Section 4 Zone 5 Iwilei (Test Excavations 086 to 095)

For reporting purposes for this archaeological inventory survey, the City Center Section 4 of the HHCTCP has been divided into 11 zones based on geographical and cultural boundaries. The Iwilei Geographic Zone runs from Dillingham Boulevard, just east of Akepo Lane at the north end, and follows a curving path to the intersection of Nimitz Highway, with Nu’uanu Stream at the south end (Figure 22). The northern boundary represents the approximate northwest corner of the historic Kūwili Fishpond/historic shoreline, while the southern boundary was represented by the southern boundary of Kawa Fishpond/historic shoreline and Nu’uanu Stream (see Vol. II Figure 12, Vol. II Figure 26, and Vol. II Figure 27). The Iwilei Zone corridor was located entirely within Honolulu Ahupua’a, although the present-day southern end of the zone was offshore in traditional Hawaiian times.

The Iwilei Zone includes eleven AIS Test Excavations numbered T-086 through T-095. Test excavations were numbered from northwest to southeast. The test excavations within the Iwilei Zone were located within five TMKs: [1] 1-5-007 was along Dillingham Boulevard, Ka’aahi Street, and Iwilei Road (owned by the City and County of Honolulu); a portion of Iwilei Station and HHCTCP corridor was located in [1] 1-5-007:016 (land owned by Hawaiian Electric); a portion of Iwilei Station was located in [1] 1-5-007:021 (land owned by Nu’uanu Auto Company); a HHCTCP corridor portion was located in [1] 1-5-007:001 (land owned by the State of Hawai’i); and a HHCTCP corridor portion was located in [1] 1-5-008:020 (land owned by Jiriochi Otani Family, Ltd.).

4.1 Transit Infrastructure

Transit infrastructure for the current project within the Iwilei Zone consists of the Iwilei Station (to be constructed at the northwest corner of the Ka’aahi Street and Ka’amahu Place intersection), a support facility structure located at the southeast corner of the Awa Street and Nimitz Highway intersection near the southern boundary of the Iwilei Zone, 19 single columns, 8.5 straddle-bent columns to support the fixed guideway system and station spaced along the Iwilei Zone corridor, and utility relocation corridors throughout. Test excavations for the project focused on column locations (T-086 to T-088 and T-093 to T-095), with additional excavations in the footprint of Iwilei Station (T-089 to T-092).

4.2 Geography, Geology, and Land Forms

The Iwilei Zone was situated along the low-lying coastal flats immediately inland of Kapālama Basin and Honolulu Harbor and was less than 0.5 km from the shoreline. Elevations within the Iwilei Zone range from approximately 1.5 to 1.8 m amsl, and the average annual rainfall was approximately 730 to 790 mm (Giambelluca et al. 2011). The present-day topography of the Iwilei Zone was generally flat. As the Iwilei Zone traverses a predominantly urban landscape, vegetation in the immediate vicinity was minimal and primarily the result of landscaping including introduced (non-indigenous) trees, shrubs, and ground cover. Of particular note are the numerous *kamani* trees that line much of Dillingham Boulevard. Nu’uanu Stream marks the southern end of the Iwilei Zone as it empties into Honolulu Harbor.

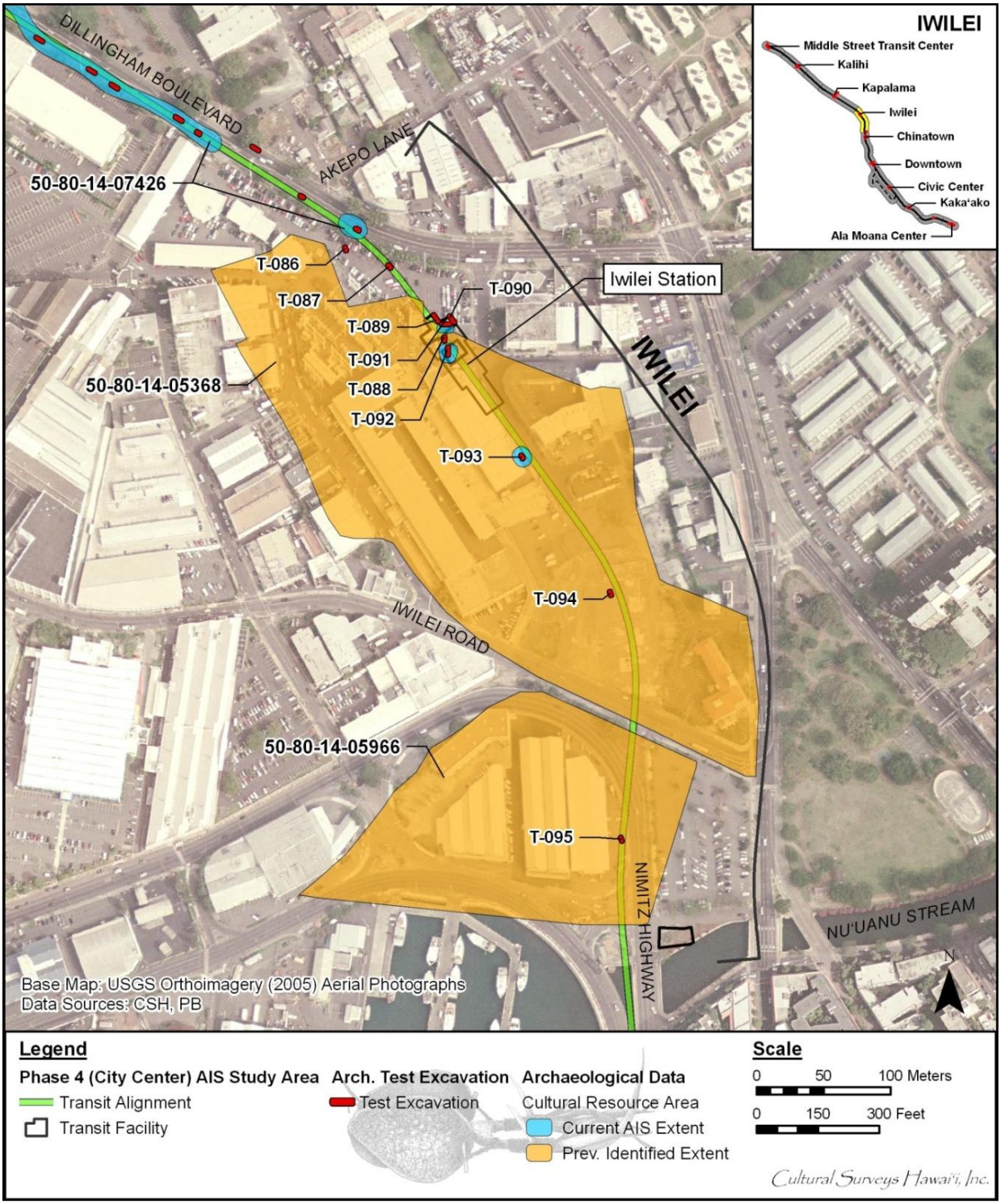


Figure 22. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) showing the location of the Iwilei Zone AIS test excavations (T-086 through T-095) along the HHCTCP corridor and at the Iwilei Station

According to the U.S. Department of Agriculture Soil Survey Geographic (SSURGO) Database (2001) and soil survey data gathered by Foote et al. (1972), soils within the Iwilei Zone consist predominantly of Fill land (FL), with a small area of Ewa silty clay loam (EmA) north of T-089 (Figure 23). Fill land soils are described as:

> …areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources… This land type was used for urban development including airports, housing areas, and industrial facilities [Foote et al. 1972:31].

Ewa silty clay loam soils are described as:

> …well-drained soils in basins and on alluvial fans… [that] developed in alluvium derived from basic igneous rock... These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, kiawe, koa haole, klu, and uhaloa [Foote et al. 1972:29].

4.3 Traditional and Historic Land Use

As noted above, the Iwilei Zone was situated within Honolulu Ahupua’a. The Iwilei Zone also lies in close proximity to Kapālama Ahupua’a, which lies to the north and west. Brief summaries of traditional and historic land use of both *ahupua’a* in the vicinity of the Iwilei Zone are presented below due to the integrated nature of this area.

4.3.1 Traditional Accounts of the Iwilei Zone

Honolulu was traditionally known as Kou and had a long tradition as a royal center where the *ali’i* (chiefs) would meet and entertain. It was “noted for *kōnane* (pebble game, like checkers) and for *ulu maika* (bowling), and was said to be named for the executive officer (*ilāmuku*) of Chief Kākuhihewa of O’ahu” (Pukui et al. 1974). In accounts of the Pele and Hi’iaka saga (Emerson 1915:168; Nogelmeier 2006:402-420), Hi’iaka from Hawai’i Island and Lohi’au, chief of Kaua’i, joined with Pele’ula, chiefess of O’ahu, for pleasure at Kou.

The place name Kapālama was often understood to refer to an enclosure (*pā*) of *lama* wood that surrounded the place of residence of high ranking *ali’i* (chiefs) (Pukui et al. 1974:87). McAllister (1933:88) relates: “Kapālama was said to have obtained its name from an establishment in which the young *ali’i* were kept just before pairing off for offspring.” Westervelt (1923:165) attributes the O’ahu place name to a chiefess of O’ahu (Kapālama) who lived in that area.

Two fishponds (Kūwili and Kawa) were located within the Iwilei Zone until around the turn of the twentieth century. These two fishponds covered nearly the entire length of the Iwilei Zone corridor, with the Iwilei Station itself understood to be at least partly within the former location of Kūwili Fishpond. Kūwili Fishpond was located in the northern half of the Iwilei Zone, and its northwestern border was used to designate the border between the Iwilei Zone and the East Kapālama Zone in the current zone designation system. Kawa Fishpond was located in the southern half of the Iwilei Zone, and its southern border was used to designate the border

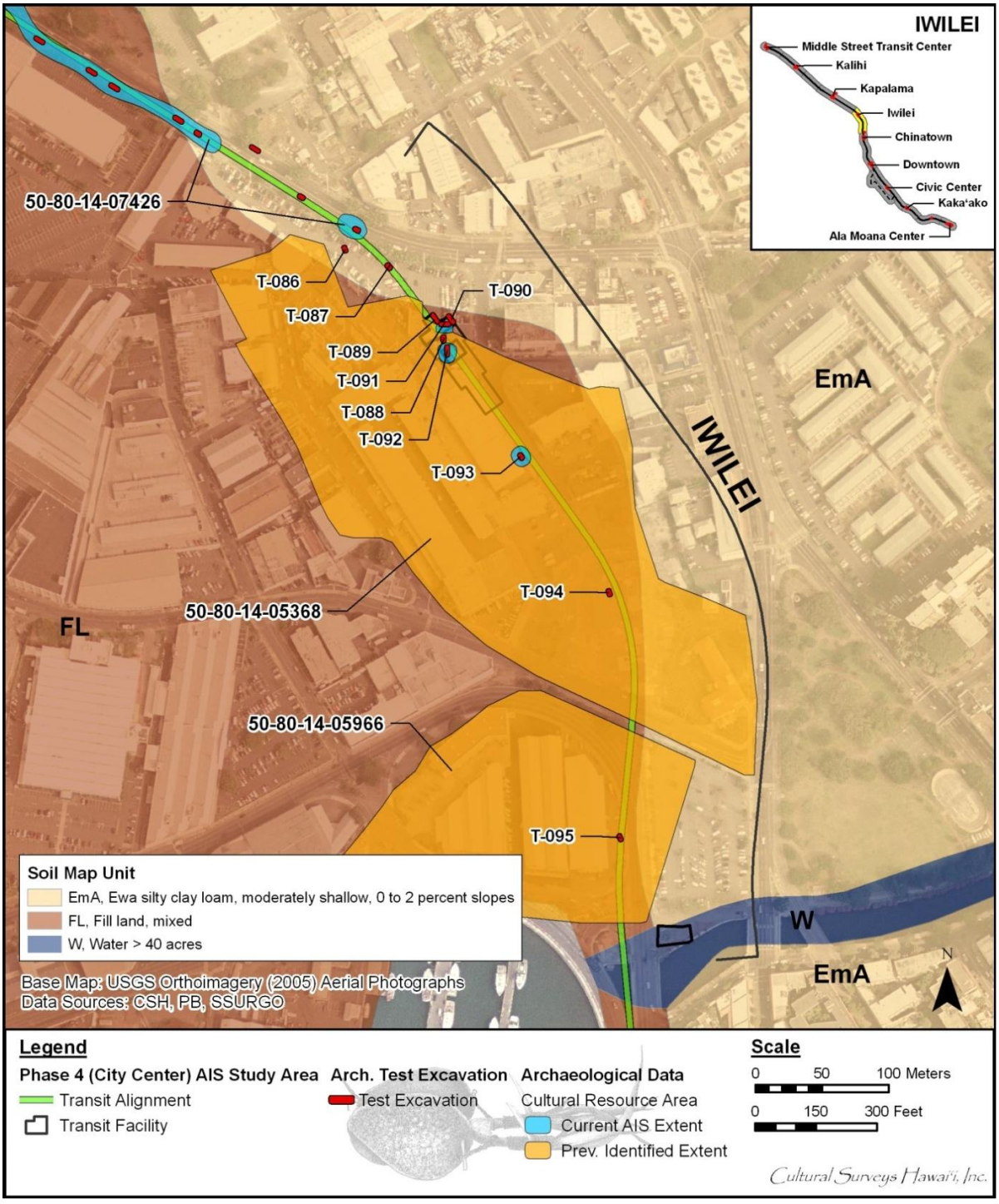


Figure 23. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) with overlay of the Soil Survey of Hawai’i (Foote et al. 1972) showing sediment types within and in the vicinity of the Iwilei Zone AIS test excavations (T-086 through T-095) along the HHCTCP corridor and at the Iwilei Station

between the Iwilei Zone and the Downtown Waterfront Zone. Kūwili literally means “stand swirling” (Pukui et al. 1974:125). This pond was mentioned in the legend of Kū’ula (the fish god of Hawai’i), where Kū’ula’s son, ‘Ai’ai, gave a sacred fishhook to his son, Puniaiki, who used it to summon a substantial school of *aku* to Honolulu Harbor. No oral traditions, legends, or other ethnographic information have been found regarding Kawa Fishpond; however, the Hawaiian word “*kawa*” literally translates as a precipice or leaping place or the pool below a precipice into which swimmers leap (Pukui and Elbert 1986:139). These ponds were an important resource for the inhabitants of the area.

4.3.2 LCA Documentation

The first detailed map of Kapālama and Iwilei made by J. F. Brown in 1885 shows a traditional Hawaiian landscape of small *kuleana* LCA parcels extending across the Kapālama plain and Iwilei (Table 5 and Figure 24). Six LCAs were awarded within and adjacent to the Iwilei Zone in Honolulu Ahupua’a (see Figure 25). Two of the awards were “Fort Lands” (F.L.), which were set aside from “Government Lands” for support of the garrison of the Fort in Honolulu. These Fort Land *kuleana* were granted free of charge to the awardees. The LCA testimonies for awards in the vicinity of the Iwilei Zone (see Vol. III Appendix C) indicate that there was intensive cultivation of taro in the area as well as habitation.

Table 5. LCAs in the vicinity of the Iwilei Zone (in numerical order)

LCA Number	Contents of Award
61 F.L.	Fort Lands, one house lot
64 F.L.	Fort Lands, one house lot and one *lo’i* to Kapulani
826	Two *lo’i* to Keakahiwa
1089	One house lot (one house) and eight taro patches (*lo’i*) at Kealia to Kapehe
2440 B	Two house lots, one *lo’i,* and one sand pond to Kauaua
6236	Six house lots to Kaaiawaawa

4.3.3 Historic Land Use

In 1857, construction of the O’ahu Prison was completed on a small island off the Iwilei mainland. An 1885 map of Kapālama by J. F. Brown shows the prison just south of the proposed Iwilei Station and *makai* of the Iwilei Geographic Zone (see Figure 24). The central building was a dwelling for the overseer and guards and was flanked by two, two-story wings housing 32 cells in each wing. The prison was built from cut coral blocks and subsequently became known as “The Reef.” A new road was constructed between Kūwili and Kawa Fishponds that connected the prison to North King Street. The new road, a causeway between the two fishponds, was first identified on earlier maps simply as “Prison Road.” By the end of the nineteenth century, maps identified it as Iwilei Street. Between 1916 and 1918, the O’ahu Prison was relocated to Kalihi and renamed the O’ahu Jail. A consortium of businessmen led by Benjamin Dillingham

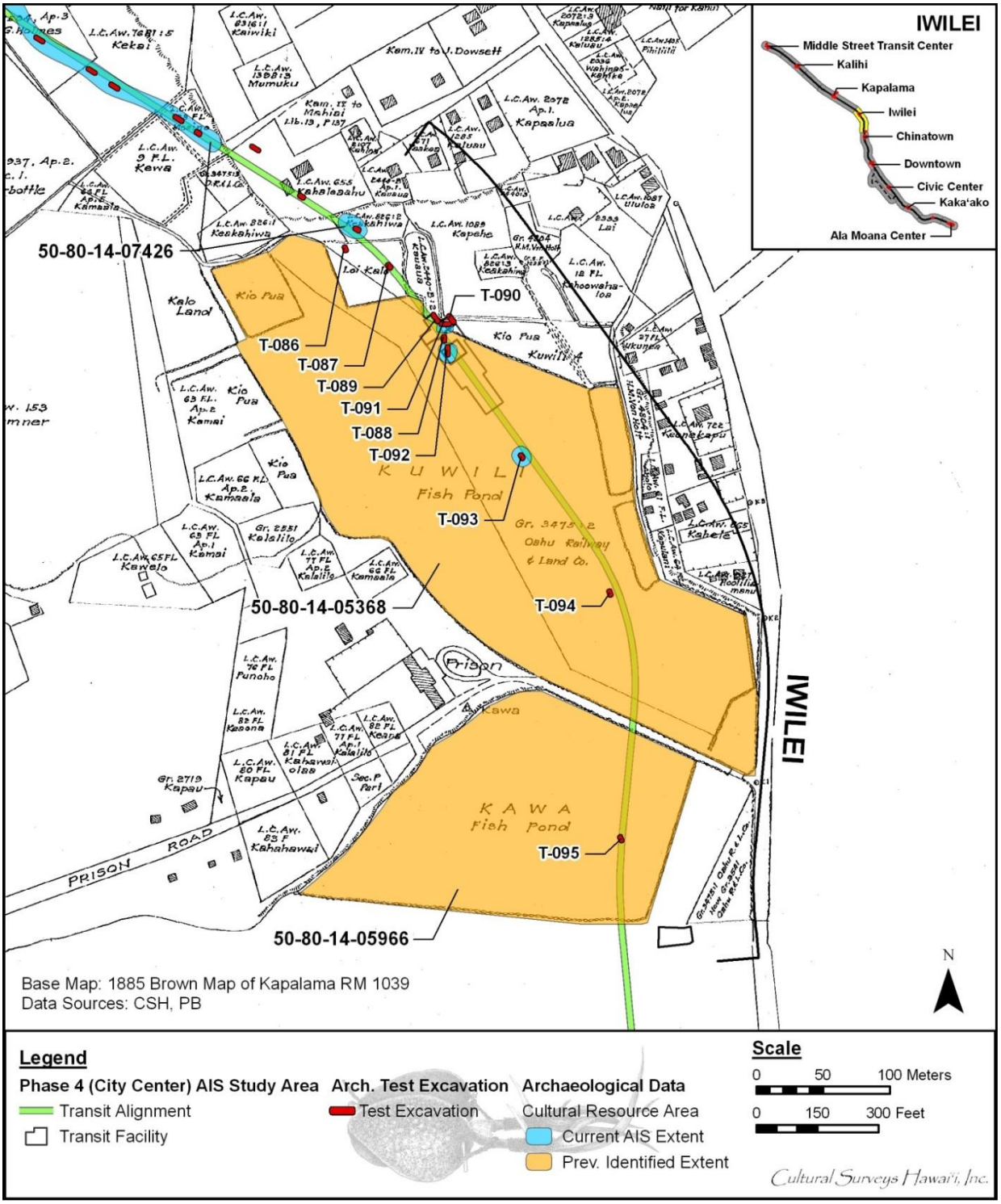


Figure 24. 1885 map of Kapālama by J. F. Brown (R.M. 1039), showing the locations of *kuleana* LCA parcels, Kūwili and Kawa Fishponds, and the Iwilei Zone AIS test excavations (T-086 through T-095) along the HHCTCP corridor and at the Iwilei Station

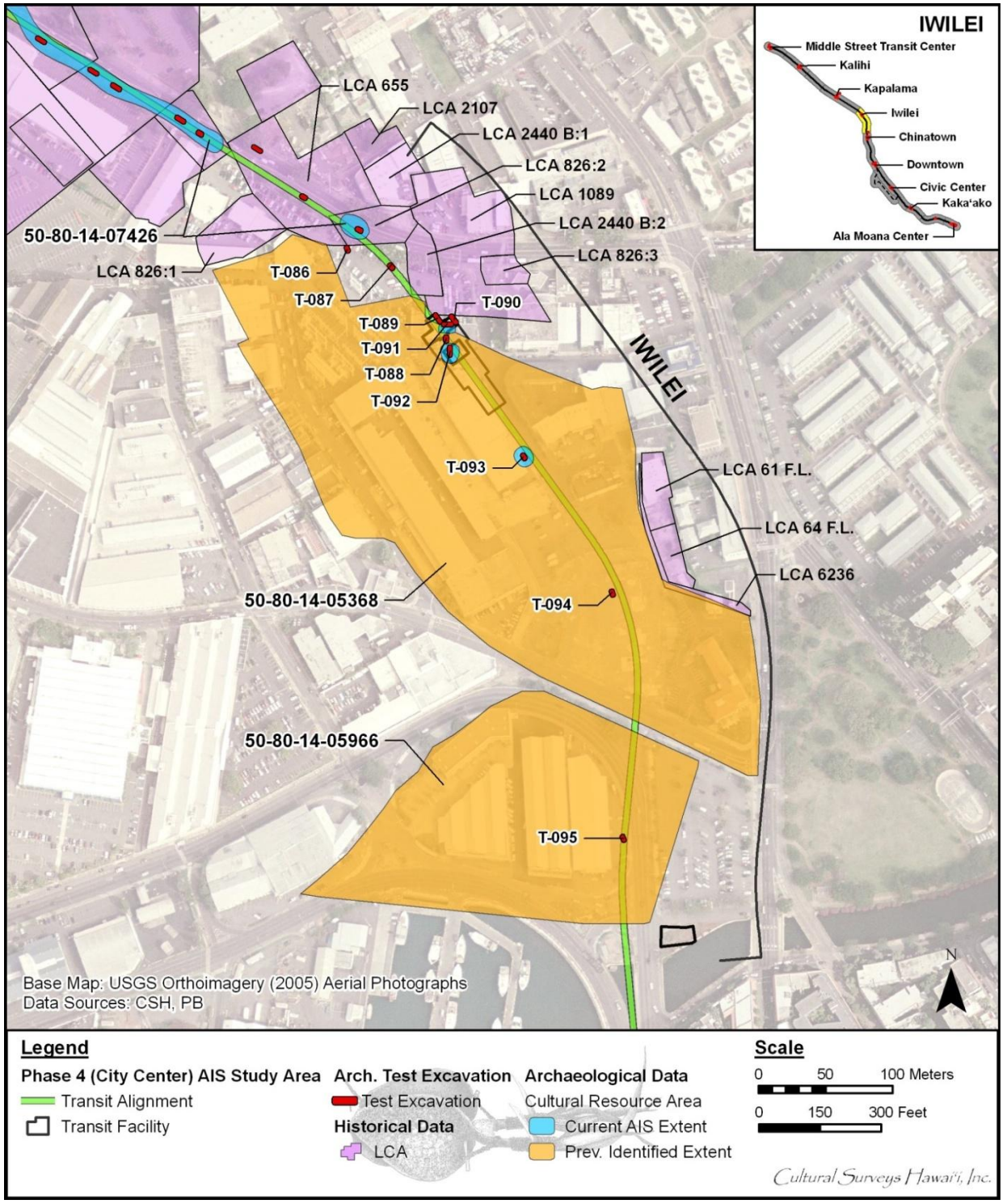


Figure 25. Aerial photograph (base map: U.S. Geological Survey Orthoimagery 2005) showing the locations of LCAs in the vicinity of the Iwilei Zone AIS test excavations (T-086 through T-095) along the HHCTCP corridor and at the Iwilei Station

created the OR&L in February 1889. The railroad officially opened on November 16, 1889. A railroad track was built across Kūwili Fishpond and the company's Honolulu depot was constructed on land between Kūwili Fishpond and North King Street, just west of the intersection of North King Street and Iwilei Road (100 m southeast of the proposed Iwilei Station). Monsarrat's 1897 map of Honolulu shows the depot partially beneath the proposed footprint of the Iwilei Station and under a portion of the associated HHCTCP alignment (see Vol. II Figure 27). The construction associated with the OR&L railroad would eventually lead to the expansion of Honolulu Harbor towards Kapālama Basin and Iwilei.

Kūwili and Kawa Fishponds continued to be used until around the turn of the twentieth century. Kūwili (Kūwili I) Fishpond has been classified as a Type II pond, a *loko pu'uone* or *loko haku'one*, "an isolated shore fishpond usually formed by the development of barrier beaches building a single, elongated sand ridge [*pu'uone* or *haku'one*] parallel to the coast and containing one or more ditches and sluice grates" (Kikuchi 1973:228). Kawa Fishpond has been classified as a Type I pond, a *loko kuapā*, "a fishpond of littoral water whose side or sides facing the sea consist of a stone or coral wall containing one or more sluice grates" (Kikuchi 1973:227). In 1896, an outbreak of cholera caused the infilling of Kawa Fishpond. Kūwili Fishpond was filled between 1895 and 1901. At this time, it becomes apparent that the harbor and its activities were gaining increasing prominence over the traditional use of the fishponds and adjoining *kalo* patches.

In 1899, through an agreement with the Hawaiian Government, the OR&L exchanged land in the vicinity of Honolulu Harbor for the filled-in Kawa Fishpond and a large portion of the adjacent Kūwili Fishpond. Between 1899 and 1901, ongoing Honolulu Harbor improvements created 6,000,000 cubic yards of mud, sand, and loose coral through dredging. Additionally, several thousand cubic yards of hard coral were blasted. This material was used to fill the low areas of the former Kawa and Kūwili Fishponds that were adjacent to the OR&L harbor facilities and terminal. In 1903, the OR&L announced that it had moved and greatly expanded its terminal (McGerty et al. 1997:21-23). The new passenger and cargo station was located on the former Kūwili Fishpond, immediately north of Iwilei Road. The expansion of the OR&L transportation and cargo routes, with the associated harbor traffic, was one of the primary factors behind the industrial development of the Iwilei area of Honolulu.

At the beginning of the twentieth century, development within the Iwilei Zone was in its early stages, limited mainly to the OR&L and the O'ahu Prison. During the remainder of the twentieth century, development increased substantially. The 1906 Dakin Series maps (maps 16 and 20) show the OR&L Round House, as well as several associated sheds and numerous train tracks, in the immediate vicinity of the Iwilei Zone. The 1914 Sanborn Series maps (Sheets 16 and 17) again show the OR&L's depot and freight yards, with the Round House, associated buildings, and numerous train tracks (Figure 26). South of Prison Road (modern-day Iwilei Road), the Iwilei Zone corridor passes through the City Mill Co. lumber yard to the west, with several warehouses and shops to the east. The 1919 U.S. Army War Department topographic map, Honolulu Quadrangle, shows a number of railroad tracks in the vicinity of the Iwilei Zone, as well as increasing development shown by buildings and roads on either side of the Iwilei Zone

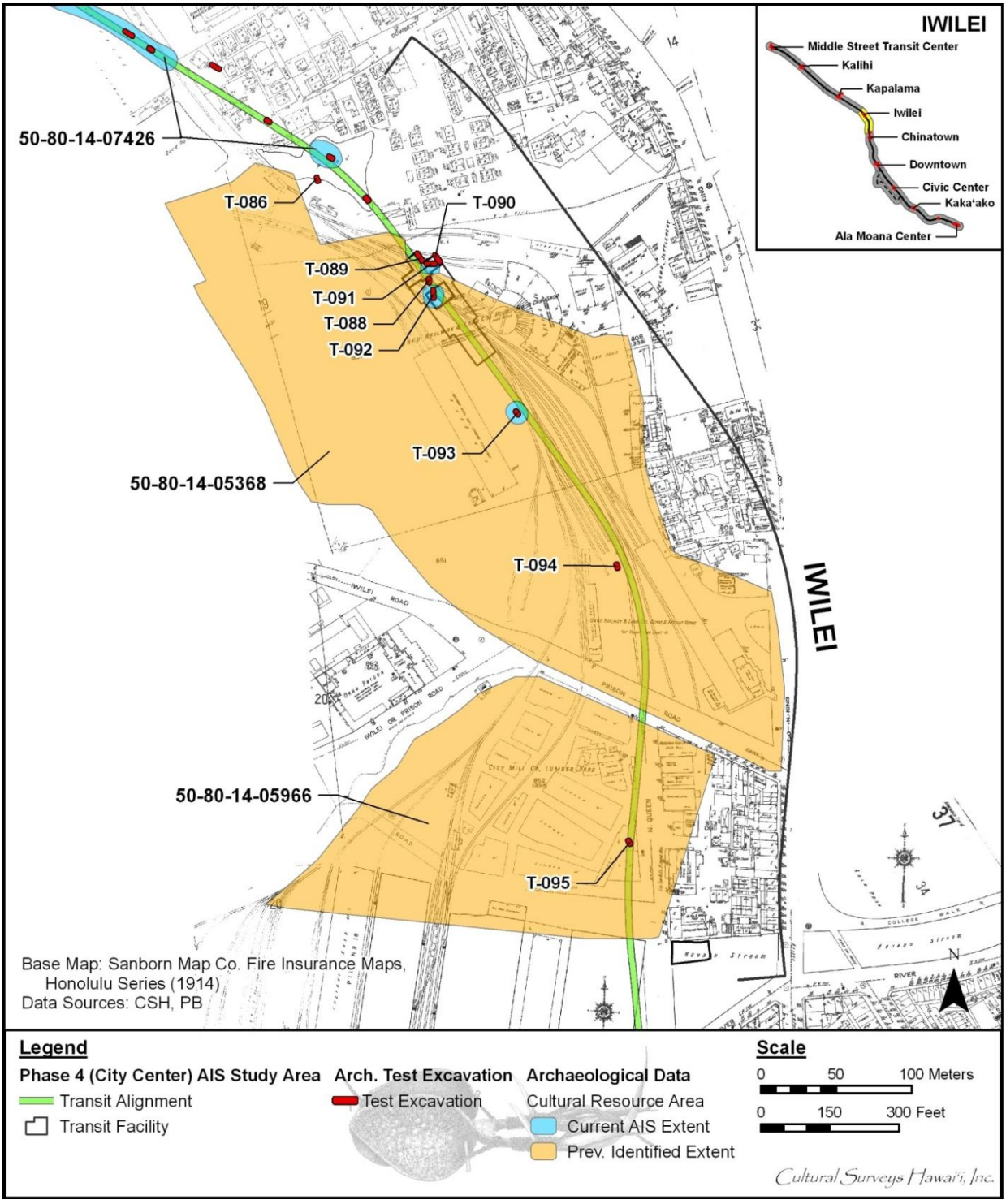


Figure 26. 1914 Sanborn Series map showing a portion of the HHCTCP corridor and AIS test excavations in the East Kapālama Zone and the OR&L holdings around the Iwilei Station (Sanborn Map Company 1914)

(Figure 27). In the 1927 Sanborn Series maps (Sheets 148 and 149), the warehouses at the south end of the Iwilei Zone and to the east have been converted into one large warehouse labeled Aala Market Ltd., and the City Mill Co. lumber yard to the west was now Lee Lup and Company's Planing Mill and Lumber Yards, Bl Sm & Auto Repairing, and several small tenements and shops (Figure 28). The 1933 U.S. Army War Department Fire Control map (Figure 29), the 1943 U.S. Army War Department map (see Vol. II Figure 33), and the 1953 U.S. Army Mapping Service topographic map (see Vol. II Figure 34), show the Iwilei Zone traversed by railroad tracks. The 1950 Sanborn Series maps (Sheets 146 through 149) show further development of the OR&L with a Passenger and Freight Terminal, Passenger Depot, and offices (Figure 30). At the southern end of the Iwilei Zone, a market place was shown to the east, and the old lumber yards to the west have been converted into large warehouses owned by the OR&L with associated auto parking. By the 1970s, as a 1978 U.S. Geological Survey orthophoto shows, the railroad tracks and associated OR&L buildings are gone and intensive urban/industrial development has taken place (see Vol. II Figure 21).

4.3.4 Settlement Pattern Summary

The land around the Iwilei Zone in Kapālama and Honolulu Ahupua'a offered desirable environmental conditions for traditional Hawaiian subsistence practices. The well-watered floodplain would have allowed for the development of an extensive taro *lo'i* system, and the protected shoreline and fringing reef would have allowed for ease of ocean access to the productive near-shore fisheries. LCA research confirms this agricultural pattern, showing an intense area of taro cultivation interspersed with scattered houses as well as some *kula* lands and several large fishponds. The small peninsula of Iwilei shows large fishponds, scattered houses, *lo'i, kula* lands, and *ki'o pua* (pools for stocking young fish) dotting the shoreline area.

4.4 Previous Archaeology

Few archaeological studies have been conducted in the vicinity of the Iwilei Zone, and only four studies have been conducted within or directly adjacent to the Iwilei Zone (Figure 31 and Table 6). Of note among the two studies conducted outside (*mauka*) of the Iwilei Zone was that one of them (West, Ostroff, and Roberts 2002) documented portions of a cultural resource, SIHP # 50-80-14-5942, remnants of the Honolulu Rapid Transit trolley system. Additionally, a historic district, the Chinatown Historic District, SIHP # 50-80-14-9986, was identified immediately adjacent to and south of the Iwilei Zone and will be discussed under the Downtown Waterfront Geographic Zone.

Kūwili Fishpond, SIHP # 50-80-14-5368 (Athens and Ward 1997; Hammatt, Hazlett, and Shideler 2008; and McGerty, Dega, and Spear 1997)

The McGerty, Dega, and Spear (1997) study was an archaeological inventory survey at the site of the proposed Liliha Civic Center and the former location of Kūwili Fishpond. A total of 12 subsurface features were documented, including human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment. The disarticulated human skeletal remains were found in historic sediments that were used to fill in the pond and a portion of the outer edge of an historic period *ki'o pua*. Subsurface testing identified soil layers

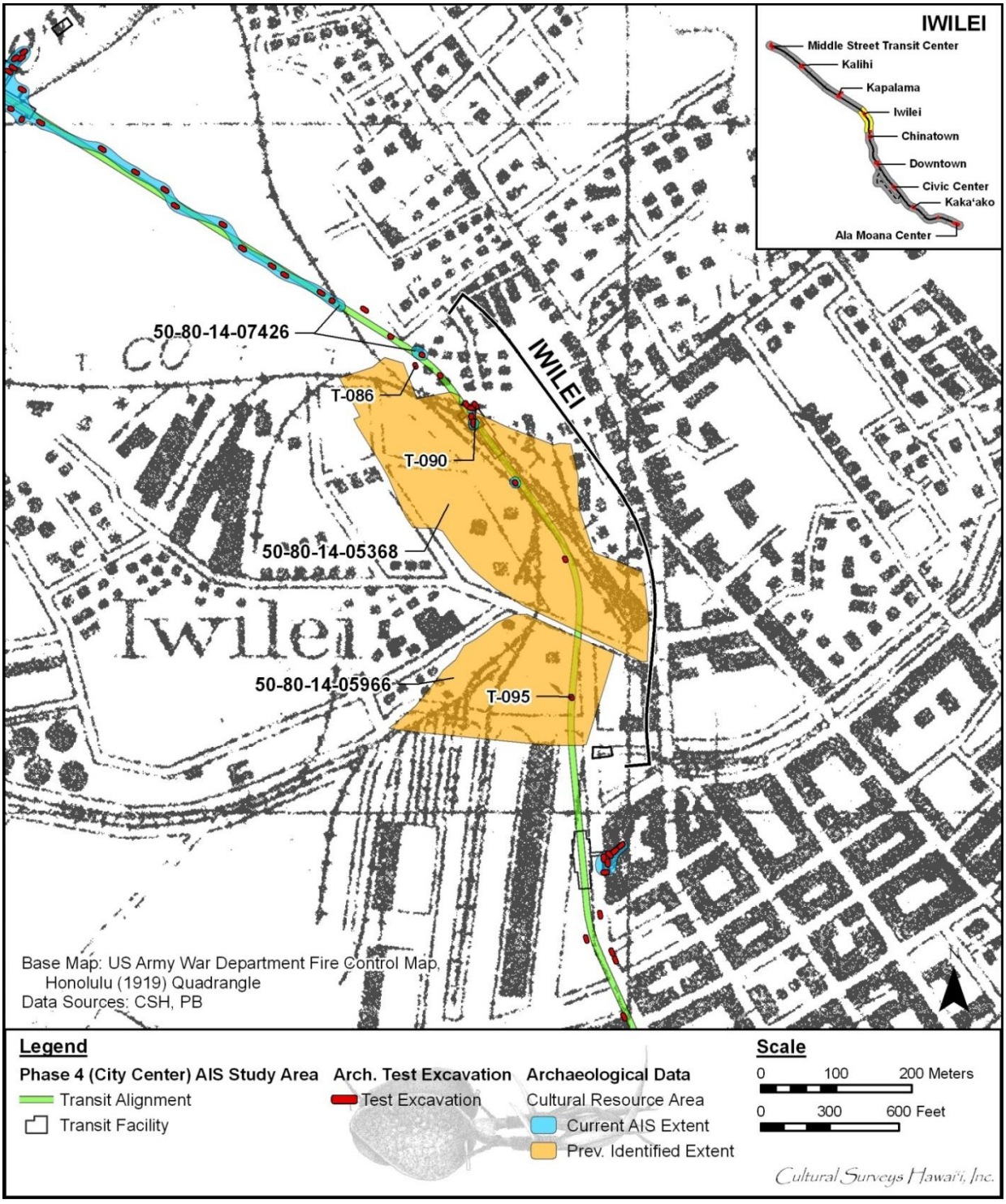


Figure 27. 1919 U.S. Army War Department Fire Control map, Honolulu Quadrangle, showing the location of the Iwilei Zone AIS test excavations (T-086 through T-095) along the HHCTCP corridor and at the Iwilei Station

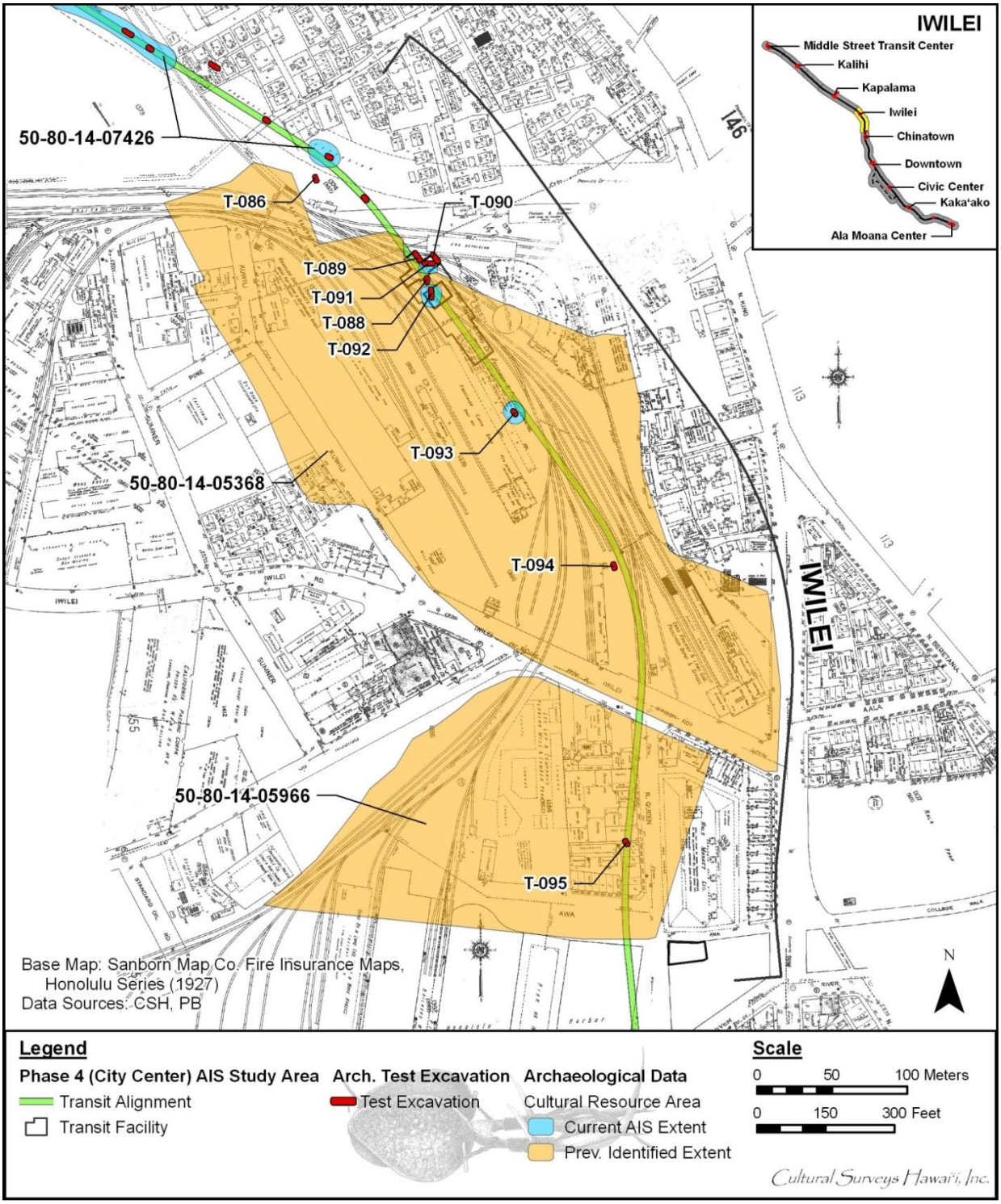


Figure 28. 1927 Sanborn Series maps showing the HHCTCP corridor and AIS test excavations in the Iwilei Zone and the OR&L holdings around the Iwilei Station (Sanborn Map Company 1927)

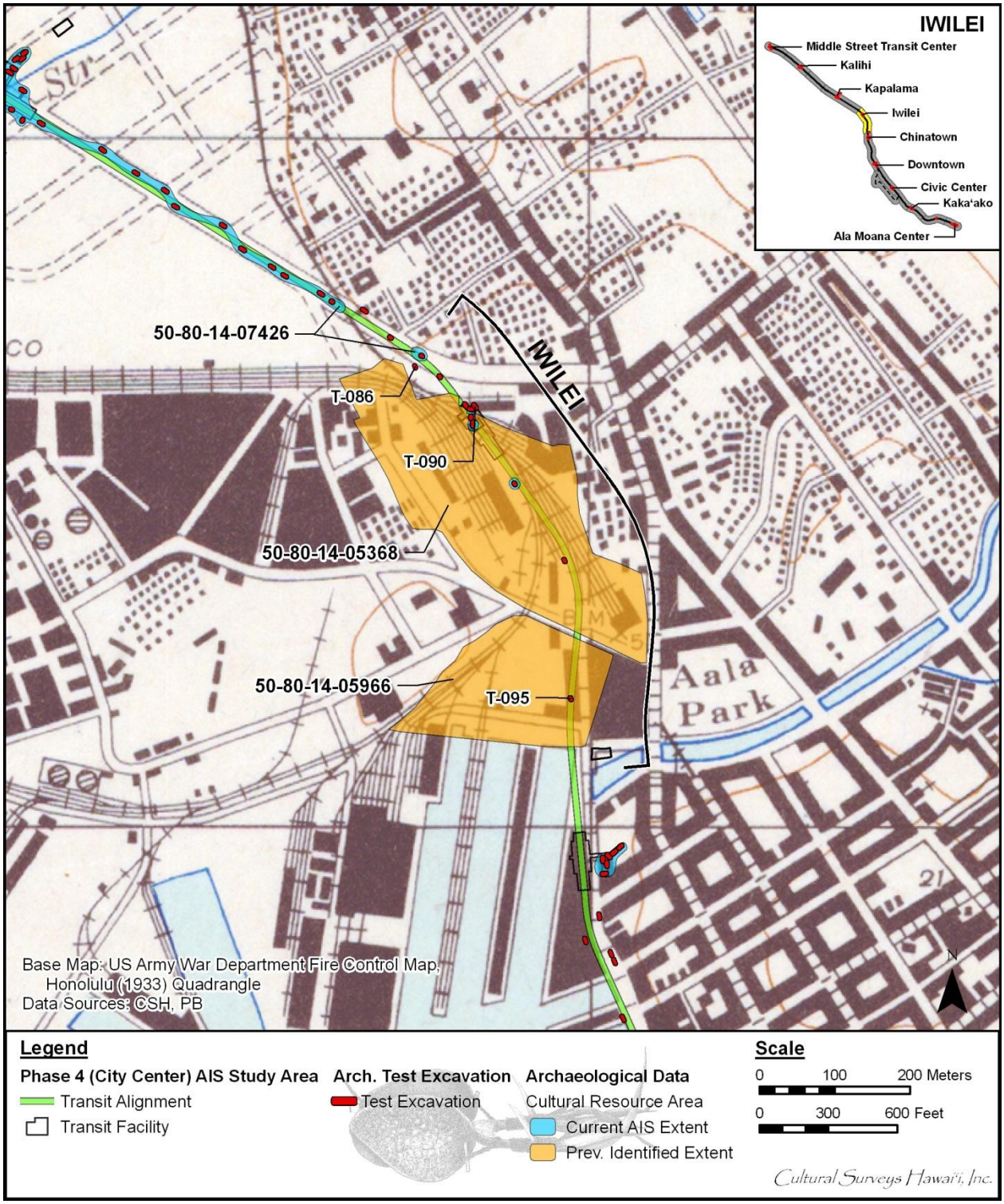


Figure 29. 1933 U.S. Army War Department Fire Control map, Honolulu Quadrangle, showing the Iwilei Zone

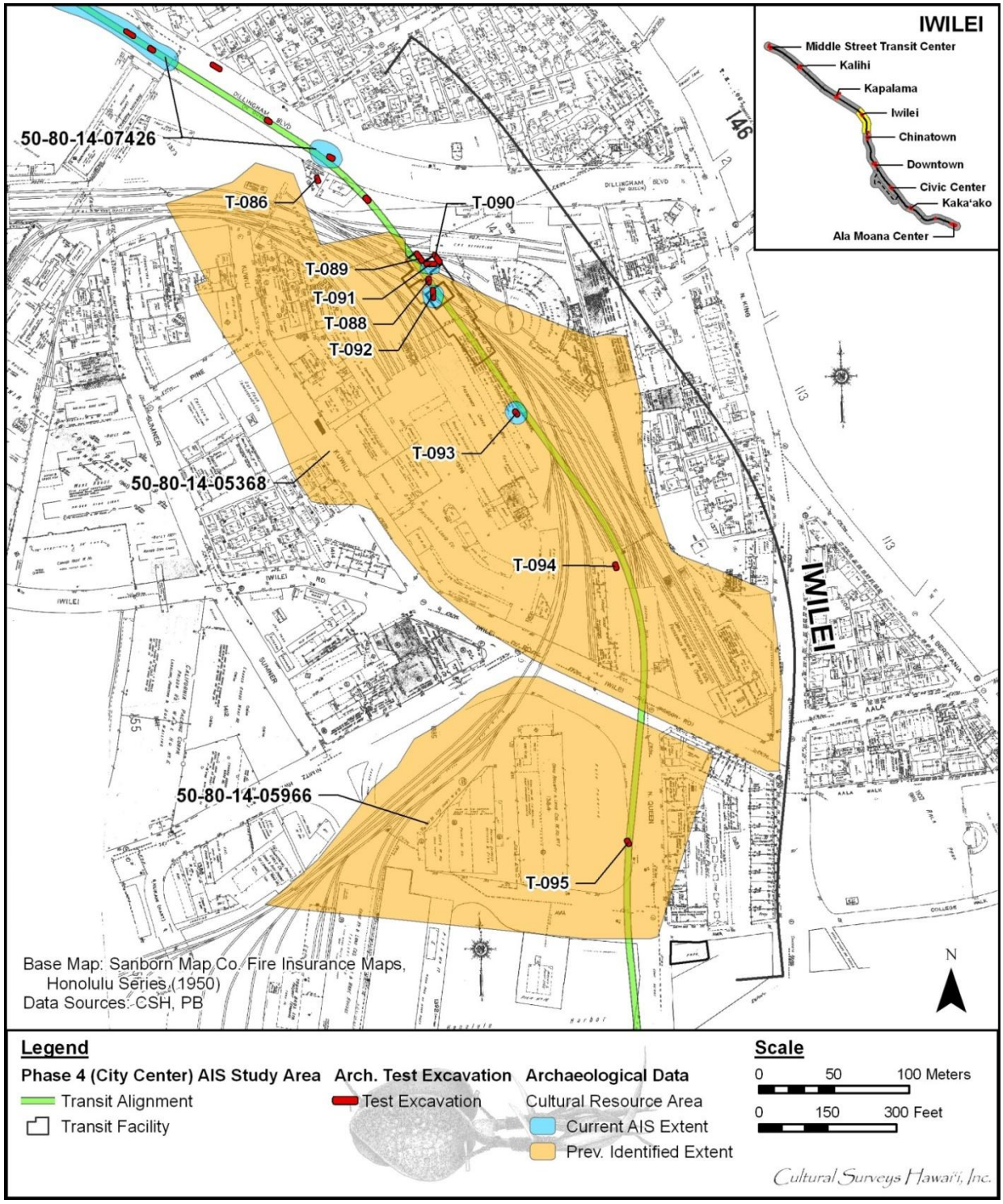


Figure 30. 1950 Sanborn Series maps showing a portion of the HHCTCP corridor and AIS test excavations in the Iwilei Zone and the OR&L holdings around the Iwilei Station (Sanborn Map Company 1950)

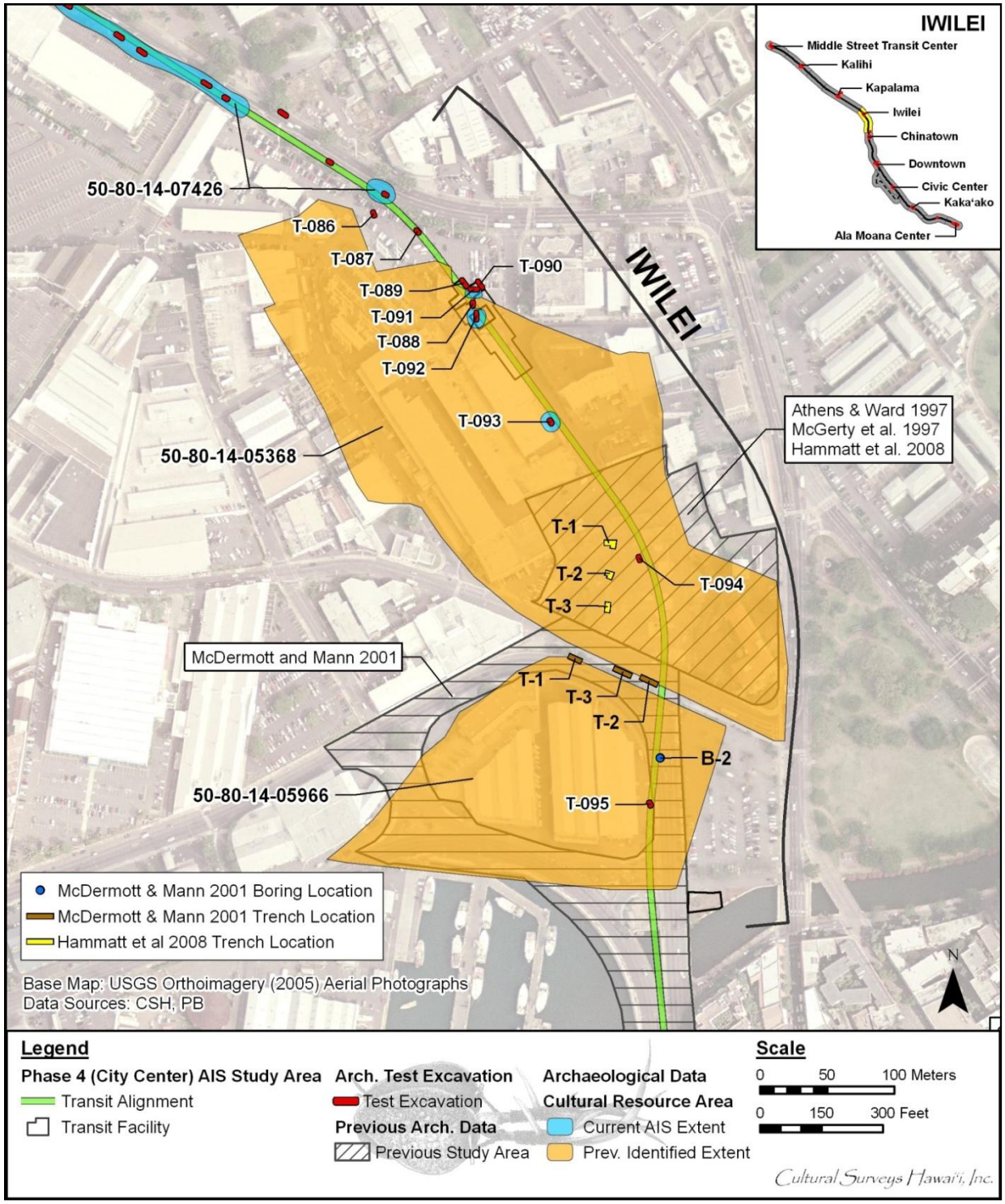


Figure 31. Previous archaeological studies in the vicinity of the Iwilei Zone (base map: U.S. Geological Survey Orthoimagery 2005); test excavations of prior studies that are immediately adjacent to the Iwilei Zone corridor are also shown

Table 6. Previous archaeological studies conducted within or directly adjacent to the Iwilei Zone (arranged chronologically)

Author	SIHP # 50-80-14	Report Description and Findings
Athens and Ward 1997	-5368	Concluded that construction of Kūwili Fishpond occurred rather late in the prehistoric Hawaiian period, after upland forests had been affected by inland expansion of Hawaiian land use
McGerty, Dega, and Spear 1997	-5368	Inventory survey at the site of the proposed Liliha Civic Center; subsurface testing identified soil layers interpreted to be the remains of Kūwili Fishpond
McDermott and Mann 2001	-5966	Inventory survey for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu; fieldwork focused on investigations of Kawa Fishpond
Hammatt, Hazlett, and Shideler 2008	-5368	Data recovery for Kūwili Fishpond; radiocarbon dating samples suggest the earliest pond sediments were deposited circa AD 1020 to AD 1120; microscopic charcoal particles in soil samples indicated local land clearing activity both prior to and after construction of the fishpond.

interpreted to be the remains of Kūwili Fishpond (SIHP # 50-80-14-5368). Radiocarbon analysis of pond sediments suggests that Kūwili Fishpond may have been constructed as early as AD 1100.

The Athens and Ward (1997) study identified massive historic fill deposits over a soil layer interpreted to be the remains of Kūwili Fishpond. Below the fishpond layer, sandy, silty marine sediments were interpreted as the natural lagoonal deposits that predated the construction of Kūwili Fishpond. Radiocarbon analysis of the fishpond sediment yielded age ranges of AD 1470-1661 and AD 1443-1657. Based on the radiocarbon dates and pollen analysis of sediment samples, Athens and Ward (1997) concluded that fishpond construction occurred rather late in the prehistoric Hawaiian period, after upland forests had been affected by inland expansion of Hawaiian land use.

The Hammatt, Hazlett, and Shideler (2008) study involved data recovery for Kūwili Fishpond. Three backhoe test trenches were excavated, all of which were located adjacent to and *makai* of the Iwilei Zone corridor. Observed stratigraphy consisted of thick historic fill layers over natural pond sediments, although in Trench 3 the water table was reached before natural sediments. This was very similar to adjacent HHCTCP excavations T-093 (thick fill layers over natural pond sediment) and T-094 (thick fill layers down to the water table). Radiocarbon analysis of sediments suggested that the earliest pond sediments were deposited circa AD 1020 to AD 1120, which was consistent with the estimate of AD 1100 by McGerty, Dega, and Spear (1997).

Microscopic charcoal particles in soil samples indicated local land clearing activity both prior to and after construction of Kūwili Fishpond. Pollen analysis indicated that the same flora (*Pritchardia*, *Cyperaceae* and *Poaceae*) that had dominated the vicinity before establishment of the fishpond continued to grow in the area afterward.

Kawa Fishpond, SIHP # 50-80-14-5966 (McDermott and Mann 2001)

The McDermott and Mann (2001) study was an archaeological inventory survey for the proposed Nimitz Highway water system improvements in Downtown Honolulu. The project area was between Iwilei Road, North King Street, River Street, and Kūkahi Street, and was located partially within the former Kawa Fishpond. The archaeological fieldwork focused primarily on the investigation of Kawa Fishpond, designated SIHP # 50-80-14-5966. Five boring cores and three backhoe trenches were excavated. Boring 2 and Trenches 1, 2, and 3 were located adjacent to the Iwilei Zone corridor and HHCTCP excavations T-094 and T-095. The stratigraphy of Boring 2 consisted of marine sediment over fishpond sediment over natural lagoonal sediment. This differed slightly from nearby T-095, which consisted of several fill layers down to 1.45 mbs, where excavation stopped due to the presence of a contaminated fill layer. However, it was possible that fishpond sediments are present beneath this level. The stratigraphy of Trenches 1 and 3 consisted of various fill layers over fishpond sediment, while in Trench 2, a concrete slab was encountered at 0.40 mbs that could not be penetrated by the backhoe, thus prohibiting further excavation. Nearby T-094 consisted of thick fill layers down to the water table, where excavation stopped; however, it was possible that fishpond sediments are present beneath the water table. Thus, excavation results of the McDermott and Mann (2001) study are fairly similar to nearby HHCTCP excavations. Radiocarbon dating results of fishpond samples did not provide a clear date of construction for Kawa Fishpond, but based on the samples, it appears that fishpond sediments were accumulating since at least AD 1150-1350.

4.5 Modern Land Use and Built Environment

The Iwilei Zone traverses an urban environment through the neighborhoods of Kapālama and Iwilei. The Iwilei Zone corridor begins at Dillingham Boulevard, just east of Akepo Lane, at the north end, cuts through a current parking lot, and then follows along Ka’aahi Street where it continues past the dead end and cuts through a current industrial lot, then crosses Iwilei Road to connect to the Nimitz Highway off-ramp to Iwilei Road, and then continues onto Nimitz Highway to Nu’uanu Stream at the south end. Parcels bordering the Iwilei Zone corridor contain largely industrial warehouses, with some bare lots, parking lots, and high-rise condominiums. A massive utility corridor was also present throughout the Iwilei Zone containing electrical, gas, water, sewer, and storm lines. The number and distribution of these existing utilities indicate that this portion of the HHCTCP corridor has been heavily disturbed in the past.

4.6 Test Excavation 85 (T-085)

***Ahupua'a*:**	Nu'uanu
LCA:	W-826:2
TMK #:	1-5-007 [Plat]
Elevation:	1.78 m
UTM:	617488.7841 mE, 2357825.695 mN
Max Length / Width / Depth:	3.0 m / 0.9 m / 2.20 mbs
Orientation:	110 / 290° TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 85 (T-085) was located within the middle southeast bound lane of Dillingham Boulevard 42 m southeast of the intersection of Dillingham Blvd. and Akepo Lane. T-085 was located on property owned by the City and County of Honolulu. Existing utilities near T-085 included a water line parallel to the excavation approximately 3.4 m to the northeast (*mauka*), an AT&T line parallel to the excavation approximately 4.5 m to the south (*makai*), and an electric manhole located 6.5 m to the northwest (*makai*). The location of T-085 was shifted 3 m south to avoid a water utility line. The excavation area was level with the surrounding road surface.

Summary of Background Research and Land Use: Land Court Application 939 map 1 indicated that T-085 was originally situated on land containing two *lo'i*, which were awarded to Keakahiwa as part of LCA 826. The LCA testimonies indicated taro cultivation and habitation for the nearby areas. According to a map by Brown (1885), T-085 was located approximately 27 m northeast of the Kūwili Fishpond (SIHP # 50-80-14-5368) shoreline and 265 m north of Kawa Fishpond (SIHP # 50-80-14-5966). According to Monsarrat's 1897 map of Honolulu, the Kūwili Fishpond area appears to be mostly rice fields and the OR&L was constructed approximately 40 m southwest of T-085. Kawa Pond also was illustrated on the map, approximately 380 m to the south. According to the Sanborn Series maps, the location of T-085 was within a pond in 1914, which became a proposed road extension in 1927. The 1933 U.S. Army War Department Fire Control map of Honolulu depicts the location of T-085 as within the present-day Dillingham Boulevard.

The two fishponds, Kūwili and Kawa, have been primary areas of archaeological studies within the immediate vicinity of T-085. The Kūwili Fishpond (designated SIHP # 50-80-14-5368) was the focus of three archaeological studies. The International Archaeological Research Institute, Inc. (IARII) conducted a paleoenvironmental study of historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond and concluded that the fishpond was constructed late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use (Athens and Ward 1997). Scientific Consultant Services, Inc. conducted an archaeological inventory survey for the proposed Liliha Civic Center and

documented 12 subsurface features, including human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment (McGerty, Dega and Spear 1997). The radiocarbon analyses suggested that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as 1100 AD. Cultural Surveys Hawai'i conducted a data recovery study for the Kūwili Fishpond, in which the radiocarbon analyses suggested the pond sediments were deposited between 1020 A.D. and 1120 A.D., consistent with previous archaeology (Hammatt, Hazlett, and Shideler 2008). The Kawa Fishpond was incorporated into one previous archaeological study. Cultural Surveys Hawai'i conducted an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu, which focused on the investigation of Kawa Fishpond (designated SIHP # 50-80-14-5966) (McDermott and Mann 2001). Although no clear dates for the original construction of the Kawa Fishpond were provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least 1150-1350 A.D.

Additional previous archaeology in the vicinity of T-085 includes a monitoring project by Paul H. Rosendahl, Inc. (PHRI) for a Palama Chevron Station Site at the corner of North King Street and Robello Lane (Dunn et al. 1991). The Department of Land and Natural Resources was notified of human remains discovered during excavation activity at the project site, and PHRI then was retained to conduct an archaeological investigation and monitoring of further construction. The human remains were determined to represent at least two adults in a secondary context and historic artifacts directly associated with the remains indicated that the remains were historic. Garcia and Associates conducted archaeological monitoring on King Street between Liliha Street and River Street for a King Street 24-inch Waterline Project and encountered remnants of the previously document Honolulu Rapid Transit trolley system, designated SIHP # 50-80-14-5942 (West et al. 2002).

Documentation Limitations: T-085 was excavated to 2.2 mbs, and beneath the water table at 2.15 mbs. T-085 was relocated prior to excavation 3.0 m to the SE to avoid a water utility line. Due to the removal of large boulders and collapsing side walls T-085 was unstable for entrance.

Stratigraphic Summary: The stratigraphy of T-085 consisted of fill strata overlying natural sediment over the coral shelf. Observed strata included asphalt (Ia), extremely gravelly sand base course (Ib), and gravelly sandy loam fill (Ic), overlying natural silty clay loam (II) above the coral shelf. The observed stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: See sample results below.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

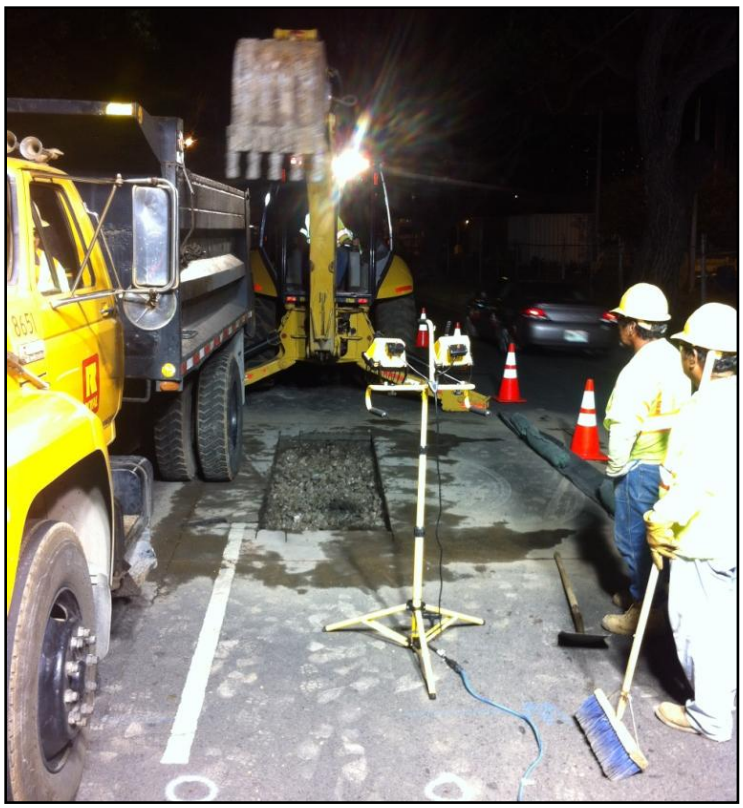
Sample Results: One bulk sediment sample was collected from Stratum II between 2.05-2.10 mbs (8 L). The sediment sample was wet-screened. The sample was collected from the bucket of the backhoe and could not be obtained directly from the stratum due to potential safety hazards

of unstable side walls. The bulk sediment sample from T-085 yielded charcoal (1.0g), naturally-occurring marine shell (8.8g), wood remains (0.1g), and rusted metal.

GPR Discussion: A review of amplitude slice maps indicated a linear feature, but it was not encountered due to the relocation of the excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

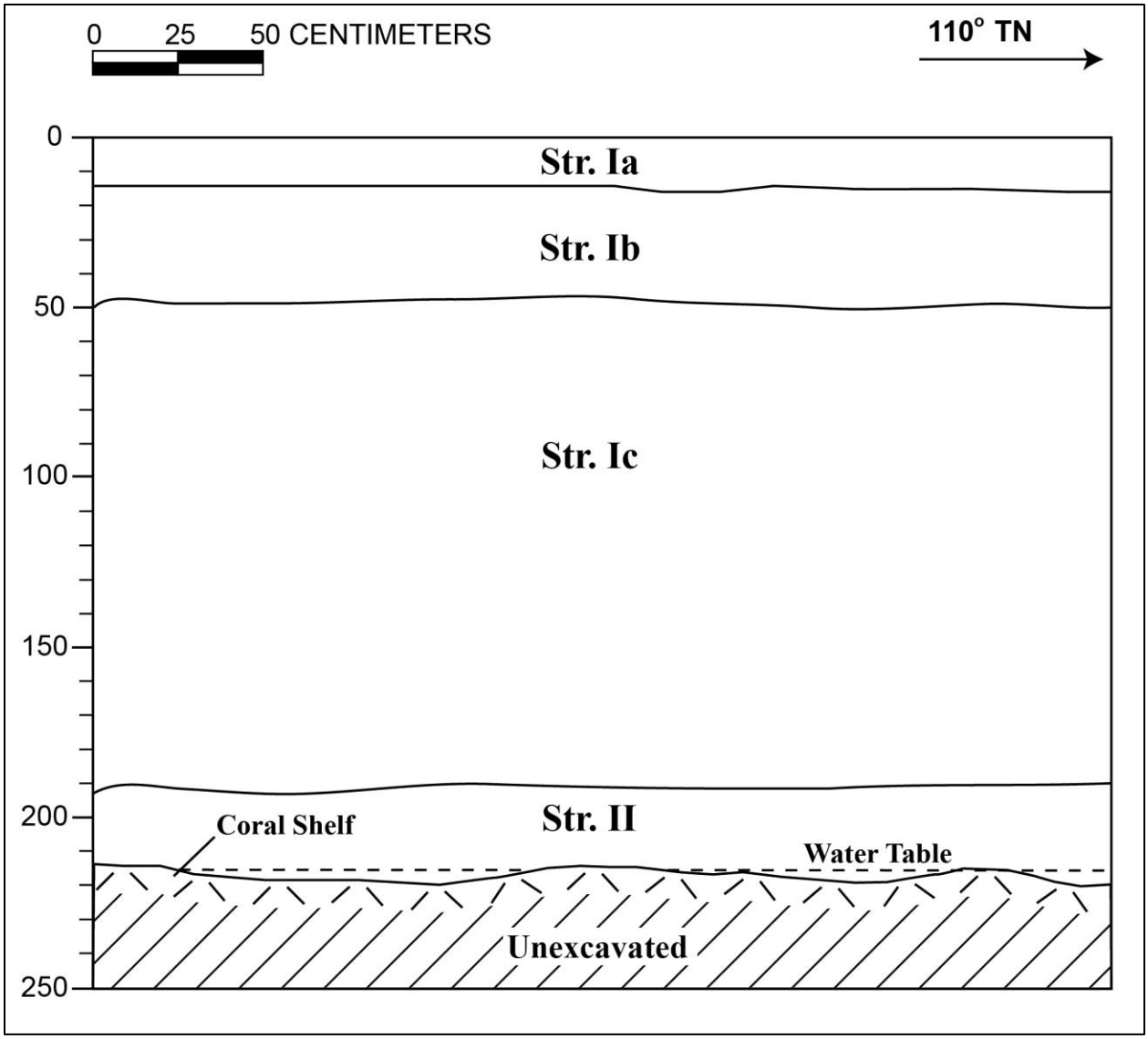
GPR depth profiles for T-085 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.15 mbs. An anomaly was observed in the profile, but was not encountered due to the relocation of the excavation. The maximum depth of clean signal return was approximately 1.00 mbs.

Summary: T-085 was excavated to a depth of 2.20 mbs, and beneath the water table at 2.15 mbs. The stratigraphy of T-085 consisted of fill strata (Ia to Ic) overlying natural alluvial sediment (II). The observed stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). The natural sediment (II) within T-085 is considered to be a possible wetland deposit and is designated a component of SIHP# 50-80-14-7426 (see Volume I).



T-085 general location, view to southeast

T-085 northeast wall



T-085 northeast profile

T-085 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-15	Asphalt; road surface
Ib	15-50	Fill; 10YR 5/1 (gray); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed basalt gravel base course fill
Ic	50-195	Fill; 10YR 3/2 (very dark grayish brown); gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, smooth lower boundary; contained brick portions and rebar
II	195-215	Natural; 10YR 3/1 (very dark gray); silty clay loam; moderate, very fine blocky structure; moist, friable consistency; plastic; marine origin; few, very fine to medium roots observed

4.7 Test Excavation 86 (T-086)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK #:	1-5-007: 016
Elevation:	1.81 m
UTM:	617480.0480 mE, 2357811.179 mN
Max Length / Width / Depth:	3.74 m / 0.91 m / 2.27 mbs
Orientation:	156 / 336º TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 86 (T-086) was located near the edge of a Hawaiian Electric Company (HECO) parking lot approximately 11 m south of Dillingham Boulevard between the intersections with Ka'a'ahi Street and Akepo Lane. Existing utilities near T-086 included a storm drain located approximately 8.8 m to the north (*mauka*). The location of T-086 was rotated from the original plan to avoid multiple existing utilities. The excavation area was level with the surrounding land surface. T-086 was located on private property owned by HECO.

Summary of Background Research and Land Use: The location of T-086 was not within an awarded Land Court Application parcel. T-086 was less than 2.0 m south of the boundary for LCA 655 awarded to Kahalea'ahu, and also less than 2.0 m south of the boundary for LCA 826 awarded to Keakahiwa. The LCA testimonies indicated *lo'i* (taro) cultivation and habitation for the nearby areas. According to the 1885 map by Brown, T-086 was located approximately 14 m east of the former Kūwili Fishpond (SIHP# 50-80-14-5368) shoreline in a *lo'i kalo* (taro patch). According to the W.A. Wall's 1887 map of Honolulu, the area surrounding the location of T-086 was relatively undeveloped. According to Monsarrat's 1897 map of Honolulu, the Kūwili Fishpond area appears to be mostly rice fields and the OR&L was constructed approximately 25 m southwest of T-086. Kawa Fishpond (SIHP# 50-80-14-5966) also was illustrated on the map, approximately 370 m to the south (*makai*). According to the Sanborn Series maps, the location T-086 was on the southern edge of a pond in 1914, which then became immediately south of a proposed road extension in 1927. The 1933 U.S. Army War Department Fire Control map of Honolulu depicts the location of T-086 as immediately south of the present-day Dillingham Boulevard.

The two fishponds, Kūwili and Kawa, have been primary areas of archaeological studies within the immediate vicinity of T-086. The Kūwili Fishpond (designated SIHP # 50-80-14-5368) was the focus of three archaeological studies. The International Archaeological Research Institute, Inc. (IARII) conducted a paleoenvironmental study of historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond and concluded that the fishpond was constructed late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use (Athens and Ward 1997). Scientific Consultant Services Inc. conducted an archaeological inventory survey for the proposed Liliha Civic Center and

documented 12 subsurface features including human skeletal remains, possible *ki’o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment (McGerty, Dega and Spear 1997). The radiocarbon analyses suggested that Kūwili Fishpond (SIHP# 50-80-14-5368) may have been built as early as 1100 AD. Cultural Surveys Hawai’i conducted a data recovery study for the Kūwili Fishpond where the radiocarbon analyses suggested the pond the sediments were deposited between 1020 AD and 1120 AD and was consistent with the previous archaeology (Hammatt, Hazlett, and Shideler 2008). The Kawa Fishpond was incorporated into one previous archaeological study. Cultural Surveys Hawai’i conducted an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu which focused on the investigation of Kawa Fishpond (designated SIHP# 50-80-14-5966) (McDermott and Mann 2001). Although clear dates of construction for the Kawa Fishpond were provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least 1150-1350 AD.

Additional previous archaeology in the vicinity of T-086 includes a monitoring project for a proposed Palama Chevron Station Site at the corner of North King Street and Robello Lane (Dunn et al. 1991). The Department of Land and Natural Resources was notified of human remains discovered during excavation activity at the project site, and PHRI then was retained to conduct an archaeological investigation and monitoring of further construction. The human remains were determined to represent at least two adults in a secondary context and historic artifacts directly associated with the remains indicated that the remains were historic. Archaeological monitoring was conducted on King Street between Liliha Street and River Street for a King Street 24-inch Waterline Project and encountered remnants of the previously documented Honolulu Rapid Transit trolley system, designated SIHP# 50-80-14-5942 (West et al. 2002).

Documentation Limitations: T-086 was excavated to the 2.27 mbs, beneath the water table at a depth of 2.17 mbs. A water line encountered at the northern end of T-086 at 0.40 mbs limited excavation at that end. The southern end was not level with the final depth due to the presence of several large basalt boulders. A metal I-bar encountered at 0.81 mbs in the central portion of the excavation was left *in situ* to avoid compromising the stability of the sidewall.

Stratigraphic Summary: The stratigraphy of T-086 consisted of fill strata to the base of excavation. Observed strata included the asphalt parking lot surface (Ia), extremely gravelly sand base course (Ib), very gravelly sandy loam crushed coral fill (Ic), very gravelly cobbly loam (Id), gravelly silty loam (Ie), very gravelly silty loam (If), gravelly coarse sand (Ig), and coarse sandy loam (Ih). The stratigraphy conforms to the USDA soil designation of Fill land (FL).

Artifacts Discussion: Thirteen (13) artifacts (Acc. # 086-A-1 to A-13) were collected from several of the fill layers in T-086, two ceramic fragments from two vessels, nine complete bottles, a rail spike, and a light bulb. The rail spike (Acc. # 086-A-13) was collected from Stratum Ib at 0.20 mbs. The likely association of the spike was with the OR&L, which was located approximately 25 m southwest of T-086. The OR&L was demolished in the late 1940s. There were four complete glass bottles and one light bulb fragment collected from Stratum Ie at 1.05-1.15 mbs. The glass bottles included a food jar, two “Pond’s” cosmetic jars, and a clear glass spirits bottle. All of the bottles were machine-blown and post-date 1903, and one was dated to 1940 (Acc. # 086-A-3). Artifacts collected from Stratum Ie (gravelly silty loam fill) indicated

that the stratum post-dates the mid-twentieth century. A total of two ceramic artifacts were collected from Stratum Ih at 1.37 mbs. The artifacts included an Asian hollowware rice bowl fragment with pink and blue floral designs and a flatware fragment with an orange and blue floral design. A total of five glass bottles were also collected from Stratum Ih at 1.2-2.0 mbs. The artifacts included three clear bottles and two amber bottles. All of the bottles were machine blown dating post 1903, and three bottles had narrow date ranges from 1911 to 1945. Artifacts collected from Stratum Ih indicated that the stratum post-dates the early-to-mid twentieth century.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: Terrestrial faunal remains were collected from Stratum Ih at 1.55 mbs. Faunal remains included a sheep (*Ovis aries*) proximal metatarsal portion. The presence of sheep remains supported the interpretation that Stratum Ih was an historic fill deposit.

Sample Results: No additional sample analysis was conducted.

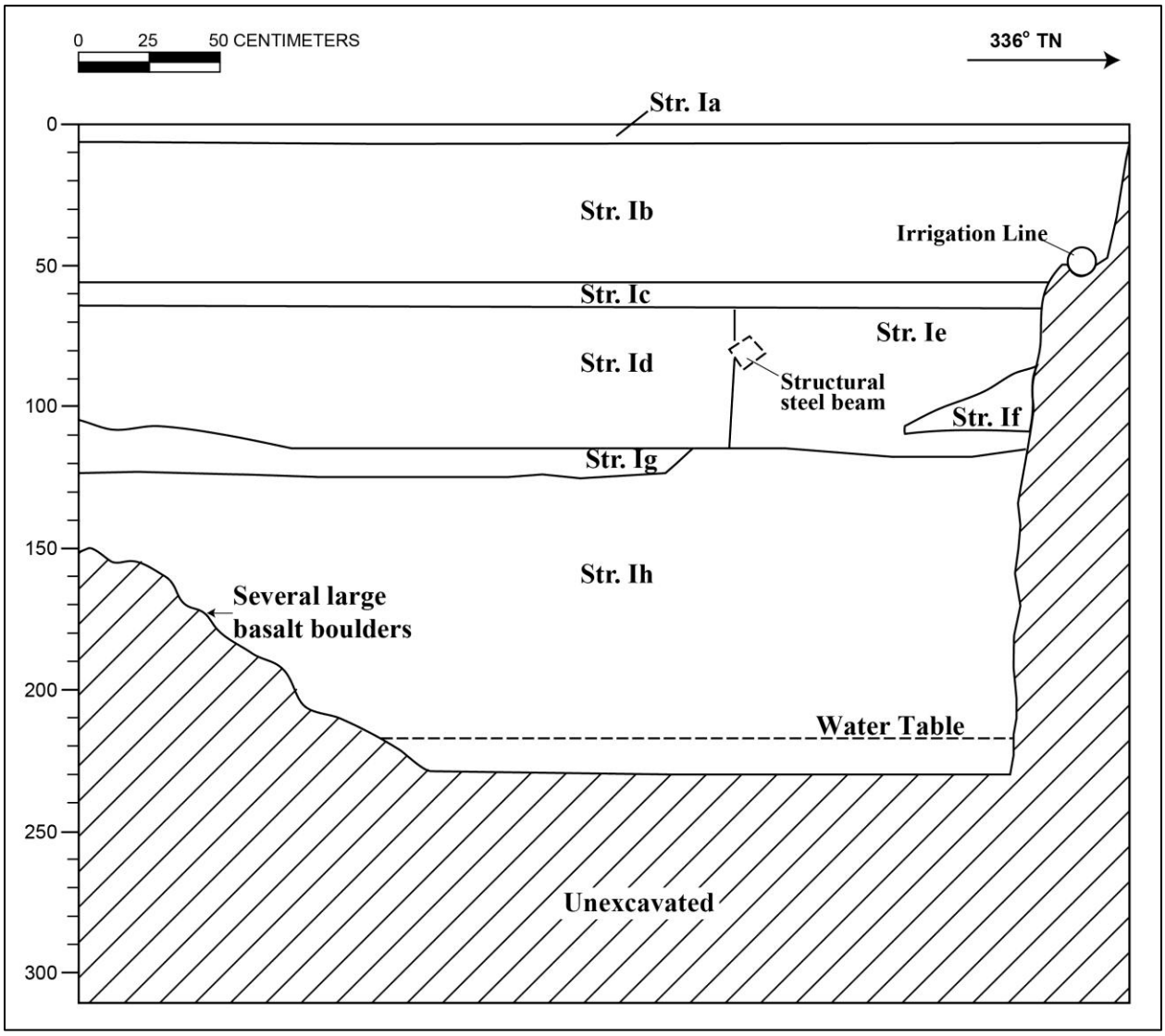
GPR Discussion: A review of amplitude slice maps indicated several linear features and a utility and structure beam were encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth with the exception of a HECO box and several utilities. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-086 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.10 mbs and again around 0.70 mbs. An anomaly was observed in the profile located outside excavation boundaries and two voids were observed in the profile that could correspond to the objects encountered during excavation. The maximum depth of clean signal return was approximately 0.90 mbs.

Summary: T-086 was excavated to the 2.27 mbs, and beneath the water table at a depth of 2.17 mbs. The stratigraphy of T-086 consisted of fill strata (Ia-Ih) to below the water table. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Artifacts collected from Stratum Ie included a railway spike and four glass bottles which indicated that Stratum Ie post-dates the mid twentieth century. Artifacts and faunal remains collected from Stratum Ih post-date the early-to-mid twentieth century. No natural sediments were observed. No significant historic properties were identified.

T-086 general location, view to the northeast

T-086 west wall profile (before water table), view to west



T-086 west wall profile

T- 086 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-6	Asphalt, parking lot surface
Ib	6-57	Fill; 10YR 5/1 (gray); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed basalt gravel base course fill; contained a railroad spike
Ic	57-66	Fill; 10YR 8/2 (very pale brown); very gravelly sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base
Id	66-116	Fill; 10YR 4/2 (dark grayish brown); very gravelly cobbly loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous; abrupt, smooth and broken/discontinuous lower boundary; imported fill; contained steel I-beam
Ie	66-116	Fill; 2.5YR 4/6 (red); gravelly silty loam; weak, medium blocky structure; moist, friable to firm consistency; terrigenous origin; abrupt, smooth and broken/discontinuous lower boundary; imported fill; contained glass bottles
If	85-107	Fill; 10YR 8/2 (very pale brown); very gravelly sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; mixed; abrupt and broken/discontinuous lower boundary
Ig	105-123	Fill; 10YR 7/4 (very pale brown); gravelly coarse sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; smooth and broken/discontinuous lower boundary;
Ih	116-227	Fill; 10YR 4/3 (brown); coarse sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; mixed origin; contained several bottles, faunal bone

T-086 Historic Artifact Analysis

Acc. # 086-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste; Decor.	Origin; Age	Comments
1	T-086, St. Ih	Hollowware - bowl	Base to rim	1	Porcelain; Incised, painted overglaze	Asian	Red chrysanthemums with blue leaves; diamond stamped on base; high foot; rice bowl
2	T-086, St. Ih	Flatware	Rim	1	Earthenware, Refined; Painted underglaze		Red & blue flowers, green leaves
Acc. # 086-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
3	T-086, St. Ie	Bottle, Spirits	Complete	1	Clear	American 1940	Thatcher Glass Mfg. Co. date code on base
4	T-086, St. Ie	Jar, Food	Complete	1	Clear	1903-post	"3" - embossed on base
5	T-086, St. Ie	Jar, Cosmetic	Complete	1	White	American 1907-post	Milk glass; Ponds face cream
6	T-086, St. Ie	Jar, Cosmetic	Complete	1	White	American 1907-post	Milk glass; Ponds face cream
7	T-086, St. Ih	Bottle, Medicine	Complete	1	Clear	1907-post	" 1 – B" - embossed on base
8	T-086, St. Ih	Bottle	Complete	1	Clear	American 1911-1929	Owens Glass Co. mark on base
9	T-086, St. Ih	Jar, Food	Complete	1	Clear	American 1925-1930	Best Foods brand; Pacific Coast Glass Works base mark
10	T-086, St. Ih	Bottle	Complete	1	Amber	1935/1945	Owens-Illinois Glass Co. base mark
11	T-086, St. Ih	Bottle	Complete	1	Amber	1907-post	Metal top
Acc. # 086-A-	**Prov.**	**Misc. Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
12	T-086, St. Ie	Light bulb	Fragment	1	Composite		Yellow oval glass with wires attached
13	T-086, St. Ib	Spike, Rail	Complete	1	Metal	American 1889-1947	P-shaped head, square cross-section, end bi-tapered

T-086 ceramic vessels (Acc. # 086-A-1 and A-2) from T-086 from Stratum Ih

T-086 glass bottles (Acc. # 086-A-3 to A-6, shown from left to right) collected from Stratum Ie

T-086 glass bottles (Acc. # 086-A-7 to A-11, shown from left to right and top to bottom) collected from Stratum Ih

4.8 Test Excavation 87 (T-087)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK #:	1-5-007: 016
Elevation:	1.77 m
UTM:	617512.9739 mE, 2357798.292 mN
Max Length / Width / Depth:	3.75 m / 0.75 m / 2.12 mbs
Orientation:	142 / 322º TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 87 (T-087) was located near the edge of a Hawaiian Electric Company (HECO) parking lot, approximately 9.0 m south of Dillingham Boulevard between the intersections with Ka'a'ahi Street and Akepo Lane. T-087 was approximately 70 m southwest of the intersection of Dillingham Boulevard and Ka'a'ahi Street. Existing utilities near T-087 included a sewer line located approximately 3.1 m to the south. The excavation area was level with the surrounding land surface. T-087 was located on private property owned by HECO.

Summary of Background Research and Land Use: The location of T-087 was not part of an awarded Land Court Application parcel. The excavation area was less than 17 m south of the boundary for LCA 826 awarded to Keakahiwa and less than 12 m east of the boundary for LCA 2440 B awarded to Kauaua. The LCA testimonies indicated *lo'i* (taro) cultivation and habitation for the nearby areas. According to a map by Brown (1885), T-087 was located approximately 23 m north of the former shoreline in a *lo'i kalo* (taro patch). According to the W.A. Wall's 1887 map of Honolulu, the location of T-087 was less than 8 m northeast of the Kūwili Fishpond in a relatively undeveloped area. According to Monsarrat's 1897 map of Honolulu, the Kūwili Fishpond area appears to be mostly rice fields and the OR&L was constructed less than 35 m southwest of T-087. Kawa Pond also was illustrated on the map, approximately 348 m to the south (*makai*). According to the Sanborn Series maps, the location T-087 was within the southern portion of a pond in 1914, which then became immediately south of a proposed road extension in 1927. The 1933 U.S. Army War Department Fire Control map of Honolulu depicts the location of T-087 as immediately south of the present-day Dillingham Boulevard.

The two fishponds, Kūwili and Kawa, have been primary areas of archaeological studies within the immediate vicinity of T-087. The Kūwili Fishpond (designated SIHP# 50-80-14-5368) was the focus of three archaeological studies. The International Archaeological Research Institute, Inc. (IARII) conducted a paleoenvironmental study of historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond and concluded that the fishpond was constructed late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use (Athens and Ward 1997). Scientific Consultant Services Inc. conducted an archaeological inventory survey for the proposed Liliha Civic Center and documented 12 subsurface features including human skeletal remains, possible *ki'o pua* (fry

pond) walls, a coral platform foundation, and a basalt alignment (McGerty, Dega and Spear 1997). The radiocarbon analyses suggested that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as 1100 AD. Cultural Surveys Hawai'i conducted a data recovery study for the Kūwili Fishpond where the radiocarbon analyses suggested the pond the sediments were deposited between 1020 AD and 1120 AD and was consistent with the previous archaeology (Hammatt, Hazlett, and Shideler 2008). The Kawa Fishpond was incorporated into one previous archaeological study. Cultural Surveys Hawai'i conducted an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu which focused on the investigation of Kawa Fishpond (designated SIHP# 50-80-14-5966) (McDermott and Mann 2001). Although clear dates of construction for the Kawa Fishpond were provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least 1150-1350 AD.

Additional previous archaeology in the vicinity of T-087 includes a monitoring project by Paul H. Rosendahl, Inc. (PHRI) for a Palama Chevron Station Site at the corner of North King Street and Robello Lane (Dunn et al. 1991). The Department of Land and Natural Resources was notified of human remains discovered during excavation activity at the project site, and PHRI then was retained to conduct an archaeological investigation and monitoring of further construction. The human remains were determined to represent at least two adults in a secondary context and historic artifacts directly associated with the remains indicated that the remains were historic. Garcia and Associates conducted archaeological monitoring on King Street between Liliha Street and River Street for a King Street 24-inch Waterline Project and encountered remnants of the previously document Honolulu Rapid Transit trolley system, designated SIHP# 50-80-14-5942 (West et al. 2002).

Documentation Limitations: T-087 was excavated to a depth of 2.12 mbs, and beneath the water table at 2.05 mbs. There were no specific factors that limited documentation of T-087.

Stratigraphic Summary: The stratigraphy of T-087 consisted of fill layers to the base of excavation. Observed strata included asphalt (Ia), extremely gravelly sand base course (Ib), very gravelly sandy loam fill (Ic), very gravelly cobbly loam crushed coral base course (Id), and volcanic cinder fill (Ie) which contained historic artifacts. Natural strata were not observed during the excavation of T-087. The observed stratigraphy did not conform to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: Fourteen (14) artifacts (Acc. # 087-A-1 to A-14, see following table and photographs) were collected from the fill layers of T-087. There were three artifacts collected from Stratum Id at 0.80-1.15 mbs. The artifacts included one medicine bottle made between the 1870s and the 1920s (Acc. # 087-A-7). Artifacts collected from Stratum Id (gravelly cobbly sandy loam) indicated that the stratum post-dates the 1870s. There were 11 artifacts collected from Stratum Ie at 1.15-2.12 mbs. The artifacts included Asian and Anglo/American wares and bottles made in the pre-1920s mold blown era. One soda bottle was dated to 1910-1913 (Acc. # 087-A-7). Like within Stratum Id, the artifacts likely post-dated the 1870s, but were deposited circa 1920.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No additional sample analysis was conducted.

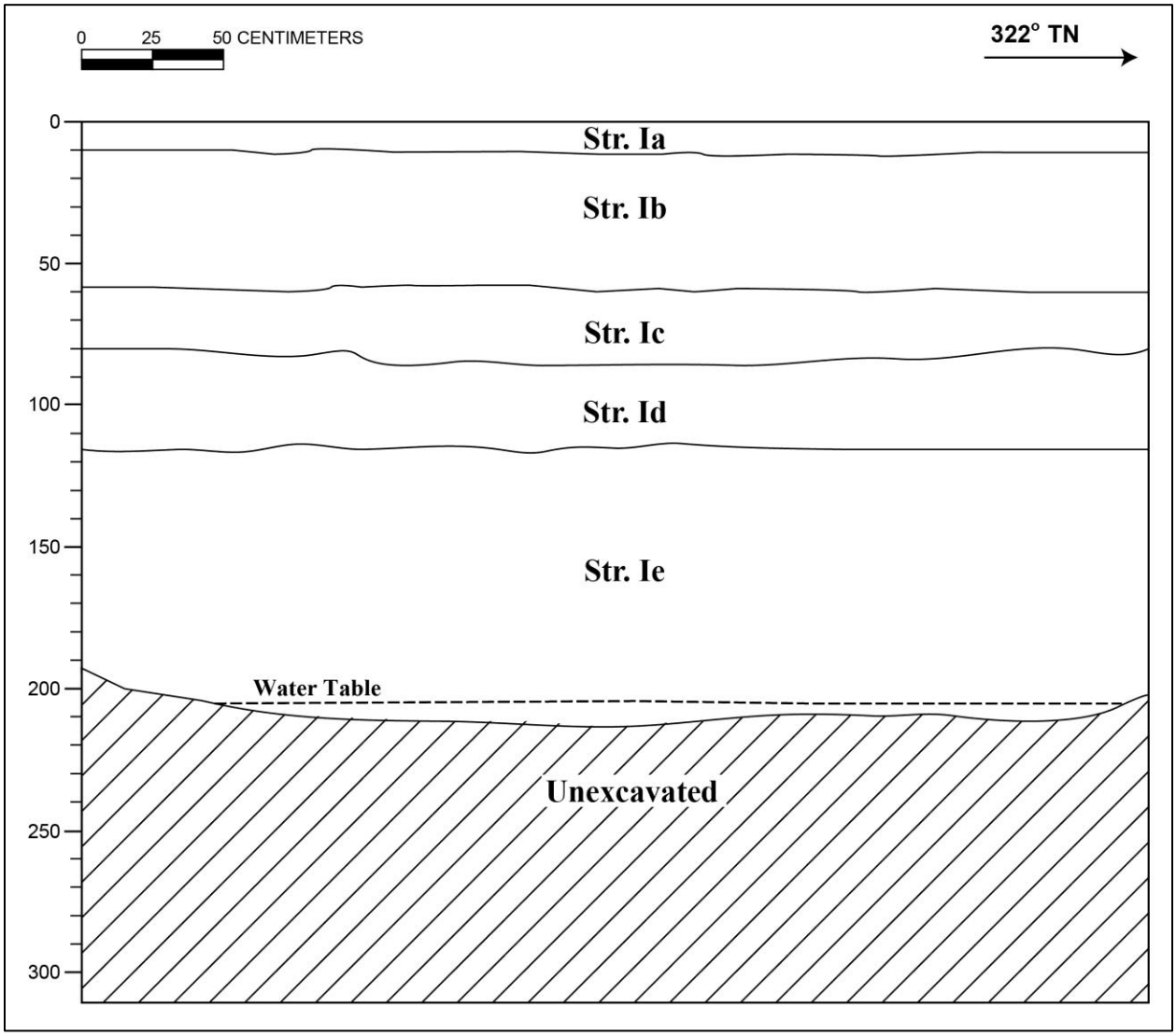
GPR Discussion: A review of amplitude slice maps indicated a linear feature located outside excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth with the exception of the utility. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-087 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.20 mbs and again around 0.50 mbs. An anomaly was observed in the profile located outside excavation boundaries. The maximum depth of clean signal return was approximately 0.80 mbs.

Summary: T-087 was excavated to a depth of 2.12 mbs, and beneath the water table at 2.05 mbs. T-087 consisted of fill strata (Ia-Ie) to beneath the water table. No natural sediment was encountered during the excavation of T-087. The observed stratigraphy did not conform to the USDA soil survey designation of Ewa silty clay loam (EmA). Artifacts observed in T-087 included Asian and European ceramic wares, five bottles, and three miscellaneous items. Artifacts collected within fill Stratum Id were from the mid-1800s and the early 1900s. No significant historic properties were identified.

T-087 general location, view to northeast

T-087 southwest wall profile, view to west



T-087 southwest wall profile

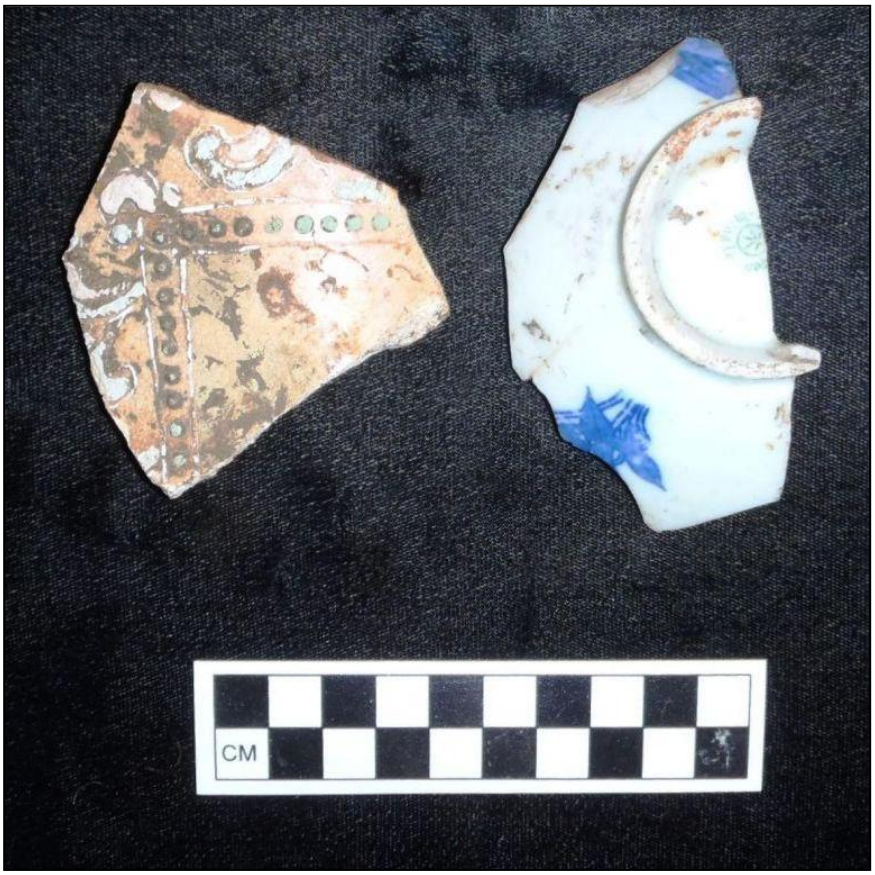
T-087 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-60	Fill; 7.5 YR 2.5/2 (very dark brown); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; abrupt, smooth lower boundary; basalt gravel base course
Ic	55-85	Fill; 2.5 YR 3/2 (very dark grayish brown); very gravelly sandy loam; weak, fine crumb structure; moist consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
Id	80-115	Fill; 10 YR 8/2 (very pale brown); gravelly cobbly sandy loam; weak, fine to medium, granular structure; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained a historic bottle
Ie	115-212	Fill; 10 YR 3/2 (very dark grayish brown); sandy loam; weak, fine to medium, crumb structure; moist, loose consistency, weak cementation; non-plastic; mixed origin; contained historic bottles, metal, ceramics

T-087 Historic Artifact Analysis

Acc. # 087-A-	Prov.	Ceramic Vessel Type	Portion	No.	Paste; Decor.	Origin; Age	Comments
1	T-087, St. Id	Hollowware	Body	1	Porcelain		Spout from teapot? Separate piece
2	T-087, St. Ie	Hollowware	Base to body	1	Porcelain; Painted underglaze	Asian; post-1921	painted on base "…pan / …Minada [Drawing] "Japan" used post 1921
3	T-087, St. Ie	Dinnerware	Body	1	Earthenware, Refined; Appliquéd, painted	Anglo/ European	Fleur-de-lis design motif
Acc. # 087-A-	**Prov.**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Origin; Age**	**Comments**
4	T-087, St. Id	Bottle, Medicine	Complete	1	Clear	American 1870s-1920s	Sloan’s Liniment, New York and St. Louis, Mo.
5	T-087, St. Ie	Bottle, Medicine	Complete (almost)	1	Clear	1870s-post	
6	T-087, St. Ie	Jar, Cosmetic	Body	1	White	1850s-post	Wide mouth milk glass jar
7	T-087, St. Ie	Bottle, Soda	Complete (almost)	1	Green, Light	American 1910-1913	Sunrise Soda Works, Kapālama; bottle made by the Illinois-Pacific Glass Co., San Francisco, Calif.
8	T-087, St. Ie	Bottle, Medicine	Base-shoulder	1	Clear	American 1860-post	Wyeth & Bro., Philadelphia
9	T-087, St. Ie	Bottle, Medicine	Complete	1	Clear	1870s-post	"A-96 H.M.M. Co"-embossed on base
10	T-087, St. Ie	Bottle, Medicine	Complete (almost)	1	Clear	American 1870s-1928	Colgate & Co., New York
Acc. # 087-A-	**Prov.**	**Misc. Type**	**Portion**	**No.**	**Material**	**Origin; Age**	**Comments**
11	T-087, St. Id	Brick	Fragment	1	--		Yellow color, coral inclusions
12	T-087, St. Ie	Brick	Fragment	1	Fired Clay		One-side flat, one-side convex
13	T-087, St. Ie	Nail, Wire	Fragment	1	Metal	Post-1850	Head missing, corroded
14	T-087, St. Ie	Tubular item	Complete	1	Rubber		Solid tubular, flat ends

T-087 ceramic artifact (Acc. # 087-A-1) from Stratum Id



T-087 ceramic artifacts (Acc. # 087-A-2 to A-3) from Stratum Ie

T-087 clear glass bottle (Acc. # 087-A-4) from Stratum Id

T-087 glass bottles (Acc. # 087-A-5 to A-10, shown from left to right and top to bottom) from Stratum Ie

4.9 Test Excavation 88 (T-088)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK #:	1-5-007: 021
Elevation:	1.66 m
UTM:	617554.4582 mE, 2357744.530 mN
Max Length / Width / Depth:	3.71 m / 0.99 m / 1.10 mbs
Orientation:	172 / 352 TN
Targeted Project Component:	Station Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 88 (T-088) was located approximately 24 m west of Ka'a'ahi Street, near the intersection with Ka'amahu Place, at the storefront driveway of Nu'uanu Auto Company. T-088 was located on private property owned by Nu'uanu Auto Company. A drain line was located 5.8 m north of T-088. The excavation surface was on a slight incline associated with the driveway.

Summary of Background Research and Land Use: Brown's 1885 map of Kalihi and Kapālama indicated T-088 was located within Kūwili Fishpond (SIHP# 50-80-14-5368), approximately 6.5 m from the edge, and approximately 270 m north of the Kawa Fishpond (SIHP # 50-80-14-5966). The location of T-088 was not part of an awarded Land Court Application parcel. The excavation area was approximately 18.0 m south of the boundary for LCA 1089 awarded to Kāpehe, which included one house lot and eight taro patches (*lo'i*). According to Monsarrat's 1897 map of Honolulu, the Kūwili Fishpond area appears to be mostly rice fields. The OR&L railway depot was located within the immediate vicinity of T-088. According to the Sanborn Series maps, a railway track was present at the location T-088 and the railway turn table was 46 m to the east, then in 1950, T-088 was in between a set of railway tracks.

The two fishponds, Kūwili and Kawa, have been primary areas of archaeological studies within the immediate vicinity of T-085. The Kūwili Fishpond (designated SIHP# 50-80-14-5368) was the focus of three archaeological studies. The International Archaeological Research Institute, Inc. (IARII) conducted a paleoenvironmental study of historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond and concluded that the fishpond was constructed late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use (Athens and Ward 1997). Scientific Consultant Services Inc. conducted an archaeological inventory survey for the proposed Liliha Civic Center and documented 12 subsurface features including human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment (McGerty, Dega and Spear 1997). The radiocarbon analyses suggested that Kūwili Fishpond (SIHP# 50-80-14-5368) may have been built as early as 1100 AD. Cultural Surveys Hawai'i conducted a data recovery study for the Kūwili Fishpond where the radiocarbon analyses suggested the pond the sediments were

deposited between 1020 AD and 1120 AD and was consistent with the previous archaeology (Hammatt et al. 2008). The Kawa Fishpond was incorporated into one previous archaeological study. Cultural Surveys Hawai'i conducted an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu which focused on the investigation of Kawa Fishpond (designated SIHP# 50-80-14-5966) (McDermott and Mann 2001). Although clear dates of construction for the Kawa Fishpond were not provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least 1150-1350 AD.

Additional previous archaeology in the vicinity of T-085 includes a monitoring project by Paul H. Rosendahl, Inc. (PHRI) for a Palama Chevron Station Site at the corner of North King Street and Robello Lane (Dunn et al. 1991). The Department of Land and Natural Resources was notified of human remains discovered during excavation activity at the project site, and PHRI then was retained to conduct an archaeological investigation and monitoring of further construction. The human remains were determined to represent at least two adults in a secondary context and historic artifacts directly associated with the remains indicated that the remains were historic. Garcia and Associates conducted archaeological monitoring on King Street between Liliha Street and River Street for a King Street 24-inch Waterline Project and encountered remnants of the previously document Honolulu Rapid Transit trolley system, designated SIHP# 50-80-14-5942 (West et al. 2002).

Documentation Limitations: T-088 was excavated to a depth of 1.10 mbs. Excavation was limited to this depth due to the presence of two concrete slabs (potentially jacketing buried utility lines), and a 32.0 cm wide clay pipe. Excavation through these materials was deemed a safety hazard.

Stratigraphic Summary: The stratigraphy of T-088 consisted of fill strata to the base of excavation. Observed strata included concrete (Ia), very gravelly cobbly sandy loam fill (Ib), a buried asphalt surface (IIa), crushed coral fill (IIb), very gravelly cobbly loamy sand fill (IIc), mottled sandy loam and clay loam utility fill (III), and a layer of basalt boulders (IV). The strata observed was likely historic to modern fill relating to the previous paved road surfaces. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were collected for analysis. Railroad and building debris were observed, but not collected in T-088. See pictures below. One concrete slab was observed but not collected at 0.95-1.1 mbs.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No sample analysis was conducted.

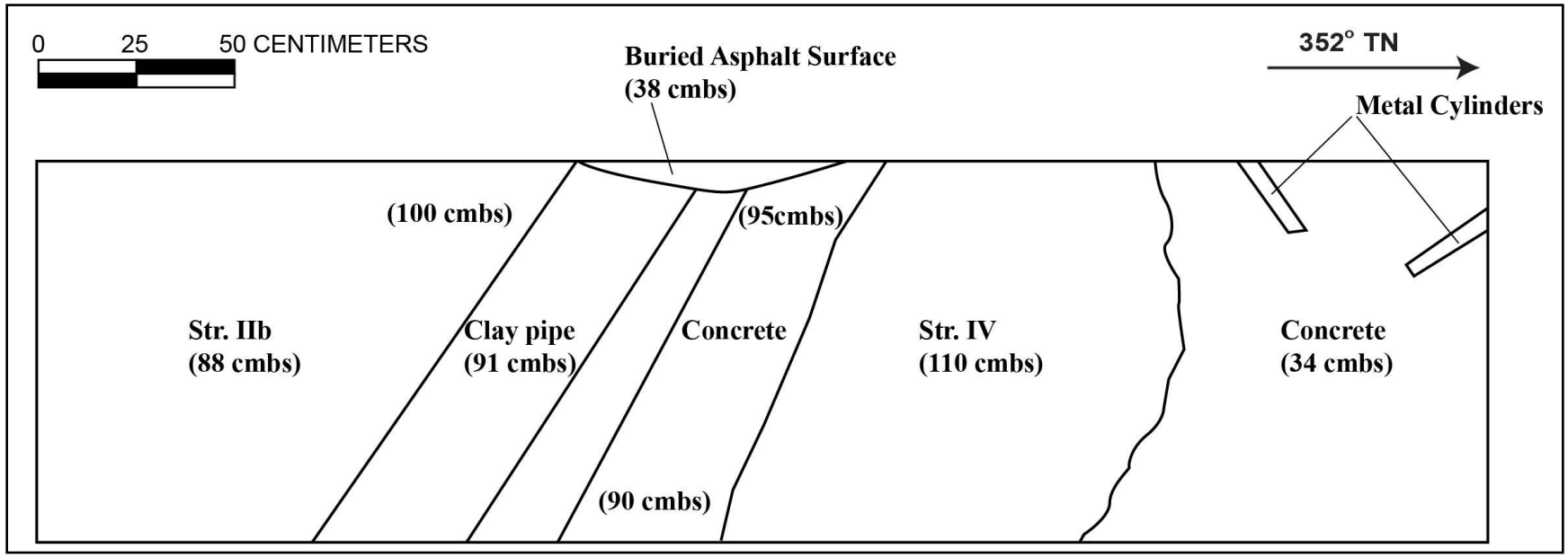
GPR Discussion: A review of amplitude slice maps indicated no linear features although several utilities were encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-088 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.50 mbs. No utilities were observed in the profile although several utilities were encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

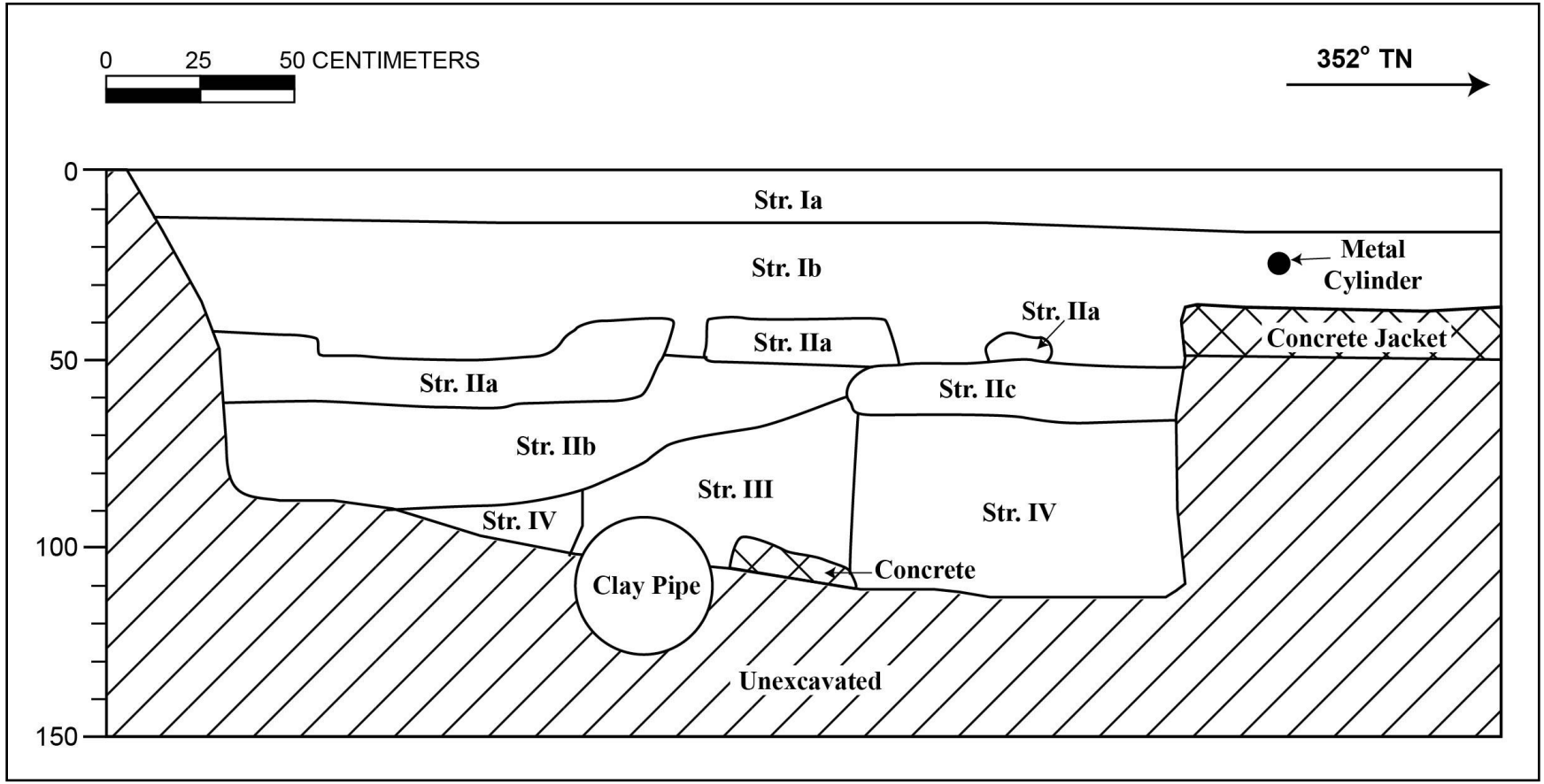
Summary: T-088 was excavated to a depth of 1.10 mbs. Excavation was terminated due to the presence of concrete slabs. The stratigraphy consisted of fill strata (Ia-IV) to the base of excavation. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Historic maps indicate that T-088 was located within the previously identified boundary of Kūwili Fishpond SIHP# 50-80-14-5368. The OR&L railway depot was also located within the vicinity, which may relate to railroad and building debris that was observed but not collected within T-088. Although no natural or pond sediments were identified during the excavation of T-088, the presence of fill deposits to 1.1 mbs may be indicative of the process of historic in-filling of the fishpond for urban development. As a result, the location of T-088 was considered to be related to Kūwili Fishpond, SIHP # 50-80-14-5368 (see Volume I).

T-088 of general location, view to the south

T-088 southwest wall profile, view to northwest



T-088 plan view

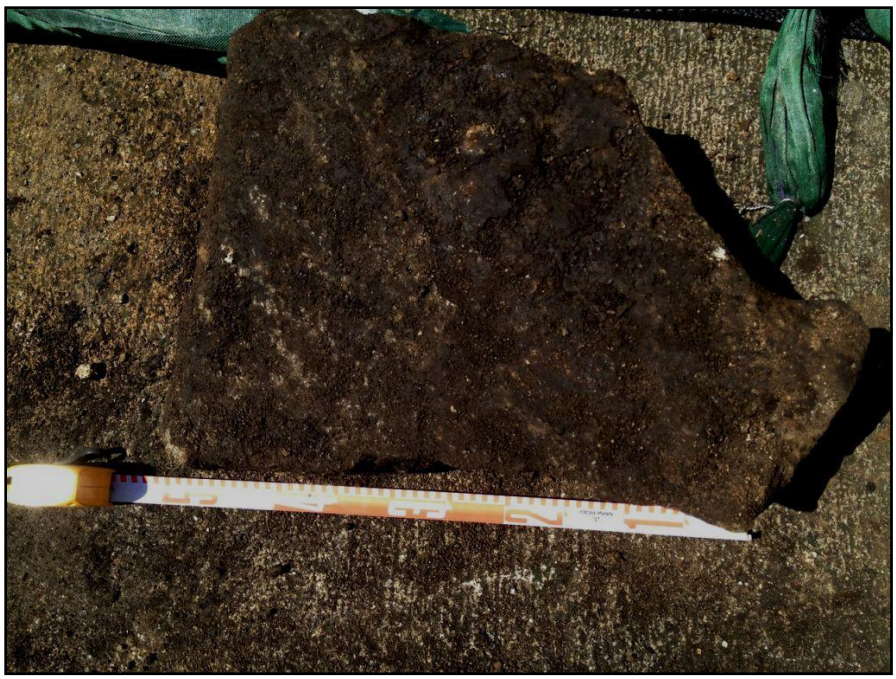


T-088 southwest wall profile

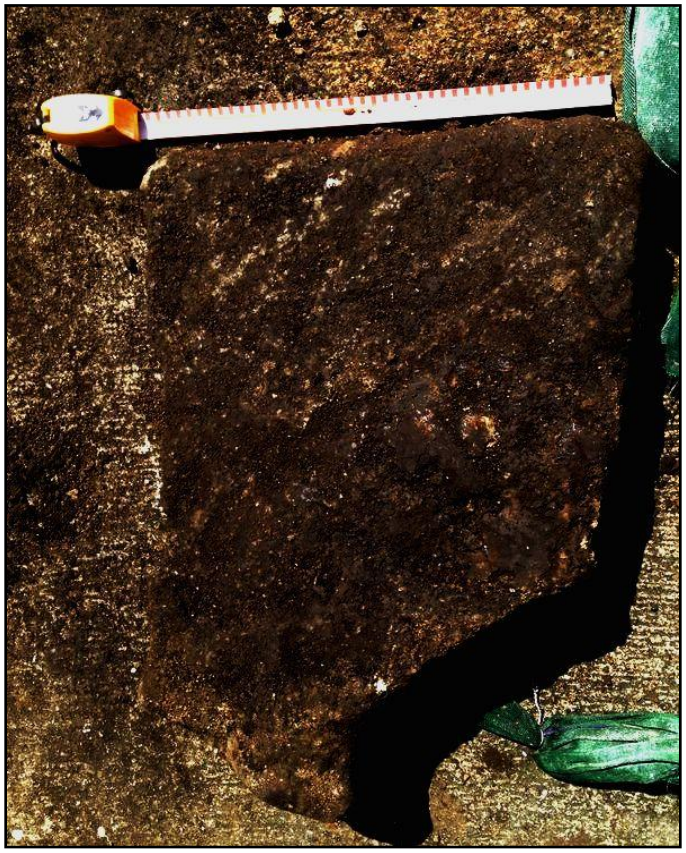
T-088 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-11	Concrete; driveway surface
Ib	11-50	Fill; 10 YR 3/4 (dark yellowish brown); very gravelly cobbly sandy loam; weak, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; contained narrow wooden planks, railroad spike, rail metal cylinders, red brick fragment; flakes of burnt wood
IIa	36-60	Fill; asphalt; buried asphalt surface
IIb	50-87	Fill; 10 YR 8/2 (very pale brown); very gravelly silty sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; very abrupt, wavy and broken/discontinuous lower boundary; contained 50% crushed coral gravel, possible base course fill for Stratum IIa
IIc	48-62	Fill; 10 YR 4/4 (dark yellowish brown); very gravelly, cobbly loamy sand; moderate, fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth/broken, discontinuous lower boundary
III	60-105	Fill; 10 YR 2/1 (black); with few clay mottles of 10 YR 5/4 yellowish brown; sandy loam and clay loam mix; weak, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous IIa origin; lower boundary not visible; churned fill surrounding clay pipe
IV	62-110	Fill; 10 YR 8/2 (very pale brown); extremely stony sand; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; lower boundary not visible; basalt boulders

T-088 wood and railroad spike observed in Stratum Ib



T-088 cut basalt block observed in Stratum IV



T-088 cut basalt block observed in Stratum IV

4.10 Test Excavation 89 (T-089)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK #:	1-5-007: 016
Elevation:	1.6 m
UTM:	617547.9120 mE, 2357759.970 mN
Max Length / Width / Depth:	6.7 m / 0.75 m / 2.33 mbs
Orientation:	153 / 333 TN
Targeted Project Component:	Station Building
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 89 (T-089) was located in a Hawaiian Electric Company (HECO) parking lot, approximately 28.0 m west of Ka'a'ahi Street and 37.0 m south of Dillingham Boulevard. Existing utilities near T-089 included a storm drain located approximately 1.8 m to the north and a sewer line located 11.5 m northwest of the excavation. T-089 was located on private property owned by HECO. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: The location of T-089 was not part of an awarded Land Court Application parcel. The excavation area was immediately outside of the southern boundary for LCA 1089 awarded to Kāpehe, which included one house lot and eight taro patches (*lo'i*). According to the 1885 Brown map of Kapālama, T-089 was located partially within LCA 2440:B awarded to Kauaua, which contained two house lots, one taro *lo'i*, and one sand pond. Brown's 1885 map of Honolulu also indicated that the southern end of T-089 was located less than 2.0 m north Kūwili Fishpond (SIHP# 50-80-14-5368) and approximately 285 m north of the Kawa Fishpond (SIHP # 50-80-14-5966). According to Monsarrat's 1897 map of Honolulu, the Kūwili Fishpond area appears to be mostly rice fields. The OR&L railway depot was located within the immediate vicinity of T-089. According to the Sanborn Series maps, a railway track was present at the location T-089 and the railway turn table was 58 m to the southeast, then in 1950, the excavation area of T-089 stretches across two sets of railway tracks.

The two fishponds, Kūwili and Kawa, have been primary areas of archaeological studies within the immediate vicinity of T-089. The Kūwili Fishpond (designated SIHP # 50-80-14-5368) was the focus of three archaeological studies. The International Archaeological Research Institute, Inc. (IARII) conducted a paleoenvironmental study of historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond and concluded that the fishpond was constructed late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use (Athens and Ward 1997). Scientific Consultant Services Inc. conducted an archaeological inventory survey for the proposed Liliha Civic Center and documented 12 subsurface features including human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment (McGerty, Dega and Spear 1997). The radiocarbon analyses suggested that Kūwili Fishpond (SIHP # 50-80-14-5368) may

have been built as early as 1100 AD. Cultural Surveys Hawai'i conducted a data recovery study for the Kūwili Fishpond where the radiocarbon analyses suggested the pond the sediments were deposited between 1020 AD and 1120 AD and was consistent with the previous archaeology (Hammatt, Hazlett, and Shideler 2008). The Kawa Fishpond was incorporated into one previous archaeological study. Cultural Surveys Hawai'i conducted an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu which focused on the investigation of Kawa Fishpond (designated SIHP # 50-80-14-5966) (McDermott and Mann 2001). Although clear dates of construction for the Kawa Fishpond were provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least 1150-1350 AD.

Additional previous archaeology in the vicinity of T-089 includes a monitoring project by Paul H. Rosendahl, Inc. (PHRI) for a Palama Chevron Station Site at the corner of North King Street and Robello Lane (Dunn et al. 1991). The Department of Land and Natural Resources was notified of human remains discovered during excavation activity at the project site, and PHRI then was retained to conduct an archaeological investigation and monitoring of further construction. The human remains were determined to represent at least two adults in a secondary context and historic artifacts directly associated with the remains indicated that the remains were historic. Garcia and Associates conducted archaeological monitoring on King Street between Liliha Street and River Street for a King Street 24-inch Waterline Project and encountered remnants of the previously document Honolulu Rapid Transit trolley system, designated SIHP# 50-80-14-5942 (West et al. 2002).

Documentation Limitations: T-089 was excavated to a depth of 2.33 mbs, and beneath the water table at 2.15 mbs. T-089 was hand excavated between approximately 0.60 mbs and 1.36 mbs due to the potential for encountering utilities; otherwise, the backhoe was used for excavation. A faint petroleum odor was detected in the lowermost strata, between Strata Il to In. There were no specific factors that limited documentation of T-089.

Stratigraphic Summary: The stratigraphy of T-089 consisted of fill strata to the base of excavation. Observed strata included asphalt (Ia), extremely gravelly loam base course (Ib), gravelly silty loam fill (Ic), buried asphalt (Id), very gravelly sand crushed coral fill (Ie), sandy loam (If), very gravelly sand crushed coral fill (Ig), sand fill (Ih), very gravelly silty loam (Ii), gravelly sandy loam fill (Ij), gravelly sand fill (Ik), gravelly sandy loam fill (Il), gravelly sand fill (Im), and gravelly sandy loam fill (In). The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: Four (4) historic artifacts (Acc. # 089-A-1 to A-4, see following photograph) were collected from the fill layers of T-089. All artifacts were from Stratum Ij (gravelly sandy loam). An OR&L rail spike dating to 1889-1947 was collected at 1.35 mbs. Four glass fragments from a minimum of three glass bottles were found at 1.60 mbs. Two bottles had labels for O'ahu soda companies, the Arctic Soda Works and the Hawaiian Soda Works, which had bottling plants in downtown Honolulu. The bottles dated from ca. 1910 to 1917 and indicated that Stratum Ij post-dates 1910.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No additional sample analysis was conducted.

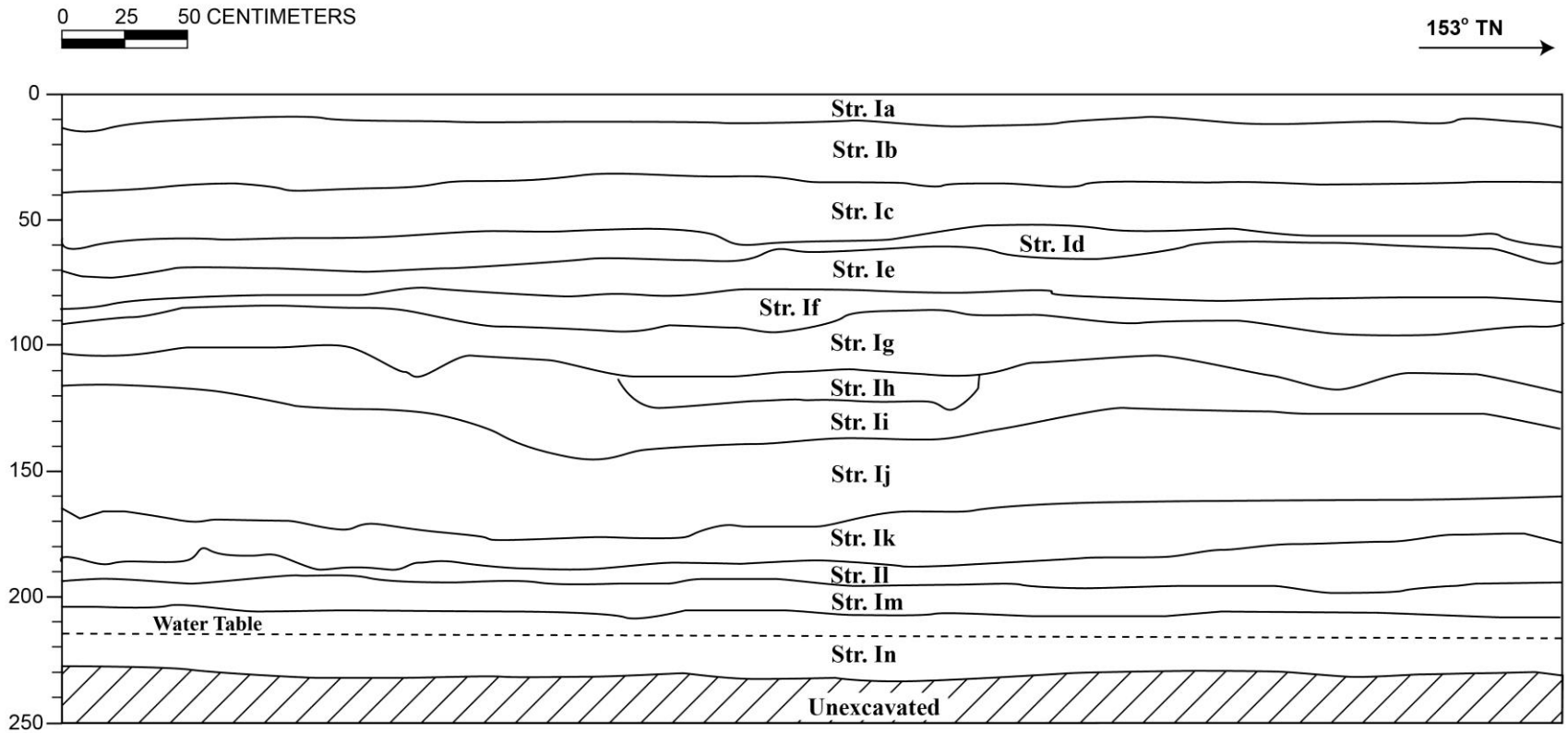
GPR Discussion: A review of amplitude slice maps indicated no linear features which might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-089 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.1 mbs.

Summary: T-089 was excavated to a depth of 2.33 mbs, and beneath the water table at 2.15 mbs. The stratigraphy of T-089 consisted of fill strata (Ia-In) to below the water table. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Artifacts observed included a railroad spike and several bottle portions collected from Stratum Ij that indicated the stratum post-dates 1910. The OR&L railway depot was also located within the vicinity, which may relate to railroad and building debris that was observed within T-088. No natural sediment was encountered. No significant cultural resources were observed.

T-089 general location, view to the south

T-089 northeast wall profile



T-089 northeast wall profile

T-089 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-12	Asphalt, parking lot surface
Ib	10-37	Fill; 10 YR 5/3 (brown); extremely gravelly loam; weak, medium crumb structure; moist, very friable to friable consistency; non-plastic; terrigenous origin; abrupt lower boundary; basalt gravel base course
Ic	30-60	Fill; 10 YR 4/3 (brown); gravelly silty loam; weak, medium block structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, wavy lower boundary
Id	51-72	Fill; buried asphalt; very abrupt, smooth lower boundary
Ie	60-85	Fill; 10 Y 8/2 (very pale brown); very gravelly sand; structureless, single-grain; moist, loose consistency; no cementation; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral fill
If	78-95	Fill; 10 YR 3/2 (very dark grayish brown); sandy loam; weak, fine granular structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, wavy lower boundary
Ig	85-115	Fill; 10 Y 8/2 (very pale brown); very gravelly sand; structureless, single-grain; moist, loose consistency; no cementation; non-plastic; marine origin; abrupt, irregular lower boundary; crushed coral fill
Ih	110-125	Fill; 10 YR 6/3 (pale brown); sand; structureless, single-grain; moist, very friable consistency; non-plastic; marine origin; abrupt and broken/discontinuous lower boundary; sand fill
Ii	101-145	Fill; 2.5 YR 5/3 (light olive brown); very gravelly silty loam; weak, medium blocky structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, wavy lower boundary
Ij	115-175	Fill; 10 YR 2/1 (black); gravelly sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, wavy lower boundary; contained historic artifacts
Ik	160-187	Fill; 2.5 Y 7/8 (yellow); gravelly sand; weak, fine to medium crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, wavy lower boundary
Il	175-197	Fill; 10 YR 2/1 (black); gravelly sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; possible petroleum odor detected
Im	193-209	Fill; 2.5 Y 7/8 (yellow); gravelly sand; weak, fine to medium crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
In	205-230	Fill; 10 YR 2/1 (black); gravelly sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin, lower boundary not visible

T-089 glass soda bottles (Acc. # 089-A-1 to A-3) collected from Stratum Ij

4.11 Test Excavation 90 (T-090)

***Ahupua'a*:**	Nu'uanu
LCA :	1089
TMK #:	1-5-007:016
Elevation:	1.78
UTM:	617559.84 mE, 2357759.20 mN
Max Length / Width / Depth:	6.78 m / 0.75 m / 2.0 mbs
Orientation:	152 / 332º TN
Targeted Project Component:	Station Building
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 90 (T-090) was located on the corner of Dillingham Boulevard and Ka'a'ahi Street within an asphalt paved parking lot, slightly elevated in relation to surrounding land surface. Utilities located nearby included a storm drain line approximately 2.5 m south of T-090. The location T-090 is privately owned.

Summary of Background Research and Land Use: T-090 was located within LCA 1089 where one house lot and eight taro patches (*lo'i*) at Keālia awarded to Kāpehe. The LCA testimonies indicated taro cultivation and habitation for the nearby areas. Baldwin's 1883 map shows the surrounding area was not very developed, a few roads present. Brown's 1885 map and W.A. Wall's 1887 map shows T-090 within 10 m south of the Kūwili Fishpond (SIHP #50-80-14-5368) and may have existed since AD 1100 (McGurty et al. 1997). Monsarrat's 1897 map of Honolulu shows T-090 on a railway. According to the 1919 U.S. Army War Department Fire Control map, Kūwili Fishpond and all agriculture in area was filled in and urban development was present. The 1927 Sanborn Series map shows more development of railroads. The 1933 and 1943 U.S. Army War Department maps and the U.S. Army Mapping Service's 1953 map showed increased urbanization and increased railways.

Previous archaeology of the surrounding area included several studies. Two fishponds (Kūwili and Kawa) were located within the vicinity of T-090, and have been the main points of interest for archaeological studies within that area. The Kūwili Fishpond (SIHP #-5368) was the focus of three archaeological studies from Athens and Ward (1997), Hammatt et al. (2008), and McGerty et al. (1997), located approximately 170 m south of T-090. Athens and Ward (1997) studied historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond, indicating that the fishpond was constructed in late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use. McGerty et al. (1997) conducted an archaeological inventory survey for the proposed Liliha Civic Center. Twelve subsurface features were documented including: human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment. The radiocarbon analyses suggest that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as A.D.1100. Hammatt et al. (2008) study involved data recovery for the Kūwili Fishpond where the radiocarbon analyses suggest the pond the sediments were deposited A.D 1020 to A.D. 1120,

consistent with the McGerty, Dega, and Spear (1997) results. The Kawa Fishpond (SIHP # 50-80-14-5966) was the focus of one archaeological study (McDermott and Mann 2001). McDermott and Mann (2001) study was an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu. Although clear dates of construction for the Kawa Fishpond were not provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least A.D. 1150-1350.

Documentation Limitations: T-090 was excavated to below the water table at a depth of 2 mbs. The water table was observed at 1.93 mbs.

Stratigraphic Summary: The stratigraphy of T-090 consisted of fill materials. The observed strata included: asphalt (Ia), extremely sandy clay loam (Ib), very sandy clay loam (Ic), old asphalt surface (Id), extremely gravelly loamy sand fill (Ie), extremely gravelly sandy loam (If), and gravelly coarse sand with potentially contaminated (petroleum) cinder inclusions (Ig). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: Two rail spikes (Acc. # 090-A-1 and A-2) were collected from Stratum If at 0.80-1.15 mbs. The artifacts indicated the fill material procured was taken from surrounding areas where the OR&L railroad once existed and operated into the 1940s.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results No sample analysis was conducted.

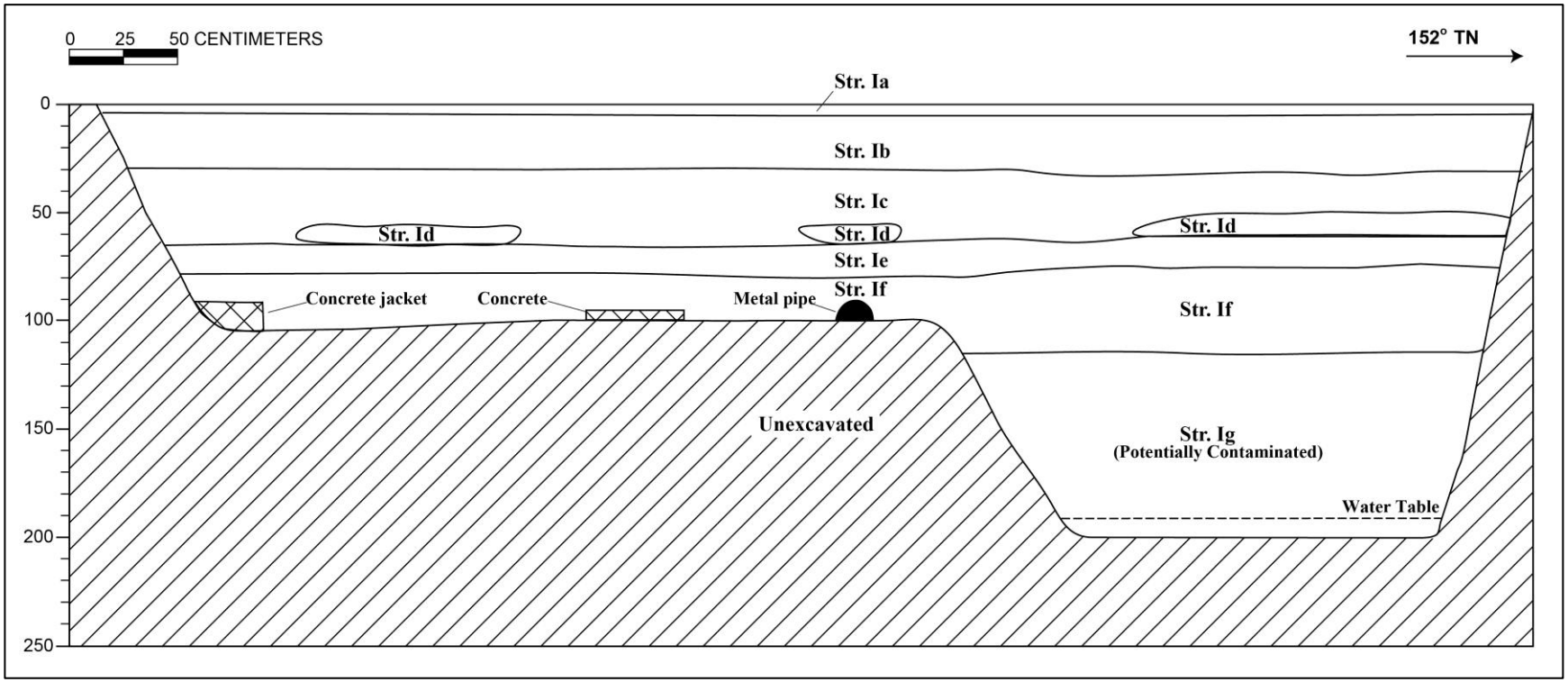
GPR Discussion: A review of amplitude slice maps indicated a linear feature but not within excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-090 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs. No utilities were observed in the profile however some metal piping and concrete slabs were revealed during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-090 was excavated to below the water table at a depth of 2 mbs. The stratigraphy of T-090 consisted of fill materials (Ia-Ig). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). T-090 was within the boundaries of a previously identified cultural resource (Kawa Fishpond SIHP# 50-80-14-7427). Pond sediments were not identified during the excavation of T-090. However, the presence of thick fill deposits may be indicative of historic in-filling of the fishpond for urban development. The OR&L railway depot was also located within the vicinity, which may relate to railroad and building debris that was observed within T-090. No significant cultural resources were observed.

T-090 general location, view to west

T-090 northeast wall profile, view to north



T-090 northeast wall profile

T-090 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-5	Asphalt
Ib	5-30	Fill; 5 YR 3/3 (dark reddish brown) with few many, fine to very coarse mottles of 10R 5/4 to 10R 5/6 (weak red to red); very extremely coarse sand to cobbly clay loam; structureless, massive; moist, very friable consistency; slightly plastic; mixed origin; very abrupt, smooth lower boundary; base course containing basalt, decomposing oxidized basalt, and coral; very coarse sand to cobbles (~75%)
Ic	30-65	Fill; 10 YR 3/3 (dark brown); very coarse sand to cobbly clay loam; structureless, massive; moist, very friable consistency; slightly plastic; very abrupt, smooth lower boundary; contained large rusted nail, loose old piece of metal pipe; with fill containing 35% coral sand to cobbles and 10% basalt gravel to boulders
Id	50-65	Asphalt, old asphalt layer partially destroyed so that this layer was not visible along entire excavation wall
Ie	65-80	Fill; 10 YR 8/1 (white); extremely gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; very abrupt, smooth lower boundary; crushed coral fill
If	75-115	Fill; 10 YR 3/1 (very dark gray); extremely gravelly sandy loam; structureless, massive; moist, very friable consistency; non-plastic to slightly plastic; mixed origin; abrupt lower boundary; contained non-diagnostic metal fragments and large metal spikes (2), part of metal coil (large), part of metal siding contained nails/bolts, unknown concrete slab, old electric metal pipe; contained 75% of very coarse coral sand and gravel; contained historic fill material, remnant rail
Ig	115-200	Fill; 10 YR 2/1 (black); gravelly coarse sand; structureless, single-grain; wet, non-sticky consistency; non-plastic; terrigenous origin; lower boundary not visible; contained petroleum product; potentially contaminated fill, consisted of possible imported cinder

4.12 Test Excavation 91 (T-091)

***Ahupua'a*:**	Nu'uanu
LCA:	1089
TMK#:	1-5-007:016
Elevation:	1.69 m
UTM:	617555.34 mE, 2357755.47 mN
Max Length / Width / Depth:	6.78 m / 0.70 m / 2.0 mbs
Orientation:	92 / 272º TN
Targeted Project Component:	Station Building
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 91 (T-091) was located within a parking lot on private property owned by Hawaiian Electric Company. T-091 was fairly level with the surrounding land surface. Utilities within the area included a storm drain located approximately 1.4 m north of T-091.

Summary of Background Research and Land Use: T-091 was located nearby LCA 1089 where one house lot and eight taro patches (*lo'i kalo*) at Keālia was awarded to Kāpehe. The LCA testimonies indicated taro cultivation and habitation for the nearby areas. Baldwin's 1883 map shows the surrounding area was not very developed, a few roads present. Brown's 1885 map shows T-091 within the Kūwili Fishpond (SIHP #50-80-14-5368) and may have existed since AD 1100 (McGurty et al. 1997). The W.A. Wall's 1887 map shows T-091 within Kūwili Fishpond. Monsarrat's 1897 map of Honolulu indicates T-091 within the vicinity of the OR&L railway depot. According to the 1919 U.S. Army War Department Fire Control map, Kūwili Fishpond and all agriculture in area was filled in and urban development was present. The 1927 Sanborn Series map shows more development of railroads. The 1933 and 1943 U.S. Army War Department maps, and the 1953 U.S. Army Mapping Service map showed increased urbanization and increased railways.

Previous archaeology of the surrounding area included several studies. Two fishponds (Kūwili and Kawa) were located within the vicinity of T-091, and have been the main points of interest for archaeological studies within that area. The Kūwili Fishpond (SIHP #-5368) was the focus of three archaeological studies: Athens and Ward (1997), Hammatt et al. (2008), and McGerty et al. (1997), located approximately 165 m southeast of T-091. Athens and Ward (1997) studied historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond, indicating that the fishpond was constructed in late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use. McGerty et al. (1997) conducted an archaeological inventory survey for the proposed Liliha Civic Center. Twelve subsurface features were documented including: human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment. The radiocarbon analyses suggest that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as A.D.1100. Hammatt et al. (2008) study involved data recovery for the Kūwili Fishpond where the radiocarbon analyses suggest the pond the sediments were deposited A.D 1020 to A.D. 1120,

consistent with the McGerty et al. (1997) results. The Kawa Fishpond (SIHP # 50-80-14-5966) was the focus of one archaeological study (McDermott and Mann 2001). This study was an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu. Although clear dates of construction for the Kawa Fishpond were not provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least A.D. 1150-1350.

Documentation Limitations: T-091 was excavated below the water table at a depth of 2.0 mbs.

Stratigraphic Summary: The stratigraphy of T-091 consisted of fill materials overtop of natural sediments. The observed strata included asphalt (Ia), very gravelly sandy loam base course (Ib), concrete (Ic), sandy clay loam (Id), an old asphalt surface (Ie), gravelly sand (If), silty sandy loam (Ig), crushed coral (Ih), very gravelly sandy loam (Ii), sandy gravelly cinder (Ij), and a clay loam pond sediment (II). Stratum II likely represents pond sediments and was considered to be a component of Kūwili Fishpond (SIHP #5238). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were collected.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were collected.

Sample Results: No sample analysis was conducted.

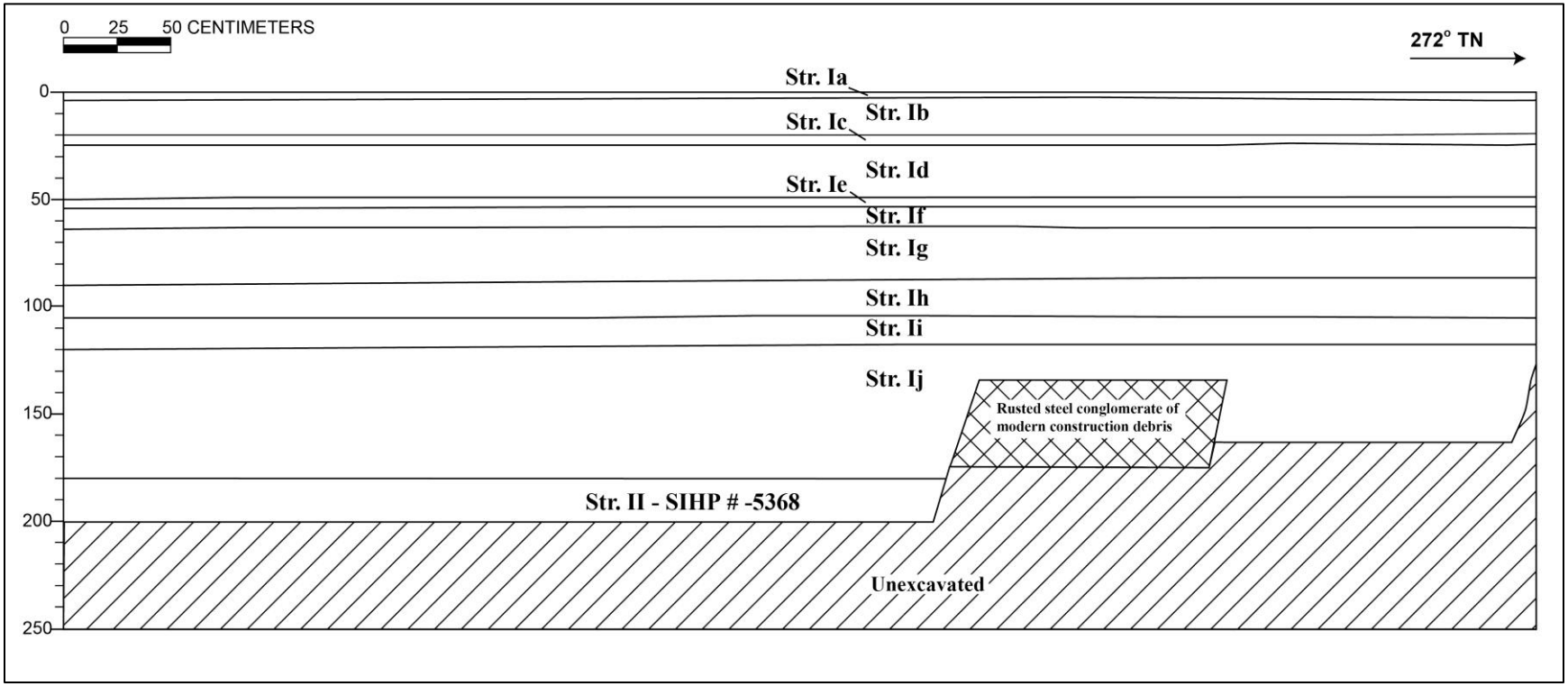
GPR Discussion: A review of amplitude slice maps indicated a linear feature but not within excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.50 mbs.

GPR depth profiles for T-091 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-091 was excavated below the water table at a depth of 2.0 mbs. The stratigraphy of T-091 consisted of fill materials (Ia-Ij) overtop of natural sediments (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The OR&L railway depot was located within the vicinity, which may relate to railroad and building debris that was observed within T-091. The presence of thick fill deposits may be indicative of the process of historic in-filling of the fishpond for urban development. Stratum II likely represents pond sediments and was considered to be a component of Kūwili Fishpond, SIHP# 50-80-14-5368 (see Volume I).

T-091 general location, view to the west

T-091 south wall profile



T-091 south wall profile

T-091 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-4	Asphalt
Ib	4-21	Fill; 10 YR 3/6 (dark yellowish brown); very gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	21-25	Fill; buried concrete
Id	25-50	Fill; 10 YR 4/2 (dark grayish brown); sandy clay loam; blocky structure; moist, friable consistency; slightly plastic; mixed origin; abrupt lower boundary; modern fill event with ferrous construction material
Ie	50-55	Fill; asphalt; abrupt lower boundary; old buried asphalt
If	55-65	Fill; 10 YR 8/1 (white); gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; crushed coral fill
Ig	65-90	Fill; 10 YR 2/1 (black); silty sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; gravelly fill layer
Ih	90-106	Fill; 10 YR 8/2 (very pale brown); crushed coral; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary
Ii	106-120	Fill; 10 YR 3/2 (very dark grayish brown); very gravelly sandy loam; weak, fine to medium, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed coral cobbles in sandy loam fill
Ij	120-190	Fill; 10 YR 2/1 (black); sandy gravelly cinder; weak, fine to medium, crumb structure; moist, loose consistency; non-plastic; mixed origin; imported fill with ferrous material and wood observed, not collected
II	190-200	Natural; Gley1 4/N (dark gray); clay loam; structureless, massive; wet, sticky consistency; plastic; mixed origin; pond sediment, fresh water snail shell ; part of SIHP # -5368 (buried remnants of Kūwili Fishpond).

4.13 Test Excavation 92 (T-092)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK#:	1-5-007:021
Elevation Above Sea Level:	1.57 m
UTM:	617557.29 mE, 2357735.59 mN
Max Length/Width/Depth:	6.83 m / 77 cm / 1.83 mbs
Orientation:	352 / 172º TN
Targeted Project Component:	Station Building
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 92 (T-092) was located within a privately owned paved parking lot of the Nu'uanu Auto Company. A sewer line was located 1.5 m south of T-092. The surface was slightly sloped at the southern end.

Summary of Background Research and Land Use: T-092 was located nearby LCA 1089 where one house lot and eight taro patches (*kalo lo'i*) at Keālia was awarded to Kāpehe. The LCA testimonies indicated taro cultivation and habitation for the nearby areas. Baldwin's 1883 map shows the surrounding area was not very developed, a few roads present. Brown's 1885 map and W.A. Wall's 1887 maps indicate T-092 within the Kūwili Fishpond (SIHP #50-80-14-5368) and may have existed since AD 1100 (McGurty et al. 1997). Monsarrat's 1897 map of Honolulu shows T-092 on a railway. According to the 1919 U.S. Army War Department Fire Control map, Kūwili Fishpond and all agriculture in area was filled in and urban development was present. The 1927 Sanborn Series map shows more development of railroads. The 1933 and 1943 U.S. Army War Department maps and 1953 U.S. Army Mapping Service maps indicated increased urbanization and increased railways within the surrounding area of T-092.

Previous archaeology of the surrounding area included several studies. Two fishponds (Kūwili and Kawa) were located within the vicinity of T-092, and have been the main points of interest for archaeological studies within that area. The Kūwili Fishpond (SIHP #-5368) was the focus of three archaeological studies: Athens and Ward (1997), Hammatt et al. (2008), and McGerty et al. (1997), located approximately 150 m southeast of T-092. Athens and Ward (1997) studied historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond, indicating that the fishpond was constructed in late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use. McGerty et al. (1997) conducted an archaeological inventory survey for the proposed Liliha Civic Center. Twelve subsurface features were documented including: human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment. The radiocarbon analyses suggest that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as A.D.1100. Hammatt et al. (2008) study involved data recovery for the Kūwili Fishpond where the radiocarbon analyses suggest the pond the sediments were deposited A.D 1020 to A.D. 1120, consistent with the McGerty, Dega, and Spear (1997) results. The Kawa Fishpond (SIHP # 50-

80-14-5966) was the focus of one archaeological study (McDermott and Mann 2001). This study was an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu. Although clear dates of construction for the Kawa Fishpond were not provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least A.D. 1150-1350.

Documentation Limitations: T-092 was excavated to below the water table at a depth of 1.83 mbs. The water table was encountered at 1.8 mbs. The southern end of T-092 was not fully excavated to avoid damaging a utility at approximately 0.7 mbs.

Stratigraphic Summary: The stratigraphy of T-092 consisted of fill materials overtop of natural sediments. The observed strata included asphalt (Ia), sandy clay loam fill (Ib), gravelly sandy clay loam fill (Ic), asphalt (Id), very gravelly sand fill (Ie), crushed coral base course fill (If), extremely gravely clay fill (Ig), sandy loam fill (Ih), clay fill (Ii), sandy loam fill (Ij), natural clay (II). Stratum II likely represents pond sediments and was considered to be a component of Kūwili Fishpond (SIHP #5238). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were collected.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: One bulk sediment sample was collected for Stratum II at 1.73-1.83 mbs (5 L). The bulk sample was wet-screened. The sample contained burned *Naticidae* (1.1g), charcoal (0.6 g), a burned seed pod fragment (0.4 g), *Ruppia maritime* seeds (1.7 g), wood (3.0 g), and naturally-occurring, water-rounded marine shell (2.4 g). Sample analysis results found the presence of organics that may be indicative of fishpond sediments.

GPR Discussion: A review of amplitude slice maps indicated linear features were not encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.75 mbs.

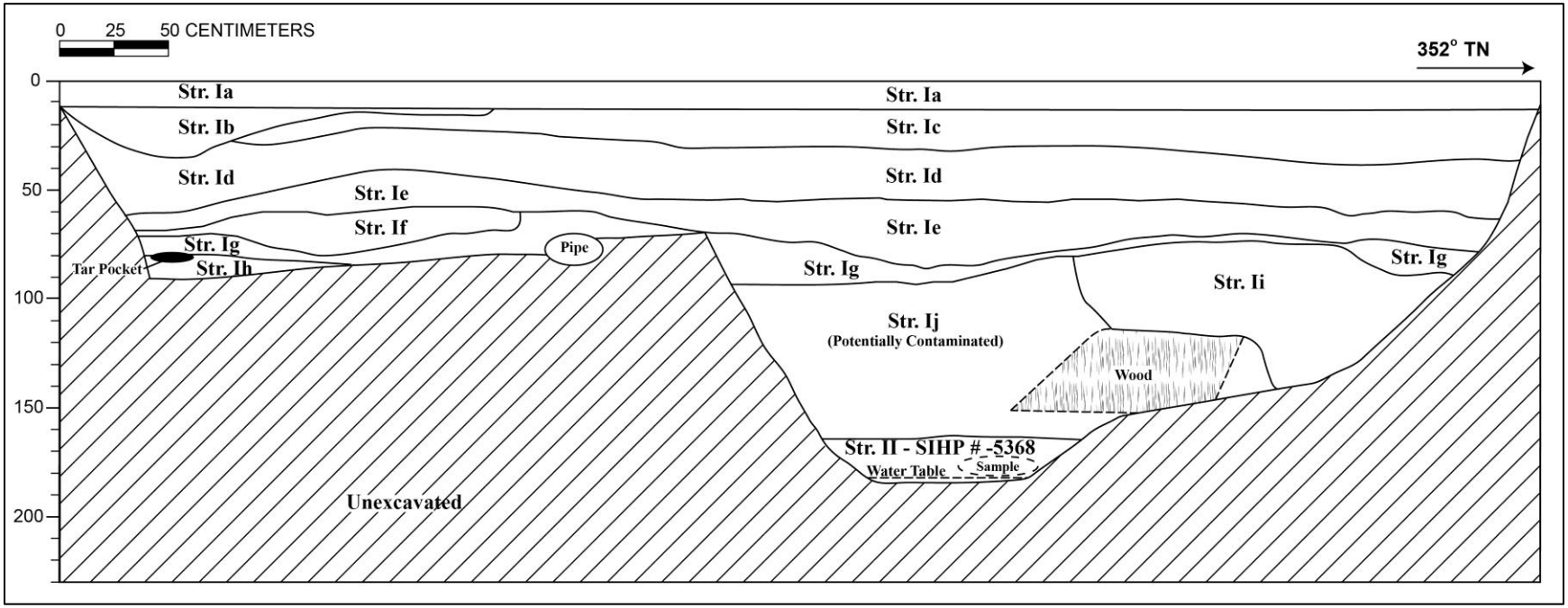
GPR depth profiles for T-092 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs and again around 0.50 mbs. Various anomalies are visible in the GPR profile and these anomalies do correspond with the asphalt and concrete slabs revealed during excavation as well as an abandoned utility pipe. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-092 was excavated to below the water table at a depth of 1.83 mbs. The stratigraphy of T-092 consisted of fill materials (Ia-Ij) overtop of natural sediments (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). Sample analysis results found the presence of organics and naturally occurring terrestrial shell indicative of fishpond sediments, likely relating Stratum II to Kūwili Fishpond sediments (SIHP #5368). The presence of thick fill deposits may be indicative of the process of historic in-filling of the

fishpond for urban development. Stratum II likely represents pond sediments and was considered to be a component of Kūwili Fishpond, SIHP# 50-80-14-5368 (see Volume I).

T-092 general location, view to north

T-092 west wall profile, view to south



T-092 west wall profile

T-092 Stratigraphic Descriptions

Stratum	Depth (cmbs)	Description
Ia	0-13	Asphalt
Ib	13-35	Fill; 10 YR 8/2 (very pale brown); sandy clay loam; structureless, massive; moist, firm consistency; slightly plastic; marine origin; very abrupt, broken/discontinuous lower boundary; likely dredged marine layer—seen only in Diamond Head end of T-092
Ic	13-35	Fill; 7.5 YR 4/4 (brown); gravelly sandy clay; structureless, massive; moist, firm consistency; plastic; terrigenous origin; abrupt, wavy lower boundary; contained coarse coral sand and coral gravel, some dense metal debris was revealed, possibly from fill
Id	35-60	Fill; 10 YR 2/1 (black); asphalt concrete (A/C); structureless, massive; moist, extremely firm consistency; non-plastic; terrigenous origin; likely surface for former gas station/train platform or other industrial use
Ie	40-85	Fill; 10 YR 4/2 (dark grayish brown); very gravelly sand; structureless, single-grain; dry, loose consistency; non-plastic; abrupt, wavy lower boundary; contained non-diagnostic piece of coiled metal wire; fill underlying A/C
If	57-80	Fill; 10 YR 8/1 (white); gravel and cobbles (coral); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; very abrupt, broken/discontinuous lower boundary; crushed coral seen only in Diamond Head end of T-092—likely associated with Stratum Id A/C
Ig	60-93	Fill; 2.5 YR 5/3 (light olive brown); extremely gravelly clay; structureless; moist, friable consistency; slightly plastic; abrupt, broken/discontinuous lower boundary; diffusion with I*f* as I*f* ran into I*g* on horizontal plane; crushed coral in clay matrix; metal pipe found running approximately west to east, possible fuel line
Ih	80-90	Fill; 10 YR 4/2 (dark grayish brown); sandy loam; structureless, single-grain; moist, friable consistency; non-plastic to slightly plastic; terrigenous origin; abrupt, broken/discontinuous lower boundary; seen only in Diamond Head end of T-092.
Ii	70-140	Fill; 10 YR 3/3 (dark brown); sandy loam; structureless, single-grain; moist, friable consistency; non-plastic to slightly plastic; terrigenous origin; lower boundary not visible; contained oxidized metal fragments; contaminated petroleum ran into this layer creating diffuse Diamond Head and bottom boundary
Ij	79-165	Fill; 10 YR 2/1 (black); clay; structureless, massive; moist, firm consistency; plastic; mixed origin; diffuse, broken/discontinuous lower boundary; contained debris from OR&L railway, wood planks and metal fragments; potentially contaminated with petroleum product; contained some small basalt gravel

II	165-183 BOE	Natural; Gley1 3/10Y (very dark greenish gray); clay; structureless, massive; wet, sticky consistency; plastic; marine origin; lower boundary not visible; marine sediment contained many marine shells; part of SIHP # -5368 (buried remnants of Kūwili Fishpond).

4.14 Test Excavation 93 (T-093)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK#:	1-5-007:026,028
Elevation Above Sea Level:	1.61 m
UTM:	617613.12 mE, 2357656.93 mN
Max Length/Width/Depth:	3.03 m / 0.92 m / 2.74 mbs
Orientation:	124 / 304º TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 93 (T-093) was located within the sidewalk of Ka'a'ahi Street, slightly elevated from the road cut. A waterline was identified 10 m east and sewer lines were located 15m north and south of T-093. South of T-093 was a large propane tank. This location was owned by the City and County of Honolulu.

Summary of Background Research and Land Use: T-093 was located nearby LCA 1089 where one house lot and eight taro patches (*lo'i kalo*) at Keālia awarded to Kāpehe. The LCA testimonies indicated taro cultivation and habitation for the nearby areas. Baldwin's 1883 map shows the surrounding area was not very developed, a few roads present. Brown's 1885 map shows T-093 within the Kūwili Fishpond (SIHP #50-80-14-5368) and may have existed since AD 1100 (McGerty et al. 1997). The W.A. Wall's 1887 map shows T-093 within Kūwili Fishpond. Monsarrat's 1897 map of Honolulu shows T-093 on a railway. According to the 1919 U.S. Army War Department Fire Control map, Kūwili Fishpond and all agriculture in area was filled in and urban development was present. The 1927 Sanborn Series map shows more development of railroads. The 1933 and 1943 U.S. Army War Department maps and the 1953 U.S. Army Mapping Service maps indicated increased urbanization and increased railways within the surrounding area of T-093.

Previous archaeology of the area surrounding T-093 included several studies. Two fishponds (Kūwili and Kawa) were located within the vicinity of T-093, and have been the main points of interest for archaeological studies within that area. The Kūwili Fishpond (SIHP #-5368) was the focus of three archaeological studies: Athens and Ward (1997), Hammatt et al. (2008), and McGerty et al. (1997), located approximately 55 m south of T-093. Athens and Ward (1997) studied historic fill deposits of a soil layer that was interpreted to be the remains of the Kūwili Fishpond, indicating that the fishpond was constructed in late in the prehistoric Hawaiian period, after the upland forests had been affected by inland expansion of Hawaiian land use. McGerty et al. (1997) conducted an archaeological inventory survey for the proposed Liliha Civic Center. Twelve subsurface features were documented including: human skeletal remains, possible *ki'o pua* (fry pond) walls, a coral platform foundation, and a basalt alignment. The radiocarbon analyses suggest that Kūwili Fishpond (SIHP # 50-80-14-5368) may have been built as early as A.D.1100. Hammatt et al. (2008) study involved data recovery for the Kūwili Fishpond where

the radiocarbon analyses suggest the pond the sediments were deposited A.D 1020 to A.D. 1120, consistent with the McGerty, Dega, and Spear (1997) results. The Kawa Fishpond (SIHP # 50-80-14-5966) was the focus of one archaeological study (McDermott and Mann 2001). McDermott and Mann (2001) study was an archaeological inventory study for the proposed Nimitz Highway Water System Improvements in Downtown Honolulu. Although clear dates of construction for the Kawa Fishpond were not provided from the radiocarbon dating, it was suggested that the fishpond sediments have been deposited since at least A.D. 1150-1350.

Documentation Limitations: T-093 was excavated to below the water table at a depth of 2.74 mbs. Below 1.8 mbs, excavation was limited to the central portion of T-093 due to an active sewer line and shoring was installed for documentation and sampling purposes.

Stratigraphic Summary: The stratigraphy of T-093 consisted of fill material overlying two natural sediment layers of silty clay. strata included concrete (Ia), extremely gravelly loamy sand fill (Ib), stony sandy loam (Ic), crushed coral fill (Id), sandy silt loam fill (Ie), crushed coral fill (If), silty loam fill (Ig), silty clay fill (Ih) silty sand fill (Ij), natural silty clay (IIa) natural silty clay (IIb). Stratum IIa and IIb likely represented consisting of sediments from Kūwili Fishpond (SIHP # -5238). The stratigraphy generally conformed to the USDA soil designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: Fish remains were collected from Stratum IIb at 2.29-2.5 mbs.

Sample Results: A total of three (3) bulk sediment samples were collected from T-093. One bulk sediment samples were collected from Stratum IIa, at 1.95-2.2 mbs (4 L), and two from Stratum IIb between 2.29-2.5 mbs (0.5 L) and 2.5-2.74 mbs (0.5 L). The bulk samples were wet-screened. The sample from Stratum IIa contained charcoal (0.3g), wood organics (0.9g), *Ruppia maritima* seeds (0.1g), and naturally-deposited shell material. The sample from Stratum IIb at 2.29-2.5 mbs contained non-midden snail shell (35.3g), charred organics (0.1g), *Ruppia maritima* seeds (0.3g), and charred fish vertebrae (0.1g). The sample from Stratum IIb at 2.5-2.74 mbs contained non-midden shell, and *Ruppia maritima* seeds (0.4g). Sample analysis results found the presence of organics and naturally occurring terrestrial shell indicative of fishpond sediments, likely relating Strata IIa and IIb to Kūwili Fishpond sediments (SIHP #5368).

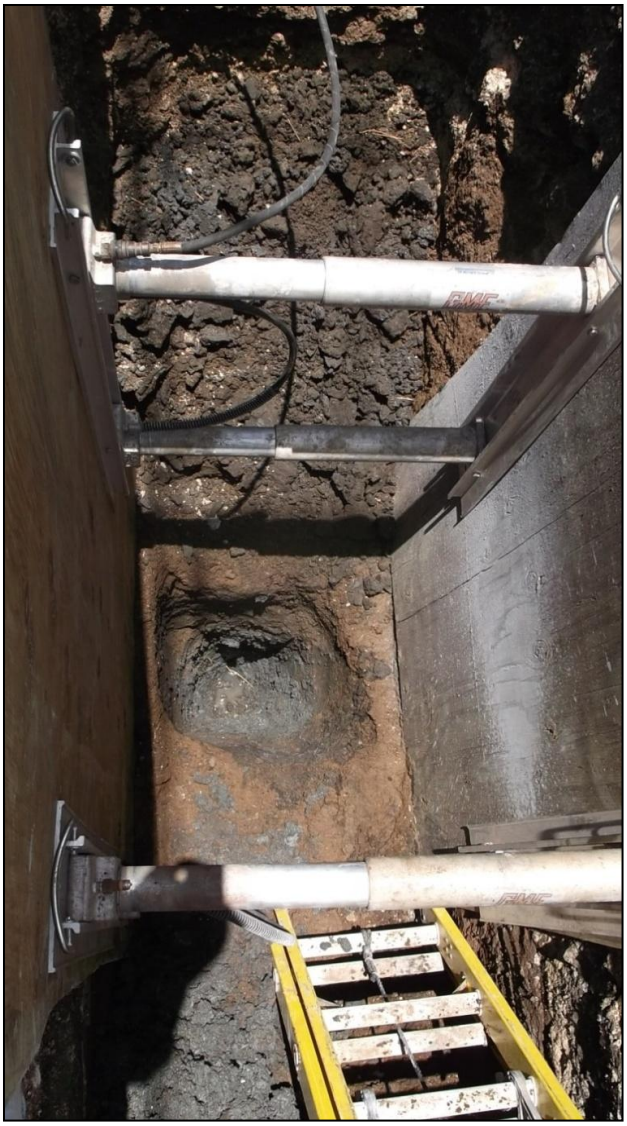
GPR Discussion: A review of amplitude slice maps indicated no linear features which might have indicated the presence of utilities. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.75 mbs.

GPR depth profiles for T-093 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.25 mbs.

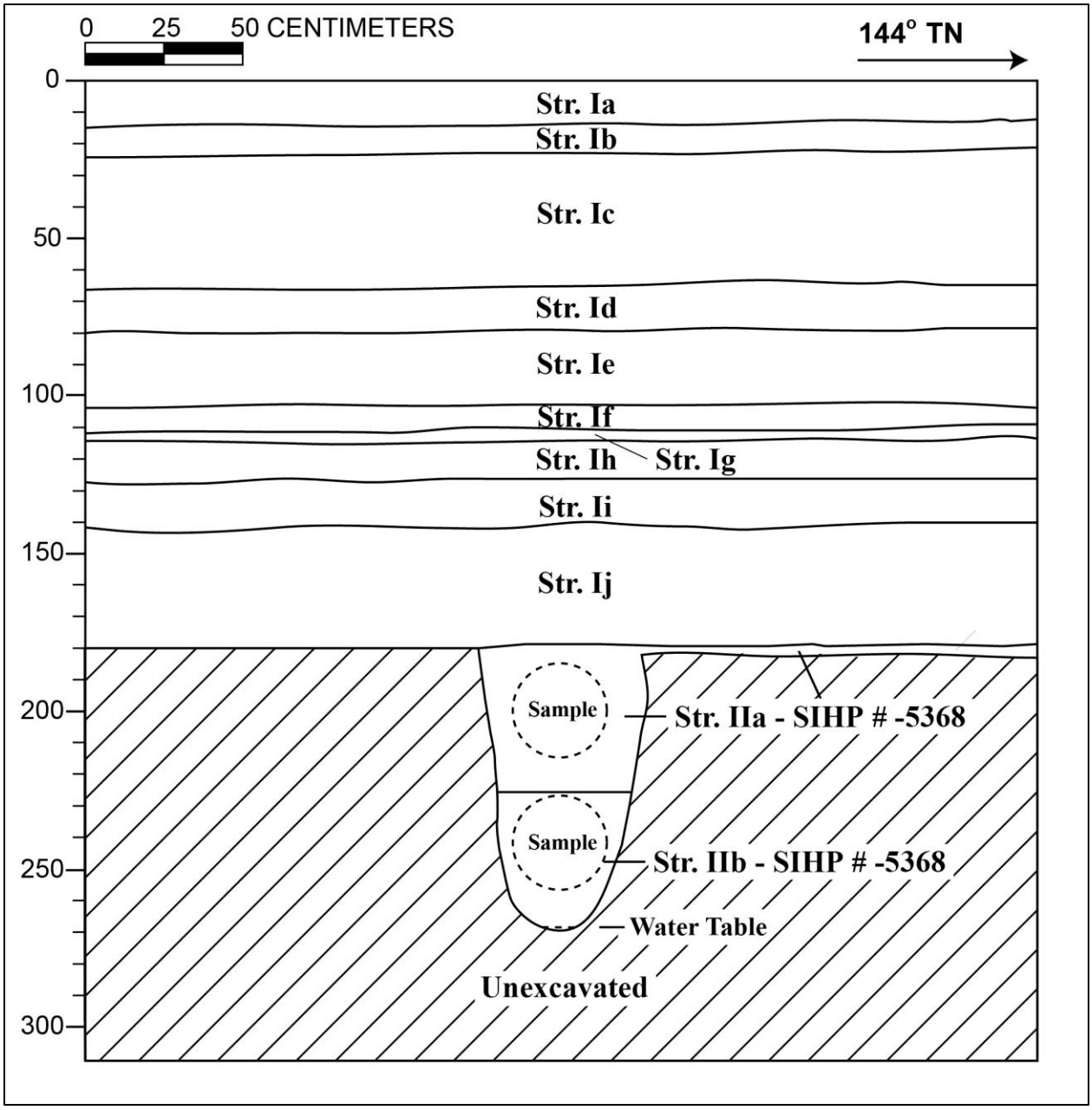
Summary: T-093 was excavated to below the water table at a depth of 2.74 mbs. The stratigraphy of T-093 consisted of fill material (Ia-Ij) overlying two natural sediment layers of silty clay (IIa-IIb). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). Sample analysis results found the presence of organics and naturally occurring terrestrial shell indicative of fishpond sediments, likely relating Strata IIa and IIb to Kūwili Fishpond sediments (SIHP #5368). The presence of thick fill deposits may be indicative of the process of historic in-filling of the fishpond for urban development. Strata IIa and IIb were considered to be a component of Kūwili Fishpond, SIHP# 50-80-14-5368 (see Volume I).

T-093: General location photo, view to north

T-093 northeast wall profile, view to southwest



T-093 overhead of shoring system and excavation into Stratum IIb



T-093: northeast wall profile

T-093, Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-14	Asphalt
Ib	14-23	Fill; 10 YR 6/4 (light yellowish brown); extremely gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained small to large coral gravels, (1) piece rebar at bottom of layer
Ic	23-66	Fill; 10 YR 3/3 (dark brown); stony sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained (1) large marble, abundant coral cobbles and boulders
Id	65-80	Fill; 10 YR 8/3 (very pale brown); crushed coral; structureless, single-grain; moist, loose consistency; non-plastic; abrupt, smooth lower boundary
Ie	80-106	Fill; 10 YR 3/1 (very dark gray); sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; has strong petroleum odor
If	106-114	Fill; 2.5 Y 7/4 (pale yellow); crushed coral; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary
Ig	114-117	Fill; 10 YR 3/4 (dark yellowish brown); silty loam; weak, fine, crumb structure; moist consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary
Ih	117-130	Fill; 10 YR 3/2 (very dark grayish brown); sandy loam; single-grain, very fine structure; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained common charcoal flecks and chunks, few shell fragments, and glass fragments
Ii	130-145	Fill; 2.5 Y 3/1 (very dark gray); silty clay; massive structure; moist consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; dredge fill
Ij	145-182	Fill; 10 YR 3/3 (dark brown); silty sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contains abundant charcoal flecks, water rounded gravel and shells and shell fragments; likely coastal material used as fill
IIa	182-229	Natural; Gley1 3/10Y (very dark greenish gray); silty clay; structureless, massive; moist consistency; plastic; marine origin; lower boundary not visible; extremely homogenous sediment with a few brown organics (see photos); wetland sediment; part of SIHP # -5368 (buried remnants of Kūwili Fishpond)
IIb	229-274	Natural; Gley1 3/N (very dark gray); silty clay; structureless, massive; moist consistency; plastic; marine origin; lower boundary not visible; pond sediment, extremely abundant shells; part of SIHP # -5368 (buried remnants of Kūwili Fishpond)

4.15 Test Excavation 94 (T-094)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK#:	1-5-007:001, 002
Elevation Above Sea Level:	1.67 m
UTM:	617679.88 mE, 2357555.589 mN
Max Length/Width/Depth:	3.7 m / 0.90 m / 1.70 mbs
Orientation:	154 / 334º TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 94 (T-94) was located within in a private parking lot approximately 75 m north of ‘Iwilei Road. Utilities that were located in the generally vicinity included two parallel storm drains approximately 7.5 m west of the test excavation. The excavation surface was elevated with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1885 map of Kalihi and Kapālama indicated T-094 was located within Kūwili fishpond (SIHP# 50-80-14-05368). O'ahu prison was approximately 120 m southwest of T-094, according to the W.A. Wall's 1887 map. By 1919, Kūwili fishpond had been filled in. T-094 was approximately 50 m east of O R & L railway tracks as indicated by the 1919 U.S. Army War Department Fire Control map. The 1933 and 1943 U.S. Army War Department maps indicated that T-094 was located 14 m east of a structure.

Previous archaeology of the area surrounding T-094 included two archaeological studies. An archaeological inventory survey was conducted (McGerty et al. 1997) in the immediate vicinity of T-094, which focused primarily on an investigation of the remnants of Kūwili fishpond. An archaeological inventory survey was conducted (McDermott and Mann 2001) 60 meters south of T-094, which focused primarily on an investigation of the remnants of Kawa Fishpond (SIHP # 50-80-14-5966).

Documentation Limitations: T-094 was excavated to a depth of 1.7 mbs, and beneath the water table at 1.65 mbs. T-094 was hand-excavated to the potential for encountering subsurface utilities. Large boulders of concrete debris were encountered in the south end of the excavation, however, no utilities were observed.

Stratigraphic Summary: The stratigraphy of T-094 consisted of fill strata to the base of excavation. Observed stratigraphy included extremely gravelly sand crushed coral fill (Ia), asphalt pavement (Ib), very gravelly cobbly sandy loam fill (Ic), very gravelly clay loam fill (Id), silty clay loam fill (Ie), and gravelly sandy loam fill (If). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: A total of seven brick fragments (Acc. # 094-A-1) were collected from Stratum Id at 0.82 mbs for T-094. These artifacts were machine-made red brick fragments. At

approximately 0.30 to 0.63 mbs, wood blocks and concrete slabs were observed, but not collected.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: A single terrestrial faunal remain was collected from Stratum Ic at 0.4 mbs. A single collected faunal remain included a *Bos taurus* rib section. The faunal remain collected appeared to be modern food refuse.

Sample Results: A total of two bulk samples were collected from Stratum Ie between 1.0-1.1 mbs (1.5), and from Stratum If between 1.1-1.2 mbs (3 L). Only the bulk sediment sample from Stratum If was wet-screened. No sample analysis was conducted for the sample collected at Stratum Ie. The sample from Stratum If between 1.1-1.2 mbs (3 L) contained naturally deposited water worn shell (0.2g) and 3 small water-rounded cobbles (17.8g). The results of sample analysis indicated no significant material was within present Stratum If.

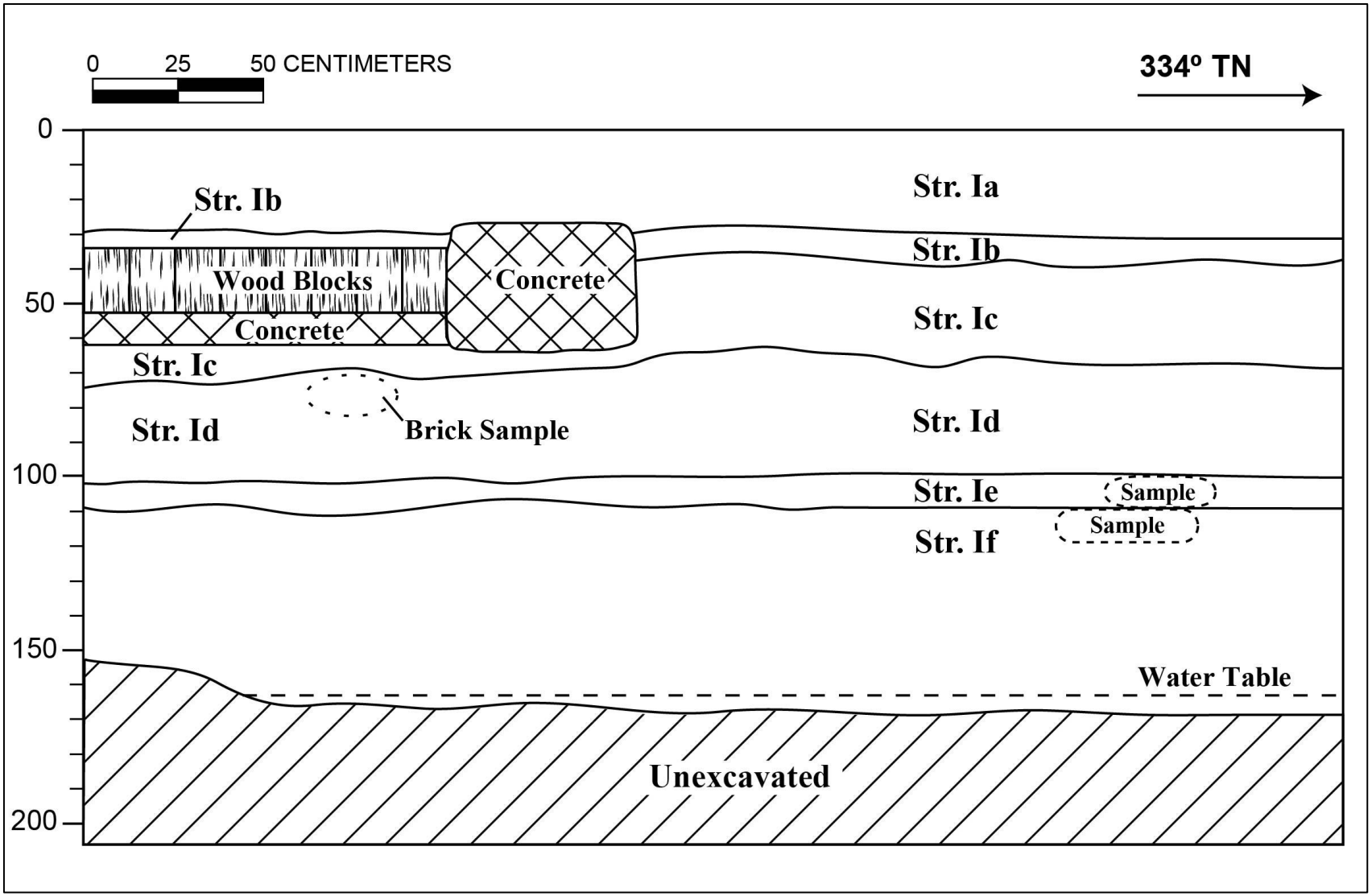
GPR Discussion: A review of amplitude slice maps indicated a linear feature but was not encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.75 mbs.

GPR depth profiles for T-094 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.20 mbs. No utilities were observed in the profile although a large piece of concrete was found during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-094 was excavated to a depth of 1.7 mbs, and beneath the water table at 1.65 mbs. The stratigraphy of T-094 consisted of fill strata to beneath the water table (Ia-If). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). The only artifacts collected were machine-made red brick fragments. Concrete slabs and wood blocks were observed but not collected. The rib section collected from Stratum Ic appeared to be modern food refuse. The results of sample analysis indicated no significant material was within Stratum If. According to historic maps, T-094 was within the boundaries of a previously identified cultural resource (Kūwili Fishpond SIHP# 50-80-14-05368). Although no natural or pond sediments were identified during the excavation of T-094, the presence of fill deposits to beyond 1.7 mbs may be indicative of the process of historic in-filling of the fishpond for urban development. As a result, the location of T-094 was considered to be related to Kūwili Fishpond, SIHP # 50-80-14-5368 (see Volume I).

T-094 general location, view to southeast

T-094 southwest wall profile, view to south



T-094 southwest wall profile

T-094 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-30	Fill; 10 YR 6/4 (light yellowish brown); extremely gravelly sand, structureless, single-grain; moist, friable consistency; non-plastic; abrupt, smooth lower boundary; crushed coral gravel road surface
Ib	30-37	Fill; asphalt
Ic	37-75	Fill; 10 YR 4/2 (dark grayish brown); very gravelly cobbly sandy loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; very angular basalt cobbles present; concrete and wood blocks observed and not collected.
Id	65-100	Fill; 10 YR 7/3 (very pale brown); very gravelly clay loam; fine to medium, blocky structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; brick found at NW wall
Ie	100-110	Fill; 10 YR 3/2 (very dark grayish brown); silty clay loam; weak, fine, crumb structure; moist, friable consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; contained charcoal deposit, glass fragments
If	110-170	Fill; 10 YR 3/3 (dark brown); gravelly sandy loam; fine to medium, blocky structure; moist, friable consistency; slightly plastic; mixed origin; lower boundary not observed; possible water rounded basalt cobbles, chunks of coral blocks

4.16 Test Excavation 95 (T-095)

***Ahupua'a*:**	Nu'uanu
LCA:	N/A
TMK#:	1-5-008: 020
Elevation Above Sea Level:	1.17 m
UTM:	617689.17 mE, 2357372.41 mN
Max Length / Width / Depth:	3.05 m / 0.90 m / 1.45 mbs
Orientation:	160 / 340º TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 95 (T-095) was located in the privately owned parking lot of HIGA Meat and Pork Market Ltd. on the west side of Nimitz Highway. T-095 was 2.5 m west of a fire hydrant and level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1885 map of Kalihi and Kapālama indicated T-095 was located within Kawa Fishpond (SIHP# 50-80-14-5966). Oahu prison was approximately 150 m northwest of T-095, according to W.A. Wall's 1887 map. By 1919, T-095 was located in the west edge of a road and Kawa Fishpond had been filled in. T-095 was approximately 100 m east of OR&L railway tracks, as documented by the 1919 U.S. Army War Department Fire Control map. The 1933 and 1943 U.S. Army War Department maps indicated that T-095 located under a structure.

Previous archaeology of the area surrounding T-095 included one study. An archaeological inventory survey was conducted in the immediate vicinity of T-095, which focused primarily on an investigation of the remnants of Kawa Fishpond (SIHP # 50-80-14-5966). The study located the boundaries of the fishpond, which included the location of T-095. The study was unable to determine the origin of construction Kawa Fishpond, but sediment sample analysis suggested the fishpond sediments had accumulated since at least A.D. 1150-1350 (McDermott and Mann 2001).

Documentation Limitations: T-095 was excavated to a depth of 1.45 mbs. A buried concrete slab at 0.5 mbs limited excavation in the northern end of T-095. At 1.15 a potentially hazardous contaminated layer was encountered. To limit exposure, further excavation was limited to a 0.20 m pothole in the northern end of T-095. The pothole was excavated to collect a sample of the contaminated sediment and the water table was encountered at 1.45 mbs.

Stratigraphic Summary: The stratigraphy of T-095 consisted of fill material to the base of excavation. Observed stratigraphy included asphalt (Ia), gravelly cobbly coarse sand crushed coral fill (Ib), clay loam fill (Ic), a concrete slab or possible buried sidewalk (Id), sandy loam fill (Ie), clay loam fill (If), and very fine sandy loam fill (Ig). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were collected. A concrete slab encountered at 0.5-0.6 mbs was observed, but not collected. The concrete slab was considered to be a buried sidewalk surface that corresponded to development infrastructure during the mid-twentieth century.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No sample analysis was conducted.

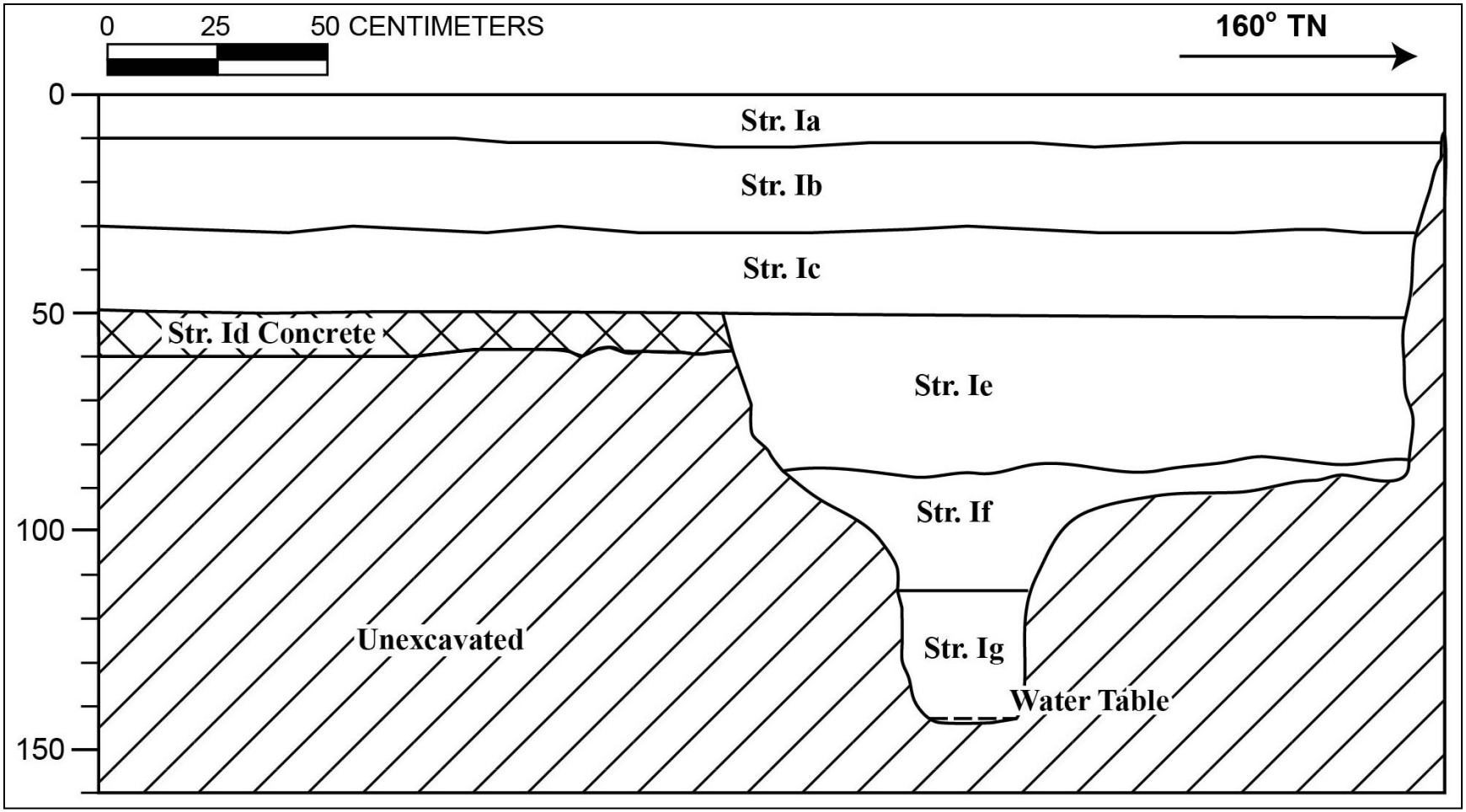
GPR Discussion: A review of amplitude slice maps indicated a linear feature which might correspond to the concrete encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

GPR depth profiles for T-095 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.15 mbs. No utilities were observed in the profile although a concrete slab was encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-095 was excavated to a contaminated fill layer at a depth of 1.45 mbs. The stratigraphy of T-095 consisted of fill material (Ia-Ig) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). A buried concrete slab (Stratum Id) was observed at a depth of 0.5 to 0.6 mbs. The observed concrete slab was considered to be a buried sidewalk surface that corresponded to development infrastructure during the mid-twentieth century. According to historic maps, T-095 was within the boundaries of a previously identified cultural resource (Kawa Fishpond SIHP# 50-80-14-5966). Although no natural or pond sediments were identified during the excavation of T-095, the presence of fill deposits to beyond 1.45 mbs may be indicative of the process of historic in-filling of the fishpond for urban development. As a result, the location of T-095 was considered to be related to Kawa Fishpond, SIHP# 50-80-14-5966 (see Volume I).

T-095 general location, view to north

T-095 northeast wall profile



T-095 northeast wall profile

T-095 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt
Ib	11-31	Fill; 10 YR 7/3 (very pale brown); gravelly cobbly coarse sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
Ic	31-50	Fill; 10 YR 3/3 (dark brown); clay loam; weak, very fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; imported fill layer with coral gravel inclusions
Id	50-60	Fill; 2.5” concrete slab, possible sidewalk
Ie	50-87	Fill; 10 YR 3/2 (very dark grayish brown); sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse, smooth lower boundary; contained ceramic; construction debris fill, ABM bottle fragment, ceramic plate fragment, Bakelite fragment, red brick chunks, coral chunks, basalt chunks
If	85-115	Fill; 10 YR 4/2 (dark grayish brown); clay loam; weak, very fine, blocky structure; moist, friable consistency; plastic; terrigenous origin; abrupt lower boundary; contained some charcoal flecking ~5%; imported fill, 0.5 m x 0.5 m x 0.3 m coral block
Ig	115-145	Fill; 10 YR 2/1 (black); very fine sandy loam; structureless, single-grain; moist, friable consistency; plastic; terrigenous origin; lower boundary not visible; contaminated fill layer