OMB Control No. 1024-0018
expiration date 03/31/2022

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form*. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: __Kalauao Stream Bridge_____
Other names/site number: __Kalauao Stream Eastbound Bridge & Kalauao Stream Westbound Bridge_____
Name of related multiple property listing**:**

_____
(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: _Kamehameha Highway and Kalauao Stream _____
City or town: __Aiea__ State: ___HI____ County: __Honolulu_____
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this ___ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property ___ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national ___statewide __X_local
Applicable National Register Criteria:

__X_A ___B ___C ___D

Signature of certifying official/Title: **Date**
State or Federal agency/bureau or Tribal Government

In my opinion, the property___ meets___ does not meet the National Register criteria.
Signature of commenting official: **Date**
Title : **State or Federal agency/ bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	☐
Public – Local	☐
Public – State	x
Public – Federal	☐

Category of Property

(Check only **one** box.)

Building(s)	☐
District	☐
Site	☐
Structure	x
Object	☐

Kalauao Stream Bridge — Honolulu, HI
Name of Property — County and State

Number of Resources within Property

(Do not include previously listed resources in the count)

Contributing	Noncontributing	
		buildings
		sites
2		structures
		objects
2		Total

Number of contributing resources previously listed in the National Register 0

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6. Function or Use

Historic Functions

(Enter categories from instructions.)

Transportation / road-related

(vehicular)bridge

Current Functions

(Enter categories from instructions.)

Transportation / road-related

(vehicular)bridge

7. Description

Architectural Classification
(Enter categories from instructions.)
Other, Bridge

Materials: (enter categories from instructions.)
Principal exterior materials of the property: FOUNDATION: Concrete & abutment of lava rock; WALLS: Concrete (parapets & stanchions); OTHER: Steel I-beams (under westbound lanes, 1945 portion)

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Kalauao Stream Bridge was built in 1936 as a single two-lane, two-direction, reinforced concrete girder bridge to cross the Kalauao Stream. The bridge is part of Kamehameha Highway, and at the point at which the bridge crosses the stream, the stream is running diagonally to the bridge in aerial view. Post-wartime activities made the capacity of Kamehameha Highway and the Kalauao Stream single bridge inadequate, so that in 1945 a second, parallel, bridge was constructed *mauka* and each of the two two-lane bridges then carried traffic in a single direction. Parapet designs of both the 1936 and 1945 bridge are similar, using concrete with cross-shaped voids and have concrete stanchions at the ends. The only major visible differences between the 1936 and 1945 bridges are that, the 1936 bridge has at-grade shoulders for pedestrian traffic, while the 1945 bridge has grade- separated concrete pedestrian sidewalks. Moreover, the 1936 stanchions are curved away from traffic and the 1945 stanchions are straight. However, there are structural differences. The original 1936 (today's eastbound) bridge used board-formed, cast-in-place concrete with five longitudinal concrete beams, and the 1945 (westbound) bridge has six

longitudinal girders (stringers) that are steel I–beams. The longitudinal I -beam stringers are supported at mid-point by 17 square concrete piles, topped by a 3'-0" tall concrete beam.

In 1966, both the 1936 and 1945 bridges were widened to add a third lane using stringer multi-beam design, with pre-stressed concrete.[1] The addition of the new lane required the demolition of the outboard walkways and parapets of each bridge. The 1966 parapet design features a concrete lower section, capped with two horizontal cylindrical metal rails. The concrete end stanchions are simple rectangular forms with year built (1966) and name inscriptions. The 1966 alterations mean that only the center parapets, walkways, and stanchions remain on the 1936 and 1945 bridges. The condition of the bridge is good. The integrity of the bridge structures have been compromised due to the 1966 bridge expansions and surrounding urbanization.

[1] National Bridge Inventory Database, Kalauao Spring Bridge, on website nationalbridges.com, accessed May 23, 2012. [The eastbound bridge has a NBI Structure Number of 003000990402053 and the westbound bridge has a NBI Structure Number

Narrative Description

Both three-lane bridges carry Kamehameha Highway across Kalauao Stream. The 1936 eastbound bridge is entirely reinforced-concrete construction, with a single span of approximately 54' and a total length (measured down the centerline of the road) of 60'. The 1945 westbound bridge is mostly reinforced-concrete construction, but also utilizes steel I-beam stringers; it has two spans, each measuring about 48', with a total bridge length of 108'. As noted in the summary above, both bridges were widened in 1966 using pre-stressed concrete girders.[2] Further information and context about the structural types are given below, in the description and significance sections.

Both eastbound and westbound bridges have roadway widths of approximately 40'. Each bridge has concrete walkways, approximately 4' wide and about 4" higher than the roadway surface. The eastbound bridge has walkways along both its 1936 mauka parapet and along its 1966 makai (seaward) edge, while the westbound bridge has a walkway only along its mauka (1966) parapet. The walkway along the 1936 parapet is now in the highway median and utilized by few pedestrians.

The inner parapet on each bridge is comprised of the original parapet and stanchions, from either 1936 (on the eastbound bridge) or 1945 (on the westbound bridge). This original (1936 and 1945) construction on each bridge includes the structure supporting the two traffic lanes adjacent to the original parapets. The 1966 widening activities increased the width of each bridge from two to three traffic lanes and provided replacement walkways along the new parapets.

Eastbound Bridge (1936/1966)

This bridge has three eastbound lanes on an asphalt-surfaced roadway. The 1936 concrete parapet and stanchions are on the mauka side of this bridge. This parapet is 2'-10" in height and about 60' in length. The parapet has a top railing that is 1'-0" wide and 7" high, with 1½" stepped corners. Below the railing is a series of vertical concrete balusters (6" wide and 6" thick) that are typically spaced at 1'-7" on center. The sections of the parapet between the balusters are slightly thinner (4" thick) and each section was formed with a cross-shaped void. These voids are typical of concrete bridge design in Hawai‘i during the 1930s and 1940s and are commonly referred to as a Greek cross shape.[3] Each cross void is 1'-3" high and 8" wide. The base of each parapet is 7" high and 10" thick, across its full length. On the inboard side of the parapet is a walkway, 3'-0" wide and about 4" higher than the road pavement. The difference in height results in an approximately 4"-high concrete curb along the road.

[2] State of Hawai‘i, Department of Transportation, Highways Division, Design Branch. FAP No. U-090-I (9), Drawing 58, Kalauao Stream Bridge Widening, Sheet No. K-1. June 1965.
[3] Heritage Center, School of Architecture, University of Hawai‘i at Mānoa [hereafter, Heritage Center], State of Hawai‘i, Historic Bridge Inventory and Evaluation (Draft prepared for the State of Hawai‘i, Department of Transportation, Highways Division) 2008. p. I-30.

The 1936 concrete end stanchions are 3'-3" high (measured from the roadway), 1'-9" thick, and about 4' long. In plan, each forms the arc of a circle spanning about 30 degrees. One end of each stanchion squarely abuts the parapet and the stanchion arcs away from the roadway, presenting a curving face to the traffic lanes. Each stanchion has 1½" stepped corners, with a top surface that is 1'-3" wide. The west stanchion has an added wedge of concrete on its outer (road-facing) surface that anchors a steel W-beam guardrail, which extends along the roadway at the approach. Typically, concrete bridges of this type and period have year built and bridge name inscriptions on their end stanchions, as is the case here. However, the added concrete wedge covers the name inscription on this stanchion. The east end stanchion has the date inscription "1936" in 3"-high block numbers.

The 1966 parapet and end stanchions of the eastbound bridge are on the makai side of the bridge. The lower part of the 1966 parapet is concrete, 1'-2" thick and 1'-6" high. The upper section of this parapet is a metal railing composed of two horizontal cylinders supported by slightly curved rail posts. The 1966 drawings indicate that the railings can be either aluminum or steel. The bottom rail cylinder is 5" in diameter and the top rail is 3" in diameter. The posts are spaced about 7' apart along the length of the parapet. These posts are bolted to the top surface of the lower concrete section. The 1966 end stanchions are rectangular concrete, 1'-2" thick, 3'-1" high, and 5'-0" long. Each has 1"-wide horizontal lines incised around its circumference at heights of 9" and 1'-6" above the walkway. The west stanchion has the inscription "Kalauao Stream Bridge 1966" in 3"-high block lettering.

Examination of the eastbound bridge's superstructure and substructure from below reveals the structural design of both the original 1936 bridge and the section under the 1966 traffic lane and walkway. The 1936 portion of the superstructure carries the two mauka lanes. It is board-formed, cast-in-place concrete with five longitudinal concrete beams, each measuring about 3'-6" high and 1'-6" wide. The added 1966 portion of the superstructure has two prestressed-concrete longitudinal girders spanning the stream. These 1966 girders are slightly taller and have a more complex shape than the 1936 ones. Engineer's drawings from 1965 show both the 1936 and 1966 portions of the bridge's substructure consist of board-formed concrete abutments supported by concrete pile foundations.[4]

Westbound Bridge (1945/1966)

This bridge has three westbound lanes of asphalt-surfaced roadway. The 1945 concrete parapet and stanchions are on the makai side of this bridge. This parapet is almost identical to the 1936 parapet described above, with a few differences. This 1945 parapet is much longer, over 100' in length; and, instead of having a walkway extending along its length, it has a 6"-high, 10"-wide concrete curb. Another difference is that the 1945 concrete end stanchions are rectangular, not curved.

The 1945 rectangular stanchions measure 3'-3" in height, 1'-9" in depth, and 3'-6" in length. Each end stanchion has 1½" stepped corners and squarely abuts the parapet. Both the eastern and western end stanchions have added W-beam guardrails that are through-bolted to them. These

[4] State of Hawai'i, Department of Transportation, Highways Division, Design Branch. FAP No. U-090-I (9), Drawing 58, Kalauao Stream Bridge Widening, Sheet No. K-1. June 1965.

guardrails obscure the name (Kalauao Stream) and year built (1945) inscriptions on the stanchions. A 3"-diameter, red bullseye reflector is set into the traffic-facing (east) end of the eastern stanchion; but the paint on it and the guardrail render it non-functional.

The 1966 parapet on this section of the bridge is about 107' long. The 1966 parapet and end stanchions of this bridge are of typical construction, as described above for the eastbound bridge, with metal parapet railings and incised-line stanchions.

Under the reinforced-concrete deck of the westbound bridge, the 1945 section has six longitudinal girders (stringers) that are steel I–beams; each is about 3' high with a flange width of about 1', and spaced at 7'-0" on center. The westbound bridge has two spans of about 50' each. The longitudinal I -beam stringers are supported at mid-point by 17 square concrete piles, topped by a 3'-0" tall concrete beam. The 1966 section of this bridge has a different structure, with two longitudinal girders of pre-stressed concrete that are 3'-9" high. Their mid-span support is a 3'-0" tall concrete beam which is supported by four octagonal concrete piles.

The east abutment of the westbound bridge is of board-formed concrete, and the west abutment is of lava rock and concrete mortar masonry. On the downstream side of this bridge, the stream channel narrows from the approximately 96' width under the westbound bridge to the approximately 54' width under the eastbound bridge; this reduction in width is accomplished by means of concrete retaining walls that extend into the stream channel from the eastbound bridge abutments. These vertical retaining walls are 1'-6" thick and extend into the stream channel, about 20' on the east side and about 26' on the west side, in an orientation approximately parallel to the roadway.

Site Information

The Kalauao Stream Bridge is located along a mixed urban/residential section of Kamehameha Highway. This bridge lies makai, or downstream, of a channelized portion of Kalauao Stream. Mauka of the highway, on both sides of the stream, are a few residences. To the northwest, beyond the residences, is a mid-rise office building, occupied by American Savings Bank, and the expansive Pearl Ridge Shopping Center. That shopping center was initially built ca. 1969, with additional phases of development in following years. Makai of the highway, there are residences on the southeast side of the stream, and a low-rise strip mall on the southwest side. Approximately one-half mile to the east is the well-developed community of ʻAiea. Historic aerial photos show that the setting around the bridge has changed greatly since its original 1936 construction date. Before World War II, the area was rural, and sugarcane fields were prevalent in the area. ʻAiea historically had a sugar mill, along with residential and commercial buildings. Construction of the additional lanes and bridges in 1945 as well as the 1966 widening of this section of Kamehameha Highway (and all six bridges) accommodated or spurred the post-World War II development of housing and businesses along this corridor.

Integrity Assessment

The location of the property has not changed. The Kalauao Stream Bridge is on its original site and retains integrity of location.

The setting of the property has changed. When the 1936 bridge was constructed the area was rural. The bridge was surrounded on all sides by agricultural fields, with only scattered buildings located in its vicinity. Further development followed the construction of the 1945 bridge. Now the area is urban, with dense commercial development along Kamehameha Highway. The further close proximity of three differing parapet designs creates a confusing view of the bridge. Integrity of setting is not retained.

The design, materials, and workmanship of the property are retained. Significant portions of the 1936 and 1945 bridges remain. These retain sufficient levels of the aspects of the form (design) and physical elements (materials), as well as retaining evidence of the skill (workmanship) employed in their construction, to allow the bridge to reflect its historic association. The historic character of the parapets and stanchions is still readily apparent. The 1966 additions to the bridges are quite different in the design of their structure, parapets, and stanchions. This contrast, however, conveys the history of the area and its rapid post-statehood growth. The 1966 sections of the bridges are not considered detracting features. They are non-contributing features, but do not obscure the design, materials or workmanship of the historic bridge sections. The guardrail additions are minor detracting elements.

The feeling and association of the property are retained. The bridge expresses the historic sense of the time of its construction. The bridge is sufficiently intact to convey its association with the important highway improvements of that period.

The overall integrity of the property remains high, except for the setting.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [x] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Transportation

Period of Significance
1936-1970

Significant Dates
1936, 1945, 1966

Significant Person
(Complete only if Criterion B is marked above.)

Cultural Affiliation

Architect/Builder
William R. Bartels (designer of 1945 section)
Walker & Olund, Ltd. (contractor for 1936 section)
E. E. Black, Ltd. (contractor for 1945 section)

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Kalauao Stream Bridge is significant at the local level under National Register Criterion A for its association with the history of O'ahu's road transportation system, as part of the Kamehameha Highway segment of O'ahu's belt road system. It is important for its association with the development of this section of Kamehameha Highway and the adjacent 'Aiea settlement, which grew into a suburb after its initial establishment as the mill village of a sugarcane plantation. This property's significance in the area of transportation (Kamehameha Highway history), for the period from the 1936 bridge construction through 1970 (when the H-1 Freeway became the main road corridor in this vicinity), also links it to the history of the Honolulu Plantation Company in 'Aiea.

The State of Hawaii, Department of Transportation (HDOT) confirmed the Kalauao Stream Bridge's eligibility under Criteria A in their November 2013 publication: "Hawaii State Historic Bridge Inventory and Evaluation" conducted in order to "identify which of the 708 bridges built before 1968…are eligible for listing on the Hawaii State Register of Historic Places (HSRHP)." Specifically, the report stated that the Kalauao Stream Bridge was: "…eligible under Criterion A for its association with post-war developments of the community due to bridge widening in 1966." (Note: The relevant pages from the HDOT Inventory has been attached to this document as 'Appendix A')

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Context and Development History of These Bridges

There are two other related bridges along this segment of Kamehameha Highway, built under the same series of project numbers – Waimalu Bridge and Kalauao Springs Bridge. The Territory of Hawai‘i, with the aid of federal funds, was responsible for construction of the original Waimalu Bridge, Kalauao Springs Bridge, and Kalauao Stream Bridge in 1936-1937. Waimalu Bridge was part of Federal Aid Project (FAP) No. 9-F and the Kalauao Springs and Stream bridges were part of National Recovery Highway (NRH) Project No. NRH-9-C.[5] In 1945, under Hawai‘i Project No. DA-WR 10 (3), three additional two-lane bridges were built parallel to the 1936 ones, and these new bridges all carried the westbound lanes. In 1966 a widening of Kamehameha Highway, FAP No. U-090-I (9), included an additional lane on the outboard sides of all six bridges.

Kamehameha Highway

Until 1936, the original alignment of Kamehameha Highway was the only road that provided passage across the ahupua‘a (Hawaiian term for land divisions that typically extend from the mountains to the sea) of Kalauao, Waimalu, and Waimano, between the settlements at ‘Aiea and Pearl City. The pre-1936 alignment of this highway extended east-west along a winding hillside route located on firmer ground, but not as level as the well-watered soils closer to Pearl Harbor. Part of Kamehameha Highway's pre-1936 route between ‘Aiea and Pearl City is the present-day alignment of Moanalua Road. Today's section of Moanalua Road between Kalauao Stream and Moanalua Loop is a new straighter alignment; the pre-1936 Kamehameha Highway route meandered through what is now the Pearl Ridge Shopping Center and then followed Moanalua Loop.

The progression of the area’s urbanization started with realignment of Kamehameha Highway through the wetlands near Pearl Harbor’s East Loch. Planning for this realignment had been underway for a few years before NRH funds became available in 1933. Road improvements from Honolulu to Pearl City were on the first list for NRH funding, which was a federal grant, with no matching Territorial appropriation. Within that planned project, the highway section from Honolulu to ‘Aiea had a higher priority, and the remaining section, from ‘Aiea to Pearl City Junction, was to be undertaken "if financially possible."[6] Two years later, this second-priority section (realignment of Kamehameha Highway west of ‘Aiea) was still unfunded. In 1935, Louis S. Cain, Superintendent of Public Works (SPW) for the Territory of Hawai‘i, submitted a throughfare plan to the U.S. Department of Roads that included the construction of an "additional unit of Kamehameha Highway beyond ‘Aiea, approximately one mile" that was

[5] Superintendent of Public Works [hereafter SPW], Report to the Governor, Territory of Hawai‘i for the Year Ending June 30, 1936 (Honolulu: New Freedom Press) 1937. pp. 10 & 11.
[6] "Hawai‘i Road Building Projects Selected," Honolulu Star Bulletin, June 24

expected to cost $148,000.[7] In March 1937, the contract amount reported for construction of a longer highway segment (from "'Aiea through Pearl City") was $203,000.[8]

On August 24, 1937, the new alignment of Kamehameha Highway between ʻAiea and Pearl City was dedicated. This new road passed over the three 1936 bridges, crossing Waimalu Stream, Kalauao Springs, and Kalauao Stream. Because no original drawings were located for the 1936 bridges in this highway segment, their designers are not known. The original 1937 Kamehameha Highway lanes are the present-day two inner lanes of the eastbound half of the highway. The construction firm of Walker & Olund, Ltd. built the section of this 1937 road between Ka'ōnohi Street and ʻAiea, including the Kalauao Stream Bridge. [9]

In 1945, the Territory of Hawaiʻi, using federal funds, improved Kamehameha Highway between ʻAiea and Pearl City with the addition of two more traffic lanes, separated by a median from the 1937 two-lane highway. This allowed the 1945 lanes to be dedicated to westbound traffic and the 1937 lanes to carry eastbound traffic. This improvement project included the 1945 Kalauao Stream Bridge, which was originally a two-lane bridge with matching parapets and stanchions.

William R. Bartels, bridge engineer for the Hawaiʻi Territorial Highway Department, designed the 1945 Kalauao Stream Bridge. Bartels received his education and training in Germany and immigrated to Hawaiʻi in 1932 when he commenced work with the Highway Department. He continued his career there until his retirement in 1958.[10] During that period, he was a prolific and versatile designer, responsible for large and sophisticated bridge construction projects in Hawaiʻi, including many tee-beam and rigid-frame concrete bridges, as well as the two reinforced-concrete girder bridges (Waimalu and Kalauao Springs 1945 bridges) along this Waimalu-ʻAiea stretch of Kamehameha Highway. Bartels' name appears on the original 1945 drawings of the Kalauao Stream Bridge as the designer. He designed and checked these drawings, with the aid of drafters D. Yanagihara and P. Yamashita. B. F. Rush, the Territorial Highway Engineer at the time, approved the drawings on June 18, 1945. All the sheets for this bridge were dated June 1945, except for one wingwall detail drawing, dated August 1946.

The 1945 highway and bridge construction, respectively, was carried out under Hawaiʻi Project Nos. DA-WR 10 (2) and DA-WR 10 (3).[11] According to the SPW report that was issued after World War II:

> During the war years, highway construction activities were limited to the building of new highways, which served as access to military and navy reservations and to those highways, which are part of the strategic network….
>
> As most military and navy reservations are adjacent to and are served by the main public highways, large sums of Federal

[7] "Cain Submits Road Plan to U.S. Officials," *Honolulu Star Bulletin*, May 3, 1935. p. 1.
[8] "Cain Reveals Road Scheme for 5 Islands," Honolulu Star Bulletin, March 6, 1937. p. 1.
[9] "Aiea Highway Link Dedicated," *Honolulu Star Bulletin*, August 25, 1937. p. 6.
[10] "TH Honors 4 Veteran Employees," *Honolulu Advertiser*, July 1, 1958, article at the University of Hawaiʻi, Hamilton Library, Honolulu Newspapers Clipping Morgue, on microfiche in Biographical section, under: Bartels.
[11] State of Hawaiʻi, Department of Transportation, Highways Division, Design Branch, Project No. DA-WR 10 (3), Plans of Three Bridges on Kamehameha Highway, Drawing 5157.1. June 18, 1945.

> access money were spent on the latter with the result that all traffic has benefited by these improvements.[12]

The SPW 1945 report explained the term "access money" as 100% Federal funding for military access roads and "those highways which are part of the strategic network."[13] At the end of the war in August 1945, "all proposed access road projects were dropped by the Federal Government …; but access road projects under construction were allowed to continue to their completion."[14] This widened section of Kamehameha Highway improved access between the main part of the Pearl Harbor Naval Base and its outlying activities near Pearl City Peninsula, Waipi‘o Peninsula, and further west.

E. E. Black, Ltd. obtained two separate construction contracts in 1945 for the highway improvements near ‘Aiea. The amount of their contract for the two new Kamehameha Highway westbound lanes was $381,177.40; and their accepted bid for three new bridges (the 1945 Waimalu, Kalauao Springs, and Kalauao Stream bridges) along this corridor was $139,207.50.[15] For most of the twentieth century, Everett Earl Black (1889-1995) was a well- connected Hawaii businessman, who was Honolulu Gas Company’s president, a director of Castle & Cooke, and on the board of Hawaiian Gas Products, Inc., as well as owner of the contracting company.[16] E. E. Black, Ltd. obtained many road and bridge contracts in Hawaii, starting as early as 1931.[17] It continued to be an important construction firm in Hawai‘i for most of the twentieth century. In the mid-1990s, a California-based corporation purchased the firm, and a few years later transferred its focus of operations to Guam.[18]

In 1966, the State of Hawai‘i, Department of Transportation carried out another improvement of this section of Kamehameha Highway, adding a third lane to both existing two-lane roadways, under FAP No. U-090-I (9). The widening project in response to numerous complaints about "bumper-to-bumper Kamehameha Highway rush hour traffic past Pearl Harbor," with protests reported at least as early as 1964.[19] The third lane was added on the outer edge (opposite the median) of each roadway. The work resulted in the demolition of the outer parapets and stanchions of the 1936 and 1945 bridges and the addition of the extant 1966 parapets and stanchions on the outer edge of the new traffic lanes.[20]

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[12] SPW, *Report to the Governor, Territory of Hawaii, for the Year Ending June 30, 1946* [Honolulu: author] [1946]. p. 17.
[13] SPW, *Report to the Governor, Territory of Hawaii, for the Year Ending June 30, 1945*. [Honolulu: author] [1945]. p 13.
[14] SPW, *Report to the Governor, Territory of Hawaii, for the Year Ending June 30, 1946* [Honolulu: author] [1946]. p. 17.
[15] Ibid., p. 26.
[16] Michael T. Holmes, *The Specter of Communism in Hawai‘i* (Honolulu: University of Hawai‘i Press) 1994.
[17] SPW, *Report to the Governor, Territory of Hawaii, for the Year Ending June 30, 1931* (Honolulu: Honolulu Star Bulletin) 1932. p. 28.
[18] Ronna Bolante, “Can Locals Compete?” *Hawai‘i Business,* on website http://www.hawaiibusiness.com/Hawaii-Business/July-2002, accessed February 20, 2013.
[19] "Pearl City Traffic Saddens Police, Too" *Honolulu Star Bulletin*, June 22, 1964. p. 3.
[20] State of Hawai‘i, Department of Transportation, Highways Division, Design Branch, FAP No. U-090-I (9), As Built Plans of Kamehameha Highway Widening, Drawing 1. July 22, 1965.

1930s Kamehameha Highway Funding around Kalauao and Construction Difficulties

The contract from the Territorial Department of Public Works for the section of Kamehameha Highway that included the Kalauao Springs and Kalauao Stream bridges was awarded to Walker and Olund, Ltd. For $153,647.87, with the cost covered by the federal government, as "U.S. Public Works Project No. NRH-9-C."[21] This type of funding was a grant and funds did not have to be matched with Territorial money. After the election of Franklin Roosevelt as President in 1932, the federal government took several measures to provide employment during the Great Depression.

> In June 1933, Congress passed the National Industrial Recovery Act (NIRA). The act was designed to help individual states with a variety of programs including new highway construction…. It was also designed to aid the states in providing unemployment relief for the millions out of work. Under the NIRA of 1933, individual states were able to obtain additional funds through grant programs, such as the National Recovery Highway… program, [under which] the United States Bureau of Public Roads stipulated that portions of the funding should be used for roadside landscaping and to develop shore routes and inland tourist lanes.[22]

This section of Kamehameha Highway did run near part of Pearl Harbor's shoreline, but it certainly was not intended to be primarily a tourist route. Instead it served the resident population; the Territory's SPW noted that upon its "completion the public will have available an improved highway from Honolulu to the fast growing community of Wahiawā."[23] This section was not an easy area for highway construction, due to numerous wetlands in the *ahupua'a* of Kalauao, Waimalu, Waiau, and Waimano. The names of all of those *ahupua'a* contain the word *wai* (water), except for Kalauao, which means "the multitude [of] clouds."[24]These *ahupua'a,* between the settlements at 'Aiea and Pearl City, were noted for their extensive irrigated fields in the early Western-contact period (eighteenth and nineteenth centuries). Such wetlands were one reason that the original alignment of Kamehameha Highway had been inland, on ground more topographically varied, but also more solid.

A newspaper article which reported on the 1937 opening of the "'Aiea Highway," the name at that period for this portion of Kamehameha Highway, noted that for the contractors:
A difficult engineering problem was faced in building a durable road bed since the highway skirts Pearl Harbor and in many places passes through former swamp lands… In

[21] SPW, *Report to the Governor, Territory of Hawaii for the Year Ending June 30, 1936* (Honolulu: New Freedom Press) [1936]. p. 10.

[22] Irene Jackson Henry and William Henry, Historic American Engineering Record, Veterans Memorial Park and Parkway, Muskegon, Michigan. (Eagle, Michigan: Henry & Henry Preservation and Architectural Consultants). July 1996, from website lcweb2.loc.gov/pnp/habshaer/mi/mi0400/mi0455/, accessed June 13, 2012.

[23] SPW, *Report to the Governor, Territory of Hawaii for the Year Ending June 30, 1937* (Honolulu: Porter Printing Company, Ltd.)[1937]. p. 22.

[24] Mary Kawena Pukui, Samuel E. Elbert, & Esther T. Mookini, *Place Names of Hawaii* (Honolulu: University of Hawai'i Press) 1976. p.75.

constructing the highway, it was necessary to lay a lumber mat of 265,000 board feet before putting in the rock sub-base.[25]

Although part of this highway officially opened for traffic on August 24, 1937, there was a mile-long portion where it was "still necessary to detour through ‘Aiea to the old Kamehameha Highway."[26] Despite the ceremonies "marking an important step in territorial highway development," the roadway surface was, at that date, only loose rocks treated with oil, with a plan that "a macadam finish will be applied within one year."[27]

The contracting company that built the Kalauao Springs Bridge and Kalauao Stream Bridge in 1936-1937, along with several miles of connecting highway segments, was the firm of Walker & Olund, Ltd. John Walker, born in Scotland, came to Hawai‘i about 1884. Around 1900 he founded his own company, under the name John Walker, Contractor, and the firm has continued to this day, currently under the name Walker-Moody Construction Company, Ltd. Alfred E. Olund, who was born in Minnesota and arrived in Hawai‘i by 1912, started working with Walker in 1920. In 1924, the firm was called Walker & Olund, Ltd., whose name continued in use until 1939, despite the 1928 death of John Walker. The business did not get renamed Walker-Moody Construction Company, Ltd., until 1941, although Olund had left the firm and Max Moody had joined it in 1939. In 2013, Walker-Moody Construction Company's website stated that Walker's company "was one of Hawai‘i's largest and most respected construction firms."[28] Some of the landmark projects that the company completed in its early decades were the Sacred Heart Catholic Church [1914], "the territorial office building [1926], the new Honolulu city hall [1929], Pier 11 [1930], the Territorial hospital for the insane at Kaneohe [1935], the concrete work for the great oil tanks at Pearl Harbor naval base [1924], and the magnificent new home of C. Brewer & Co., Ltd …..1930."[29]

Honolulu Plantation Company, ‘Aiea

Before the construction of the 1937 "‘Aiea Highway," most of the land around ‘Aiea , especially *mauka* of Kamehameha Highway, was planted in sugarcane. These sugarcane fields extended up to about the 500-foot elevation level. A portion of the land *makai* of the highway was also planted in sugarcane, but here it was typically interspersed with farm plots of various crops and scattered residences. These extensive sugarcane lands were part of the field system of Honolulu Plantation Company (HPC), a company based in ‘Aiea, which began in 1899 and which had about 6,500 acres under cultivation during the 1920s. HPC lands reached from Waimalu and Halawa Valley beyond the Southeast Loch of Pearl Harbor, almost to Bishop Point and Fort Kamehameha at the harbor mouth, as well as east to Kalihi. All HPC-cultivated land was leased, with some non-contiguous parcels in the eastern section. The only fee-simple land owned by the

[25] "Aiea Highway Link Dedicated," *Honolulu Star Bulletin*, August 25, 1937. p. 6.
[26] "New Aiea Road Open August 20," *Honolulu Star Bulletin*, August 3, 1937. p. 5.
[27] "Aiea Highway Link Dedicated," *Honolulu Star Bulletin*, August 25, 1937. p. 6.
[28] Walker-Moody Construction Company, Ltd., "The Walker Moody Story – Company History, Start – 1940," on website at http://www.walker-moody.com/inde.php/company-history-start-1940.html, accessed on June 13, 2012.
[29] Ibid. (in Olund biography section).

company was at the mill, main camps, reservoirs, and pump sites.

HPC made its first harvest in 1901. The mill and main plantation community were centered at ‘Aiea, about ½ mile inland from the mouth of ‘Aiea Stream. In 1906, HPC added a sugar refinery to the mill and began producing refined sugar for use locally. HPC was the only producer in Hawai’i that refined its sugar; all other producers shipped their raw sugar out for refining elsewhere, usually to the California & Hawaiian Sugar Company refinery in Crockett, CA. Most of the HPC-refined sugar was used in locally bottled soft drinks and by the pineapple canneries. HPC shipped to the mainland any refined sugar which was in excess of local demand.[30]

HPC was one of the very few sugar plantations in Hawaii with a year-round water supply that was sufficient for its irrigation needs.[31] About 20 million gallons per day flowed to the surface at the two springs at Kalauao. HPC pumped this water to its upper fields for irrigation, and for fluming, using less than half of the daily supply. The rest flowed into Pearl Harbor.

Although HPC had employee camps scattered about the plantation, ‘Aiea was the hub and main settlement. HPC's refinery and its hospital formed a nucleus for the community of ‘Aiea , which grew up around these facilities. By the mid-1920s, HPC had begun replacing former barracks-type housing with single-family and duplex cottages. The newer cottages provided more privacy, and also had electricity, water, and kitchens in each unit.

Individual kitchens were an improvement from the older barracks that had communal kitchens separated from sleeping quarters. In addition, the 1920s cottages were typically on 50' x 80' lots, which allowed space for gardens and fruit trees. The HPC community at ‘Aiea also had churches, baseball fields, volleyball, basketball, and tennis courts, and a general store. Additionally, there was an assured milk supply for the plantation because HPC operated a private dairy.[32]

Over the years, HPC lost much of its leased acreage. The lands lost included some at Pearl Harbor in 1907 for the naval base, and additional lands east of Bishop Point, and others lost for Hickam Field in 1935. The military occupied other HPC sugarcane fields during World War II. One author stated that the military confiscation of HPC land led to its closure in 1947.[33] Another writer noted that "post-war urban growth supplied the final blow.”[34] After the plantation closed, O‘ahu Sugar Company purchased most equipment and obtained leases on the remaining land. California & Hawaiian Sugar Company acquired the ‘Aiea refinery and continued to refine sugar there until 1996, when local bottlers switched to corn syrup for sweetening.[35]

Reinforced-Concrete Girder Bridges

Reinforced-concrete girder bridge construction was common in the early twentieth century. The

[30] William H. Dorrance, *Sugar Islands, The 165-year Story of Sugar in Hawai‘i*. (Honolulu: Mutual Publishing LLC) 2000. p. 50.
[31] Jared G. Smith, *Plantation Sketches* (Honolulu: Advertiser Press) 1924. p. 132.
[32] Ibid., pp. 138-39.
[33] Edward D. Beechert, *Working in Hawaii, A Labor History*. (Honolulu: University of Hawai‘i Press) 1985. p. 304.
[34] William H. Dorrance, *Sugar Islands, The 165-year Story of Sugar in Hawai‘i* (Honolulu: Mutual Publishing LLC) 2000. p. 50.
[35] Ibid.

character-defining features of this type include a monolithic deck and girder system and short spans (typically 15 to 40 feet).[36] This type, using cast-in-place concrete girders with reinforcing, replaced earlier concrete arch bridges, which had even more limited spans. This type of bridge was also a more economical choice than concrete arch bridges. From the 1910s through the 1940s, reinforced-concrete girder bridges were often constructed in Hawai‘i to span short distances. Generally, this type of bridge is eligible under Criterion A, as the historic context above presents, because they are "representative of important public works projects initiated by the Territorial . . . government . . . constructed at important crossings along a major transportation route or belt road."[37]

The 1936 portion of the Kalauao Stream Bridge was a relatively short-span, narrow (two-lane) bridge that used cast-in-place reinforced-concrete girders. See the section below for information on the 1945 portion of the Kalauao Stream Bridge. The portions of the bridges added in 1966 used pre-stressed girders.[38] A nationwide bridge study notes the combination of cast-in-place concrete girder bridges with pre-stressed (pre-cast) concrete girders for added portions was used for a number of widening projects.[39]

Steel I-Beam Bridges

The 1945 portion of the Kalauao Stream Bridge is classified as a steel I-beam bridge. This bridge type uses rolled steel beams as longitudinal members (stringers). Rolled steel beams came into general use for highway bridges in the 1920s and 1930s, as steel plants gained the ability to form steel beams into the greater lengths and depths required by bridge designers. By the early 1960s, the use of steel I-beams for bridge structures became less common, due to rising steel prices and the decreasing costs of pre-stressed concrete beams.[40]

Conclusion

The Kalauao Stream Bridge is eligible for the National Register of Historic Places under Criterion A (Events) as a contributing element to the development of the around the island road system developed by the Territory in the 1930s.

[36] Parsons Brinckerhoff and Engineering and Industrial Heritage, A Context for Historic Bridge Types, NCHRP Project 25-25, Task 15. (Prepared for the National Cooperative Highway Research Program) October 2005. p. 3-93.
[37] Heritage Center, State of Hawai‘i, Historic Bridge Inventory and Evaluation, Draft, 2008. pp. I-71 & I-72.
[38] State of Hawaii, Department of Transportation, Highways Division, Design Branch, FAP No. U-090-I (9), Waimalu Stream Bridge Widening, Drawing 73. June 1965.
[39] Parsons Brinckerhoff and Engineering and Industrial Heritage, A Context for Historic Bridge Types, October 2005. p. 3-93.
[40] Parsons Brinckerhoff and Engineering and Industrial Heritage, A Context for Historic Bridge Types, NCHRP Project 25-25, Task 15 (Prepared for the National Cooperative Highway Research Program) October 2005. p. 3-107.

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

Architectural Drawings and Early Views

No drawings or early photographs of the original 1936 bridge were located for this report.

The 1945 and 1966 construction drawings are electronic files (scans) located in the database at State of Hawai‘i Department of Transportation, Highways Division, Design Branch: 1945 Project – Hawai‘i Project No. DA-WR 10 (3) dated June 18, 1945; 1966 Project FAP No. U-090-I (9) dated July 22, 1965.

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"Allotment to Hawai'i Roads is Agreed On." August 3, 1933. p. 1.

"$2,631,000 To Be Spent For Island Roads." August 16, 1933. P. 1.

"Moses Akiona is Low Bidder on Puuloa Road." November 10, 1933. p. 1.

"Cain Submits Road Plan to U.S. Officials." May 3, 1935. p. 1.

"Cain Reveals Road Scheme for 5 Islands." March 6, 1937. p. 1.

"New Aiea Road Open August 20." August 3, 1937. p. 5.

"Ceremony Will Open New Road." August 23, 1937. p. 7.

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Newspaper articles on W.R. Bartels are available at the University of Hawai'i, Hamilton Library, Honolulu Newspapers Clippings Morgue on microfiche, in Biographical section, under: Bartels. Various Dates.

Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____previously determined eligible by the National Register
____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
__X__recorded by Historic American Engineering Record # __HI-117_____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

____ State Historic Preservation Office
__X__ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: ___Hawaii DOT, Highways div., Design Branch_____

Historic Resources Survey Number (if assigned): _____

10. Geographical Data

Acreage of Property _Less than one acre_____

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)
1. Latitude: Longitude:

2. Latitude: Longitude:

3. Latitude: Longitude:

4. Latitude: Longitude:

Or
UTM References
Datum (indicated on USGS map):

☐ NAD 1927 or ☐ NAD 1983

1. Zone: 04	Easting: 609850	Northing: 2364650
2. Zone:	Easting:	Northing:
3. Zone:	Easting:	Northing:
4. Zone:	Easting :	Northing:

Verbal Boundary Description (Describe the boundaries of the property.)

The boundary of Kalauao Stream Bridge is defined by the outer limits of the structures, enclosed by a parallelogram measuring approximately 105' x 115' that includes the superstructures and abutments of both the eastbound and westbound bridges. See boundary map on Continuation Sheet 10.1.

Boundary Justification (Explain why the boundaries were selected.)
The boundary of the property includes all historic features of the bridges that are named Kalauao Stream Bridge.

---

11. Form Prepared By

name/title: Lorraine Minatoishi, PhD, AIA, President
organization: Minatoishi Architects
street & number: 1003 Bishop Street, Suite 1975
city or town: Honolulu state: Hawaii zip code: 96813
e-mail LM@mahawaii.com Natalie@mahawaii.com
telephone: (808)942-7474
date: March 4, 2020

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.

- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property:

City or Vicinity:

County: State:

Photographer:

Date Photographed:

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of ___.

Additional Information

Figure #	Name	Description
1	USGS Map	USGS Map showing location of property
2	USGS Map	USGS Map showing location of property
3	Historic Map	Historic Map showing location of property
4	Historic Photo	Historic photo showing location of property
5	Historic Photo	Historic photo showing location of property
6	Historic Document	Historic Document - Drawing

Figure 1: USGS Map showing location of property

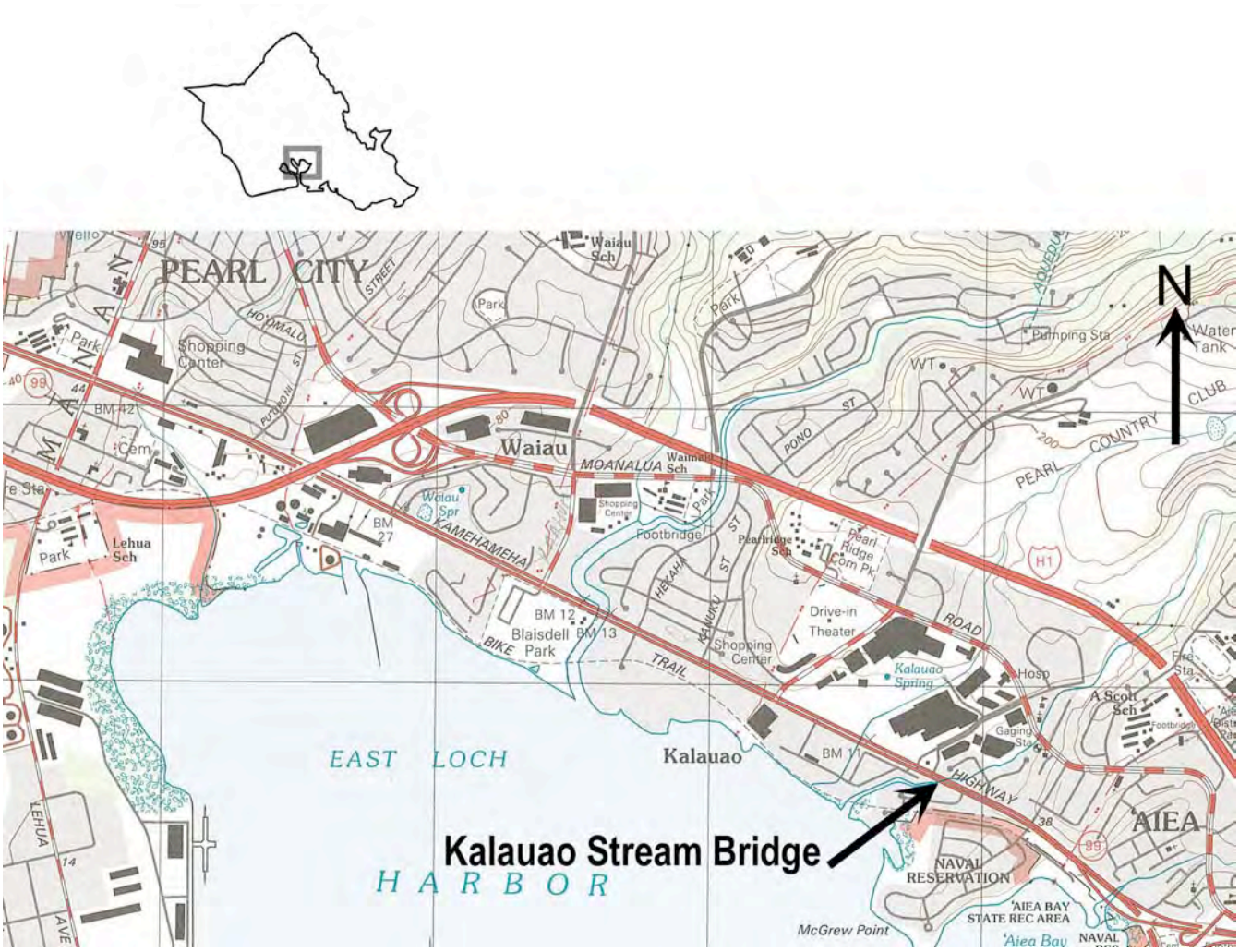

Figure 2: USGS Map showing location of property

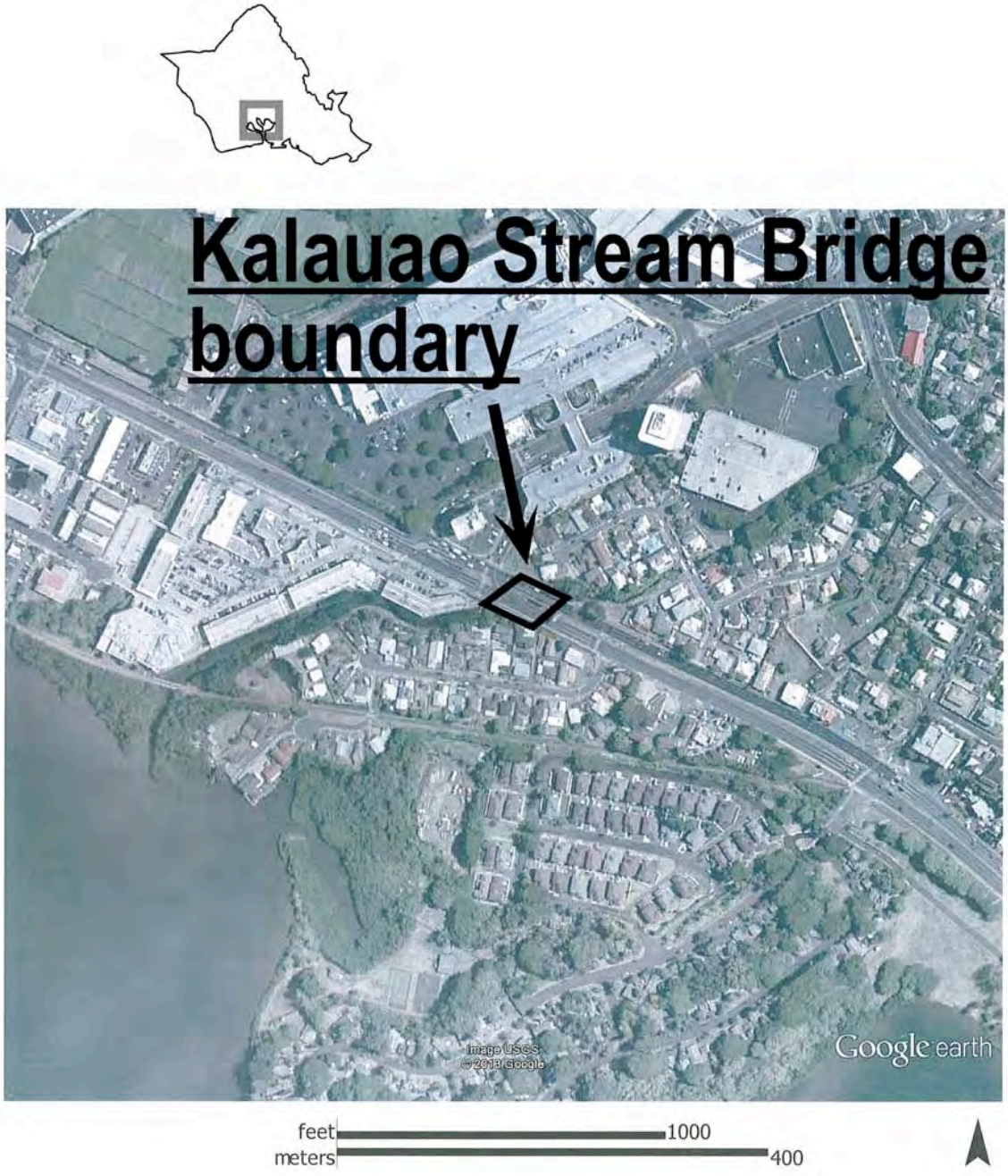

Figure 3: Historic Map showing location of property

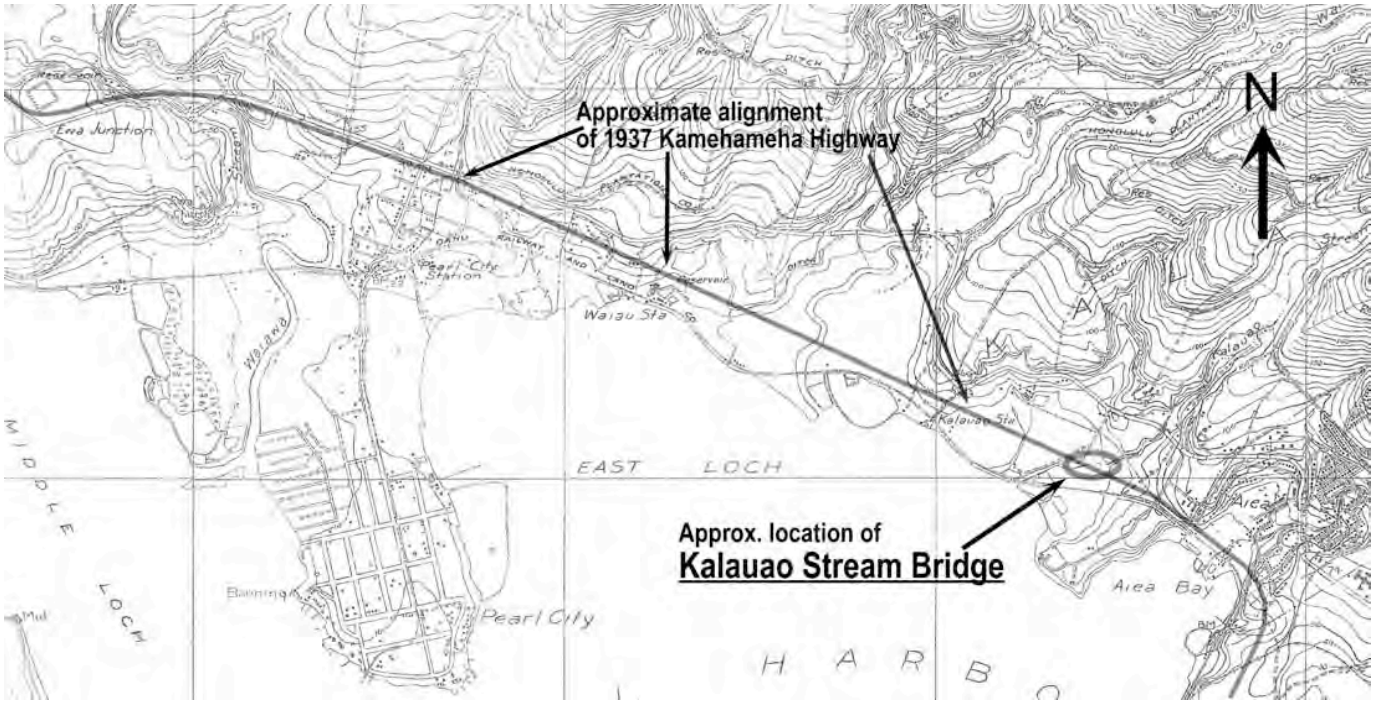

Figure 4: Historic photo showing location of property

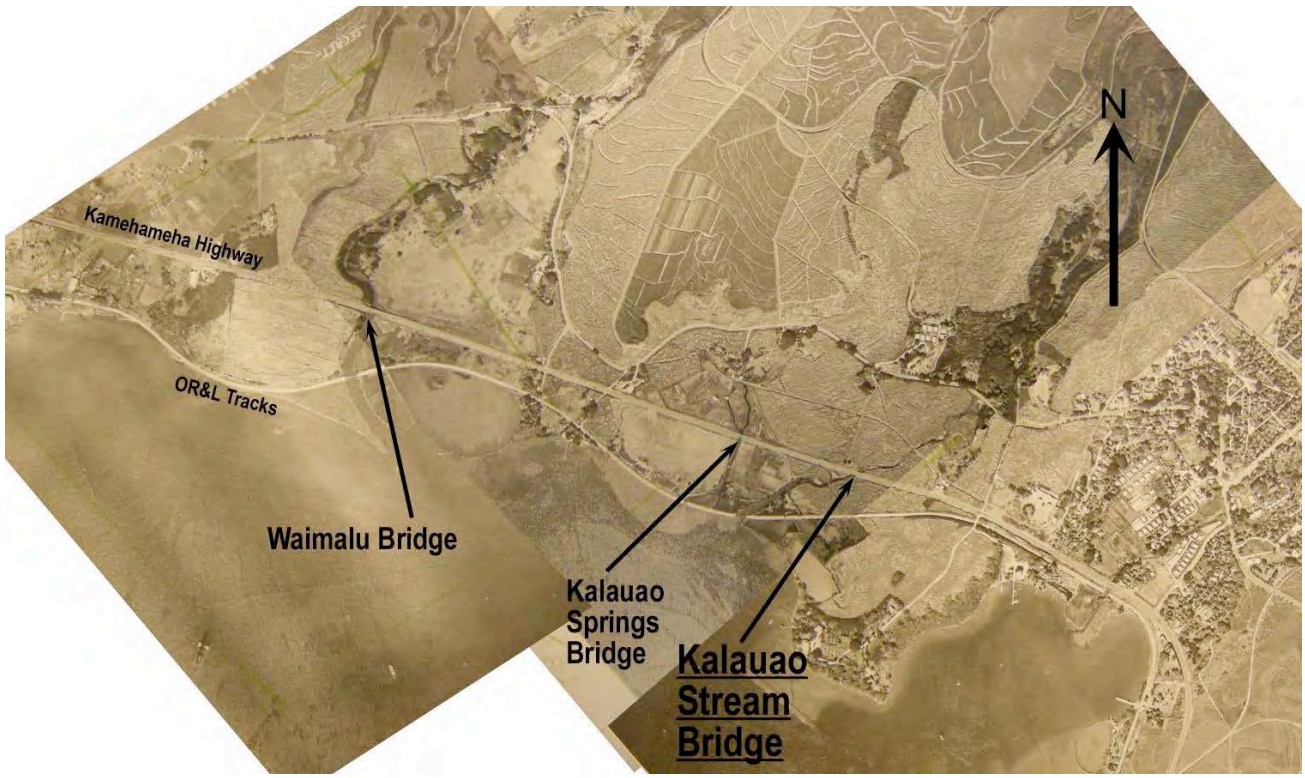

Figure 5: Historic photo showing location of property

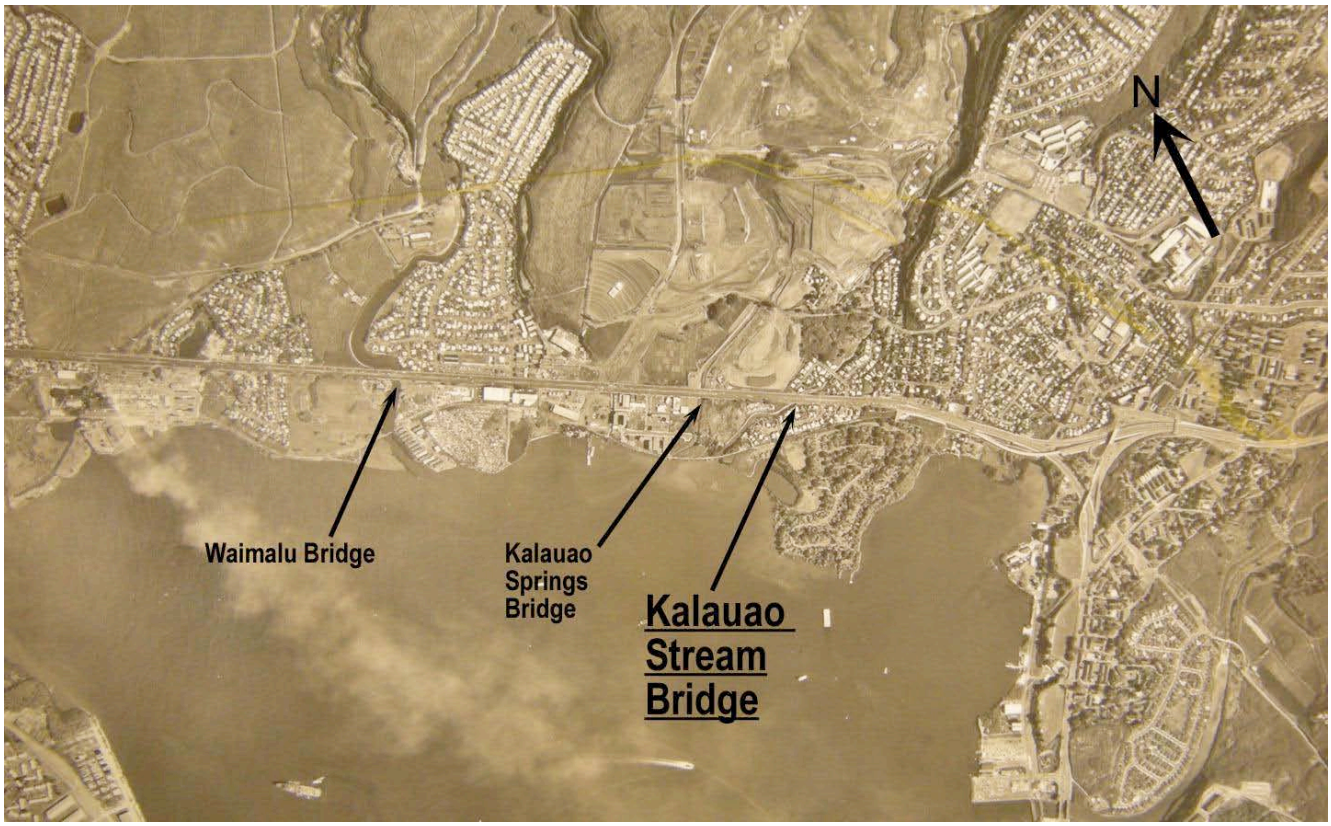

Figure 6: Historic Drawing

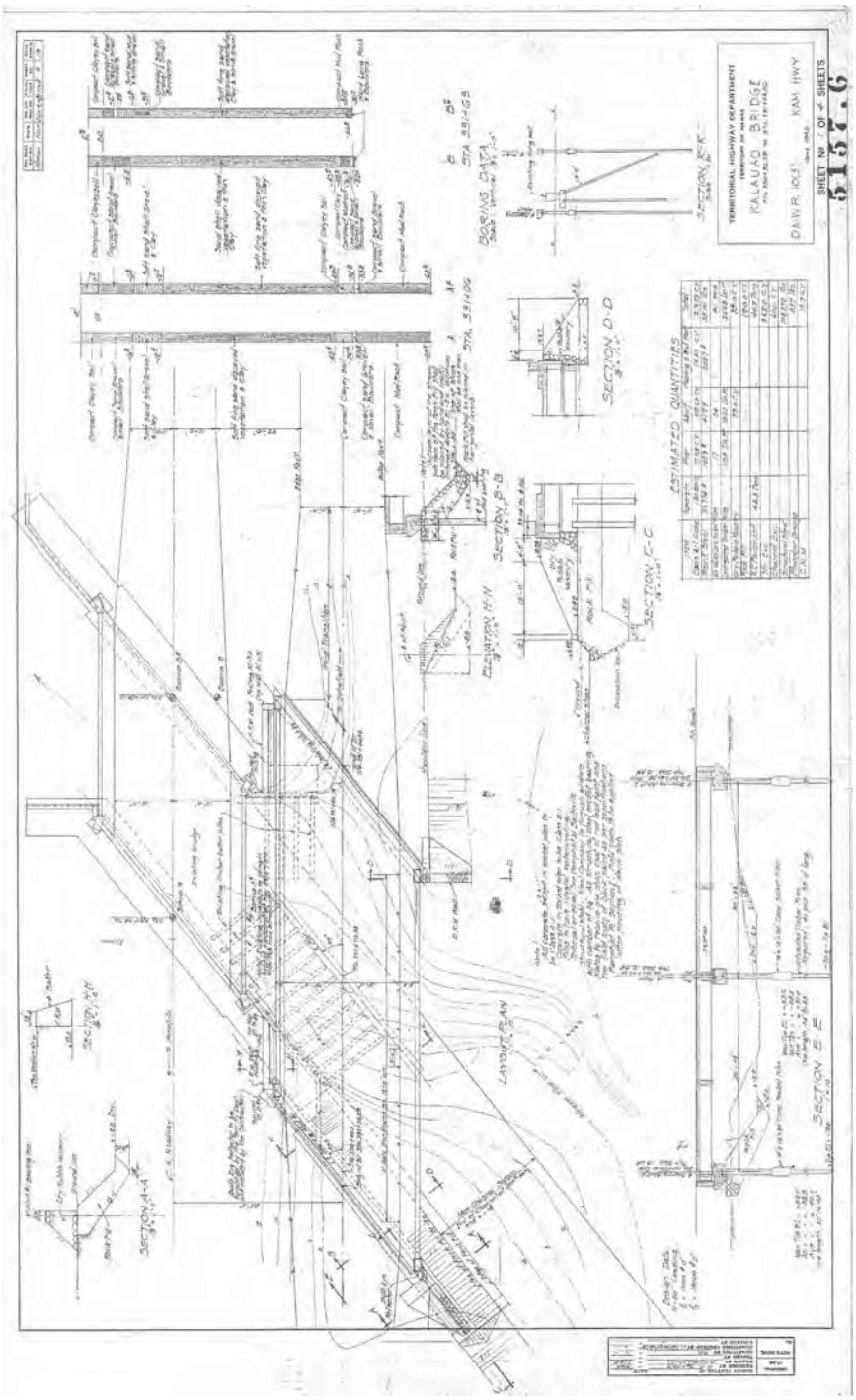

Photo #	File Name	Description
1	HI_Honolulu_KalauaoStreamBridge_0001	Overview showing approach to westbound bridge, camera facing west.
2	HI_Honolulu_KalauaoStreamBridge_0002	Overview with westbound bridge on the right and eastbound bridge on the left, camera facing northwest.
3	HI_Honolulu_KalauaoStreamBridge_0003	Overview showing approach to eastbound bridge, camera facing east.
4	HI_Honolulu_KalauaoStreamBridge_0004	Overview of approach showing the median, with eastbound bridge on the right and westbound bridge on the left, camera facing east-southeast.
5	HI_Honolulu_KalauaoStreamBridge_0005	Overview with eastbound bridge on the right and westbound bridge on the left, camera facing southeast.
6	HI_Honolulu_KalauaoStreamBridge_0006	Detail of a 1966 parapet and stanchion with scale device (one-foot increments), camera facing southwest.
7	HI_Honolulu_KalauaoStreamBridge_0007	Detail of a 1936 parapet and stanchion with scale device (one-foot increments), camera facing northeast.
8	HI_Honolulu_KalauaoStreamBridge_0008	Oblique view of a 1936 end stanchion, camera facing west.
9	HI_Honolulu_KalauaoStreamBridge_0009	Detail of 1945 end stanchion (right) with scale device (one-foot increments), camera facing northwest. Note the bullseye reflector in the end stanchion.
10	HI_Honolulu_KalauaoStreamBridge_0010	View from below of westbound bridge, showing both the 1966 pre-stressed concrete girders (right side) and the 1945 steel I-beam girders, as well as the lava rock and concrete masonry abutment, camera facing west.
11	HI_Honolulu_KalauaoStreamBridge_0011	View from below of 1936 portion of eastbound bridge deck and abutments, camera facing southwest.
12	HI_Honolulu_KalauaoStreamBridge_0012	View from below of 1945 portion of westbound bridge deck and supporting piles, camera facing northeast.

Photo Key

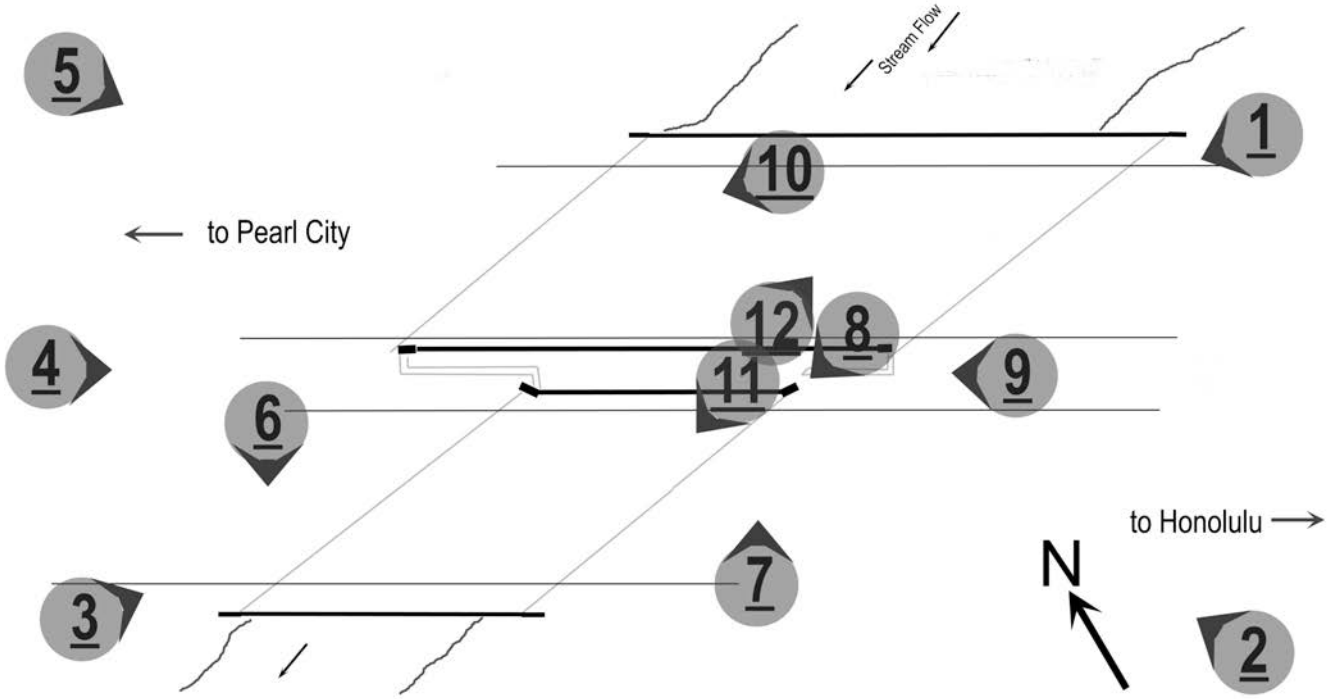

Photo:	1 of 17
Name of Property:	Kalauao Stream Bridge
City or Vicinity:	ʻAiea
Photographer:	Stanley Solamillo
Date Photographed:	February 24, 2020
Description	Overview showing approach to westbound bridge
Camera Facing:	W

Photo: 2 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Overview with westbound bridge on the right and eastbound bridge on the left
Camera Facing: NW

Photo: 3 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Overview showing approach to eastbound bridge
Camera Facing: E

Photo:	4 of 17
Name of Property:	Kalauao Stream Bridge
City or Vicinity:	ʻAiea
Photographer:	Stanley Solamillo
Date Photographed:	February 24, 2020
Description	Overview of approach showing the median, with eastbound bridge on the right and westbound bridge on the left
Camera Facing:	SE

Photo: 5 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Overview with eastbound bridge on the right and westbound bridge on the left
Camera Facing: SE

Photo: 6 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Detail of a 1966 parapet and stanchion with scale device (one-foot increments)
Camera Facing: SW

Photo: 7 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Detail of a 1936 parapet and stanchion with scale device (one-foot increments)
Camera Facing: NE

Photo: 8 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description Oblique view of a 1936 end stanchion
Camera Facing: W

Photo:	9 of 17
Name of Property:	Kalauao Stream Bridge
City or Vicinity:	ʻAiea
Photographer:	Stanley Solamillo
Date Photographed:	February 24, 2020
Description	Detail of 1945 end stanchion (right) with scale device (one-foot increments). Note the bullseye reflector in the end stanchion.
Camera Facing:	NW

Photo: 10 of 17

Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description: View from below of westbound bridge, showing both the 1966 pre-stressed concrete girders (right side) and the 1945 steel I-beam girders, as well as the lava rock and concrete masonry abutment
Camera Facing: W

Photo: 11 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description View from below of 1936 portion of eastbound bridge deck and abutments
Camera Facing: SW

Photo: 12 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE

Photo: 13 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE

Photo: 14 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE

Photo: 15 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE

Photo: 16 of 17
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE

Photo:	17 of 17
Name of Property:	Kalauao Stream Bridge
City or Vicinity:	‘Aiea
Photographer:	Stanley Solamillo
Date Photographed:	February 24, 2020
Description	View from below of 1945 portion of westbound bridge deck and supporting piles
Camera Facing:	NE

Photo: 18 of 18
Name of Property: Kalauao Stream Bridge
City or Vicinity: ʻAiea
Photographer: Stanley Solamillo
Date Photographed: February 24, 2020
Description

View from below of 1945 portion of westbound bridge deck and supporting piles

Camera Facing: NE