

Section 2 Zone 1 West Kalihi (Test Excavations T-001 through T-020 and T-020A)

2.1 Overall Location

For reporting purposes for this AIS, the City Center Section 4 of the HHCTCP has been divided into 11 zones based on geographic and cultural boundaries. The West Kalihi Geographic Zone is located within the western portion of Kalihi Ahupua'a, Honolulu District, Island of O'ahu, in a physiographic division known as the Pearl Harbor Plain (Armstrong 1983:36). West Kalihi extends approximately 0.5 km along Kamehameha Highway and is bounded to the west by the Middle Street exit from Kamehameha Highway and on the east by Laumaka Street (Figure 2). As part of the City Center AIS, a total of 21 test excavations (T-001 through T-020 and T-020A) were excavated in the West Kalihi Zone along and adjacent to Kamehameha Highway. Test excavation numbering proceeded from northwest to southeast. Test excavations documented within West Kalihi fall predominantly under the jurisdiction of the State of Hawai'i (T-001 through T-005, T-009 and T-010) and the City and County of Honolulu (T-012 through T-020 and T-20A), while those located in an adjacent lot (T-006 through T-008 and T-011) are privately owned by First Hawaiian Bank. T-006 through T-008 and T-011 are located within TMK Parcel [1] 1-2-013:021. The remaining test excavations are located within TMK Plats [1] 1-2-013 (T-001, T-002, T-004, T-005, T-009, T-010, T-014 through T-020, and T-020A), TMK [1] 1-2-017 (T-012 and T-013), and TMK [1] 1-2-018 (T-003) and are within the Kamehameha Highway right-of-way.

2.2 Transit Infrastructure

HHCTCP facilities for the current project within the West Kalihi Zone consist of: the Middle Street Transit Center Station, to be constructed over Kalihi Stream on Kamehameha Highway; a Station Ancillary Building located *mauka* of Kamehameha Highway and east of Kalihi Stream; 15 single columns and two straddle-bent columns to support the fixed guideway system spaced along Kamehameha Highway; and utility relocation corridors throughout. Test excavations focused on column locations (T-001 through T-005 and T-009), utility relocation corridors (T-010 for a 27-inch sewer and T-012 through T-020 for a 12-inch sewer, a 24-inch water line, and 6-inch gas lines), and also included test excavations in the footprint of the Station Ancillary Building (T-006 through T-008) and an adjacent utility relocation area (T-011).

2.3 Geography, Geology, and Land Forms

The West Kalihi Zone is situated along the low-lying coastal flats immediately inland of Ke'ehi Lagoon, an embayment or estuary of the Moanalua, Kahauiki, and Kalihi Streams. Elevations in the zone range from approximately 1.6 to 3.3 m AMSL and the average annual rainfall measures 760 to 810 mm (30 to 32 in) (Giambelluca et al. 2011). East of the West Kalihi Zone elevations in the study area increase from the relatively low-lying Kalihi Stream estuary as the HHCTCP corridor ascends onto a portion of the emerged Pleistocene reef limestone common along southern O'ahu. This reef limestone formed during the 7.5-m (Waimānalo) sea-stand (Macdonald et al. 1983:420-421). Kalihi Stream traverses the westernmost limit of the area and debouches approximately 400 m away into Ke'ehi Lagoon. The mixing of fresh and salt water produced a coastal ecosystem. In general, the West Kalihi Zone is located between 0.5 and

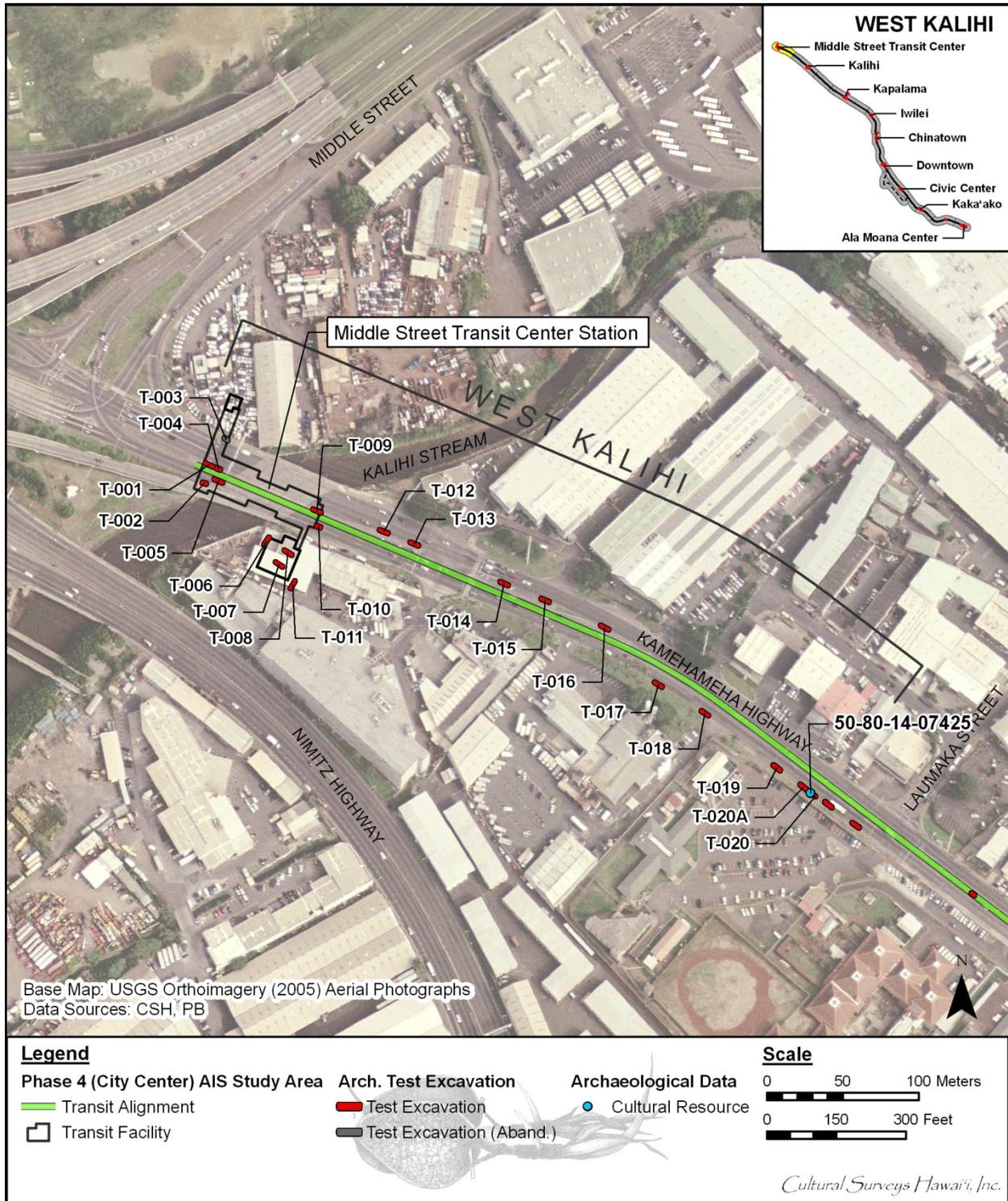


Figure 2. Aerial photograph (source: U.S. Geological Survey orthoimagery 2005) showing the location of the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

1.0 km inland from the modern shoreline. At the end of the nineteenth century, the shore of Ke'ehi Lagoon was between 50 m and 0.5 km away from the West Kalihi Zone. Vegetation in the study area and immediate vicinity consists primarily of landscaping with *naupaka* (*Scaevola taccada*), *kiawe* (*Prosopis pallida*), coconut (*Cocos nucifera*), Cook pine (*Araucaria columnaris*), plumeria (*Plumeria obtusa*), monkeypod (*Albizia saman*), and fountain grass (*Pennisetum setaceum*).

According to the U.S. Department of Agriculture Soil Survey Geographic (SSURGO) Database (2001) and soils survey data gathered by Foote et al. (1972) (Figure 2), sediment types in the West Kalihi Zone consists predominantly of Fill land (FL), with a small area of Ewa silty clay loam (EmA) east of T-019 (Foote et al. 1972).

Fill land is described as follows:

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

Ewa silty clay loam soils are described as follows:

...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]

2.4 Traditional and Historic Land Use

2.4.1 Traditional Accounts of the West Kalihi Zone

There are only a few traditional accounts originating from the coastal areas of Kalihi Ahupua'a. They primarily concern fishing, the sea and a resident shark deity. Pukui (1983:186) relates that "the sea at Pu'uhale, Kalihi, Oahu was said to murmur softly as it washed ashore. There were once many fishponds there."

One legend tells of the shark guardian Makali'i who was known to frequent the waters of Kalihi Kai and had his cave at Kahaka'aulana (Oppenheimer 1976:15). In *Place Names of Hawai'i*, Kahaka'aulana is listed as the old name for Sand Island (Pukui et al. 1974:62). The literal translation, "the floating swimmers pass by," might refer to the travelers who would make their way to or from Pu'uloa by swimming through the channel of Kalihi instead of walking. Alternatively, this may refer to the fishermen's containers that would float by as they fished for crabs and seaweed (Pukui et al. 1974:62). This sea crossing would have been well to the south of the HHCTCP alignment. Kahaka'aulana was also noted as a place in Kalihi Harbor that was used as a passage for travelers going from Kou (adjacent to Nu'uanu Stream and Honolulu Harbor) toward Pu'uloa (Pearl Harbor). This allowed them to avoid the long inland detour by way of Moanalua (Sterling and Summers 1978:322).

Place names can offer insight into former features of the landscape and potential land use. Of note is 'Umi Street, roughly 300 m north of the study area. This road traverses a former land division known as Umi (Māhele Award 50), as can be seen on the 1904 Alexander Map

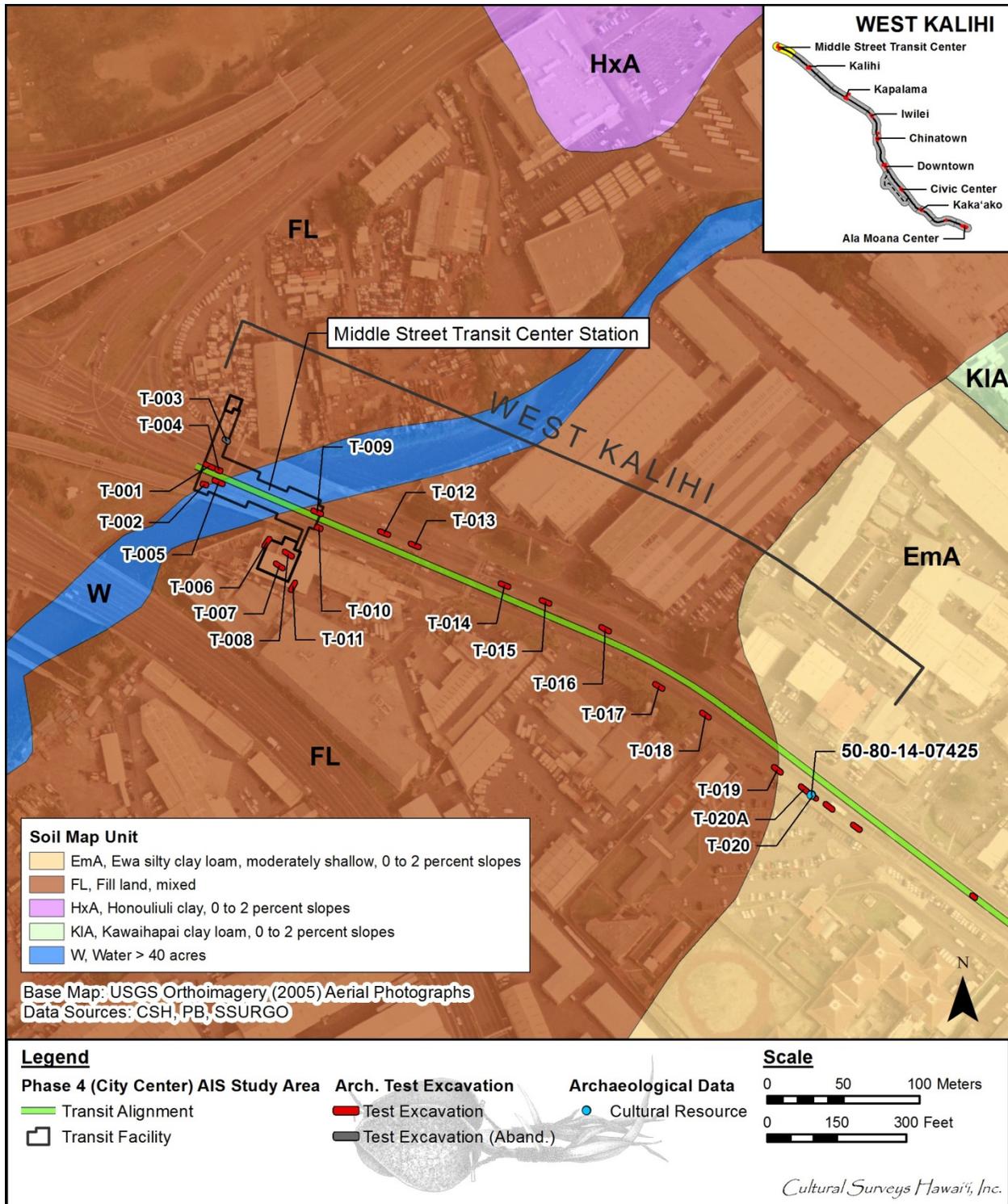


Figure 3. Aerial photograph (source: U.S. Geological Survey orthoimagery 2005) with overlay of the *Soil Survey of Hawai'i* (Foote et al. 1972) showing sediment types near the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

(Figure 4). The name *‘Umi* (lit., “to strangle”) may be associated with human sacrifice. Pukui et al. (1974:215) suggest *‘Umi* “is probably derived from the strangling of a victim used as a human sacrifice at the *heiau* Hāunapō which stood in the vicinity of the present street.” It is likely that *heiau* Hāunapō (lit., “night striking”) was on one of two land sections named “Hāunapō” in the central portion of the West Kalihi Zone (Figure 4). Following land division, the parcels between *‘Umi* and Hāunapō were claimed by the direct descendants of Hewahewa, the *Kahuna Nui*, who served as the highest priest in the archipelago under Kamehameha the Great. These claims may have been due to the land’s association with the *heiau* and the ritual activities that went on there.

Thrum’s description of Kalihi Ahupua‘a in the early twentieth century noted two *heiau* in Kalihi Kai, “Kaaleo” and “Hāunapō” (Thrum 1908:41). Unfortunately, no details about these *heiau* were collected. The presence of a temple of human sacrifice in this immediate area may have been another reason to consider braving the sharks and swimming the channel rather than taking the land route.

Table 1. Place Names in LCA Documents from West Kalihi Zone

| Name | Description |
|----------------------|---|
| Apili Fishpond | Fishpond located at western tip of Alexander Adams’ LCA 803 <i>‘āpana</i> 5. Apili was the closest of the many fishponds of coastal Kalihi to the project corridor (approx. 200 m [656 ft] <i>makai</i>). It appears an area inland of the fishpond was also known as Apili (Figure 5 and Figure 6). |
| Kaliawa (Kaliheawa) | Name of George Beckley’s (LCA 818) Kalihi farm and fishing grounds, understood to lie west and northeast of the Middle Street Transit Center Station. Today there is a street in Kalihi Kai called Kaliawa, approximately 1 km (0.6 mi) south of the West Kalihi Geographic Zone. |
| Kaluapulu | Name associated with Hewahewa’s LCA 3237 Kalihi lands for location of Hewahewa’s LCA 3237). |
| Kaluaopalena | Place name on Monsarrat map (Figure 6) in the vicinity of Hewahewa’s “Kaluapulu.” It is listed on the map as Government Land leased to A. Herbert. |
| Kiona (Kionawawana) | Name associated with Nahinu’s LCA 10498, 100 m (328 ft) <i>mauka</i> of the Middle Street Transit Center Station (see Volume III Appendix B, LCA 10498). |
| Umi | Name of Alexander Adams’ LCA 803 <i>‘āpana</i> 3, 100 m (328 ft) northeast of the Middle Street Transit Center Station (Figure 4 and Figure 7). It appears the Umi land area was bound on the west and north by a major curve of Kalihi Stream. Adams had a house in Umi. |
| Wanana (Kionawawana) | Name associated with Nahinu’s LCA 10498 100 m (328 ft) <i>mauka</i> of the Middle Street Transit Center Station (see Volume III Appendix B, LCA 10498). |

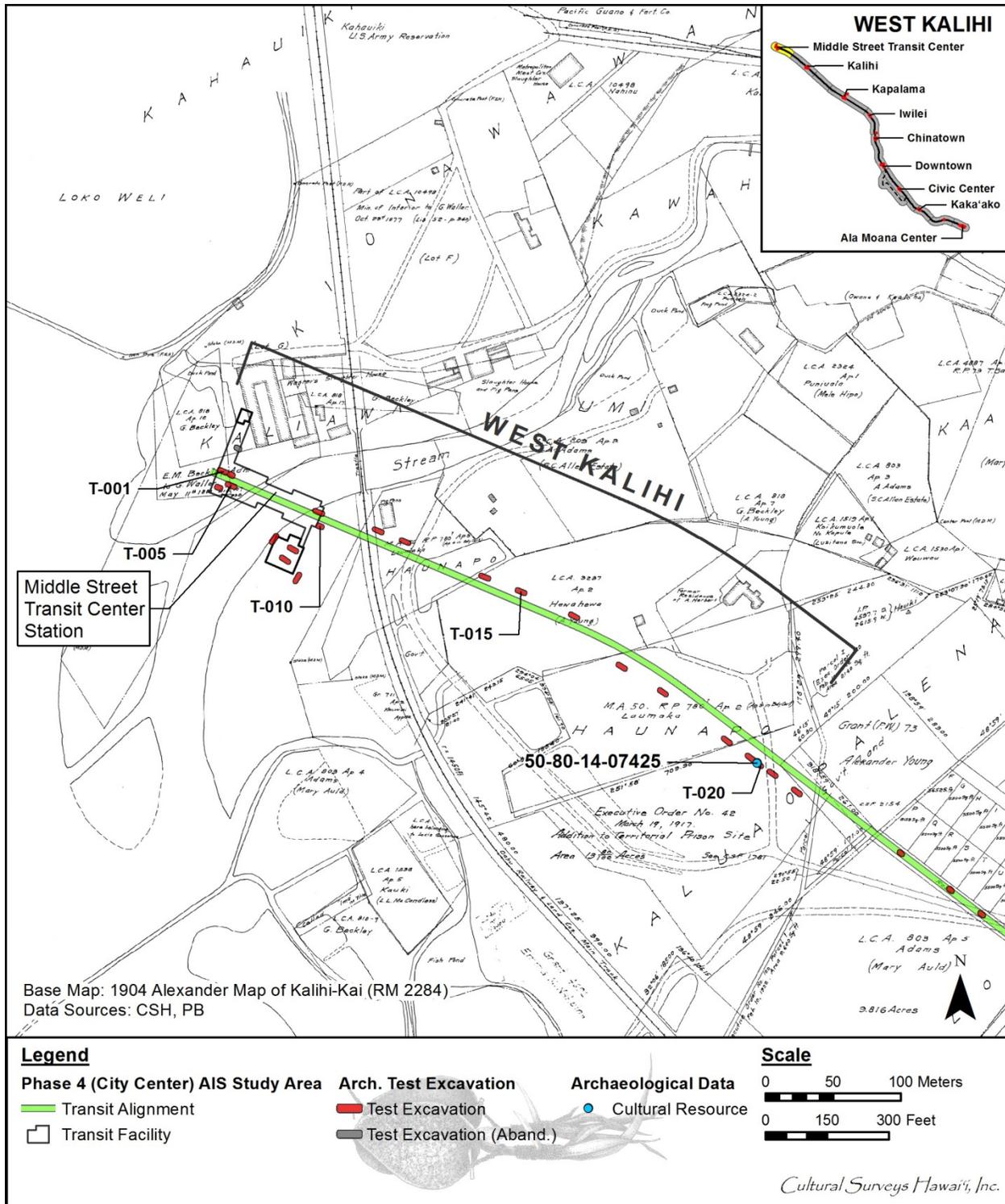


Figure 4. Portion of the 1904 Alexander Map of Kalihi Kai (RM 2284) showing the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

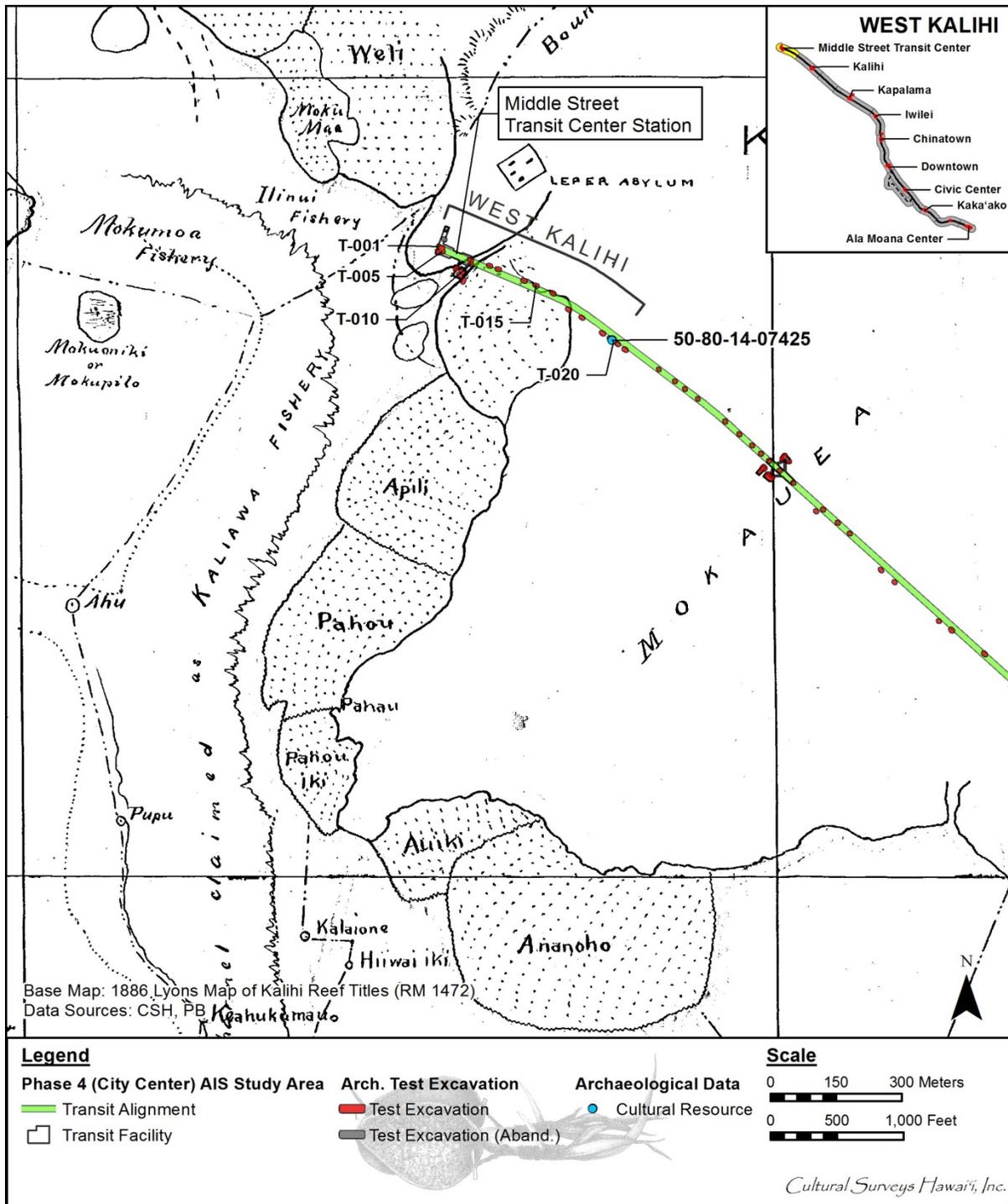


Figure 5. Portion of Registered Map 1472, Map of Reef Titles of Kalihi, compiled by C. J. Lyons (1886) showing locations of seven fishponds (Weli, Waikulu [not labeled but immediately north of Apili], Apili, Pahounui, Pahouiki, Auiki, and Ananoho) in lower Kalihi in relation to West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

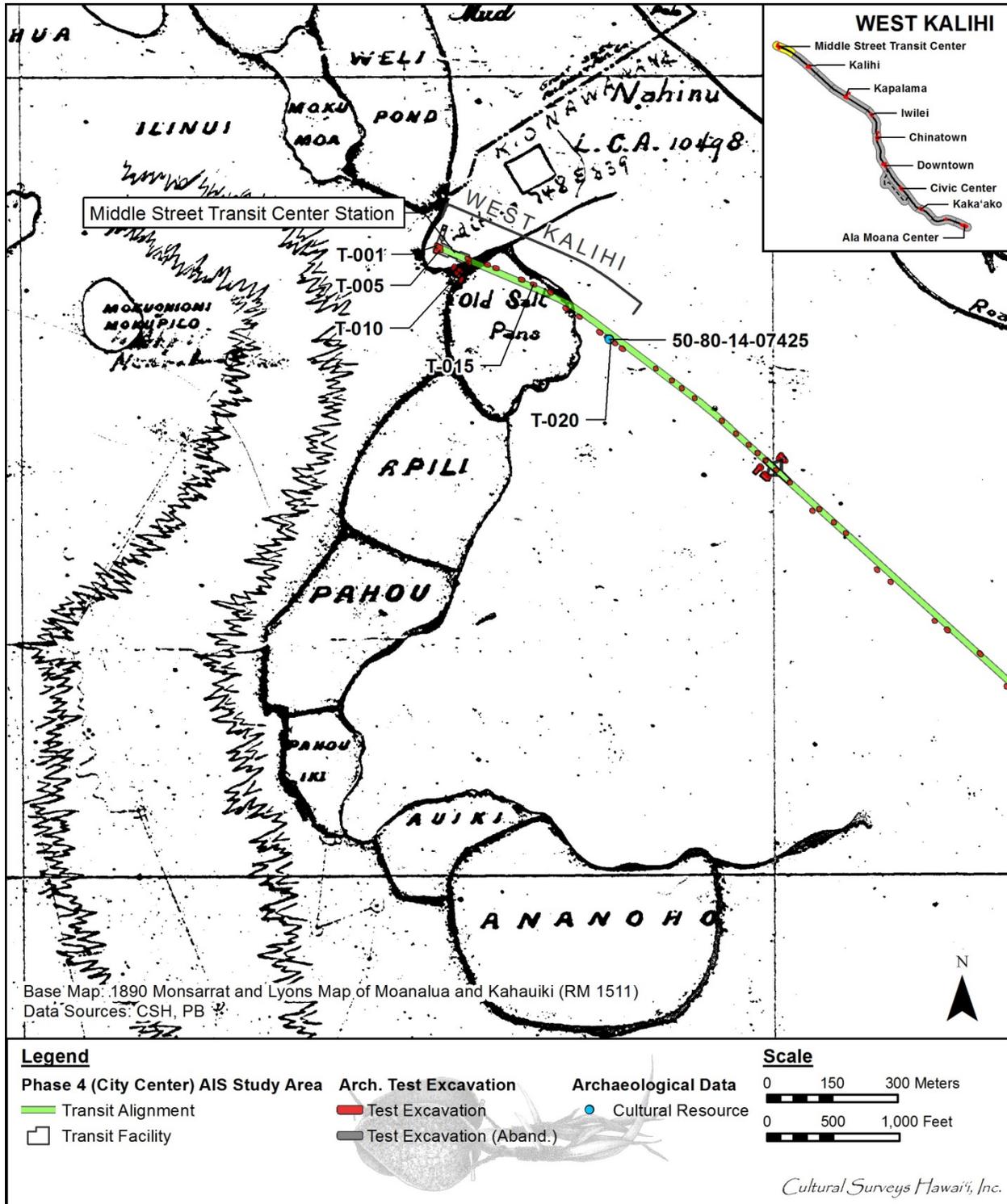


Figure 6. Portion of the 1890 Monsarrat and Lyons Map of Moanalua and Kahauiki depicting the old salt pans makai (south) of the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

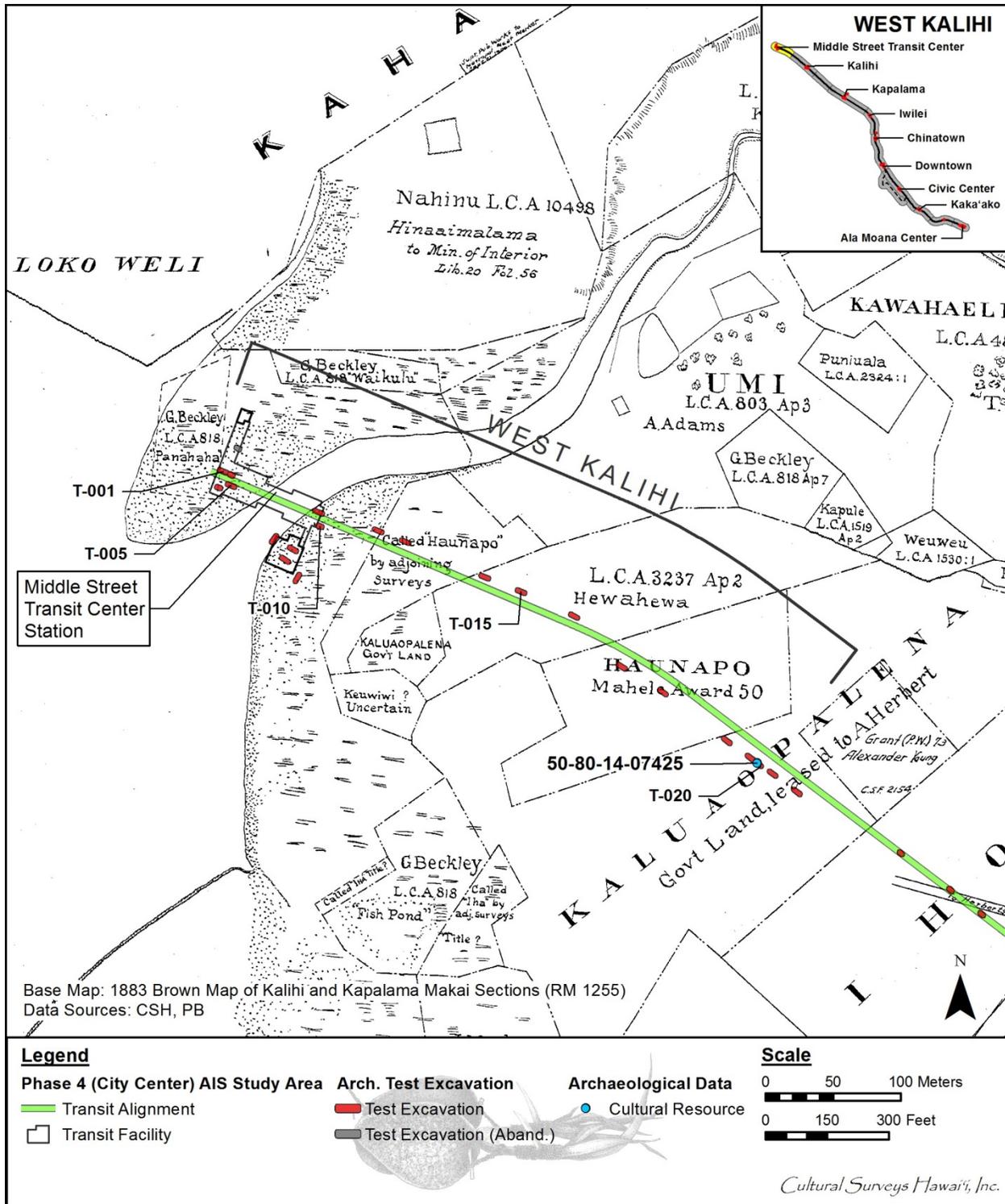


Figure 7. Portion of the 1883 Brown Map of Kalihi and Kapālama (RM 1255) depicting the LCAs near the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

2.4.2 LCA Documentation

Land Commission documents (see Volume III Appendix B for a more complete introduction to these historical records) associated with the Kuleana Act of 1850 allow reconstruction of the land use in Kalihi at that time. Undoubtedly, residential patterns had changed from pre-Contact times as a result of massive depopulation owing to introduced diseases as well as in-migration into greater Honolulu from outlying areas. The pattern of land holdings circa 1850 suggests the majority of Hawaiians in the *ahupua'a* were living relatively close to Kalihi Stream, inland of present-day Dillingham Boulevard and seaward of the confluence of Kalihi and Kamaikai Streams. Coastal habitation was somewhat less than might have been expected. This may have been because the coast was exposed to occasional storm surf, high winds, tsunami and hurricanes; or it may have reflected a cultural pattern in which relatively few people lived close to fishponds that were *kapu* (“marked” or “restricted”) for the *ali'i* (aristocracy). Alternatively, it may simply have reflected an avoidance of the low-lying coastal mudflats that were close to the water table.

Along the Kalihi coastline (in the vicinity of the HHCTCP corridor), the majority of LCAs were large claims that lacked land use descriptions or locational specifics, such as clarification of the land use of various *'āpana* (Table 2, Figure 7, and Figure 8). However, land use descriptions for LCA 818 awarded to George Beckley did specify fishing grounds. Additionally, salt was harvested on lands (“Old Salt Pans”) just east of Kalihi Stream (see Figure 6). The seven fishponds strung along almost the entire West Kalihi shoreline also indicate the rich marine resources of the *ahupua'a* (see Figure 5 and Figure 6). Land use of the coastal area further consisted of at least scattered house lots and farming as indicated by LCA 803 (*'āpana 3*), located approximately 50 m northeast of the West Kalihi Zone, which contained Captain Alexander Adams' house lot. The pattern of land award distribution shown in the LCAs suggests that the traditional Hawaiian practice of maintaining residences dispersed within and throughout their agricultural fields continued in Kalihi at least until the mid-nineteenth century.

Lands in the West Kalihi Zone were awarded to advisors of the Kamehameha line. Land use indicated in the LCA documentation consisted of *lo'i* (pond fields), *kula* (pastures), and *loko* (fishponds). Of note is the mention of *pō'alima* (land worked for the *ali'i*) within LCA 10498, further illustrating the presence of high-ranking government officials.

Hewahewa was awarded the *'ili* of Kaluapulu in Kalihi, which included fishponds at Kalihi Kai (Kamakau 1992; LCA 3237). Hewahewa was a descendant from the Paoa priestly class serving under Kamehameha I, Kamehameha II, and Kamehameha III. A second *kahuna* (priest; expert) of the same Hewahewa line, Nahinu, was also awarded lands in Kalihi (LCA 10498) near the outlet of Kalihi Stream (Bushnell and Hammatt 2002:6). Nahinu also served as *konohiki* (headman of an *ahupua'a* land division) (Pukui 1986:166) for Kalihi Kai during the time of the Māhele (Landrum and Klieger 1991:22–23). Kamakau mentions the two *kahuna* as contemporaries skilled in the diagnosis of illness:

Boki returned and lived at his place at Beretania and devoted himself to medicine, in which he was proficient, and all those joined him who were skilled in placing pebbles [in diagnosis], such as Kaaou, Kuauau, Kinopu, Kahiolo, Nahinu, Kekaha, Hewahewa, and their followers and other kahunas besides. [Kamakau 1992:291]

Table 2. LCAs in the West Kalihi Zone (in numerical order)

| LCA Number | Contents of Award |
|-----------------|---|
| Māhele Award 50 | 'Ili of Hāunapō (approximately six acres) awarded to Laumaka. According to the 1883 Brown map, T-013, T-017 and T-018 are located within this land division. |
| 803 | <i>Lo'i, kula, and loko</i> (292.41 acres) awarded to Alexander Adams in 1828/1829 by Ka'ahumanu. LCA documents indicate that Adams owned a large fishpond just north of Apili fishpond. The precise boundaries of LCA 803 are not provided; however, this fishpond was presumably part of this land division. |
| 818 | One farm with the fishing grounds called Kaliheawa, situated in Kalihi. Awarded to George Beckley by Keōpūolani around 1815. |
| 3237 | Lot called Kaluapulu awarded to Hewahewa. No description of land use in award. |
| 10498 | In 1851, it is described as two divisions of land. The first, named Kiona, was taken by the government. Nahinu kept the second section, called Kukahi. It included six <i>pō'alima</i> (land worked for the <i>ali'i</i>) <i>kalo</i> (taro) patches and one pasture. Awarded to Nahinu by Kamehameha III in 1831. |

Apparently, *kahuna* were given lands near fresh water because it was important for them to practice their *ho'oponopono* (lit., to correct) at those locations (Bushnell and Hammatt 2002:6).

Captain Alexander Adams (LCA 803) and George Beckley (LCA 818) were also awarded large parcels of land in Kalihi Kai. Adams befriended Kamehameha I, who made him the captain of his personal fleet of ships. In 1816, he sailed the *Kaahumanu* to Kaua'i to expel the Russians from their forts on that island. In 1817, he sailed to Canton on the *Forrester* to sell a load of sandalwood for the king. During Kamehameha II's reign, Adams encouraged the king to allow the first American missionaries to stay in the islands and helped design the Hawaiian flag, placing the Union Jack in one corner. In 1823, he became the first official pilot for Honolulu Harbor, a job he held for 30 years (Day 1984:1).

Beckley, like Adams, had served under Kamehameha I and II as a harbor pilot and as the commander of the Honolulu Fort from 1816 (Day 1984:9). He died in 1826, but his heirs were awarded 70 acres (see Volume III Appendix B). An interesting aspect of George Beckley's land documents is the assertion in the Foreign Testimony for LCA 818 (see Volume III Appendix B) that "...I request my executor to have my body decently interred in the house I have commenced building..." It seems most likely that this was in reference to his "premises situated at Honolulu" and not to his Kalihi "farm."

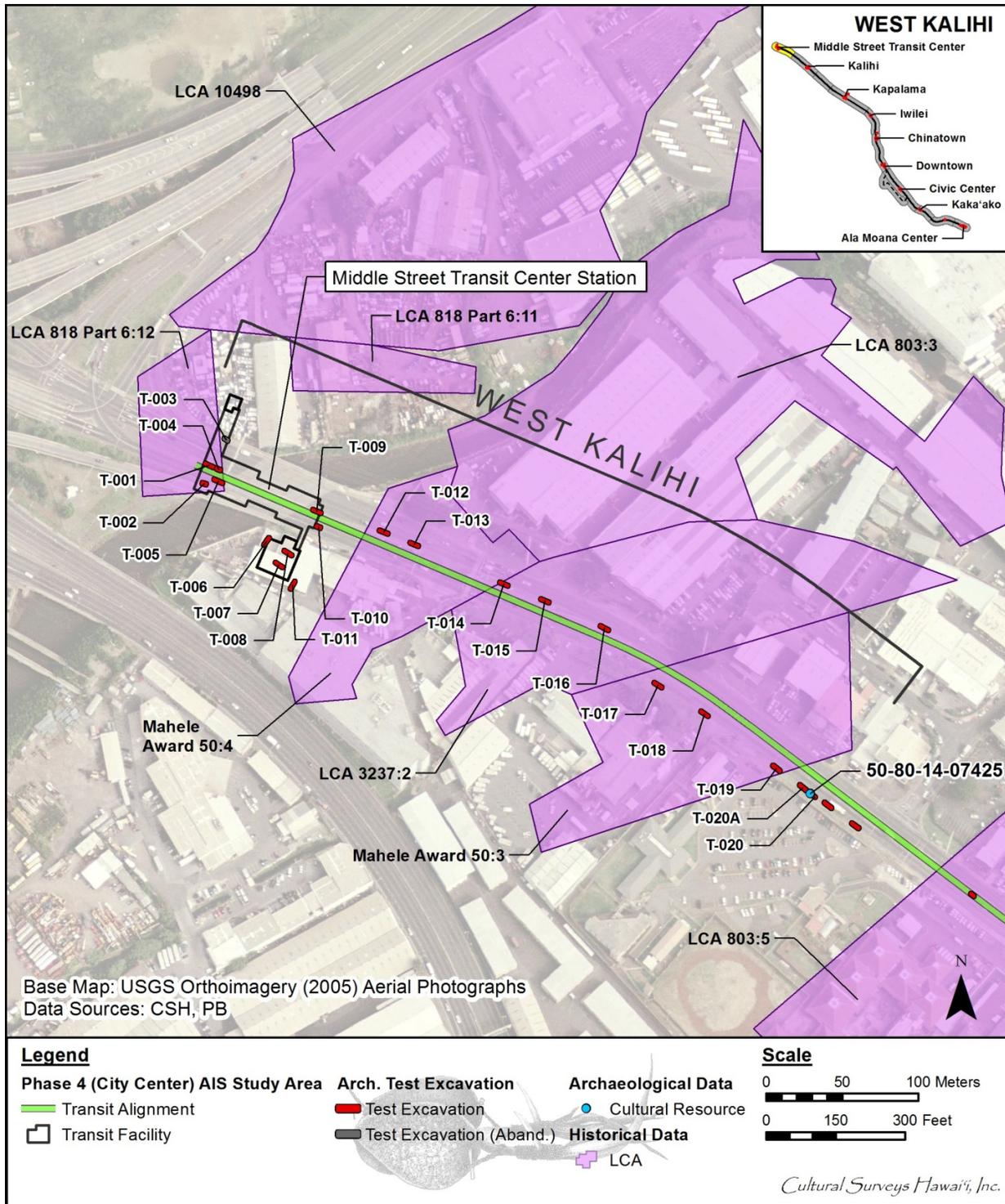


Figure 8. Aerial photograph (source: U.S. Geological Survey orthoimagery 2005) showing the locations of LCAs near the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

2.4.3 Historic Land Use

Kalihi Ahupua'a consisted of a deep and, in certain places, narrow valley along with an adjacent, much shallower side valley (Kamanaiki). The abundant mountain rains were carried down to the coastal floodplain via the perennial Kalihi Stream and the intermittent Kamanaiki Stream, which joined the larger Kalihi Stream at the mouth of Kalihi Valley (see Volume II).

The rich alluvial coastal plains, watered by the mountain streams, provided favorable conditions for the cultivation of wetland taro as well as other crops. Early historic accounts of the West Kalihi Zone (see Volume II Section 3) describe a richly cultivated coastal plain of taro fields and gardens, with scattered habitations stretching from the lower plain up to the mouth of Kalihi Valley. The productivity of this coastal area was supplemented by rich offshore fisheries and coastal fishponds, as well as salt pans that dotted the tidal mudflats east of the Kalihi outlet (see Figure 5 and Figure 6). Many of the taro *lo'i* along the Kalihi Stream were claimed during the Māhele. A review of historic maps and LCA documents indicate that the area encompassing the West Kalihi Zone was continuously cultivated from the early nineteenth through twentieth centuries (Handy 1940:79).

As the subsistence-based economy shifted to a cash-based economy during the second half of the nineteenth century, salt production became a lucrative venture in coastal Kalihi (Moore et al. 2004:9). Large-scale salt pans were constructed south of the Middle Street Transit Center Station. These pans are depicted on the 1890 Monsarrat map near where the Waikulu Fishpond was presumably located (see Figure 6). The low-lying coastal environs of the Ke'ehi estuary would have been ideal for salt production, as were many areas of the Honolulu coastline. Later maps, particularly the 1919 U.S. Army War Department Fire Control map (Figure 9), indicate these salt operations had dwindled in size by the early twentieth century.

Following the introduction into Hawai'i of Hansen's disease in 1863, the area immediately northeast of the Middle Street Transit Center Station became the site of the first Leprosarium ("Leper Asylum" on the map; see Figure 7) in Hawai'i (Dega and Davis 2005:7). This began a period of development that altered the landscape of the West Kalihi Zone. As early as 1904 (see Figure 4), a portion of the Oahu Railway and Land Company (OR&L) bisected the West Kalihi Zone between T-009 and T-010 on the west and T-012 on the east. Later, as depicted on maps from 1919 through 1933, the network of rail lines was more extensive throughout Kalihi Kai (see Figure 9 and Figure 10). The 1950 Sanborn Series maps show the Middle Street Transit Center Station at the former location of the Hawaiian Gas Products, Ltd. Acetylene Plant, with a cinder brick factory just to the east (Figure 11).

2.4.4 Subsistence and Settlement Pattern Summary

A review of the LCA documentation indicates that the coastal subsistence and settlement pattern in the West Kalihi Zone appeared to include a mixture of marine resource and inland fishpond exploitation as well as taro pond field agriculture. House sites, although present, appear to have been relatively modest in number and density. The flat of Kaluapuhi, where Kalihi Kai meets the ocean, was likely reserved for aquaculture. Fishponds were prominent in the coastal environs of Kalihi, particularly in West Kalihi.

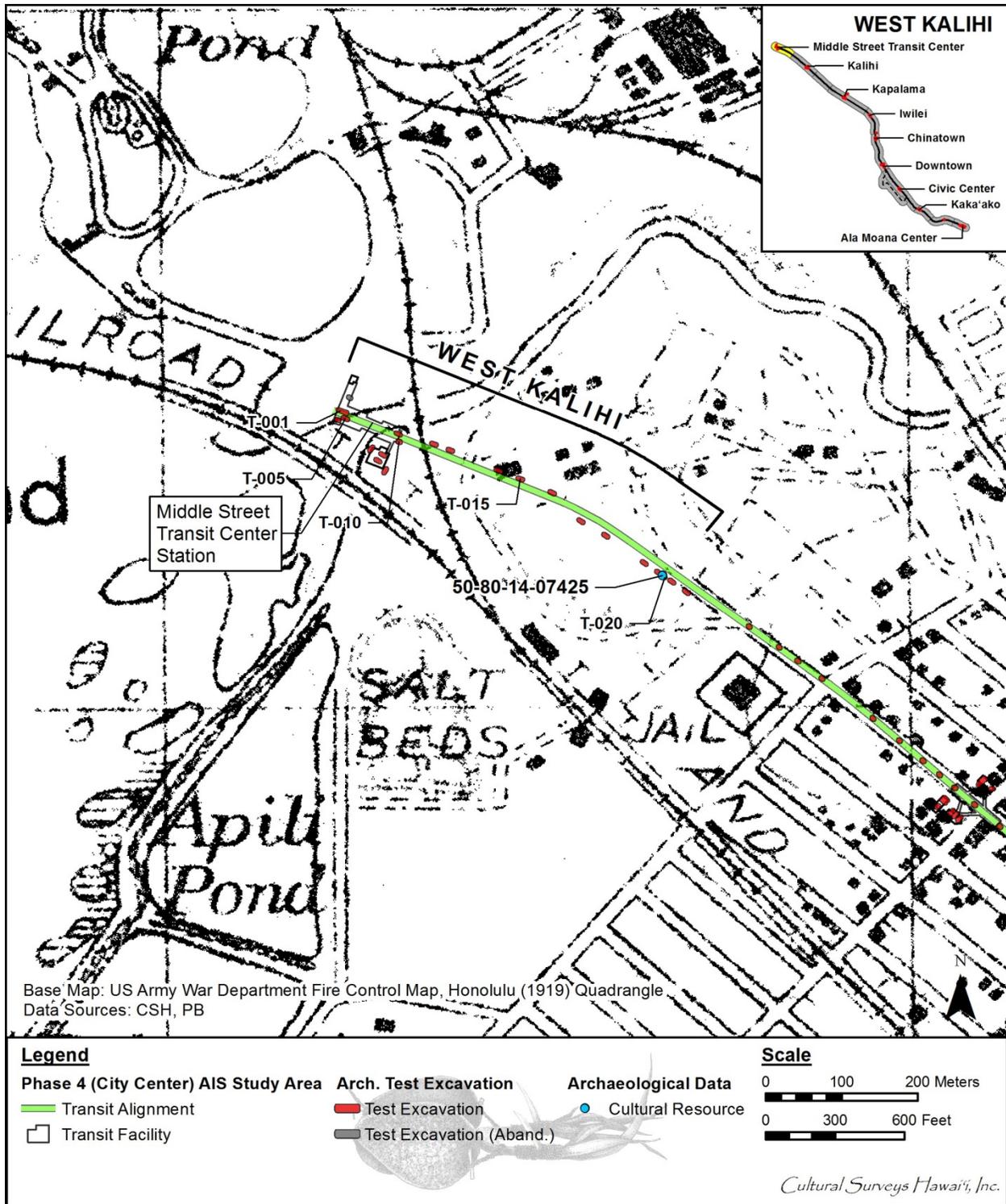


Figure 9. Portion of the 1919 U.S. Army War Department Fire Control Map of Honolulu depicting the salt beds east of the Kalihi Stream outlet in relation to the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station



Figure 10. 1933 U.S. Army War Department Fire Control Map, Honolulu Quadrangle, depicting the OR&L railroad showing the relationship of the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station

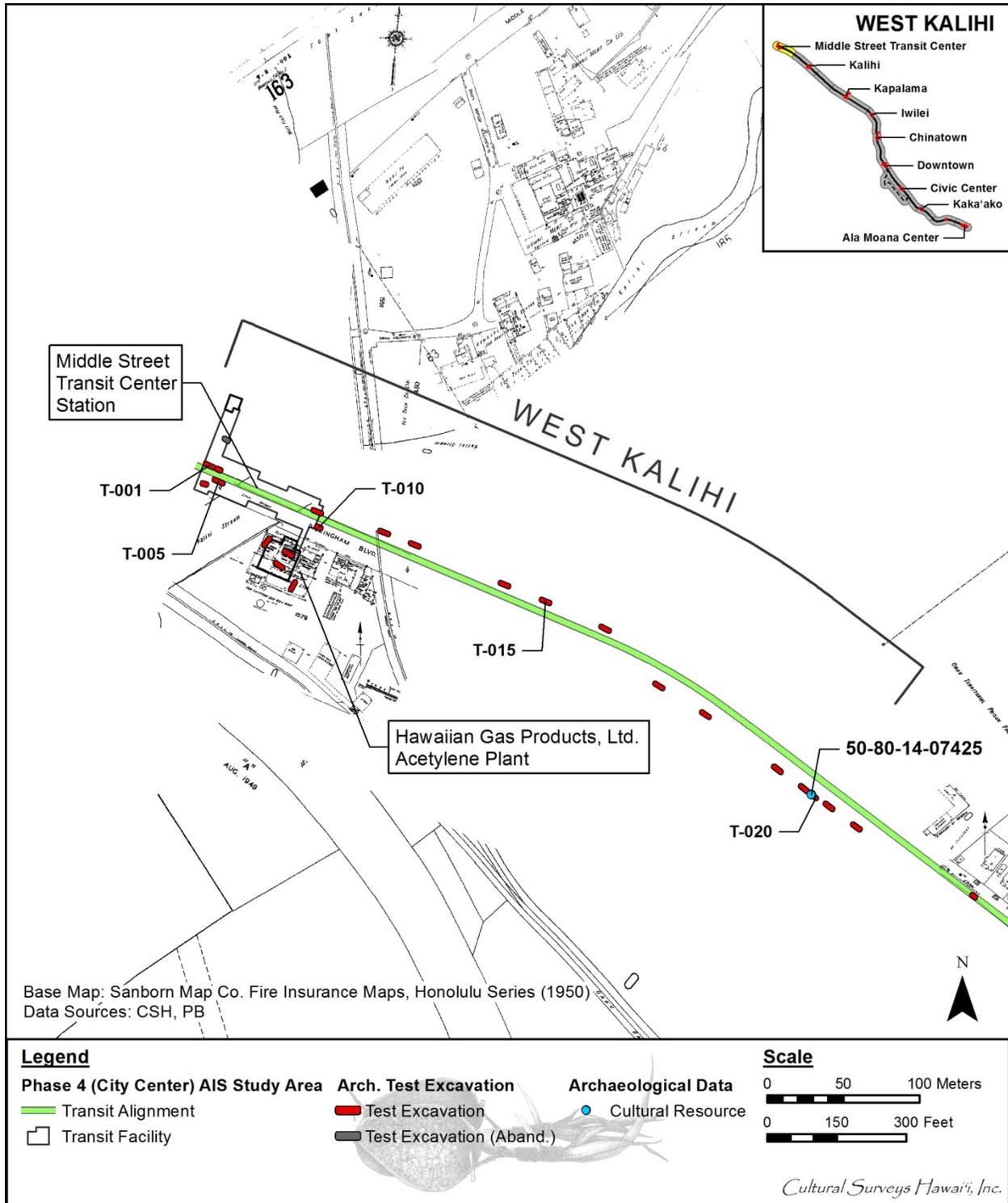


Figure 11. 1950 Sanborn Series maps showing development around the Middle Street Transit Center Station, HHCTCP corridor, including the former location of the Hawaiian Gas Products, Ltd. Acetylene Plant, and AIS test excavations T-001 through T-020 and T-020A in the West Kalihi Zone

Seven fishponds formerly dotted the Ke'ehi Lagoon shoreline, south and west of the West Kalihi Zone (see Figure 5). These fishponds include, from northwest to southeast: Weli (SIHP #-0075), Waikulu (no SIHP number was found in previous archaeology documents), Apili (SIHP #-0074), Pahounui (SIHP #-0074), Pahouiki (SIHP #-0074), Auiki (SIHP #-0073), and Ananoho (SIHP #-0073). Modern development, including the dredging of Ke'ehi Lagoon for the construction of the harbor and the nearby seaplane runway prior to World War II, have destroyed or filled in any remnants of these fishponds (Dega and Davis 2005:13; McAllister 1933:90–91). Previous surveys and studies in the area provide some general information about these fishponds.

Weli fishpond was located approximately 80 m northwest of the Middle Street Transit Center Station. Sterling and Summers (1978:327) document it as measuring approximately 30 acres, bounded by earthen embankments. Waikulu fishpond is depicted in the 1886 Lyons map (see Figure 5) south of the West Kalihi Geographic Zone and north of Apili fishpond. It was located in *āpana* 11 of LCA 818, which belonged to Captain George Beckley. The pond covered an area of only one acre and was classified by Kikuchi (1973) as a *loko wai*, or a freshwater pond, that was artificially separated from an adjacent stream by an earthen or stone embankment (Dega and Davis 2005:13). Apili (lit. “caught, snared, or stuck”) fishpond, located below Waikulu and 240 m south of the West Kalihi Zone, encompassed an area of 38 acres and was renowned for the *awa* (milkfish) it produced (see Figure 5 and Figure 6) (Sterling and Summers 1978:322–323). Pahounui (26 acres) and Pahouiki (14 acres) were joined to one another and bounded by artificial coral walls (see Figure 5 and Figure 6) (Sterling and Summers 1978:322). Auiki fishpond was relatively small, measuring approximately 12 acres in extent. The final fishpond, Ananoho, encompassed 52 acres and was enclosed by coral walls that averaged 6 ft in width and 3 ft in height (Sterling and Summers 1978:322). Given their proximity to the coastline, these fishponds were likely brackish environments that supported *awa* and *'ama'ama* (mullet) (Dega and Davis 2005:12).

A paleoenvironmental study of Auiki and Ananoho Fishponds (Athens and Ward 2002) concluded that they were probably constructed sometime between the sixteenth and seventeenth centuries. Toward the end of the nineteenth century, their use became more commercial. A period of infilling of the historic coastal fishponds followed the construction of an asphaltic concrete plant along the eastern shoreline of Ke'ehi Lagoon in the 1940s. Ananoho and Auiki were completely filled during World War II, at which time an Army port and warehouse complex was built (Athens and Ward 2002:1). Later, this became part of the Kapālama Military Reservation. By 1954, Apili, Pahounui, Pahouiki, Auiki, and Ananoho fishponds had disappeared from the coastal landscape (Moore et al. 2004:11).

2.5 Previous Archaeology

Commercial development in coastal Kalihi primarily occurred prior to the late 1970s, when archaeological investigation became standard during project planning and construction activities. As a result, few archaeological studies have been conducted in Kalihi. Eight previous archaeological studies have been conducted in the general vicinity of the West Kalihi Zone, seven close to the Middle Street Transit Center Station and the eighth along the Ke'ehi shoreline (Table 3 and Figure 12). The studies are briefly discussed below (starting from northwest and heading southeast).

Table 3. Previous Archaeological Studies in the West Kalihi Zone (arranged chronologically)

| Author | SIHP #50-80-14- | Report Description and Findings |
|--------------------------------|------------------------|---|
| Landrum and Klieger 1991 | N/A | Historical literature and documents search for the City and County of Honolulu, Department of Transportation Services, Bus Unit Repair Shop Facility |
| Hammatt and Folk 1992 | 4525 | A burial treatment plan for the City and County of Honolulu, Department of Transportation Services, Bus Unit Repair Shop Facility |
| Folk, Crotty, and Hammatt 1993 | 4525 | Archaeological survey - one historic property identified: SIHP #50-80-14-4525, a post-Contact cultural layer containing three human burials, two of which were in coffins |
| Folk and Hammatt 1993 | 4525 | A mitigation plan for the City and County of Honolulu, Department of Transportation Services, Bus Unit Repair Shop Facility |
| Hammatt and Shideler 2002 | N/A | Literature review and field inspection of the Middle Street Transit Center Station; recommended an archaeological inventory survey |
| Bushnell and Hammatt 2002 | N/A | Cultural impact assessment of the Middle Street Transit Center Station |
| Moore, Bevan, and Kennedy 2004 | 0074 | Archaeological inventory survey of eastern coastline of Ke'ehi Lagoon - portions of one historic property identified: SIHP #50-80-14-0074, three adjoining fishponds |
| Dega and Davis 2005 | 6683 | Inventory survey at the (then) proposed Middle Street Intermodal Center - one historic property identified: SIHP #50-80-14-6683, a subsurface historic refuse pit and material remains associated with a slaughterhouse |

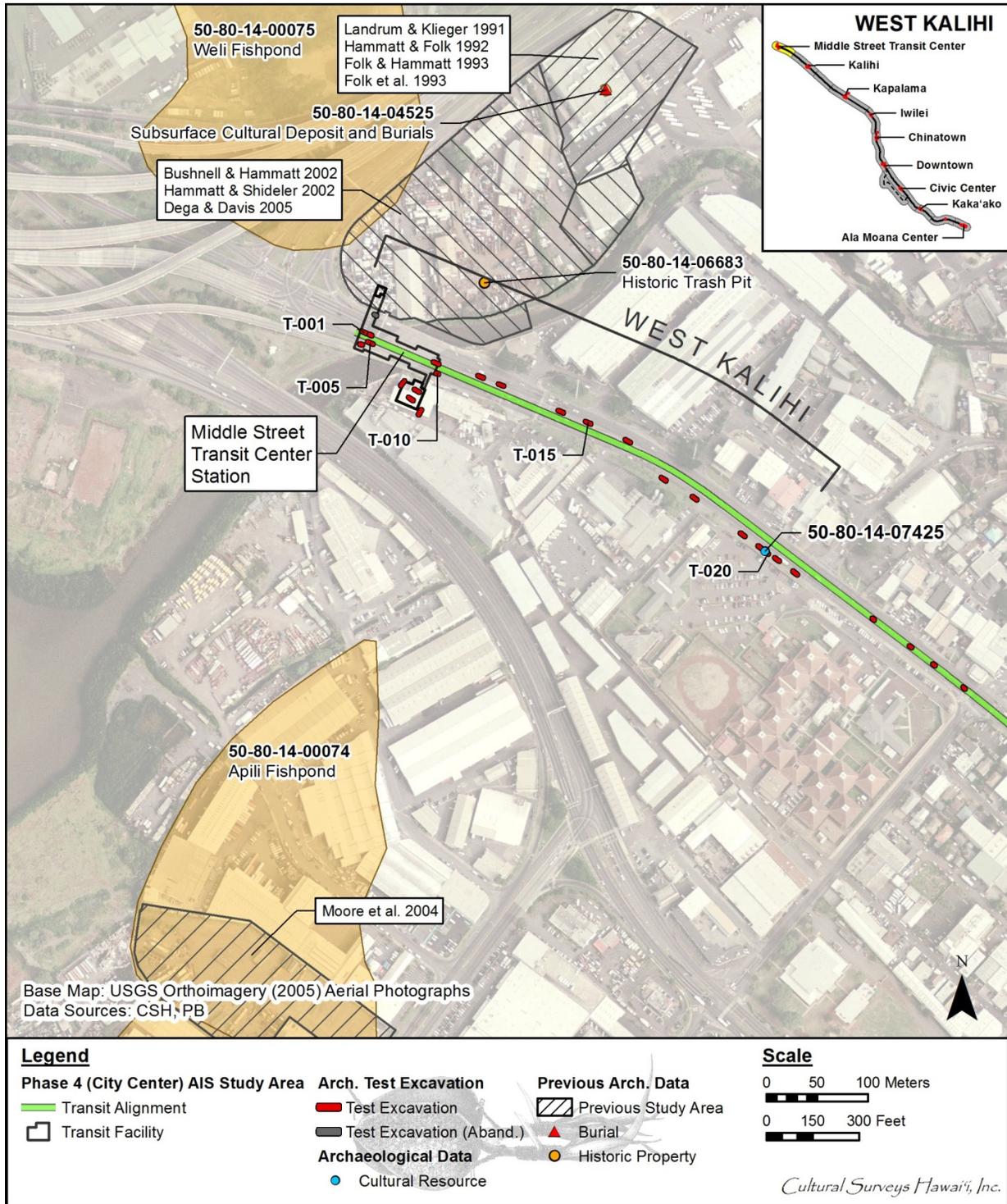


Figure 12. Previous archaeological studies in the vicinity of the West Kalihi Zone AIS test excavations (T-001 through T-020 and T-020A) along the HHCTCP corridor and at the Middle Street Transit Center Station (source: U.S. Geological Survey orthoimagery 2005)

City and County of Honolulu, Repair Shop Facility in Kalihi (Landrum and Klieger 1991; Hammatt and Folk 1992; Folk and Hammatt 1993; Folk et al. 1993)

Several studies were undertaken to fulfill the requirements of an Environmental Impact Study (EIS) for the (then) proposed development of a 4.2-acre City and County of Honolulu Bus Repair Shop Facility at 711 Middle Street in Kalihi (TMK: (1) 1-2-16:17). Beginning in 1991, the studies included a historical literature and documents search (Landrum and Klieger 1991); an archaeological survey with subsurface testing (Folk et al. 1993); a burial treatment plan (Hammatt and Folk 1992); and a mitigation plan (Folk and Hammatt 1992). Landrum and Klieger (1991) reported that the project area was used extensively for habitation and agriculture from the pre-Contact period through the late 1800s. This was due in part to its proximity to Weli Fishpond. The research did not identify any extant archaeological remains (Landrum and Klieger 1991:35). During the archaeological survey by Folk et al. (1993), 19 trenches were excavated by backhoe. Three burials were exposed during excavation, including two coffin burials and one burial without a coffin. The burials were situated between 0.6 to 1.1 m below the existing ground surface within a reddish-brown silty clay loam buried A-horizon (former land surface), which was capped by modern fill. In addition, a cultural layer was identified. The burials and cultural layer were assigned SIHP #50-80-14-4525 (Folk et al. 1993:28). Based on recommendations in the AIS, a burial treatment plan was written to address the human remains found, and a mitigation plan was written to address any potential impacts during facilities construction.

Vicinity of the Middle Street Transit Center Station (Bushnell and Hammatt 2002; Hammatt and Shideler 2002; Dega and Davis 2005)

Several historic preservation studies were conducted immediately *makai* of the Bus Repair Shop Facility project, including an archaeological assessment (Hammatt and Shideler 2002), a cultural impact assessment (Bushnell and Hammatt 2002), and an archaeological inventory survey with subsurface testing (Dega and Davis 2005). The archaeological assessment uncovered no new data regarding the project area; however, it was recommended that a program of subsurface testing be implemented to provide paleoenvironmental information, particularly in regard to Waikulu Fishpond, which historical records indicated was under the southern half of the subject parcel (Hammatt and Shideler 2002).

In the cultural impact assessment, concerns were expressed regarding the potential for more burials in the project area (Bushnell and Hammatt 2002:13). Dega and Davis (2005) collected and analyzed numerous sediment samples during their archaeological inventory survey; however, it was impossible to distinguish between naturally-deposited stream sediments and fishpond sediments in the project area. Evidence of pre-Contact cultural activity was inconclusive. However, evidence of historic-era industrial activity was abundant and Waikulu Fishpond was designated as SIHP #50-80-14-6683 (Dega and Davis 2005:42).

Eastern Coastline of Ke'ehi Lagoon (Moore et al. 2004)

Moore et al. (2004) conducted an archaeological inventory survey of the eastern shoreline of Ke'ehi Lagoon; they encountered portions of SIHP #50-80-14-0074, documented by McAllister (1933:91) as three adjoining fishponds (Apili, Pahounui, and Pahouiki). Sediment samples were collected from six geotechnical borings to identify fishpond sediments. Palynology and

radiometric analysis of these samples provided information on the paleoenvironment of Kalihi prior to human colonization, but did not yield definitive evidence of fishpond sediments.

2.6 Modern Land Use and Built Environment

The West Kalihi Geographic Zone traverses a predominantly urban environment, through the neighborhoods of coastal Kalihi. The centerline of the project alignment is generally within Kamehameha Highway. Parcels bordering the roads and highways include a mix of commercial, industrial, and residential developments. Large developments in the vicinity include Diamond Head Distributor and Oahu Community Correctional Center. A massive utility corridor containing electrical, gas, water, sewer, and storm lines is also present throughout the West Kalihi Geographic Zone. The number and distribution of these existing utilities indicates that this West Kalihi portion of Kamehameha Highway was heavily disturbed in the past.

2.7 Test Excavation 1 (T-001)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 818 part 6:12 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.3 m |
| UTM: | 615235.1495 mE, 2359417.997 mN |
| Max Length/Width/Depth: | 5.83 m/0.80 m/2.40 mbs |
| Orientation: | 112/292° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 1 (T-001) was located in the left lane of the west-bound side of Kamehameha Highway, near its intersection with Middle Street, on the north bank of Kalihi Stream. The closest utilities are a telephone cable approximately 6 m south of T-001 and an electrical line approximately 3.2 m northwest. A waterline is located approximately 12.0 m north of the test excavation. T-001 was located on property owned by the State of Hawai'i (Kamehameha Highway right-of-way) on a slight rise in the roadway surface that gives access to a bridge over Kalihi Stream.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates that T-001 was located within a portion of LCA 818 Part 6:12, known as Panahaha, which had been awarded to George Beckley. Land use consisted of one farm along with the fishing ground Kaliheawa. T-001 was situated on a wetland along the edge of the Kalihi Stream. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-001 between a fork in the tracks of the former OR&L railroad. According to the 1953 U.S. Army Mapping Service topographic map (see Volume II), T-001 by that time was located within Kamehameha Highway.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility approximately 250 m northeast of T-001. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the proposed bus depot, the Middle Street Transit Center Station project area, the nearest (southern-most) end being approximately 25 m north of T-001. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 125 m northeast of T-001 (Dega and Davis 2005).

Documentation Limitations: T-001 was excavated to the water table at a depth of 2.4 mbs. There were no factors that limited the documentation of T-001.

Stratigraphic Summary: The stratigraphy of T-001 consisted of fill strata overlying natural alluvial sediment to the water table. Observed strata were asphalt (Ia), gravelly loamy sand base course (Ib), very gravelly loamy sand fill (Ic), silt loam fill (Id), and natural gravelly sandy loam (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: Metal wire and a plastic fork were observed in Stratum Id but not collected.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: Two bulk sediment samples were collected from Stratum II at 1.80 to 2.40 mbs (8 L) from the backhoe bucket. The bulk samples were wet screened. The bulk samples yielded small amounts of charcoal (0.2 g), shell (13.4 g), water-worn gravels/cobbles (36.3 g), and wood (0.1 g). The shells, none of which were considered midden, included the following taxonomic categories: Pyramidellidae (0.1 g), Veneridae (0.1 g), *Insognomon* sp. (5.1 g), Tellinidae (3.5 g), *Tellina palatam* (1.1 g), *Tellina* sp. (0.4 g), Crustacea (0.6 g), *Ctena bella* (0.1 g), *Brachidontes crebristriatus* (0.1 g) and *Periglypta reticulata* (2.3 g). The bulk sediment samples documented the mixed depositional origin of Stratum II.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might have suggested 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 0.5 mbs.

GPR depth profiles for T-001 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 that occurred around 0.25 mbs and again around 0.75 mbs. Two anomalies were observed in the profile but were not within the excavation boundaries. The maximum depth of clean signal return was approximately 1 mbs.

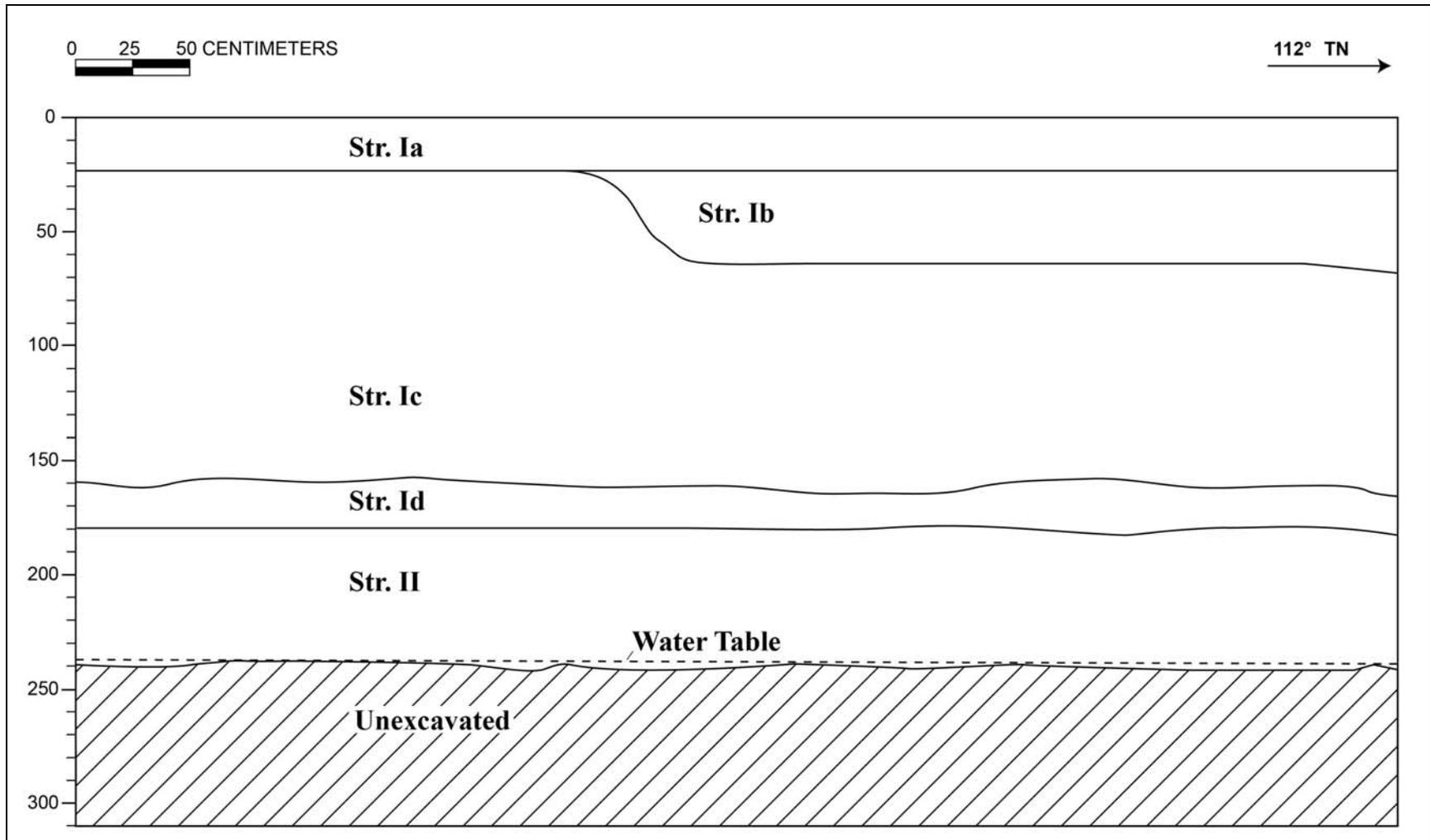
Summary: T-001 was excavated to the water table at a depth of 2.4 mbs. The stratigraphy of T-001 consisted of fill (Ia–Id) overlying natural alluvial sediment (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The bulk sediment samples documented the mixed depositional origin of Stratum II. No archaeological cultural resources were identified within T-001.



T-001 general location, view to the northwest



T-001 north wall profile, view to the north



T-001 north wall profile

T-001 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|---------------------|--|
| Ia | 0–25 | Asphalt; road surface |
| Ib | 25–63 | Fill; 7.5 YR 4/2 (brown); gravelly loamy sand; structureless, single grain; moist, friable consistency; non-plastic; terrigenous origin; very abrupt, discontinuous lower boundary; modern fill; base course for Kamehameha Highway |
| Ic | 25–160 | Fill; 10 YR 7.2 (light gray); very gravelly loamy sand; structureless, massive; moist, very firm consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; crushed coral and coral cobble fill |
| Id | 160–180 | Fill; 10 YR 7/1 (light gray); silt loam; structureless, massive; moist, firm consistency; slightly plastic; terrigenous origin; very abrupt, smooth lower boundary; contained metal wire and a plastic fork (not collected); similar to the unknown substances in T-006 and T-008, industrial product or by-product fill |
| II | 180–240 (BOE) | Natural; 10 YR 2/1 (black); gravelly sandy loam; weak, very fine to fine, granular structure; wet, sticky consistency; plastic; mixed origin; moderate to high energy alluvial environment with estuary sediment containing marine shell and water-rounded basalt gravels |

2.8 Test Excavation 2 (T-002)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 818 part 6:12 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.3 m |
| UTM: | 615231.9791 mE, 2359405.941 mN |
| Max Length/Width/Depth: | 3.05 m/0.91 m/2.60 mbs |
| Orientation: | 111/291° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 2 (T-002) was located in the right lane of the east-bound side of Kamehameha Highway, near its intersection with Middle Street, on the north bank of Kalihi Stream. T-002 was level with the surrounding surface and was not in a road cut or causeway. At the time of excavation, T-002 was moved 0.5 m north from the location indicated in the AISP to avoid cutting through guard rails along the highway. Utilities in the vicinity included a storm drain 0.5 m north and an electric line 2.4 m south of the excavation. T-002 was located on property owned by the State of Hawai'i (Kamehameha Highway right-of-way) on a slight rise in the roadway surface that gives access to a bridge over Kalihi Stream.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates T-002 was located within a portion of LCA 818 Part 6:12 known as Panahaha, which was awarded to George Beckley. Land use consisted of one farm along with the fishing ground, Kaliheawa. T-002 was located within a coastal wetland area along the margins of the Kalihi Stream. The 1919 U.S. Army War Department Fire Control map (see Figure 9) indicates T-002 was located between a fork in the former OR&L railroad tracks.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility approximately 265 m northeast of T-002. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the bus depot, Middle Street Transit Center Station project area, the nearest (southern-most) end being approximately 38 m north of T-002. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 135 m northeast of T-002 (Dega and Davis 2005).

Documentation Limitations: T-002 was excavated to the water table at a depth of 2.60 mbs. There were no factors that limited the documentation of T-002.

Stratigraphic Summary: The stratigraphy of T-002 consisted of fill sediments that extended below the water table. Observed strata were asphalt (Ia), gravelly loam base course material (Ib), and clay loam (Ic). The stratigraphy conforms to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed a linear feature that might indicate the presence of utilities although none 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 0.75 mbs.

GPR depth profiles for T-002 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 that occurred around 0.35 mbs. An anomaly was observed in the profile but was not encountered during excavation. The maximum depth of clean signal return was approximately 0.9 mbs.

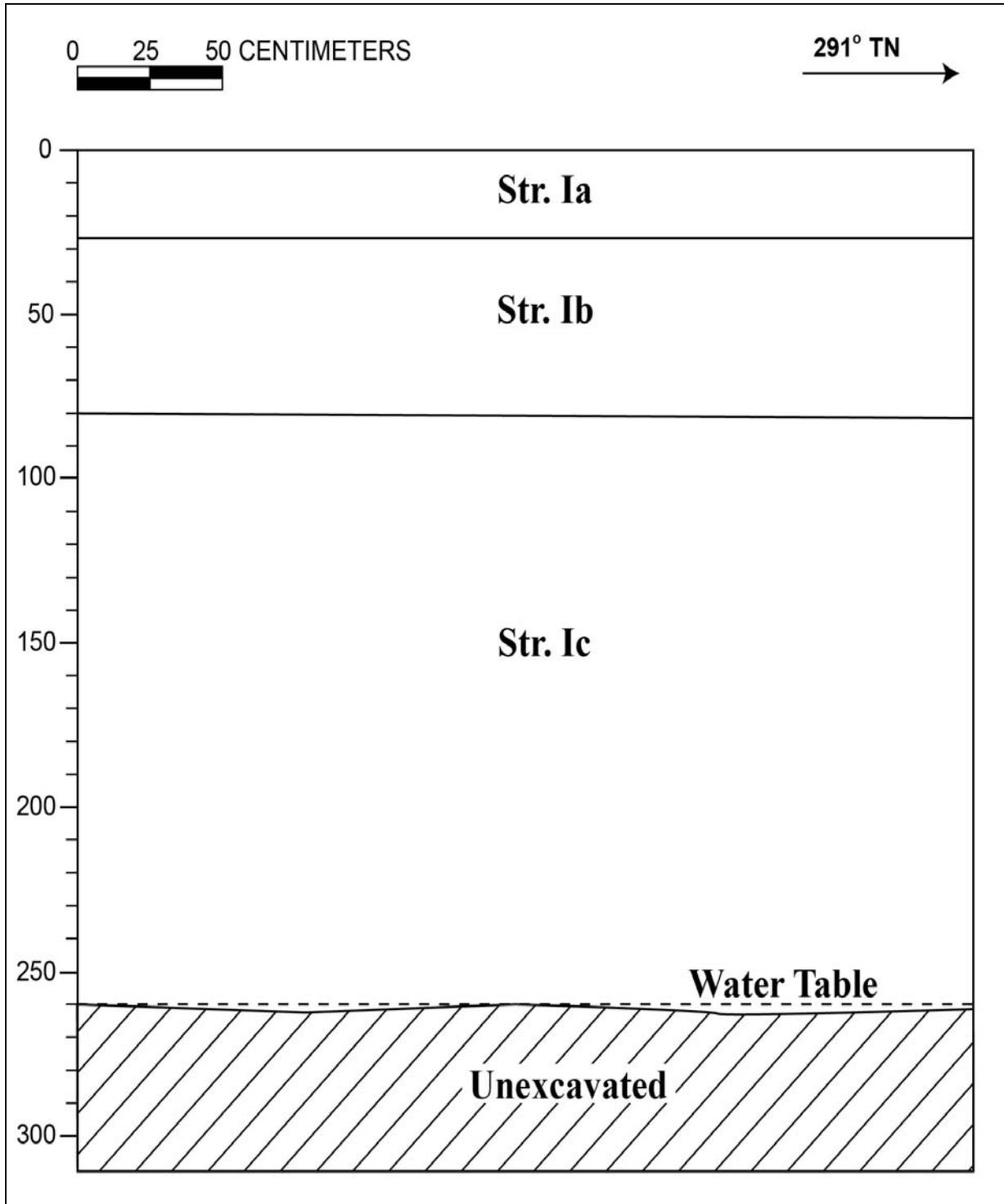
Summary: T-002 was excavated to the water table at a depth of 2.60 mbs. The stratigraphy of T-002 consisted of fill strata (Ia–Ic) to beneath the water table at 2.60 mbs. The stratigraphy conforms to the USDA soil survey designation of Fill land (FL). No archaeological cultural resources were identified within T-002.



T-002 pre-excitation, view to the east



T-002 north wall profile, view to the north



T-002 south wall profile

T-002 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|-------------------------|---|
| Ia | 0–26 | Asphalt; road surface |
| Ib | 26–80 | Fill; 5 YR 3/1 (very dark gray); gravelly loam; moderate, medium, granular structure; dry, hard consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; interpreted as highway base course |
| Ic | 80–260 (BOE) | Fill; 10 YR 3/1 (very dark gray); clay loam; moderate, medium, granular structure; moist, friable consistency; plastic; terrigenous origin; lower boundary not visible; occasional inclusions of basalt cobbles and pebbles and abundant fragmentary shells; interpreted as fill associated with major land reclamation of this area in the early twentieth century |

2.9 Test Excavation 3 (T-003)

Ahupua'a: Kalihi
LCA: N/A
TMK #: 1-2-018 [Plat]

Setting: Test Excavation 3 (T-003) was proposed to be located within the sidewalk on the northeast (*mauka*) side of the westward bound lane of Kamehameha Highway, approximately 70 m southeast of the Middle Street intersection. T-003 was abandoned because the excavation was situated alongside a fence line with retaining walls and a structural footing.

2.10 Test Excavation 4 (T-004)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 818 pt 6:12 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.4 m |
| UTM: | 615241.3279 mE, 2359415.453 mN |
| Max Length/Width/Depth: | 3.10 m/0.85 m/2.08 mbs |
| Orientation: | 112/292° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 4 (T-004) was located on Kamehameha Highway near the Middle Street intersection. The east edge of T-004 was 4 m west of a sewer line. T-004 was level with the surrounding land surface and was not located in a road cut or causeway. T-004 was located on property owned by the State of Hawai'i (Kamehameha Highway right-of-way) on a slight rise that gives access to a bridge over Kalihi stream and was tested as a utility corridor. As originally described in the AISP, T-004 was 6.0 m by 0.6 m. The change to a 3.0 m by 0.8 m excavation was required based on the proximity of the existing sewer line immediately to the east.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates that T-004 was located within a portion of LCA 818 Part 6:12 known as Panahaha, which was awarded to George Beckley. Land use consisted of one farm along with the fishing ground Kaliheawa. T-004 was within a coastal wetland area 26 m northwest of the western bank of Kalihi Stream. Maps from 1883 through 1943 indicate that the coastal area around T-004 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) documents T-004 72 m northeast of the former OR&L railroad tracks and approximately 262 m northwest of some salt beds. The 1933 U.S. Army War Department Fire Control map (see Figure 10) locates T-004 near a wetland northwest of Kalihi Stream. The area that surrounded T-004 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map (see Volume II), T-004 was within Kamehameha Highway.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility approximately 250 m northeast of T-004. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres 25 m *mauka* of T-004. In 2005, Dega and

Davis performed an archaeological inventory survey for an 8-acre parcel in the same vicinity. Dega and Davis (2005) carried out subsurface testing and encountered a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-004 was excavated to a depth of 2.08 mbs, with the water table encountered at 2.00 mbs. There were no factors that limited the documentation of T-004.

Stratigraphic Summary: The stratigraphy of T-004 consisted of fill overlying natural sediment. Observed strata were asphalt (Ia), gravelly sandy loam base course (Ib), very gravelly sand crushed coral fill (Ic), silty loam fill (Id) that contained wire (not collected), and natural sandy loam (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: See Sample Results below.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A total of two sediment samples were collected from Stratum II between 1.70 and 2.08 mbs (7 L total). The samples were collected from the excavation floor of T-004 and were not depicted in the stratigraphic profile. The bulk samples were wet screened. Material collected included charcoal (0.4 g), naturally-occurring water-rounded marine shell (95.6 g), a wood fragment (0.9 g), a burned *kukui* nut shell (0.1 g), an unidentified seed (0.1 g), unidentified metal fragments (0.7 g), and naturally-deposited waterworn basalt gravel and marine shell. The results of sample analysis indicated Stratum II was a natural alluvial deposit with minimal cultural inclusions based on the presence of metal fragments.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.5 mbs.

GPR depth profiles for T-004 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 that occurred around 0.25 mbs and again around 0.65 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1 mbs.

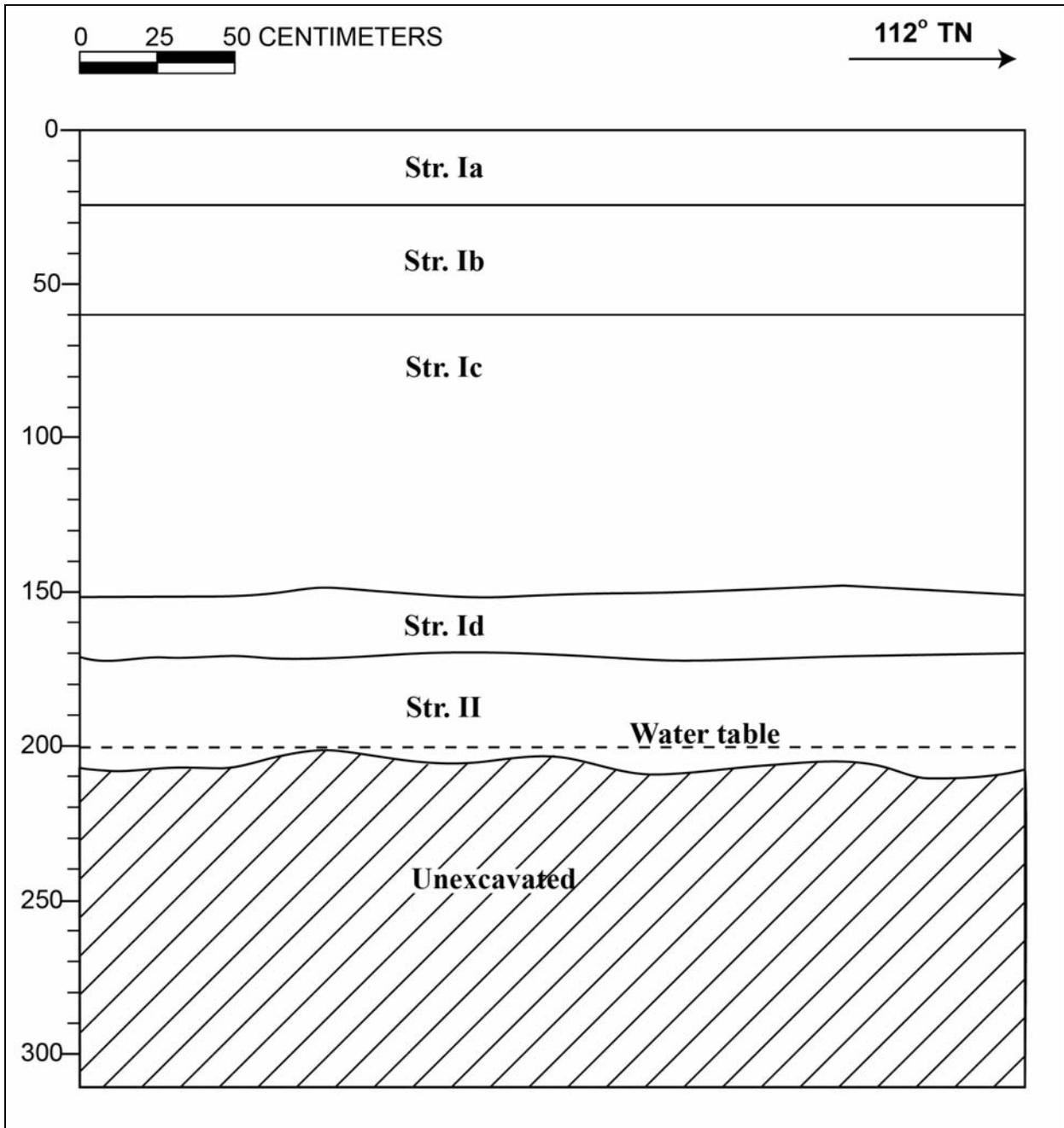
Summary: T-004 was excavated to a depth of 2.08 mbs. The water table was encountered at 2.00 mbs. The stratigraphy of T-004 consisted of fill strata (Ia–Id) overlying natural sediment (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The results of sample analysis indicated that Stratum II was a natural alluvial deposit with some cultural inclusions as evidenced by the presence of metal fragments in the sediment sample. No archaeological cultural resources were identified within T-004.



T-004 general location, view to the northwest



T-004 north profile, view to the north



T-004 north profile

T-004 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|---------------------|--|
| Ia | 0–25 | Asphalt; road surface |
| Ib | 25–60 | Fill; 5 YR 2.5/2 (dark reddish brown); gravelly sandy loam; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course |
| Ic | 60–150 | Fill; 10 YR 7/2 (light gray); very gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, smooth lower boundary; crushed coral fill |
| Id | 150–170 | Fill; 10 YR 8/2 (very pale brown); silty loam; structureless, massive; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; contained wire (not collected); likely industrial product or by-product fill similar to that seen in T-001 |
| II | 170–208 (BOE) | Natural; 10 YR 2/1 (black); sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; mixed energy alluvial deposit that contained rounded basalt gravels and cobbles; disturbed upper boundary |

2.11 Test Excavation 5 (T-005)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 818 part 6:12 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.5 m |
| UTM: | 615241.2204 mE, 2359407.616 mN |
| Max Length/Width/Depth: | 6.40 m/0.78 m/2.20 mbs |
| Orientation: | 296/116° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 5 (T-005) was located within the median center lane of Kamehameha Highway. T-005 was located along the west bank of Kalihi Stream near the intersection of Kamehameha Highway and Middle Street. A telephone line was present 2.8 m to the northwest of T-005 and a sewer line less than 2.0 m to the northeast. T-005 was located on property owned by the State of Hawai'i (Kamehameha Highway right-of-way). At the time of excavation, the location of T-005 was shifted 0.7 m *makai* (southwest) from the location described in the AISP to avoid impacts to the adjacent telephone and sewer utilities.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-005 was located within a portion of LCA 818 Part 6:12 known as Panahaha, which was awarded to George Beckley. Land use consisted of one farm along with the fishing ground Kaliheawa. T-005 was within a coastal wetland area 16 m northwest of Kalihi Stream. Maps from 1883 through 1943 indicate that the coastal area around T-005 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) documents T-005 61 m northeast of the former OR&L railroad tracks and approximately 260 m northeast of some salt beds. The area that surrounded T-005 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of the Kamehameha and Nimitz highways.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility approximately 265 m northeast of T-005. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus

depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 30 m north of T-005. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 127 m northeast of T-005 (Dega and Davis 2005).

Documentation Limitations: T-005 was excavated to the water table at a depth of 2.2 mbs. There were no factors that limited the documentation of T-005.

Stratigraphic Summary: Stratigraphy of T-005 included three fill strata overlying natural sediment to the water table. Observed strata were asphalt (Ia); very gravelly sandy loam base course (Ib); gravelly, stony sandy clay fill (Ic); and natural sandy loam with rounded basalt gravel, cobbles, and oyster shells (II). The oyster shells observed within Stratum II were considered to be naturally deposited. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

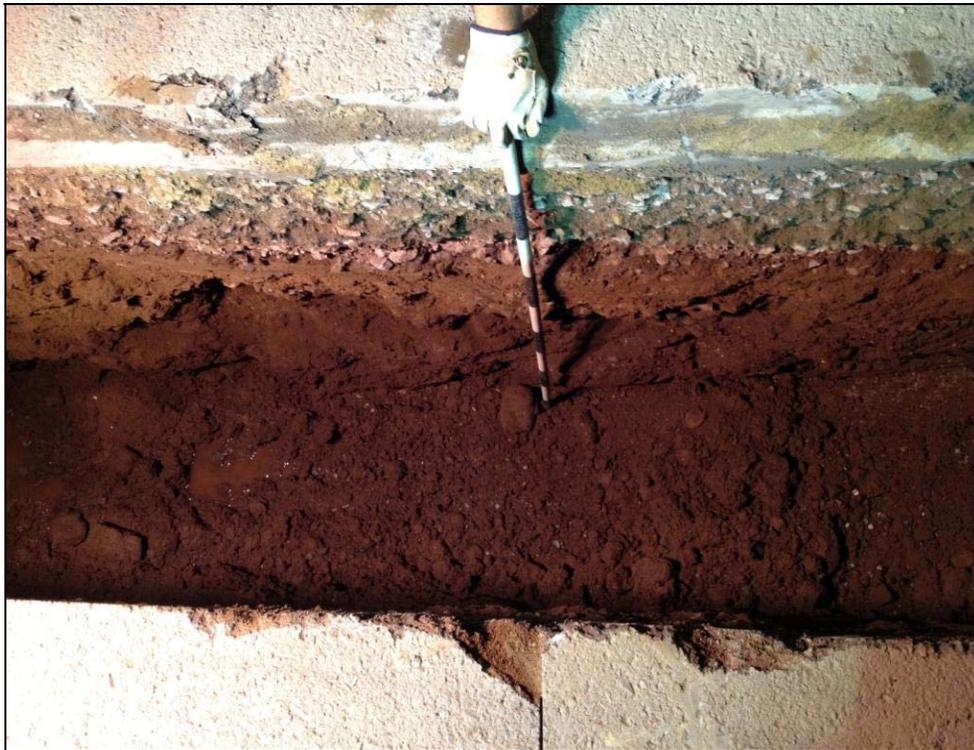
GPR Discussion: A review of amplitude slice maps indicated a linear feature located outside excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the utility. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-005 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 that occurred around 0.35 mbs and again around 0.75 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.1 mbs.

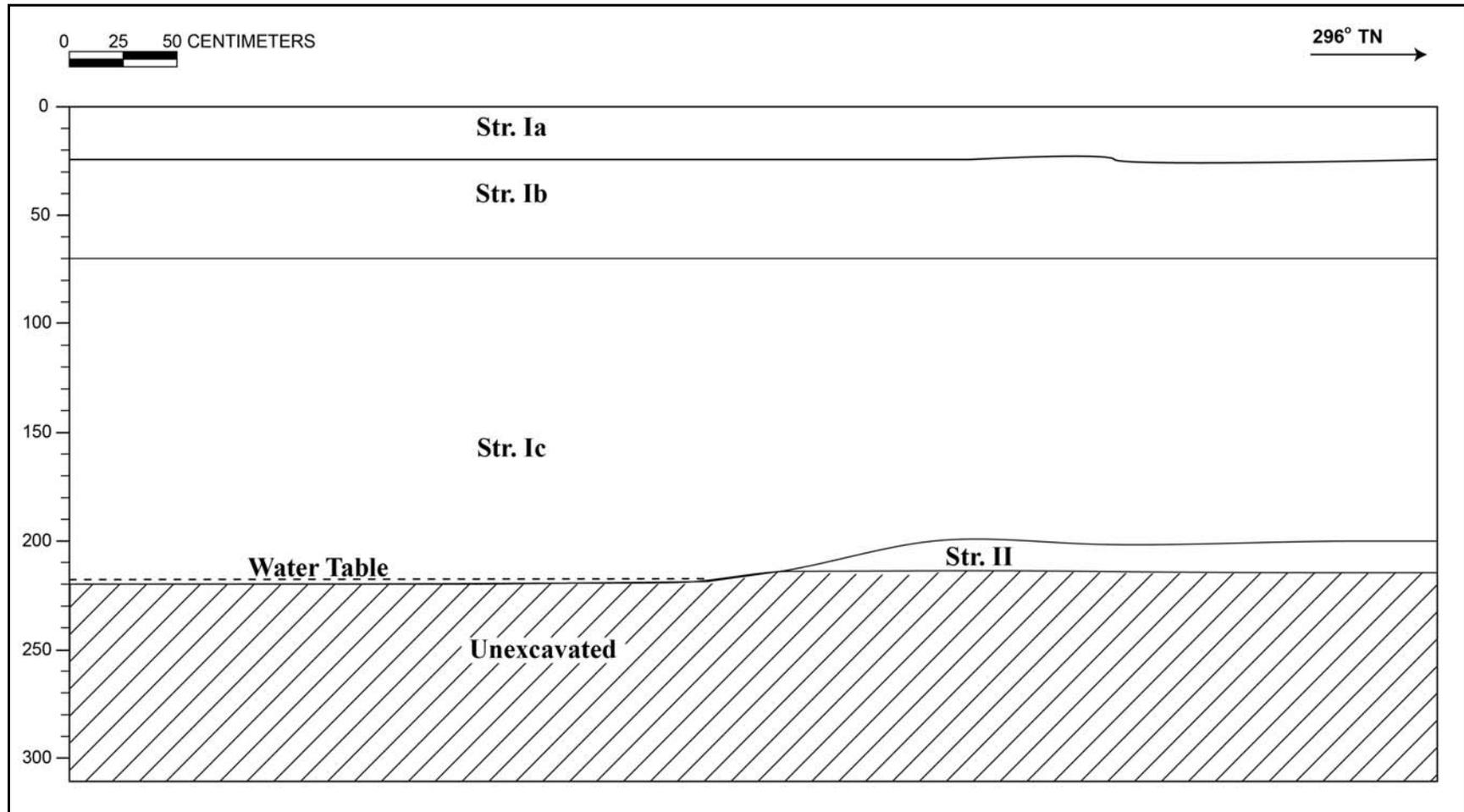
Summary: T-005 was excavated to the water table at a depth of 2.2 mbs. The stratigraphy of T-005 consisted of fill strata (Ia–Ic) overlying natural sediment (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The natural sediment (II) within T-005 contained rounded basalt gravel and cobbles, and naturally-deposited oyster shells. No archaeological cultural resources were identified within T-005.



T-005 general location, view to the west



T-005 profile of the south (*makai*) wall, view to the south



T-005 south wall profile

T-005 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|---------------------|---|
| Ia | 0–25 | Asphalt; road surface |
| Ib | 25–70 | Fill; 10 YR 3/2 (very dark grayish brown); very gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base course |
| Ic | 70–220 | Fill; 10 YR 3/4 (dark yellowish brown); gravelly, stony sandy clay loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; imported fill material |
| II | 200–215 (BOE) | Natural; 10 YR 2/1 (black); sandy loam; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; lower boundary not visible; mixed energy alluvial deposit with rounded basalt gravel and cobbles; a high number of naturally-deposited oyster shells |

2.12 Test Excavation 6 (T-006)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013:021 |
| Elevation Above Sea Level: | 1.6 m |
| UTM: | 615273.2175 mE, 2359368.161 mN |
| Max Length/Width/Depth: | 1.85 m/0.80 m/1.85 mbs |
| Orientation: | 36/216° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 6 (T-006) was located adjacent to the eastern bank of Kalihi Stream, southeast of the Kamehameha Highway and Middle Street intersection. T-006 was located on private property within a vacant lot owned by First Hawaiian Bank. A sewer line was located 6.7 m northwest of T-006. The excavation area was generally level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates that T-006 was located within a coastal wetland area, approximately 85 m northeast of the mouth of Kalihi Stream. Maps from 1883 through 1943 indicate that the coastal area around T-006 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-006 approximately 51 m northeast of the former OR&L railroad and approximately 209 m north of salt beds. The area that surrounded T-006 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of the Kamehameha and Nimitz highways.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 257 m northeast of T-006. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres located approximately 61 m north of T-006. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 126 m northeast of T-006 (Dega and Davis 2005).

Documentation Limitations: T-006 was excavated to the water table at a depth of 1.85 mbs. The northern portion of T-006 was unexcavated beneath 1.10 mbs due to the identification of potentially hazardous material (possible calcium carbide). The identification of potentially hazardous material limited the documentation of T-006.

Stratigraphic Summary: The stratigraphy of T-006 consisted of fill strata to the base of excavation. Observed strata were stony loamy sand fill (Ia); loamy sand fill (Ib), which contained one brick (not collected); and sandy silt fill, possibly consisting of calcium carbide (Ic). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: A total of seven artifacts were observed but not collected from Stratum Ic. The artifacts included 9-inch and 12-inch diameter metal lids with the following inscriptions: "UNION CARBIDE CO," "HIGHEST GAS YIELD," and "CALCIUM CARBIDE." The lids were not collected due to the potential for hazardous material contamination from calcium carbide. Artifacts observed in Stratum Ic indicated that the area was a former calcium carbide waste disposal area.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.25 to 0.5 mbs and increased again at around 0.75 mbs.

GPR depth profiles for T-006 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 that occurred around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 0.6 mbs.

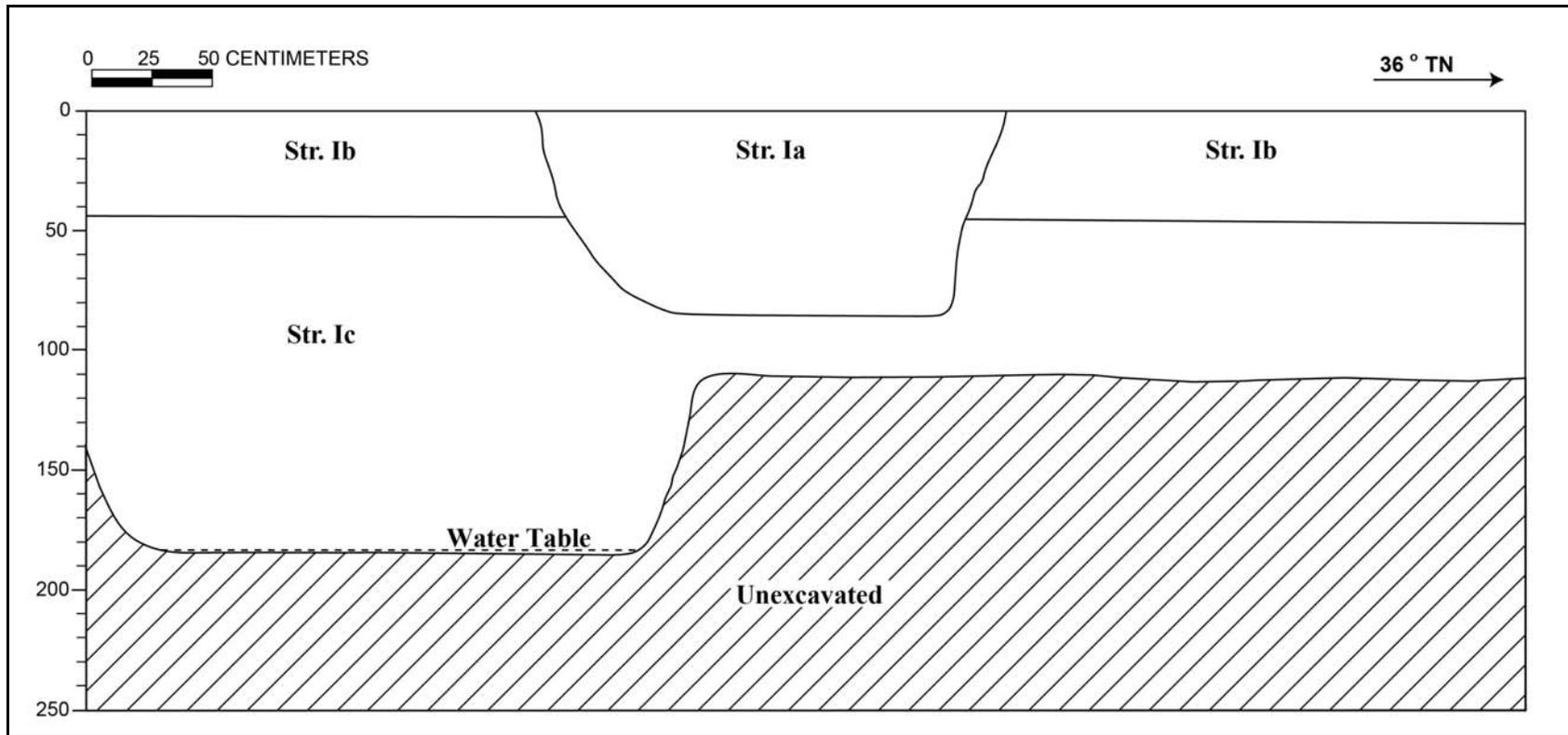
Summary: T-006 was excavated to the water table at a depth of 1.85 mbs. The stratigraphy of T-006 consisted of fill strata (Ia–Ic) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Stratum Ic possibly contained calcium carbide, considered to be potentially hazardous, which limited the excavation of the northern portion of T-006. Stratum Ic contained several metal lids inscribed with "UNION CARBIDE CO," "HIGHEST GAS YIELD," and "CALCIUM CARBIDE." The lids indicated that Stratum Ic was possibly associated with a former calcium carbide waste disposal area. No natural sediment was observed. No archaeological cultural resources were identified within T-006.



T-006 general location, view to the north



T-006 profile of the west wall, view to the northwest



T-006 northwest wall profile

T-006 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|---------------------|--|
| Ia | 0–85 | Fill; 7.5 YR 2.5/2 (very dark brown) with banding of GLEY 1 8/N (white); stony loamy sand; abrupt, smooth lower boundary; contained a mix of Strata Ib and Ic and basalt boulders |
| Ib | 0–45 | Fill; 7.5 YR 2.5/2 (very dark brown) with common, fine mottles of 2.5 YR 4/8 (red); loamy sand; weak, very fine granular structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained one brick (not collected); gravelly, demolition debris on top |
| Ic | 45–185 (BOE) | Fill; GLEY 1 8/N (white); sandy silt; weak, fine, platy structure; moist, very friable consistency; lower boundary not visible; contained Union Carbide canister lids; possible hazardous material (calcium carbide) |

2.13 Test Excavation 7 (T-007)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013:021 |
| Elevation Above Sea Level: | 1.6 m |
| UTM: | 615281.5099 mE, 2359352.748 mN |
| Max Length/Width/Depth: | 6.09 m/0.80 m/1.85 mbs |
| Orientation: | 124/304° TN |
| Targeted Project Component: | Station Building |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 7 (T-007) was located within the First Hawaiian Bank lot, approximately 27.0 m southwest of the Kalihi Stream. The excavation surface was level and elevated approximately 1.4 m above Kalihi Stream.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates that T-007 was located within a coastal wetland area approximately 85 m northeast of the mouth of Kalihi Stream. Maps from 1883 through 1943 indicate that the coastal area around T-007 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-007 approximately 50 m northeast of the former OR&L railroad and approximately 210 m north of several salt beds. The area that surrounded T-007 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of Kamehameha Highway and Kalihi.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility located 268 m northeast of T-007. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the proposed bus depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 100 m north of T-007. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 137 m northeast of T-007 (Dega and Davis 2005).

Documentation Limitations: T-007 was excavated to the water table at a depth of 1.85 mbs. There were no factors that limited the documentation of T-007.

Stratigraphic Summary: The stratigraphy of T-007 consisted of fill strata to the base of excavation. Observed strata were gravelly sandy loam fill (Ia) and clay loam fill (Ib) to the water table. The fill strata contained construction debris that were noted but not collected. Stratum Ia contained gravel, concrete rubble, and pieces of rebar. Stratum Ib contained cobble- to boulder-sized concrete fragments and rebar. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.5 mbs.

GPR depth profiles for T-007 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 that occurred at around 0.35 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 0.5 mbs.

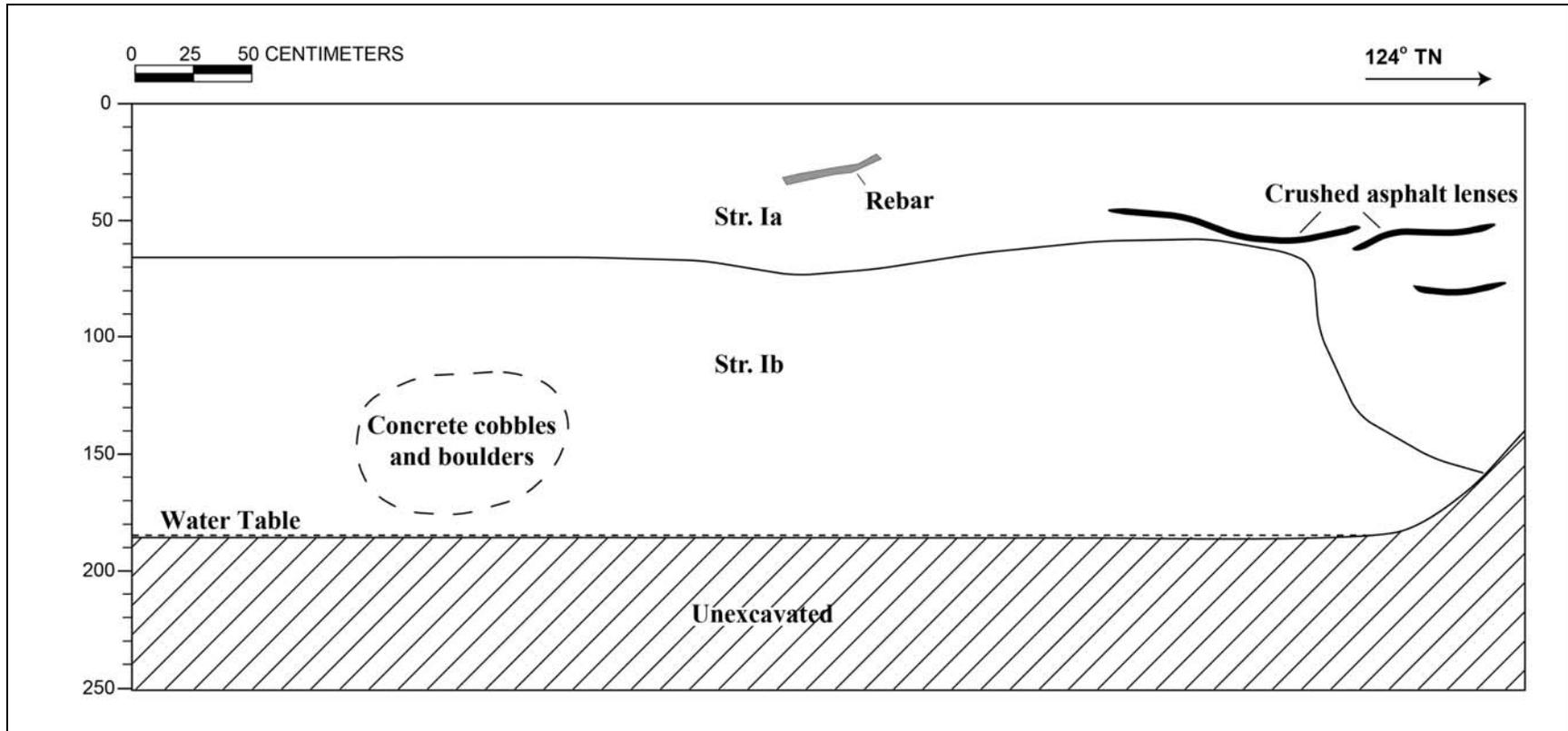
Summary: T-007 was excavated to the water table at a depth of 1.85 mbs. The stratigraphy of T-007 consisted of fill strata (Ia and Ib) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Strata contained construction debris that were noted but not collected, including gravel, concrete rubble, and pieces of rebar (Stratum Ia), and cobble- to boulder-sized concrete fragments and rebar (Stratum Ib). No natural sediment was encountered. No archaeological cultural resources were identified within T-007.



T-007 general location and excavation, view to the southwest



T-007 north wall profile, view to the northwest



T-007 north wall profile

T-007 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|---------------------|---|
| Ia | 0–160 | Fill; 7.5 YR 4/4 (brown); gravelly sandy loam; weak, fine granular structure; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; contained lenses of crushed basalt 7.5 YR 2.5/1 (black); contained gravel, concrete rubble, and abundant rebar (not collected) |
| Ib | 65–185 (BOE) | Fill; 7.5 YR 4/2 (brown) with common, coarse mottles of 5 YR 5/8 (yellowish red); clay loam; weak, medium to coarse crumb structure; moist, friable consistency; plastic; terrigenous origin; lower boundary not visible; contained construction rubble, cobble- to boulder-sized concrete fragments, and rebar (not collected) |

2.14 Test Excavation 8 (T-008)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013:021 |
| Elevation Above Sea Level: | 1.8 m |
| UTM: | 615287.3652 mE, 2359360.549 mN |
| Max Length/Width/Depth: | 6.09 m/0.80 m/2.08 mbs |
| Orientation: | 300/120° TN |
| Targeted Project Component: | Station Building |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 8 (T-008) was located approximately 27 m southwest of the western bank of Kalihi Stream. T-008 was located within the vacant lot owned by First Hawaiian Bank, southeast of the Kamehameha Highway and Middle Street intersection.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) locates T-008 within a coastal wetland area adjacent to the mouth of Kalihi Stream. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-008 55 m northeast of the former OR&L railroad tracks and 220 m north of some salt beds. The area surrounding T-008 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of Kamehameha Highway and Kalihi, as well as the extension of the shoreline.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility located 262 m northeast of T-008. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 92 m north of T-008. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 130 m northeast of T-008 (Dega and Davis 2005).

Documentation Limitations: T-008 was excavated to a depth of 2.08 mbs. The water table was encountered at 2.05 mbs. There were no factors that limited the documentation of T-008.

Stratigraphic Summary: The stratigraphy of T-008 consisted of fill strata overlying natural sediment to the base of excavation. Observed strata were sandy clay loam fill (Ia); stony, cobbly sandy clay fill (Ib); and natural cobbly, gravelly sandy clay (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A total of two bulk sediment samples were collected from Stratum II between 1.55 and 2.00 mbs (10 L total), as shown on the profile. All sample locations have been identified as "sample" because the samples were noted by depth, not by number. The sediment samples were wet screened and found to contain only small, water-rounded basalt gravel. The results of sample analysis support the identification of Stratum II as a natural alluvial deposit.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.5 mbs.

GPR depth profiles for T-008 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 that occurred around 0.15 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 0.5 mbs.

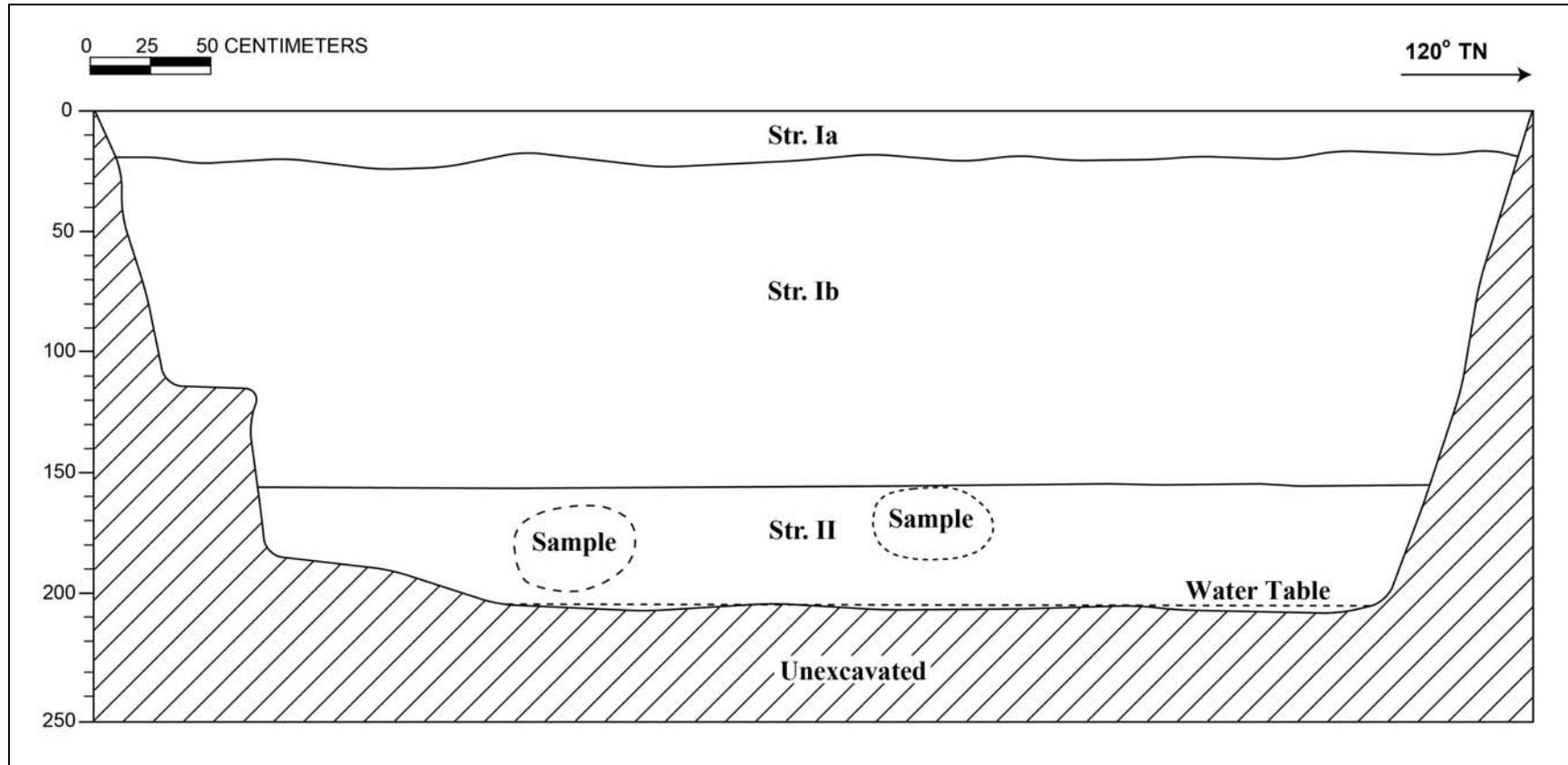
Summary: T-008 was excavated to a depth of 2.08 mbs. The water table was encountered at 2.05 mbs. The stratigraphy of T-008 consisted of fill strata (Ia and Ib) overlying natural sediment (II) to the base of excavation. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). Stratum II was considered to be consistent with an alluvial deposit related to a former channel of Kalihi Stream. The results of sample analysis indicated that Stratum II was a natural alluvial deposit. No archaeological cultural resources were identified within T-008.



T-008 general location and excavation, view to the north



T-008 north wall profile, view to the north



T-008 north wall profile

T-008 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|---------------|--|
| Ia | 0–20 | Fill; 7.5 YR 4/2 (brown) with common, medium mottles of 7.5 YR 5/6 (strong brown), 2.5 YR 4/8 (red), and GLEY 1 5/N (gray); sandy clay loam; weak, fine–medium crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; contained a single brick (not collected) and construction debris (concrete rubble, coral fill) |
| Ib | 20–155 | Fill; 7.5 YR 4/2 (brown) common, medium mottles of 7.5 YR 5/6 (strong brown), 2.5 YR 4/8 (red), and GLEY 1 5/N (gray); stony, cobbly sandy clay; weak, medium blocky structure; moist, friable consistency; very plastic; terrigenous origin; clear, wavy lower boundary; contained a large angular basalt boulder and cobbles (angular but water-worn) |
| II | 155–208 (BOE) | Natural; GLEY 1 3/N (very dark gray) with common, very coarse mottles of GLEY 1 5/N (gray) and 2.5 YR 1/N (black); cobbly, gravelly sandy clay; weak, fine granular structure; wet, very sticky consistency; very plastic; mixed origin; lower boundary not visible; very few, very fine–medium roots; contains water-rounded basalt cobbles and gravel; sediment consistent with stream deposit |

2.15 Test Excavation 9 (T-009)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.4 m |
| UTM: | 615306.1489 mE, 2359388.165 mN |
| Max Length/Width/Depth: | 6.10 m/0.80 m/2.25 mbs |
| Orientation: | 294/114° TN |
| Targeted Project Component: | Station Column |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 9 (T-009) was located at the base of the westbound on-ramp of Kamehameha Highway just before the Middle Street intersection on property owned by the State of Hawai'i (Kamehameha Highway right-of-way). The test excavation was relocated 0.46 m north of the original location to avoid utilities. T-009 was situated along the east bank of Kalihi Stream. The eastern edge of T-009 extended 1.50 m northwest of a sewer line.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) locates T-009 in an area designated as marshland 2 m southeast of the southeast bank of Kalihi Stream. T-009 was located approximately 30 m northwest of LCA MA 50:4, awarded to Laumaka. Maps from 1883 through 1943 indicate that the coastal area around T-009 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-009 approximately 85 m northeast of the former OR&L railroad tracks and approximately 233 m north of some salt beds. The area that surrounded T-009 remained a wetland environment throughout the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of Kamehameha Highway and Kalihi.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 230 m northeast of T-009. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 80 m north of T-009. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit

(SIHP #50-80-14-6683) was documented approximately 90 m northeast of T-009 (Dega and Davis 2005).

Documentation Limitations: T-009 was excavated to just below the water table at a depth of 2.25 mbs. Excavation of the eastern portion of T-009 could not be completed due to the presence of a utility conduit located at 1.20 mbs.

Stratigraphic Summary: The stratigraphy of T-009 consisted of fill overlying natural alluvial sediment to the base of excavation. Observed strata were asphalt (Ia), gravelly sand base course (Ib), very gravelly sandy loam fill (Ic), and gravelly sand fill (Id) overlying natural alluvial cobbly, gravelly sandy loam. The natural sediment (II) was considered to be consistent with an alluvial deposit related to a former channel of Kalihi Stream. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: See sample results below.

Feature Discussion: No features were observed.

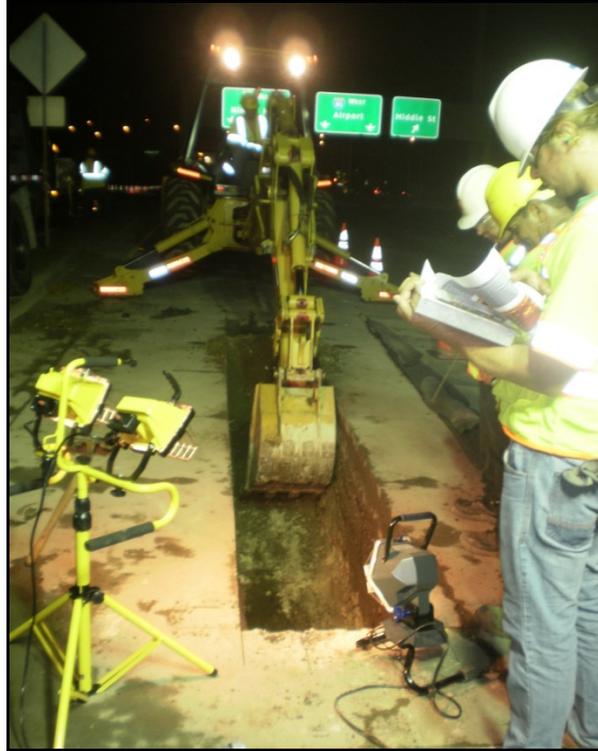
Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample was collected from Stratum II between 2.0 and 2.2 mbs (3 L). The sediment sample was wet screened and contained naturally-deposited marine shell (5.7 g), a metal fragment (0.4 g), and a glass fragment (0.3 g). The sample analysis results indicated Stratum II was a natural sediment with minor cultural inclusions.

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 except for the utility. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-009 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 that occurred at around 0.3 mbs and again at around 0.75 mbs. An anomaly was observed in the profile outside of the excavation boundaries. The utility jacket encountered was below the clean signal return depth. The maximum depth of clean signal return was approximately 0.9 mbs.

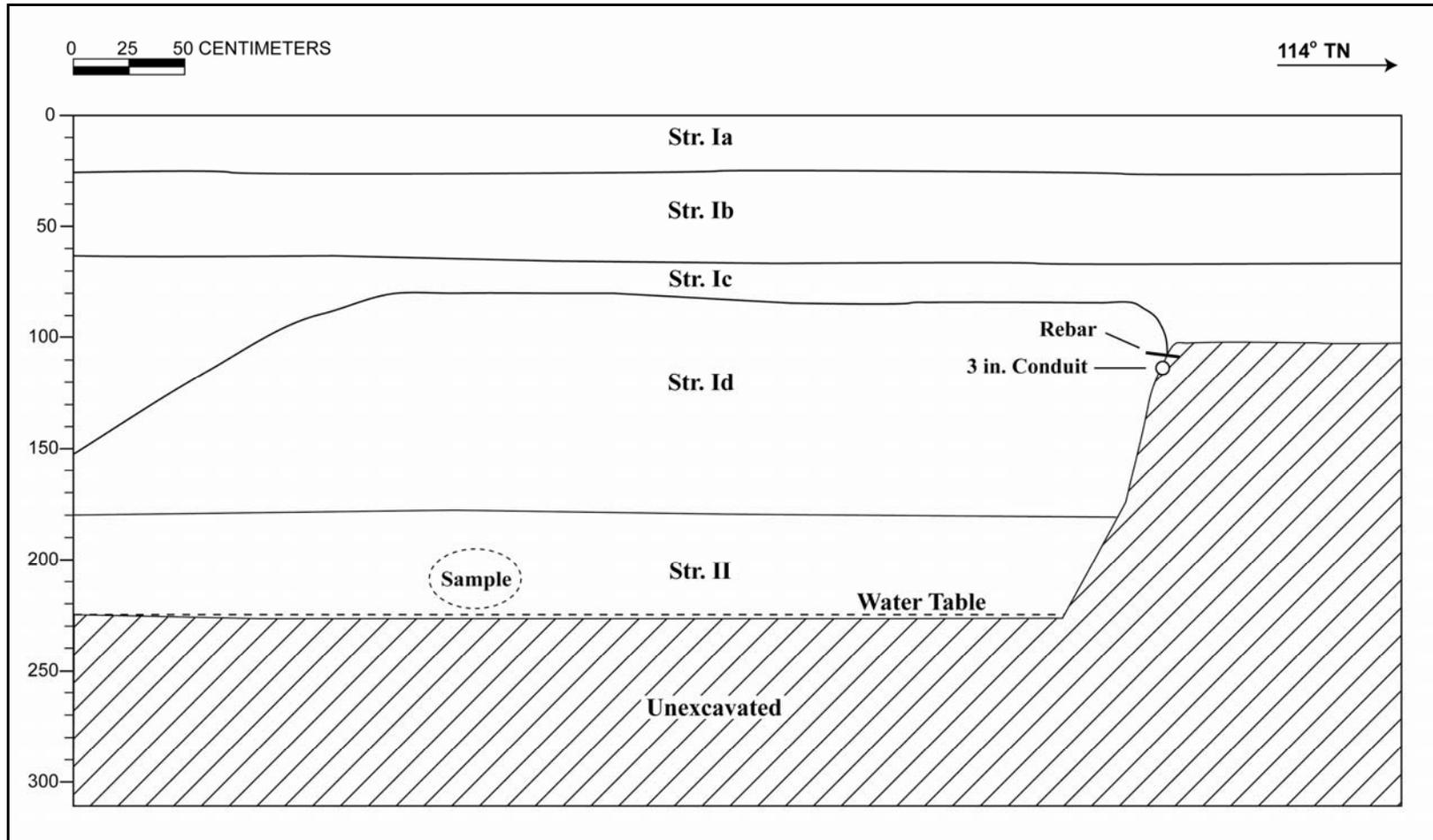
Summary: T-009 was excavated to the water table at a depth of 2.25 mbs. The stratigraphy of T-009 consisted of fill (Ia–Id) overlying natural alluvial sediment (II) near the base of excavation. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The natural sediment (II) was considered to be consistent with an alluvial deposit related to a former channel of Kalihi Stream. The results of sample analysis indicated Stratum II was natural sediment with minor cultural inclusions. No archaeological cultural resources were identified within T-009.



T-009 excavation in Kamehameha Highway, view to the west



T-009 north profile, view to the north



T-009 north profile

T-009 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|---------------------|---|
| Ia | 0–25 | Asphalt; road surface |
| Ib | 25–65 | Fill; 10 YR 4/2 (dark grayish brown); gravelly, medium grain sand; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; basalt base course |
| Ic | 65–152 | Fill; 10 YR 3/2 (dark grayish brown); gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill |
| Id | 81–180 | Fill; 10 YR 7/2 (light gray); very gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral fill |
| II | 180–225 (BOE) | Natural; 10 YR 3/2 (very dark grayish brown); cobbly, gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; lower boundary not visible |

2.16 Test Excavation 10 (T-010)

| | |
|------------------------------------|------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.2 m |
| UTM: | 615307.406 mE 2359377.817 mN |
| Max Length/Width/Depth: | 3.10 m/0.90 m/2.05 mbs |
| Orientation: | 116/296° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 10 (T-010) was located in the center lane of the eastbound lanes of Kamehameha Highway near Middle Street on property owned by the State of Hawai'i (Kamehameha Highway right-of-way). T-010 was located 17.0 m from the western bank of Kalihi Stream. Subsurface utility lines in the general vicinity of T-010 included a telephone line (2.5 m east), a sewer line (5.0 m northwest), and a gas line (2.0 m south). T-010 was relocated 3.1 m southeast of the original location and shortened by approximately 3 m to avoid damaging a telephone line.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map (see Figure 7) indicates that T-010 was located in an area designated as marshland 2 m southeast of the southeast bank of Kalihi Stream. T-010 was located approximately 30 m northwest of LCA MA 50:4, awarded to Laumaka. Maps from 1883 through 1943 indicate that the coastal area around T-010 contained several fishponds during this period. The 1919 U.S. Army War Department Fire Control map (see Figure 9) locates T-010 approximately 85 m northeast of the former OR&L railroad tracks and approximately 230 m north of some salt beds. During the period represented by the 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map, the area surrounding T-010 remained a wetland environment. By the 1953 U.S. Army Mapping Service topographic map, the wetlands and fishponds had been modified or filled in conjunction with the development of Kamehameha Highway and Kalihi.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 230 m northeast of T-010. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). During the archaeological inventory survey, three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525) were discovered. Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 80 m north of T-

010. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. One historic property consisting of a subsurface historic refuse pit (SIHP #50-80-14-6683) was documented approximately 100 m northeast of T-010 (Dega and Davis 2005).

Documentation Limitations: T-010 was excavated to a depth of 2.05 mbs. The water table was encountered at 1.87 mbs. There were no factors that limited the documentation of T-010.

Stratigraphic Summary: The stratigraphy of T-010 consisted of fill to beneath the water table. Observed strata were asphalt (Ia), gravelly sandy loam base course (Ib), very gravelly loamy sand crushed coral fill (Ic), a gravelly sandy loam fill (Id), gravelly loamy sand compacted crushed coral fill (Ie), gravelly sandy loam fill (If), gravel and cobbles fill (Ig), gravelly loam fill (Ih), and gravelly loam fill (Ii) to beneath the water table. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: See sample results below.

Feature Discussion: No features were observed.

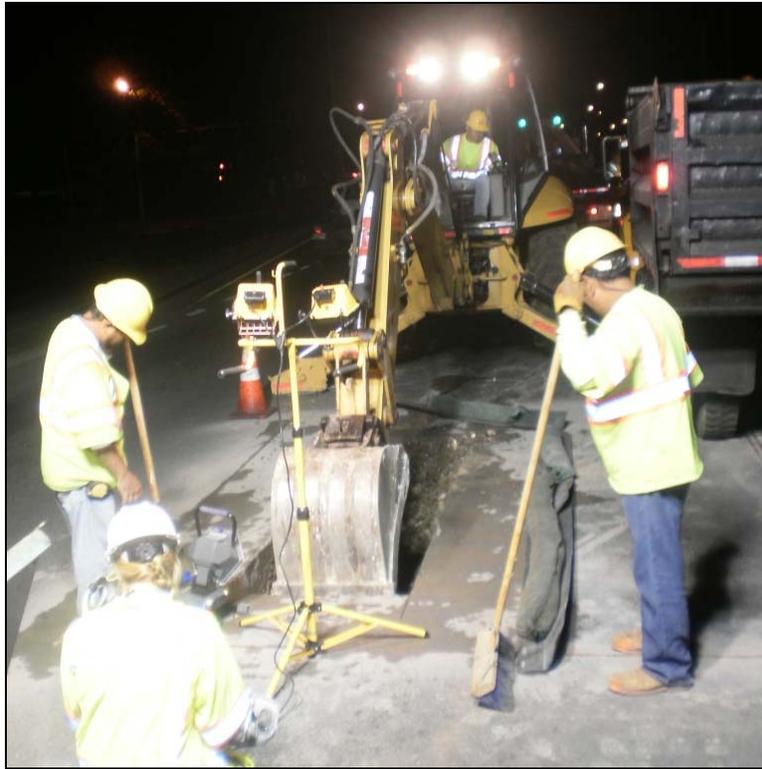
Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample (3.5 L) was collected from Stratum Ih (imported fill) between 0.90 and 1.15 mbs. The sediment sample, removed from the backhoe bucket and not depicted on the stratigraphic profile, was collected for comparative purposes. The bulk sample was wet screened and yielded charcoal (0.2 g), a *kukui* nut shell fragment (0.1 g), a small piece of volcanic glass (0.5 g), and naturally-occurring marine shell (0.3 g). The results of sample analysis indicated that Stratum Ih contained no significant materials based on the size of the finds and the fact that no other cultural material was found during excavation. The piece of volcanic glass did not exhibit any use or wear, and the charcoal and *kukui* were likely naturally occurring.

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

GPR depth profiles for T-010 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 that occurred at around 0.15 mbs and again at around 0.5 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 0.85 mbs.

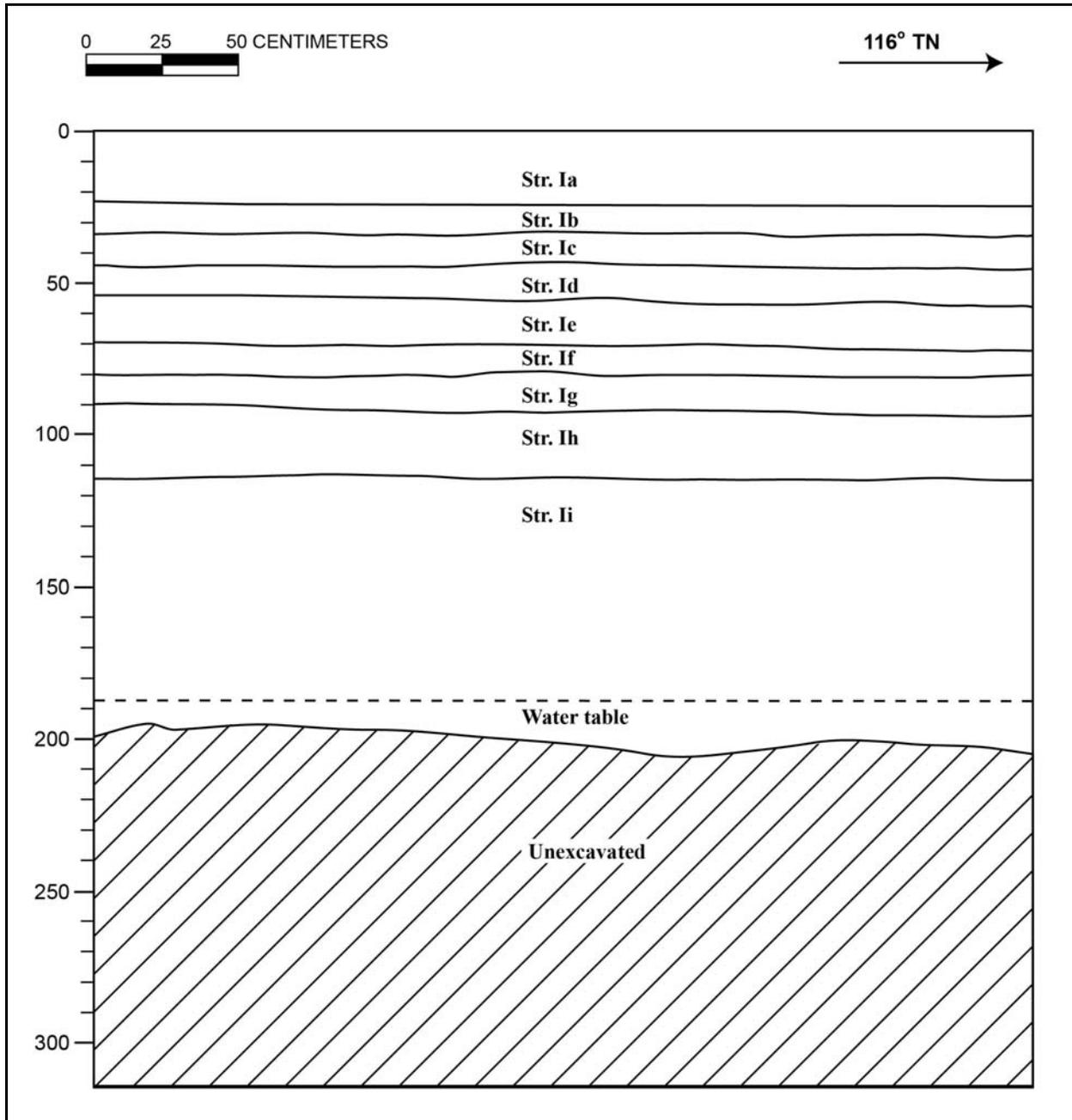
Summary: T-010 was excavated to a depth of 2.05 mbs. The water table was encountered at 1.87 mbs. The stratigraphy of T-010 consisted of fill (Ia–Ii) to beneath the water table. The stratigraphy conforms to the USDA soil survey designation of Fill land (FL). The results of sample analysis indicated Stratum Ih contained minor cultural inclusions. No natural sediments were observed. No archaeological cultural resources were identified within T-010.



T-010 excavation in the east-bound center lane of Kamehameha Highway, view to the northwest



T-010 southwest wall profile (opposite sidewall from stratigraphic profile), view to the southwest



T-010 northeast profile

T-010 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|---------------|--|
| Ia | 0–24 | Asphalt |
| Ib | 24–33 | Fill; 5 YR 3/2 (dark reddish brown); gravelly sandy loam; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt base course |
| Ic | 33–44 | Fill; 10 YR 6/3 (pale brown); very gravelly loamy sand; structureless, single-grain; dry, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; compact crushed coral |
| Id | 44–55 | Fill; 10 YR 3/2 (very dark grayish brown); gravelly sandy loam; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill material |
| Ie | 55–70 | Fill; 10YR 6/3 (pale brown); very gravelly loamy sand; structureless, single-grain; dry, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; highly compacted crushed coral |
| If | 70–80 | Fill; 10 YR 3/1 (very dark gray); gravelly sandy loam; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill |
| Ig | 80–90 | Fill; 10 YR 4/1 (dark gray); gravel and cobbles; structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; very thin layer of basalt gravel and cobbles |
| Ih | 90–115 | Fill; 10 YR 3/2 (very dark grayish brown); gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; diffuse, smooth lower boundary; imported fill deposit |
| Ii | 115–205 (BOE) | Fill; 10 YR 2/2 (very dark brown); gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; lower boundary not visible; gravel and cobble basalt inclusions |

2.17 Test Excavation 11 (T-011)

| | |
|-----------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013:021 |
| Elevation Above Sea Level: | 1.8 m |
| UTM: | 615290.5965 mE, 2359339.485 mN |
| Max Length/Width/Depth: | 6.09 m/0.80 m/1.75 mbs |
| Orientation: | 210/30° TN |
| Targeted Project Component | Station Building |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 11 (T-011) was excavated within the footprint of the Middle Street Transit Center Station. T-011 was located adjacent to Kalihi Stream on private property owned by the First Hawaiian Bank. There were no nearby utilities. The surrounding topography of T-011 was level.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-011 was located within a coastal wetland area 27 m east from the margins of Kalihi Stream. T-011 was located 23 m west of LCA MA 50:4, awarded to Laumaka. The 1919 U.S. Army War Department Fire Control map (see Figure 9) indicates that T-011 was located within a fork of the former OR&L railroad tracks and was approximately 220 m north of several salt beds. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map showed that the area surrounding T-011 remained a wetland environment through this period. The 1953 U.S. Army Mapping Service topographic map indicates much development in the surrounding area through which Kamehameha Highway and Nimitz Highway passed.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 270 m northeast of T-011. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, the nearest (southernmost) end being approximately 87 m north of T-011. Dega and Davis (2005) subsequently conducted an archaeological inventory survey for a portion of this project area. Dega and Davis (2005) documented a subsurface historic refuse pit (SIHP #50-80-14-6683) approximately 140 m northeast of T-011.

Documentation Limitations: T-011 was excavated to the water table at a depth of 1.75 mbs. The southwestern portion of T-011 was unexcavated beneath 1.10 mbs due to the identification of potentially hazardous material (possible calcium carbide). This material was similar to the possible calcium carbide deposit observed within T-006. The identification of potentially hazardous material limited the documentation of T-011.

Stratigraphic Summary: The stratigraphy of T-011 consisted of fill strata to the base of excavation. Observed strata were gravelly sandy silt (Ia), extremely gravelly sand fill (Ib), a possible burned silty sand (Ic), and sandy silt (Id) that might include calcium carbide. Strata Ia, Ic, and Id contain construction debris (not collected). No natural sediment was observed. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample was collected from Stratum Id (possible calcium carbide) for comparison to similar material identified in T-006. No sample analysis was conducted on the potentially hazardous sediment sample.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.5 mbs.

GPR depth profiles for T-011 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.2 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 0.75 mbs.

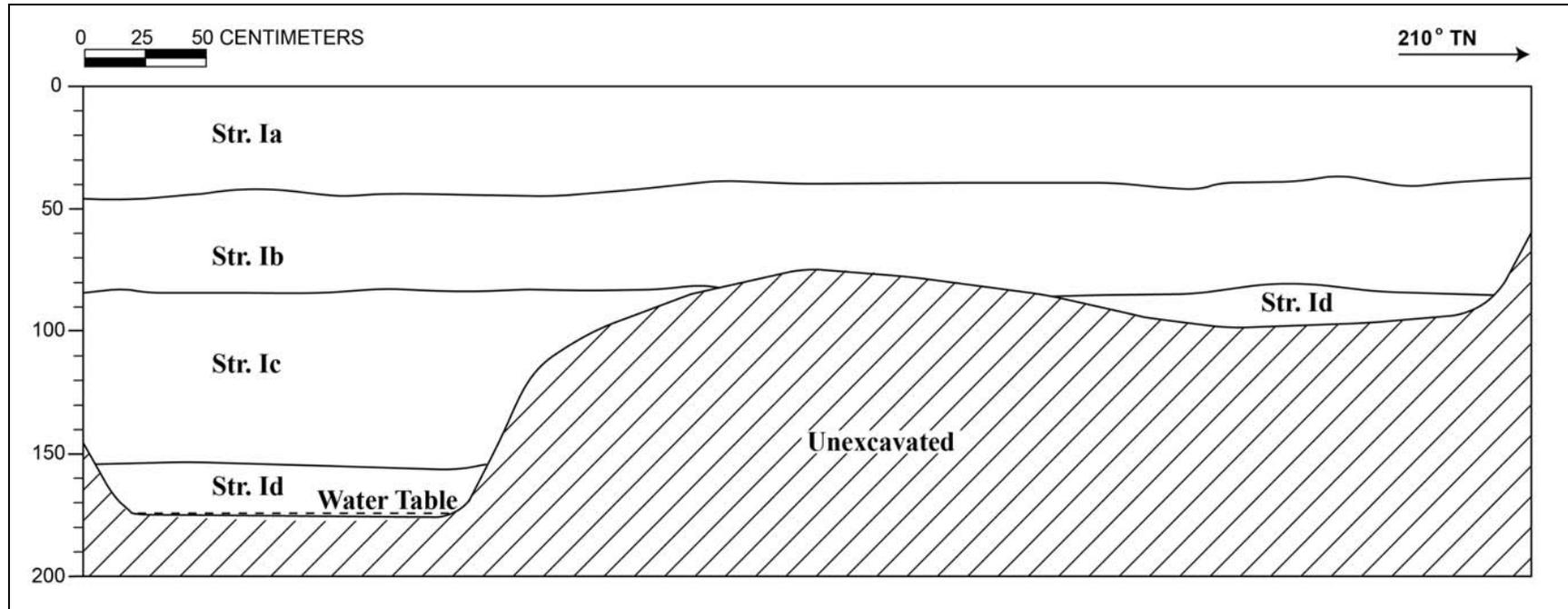
Summary: T-011 was excavated to the water table at a depth of 1.75 mbs. The stratigraphy of T-011 consisted of fill strata (Ia–Id) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No natural sediment was observed. No archaeological cultural resources were identified within T-011.



T-011 general location of excavation area, view to the east



T-011 southeast profile wall, view to the northeast



T-011 southeast wall profile

T-011 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|--------------|--|
| Ia | 0–45 | Fill; 2.5 YR 3/2 (dusky red) with 20% fine-course mottles of 10 YR 3/1 (white); gravelly sandy silt; weak, fine crumb structure; dry, weakly coherent consistency; non-plastic; mixed origin; clear, smooth lower boundary; contained red brick, rebar, and plastic (not collected); top fill mixed with construction debris |
| Ib | 45–85 | Fill; GLEY 1 7/10Y (light greenish gray); extremely gravelly sand; structureless, single-grain; dry, weakly coherent consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; gravel fill |
| Ic | 85–155 | Fill; GLEY 1 2.5/N (black) and 5 YR 4/4 (reddish brown) with few, fine mottles of 2.5YR 7/6 (yellow); sandy silt; structureless, single-grain; moist, loose consistency; non-plastic; lower boundary not visible; contained brick and pipe (not collected); extremely mixed fill of soot and silty sand; lower portion a GLEY 2 3/5 BG (very dark greenish gray) |
| Id | 80–175 (BOE) | Fill; GLEY 1 8/N (white); sandy silt; calcium carbide; structureless, single-grain; non-plastic; lower boundary not visible; contained brick, rebar, and plastic (not collected); waste disposal fill |

2.18 Test Excavation 12 (T-012)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | MA 50:4 |
| TMK #: | 1-2-017 [Plat] |
| Elevation Above Sea Level: | 1.9 m |
| UTM: | 615350.2824 mE, 2359374.818 mN |
| Max Length/Width/Depth: | 7.30 m/0.73 m/1.98 mbs |
| Orientation: | 294/114° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 12 (T-012) was located at the base of the westbound on-ramp of Kamehameha Highway just before the Middle Street intersection. T-012 was situated approximately 30.0 m south of Kalihi Stream. T-012 was located on City and County of Honolulu property. A sewer line was located 4.5 m north of T-012. The test excavation was relocated 2.0 m southeast of the original location to avoid utilities. The topography of the excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-012 was located 38.6 m southeast from the southeast bank of Kalihi Stream, in an area designated as marshland. T-012 was located within LCA MA 50:4, awarded to Laumaka. The 1919 U.S. Army War Department Fire Control map (see Figure 9) shows T-012 approximately 30 m east of the former OR&L railroad tracks and approximately 260 m north of some salt beds. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map indicate the area surrounding T-012 remained a wetland environment. The 1933 U.S. Army War Department Fire Control map shows a railroad line built directly on the northern tip of T-012. The 1953 U.S. Army Mapping Service topographic map shows that the wetlands were modified or filled in with the development of Kamehameha Highway. Kamehameha Highway was expanded into four lanes, with T-012 situated in the center lane. The railroad line that ran through T-012 was rebuilt 4 m east of its previous location.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 215 m northeast of T-012. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, approximately 160 m northeast of T-012. Dega and Davis (2005) subsequently conducted an

archaeological inventory survey for a portion of this project area. Dega and Davis (2005) documented a subsurface historic refuse pit (SIHP #50-80-14-6683) approximately 55 m north of T-012.

Documentation Limitations: T-012 was excavated to a depth of 1.98 mbs. The water table was encountered at 1.70 mbs. An abandoned utility present in the central portion of T-012 limited documentation.

Stratigraphic Summary: The stratigraphy of T-012 consisted of fill strata to the base of excavation. Observed strata were asphalt road surface (Ia), extremely gravelly sand (Ib), sandy silt (Ic), and very gravelly, cobbly sandy loam fill (Id) to the water table. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample was collected from the excavation floor of Stratum Id at 1.80 mbs (2.5 L). The sediment sample was wet screened. It yielded charcoal (0.7 g) and naturally-deposited marine shell (2.2 g) mixed in fill. One small piece of shell (0.2 g) appeared to have been burnt; however, its presence within a fill deposit indicated it had been removed from its original context. The results of sample analysis indicated Stratum Id contained no significant material based on the size of the finds and the fact that no other cultural material was found during excavation.

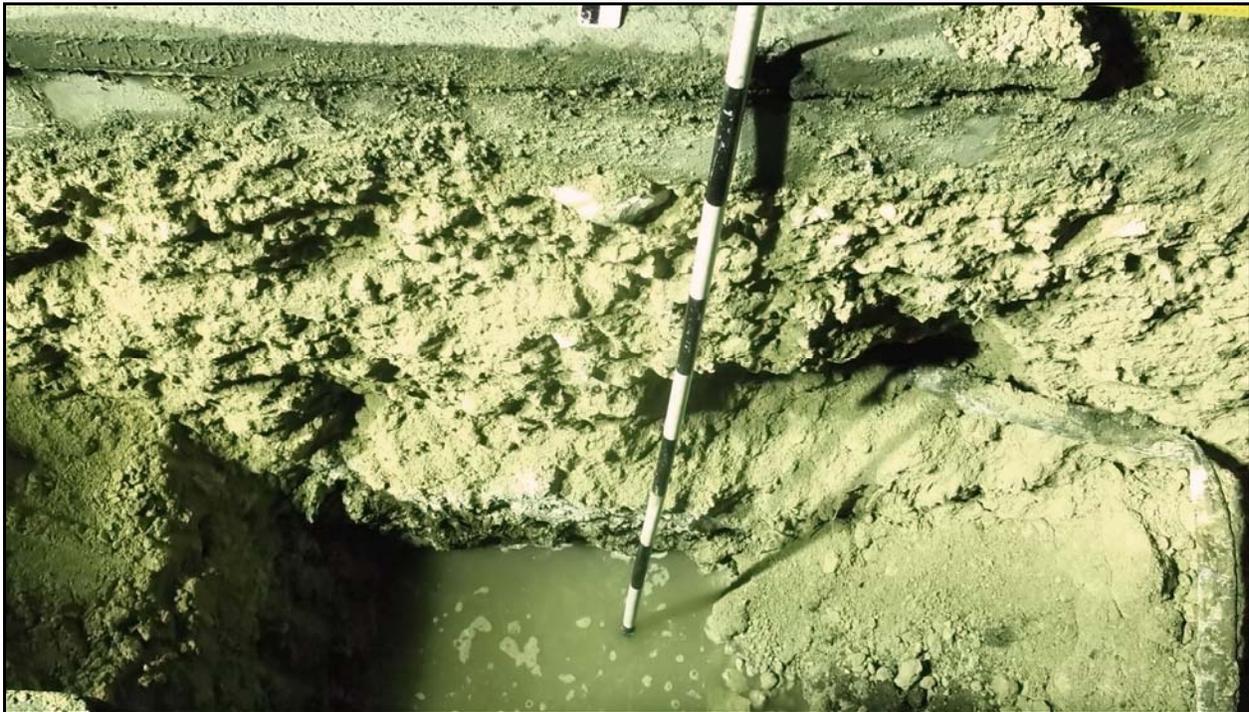
GPR Discussion: A review of amplitude slice maps indicated a linear feature that corresponded to the utility line encountered. Reflectivity was relatively uniform throughout the grid and decreased with depth, except for the utility. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

GPR depth profiles for T-012 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.15 mbs. An anomaly was observed in the profile and corresponded to the utility that was encountered during excavation. The maximum depth of clean signal return was approximately 1.25 mbs.

Summary: T-012 was excavated to a depth of 1.98 mbs. The water table was encountered at 1.70 mbs. The stratigraphy of T-012 consisted of fill strata (Ia–Id) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). The results of sample analysis indicated Stratum Id contained no significant material based on the size of the finds and the fact that no other cultural material was found during excavation. No natural sediment was observed. No archaeological cultural resources were identified within T-012.



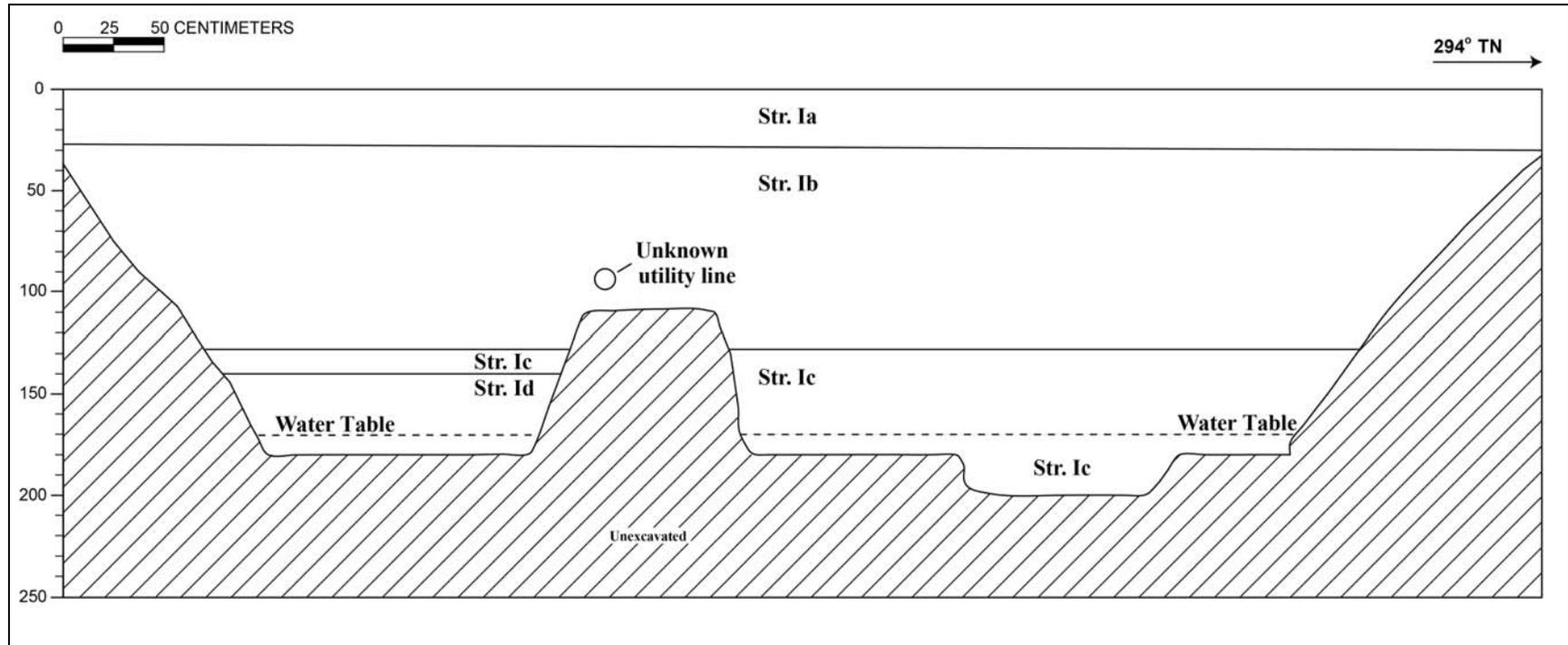
T-012 general location, view to the west



T-012 close up of western portion of profile wall, view to the north



T-012 close-up of western end of north wall showing utility, view to the northwest



T-012 north wall profile

T-012 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|---------------------|---|
| Ia | 0–28 | Asphalt road surface; structureless, massive; indurated |
| Ib | 28–129 | Fill; 2.5 YR 7/3 (pale yellow); very gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; very abrupt, smooth lower boundary; crushed coral fill |
| Ic | 129–198 | Fill; GLEY 2 8/10B (light bluish gray); very gravelly, cobbly sandy loam fill; powder; structureless, single-grain; moist, loose consistency; non-plastic; wet calcium carbide waste |
| Id | 142–180 (BOE) | Fill; 10 YR 3/2 (very dark grayish brown); very gravelly, cobbly sandy loam; weak, fine crumb structure; wet, non-sticky consistency; non-plastic; terrigenous origin; lower boundary not visible; consisted of a pocket of sandy loam with subangular gravels and cobbles only visible at the western end and mostly at the north corner; contained a burnt root or branch and possible construction debris metal fragment (not collected) |

2.19 Test Excavation 13 (T-013)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | MA 50:4 |
| TMK #: | 1-2-017 [Plat] |
| Elevation Above Sea Level: | 2.1 m |
| UTM: | 615370.4199 mE, 2359366.797 mN |
| Max Length/Width/Depth: | 6.65 m/0.76 m/1.70 mbs |
| Orientation: | 113/293° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 13 (T-013) was located in the left west-bound lane of Kamehameha Highway just before the Middle Street and Kamehameha Highway intersection. T-013 was situated 49 m south of the east bank of Kalihi Stream. T-013 was located on City and County of Honolulu property. Water lines were present 3.2 m west, 10.2 m southeast, and 9.0 m east of T-013. A sewer line was 6.0 m south of T-013. T-013 was originally planned as a 3.0 m by 0.9 m unit within a column footprint, but it was relocated 3.8 m north and 0.5 m west to avoid the existing sewer line and resized to a 6.0 m by 0.6 m unit. The topography of the excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Kotzebue's 1817 map of south Oahu indicates the presence of *kalo lo'i* in the area of T-013. Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-013 was located in an area designated as marshland 49 m east of the southeast bank of Kalihi Stream. T-013 was located within LCA MA 50:4, awarded to Laumaka. The 1919 U.S. Army War Department Fire Control map (see Figure 9) shows T-013 was approximately 45 m east of the former OR&L railroad tracks and approximately 230 m north of some salt beds. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map indicate the area surrounding T-013 remained a wetland environment. The 1933 U.S. Army War Department Fire Control map shows a railroad line built 18 m west of T-013. The 1953 U.S. Army Mapping Service topographic map shows the wetlands had been modified or filled in along with the construction of Kamehameha Highway. Kamehameha Highway was expanded into four lanes, with T-013 situated in the left lane. The railroad line was rebuilt 9 m west of its previous location.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 210 m northeast of T-013. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological

assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, approximately 43 m northeast of T-013. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. Dega and Davis (2005) documented a subsurface historic refuse pit (SIHP #50-80-14-6683) approximately 67 m north of T-013.

Documentation Limitations: T-013 was excavated to a depth of 1.70 mbs. The water table was encountered at 1.45 mbs. There were no factors limiting the documentation of T-013.

Stratigraphic Summary: The stratigraphy of T-013 consisted of fill strata overlying natural sediment to the base of excavation. Observed strata were asphalt (Ia), very gravelly sand fill (Ib), silt fill (calcium carbide waste) (Ic), and a previously disturbed natural loam (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: A total of two WWII-era newspaper fragments dated Dec. 16 were collected from Stratum II at 1.66 mbs. Text in the article(s) mention “December 7,” “war production,” and “vital.” The reverse side has apartment advertisements listing 4- and 5-digit telephone numbers. Artifacts collected from Stratum II were consistent with 1940s historic material.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: One bulk sediment sample was collected from the excavation floor of Stratum II between 1.64 and 1.70 mbs (3 L). The sediment sample was wet screened. It yielded plant fibers (0.1 g) and small, water-worn cobbles cemented with calcium carbonite. The results of sample analysis indicated Stratum II contained no significant cultural material.

GPR Discussion: A review of amplitude slice maps indicated a linear feature, but this was located outside of the excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth, except for the linear feature. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-013 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 0.75 mbs.

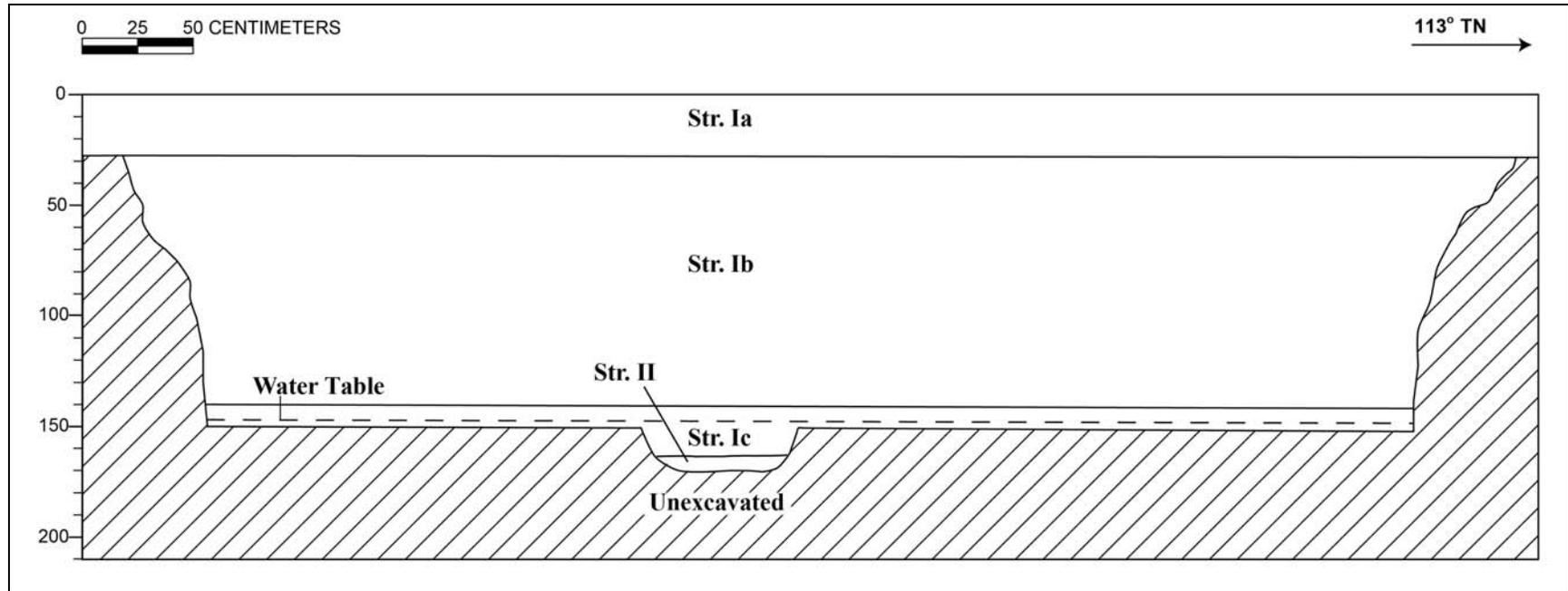
Summary: T-013 was excavated to a depth of 1.70 mbs and the water table was reached at 1.45 mbs. The stratigraphy of T-013 consisted of fill strata (Ia–Ic) overlying natural sediment (II) to the base of excavation. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). Stratum II contained historic 1940s newspaper clippings likely incorporated during previous disturbance. The results of sample analysis indicated Stratum II contained no significant cultural material. No archaeological cultural resources were identified in T-013.



T-013 investigation at the base of Stratum Ic, view to the northeast



T-013 northeast wall, view to the east



T-013 northeast wall profile

T-013 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|---------------------|--|
| Ia | 0–27 | Asphalt |
| Ib | 27–140 | Fill; 2.5 YR 7/3 (pale yellow); very gravelly sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; imported crushed coral sand fill with some cobble material present (10-20%) |
| Ic | 140–164 | Fill; GLEY 2 8/10 B (light bluish gray); silt; structureless, single-grain; wet, non-sticky consistency; non-plastic; smooth lower boundary; manufactured fill (calcium carbide) |
| II | 164–170 (BOE) | Natural; 10 YR 2/2 (very dark brown); loam; structureless, single-grain; wet, non-sticky consistency; non-plastic; terrigenous origin; lower boundary not visible; few fine to coarse roots; natural layer previously disturbed by agricultural activity; organic matting mixed into upper boundary; contained two newspaper fragments (collected) |

2.20 Test Excavation 14 (T-014)

| | |
|------------------------------------|-------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 3237:2; MA 50:4 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.3 m |
| UTM: | 615429.5404 mE 2359340.948 mN |
| Max Length/Width/Depth: | 6.50 m/0.80 m/2.07 mbs |
| Orientation: | 111/291° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 14 (T-014) was located in the middle-left west-bound lane of Kamehameha Highway just before the Middle Street and Kamehameha Highway intersection. T-014 was on City and County of Honolulu property. A water line was located 5.0 m northeast of T-014 and a gas line was 5.8 m southeast. The topography of the excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-014 was located 48 m south from the bank of Kalihi Stream near an area designated as marshland. T-014 was situated in LCA 3237:2, which was awarded to Hewahewa, and in LCA MA 50:4, which was awarded to Laumaka. The Monsarrat and Lyons 1890 map of Honolulu (see Figure 6) shows that T-014 was located approximately 260 m north of several *loko* and approximately 90 m southeast of Kalihi Stream. The 1919 (see Figure 9), 1933 (see Figure 10), and 1943 U.S. Army War Department maps show major development in those years in Kalihi, including the OR&L railroad to the southwest of T-014. The 1953 U.S. Army Mapping Service topographic map shows the wetlands were modified or filled in with the development of Kamehameha Highway. Kamehameha Highway was expanded into four lanes, with T-014 situated in the middle-left lane.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 220 m north of T-014. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, approximately 110 m northwest of T-014. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. Dega and Davis (2005) documented a subsurface historic refuse pit (SIHP #50-80-14-6683) approximately 140 m northwest of T-014.

Documentation Limitations: T-014 was excavated to a depth of 2.07 mbs. The water table was encountered at 1.72 mbs. An abandoned utility line was present near the western portion of T-014, which limited documentation.

Stratigraphic Summary: The stratigraphy of T-014 consisted of fill strata overlying natural sediment to the base of excavation. Observed strata were asphalt (Ia), very gravelly loamy sand fill (Ib), and very gravelly loamy sand fill (Ic), overlying natural silty clay loam (II). The stratigraphy generally conformed to the USDA soils survey designation of Ewa silty clay loam.

Artifact Discussion: See Sample Results below.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: Two bulk sediment samples (1.0 L total) strata were collected from Stratum II between 1.80 and 2.07 mbs. The samples were wet screened. Contents included charcoal (1.2 g), a small piece of volcanic glass (0.1 g), rusted metal objects (13.6 g), ceramic sherds (3.4 g), bottle glass sherds (0.5 g), unidentified medium mammal fragments (1.9 g), unidentified small mammal fragments (0.1 g), fish bone (0.1 g), and naturally-deposited Ostracidae (2.8 g).

The Stratum II sample (1.80–2.07 mbs) pollen analysis indicated the presence of both native and Polynesian cultigens, as well as introduced cultigen species. The sample was dominated by Poaceae pollen, which is consistent with *Oryza*-type production and suggests rice cultivation. The sample also contained abundant Chenopodiaceae pollen, indicating a drier environment, which might have supported the growth of species such as *Chenopodium oahuense*. There were smaller quantities of *Cocos nucifera* (coconut, *niu*, *alolani*); *Myrsine* (*kōlea*); Myrtaceae (myrtle family); *Sida* (*ilima*); Low-spine and High-spine Asteraceae and Liguliflorae (sunflower family); Brassicaceae (mustard family), and *Broussaisia*-type (*kanawao*) pollen. The small quantity of Cyperaceae pollen also present suggests neighboring growth of sedges. Moderate amounts of microscopic charcoal might indicate that rice fields were periodically burned, which is also supported by the presence of charred grass stems and sunflower plants.

The piece of volcanic glass from Stratum II was submitted for EDXRF analysis. Specific source information was not available, but the volcanic glass sample clearly did not match sources from Hawai'i County. The sample was from "Group 1," one of two distinct geochemical groups identified from the 35 City Center AIS EDXRF volcanic glass samples. The groups likely represent different volcanic sources on O'ahu (see EDXRF discussion in Volume V). The results of sample analysis documented cultural inclusions within Stratum II as evidenced by the presence of charcoal, faunal material, a piece of volcanic glass, and historic artifacts.

GPR Discussion: A review of amplitude slice maps indicated no linear features, although a utility was 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 and increased again at around 0.75 mbs.

GPR depth profiles for T-014 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in

reflectivity that occurred at around 0.15 mbs and again at around 0.75 mbs. No utilities were observed in the profile, although a utility was encountered during excavation. The maximum depth of clean signal return was approximately 0.75 mbs.

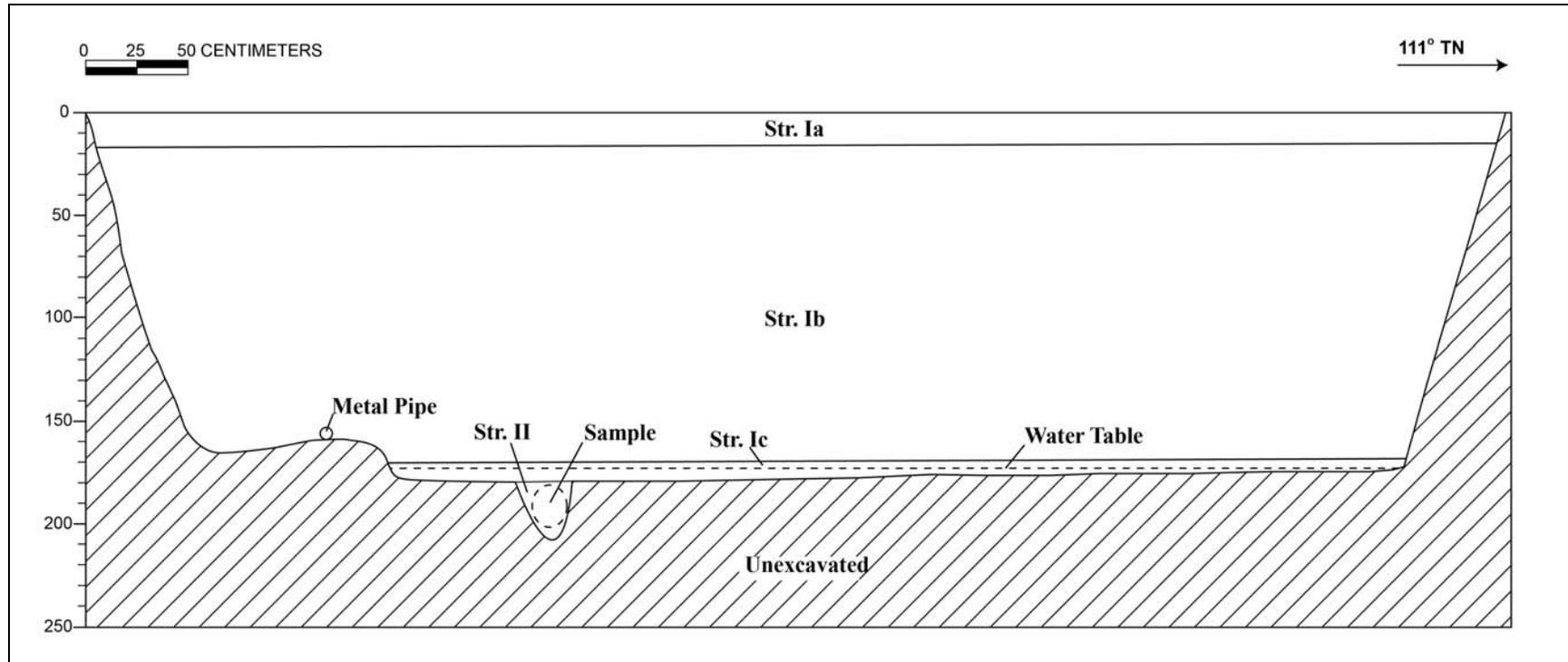
Summary: T-014 was excavated to a depth of 2.07 mbs. The water table was encountered at 1.72 mbs. The stratigraphy of T-014 consisted of fill strata (Ia–Ic) overlying natural sediment to the base of excavation (II). The stratigraphy generally conformed to the USDA soils survey designation of Ewa silty clay loam (EmA). The results of sample analysis documented cultural inclusions in Stratum II as evidenced by the presence of charcoal, faunal material, a piece of volcanic glass, and historic artifacts. No archaeological cultural resources were identified in T-014.



T-014 general location in Kamehameha Highway, view to the northwest



T-014 profile wall, view to the east



T-014 northeast profile

T-014 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|-------------------------|---|
| Ia | 0–17 | Asphalt |
| Ib | 17–170 | Fill; 10 YR 6/3 (pale brown) with common, fine to coarse mottles of 10 YR 8/3; very gravelly loamy sand; weak, fine granular structure; moist, loose consistency; non-plastic; marine origin; clear, smooth lower boundary; contained a metal pipe, a few broken glass sherds, and corroded iron in the lower interface (not collected); crushed coral fill |
| Ic | 170–180 | Fill; GLEY 1 8/10 Y (light greenish gray); very gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not visible; contained few broken glass sherds (not collected); crushed coral fill |
| II | 180–207 (BOE) | Natural; 10 YR 2/1 (black); silty clay loam; structureless, massive; moist, very firm consistency; plastic; marine origin; lower boundary not visible; common, fine roots; contained historics at interface with Ic (not collected) |

2.21 Test Excavation 15 (T-015)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 3237:2 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.4 m |
| UTM: | 615456.5694 mE, 2359330.227 mN |
| Max Length/Width/Depth: | 6.10 m/0.60 m/1.95 mbs |
| Orientation: | 110/290° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 15 (T-015) was located in the left west-bound turn lane of Kamehameha Highway, 315 m southeast of the Middle Street and Kamehameha Highway intersection. T-015 was on City and County of Honolulu property. A water line was located 5 m northeast of T-015 and a gas line approximately 15 m south. The excavation surface was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-015 was situated in LCA 3237:2, awarded to Hewahewa. Monsarrat's map of Honolulu (see Volume II) from 1897 indicates that LCA 3237:2 was owned by Alexander Adams. T-015 was located approximately 290 m northeast of several *loko* and approximately 140 m southeast of Kalihi Stream. The 1919 (see Figure 9), 1933 (see Figure 10), and 1943 U.S. Army War Department maps show major development during those years in Kalihi, including the OR&L track located to the south of T-015. The 1953 U.S. Army Mapping Service topographic map indicates that Kamehameha Highway was expanded into four lanes, with T-015 situated in the left lane.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility north of T-015. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of the (then) proposed bus depot, Middle Street Transit Center Station project area, approximately 160 m northwest of T-015. Dega and Davis (2005) subsequently conducted an archaeological inventory survey of a portion of this project area. Dega and Davis (2005) documented a subsurface historic refuse pit (SIHP #50-80-14-6683) approximately 108 m northwest of T-015.

Documentation Limitations: T-015 was excavated to a depth of 1.95 mbs. The water table was encountered at 1.62 mbs. There were no factors that limited the documentation of T-015.

Stratigraphic Summary: The stratigraphy of T-015 consisted of fill strata to the base of excavation. Observed strata were two asphalt layers (Ia and Ib) and a very gravelly sand fill (Ic). Stratum Ic contained a partially burnt *kiawe* log. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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-015 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.15 mbs and again at around 0.65 mbs. An anomaly was observed in the profile but was not encountered during excavation. The maximum depth of clean signal return was approximately 0.8 mbs.

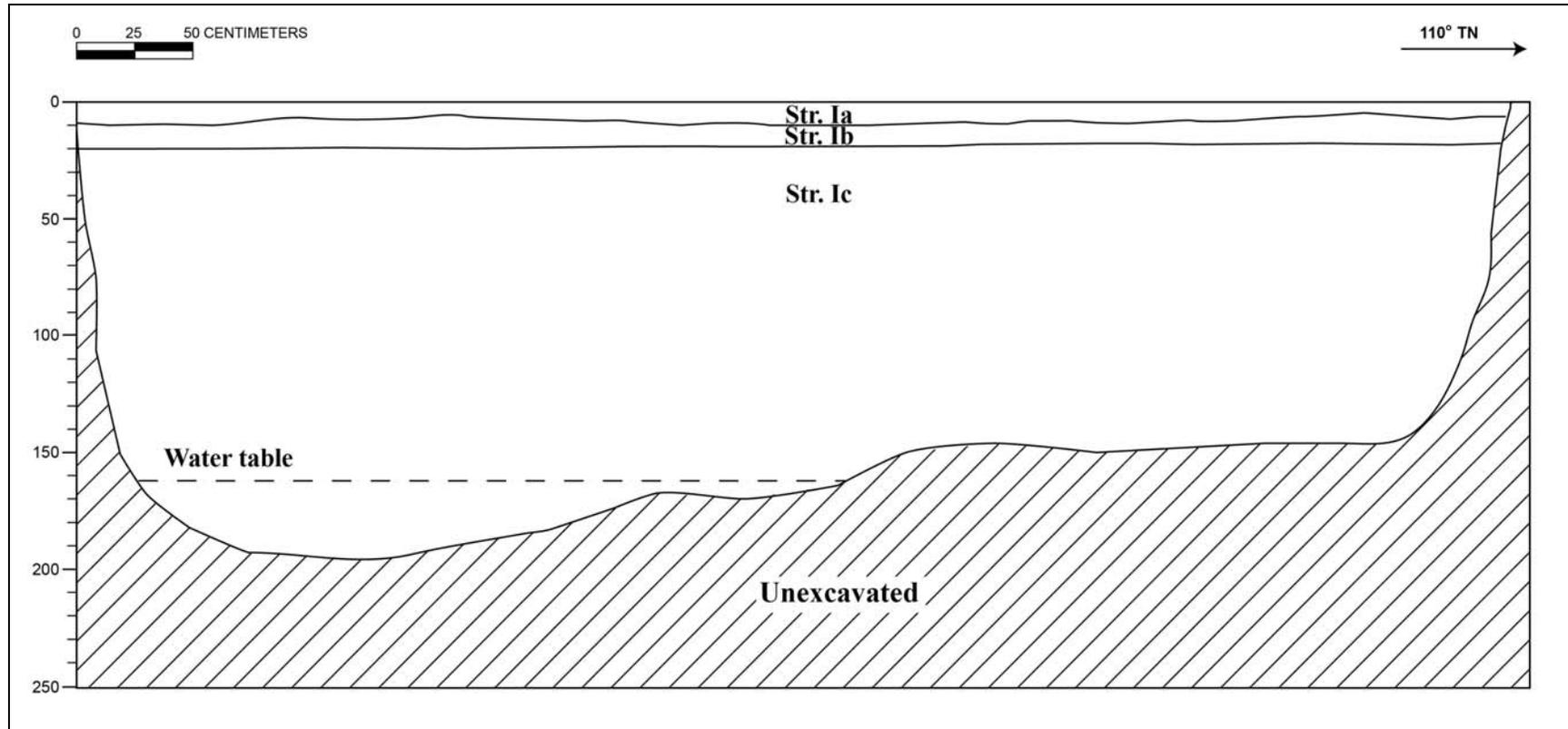
Summary: T-015 was excavated to a depth of 1.95 mbs. The water table was encountered at 1.62 mbs. The stratigraphy of T-015 consisted of fill strata (Ia–Ic) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No natural sediment was observed. No archaeological cultural resources were identified within T-015.



T-015 general location, view to the northwest



T-015 profile, view to the north



T-015 northeast wall profile

T-015 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|-------------------------|--|
| Ia | 0–10 | Asphalt; current road surface |
| Ib | 10–20 | Asphalt; older road surface |
| Ic | 20–195 (BOE) | Fill; 10 YR 8/1 (white); very gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; contained a partially burnt <i>kiawe</i> log (not collected); lower boundary not visible; crushed coral fill |

2.22 Test Excavation 16 (T-016)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | 3237:2 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.4 m |
| UTM: | 615495.9332 mE, 2359312.342 mN |
| Max Length/Width/Depth: | 5.60 m/0.61 m/1.75 mbs |
| Orientation: | 110/290° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 16 (T-016) was located in the left westbound lane of Kamehameha Highway. T-016 was 185.0 m southeast of Kalihi Stream, near the Kamehameha Highway and Laumaka Street intersection. T-016 was on City and County of Honolulu property. A gas line was located 1.7 m southeast of T-016, and water lines were present 4.0 m northeast and 4.6 m southwest of T-016. The topography of the excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates that T-016 was located in LCA 3237:2, awarded to Hewahewa. Hewahewa was awarded the *'ili* of Kaluapulu in Kalihi, which included fishponds located at Kalihi Kai. T-016 was 173 m east of the wetland area bordering the coast. The 1919 U.S. Army War Department Fire Control map (see Figure 9) indicates that T-016 was 158 m northeast of the former OR&L railroad tracks and approximately 236 m northeast of some salt beds. The 1919, 1933 (see Figure 10), and 1943 U.S. Army War Department maps show that the area surrounding T-016 experienced minor development during those years. The 1953 U.S. Army Mapping Service topographic map shows that nearby wetlands and fishponds were modified or filled in. Kamehameha Highway was expanded into four lanes, with T-016 situated in the middle-left lane.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility 256 m northwest of T-016. Landrum and Klieger (1991) completed a historical literature and document search for the bus repair shop project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres 170 m northwest of T-016. In 2005, Dega and Davis performed an archaeological inventory survey of an 8-acre parcel in the same vicinity. Dega and Davis (2005) conducted subsurface testing and encountered a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-016 was excavated to a depth of 1.75 mbs. The water table was encountered at 1.63 mbs. There were no factors that limited the documentation of T-016.

Stratigraphic Summary: The stratigraphy of T-016 consisted of fill strata to the base of excavation. Observed strata were two layers of asphalt road surface (Ia and Ib), and a very gravelly medium–fine grain sand fill (Ic). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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-016 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.1 mbs and again at around 0.5 mbs. Several small anomalies were observed in the profile but were not encountered during excavation. The maximum depth of clean signal return was approximately 0.6 mbs.

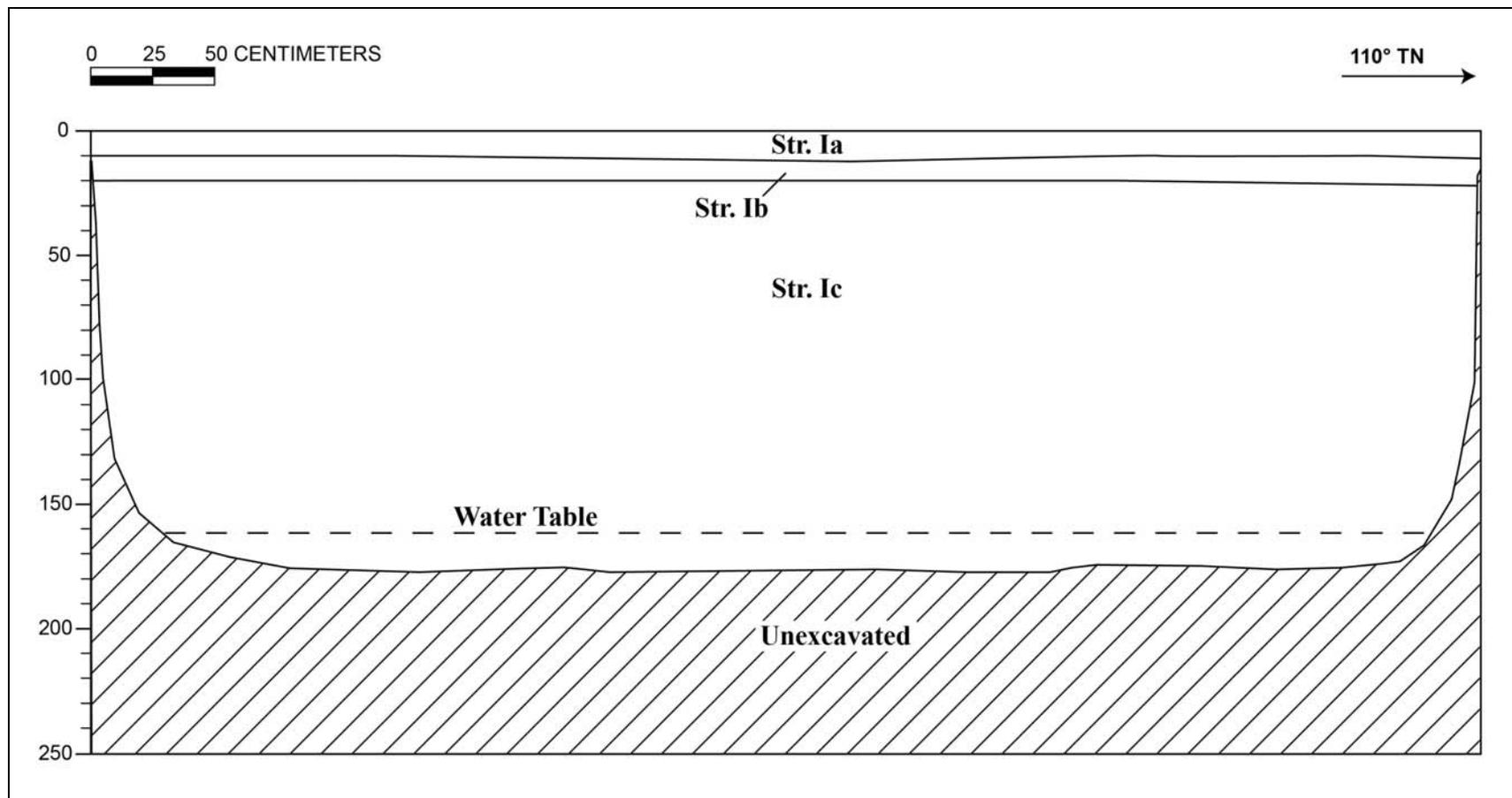
Summary: T-016 was excavated to a depth of 1.75 mbs. The water table was encountered at 1.63 mbs. T-016 reached the water table at 1.63 mbs and consisted of fill strata (Ia–Ic) to the base of the excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No natural sediment was observed. No archaeological cultural resources were identified within T-016.



T-016 general location, view to the southeast



T-016 north wall profile, view to the north



T-016 north wall profile

T-016 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|----------------|-------------------------|--|
| Ia | 0–10 | Asphalt; Kamehameha Highway current road surface |
| Ib | 10–20 | Asphalt; Kamehameha Highway older road surface |
| Ic | 20–175 (BOE) | Fill; 10 YR 8/1 (white); very gravelly medium–fine sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not visible; crushed coral fill |

2.23 Test Excavation 17 (T-017)

| | |
|------------------------------------|------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | MA 50:3 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.6 m |
| UTM: | 615531.443 mE 2359275.049 mN |
| Max Length/Width/Depth: | 6.10 m/0.77 m/1.44 mbs |
| Orientation: | 121/301° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 17 (T-017) was located northwest of the Laumaka Street intersection in the far right eastbound lane of Kamehameha Highway. T-017 was directly in front of the Oahu Community Correctional Center (OCCC) and across from the Marukai Wholesale Market. T-017 was on City and County of Honolulu property. Two AT&T lines were present 1.8 m southwest and 2.8 m northeast of T-017. The excavation surface was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicate T-017 was 216 m southeast of Kalihi Stream and 273 m east of the former shoreline. Several fishponds existed along the coastline during this time. T-017 was within LCA MA 50:3, which was awarded to Laumaka. LCA MA 50:3 consisted of lands that were part of Kaunapo, an *'ili* of Kalihi. T-017 was approximately 165 m inland of the indicated wetlands bordering the old coast. The 1919 U.S. Army War Department Fire Control map (see Figure 9) shows that T-017 was 176 m northeast of the former OR&L railroad tracks and approximately 244 m northeast of some salt beds. Multiple small structures were present in the area immediately surrounding T-017. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map show the area had no major developments present. The 1953 U.S. Army Mapping Service topographic map shows Kamehameha Highway was formally established by this time and bisected the area. The fishponds and the surrounding wetlands had been modified or filled in conjunction with the development of Kamehameha and Nimitz highways.

Previous archaeology of the surrounding area included several studies (300 m northeast of T-017) between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres 195.4 m northeast of T-017. In 2005, Dega and Davis performed an

archaeological inventory survey an 8-acre parcel in the same vicinity. Dega and Davis (2005) conducted subsurface testing that encountered a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-017 was excavated to a depth of 1.44 mbs. Excavation was unable to proceed below 1.44 mbs due to an 8-inch metal pipe. The utility was located in Stratum Ic and extended from the southeast to northwest end of T-017. The utility was suspected to be an active gas or fuel line.

Stratigraphic Summary: The stratigraphy of T-017 consisted of fill material with no natural sediments observed. Observed strata were asphalt road surface (Ia), very gravelly loamy sand base course (Ib), and a cobbly sandy clay loam fill (Ic). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

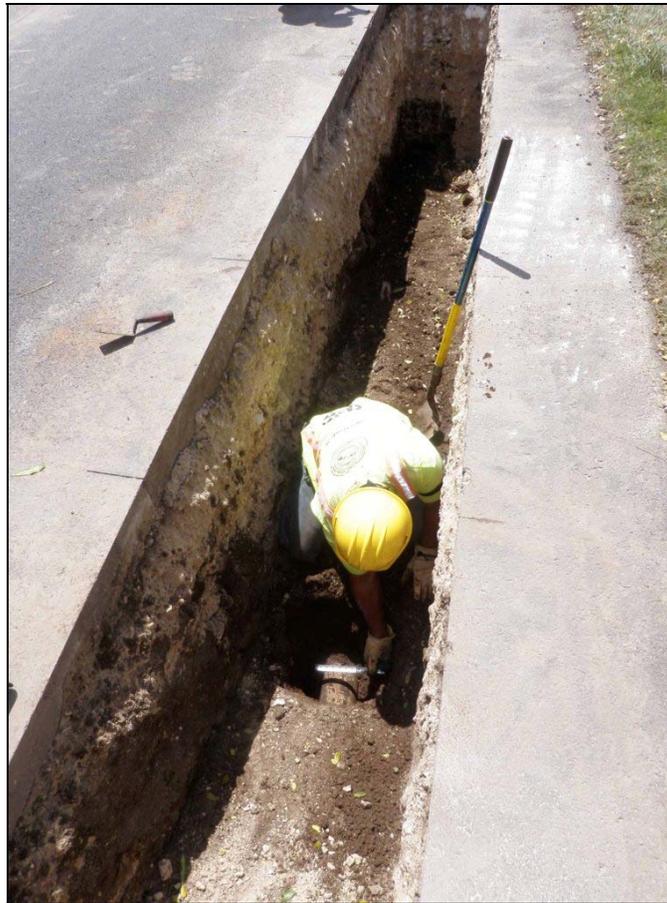
GPR Discussion: A review of amplitude slice maps indicated a linear feature that corresponds to the metal utility that was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed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

GPR depth profiles for T-017 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.25 mbs and again at around 1.00 mbs. An anomaly was observed in the profile, and this corresponds to the utility that was encountered during excavation. The maximum depth of clean signal return was approximately 2 mbs.

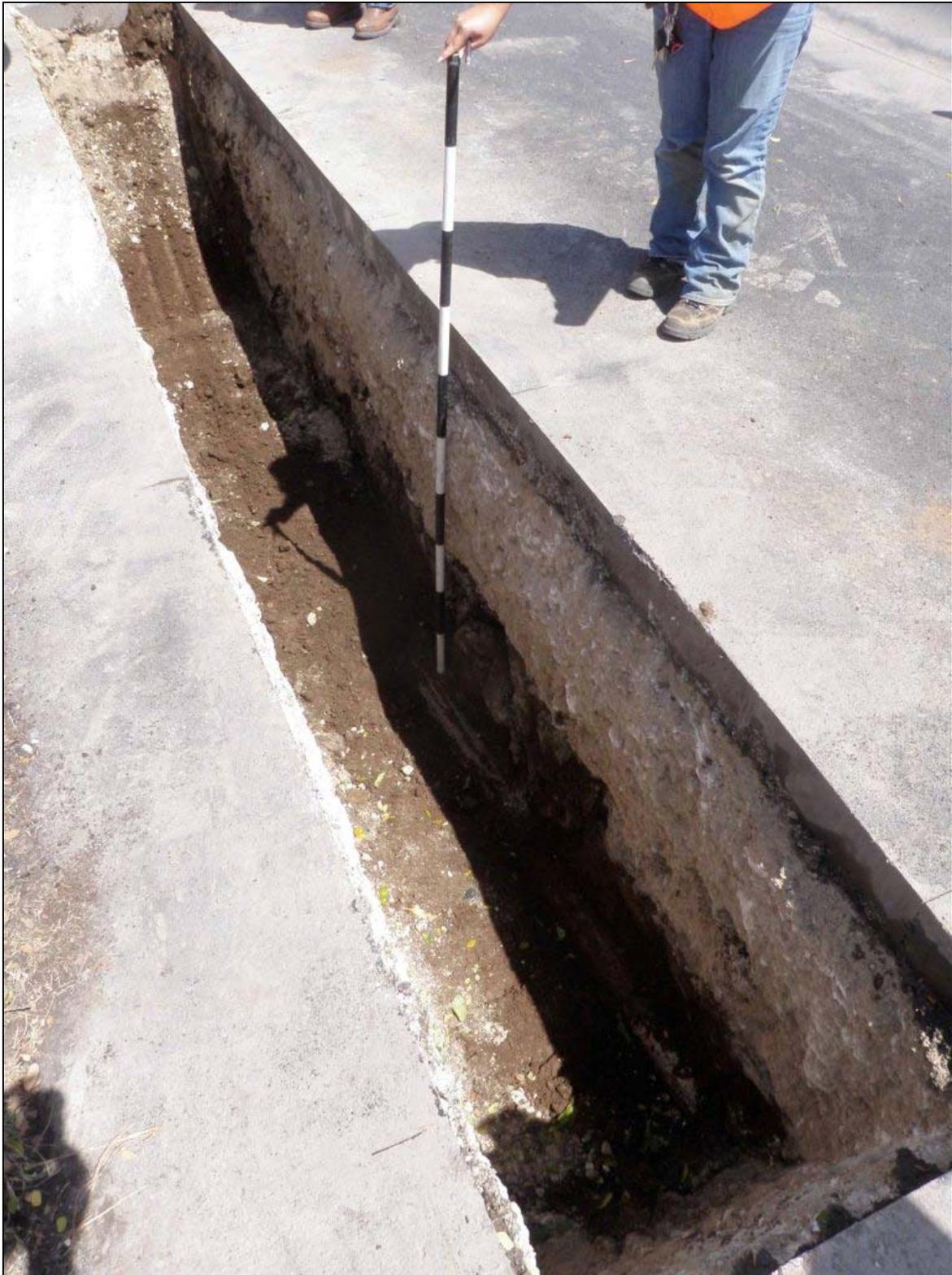
Summary: T-017 was excavated to a depth of 1.44 mbs. The stratigraphy of T-017 consisted of fill material (Ia–Ic) with no natural sediments observed. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). A metal utility pipe prevented excavation below 1.44 mbs. No natural sediments were observed. No archaeological cultural resources were identified within T-017.



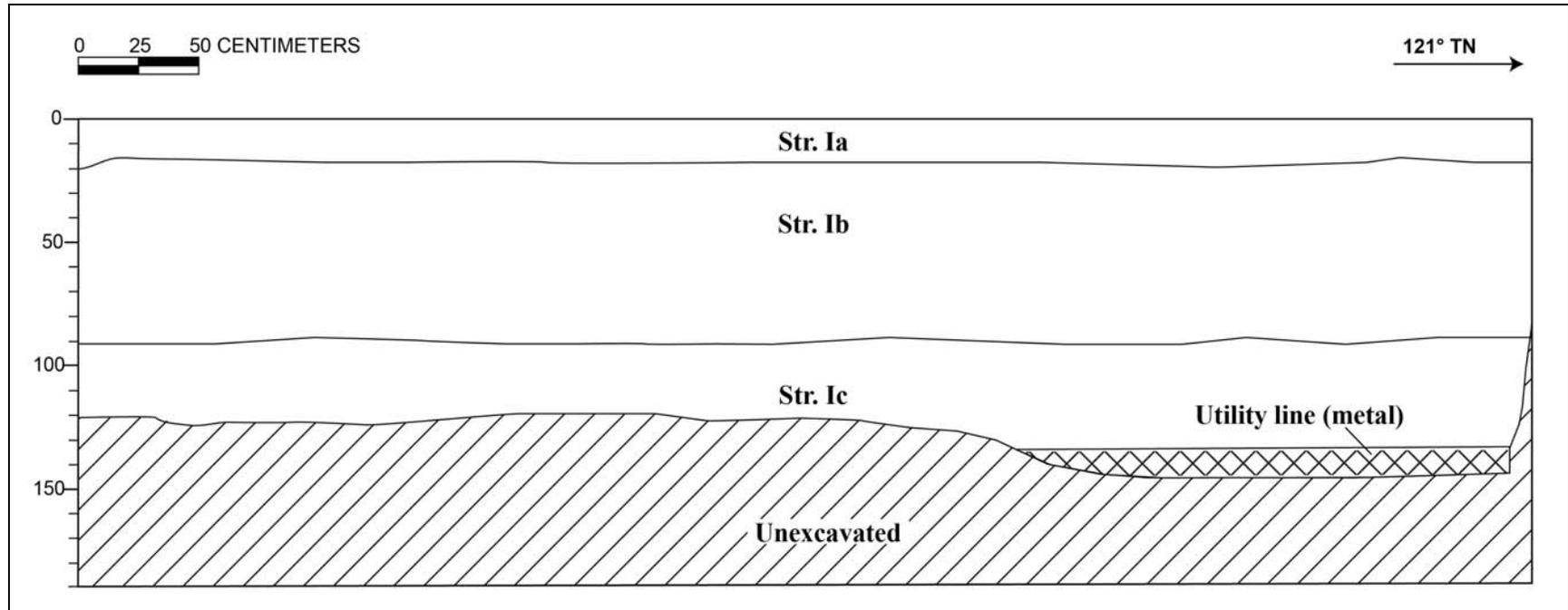
T-017 general location, view to the north



T-017 Exposing 8-inch metal utility in center of northwest end, view to the southeast



T-017 northeast (*mauka*) wall, view to the north



T-017 northeast wall profile

T-017 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|----------------|-------------------------|---|
| Ia | 0–17 | Asphalt; road surface |
| Ib | 17–90 | Fill; 10 YR 8/2 (very pale brown); very gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course |
| Ic | 90–144 (BOE) | Fill; 10 YR 4/5 brown; cobbly sandy clay loam; moderate, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; lower boundary not visible; contained small basalt boulders near upper boundary and cinder around 8-inch metal utility |

2.24 Test Excavation 18 (T-018)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | MA 50:3 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 2.77 m |
| UTM: | 615562.1449 mE, 2359256.331 mN |
| Max Length/Width/Depth: | 6.05 m/0.75 m/2.38 mbs |
| Orientation: | 130/310° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) |

Setting: Test Excavation 18 (T-018) was located in the far right lane on the southwest side of Kamehameha Highway. T-018 was near the Oahu Community Correctional Center (OCCC) and across from the Marukai Wholesale Mart. T-018 was on City and County of Honolulu property. Utilities near T-018 included a water line 2.6 m southeast, and AT&T and telephone lines were 2.7 m southwest and 1.9 m northeast. The test excavation was level with the surrounding roadway.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates T-018 was within LCA MA 50:3. LCA MA 50:3 was within Hāunapō, an *'ili* of Kalihi, but there is no description of the land use. T-018 was 280 m southeast of the eastern bank of Kalihi Stream and located in a wetland. The 1919 U.S. Army War Department Fire Control map (see Figure 9) shows that T-018 was approximately 180 m northeast of the former OR&L railroad tracks and approximately 255 m northeast of some salt beds. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map do not indicate any major developments in the area. The 1953 U.S. Army Mapping Service topographic map shows the nearby wetlands and fishponds were modified or filled in the development of Kamehameha Highway and Nimitz Highway.

Previous archaeology of the surrounding area included several studies (330 m northwest of T-018) between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres 252 m northwest of T-018. In 2005, Dega and Davis performed an archaeological inventory survey of an 8-acre parcel in the same vicinity. Dega and Davis (2005) conducted subsurface testing and encountered a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-018 was excavated to a depth of 2.38 mbs. The water table was encountered at 2.15 mbs. There were no factors that limited the documentation of T-018.

Stratigraphic Summary: Stratigraphy of T-018 consisted of fill material overlying two natural layers to the base of the excavation. Observed strata were asphalt (Ia), very gravelly loamy sand fill (Ib), very gravelly loamy sand fill (Ic), very gravelly loamy sand fill (Id), sandy loam fill (Ie), sand fill (If), natural silty clay loam (II), and a sandy clay loam with abundant organics (III). Stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifacts Discussion: One artifact (Acc. #018-A-1, see following photograph) was collected within Stratum Ie (fill). The artifact was a soda bottle embossed on the shoulder with the word "Liberty" and on the base with "LBW." Both marks were used by the Liberty Bottling Works of Wahiawā, O'ahu from the 1930s to the mid-1940s. The artifact collected from Stratum Ie indicated that the stratum post-dates 1930.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: Three bulk sediment samples were collected, consisting of one each from Stratum Ie between 1.15 and 1.30 mbs (2.50 L), Stratum II (0.75 L from excavator bucket), and Stratum III between 2.20 and 2.35 mbs (2.50 L). The bulk samples were wet screened. No material was recovered from the Stratum II sample. Stratum Ie contained naturally-deposited Echinoidea fragments (0.1 g), basalt gravels (483.6 g), bottle glass fragments (0.7 g), charcoal (3.1 g), and fish remains (0.1 g). Stratum III contained roots (0.1 g) and naturally-deposited gastropod shells (0.1 g). The results of sample analysis documented the presence of minimal amounts of cultural material in Stratum Ie.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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-018 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred at around 0.25 mbs and again at around 0.75 mbs. An anomaly was observed in the profile and could correspond to a metal cable that was encountered during excavation. The maximum depth of clean signal return was approximately 0.9 mbs.

Summary: T-018 was excavated to a depth of 2.38 mbs. The water table was encountered at 2.15 mbs. Stratigraphy of T-018 consisted of fill material (Ia–If) overlying two natural layers (II and III) to the base of the excavation. Stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). Artifact analysis indicated the fill strata above Stratum Ie was deposited post-1930. The results of sample analysis documented the presence of minimal amounts of cultural material in Stratum Ie. No archaeological cultural resources were identified within T-018.



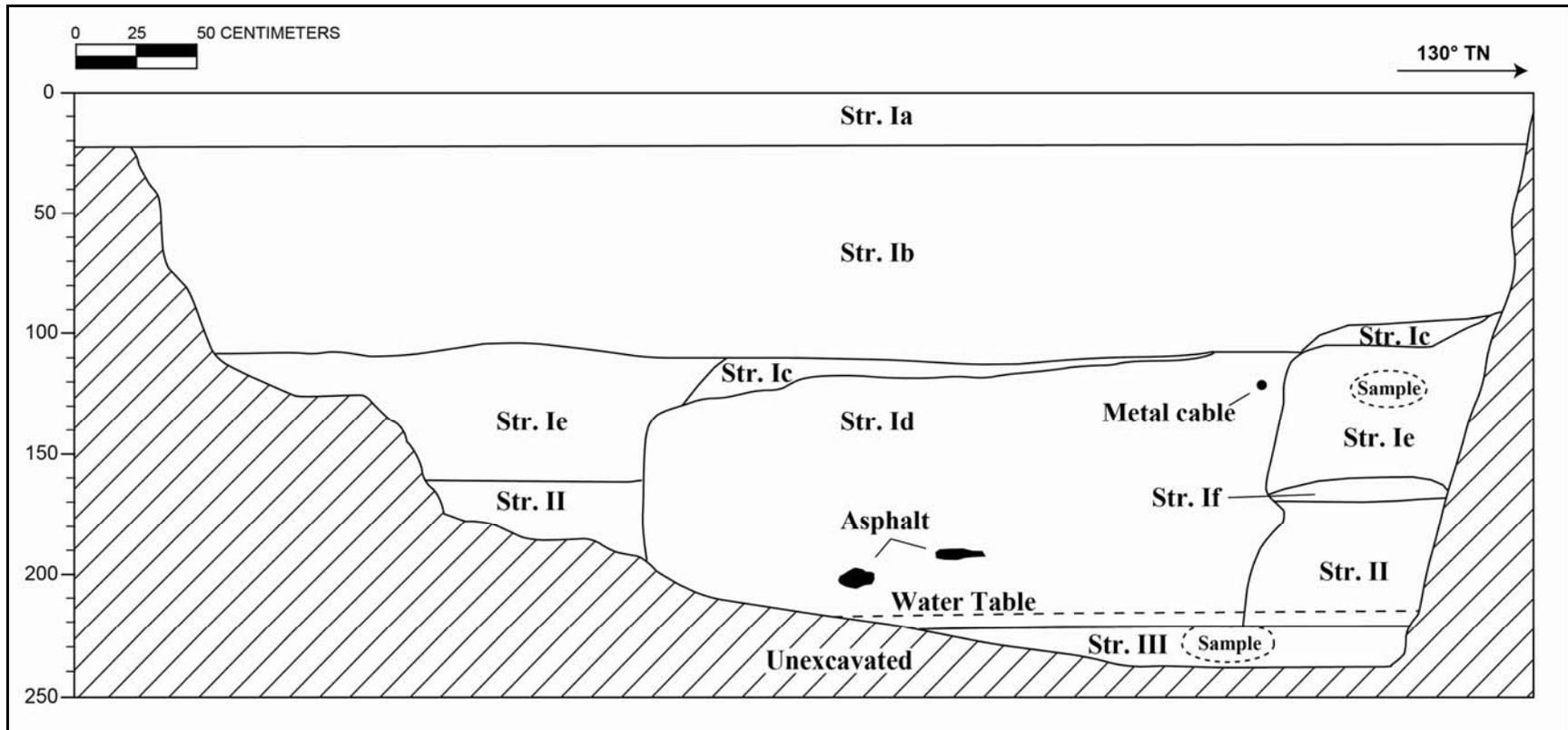
T-018 general location, view to the north



T-018 northeast profile, view to the northeast



T-018 northeast wall, view to the north



T-018 northeast profile

T-018 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|---------------|---|
| Ia | 0–22 | Asphalt road surface (two layers) |
| Ib | 22–112 | Fill; 10 YR 8/2 (very pale brown); very gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course |
| Ic | 92–130 | Fill; 10 YR 3/3 (brown), very gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, wavy to broken/discontinuous lower boundary; intermixed lenses of silt and crushed coral |
| Id | 108–220 | Fill; 10 YR 8/3 (very pale brown); very gravelly loamy sand; structureless, single-grain structure; non-plastic; lower boundary not visible (below water); crushed coral with some silt and asphalt chunks |
| Ie | 92–165 | Fill; 10 YR 3/3 (dark brown); sandy loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contained asphalt pieces and rust-colored particles (likely metal); also contained a whole soda bottle (collected) |
| If | 160–170 | Fill; 10 YR 2/1 (black); sand; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; imported volcanic cinder |
| II | 170–220 | Natural; 10 YR 3/2 (very dark grayish brown); silty clay loam; moderate, fine blocky structure; moist, firm consistency; plastic; terrigenous origin; lower boundary not visible (below water); common tubular hollows (root action), and common small shells and shell fragments |
| III | 220–238 (BOE) | Natural; 2.5 Y 3/1 (very dark gray); sandy clay loam; weak, fine, granular structure; wet, slightly sticky consistency; terrigenous origin; lower boundary not visible; common, very fine to medium roots; just below water table; contained abundant organics |



T-018, a glass soda bottle (Stratum Ie, Acc. #018-A-1) from the Liberty Bottling Works of Wahiawā, O‘ahu dating from the 1930s to the mid-1940s

2.25 Test Excavation 19 (T-019)

| | |
|------------------------------------|--|
| Ahupua'a: | Kalihi |
| LCA: | MA 50:3 |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 3.2 m |
| UTM: | 615609.7879 mE, 2359220.665 mN |
| Max Length/Width/Depth: | 6.20 m/0.80 m/3.25 mbs |
| Orientation: | 129/309° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Fill land (FL) and Ewa silty clay loam (EmA) |

Setting: Test Excavation 19 (T-019) was located in the right lane of the eastbound lanes on Kamehameha Highway. T-019 was adjacent to the Oahu Community Correctional Center (OCCC) and southwest of the Marukai Wholesale Market, before the Kamehameha Highway and Laumaka Street intersection. T-019 was located on City and County of Honolulu property. Utilities near T-019 included an AT&T line 2.3 m southwest and a telephone line that was 5.2 m northeast. The excavation surface was level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates T-019 was within LCA MA 50:3. T-019 was 290 m inland of the wetlands and fishponds bordering the shoreline. M.D. Monsarrat's 1897 map of Honolulu has T-019 at 12 m northeast of an unnamed road. The 1919 U.S. Army War Department Fire Control map (see Figure 9) indicates T-019 was 194 m northeast of the former OR&L tracks and 290 m northeast of the salt beds. The area surrounding T-019 had minor structures and planned road developments. The 1933 U.S. Army War Department Fire Control map (see Figure 10) and the 1943 U.S. Army War Department Terrain map locates T-019 southwest of the main road and documents ongoing urban development to the east. The 1953 U.S. Army Mapping Service topographic map shows that the fishponds and coastal wetlands around T-019 were filled in as a result of the development of Kamehameha and Nimitz Highways.

Previous archaeology of the surrounding area included several studies (approximately 380 m northwest of T-019) conducted in support of the development of a proposed City and County of Honolulu bus repair shop facility. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. More recently, Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres 300 m northwest of T-019. In 2005, Dega and Davis performed an archaeological inventory survey of an 8-acre parcel in the same vicinity. Their study (Dega and Davis 2005) included subsurface testing and identification of a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-019 was excavated to a depth of 3.25 mbs and beneath the water table at 3.20 mbs. There were no factors that limited the documentation of T-019.

Stratigraphic Summary: The stratigraphy of T-019 consisted of fill material and possible natural sediments. Observed strata were asphalt (Ia), very gravelly coarse sand (Ib), silty clay loam (II), and very gravelly, cobbly, sandy clay loam (III). T-019 was located on the USDA soil survey boundary between Fill land (FL) and Ewa silty clay loam (EmA). The stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: A total of three historic artifacts was observed, but not collected from the interface of Stratum Ib and Stratum II at approximately 1.85 mbs. They consisted of a metal wire, an unidentified encrusted metal piece, and six fragments of a machine-made beverage bottle manufactured by the Brockway Glass Co., Brockway, Pennsylvania (1907–1988). The base mark (number 44) may represent the manufacturing year or a mold number. No age was indicated for the metal. Artifacts observed in Stratum II (natural sediment) were consistent with sample findings (below) and with twentieth century disturbance to the natural sediment.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A total of three bulk sediment samples were collected from T-019. They consisted of two samples from Stratum II between 1.98 and 2.20 mbs (10 L) and between 2.13 and 2.23 mbs (10 L), and one sample from Stratum III between 3.00 and 3.25 mbs (14 L total). The sample from Stratum III was collected from a backhoe bucket, and is not indicated on the profile. All of the bulk samples were wet screened. The Stratum II sample at 1.98 to 2.20 mbs contained burned *kukui* (<0.1 g), volcanic glass (<0.1 g), and *Pervagor spilosoma* remains (0.3 g). The Stratum II sample at 2.13–2.33 mbs contained charcoal (0.1 g), fish remains (0.2 g), and two small water-rounded cobbles. The Stratum III sample contained charcoal (1.1 g), wood pieces (5.4 g), a small unidentified fish spine (0.1 g), naturally-occurring, water-rounded marine shell (293.1 g), and water-rounded basalt gravel. The results of sample analysis documented the presence of sparse amounts of cultural material in Strata II and III.

GPR Discussion: A review of amplitude slice maps indicated no linear features that might indicate 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 0.25 mbs and increased again around 0.75 mbs.

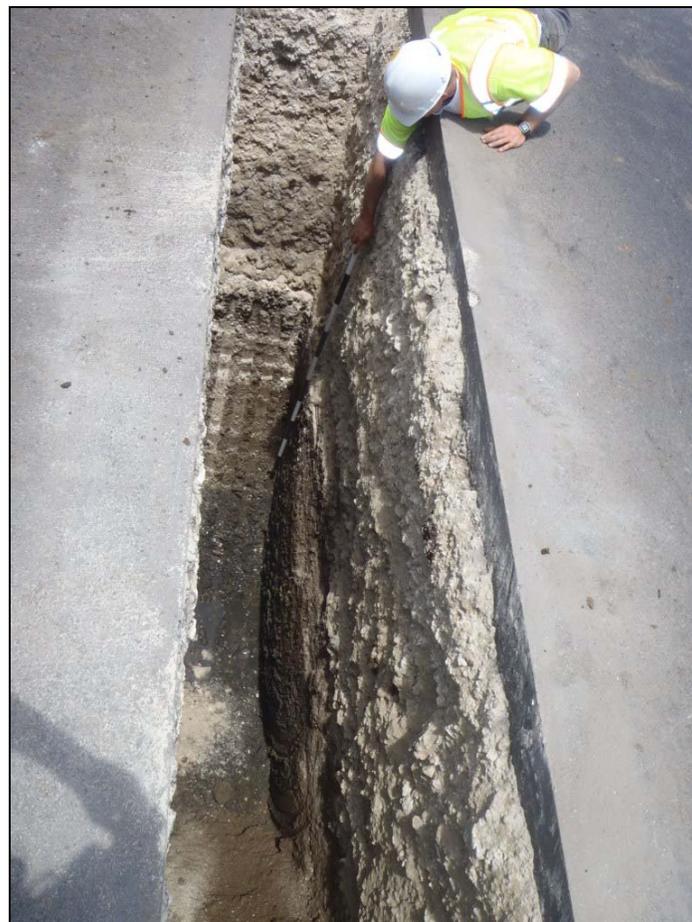
GPR depth profiles for T-019 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred around 0.15 mbs and again around 0.6 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.75 mbs

Summary: T-019 was excavated to a depth of 3.25 mbs and encountered the water table at 3.20 mbs. The stratigraphy contained both fill material (Ia–Ib) and natural sediments (II–III). The stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). Artifacts observed were consistent with twentieth century disturbance. The bulk sample analysis

documented the presence of sparse amounts of cultural material in Strata II and III. No archaeological cultural resources were identified within T-019.



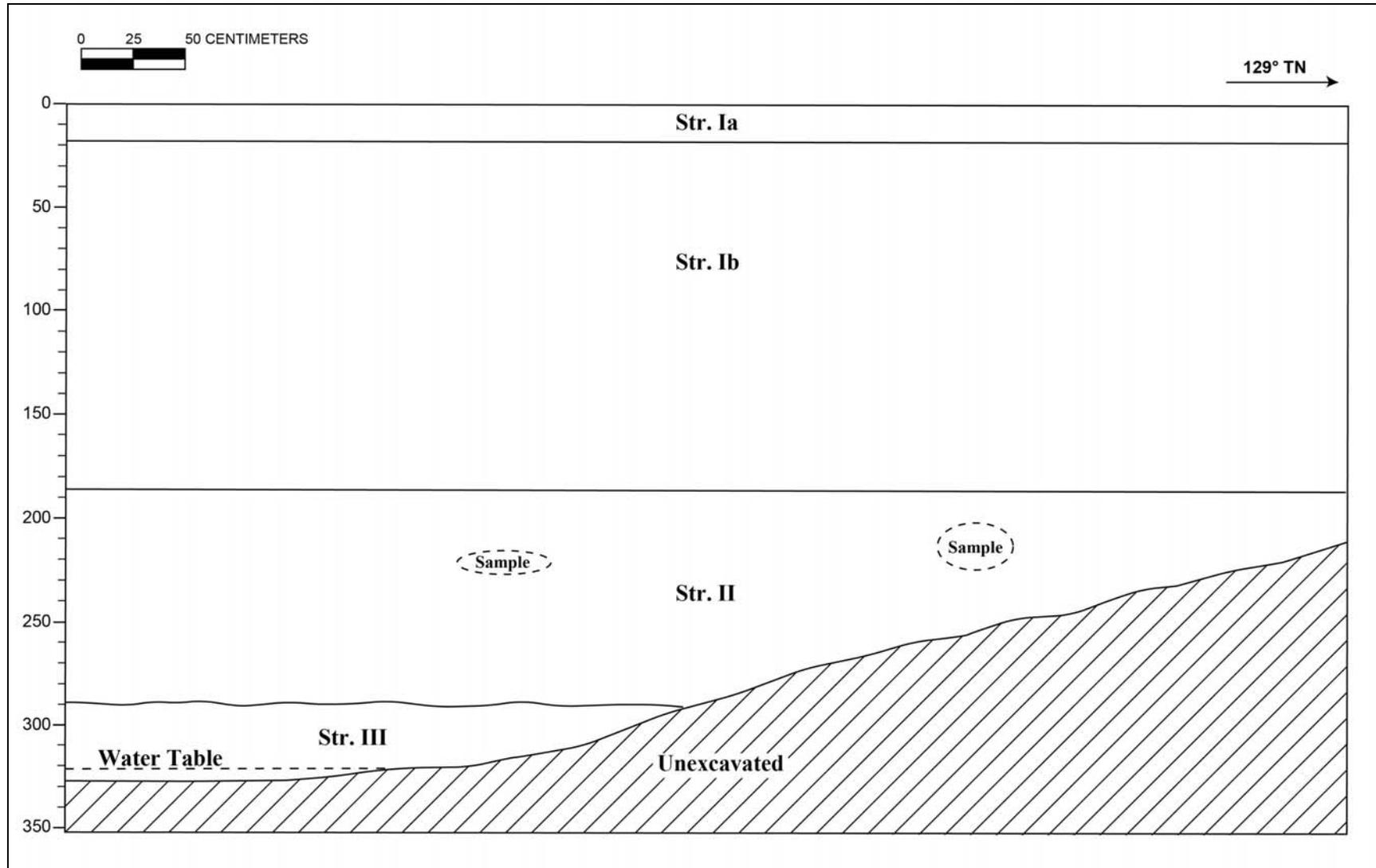
T-019 general location, view to the northwest



T-019 northeast wall profile, view to the north



T-019 historic artifacts observed in Stratum II (not collected)



T-019 northeast wall profile

T-019 Stratigraphic Description

| Stratum | Depth (cmts) | Description |
|---------|---------------|---|
| Ia | 0–17 | Asphalt; road surface |
| Ib | 17–185 | Fill; 10 YR 7/4 (very pale brown); very gravelly coarse sand; structureless, single-grain; dry, very hard consistency; non-plastic; marine origin; abrupt, smooth lower boundary; imported crushed coral fill |
| II | 185–290 | Possible natural; 10 YR 4/2 (dark grayish brown); silty clay loam; weak, very fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; clear-diffuse lower boundary; contained metal and bottle glass fragments (not collected) and charcoal flecking |
| III | 290–325 (BOE) | Natural; GLEY 2 2.5/5GB (greenish black); very gravelly, cobbly, sandy clay loam; structureless, massive; wet, sticky consistency; plastic; mixed origin; lower boundary not visible; consistent with mixed energy fluvial/marine environment and contained marine shells and basalt gravel and cobbles |

2.26 Test Excavation 20 (T-020)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013 [Plat] |
| Elevation Above Sea Level: | 3.3 m |
| UTM: | 615633.0411 mE, 2359203.593 mN |
| Max Length/Width/Depth: | 6.10 m/0.74 m/3.10 mbs |
| Orientation: | 131/311° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Ewa silty clay loam (EmA) |

Setting: Test Excavation 20 (T-020) was located in the southernmost eastbound lane of Kamehameha Highway. T-020 was located in front of the Oahu Community Correctional Center (OCCC) and across from the Marukai Wholesale Market. T-020 was located on City and County of Honolulu property. Utilities included electric lines located 2.7 m southwest (*makai*), and 5.0 m northeast (*mauka*) of T-020. T-020 was originally planned as a 3.0 m by 0.9 m unit within in a column footprint, but it was relocated to avoid existing utilities and adjusted to 6.0 m by 0.6 m. The land surface sloped gently to the northwest, toward the Middle Street intersection. The northeast (*makai*) side of the roadway gradually sloped to 1.20 m above the roadway, while the southwest (*mauka*) side sloped to 0.61 m above the roadway surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates T-020 was located on government lands leased to A. Herbert, near Māhele Award 50:3 to Hāunapō (20 m north); Grant (P.W.) 73 to Alexander Young (40 m east); and LCA 803:5 to A. Adams (95 m southeast). The 1919 (see Figure 9), 1933 (see Figure 10), and 1943 U.S. Army War Department maps document major urban development to the northeast along with planned development in the area. The 1953 U.S. Army Mapping Service topographic map shows an extended shoreline with a completed Nimitz Highway.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility northwest of T-020. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres north of T-020A. In 2005, Dega and Davis performed an archaeological inventory survey of an 8-acre parcel in the same vicinity. Their study (Dega and Davis 2005) included subsurface testing and identification of a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-020 was excavated to the coral shelf at a depth 3.10 mbs. The water table was encountered at 3.05 mbs. There were no factors that limited the documentation of T-020.

Stratigraphic Summary: The stratigraphy of T-020 consisted of fill material overlying several natural layers of clay loam. Strata were asphalt (Ia), very gravelly sand (Ib), silty clay loam (II), gravelly clay loam (IIIa), clay loam (IIIb), and a decomposing coral shelf of cobbles and gravels (IV). Stratum II contained an *imu* pit that extended from 2.35 to 2.50 mbs. The *imu* pit was designated as SIHP #50-80-14-7425. The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: See sample results below.

Feature Discussion: Stratum II contained an *imu* pit that extended from 2.35 to 2.50 mbs. The *imu* pit was a 0.10-m thick lens observed in the northeast excavation sidewall and contained abundant charcoal flecking and 11 small to medium water-rounded basalt cobbles. The basalt cobbles would have been heated and placed inside the pit to cook food. The cobbles were collected and cleaned in an effort to identify any potential use, wear, or alteration. Reddish discoloration indicative of thermal alteration was visible. The basalt cobbles were considered manuports for use in the *imu* pit. None exhibited evidence of having been used for tools or for construction (stacked or piled). The *imu* pit has been designated as SIHP #50-80-14-7425.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A total of six bulk sediment samples were collected from T-020. They consisted of two from Stratum II, one each at 1.55 to 1.70 mbs (2 L) and at 1.83 to 1.93 mbs (4 L), and one each from Stratum IIIa at 2.80 to 2.90 mbs (2.5 L), from Stratum IIIb at 2.90 to 3.00 mbs (2.5 L), from Stratum IV at 3.00 to 3.10 mbs (0.5 L), and from SIHP #-7425 (*imu*) at 2.35 to 2.50 mbs. The sediment samples from Stratum II and SIHP #-7425 (*imu*) were not collected from the excavation sidewall and are not depicted on the stratigraphic profile map. All of the bulk sediment samples were wet screened.

The Stratum II sample at 1.55 to 1.70 mbs contained clear and green glass bottle fragments (1.8 g), two Coke bottle fragments (61.0 g), organics (<0.1 g), naturally-deposited shell (0.3 g), and water-rounded gravels and coral fragments. The Stratum II sample from 1.83 to 1.93 mbs contained naturally-deposited snails (0.9 g), Tellinidae (1.1 g), glass fragments (<0.1 g), fish remains (0.1 g), and water-rounded gravels. No significant material was recovered from the Strata IIIa, IIIb, and IV samples.

The sample from SIHP #-7425 (*imu*) contained abundant charcoal (119.2 g). A sub-sample of the charcoal was submitted for wood taxa identification and radiocarbon dating. Wood taxa analysis identified *Lama* (*Diospyros sandiwiensis*), *Akoko* (*Chamaesyce* sp.), 'A'ali'i (cf. *Dodonaea viscosa*), 'Ūlei (cf. *Osteomeles anthyllidifolia*), and Hō'awa (cf. *Pittosporum* sp.). All of the identified wood taxa were considered to be native trees or shrubs (see Wood Taxa Identification located at the end of this section). The 'Ūlei charcoal collected from SIHP #-7425 was submitted for radiocarbon analysis. The results of radiocarbon analysis of charcoal collected from the *imu* pit yielded two possible date ranges, with a calibrated 2-sigma date of AD 1440 to AD 1530 (61.6%) being the most probable (see Radiocarbon Results located at the end of this section).

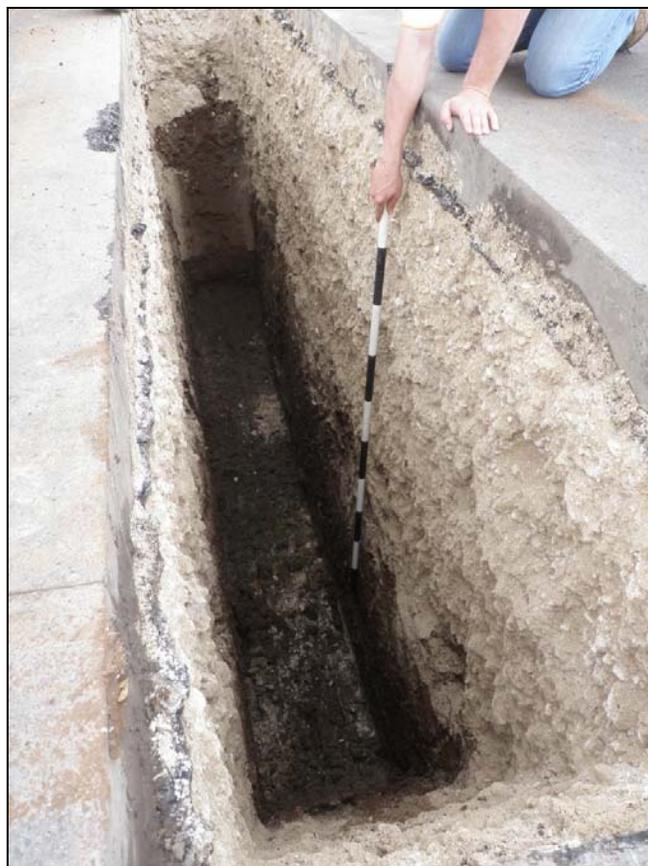
GPR Discussion: A review of amplitude slice maps indicated no linear features, although a metal pipe was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs and increased again at around 0.75 mbs.

GPR depth profiles for T-020 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred around 0.2 mbs and again around 0.6 mbs. No utilities were observed in the profile, although a metal pipe was encountered during excavation. The maximum depth of clean signal return was approximately 1.5 mbs.

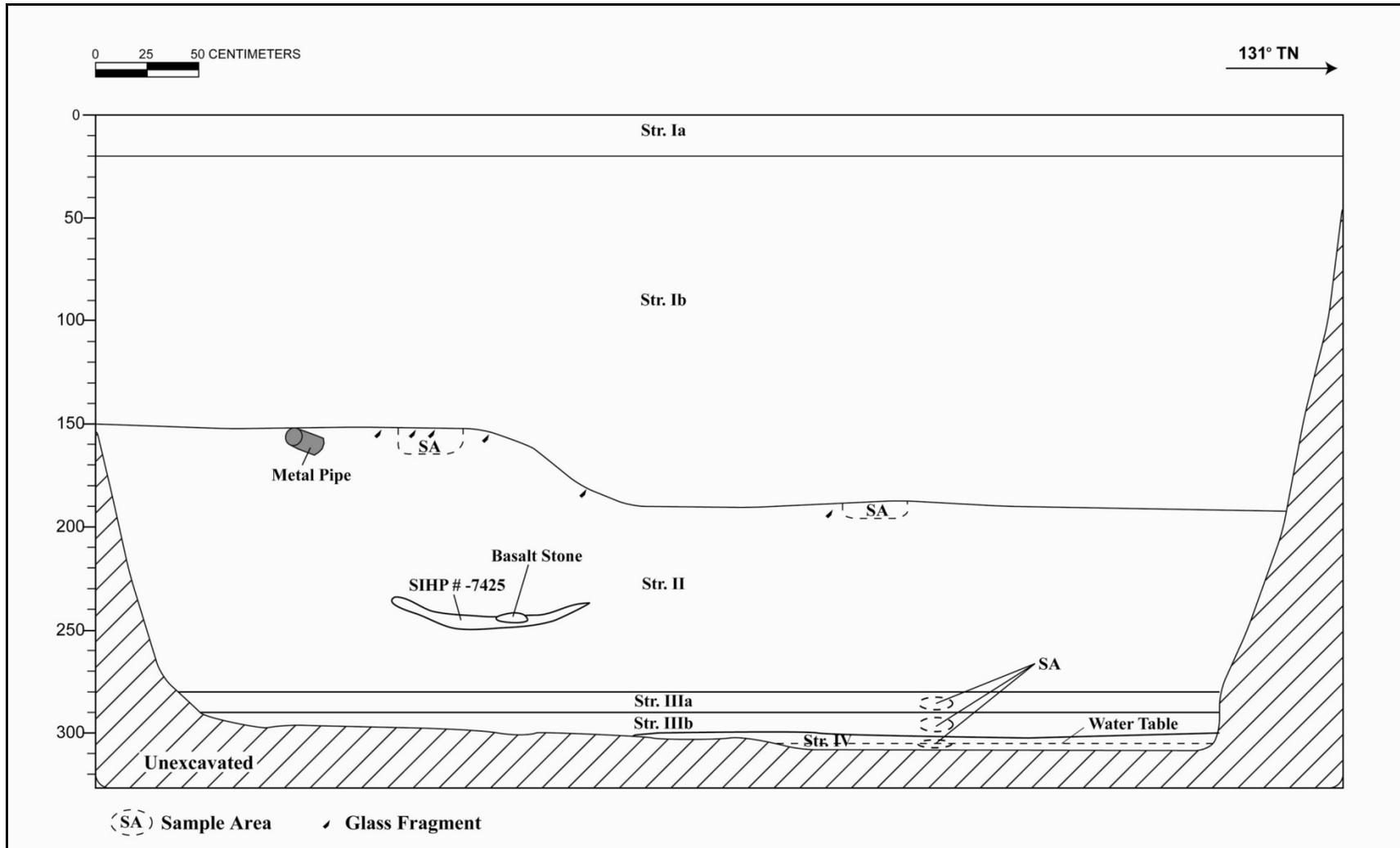
Summary: T-020 was excavated to the coral shelf at a depth 3.10 mbs. The water table was encountered at 3.05 mbs. The stratigraphy of T-020 consisted of fill material (Ia and Ib) overlying several natural layers of clay loam (II–IIIb) to the coral shelf (IV). The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). Sample analysis documented the presence of historic artifacts and faunal material within the upper portion of Stratum II. The sample from SIHP #-7425 (*imu*) contained a large amount of charcoal (119.2 g). A sub-sample of the charcoal was submitted for wood taxa identification and radiocarbon dating. All of the identified wood taxa were considered to be native trees or shrubs. The *Ūlei* charcoal collected from SIHP #-7425 was submitted for radiocarbon analysis. The results of radiocarbon analysis of charcoal collected from the *imu* pit yielded two possible date ranges, with a calibrated 2-sigma date of AD 1440 to AD 1530 (61.6%) being the most probable. A complete description of SIHP #50-80-14-7425 is presented in Volume I.



T-020 general location, view to the northwest



T-020 northeast wall, view to the north



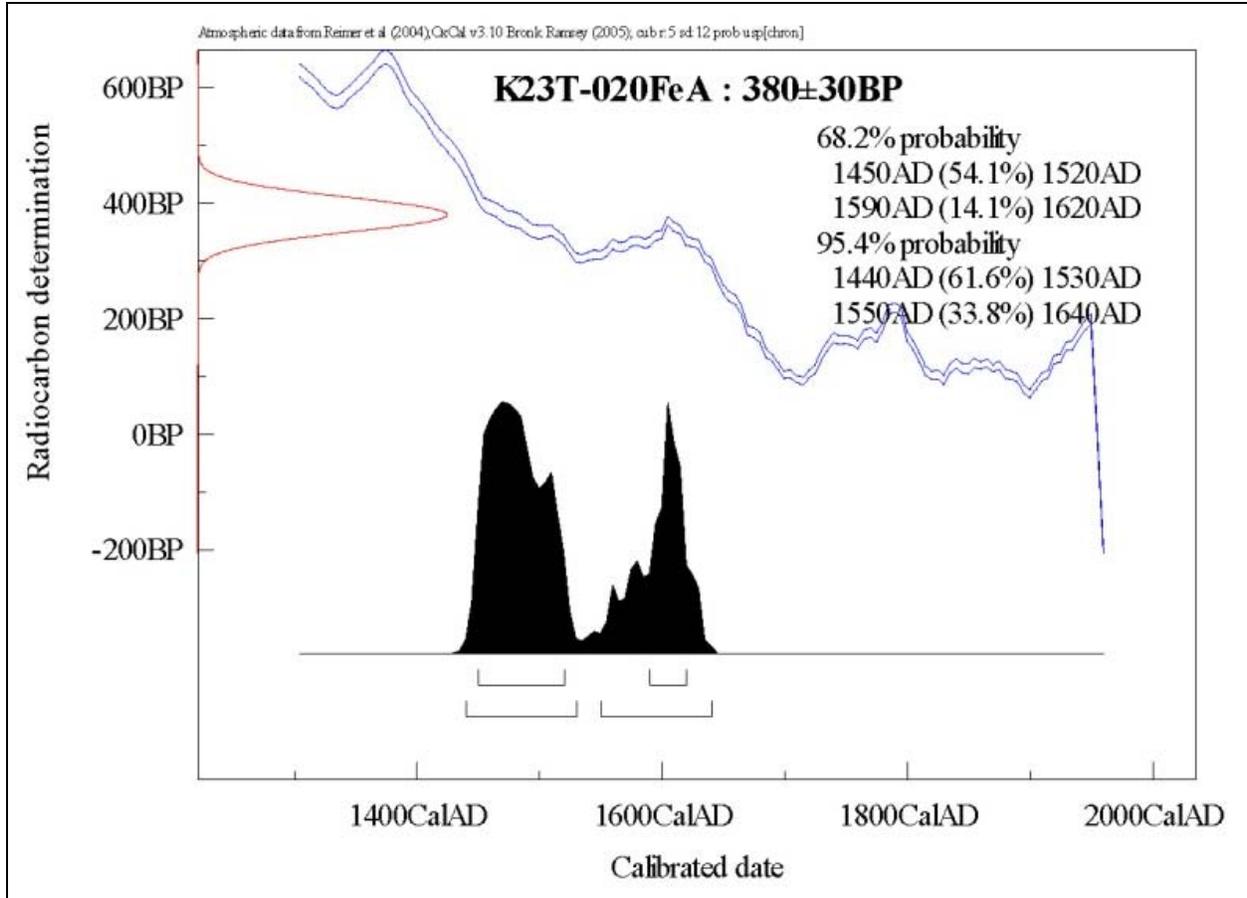
T-020 northeast wall profile

T-020 Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|---------------|---|
| Ia | 0–20 | Asphalt; road surface |
| Ib | 20–195 | Fill; 10 YR 7/4 (very pale brown); very gravelly sand; structureless, single-grain, coarse; dry, very hard consistency; non-plastic; marine origin; abrupt lower boundary; imported crushed coral fill consisting of gravel and cobbles |
| II | 150–280 | Natural; 10 YR 4/2 (dark grayish brown); silty clay loam; weak, very fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; contains moderate charcoal flecking; contains SIHP #50-80-14-7425, <i>imu</i> |
| IIIa | 280–290 | Natural; 2.5 YR 4/2 (dark grayish brown); gravelly clay loam; structureless, massive; moist, friable consistency; plastic; mixed origin; clear, smooth lower boundary; few, fine roots |
| IIIb | 290–300 | Natural; 2.5 YR 4/2 (dark grayish brown); clay loam; structureless, massive, moist, friable consistency; plastic; mixed origin; clear, smooth lower boundary; few, fine roots |
| IV | 300–310 (BOE) | Natural; 10 YR 7/4 (very pale brown); cobbles and gravels; structureless, massive; moist, extremely firm consistency; non-plastic; marine origin; lower boundary not visible; decomposing coral shelf |

T-020 Wood taxa identification from charcoal collected from SIHP #-7425 at 2.35 to 2.50 mbs

| Provenience | WIDL No. | Taxa | Common/Hawaiian Name | Origin/Habit | Part | Count | Weight (g) |
|--------------------------------------|----------|---------------------------------------|----------------------|--------------|------|-------|------------|
| T-020: SIHP #-7425 (235–250 cmbs) | 1223-1 | <i>Diospyros sandiwickensis</i> | <i>Lama</i> | Native/Tree | Wood | 8 | 5.07 |
| | 1223-2 | <i>Chamaesyce</i> sp. | <i>Akoko</i> | Native/Shrub | Wood | 2 | 1.23 |
| | 1223-3 | cf. <i>Dodonaea viscosa</i> | ' <i>A'ali'i</i> | Native/Shrub | Wood | 6 | 4.60 |
| | 1223-4 | cf. <i>Osteomeles anthyllidifolia</i> | ' <i>Ulei</i> | Native/Shrub | Wood | 1 | 1.55 |
| | 1223-5 | cf. <i>Pittosporum</i> sp. | <i>Hō'awa</i> | Native/Tree | Wood | 4 | 3.22 |



T-020 Radiocarbon analysis results from charcoal collected from SIHP #-7425 (formerly Feature A) at 2.35 to 2.50 mbs

2.27 Test Excavation 20A (T-020A)

| | |
|------------------------------------|--------------------------------|
| Ahupua'a: | Kalihi |
| LCA: | N/A |
| TMK #: | 1-2-013 [Plat] |
| Elevation: | 3.4 m |
| UTM: | 615627.3214 mE, 2359207.999 mN |
| Max Length/Width/Depth: | 6.70 m/0.72 m/3.02 mbs |
| Orientation: | 306/126° TN |
| Targeted Project Component: | Utility Relocation |
| USDA Soil Designation: | Ewa silty clay loam (EmA) |

Setting: Test Excavation 20A (T-020A) was located within the eastbound right lane of Kamehameha Highway, northeast of the Oahu Community Correctional Center (OCCC). T-020A was located on City and County of Honolulu property. T-020A was added to further investigate an *imu* feature (SIHP #50-80-14-7425) discovered in T-020. This test excavation also investigated a utility relocation. Two electric lines (1.5 m northwest and 2.8 m southwest) and one telephone line (5.3 m northeast) were located near T-020A. The excavation surface was generally level with the surrounding land surface.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama (see Figure 7) indicates T-020A was located on government lands leased to A. Herbert, near Māhele Award 50:3 to Hāunapō (20 m north); Grant (P.W.) 73 to Alexander Young (40 m east); and LCA 803:5 to A. Adams (95 m southeast). The 1919 (see Figure 9), 1933 (see Figure 10), and 1943 U.S. Army War Department maps documented major urban development to the northeast along with planned development in the area. The 1953 U.S. Army Mapping Service topographic map showed an extended shoreline with a completed Nimitz Highway.

Previous archaeology of the surrounding area included several studies between 1991 and 1993 that were conducted for the development of a proposed City and County of Honolulu bus repair shop facility northwest of T-020A. Landrum and Klieger (1991) completed a historical literature and document search for the project area prior to an archaeological inventory survey (Folk et al. 1993). The inventory survey discovered three post-Contact human burials with an associated cultural layer (SIHP #50-80-14-4525). Hammatt and Folk (1992) prepared a burial treatment plan for the site. Folk and Hammatt (1993) subsequently developed a burial mitigation plan for the site. Hammatt and Shideler (2002) conducted an archaeological assessment of 10.35 acres north of T-020A. In 2005, Dega and Davis performed an archaeological inventory survey of an 8-acre parcel in the same vicinity. Their study (Dega and Davis 2005) included subsurface testing and identification of a historic refuse pit (SIHP #50-80-14-6683).

Documentation Limitations: T-020A was excavated to a depth of 3.02 mbs. The water table was encountered at 2.97 mbs. There were no factors that limited the documentation of T-020A.

Stratigraphic Summary: The stratigraphy of T-020A consisted of fill strata overlying natural sediment to the base of excavation. Observed strata were asphalt (Ia) and very gravelly sand (Ib) overlying natural silty clay loam (II and III) to the base of excavation. The stratigraphy conformed to the USDA soil designation of Ewa silty clay loam (EmA).

Artifacts Discussion: See below.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Discussion: No terrestrial faunal remains were collected individually during excavation.

Sample Results: A total of three bulk sediment samples were collected from Stratum II consisting of one each at 1.70–1.89 mbs (1.5 L), 2.30–2.34 mbs (1.0 L), and 2.36–2.53 mbs (3.0 L). A fourth sample was collected from Stratum III at 2.56–2.85 mbs (2.0 L). The sediment samples were wet screened. The sample from Stratum II at 1.70–1.89 mbs contained charcoal (0.1 g). The sample from Stratum II at 2.30–2.34 mbs was taken from a charcoal lens. The sample from Stratum II at 2.36–2.53 mbs contained charcoal (0.6 g), volcanic glass (0.4 g), and fish bone (0.4 g). The sample from Stratum III at 2.56–2.85 mbs contained charcoal (0.8 g). The results of the analysis of bulk sediment samples indicated the presence of sparse cultural material within Stratum II and Stratum III.

The volcanic glass from the sample of Stratum II at 2.36–2.53 mbs was sent for EDXRF analysis. Specific source information is not available; however, the volcanic glass sample clearly does not match sources from Hawai'i County. The sample is from "Group 1," one of two distinct geochemical groups identified from the 35 City Center AIS EDXRF volcanic glass samples, likely representing different volcanic sources on O'ahu (see EDXRF discussion in Volume IV).

Charcoal collected from the bulk sample of Stratum II at 2.30–2.34 mbs was submitted for wood taxa identification and radiocarbon dating. Wood taxa analysis identified *pūkiawe* (*Styphelia tameimeae*), 'a'ali'i (cf. *Dodonea viscosa*), and 'ūlei (cf. *Osteomeles anthyllidifolia*). All of the identified wood taxa were native shrubs (see Wood Taxa Identification located at the end of this section). The *pūkiawe* charcoal collected from Stratum II was submitted for radiocarbon analysis. The results of radiocarbon analysis yielded a calibrated 2-sigma date of AD 1480 to 1650 (95.4%) (see Radiocarbon Results located at the end of this section).

GPR Discussion: A review of amplitude slice maps revealed no linear features that might indicate 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 0.25 mbs and increased again at around 0.75 mbs.

GPR depth profiles for T-020A identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 2 mbs.

Summary: T-020A was excavated to a depth of 3.02 mbs. The water table was reached at 2.97 mbs. The stratigraphy of T-020A consisted of fill strata (Ia–Ib) overlying natural sediment (II–

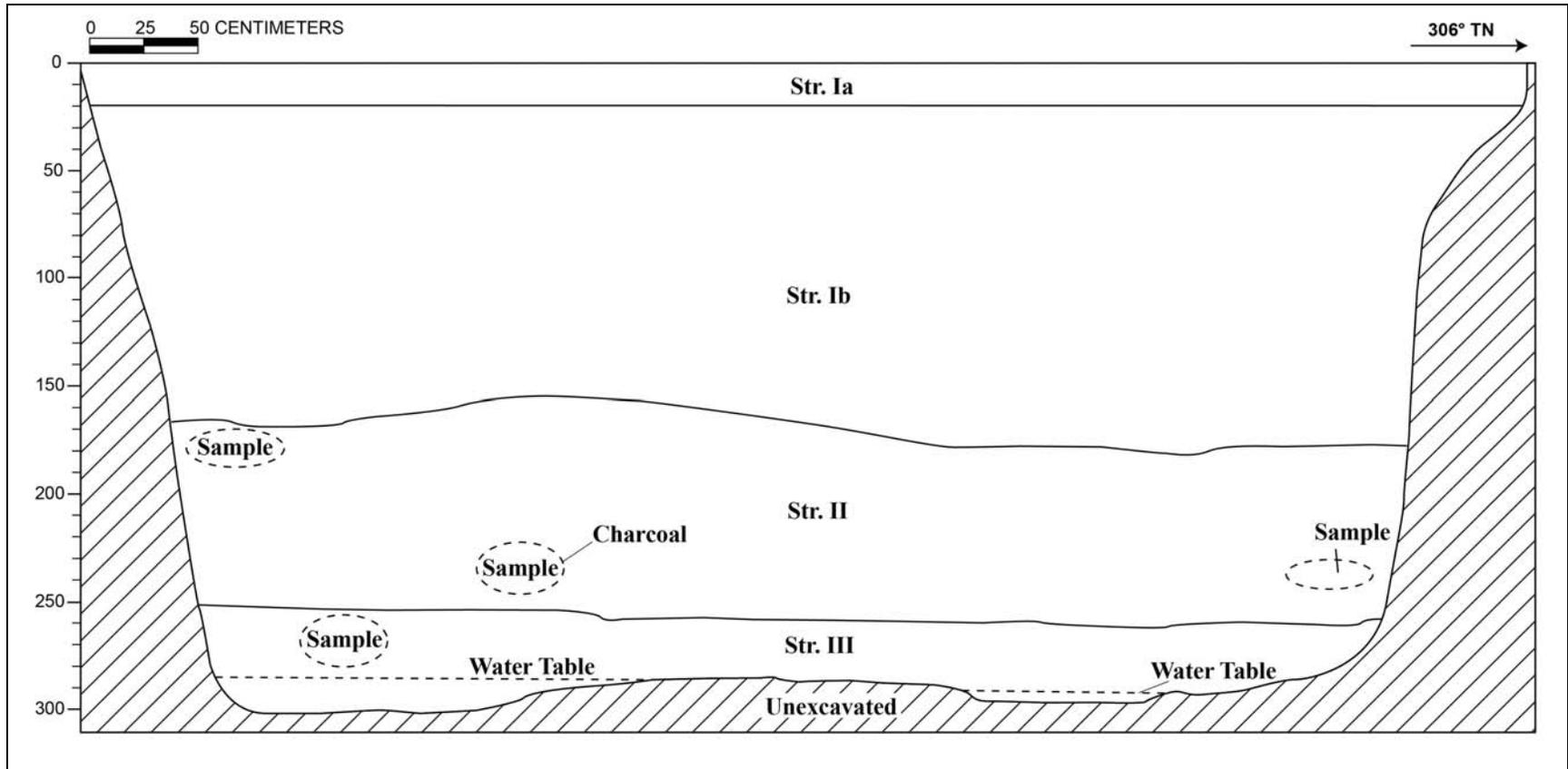
III) to the base of excavation. The stratigraphy generally conformed to the USDA soil designation of Ewa silty clay loam (EmA). The results of the analysis of bulk sediment samples indicated the presence of sparse cultural material within Strata II and III. EDXRF analysis of the volcanic glass from the sample of Stratum II at 2.36–2.53 mbs did not identify source, but confirmed it does not match sources from Hawai'i County. Wood taxa analysis of charcoal collected from the bulk sample of Stratum II at 2.30–2.34 mbs identified all native shrubs. The *pūkiawe* charcoal identified in this sample was submitted for radiocarbon analysis. The results of radiocarbon analysis yielded a calibrated 2-sigma date of AD 1480 to 1650 (95.4%). No archaeological cultural resources were identified in T-020A.



T-020A general location, view to the northwest



T-20A northwest profile, view to the west



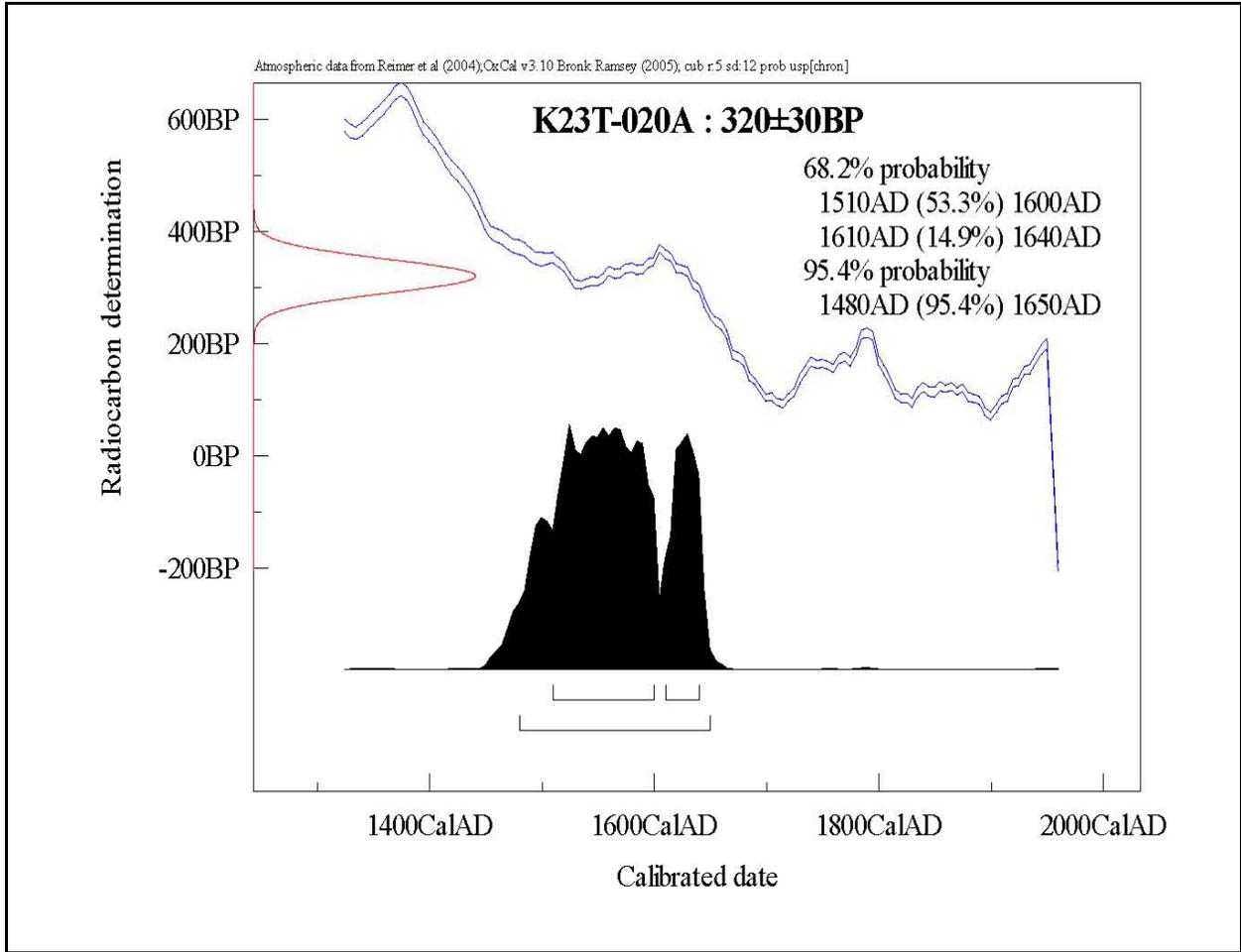
T-020A southwest profile

T-020A Stratigraphic Description

| Stratum | Depth (cmbs) | Description |
|---------|---------------|--|
| Ia | 0–20 | Asphalt/concrete |
| Ib | 20–155 | Fill; 10 YR 8/3 (very pale brown); very gravelly sand; single-grain; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; crushed coral |
| II | 155–250 | Natural; 10 YR 3/3 (dark brown); silty clay loam; moderate, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt lower boundary; two metal pipes; charcoal lens/band in the southeast end |
| III | 250–302 (BOE) | Natural; 2.5 Y 4/2 (dark grayish brown); silty clay loam; moderate, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; diffuse, smoother lower boundary; charcoal flecking, similar natural alluvial material to Stratum II |

T-20A Wood Taxa Identification Results

| Provenience | WIDL No. | Taxa | Common/Hawaiian Name | Origin/Habit | Part | Count | Weight (g) |
|--------------------------------------|----------|---------------------------------------|----------------------|--------------|------|-------|------------|
| T-020A: Stratum II (230–234 cmbs) | 1302-2 | <i>Styphelia tameiameaie</i> | <i>Pūkiawe</i> | Native/Shrub | Wood | 15 | 0.82 |
| | 1302-3 | cf. <i>Dodonaea viscosa</i> | 'A'ali'i | Native/Shrub | Wood | 19 | 2.42 |
| | 1302-4 | cf. <i>Osteomeles anthyllidifolia</i> | 'Ūlei | Native/Shrub | Wood | 7 | 0.06 |



T-20A Radiocarbon analysis results from charcoal collected from Stratum II at 2.30 to 2.34 mbs