable to certify the shoreline and the requirement for a Certified Shoreline Survey was waived. See Attachment A.

Existing utilities (electrical, communication, gas, drainage, water & wastewater):

Electrical, water and wastewater utilities exist at the park comfort station. Portions of the storm drain system will be demolished and removed (outlet), or cut, plugged and removed (24-inch RCP) or abandoned and filled with Controlled Low Strength Material (CLSM). See attached Attachment B Construction Plan: "Demolition Plan" Sheet 13, drawing C-12.

Physiography (geology, topography, & soils):

The project site is underlain by Younger Dune Deposits of well-sorted calcareous sand and Beach Deposits consisting of well-sorted sand and gravel. There is a shallow depressed area on the east portion of Kailua Beach Park that detains storm water runoff. The northwest portion of Kailua Beach Park generally slopes toward outfalls that discharge into Ka'elepulu Stream. Subsurface conditions beneath Alala Road are comprised of clayey fillsoil up to 3 feet thick overlain by very fine sand.

Hydrology (surface water, groundwater, coastal waters, & wetlands):

The project site is bordered by Kailua Bay to the north and Ka'elepulu Stream to the west. Both of these water bodies are listed as impaired by the Clean Water Act Section 303(d). The existing drainage system and proposed improved drainage system discharges into Kailua Bay. Ka'elepulu Stream is separated from Kailua Bay by a sand berm approximately 100 feet wide. Approximately once per month the City and County opens the sand berm, connecting the two bodies of water, allowing the water retained in the system to drain, and allowing seawater to enter. Storm water that enters Ka'elepulu Stream is retained until it discharges into Kailua Bay.

Flora & fauna (indicate if rare or endangered plants and/or animals are present):

Terrestrial flora at Kailua Beach Park consists of a variety of cultivated species including ironwoods, coconut trees, banyan trees, kiawe trees, and grasses. Avian species that sometimes occupy or fly by the project site are marine birds, waterbirds, introduced non-game birds and introduced game birds. Juvenile

fish and algae are the predominant flora and fauna within Ka'elepulu Stream. No threatened or endangered species of wildlife are known to inhabit the beach park area or surrounding roads.

Natural hazards (erosion, flooding, tsunami, seismic, etc.):

According to the City and County of Honolulu Multi-Hazard Mitigation Plan (2012), potential natural hazards at the proposed project site could include strong winds, tropical cyclones (including hurricanes), landslides, earthquakes, floods, droughts, volcanic gaseous emissions (VOG) and wildfire. Over the years, heavy rains have caused excess storm water runoff along Kawaihoa and Alala Roads and areas surrounding Kailua Beach Park. The purpose of this project would be to mitigate this runoff, minimize ponding and reduce flooding of residential properties in the area and within Kailua Beach Park.

Historic & cultural resources:

Cultural Surveys Hawai'i (CSH) conducted an Archaeological Inventory Survey (AIS) and documented their results in an March 2018 report (See Appendix A of Attachment C). The historic property that was identified in the project area during the AIS was a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden (SIHP # 50-80-11-8166). The property retains integrity of location and materials and may represent a former activity area and has the potential to offer insight into land use of the area. The proposed mitigation for this project is archaeological monitoring for SIHP # 50-80-11-8166. An archaeological monitoring plan (AMP), meeting the requirements of HAR §13-279-4 shall be submitted for review and acceptance by SHPD prior to project work commencing. CSH's Archaeological Inventory Survey (AIS) Report was accepted by the State Historic Preservation Division on March 12, 2018. CSH also prepared an Archaeological Literature Review and Field Inspection Report in December 2012. No historic resources and/or human remains were discovered or have been reported from the area surveyed. The review and field inspection study did not reveal any clear signs of a developed cultural layer or clear trace of the presence of historic resources.

EVALUATION CRITERIA

The Department or Board will evaluate the merits of a proposed land use based upon the following eight criteria (*ref §13-5-30(c)*)

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. (*ref §13-5-1*) How is the proposed land use consistent with the purpose of the conservation district?

Proposed project improvements that may extend into the Conservation District are the drain outlet and surrounding concrete rubble masonry (CRM) walls and riprap apron. These improvements will have minimal impacts to the beach, including erosion and the nearshore environment. The tributary area served by the proposed drainage system will be the same as the service area of the existing drainage system, which means stormwater runoff quantities discharged into Kailua Bay should be similar to existing conditions. Stormwater runoff will be temporarily detained in a grassed area of Kailua Beach Park prior to discharge into Kailua Bay, which will provide some stormwater quality improvements. The proposed outlet structure will be located adjacent to the existing drainage outlet, which will be demolished and removed. The proposed CRM walls and riprap will reduce erosion at the outlet, but some erosion will continue to occur to allow runoff to flow to the ocean.

2. How is the proposed use consistent with the objectives of the subzone of the land on which the land use will occur? (*ref §13-5-11 through §13-5-15*)

Proposed project improvements are not located in any of the listed Conservation District subzones described in HAR §13-5-11 through §13-5-15.

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management" (*see 205A objectives on p. 13*).

Recreational resources - The proposed project is located in and adjacent to Kailua Beach Park and will improve existing coastal recreation opportunities. Project improvements would improve drainage within the park and surrounding roadways and reduce flooding.

Historic resources - During an Archaeological Inventory Survey (AIS) conducted by Cultural Surveys Hawai'i (CSH) one historic property was identified in the project area that could potentially be affected by the project. This historic property (SIHP # 50-80-11-8166) was a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. The property retains integrity of location and materials and may represent a former activity area and has the potential to offer insight into land use of the area. The proposed mitigation is to perform archaeological monitoring at this site. An archaeological monitoring plan (AMP) that meets the requirements of HAR §13-279-4 and shall be submitted for review and acceptance by SHPD prior to project work commencing.

Scenic and open space resources - A portion of the project is along the shoreline and may impact the shoreline environment temporarily during construction. After completion, no visual impacts to the environment are expected.

Coastal ecosystems - The project is intended to improve drainage along Kawailoa and Alala Roads and areas surrounding Kailua Beach Park. The proposed earth berm will contain runoff in an existing low-lying depressed area of Kailua Beach Park and minimize runoff from flowing onto Kawailoa Road. This will reduce sediment load discharged into Kailua Bay during storm events and reduce adverse effects on the marine environment. During construction BMPs will be employed to reduce pollution, minimize turbidity and control and prevent construction related runoff from the project site. BMPs will include sandbags, fiber rolls, drain inlet covers, grassing, geotextiles, and silt fences. The Contractor shall consider the weather while performing construction. Some work may be performed during low rain conditions, but all construction would be halted during storm conditions or when storm conditions threaten the watershed.

Economic uses - Proposed drainage improvements were located and designed to minimize adverse economic, social, visual and environmental impacts to park users and commuters.

Managing development - The proposed project was presented in an Environmental Assessment that will be subject to two public comment periods.

Public participation - The Draft Environmental Assessment was published in the March 8, 2018 Environmental Notice. During the 30-day public comment period no comments were received. The Final Environmental Assessment will be published in the November 8, 2019 Environmental Notice. The contractor shall coordinate his activities with the community and stakeholders before and during construction.

Beach protection - A portion of the proposed project replaces a storm drain outlet on the beach adjacent to the boat ramp and parking lot. Project improvements will have minimal impacts on the beach.

Marine resources - The proposed project is not anticipated to result in long-term adverse impacts on marine resources.

4. Describe how the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

Project improvements will have minimal impacts to the beach, including erosion and the nearshore environment. Storm water runoff quantities discharged into Kailua Bay should be similar to existing conditions and storm water quality will be equal or better than existing conditions.

Coastal hazards - Project improvements will reduce coastal flooding due to improved storm water runoff. The proposed improvements may also have a minimal effect on erosion and point and nonpoint source pollution hazards.

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

The proposed drain outlet structure is compatible with surrounding area, right next to the existing outlet which has collapsed and will be demolished and removed.

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

The existing and proposed drainage outlet site borders a parking lot at the northeast section of Kailua Beach Park. The proposed outlet structure will have little impact on the natural beauty or open space characteristics of the area.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

This project does not involve any subdivision of land.

8. Describe how the proposed land use will not be materially detrimental to the public health, safety and welfare.

Construction of a new drainage outlet to replace the existing outlet, that has collapsed will improve public safety and welfare.

CULTURAL IMPACTS

Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups.

Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.

A historic property was identified in the project area during an Archaeological Inventory Survey (AIS) conducted by Cultural Surveys Hawaii. The historic property was a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden (SIHP # 50-80-11-8166). The property retains integrity of location and materials and may represent a former activity area and has the potential to offer insight into land use of the area. See Appendix A of Attachment C. CSH's Archaeological Inventory Survey (AIS) Report, was accepted by the State Historic Preservation Division on March 12, 2018.

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

Natural resources, including traditional and customary Native Hawaiian rights should not be affected by the proposed action. Archaeological monitoring of the historic property (SIHP # 50-80-11-8166) in accordance with an Archaeological Monitoring Plan (AMP), meeting HAR §13-279-4 requirements should preclude any impacts on traditional and native Hawaiian rights.

What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

No additional actions are required by the Board of Land and Natural Resources to protect these resources.

OTHER IMPACTS

Does the proposed land use have an effect (positive/negative) on public access to and along the shoreline or along any public trail?

The proposed drainage outlet will replace a damaged outlet, which is a hazardous condition. The new outlet has a positive effect on public access to and along the shoreline. Unobstructed pedestrian access will be provided mauka and makai of the proposed outlet structure.

Does the proposed use have an effect (positive/negative) on beach processes?

The proposed outlet will have a negligible effect on beach processes, as some erosion downstream of the outlet will continue allowing storm water runoff to flow to the ocean.

Will the proposed use cause increased sedimentation?

No.

Will the proposed use cause any visual impact on any individual or community?

No.

Please describe any sustainable design elements that will be incorporated into the proposed land use (*e.g. the use of efficient ventilation and cooling systems; renewable energy generation; sustainable building materials; permeable paving materials; efficient energy and water systems; efficient waste management systems; etc.*).

None.

If the project involves landscaping, please describe how the landscaping is appropriate to the Conservation District (*e.g. use of indigenous and endemic species; xeriscaping in dry areas; minimizing ground disturbance; maintenance or restoration of the canopy; removal of invasive species; habitat preservation and restoration; etc.*)

Not applicable.

Please describe Best Management Practices that will be used during construction and implementation of the proposed land use.

Attached Erosion and Sediment Control Plans describes Best Management Practices recommended.

Attachment B - Construction Plans.

- Sheet 7, drawing C-6 to Sheet 8, drawing C-7 "Erosion and Sediment Control Plan Notes"

- Sheet 10, drawing C-9 "Erosion and Sediment Control Plan Details"

- Sheet 12, drawing C-11 "Erosion and Sediment Control Plan"

The temporary erosion control measures and BMPs shown on above plans are the minimum necessary to mitigate potential pollutants from entering into the existing drainage systems and State receiving waters.

The Contractor shall install additional erosion control measures and BMPs as required by the Officer-in-charge to satisfy the conditions of the various permits.

Please describe the measures that will be taken to mitigate the proposed land use's environmental and cultural impacts.

The Erosion and Sediment Control measures and BMPs listed previously in the construction plans (Attachment B) will mitigate any environmental impacts of the proposed land use. In order to determine cultural impacts, CSH conducted an Archaeological Literature Review and Field Inspection (Report dated December 2012). No historic resources and/or human remains were discovered or have been reported from the area CSH surveyed. The review and field inspection did not reveal any clear signs of a developed cultural layer or clear trace of the presence of historic resources. An Archaeological Monitoring Plan (AMP), meeting HAR §13-279-4 requirements should preclude any impacts on these environmental and cultural resources should reasonably protect any resources uncovered during construction, including cultural artifacts.

SINGLE FAMILY RESIDENTIAL STANDARDS

Single Family Residences must comply with the standards outlined in HAR Chapter 13-5, Exhibit 4. Please provide preliminary architectural renderings (e.g. building foot print, exterior plan view, elevation drawings; floor plan, etc.) drawn to scale.

SIZE OF LOT

	Existing	Proposed	Total
Proposed building footprint			
Paved areas/ impermeable surfaces			
Landscaped areas			
Unimproved areas			

SETBACKS Front: Side: Back:

SHORELINE PROPERTIES

Average Lot Depth (ALD): Average annual coastal erosion rate:

Minimum shoreline setback based on Exhibit 4:

Actual shoreline setback or proposed structure:

MAXIMUM DEVELOPABLE AREA

The Maximum Developable Area includes all floor areas under roof, including first, second, and third stories, decks, pools, saunas, garage or carport, and other above ground structures.

Maximum Developable Area based on Exhibit 4:

Actual Developable Area of proposed residence:

Actual height of the proposed building envelope as defined in Exhibit 4:

COMPATIBILITY

Provide justification for any propose deviation from the established residential standards.

How is the design of the residence compatible with the surrounding area?

If grading is proposed, include a grading plan which provides the amount of cut and fill. Has grading or contouring been kept to a minimum?

CHAPTER 205A – COASTAL ZONE MANAGEMENT

Land uses are required to comply with the provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled "Coastal Zone Management," as described below:

- **Recreational resources:** Provide coastal recreational opportunities accessible to the public.
- **Historic resources:** Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- **Scenic and open space resources:** Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- **Coastal ecosystems:** Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
- **Economic uses:** Provide public or private facilities and improvements important to the State's economy in suitable locations.
- **Coastal hazards:** Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- **Managing development:** Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- **Public participation:** Stimulate public awareness, education, and participation in coastal management.
- **Beach protection:** Protect beaches for public use and recreation.
- **Marine resources:** Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

CERTIFICATION

I hereby certify that I have read this completed application and that, to the best of my knowledge, the information in this application and all attachments and exhibits is complete and correct. I understand that the failure to provide any requested information or misstatements submitted in support of the application shall be grounds for either refusing to accept this application, for denying the permit, or for suspending or revoking a permit issued on the basis of such misrepresentations, or for seeking of such further relief as may seem proper to the Land Board.

I hereby authorize representatives of the Department of Land and Natural Resources to conduct site inspections on my property. Unless arranged otherwise, these site inspections shall take place between the hours of 8:00 a.m. and 4:30 p.m.

Signature of authorized agent(s) or if no agent, signature of applicant

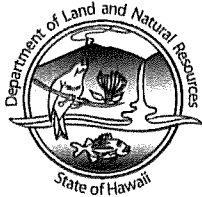
AUTHORIZATION OF AGENT

I hereby authorize _____ Cris Takushi _____ to act as my representative and to bind me in all matters concerning this application.

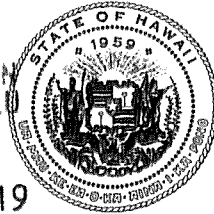
Signature of applicant(s)

ATTACHMENT A
DLNR-OCCL letter to DDC,
COR: OA-18-08c,
dated April 24, 2018

DAVID Y. IGE
GOVERNOR OF
HAWAII



RECEIVED
DDC-CIVIL DIVISION
C & C OF HONOLULU



RECEIVED

MAY 1 2018

DDC/CDD

18X-728028

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: AJR

COR: OA-18-08c

Robert J. Kroning, Director
City and County of Honolulu
Department of Design and Construction
650 South King St., 7th Floor
Honolulu, HI 96813

APR 24 2018

SUBJECT: KAWAIOLOA ROAD DRAINAGE IMPROVEMENT PROJECT – CONFIRMATION OF SHORELINE CERTIFICATION WAIVER
Kailua, Ko'olaupoko District, Island of Oahu
TMK: Submerged lands seaward (makai) of (1) 4-3-009:001

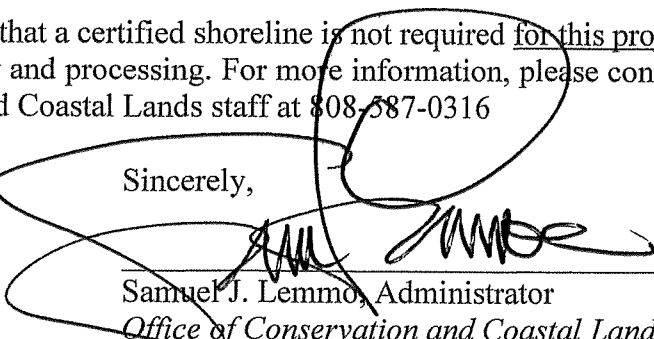
Dear Mr. Kroning,

The Office of Conservation and Coastal Lands (OCCL) is in receipt of your letter requesting that the State of Hawaii – Department of Land and Natural Resources (DLNR) waive the requirement for a shoreline certification for the subject project. For reference, a portion of the project is located within the State Land Use (SLU) Conservation District, *Resource* Subzone.

As discussed previously, the applicant (i.e., City and County of Honolulu) will be submitting a Conservation District Use Application (CDUA) in order to apply for the subject project. Typically, projects that are situated at or near the "shoreline" require a shoreline certification to determine setback requirements, and/or the jurisdictional boundary between the county and the State. However, since the proposed activity is a drainage outfall that involves working across jurisdictional boundaries, the OCCL believes that a shoreline certification, in this instance, would not add any additional information that would improve the project's environmental review.

The OCCL is therefore confirming that a certified shoreline is not required for this project as long as a CDUA is submitted for review and processing. For more information, please contact Alex J. Roy, M.Sc. of our Conservation and Coastal Lands staff at 808-587-0316

Sincerely,


Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

CC: ODLO

Attachment A

ATTACHMENT B
CONSTRUCTION PLANS
November 2018

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GOOD HOUSEKEEPING BMPS:

THE CONTRACTOR SHALL PERFORM THE FOLLOWING WORK:

1. STREET SWEEPING AND VACUUMING. ALL POLLUTANTS DISCHARGED FROM CONSTRUCTION SITE TO OFF-SITE AREAS MUST BE SWEEP OR VACUUMED EACH DAY BEFORE LEAVING THE JOB SITE.
2. MATERIALS DELIVERY, STORAGE AND USE MANAGEMENT. PREVENT, REDUCE, OR ELIMINATE THE DISCHARGE OF POLLUTANTS FROM MATERIAL DELIVERY, STORAGE, AND USE TO THE STORM WATER SYSTEM OR WATERCOURSES BY MINIMIZING THE STORAGE OF HAZARDOUS MATERIALS ONSITE, STORING MATERIALS IN A DESIGNATED AREA, INSTALLING SECONDARY CONTAINMENT. CONSTRUCTION MATERIALS, WASTE, TOXIC AND HAZARDOUS SUBSTANCES, STOCKPILES AND OTHER SOURCES OF POLLUTION SHALL NOT BE STORED IN BUFFER AREAS, NEAR AREAS OF CONCENTRATED FLOW, OR AREAS ABUTTING THE MS4, RECEIVING WATERS, OR DRAINAGE IMPROVEMENTS THAT DISCHARGE OFF-SITE. PRIMARY AND SECONDARY CONTAINMENT CONTROLS AND COVERS SHALL BE IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICABLE (MEP).
3. SPILL PREVENTION AND CONTROL. CREATE AND IMPLEMENT SPILL PREVENTION AND RESPONSE PLANS TO ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO THE MS4 AND RECEIVING WATERS FROM LEAKS AND SPILLS BY REDUCING THE CHANCE FOR SPILLS, ABSORBING, CONTAINING, AND CLEANING UP SPILLS AND PROPERLY DISPOSING OF SPILL MATERIALS. AT A MINIMUM, ALL PROJECTS SHALL CLEANUP ALL LEAKS AND SPILLS IMMEDIATELY.
4. HAZARDOUS MATERIALS. PREVENT OR REDUCE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM HAZARDOUS WASTE THROUGH PROPER MATERIAL USE AND WASTE DISPOSAL. IN THE EVENT THAT HAZARDOUS MATERIALS ARE DISCHARGED TO THE MS4, THE PROPERTY OWNER OR ESCP COORDINATOR SHALL IMMEDIATELY NOTIFY THE DEPARTMENT OF FACILITIES MAINTENANCE, HONOLULU FIRE DEPARTMENT, AND HONOLULU POLICE DEPARTMENT OF THE DISCHARGE BY TELEPHONE. A WRITTEN REPORT DESCRIBING THE POLLUTANTS THAT WERE DISCHARGED, THE REASONS FOR THE DISCHARGE, AND THE MEASURES THAT HAVE BEEN TAKEN OR WILL BE TAKEN TO PREVENT A REOCCURRENCE OF THE DISCHARGE SHALL BE SUBMITTED TO THE DIRECTOR NO LESS THAN 3 DAYS AFTER NOTIFICATION BY PHONE.
5. NONHAZARDOUS MATERIALS. IN THE EVENT THAT NONHAZARDOUS MATERIALS ARE DISCHARGED TO THE MS4, THE PROPERTY OWNER OR ESCP COORDINATOR SHALL NOTIFY THE CITY DEPARTMENT OF FACILITIES MAINTENANCE BY TELEPHONE NO LATER THAN THE NEXT BUSINESS DAY. A WRITTEN REPORT DESCRIBING THE POLLUTANTS THAT WERE DISCHARGED, THE REASONS FOR THE DISCHARGE, AND THE MEASURES THAT HAVE BEEN TAKEN OR WILL BE TAKEN TO PREVENT A REOCCURRENCE OF THE DISCHARGE SHALL BE SUBMITTED TO THE DIRECTOR NO LESS THAN 3 DAYS AFTER NOTIFICATION BY PHONE.
6. VEHICLE AND EQUIPMENT CLEANING. ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM VEHICLE AND EQUIPMENT CLEANING OPERATIONS BY USING OFF-SITE FACILITIES WHEN FEASIBLE, WASHING IN DESIGNATED, CONTAINED AREAS ONLY, AND ELIMINATING DISCHARGES TO THE STORM DRAIN SYSTEM BY EVAPORATING AND/OR TREATING WASH WATER, AS APPROPRIATE OR INFILTRATING WASH WATER FOR EXTERIOR CLEANING ACTIVITIES THAT USE WATER ONLY.
7. VEHICLE AND EQUIPMENT FUELING. PREVENT FUEL SPILLS AND LEAKS BY USING OFF-SITE FACILITIES, FUELING ONLY IN DESIGNATED AREAS, ENCLOSING OR COVERING STORED FUEL, AND IMPLEMENTING SPILL CONTROLS SUCH AS SECONDARY CONTAINMENT AND ACTIVE MEASURES USING SPILL RESPONSE KITS.
8. VEHICLE AND EQUIPMENT MAINTENANCE. ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM VEHICLE AND EQUIPMENT MAINTENANCE OPERATIONS BY USING OFF-SITE FACILITIES WHEN FEASIBLE, PERFORMING WORK IN DESIGNATED AREAS ONLY, USING SPILL PADS UNDER VEHICLES AND EQUIPMENT, CHECKING FOR LEAKS AND SPILLS, AND CONTAINING AND CLEANING UP SPILLS IMMEDIATELY.
9. SOLID WASTE MANAGEMENT. PREVENT OR REDUCE DISCHARGE OF POLLUTANTS TO THE LAND, GROUNDWATER, AND IN STORM WATER FROM SOLID WASTE OR CONSTRUCTION AND DEMOLITION WASTE BY PROVIDING DESIGNATED WASTE COLLECTION AREAS, COLLECT SITE TRASH DAILY, AND ENSURING THAT CONSTRUCTION WASTE IS COLLECTED, REMOVED, AND DISPOSED OF ONLY AT AUTHORIZED DISPOSAL AREAS.
10. SANITARY/SEPTIC WASTE MANAGEMENT. TEMPORARY AND PORTABLE SANITARY AND SEPTIC WASTE SYSTEMS SHALL BE MOUNTED OR STAKED IN, WELL-MAINTAINED AND SCHEDULED FOR REGULAR WASTE DISPOSAL AND SERVICING. SOURCES OF SANITARY AND/OR SEPTIC WASTE SHALL NOT BE STORED NEAR THE MS4 OR RECEIVING WATERS.
11. STOCKPILE MANAGEMENT. STOCKPILES SHALL NOT BE LOCATED IN DRAINAGE WAYS, WITHIN 50 FEET FROM AREAS OF CONCENTRATED FLOWS, AND ARE NOT ALLOWED IN THE CITY RIGHT-OF-WAY. SEDIMENT BARRIERS OR SILT FENCES SHALL BE USED AROUND THE BASE OF ALL STOCKPILES. STOCKPILES SHALL NOT EXCEED 15 FEET IN HEIGHT. STOCKPILES GREATER THAN 15 FEET IN HEIGHT SHALL REQUIRE 8 FOOT WIDE BENCHING IN ACCORDANCE WITH REVISED ORDINANCES OF HONOLULU (ROH) CHAPTER 14, ARTICLE 15. STOCKPILES MUST BE COVERED WITH PLASTIC SHEETING OR A COMPARABLE MATERIAL IF THEY WILL NOT BE ACTIVELY USED WITHIN 7 DAYS.
12. LIQUID WASTE MANAGEMENT. LIQUID WASTE SHALL BE CONTAINED IN A CONTROLLED AREA SUCH AS A HOLDING PIT, SEDIMENT BASIN, ROLL-OFF BIN, OR PORTABLE TANK OF SUFFICIENT VOLUME AND TO CONTAIN THE LIQUID WASTES GENERATED. CONTAINMENT AREAS OR DEVICES MUST BE IMPERMEABLE AND LEAK FREE AND SHOULD NOT BE LOCATED WHERE ACCIDENTAL RELEASE OF THE CONTAINED LIQUID CAN DISCHARGE TO WATER BODIES, CHANNELS, OR STORM DRAINS.
13. CONCRETE WASTE MANAGEMENT. PREVENT OR REDUCE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM CONCRETE WASTE BY CONDUCTING WASHOUT OFFSITE OR PERFORMING ONSITE WASHOUT IN A DESIGNATED AREA CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS. PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MILLIMETER POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL. CONTAINMENT AREAS OR DEVICES SHOULD NOT BE LOCATED WHERE ACCIDENTAL RELEASE OF THE CONTAINED LIQUID CAN DISCHARGE TO WATER BODIES, CHANNELS, OR STORM DRAINS. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75 PERCENT FULL. ONCE CONCRETE WASTES ARE WASHED INTO THE DESIGNATED AREA AND ALLOWED TO HARDEN, THE CONCRETE SHOULD BE BROKEN UP, REMOVED, AND DISPOSED OF AS SOLID WASTES.
14. CONTAMINATED SOIL MANAGEMENT. AT MINIMUM CONTAIN CONTAMINATED MATERIAL SOIL BY SURROUNDING WITH IMPERMEABLE LINED BERMS OR COVER EXPOSED CONTAMINATED MATERIAL WITH PLASTIC SHEETING. CONTAMINATED SOIL SHOULD BE DISPOSED OF PROPERLY IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.

GOOD HOUSEKEEPING BMPS: (CONTINUED)

15. MATERIALS POLLUTION PREVENTION PLAN

- A. APPLICABLE MATERIALS OR SUBSTANCES LISTED BELOW ARE EXPECTED TO BE PRESENT ONSITE DURING CONSTRUCTION. OTHER MATERIALS AND SUBSTANCES NOT LISTED SHALL BE ADDED TO THE INVENTORY:

CONCRETE
DETERGENTS
PAINT
CLEANING SOLVENTS
MASONRY BLOCKS

FERTILIZERS
PETROLEUM BASED PRODUCTS
ADHESIVES
WOOD
- B. MATERIAL MANAGEMENT PRACTICES SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORMWATER RUNOFF. AN EFFORT SHALL BE MADE TO STORE ONLY ENOUGH PRODUCT AS REQUIRED TO DO THE JOB.
- C. ALL MATERIALS STORED ONSITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR APPROPRIATE CONTAINERS AND IF POSSIBLE UNDER A ROOF OR OTHER ENCLOSURE.
- D. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURE'S LABEL.
- E. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURE.
- F. WHENEVER POSSIBLE, A PRODUCT SHALL BE USED UP COMPLETELY BEFORE DISPOSING OF THE CONTAINER.
- G. MANUFACTURE'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED.
- H. THE CONTRACTOR SHALL CONDUCT A DAILY INSPECTION TO ENSURE PROPER USE, STORAGE AND DISPOSAL OF MATERIALS ONSITE.

16. ONSITE AND OFFSITE PRODUCT SPECIFIC PLAN

- A. THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ONSITE;

I. PETROLEUM BASED PRODUCTS: ALL ONSITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. PETROLEUM PRODUCT SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT SUBSTANCES USED ONSITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURE'S RECOMMENDATIONS.

II. FERTILIZERS: FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS RECOMMENDED BY THE MANUFACTURE. ONCE APPLIED, FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER RUNOFF. STORAGE SHALL BE IN A COVERED SHED. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN WITH A LID TO AVOID SPILLS.


III. PAINTS: ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT SHALL NOT BE DISCHARGED TO THE CITY DRAINAGE SYSTEM BUT SHALL BE PROPERLY DISPOSED OF ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.

IV. CONCRETE TRUCKS: CONCRETE TRUCKS SHALL BE ALLOWED TO WASH OUT OR DRUM WASH WATER ONLY AT A DESIGNATED SITE. WATER SHALL NOT BE DISCHARGED TO THE CITY DRAINAGE SYSTEM OR WATERS OF THE UNITED STATES. THE CONTRACTOR SHALL CONTACT THE DRINKING WATER BRANCH, DEPARTMENT OF HEALTH AT 586-4258 TO RECEIVE PERMISSION TO DESIGNATE A DISPOSAL SITE. THE CONTRACTOR SHALL CLEAN THE DISPOSAL SITE AS REQUIRED OR AS REQUESTED BY THE OFFICER-IN-CHARGE.
- B. OFFSITE VEHICLE TRACKING:

A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED TO HELP REDUCE VEHICLE TRACKING OF SEDIMENT. THE PAVED STREET ADJACENT TO THE SITE ENTRANCE SHALL BE CLEANED DAILY OR AS REQUIRED TO REMOVE ANY EXCESS MUD, DIRT, ROCKS OR DEBRIS TRACKED FROM THE SITE. DUMP TRUCKS HAULING MATERIAL TO AND FROM THE CONSTRUCTION SITE SHALL BE COVERED WITH A TARPULIN OR MATERIAL ACCEPTABLE TO THE OFFICER-IN-CHARGE.

17. DUST CONTROL. DUST FROM THE PROJECT SITE SHALL NOT BE TRANSPORTED OR DISCHARGE TO OFFSITE AREAS. PERFORM THE WORK IN ACCORDANCE WITH THE AIR POLLUTION CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES: TITLE 11, CHAPTER 60.1, "AIR POLLUTION CONTROL". PROVIDE ONE OR MORE OF THE FOLLOWING DUST CONTROL MEASURE(S) AS DIRECTED BY THE OFFICER-IN-CHARGE:
 - MULCHING TO A DEPTH OF NO LESS THAN 1 INCH.
 - SPRINKLING EXPOSED SOIL WITH WATER TO MAINTAIN MOISTNESS AT A DEPTH OF 2 - 3 INCHES DURING WORKING HOURS AND NOT TO GENERATE ANY RUNOFF.
 - VERTICAL DUST BARRIERS NO LESS THAN 6 FEET IN HEIGHT, CONSTRUCTED OF MATERIALS CAPABLE OF EFFECTIVELY PREVENTING THE SPREAD OF DUST PARTICLES, AND/OR
 - SPRAY-ON CHEMICAL SOIL TREATMENTS (PALLIATIVES) SUCH AS ANIONIC ASPHALT EMULSION, LATEST EMULSION, RESIN-WATER EMULSIONS, OR CALCIUM CHLORIDE. SPRAY-ON CHEMICAL TREATMENT SHALL BE APPLIED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

REVISION	DATE	DESCRIPTION	ENGR.	APPROVED



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. (OBSERVATION OF CONSTRUCTION SHALL BE AS DEFINED IN CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII, SUBCHAPTER 1, SECTION 16-115-2, DEFINITIONS, EFFECTIVE 08/28/94).

Russell M. Arai

ParEn, Inc.
dba PARK ENGINEERING
LICENSE EXPIRES 4-30-20

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
CIVIL DIVISION

KAWAILOA ROAD DRAINAGE IMPROVEMENTS
TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010
KAILUA, KOOLAUPOKO, OAHU, HAWAII

EROSION AND SEDIMENT
CONTROL PLAN NOTES

DESIGN: EHV

DRAWN: NGA

CHECKED: RMA

DATE: NOVEMBER 2018

APPROVED:

CHIEF, CIVIL DIVISION, DDC

DATE

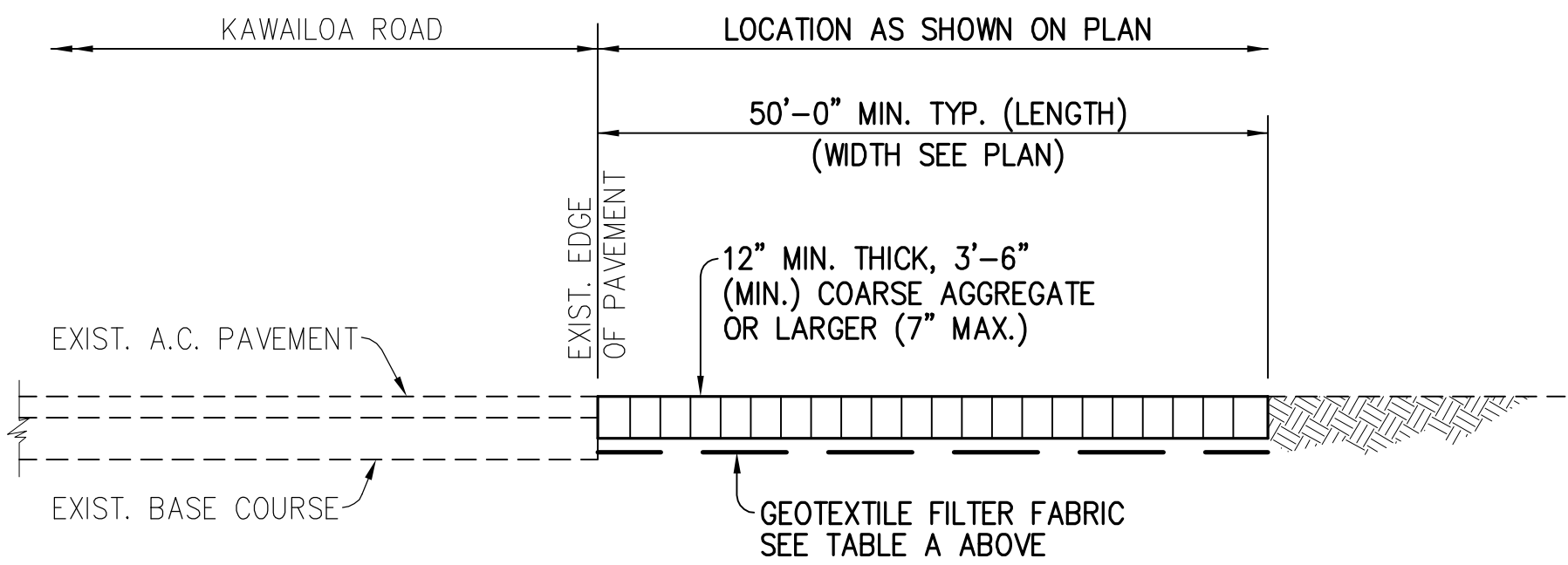
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C-7
SHEET 8
OF 54 SHEETS

JOB NO. 24-18FILE __ __ DRAW __ __ FOLDER __ __ NUMBER __ __

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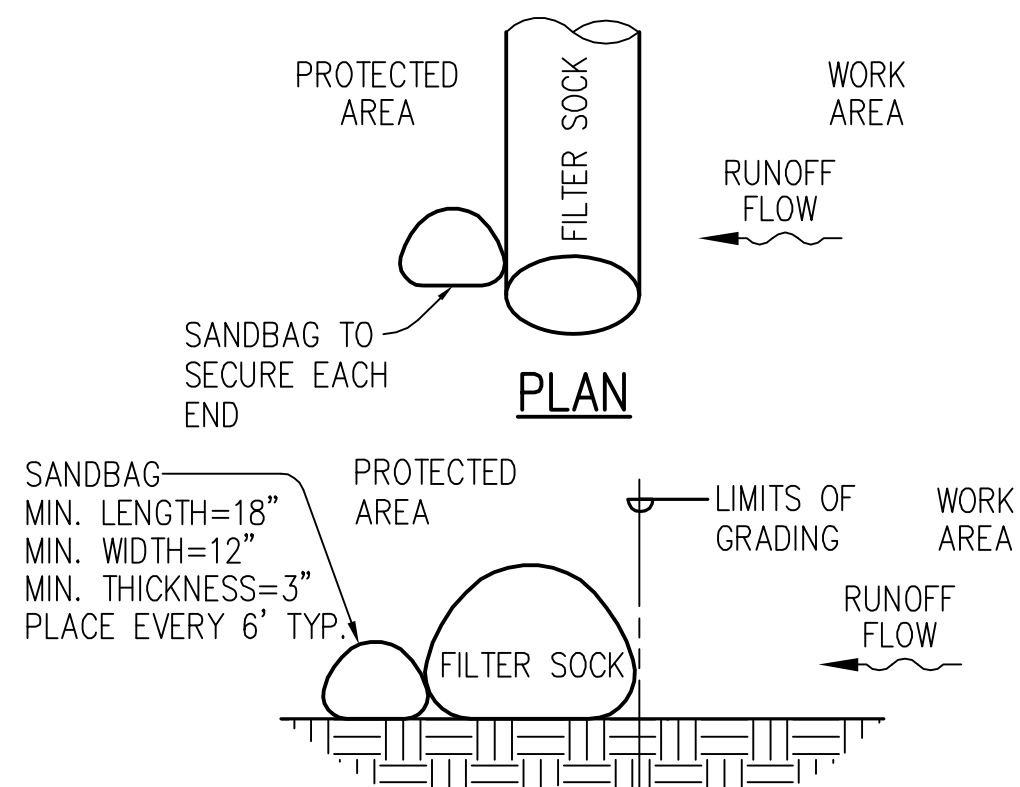
CHIEF, CIVIL ENGINEERING BRANCH, DPP

DATE

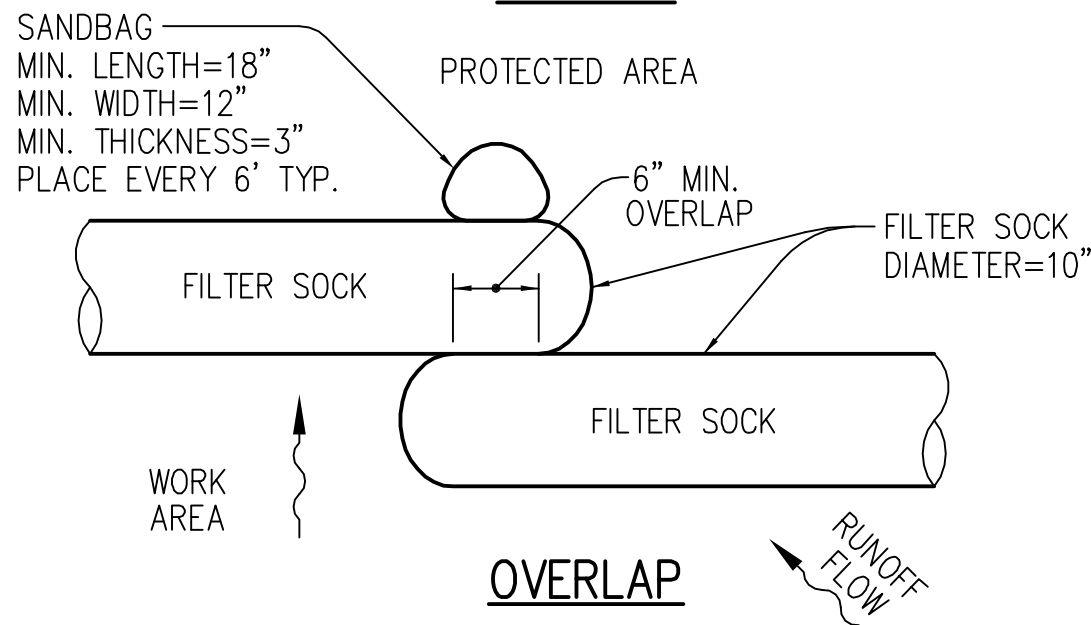


SECTION

CONSTRUCTION INGRESS/EGRESS DETAILS
NOT TO SCALE



SECTION



OVERLAP

NOTES:

1. COMPOST SHALL NOT CONTAIN BIOSOLIDS AND SHOULD BE CONSISTENT WITH EPA GUIDELINES.
2. STAKING NOT REQUIRED. PROVIDE SANDBAGS AS INDICATED.

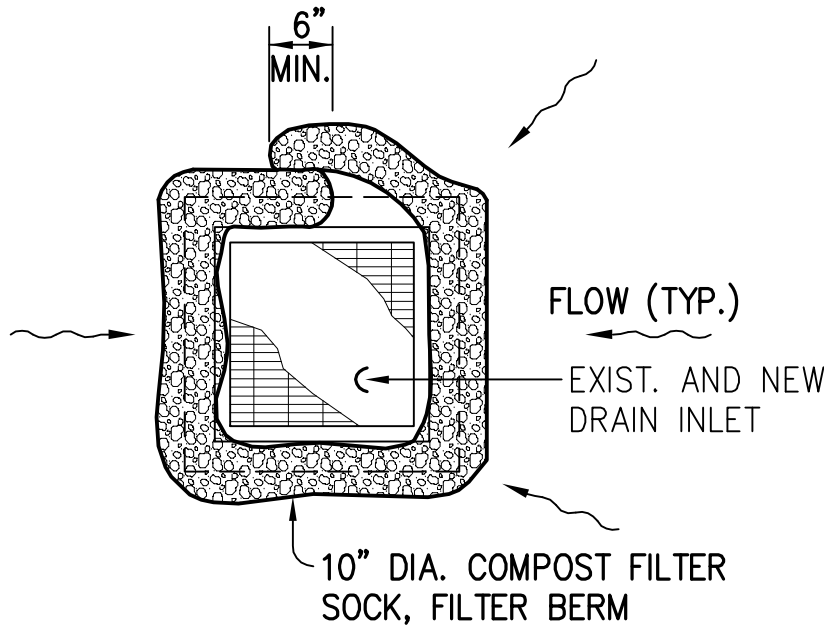
COMPOST FILTER SOCK DETAILS
NOT TO SCALE

NOTES:

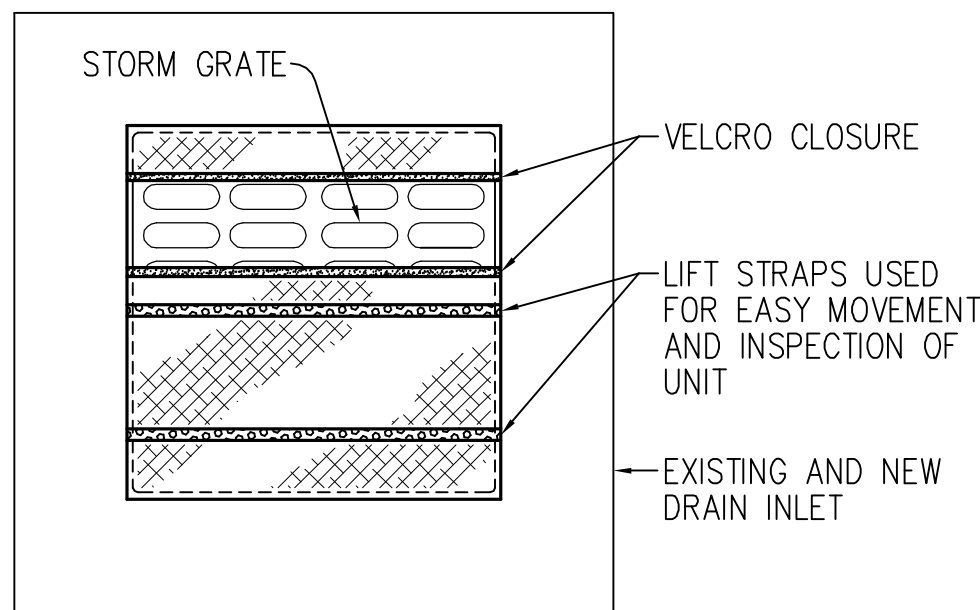
1. COMPOST SHALL NOT CONTAIN BIOSOLIDS AND SHOULD BE CONSISTENT WITH EPA GUIDELINES.
2. THE CONTRACTOR SHALL REMOVE THE INLET FILTERS DURING TIMES OF ABOVE NORMAL RAINFALL EVENTS AND REPLACE THE FILTER WHEN THE EVENT HAS PASSED.
3. GEOTEXTILE FILTER FABRIC SHALL HAVE THE FOLLOWING MINIMUM PHYSICAL PROPERTIES:

MECHANICAL PROPERTIES	TEST METHOD	UNITS	MARV
GRAB TENSILE STRENGTH	ASTM D 4632	kN (lbs)	1.62 (365) X 0.89 (200)
GRAB TENSILE ELONGATION	ASTM D 4632	%	24 X 10
PUNCTURE STRENGTH	ASTM D 4833	kN (lbs)	0.40 (90)
MULLEN BURST STRENGTH	ASTM D 3786	kPa (psi)	3097 (450)
TRAPEZOID TEAR STRENGTH	ASTM D 4533	kN (lbs)	0.51 (115) X 0.33 (75)
UV RESISTANCE	ASTM D 4355	%	90
APPARENT OPENING SIZE	ASTM D 4751	Mm (US Std Sieve)	0.425 (40)
FLOW RATE	ASTM D 4491	1/min/m ² (gal/min/ft) ²	5907 (145)
PERMITTIVITY	ASTM D 4491	Sec ⁻¹	2.1

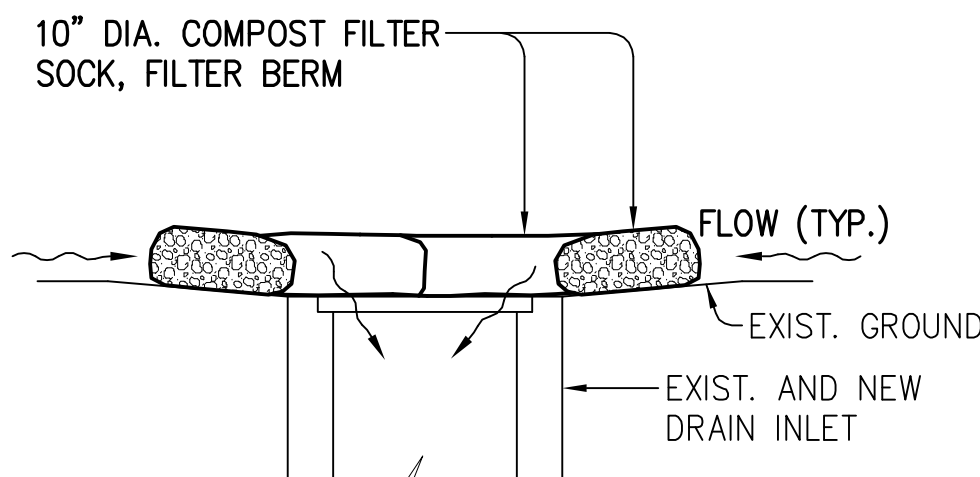
4. SEE EROSION PREVENTION/SEDIMENT CONTROL NOTE NO. 10 ON DWG. C-6 FOR ADDITIONAL REQUIREMENTS.



PLAN

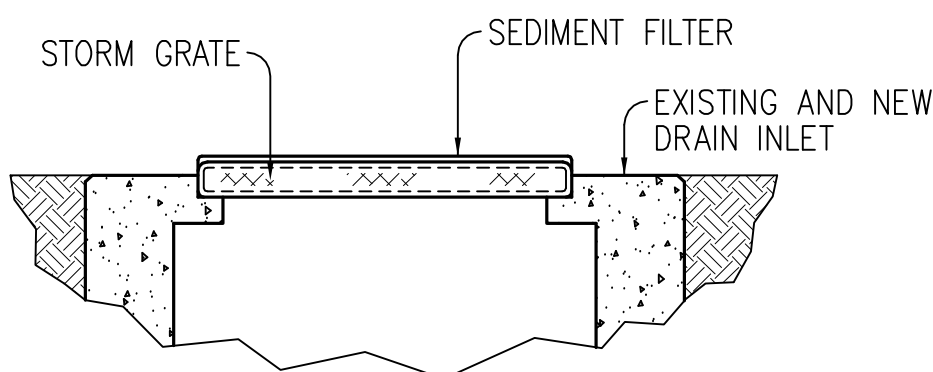


PLAN



SECTION

(OPTION 1)



SECTION

(OPTION 2)

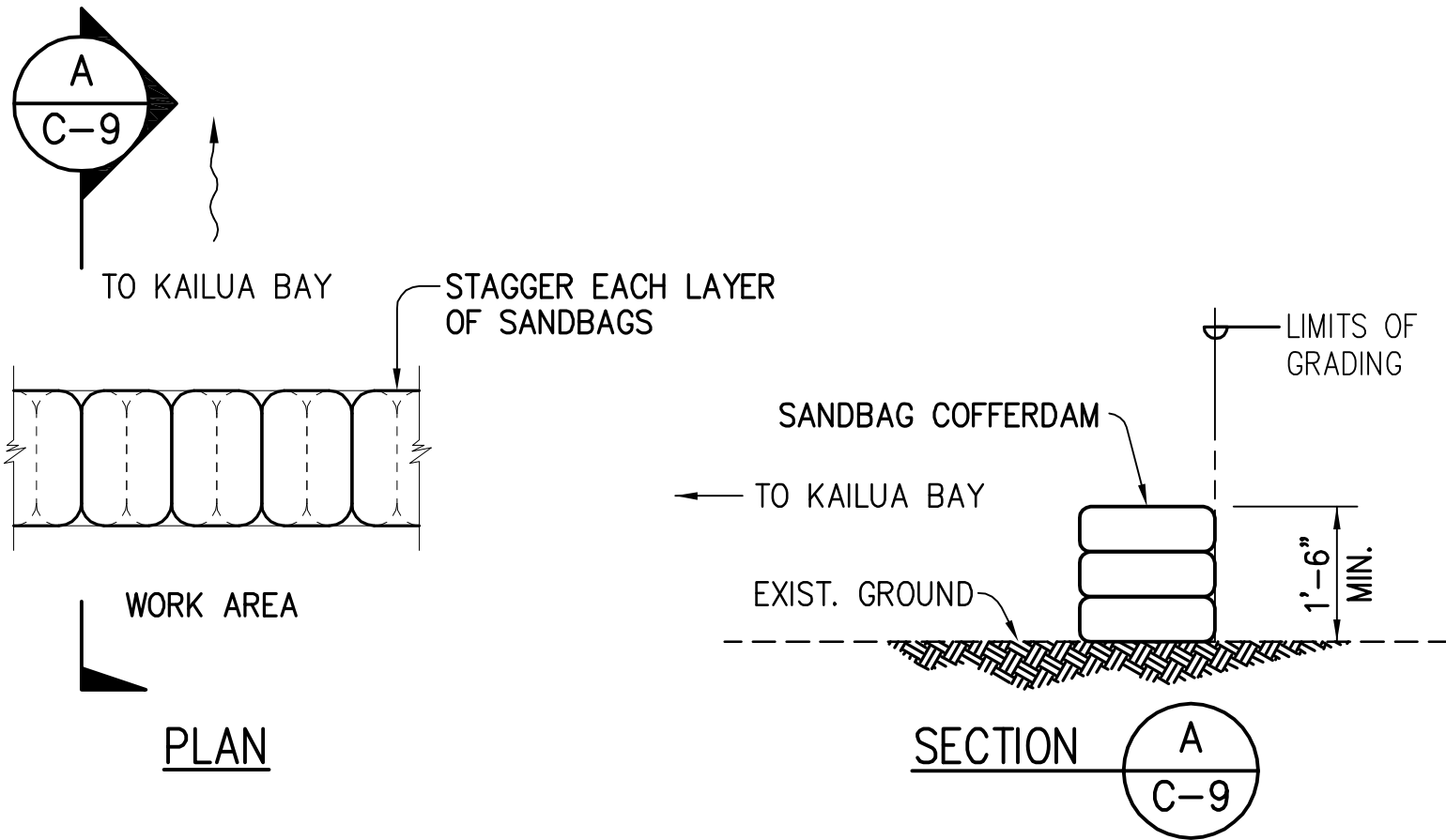
SEDIMENT CONTROL FILTER AT DRAIN INLET
NOT TO SCALE

NOTES:

1. THE GEOTEXTILE FILTER FABRIC SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

TABLE A GEOTEXTILE REQUIREMENTS		
PHYSICAL PROPERTY	TEST METHOD	REQUIREMENTS
GRAB TENSILE STRENGTH	ASTM D 1682	220 LB
ELONGATION FAILURE	ASTM D 1682	60%
MULLEN BURST STRENGTH	ASTM D 3768	430 LB.
PUNCTURE STRENGTH	ASTM D751 MODIFIED	125 LB.
EQUIVALENT OPENING	U.S. STD. SEIVE CW-02215	SIZE 40-80

2. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO ENSURE THAT THE AGGREGATE FROM THE TEMPORARY CONSTRUCTION INGRESS/EGRESS DOES NOT SPILL ONTO THE ADJACENT LANDSCAPED AREAS, WALKWAYS, PARKING LOT AND ROADWAYS. THE CONTRACTOR SHALL REMOVE ALL AGGREGATE MATERIAL DISPLACED FROM THE TEMPORARY CONSTRUCTION INGRESS/EGRESS TO PREVENT POTENTIAL DAMAGE TO MOWING EQUIPMENT AND INJURY TO THE PUBLIC AND CITY STAFF.



PLAN

SECTION

SANDBAG NOTES:

1. SANDBAGS SHALL BE COMPOSED OF POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN FABRIC WITH MINIMUM UNIT WEIGHT 4 OUNCES PER SQ. YD., MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70 PERCENT.
2. TYPICAL SANDBAG DIMENSIONS:
LENGTH 18" MIN.
WIDTH 12" MIN.
THICKNESS 6" MIN.
3. DOUBLE BAG EACH SAND BAG.
4. SANDBAGS SHALL BE FILLED WITH ONSITE SAND FROM EXCAVATION.
5. SANDBAGS SHALL BE FILLED ONE-HALF TO TWO-THIRDS FULL.
6. STACK AND STAGGER SANDBAGS.
7. THE SANDBAG COFFERDAM WILL ALSO SERVE AS A VELOCITY DISSIPATION DEVICE. THE COFFERDAM WILL COMPLY WITH THE C&C SWQ RULE 20-3-35 TO ACCOMMODATE THE PEAK FLOW OF A 10 YEAR, 1 HOUR STORM. SEE THE DRAINAGE REPORT FOR RESULTS AND CALCUATIONS.

SANDBAG COFFERDAM DETAIL
NOT TO SCALE

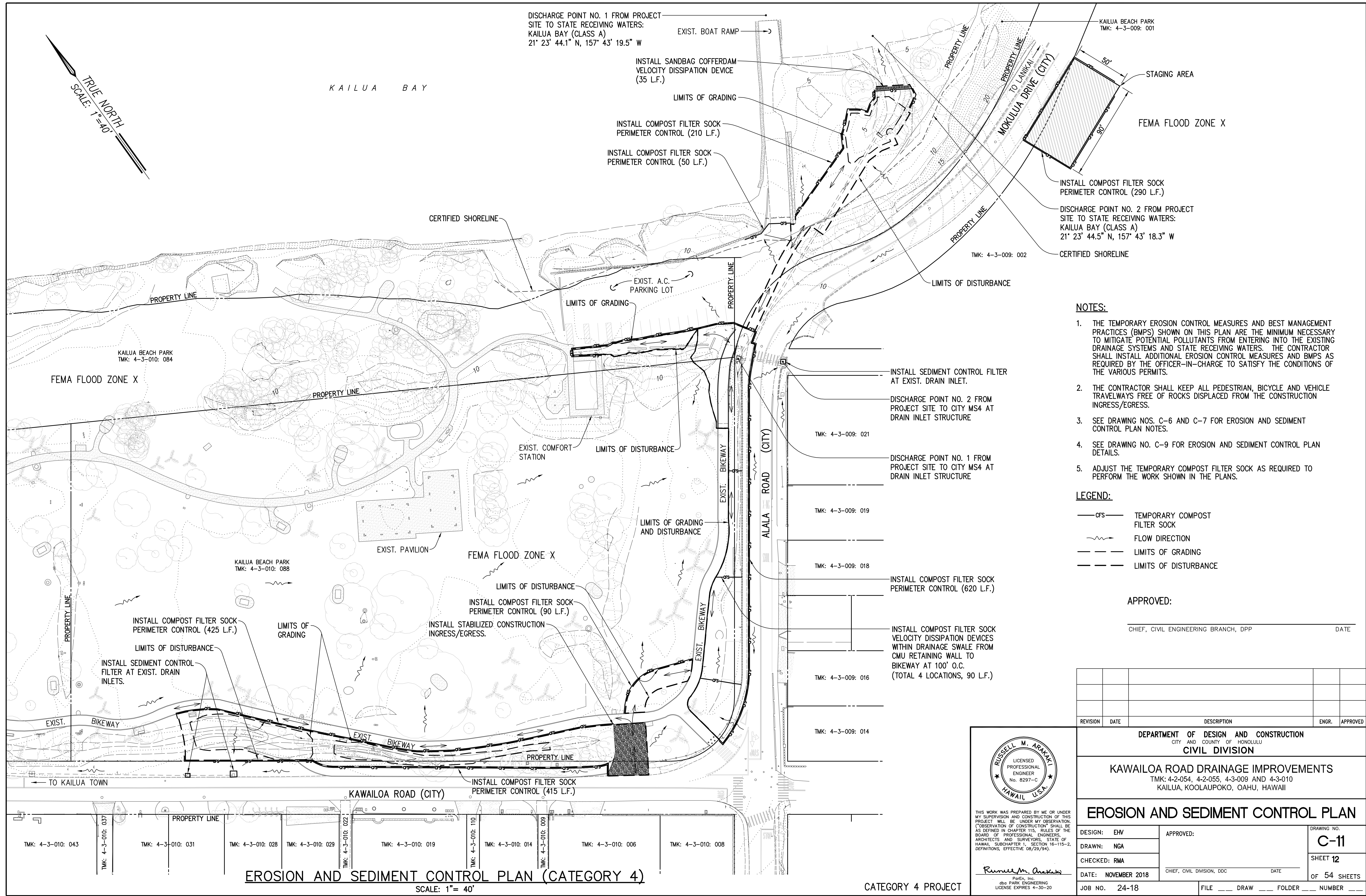
REVISION	DATE	DESCRIPTION	ENGR.	APPROVED

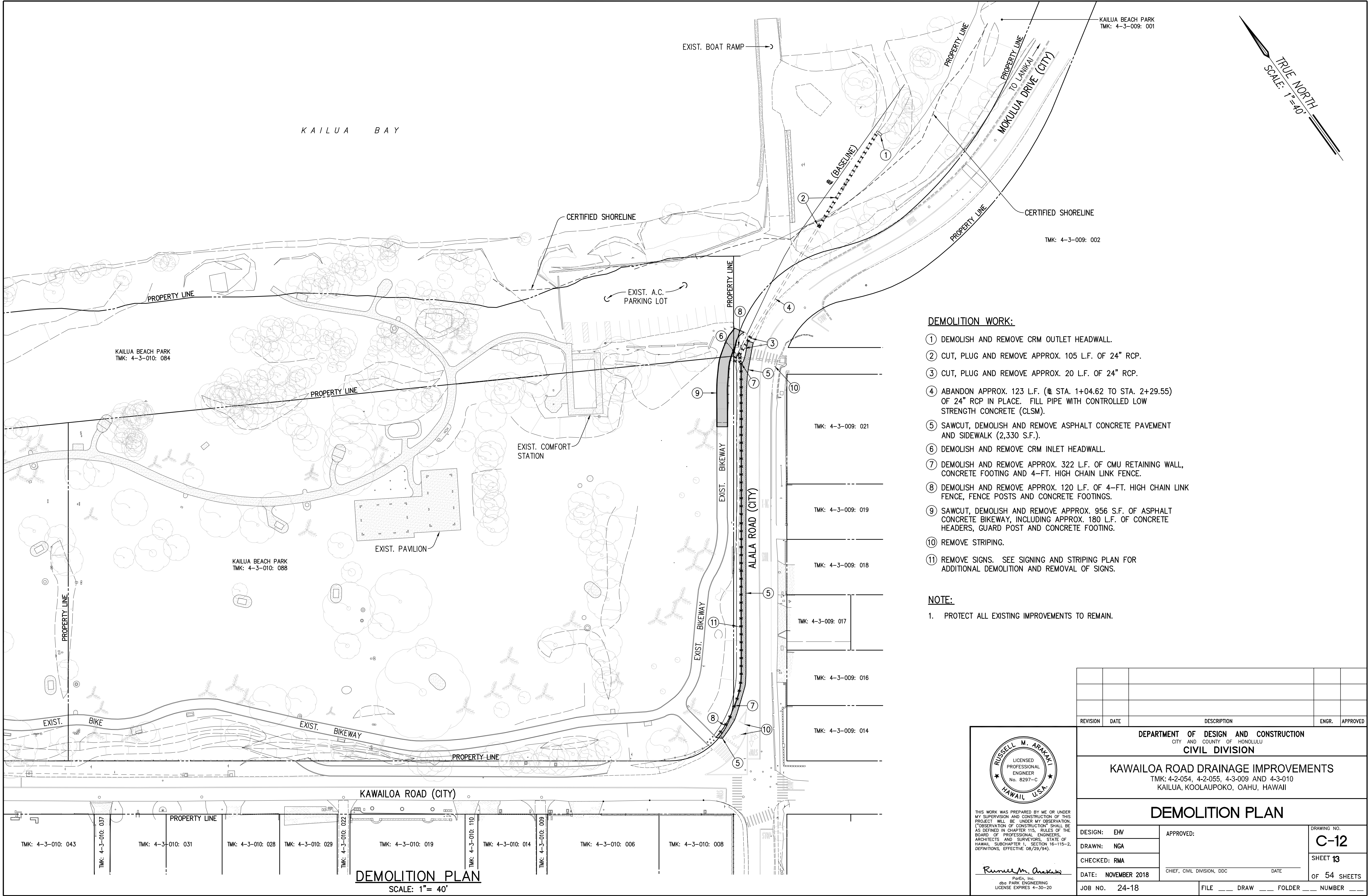
<p>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. (OBSERVATION OF CONSTRUCTION) SHALL BE AS DEFINED IN CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII, SUBCHAPTER 1, SECTION 16-115-2, DEFINITIONS, EFFECTIVE 08/28/94).</p> <p>Russell M. Arai PacEn, Inc. dba PARK ENGINEERING LICENSE EXPIRES 4-30-20</p>	DEPARTMENT OF DESIGN AND CONSTRUCTION CITY AND COUNTY OF HONOLULU CIVIL DIVISION			
	KAWAILOA ROAD DRAINAGE IMPROVEMENTS TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010 KAILUA, KOOLAUPOKO, OAHU, HAWAII			
	EROSION AND SEDIMENT CONTROL PLAN DETAILS			
	DESIGN: EHV DRAWN: NGA CHECKED: RMA DATE: NOVEMBER 2018	APPROVED: CHIEF, CIVIL DIVISION, DDC DATE	DRAWING NO. C-9 SHEET 10 OF 54 SHEETS	
	JOB NO. 24-18	FILE	DRAW	FOLDER

APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, DPP

DATE



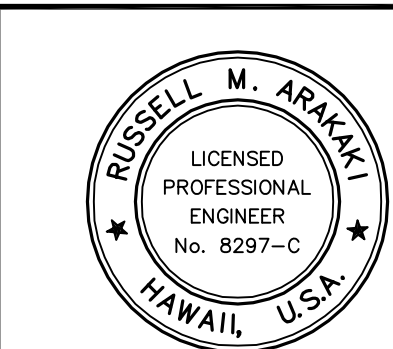


DEMOLITION WORK:

- ① DEMOLISH AND REMOVE CRM OUTLET HEADWALL.
- ② CUT, PLUG AND REMOVE APPROX. 105 L.F. OF 24" RCP.
- ③ CUT, PLUG AND REMOVE APPROX. 20 L.F. OF 24" RCP.
- ④ ABANDON APPROX. 123 L.F. (ℳ STA. 1+04.62 TO STA. 2+29.55) OF 24" RCP IN PLACE. FILL PIPE WITH CONTROLLED LOW STRENGTH CONCRETE (CLSM).
- ⑤ SAWCUT, DEMOLISH AND REMOVE ASPHALT CONCRETE PAVEMENT AND SIDEWALK (2,330 S.F.).
- ⑥ DEMOLISH AND REMOVE CRM INLET HEADWALL.
- ⑦ DEMOLISH AND REMOVE APPROX. 322 L.F. OF CMU RETAINING WALL, CONCRETE FOOTING AND 4-FT. HIGH CHAIN LINK FENCE.
- ⑧ DEMOLISH AND REMOVE APPROX. 120 L.F. OF 4-FT. HIGH CHAIN LINK FENCE, FENCE POSTS AND CONCRETE FOOTINGS.
- ⑨ SAWCUT, DEMOLISH AND REMOVE APPROX. 956 S.F. OF ASPHALT CONCRETE BIKEWAY, INCLUDING APPROX. 180 L.F. OF CONCRETE HEADERS, GUARD POST AND CONCRETE FOOTING.
- ⑩ REMOVE STRIPING.
- ⑪ REMOVE SIGNS. SEE SIGNING AND STRIPING PLAN FOR ADDITIONAL DEMOLITION AND REMOVAL OF SIGNS.

NOTE:

- 1. PROTECT ALL EXISTING IMPROVEMENTS TO REMAIN.

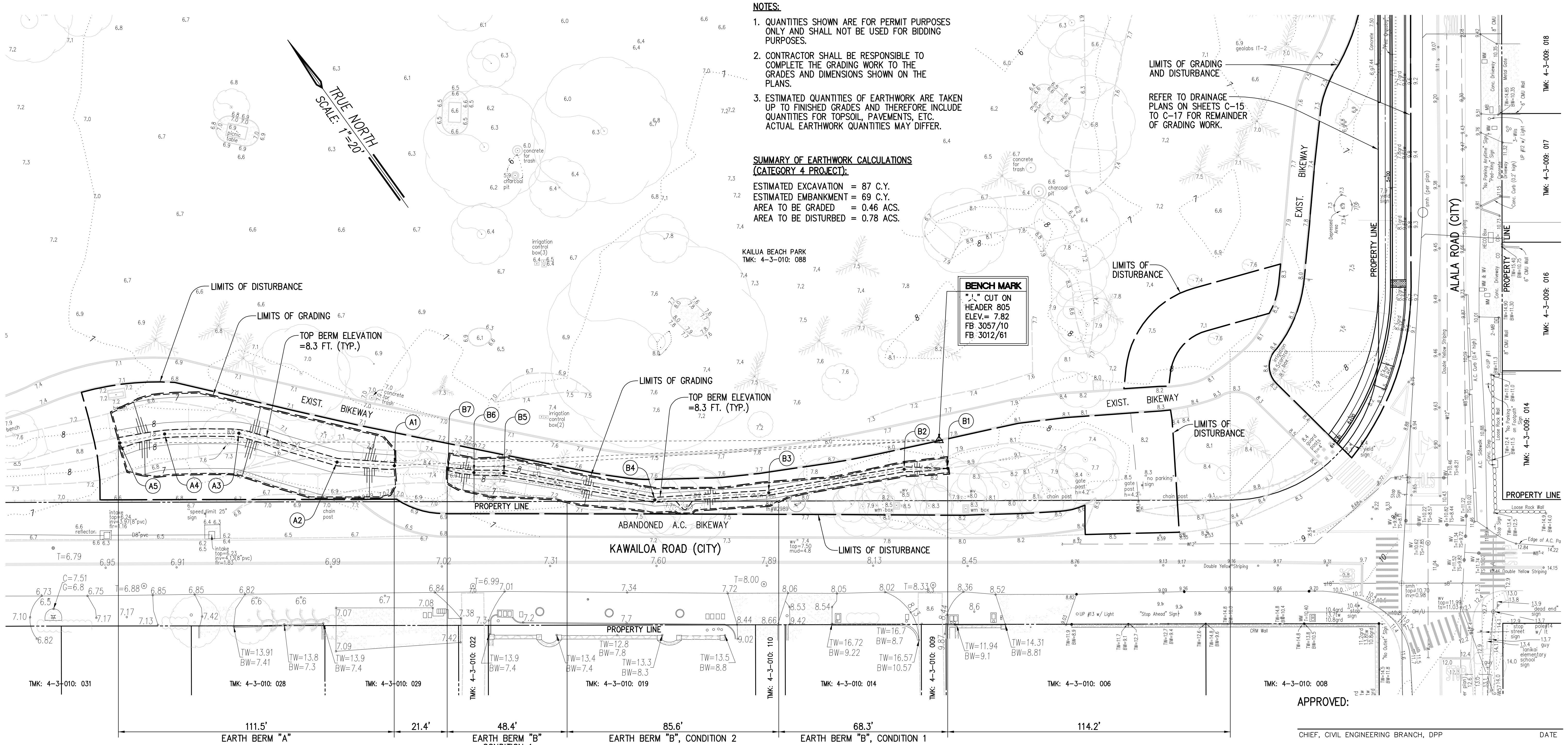


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Russell M. Arai
PerEn, Inc.
dba PARK ENGINEERING
LICENSE EXPIRES 4-30-20

REVISION	DATE	DESCRIPTION	ENGR.	APPROVED

DEPARTMENT OF DESIGN AND CONSTRUCTION CITY AND COUNTY OF HONOLULU CIVIL DIVISION			
KAWAIOLOA ROAD DRAINAGE IMPROVEMENTS TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010 KAILUA, KOOLAUPOKO, OAHU, HAWAII			
DEMOLITION PLAN			
DESIGN: EHV	APPROVED:	DRAWING NO. C-12	
DRAWN: NGA	CHIEF, CIVIL DIVISION, DDC	SHEET 13	
CHECKED: RMA		OF 54 SHEETS	
DATE: NOVEMBER 2018	DATE	FILE	
JOB NO. 24-18	DRAW	FOLDER	NUMBER



STAKEOUT INFORMATION FOR EARTH BERM "A"

TIE	AZIMUTH	DISTANCE [FT]	SIDE SLOPE [FT/FT]	TOP WIDTH [FT]
BENCHMARK TO A1	123° 03' 15"	220.26	10H:1V	2.6
A1 TO A2	129° 21' 18"	23.23	10H:1V	3.0
A2 TO A3	142° 09' 18"	42.12	10H:1V	3.0
A3 TO A4	125° 10' 36"	31.07	10H:1V	3.0
A4 TO A5	114° 29' 22"	18.46	10H:1V	3.7
A5 TO BENCHMARK	305° 33' 19"	331.00	10H:1V	4.4

STAKEOUT INFORMATION FOR EARTH BERM "B"

TIE	AZIMUTH	DISTANCE [FT]	SIDE SLOPE [FT/FT]	TOP WIDTH [FT]
BENCHMARK TO B1	18° 20' 18"	11.98	5H:1V	0.0
B1 TO B2	124° 24' 39"	17.62	5H:1V	2.0
B2 TO B3	115° 55' 43"	55.52	5H:1V	2.0
B3 TO B4	112° 11' 16"	46.13	5H:1V	2.0
B4 TO B5	135° 51' 29"	61.97	5H:1V	2.3
B5 TO B6	126° 29' 47"	12.08	5H:1V	2.0
B6 TO B7	133° 52' 56"	10.65	5H:1V	1.7
B7 TO BENCHMARK	302° 23' 32"	198.74	5H:1V	1.3

LEGEND:

- (A1) STAKEOUT POINT
- 7.6 EXISTING SPOT ELEVATION
- APPROXIMATE EXIST. 7-FT CONTOUR
- APPROXIMATE PROP. 7-FT CONTOUR
- LIMITS OF DISTURBANCE
- LIMITS OF GRADING
- PROPERTY LINE



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Russell M. Arawaka

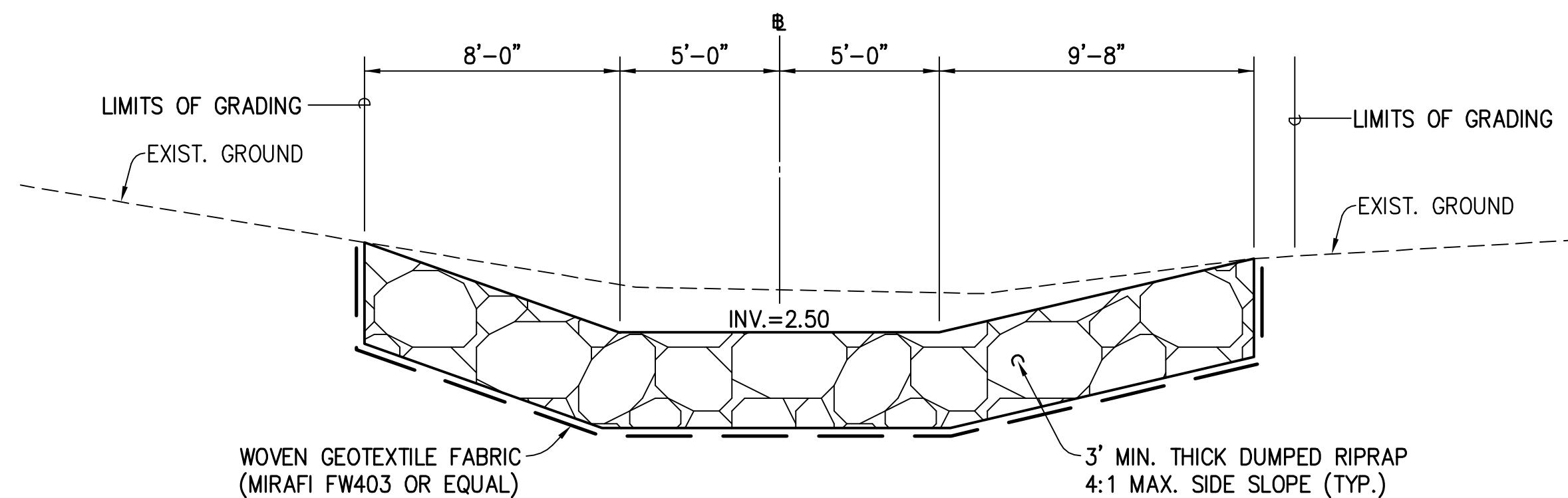
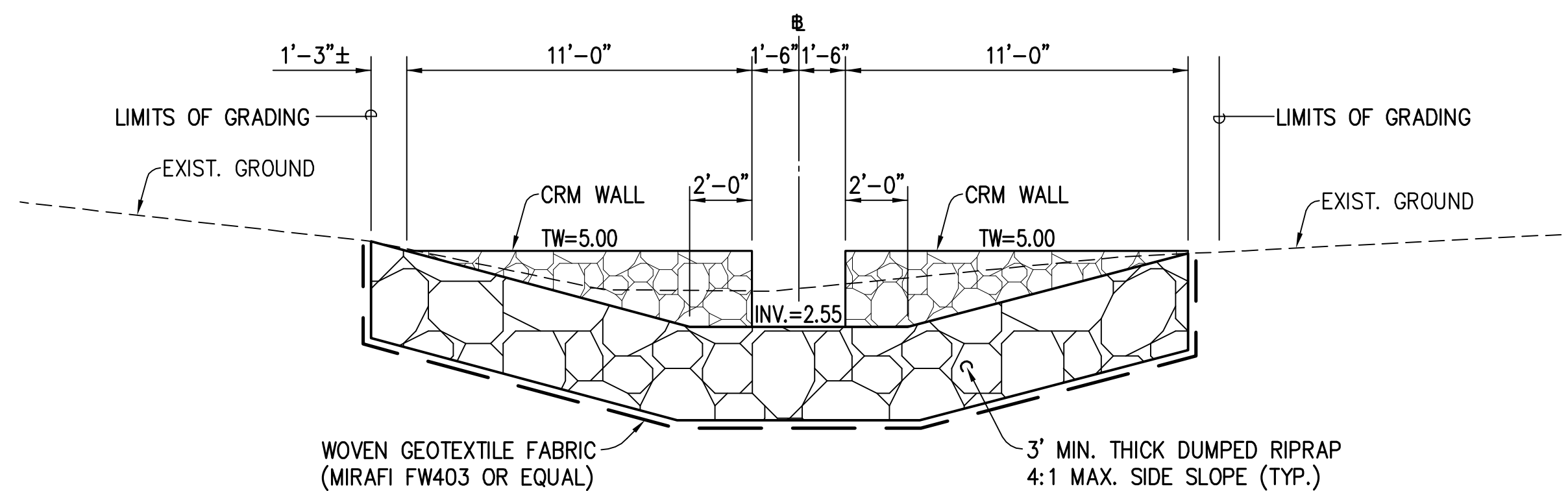
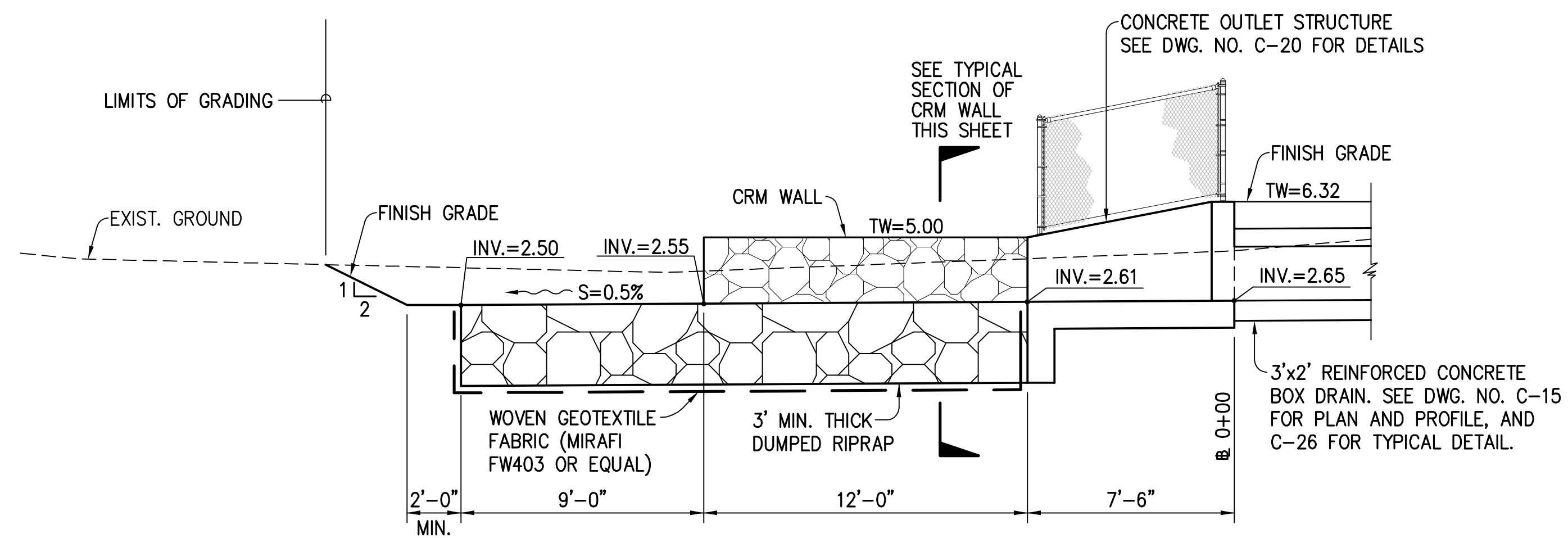
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CIVIL DIVISION

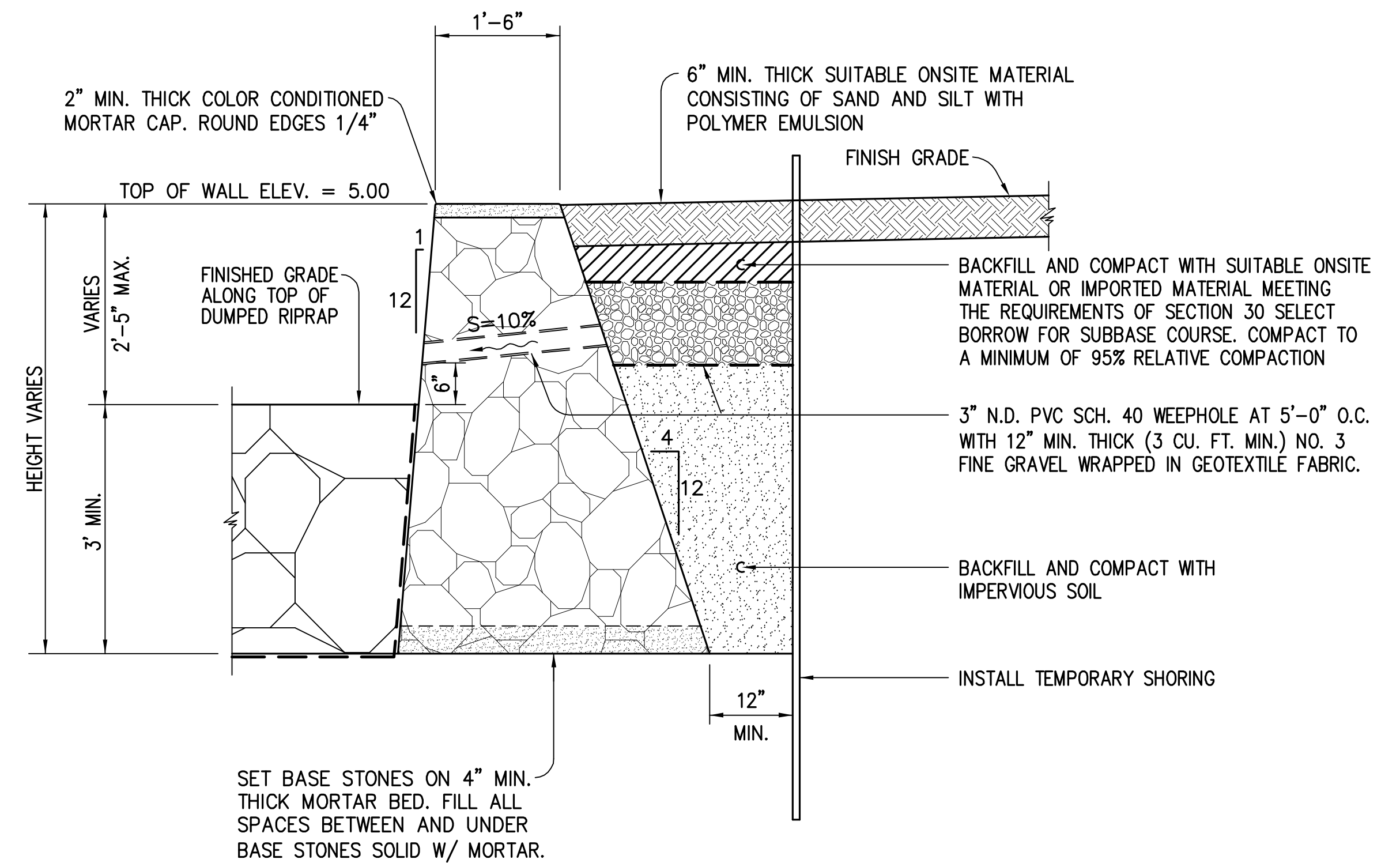
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TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010
KAILUA, KOOLAUPOKO, OAHU, HAWAII

GRADING PLAN

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OUTLET SECTIONS



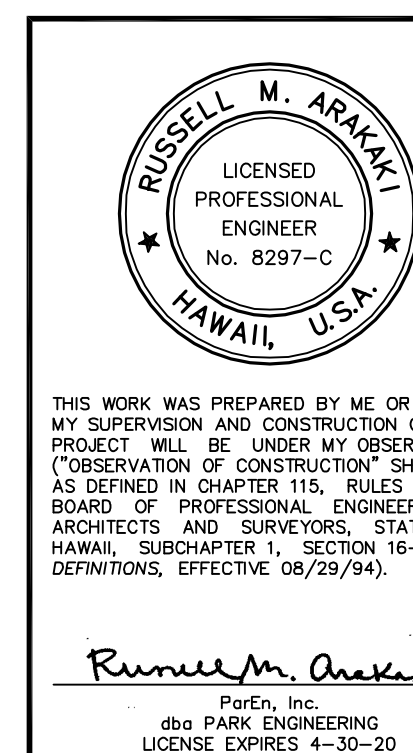
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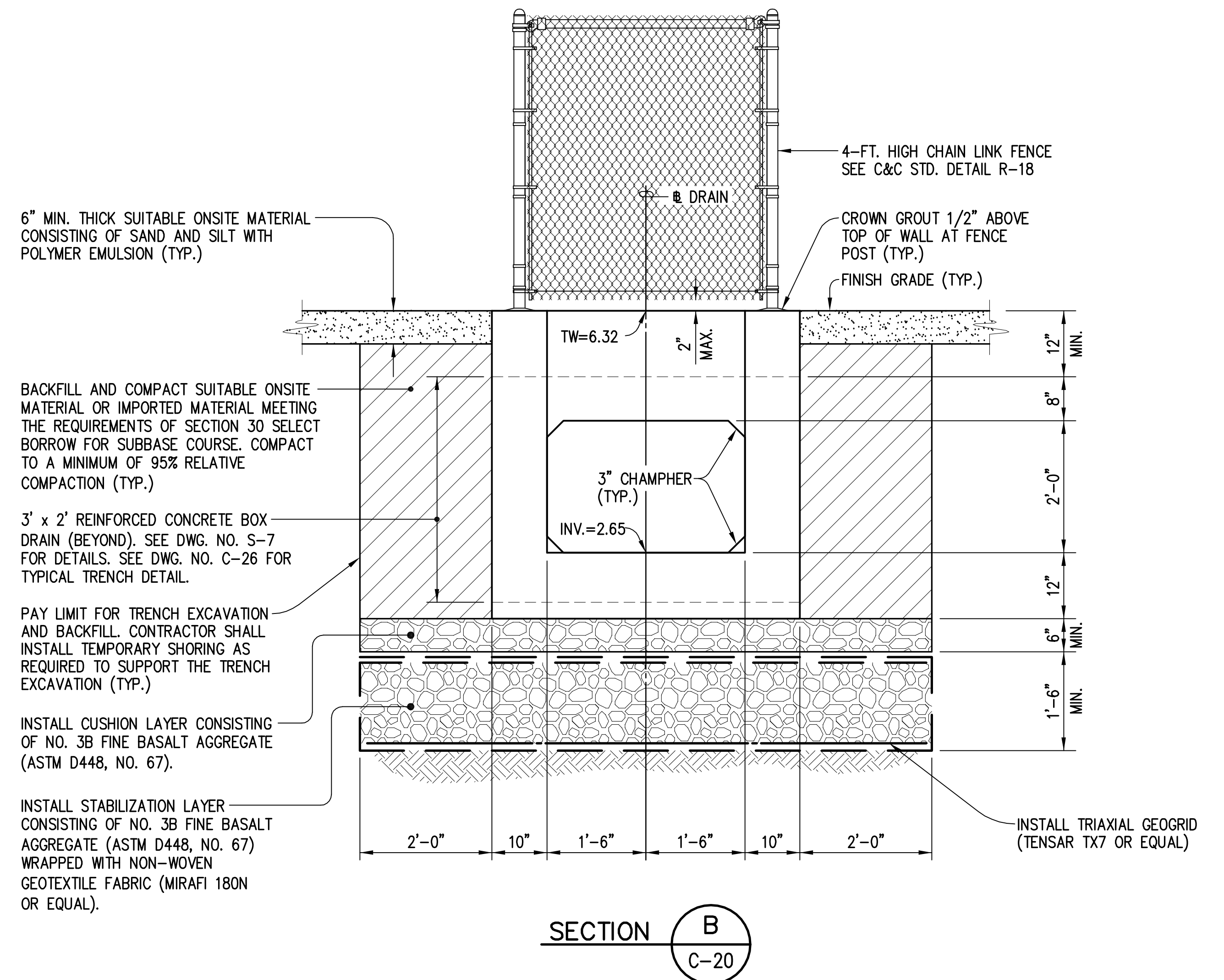
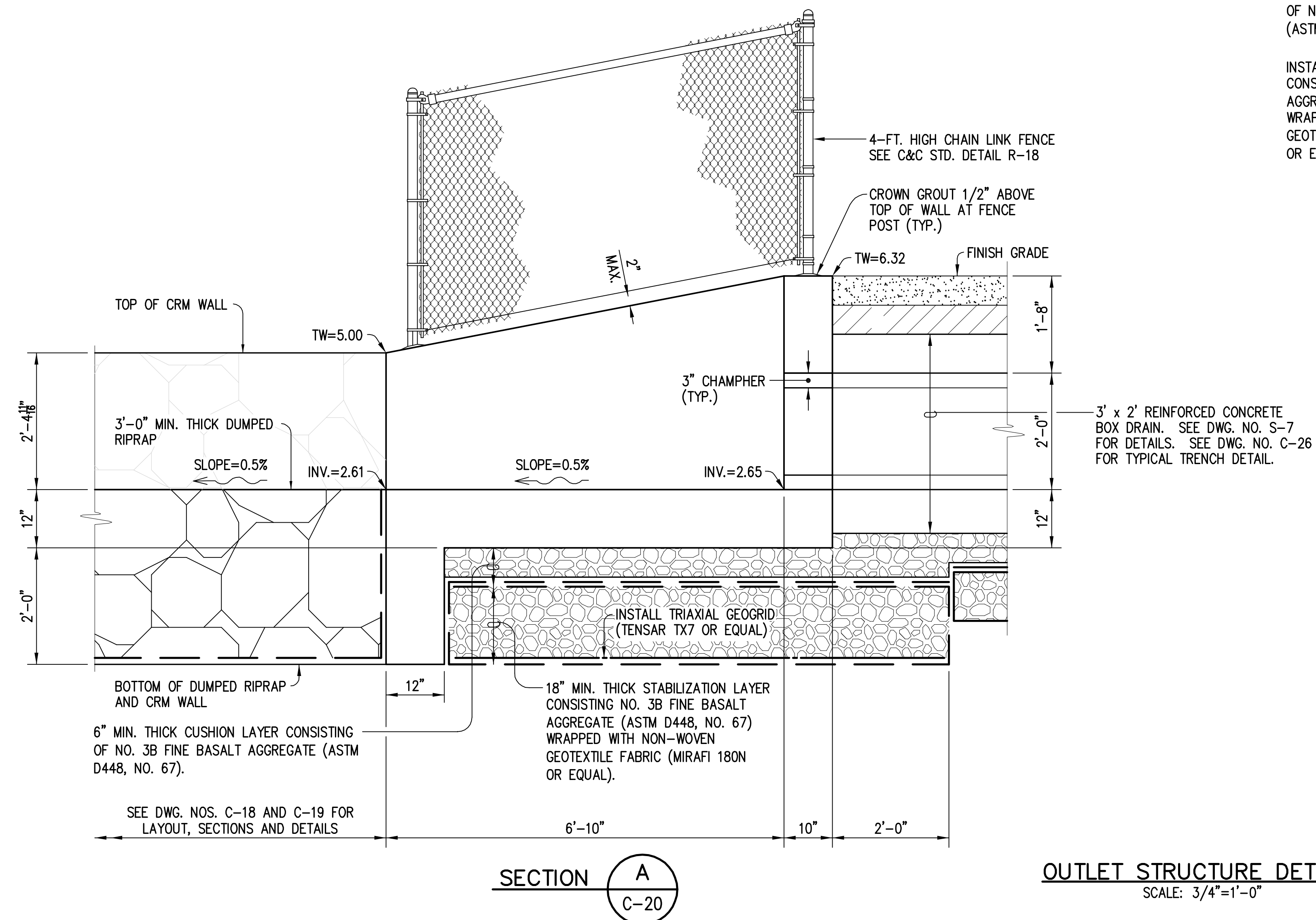
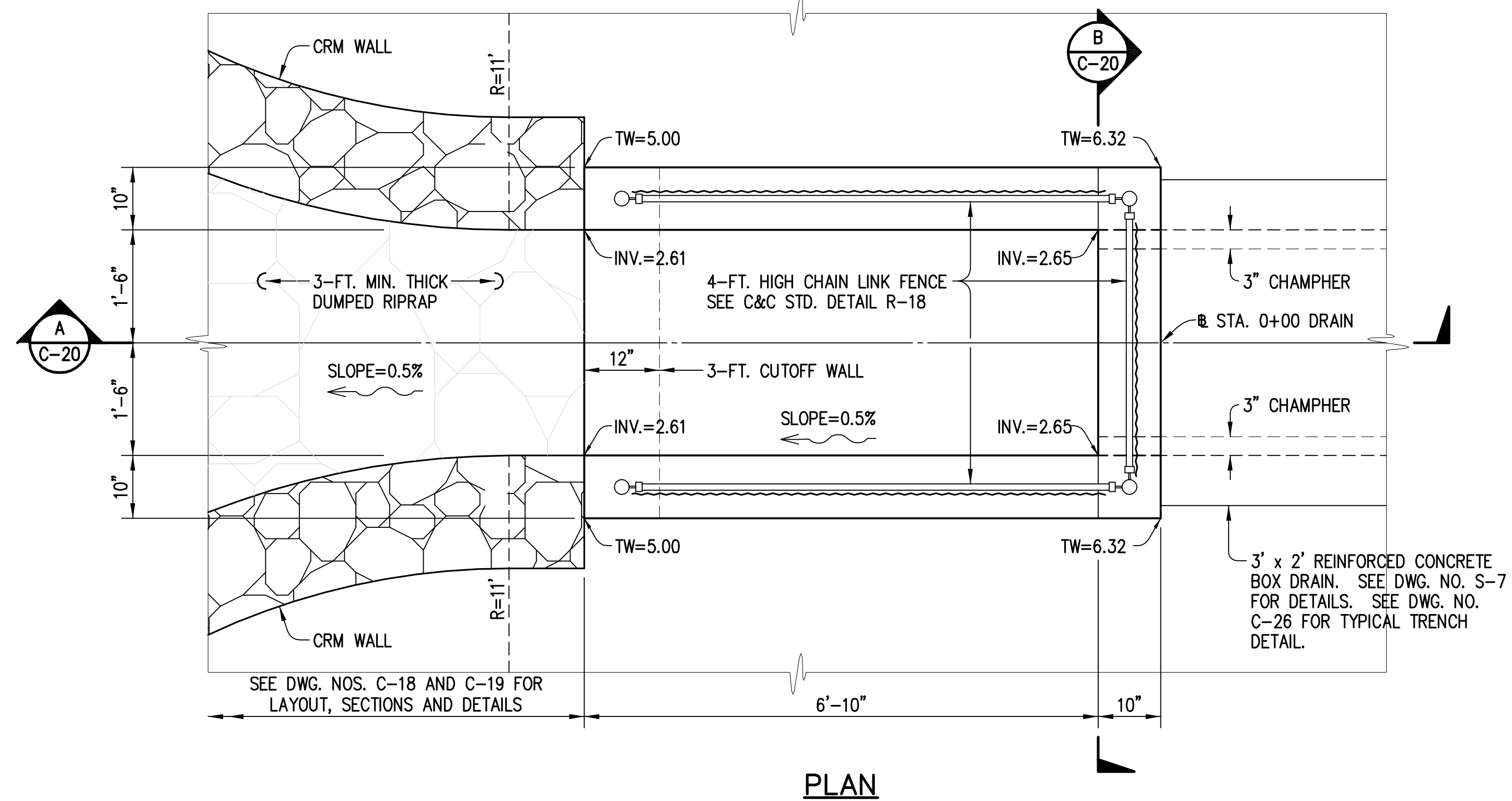
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CHIEF, CIVIL ENGINEERING BRANCH, DPP

DATE



REVISION	DATE	DESCRIPTION	ENGR. APPROVED

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CITY AND COUNTY OF HONOLULU
CIVIL DIVISION

KAWAILOA ROAD DRAINAGE IMPROVEMENTS
 TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010
 KAILUA, KOOLAUPOKO, OAHU, HAWAII

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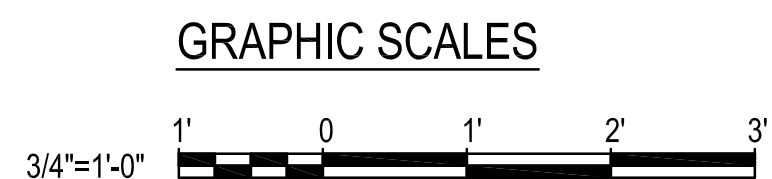
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Russell M. Arakawa
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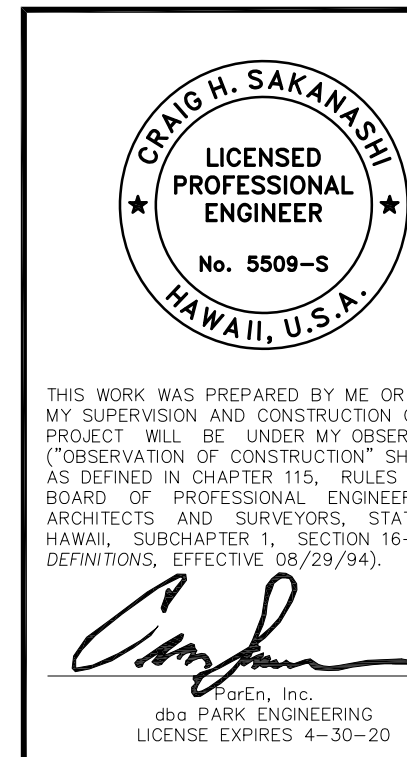
OUTLET STRUCTURE DETAILS

SCALE: 3/4"=1'-0"



<p>DEPARTMENT OF DESIGN AND CONSTRUCTION</p> <p>CITY AND COUNTY OF HONOLULU</p> <p>CIVIL DIVISION</p>	
<p>KAWAIOLOA ROAD DRAINAGE IMPROVEMENTS</p> <p>TMK: 4-2-054, 4-2-055, 4-3-009 AND 4-3-010</p> <p>KAILUA, KOOLAUPOKO, OAHU, HAWAII</p>	

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ATTACHMENT C
DRAFT FINAL ENVIRONMENTAL
ASSESSMENT
September 2019

KAWAILOA ROAD DRAINAGE IMPROVEMENTS

KAILUA, O‘AHU

DRAFT FINAL ENVIRONMENTAL
ASSESSMENT

SEPTEMBER 2019



Prepared for:

**Department of Design and Construction, Civil Division
City and County of Honolulu**

Prepared by:

Oceanit Laboratories Inc.

Oceanit

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DRAFT FINAL ENVIRONMENTAL ASSESSMENT

KAWAILOA ROAD DRAINAGE IMPROVEMENTS
Kailua, Island of O‘ahu, Hawai‘i

Submitted Pursuant to the
Hawai‘i Environmental Policy Act,
Chapter 343 Hawai‘i Revised Statutes, and
Title 11, Chapter 200, Hawai‘i Department of Health Administration Rules

by the

City and County of Honolulu,
Department of Design and Construction (DDC), State of Hawai‘i

The following person may be contacted for additional information concerning this document:

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Civil Division
Department of Design and Construction
City and County of Honolulu
650 South King Street, 15th floor
Honolulu, Hawai‘i 96813

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Appendix B	Agency Comments for Draft Final Environmental Assessment and Responses

ACRONYMS AND ABBREVIATIONS

AIS	Archaeological Inventory Survey
AFONSI	Anticipated Finding of No Significant Impact
BMP	Best Management Practice(s)
BWS	Board of Water Supply
CDP	Census-designated place
CEQ	Council on Environmental Quality
CIA	Cultural Impact Assessment
CWA	Clean Water Act
CZM	Coastal Zone Management
BMP	Best Management Practices
DDC	Department of Design and Construction
DLNR	Department of Land and Natural Resources
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ft	foot/feet
FWS	Fish and Wildlife Service
HEPA	Hawai‘i Environmental Protection Agency
HDOH	Hawai‘i Department of Health
HRS	Hawai‘i Revised Statutes
MBTA	Migratory Bird Treaty Act
MSL	Mean Sea Level
OEQC	Office of Environmental Quality Council
OHA	Office of Hawaiian Affairs
NRHP	National Register of Historic Places
PIRO	Pacific Island Resources Office
PM2.5	Suspended particulate matter \leq microns aerodynamic diameter
PM10	Suspended particulate matter \leq 10 microns aerodynamic diameter
ppm	Parts per million
ppt	Parts per trillion
PVT	PVT Integrated Solid Waste Management Facility
SHPD	State Historic Preservation Division
SLR	Sea Level Rise
SMA	Special Management Area
sq ft	Square feet
TMDL	Total Maximum Daily Loads
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter
U.S. or US	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

GENERAL INFORMATION SUMMARY

Applicant:	City and County of Honolulu Department of Design and Construction 650 South King Street, 15 th floor Honolulu, Hawai‘i 96813
Owner:	City and County of Honolulu Department of Design and Construction 650 South King Street, 15 th floor Honolulu, Hawai‘i 96813
Consultant/Preparer:	Oceanit Laboratories Inc. 828 Fort Street Mall Suite 600 Honolulu, Hawai‘i 96813
Approving Agency:	City and County of Honolulu Department of Design and Construction 650 South King Street, 11 TH floor Honolulu, Hawai‘i 96813
Project Description:	Drainage improvements are intended to alleviate excess storm water runoff along Kawailoa and Alala Roads and areas surrounding Kailua Beach Park and minimize ponding, flooding and storm water runoff entering residential properties in the area.
Anticipated Final Determination:	Finding of No Significant Impact (FONSI)
Agencies Consulted:	Federal U.S. Army Corps of Engineers U.S. Coast Guard U.S.D.A. – Natural Resources Conservation Service U.S. EPA-Pacific Islands Office U.S. Fish & Wildlife U.S. Geological Service National Oceanic and Atmospheric Administration State of Hawai‘i Department of Accounting and General Services Department of Agriculture Department of Business, Economic Development, Tourism and Management - Office of Planning Department of Education

Department of Hawaiian Home Lands
Department of Health, Environmental Planning Office
Department of Land and Natural Resources
 Engineering Division
 Commission on Water Resource Management
 Division of Aquatic Resources
 Division of Boating and Oceanic Recreation
 Division of Forestry and Wildlife
 Division of State Parks
 Land Division
 Office of Conservation and Coastal Lands
 State Historic Preservation Division
Department of Transportation, Highways Division
Office of Hawaiian Affairs

City and County of Honolulu

Board of Water Supply
Department of Community Services
Department of Design and Construction
Department of Environmental Services
Department of Facility Maintenance
Department of Parks and Recreation
Department of Planning and Permitting
Department of Transportation Services
Honolulu Fire Department
Honolulu Police Department
Kailua Neighborhood Board No. 31

Other Individuals

Ikaika Anderson, Councilmember
Chris Lee, State Representative, District 51
Laura Theilen, State Senate, District 25

Tax Map Key:	(1) 4-3-009:001, 4-3-010: 084 and 088
State Land Use District:	Urban
County Zoning:	R-7.5 (Residential District)
(Land Use Ordinance)	P-2 (General Preservation)

1 INTRODUCTION

The City and County of Honolulu, Department of Design and Construction (DDC) is proposing drainage improvements on the eastern side of Kailua, on the island of Oahu, Hawai'i . These improvements are intended to alleviate excess storm water runoff along Kawailoa and Alala Roads and areas surrounding Kailua Beach Park and minimize ponding, flooding and storm water runoff entering residential properties in the area.

Drainage improvements are proposed within a few key areas where runoff has concentrated. These areas include the southeastern part of Kailua Beach Park and Alala Road between Kawailoa Road and Mokulua Drive. See **Figures 1-1 and 1-2**.

This document is being prepared to evaluate and document the possible environmental, social and economic consequences associated with these proposed improvements.

Section 6 of the Draft Final EA describes how the proposed project actions are in conformance with the following plans and policies: Hawai'i 2050 Sustainability Plan; Ko'olaupoko Watershed Restoration Action Strategy; Ko'olaupoko Sustainable Communities Plan; Hawai'i Watershed Guidance, Coastal Zone Management Program, Special Management Area guidelines and Oahu General Plan.

Photos showing some of the existing conditions within the project site are shown in **Figure 1-3** and **Figure 1-4**. The tax map key numbers for this proposed project are 4-3-009, 4-3-009: 001, 4-3-010, 4-3-010:084 and 4-3-010:088.

Cultural Surveys Hawai'i , Inc. conducted an Archaeological Inventory Survey and generated *Draft Archaeological Inventory Survey Report* in August 2017. A summary of their findings is provided in this DEA and a copy of the draft report is included in **Appendix A**.

A Special Management Area Use (SMA) Permit may be required for this project. If the applicant, DDC declares that the project does require a SMA use approval, then by SMA Rules HAR §15-150-13 a public hearing shall be held. The applicant shall give notice of the public hearing to the neighborhood board, the owners of all properties within 300 feet of proposed improvements, and to persons who have requested to be notified of SMA use hearings.

1.1 Purpose of Document

The purpose of the project is to alleviate excess storm water runoff along Kawailoa and Alala Roads and areas surrounding Kailua Beach Park and minimize storm water runoff entering residential properties along Kawailoa Road.

The majority of drainage improvements proposed for this project is on land owned by the City and County of Honolulu. The proposed drainage outlet structure is on land makai of the shoreline that is owned by the State. The ownership and funding of the project by the City triggers the requirement that an Environmental Assessment (EA) be conducted in accordance with Chapter 343 of the Hawai'i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai'i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to 13 specific criteria. If after considering comments made regarding the Draft Final EA, the proposing agency confirms that no significant impacts are expected, then the agency would issue a Finding of No Significant Impact (FONSI), and the action would be permitted to occur. However, if the agency concludes that significant impacts are expected to occur, then an Environmental Impact Statement (EIS) would be prepared.

This Draft Final EA discloses the foreseeable environmental impacts that could result from the proposed project's implementation and recommends employment of specific measures to avoid, minimize, or mitigate impacts to the environment. The Draft Final EA contains a record of the consultation activities that were conducted as part of project planning. Refer to **Appendix B**.

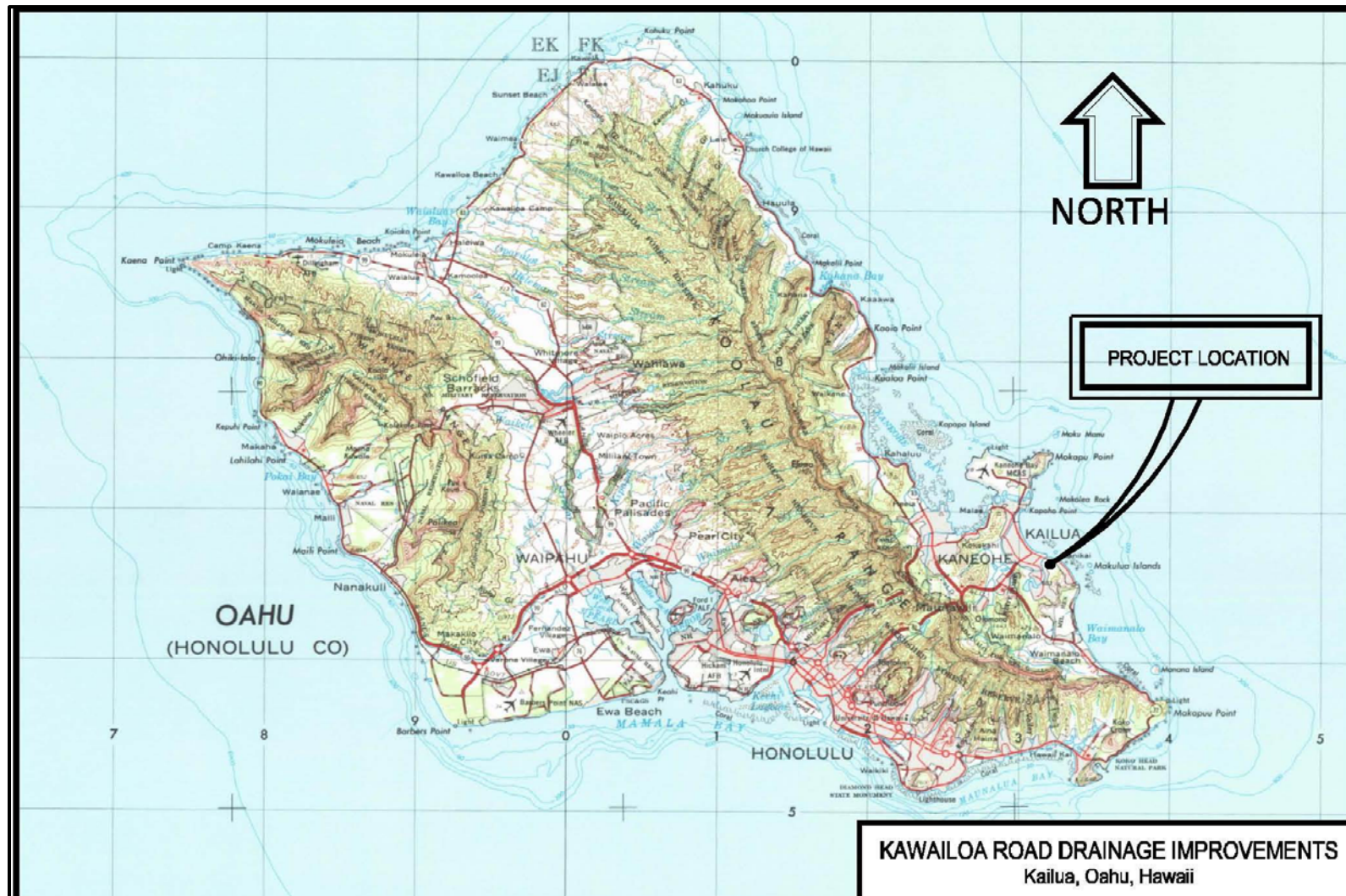


Figure 1-1. Vicinity of Kawailoa Road Drainage Improvements Project

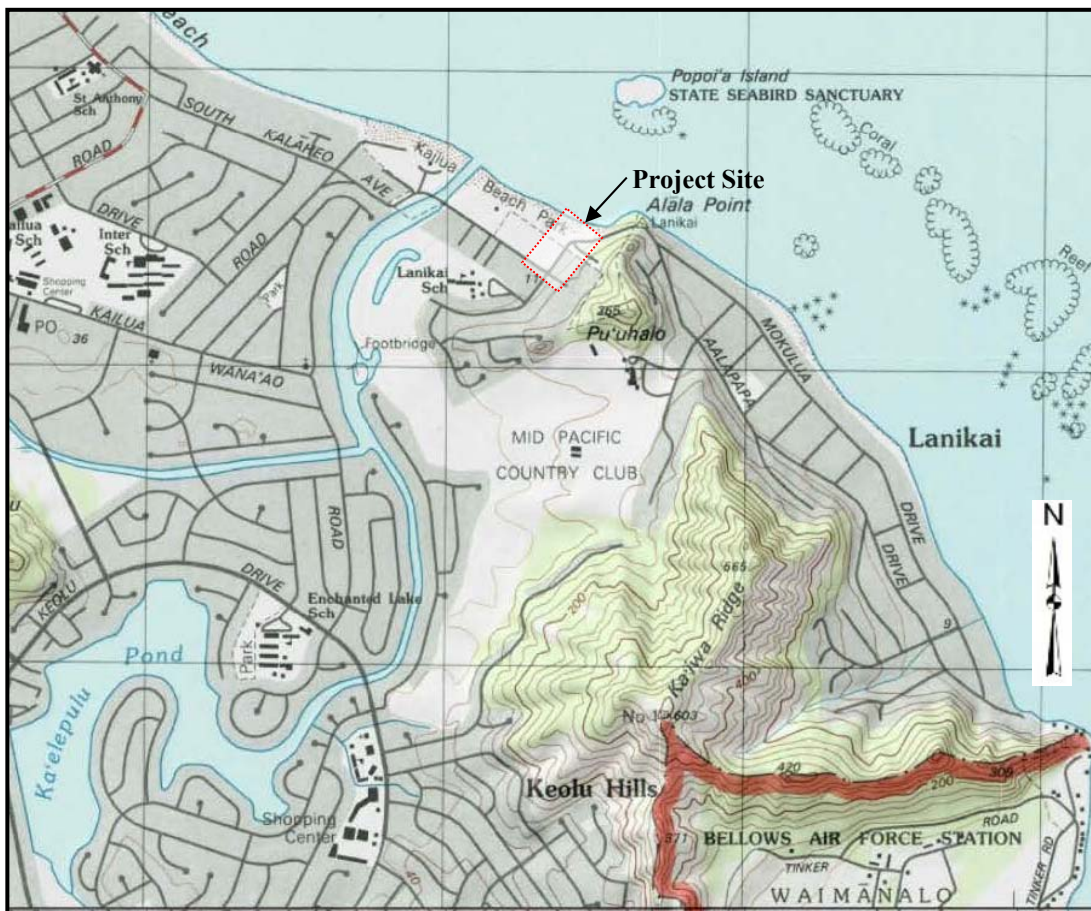


Figure 1-2. Project Location Map



Figure 1-3. Alala Road turning lane to Kawailoa Road



Figure 1-4. Road Drain Inlet near Alala Road – Kaneapu Place intersection

1.2 Historical Accounts of Flooding and Past Drainage Improvements

Residents of the Kawailoa residential area have experienced heavy flooding incidents over the years. The severity of these floods ranged from a few inches of water running through driveways and lawns to over six (6) inches of water inside houses. A few long-time residents of the area observed flow paths, identified areas prone to flooding, and pointed out historical changes. Some of the reasons expressed by these residents for the area's chronic flooding problems are summarized below.

- Leaving the Ka'elepulu Stream mouth closed during large storms results in major flooding in Kailua Beach Park, Kawailoa Road, and other areas along the stream.
- Limited maintenance in Kailua Beach Park and at the outlet near the boat ramp causes storm water to back up from the park to both Alala and Kawailoa Roads.
- Lack of continuous earth berms within Kailua Beach Park along Kawailoa Road allows storm water to cross over from the park to Kawailoa residential areas.
- The Kawailoa Road drainage system is unable to convey enough storm water runoff, resulting in ponding and increased flooding in low-lying homes.

Recent storm water drainage improvements in the area includes work on a grated drain inlet at the Alala Road - Kaneapu Place intersection, which was modified by widening the inlet entrance and raising the grate. Refer to **Figure 1-4**. Along Kawailoa Road, recent construction includes installation of an 8-inch drain line connecting two (2) sump inlets to an 18-inch storm drain adjacent to the park. Within Kailua Beach Park, recent improvements include the removal of a Kiawe tree to re-grade a grass swale, construction of a new raised bicycle path through the park, and reconstruction of earth berms within the park parallel to Kawailoa Road. In addition, there have been modifications to existing private properties along Kawailoa Road, which include new walls and raised structures.

2 PROJECT DESCRIPTION

2.1 Project Location and Description

Project site improvements are proposed on the eastern side of Kailua, Oahu, Hawai'i within and directly along Kailua Beach Park. Pu'uhalo Ridge is southeast of the project site and the highest point in this area, about 260 feet in elevation above mean sea level. Project components include a new earth berm in the southeast portion of Kailua Beach Park, and improvements along Alala Road including a concrete sidewalk, curb and sidewalk culverts, a concrete lined swale, a concrete retaining wall with chain link fence, and a reconstructed bike path. In place of the chain link fence, strategic use of low hedges, planters or small trees will also be considered. Near the Alala Road - Mokulua Drive intersection a concrete box drain, new manholes and a concrete outlet structure will be constructed. Bodies of water near the project site are Kailua Bay and Ka'elepulu Stream & Pond. Refer to **Figure 2-1** and **Figure 2-2**.

2.2 Existing Land Use Classifications

State land Use. The proposed project site is located entirely within the Urban (U) State Land Use District. Refer to **Figure 2-2**.

Zoning. Residential areas within the project site and the eastern portion of Kailua Beach Park is designated by the City and County of Honolulu Land Use Ordinance Zone R7.5 (for Residential properties 7,500 sq ft). This includes Lanikai Elementary School, and the housing directly surrounding the beach park. The area surrounding this residential area is zoned P-2 (General Preservation). Refer to **Figure 2-3**.



Figure 2-1. Aerial photo of Kawailoa Road Drainage Improvements Project Site

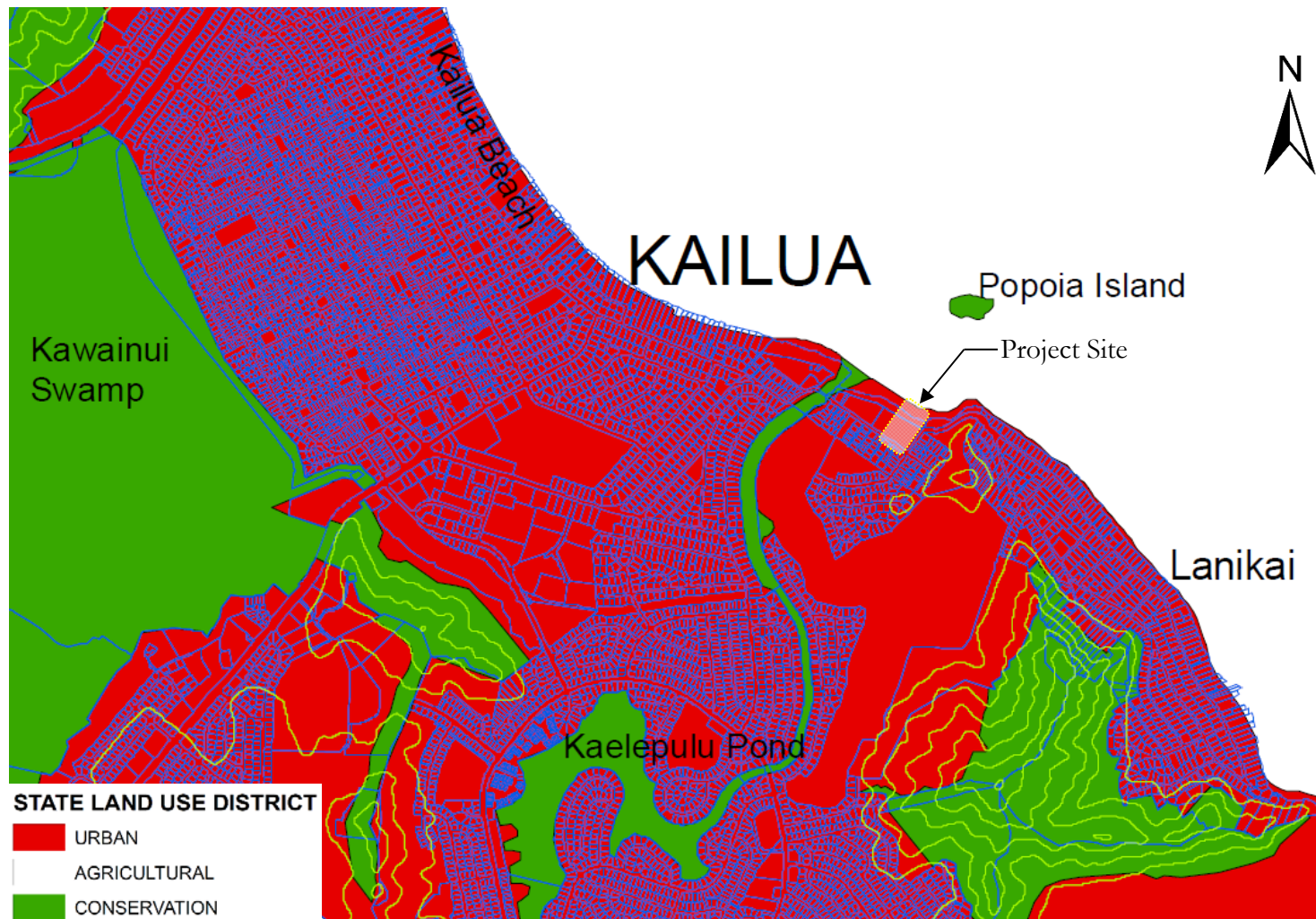
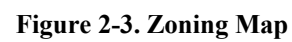


Figure 2-2. State Land Use Map



3 CLIMATE CHANGE AND SEA LEVEL RISE

This section is provided to address the risks from and adapt to the impacts of climate change and sea level rise. A sea level rise (SLR) analysis was conducted to ensure project improvements are designed in accordance with the Findings and Policies of the City & County of Honolulu's *Climate Change Commission for Sea Level Rise Guidance* (adopted June 5, 2018). Specifically, these include treating climate change mitigation and adaption issues as urgent matters, taking a proactive approach to adapt to SLR impacts and designing project improvements to protect and prepare the infrastructure, assets and citizens of Honolulu for the physical and economic impacts of climate change.

In the Commission's report, it was stated that with no actions, 3.2 feet of sea level rise and associated erosion and flooding would impact or inundate structures. The concrete drainage outlet and a portion of the concrete box drain are the only proposed project structures that would likely be affected by SLR. This section provides the results of expected changes to sea water levels and describes the resiliency of project improvements and how these improvements could be modified to adapt to the threat of increased erosion and flooding hazards as sea levels rise.

3.1 Expected Future Sea Level Change

The closest U.S. National Oceanic and Atmospheric Administration (NOAA) tidal station is the Mokuoloe Station located in Kaneohe Bay (Station ID: 1612480). The tidal station datum defines the range in water levels, which varies between a Mean Higher-High Water (MHHW) level of 1.07 ft. above Mean Sea Level (MSL) and a Mean Lower-Low Water (MLLW) level of (-) 1.05. By removing short-term water level fluctuations from water levels recorded at this tidal station between 1957 and 2018, the historic trend in sea water levels at the project site is estimated to rise at a rate of 1.45 ± 0.53 mm/year.

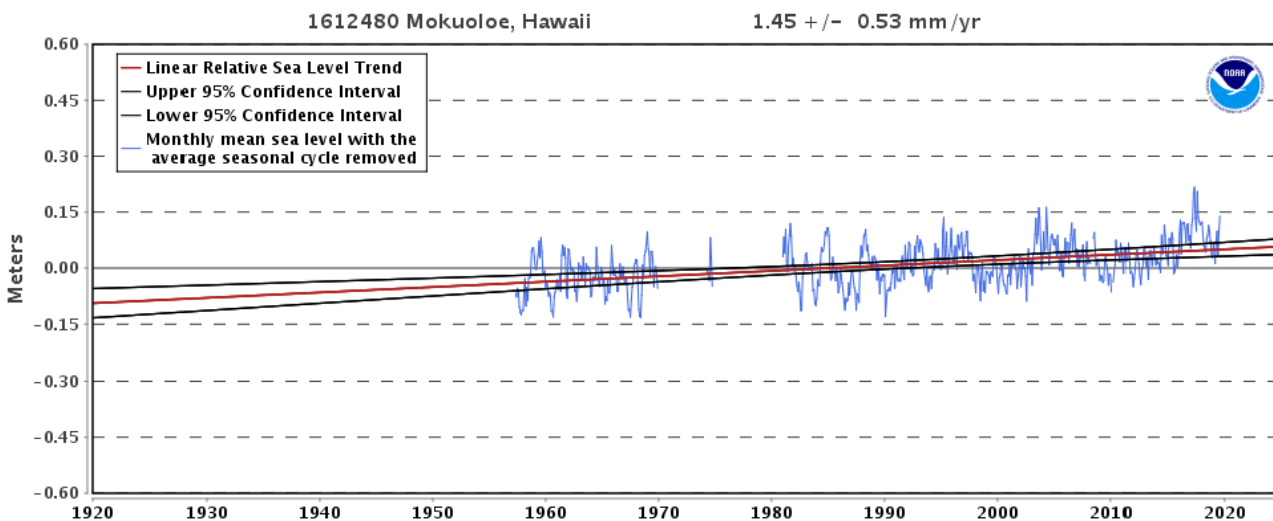


Figure 3-1. Sea Level Trend at NOAA Mokuoloe Tide Gauge 1612480

Source: NOAA Tides & Currents website

https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=1612480

The USACE Sea-Level Change Curve Calculator applied the data from tide gauge 1612480 to calculate expected Relative Sea Level Change (RSLC) projections between 1957 and 2006. Using NOAA's 2006 published rate of 0.0043 feet/year and the Sea-Level Change Curve Calculator, the various estimated RSLR projections at gauge 1612480 for two different Project Life Cycles (50-year and 75-year) is shown below.

	50-year Life Cycle (2020 - 2070)	75-year Life Cycle (2020 - 2095)
Sea Level Curve Calculator		
Low / Intermediate / High	0.34 ft / 0.88 ft / 2.59 ft	0.44 ft / 1.39 ft / 4.38 ft
City & County of Honolulu Climate Change Commission	3.2 ft	

Table 3-1. Relative Sea Level Change Projections over Project Life Cycle

Figure 3-2 shows the RSLC estimated by the USACE calculator between 2020 and 2100. The City & County of Honolulu Climate Change Commission's findings and recommendations that 3.2 feet of SLR will occur by the end of the century is within the range of RSLC values from the calculated 75-year Life Cycle values, with a 'High' estimate of 4.38 feet.

1612480, Mokuoloe, HI
NOAA's 2006 Published Rate: 0.0043 feet/yr

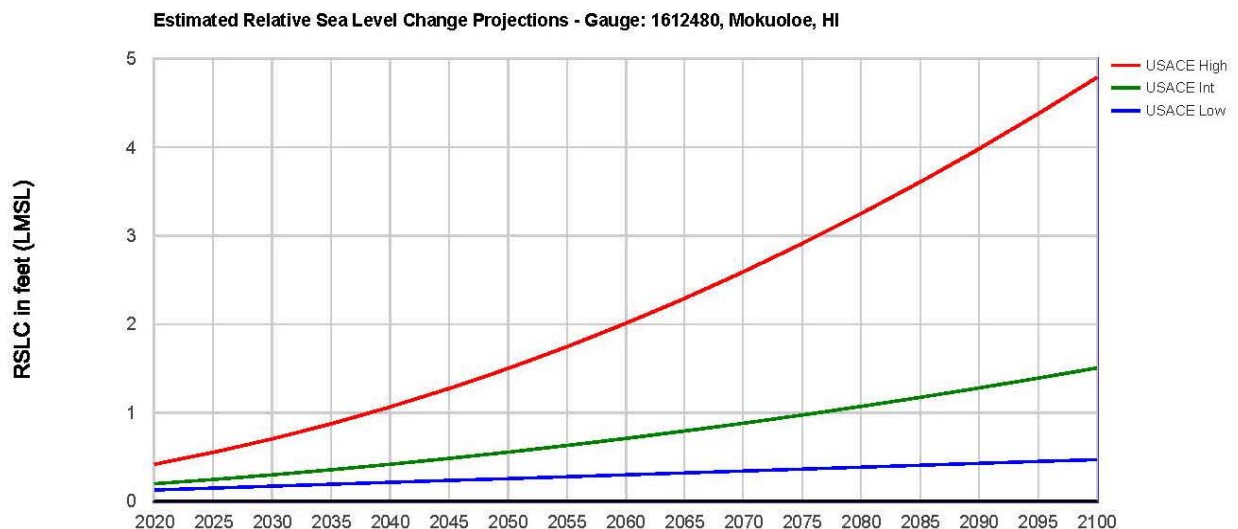


Figure 3-2. Estimated RSLC Projections (2020 – 2100)

3.2 Sea Level Rise Impact on Project Improvements

Sea level rise at the proposed outlet site over the next 50 to 75 years could be as low as 0.34 feet or as high as 4.38 feet. Impacts of high tide flooding may affect project improvements before permanent inundation by SLR and the frequency and damage caused by flooding may increase as ocean levels rise. All project drainage improvements are currently designed to meet the City and County's *Storm Drainage Standards* (dated August 2017).

3.3 Providing an Adaptive & Resilient Design, while Addressing Flooding

As sea level rises, the shoreline will erode and recede, but exactly how much and when the shoreline will erode is purely theoretical. The City will monitor the outlet structure on a regular basis and shall make the determination when erosion and the receding shoreline have threatened the functionality of the outlet structure. At that time, the outlet structure, dumped riprap, CRM walls and a portion of the connecting box drain should be removed and a new outlet structure and other drainage and erosion control improvements can be constructed near the new shoreline.

4 ALTERNATIVES CONSIDERED

4.1 No Action Alternative

Over the years excess storm water runoff has resulted in ponding and increased flooding in low lying areas, including residential driveways and homes along Kawailoa Road. Unless improvements are made to the storm drain system in the area, flooding, property damage and potential injury to homeowners and commuters will continue.

A total of six alternatives were evaluated. Four alternatives were considered for drainage improvements along Alala Road and two alternatives were considered for drainage improvements along Kawailoa Road.

4.2 ALALA ROAD Alternative No. 1

This alternative includes a new 7' x 2' box culvert along Alala Road, three new modified catch basins, a new bike path and sidewalk and a new grated concrete ditch. **Figure 4-1** shows the Alternative No. 1 plan for Alala Road improvements.

4.3 ALALA ROAD Alternative No. 2

This alternative includes five new sidewalk culverts along Alala Road, a new graded grass swale and a new concrete lined channel. **Figure 4-2** shows the Alternative No. 2 plan and profile for Alala Road improvements.

4.4 ALALA ROAD Alternative No. 3

This alternative includes five new sidewalk culverts along Alala Road, a new 3' x 2' concrete box culvert through Kailua Beach Park, a new graded grass swale, and a new concrete lined channel. **Figures 4-3 to 4-5** shows the Alternative No. 3 plan and profile for Alala Road improvements.

4.5 ALALA ROAD Alternative No. 4

This alternative includes a new 18" reinforced concrete pipe (RCP) drain line along Alala Road, new grated drain inlets, a new 3' x 2' concrete box culvert through Kailua Beach Park, a new graded grass swale, and a new concrete lined channel. **Figure 4-6** shows the Alternative No. 4 plan and profile for Alala Road improvements.

4.6 KAWAIILOA ROAD Alternative No. 1

This alternative includes a new 3' x 1.5' concrete box culvert along Kawailoa Road with twelve new grated drain inlets, and a new earth berm. **Figure 4-7** to **Figure 4-9** shows the Alternative No. 1 plan and profile for Kawailoa Road improvements.

4.7 KAWAIILOA ROAD Alternative No. 2

This alternative includes new HDPE drainage pipelines along Kawailoa Road comprised of 18", 24" and 30" pipes, five (5) new drywells, and eight (8) new grated drain inlets, and a new earth berm. Alternative No. 2 plan and profile for Kawailoa Road improvements. See **Figure 4-10** to **Figure 4-12**.

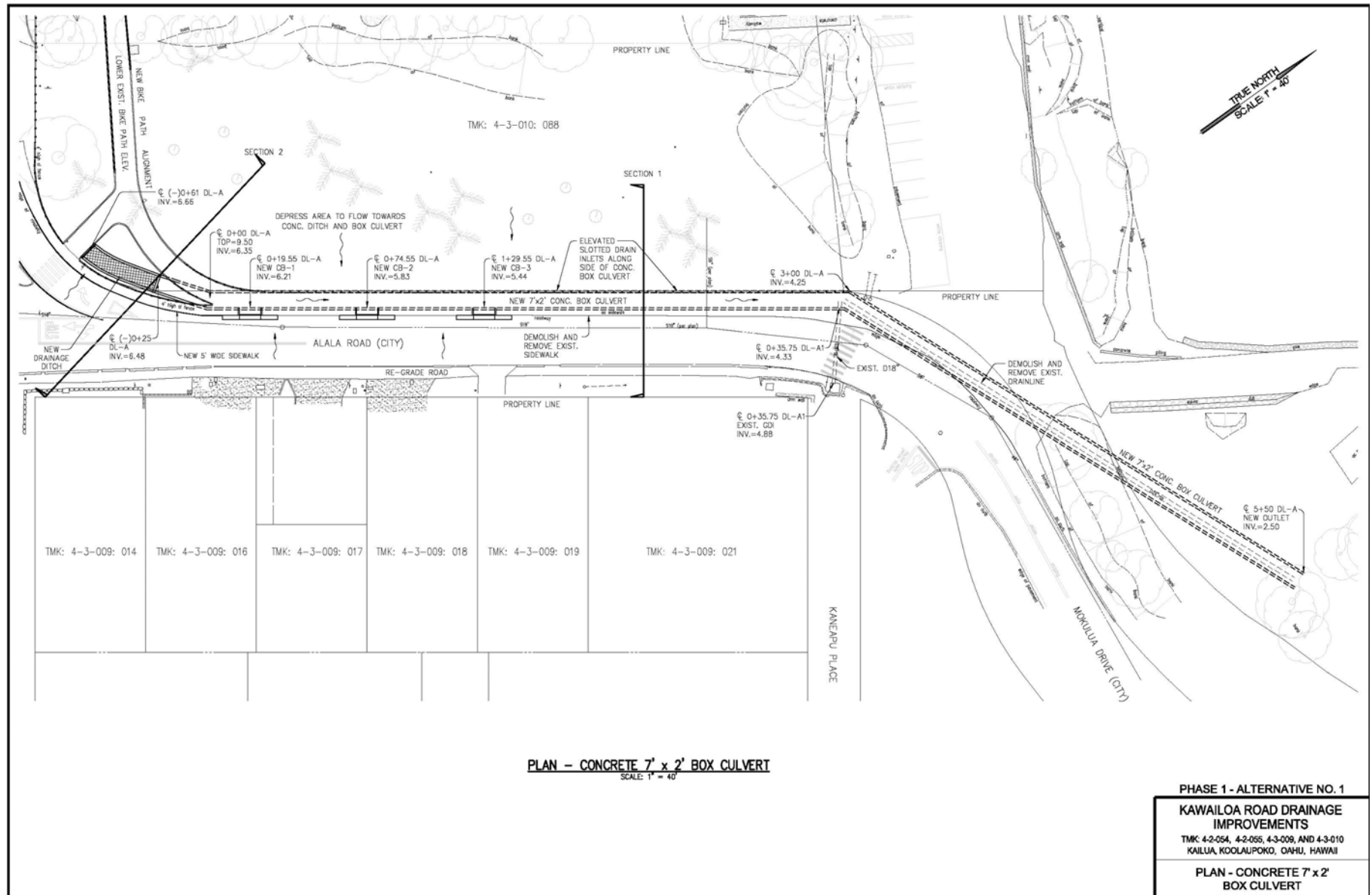


Figure 4-1. ALALA ROAD Alternative No. 1 Plan

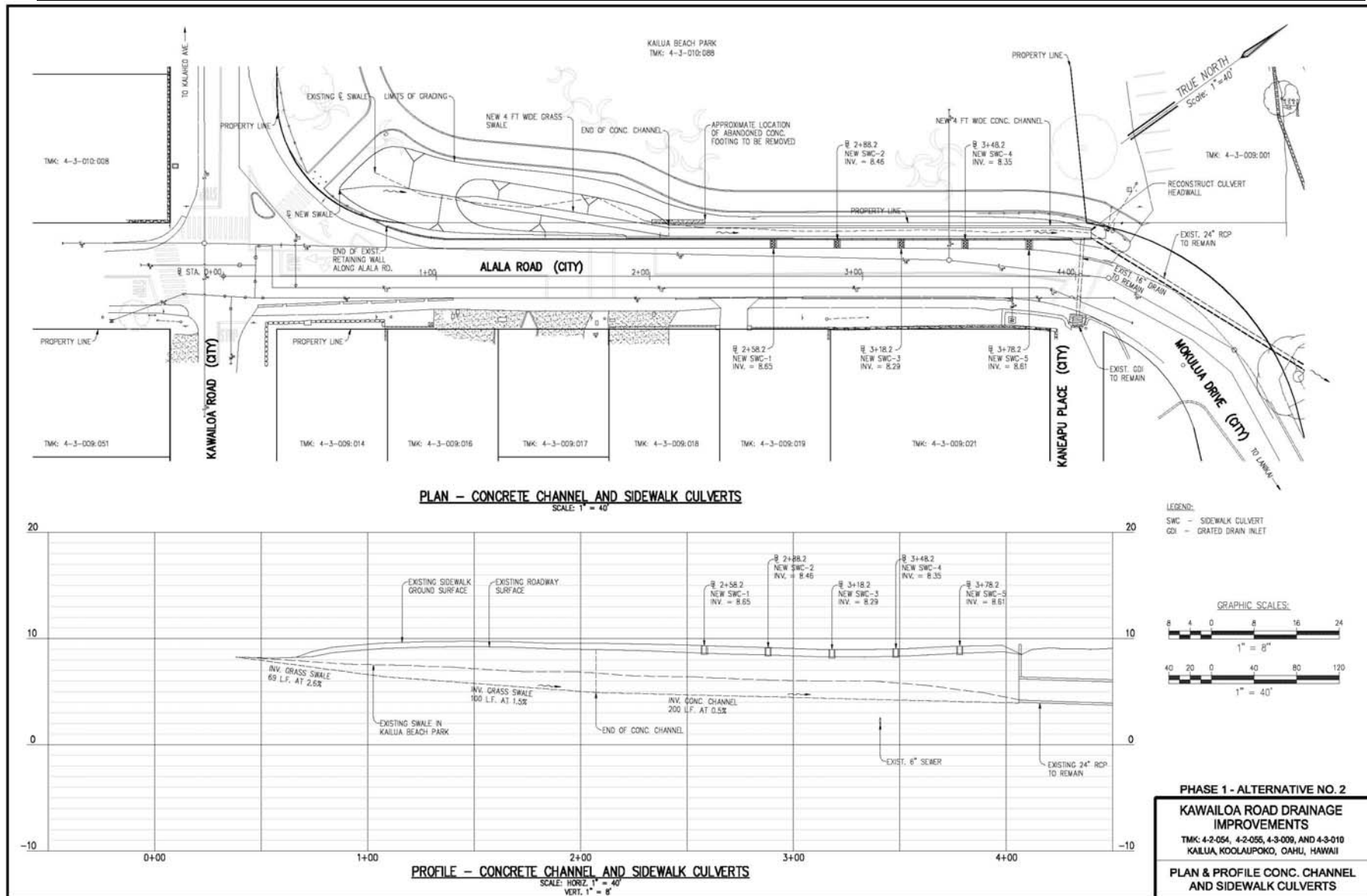


Figure 4-2. ALALA ROAD Alternative No. 2 Plan and Profile

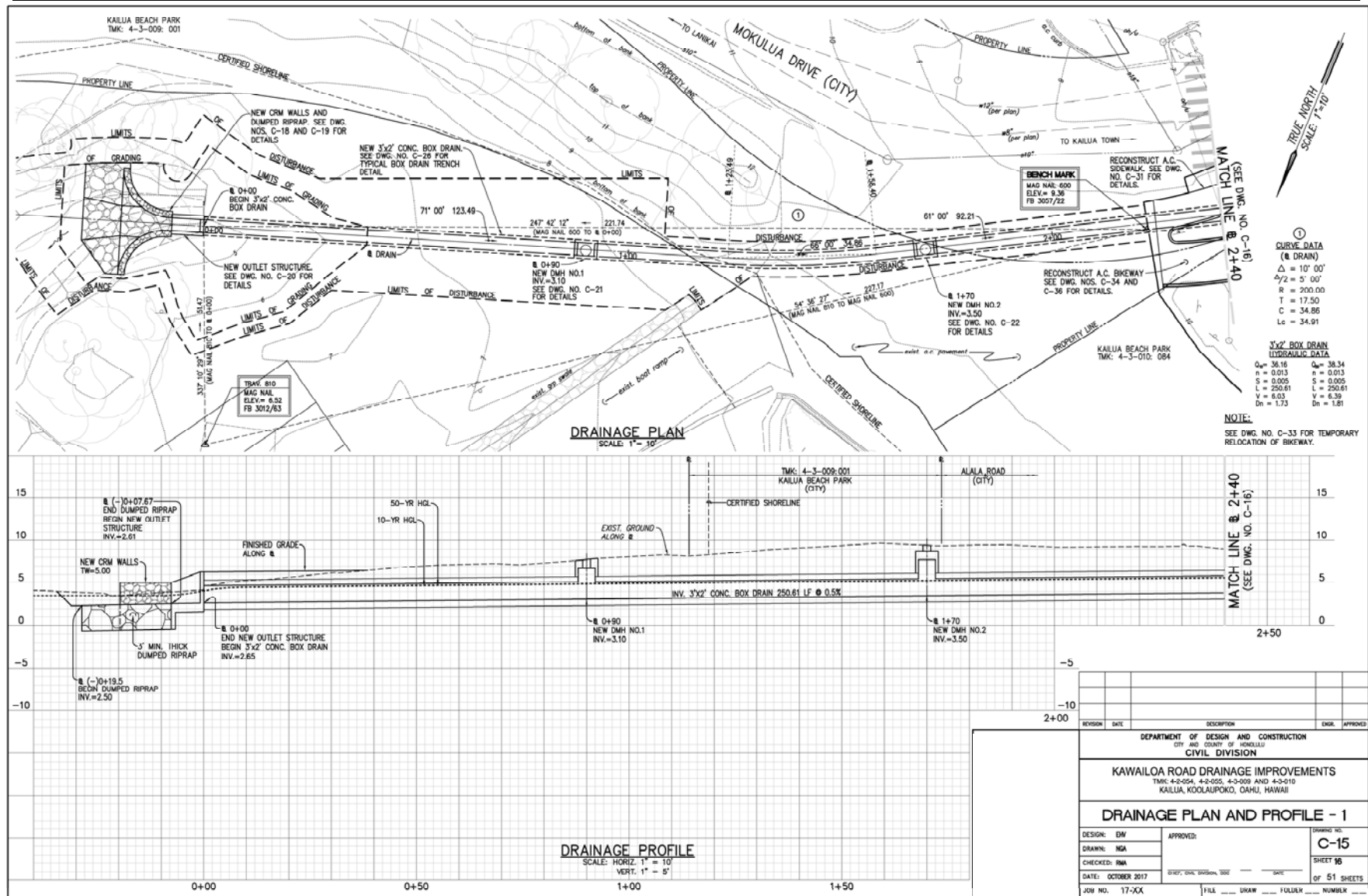


Figure 4-3. ALALA ROAD – Alternative No. 3 Plan & Profile Sta (-)0+19.5 to 2+40

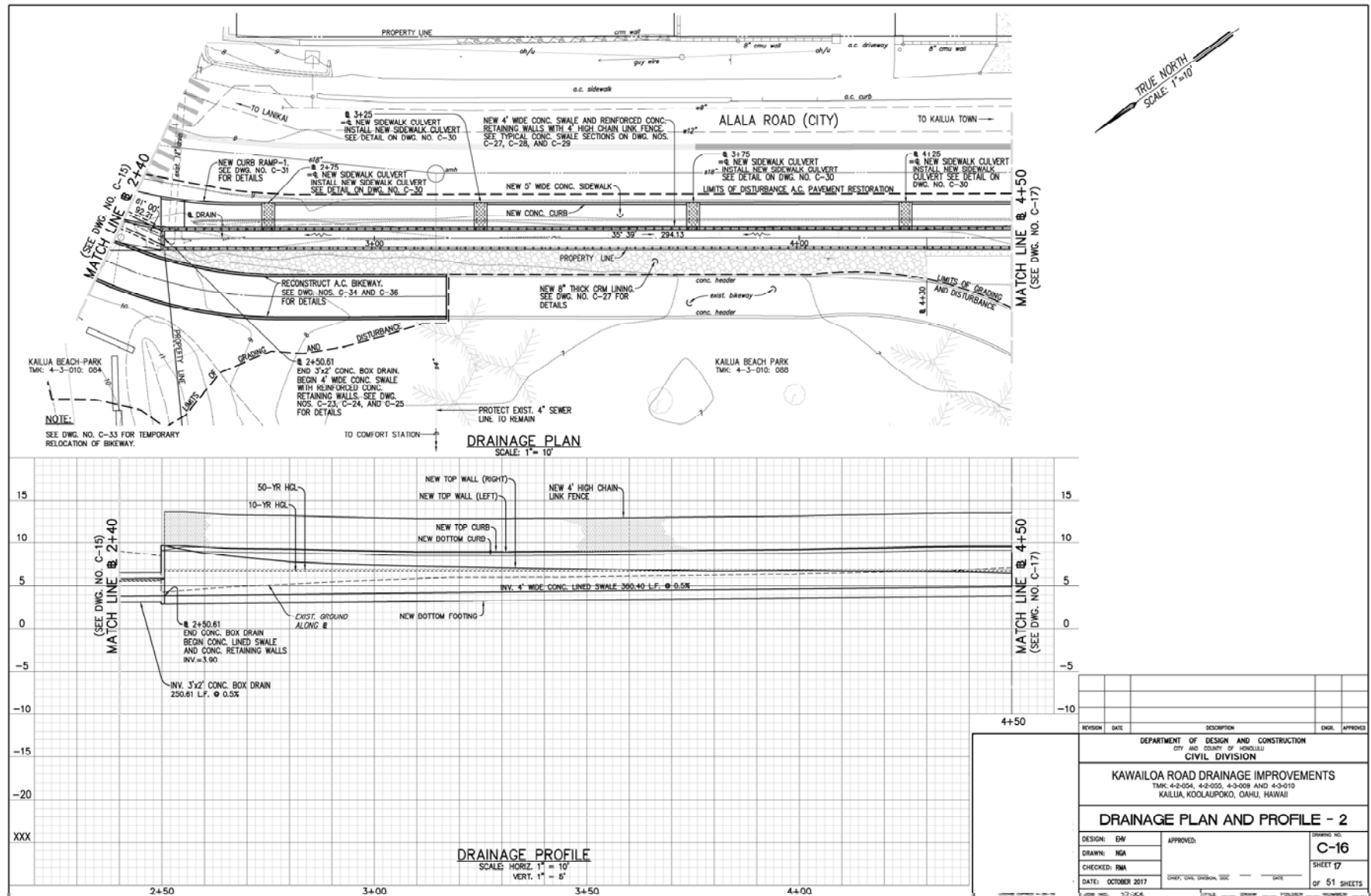


Figure 4-4. ALALA ROAD – Alternative No. 3 Plan & Profile Sta 2+40 to 4+50

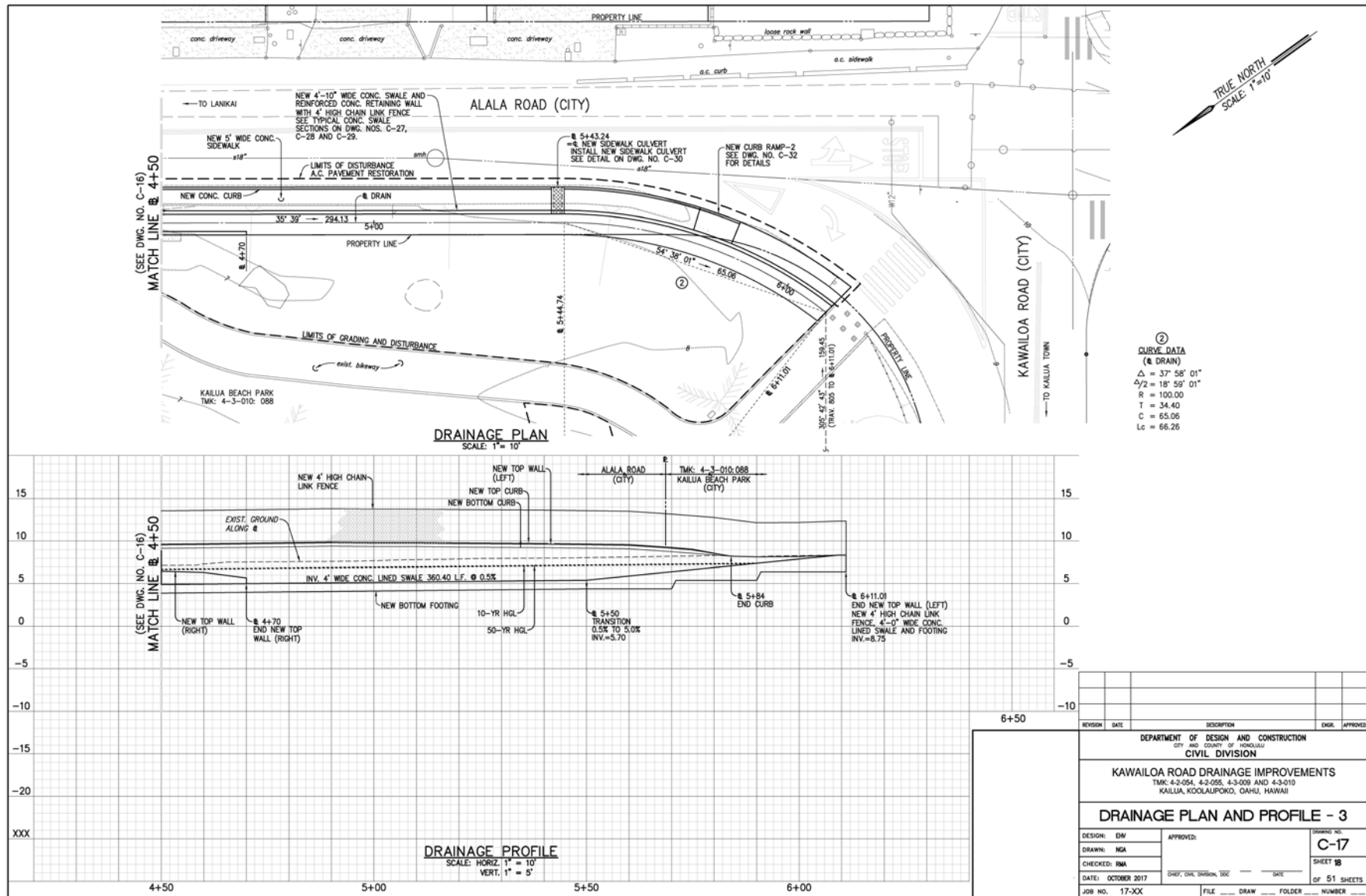


Figure 4-5. ALALA ROAD Alternative No. 3 Plan & Profile Sta 4+50 to End

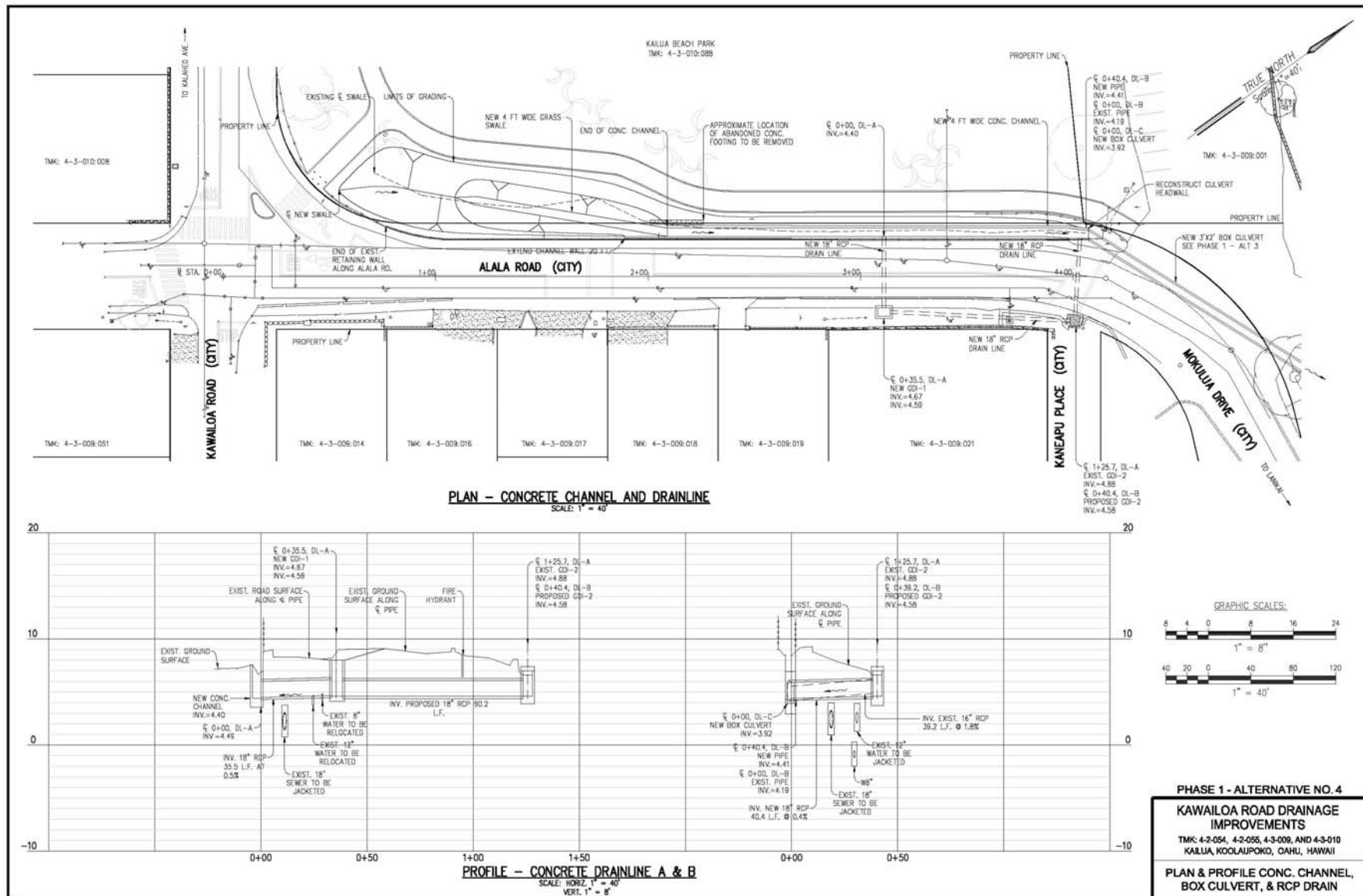


Figure 4-6. ALALA ROAD Alternative No. 4 Plan & Profile

Draft Final Environmental Assessment
Kawailoa Road Drainage Improvements

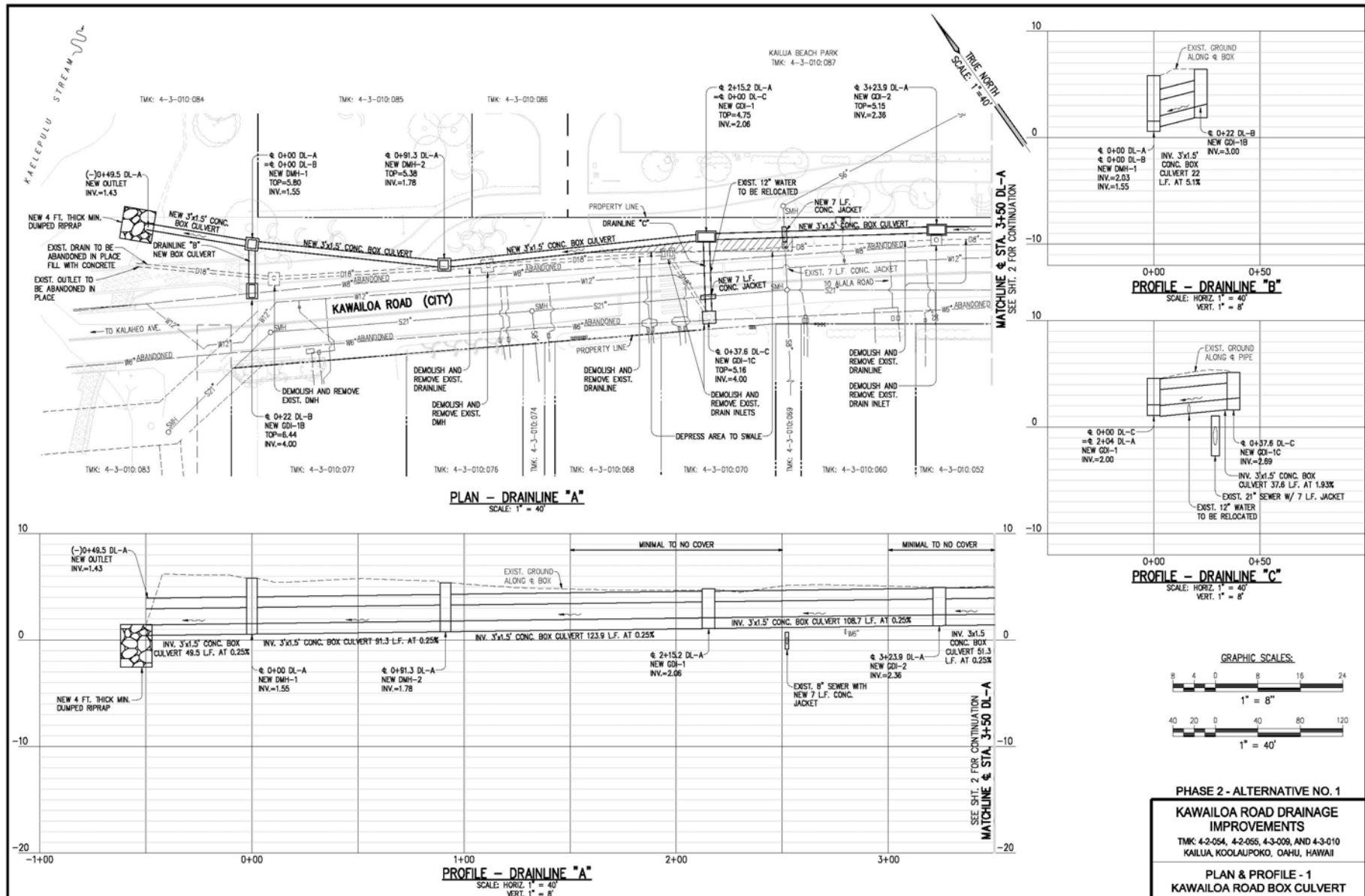


Figure 4-7. KAWAIILOA ROAD Alternative No. 1 Plan & Profile Sta (-) 0+49.5 to 3+50

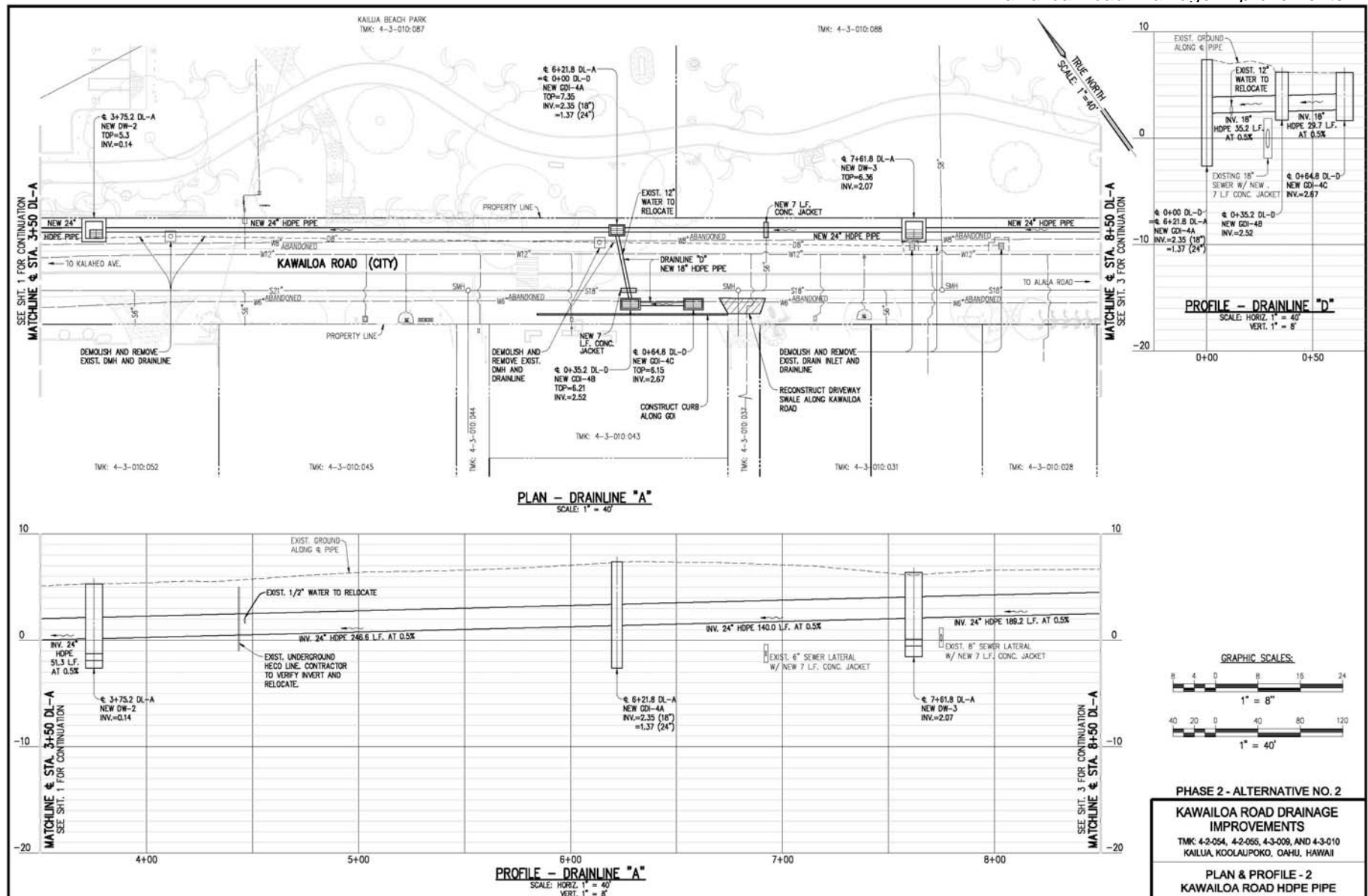


Figure 4-8. KAWAIILOA ROAD Alternative No. 1 Plan & Profile Sta 3+50 to 8+50

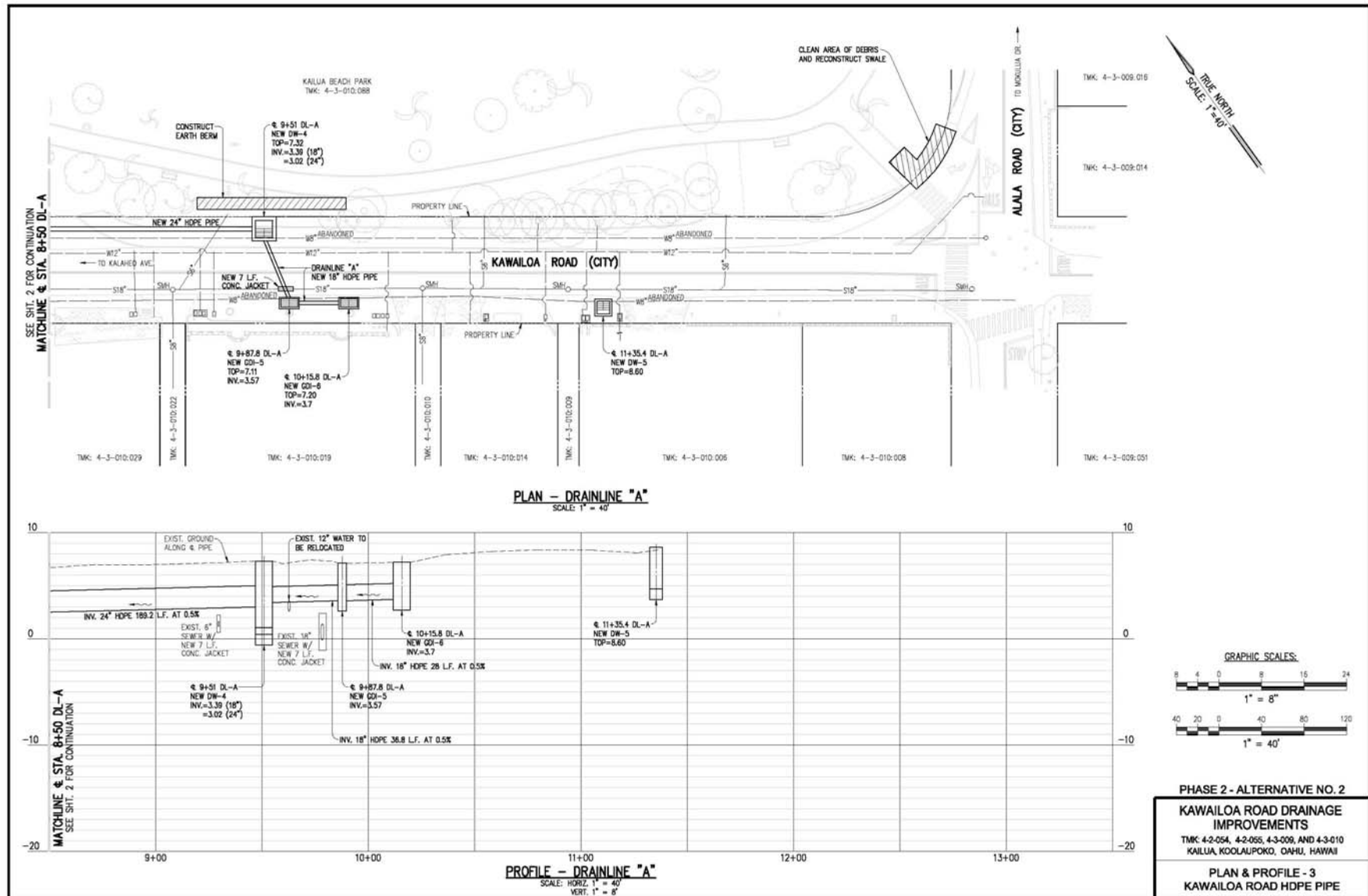


Figure 4-9. KAWAIILOA ROAD Alternative No. 1 Plan & Profile Sta 8+50 to End

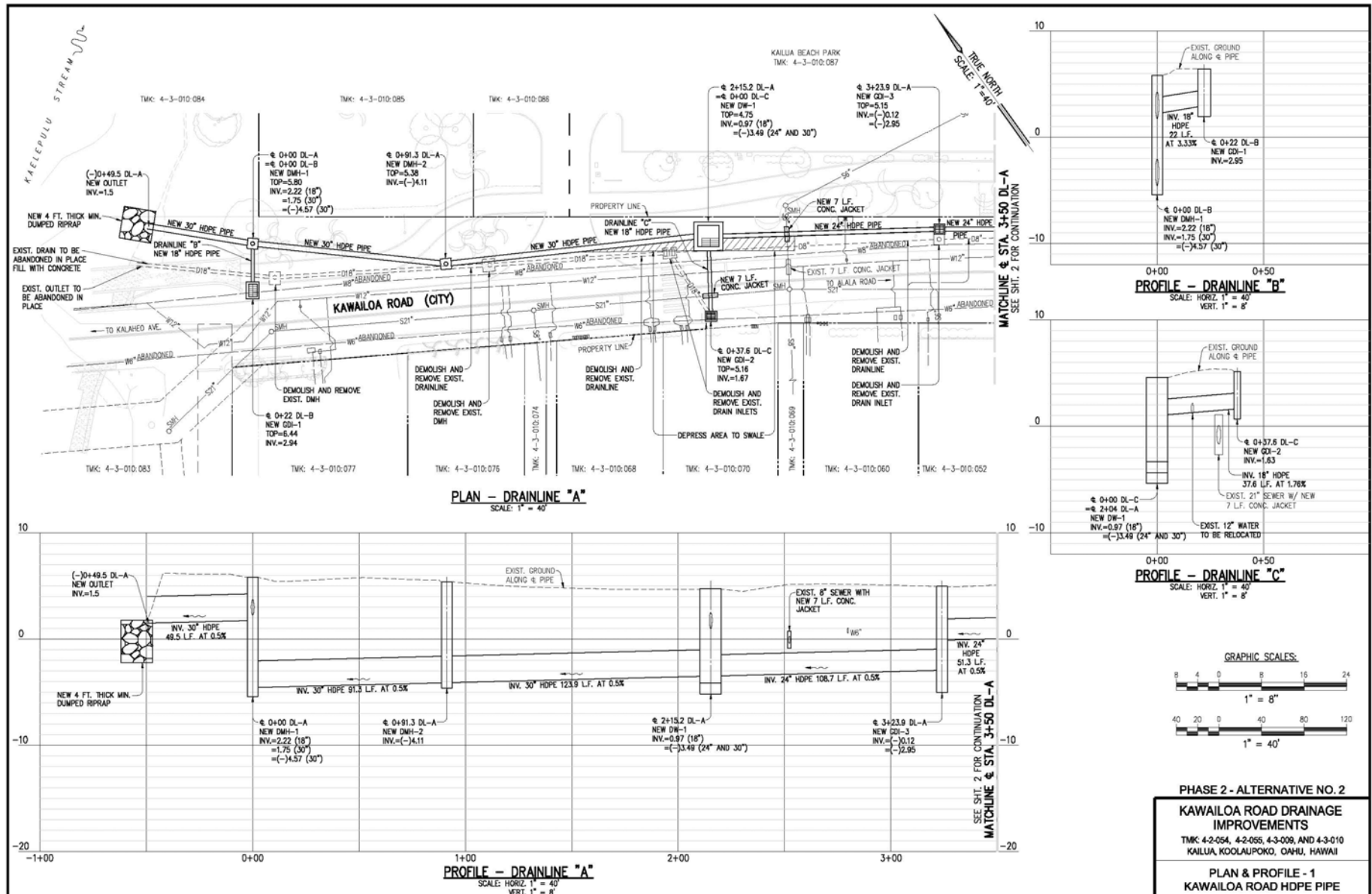


Figure 4-10. KAWAILOA ROAD Alternative No. 2 Plan & Profile Sta (-)0+49.5 to 3+50

Draft Final Environmental Assessment
Kawailoa Road Drainage Improvements

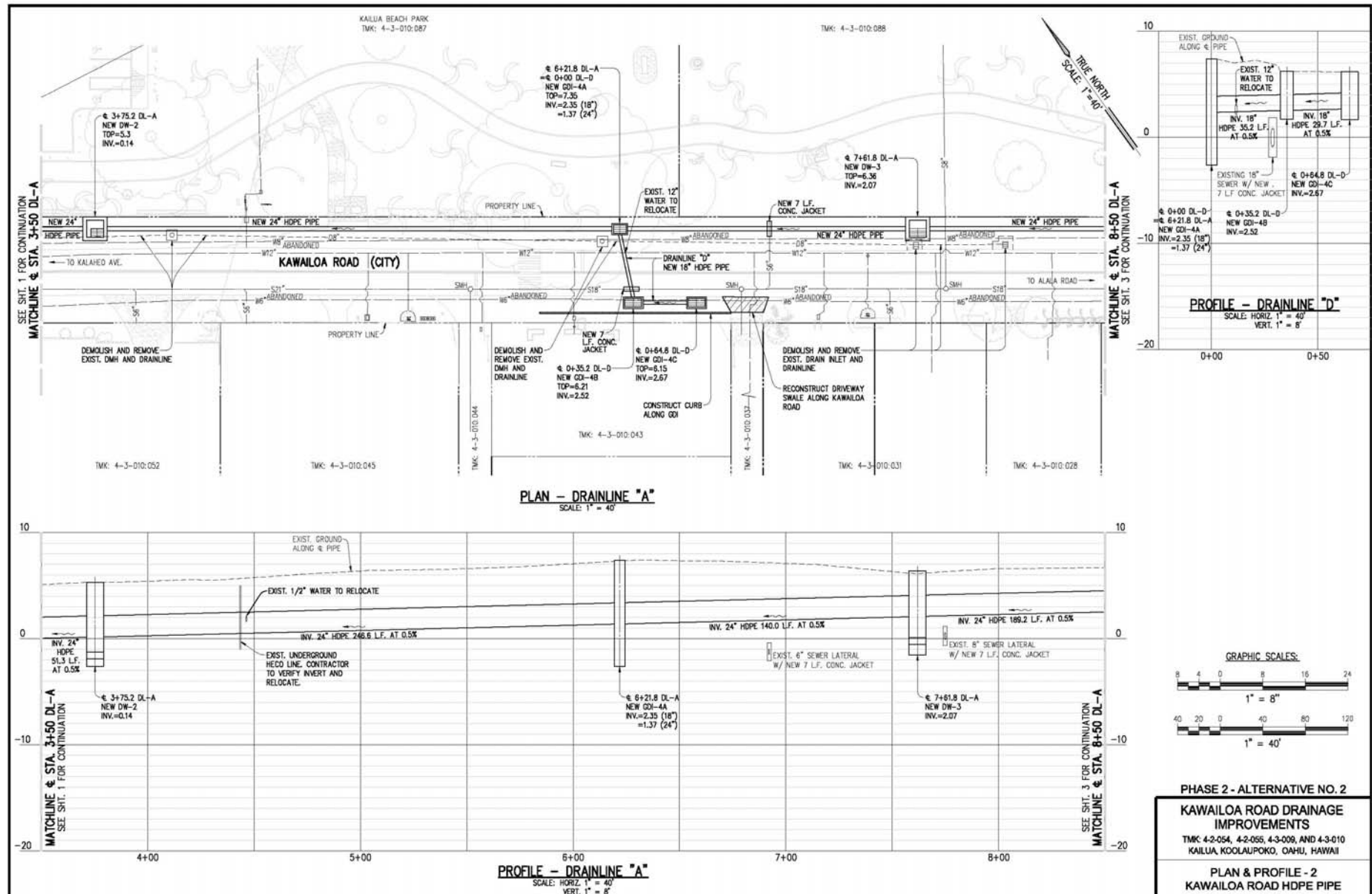


Figure 4-11. KAWAILOA ROAD Alternative No. 2 Plan & Profile Sta 3+50 to 8+50

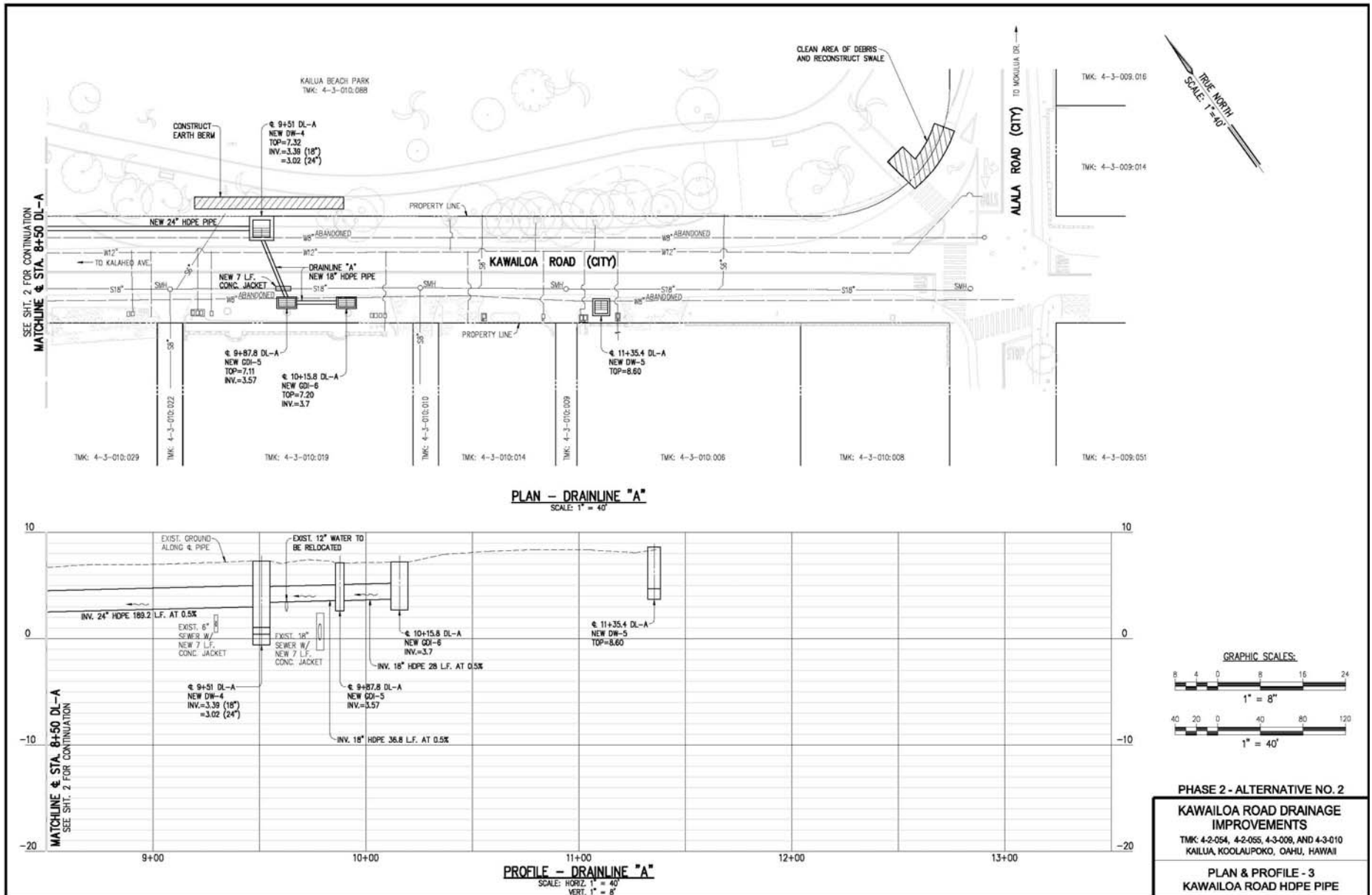


Figure 4-12. KAWAILOA ROAD Alternative No. 2 Plan & Profile Sta 8+50 to End

Alternative No.	Description of Proposed Improvements	Estimated Cost	Estimated Duration
Along Alala Road			
1	New 7' x 2' box culvert along Alala Road. Three (3) new modified catch basins, new bike path and sidewalk, and a concrete grated ditch.	\$ 2,200,000	13 months
2	Five (5) new sidewalk culverts along Alala Road. New graded grass swale and new concrete lined channel.	\$ 1,200,000	9 months
3	Five (5) new sidewalk culverts along Alala Road. New 3' x 2' concrete box culvert through Kailua Beach Park, new graded grass swale and new concrete lined channel.	\$ 1,500,000	10 months
4	New 18" RCP drain line along Alala Road. New grated drain inlets, new 3' x 2' concrete box culvert through Kailua Beach Park, new graded grass swale and new concrete lined channel.	\$ 1,650,000	11 months
Along Kawailoa Road			
1	New 3' x 1.5' concrete box culvert along Kawailoa Road. Twelve (12) new grated drain inlets and a new earth berm.	\$ 1,610,000	13 months
2	New HDPE drainage pipelines along Kawailoa Road. Includes 30", 24" and 18" pipes, five (5) new grated drain inlets and a new earth berm.	\$ 1,500,000	12 months

Table 4-1. Estimated Construction Costs and Durations of Alternatives

4.8 Recommended Proposed Alternative

In order to address the issues with storm water runoff in the area the City and County must ensure that the Ka'elepulu Stream mouth is open and the Boat Ramp culvert is cleared of debris before any major storm event. Several alternatives were evaluated that would allow storm water runoff to collect within Kailua Beach Park and discharge with more efficiency than existing conditions. These improvements would reduce the amount of storm water runoff that is being redirected into the residential area along Kawailoa Road.

- a) Alternative No. 3 along Alala Road is recommended because it would be the shortest to construct and most economical option that discharges the 10-yr and 50-yr peak storm water runoff within Kailua Beach Park and improves the park's natural sump and detention area, while improving the drainage flow and storm water quality. In addition, this alternative reduces the amount of flooding on Alala Road and decreases the storm water runoff discharging from Kailua Beach Park to Kawailoa Road. See **Figures 4-3 to 4-5** and **Figure 4-13**.
- b) Routine and regular maintenance should be performed on the existing and proposed drainage improvements. This would include cutting the grass and preventing trees from growing in the drainage swales to maintain the hydraulic capacity of the swales, clearing of outlets to prevent blockages and cleaning of the culverts to maintain flow capacity.

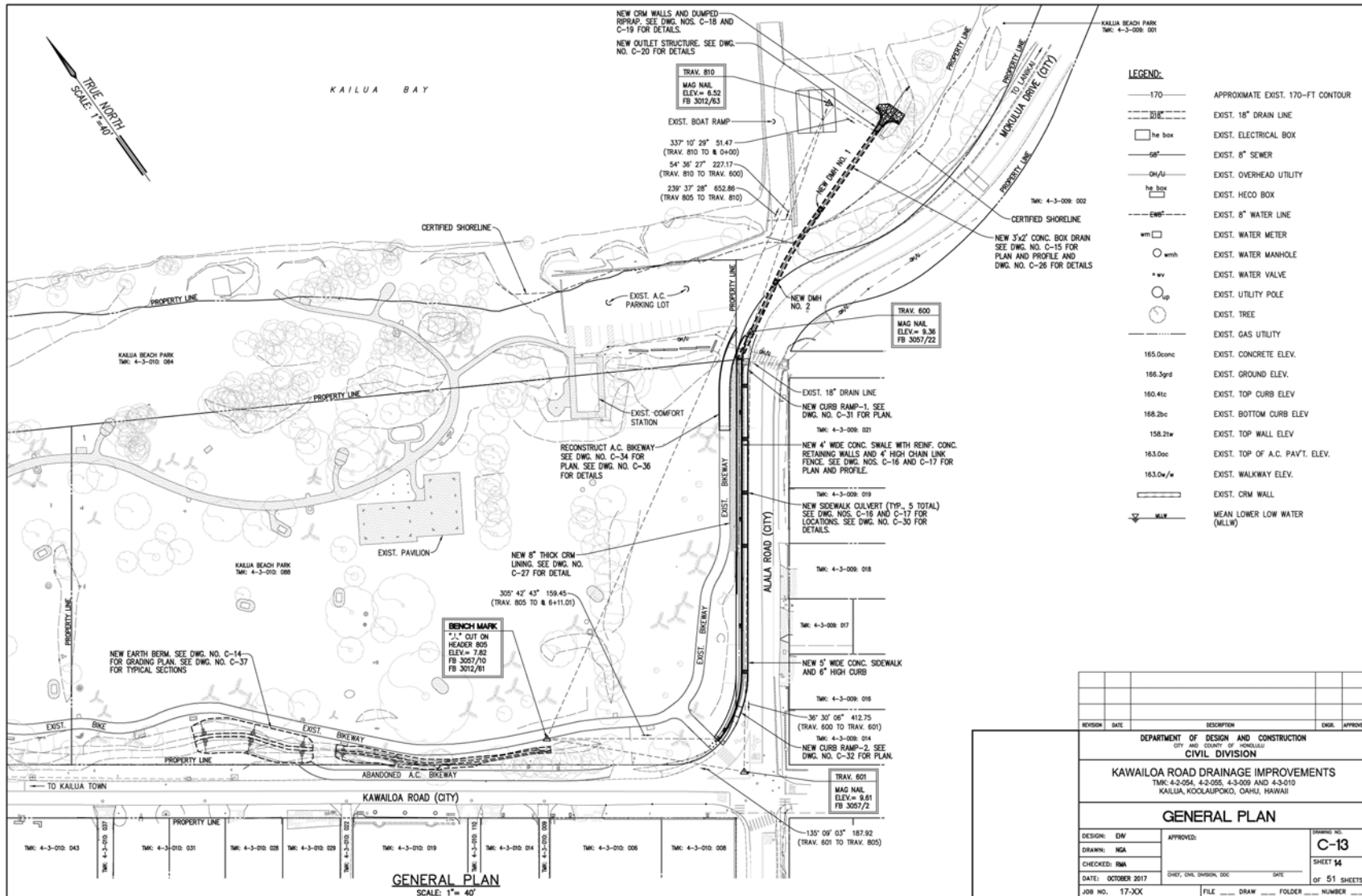


Figure 4-13. Recommended Project Improvements

5 PHYSICAL, BIOLOGICAL AND CULTURAL ENVIRONMENT

5.1 Climate, Topography, and Soils

O‘ahu, like the other Hawaiian Islands, has a mild semi-tropical climate that varies across the terrain. The proposed project site is located within a climate region known as the windward lowlands. Average temperatures range from 77 degrees Fahrenheit (°F) degrees in the warmer months to 72°F during the cooler months. The project site is moderately rainy with frequent trade wind showers. Average rainfall varies between 4 inches per month during the summer, to 8 inches per month during the winter. Mean annual rainfall at the site is approximately 58 inches (Giambelluca and others 2013).

The highest point near the project site is Pu‘uhalo Ridge to the southeast of the project site. Topography slopes from Pu‘uhalo Ridge through undeveloped forest, residential lots and beach land along Alala and Kawailoa Roads. There is a shallow depressed area in the east portion of Kailua Beach Park that detains runoff before flowing to the beach outfall. The residential area is bordered by Kawailoa Road on the north and Mid-Pacific Country Club and Lanikai Elementary School on the south. The northwest portion of Kailua Beach Park generally slopes toward outfalls that discharge into Kaelepulu Stream.

The shallow subsurface conditions in the Alala Road side of the site is dominated by clayey fill soil up to 3 feet in thickness, overlain by very fine sand (Dune Sand). Two 10-foot deep borings that were drilled at the south side of Kailua Beach Park revealed a layer of up to 3-1/2 feet of sandy clay, roughly 6-1/2 feet of poorly graded, gravelly sand on top of 2 feet of well graded sand. Geolabs, Inc. conducted two Geotechnical Engineering Explorations, July 2013 and April 2017 for this project.

5.1.1 Impacts & Mitigation

It is anticipated that the Proposed Action would result in negligible adverse impacts on climate, topography, or soils. On the contrary, it is anticipated that the Proposed Action would improve drainage conditions in the area.

5.2 Natural Hazards

According to the City and County of Honolulu Multi-Hazard Mitigation Plan (C&C 2012), potential natural hazards at the proposed project site could include strong winds, tropical cyclones (including hurricanes), landslides, earthquakes, floods, droughts VOG (volcanic gaseous emissions) and wildfire.

5.2.1 Impacts and Mitigation

It is anticipated that the Proposed Action would result in negligible impacts on the severity of most natural hazards. A reduction of local flooding of the roadway and adjacent properties is anticipated after completion of the project. There would be no mitigation necessary.

5.3 Geology, Geomorphology and Hydrogeology

Kawailoa and Alala Roads are located on the windward coastal area of the Koʻolau Volcano. The project site is directly underlain by Younger dune deposits and Beach deposits. Refer to **Figure 5-1**. The primary underlying geology consists of Younger dune deposits are well-sorted calcareous sand. Beach deposits consist of well-sorted sand and gravel.

The Koʻolau lavas are found within the watershed and immediately outlying the project area. They are divided into the Koʻolau Basalt and the Honolulu Volcanics. The Koʻolau Basalt primarily consists of Pliocene aged shield stage tholeiitic basalt plays an important role in the Kaʻelepulu watershed.

Koʻolau Basalt rocks can be divided into three groups; lava flows (aʻa and pahoehoe), pyroclastic deposits, and dikes. Lava flows associated with Koʻolau basalt are usually thin bedded with an average thickness of about ten feet (Wentworth and MacDonald, 1953). These beds are composed of aʻa, pahoehoe flows and pyroclastic deposits. Aʻa flows contains a solid central core between two gravely clinker layers. Pahoehoe flows are usually characterized by a smooth ropy texture. Pyroclastic deposits originate from explosive volcanism. They are composed of friable sand-like ash and indurated tuff deposits. Dikes are thin near vertical sheets of rock that intruded or squeezed into existing lava flows or pyroclastic deposits. A Koʻolau Basalt dike exists on the eastern end of the project site in the vicinity of the boat ramp.

The project site is urbanized and consists of Kailua Beach Park and the surrounding residential streets. The area is shallowly graded and over the years several residents along Kawailoa Road have reported flooding and ponding on their properties during heavy rains.

The project area is low lying with the Kaʻelepulu pond and stream bodies of water nearby.

5.3.1 Impacts & Mitigation

The Proposed Action is not anticipated to adversely impact the geological conditions of the proposed project site and therefore no mitigation is required.

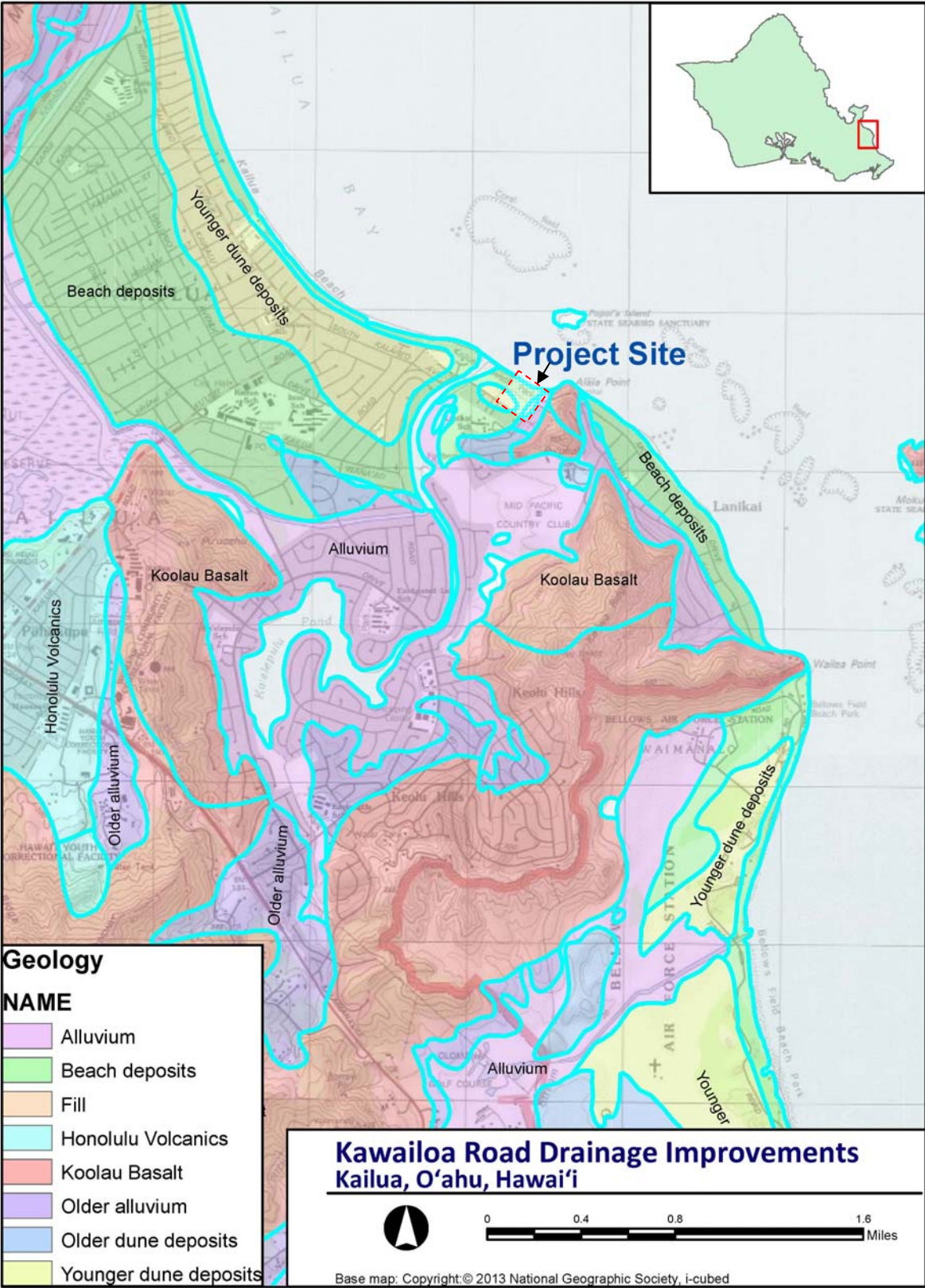


Figure 5-1. Geologic Map

5.4 Surface Water

The project area is bordered by Kailua Bay to the north and Ka'elepulu Stream to the west. Both of these water bodies are listed as impaired by the Clean Water Act Section 303(d). The existing drainage system empties into both of these water bodies. Drainage improvements proposed under this project will outlet into Kailua Bay.

Ka'elepulu Stream outlets into Kailua Bay at the western end of Kailua Beach Park. Connected water bodies include Ka'elepulu Pond, also known as Enchanted Lake, and Kawainui Stream. The major sources of freshwater for these waterbodies are from storm water. Prior to the 1997 completion of the Kawainui Levee, Kawainui Stream was fed by freshwater flows from Kawainui Marsh. The existing and proposed storm drainage structures along Kawailoa and Alala Roads drain is approximately 39.76 acres of residential and preservation land. For comparison purposes, the drainage area of Ka'elepulu Stream is approximately 153.6 acres.

Ka'elepulu Stream is separated from Kailua Bay by a sand berm approximately 100 feet wide. Approximately once per month the City and County opens the sand berm, connecting the two bodies of water, allowing the water retained in the system to drain, and allowing seawater to enter. Storm water that enters Ka'elepulu Stream is retained until it is connected with Kailua Bay. Water levels within the Ka'elepulu Stream vary with the amount of rainfall and evaporation experienced since the time of the last stream mouth opening. A record of the rainfall, water elevations and stream mouth opening dates from 2013 to 2015 is seen in Figure 5-2.

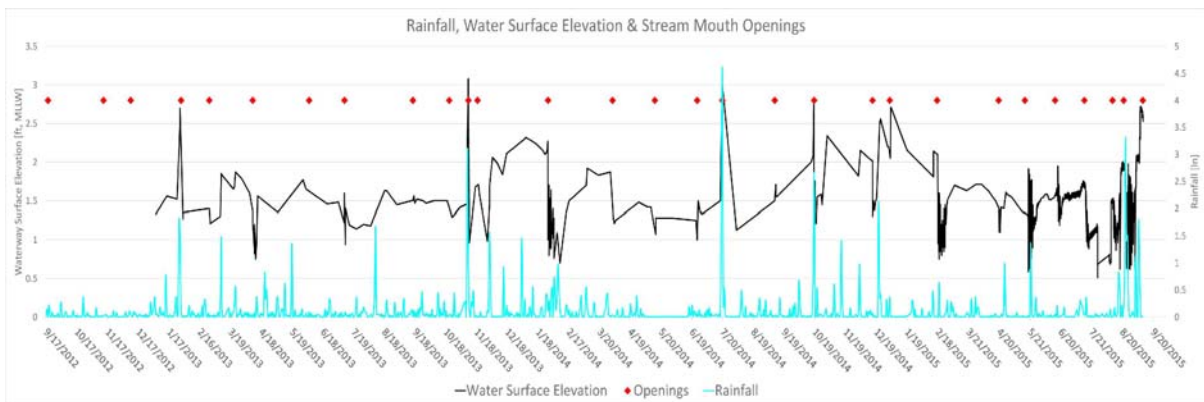


Figure 5-2. Ka'elepulu Stream & Pond Water Elevations, Rainfall, Stream Mouth Openings
[January 2013 to October 2015]

During prolonged periods of rain or very intense rainfall, Ka'elepulu Stream can overtop the sand berm and drain into Kailua Bay without human intervention. For this reason, the maximum water elevation is typically limited to approximately 3' MLLW. Flood inundation above this elevation is unlikely. The flood hazard zones map can be seen in Figure 5-3. The project site is located in flood zone X, beyond the 500-year flood plain.

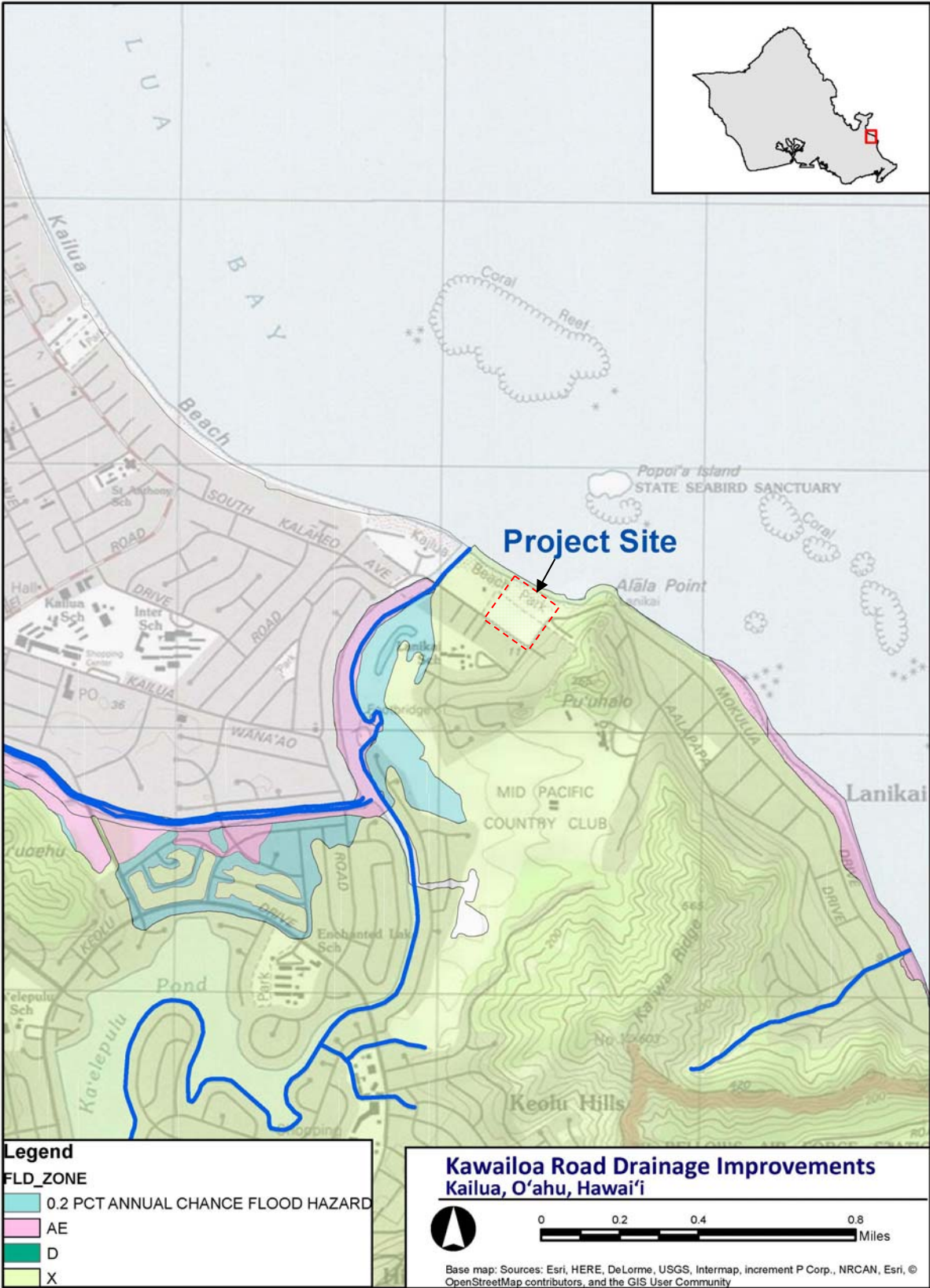


Figure 5-3. Flood Hazard Zones Map

5.4.1 Impacts and Mitigation

The Proposed Action is anticipated to reduce flooding by increasing the flow capacity and efficiency of the drainage system. Increased storm water conveyance is the expected outcome of the proposed project. The Proposed Action may result in slight increases in short-term sediment runoff.

During construction, BMPs such as sand bags or filter socks around drain inlets and disturbed ground would be implemented to minimize the sediment and pollution caused during construction. The Contractor should consider the weather while performing construction. Some work can be performed during low rain conditions, but all construction should be halted during storm conditions.

5.5 Aquatic Resources

The project site consists of dry storm drain channels and culverts that outlet into Kailua Bay. No aquatic resources are present on site however Kailua Bay has its own set of aquatic resources.

Many species of fish inhabit Kailua Bay and the offshore environment including surgeonfish (*Acanthuridae sp.*), butterflyfish (*Chaetodontidae sp.*), and bonefish (*Albulidae sp.*). However, the nearshore environment is less conducive to a wide range of aquatic species due to its fine sandy bottom which lacks hard substrate for benthic organism attachment and diminishes nearshore water quality by suspending fine sediments in the water column.

During heavy rainfall events storm water from a portion of Kailua Beach Park is channeled into a culvert and discharged adjacent to the boat ramp. Other storm water outfalls as well as stream mouths will cause the waters of Kailua Bay to turn turbid and brown with suspended sediment.

5.5.1 Impacts and Mitigation

Proper use of Best Management Practices (BMPs) during construction shall mitigate any adverse impacts to nearby aquatic resources. BMPs deployed particularly near the ocean and nearby streams may include filter socks, sandbags, grassing, geotextiles, and silt fences. Additionally, the Contractor should consider weather while performing construction in the stream. Work would be performed during low rain conditions. All of the construction would be ceased during heavy storm conditions or when storm conditions threaten the watershed. For the purpose of this watershed, “storm conditions” consists of any storm anticipated of delivering more than 0.5 inches of rain in 12 hours. Lands denuded of vegetation should be planted or covered as quickly as possible to prevent erosion and sediment flow into the aquatic environment. The Contractor shall take appropriate measures to prevent construction materials, petroleum products, debris and landscaping products from falling, blowing or leaching into the aquatic environment.

After construction, ponding on roadways, shoulders and adjacent lands will be reduced. The addition of oil and grease and sediment to storm water runoff that typically occurs when traffic makes its way through ponded streets will also be reduced.

5.6 Botanical Resources

Terrestrial flora at Kailua Beach Park consists of a variety of cultivated species including ironwoods, coconut trees, banyan trees, kiawe trees, and grasses.

5.6.1 Impacts and Mitigation

No botanical resources of notable value or worthy of consideration for conservation or protective measures are known within the project area.

No mitigation is proposed. The current vegetation cover in Kailua Beach Park presently provides a level of erosion control. The Proposed Action includes construction of an earth berm in the park, which involves some ground disturbance, but the berm will be grassed to control dust and minimize sediment runoff.

5.7 Avian, Terrestrial Fauna and Feral Mammals

Avian species that sometimes occupy or fly by the project site are marine birds, waterbirds, introduced non-game birds and introduced game birds. Marine birds such as Wedge-tailed Shearwaters commonly nest on the islands offshore of Kailua, but are less common on the shoreline areas near the project site. Other seabirds like Brown or Red-tailed Boobies, Sooty Terns and Black or Brown Noddies or Great Frigatebirds are also uncommon sights on shore and more often just fly by.

The most common introduced non-game birds at the project site are Mynahs, Japanese White-eyes, House Finches, Cardinals and Sparrows.

The most common introduced game birds at the project site are doves and pigeons.

Terrestrial fauna that have been observed at the project site are House Mice, domestic dogs, mongoose and Black Rats.

No threatened or endangered species of wildlife are known to inhabit the beach park area or surrounding roads. The beach park is extensively visited by residents and tourists and Kawailoa and Alala Roads provide the sole vehicle access for the neighborhood of Lanikai.

5.7.1 Impacts and Mitigation

Nighttime work restrictions will minimize construction impacts on any nocturnal avian species that may be in the area.

House Finches are protected by the Migratory Bird Treaty Act (MBTA). It is possible that there would be adverse impacts to these species' habitats during construction. To avoid any adverse impacts to MBTA species, efforts shall be made to minimize or entirely avoid actions that may harass or injure these birds. It is illegal to take, possess, transport or sell any migratory bird except with a valid MBTA permit.

5.8 Archaeological and Cultural Resources

A Draft Archaeological Inventory Survey (AIS) Report was prepared by Cultural Surveys Hawai'i (CSH) in August 2017 and is currently under review by SHPD. A copy of the Draft report is included in Appendix A. The proposed project may potentially affect one historic property identified within the project area. This historic property, designated as State Inventory of Historic Places (SIHP) # 50-80-11-8166 is a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. The property is evaluated as significant pursuant to HAR §13-275-6, Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history). SIHP # -8166 retains integrity of location and materials and may represent a former activity area and has the potential to offer insight into land use of the area.

Additionally, a Draft Archaeological Literature Review and Field Inspection Report was prepared by CSH in December 2012. In the report's Summary of Findings, it was stated that "no historic resources and/or human remains have ever been reported from this approximately 15.5-ac project area and that furthermore direct searching of exposed cuts in the sand dunes by Dr. Ross Cordy in 1978 and in the present study failed to identify any clear signs of a developed cultural layer or clear trace of the presence of historic resources."

5.8.1 Impacts and Mitigation

In order to mitigate adverse impacts to SIHP # 50-80-11-8166, as well as to any additional historic properties that may be present within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification and proper treatment of any future exposures of SIHP # 50-80-11-8166, as well as any additional historic properties (burial or non-burial) that may be discovered within the project area.

5.9 Visual Resources

According to The Vision for Ko'olaupoko's Future section of the *Ko'olaupoko Sustainable Communities Plan*, “Views of ridgelines or upper slopes of coastal headlands and mountains from the vantage point of coastal waters, major roads, parks, and other public places...should be kept free from land disturbance or the encroachment of structures or other projects that would affect the scenic viewplanes.” The plan goes on to say “Physical access to the shoreline and mountain areas should also be increased and enhanced...” and “To maintain lateral access along public beaches the challenges of long-term and seasonal erosion of the shoreline needs to be addressed.” Drainage improvements within Kailua Beach Park and the surrounding streets will increase park access to the many visual resources it provides.

5.9.1 Impacts and Mitigation

This drainage improvement project will maintain shoreline access, aesthetics, and address erosion at the drainage outlet. The Proposed Action would positively impact visual resources and therefore no mitigation would be necessary.

5.10 Air Quality and Noise

The State Department of Health, Clean Air Branch, monitors ambient air in the State using air quality monitoring stations. O'ahu has six monitoring stations. The Environmental Protection Agency (EPA) has set standards for six pollutants: 1) carbon monoxide; 2) nitrogen dioxide; 3) sulfur dioxide; 4) lead; 5) ozone; and 6) particulate matter (PM_{2.5} and PM₁₀). Particulate matter is measured in microns. The subscript 2.5 and 10 represents microns in aerodynamic diameter. Because of volcanic activity, the State has also set standards for hydrogen sulfide, monitored on the Big Island.

The State has set more stringent standards for nitrogen dioxide and carbon monoxide. The Federal standard for nitrogen dioxide is 100 µg/m³ (micrograms per cubic meter of air) whereas the State standard is 70 µg/m³. For Carbon Monoxide, the 1-hour Federal standard is 40,000 µg/m³ and the State standard is 10,000 µg/m³.

According to the 2006 annual summary, none of these pollutants exceeded State or Federal standards in the last three years from 2006 to 2008. Ambient air quality in the State of Hawai'i continues to be one of the best in the nation.

Noise pollution is regulated by the State Department of Health, which has set specific decibel levels into three classes based on land use. Hawai'i Administrative Rules Title 11, Chapter 46, Community Noise Control contains the specific sound levels in dBA and is shown in **Table 5-1**.

Zoning District	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Class A	55	45
Class B	60	50
Class C	70	70

Table 5-1. Maximum Permissible Sound Levels in dBA

Class A zoning districts are lands zoned residential, conservation, preservation, public space, open space, or similar type. Class B lands are zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar. Class C includes lands zoned agriculture, country, industrial, or similar types. Since the park is located in a residential zoned area, Class A has been identified as the standard to use for this assessment.

Noise levels cannot exceed the dBA identified above for more than 10 percent of the time within any twenty-minute period, except by noise permit or noise variance. Impulsive noise can be 10 dBA above the maximum permissible sound levels. Impulsive noise includes activities such as hammering, pile driving, and explosion.

5.10.1 Impacts and Mitigation

Air Quality. Construction activities and emissions from construction equipment are expected to cause short-term adverse impacts on air quality. Construction activities that effect air quality include ground excavation, removal of vegetation and installation of concrete, cobbles, and rocks. Release of dust is expected since there will be a significant amount of grading and excavation in the park. Fugitive dust would be mitigated during construction by periodic watering of disturbed ground and demolished concrete to prevent airborne particulate matter from escaping the work area during construction. Stockpiled materials shall also be watered to prevent fugitive dust. Once construction is complete, the air quality would be restored to similar or better than pre-construction conditions.

Noise Impacts. Short-term adverse noise impacts would be produced by construction activity throughout the duration of the project. Heavy equipment would be used to grade, excavate, and pour concrete. Single family residences are located immediately adjacent to and surrounding the park. Much of the project work would occur within 100 feet from the nearest residence on park land. Noise pollution would need to be addressed through work practice controls and, if necessary, engineering controls. Noise impacts would be generated from construction equipment. Due to the close proximity to residences, curfew times for construction would be established and mufflers would be used on equipment to minimize noise from construction equipment. A Department of Health Community Noise Permit is required to allow sound levels during construction that exceed maximum permissible levels for Class A zoning district properties.

A Community Noise Variance is required for construction activities that generate noise exceeding maximum permissible sound levels outside of normal permitted hours.

Noise shall be kept within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 – Community Noise Control. The Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels. Construction equipment meeting allowable noise limits shall not be started prior to 6:45 a.m. without prior approval of the City Engineer.

The City will designate a Construction Manager (CM) who will oversee the proposed project. Contract documents shall state that the CM would contact Kailua Beach Park's manager in the early stages of the project and would keep the park's manager informed of construction activities throughout the duration of the project.

The Contractor shall deliver a Public Notice to the residences immediately adjacent to the proposed project site prior to starting construction. The notice shall include at a minimum:

- Contractor contact information;
- Planned weekly hours of construction;
- Planned overall construction schedule;
- Brief description of construction activity; and
- Any planned hindrances to the public.

These noise impacts are short-term and would occur only during construction. After construction is completed, no noise impacts would be generated by the Proposed Action.

5.11 Social Factors

This section describes the social and economic environment of the Kailua census-designated place (CDP) where the Proposed Action would occur. Factors such as demographic characteristics and economic context are described below.

According to the latest U.S. Census Bureau estimates, the population of the City and County of Honolulu in 2017 is 953,207. This represents approximately 68% of the total population of the State of Hawai'i. The Ko'olaupoko District has a population of 123,917 people (or about 13% of O'ahu's population). In 2000, the Kailua CDP had a population of 38,635, with an average of about 3 people per household.

The largest ethnic population of Kailua is white (non-Hispanic) with about 45%, followed by people reporting two or more races and the Asian population, both comprising about 19%. Native Hawai'ian and Pacific Islanders make up about 7%. These numbers are from the 2010 U.S. Census Bureau Survey.

Housing units in Kailua in 2010 totaled 13,650 compared to 519,508 units in the State. Owner-occupied units totaled 9,637 units and renter-occupied units totaled 3,284 units.

Vacant units totaled 729. The homeowner vacancy rate was about 4% while the rental vacancy rate was about 1%. The median value of owner-occupied housing units in Kailua from 2011-2015 was \$829,500.

5.11.1 Impacts and Mitigation

The Proposed Action will help improve park access by reducing the frequency of ponding after rainfall events. Parkgoers, landowners and tenants occupying properties adjacent to Kawailoa Road would benefit from the reduced risk of property damage due to flooding. Reduced flooding and ponding will have a positive social effect and therefore no mitigation would be necessary.

5.12 Economic and Fiscal Factors

The civilian labor force for the City and County of Honolulu in April 2017 was estimated at 481,261 people. The labor force is comprised of persons 16 years of age and over. Honolulu has the largest labor force compared to the other three counties. The unemployment rate in April 2017 was 2.7 percent. The median household income from 2009-2014 was \$73,985 in the City and County of Honolulu.

In April 2017 government (federal, state and local) had the highest number of civilian jobs statewide at 126,500. The Leisure and Hospitality Industry and Trade, Transportation and Utilities job categories both had an estimated 121,400 jobs statewide.

As of May 2016, there were 40,034 active duty and reserve members of the military stationed in the State of Hawai'i with the majority of those located in the County of Honolulu. Eleven of the state's fourteen major military installations are located on Island of O'ahu. One of these, Marine Corps Base Hawai'i, is located within 4 miles of the proposed project site.

5.12.1 Impacts and Mitigation

Long-term adverse impacts on the economy are not anticipated from the Proposed Action. Short-term positive impacts are anticipated from direct and indirect employment and supplies and equipment required for construction. In the long-term the economy would be positively impacted because Kawailoa and Alala Roads and the adjacent properties would be protected from flood damage during most storms (up to a 50-year storm).

No mitigation is required regarding the economic environment associated with the proposed project since the Proposed Action is not anticipated to have adverse impacts on the economy and would result in short and long-term positive impacts.

6 INFRASTRUCTURE, PUBLIC FACILITIES AND UTILITIES

This section describes the existing infrastructure, public facilities, and utilities in the vicinity of the proposed project site and any adverse impacts that the proposed project would incur. Water, wastewater, drainage, solid waste, transportation, power, communications, medical, schools, police, and fire services will be addressed in this section.

6.1 Water, Wastewater, Drainage, and Solid Waste

Services provided by the City and County of Honolulu include potable water, wastewater, drainage, and solid waste. Potable water is managed by the Board of Water Supply (BWS), who gets water from a series of wells in the Kailua Ahupua'a. Wastewater conveyance and treatment is provided by the Department of Environmental Services. Treatment occurs at the Kailua Regional Wastewater Treatment Plant.

There are two operational landfills located approximately thirty miles away from the proposed project site; the PVT Integrated Solid Waste Management Facility Landfill and Waimanalo Gulch Sanitary Landfill. The City and County maintains an island-wide system of solid waste collection, transfer, and disposal. The Contractor shall discard excess material from construction project activities at an appropriate landfill. Kapaa Transfer Station is the closest City and County facility, about 4 miles away from Kailua Beach Park, but only accepts household waste.

Although the Proposed Action is not expected to impact potable water, wastewater or solid waste facilities there is always the possibility that excavation would uncover undocumented utility lines.

Kawailoa and Alala Roads and the associated storm water drainage system are maintained by the City and County of Honolulu, Department of Facilities Maintenance. Kailua Beach Park is maintained by the City and County of Honolulu, Department of Parks and Recreation. Portions of the existing and proposed storm water drainage system are "green infrastructure". The southeast portion of Kailua Beach Park is a natural sump and low-lying, depressed area that has a history of ponding and flooding during heavy rains. The proposed earth berms are designed to contain runoff in the park and minimize runoff from the park onto Kawailoa Road. The existing grass swales along Alala Road flow into an existing 24" pipe culvert under the parking lot adjacent to the boat ramp. A portion of the drainage swale closer to Kawailoa Road will be grass-lined and will provide storm water quality improvements.

During rainfall events through the construction period, runoff associated with the proposed project may result in a temporary increase in suspended solids levels.

6.1.1 Impacts and Mitigation

The Proposed Action is not expected to result in adverse impacts on water, wastewater, solid waste or storm water drainage facilities. In order to mitigate against the possibility of damaging existing pipelines, the Contractor will be required to notify the Utility Notification Center before excavating and coordinate excavation activities with the City and County.

Proposed construction activities may temporarily impact the area's storm water drainage structures and mitigation measures should be implemented to address the following short-term adverse impacts. Temporary water pollution, erosion and dust control measures that are proposed for this project are provided in the construction plans. Prior to the start of construction these temporary measures shall be installed and must be maintained through the construction period, including demolition activities until permanent ground cover is established in the park and project completion. These measures include: compost filter socks, site watering for dust control, grassing or mulching of exposed areas, daily cleaning of adjacent roads of debris and sediment (flushing into drain inlets prohibited), sediment control filters at catch basins, stabilized construction ingress and egress and no stockpiling of construction material in the road travelways.

During construction, equipment, personnel, and new construction materials to be installed may be present within or near the swale and drainage channels. Typical BMPs for culvert construction include: regular inspection and maintenance of equipment for leaks or damage; temporary diversion of water away from active concrete pour sites; proper concrete washout disposal from trucks; catchment of loose solids and debris; stockpiling of accumulated debris away from the channels; proper containment of runoff from stockpiles; ensuring safe passage of wildlife; and daily inspection of all BMPs.

The completed project will improve the efficiency of the storm water drainage system by reducing flooding and ponding which will be a major benefit to park users, residents and commuters. However, increases in sediment loads and turbidity in offshore areas will continue after storm events.

6.2 Transportation

A number of residential neighborhood streets are adjacent to Alala Road within the boundaries of this proposed project. Kawailoa and Alala Roads provide the sole access for the neighborhood of Lanikai. Full or partial access must be maintained on these roads at all times during construction. According to the Ko'olaupoko *Sustainable Community Plan (2000)*, none of these roads are slated for improvements or changes by 2020.

6.2.1 Impacts and Mitigation

Proposed drainage improvements may have temporary adverse impacts on Alala Road during construction. If temporary closures on City streets do become necessary, the Contractor shall obtain a Street Usage Permit from the City's Department of Transportation Services. Lane closures and delivery of construction materials or equipment to and from the project site shall be performed only during off-peak traffic

hours mitigate impacts. Staging areas should not be on or adjacent to roadways, as much as practical to reduce parking impacts and inconvenience to residents.

To maintain the safety of pedestrians, bikers, commuters and construction workers around the construction area a Traffic Control Plan shall be developed by the Contractor. The plan will include flag persons, clear signage, detour routes, cones and special duty officers. If required by DTS, the Contractor's Traffic Control Plan will be reviewed and approved by the City Department of Planning and Permitting Traffic Review Branch.

Prior to the start of construction, the Contractor shall notify the Kailua Neighborhood Board No. 31, area residents, businesses, emergency personnel and Oahu Transit Services of the details and impact of the proposed project on the street network in the area.

During construction, walking routes to and from Kailua Beach Park and nearby schools, such as Lanikai Elementary School may be affected. The Contractor shall be required to provide and maintain a Safe Routes to School connection between Kailua Beach Park and Lanikai Elementary School. When sidewalks or crosswalks are blocked or detours required, a safe alternate route with proper signage shall be required.

Equipment and staging areas will be required to be located off the street, so as not to impede traffic flow along these roadways. Many neighborhood residents park their cars on the streets.

Contract documents shall contain provisions for transferring construction-related materials and equipment to and from the proposed project site only during off-peak traffic hours to minimize disruption to traffic on the local streets, including school arrivals and departures.

The Contractor shall repair any damage to the roadway resulting from construction activities to City standards and Americans with Disabilities Act (ADA) requirements.

6.3 Power and Communications

Electricity is provided by Hawai'ian Electric Company, and telephone communications are provided by several private companies. Spectrum provides cable TV service. The proposed drainage improvements project would not require electricity, telephones or cable service.

6.3.1 Impacts and Mitigation

Since the proposed project would not require telephone, or cable services, no impacts on these systems are expected and no mitigation is required. The Contractor may need to temporarily relocate a utility pole, guy and overhead utility lines prior to construction of drainage improvements. The utility pole is located along Alala Road, across from Kaneapu Place. Refer to construction plans. If this temporary relocation is required, the City will coordinate the work with the appropriate utility company.

6.4 Medical, Schools, Police, and Fire

Castle Medical Center is the medical facility located closest to the proposed project site and the largest medical facility in the area. It is located approximately 3 miles to the southwest. Other medical centers in the proximity include Kaiser Permanente and Straub Clinics in Kailua.

The Kailua community is served by the State Department of Education public school system and private schools. The Department of Education facilities in Kailua include Enchanted Lake, Kaelepulu, Keolu, Maunawili, Pope, Waimanalo, Aikahi, Kailua, Kainalu, and Mokapu, Elementary Schools, Waimanalo and Kailua Intermediate School, and Kailua and Kalaheo High Schools. Other existing facilities in the area include Lanikai Elementary Public Charter School, Ke Kula O Kamakau Lab Public Charter School, Malama Honua Learning Center, Olomana School, and Windward Community School. Windward Community College and Hawai'i Pacific University are located in Kāne'ohe. Leeward Community College, Kapi'olani Community College, Chaminade University and the University of Hawai'i Mānoa and West O'ahu campuses are also located on O'ahu.

Lanikai Elementary School is located about 600 feet south (mauka) of the project area.

Police protection for the Kailua CDP is provided by the Honolulu Police Department headquartered in the city of Honolulu approximately 11 miles south of the proposed project site. Honolulu Police Department operates the Kailua Substation located approximately 1 mile east of the proposed project site.

6.4.1 Impacts and Mitigation

No impacts on medical and fire services are expected. Thus, no mitigation is required for these services. To maintain the safety of pedestrians, bikers, commuters and construction workers around the construction area a Traffic Control Plan shall be developed by the Contractor. The plan will include flag persons, clear signage, detour routes, cones and special duty officers and will be reviewed and approved by the City Department of Planning and Permitting.

During construction, walking routes to and from Kailua Beach Park and nearby schools such as Lanikai Elementary School may be affected. The Contractor shall be required to provide and maintain safe passageway(s) for pedestrians or bikers. When sidewalks or crosswalks are blocked or detours required, a safe alternate route with proper signage shall be required.

7 CONFORMANCE WITH PLANS AND POLICIES

This section will describe the relationship of the proposed project to applicable State and City and County policies. Only those policies related to the drainage improvements project will be described.

7.1 Hawai‘i 2050 Sustainability Plan (2008)

The *Hawai‘i 2050 Sustainability Plan* is the successor to the *Hawai‘i State Plan* and twelve functional plans. The plan lists five goals with associated strategic actions and indicators for each. The five established goals are 1) A way of life; 2) The economy; 3) Environment and natural resources; 4) Community and social well-being; and 5) Kanaka Maoli and island values.

The Proposed Action would have implications on each of these five goals, but primarily would speak to the way of life, economy, and community and social well-being.

7.1.1 Goal One: A Way of Life

Strategic actions recommended for goal one are to:

- Develop a sustainability ethic;
- Conduct ongoing forums and cross-sector dialogue to promote collaboration and progress on achieving Hawai‘i’s sustainability goals; and
- Continually monitor trends and conditions in Hawai‘i’s economy, society and natural systems.

The proposed project relates to how well the storm water drainage system can safely and efficiently convey storm water from the streets, park and residential areas and prevent flooding, ponding and hazardous conditions. Project improvements address issues related to how well people can move about between their homes, businesses, schools, parks and the beach park. Residents and visitors all benefit from an improved drainage system, which furthers strategic actions associated with goal one.

7.1.2 Goal Two: The Economy

The strategic actions recommended for goal two are to:

- Develop a more diverse and resilient economy;
- Support the building blocks for economic stability and sustainability;
- Increase the competitiveness of Hawai‘i’s workforce; and
- Identify, prioritize and fund infrastructure “crisis points” that need fixing.

The proposed project may have a positive short-term impact on the economy by creation of direct and indirect jobs. After construction is completed, no additional jobs would be created. The proposed project has been designed to address a “crisis point” in the storm water management infrastructure.

7.1.3 Goal Three: Environment and Natural Resources

The strategic actions recommended for goal three are to:

1. Reduce reliance on fossil (carbon based) fuels;
2. Conserve water and ensure adequate water supply;
3. Increase recycling, reuse and waste reduction strategies;
4. Provide greater protection for air, and land, fresh water and ocean based habitats;
5. Conserve agricultural, open space and conservation lands and resources;
6. Research and strengthen management initiatives to respond to rising sea levels, coastal hazards, erosion and other natural hazards; and
7. Develop a comprehensive environmental mapping and measurement system to evaluate the overall health and status of Hawai'i's natural ecosystems.

The proposed project has minimal impacts to the environment and natural resources. Although short-term adverse impacts are expected during the construction; long-term positive impacts are expected after project completion. The following long-term positive impacts all coincide with the strategic actions called for under goal three.

The proposed project specifically addresses the fourth and sixth recommended actions regarding protection of fresh water- and ocean-based habitats and response to flooding. The current grading and drainage system configuration fails to convey all storm water runoff from the watershed into the surrounding water bodies. During heavy rainfall, water ponds within the roadways, shoulders and flows into adjacent residential properties. This has caused driving hazards, washed oil and grease from the bottom vehicle undercarriages, caused residential property flood damage, and rendered portions of park land temporarily unusable.

7.1.4 Goal Four: Community and Social Well-Being

The strategic actions recommended for goal four are to:

- Strengthen social safety nets;
- Improve public transportation infrastructure and alternatives;
- Strengthen public education; and
- Provide access to diverse recreational facilities and opportunities.

The project is expected to improve road infrastructure and accessibility within Kailua and Lanikai and to Kailua Beach Park, a popular community and recreational gathering place. An improved and properly maintained storm water drainage system, including the low-lying, depressed area in Kailua Beach Park would reduce the frequency and severity of flooding in the park, adjacent roadways, bus stops and supports goal four. Some flooding will still occur in the area but only during the more intense storms (greater than 50-year storm).

7.1.5 Goal Five: Kānaka Maoli and Island Values

The strategic actions recommended for goal five are to:

- Honor Kānaka Maoli culture and heritage;
- Celebrate our cultural diversity and island way of life;
- Enable Kānaka Maoli and others to pursue traditional Kanaka Maoli lifestyles and practices; and
- Provide support for subsistence-based business and economics.

The proposed project is not expected to impact Kānaka Maoli and Island Values. By improving public infrastructure that enables accessibility, free movement between all areas of our island for those seeking cultural diversity and an island way of life.

7.2 Ko‘olaupoko Watershed Restoration Action Strategy (2007)

The *Ko‘olaupoko Watershed Restoration Action Strategy* was authored by the Kailua Bay Advisory Council and addresses technical and financial, watershed monitoring strategy, and public participation, outreach and education needs of each separate watershed within the Ko‘olaupoko District. Within this plan sections specifically address the Ka‘elepulu watershed. The recommended watershed management measures for Ka‘elepulu watershed include the following:

- Distribute homeowner/resident educational curriculum and management guidelines for nutrient and fertilizer application
- Work with managers at Mid-Pac golf course for riparian plantings
- Coordinate efforts with future TMDL recommendations
Work with City of Honolulu on street sweeping efforts along Keolu Drive
Identify sources of TSS originating from steep upland erosion, road cuts and/or urban runoff
- Implement pilot project to capture rain/storm water on residential and commercial lots
- Improve DOT Highway storm drains above Kalaniana‘ole Highway to limit the quantity of sediment and debris entering the drains via bio-retention
- Install sediment and trash catchment BMPs on the major drainage ways entering into Enchanted Lake

While the Proposed Action does not directly address any of these management measures, the installation of new drain structures brings the opportunity to implement catchment Best Management Practices (BMPs) or design the new structures to accommodate future BMP installations.

7.3 Ko‘olaupoko Sustainable Communities Plan (Updated 2016)

The *Ko‘olaupoko Sustainable Communities Plan* is one of eight community-oriented plans on the Island of O‘ahu intended to help guide public policy, investment, and decision making through the 2020 planning horizon. It addresses the areas of development, vision for the future, land use, public facilities and infrastructure, and implementation.

The plan addresses drainage systems under the public facilities and infrastructure section and outlines the following general policies:

1. Promote drainage system that emphasizes control and minimization of non-point source pollution and the retention of storm water on-site and in wetlands;
2. A comprehensive study of local flooding and drainage problems should be developed and should include a phased plan for improvements;
3. Modifications needed for flood protection should be designed and constructed to maintain habitat and aesthetic values, and avoid and/or mitigate degradation of stream, coastline and nearshore water quality;
4. Planned drainageway improvements should be integrated into the regional open space network by providing access for pedestrians and bicyclists;
5. View storm water as a potential irregular source of water that should be retained for recharge of the aquifer rather than quickly moved to coastal waters;
6. Select natural and man-made vegetated drainageways and retention basins as the preferred solution to drainage problems wherever they can promote water recharge, help control non-source pollutants, and provide passive recreation benefits;
7. Keep drainageways clear of debris to avoid the flooding problems that have occurred in the past.

The plan also details the following planning principles to guide the maintenance and improvement of the drainage systems:

- Retention and detention;
- Stream channel improvements; and
- Channel and Basin Management.

The Proposed Action most clearly aligns with the first, second and seventh general policies. The southeast portion of Kailua Beach Park is a low-lying natural sump area. The project will improve drainage flow and alleviate flooding on Kawailoa Road. Drainage improvements will help keep drainageways clear and open to avoid flooding. Past flooding problems have occurred due to undersizing of existing drainage culverts. These drainage culverts will be replaced with larger sized culverts able to convey greater storm water flows.

7.4 Hawai'i Watershed Guidance

The Hawai'i Coastal Zone Management (CZM) Program and Hawai'i Department of Health developed the Watershed Guidance (State of Hawai'i, 2010) to help people managing watersheds develop and implement management plans that have the greatest potential for achieving water quality goals. Section 5.0 of the Watershed Guidance proposes management measures to help reduce nonpoint source pollution. Management measures are defined as, "economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives." Section 5.3 offers management measures for urban areas.

The Watershed Guidance suggests four Management Measures for Roads, Highways, and Bridges.

"Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

1. Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures); and
2. Establish schedules for implementing appropriate controls."

This drainage improvements project presents an opportunity for pollutant reduction to urban waters.

7.5 Coastal Zone Management Program §205A-2

The Coastal Zone Management (CZM) Area is defined as, "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the territorial sea". This project falls under the jurisdiction of the Coastal Zone Management Program. The CZM program covers the following areas; recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection and marine resources. The objectives and policies for these areas and the project's impacts on these areas are described below.

7.5.1 Recreational resources

Objective: Provide coastal recreational opportunities accessible to the public.

The proposed project is located in and adjacent to a coastal park and would improve existing coastal recreation opportunities. Project improvements would improve drainage

within the park and surrounding roadways by improving park grading and culvert capacity that eventually discharges storm water into Kailua Bay.

Policies:

- (A) Improve coordination and funding of coastal recreational planning and management

The proposed project would not affect coordination and funding of coastal recreational planning and management.

- (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

- (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.

Proposed improvements would improve the storm water drainage system and access to the park and surrounding roadways that regularly experience flooding and ponding during heavy rainfall.

- (ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources would be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable.

The proposed drainage improvements would not adversely impact surfing sites, fishponds or sand beaches.

- (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.

The proposed improvements may temporarily hinder public access to and along shorelines with recreational value. During construction parking spaces and roadway access may be temporarily restricted. Work will be performed during off-peak park hours. Following construction, park access will be enhanced with less ponding areas.

- (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation.

The proposed improvements would not affect the number of shoreline parks and recreational facilities.

- (v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources.

The proposed project improvements would not affect potential recreational uses of the project area. Access to portions of the park will temporarily be hindered during construction.

- (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.

Project improvements would not adversely affect potential recreational uses of the coastal waters.

- (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing.

The proposed project would not develop any new shoreline opportunities. Improved efficiency of the storm drain system will improve accessibility within existing recreational areas of the Kailua Beach Park and roadways during and after rainfall events.

- (viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

The proposed project would not affect the dedication of shoreline areas for public use.

7.5.2 Historic resources

Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

- (A) Identify and analyze significant archaeological resources;

Proposed project improvements may potentially affect one historic property identified in the project area. This historic property (SIHP # 50-80-11-8166) is a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. The property retains integrity of location and materials and may represent a former activity area and has the potential to offer insight into land use of the area. See Appendix A.

In order to mitigate adverse impacts to any historic properties found within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification and proper treatment of any future exposures.

(B) Maximize information retention through preservation of remains and artifacts or salvage operations

If historic resources, including human skeletal remains, cultural layers, cultural deposits, features, artifacts, sinkholes, lava tubes or lava blisters/bubbles are identified during construction, all work would be stopped in the immediate vicinity of the find, the site would be protected from additional disturbance and the State Historic Preservation Division would be contacted. This directive would also be included in applicable project permits.

(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

If significant archaeological or historic resources are discovered, they would be treated in a manner that complies with state goals.

7.5.3 Scenic and open space resources

Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;

The project area has been heavily altered by historical and modern development. No valued scenic resources would be impacted.

(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

A portion of the project is along the shoreline and therefore may impact the shoreline visual environment temporarily during construction. After completion, no impacts to the visual environment are expected.

(C) Preserve, maintains, and, where desirable, improve and restore shoreline open space and scenic resources.

A portion of the project is along the shoreline but would not impact the shoreline scenic resources or open space after completion.

(D) Encourage those developments that are not coastal dependent to locate in inland areas.

A portion of the proposed project is coastal dependent and will modify an existing coastal outfall structure.

7.5.4 Coastal ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

The project is intended to improve drainage along Kawailoa and Alala Roads and areas surrounding Kailua Beach Park. The proposed earth berm will contain runoff in an existing low-lying depressed area of Kailua Beach Park and minimize runoff from flowing onto Kawailoa Road. This will reduce sediment load discharged into Kailua Bay during the more frequent storm events and reduce adverse effects on the marine environment.

(B) Improve the technical basis for natural resource management;

This project will not affect the basis for natural resource management.

(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

The proposed project would help preserve valuable coastal ecosystems by reducing the pollutant input into Kailua Bay.

(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

The proposed project would not include any off-stream diversions.

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and

enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The proposed project would include the use of BMPs to reduce pollution during construction. BMPs to minimize turbidity by controlling and preventing construction related runoff for the proposed project may include the use of sandbags, fiber rolls, drain inlet covers, grassing, geotextiles, and silt fences. The Contractor shall consider the weather while performing construction. Some work may be performed during low rain conditions, but all construction would be halted during storm conditions or when storm conditions threaten the watershed. For the purpose of this watershed, “storm conditions” consists of any storm anticipated of delivering more than 0.5 inches of rain in 12 hours.

7.5.5 Economic uses

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(A) Concentrate coastal dependent development in appropriate areas;

(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area;

(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

The proposed project drain outlet is located along the coast. The economic use objective and policies listed above would not be adversely affected by project improvements because they are infrastructure improvements and no change in land use will occur.

7.5.6 Coastal hazards

Objective: Reduce hazard to life and property from tsunamis, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:

- (A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
- (B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;
- (C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
- (D) Prevent coastal flooding from inland projects.

The proposed project is located along the coast and is expected to have a positive impact on coastal flooding.

7.5.7 Managing development

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

- (A) Use, implements, and enforces existing law effectively to the maximum extent possible in managing present and future coastal zone development;

The proposed project will not develop along the coastline and would not have any effect on this policy.

- (C) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements.

Table 7-1 shows the permits that may be required for the project. Every effort shall be made to coordinate these permits between the approving agencies.

Table 7-1. Anticipated Permits

Permit	Agency Approval
Conservation District Used Permit (CDUP)	State of Hawai‘i Department of Land and Natural Resources (DLNR)
Shoreline Setback Variance (SSV)	City Department of Planning and Permitting (DPP)
Special Management Area (SMA)	City Department of Planning and Permitting (DPP)
Grading Permit (Contractor)	City Department of Planning and Permitting (DPP)
Street Usage Permit (Contractor)	City Department of Transportation Services (DTS)

A Department of Army permit will not be required for this project. See **Appendix C**.

- (C) Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

The proposed project area will not develop along the coastline and would not have any effect on this policy. The SMA process includes a public hearing which would disclose any potential impacts as a result of the Proposed Action.

7.5.8 Public participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

- (A) Promote public involvement in coastal zone management processes;
- (B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
- (C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

The environmental assessment and permits would be available for public review. Comments would be encouraged and addressed. The contractor shall coordinate with the community and stakeholders before and during construction.

7.5.9 Beach protection

Objective: Protect beaches for public use and recreation.

Policies:

- (A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
- (B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
- (C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

A portion of the proposed project modifies a storm water outlet on the beach adjacent to the boat ramp. The proposed outlet will be located seaward of the certified shoreline.

7.5.10 Marine resources

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

- (A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- (B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
- (C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
- (D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

- (E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The Proposed Action is not anticipated to result in long-term adverse impacts on marine resources.

7.6 Special Management Area guidelines (§205A-26, January 2006)

7.6.1 Adequate access to beaches, recreation areas and natural reserves

The proposed outfall structure will be located next to an existing drain outlet, bordering a parking area at the northeast section of Kailua Beach Park. The structure will have no effect on the publically owned beach or restrict access to recreation areas and natural reserves.

7.6.2 Adequate and properly located public recreation areas and wildlife preserves

Proposed project improvements will not affect any public recreation areas and wildlife preserves. The portion of Kailua Beach Park where the earth berm is proposed is an existing low-lying depressed grassed area between the bike path and Kawailoa Road. The purpose of the berm is to raise the existing ground in this area to contain storm water runoff in the park and prevent runoff from discharging onto Kawailoa Road.

7.6.3 Solid and liquid waste treatment, disposition and management

No solid waste treatment will be required for this project as all solid waste will be transported to an authorized landfill. Portable sanitation stations will be setup to dispose of liquid waste into the City sewer system.

7.6.4 Alterations to existing landforms and structures, effects on water resources, scenic and recreational amenities. Danger caused by floods, wind damage, storm surge, landslides, erosion, siltation and earthquakes

The proposed earth berm in Kailua Beach Park will increase the hydraulic capacity and efficiency of the storm water drainage system. Project improvements will have no effect on scenic and recreational amenities. Project improvements will not be affected or increase danger to the public resulting from wind damage, erosion, storm surges, landslides or earthquakes.

7.6.5 Environmental or ecological effects

Proposed improvements will have no long-term substantial adverse environmental or ecological effects. During construction storm water runoff quality from the project site may degrade slightly, but this will be minimized by proper application of BMPs. The long-term effect of the project on the environment and ecology of the area is positive as flooding and ponding will be reduced and the efficiency of the storm drain system and quality of storm water runoff will be improved.

7.6.6 Consistency with objectives, policies, and special management area guidelines

Proposed project improvements are consistent with CZM objectives, policies and SMA guidelines.

7.6.7 Consistency with County General Plan and Zoning

The proposed project is consistent with the Oahu General Plan and zoning. See **section 7.7**.

7.6.8 Dredging, filling or altering a bay, estuary, salt marsh, river mouth, slough or lagoon

Proposed project improvements do not involve dredging, filling or altering any of these waterbodies.

7.6.9 Beaches or other public recreation areas

Proposed project improvements will not reduce the size of any beach or other public recreation area.

7.6.10 Restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams

Proposed project improvements will not reduce or impose restrictions upon public access to tidal or submerged lands or beaches.

7.6.11 Line of sight toward the sea from the state highway nearest the coast

Proposed project improvements will not interfere or detract from the line of sight toward the sea from the state highway nearest the coast.

7.6.12 Water quality, existing open areas, fisheries and fishing grounds, wildlife habitats, or agricultural uses of land.

Proposed project improvements will not adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

7.7 Oahu General Plan (amended 2002)

The General Plan for the City and County of Honolulu is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of Oahu's residents and the strategies of actions to achieve them. The proposed project is consistent with the following objectives and policies of the Oahu General Plan.

Objective C: To maintain a high level of service for all utilities.

Policies 1 and 2: The proposed project conforms with these policies by improving the existing storm drain system to avoid breakdowns and reducing substandard conditions such as road flooding and ponding.

Objective D: To maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit.

Policy 1: This drainage improvement project will improve the existing drainage system and the functionality and safety of roadways.

Objective F: To promote and enhance the social and physical character of Oahu's older towns and neighborhoods.

Policies 2 and 3: The proposed project conforms with these policies by repairing or replacing existing substandard components of the storm drain system, while maintaining the character of this portion Kailua.

8 SIGNIFICANCE CRITERIA

The planned use does not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The Proposed action under this project would not result in the irrevocable destruction of a cultural resource; the AIS for the project is currently being reviewed by SHPD.

(2) Curtails the range of beneficial uses of the environment;

The proposed project involves improving the storm water conveyance system within Kailua Beach Park and areas along Kawailoa and Alala Roads. These improvements will reduce the frequency and incidence of ponding and flooding within the project area and increase beneficial uses for residents and visitors.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

The proposed project would not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS. Evaluation of the construction activity described in this Draft EA shows that the proposed project would not have long-term adverse impacts. Short-term adverse impacts would occur during construction from noise, dust and turbidity in the water. However, these impacts can be mitigated by proper use of BMPs, such as mufflers used on equipment, frequent watering to keep dust down, and control of construction material.

(4) Substantially affects the economic or social welfare of the community or state;

The proposed project would have a short-term positive effect on the economy by creating new jobs and increased revenue during construction. After project completion, the improvements would not directly affect the economy. Additionally, the proposed project would affect the social welfare of the community by preserving a popular public recreational area.

(5) Substantially affects public health;

Increasing the flood capacity of the storm water conveyance structures would improve storm water drainage for the land along Kawailoa and Alala Roads and maintain the safety and public health of residents, drivers and pedestrians.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

Proposed drainage improvements would not result in any substantial secondary impacts, such as population changes or effects on public facilities. A positive, but indirect secondary impact of the project is the improvements would help maintain real estate property values for residences located along Kawailoa, Alala Roads and the surrounding areas.

(7) Involves a substantial degradation of environmental quality;

Proposed drainage improvements for this project will not substantially degrade environmental quality.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The proposed project is not part of a larger action and would not contribute to cumulative adverse environmental effects on the environment. The drainage culverts do require periodic maintenance to ensure proper drainage is maintained.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat;

Proposed drainage improvements will not effect any aquatic resources currently listed or proposed for listing under the Federal or State of Hawai'i endangered species. No avian or mammalian species currently listed or proposed for listing under the Federal or State of Hawai'i endangered species statutes are known to exist within the project area.

(10) Detrimentially affects air or water quality or ambient noise levels;

Short-term impacts on air quality and noise levels would occur during construction but will be mitigated by proper BMPs. After construction is completed, no long-term effects on air quality and noise level are expected.

Construction of drainage improvements may temporarily increase turbidity in the storm water runoff. BMP plans initiated by the design engineer, reviewed and approved by the various regulatory agencies and adapted for site-specific conditions by the Contractor, according to the Contractor's means and methods shall be implemented to minimize the effects of turbidity and other pollutants into the storm drain system.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The Kawailoa Road Drainage Improvements project site falls within flood Zone X as shown in **Figure 5-3**. Zone X is an area determined to be outside of the 0.2% annual chance floodplain.

(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies;

The proposed project would have no adverse effects on scenic vistas or view planes.

(13) *Requires substantial energy consumption.*

The proposed project would not require any substantial energy consumption.

8.1 Final Determination

An Anticipated Finding of No Significant Impact (AFONSI) determination for the proposed project is based upon the information provided in this Draft Final EA document. The results of the assessments conducted have determined that there would be no “significant” impact in accordance with HRS Chapter 343 from the proposed improvements along Kawailoa Road in Kailua, O‘ahu.

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Appendix A

Archaeological Inventory Survey (AIS) Documents

- Chapter 6E-8 Historic Preservation Review / AIS –
Acceptance letter March 12, 2018
- Final AIS Report March 2018

DAVID Y. IGE
GOVERNOR OF
HAWAII



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ENGINEERING
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

March 12, 2018

Robert Kroning, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street 11th Floor
Honolulu, HI 96813

IN REPLY REFER TO:
Log No.: 2017.01773
Doc. No.: 1803KM21
Archaeology

Dear Mr. Kroning:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –
Archaeological Inventory Survey for the Kawaihoa Road Drainage Improvements
Kailua Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu
TMK: (1) 4-3-009:001 por.; 4-3-010:084 and 088**

Thank you for the opportunity to review the draft report titled *Archaeological Inventory Survey for the Kawaihoa Road Drainage Improvements, Kailua Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu, TMK: (1) 4-3-009:001 por.; 4-3-010:084 and 088* (Blahut et al., August 2017). The State Historic Preservation Division (SHPD) received this submittal on August 11, 2017. Previously, the SHPD received an archaeological literature review and field inspection (LRFI) for the proposed project on December 13, 2012. The LRFI (Hammatt and Shideler, 2012) recommended either archaeological inventory survey or archaeological monitoring; however the submittal was overtaken by events (December 24, 2015; Log No. 2012.3630, Doc. No. 1512KM14).

This archaeological inventory survey (AIS) was completed at the request of ParEn Inc. (dba Park Engineering) on behalf of the City and County of Honolulu Department of Design and Construction (DDC). The DDC is the project proponent and is proposing improvements to the storm water drainage system. The project area totals 2.8 acres and involves City and County owned land. The scope of work involves installation of new drainage improvements along Alala Road, replacing the drain line and ocean outlet by the boat ramp, and grading of an earthen berm within Kailua Beach Park adjacent to Kawaihoa Road.

The AIS involved a 100% pedestrian survey and the excavation of four test trenches. The general stratigraphy within the project area included landscaping and road fills overlying natural alluvial deposits, all above natural Jaucas sands. The AIS documented one newly identified historic property: a buried cultural layer (Site 50-80-11-8166). Site 8166 included a single feature and contained small amounts of midden and charcoal material. Site 8166 is interpreted as a late pre-Contact to early post-Contact habitation site. Pursuant to Hawaii Administrative Rules (HAR) §13-275-6, the AIS assessed Site 8166 as significant under Criterion “d”. The report recommends a project effect determination of “effect, with proposed mitigation commitments” and recommends an archaeological monitoring program for the project. SHPD concurs with the effect determination.

The report meets the minimum requirements of HAR §13-276-5. **It is accepted.** Please send one hardcopy of the document, clearly marked FINAL, along with a text-searchable PDF version to the Kapolei SHPD office, attention SHPD Library.

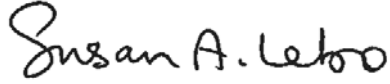
As stipulated in HAR §13-275-7, when SHPD comments that a project will result in “effect with proposed mitigation commitments,” then detailed mitigation plans shall be developed for SHPD review and acceptance prior to project work commencing. The proposed mitigation for this project is archaeological monitoring for Site 8166.

Mr. Kroning
March 12, 2018
Page 2

The SHPD looks forward to receiving an archaeological monitoring plan (AMP) meeting the requirements of HAR §13-279-4 for review and acceptance prior to project work commencing.

Please contact Kimi Matsushima at (808) 692-8027 or at Kimi.R.Matsushima@hawaii.gov for questions regarding archaeological resources or this letter.

Aloha,

A handwritten signature in black ink that reads "Susan A. Lebo". The signature is written in a cursive, flowing style.

Susan A. Lebo, PhD
Archaeology Branch Chief

cc: Doug Borthwick, Cultural Surveys (dborthwick@culturalsurveys.com)

Final

**Archaeological Inventory Survey Report for the
Kawailoa Road Drainage Improvements,
Kailua Ahupua‘a, Ko‘olaupoko District, O‘ahu
TMKs: [1] 4-3-009:001 por.; 4-3-010:084 and 088**

**Prepared for
City and County of Honolulu
Department of Design and Construction
at the request of
ParEn Inc. dba Park Engineering**

**Prepared by
Sara M. Blahut, M.A.,
Constance R. O’Hare, B.A.,
and
Hallett H. Hammatt, Ph.D.**

**Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: KAILUA 62)**

March 2018

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Management Summary

Reference	Archaeological Inventory Survey Report for the Kawailoa Road Drainage Improvements, Kailua Ahupua'a, Ko'olaupoko District, O'ahu, TMKs: [1] 4-3-009:001 por.; 4-3-010:084 and 088 (Blahut et al. 2018)
Date	March 2018
Project Number(s)	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: KAILUA 62
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological fieldwork permit number 17-04, issued by the Hawai'i State Historic Preservation Division (SHPD) per Hawai'i Administrative Rules (HAR) §13-282
Agencies	State Historic Preservation Division/Department of Land and Natural Resources (SHPD)
Land Jurisdiction	City and County of Honolulu
Project Proponent	City and County of Honolulu, Department of Design and Construction
Project Location	The project area is located along the eastern edge of Kailua Beach Park, including the eastern end of Kawailoa Road, the northern end of Alāla Road, and the western end of Mokulua Drive. It extends <i>mauka/makai</i> (mountains/sea), parallel to Alāla Road, to the boat ramp along the eastern edge of the beach park. The project area is depicted on a portion of the 1998 Mokapu Point U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	The proposed improvements to the storm water drainage systems include installing new drainage improvements along Alāla Road and replacing the drain line and outlet to the ocean by the boat ramp. The project also includes grading of an earth berm in Kailua Beach Park adjacent to Kawailoa Road.
Project Acreage	Approximately 2.80 acres (1.13) hectares, 360 m long
AIS Scope	This archaeological inventory survey (AIS) focused on archaeological historic properties and burial sites per the guidelines of HAR §13-276. The identification, documentation, and evaluation of in-use potential architectural historic properties such as historic buildings and structures was outside the scope of this AIS. Throughout this report the term "historic properties" is used and should be generally understood to refer to archaeological historic properties, unless otherwise stated.
Area of Potential Effect (APE)	The APE is considered to be the entirety of the approximately 2.80 acres of the project area.
Historic Preservation Regulatory Context	This AIS investigation fulfills the requirements of HAR §13-276 and was conducted to identify, document, and assess significance of any historic properties. This document is intended to support the proposed

	<p>project's historic preservation review under Hawai'i Revised Statutes (HRS) §6E-8 and HAR §13-275, as well as the project's environmental review under HRS §343. It is also intended to support any project-related historic preservation consultation with stakeholders such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups.</p> <p>An archaeological literature and field inspection report (LRFI) (Hammatt and Shideler 2012) addressing the entire Kailua Beach Park was prepared for this project and submitted to SHPD on 13 December 2012. A SHPD letter dated 24 December 2015 (LOG NO.: 2012.3630, DOC. NO.: 1512KM14) noted this LRFI had been overtaken by coordination for the current AIS study.</p>
Fieldwork Effort	Fieldwork was accomplished between 15 May 2017 and 17 May 2017 by Douglas Borthwick, B.A. (project manager), Michelle Pammer, B.A. (project director), Sara Blahut, M.A., Jesse Davis, B.A., and Jason Richards, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). This work required approximately 9 person-days to complete.
Consultation	A letter was sent out to members of the Kailua cultural descendant group, Kau a Ho'oilō, the week of 24 April 2017 notifying them of the Kawailoa Road Drainage Improvements project. Following this notification, on 27 April 2017 a meeting was held in Kailua within the Community Room at 146 Hekili Street to discuss the AIS excavation plan and to address any concerns. An email dated 10 May 2017 from Kailua cultural descendants Māpuana and Kihei de Silva to CSH confirmed descendent approval of the current AIS excavation plan. The current AIS project was subsequently presented to the O'ahu Island Burial Council (OIBC) during the 10 May 2017 meeting.
Historic Properties Identified and Historic Property Significance	One new historic property was identified: State Inventory of Historic Places (SIHP) # 50-80-11-8166 is a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. SIHP # -8166 is evaluated as significant pursuant to HAR §13-275-6, Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history). SIHP # -8166 retains integrity of location and materials (Hardesty and Little 2000). This historic property may represent a former activity area and has the potential to offer insight into land use of the area.
Effect Recommendation	The proposed project will potentially affect one historic property (SIHP # -8166) identified within the project area. Under Hawai'i State historic preservation review legislation, the project's effect recommendation is "effect, with proposed mitigation commitments" (in accordance with HAR §13-275-7).

Mitigation Recommendations	In order to mitigate adverse impacts to SIHP # -8166, as well as to any additional historic properties that may be present within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification and proper treatment of any future exposures of SIHP # -8166 as well as any additional historic properties (burial or non-burial) that may be discovered within the project area.
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Section 1 Introduction

1.1 Project Background

At the request of ParEn Inc. dba Park Engineering, on behalf of City and County of Honolulu Department of Design and Construction, Cultural Surveys Hawai'i, Inc. (CSH) completed this archaeological inventory survey report (AIS) for the Kawaihoa Road Drainage Improvements project, in the traditional Hawaiian land division of Kailua Ahupua'a, Ko'olaupoko District, O'ahu, TMKs: [1] 4-3-009:001 por.; 4-3-010:084 and 088. The project area is located along the eastern edge of Kailua Beach Park, including the eastern end of Kawaihoa Road, the northern end of Alāla Road, and the western end of Mokulua Drive. It extends *mauka/makai* (mountain/sea), parallel to Alāla Road, to the boat ramp along the eastern edge of the beach park. The project area is depicted on a portion of the 1998 Mokapu Point U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), tax map plats (Figure 2 and Figure 3), and a 2013 aerial photograph (Figure 4).

The proposed improvements to the storm water drainage systems include installing new drainage improvements along Alāla Road, and replacing the drain line and outlet to the ocean by the boat ramp. The project also includes grading of an earth berm in Kailua Beach Park adjacent to Kawaihoa Road.

1.2 Historic Preservation Regulatory Context and Document Purpose

This AIS investigation fulfills the requirements of Hawai'i Administrative Rules (HAR) §13-276 and was conducted to identify, document, and make significance assessments of any historic properties. This document is intended to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) §6E-8 and HAR §13-275, as well as the project's environmental review under HRS §343. It is also intended to support any project-related historic preservation consultation with stakeholders such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups.

An archaeological literature and field inspection report (LRFI) (Hammatt and Shideler 2012) addressing the entire Kailua Beach Park was prepared and submitted to State Historic Preservation Division (SHPD) on 13 December 2012. An SHPD letter dated 24 December 2015 (LOG NO.: 2012.3630, DOC. NO.: 1512KM14) noted the LRFI had been overtaken by coordination for the current AIS study.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is *makai* (seaward) of Kawaihoa Road and includes much of Kailua Beach Park east of the Ka'elepulu stream mouth (see Figure 1). Elevation ranges from sea level to 3 m (9 feet [ft]) above mean sea level (amsl). Annual rainfall is 1,500 mm (59 inches [in]) or less (Giambelluca et al. 2013). A flora inventory of the project area includes sea grape (*Coccoloba uvifera*), coconut (*Cocos nucifera*), plumeria (*Nerium oleander*), ironwood (*Casuarina equisetifolia*), pink tecoma (*Tabebuia rosea*), *hala* (*Pandanus tectorius*), monkeypod (*Albizia saman*), autograph tree (*Clusia rosea*), banyan (*Ficus benghalensis*), false *kamani* (*Terminalia catappa*), and *koa* (*Acacia koa*).



Figure 1. Portion of the 1998 Mokapu Point USGS 7.5-minute topographic quadrangle showing the location of the project area

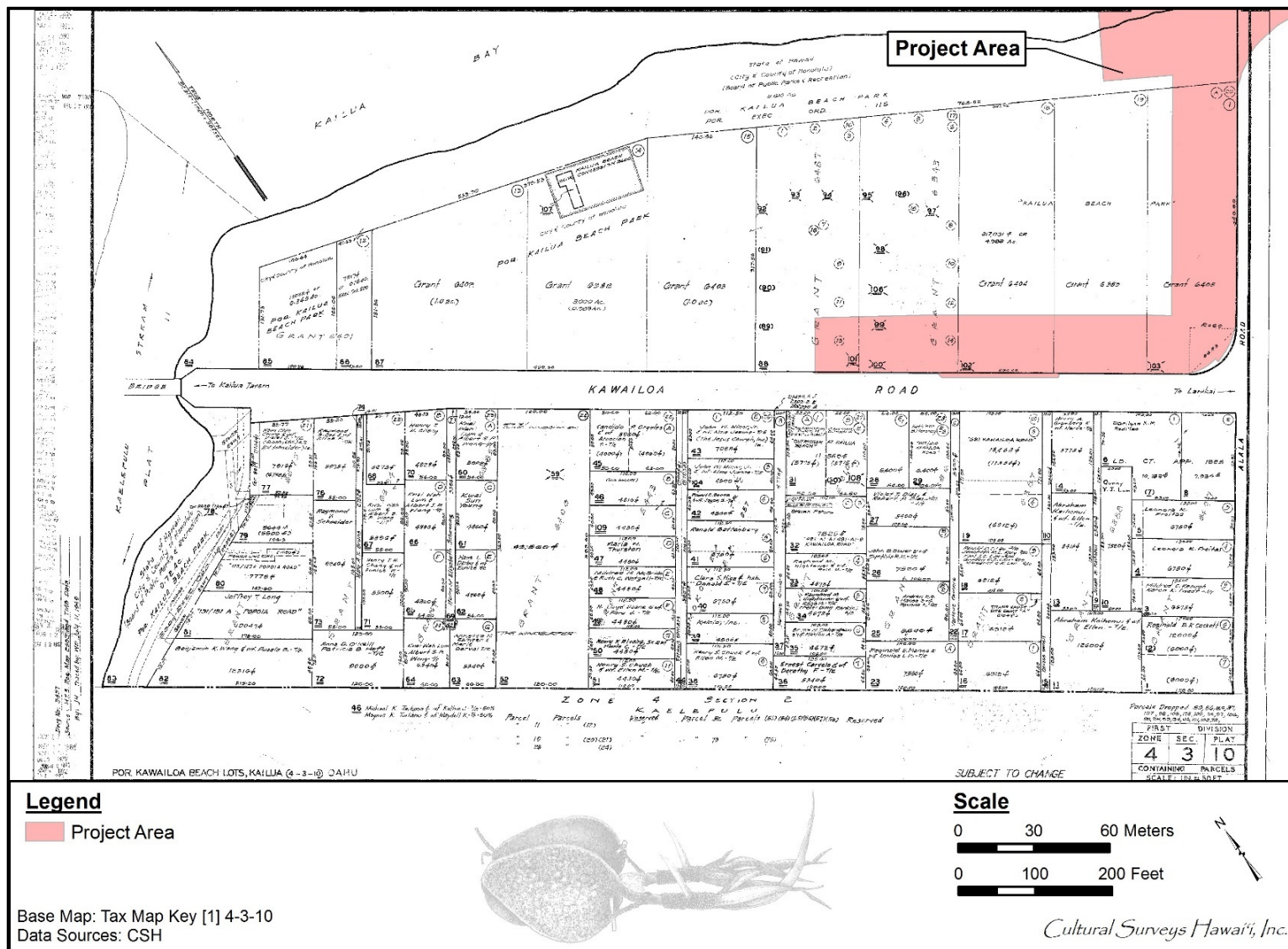


Figure 2. Tax Map Key (TMK) [1] 4-3-010 showing western portion of the project area (Hawai'i TMK Service 2014)

AISR for Kawaioloa Road Drainage Improvements, Kailua, Ko'olaupoko, O'ahu

TMKs: [1] 4-3-009:001 por.; 4-3-010:084 and 088

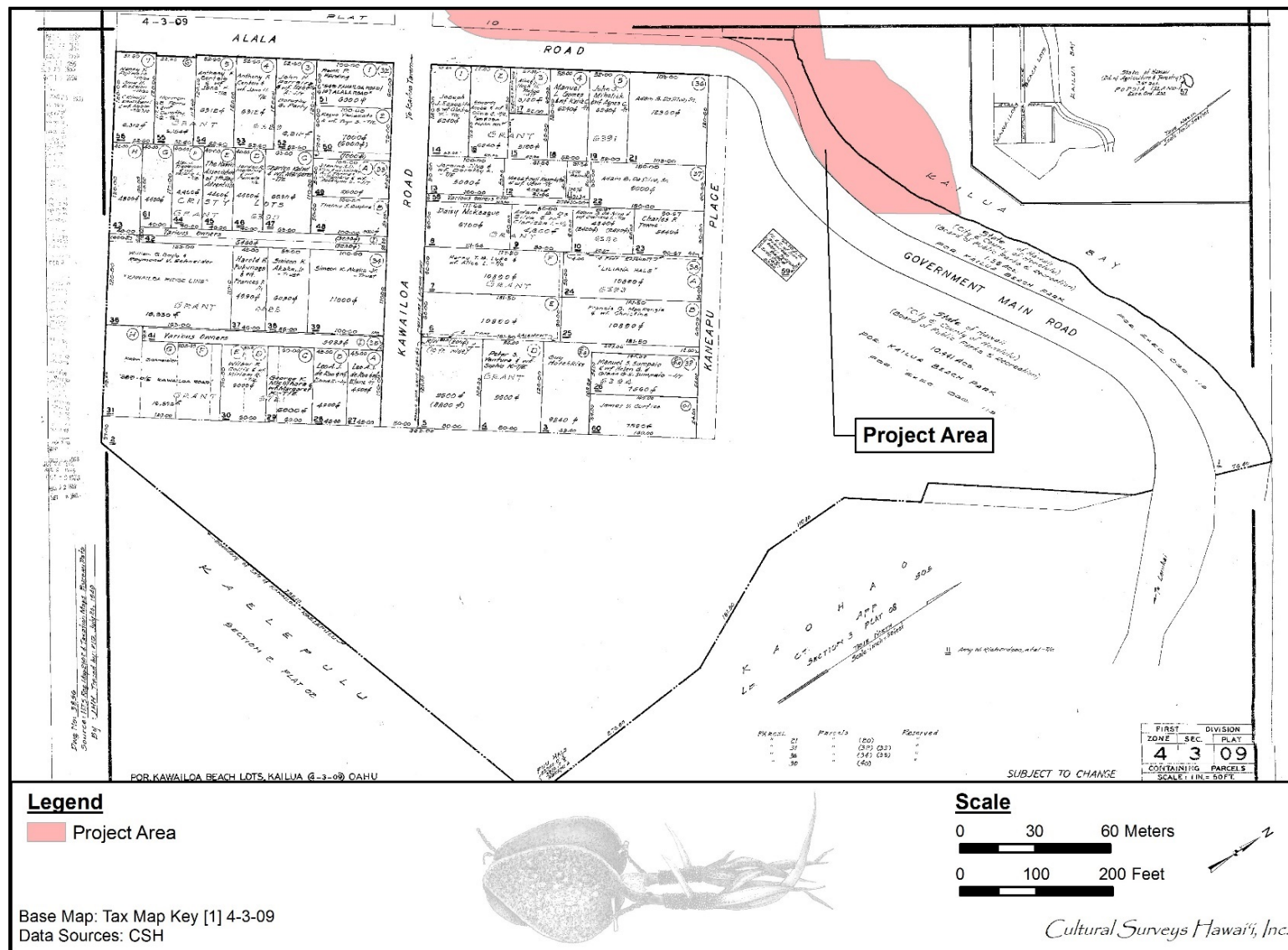




Figure 4. Aerial photograph of the project area (Google Earth 2013)

According to Foote et al. (1972:48) (Figure 5), project area soil primarily consists of Jaucas (JaC), pale to very pale brown single grain sand.

This series consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. These soils occur on all the islands of this survey area. They developed in wind- and water-deposited sand from coral and seashells. [Foote et al. 1972:48]

Jaucas sand areas have been used for pasture, sugarcane, truck crops, and urban development. Throughout the Hawaiian Islands, Jaucas sand deposits have contained human burials and cultural deposits.

Kokokahi very stony clay, from 0 to 35% slopes (KTKE) is also found in the eastern portion of the project area. The soil is usually used for pasture and home sites.

This series consists of moderately well drained soils on talus slopes and alluvial fans on the island of Oahu. These soils developed in colluvium and alluvium derived from basic igneous rock. They are moderately sloping to steep. [Foote et al. 1972:73]

According to the City and County of Honolulu Department of Parks and Recreation (1991:9), the accretion of sand at Kailua Beach

Suggest[s] that three to four centuries ago, except for the Alala Point area, all low-lying parts of the park were seaward of the shoreline. . . . In 1884, the site of the pavilion and the most mauka-Kailua corner of the park (where the pavilion access road enters the park) were seaward of the shoreline, and what is now Lihikai Road was the center of the Kaelepulu Stream channel. [City and County of Honolulu Department of Parks and Recreation 1991:9]

1.3.2 Built Environment

The project area is within Kailua Beach Park in the residential neighborhood of Kawailoa adjacent to the Lanikai (Ka'ōhao) neighborhood on the east. Alāla Point marks the boundary at the shore between Kailua Beach Park to the west and Lanikai Beach to the east. Kailua Beach Park consists of paved parking lots, covered pavilions, picnic tables, lifeguard stands, and restroom facilities. Residential housing borders the project area.

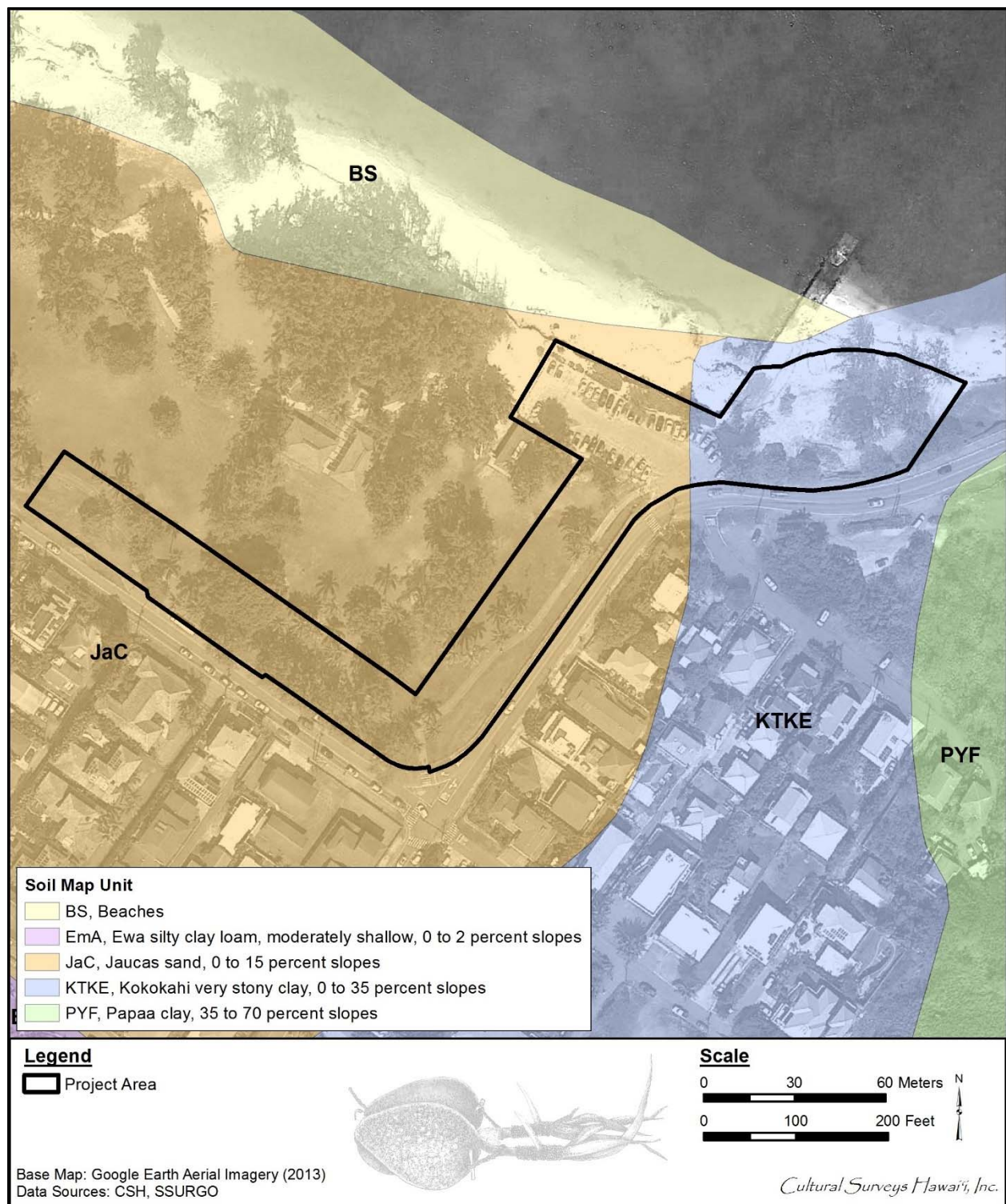


Figure 5. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [USDA SSURGO] 2001)

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this AIS under archaeological fieldwork permit number 17-08, issued by the SHPD pursuant to HAR §13-282. Fieldwork was accomplished between 15 May 2017 and 17 May 2017 by Douglas Borthwick, B.A. (project manager), Michelle Pammer, B.A. (project director), Sara Blahut, M.A., Jesse Davis, B.A., and Jason Richards, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). This work required approximately 9 person-days to complete.

2.1.1 Pedestrian Survey

A 100%-coverage pedestrian inspection of the project area was undertaken for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps spaced 5 m apart. As there were no surface historic properties, historic property identification efforts focused on the identification of subsurface cultural deposits.

2.1.2 Subsurface Testing

The subsurface testing program was backhoe assisted and involved four test excavations. In general, linear trenches measuring approximately 6 m (20 ft) long and 0.6 m (2 ft) wide were excavated within the project area.

A standard backhoe with a 2-ft-wide bucket assisted with each excavation. At least two archaeologists monitored machine excavation, one positioned at either end of the excavation to monitor both removal of sediment from the excavation and the emptying of the excavator bucket on the adjacent backdirt pile. An archaeologist routinely entered the trenches during excavation to clean the base and sides of the trench as excavation progressed.

When an in situ cultural layer or sand deposits were encountered, excavation was conducted by hand (e.g., shovel and trowel). Hand excavations completed in sand deposits were undertaken to identify potential buried cultural deposits. The sand was carefully scraped off with a flat shovel and trowel in thin layers in order to minimize any possible disturbance to cultural deposits. Only after the sand deposits were confirmed to be culturally sterile did a backhoe resume excavation to the water table and/or the required depth.

A stratigraphic profile of each test excavation was drawn and photographed. The observed sediments were described using standard USDA soil description observations/terminology. Sediment descriptions included Munsell color; texture; consistence; structure; plasticity; cementation; origin of sediments; descriptions of any inclusions, such as cultural material and/or roots; lower boundary distinctiveness and topography; and other general observations. Where stratigraphic anomalies or potential cultural deposits were exposed, these were carefully represented on test excavation profile maps. Sediment samples, faunal remains, floral remains, and diagnostic (identifiable or datable) artifacts were collected from several test excavations and were analyzed as described below.

2.2 Laboratory Methods

Materials collected during AIS fieldwork were identified and catalogued at CSH's laboratory facilities on O'ahu. Analysis of collected materials was undertaken using standard archaeological laboratory techniques. Materials were washed, sorted, measured, weighed, described, and/or photographed.

2.2.1 Sediment Sample Analysis

Sediment samples collected from potential cultural strata and/or features were examined within the CSH laboratory to aid in characterizing the cultural content and chronology of these deposits. Samples were collected and screened in the field and/or collected as bulk samples. All samples were labeled with provenience information, and the volume of each sample was recorded so that comparisons could be made between samples. Samples screened in the field utilized 1/8-inch wire mesh to remove the sedimentary matrix from the cultural content (faunal, floral, and artifactual remains). In the lab, bulk sediment samples were screened through 1/16-inch wire mesh. Wet screening of samples was performed as necessary. As applicable, the cultural material was washed, sorted, measured, weighed, described, photographed, identified, and catalogued.

2.2.2 Artifact Analysis

In general, artifact analysis focused on establishing, to the greatest extent possible, material type, function, cultural affiliation, and age of manufacture. As applicable, artifacts were washed, sorted, measured, weighed, described, photographed, and catalogued. Diagnostic (dateable or identifiable) attributes of artifacts were researched.

Historic artifacts were identified using standard reference materials (e.g., Elliott and Gould 1988; Fike 1987; Godden 1964; Kovel and Kovel 1986; Lehner 1988; Lindsey 2014; Millar 1988; Munsey 1970; Toulouse 1971; Whitten 2009; and Zumwalt 1980), as well as resources available on the internet.

2.2.3 Faunal Analysis

Faunal analysis generally focused on species identification and evidence of food consumption. For collected invertebrate remains, shell midden was identified to the lowest possible taxa, weighed, and analyzed. Common shells were identified and analyzed using an in-house comparative collection and reference texts (e.g., Abbott and Dance 1990; Eisenberg 1981; Kay 1979; Titcomb 1979). Collected non-human vertebrate skeletal material was identified by CSH osteologist Sara Blahut, M.A., to the lowest possible taxa and analyzed using an in-house comparative collection and reference texts (e.g., Adams and Crabtree 2012; France 2009).

2.2.4 Wood Taxa Analysis

Select samples of charcoal material from intact cultural deposits were analyzed for species identification. Samples were sent to Jennifer Huebert, Ph.D. at International Archaeological Research Institute, Inc. (IARII) for taxa identification. The samples were viewed under magnification of a dissecting microscope and then compared with anatomical characteristics of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai'i at Mānoa, as well as in published descriptions. Taxa identification of wood samples provides useful information for interpreting the environmental and cultural history of the project

area and helps determine a general time frame of land use. Following analysis, samples were returned to the CSH laboratory.

2.2.5 Disposition of Materials

Materials collected during the current AIS (excluding human remains and grave goods) will remain temporarily curated at the CSH office in Waimānalo, O'ahu. CSH will make arrangements with the landowner regarding the disposition of this material. Should the landowner request different archiving of material, an archive location will be determined in consultation with the SHPD. All data generated during the course of the AIS are stored at the CSH offices.

2.2.6 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai'i at Mānoa, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai'i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina database (Waihona 'Aina 2000).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Consultation

A letter was sent out to members of the Kailua cultural descendant group, Kau a Ho‘oilō, the week of 24 April 2017 notifying them of the Kawailoa Road Drainage Improvements project. Following this notification, on 27 April 2017 a meeting was held in Kailua within the Community Room at 146 Hekili Street to discuss the AIS excavation plan and to address any concerns. The meeting was attended by members of Kau a Ho‘oilō as well as Russell Arakaki (Park Engineering), Alani Apio (cultural liaison; Kamau LLC) and CSH staff Douglas Borthwick, Carmen Delos Reyes, and Hallett Hammatt.

An email dated 10 May 2017 from Kailua cultural descendants Māpuana and Kihei de Silva to CSH confirmed descent approval of the current AIS excavation plan.

The current AIS project was subsequently presented to the O‘ahu Island Burial Council (OIBC) during the 10 May 2017 meeting. It was noted that AIS trenches were placed to coincide with proposed drainage improvements within the eastern portion of Kailua Beach Park along Alāla Road. Additionally, it was confirmed that as an AIS, any potential human burial finds would remain in place, be defined as “previously identified,” and go through the burial treatment process of consultations and OIBC determination.

Section 4 Traditional and Historical Background

The history of the Kailua region of O'ahu has been documented in a number of studies including, but not limited to, Hall's (1997) "The History of Kailua," Creed and Chiogioji's (1991) "Facets of Maunawili Valley and Kailua Ahupua'a History," and Kelly and Nakamura's (1981) "Historical Study of Kawainui Marsh Area, Island of O'ahu." All of these studies detail the legendary history and oral traditions, the legendary rulers and personalities, the early historic accounts, land ownership and utilization changes during and following the Māhele (land division of 1848), and the changes in land use from traditional to modern times. With so many sources already documenting Kailua's rich historical and cultural past, the purpose of this section is only to orient the present project area within the overall historical and cultural setting. For more detailed accounts of Kailua's past, the reader is referred to the above sources, as well as those cited in the following text.

4.1 Setting of Kailua

Kailua Ahupua'a encompasses the largest valley on the windward side of O'ahu, and is the largest *ahupua'a* (traditional land division) of the Ko'olaupoko District; it is approximately 15 km long (9 miles) and 11 km (7 miles) wide. Flanked by the *ahupua'a* of Waimānalo on the southeast, Kāne'ohe on the northwest, and Honolulu to the south, the *ahupua'a* of Kailua is shaped like a rectangle. From the Ko'olau summit ridge, it extends down two descending ridgelines, which provide the natural boundaries for the sides of the *ahupua'a*. The fourth side of the rectangle is the reef line of Kailua Bay.

The natural environment includes the sand barrier upon which Kailua Town stands, the mountainous upland terrain and alluvial valleys of Maunawili, the largest freshwater marsh in Hawai'i (Kawainui Marsh), another inland pond (Ka'elepulu), approximately 18 permanent and intermittent streams, a freestanding mountain halfway between the shore and the Ko'olau Mountains (Mount Olomana, 501 m [1,643 ft]), several low ridgelines, and the off-shore Mokulua Islands, Mōkōlea Rock, and Popoi'a Island. The *ahupua'a* includes 4,809 hectares (11,885 acres) of land, according to the Boundary Commission (1892) review of the mid-nineteenth century. In fact, it extends beyond the shore 1.61 km (approximately a mile) out to sea, to the reef.

During the estimated 1,500 years since initial Polynesian settlement, the sand barrier that forms the shore at Kailua Bay has provided a desirable location for residences with its sunny, dry beach area. The well-watered interior lands, including the two marsh/pond areas of Ka'elepulu and Kawainui and the many springs and streams of Maunawili, provided bountiful agricultural and resource gathering areas. During the fifteenth and sixteenth centuries, Kailua, O'ahu was the center of a large royal complex with large playgrounds for sports, physical training, and recreation (Sterling and Summers 1978:231–232). Supporting this large complex was a bountiful land where fish, fowl, and vegetables were plentiful (Sterling and Summers 1978:227–228).

Mele or chants about Kailua frequently mention the two fishponds, which were famous for their mullet and 'awa. They also praise the taro gardens of the area (see Beckwith 1970 and Drigot and Seto 1982). A few of these chants and legends are those of Hi'iaka, Kahinahinanui, Makalei Tree, and Ka'ulu. Early visitors (Bowser [1880-1881], in particular) to the island also mention a wealth of birds in the area.

Besides a sunny beach area and uplands watered by frequent showers, other resources were easily available in Kailua. At the center of the caldera of the ancient Ko'olau Volcano (MacDonald and Abbott 1974:363), a basalt quarry (the present Ameron Quarry is built upon the site of the pre-Contact quarry) for raw material for lithic tools was near at hand. Kailua was a residential district surrounded by *ahupua'a* that were also highly cultivated and capable of providing ample resources for a large resident and visiting population. Kailua apparently also was a *pu'uhonua* (place of refuge) before Kamehameha I conquered the island of O'ahu. After this time the ancient *pu'uhonua* were abolished.

4.2 Place Names near the Project Area

The project area is in the *ahupua'a* of Kailua (meaning “two currents” or “two seas”), bounded by Kane'ohe Ahupua'a on the west and Waimanalo Ahupua'a on the east. All place name meanings in this section are from Clark 1977 or Soehren 2017, unless otherwise noted.

The western section of Kailua fronts Kailua Bay, which stretches from Kapoho (“the depression”) Point, near the *makai* end of Mōkapu Peninsula in Kane'ohe Ahupua'a to Alāla (“awakening”) Point. Alāla Point is a rocky promontory, the toe of a ridge that extends along Ka'iwa (“frigate bird”) inland to the peak Pu'u Hālō (perhaps, “hill for peering”). To the east of Alāla Point is Ka'ōhao (“the tying”) (Mrs. Charles Alona, 29 September 1939 in Sterling and Summers 1978:239), the ancient name for the modern neighborhood called Lanikai (traditional name, Ka'ōhao). This eastern beach extends to the east to a ridge at the boundary with Waimānalo Ahupua'a, marked by the shrine Wailea (“water of Lea”), so-called in reference to the goddess of canoe-makers (Pukui and Elbert 1986:392). Mōkapu Peninsula, Kailua Bay, Ka'elepulu Pond and Stream, Alāla Point, and Ka'ōhao can all be seen in a 1924 aerial photograph (Figure 6).

The project area is in the *'ili* (land division smaller than an *ahupua'a*) of Kaiwaloa on Kailua Bay, between the *'ili* of Keahupua'anui (Kailua town center area) to the west and the *'ili* of Ala'apapa (“level path or paved pathway”) and Mokulua (“two islands”) to the east, as shown on an 1899 map (Figure 7). On maps, Ala'apapa is sometimes spelled as Aalapapa or Alapapa (Soehren 2017). The coastal area of Kailua Bay is divided into three beach areas, Oneawa (“sands of the milk fish”), which is on the west side of the bay on each side of the Kawainui Canal, Kalama Beach (named for queen Kalama, wife of Kamehameha III) in front of the current Kailua town center, and Kailua Beach Park, a 30-acre public park on the east side of the bay, which has a wide sandy beach and the only public boat ramp in Kailua. The beach narrows at the rocky promontory Alāla Point, which marks the boundary between Kailua and Lanikai beaches. The project area is adjacent to Kailua Beach Park and is on the east side of Ka'elepulu (“the moist blackness”) Stream, which drains the large inland pond called Ka'elepulu (now called Enchanted Lake) (Clark 1977:170–177; Soehren 2017). Ka'elepulu Stream has also been called Kamokowa'a and Pūpū'opae (“gathering shrimp”) Stream (names from Kailua Historical Society 2009:172).

Many of these place names are shown on a 1913 map depicting the traditional offshore fisheries of O'ahu (Figure 8). Kailua, Kawailoa, Ala'apapa, and Mokulua each had their own designated fishing zones. This map also shows three offshore islands in the Kawailoa/Lanaikai area, Popio'a Island, off Kawailoa 'Ili, and the Mokulua Islands, off Mokulua 'Ili.

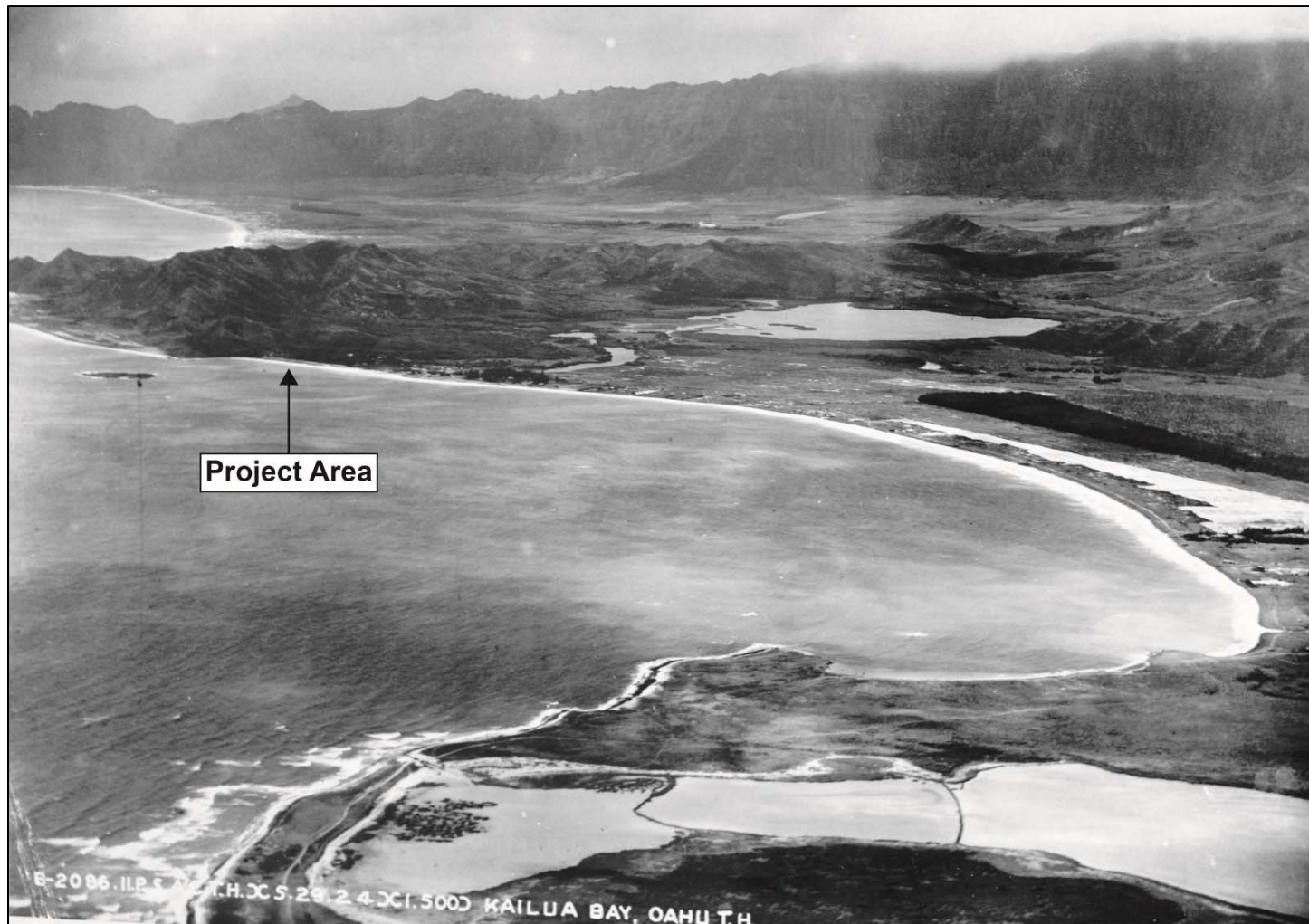


Figure 6. 1924 photograph of Kailua Bay, extending from (bottom to top) Mōkapu Peninsula, Oneawa Beach (west shore of bay), Kalama Beach (central section of bay), Kailua Beach Park (east side of bay); the project area is between Ka‘elepulu Stream (draining Ka‘elepulu Pond) and the rocky Alāla Point; Ka‘ōhao (Lanikai) extends to the east of Alāla Point (Hawai‘i State Archives 1924)

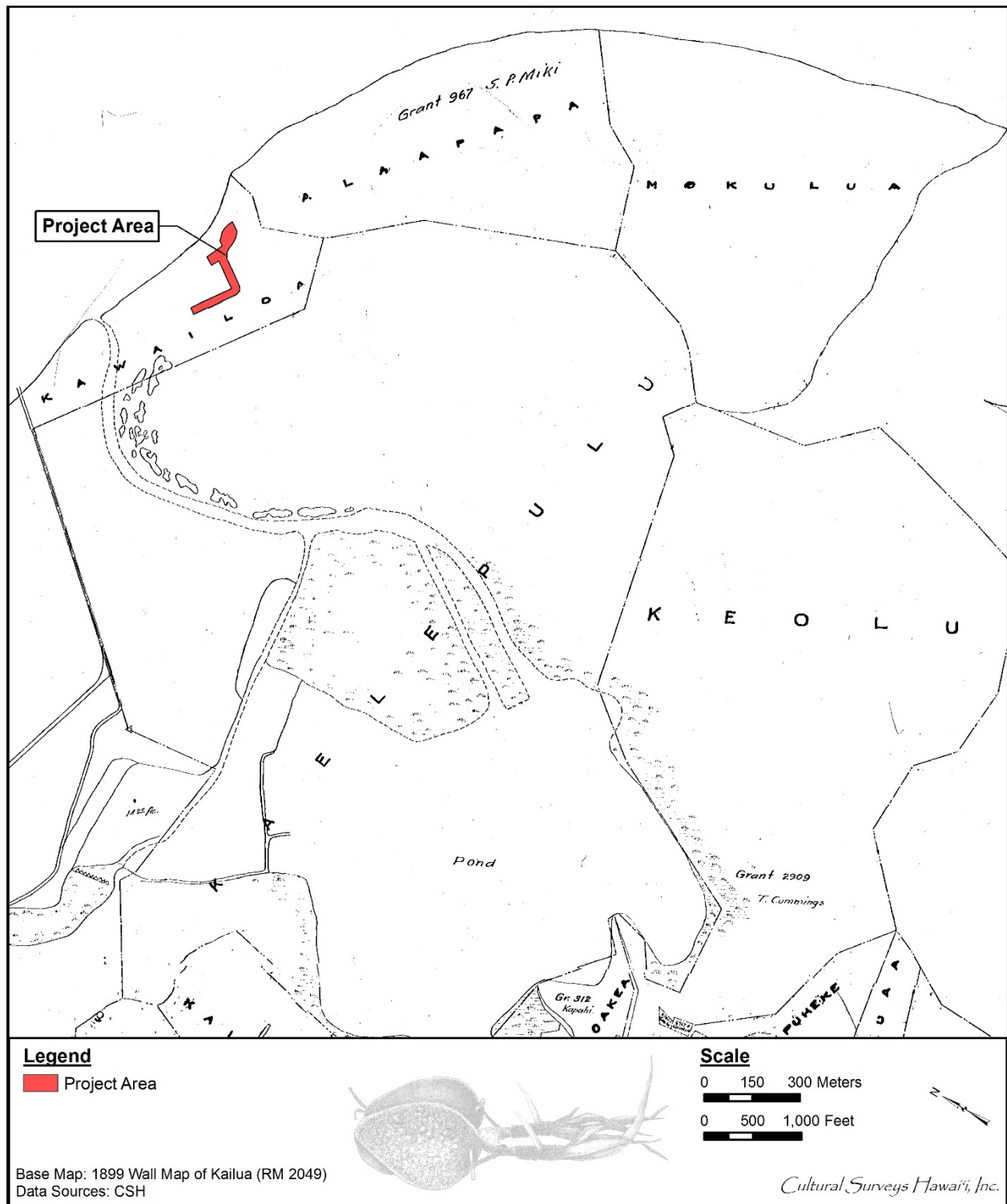


Figure 7. Portion of 1899 map of Kailua (Wall 1899) showing Kawailoa and surrounding 'ili

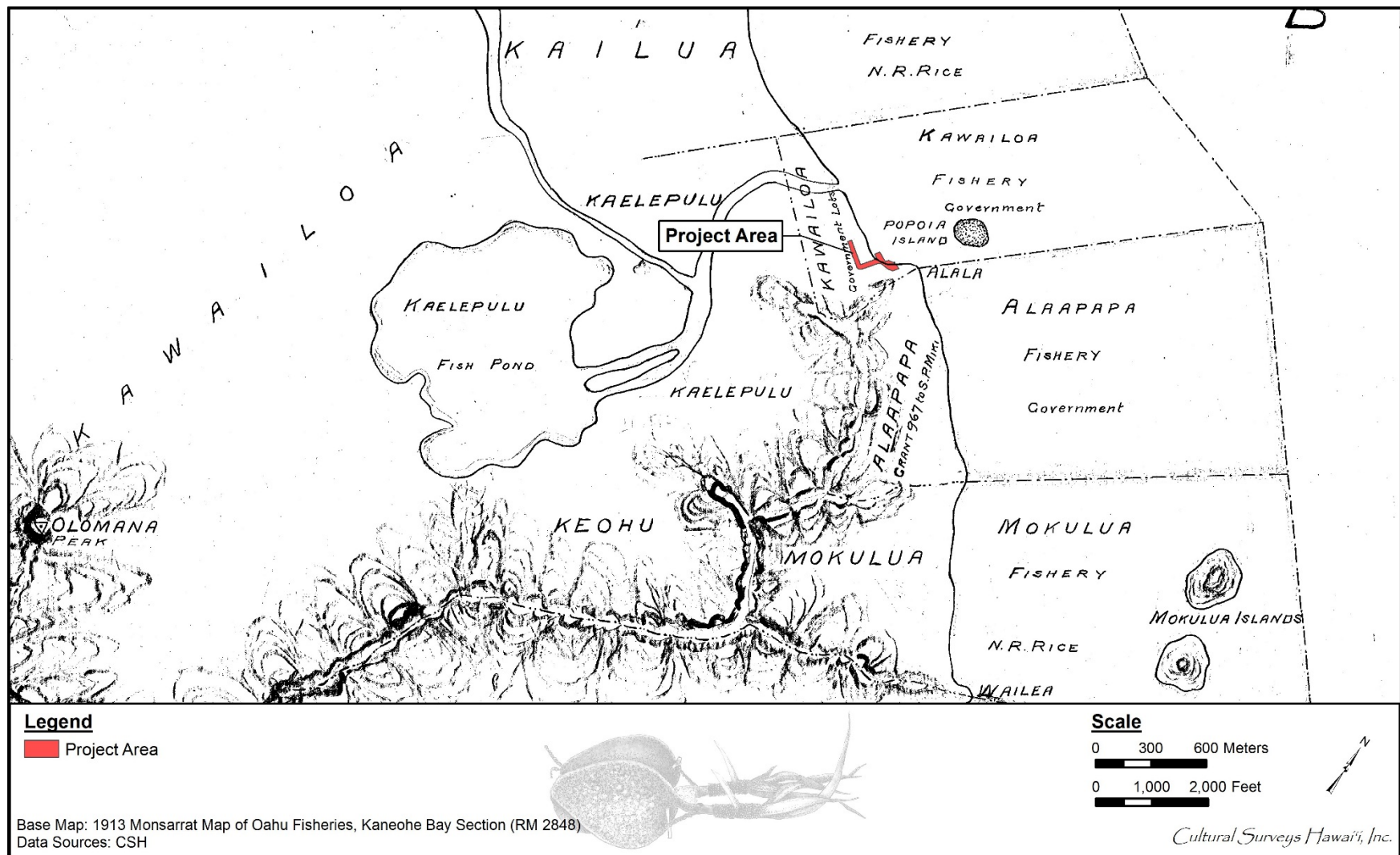


Figure 8. Portion of 1913 map of fisheries of O'ahu by Monsarratt (1913), showing place names surrounding the project area

Popoi'a means 'rotten fish,' and probably refers to the numerous offerings once left an old fishing shrine in the middle of the island. This *ko'a* was obliterated in the tidal wave of 1946. Popoi'a is now commonly known is Kailua as Flat Island. [Clark 1977:175]

The two Mokulua islands are also referred to as the "Twin Islands" or separated into Moku Nui (large island) and Moku Iki (small island). All three offshore islands are State bird sanctuaries today (Clark 1977:177).

4.3 *Mo'olelo* (Stories) and *Wahi Pana* (Storied Places)

Legends and oral history provide stories for many of the place names and give specific beliefs Hawaiians held and hold about the land. The name Kailua, meaning "two seas," apparently refers to the two large inland waters, Ka'elepulu Pond and Kawainui Pond (Pukui et al. 1974:69; Quebral 1991:14). That Kailua was a "fat" land, a land of plentiful food in all times, is suggested by several legends. The Makalei, or Fish-Attracting Tree was a mythological tree or stick that could summon fish from Kawainui. Reportedly located near the present day Hāmākua Bridge, it was described as a never-failing source of a plentiful supply of food (Beckwith 1970:279–280; Pukui and Elbert 1986:382). Another tradition of the ample productivity of the Kailua region involves the edible, *haupia* (coconut pudding)-like mud called *lepo'ai ai*, which was available from Kawainui Marsh (Kelly and Nakamura 1981:5). This tradition implies a bountiful Kailua where even the mud was regarded as edible.

Kailua is one of the places where, following their arrival on O'ahu from Kahiki, the *menehune* (legendary race of small people) were assigned to live. These legendary workers are credited with the construction of numerous fishponds and religious structures. Fornander points out that the term *menehune* in Tahitian had become the name for the lowest laboring class of people—suggesting a Tahitian origin for the term for the legendary workers (Fornander 1880:23).

Traditional history describes Kailua as the residence of many prominent O'ahu ruling chiefs. There is 'Olopana, "who with his brother Kahiki'ula came to O'ahu from Kahiki . . . He is said to have established several *heiau* (pre-Christian places of worship) in Kāne'ohe and Kailua, including Pahukini and Holomakani in the Kawainui area" (Kelly and Nakamura 1981:3). One of the earliest great chiefs to reside in Kailua was Kākuhihewa, who built himself a great house at 'Alele in Kailua (Kelly and Nakamura 1981:5). At approximately the same time (the sixteenth century,) another prominent chief, Kūali'i, born at Kalapawai, Kailua and raised in Kualoa and Kailua, had his navel cutting ceremony at the *heiau* of Alāla (present day Lanikai Point), and, after being the hero of many battles, became the high chief of all O'ahu (Kelly and Nakamura 1981:6). In early historic times, the conquering chief Kahekili, followed by Kamehameha I, resided in Kailua for a time (Kelly and Nakamura 1981:6–7).

4.3.1 Legends and Traditional Stories

A chief named Kualī'i was born at Kalapawai (or Kapalawai) in Kailua around 1640 (Beckwith 1940:395; Fornander 1880:278). Kalapawai means "the water ridge" and was an early Hawaiian surfing spot. The exact location of this place is unknown (Soehren 2017). Birth rituals, including the *piko* (navel) cutting ceremony for the child, were performed at a *heiau* called Alāla, located on the coastal promontory of Alāla or the hill above. The sacred drums, Hawea and Opuku were moved from Ho'olonopahu and taken to Alāla at Kualī'i's birth for this ceremony (Thrum

1923:92). When Kualī‘i later dedicated the *heiau*, he saw a fire on Moloka‘i, and did not wish to go on with the procession to the *heiau* with the light of the fire in the sky. He talked to his *kahuna* (priest), who prayed to the gods, and the fire was extinguished and “the procession was able to march at once” (Kamakau in Sterling and Summers 1978).

No rock walls or mounds for a shrine or *heiau* were found by later historians or archaeologists (e.g., Thrum 1906:48, Thrum 1915:87–88), but Anne Landgraf has suggested the shrine on the hill above Alāla consisted of a natural stone outcrop (Landgraf 1994:136–137), which she photographed for her book *Nā Wahi Puna o Ko‘olau Poko*. This photographed outcrop is in the backyard of the Powlison house (State Inventory of Historic Places [SIHP] # 50-80-11-9009), which was built on similar basalt outcrop as the base of the house without moving or altering any of the stones (My Kailua 2017). Alāla had a companion shrine, also made of natural bedrock, at Wailea, on the ridge that divides Kailua from Waimānalo. Landgraf (1994:138) also provides a photograph of this rock formation in her book. She noted, “Wailea and Alāla were fish gods that marked the best fishing grounds of Ka‘ōhao” (Landgraf 1994:137).

In addition to the shrines, there was once a cave near the coastal point in Alāla:

Charles Kamanu, Sr., Solomon Mahoe, Jr., and Nawelu have each mentioned the cave at Alala Point, running through to Mid-Pacific Country Club grounds. Both entrances are blocked up. Solo Maho, Jr., said his grandmother told him that this was used as a refuge cave in times of trouble. [D. Barrère 1953, in Sterling and Summers 1978:238]

4.3.2 Ka‘ōhao

Clark (1977) describes how Lanikai came to be the name for the area traditionally known as Ka‘ōhao:

Lanikai is the name of the residential community situated in the headlands between Kailua Bay and Waimanalo Bay. Lanikai is not a proper Hawaiian word, but was devised by this community’s promoters. The name probably was intended to mean ‘royal sea’ or perhaps ‘heavenly sea,’ which in proper Hawaiian, would have been Kailani, but the words were transposed and joined as they would be in English, rather than in Hawaiian.

The land that comprised the original Lanikai tract was called Ka‘ōhao, ‘the tying.’ One story about the naming of Ka‘ōhao concerns a chief who played a game of *kōnane* with two women. The women wagered themselves against the chief’s double canoes, their contents, and the crews. The unscrupulous chief cheated and won and then led the women, tied together, to the place where his canoes were beached. Thereafter the landing was called Ka‘ōhao, ‘the tying,’ because of this incident. Ka‘ōhao also means a swelling, as from the accumulation of fluids in a body during sickness. Other stories are told of people from this area who suffered from such a dropsical condition, again accounting for the name Ka‘ōhao.

Ka‘ōhao extended from Alala Point to the hill sloping down from Ka‘iwa Ridge, just about opposite the present Onekea Street. In the ocean fronting Ka‘ōhao was a flat reef covered with seaweeds that was known as ‘A‘alapapa, the ‘fragrant shelf.’

The *papa* was noted especially for its *limu lipe* 'epe'e, which is one of the fragrant seaweeds. [Clark 1977:175]

Popoi'a means "Popo, rotted;— i'a, fish. Rotted fish. According to Samuel Mahoe, it is called by this name because of the bones of the fish left there" (Sterling and Summers 1978:238).

4.3.3 Islands and Reef off Ka'ōhao

Sterling and Summers (1978:240) cite McAllister's notation regarding this place: "The reef with small islands off of Ka'ōhao were built by the Menehune [legendary race of small people who worked at night, building fishponds, roads, temples] in one night for the protection of the people. The *menehune* did not finish the work." The Boundary Commission (1892) review for Ka'elepulu showed the

fishing right of this land was over one mile from the shore and just outside the breakers, the *tabu* fish was the 'Uhu,' but the people went to law, and it was decided that the reef bounded the fisheries, so this was thrown open. Thus the Mokulua Islands and Popoia Island are integral parts of the *ahupua'a* of Kailua. [Boundary Commission 1892, Oahu 2:89]

4.3.4 Pu'uhālo

Pu'uhālo is a

peak at entrance to Lanikai, same as Alāla, A Natural Shrine. Small hilltop peak above entrance to Lanikai and one of the division markers for the 'ili of Kawaihoa. The name most likely comes from *halo*, meaning to peer with hands shading the eyes. 'Prominent and commanding stones were used as lookouts for fish.' [McAllister 1933:20]

It is the site of the Powlison house and *pu'uhonua* (refuge place).

4.3.5 Pu'uhonua

This place is a large rock located atop Alāla Ridge used as place of refuge of Kamehameha I, located behind the Powlison residence which has been given the same name (Powlison 1976).

The places of refuge of the ancient people were district divisions, as Kailua and Waikane at Koolaupoko, and Kualoa, which was a very sacred place and a real place of refuge for condemned persons, for when they entered it they were saved. For all Oahu, Kawiwi (at Waianae) was the place of refuge during the time of war. [McAllister 1933:18]

4.4 Historical Accounts

4.4.1 Early Population Estimates

The drastic depopulation of the Hawaiian Islands following the introduction of western disease has been documented in a number of sources (Bingham 1847; Bushnell 1993; and Stannard 1989). According to one estimate, the population of Hawaiians and part-Hawaiians fell from approximately 300,000 in 1778 to 82,593 by 1850 (Schmitt 1968:43 and 74). Population counts from the 1830s place the population of Kailua at approximately 760 individuals (Schmitt 1973:19). This low population figure is incongruous with the productivity of the region, but in keeping with

population decline estimates due to western disease. Westerners passing through Ko‘olaupoko, the district in which Kailua is located, in the mid-1840s made note of the cold and flu symptoms among the Native Hawaiians and that much formerly productive land appeared abandoned (Wyllie 1848:20).

4.4.2 The Māhele and the Kuleana Act

Māhele records are an important resource for determining land use during the first half of the nineteenth century. In the great division of lands under Kamehameha III, lands were awarded to the crown, the government, the *ali‘i* (chiefs), and the people (*kuleana* awards) between 1848 and 1853 (Chinen 1958:15–16). The *ali‘i* did not specify what use they were making of land they were awarded for their Konohiki (land manager) awards. Most information on mid-nineteenth century land use comes from the Land Commission Awards, mainly from the *kuleana*, belonging to commoners. A total of 71 Land Commission Awards (LCA) were claimed before the Board of Commissioners to Quiet Land Titles (Land Commission) in Kailua. In the Māhele records, 123 house lots are mentioned in the awards for Kailua (Waihona ‘Aina 2000). Where “*kahuahale*,” or homes, are mentioned, these house lots are typically bounded “on all sides by upland,” indicating an overwhelmingly inland settlement pattern. Early twentieth century testimony (Kailua Library 1977:10, Solomon Mahoe interview) indicates the fishermen at the shore traded ocean fish for taro with the upland farmers, probably a long-established pattern. LCA lots in Kailua mention numerous fisheries and pools where fish would have been raised. The current project area has no *kuleana* (commoner) LCA lots associated with it. On an early 1884 map (Figure 9), only one house is shown near the coast, in the adjacent ‘*ili* of Ala‘apapa.

At the time of the Māhele, it appeared Kailua, Kāne‘ohe, and Waimānalo were considered choice locations, for these *ahupua‘a* were awarded to the Crown, the royal family, and then to important *ali‘i*, particularly warrior chiefs for Kamehameha I. The entire *ahupua‘a* of Kailua was awarded to Queen Hazaleleponi Kalama. Kawailoa, the ‘*ili* in which the project is located, at that time was held by the King’s niece, Victoria Kamāmalu, and administered by Victoria’s father, Mataio Kekūanā‘a. Kekūanā‘a relinquished all interest in Kawailoa to the King during the Māhele, as shown on a map of the area drawn in 1900 (Figure 10; Kailua Historical Society 2009:11). This ‘*ili* surrounds the Olomana peaks, with a portion in Maunawili Valley, the major portion descending to the sand barrier, and another detached portion of the ‘*ili* located along the shoreline. The project area is within this coastal section of Kawailoa ‘*Ili*.

4.4.3 Ranching

In the early 1900s, Kaneohe Ranch came to dominate land holdings in the Kailua and Kāne‘ohe area. Included within this acreage is much ranch land, which had been bought, sold, let, and used as ranch land by numerous parties since the mid-1850s. Kelly and Nakamura’s history (1981:34–35) indicates Government land sales amounting to 1,214 ha (3,000 acres), were sold to 21 buyers in Kailua between the years 1849 and 1863. The largest parcel, in the ‘*ili* of Maunawili, went to William Jarrett in 1849. The second largest parcel was 161.7 ha (399.5 acres) to T. Cummins in Mokulua. Both parcels were used for ranching. Other land holdings that were turned into ranch land in the mid-1850s included the ‘*ili* of Mōkapu and Oneawa (by William Sumner and J.I. Dowsett) and the ‘*ili* of Puanea and ‘Ōhuauili (by the son of Paula Marin, Paul F. Manini). These large land holdings were used for many years as ranch lands before becoming part of the Castles’ Kaneohe Ranch. Cattle, sheep, and horses were thus allowed to roam at will through many parts

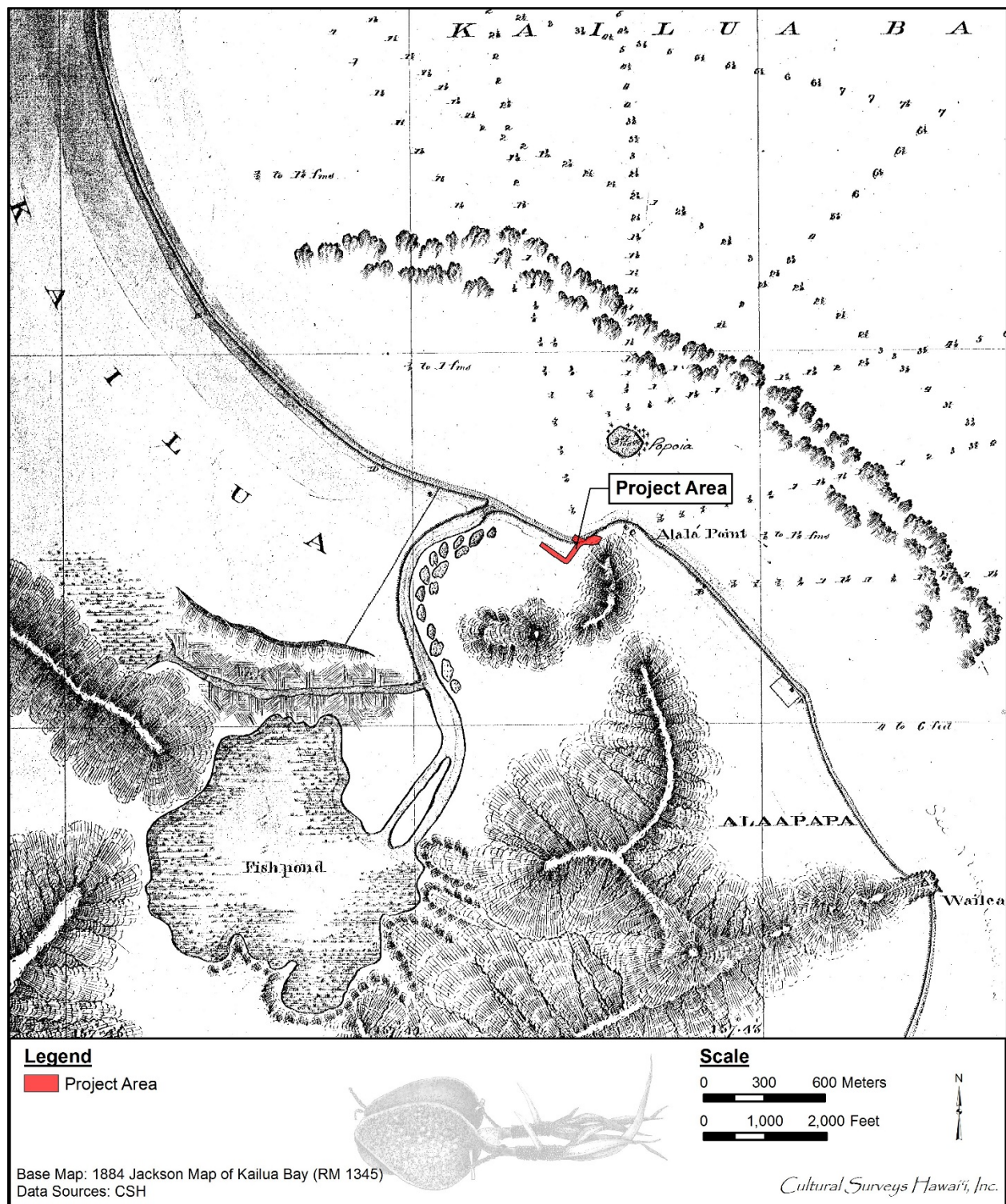


Figure 9. Portion of Jackson (1884) survey map showing project area; notice small circles adjacent to .Kaelepulu Stream (“Fish pond”) which may denote taro *lo‘i* or small ponds

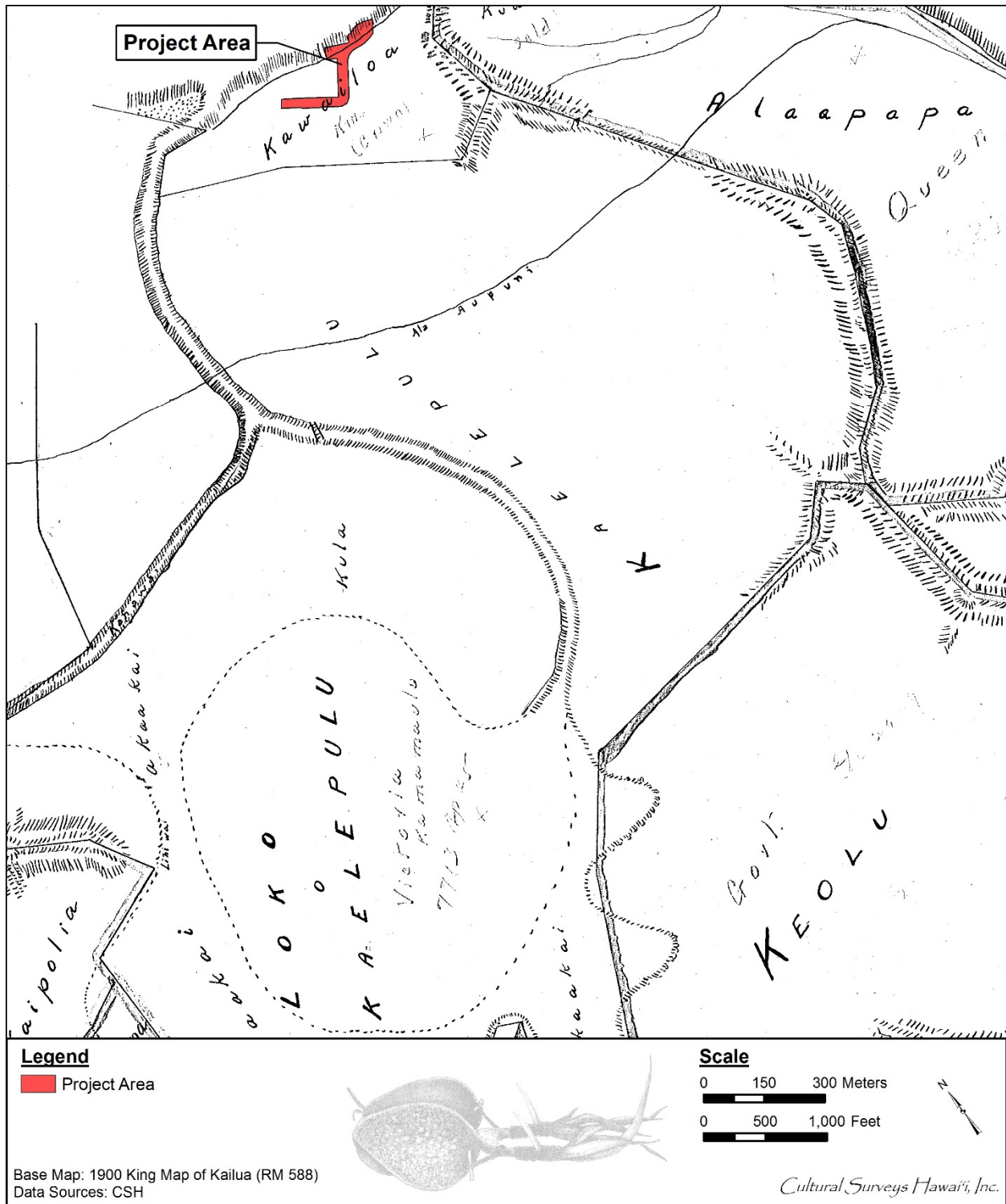


Figure 10. Portion of King (1900) map of Kailua, showing penciled annotations identifying “King (Crown)” lands in Kawailoa ‘Ili, Government (Gov’t) lands in Keolu ‘Ili, and lands awarded to Queen Kālama (Queen) in Ala‘apapa ‘Ili in the Māhele

of Kailua and would have destroyed many gardens and abandoned habitation areas. Kelly and Nakamura point out that although specific records are not available, based on tax information, it is not unreasonable to estimate that several thousand head of cattle were grazing in Kailua by 1875 (Kelly and Nakamura 1981:69).

Kaneohe Ranch (Castle Trust) eventually acquired much of the land in Kailua (Hall 1997:84). Kaneohe Ranch, in addition to ranching, grew pineapple and sugarcane. With the decline of rice farming around the margins of Kawainui, cattle stock moved onto the abandoned agricultural lands. Ranching in Kailua continues today, albeit on a drastically reduced scale, along Pu'u o 'Ehu ridge. The approximate extent of "grazing lands" is marked by a yellow outline on a 1902 map (Figure 11). The project area is within this outlined area. The project area is also marked in green, denoting that at this time the coastal park was already "Public Lands."

4.4.4 Growth of Cash Crops and Early Residents

For nearly 100 years following the Māhele, Kailua grew into an important area of commercial agriculture. Until the early 1900s, rice was the major crop. Rice was followed by truck farming of taro and western crops. Melons, avocado plants, and even rubber trees were at one time planted in areas of Kailua, as remembered by an early resident, Salomon Mahoe. It was Mr. Mahoe who bought a beach home in the early 1900s at the northern end of Kailua Beach Park, and placed a sign at the front gate of his home with the name "Kalapawai." As noted in Section 3.1, Kalapawai ("the water ridge") was an ancient name of a surfing spot somewhere on the Kailua coast (Soehren 2017), although its exact location is unknown. Louis Mahoe says that her father was not exactly referring to this ancient place, but instead named his property from the Hawaiian words for "the rascal water," in reference to a friend who was one of the best fishermen in Kailua. In 1932, the Wong family opened a market for Kailua residents near Kalaheo Avenue. Mr. Wong adopted the use of the name to operate the "Kalapawai Market" (Clark 1977:174; Clark 2002:143).

In 1909, the Hawaiian Copra Company was established by Albert and Fred Waterhouse on the sandy area that is today bounded by Kalāheo and Oneawa streets. Over 130,000 trees were planted on 80.9 ha (200 acres) leased from J.B. Castle in an operation that involved leveling "the sand dunes and smooth[ing] out the sand hillocks" (Hall 1997:77–78). The name Coconut Grove stuck, referring to most of the sand barrier area of Kailua. Clearly this leveling and smoothing of former dune areas had a great impact on the archaeological record of this area of Kailua and is of particular relevance to the present project area.

One of the attractions for early residents or people with beach houses was the fishing pier at Kawailoa. The pier was also used to launch boats, especially used by fishermen who wished to visit the offshore islands of Kawailoa. This pier appears on a 1928 map and a 1920s photograph (Figure 12 and Figure 13). Today, the pier is a boat ramp, the only one in the Kailua Beach Park area.

4.4.5 Residential Development in Kawailoa

By the 1950s, the truck farms that had flourished since the turn of the century within the bounds of present day Kailua Town were slowly replaced by housing, municipal, and retail developments. Kailua was promoted as the bedroom community for Honolulu businessmen, only "8 miles and 20 minutes" from downtown. Residential developments were planned for more outlying areas of Kailua Town, such as Olomana, Pōhākapu, and Oneawa Hills (Hall 1997:141).

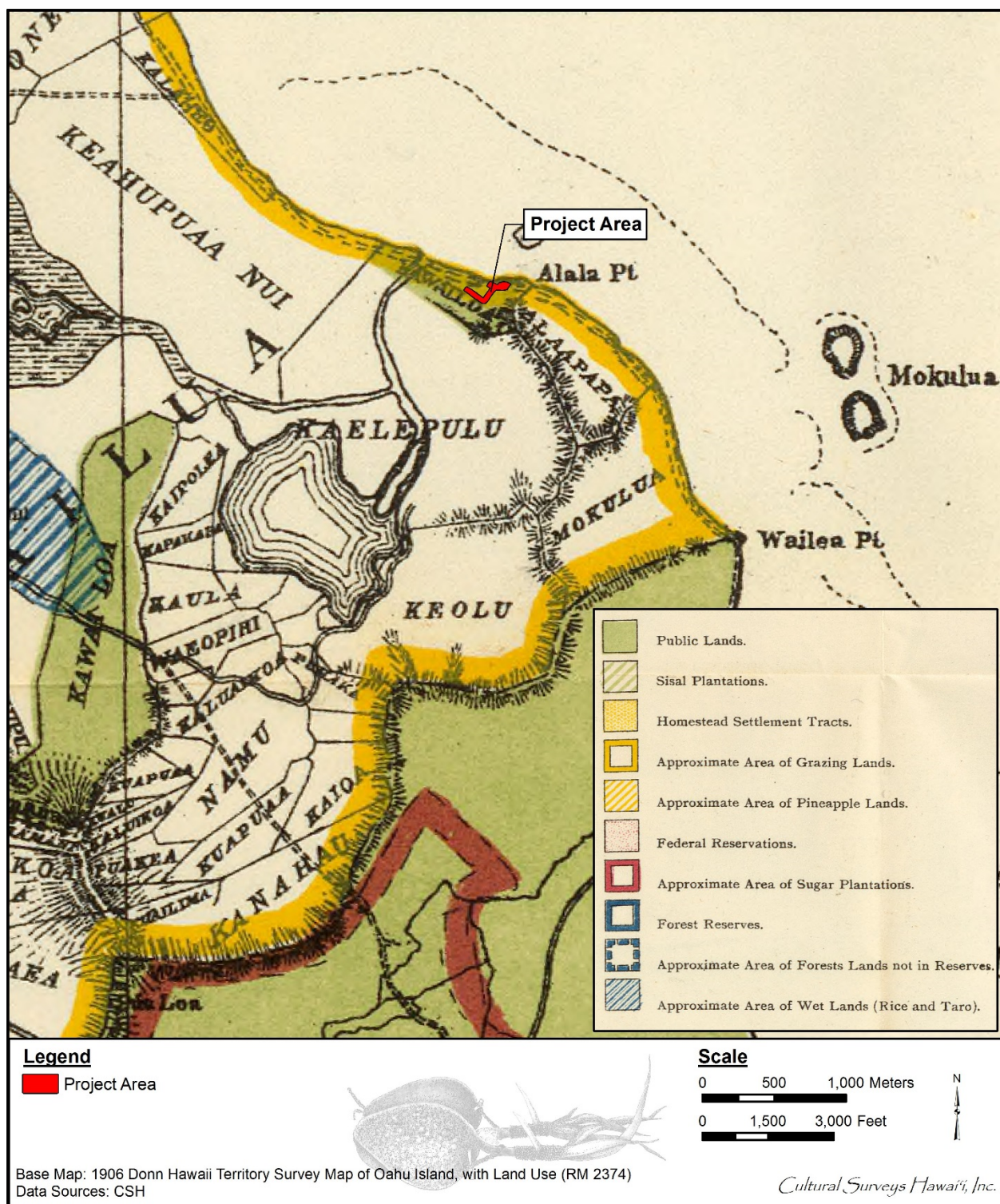


Figure 11. Portion of Donn (1906) O'ahu Island map showing land use; project area is in "Public Lands" (green areas) and also within boundary of "Grazing Lands" (yellow line)

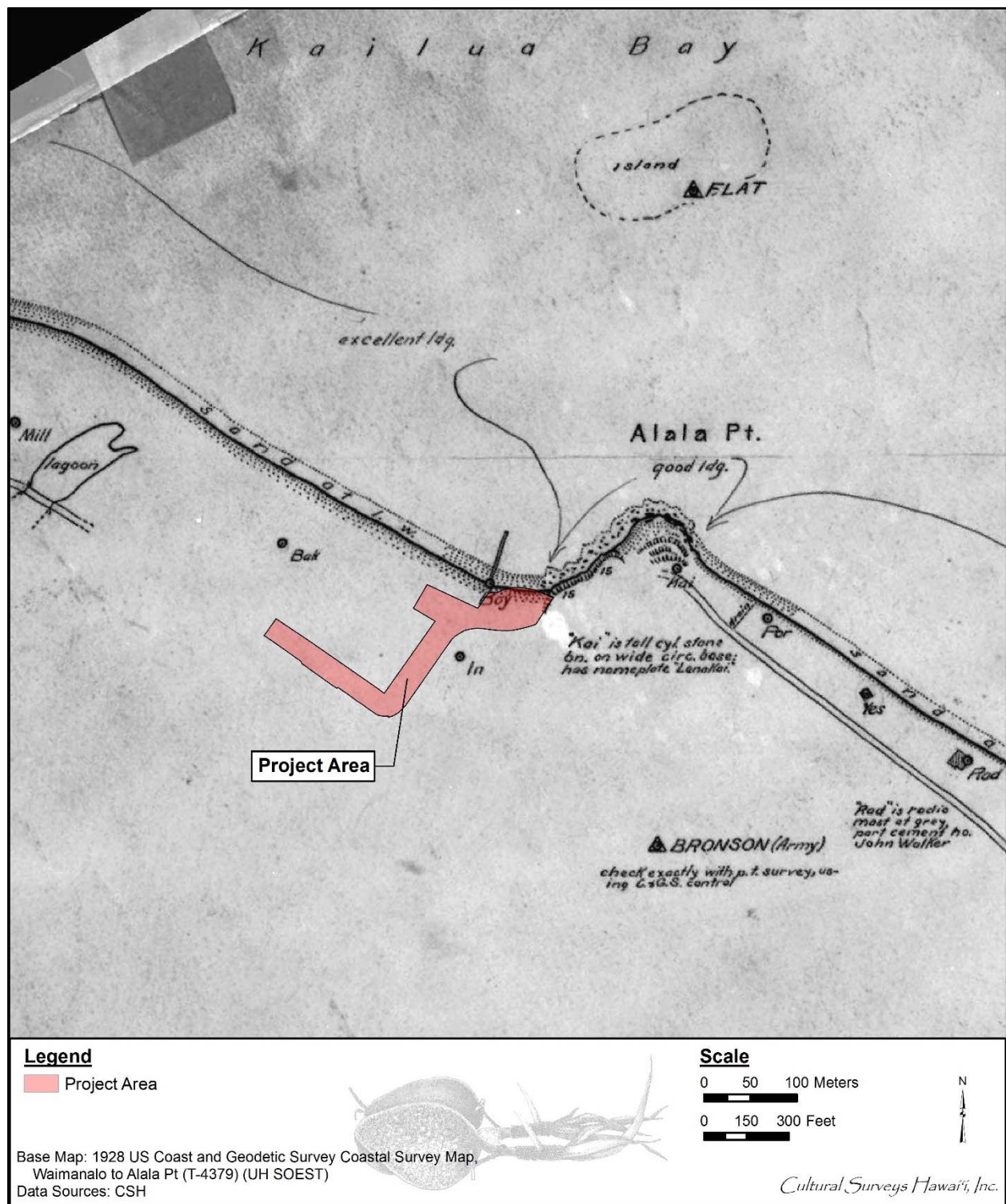


Figure 12. Portion of 1928 U.S. Coast and Geodetic Survey Coastal Survey map of O'ahu, Waimanalo to Alala Pt. (UH SOEST 1928); note the location of a long pier



Figure 13. 1920s photograph of Kailua Beach Park with pier (Hawai'i State Archives)

Following the overthrow of the Kingdom of Hawaii many of the Crown Lands, including Kawaihoa, became the property of the United States government and were controlled by Land Office of the Territorial Government. In 1911, auctions were held by the Land Office of the Territorial Government which sold off most of the *makai* portion of Kawaihoa to private individuals. This auction was reported on 2 May 1911 by the *Honolulu Commercial Advertiser* stating

Acre lots, offered at an auction upset price of twenty-five dollars apiece at Kawaihoa, windward Oahu, were gobbled up at noon yesterday by a crowd of bidders. There were thirty-nine lots, the first being declared a homestead for a Hawaiian now living there, leaving thirty-eight to be bid on. The upset price for the thirty-eight lots was \$950, but the sale realized \$8125. The bidding was spirited and although some of the properties are in low lying places near the seashore and some are under water, every lot was sold. There was a demand for it all, and the lowest price realized [per lot] was \$45, the highest price being \$605. [*Honolulu Commercial Advertiser* 2 May 1911]

A 1911 map (Figure 14) shows the proposed “Kawaihoa Beach Lots” developed, and the subdivided lots. In 1916, the Waterhouse’s copra endeavor failed and they sold their “Coconut Grove” to A.H. Rice, who planned a residential subdivision (Drigot and Seto 1982:36). “In 1924, Earl H. Williams, of Liberty Investment Co., acquired 200 ac (80.9 ha) from A. H. Rice and began the lot subdivision process” (Drigot and Seto 1982:36).

A series of USGS and U.S. Army War Department maps (Figure 15 through Figure 21) show the development of the beach lots and Kailua Beach Park in the early twentieth century.

A 1913 U.S. Engineers map (see Figure 15) shows no development in the project area. The entire area is marked with tufts of grass, the icon used to denote wetlands. The area around Ka‘elepulu Pond and Stream are marked as flood zones. The Kailua “Cocoanut Grove” can be seen on the left side of this map, marked by rows of asterisk within a fenced enclosure (dotted lines). There are cattle paddocks on the north side of Ka‘elepulu Stream, and the south bank of the stream has a fence, probably to keep cattle out of the wetlands on the north side of the stream, near the project area. Although the “Kawaihoa Beach Lots” were subdivided and sold in 1911, there is little evidence from this map that any homes were actually built during this period.

The 1919 U.S. Army War Department fire control map (see Figure 16) depicts many features likely associated with the extensive ranching of the area. To the west of the project area, across Ka‘elepulu Stream, roads and structures begin to appear as well as many fences likely used for cattle. Within Ka‘ōhao, a couple of long walls are visible that are likely related to ranching. Many trails are seen from Ka‘ōhao to Ka‘elepulu Pond and beyond. However, little development, including houses, is shown in the current project area.

By the 1920s, rice cultivation at Kawainui stopped and the formerly cultivated areas became pasture land. Some of the wetlands were drained and converted for the dryland cultivation of fruit and vegetable crops. Jiro Tanabe, an old-timer of Ka‘ōhao, shared stories with Kīhei de Silva (2016). Tanabe said he grew up in Ka‘ōhao when it was still ranch land and a watermelon farm and before it was a residential development (i.e., before 1926). Frazier and the Trent Trust Company bought the land from Maunawili Ranch in 1926 and began their development. First, they

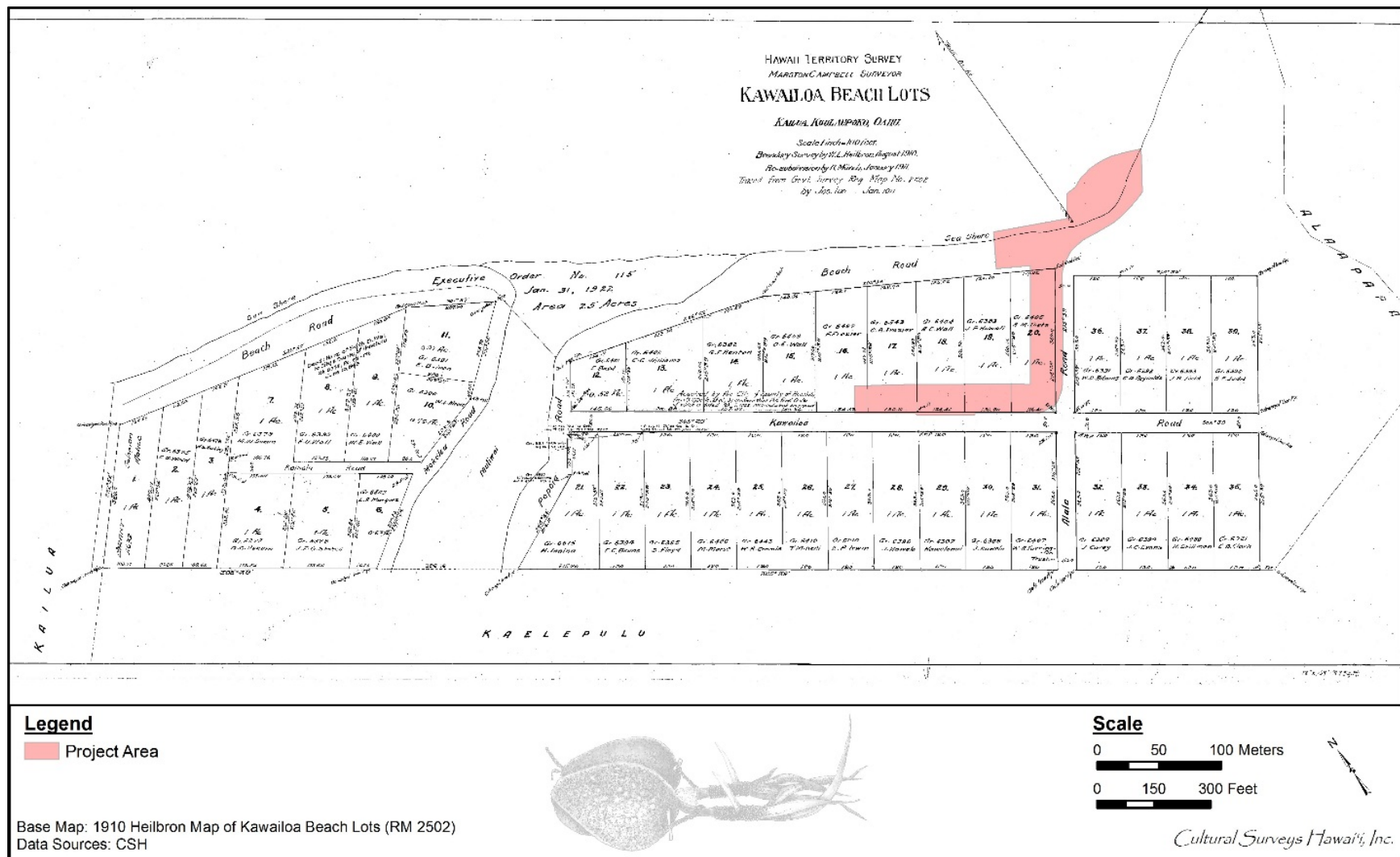


Figure 14. 1911 Heilbron map of the newly planned subdivision of the Kawaiolo Beach Lots

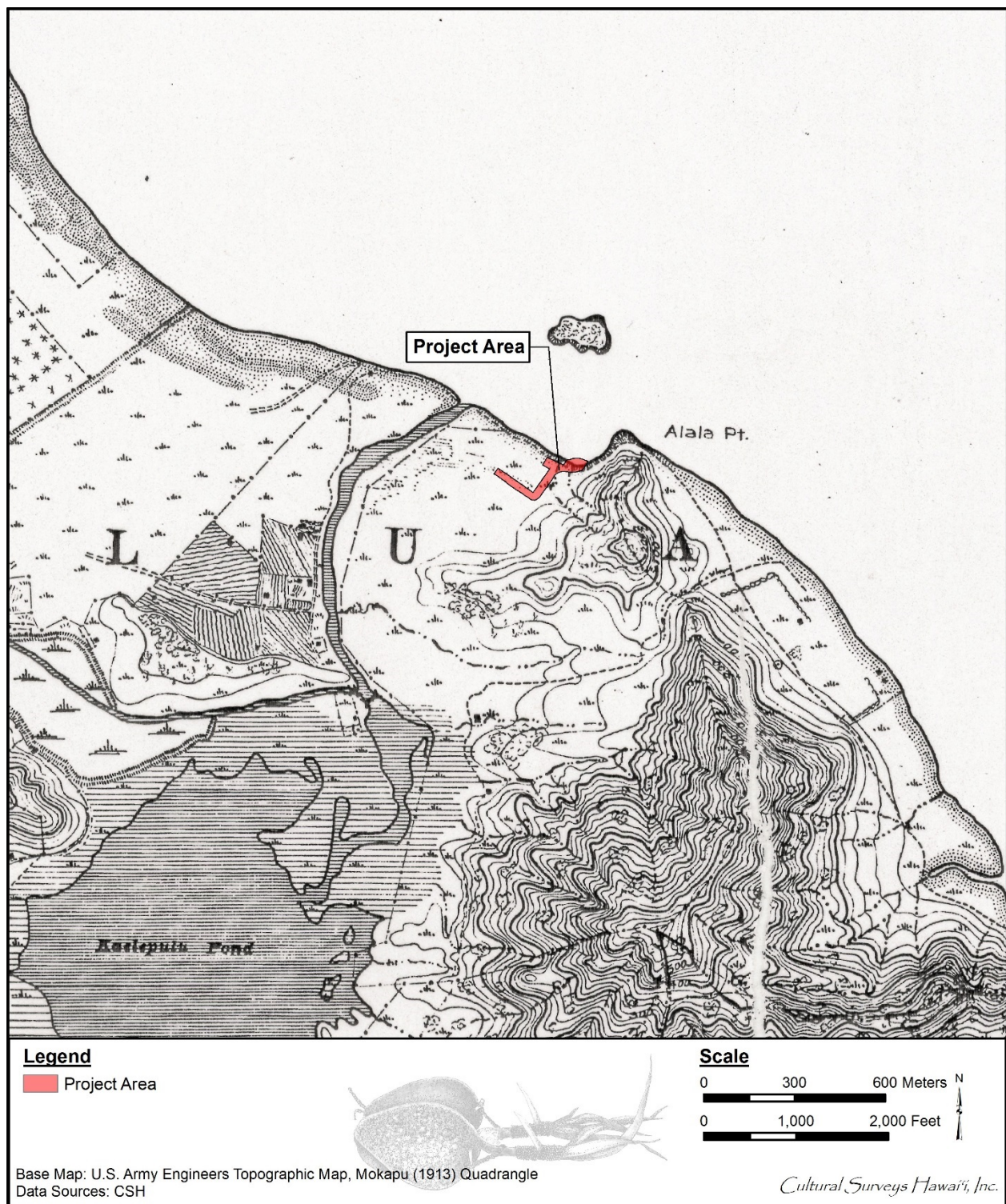


Figure 15. Portion of 1913 U.S. Army Engineers map, Mokapu quadrangle, showing project area in swampy area (denoted by grass tuft symbol)

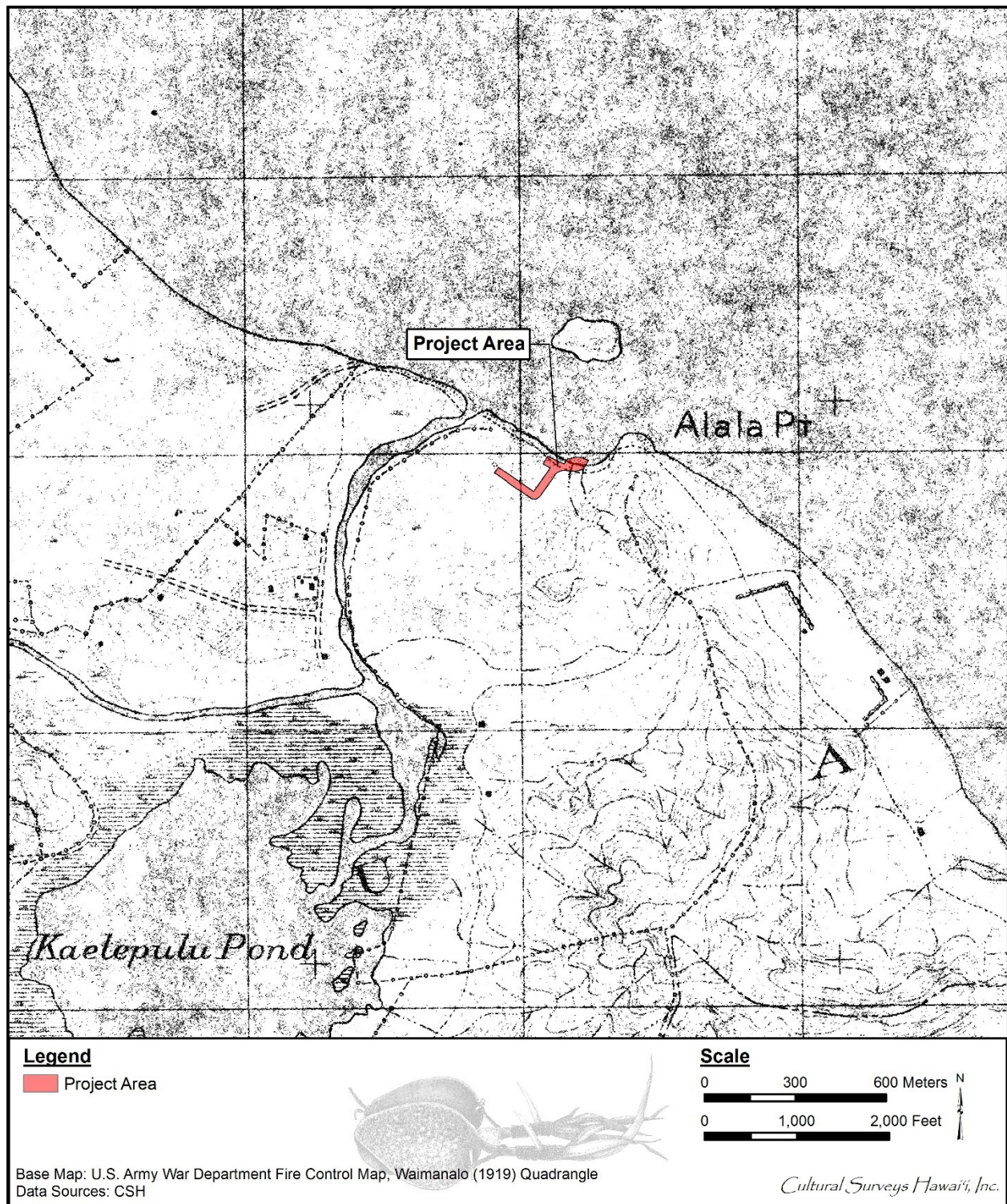


Figure 16. Portion of 1919 U.S. Army War Department fire control map, Waimanalo quadrangle, showing the extent of historic ranching in the vicinity of the project area; note fence lines (dot and dashed lines) and L-shaped rock enclosures for cattle paddocks

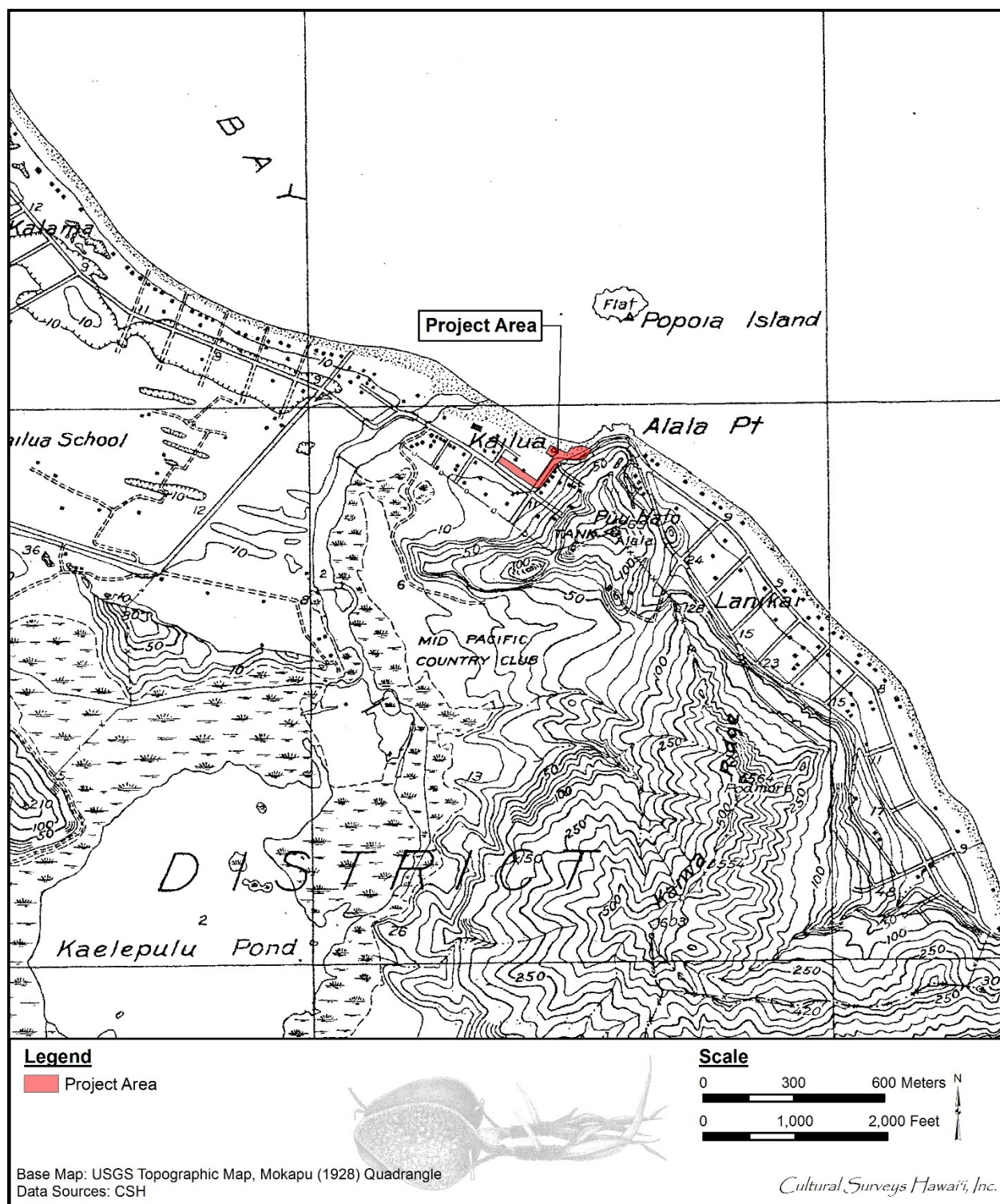


Figure 17. Portion of 1928 Mokapu USGS topographic quadrangle, showing project area; note large structure in Kailua Beach park area (pavilion) and new Mid-Pacific Golf Club *mauka* of the park



Figure 18. Portion of 1936 U.S. Army War Department terrain map, Mokapu quadrangle, showing project area; note several structures in Kailua Beach Park area

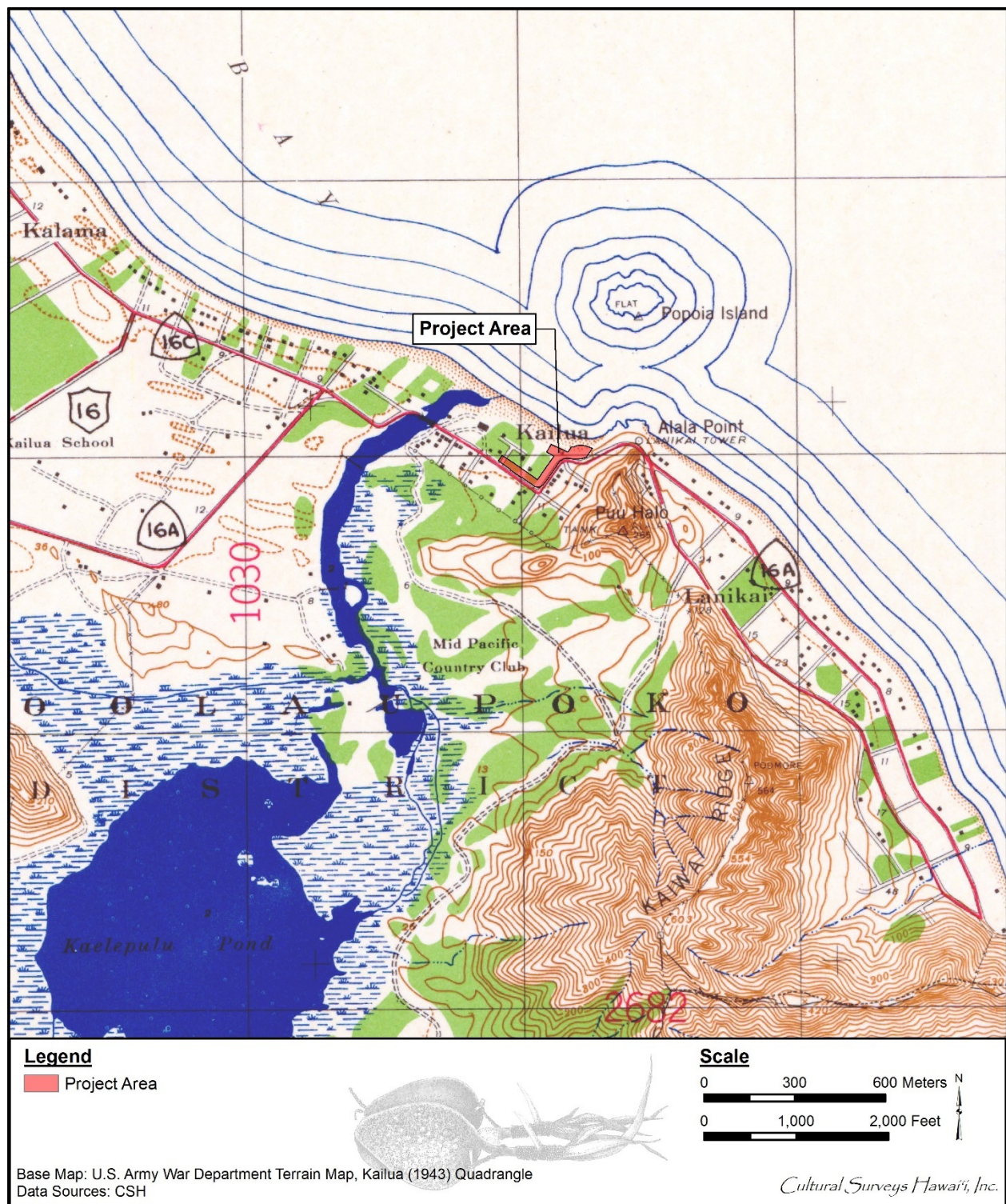


Figure 19. Portion of 1943 U.S. Army War Department terrain map, Kailua quadrangle, showing project area; note structures in Kailua Beach Park area

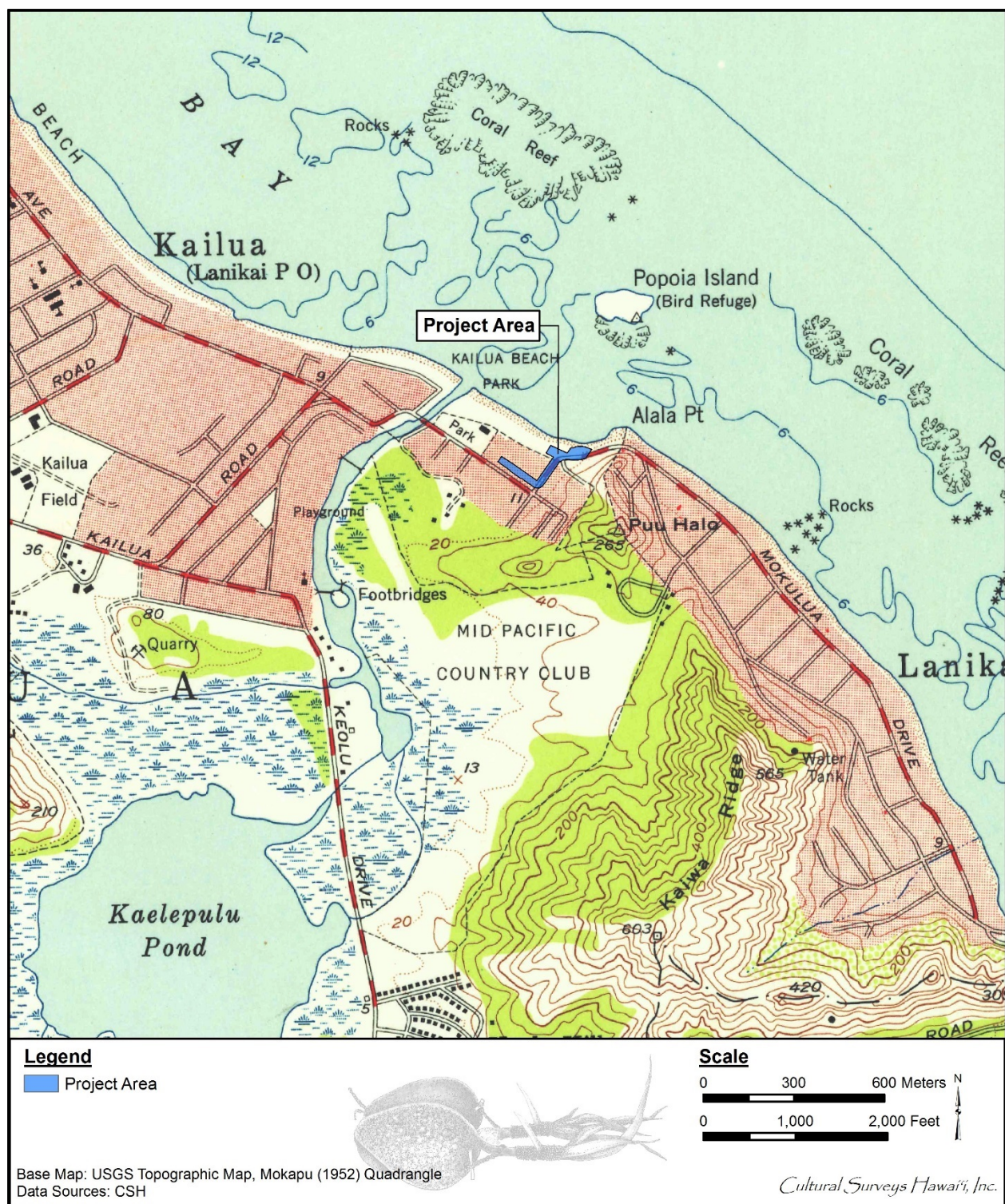


Figure 20. Portion of 1952 Mokapu USGS topographic quadrangle, showing project area; note designation of Kailua Beach Park

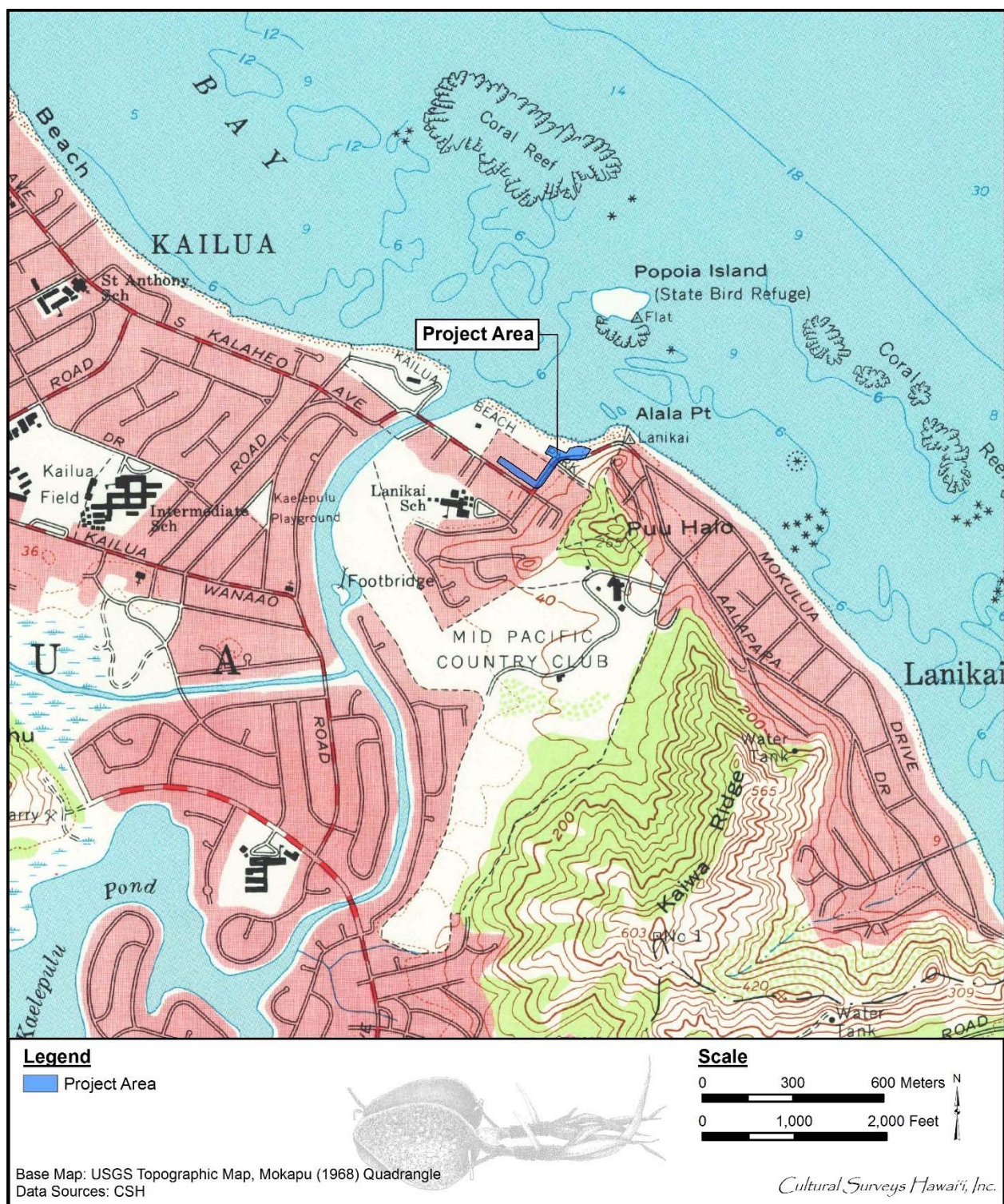


Figure 21. Portion of 1968 Mokapu USGS topographic quadrangle, showing project area; note designation of Kailua Beach and modifications of Kaelepulu Pond and Stream

bought Ka'ōhao, the northernmost of the two land divisions between Alāla and Wailea, then they bought Mokulua, the other half, and developed it and renamed the whole development Lanikai, an invented name that inverts the normal Hawaiian syntax of noun before adjective. And then they developed the nearby golf course to attract wealthy folks to buy their homes. Mr. Frazier was formerly a supervisor at Maunawili Ranch (Creed and Chiogioji 1991:17).

The 1928 USGS topographic map (see Figure 17) depicts the area shortly after Ka'ōhao was purchased and developed by Frazier and the Trent Trust Company. Extensive roads and numerous structures were built along the Kailua coast and in Ka'ōhao. The current project area land was now between residential development to its north and the Mid Pacific Country Club to the south. It is seen on this map that the lands of the project area are still undeveloped. In the "Kawailoa Beach Lots" area, only four small houses and one large structure, the beach park pavilion, are shown near the project area on this map, although several subdivision streets have been completed *mauka* of Kawailoa Road and the project area. The 1936 and 1943 (see Figure 18 and Figure 19) maps are similar to the 1928 map, but some roads have now been constructed *makai* of Kawailoa Road, into the park area. The 1952 map (see Figure 20) is the first to designate the project area as a "Park" and the 1968 map (see Figure 21) designates the coast "Kailua Beach." The 1968 map also shows the extensive modifications to Ka'elepulu Pond and Ka'elepulu Stream to make the new subdivision "Enchanted Lake."

By the 1950s, Kawainui was recognized as a swamp or marsh, opposed to its beginnings as a fishpond. The truck farms that had flourished since the turn of the century within the bounds of present day Kailua Town were slowly replaced by housing, municipal, and retail developments. Kailua was promoted as the bedroom community for Honolulu businessmen.

4.4.6 Development of Kailua Beach Park

According to the Honolulu City and County Department of Parks and Recreation, Kailua Beach Park "has developed in stages from 1920 to the present in response to the growth of the Kailua area" (U.S. Army Engineer District, Honolulu 1978:3-1).

Kailua Beach Park began in 1920 when the Territory transferred 20 acres of beach to Kailua City. Adjacent to the park, the Methodist Church built Camp Kailani in 1947 (Methodist Church, U.S. Board of Missions 1949:28), wooden huts used for church outings and camping. The church offered to sell the land to the Department of Parks and Recreation (DPR) in 1980, and in 1984 the DPR took over management and renamed the area Camp Kailua (City and County of Honolulu Department of Parks and Recreation 1991:5). The city eventually intended to remove most of the wooden structures and expand the beach park. However, the structures continued to be used for overnight camping, especially by non-profit groups and senior citizens. When the DPR began to develop a new building for meetings of non-profit organization at Kailua Field, the buildings at Camp Kailua were closed. However, there were complaints and the demolition of the buildings was blocked in 2013, but eventually the buildings were removed. The location of Camp Kailua and the location of former structures is shown in Figure 22 and Figure 23. The project area is adjacent (along Alāla Road) to the former location of Camp Kailua and an area of old house lots. The area of the abandoned house lots was acquired by the City in 1991.

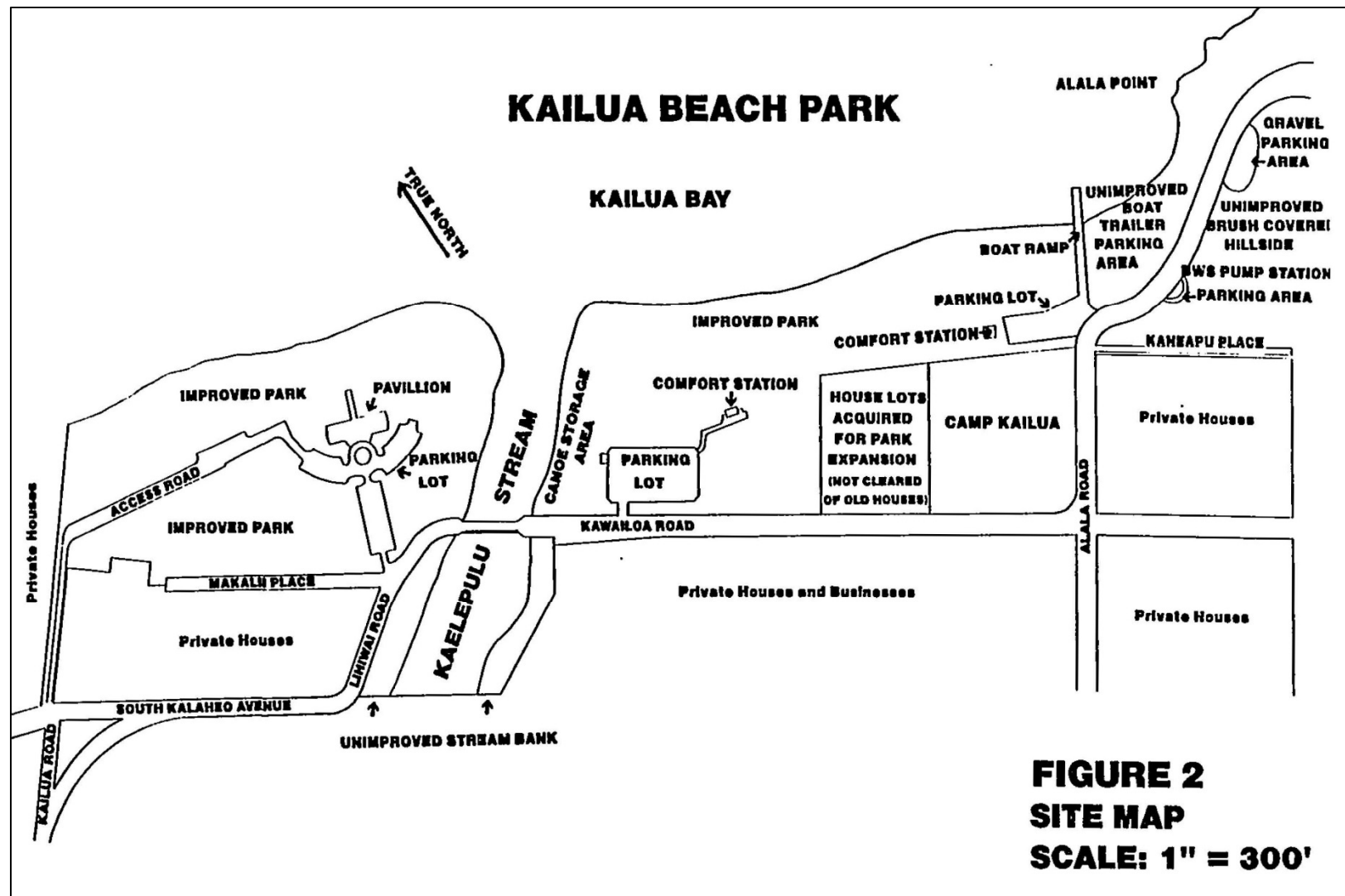


Figure 22. Location of Camp Kailua in relation of Kailua Beach Park (City and County of Honolulu Department of Parks and Recreation 1991:4)

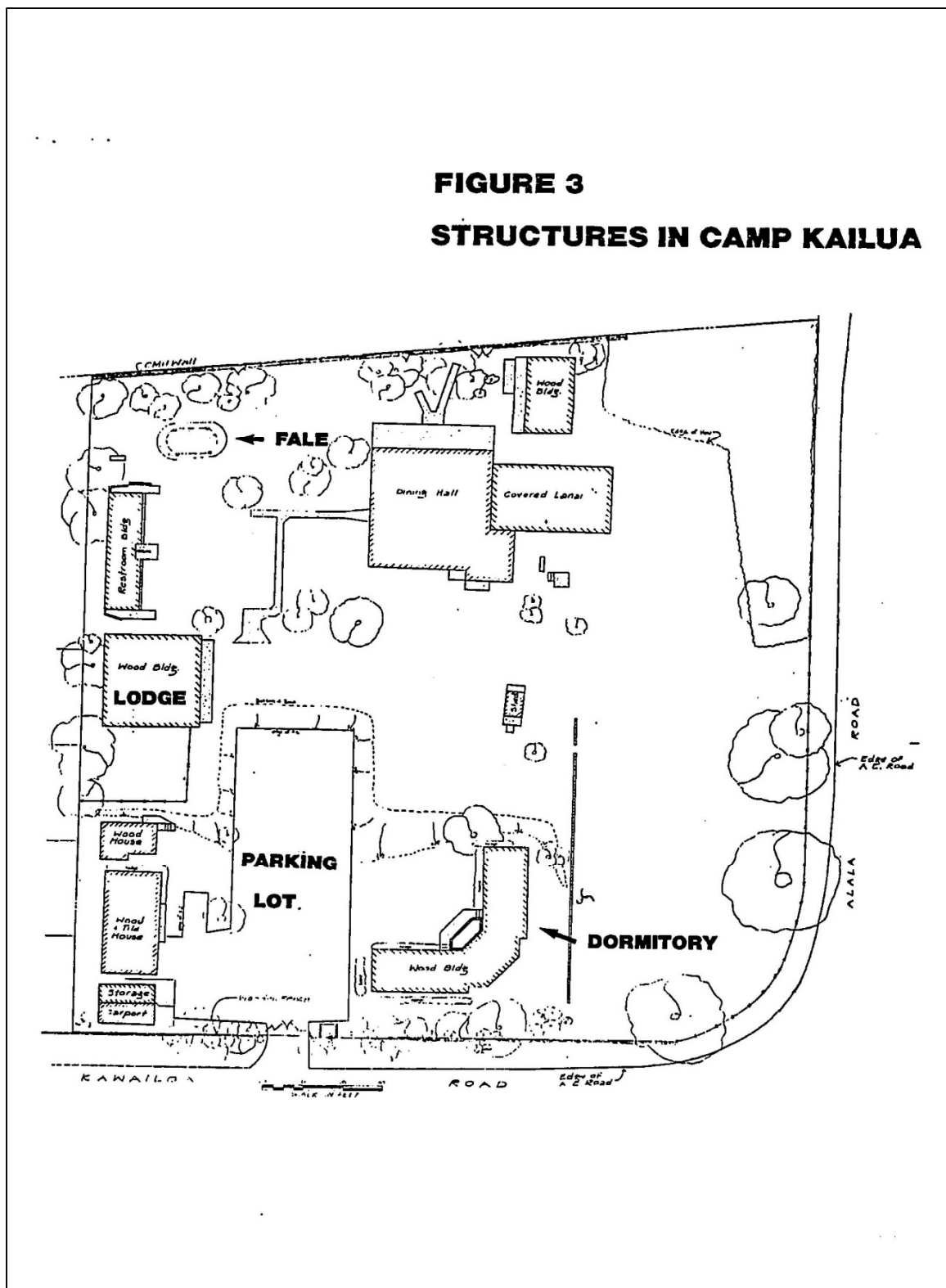


Figure 23. Layout of Camp Kailua in 1991 (City and County of Honolulu Department of Parks and Recreation 1991:5)

A series of aerial photographs shows the development of the park from the 1940s (Figure 24 through Figure 28). A 1949 aerial photograph (see Figure 24) shows the area of Camp Kailua and the houses acquired by the City in 1991 still in good condition. There is no pier or boat ramp evident in the photo; it may have been moved. The beach area is wide, so accreting sand may have covered the ramp.

A 1963 aerial photograph (see Figure 25) shows an exposed ramp and a narrow beach. The houses and structures to the west of the project area are still fairly well maintained. The 1971 and 1978 aerial photographs (see Figure 26 and Figure 27) show many areas where houses or structures have been removed. In years when the beach is narrow, the boat ramp is evident and in years when the beach had accreted sand, the ramp is missing. The 1988 aerial photograph (see Figure 28) shows much of the former Camp Kailua area cleared. The 2013 aerial photograph shows all remains of Camp Kailua removed (see Figure 4).



Figure 24. Portion of the 1949 Kailua Coast aerial photograph (UH SOEST) showing cottages of the Kailani Methodist Camp, established in 1947, to the west of the project area; no boat ramp is evident



Figure 25. Portion of the 1963 Kailua Coast aerial photograph (UH SOEST) showing structures in Kailani Camp/Camp Kailua west of the project area; small boat ramp or barge is evident

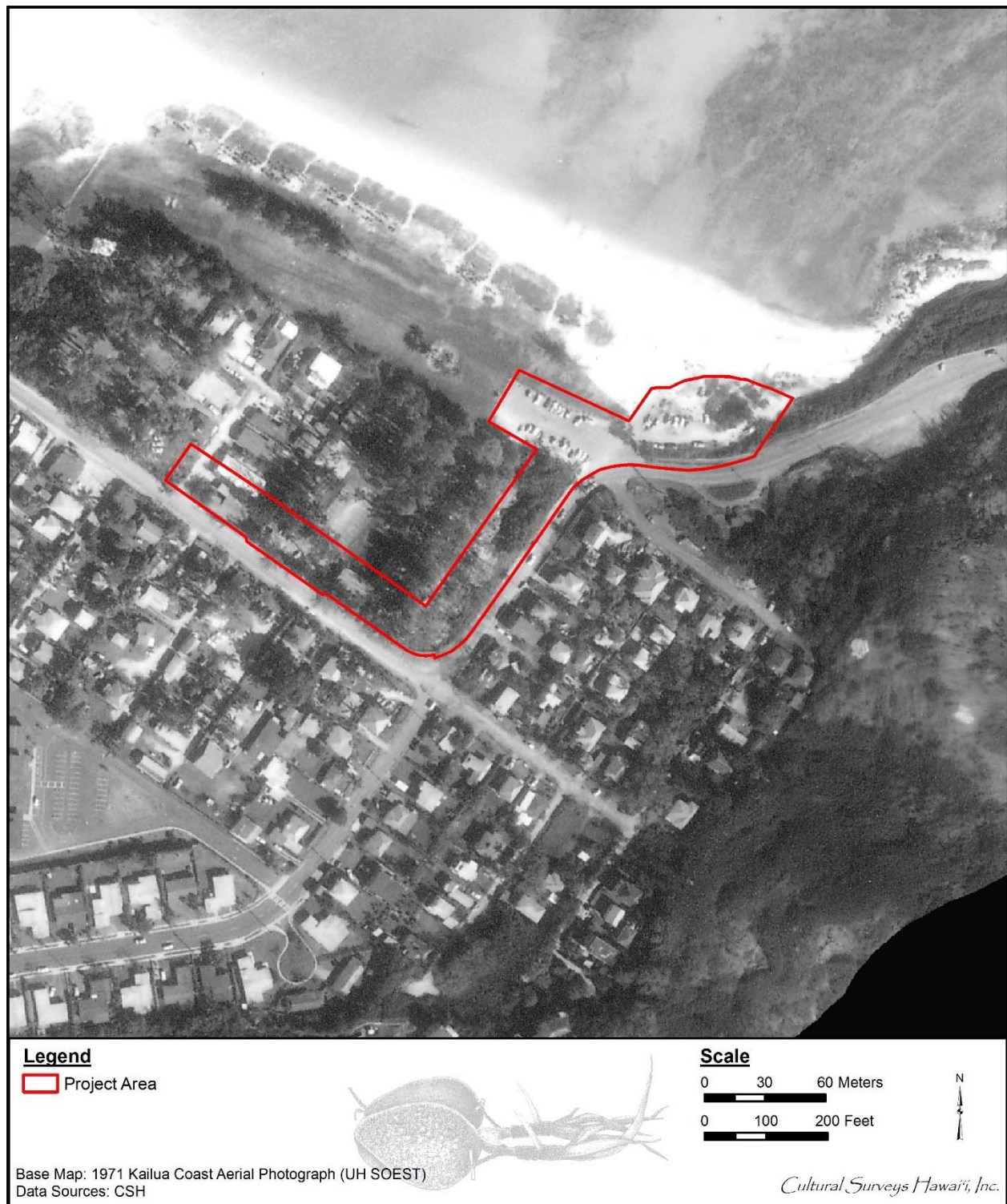


Figure 26. Portion of the 1971 Kailua Coast aerial photograph (UH SOEST); no boat ramp

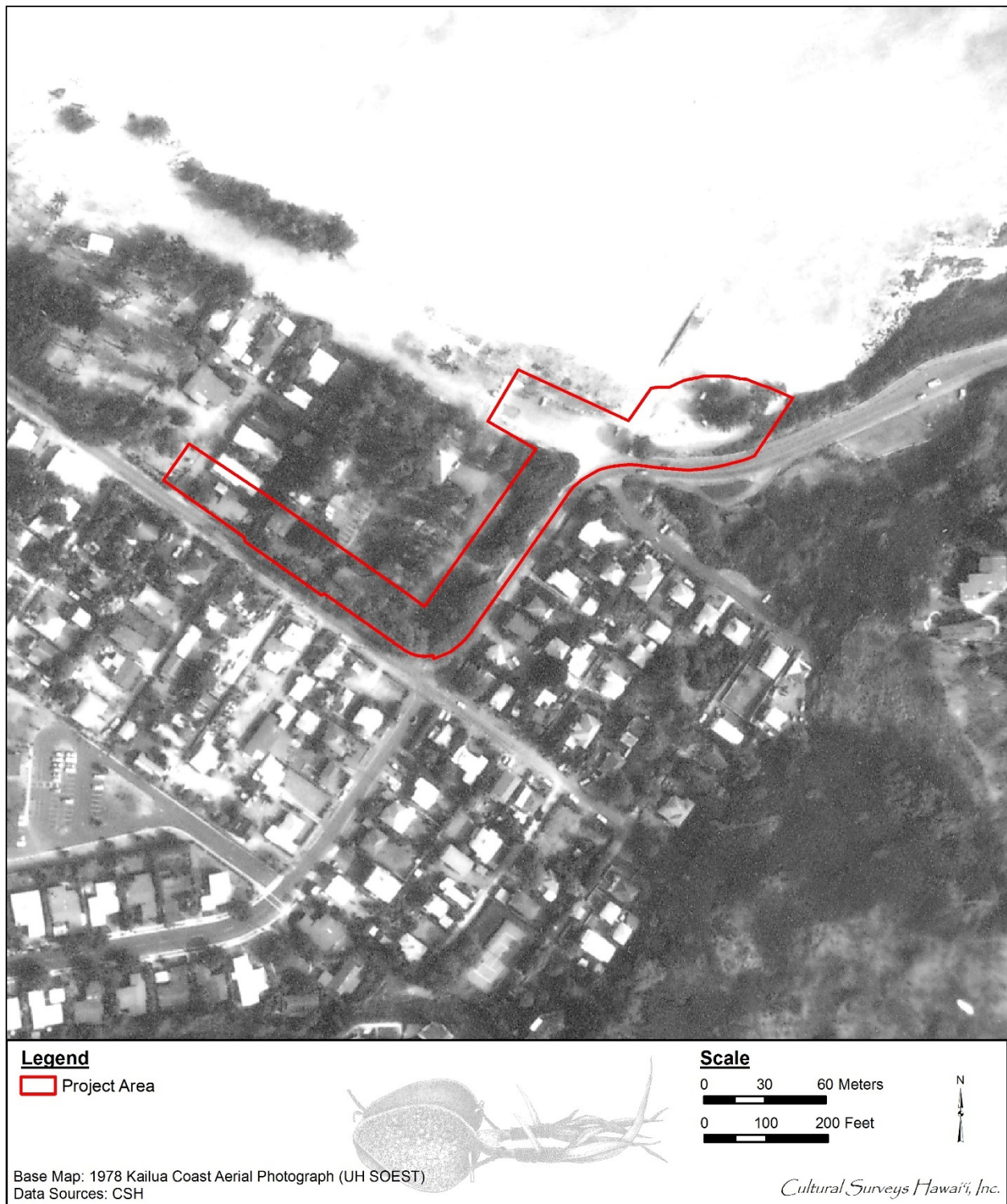


Figure 27. Portion of the 1978 Kailua Coast aerial photograph (UH SOEST); showing boat ramp



Figure 28. Portion of the 1988 Kailua Coast aerial photograph (UH SOEST); showing boat ramp

Section 5 Previous Archaeological Research

5.1 Previous Archaeological Work in Kailua

Twentieth and twenty-first century archaeological findings from inventory surveys, data recovery projects, and inadvertent finds during development are the main source of our knowledge about the archaeological record in Kailua. Archaeological work in the last 20 years in Kailua has been fairly extensive. For the most part, this work has been concentrated along the margins of Kawainui Marsh and within Maunawili Valley. This is largely due to the fact that most of the *makai* portions of the *ahupua'a* had been developed prior to the implementation of State and Federal Historic Preservation Rules (Dye 1992).

The earliest habitation of the Kailua area is still in question. A radiocarbon date obtained from an organic soil layer has been interpreted as evidence that human habitation of Kailua began at approximately AD 350-650 (Clark 1980a:32-33, 77-78). Although this date is not universally accepted, it is fairly well agreed upon among the archaeological community that by approximately AD 1200-1300 dramatic changes in the pollen record are indicative of the expansion of agriculture in the Kailua area, most likely in the well-watered margins of Kawainui Marsh (Athens and Ward 1991; Hammatt et al. 1990). Human colonization of the region would clearly have had to precede this agricultural expansion, perhaps by many centuries. It is logical that Kailua, and other regions of Ko'olaupoko, with their abundant marine and terrestrial resources, would have been attractive to the early Polynesian colonizers.

The work of Hammatt et al. (1990) and Athens and Ward (1991), has largely discredited Kraft's (1980) earlier assertions that Kawainui Marsh was an open water embayment at the time of early Polynesian colonization. Athens and Ward (1991) suggest the Kawainui Embayment was sealed off during the first millennium BC as the result of a drop in sea level. They correlate the Kawainui event with similar events at the same time in Kahana Valley and Ft. Shafter Flats, O'ahu.

Remains of upland terraces show taro was grown extensively and intensively in Kailua around the thirteenth or fourteenth century, and possibly earlier (Allen-Wheeler 1981). The work of Cordy (1977a and b, 1978), Allen-Wheeler (1981), Allen (1986, 1988a, 1988b), and Athens (1983) all document the mix of irrigated and dryland agriculture that existed in Kailua during prehistory and continuing into the historic period. Dryland agriculture, including the cultivation of yams, gourds, and sweet potato, would have been carried out on slopes and on drier flatlands. Modification to the landscape was variable, ranging from none at all to the construction of terraces and mounds for planting. According to Handy (1940:155), the beach barrier at Kailua (current-day Coconut Grove) was famous for its production of sweet potatoes grown in small mounds. Irrigated agriculture would have been carried out along streams and below springs. Associated landscape modifications would have included construction of terraces and/or pond fields, *'auwai* (irrigation ditches), and earthen and stacked-stone berms. These types of dryland and irrigated agricultural features have been found in Maunawili and along the margins of Kawainui Marsh.

Previous archaeological investigations in Kailua have located dispersed pre-Contact habitation remnants. This is in keeping with the observations of early westerners in Hawai'i that the settlement pattern for the most part was dispersed habitations scattered across the landscape amid agricultural fields. It should be remembered that settlement data is conspicuously absent from the

lowland, beach berm areas of Kailua due to early development of these areas. Human burials have been the primary historic property type documented in the sand berm area.

In the last several years, over 20 reports of inadvertent finds of human skeletal remains have been made in Kailua on the sandy beach berm of the Coconut Grove, Kawailoa, and Lanikai/Ka'ōhao coastal areas. As with other near-shore sandy areas in Hawai'i, this portion of Kailua was used extensively for burial of the dead. These burial remains are typically not as dense as the hundreds of human burials discovered from nearby Mōkapu peninsula (Snow 1974); however, they are of particular relevance to the present project, since they have been found within the beach berm of Kailua.

5.2 Previous Archaeology in the Vicinity of the Project Area

Early archaeological surveys of the Kawailoa/Lanikai coastal area of Kailua focused on the location of traditional surface structures such as shrines and *heiau*. Later archaeological surveys have focused on the inadvertent discovery of human remains, mainly in Jaucas sands near the shore, and in the subsurface excavation of pre-Contact (before 1778) and early post-Contact (ca. 1778-1850) cultural deposits. The locations of previous archaeological studies and any previous identified historic properties in the coastal Kawailoa and Lanikai neighborhoods are presented in Figure 29 and Figure 30 and Table 1 and Table 2. A summary of the projects and historic properties are listed in Table 1 and Table 2 and a more detailed discussion of archaeological projects follow.

Historic properties include archaeological sites and historic structures listed on the Hawai'i Register of Historic Places (HHRP) and National Register of Historic Places (NRHP). These listed sites are mainly residential houses associated with important people in the history of Kailua, or built in a particular style associated with early Hawaiian architecture.

5.3 Early Surveys in the Kawailoa area

5.3.1 SIHP # 50-80-11-378 Alāla Heiau; SIHP # 50-80-11-18 Alāla Shrine

In Thomas Thrum's (1906:48) listing of O'ahu *heiau* he mentions: "Alala . . . Kailua. — Celebrated as the heiau where the ceremonies attending the birth of Kualii were performed about 1640." This was supposedly located at the foot of the hill near the coast. However, in a later article, Thrum downgrades Alāla from a *heiau* to a possible shrine.

Traditions for ages past has credited the heiau of Alala . . . as having the distinction of being the temple where the ceremonies attending the royal birth of Kualii, about 1640, were performed, but of which no traces of any kind now remain. . . . The site to which we were directed, while convenient and appropriate for a ko'a, or fisher-folk's heiau, gave no evidence by stones of the vicinity, contour of the hill at the point shown, or other feature, of ever having been the location of a temple of the importance alleged. [Thrum 1915:87–88]

J. Gilbert McAllister conducted an island-wide survey of O'ahu in 1930. The only site he physically visited in the vicinity was Site 377 Ka'elepulu Pond, which he places "about two-thirds of a mile from the shore."

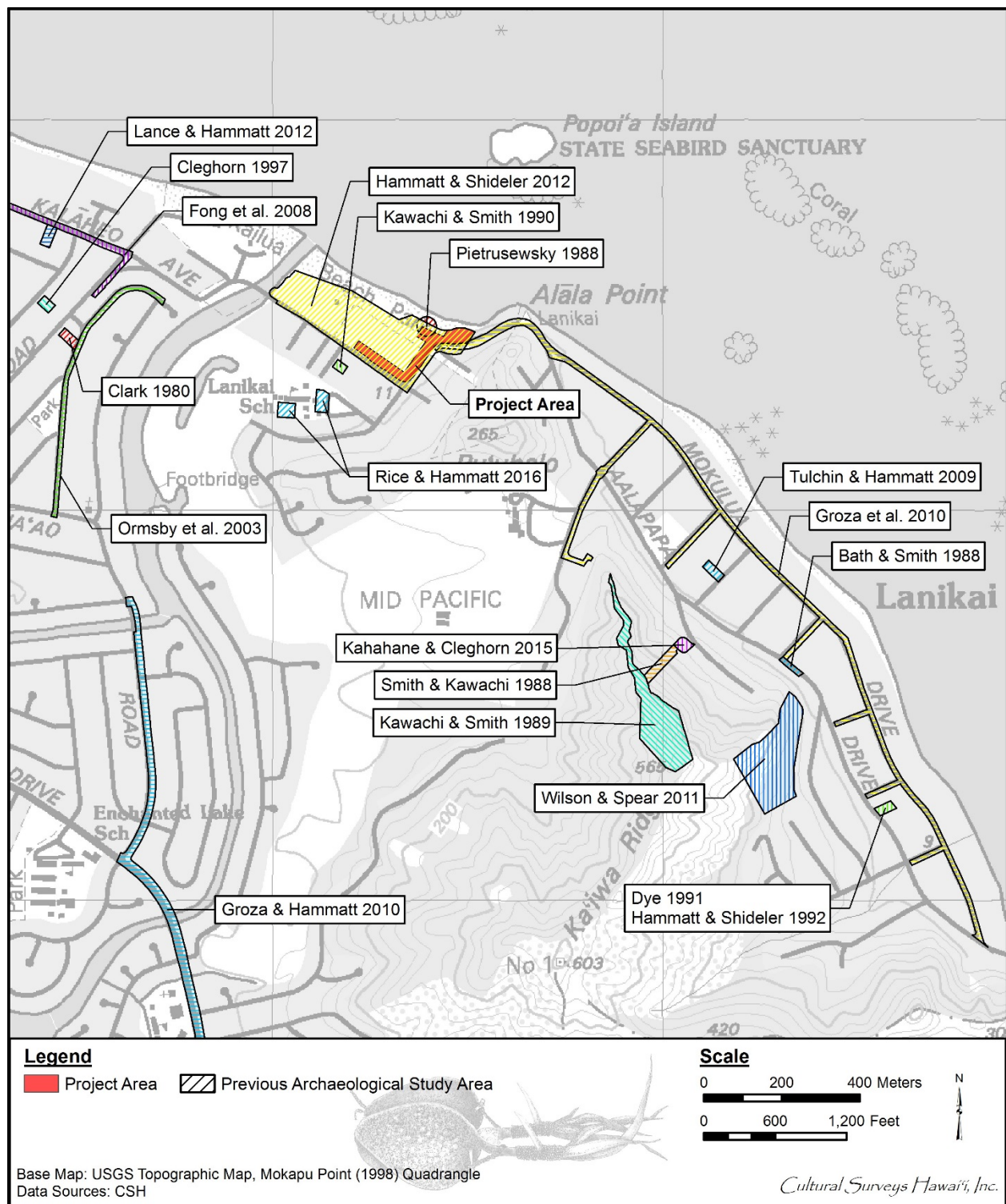


Figure 29. Locations of previous archaeological studies in the coastal Kawaihoa and Lanikai neighborhoods of Kailua

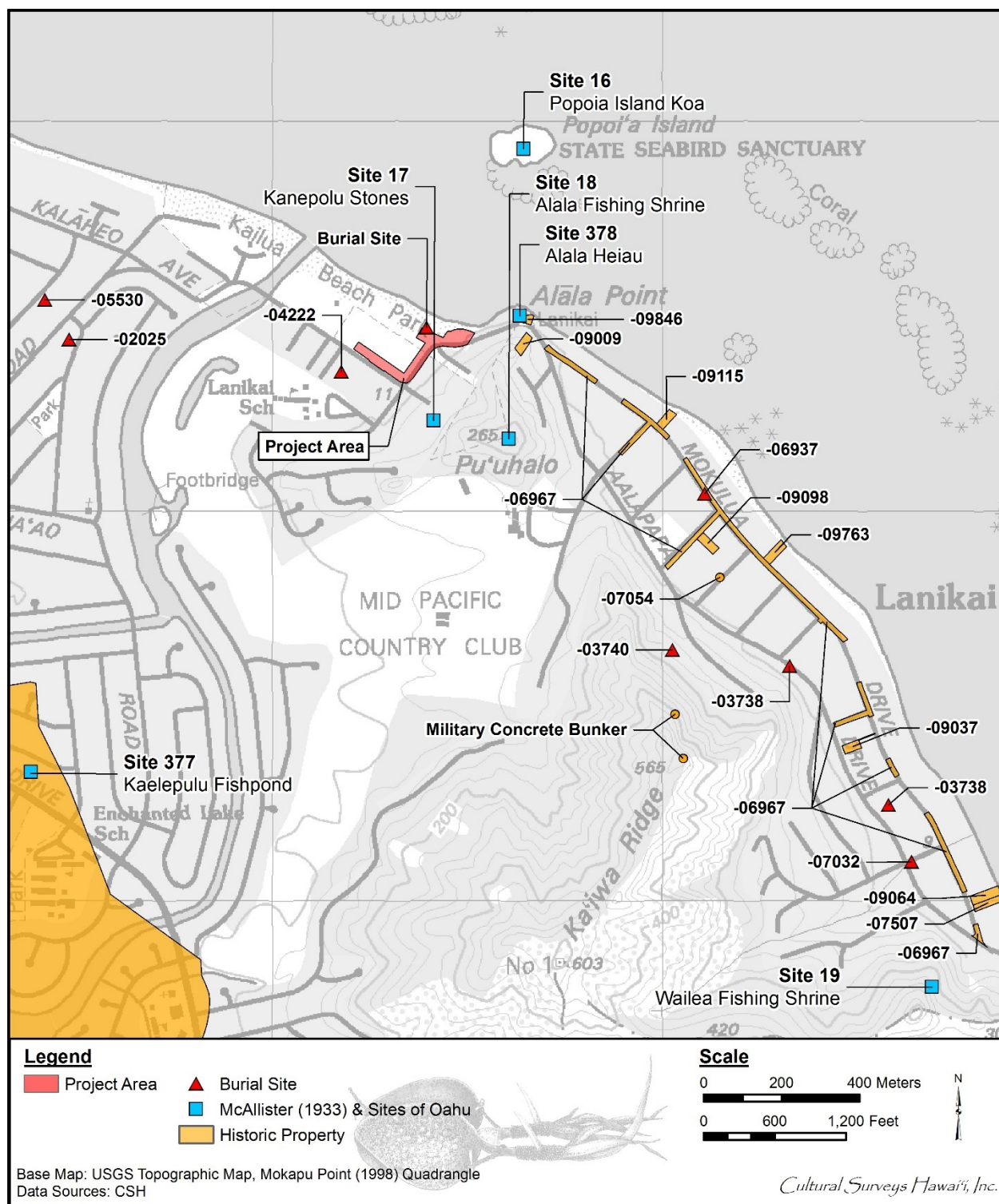


Figure 30. Locations of previously identified burial sites and historic properties in the coastal Kawailoa and Lanikai neighborhoods of Kailua

Table 1. Previous archaeological studies in the vicinity of the project area

Reference	Type of Investigation	Location	Results (SIHP # 50-80-11)
McAllister 1933	Archaeological reconnaissance survey	Island-wide	Describes 16 sites within Kailua Ahupua'a, including Ka'elepulu Fishpond (Site 377) and Alāla Heiau (Site 378); in all, eight <i>heiau</i> reported for Kailua
Sterling and Summers 1978	Reconnaissance survey	Island-wide	Consolidates from other studies sites of O'ahu including Ko'a at Popoi'a Island (Site 16), Kanepolu Stones (Site 17), Alāla Fishing Shrine (Site 18), and Waile'a Fishing Shrine (Site 19)
Clark 1980 [b]	Paul Property, TMK: [1] 4-2-018:016	Analysis of skeletal remains	Human burial report; analysis of skeletal remains, SIHP # -2025
Bath and Smith 1988	Data recovery	Lanikai 8-inch water main project	Single burial recovered, osteological analysis completed. SIHP # -3738
Pietrusewsky 1988	Data recovery	Kailua Beach Park	Single burial removed, osteological analysis completed
Smith and Kawachi 1988	1063 Ko'oho'o Place, Lanikai	SHPD burial removal report	Single burial (SIHP # -3740) recovered, osteological analysis completed
Kawachi and Smith 1989	SHPD field check,	Kaiwa Ridge, Lanikai, TMK: [1] 4-2-002:017	Notes two WWII bunkers (informant asserts former <i>ko'a</i> or <i>kilo i'a</i> locations, notes possibility of caves
Kawachi and Smith 1990	SHPD burial	481-A1 Kawaihoa Rd, TMK: [1] 4-3-010:032 (East side Ka'elepulu Stream)	Single flexed burial (SIHP # -4222)
Dye 1991	Burial recovery	1414 'A'alapapa Dr, Lanikai, TMK: [1] 4-3-004:005	Burial recovered (SIHP # -3738) (see Hammatt and Shideler 1992 for work on same project
Hammatt and Shideler 1992	Burial recovery	1414 'A'alapapa Dr, Lanikai, TMK: [1] 4-3-004:005	Archaeological disinterment of inadvertent burial finds (three individuals) (see Dye 1991 for work on same project); SIHP # -3738 used by Bath and Smith 1988
Cleghorn 1997	Data recovery	Ku'ukama St	Reports recovery of human skeletal material designated SIHP # -5530

Reference	Type of Investigation	Location	Results (SIHP # 50-80-11)
Ormsby et al. 2003	Archaeological monitoring	Kalaheo Ave Sewer project, Kailua, TMKs: [1] 4-2-001, 019, 020; 4-4-022–032; 4-4-011	No historic properties identified
Fong et al. 2008	Archaeological monitoring	Kalāheo Ave, from intersection of Kaluamo‘o St to Kailua Rd, TMKs: [1] 4-3-011–016, 026–030, and 069	No historic properties identified
Tulchin J. and Hammatt 2009	Archaeological inventory survey	Geary Residence at 136 Haokea Dr, TMK: [1] 4-3-006:023	Identified SIHP # -7054, a pre-Contact hearth
Groza and Hammatt 2010	Archaeological monitoring	Wana‘ao Rd/Keolu Dr	No historic properties identified
Groza et al. 2010	Archaeological monitoring and burial plans	Mokulua Dr 8-inch water main project, Part II	Two sets of inadvertently discovered human remains (SIHP #s -6937 and -7032) and a cultural layer within A horizon designated as SIHP # -6967
Wilson and Spear 2011	Archaeological inventory survey (recorded as an archaeological assessment)	Approx. 7-acre Lanikai residential property, TMK [1] 4-3-05:077-086	No historic properties identified
Hammatt and Shideler 2012	Literature review and field inspection	Kailua Beach Park	No historic properties identified
Lance and Hammatt 2012	Archaeological inventory survey (recorded as an archaeological assessment)	211 S. Kalāheo Ave, TMK: [1] 4-3-014:010	No historic properties identified

Reference	Type of Investigation	Location	Results (SIHP # 50-80-11)
Kahahane and Cleghorn 2015	Archaeological inventory survey (recorded as an archaeological assessment)	1055 Ko'oho'o Place, TMK: [1] 4-3-006:009	No historic properties identified
Rice and Hammatt 2016	Archaeological inventory survey (recorded as an archaeological assessment)	Lanikai Elementary School	No historic properties identified

Table 2. Summary of identified historic properties in the vicinity of the project area

SIHP # 50-80-11****	Site Type/Name	Description	Reference
-0016	Site 16, <i>Ko 'a</i> at Popoi'a Island	A <i>ko 'a</i> (fishing shrine) for <i>moi</i> was located near the center of the island; in 1946, a tidal wave almost completely destroyed it; no walls remain though a lot of coral is laying around	Sterling and Summers 1978
-0017	Site 17, Kanepolu Stones	Legendary stones said to have been guards set to watch for the coming of Kanepolu, a man who was born, grew up, and died in a single day; when he arrived he slipped on a coral stone, leaving an imprint of his leg on it, and died	Sterling and Summers 1978
-0018	Site 18, Alāla Fishing Shrine	In 1939, an informant described it as a natural shrine on the top of Alāla that fisherman at sea looked at and used, along with Wailea Fishing Shrine, to locate the best fishing grounds in the sea; Alāla described as not only a shrine but a fish god	Sterling and Summers 1978
-0019	Site 19, Waile'a Fishing Shrine	In 1939, an informant described it as a natural shrine above "Hale aloha" that fisherman at sea looked at and used, along with Alāla Fishing Shrine, to locate the best fishing grounds in the sea; Waile'a described as not only a shrine but a fish god	Sterling and Summers 1978
-0377	Site 377, Ka'elepulu Fishpond	Formerly a freshwater pond located inland about two-thirds of a mile from shore; pond was approximately 280 acres and limited by natural contours and some earth embankments	McAllister 1933
-0378	Site 378, Alāla Heiau	<i>Heiau</i> credited as being temple where ceremonies attending the royal birth of Kualii took place ca. 1640; no traces of the <i>heiau</i> remain and no evidence shows a <i>heiau</i> of this importance was located here	McAllister 1933
-2025	Burial site	Inadvertent discovery of human skeletal remains at a private home	Clark 1980 [b]

SIHP # 50-80-11****	Site Type/Name	Description	Reference
-3738	Burial site	Inadvertent discovery of human skeletal remains in two locations dating to pre-Contact period; at least four individuals documented by Bath and Smith (1988) and at least three individuals documented by Hammatt and Shideler (1992)	Bath and Smith 1988; Hammatt and Shideler 1992
-3740	Burial site	Inadvertent discovery of an adult female (flexed burial) aged 40 to 45 dating to pre-Contact period, skeletal remains found in a dark yellowish brown colluvium	Smith and Kawachi 1988
-4222	Burial site	Inadvertent discovery of an adult female (flexed burial) aged 40 years or older, skeletal remains identified in clean white sand	Kawachi and Smith 1990
-5530	Burial site	Inadvertent discovery of an adult individual, skeletal remains appear to be previously disturbed, most likely during development of the subdivision	Cleghorn 1997
-6937	Burial site	Inadvertent discovery of human skeletal remains dating to pre-Contact period; skeletal remains associated with a single individual found in Jaucus sand, and may have been previously disturbed by a utility line	Groza et al. 2010
-6967	Subsurface cultural deposit	Discontinuous subsurface cultural layer with primarily pre-Contact activity; generally evidenced by a buried A horizon developed on natural Jaucas sand that pervades the area, and that contains areas enriched with pockets of indigenous Hawaiian cultural material	Groza et al. 2010
-7032	Burial site	Inadvertent discovery of human skeletal remains dating to pre-Contact period; skeletal remains associated with a single individual found in Jaucas sand, and may have been previously disturbed by a utility line	Groza et al. 2010

SIHP # 50-80-11****	Site Type/Name	Description	Reference
-7054	Subsurface cultural deposit	A hearth determined to be of pre-Contact origin; screened samples yielded fire-cracked rock, basalt flakes, water-rounded pebbles (basalt), marine shell midden, and fish bone	Tulchin and Hammatt 2009
-7507	Historic residence	Harold Eichelberger family beach house	SHPD Hawai'i Register: 14 January 2013
-9009	Historic residence	"Hilltop house," "Pu'uhonua," or "Bird Lady's House" built by Arthur and Anne Powlison in the 1920s, constructed without removing any rock from on top of hill; used by military during WWII as a training center and vantage point	SHPD Hawai'i Register: 24 June 2006
-9037	Historic residence	Miles and Kathy Anderson residence, 1320 'A'alapapa Dr; Hawaiian plantation style home built in 1928; moved to Lanikai in 1942	SHPD Hawai'i Register: 30 June 2007
-9064	Historic residence	Clarence Cooke guest beach house, 1548 Mokulua Dr; Hawaiian beach house built in 1929	SHPD Hawai'i Register: 18 June 2009
-9098	Historic residence	Richard J. Boyen beach cottage; 123 Kaiolena Dr; Hawaiian style home built in 1933	SHPD Hawai'i Register: date not available
-9115	Historic residence	Andrade beach retreat, 908 Mokulua Dr	SHPD Hawai'i Register: date not available
-9763	Historic residence	Robert McCorriston beach house, 1056 Mokulua Dr; Hawaiian style bungalow home built in 1929	SHPD Hawai'i Register: 28 June 1993
-9846	Lanikai monument	Marker used to designate entry to the Lanikai subdivision, near 726 Mokulua Dr	SHPD Hawai'i Register: 18 June 2003

He tried to confirm many of the *heiau* mentioned by Thrum. McAllister (1933:190) designated the *heiau* as his Site 378, as an informant pointed out the location at Alāla Point, although no remains of any *heiau* were noted. McAllister agreed with Thrum that if a structure had been at Alāla Point, it was more likely to have been some type of simple shrine rather than a *heiau*. McAllister stated, "When the site was indicated by Solomon Mahoe, my reaction was similar to that already expressed by Thrum."

In their *Sites of O'ahu*, Sterling and Summers (1978) cite the following description of the natural shrine of Alāla on the top of the hill above the coastal point:

(Site 18) Where a cement sign with 'Lanikai' on it stands. Looking up from this spot we saw the most extraordinary house built on and over the huge rocks. It is owned by Arthur Powlison. The 'haunted house', Mrs. Alona calls it because it was built directly in front of Alāla, a natural shrine on the hill. We had to move some distance away to see Alāla on the hill, behind the house. The fishermen of old watched this big rock on the hill and Waile'a, another natural shrine a distance away at a place called Waile'a, to locate the best fishing grounds in the sea. 'It is too bad,' said Mrs. Alona, 'to deprive Alāla of an unobstructed view of the sea, for Alāla is not only a shrine but a 'fish' god. So is Waile'a.' [Mrs. Charles Aiona, Informant, 29 September 1939 in Sterling and Summers 1978:239]

5.3.2 Bernice Pauahi Bishop Museum Sites

In addition of Alāla Heiau and Shrine (Site 18) Bishop Museum archaeologists recorded a number of other sites near the project area, designated Sites 16, 17, 18 and 19. These are mentioned in Sterling and Summers' *Sites of O'ahu*, but there are no published reports for these sites.

Sterling and Summers (1978:240) note there are "Ko'a on each of the two islands of Mokolua, off Lanikai." One of these, the *ko'a* at Popoi'a Island, is specifically discussed:

(Site 16) Ko'a for moi [threafish; *Polydactylus sexfilis*] located almost in center of island. There are no walls remaining. Much coral lying around. It was nearly obliterated by tidal wave of 1946. Small overhang under which offerings were placed still visible. Louis Mahoe, informant, said that this *ko'a* was used by his father, with appropriate *pule* [prayer], at least up to the 1920's. [Sterling and Summers 1978:238]

The Guardian Rocks were basalt rocks commemorating the coming of Kanepolū to Kamehameha III:

(Site 17) Kane-polū (pronounced by Mahoe, Kane-p'lu) at Nawelu's place are several large rocks. These were guards and when he came there he found them scattered about on the lot (on Kawaihua Road, opposite Kai-lani camp). He had collected a few of them and these are close together now, another about 10 feet away. They are basalt. Another, which he states is now covered by earth (next door garden) is a coral rock, with the imprint of a man's leg upon it.)

The story connected with these rocks is of the time of Kamehameha III. The King was in Kailua on a fishing expedition, staying in the cave at the foot of Alala Point.

..

Kane-polū was a man who was born, grew up, and died in one day. He belonged to Kuli-ouou. The King sent for him to come to Alāla and he came . . . ‘perhaps he flew, I don’t know’ . . . The stones were guards set to watch for his coming. When he arrived it was getting dark, and as night fell, he slipped on the coral stone, leaving an imprint ‘of his leg’ on it, and was killed. This stone was ‘His leg’ . . . ‘Where the rest of his body is, nobody knows.’ [Sterling and Summers 1978:238]

Sterling and Summers (1978:239) describe the natural shrine known as Waile‘a (Site 19) as being located “[u]p above ‘Hale aloha’ . . . bold and clear against the sky line . . . The beautiful homes here are built where the old native road used to be.” As previously noted in Section 3.3.1, Waile‘a was a companion shrine to Alāla. Both were probably natural bedrock outcrops high on hills that were used as fish locating lookout points.

5.4 Later Archaeological Surveys and Inadvertent Finds

5.4.1 Clark 1980 [b]

In 1980, Jeffrey T. Clark performed an analysis of human skeletal remains located on the Paul Property, Kailua, O‘ahu, Hawai‘i, TMK: [1] 4-2-018:016.

5.4.2 Bath and Smith 1988

In 1988, during a Board of Water Supply excavation for a water main along ‘A‘alapapa Drive, at least four human burials were exposed (SIHP # -3738). Bath and Smith were called out to the site; they determined the burials were not recent and removed them.

5.4.3 Pietrusewsky 1988

In 1988, Mike Pietrusewsky prepared a forensic identification report addressing 13 fragments found on the seafloor 100 yards (300 ft) east of the boat ramp at Kailua Bay. None of the remains could be positively identified as human and some were regarded as certainly non-human in origin. Dr. Pietrusewsky (1988:2) concluded, “These remains do not appear to have any forensic or archaeological value . . .”

5.4.4 Smith and Kawachi 1988

In 1988, Joyce Bath, the O‘ahu Island State Archaeologist, was notified by the Medical Examiner’s office of a burial (SIHP # -3740) exposed during excavation at 1063 Ko‘oho‘ō Place. Smith and Kawachi were sent out to investigate and found the skeleton had been removed and boxed. The owner of the house reported the burial to have been in a flexed position. Smith and Kawachi note the burial was in situ in colluvium.

5.4.5 Kawachi and Smith 1989

In 1989, Kawachi and Smith were sent out to perform a field check of Kaiwa Ridge following the call of a concerned citizen. Kawachi and Smith hiked the ridge and the only archaeological features they identified were two World War II era bunkers. The concerned citizen informed them that the sites of the bunkers are where fishing shrines and/or fishing lookouts had been. They were also informed that burials were on the ridge, however, due to the exposed bedrock Kawachi and Smith suggested burials in the bedrock would not be possible. They concluded any burials would likely be held within caves.

5.4.6 Kawachi and Smith 1990

In 1990, Kawachi and Smith were notified of human skeletal remains (SIHP # -4222) identified during excavation for a pool. These remains were removed and stored at the State facility. The *iwi* (bones) associated with SIHP # -4222 were observed within natural marine sand. Kawachi and Smith (1990) noted no soils were encountered during the excavation and that the sand is white and very fine grained.

5.4.7 Dye 1991

In 1991, Dye was contacted and notified of human burial remains (SIHP # -3738) in sand during excavation for a house footing at TMK: [1] 4-3-004:005. Dye instructed workers to leave the remains in place and to re-cover them with sand. The next day Dye visited the site and after consultation with the O'ahu Island Burial Council (OIBC), house architect, and owner it was determined to move the burial remains. Dye noted the burial had been in a flexed position in clean white marine sand. The remains were moved to the Historic Preservation Division.

5.4.8 Hammatt and Shideler 1992

In 1991, in coordination with the contractor, SHPD, and the OIBC, three burials were removed from a construction site at TMK: [1] 4-3-004:005 Ka'ōhao by CSH. One burial had been previously removed by the SHPD (see Dye 1991). After consultation with SHPD, it was decided to consider these burials as part of SIHP # -3738, designated a previously encountered area of sand burials on the east side of 'A'alapapa Drive (see Bath and Smith 1988). This decision to use the same site number was admittedly somewhat arbitrary but was based on the probability of other burials remaining between the burial area described by Bath and Smith and the area of this study, and also because of the probability of close relatedness between these sets of prehistoric Hawaiian remains.

5.4.9 Cleghorn 1997

In 1997, Cleghorn reported human skeletal remains were inadvertently discovered on 7 January 1997, in a hand-excavated trench at 159 Ku'ukama Street, approximately 140 m (0.9 miles) from the current project area. The remains were determined to represent at least one adult individual. While archaeological evidence was lacking to determine the burial's ethnicity, archival research suggested the remains were likely Native Hawaiian and older than 50 years. The remains were assigned SIHP # -5530.

5.4.10 Ormsby et al. 2003

In 2003, Ormsby et al. reported on archaeological monitoring conducted between 14 December 1999 and 29 August 2000 for the Kalāheo Avenue Sewer project, approximately 222 m (0.14 miles) from the current project area. They reported no human remains or cultural resource sites were encountered during the course of monitoring.

5.4.11 Fong et al. 2008

In 2008, Fong et al. reported on archaeological monitoring conducted between May 2005 and March 2007 for the Kalāheo Avenue Reconstructed Sewer project, immediately adjacent to the northeast border of the current project area. Historically significant finds included several historic

glass bottles, cultural sediments, a charcoal accumulation associated with a cultural layer, and a possible hearth. No human skeletal remains were encountered during the course of monitoring.

5.4.12 Tulchin and Hammatt 2009

In 2009, CSH archaeologists conducted an inventory survey for the renovation of an existing residential building. Associated ground disturbance was limited to the rerouting of an existing subsurface electric line. This involved the excavation of a single trench connecting a HECO utility box to a new electric meter and utility box located at the eastern end of an existing residential building. A hearth (SIHP # -7054) was identified in natural Jaucas sand and determined to be of pre-Contact origin and associated with the former indigenous Hawaiian habitation of the Ka'ōhao area, utilized specifically for food preparation.

5.4.13 Groza and Hammatt 2010

In 2008 and 2009, CSH archaeologists monitored for the Wana'ao Road/Keolu Drive Reconstructed Sewer (Job No. W2-06) project, Kailua Ahupua'a, TMKs: [1] 4-2-001, 002. No historic properties were identified as a result of the project's monitoring program. Disturbance to the project area's subsurface deposits is the result of filling and reconfiguring Ka'elepulu Pond prior to the construction of the Enchanted Lakes subdivision during the early 1960s. Subsurface stratigraphy shows evidence of extensive earthmoving activities and importation of fill sediments into the project area. The project area's subsurface deposits were also disturbed during previous utility installation.

5.4.14 Groza et al. 2010

In 2007 and 2008, CSH archaeologists monitored the Mōkulua Drive 8-inch Water Main, Part II project, Kailua Ahupua'a, TMKs: [1] 4-2-002, 4-3-001, 003– 009. Two sets of inadvertently discovered human remains were encountered during subsurface excavations associated with this project. The first set of remains (SIHP # -6937) was encountered during excavation fronting 971 Mōkulua Drive near the intersection with Kaiolena Drive (TMK: [1] 4-3-007:014). The second set of remains (SIHP # -7032) was encountered during excavation fronting 122 Lanipō Drive near the intersection with 'A'alapapa Drive (TMK: [1] 4-3-003:056). A cultural layer (SIHP # -6967) was also observed during monitoring. Findings within the cultural layer included a possible *'ulu maika* (game stone), a possible sling stone, a grinding stone, 15 fire pit features, and one historic trash pit.

5.4.15 Wilson and Spear 2011

In 2010, Scientific Consultant Services, Inc. archaeologists conducted an inventory survey for a residential property at TMKs: [1] 4-3-05:077–086. No historic properties were identified. Wilson and Spear noted there is only about a 20-cm thick layer of sediment above the bedrock in the upslope areas. Due to negative historic properties findings, the archaeological inventory survey (AIS) results were presented in an archaeological assessment (AA) report.

5.4.16 Hammatt and Shideler 2012

In 2012, CSH conducted a literature review and field inspection for the current project encompassing nearly all of Kailua Beach Park east of Ka'elepulu Stream. No surface archaeological historic properties were identified. However, as Kailua has been a place of

habitation for nearly a thousand years, and due to the proximity of burial finds in the area, archaeological monitoring and/or an inventory survey were recommended.

5.4.17 Lance and Hammatt 2012

In 2011, CSH archaeologists conducted an inventory survey for the Rosenberg Residence at 211 S. Kalāheo Avenue, Kailua Ahupua'a, TMK: [1] 4-3-014:010. The observed and documented stratigraphy consisted of modern A horizon/graded sand layer overlying naturally deposited Jaucas sand. No historic properties were identified. Due to negative historic properties findings, the AIS results were presented in an AA report.

5.4.18 Kahahane and Cleghorn 2015

In 2015, Pacific Legacy archaeologists conducted an inventory survey for a proposed pool located at 1055 Ko'oho'ō Place in Ka'ōhao/Lanikai, Kailua Ahupua'a, TMK: [1] 4-3-006:099. Observed and documented stratigraphy consisted of clay loam that contains modern construction debris overlying three layers of natural clay loam and clay. No historic properties were identified. Due to negative historic properties findings, the AIS results were presented in an AA report.

5.4.19 Rice and Hammatt 2016

In 2016, CSH conducted an inventory survey for the Lanikai Elementary School Cafeteria project. Three test excavations were conducted. Observed stratigraphy consisted of imported sand fill, imported landscape fill, reworked natural Ewa silty clay loam, natural in situ Ewa silty clay loam, and decomposing coral shelf. No historic properties were identified. Due to negative historic properties findings, the AIS results were presented in an AA report.

5.5 Background Summary and Predictive Model

During the estimated 1,500 years since initial Polynesian settlement, the sand barrier that forms the shore at Kailua Bay has provided a desirable habitation location with its sunny, dry beach area.

Previous archaeological research has revealed six inadvertent finds of human skeletal remains within Ka'ōhao/Lanikai and more than 15 reports of inadvertent finds of human skeletal remains from the sand berm of Kailua. As with other near-shore sandy areas in Hawai'i, this portion of Kailua was used for burial of the dead. Previous archaeological research documents pre-Contact subsurface cultural deposits in the general vicinity of the project area.

Based on background research, expected finds might include evidence of both indigenous Hawaiian occupation (habitation and burial) and historic ranching and habitation. Evidence of traditional Hawaiian land use could include subsurface cultural deposits containing midden, fire pits, artifacts, and/or human burials.

Section 6 Results of Fieldwork

CSH completed the fieldwork component of this AIS under archaeological fieldwork permit number 17-08 issued by the SHPD pursuant to HAR §13-282. Fieldwork was conducted between 15 May 2017 and 17 May 2017 by CSH archaeologists Douglas Borthwick, B.A. (project manager), Michelle Pammer, B.A. (project director), Sara Blahut, M.A., Jesse Davis, B.A., and Jason Richards, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).

Fieldwork consisted of an initial 100% coverage pedestrian inspection within the study area in order to locate any surface historic properties. The pedestrian survey was accomplished through systematic sweeps spaced 5 m apart. No surface historic properties were observed and therefore historic property identification efforts focused on the identification of subsurface cultural deposits through a subsurface testing program.

Four test trenches were excavated, documented, sampled, and subsequently backfilled (Figure 31). These four test excavations were placed to target proposed ground disturbing activity related to drainage improvements along Alāla Road. The following paragraphs provide an overview and summary of the backhoe testing results. For detailed information regarding each of the test excavations, please refer to the excavation profiles, sediment descriptions, and photographs that follow this more general summary discussion.

6.1 Stratigraphic Summary

Stratigraphic documentation for excavations included the production of detailed stratigraphic profile maps, the completion of USDA soil description observations for each stratum, and the sequential designation of each stratum using roman numerals (i.e., Strata I, II, III, etc.) with sub-designations (i.e., Strata Ia, Ib, Ic, etc.) used for sequential deposits, primarily in reference to successive fill layers.

In general, the observed stratigraphy consisted of fill sediments, overlying naturally deposited alluvial clay, atop naturally deposited Jaucas sand. Fill layers were designated Stratum I, which was subdivided into sub-strata based on differences in matrix, soil color, and texture. Stratum II was used most often for the naturally deposited alluvial sediments, and Stratum III was used for naturally deposited Jaucas sand. The observed stratigraphy was consistent with USGS soil survey data for the project area (see Figure 5).

One newly identified historic property was observed during the current AIS: SIHP # -8166. SIHP # -8166 consists of a subsurface cultural deposit consisting of a single feature of potentially late pre-contact to post-contact origin containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. See Section 8 for a full description of SIHP # -8166.

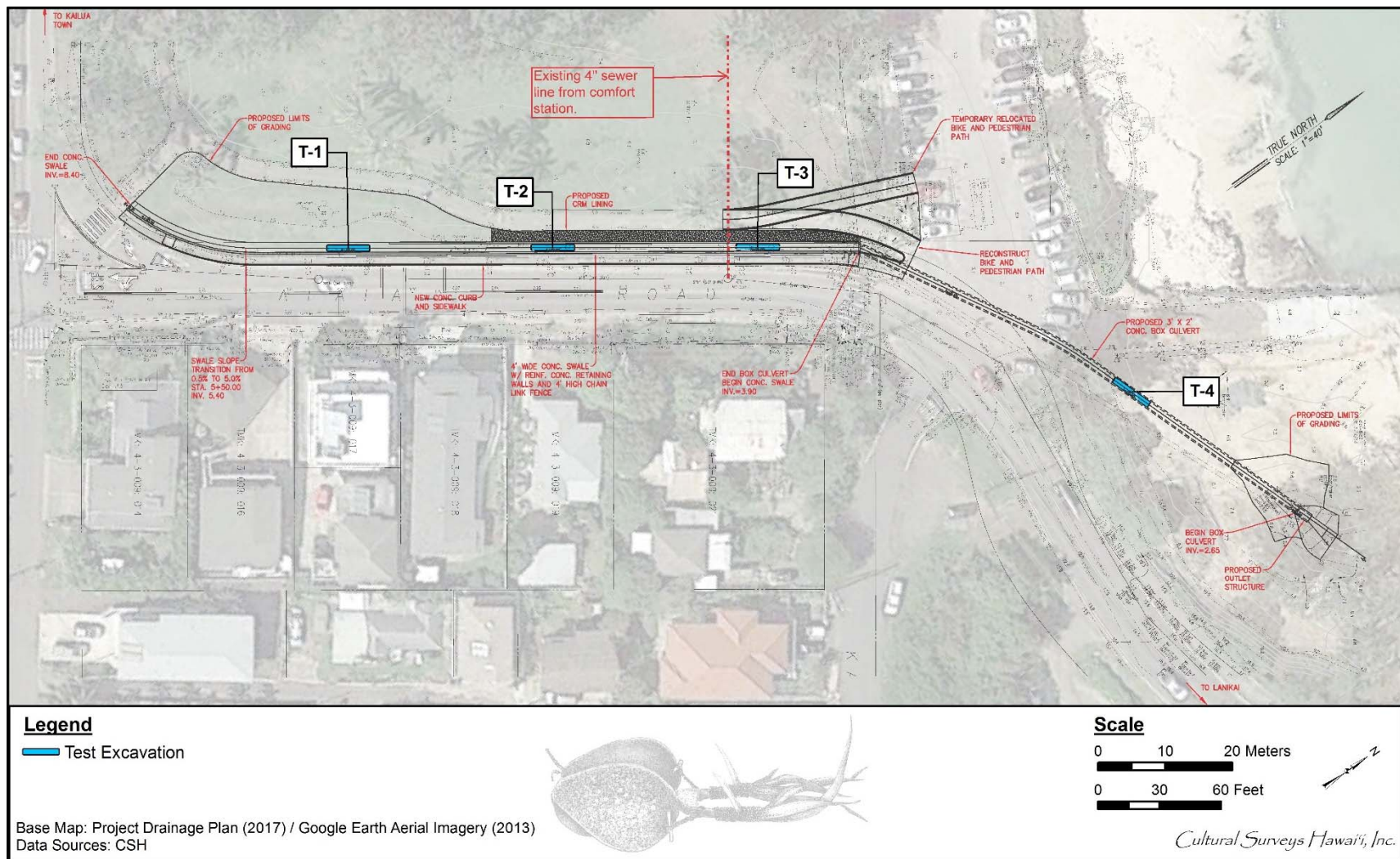


Figure 31. Aerial photograph overlaid with client project plans and test excavation locations

6.2 Test Excavation Results

6.2.1 Test Excavation 1 (T-1)

Test Excavation 1 (T-1) is located within the east end of Kailua Beach Park, parallel to Alāla Road, approximately 40 m northeast of the intersection of Alāla Road and Kawaialoa Road. T-1 is oriented in a northeast/southwest direction, and measures 6.0 m long, 0.60 m wide, with a maximum depth of 2.20 mbs. T-1 is placed to target proposed ground disturbing activity for drainage improvements along Alāla Road. The proposed maximum depth for improvements at this location is 6.5 ft (1.98 m).

Stratigraphy observed within T-1 consists of loamy sand landscaping fill (Stratum Ia), sandy loam fill containing modern glass fragments (Stratum Ib), sandy clay loam fill containing coral gravel (Stratum Ic), and sandy loam fill containing oxidized basalt gravel (Stratum Id), overlying naturally deposited silty clay (Stratum II), Jaucas sand (Stratum IIIa), light greenish gray gleyed sand (Stratum IIIb), and greenish gray gleyed sand (Stratum IIIc) (Figure 32, Figure 33, and Table 3). The water table was encountered at 1.95 mbs.

The observed stratigraphy is consistent with USGS soil survey data depicting Jaucas sands (JaC) (Stratum III) across much of the project area (see Figure 5). Historic accounts describe the project area as low lying, prone to flooding, and at times underwater. Therefore Stratum II may represent alluvial deposition from Kokokahi very stony clay (KTKE), present on the upslopes to the east of T-1. The various fills comprising Stratum I are likely associated with twentieth century development in the area including raising and leveling the land surface for Kawailoa and Alāla roads, Camp Kailua, and Kailua Beach Park.

One piece of faunal osseous material identified as pig (*Sus scrofa*) was observed and collected from within Stratum IIIa. Bulk samples were collected for Strata II and IIIa, to be wet-screened for content in the lab. No other cultural material was observed.



Figure 32. Photograph of T-1 northwest sidewall, view to west

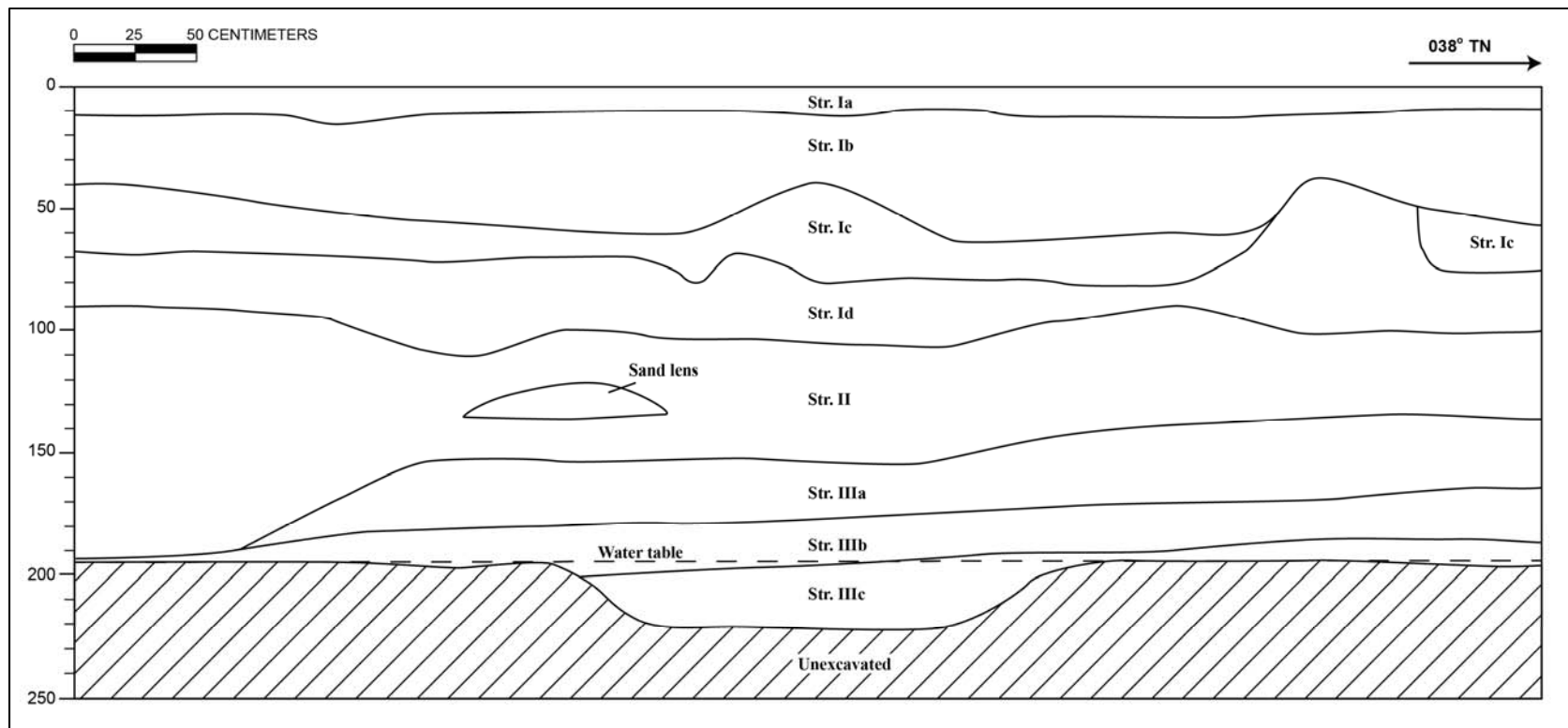


Figure 33. Profile of T-1 northwest sidewall

Table 3. Stratigraphic description of T-1

Stratum	Depth (cmbs)	Description
Ia	0–15	Fill; 7.5YR 3/3, dark brown; loamy sand; weak, fine, granular structure; moist, loose consistence; no cementation; non-plastic; terrigenous origin; clear, smooth, lower boundary; many fine roots; landscaping soil associated with current grass surface
Ib	10–65	Fill; 10YR 4/2, dark grayish brown; sandy loam; weak, fine, granular structure; moist, loose consistence; no cementation; non-plastic; mixed origin; clear, smooth lower boundary; few fine roots
Ic	40–82	Fill; 10YR 3/2, very dark grayish brown; sandy clay loam; moderate, medium, block structure; moist; friable consistence; no cementation; plastic; mixed origin; clear, smooth lower boundary; no roots observed
Id	39–110	Fill; 7.4YR 4/3, brown; gravelly, sandy clay loam; moderate, medium, block structure; moist; friable consistence; no cementation; slightly plastic; mixed origin; clear, smooth lower boundary; no roots observed
II	90–195	Natural; 10YR 3/3, dark brown; silty clay; massive (structureless); moist, firm consistence; no cementation; plastic; terrigenous origin; clear, discontinuous lower boundary; no roots observed, naturally deposited clay
IIIa	135–195	Natural; 10YR 8/2, very pale brown; extremely stony, sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; marine origin; clear, smooth lower boundary; no roots observed; naturally deposited Jaucas sand
IIIb	165–200	Natural; GLEY 10Y 7/1, light greenish gray; sand; single grain (structureless); wet, non-sticky consistence; no cementation; non-plastic; marine origin; clear, smooth lower boundary; no roots observed
IIIc	185–220 (BOE)	Natural; GLEY 10GY 5/1, greenish gray; sand; single grain (structureless); wet, non-sticky consistence; no cementation; non-plastic; marine origin; clear, lower boundary not visible; no roots observed

6.2.2 Test Excavation 2 (T-2)

Test Excavation 2 (T-2) is located within the east end of Kailua Beach Park, parallel to Alāla Road, approximately 25 m northeast of T-1. T-2 is oriented in a northeast/northwest direction and measures 6.0 m long by 0.60 m wide with a maximum depth of 1.75 mbs. T-2 is placed to target proposed ground disturbing activity for drainage improvements along Alāla Road. The proposed maximum depth for improvements at this location is 4.5 ft (1.37 m).

Stratigraphy observed within T-2 consists of sandy clay loam fill (Stratum I), overlying a silty clay alluvium deposit (Stratum II), overlying naturally deposited Jaucas sand (Stratum III) (Figure 34, Figure 35, and Table 4). The water table was encountered at 1.75 mbs.

The observed stratigraphy is consistent with USGS soil survey data depicting Jaucas sands (JaC) (Stratum III) across much of the project area (see Figure 5). Historic accounts describe the project area as low lying, prone to flooding, and at times underwater. Therefore Stratum II is may represent alluvial deposition from Kokokahi very stony clay (KTKE), present on the upslopes to the east of T-2. Stratum I is likely associated with twentieth century development in the area including raising and leveling the land surface for Kawailoa and Alāla roads, Camp Kailua, and Kailua Beach Park. Recent glass beer bottles (e.g., Lowenbrau and Michelob) and other modern trash were observed within Stratum I.

SIHP # -8166, Feature 1 was identified within the southwest end of T-2 originating at the transition between Stratum II and Stratum III (0.95 mbs) and terminating within Stratum III at a depth of 1.70 mbs. The observed portion of the feature was 1.10 m in length and continued into the southwest sidewall. Fifteen gallons of sediment were screened in the field. One charcoal sample taken directly from the sidewall was collected and three bulk samples were collected from discrete locations within the sidewall (Figure 35) for analysis in the lab. Feature 1 contained charcoal, few basalt and coral cobbles, faunal material, and shell midden.

Three charcoal samples from SIHP # -8166, Feature 1 were sent to Jennifer Huebert, Ph.D. at IARII for wood taxa identification. Results indicated the samples to be in poor condition and only two genera could be identified: *Acacia* and *Syzygium*. Both genera include native and historically introduced long-lived species, therefore it was determined not to submit the samples for radiocarbon dating.



Figure 34. Photograph of T-2 southeast sidewall, view to east, Feature 1 in lower right

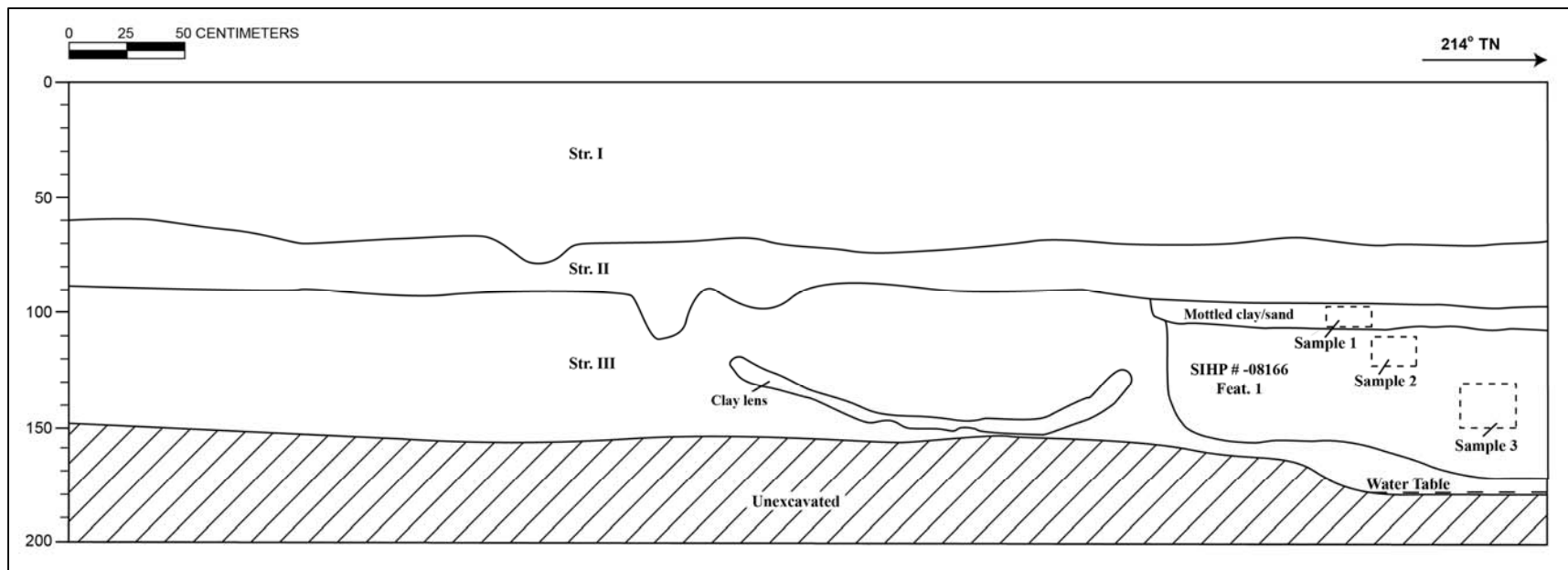


Figure 35. Profile of T-2 southeast sidewall

Table 4. Stratigraphic description of T-2

Stratum	Depth (cmbs)	Description
I	0–80	Fill; 10YR 3/2, very dark grayish brown; sandy clay loam; weak, medium granular structure; moist, loose consistence; no cementation; plastic; mixed origin; clear, smooth lower boundary; few fine roots; modern trash (beer bottles) observed
II	60–110	Natural; 2.5Y 4/2, dark grayish brown; silty clay; massive (structureless); no cementation; very plastic; terrigenous origin; diffuse, wavy lower boundary, no roots observed; naturally deposited clay
SIHP # -8166, Fea. 1	92–170	SIHP # -8166; 2.5Y 5/2, grayish brown; sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; mixed origin; clear, irregular boundary; no roots observed; contains charcoal flecking, faunal, and shell midden
III	85–150 (BOE)	Natural; 2.5Y 7/2, light gray; sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; marine origin; lower boundary not visible; no root observed; natural Jaucas sand

6.2.3 Test Excavation 3 (T-3)

Test Excavation 3 (T-3) is located within the east end of Kailua Beach Park, parallel to Alāla Road, approximately 25 m northeast of T-2 within the current drainage channel. T-3 is oriented in a northeast/northwest direction and measures 5.5 m long by 0.60 m wide with a maximum depth of 1.54 mbs. T-2 is placed to target proposed ground disturbing activity associated with drainage improvements along Alāla Road. The proposed maximum depth for improvements at this location is 4.5 ft (1.37 m).

Stratigraphy observed within T-3 consists of sandy runoff sediment (Stratum Ia), and sandy loam fill (Stratum Ib), overlying naturally deposited silty clay loam with basalt boulder inclusions (Stratum II) and naturally deposited Jaucas sand (Stratum III) (Figure 36, Figure 37, and Table 5). The water table was encountered at 1.50 mbs. No cultural material was observed and no samples were taken.

The observed stratigraphy is consistent with USGS soil survey data depicting Jaucas sands (JaC) (Stratum III) across much of the project area (see Figure 5). Kokokahi very stony clay (KTKE) is depicted as present on the upslope directly east of T-3, and appears consistent with Stratum II. Stratum Ib is likely associated with twentieth century development in the area including raising and leveling the land surface for Kawaihoa and Alāla roads, Camp Kailua, and Kailua Beach Park. Stratum Ia is the current surface of accumulated runoff sediment within the drainage channel.

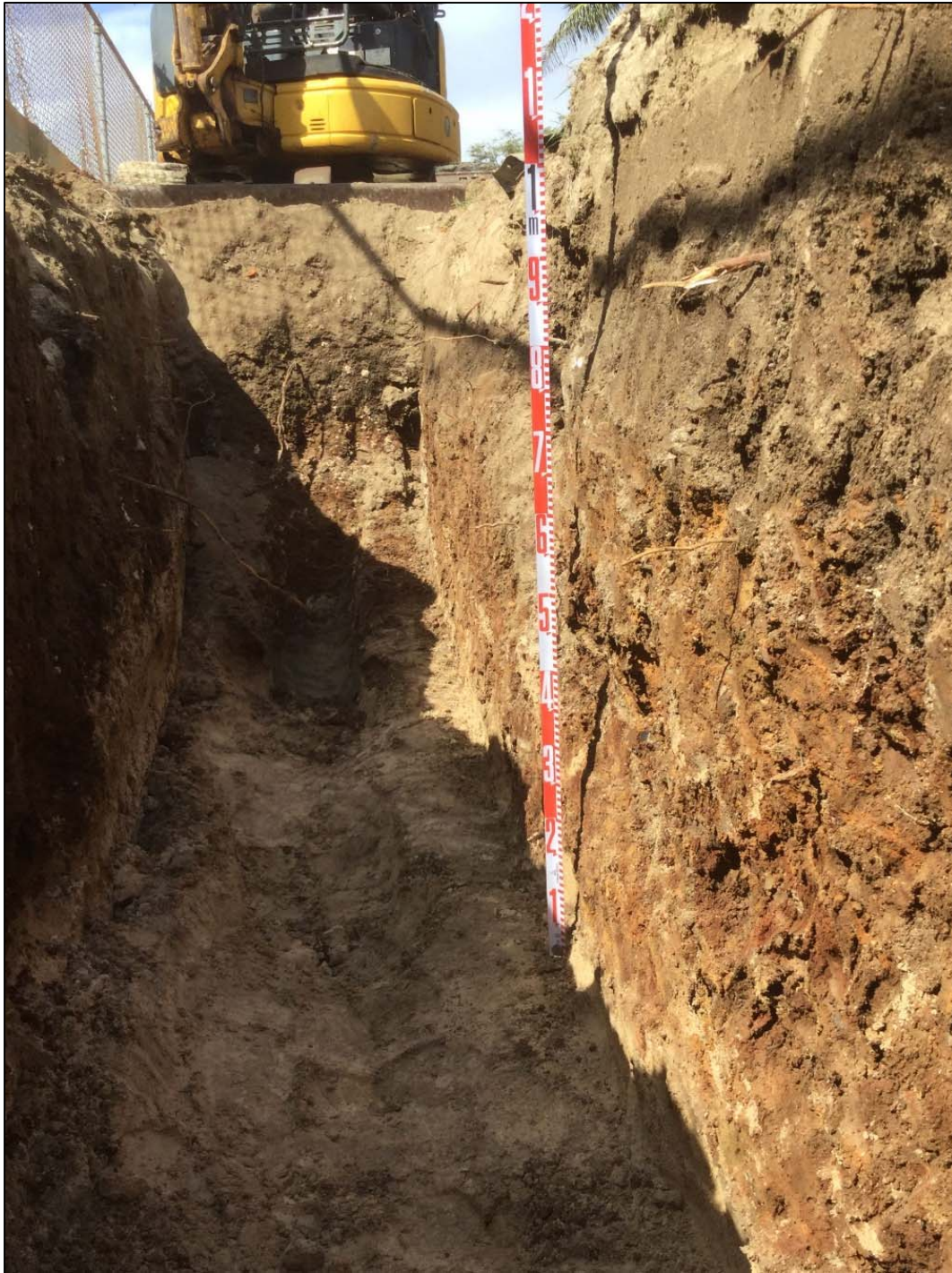


Figure 36. Photograph of T-3 northwest sidewall, view to west

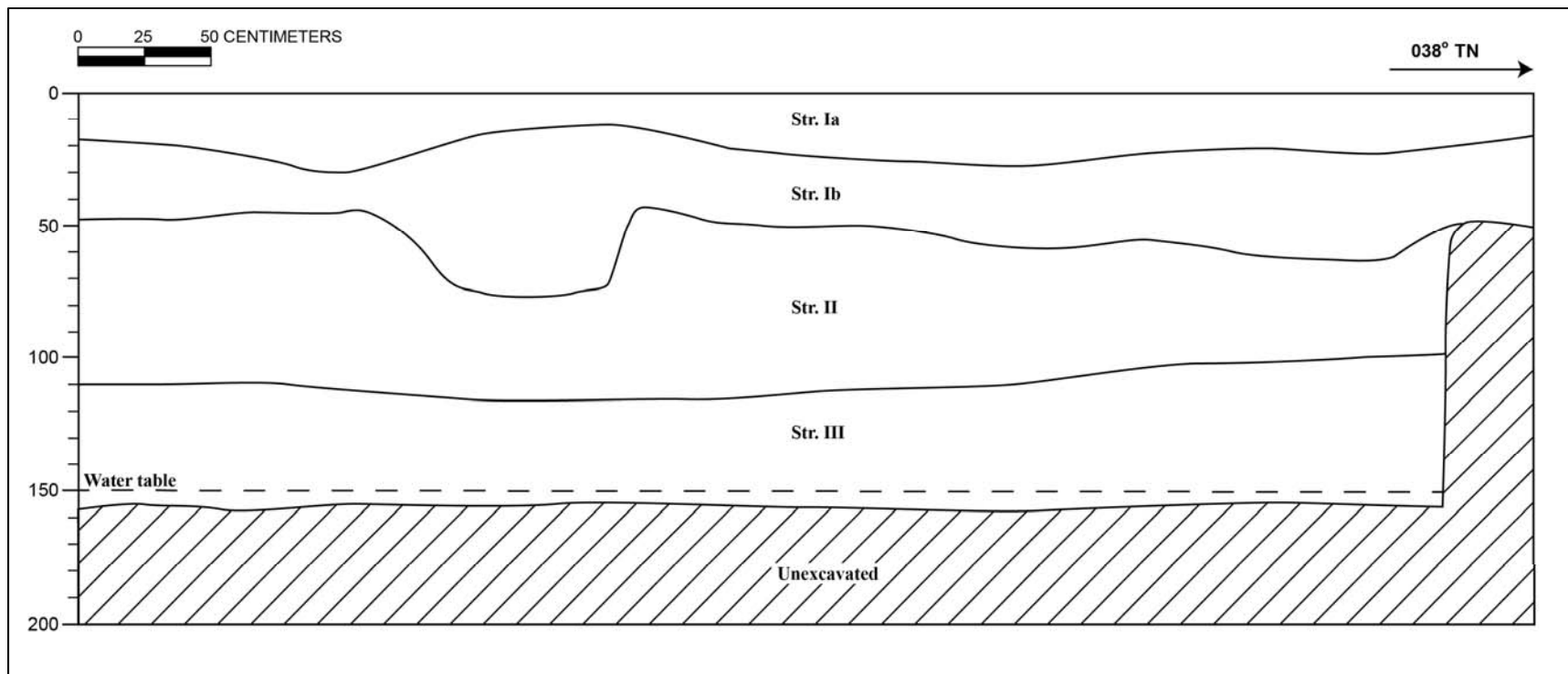


Figure 37. Profile of T-3 northwest sidewall

Table 5. Stratigraphic description of T-3

Stratum	Depth (cmbs)	Description
Ia	0–30	Fill; 10YR 6/3, pale brown; sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; mixed origin; abrupt, smooth lower boundary; few fine roots; accumulated sand runoff within drainage channel
Ib	12–77	Fill; 10YR 4/2, dark grayish brown; loamy sand; weak, very fine granular structure; moist, friable consistence; no cementation; non-plastic; mixed origin; abrupt, smooth lower boundary; few medium roots
II	42–117	Natural; 7.5YR 3/3, dark brown; cobbly, silty clay loam; moderate, fine blocky structure; moist, firm consistence; no cementation; plastic; terrigenous origin; abrupt, smooth lower boundary; few medium roots; naturally deposited colluvium
III	98–154 (BOE)	Natural; 10YR 8/1, white; sand; single grain (structureless); wet, non-sticky consistence; no cementation; non-plastic; marine origin; lower boundary not visible; no roots observed; natural Jaucas sand

6.2.4 Test Excavation 4 (T-4)

Test Excavation 4 (T-4) is located near the boat ramp at the eastern end of Kailua Beach Park within the sandy parking area. T-4 is oriented in an approximate east/west direction and measures 6.0 m long by 0.65 m wide with a maximum depth of 2.05 mbs. T-4 is placed to target drainage improvements for the park. The proposed maximum depth for improvements at this location is 2.43 m (8 ft).

Stratigraphy observed within T-4 consists of a compacted sand layer (Stratum Ia), loamy sand fill (Stratum Ib), a disturbed sand fill (Stratum Ic), and an imported sandy clay loam (Stratum Id), overlying naturally deposited Jaucas sand (Stratum IIa) and natural gleyed sand (Stratum IIb) (Figure 38, Figure 39, and Table 6). The water table was encountered during a probe at 2.0 mbs. One artifact, a corkscrew picket (Acc. # 003), was observed within Stratum IIa and collected. No other cultural material was observed and no samples were taken.

USGS soil survey data shows Kokokahi very stony clay (KTKE) at the location of T-4 (see Figure 5). While a natural clay layer was not observed, Jaucas sands (JaC) and Beaches (BS) are also shown to be within close proximity to T-4 and are consistent with Stratum II. Stratum I is likely associated with twentieth century development in the area including raising and leveling the land surface for Alāla Road/Mokulua Drive and the parking lot for the Kailua Beach Park boat ramp. Stratum Ic consists of a disturbed sand fill likely associated with the installation of the current drainage infrastructure (Figure 40). Stratum Ia is the current compacted sand surface of the Kailua Beach Park boat ramp parking lot.

T-4 was planned to extend to a depth of 2.43 m (8ft), the proposed depth of construction excavations for this area, but safety concerns due to unstable and collapsing sidewalls made this impossible. The excavation did extend more than a meter into clean, natural sediment and terminated just above the water table. Therefore no cultural material below the base of excavation would be expected.



Figure 38. Photograph of T-4 south sidewall at 85 cmbs, view to west

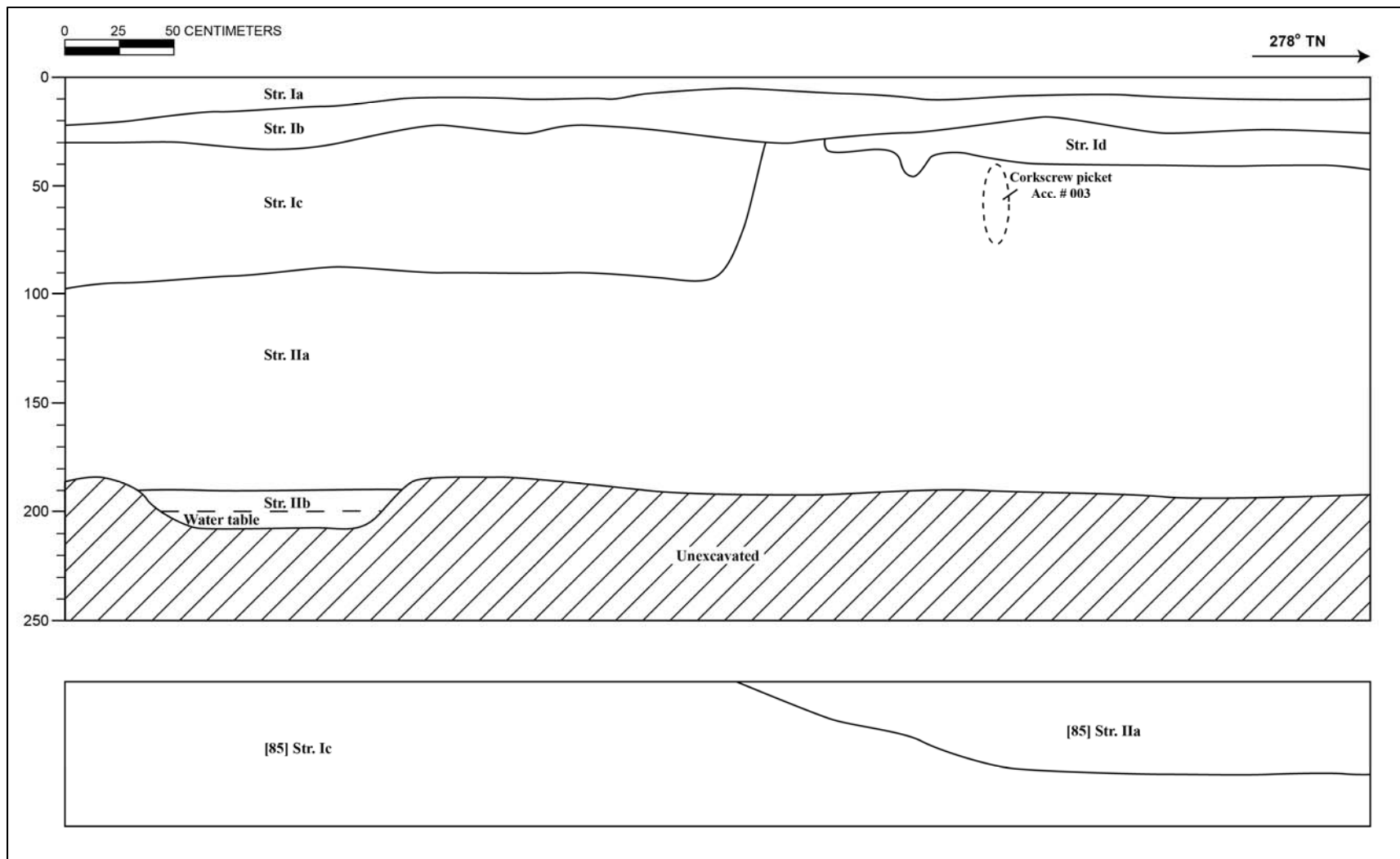


Figure 39. Profile of T-4 south sidewall and plan view at 85 cmbs

Table 6. Stratigraphic description of T-4

Stratum	Depth (cmbs)	Description
Ia	0–21	Fill; 10YR 4/3, brown; gravelly, loamy sand; weak, medium granular structure; moist, loose consistence; no cementation; non-plastic; mixed origin; clear, smooth lower boundary; few fine roots; current surface
Ib	5–28	Fill; 10YR 3/6, dark yellowish brown; loamy sand; weak, very fine granular structure; moist, loose consistence; no cementation; non-plastic; mixed origin; clear, wavy lower boundary; few fine roots
Ic	22–95	Fill; 10YR 6/4, light yellowish brown; sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; marine origin; clear, smooth lower boundary; few coarse roots
Id	18–45	Fill; 7.5YR 3/4, dark brown; gravelly, clay loam; moderate, fine blocky structure; moist, friable consistence; no cementation; plastic; terrigenous origin; clear, discontinuous lower boundary; few medium roots
IIa	28–190	Natural; 10YR 6/3, pale brown; sand; single grain (structureless); moist, loose consistence; no cementation; non-plastic; marine origin; clear, smooth lower boundary; few medium roots; natural Jaucas sand
IIb	190–207 (BOE)	Natural; GLEY 10B 3/1, very dark greenish gray; sand; single grain (structureless); wet, non-sticky consistence; no cementation; non-plastic; marine origin; lower boundary not visible; no roots observed



Figure 40. T-4 Plan view, showing disturbance likely associated with installation of current drainage

Section 7 Results of Laboratory Analysis

7.1 Artifact Analysis

Archaeologists collected one historic artifact (Acc. # 003) during the AIS for the Kawaihoa Road Drainage Improvements project. The artifact is the base of a corkscrew picket and was collected from Stratum IIIa within T-4. The artifact is described below and depicted in Figure 41.

Corkscrew pickets were introduced in 1915 and used during World War I and World War II as supports for barbed wire defenses. They replaced traditional timber posts driven into the ground with a mallet. Corkscrew pickets have been called “silent pickets” because the bottom of the steel rod was bent into a coil spiral which allowed the picket to be twisted into the ground quietly without attracting the enemy’s attention. Barbed wire was strung through, or secured with binding wire to, the loops at the top of the steel rod to form a defensive wire barrier to protect soldiers in the trenches (Army War College 1917:62 and 74). In Hawai‘i, corkscrew pickets were utilized along the beaches during World War II to protect against invaders. A historic photograph (Figure 42) shows an example of the pickets in action along Waikīkī during World War II.

The artifact collected in the field is incomplete, consisting only of the coil spiral from the bottom of a corkscrew picket. The loops at the top of the steel rod, used for barbed wire holds, are missing. The pickets were screwed into the ground 2 ft deep or more (Army War College 1917:74). The artifact collected from T-4 is 38 cm (1 ft 3 ¼ inches) long and weighs 1107.5 g (2.4 pounds).



Figure 41. Base of corkscrew picket (Acc. # 003) collected from T-4, Stratum IIIa



Figure 42. Corkscrew pickets (left of photo) along Waikīkī Beach during World War II (reprinted Fleck 2012)

7.2 Sediment Sample Analysis

Five bulk samples were collected during the Kawailoa Road Drainage Improvements inventory survey. All samples were screened for content at the CSH laboratory located in Waimānalo. Wet-screening was used as necessary. Bulk sample screening results are presented in Table 7. Midden analysis is presented in Table 8. Collected charcoal samples are presented in Table 9.

7.2.1 Bulk Samples

Table 7. Bulk sample screening results

Provenience	Depth (cmbs)	Volume (L)	Description
T-1, Str. II	110-150	2	Rootlets, brackish water snails
T-1, Str. IIIa	160-170	2	Non-midden marine shell
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 1	97-106	2	Charcoal flecking, rootlets, brackish water snails
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 2	110-122	2	Charcoal, shell midden
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 3	130-150	2	Charcoal, shell midden

7.2.2 Midden Analysis

Table 8. Summary of sorted midden

Provenience	Depth (cmbs)	Material	Description
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 2	110-122	Shell	<i>Theodoxus neglectus</i> (>0.1g) Conidae (1.0g) Cypraeidae (1.1g) Unidentified (1.1g)
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 3	130-150	Shell	Tellinidae (1.4g) Pinnidae (6.3g)

7.2.3 Charcoal Samples

Table 9. Summary of charcoal

Provenience	Depth (cmbs)	Description
T-2, Str. III, SIHP # -8166, Fea. 1	107-117	Charcoal, collected from sidewall
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 2	110-122	Charcoal, collected from screening of bulk sample in lab
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 3	130-150	Charcoal, collected from screening of bulk sample in lab

7.3 Wood Taxa Analysis

Three charcoal samples were sent to Jennifer Huebert, Ph.D. at IARII for wood taxa identification (Table 10). The full charcoal report (Huebert 2017) is presented in Appendix B. Charcoal samples were selected from SIHP # -8166, Feature 1 from discrete locations within the excavation sidewall.

Analysis indicated the charcoal samples were small and in a condition indicative of repeated wetting and drying or being waterlogged and then dried. As a result, only two genera could be identified: *Acacia* and *Syzygium*. *Acacia* includes species native to the Hawaiian Islands and those that were historically introduced. *Syzygium* includes native species and both Polynesian and historically introduced species. Other hardwood species and small plant stems were present within the sample but lacked the diagnostic characteristics necessary for identification down to the genus level.

Descriptions of the identified taxa provided with the IARII report are as follows:

LEGUMINOSAE / FABACEAE (Pea family)

Acacia sp. (*koa* and others)

There are two native and four naturalized *Acacia* species found in the Hawaiian Islands. The native *A. koa* is one of the largest endemic trees in Hawai'i, and may attain 35 m in height at higher elevations (Wagner et al. 1990:641-642); its fine wood was used for canoes, paddles, and surfboards (Malo 1951:126, 223). Several of the historic introductions were brought to the islands in the early 1900s, while *A. farnesiana* was probably introduced before the 1860s (Wagner et al. 1990:641-643).

MYRTACEAE (Myrtle family)

Syzygium spp. ('*ohi'a ai*, '*ohia ha*, and others)

Four species of these trees are found on O'ahu. The native *S. sandwicensis* ('*ohi'a hā*) is today restricted to ridges and slopes on Kaua'i, O'ahu, Moloka'i, Lāna'i, and Maui (Wagner et al. 1990:975-976). *S. malaccense* (mountain apple, '*ohi'a ai*) is a Polynesian introduction, known for its apple-like fruits, whose trunks were

formerly used for posts, house rafters and temple enclosures. Idols were also carved from the wood. The bark, flowers, and leaves were used medicinally (Rock 1974:323), and a dye for clothing was extracted from the bark (Buck 1957:187). *S. cumini* (Java plum) and *S. jambos* (rose apple) have naturalized in mesic Hawaiian forests after their introduction prior to 1871 and 1825, respectively. [Heubert 2017:3–4]

As the samples were in poor condition and the only two identifiable genera include both native and historically introduced species, it was determined not to proceed with radiocarbon dating. Following analysis, samples were returned to the CSH laboratory.

Table 10. Identified wood taxa

Provenience	WIDL #	Taxon	Origin/Habit	Part	Weight (g)
T-2, SHIP # -8166, Fea. 1, 107-117 cmbs	1715-1	Indeterminate hardwoods	—	Wood	n/a
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 2, 110-122 cmbs	1715-2	Indeterminate poss. monocot	—	Woody stem	0.43
	1715-3	Indeterminate hardwood	—	Wood	0.03
	1715-4	<i>Acacia</i> sp. (<i>koa</i> and others)	Native and historic introductions/tree	Wood	<0.01
T-2, Str. III, SIHP # -8166, Fea. 1, Sample 3, 130-150 cmbs	1715-5	<i>Syzygium</i> sp. (' <i>ōhi'a</i> 'ai, ' <i>ōhia</i> hā, and others)	Native, Polynesian, and historic introductions/tree	Wood	0.18
	1715-6	Indeterminate poss. monocot	—	Woody stem	<0.01

7.4 Faunal Analysis

Faunal osseous material was collected from two test excavations (T-1 and T-2). The identified faunal remains, as shown in Table 11, consisted of pig (*Sus scrofa*) long bone elements. These faunal materials are indicative of food use. One element (Acc. # 002), a radial shaft portion, has an abraded flat surface on the distal end, likely an eroded remnant butcher mark.

Table 11. Results of faunal analysis

Acc. #	Provenience	Species	Mass (g)	Description
001	T-1; Str. IIa; 170 cmbs	Pig (<i>Sus scrofa</i>)	18.8	Humeral shaft portion
002	T-2; Str. III; Fea. 1; 140 cmbs	Pig (<i>Sus scrofa</i>)	18.8	Radial shaft portion, abraded flat surface on distal end; long bone shaft fragment

Section 8 Historic Property Description

8.1 SIHP # 50-80-11-8166

FORMAL TYPE:	Subsurface cultural deposit
FUNCTION:	Activity area
NUMBER OF FEATURES:	1
AGE:	Late pre-contact to post-contact
TEST EXCAVATIONS:	T-2
TAX MAP KEY:	[1] 4-3-009:001 por. and [1] 4-3-010:084, and 088
LAND JURISDICTION:	City and County of Honolulu
PREVIOUS DOCUMENTATION:	None

One archaeological site was identified within the current project area during this AIS. SIHP # 50-80-11-8166 is a subsurface cultural deposit consisting of a single feature (Feature 1) of potentially late pre-contact to post-contact origin. The distribution of SIHP # -8166 within the project area is depicted on a portion of the 1998 USGS 7.5-minute topographic quadrangle (Figure 43) and a 2013 aerial photograph (Figure 44).

Due to its numerous resources, Kailua Ahupua'a appears to have been a likely area for early and dense Hawaiian habitation. The sand berm of Kailua has a number of reported human burials and previous archaeological research documents pre-Contact subsurface deposits in the general vicinity of the project area. Historic documents show that during the early 1900s, the project area and vicinity was utilized as ranching and grazing lands (see Figure 11). By 1928, development of the area was underway (see Figure 17) and by the mid-twentieth century many of the current road alignments, house lots, and large trees are visible (see Figure 24).

SIHP # -8166, Feature 1 was identified within the southwest end of T-2 extending into Stratum III, natural Jaucas sand, at 0.95 mbs. The upper boundary was disturbed, characterized by mottled clay and sand sediments with heavy charcoal flecking. No intact or remnant associated A horizon was observed. Feature 1 terminated within Stratum III at a depth of 1.70 mbs, just above the water table present at 1.75 mbs. The observed portion of Feature 1 measured 1.10 m in length and continued into the southwest sidewall (Figure 45 and Figure 46).

Fifteen gallons of sediment from SIHP # -8166, Feature 1 were screened in the field. Heavy charcoal flecking was observed, as well as a few basalt and coral cobbles, and two pieces of faunal osseous material, identified as pig (*Sus scrofa*) were collected. One charcoal sample was collected directly from the sidewall at a depth of 1.07-1.17 mbs. Additionally, three bulk samples were collected from discrete locations within the sidewall: the upper boundary of mottled sand and clay (Sample 1), and upper (Sample 2) and lower (Sample 3) samples from the main portion of the feature (see Figure 45). These samples were screened for content at the CSH laboratory in Waimānalo and produced additional charcoal, coral cobbles, and shell midden.



Figure 43. Portion of the 1998 Mokapu USGS 7.5-minute topographic quadrangle showing the location of SIHP # -8166 within the project area

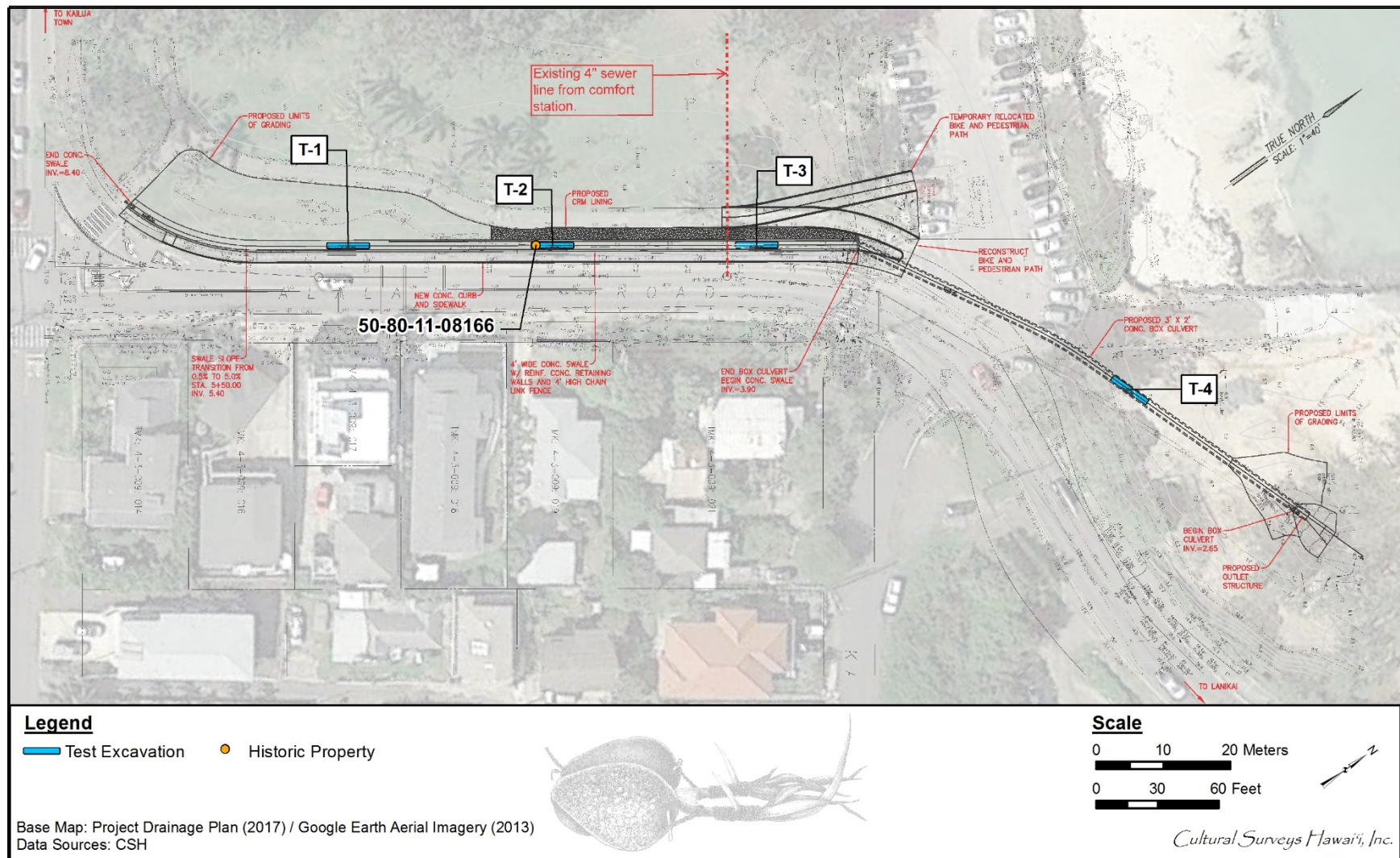


Figure 44. Aerial photograph of the project area, overlaid with client-provided construction plan, showing location of test excavations and the distribution of SIHP # -8166 (Google Earth 2013)

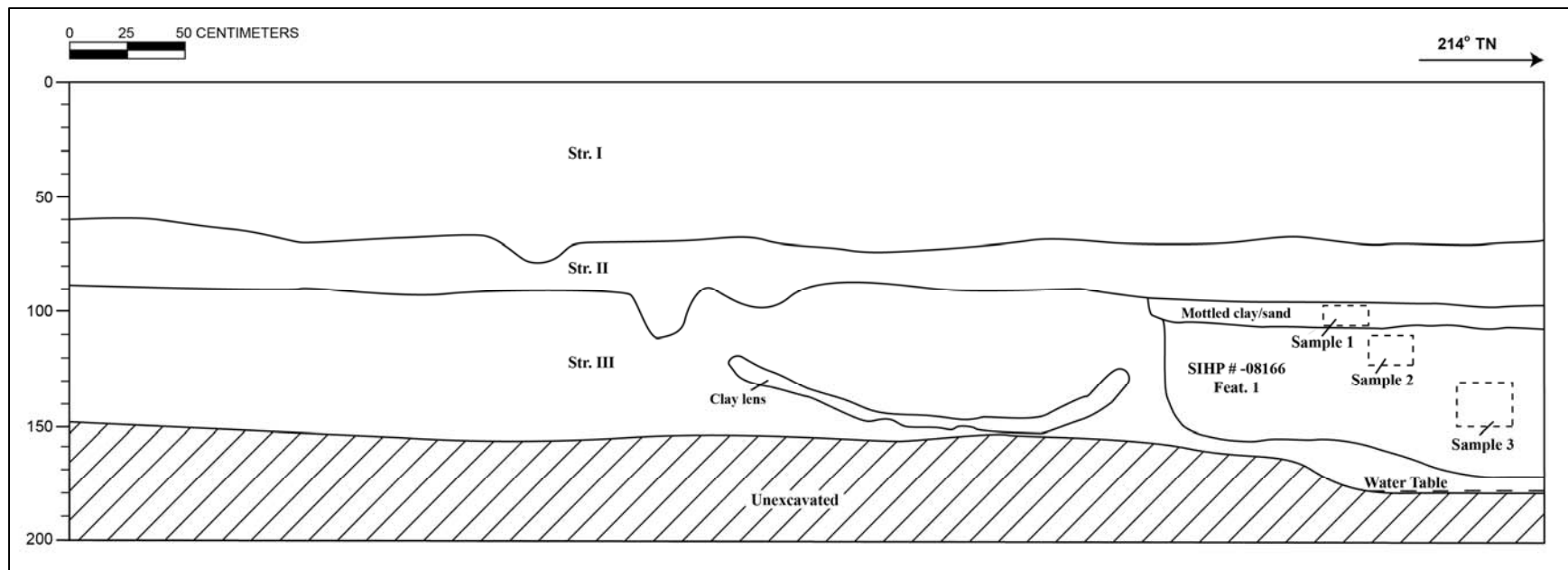


Figure 45. Profile of T-2 southeast sidewall, showing location of SIHP # -8166, Feature 1



Figure 46. Photograph of SIHP # -8166, Feature 1 in southwest end of T-2, view to east

Three charcoal samples were sent to Jennifer Huebert, Ph.D. at IARII for wood taxa identification. Analysis indicated the charcoal samples were small and in a condition indicative of repeated wetting and drying or being waterlogged and then dried. As a result, only two genera could be identified, *Acacia* and *Syzygium*, neither of which could be identified down to the species level. *Acacia* includes species native to the Hawaiian Islands and those that were historically introduced. *Syzygium* includes native species and both Polynesian and historically introduced species. As the samples were in poor condition and the only two identifiable genera include both native and historically introduced long lived species, it was determined not to proceed with radiocarbon dating.

Although no conclusive date range can be given to SIHP # -8166, at a minimum it is believed to be older than 50 years. Prior to modern development, the area was low lying wetlands and sand dunes. This is evident based on 1911 reports of land auction within the project area, "The bidding was spirited and although some of the properties are in low lying places near the seashore and some are under water, every lot was sold" (*Honolulu Commercial Advertiser* 2 May 1911). Development did not occur until the early to mid-twentieth century. A 1949 aerial photograph (see Figure 24) shows established trees in the area, indicating filling had been completed prior to this time frame. As no historic artifacts were observed within SIHP # -8166, it is possible the feature is indicative of traditional Hawaiian land use. The potential to uncover and sample additional features of SIHP # -8166 during project construction would provide more information about this historic property and early land use within the area.

SIHP # -8166 consists of a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. SIHP # -8166 is evaluated as significant pursuant to HAR §13-275-6, Criteria d (have yielded, or is likely to yield, information important for research on prehistory or history). SIHP # -8166 retains integrity of location and materials (Hardesty and Little 2000). This historic property may represent a former activity area and has the potential to offer insight into land use of the area.

Section 9 Summary and Interpretation

At the request of Park Engineering, CSH completed this AIS for the Kawailoa Road Drainage Improvements project, in the traditional Hawaiian land division of Kailua Ahupua'a, Ko'olaupoko District, O'ahu, TMK: [1] 4-3-009:001 por.; 4-3-010:084 and 088. The project area is located along the eastern edge of Kailua Beach Park, including the eastern end of Kawailoa Road, the northern end of Alāla Road, and the western end of Mokulua Drive. It extends *mauka/makai*, parallel to Alāla Road, to the boat ramp along the eastern edge of the beach park.

The proposed improvements to the storm water drainage systems include installing new drainage improvements along Alāla Road and replacing the drain line and outlet to the ocean by the boat ramp. The project also includes grading an earth berm in Kailua Beach Park adjacent to Kawailoa Road.

During the estimated 1,500 years since initial Polynesian settlement, the sand barrier that forms the shore at Kailua Bay has provided a desirable habitation location with its sunny, dry beach area. Previous archaeological research has revealed six inadvertent finds of human skeletal remains within Ka'ōhao/Lanikai and more than 15 reports of inadvertent finds of human skeletal remains from the sand berm of Kailua. As with other near-shore sandy areas in Hawai'i, this portion of Kailua was used for burial of the dead. Previous archaeological research documents pre-Contact subsurface cultural deposits in the general vicinity of the project area.

The subsurface testing program was backhoe assisted and involved four test excavations. In general, linear trenches measuring approximately 6 m (20 ft) long and 0.6 m (2 ft) wide were excavated within the project area. The observed stratigraphy consists of fill sediments, overlying naturally deposited alluvial clay, atop naturally deposited Jaucas sand. Fill layers were designated Stratum I, which was subdivided into sub-strata based on differences in matrix, soil color, and texture. Stratum II was used most often for the naturally deposited alluvial sediments, and Stratum III was used for naturally deposited Jaucas sand. The observed stratigraphy was consistent with USGS soil survey data for the project area.

One newly identified historic property was observed during the current AIS: SIHP # -8166. SIHP # -8166 consists of a subsurface cultural deposit consisting of a single feature of potentially late pre-contact to post-contact origin containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. See Section 8 for a full description of SIHP # -8166.

Section 10 Significance Assessments

Historic property significance is evaluated and assessed based on the five State of Hawai'i historic property significance criteria. To be considered significant, a historic property must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and meet one or more of the following broad cultural/historic significance criteria (in accordance with HAR §13-275-6):

- a. Be associated with events that have made an important contribution to the broad patterns of our history;
- b. Be associated with the lives of persons important in our past;
- c. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value;
- d. Have yielded, or is likely to yield, information important for research on prehistory or history; or
- e. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

One new historic property was identified within the current project area. Table 12 lists the historic property along with the significance/eligibility assessments and mitigation recommendations. These significance recommendations are included in this AISR for the review and concurrence of the SHPD.

SIHP # -8166 consists of a subsurface cultural deposit consisting of a single feature containing charcoal, few basalt and coral cobbles, faunal material, and shell midden. SIHP # -8166 is evaluated as significant pursuant to HAR §13-275-6, Criteria d (have yielded, or is likely to yield, information important for research on prehistory or history). SIHP # -8166 retains integrity of location and materials (Hardesty and Little 2000). This historic property may represent a former activity area and has the potential to offer insight into land use of the area.

Table 12. Archaeological historic property integrity, significance, and mitigation recommendations

SIHP #	Test Excavation	Formal Type/ Description	Integrity							Significance	Mitigation Recommendation
			Location	Design	Setting	Materials	Workmanship	Feeling	Association		
50-80-11-8166	T-2	Subsurface cultural deposit	Y	N	N	Y	N	N	N	d	Archaeological monitoring

Section 11 Project Effect and Mitigation Recommendations

11.1 Project Effect

The proposed project will potentially affect one historic property (SIHP # -8166) identified within the project area. Under Hawai'i State historic preservation review legislation, the project specific effect recommendation is "effect, with proposed mitigation commitments" (in accordance with HAR §13-275-7). The recommended mitigation measures will reduce the project's potential effect on significant historic properties.

11.2 Mitigation Recommendations

This AIS represents a good faith effort to identify and document the historic properties located within the project area. Due to the inherent limitations of any sampling strategy, however, it is likely additional features associated with the historic property identified during this inventory survey, potentially including human burials, will be uncovered during the project's construction.

In order to mitigate adverse impacts to SIHP # -8166, as well as to any additional historic properties that may be present within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification and proper treatment of any future exposures of SIHP # -8166 as well as any other historic properties (burial or non-burial) that may be discovered within the project area. Due to the potential to encounter additional components of SIHP # -8166 as well as the sensitive nature of the Jaucas sand deposits within the project area and the high density of burial finds in the Lanikai and Kailua coastal areas, CSH recommends on-site archaeological monitoring for all ground-disturbing activities within the project area.

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UH SOEST

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Appendix A SHPD 6E-8 Review of LRFI



DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENFORCEMENT
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 24, 2015

David Shideler
Cultural Surveys Hawai'i, Inc.
P.O. Box 1114
Kailua, Hawaii 96734

Dear Mr. Shideler,

**SUBJECT: Chapter 6E-8 Historic Preservation Review –
Archaeological Literature Review and Field Inspection for Kawailoa Road Drainage Project
Kailua Ahupua'a, Ko'olaupoko District, Island of O'ahu
TMK: (1) 4-3-009:001 por. and (1) 4-3-010:084, 087, 088**

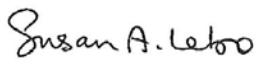
Log No. 2012.3630
Doc. No. 1512KM14
Archaeology

Thank you for the opportunity to review the draft report titled *Archaeological Literature Review and Field Inspection Report for Kawailoa Road Drainage Improvements Project, Kailua Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: (1) 4-3-009:001 por. and (1) 4-3-010:084, 087, 088* (Hammatt and Shideler 2012). We received this submittal on December 13, 2012.

Due to the passage of time, we understand that this project was overtaken by events and that no review is needed. We kindly request receiving a hard copy and a CD labeled **Draft (SHPD Library Copy)** for inclusion in our library.

Please contact me at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,



Susan A. Lebo, PhD
Archaeology Branch Chief

Appendix B Wood Taxa Identification



INTERNATIONAL ARCHAEOLOGICAL RESEARCH INSTITUTE, INC.
ARCHAEOBOTANICAL SERVICES

WIDL1715

ANALYSIS OF CHARCOAL SAMPLES FROM KAILUA 62 (KAILUA BEACH PARK), O'AHU, HAWAII

Jennifer Huebert, IARII

METHODS

Samples were first scanned under a dissecting microscope to determine the range of plant parts present. Next, the freshly fractured transverse, tangential, and radial facets of selected charcoal fragments were examined with an epi-illuminated microscope at magnifications of 50–500X. Small samples (less than approximately 5 g or 20 fragments) were examined in their entirety, while larger samples were split objectively and fragments identified until taxonomic redundancy was achieved. Taxonomic identifications were made by comparing anatomical characteristics with those of woods in the IARII reference collection. Vouchers associated with this collection have been verified and archived at the Department of Botany, University of Hawai'i at Mānoa. Other published references, including books, journal articles, technical documents, and wood atlases, were also consulted.

RESULTS

These samples were small. Many fragments were very fragile and would not produce a good cross-section for examination—a characteristic of charcoal that has been repeatedly wet and dried, or waterlogged for a long time and then dried. Several of the larger pieces were encrusted with sand. Wood from at least two hardwood trees were identified: *Acacia* and *Syzygium*, genera that include both native and introduced species in Hawai'i. Other wood species were noted in the assemblage, although few diagnostic characteristics could be located. Detailed results are presented in the table below. Several small plant stems were also identified. A systematic review of the identified taxa is presented at the end of this report, followed by descriptions of the wood anatomy.

The best choices for radiocarbon dating in this assemblage are the small plant stems in Samples 2 (1715-2) and 3 (1715-6), although the latter is very small and might not produce enough carbon to date. A copy of two useful papers on selecting material for radiocarbon dating in Pacific Island contexts can be provided upon request (Allen and Huebert 2014, Athens and Rieth 2013).

PREHISTORIC & HISTORIC INVESTIGATIONS • CULTURAL RESOURCES ASSESSMENTS & PLANNING • PALEOENVIRONMENTAL STUDIES

HAWAII: 2081 Young Street, Honolulu, Hawai'i 96826-2231 - Tel: (808) 946-2548 - Fax: (808) 943-0716 - E-mail: HonoluluOffice@iaril.org
GUAM: P.O. Box 22621, GMF, Guam 96921 - Tel/Fax: (671) 646-7552 - E-mail: GuamOffice@iaril.org

Of note:

- It is best to choose one fragment, or at least one taxon, for radiocarbon dating. Dating mixtures can be problematic; while radiocarbon labs measure and correct $\delta^{13}\text{C}$ values, there can be large differences in the isotopic fractionation between certain types of plants (C3, C4, and CAM).
- Some small samples are packaged in foil. This was done to prevent minute pieces of charcoal from adhering to the sides of plastic bags.
- The abbreviation "cf." indicates that material resembles the taxon specified, but a secure identification could not be made due to the lack of certain diagnostic features or insufficient reference material. When publishing results, please ensure the designation is reported.
- Indeterminate material was too fragile or warped for taxonomic identification, or derives from small woody herb or fern stems which are rarely diagnostic. I have noted whether material was wood, herbaceous stems, grass stems, etc., whenever possible.
- Materials with distinctive anatomy that could not be securely matched to anything in the reference collection are recorded as numbered "Unknown" taxa (e.g., Unknown hardwood 01). Potential candidates, if any, are described along with the anatomical details later in this report.
- Twigs are defined as small branches under approximately 1 cm diameter with sharply curving rays, pith (or a hollow core), and thin bark or a smooth outer surface that suggests bark has detached. Twigs are not always diagnostic because juvenile wood, formed in the first few years of growth and typically found in twigs but also present near the core and tips of branches, has a simpler structure than mature wood.
- Isolated fragments of charred bark are not often diagnostic. This material is not recommended for dating, as it can be as old as the tree and therefore could have significant inbuilt age.
- Small, isolated lumps of parenchyma are often non-diagnostic. Masses of parenchyma are storage tissues generally found in softer plant structures (i.e., not wood), and are not likely to be very long-lived.

Table 1. Results of charcoal analysis from Kailua 62.

WIDL No.	Taxon	Plant Part & State of Preservation	Weight (g)	Comment
Sample 1: TE2, Fe.1, 107-117 cm bs				
1715-1	Indeterminate hardwoods	Wood charcoal	n/a	Extremely fragile; encrusted with sand; several types present, but none could be diagnosed
Sample 2: TE2, Str.III, Fe.1, 110-122 cm bs				
1715-2	Indeterminate poss. monocot	Woody stem charcoal	0.43	Parenchymous tissue surrounded by thin bark; encrusted with sand
1715-3	Indeterminate hardwood	Wood charcoal	0.03	
1715-4	<i>Acacia</i> sp. (<i>koa</i> and others)	Wood charcoal	<.01	
Sample 3: TE2, Str.III, Fe.1, 130-150 cm bs				
1715-5	<i>Syzygium</i> sp. (' <i>ōhi'a</i> 'ai, ' <i>ōhia</i> hā, and others)	Wood charcoal	0.18	Encrusted with sand
1715-6	Indeterminate poss. monocot	Woody stem charcoal	<.01	Very, very small

TAXA REVIEW

LEGUMINOSAE / FABACEAE (Pea family)

Acacia sp. (*koa* and others)

There are two native and four naturalized *Acacia* species found in the Hawaiian Islands. The native *A. koa* is one of the largest endemic trees in Hawai'i, and may attain 35 m in height at higher elevations (Wagner et al. 1990:641-642); its fine wood was used for canoes, paddles, and surfboards (Malo 1951:126, 223). Several of the historic introductions were brought to the islands in the early 1900s, while *A. farnesiana* was probably introduced before the 1860s (Wagner et al. 1990:641-643).

MYRTACEAE (Myrtle family)

Syzygium spp. ('*ōhi'a* 'ai, '*ōhia* hā, and others)

Four species of these trees are found on O'ahu. The native *S. sandwicensis* ('ōhi'a hā) is today restricted to ridges and slopes on Kaua'i, O'ahu, Moloka'i, Lāna'i, and Maui (Wagner et al. 1990:975-976). *S. malaccense* (mountain apple, 'ōhi'a 'ai) is a Polynesian introduction, known for its apple-like fruits, whose trunks were formerly used for posts, house rafters and temple enclosures. Idols were also carved from the wood. The bark, flowers, and leaves were used medicinally (Rock 1974:323), and a dye for clothing was extracted from the bark (Buck 1957:187). *S. cumini* (Java plum) and *S. jambos* (rose apple) have naturalized in mesic Hawaiian forests after their introduction prior to 1871 and 1825, respectively.

DESCRIPTIONS OF WOOD ANATOMY

Acacia sp.

Large vessels noted in groups of 2-3 with lozenge-shaped axial parenchyma; mostly uniseriate rays ~15 cells tall, all cells procumbent; fibers small with medium-thick walls, very evenly arranged in cross-section; section very smooth and reflective

Syzygium sp.

Vessels ~100 µm dia., solitary or in small groups; axial parenchyma in bands 4-5 cells wide, cells large, banding frequent; fiber walls medium-thick; rays few cells wide, body cells small, uniseriate ends of square and upright cells can be tall, some with rhomboid crystals; intervessel pits alternate, medium sized

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Appendix B

Agency Comments for Draft Final Environmental Assessment and Responses

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluluodpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR



KATHY K. SOKUGAWA
ACTING DIRECTOR

TIMOTHY F. T. HIU
DEPUTY DIRECTOR

August 10, 2017

2017/ELOG-1452 (df)

Mr. Cris T. Takushi, Project Manager
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Dear Mr. Takushi:

This is in response to your July 20, 2017 letter, requesting comments on the pre-assessment for a draft environmental assessment for the Kawaihoa Road Drainage Improvements Project, Kailua, TMK: 4-3-009: 001, 4-3-010, 4-3-010: 084 and 088. Our preliminary comments are as follows:

1. Construction plans for work within the City and County of Honolulu right-of-way shall be submitted to this Department for One-Time Review.
2. The project may require a grading permit.
3. Since the approximate project cost exceeds \$500,000, a Special Management Area Use Permit (SMP) is required. In addition, a shoreline setback variance may be required if any work is located within 40 feet of the shoreline.
4. The Draft Environmental Assessment (DEA) should describe how the proposed project meets the planning principles and guidelines for the Koolau-poko Sustainable Communities Plan and the Oahu General Plan.
5. Be advised that there is an existing Public Infrastructure Map (PIM) Symbol for a park on the identified parcels. The park project is to include a pedestrian pathway system, realignment of the existing bikeway, relocation of the "boat ramp" comfort station and numerous other public improvements.

As such, the Department of Parks and Recreation should be provided the opportunity to review the DEA.

6. A PIM Amendment Revision would not be required for the proposed drainage improvements, as the project does not meet the applicability criteria under Section 4-8.4 of the Revised Ordinances of Honolulu.

Mr. Cris T. Takushi, Project Manager
August 10, 2017
Page 2

7. The DEA should include an analysis of the possible impact of sea level rise on the project. If it is likely that sea level rise will increase the risk of flooding during the life of the project structures, the DEA should discuss how the design of the project and proposed operations at the project site will address that risk and provide resilience in recovering from any flooding.

The national standard for making such project assessments has been developed by the U. S. Army Corps of Engineers (USACE). The USACE issued an Engineering Regulation (ER 1100-2-8162) on December 13, 2013, which provides "guidance for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects." The guidance in the regulation can be used as the basis for assessing the "potential relative sea level change" that might be experienced by projects in shoreline areas, and is required to be used for all USACE civil works. See <http://www.corpsclimate.us/rccslca.cfm> for more details, including the use of an online sea-level calculator which can be used to produce Oahu-specific projections of sea level rise through 2100.

Should you have any questions, please contact Don Fujii of the Site Development Division, at 768-8107.

Very truly yours,



Kathy K. Sokugawa
Acting Director

cc: Department of Design and Construction
Department of Parks and Recreation
DPP – Land Use Permits Division
DPP – Planning Division
DPP – Subdivision Branch
DPP – Wastewater Branch



September 17, 2019

Ms. Kathy Sokugawa, Acting Director
City and County of Honolulu
Department of Planning and Permitting
650 South King St, 7th Floor
Honolulu, Hawaii 96813

Attention: Mr. Don Fujii
Civil Engineering Branch
Site Development Division

Dear Ms. Sokugawa:

Subject: Kawaioloa Road Drainage Improvements
Consultation for Draft Final Environmental Assessment (FEA)
Kailua, Oahu, Hawaii
TMK: 4-3-009, 4-3-009:001, 4-3-010, 4-3-010:084 & 088
Ref no.: **2017/ELOG-1452 (df)**

This letter is in response to your comment letter dated August 10, 2017, regarding the City and County of Honolulu, Department of Design and Construction's (DDC) Kawaioloa Road Drainage Improvements project. On behalf of the applicant, DDC, thank you for reviewing the Pre-Assessment Consultation letter and your comments. We offer the following information in response to your comments.

1. Construction plans were submitted to the Department of Planning and Permitting (DPP) for One-Time Review.
2. A Grading Permit will be obtained by the Contractor for the project, if required.
3. Applications for a Special Management Area Use Permit (SMP) and Shoreline Setback Variance will be submitted to the Department of Planning and Permitting for review and approval.
4. Section 7 of the Draft Final EA will include discussion on how the project meets the planning principles and guidelines for the *Koolaupoko Sustainable Communities Plan* and the *Oahu General Plan*.
5. We acknowledge that there are other planned improvements for Kailua Beach Park. The design consultant will coordinate with the Department of Parks and Recreation (DPR) and their consultants to ensure this project does not conflict with other planned improvements in the park. DPR's comments for the Pre-Assessment consultation and a response letter is provided in the DEA, Appendix B.
6. We acknowledge that a Public Infrastructure Map (PIM) Amendment Revision will not be required for the proposed drainage improvements based on the applicability criteria under Section 4-8.4 of the Revised Ordinances of Honolulu.
7. Section 3 of the Draft Final EA includes an analysis of the possible impact of sea level rise on the project.

If there are any questions, please contact Cris Takushi at (808) 954-4129 or by email at ctakushi@oceanit.com.

Sincerely,

Cris T. Takushi
Senior Civil Engineer

cc: ParEn Inc. - Russell Arakaki, P.E.
Department of Design and Construction – Dennis Toyama, P.E.