

4.0 DESCRIPTION OF THE AFFECTED NATURAL ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

This section describes the existing conditions of the physical or natural environment, potential impacts of the proposed Līhuʻe Civic Center Site Improvements on the environment, and mitigation measures to minimize any impacts.

4.1 CLIMATE

4.1.1 Existing Conditions

The average annual temperature recorded for Līhuʻe ranges between a high of 81 degrees to a low of 70 degrees Fahrenheit. While January and February are generally the coolest months, August is the warmest. The average relative humidity recorded at Līhuʻe Airport is 67 percent in the middle of the afternoon and 83 percent in the early morning hours.

Surface winds are generally around 13 to 24 miles per hour from the northeast. There are some seasonal changes in prevailing wind direction in winter with southerly Kona winds. Strong winds occur at times in connection with storm systems moving through the area. Wind velocities and directions are influenced by the mountainous terrain to the south and west. Daily variations include diurnal effects of winds from the southwest quadrant during the night and morning hours, shifting to the northeast during the day.

Trade wind showers are relatively common and although heavy rains can occur, most of the showers are light and of short duration. The average annual rainfall at Līhuʻe Airport is 43 inches, three-fourths of which falls during the wet season from October through April. Normal precipitation in January, the wettest month, is nearly 6 inches, and in June, the driest month, averages 1.69 inches.

4.1.2 Potential Impacts and Mitigation

The proposed Līhuʻe Civic Center site improvements are not expected to have an impact on climatic conditions and no mitigation measures are planned.

4.2 GEOLOGY AND TOPOGRAPHY

4.2.1 Existing Conditions

The proposed project area is located south of Kālepa Ridge, an erosional remnant of lava of the original volcanic dome on Kauaʻi. It also forms with the Nonou Ridge, the eastern boundary of the Līhuʻe Depression, a collapsed caldera.

The rocks of Kālepa Ridge are part of the Nāpali formation of the Waimea Canyon volcanic series of the Pliocene age. The Nāpali formation rocks are gently dipping, thin flows of olivine basalt. Dikes are present in the Nāpali formation of the Kālepa Ridge but their effect on ground water is unknown. In general, these rocks are highly permeable and form an excellent source of groundwater.

Overlying the Nāpali formation and separated by an erosional unconformity are the rocks of the Kōloa volcanic series. These volcanic flows and ash deposits floor much of the Līhu'e Depression.

A topographic survey for the existing project site was performed by M&E Pacific, Inc. The topography of the Līhu'e Civic Center project site is relatively flat, ranging from 196 feet above mean sea level (msl) at the intersection of Rice Street and Kūhiō Highway, to 208 feet above msl at the intersection of Hardy Street and 'Umi Street.

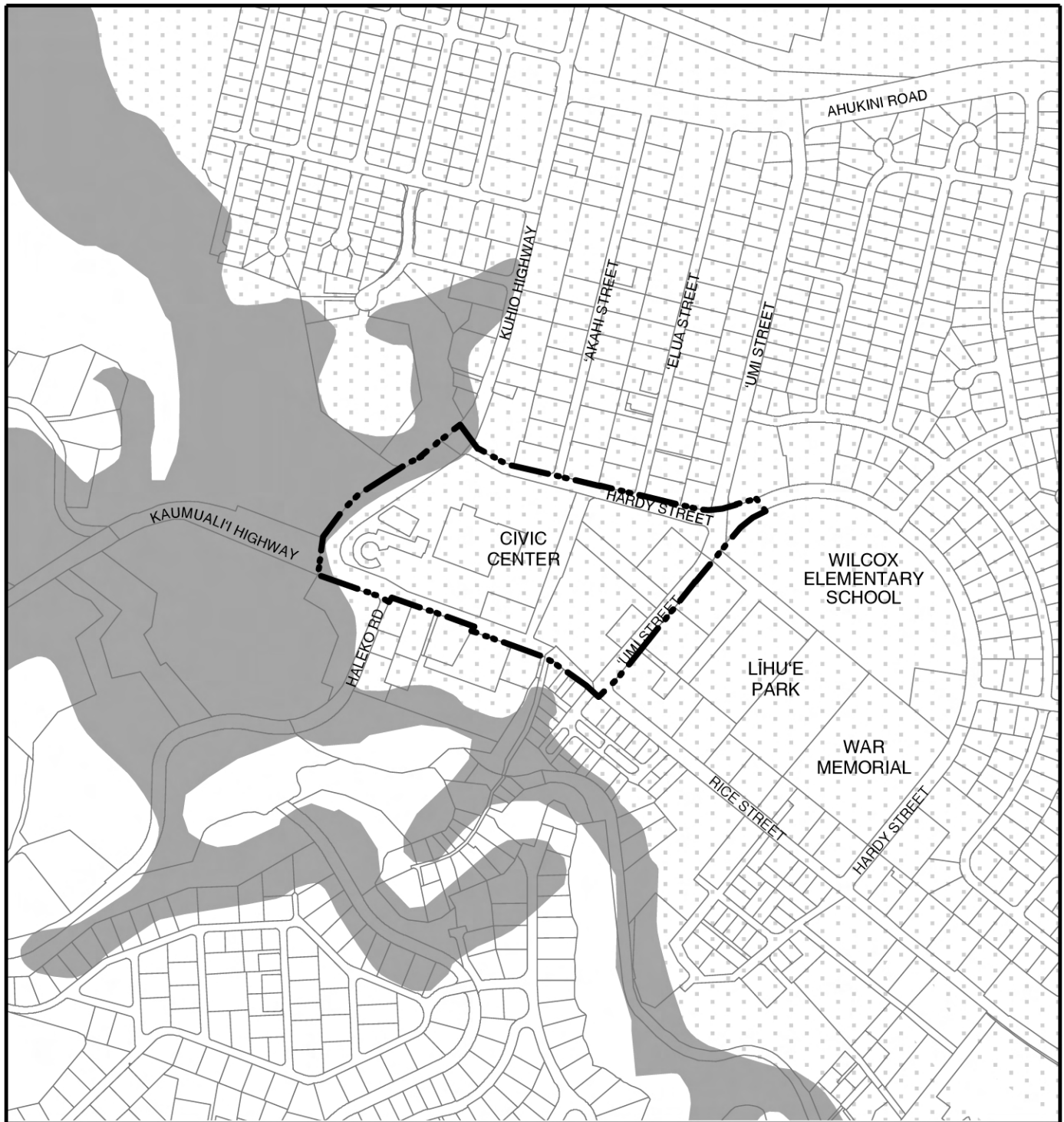
The greatest topographic change occurs along Kūhiō Highway where the topography rises from a low of 196 feet above msl at near Rice Street to a high of 206 feet above msl at Hardy Street (roughly five percent incline). Rice Street has a six percent slope between Kūhiō Highway and Halekō Road and then plateaus at 204 feet above msl from Halekō Road to 'Umi Street. Hardy Street runs flat at 208 feet above msl from Kūhiō Highway to 'Umi Street. Both 'Eiwa Street and 'Umi Street have a slight elevation change of four feet (204 to 208 feet above msl) as the streets go north from Rice Street to Hardy Street (less than one percent slope).

4.2.2 Potential Impacts and Mitigation

The site already has been extensively modified by urban improvements related to the Civic Center as well as the previous shopping center use. Construction will occur in previously disturbed areas and therefore no significant impacts are anticipated. The majority of the proposed Līhu'e Civic Center Site Improvements will require minor grading except for the construction of the underground parking structures which will require major excavation. Throughout construction, appropriate engineering, design and construction measures will be undertaken to minimize potential soil erosion. No significant grading will occur near any of the historic buildings. All ground-altering activity will be conducted in accordance with the Kaua'i County Code. Adverse impacts to landforms and topography associated with grading are not anticipated.

4.3 SOILS

There are three studies prepared for Hawai'i soils whose principal focus has been to describe the potential for agricultural production. They are: 1) the US Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey, 2) the University of Hawai'i Land Study Bureau (LSB), and 3) the State Department of Agriculture (DOA) Agricultural Lands of Importance to the State of Hawai'i (ALISH).



LEGEND

Soil Types

□ HnA: HANAIEI Silty Clay, 0-2% Slopes

□ LhB: LIHUE Silty Clay, 0-8% Slopes

■ rRR: Rough Broken Land

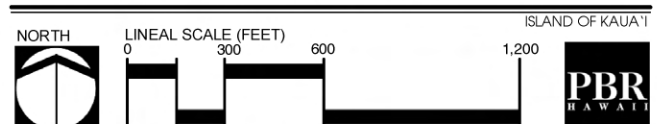
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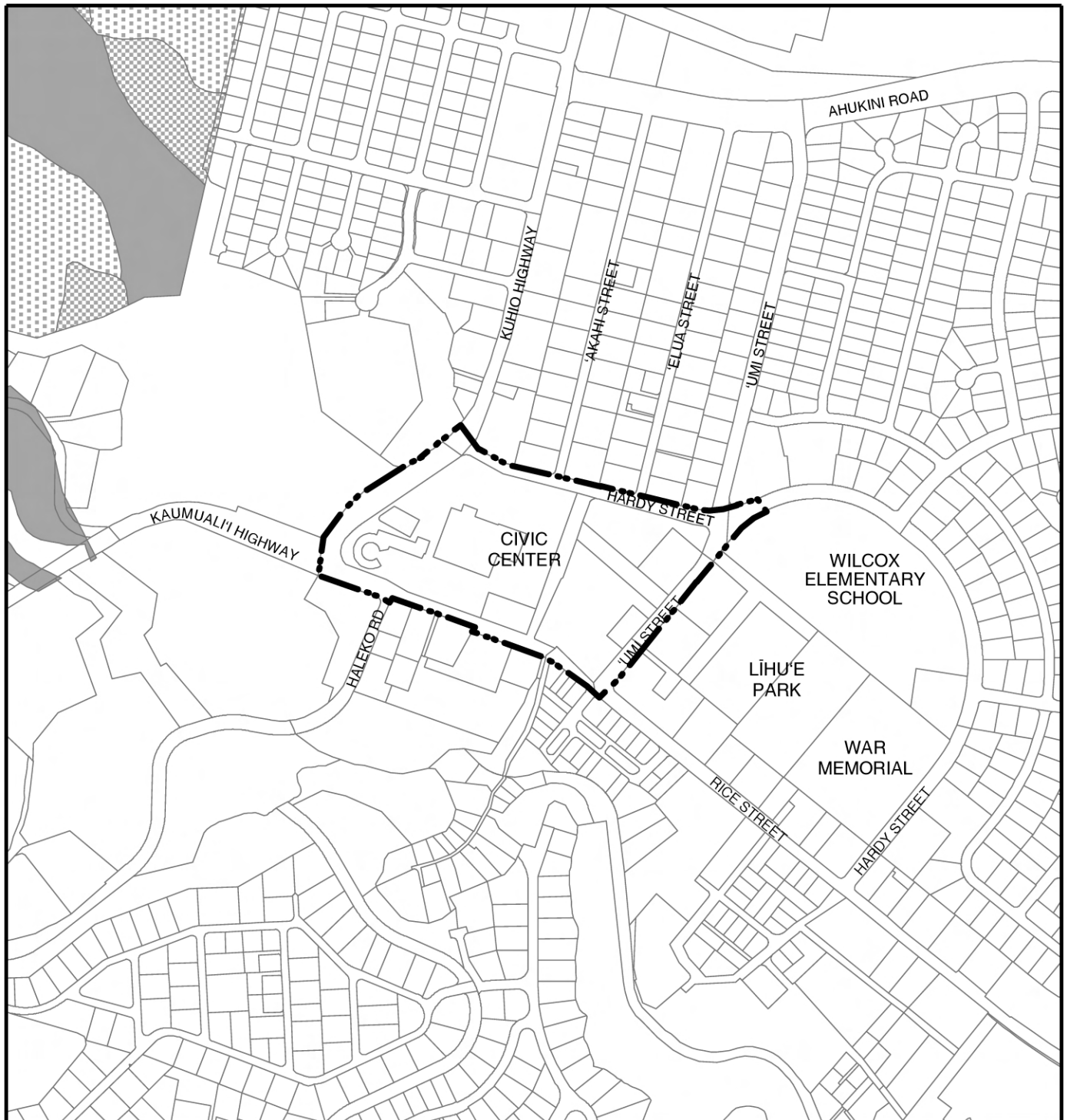
Source:
U.S. Soil Conservation Service (1972)

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Figure 13
Soil Conservation Service Soil Survey Map

LIHUE CIVIC CENTER SITE IMPROVEMENTS





LEGEND

Agricultural Land Productivity Ratings

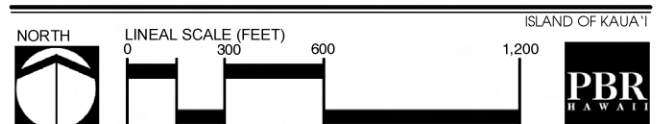
- A (Excellent)
- B (Good)
- C (Fair)
- D (Poor)
- E (Very Poor)
- Not classified
- Project Bounds

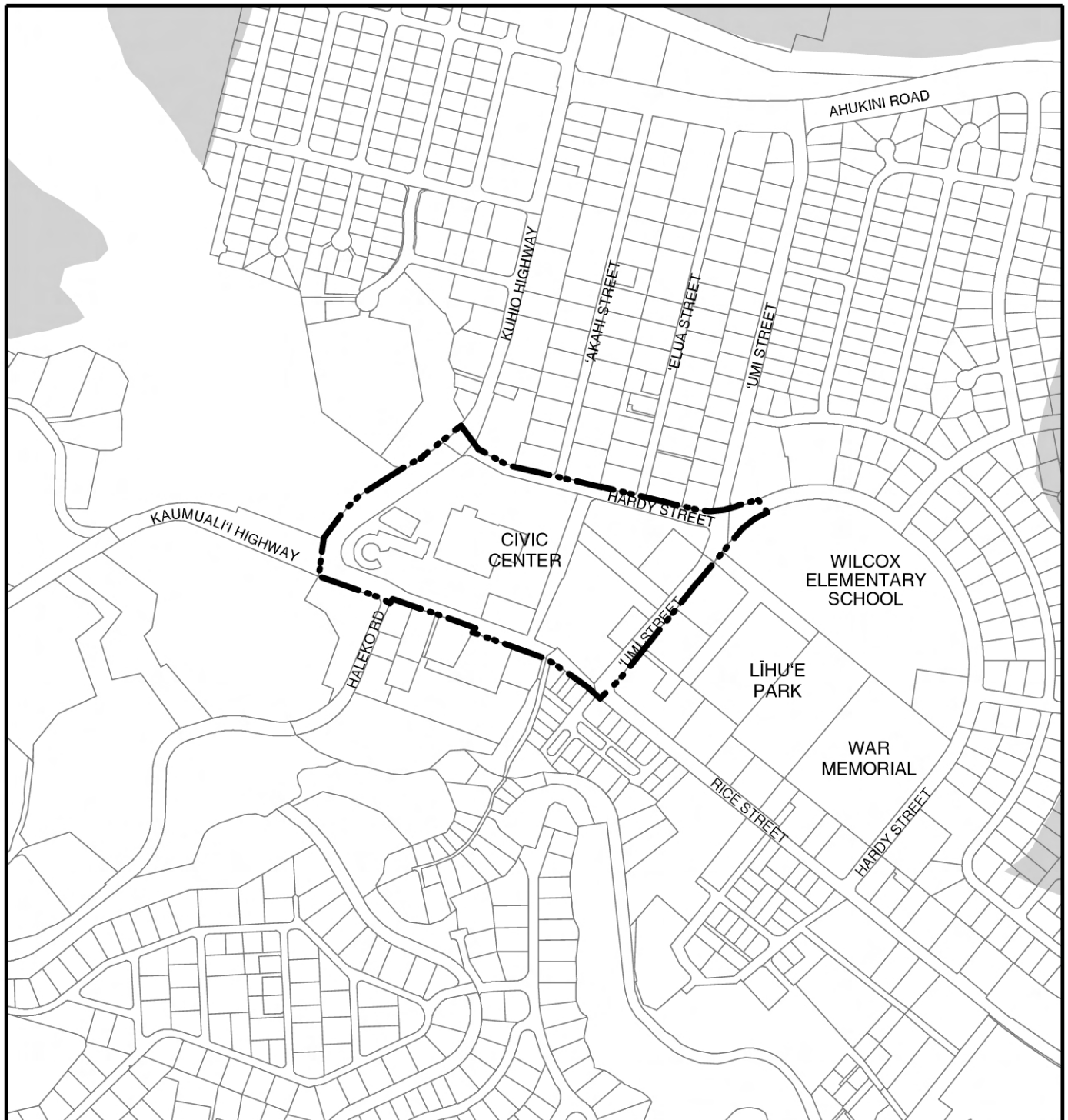
Source:
Land Study Bureau (1967)

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Figure 14
Land Study Bureau



LĪHUE CIVIC CENTER SITE IMPROVEMENTS





LEGEND

ALISH Types

-  Prime ALISH Lands
-  Not classified

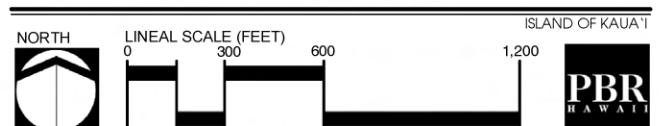
-  Project Bounds

Source:
State Department of Agriculture (1977)
State of Hawaii GIS Database (2002)

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Figure 15
Agricultural Lands of Importance to
the State of Hawai'i (ALISH)

LĪHU'E CIVIC CENTER SITE IMPROVEMENTS



4.3.1 Soil Conservation Service Soil Survey

The SCS Soil Survey shows that the soils beneath the Līhu'e Civic Center are soils from the Līhu'e-Puhi Association, characterized by deep, nearly level to steep, well-drained soils that are found on uplands and have a fine-textured or moderately fine-textured subsoil. The soils specific to the project site are Līhu'e Silty Clay, with zero to 8 percent slopes (LhB) (Figure 13). This soil typically has a dusky-red strongly acid silty clay surface layer that is about twelve inches thick with 48-inch thick slightly acid to neutral dark-red and dark reddish-brown compact silty clay subsoil with subangular blocky structure. The substratum consists of soft, weathered rock. The soil is primarily found on tops of broad interfluvies in the uplands. This soil has moderately rapid permeability, slow runoff and no more than slight erosion hazard. The soil has an available water capacity that is about 1.5 inches per foot of soil. The soil is primarily used for cultivation of sugarcane, pineapple, truck crops or orchards, pasture, wildlife habitat and homesites. The capability classification is IIe, irrigated or non-irrigated. Class II soils have moderate limitations that reduce the choice of plants or require conservation. The subclass is "e," meaning the soil is subject to moderate erosion if it is not cultivated or protected by ground cover.

Along Kūhiō Highway, the bluff is classified as Rough Broken Land (rRR). This soil type consists of very steep land broken by numerous intermittent drainage channels. It occurs in gulches, as in this instance, and erosion is active. The mapping of these areas included areas of colluviums and alluvium along gulch bottoms. This land type is used primarily for watershed and wildlife habitat.

4.3.2 Land Study Bureau Detailed Land Classification

The University of Hawai'i Land Study Bureau (LSB) document titled Detailed Land Classification, Island of Kaua'i, classifies non-urban land by a five-class productivity rating system, using the letters A, B, C, D and E, where "A" represents the highest class of productivity and "E" the lowest. Because the project site is located on urbanized lands, it is unclassified according to the LSB rating system (Figure 14).

4.3.3 Agricultural Lands of Importance to the State of Hawai'i

The State of Hawai'i Department of Agriculture's Agricultural Lands of Importance to the State of Hawai'i (ALISH) system rates agricultural land as "Prime," "Unique" or "Other." The remaining land is not classified.

"Prime" agricultural land is best suited for production of food, feed, forage and fiber crops. The land has the soil quality, growing season and moisture supply necessary to economically sustain high yields of crops when treated and managed including water management, according to modern farming methods.

"Unique" agricultural land can be used for specific high-value food crops. The land has a special combination of soil quality, growing season, temperature, humidity, sunlight, air drainage, elevations, aspect, moisture supply, or other conditions that

favor the production of a specific crop of high quality and/or high yield when the land is treated and managed according to modern farm methods.

“Other” agricultural land is vital to production of food, feed, fiber and forage crops, yet they exhibit properties that are not ideal, such as seasonal wetness, erosion, limited rooting zone, slope, flooding, or drought. The land can be farmed satisfactorily through greater fertilization and other soil amendment, drainage improvement, erosion control practices, and flood protection and can produce fair to good crop yields when properly managed.

According to the ALISH system, the proposed Līhu'e Civic Center Site Improvements area is not classified and therefore, not considered important agricultural land (Figure 15).

4.3.4 Potential Impacts and Mitigation

Implementation of the proposed Līhu'e Civic Center Site Improvements Master Plan is not expected to impact soils with agricultural significance since they are located in an existing urbanized area and do not contain soils of agricultural value.

Construction will involve land disturbance, including removal of existing asphaltic pavement, installation of landscaping, and grading. Excavation will be required where the proposed underground parking structures are located. Impacts to the soils of the proposed Līhu'e Civic Center Site Improvements include the removal of excavated material and the generation of dust during construction. Implementation of the proposed improvements will be conducted in full compliance with dust and erosion control and other requirements of the County of Kaua'i. Best management practices (BMPs) to mitigate any dust and/or silt will be included in the construction plans. As typically required for projects on land greater than one acre in size, a National Pollutant Discharge Elimination System (NPDES) Notice of General Permit Coverage (NGPC) for Storm Water Associated with Construction Activity will be necessary. No improvements are recommended along Kūhiō Highway where the bluff has potential erosion hazards. However, if the County decides to pursue the construction of a parking structure along this bluff, geological and engineering studies should be conducted to see if it would be feasible, safe, and cost-effective.

4.4 NATURAL HAZARDS

4.4.1 Existing Conditions

Natural hazards impacting the Hawaiian Islands include flooding, tsunami inundation, hurricanes, volcanic eruptions, and earthquakes. According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, the project area is located in Zone X and is outside of the 500-year flood plain. This is an area with a minimal chance of flooding (less than 0.2% annual chance) (Figure 16).



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

FLOODWAY AREAS IN ZONE AE
Base Flood Elevations determined.

OTHER FLOOD AREAS

ZONE X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
Areas determined to be outside the 0.2% annual chance floodplain.

513 Base Flood Elevation line and value; elevation in feet*

* Referenced to the National Geodetic Vertical Datum of 1929

Cross section line

Transect line

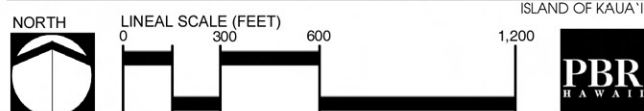
Project Bounds

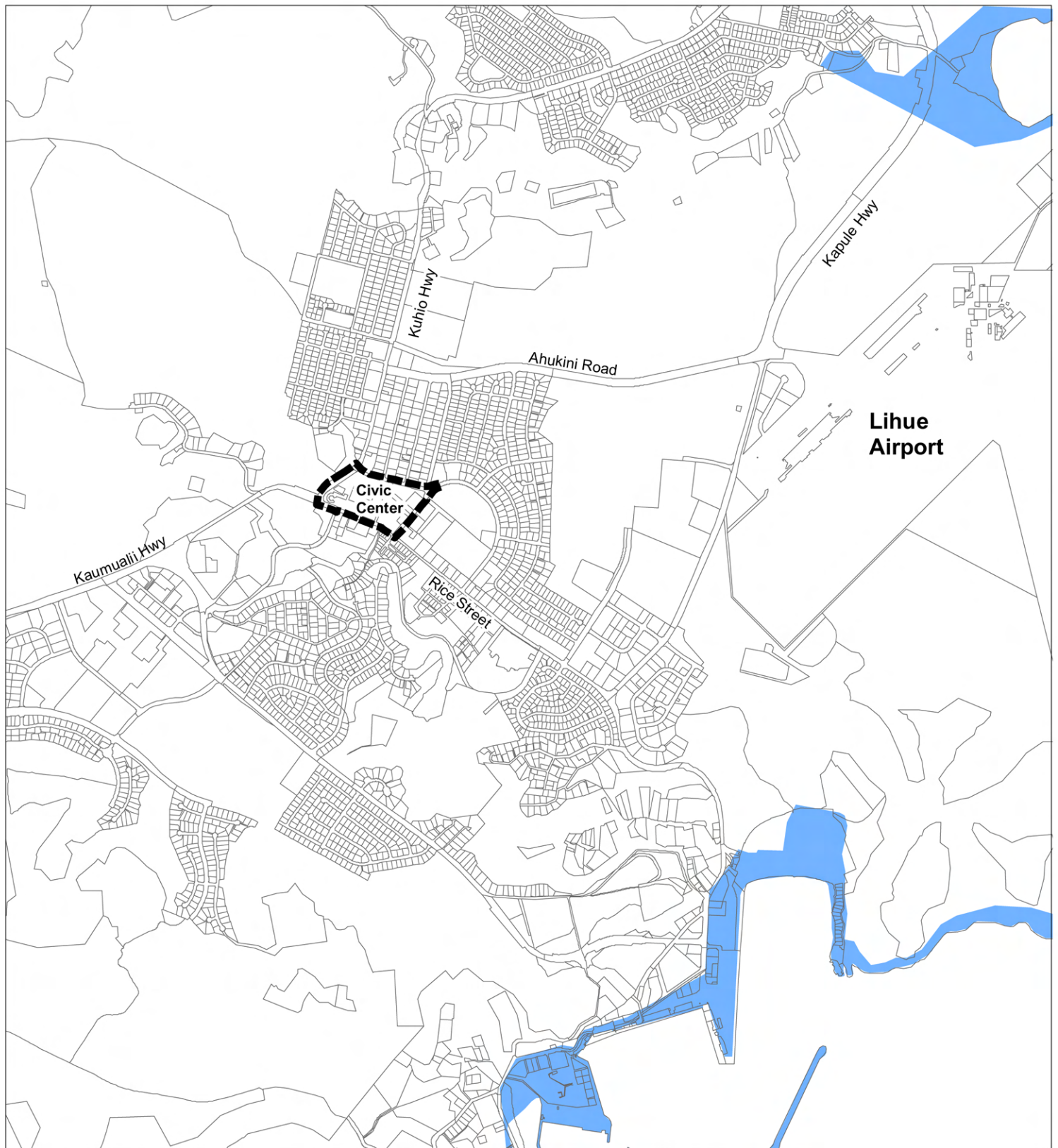
Source:
FEMA Flood Insurance Rate Map
(Panel No. 150002 0326E, 2005)

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Figure 16
Flood Insurance Rate Map

LIHU'E CIVIC CENTER SITE IMPROVEMENTS



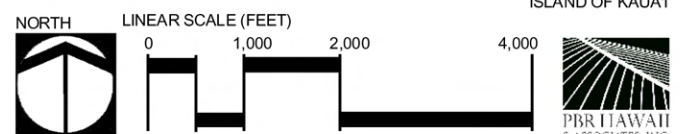


Legend

- Project Bounds
- Iniki Overwash Boundary
- Tsunami Evacuation Zone

Figure 17
Tsunami Evacuation Zone
& Hurricane 'Ini'ki Overwash Boundary
LIHUE CIVIC CENTER
SITE IMPROVEMENTS

Source: Pacific Disaster Center (1998); Aerial Photographs taken shortly after Hurricane Iniki
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ISLAND OF KAUAI

The tsunami evacuation zone is located far to the east and makai of the proposed Lihu'e Civic Center Site Improvements area. There was no hurricane overwash recorded in the area after Hurricane 'Iniki since Lihu'e is located on a plateau above coastal areas. (See Figure 17.) Much of the damage due to the hurricane overwash was recorded in low-lying coastal areas in Wailua and Kapa'a and along the southern coast of the island.

Since 1980, two hurricanes have had a devastating effect on Kaua'i. They were Hurricane Iwa in 1982 and Hurricane 'Iniki in 1992. While it is difficult to predict such natural occurrences, it is reasonable to assume that future incidents are likely, given historical event. However, the threat of such hazard is no greater for the proposed project site than any other location on Kaua'i.

Volcanic hazard is considered minimal due to the extinct status of the volcanoes comprising Kaua'i.

In Hawai'i, most earthquakes are linked to volcanic activity, unlike other areas where a shift in tectonic plates is the cause of an earthquake. Each year, thousands of earthquakes occur in Hawai'i, the vast majority of which are so small they are detectable only with highly sensitive instruments. The threat of an earthquake to the Lihu'e Civic Center Site Improvements area is no greater than any other location on Kaua'i.

4.4.2 Potential Impacts and Mitigation

The proposed Lihu'e Civic Center Site Improvements will not exacerbate any natural hazard conditions. The project site is located outside the 500-year floodplain and outside of the tsunami evacuation zone. The hurricane overwash boundary recorded after 'Iniki did not encroach upon Lihu'e. Flooding tends to have less of an impact on the Lihu'e Civic Center area since it is located on the top of a plateau. Should there be a hurricane, the potential impact of destructive winds and torrential rainfall will be mitigated through compliance with the Uniform Building Code. All structures will be constructed in consideration of the possibility of earthquake occurrence, in compliance with County building codes and design standards.

4.5 FLORA

4.5.1 Existing Conditions

In front of the Historic County Building at the County Lawn are the historic double rows of royal palms. The palms are estimated to have been there since the 1930s when they once lined the dirt road leading up to the Historic County Building. However, several palms have been removed over the years due to wind damage and age. Around the edge of the County Lawn are several large monkey pod trees. The rest of the eastern block has a mix of trees such as plumeria, autograph, mango, Poinciana, monkey pod, kukui, banyan, coconut, and a variety of palms including

Chinese fan palm, manila and areca. There are also small shrubs and hedges including a hibiscus hedge near the State Office Building and several grassy areas around the buildings and parking lots.

On the western block where the Mo'ikeha and Pi'ikoi Buildings are located, the majority of the existing site is covered with impermeable surfaces—buildings and asphalt. There is very little vegetation. There are two small Japanese gardens fronting the County buildings and bougainvillea plants dot the parking lots facing Hardy and 'Eiwa Streets. There is a single paperbark tree in the parking lot facing Hardy Street. Mock orange hedges front Hardy and 'Eiwa Streets with wedelia in planter beds. At the intersection of Rice Street and Kūhiō Highway, the slope below the Mo'ikeha Building has been landscaped with loulu, areca and Alexander palms, red ginger, bougainvillea, and wedelia. Kou trees have been planted along a narrow planting strip on Rice Street and the pedestrian path between the Pi'ikoi and Kapule Buildings but are struggling. There are also plumeria trees at the entrance of the Mo'ikeha Building with a mix of shrubs in the buildings atrium including raphis palms. Along Kūhiō Highway, parrot beak heliconia, wedelia and jatropa line the sidewalk.

4.5.2 Potential Impacts and Mitigation

Overall, the flora at the Civic Center is a mix of alien and introduced species with a few natives like the loulu, kou, and kukui recently planted. Besides the County Lawn, there is no coordinated landscaping design or theme. The Lihu'e Civic Center Site Improvements Master Plan recommends preserving the large specimen trees like the monkey pods at the County Lawn and others within the historic district. The existing canopy trees that will be preserved are shown as lighter yellow-green trees in the master plan (Figure 1).

The master plan also recommends replacing the missing royal palm trees at the County Lawn and checking the health of the remaining trees to see if replacement of any of the remaining trees is also necessary. While the master plan will be removing some of the existing vegetation, it proposes adding more parks and open space with canopy trees shading pedestrian paths, parking areas and outdoor spaces. It recommends using native plants and plants significant to Lihu'e and Kaua'i. With the added open spaces, over 2.4 acres of impermeable surfaces will be replaced with green, open spaces, reducing the heat island effect and reducing stormwater runoff. The landscape will become more coordinated and welcoming, encouraging workers, residents and visitors to enjoy the outdoor areas of the Civic Center.

4.6 FAUNA

4.6.1 Existing Conditions

Although no formal study of mammalian and avian species has been conducted for this highly urbanized area, it is expected that the species found in the vicinity of the

subject property and surrounding areas are typical of species found in urban Līhu'e. Feral mammals typically include cats, rats, and mice. Common bird species include doves, mynas, sparrows, cattle egrets, Japanese white-eyes, and chickens. The migratory Pacific Golden-Plover or Kōlea (*Pluvialis fulva*) are also known to frequent the area. Newell shearwaters, a threatened species, are also known to fly over Līhu'e between nesting areas in the mountains and foraging areas at sea, and can sometimes become disoriented by urban lights at night. The native Hawaiian Hoary Bat or Opa'epa'e (*Lasiurus cinereus semotus*), which is endangered on all islands except Kaua'i, may also be found in the area due to the project's proximity to 'Alekoko (the Menehune Fish Pond) and Hule'ia National Wildlife Refuge. They are known to frequent open wet areas near forests on Kaua'i and forage near towns and agricultural fields.

4.6.2 Potential Impacts and Mitigation Measures

Because the existing site is already highly urbanized, no significant impact to fauna resources are expected since the proposed uses will be the same. The increase in open space and landscaping may improve conditions for some avian species such as the Kōlea which is attracted to open grassy areas and lawns.

Because Newell's shearwaters are known to fly over the area and can be distracted by outdoor lighting, the proposed improvements will minimize potential impacts to these birds by requiring that all new outdoor lighting fixtures be shielded and pointed downwards. Lighting fixtures approved by the International Dark-Sky Association (IDA) are recommended and can be found at their website: www.darksky.org/lighting.

The following guidelines will be followed in selecting and designing any outdoor lighting:

- All outdoor lights including parking lot lights, landscaping, security, path and deck lights should be fully shielded, full cutoff luminaries.
- Complete avoidance of all outdoor up-lighting for any purpose.
- Avoidance of tree-mounted lights unless they are fully shielded and pointing down towards the ground or shining into dense foliage. Ensure compliance over time.
- Complete avoidance of up-lighting and unshielded lighting in water features such as fountains and ponds.

No special mitigation measures are recommended for the Hawaiian Hoary Bat since none of the proposed improvements are expected to impact them. They are already found in the existing environment and none of the proposed changes are expected to significantly affect their use of the area.