

BOTANICAL AND FAUNA SURVEYS

PILANI PROMENADE PROJECT

KIHEI, MAUI, HAWAII

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BOTANICAL AND FAUNA SURVEY THE PI'ILANI PROMENADE - KIHAI, MAUI

INTRODUCTION

The Pi'ilani Promenade Project lies on approximately 88 acres of undeveloped land in upper Kihei, Maui TMK's (2) 3-9-01:16 (see Figure 5). On its lower edge is Pi'ilani Highway. On its northern edge are commercially zoned properties. Its east and south edges border pasture lands of Ka'ono'ulu Ranch. Two small parcels TMKs (2) 3-9-48:122 & (2) 3-9-01:148 which together comprise 32,185 sq. ft. are situated on the lower edge of Pi'ilani Highway and are to be incorporated into highway improvements. This survey was initiated by the owners in fulfillment of environmental requirements of the planning process.

SITE DESCRIPTION

The project area was formerly a dry, seasonal pasture situated on gently sloping lands above the coastal plain in north Kihei. Elevations range from 15 feet along Pi'ilani Highway up to 220 feet on the top of the project. One large, rocky gulch, Kūlanihako'i, runs just south of the project area, and one small, unnamed gully runs through the project. Soils are all classified as Waiakoa Extremely Stony Silty Clay Loam, eroded (WID2) which is a light brown, well-drained soil with extensive surface rock (Foote et al, 1972). Rainfall averages a scant 8 – 10 inches per year, in this driest part of Maui (Armstrong, 1983). The vegetation consists of dry Savannah with scattered kiawe trees (*Prosopis pallida*) and an extensive, sparse grassland of buffelgrass (*Cenchrus ciliaris*).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Pi'ilani Promenade Project which was conducted in July 2013. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BIOLOGICAL HISTORY

Originally this area would have been a dry native forest/shrubland with such trees as wiliwili (*Erythrina sandwicensis*), 'ohe makai (*Reynoldsia sandwicensis*) and hao (*Rauvolfia sandwicensis*), shrubs such as 'a'ali'i (*Dodonaea viscosa*), ma'o (*Gossypium tomentosum*), 'ilima (*Sida fallax*) and grasses and vines such as pili (*Heteropogon contortus*), kalamalō (*Eragrostis deflexa*), huehue (*Cocculus orbiculatus*) and 'āwikiwiki (*Canavalia pubescens*).

For the past 150 years this area has been grazed by livestock, usually seasonally, following winter rains when the vegetation responds with a flush of growth. This land use has resulted in the gradual loss of native plants species and their replacement with hardy pasture grasses and weeds. During the past 40 years two other environmental disturbances have influenced conditions on the property. Introduced axis deer (*Axis axis*) have built up sizeable herds within this part of Maui. These animals are able to access steeper sites than cattle and have eliminated additional species of native plants. Also fires have swept through this area a number of times over the years. Charred stumps were encountered throughout the property. Fires, over time, eliminate species not adapted to this type of catastrophic environmental disturbance.

Today few plants species occur on the property and those that do tend to dominate. Few of these are native.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure maximum coverage of the many areas of this large property. Areas most likely to harbor native or rare plants such as gulches or rocky outcroppings were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation on this large property was dominated by just two species: kiawe (*Prosopis pallida*) and buffelgrass (*Cenchrus ciliaris*). These two species make up more than 95% of the plant cover. The kiawe trees create an open woodland across the entire property with denser growth along the rocky gully. The buffelgrass forms an almost uniform grassland under and between the trees. All other plant species were uncommon to rare on the property. Small parts of the property had no vegetation only bare patches of soil and surface stones.

A total of 10 species of plants were recorded during the survey. Of these 2 were native Hawaiian species, 'ilima (*Sida fallax*) and 'uhaloa (*Waltheria indica*). Both are indigenous to Hawaii as well as other countries and both are widespread and of common occurrence in Hawaii.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project is dominated by just two non-native plant species, kiawe and buffelgrass. The two native Hawaiian plant species recorded, 'ilima and 'uhaloa, although of uncommon or rare occurrence on the property, are widespread and common in Hawaii in general.

No Federally listed Endangered or Threatened native plants (USFWS, 2013) were encountered during the course of the survey nor were any species that are candidate for such status seen. No special habitats or rare plant communities were seen on the property, although there is a large protected reserve three to four miles up-slope near Pu'u o Kali containing some Endangered dryland plant species.

Because the vegetation is dominated by non-native plants, and no rare or protected species occur on or adjacent to the property, there is little of botanical concern and the proposed land uses are not expected to have a significant negative impact on the botanical resources in this part of Maui.

Because much of Kihei is a flood plain and because the soils on the property are subject to erosion, it is recommended that during any land clearing work special care be taken to use accepted contouring and terracing techniques to avoid significant soil runoff.

It is also recommended that native dryland plants known to occur in this area be incorporated into the landscape design of the completed project. The Maui County Planting Plan can be consulted for ideas.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:

endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.

indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

non-native = all those plants brought to the islands intentionally or accidentally after western contact.

Polynesian = all those plants brought to the islands by the Hawaiians during the course of their migrations.

4. Abundance of each species within the project area:

abundant = forming a major part of the vegetation within the project area.

common = widely scattered throughout the area or locally abundant within a portion of it.

uncommon = scattered sparsely throughout the area or occurring in a few small patches.

rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
POACEAE (Grass Family)			
<i>Cenchrus ciliaris</i> L.	buffelgrass	non-native	abundant
<i>Eragrostis pectinacea</i> (Michx.) Nees	Carolina lovegrass	non-native	rare
DICOTS			
AMARANTHACEAE (Amaranth Family)			
<i>Amaranthus spinosus</i> L.	spiny amaranth	non-native	rare
EUPHORBIACEAE (Spurge Family)			
<i>Ricinus communis</i> L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
<i>Acacia farnesiana</i> (L.) Millsp.	klu	non-native	uncommon
<i>Desmanthus pernambucanus</i> (L.) Thellung	slender mimosa	non-native	rare
<i>Leucaena leucocephala</i> (Lamarck) de Wit	koa haole	non-native	uncommon
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth	kiawe	non-native	common
MALVACEAE (Mallow Family)			
<i>Sida Fallax</i> Walp.	'ilima	indigenous	rare
<i>Waltheria indica</i> L.	'uhaloa	indigenous	uncommon

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Four non-native mammal species were observed in the project area during two site visits. Taxonomy and nomenclature follow Tomich (1986).

The axis deer (*axis axis*) was abundant throughout the area. These herbivores spend the day bedded down in secluded areas, then come out during the evening to feed under cover of darkness. While not seen, their tracks, droppings and antler rubbings were everywhere.

Signs of domestic cats (*Felis catus*) and dogs (*Canis familiaris*) were seen sporadically. Old cattle (*Bos Taurus*) droppings were seen from former grazing in this area.

Other mammals that likely occur on the property, but which were not seen, include rats (*Rattus* spp.), mice (*Mus domesticus*) and mongoose (*Herpestes auropunctatus*). Rats and mice feed on seeds and herbaceous vegetation and mongoose hunt for the rodents as well as birds.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey on two areas of the property. These bats are known to occur sporadically across much of Maui.. When present in an area they can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. In addition an electronic bat detector (Batbox IIID) was employed, set to the frequency of 27,000 Hertz that these bats are known to emit when echolocating for nocturnal flying insect prey. No bats were detected at either location using this device.

BIRDS

Birdlife was rather sparse in this dry habitat with few food resources. Seven species of birds were seen during two site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2013). Two non-native bird species were of common occurrence: the zebra dove (*Geopelia striata*) and the gray francolin (*Francolinus pondicerianus*). The other five species were of uncommon to rare occurrence.

One flock of six nēnē or Hawaiian geese (*Branta sandvicensis*) were seen flying south above the project area. These endemic and Endangered geese are powerful and wide-ranging fliers that are capable of reaching anywhere on the island within an hour in their search for water and succulent herbaceous vegetation resources. They did not come from or land on the project area as there are no habitats or resources here to attract them. They were observed for about three minutes at which point they had covered about two miles and disappeared from sight.

A few other non-native birds could occasionally visit this project area such as the house finch (*Carpodacus mexicanus*), African silverbill (*Lonchura cantans*), nutmeg mannikin (*Lonchura punctulata*), northern cardinal (*Cardinalis cardinalis*), Japanese white-eye (*Zosterops japonicus*) and the northern mocking bird (*Mimus polyglottos*) although none of these were seen.

The habitat is also unsuitable for Hawaii's native forest birds which are presently restricted to higher elevation native forests beyond the range of mosquitoes and the deadly avian diseases they carry and transmit.

INSECTS

Insect life was sparse throughout the project area. Just six insect species were observed in five Orders. Taxonomy and nomenclature follow Nishida et al (1992). Two species were found to be common, the blowfly (*Lucilia sericata*) and the globe skimmer dragonfly (*Pantala flavescens*). The other four species were all rare. The two dragonfly species, the globe skimmer and the green darner (*Anax junius*) are native species. Both are indigenous and common throughout Hawaii and are also found in other parts of the world.

One native sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth is known to occur in parts of East Maui and Central Maui. Its native host plants are species of 'aiea (*Nothocestrum* spp.) and non-native alternative host plants are tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). None of these plants were found on the property, and no Blackburn's sphinx moth or their larvae were seen.

CONCLUSIONS AND RECOMMENDATIONS

Diversity of species in this project area was generally low with just a few species dominating the landscape. Axis deer were abundant and zebra doves, gray francolins, blow flies and the globe skimmer dragonfly were common. This pattern mirrors the situation in the plant life with low diversity and just two hardy species dominating. This lack of species has resulted from the inordinate grazing pressure of deer and cattle, the effects of periodic wildfires and several years of severe drought that has plagued leeward Maui. Only the hardiest species are able to survive.

The two native dragonfly species are both widespread and common in Hawaii as well as in other parts of the world and are of no special conservation concern.

The sighting of six Endangered nēnē geese flying over the project area was recorded in the inventory, but has to be considered tangential in nature and not an indication of use of this habitat by these birds. There are no food or water resources that would lure these birds to feed or rest here.

No Hawaiian bats were recorded on the project area. These bats are wide ranging and opportunistic to spikes in insect activity. The general lack of insect food resources here does not promote the use of this habitat by these bats.

No Blackburn's sphinx moths or their larvae were found. The total lack of their required host plant species on the project area effectively prohibits their use of this habitat.

No native bird species were found on the property during two site visits and none are to be expected in this habitat. Nonetheless, there are native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell's shearwater (*Puffinus newelli*) that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury, vehicle strikes and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds.

No other issues are anticipated with wildlife species.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within three groups: Mammals, Birds and Insects. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:

endemic = native only to Hawaii; not naturally occurring anywhere else in the world.

indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

migratory = all species that spend part of their annual life cycle in Hawaii and part of it elsewhere. Migrant birds typically spend their spring and summer months breeding in the arctic and their fall and winter months in Hawaii.

non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

abundant = many flocks or individuals seen throughout the area.

common = a few flocks or well scattered individuals throughout the area.

uncommon = only one flock or several individuals seen within the project area.

rare = only one or two seen within the project area.

SCIENTIFIC NAME

COMMON NAME

STATUS

ABUNDANCE

MAMMALS

Axis axis Erxleben

axis deer

non-native

abundant

Felis catus L.

domestic cat

non-native

rare

Canis familiaris L.

domestic dog

non-native

rare

Bos taurus L.

domestic cattle

non-native

rare

BIRDS

Geopelia striata

zebra dove

non-native

common

Francolinus pondicerianus Gmelin

gray francolin

non-native

common

Streptopelia chinensis Scopoli

spotted dove

non-native

uncommon

Acridotheres tristis L.

common myna

non-native

uncommon

Branta sanvicensis Vigors

nēnē, Hawaiian goose

endemic

rare

Zenaida macroura L.

mourning dove

non-native

rare

Francolinus francolinus L.

black francolin

non-native

rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order DIPTERA - flies			
CALLIPHORIDAE (Blow Fly Family)			
<i>Lucilia sericata</i> Meigen	blow fly	non-native	common
Order HETEROPTERA - true bugs			
APHIDIDAE (Aphid Family)			
<i>Aphis craccivora</i> Koch	cowpea aphid	non-native	rare
Order LEPIDOPTERA - butterflies & moths			
PAPILIONIDAE (Swallowtail Butterfly Family)			
<i>Papilio xuthus</i> L.	Asian swallowtail	non-native	rare
Order ODONATA)dragonflies & damselflies			
AESHNIDAE (Darner Dragonfly Family)			
<i>Anax junius</i> Drury	green darner	indigenous	rare
LIBELLULIDAE (Skimmer Dragonfly Family)			
<i>Pantala flavescens</i> Fabricius	globe skimmer	indigenous	common
Order ORTHOPTERA - grasshoppers & crickets			
ACRIDIDAE (Grasshopper Family)			
<i>Oedaleus abruptus</i> Thunberg	short-horned grasshopper	non-native	rare



Figure 1. Project Area – view south from northeast corner.

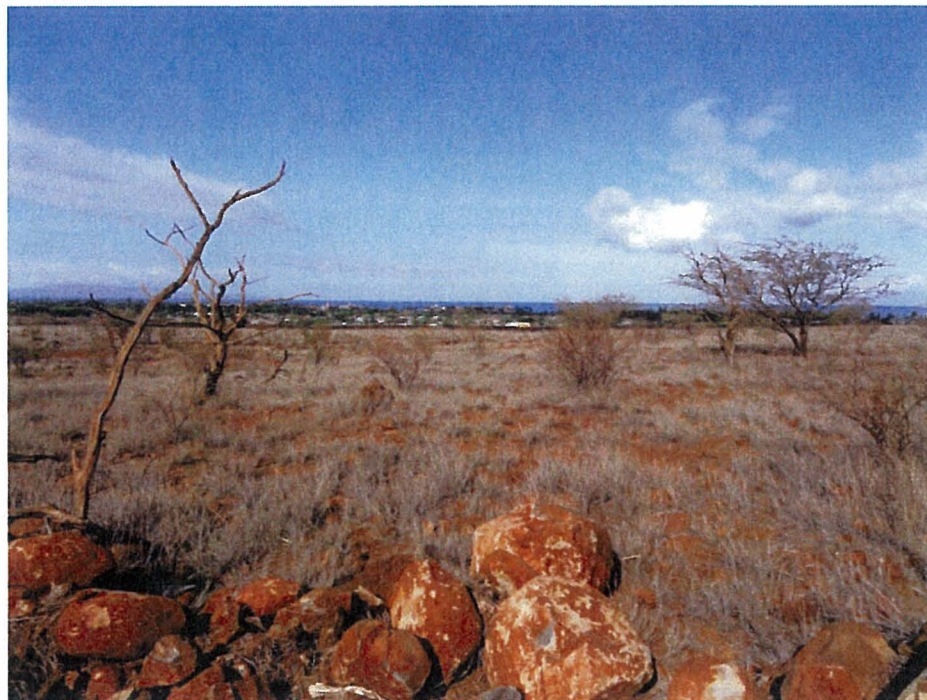


Figure 2. Project Area – view west from the northeast corner.

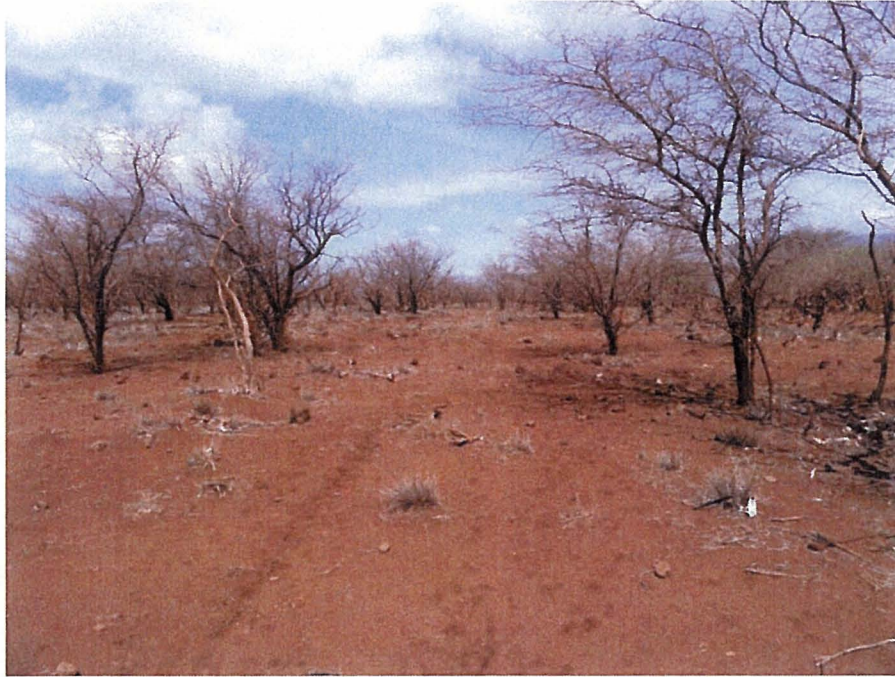


Figure 3. Waterline Corridor –
view west showing area denuded of grass.

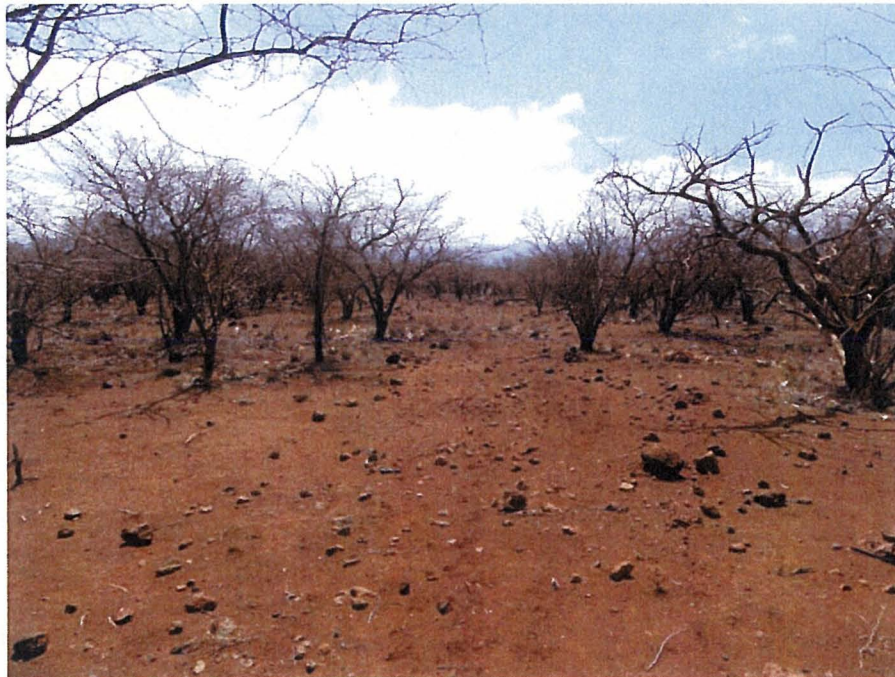
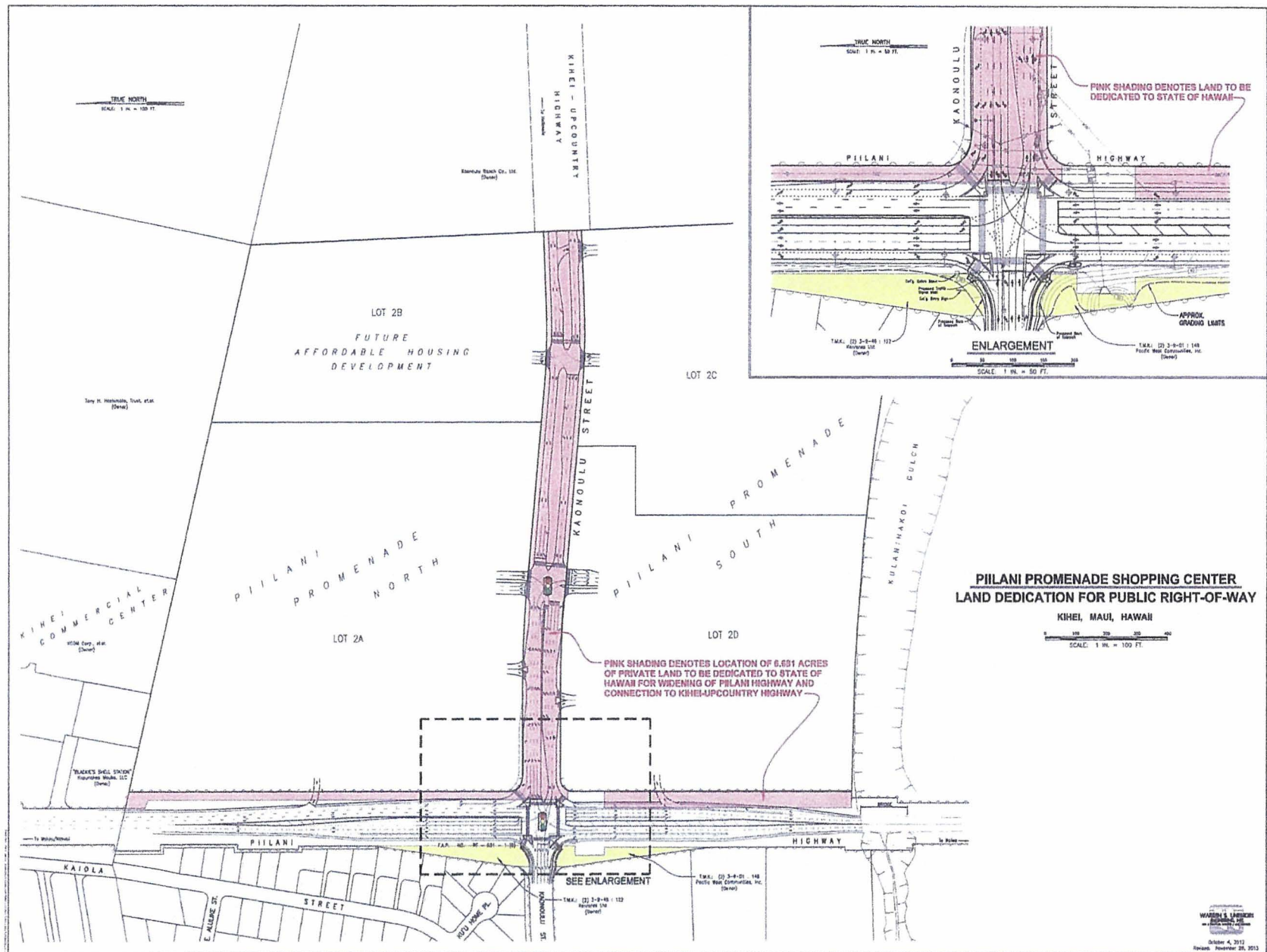


Figure 4. Waterline Corridor –
view east showing denuded rocky landscape.

Figure 5 – Project Map



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