TECHNICAL REPORTS

LĀNA'I HIGH AND ELEMENTARY SCHOOL MASTER PLAN

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APPENDIX A

Botanical Survey for Proposed Public School Facilities Expansion at Lānaʻi City, Island of Lānaʻi.

Botanical survey for proposed public school facilities expansion at Lānaʻi City, Island of Lānaʻi.

November 5, 2008 *AECOS* Consultants No. AC080

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Introduction

This report describes results of a botanical field survey and generation of a plant species list for use in an Environmental Assessment (EA) for a proposed expansion of public school facilities on the Island of Lānaʻi. The project area discussed herein is a 50.0-acre (20.2-ha) parcel of Maui County land dedicated to the Lanai School Master Plan.

Methods

The project property was visited on September 24, 2008 and surveyed for botanical resources by Eric Guinther of *AECOS* Consultants. The botanical survey involved walking over all accessible areas of the property and noting the names and relative abundance of all ferns, fern allies, and flowering plants growing there. Field notes were translated into a flora listing, presented herein as Table 1. Plant names follow *Manual of the Flowering Plants of Hawaiʻi* (Wagner et al., 1990, 1999) for native and naturalized flowering plants, and *A Tropical Garden Flora* (Staples and Herbst, 2005) for crop and ornamental plants. Place names follow *Place Names of Hawaii* (Pukui et al., 1974) and USGS topographic maps.

Site Description

The project site is a long, approximately rectangular, parcel (Fig. 1) extending westsouthwest from Lānaʻi City and the Lānaʻi High & Elementary School property. Beyond the developed part of the property (existing school campus) the land slopes gently downward, then very gently upwards towards Hulupuʻuniu and Puʻu Koa, low hills or high points on the western edge of the central Lānaʻi plain. Drainage

features and small erosion gullies are present behind the high school athletic field and the community center and these lead storm water runoff towards the southwest and the Pālāwai Basin. Otherwise, the land is rather featureless except for a grid of former field roads indicating past use of the land for commercial growing of pineapple (*Ananas comosus* cultivars).

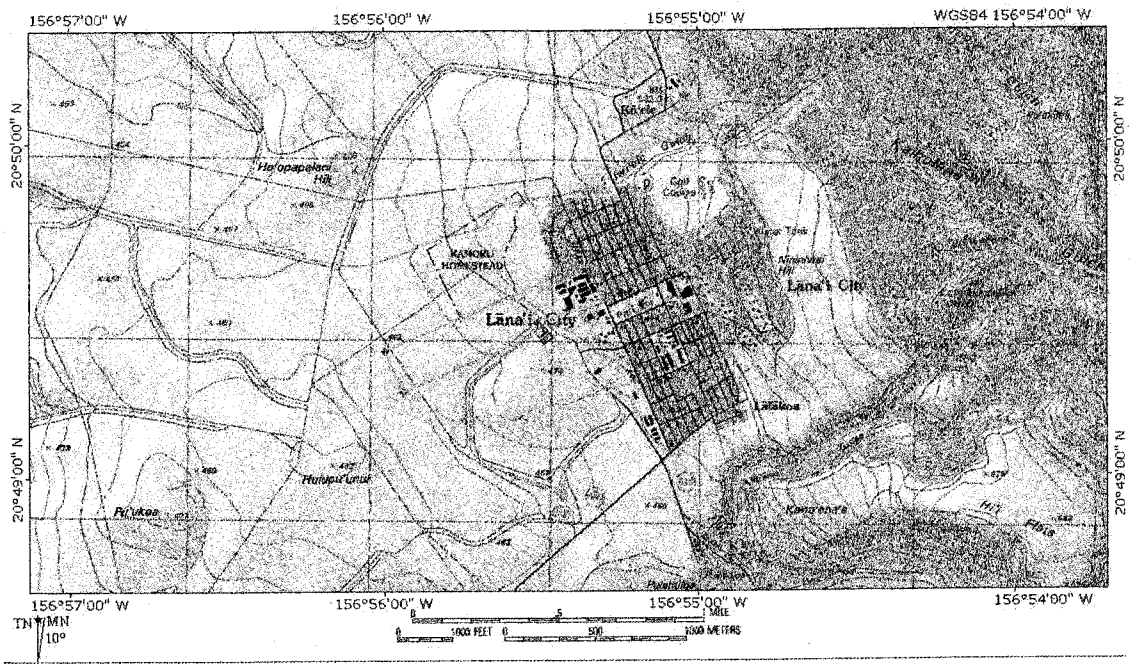

Figure 1. Central part of Island of Lāna'i showing (outlined in orange) the area of the September 2008 botanical survey.

Vegetation

The project site is mostly covered with a scrubby growth of shrubs, scattered and typically short-stature trees (mostly under 4 m or 12 ft), and grasses. However, the nature of the vegetation changes from one end of the nearly 2690-ft (820-m) long parcel to the other. The developed campus, beginning at Fraser Avenue, occupies a narrower parcel at the eastern end, about 820 ft (250 m) in length. This area consists of planted and well-maintained grounds with lawns and ornamental planting beds, and only a few weedy areas where ruderal species are to be found. Hawaiian native plants have been planted in a few places on campus as discussed further on in this report.

Beyond the playing field at the lower end of the school campus is found an area of disturbed land broken up into patches or weedy fields by tree lines, an energy corridor with access roads, vehicle tracks ("dirt" roads), and stockpiled soil mounds (Fig. 2). For a variety of reasons, notably proximity to weed sources and patterns of

disturbance, this area demonstrates the greatest diversity of plants within the project area. Most of the trees in this area are Fomosan koa (*Acacia confusa*) with brush box (*Lophostemon confertus*) and ironwood (*Casuarina equisetifolia*) present in smaller numbers. Fields are a mixture of weedy species, mostly grasses such as Guinea grass (*Urochloa maxima*), California or para grass (*Urochloa mutica*), and some Napier or elephant grass (*Pennisetum purpureum*). Most of the other species recorded here are rare or present in small numbers of localized growth.

Figure 2. Area of mixed open forest (here, mostly Formosan koa) and dense grasses (mostly Guinea grass) at the *mauka* end of the 50-acre parcel. Western rim of the basin is seen in the far distance.

The latter area of disturbed ground transitions into an area of dense lantana (*Lantana camara*) scrub with low-growing or "scrubby" Christmas berry (*Schinus terebinthifolius*) trees. Also abundant are Guinea grass and sourgrass (*Digitaria inslularis*). This area of scrub proved exceptionally difficult to traverse because of dense growth of thorny lantana and low trees. However, axis deer or chital (*Axis axis*) trails crisscross the area, providing exploratory access (although often on hands and knees). This vegetation zone is especially low in plant diversity. The four species mentioned are the only ones present, except along parts of former field roads that cross the parcel. The restricted flora has developed under extreme grazing pressure that limits invasion by other species, while favoring lantana and Christmas berry.

The lantana/Christmas berry shrub-scrub gives way to dense groves of Christmas berry separated by old field roads supporting more open growth. Minimal undergrowth occurs in the closed canopy forests of Christmas berry (Fig. 3) due to a combination of shading and grazing pressure.

Figure 3. Inside a copse of Christmas berry trees showing lack of groundcover due to shading and grazing.

Further out (to the southwest), the copses of Christmas berry forest give way to a savannah of scattered Christmas berry trees and grassland, with patches of lantana (see foreground, Fig. 4). Plant diversity increases in this open, old field setting.

Flora

A listing of plants observed during the botanical survey is presented as Table 1. A total of 58 flowering plant species were observed in the project area. No ferns or fern allies were recorded. Of these 58 species, only two (2) are considered native to the Hawaiian Islands (3.4%). These species are *'uhaloa* (*Waltheria indica*) and *koali'ai* (*Ipomoea cairica*), both generally common lowland species throughout the islands, especially in leeward areas. Both may be early Polynesian introductions. The low number of native plants is typical for most lowland, disturbed sites in the Hawaiian Islands and reflects on the past highly disturbed nature of this particular area where pineapple fields covered the land in the not too distant past.

Figure 4. Photograph looking northeast (*mauka*) towards Lāna'i City across the project site from near the southwest end.

Table 1. Listing of plant species observed at the proposed High School expansion site on Lāna'i on September 24, 2008.

Species	Common name	Status	Abundance	Notes
FLOWERING PLANTS				
DICOTYLEDONES				
ACANTHACEAE				
Thunbergia alata Bojer ex Sims	black-eyed Susan vine	nat	R	(1)
AMARANTHACEAE				
Amaranthus sp.	"red flwrs, lg fruit"	orn	R	(1)(2)
ANACARDIACEAE				
Schinus terebinthifolius Raddi	Christmas berry	nat	AA	
ASCLEPIADACEAE				
Asclepias physocarpa (E. Mey.) Schlechter	balloon plant	nat	C	(1)
ASTERACEAE				
Acanthospermum australe (Loefl.) Kuntze	Paraguay burr	nat	R	(1)
Bidens pilosa L.	---	nat	R	(1)
Conyza bonariensis (L.) Cronquist	hairy horseweed	nat	C	(1)
Emilia fosbergii Nicolson	Flora's paintbrush	nat	R	(1)
Heterotheca grandiflora Nutt.	telegraph weed	nat	U	
Sphagneticola trilobata (L.) Pruski	wedelia	nat	R	(1)(2)

Table 1 (continued).

Species	Common name	Status	Abundance	Notes
ASTERACEAE (continued).				
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	nat	U2	(1)
Youngia japonica (L.) DC	oriental hawksbeard	nat.	R	(1)
CASUARINACEAE				
Casuarina equisetifolia L.	ironwood	nat	O	(1)
CHENOPODIACEAE				
Chenopodium carinatum R. Br.	---	nat	R	(1)
COMBRETACEAE				
Terminalia catappa L.	tropical almond	orn	R	(2)
CONVOLVULACEAE				
Ipomoea cairica (L.) Sweet	*koali 'ai*	**ind**	C	
EUPHORBIACEAE				
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	nat.	R	(1)
Ricinus communis L.	castor bean	nat.	U	
FABACEAE				
Acacia confusa Merr.	Formosan koa	nat	C	
Chamaecrista nictitans (L.) Moench	partridge pea	nat	U	(1)
Crotalaria incana L.	fuzzy rattlepod	nat.	R	(1)
Desmanthus pernambucanus (L.) Thellung	virgate mimosa	nat	R	(1)
Desmodium incanum DC	Spanish clover	nat	R	(1)
Desmodium sandwicense E. Mey.	Spanish clover	nat	R	(1)
Desmodium sp.	Spanish clover	nat	R	(1)(3)
Indigofera hendecaphylla Jacq.	creeping indigo	nat	R	
Indigofera suffruticosa Mill.	indigo	nat	O	
Leucaena leucocephala (Lam.) de Wit	*koa haole*	nat	O	
Macroptilium atropurpureum (DC) Urb.	---	nat	R	(1)(2)
MALVACEAE				
Malvaviscus penduliflorus de Candolle	turk's cap	orn	R	
Malva parviflora L.	cheeseweed	nat	R	(1)
Malvastrum coromandelianum (L.) Garcke	false mallow	nat	R	
Sida spinosa L.	prickly sida	nat	R	(1)
MYRTACEAE				
Lophostemon confertus (R.Br.) P.G. Wilson & Waterhouse	Vinegar tree, brush box	nat	O2	
Psidium guajava L	common guava	nat	R	
PASSIFLORACEAE				
Passiflora foetida L.	passion fruit	nat	R	
PLANTAGINACEAE				
Plantago lanceolata L.	narrow-leaved plantain	nat	C	(1)
SOLANACEAE				
Solanum linnaeanum Hepper & P. Jaeger	apple of Sodom	nat	U2	
STERCULIACEAE				
Waltheria indica L.	*'uhaloa*	**ind**	O	
VERBENACEAE				
Lantana camara L.	lantana	nat	A	

Table 1 (continued).

Species	Common name	Status	Abundance	Notes
	FLOWERING PLANTS			
	MONOCOTYLEDONES			
ARACEAE				
Syngonium sp.	nephthytis	orn	R	(1)
BROMELIACEAE				
Billbergia pyramidalis (Sims) Lindley	summer-torch	orn	R	(1)
POACEAE				
Bothriochloa pertusa (L.) A.Camus	pitted beardgrass	nat	R	(1)
Chloris gayana Kunth	Rhodes grass	nat.	C	(1)
Cynodon dactylon (L.) Pers.	Bermuda grass	nat	R	
Dichanthium aristatum (Poir.) C.E.Hubb.	Angleton grass	nat	R	(1)
Digitaria ciliaris (Retz.) Koeler	Henry's crabgrass	nat.	R	(1)
Digitaria insularis (L.) Mez ex Ekman	sourgrass	nat	A	
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	nat	U2	(1)
Melinis repens (Willd.) Zizka	Natal redtop	nat	R	(1)
Paspalum conjugatum Bergius	Hilo grass	nat	R	(1)
Paspalum dilatatum Poir.	Dallis grass	nat	R	(1)
Pennisetum clandestinum Chiov.	kikuyu grass	nat.	R2	(3)
Pennisetim purpureum Schumach.	elephant grass	nat	R3	(1)(3)
Saccharum spontaneum L.	sugar cane	nat	R	(1)
Sporobolis cf. *africans*	dropseed	nat	U2	(1)
Urochloa maxima (Jacq.) R. Webster	Guinea grass	nat	AA	
Urochloa mutica (Forsk.) Webster	California grass	nat	U3	(1)

TABLE 1 LEGEND:

Status = distributional status

End = endemic; native to Hawai'i and found naturally nowhere else.
Ind = indigenous; native to Hawai'i, but not unique to the Hawaiian Islands.
Orn = Ornamental, always or a planting in this situation; or escaped ornamental.
Nat = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.

Abundance = occurrence ratings for plants:

R - Rare - only one or two plants seen.
U - Uncommon - several to a dozen plants observed.
O - Occasional - More than a dozen plants seen, but encountered infrequently.
C - Common - considered an important part of the vegetation and encountered regularly.
A - Abundant - found in large numbers; may be locally dominant.
AA - Abundant and dominant - a defining species for the survey area.

Numbers (1-3) after an abundance rating for a species indicate modifications for localized abundance increases as per the following examples:

R1 - species encountered perhaps once, but several plants seen together.
O2 - a species encountered only occasionally, but seen in clusters of many..
U3 - plant uncommon in its distribution, but very numerous where encountered.

Notes:

(1) Found almost exclusively in the disturbed area close to the school campus or along "dirt" roads crossing site; mostly ruderal weeds.
(2) Not previously reported from Lāna'i.
(3) Observed, but without flower or fruit at the time of the survey and identification therefore tentative.

An adjacent, 50-ac parcel (DHHL land off the end of Fifth Street) was previously surveyed by W. Char in December 2000 (Char & Assoc., 2000). Char discussed the dominant vegetation and common species observed, but did not provide a species list for her survey. Of the 17 plant species mentioned, all but three were also observed in 2008 on the Lanai School Master Plan property as being present, and generally also among the common or abundant species. Three (of 17) species from 2000 not seen in 2008 were feather fingergrass (*Chloris virgata*), pigweed (*Portulaca oleracea*), and *pōpolo* (*Solanum americanum*). All would likely be found at the proposed school site later into the wet season. For example, *pōpolo*, an indigenous species (or early Polynesian introduction) is an annual where the summer is dry.

School Campus Plantings

A number of native and early Polynesian ("canoe") plants have been planted on the Lāna'i High & Elementary School campus. These are listed in Table 2 and noted because several are federally listed (endangered) species. Other than these native species, no attempt was made to identify other plants on the campus.

Table 2. Listing of native plants planted on the Lāna'i High & Elementary School campus and observed in September 2008 survey.

name	scientific name	number	status
'a'ali'i	*Dodonaea viscosa*	---	ind, NL
kamani	*Calophyllum inophyllum*	---	pol, NL
ki	*Cordyline fruticosa*	---	pol, NL
koa	*Acacia koa*	---	end, NL
ko'oko'olau	*Bidens micrantha kalealaha*	1	end, **E**
ko'oloa 'ula	*Abutilon menziesii*	2	end, **E**
koki'o ke'oke'o	*Hibiscus arnottianus immaculatus*	1	end, **E**
kou	*Cordia subcordata*	---	pol, NL
loulu	*Pritchardia* sp.	---	ukw
mao	*Gossypium tomentosum*	---	end, NL
milo	*Thespesia populnea*	---	ind, NL
noni	*Morinda citrifolia*	---	pol, NL
'ōhi'a	*Metrosideros polymorpha*	---	end, NL
pili	*Heteropogon contortus*	---	ind, NL
wiliwili	*Erythrina sandwicensis*	---	end, NL
'ūlei	*Osteomeles anthyllidifolia*	---	ind, NL

NOTES:
E - species or subspecies listed as endangered (USFWS, 2008); end - endemic; ind - indigenous; NL - species not listed; pol - early Polynesian introduction; ukw - likely a native, but status not determined due to incomplete identification.

Conclusions

No species that is listed by the state or federal governments or considered a candidate species (USFWS, 2005, 2008), or is rare, or is of any special concern was observed at the 50-ac site (excludes the existing school campus). Therefore, no mitigations measures are proposed based upon any specifics of the flora. The endangered species on the school campus are presently being cared for (all were planted at their present location) and could be moved as necessary to accommodate construction plans.

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APPENDIX B

An Archaeological Assessment Report for the Lānaʻi High and Elementary School Expansion Parcel Kamoku Ahupaʻa, Lāhainā District, Lānaʻi Island, TMK (2) 4-9-002: 058 por.

An Archaeological Assessment Report for the Lāna'i High and Elementary School Expansion Parcel Kamoku Ahupua'a, Lāhainā District, Lāna'i Island

TMK: (2) 4-9-002:058 por.

Prepared for

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Management Summary

Reference	An Archaeological Assessment Report for The Lāna'i High and Elementary School Expansion Parcel TMK: (2) 4-9-002:058 por. (Lee-Greig and Hammatt 2009)
Date	August 2009 (DRAFT)
Project Number (s)	CSH Job Code: KAMOKU 3
Investigation Permit Number	CSH completed the inventory survey fieldwork under state archaeological permit No. 08-14 issued by the State Historic Preservation Division (SHPD), per Hawai'i Administrative Rules (HAR) Chapter 13-13-282.
Project Location	Lāna'i Island, Lāhainā District, Kamoku Ahupua'a, TMK: (2) 4-9-002:058 por., as depicted on the South Lāna'i USGS 7.5-minute topographic quadrangle (1998).
Land Jurisdiction	Government: County of Maui
Agencies	Department of Land and Natural Resources' State Historic Preservation Division (DLNR/SHPD) Hawai'i State Department of Education (DOE)
Project Description	The Department of Education, State of Hawai'i, has prepared a Lāna'i High and Elementary School Master Plan to guide the physical expansion and development of the school over the next 25 years. The Master Plan proposes to use the existing school facilities and grounds, in addition to approximately 50 acres of land adjoining the existing campus to accommodate the proposed expansion.
Project Acreage	The County of Maui proposes to transfer approximately 50.017 acres to the Department of Education, State of Hawaii for the proposed expansion. The acreage is derived from two separate parcels. One parcel of 8.017 acres (TMK [2] 4-9-014: 002) is a County park adjoining the school. The second parcel, which comprises the current study area, consists of approximately 42 acres of a portion of TMK (2) 4-9-002: 058.
Area of Potential Effect (APE) and Survey Acreage	Because the intended development of the project area poses no visual, auditory, or other environmental impact to any known historic properties in the vicinity, the project APE extends no further than the approximate 50-acre expansion area. Approximately 42-acres of fallow pineapple fields were subject to systematic pedestrian inspection. The approximate eight acres of county park facilities were not subject to the current inspection as this parcel was not a part of the original study area and has been previously improved with the recreational facilities of the park.

Historic Preservation Regulatory Context	As a DOE proposed project within county lands, the project is subject to State of Hawai'i environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/Hawai'i Administrative Rules (HAR) Chapter 13-13-275, respectively]. This archaeological assessment report was conducted to fulfill the proposed project's historic preservation requirements in accordance with Hawai'i Administrative Rules (HAR) Chapters 13-275-5(A) and 13-276 and details the survey methods of the archaeological investigation and subsequent results.
Fieldwork Effort	The pedestrian survey of the 42-acres was accomplished over a period of two days. On September 24th, 2008 and November 17th, 2008. The archaeological survey crew consisted of Mr. Gerald Park, Hallett Hammatt, Ph.D, Michael Willman B.A., Todd McCurdy, M.A. and Tanya Lee-Greig, M.A. A total of six person days were required to complete the fieldwork for the archaeological assessment of this parcel.
Number of Historic Properties Identified	No historic properties identified.
Effect Recommendation	Based on the lack of findings within the current project area, CSH recommends a project specific effect determination of "no historic properties affected."
Mitigation Recommendation	Due to poor ground visibility throughout the majority of the project area, the identification of low density surface artifact scatters proved difficult to recognize, if such site types are indeed present within the project area. Consequently, precautionary archaeological monitoring of the initial grubbing activities associated with the proposed project is recommended.

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Section 1 Introduction

1.1 Project Background

The Department of Education, State of Hawai'i, has prepared a Lāna'i High and Elementary School Master Plan to guide the physical expansion and development of the school over the next 25 years. This Master Plan proposes to use the existing school facilities and grounds and approximately 50.0 acres of land adjoining the existing campus to accommodate the proposed expansion that incorporates the P-20 concept where learning can begin before pre-school and extend well beyond college. Inherent in the P-20 concept is the close proximity of Pre-School, Elementary School, Middle School, High School, and Community College, whereby components of each educational level are located on one campus, thus resulting in several campuses on a single property. These campuses are separated to maintain safety and security for students of all ages but are still linked to unify the separate schools into one educational complex (figure).

The County of Maui proposes to transfer approximately 50.017 acres to the Department of Education, State of Hawaii for the proposed future expansion (Figure 1). The acreage is derived from two separate parcels. One parcel of 8.017 acres (TMK [2] 4-9-014: 002) is a County park adjoining the school. The park, which is improved with a softball field, basketball courts, tennis courts, and a play structure, is shared with the school. The second parcel of approximately 42 acres is a portion of TMK (2) 4-9-002: 058 that are currently comprised of 115 acres of vacant agricultural lands. The approximate eight acres of county park facilities were not subject to the current survey as the area has been improved with recreation facilities. Therefore, the area covered during the course of this study is limited to the 42-acres within TMK (2) 4-9-002: 058 and hereafter referred to as the current project area (Figure 2).

At the request of Gerald Park Urban Planner, on behalf of the Hawai'i State Department of Education (DOE), Cultural Surveys Hawai'i, Inc. (CSH) conducted an archaeological inventory survey of the approximate 42-acres of fallow pineapple lands. The current study area is located in the *ahupua'a* of Kamoku, Lāhaina District, Lāna'i Island (TMK [2] 4-9-002:058 por.) (Figure 2 and Figure 3). More specifically, the project parcel is located to the southwest of Fraser Avenue and Lāna'i High and Elementary School, and, with the exception of the County Park (TMK [2] 4-9-014: 002) along the northeastern boundary, surrounded by undeveloped, fallow pineapple fields.

The archaeological fieldwork for this study was conducted under state archaeological permit number 08-14 issued by Hawai'i State Historic Preservation Division (SHPD), per Hawai'i Administrative Rules (HAR) Chapter 13-276, 13-284, and Hawai'i Revised Statutes (HRS). This archaeological assessment report was prepared to fulfill the proposed project's historic preservation requirements in accordance with Hawai'i Administrative Rules (HAR) Chapters 13-275-5(A) and 13-276 and details the survey methods of the archaeological investigation and subsequent results.

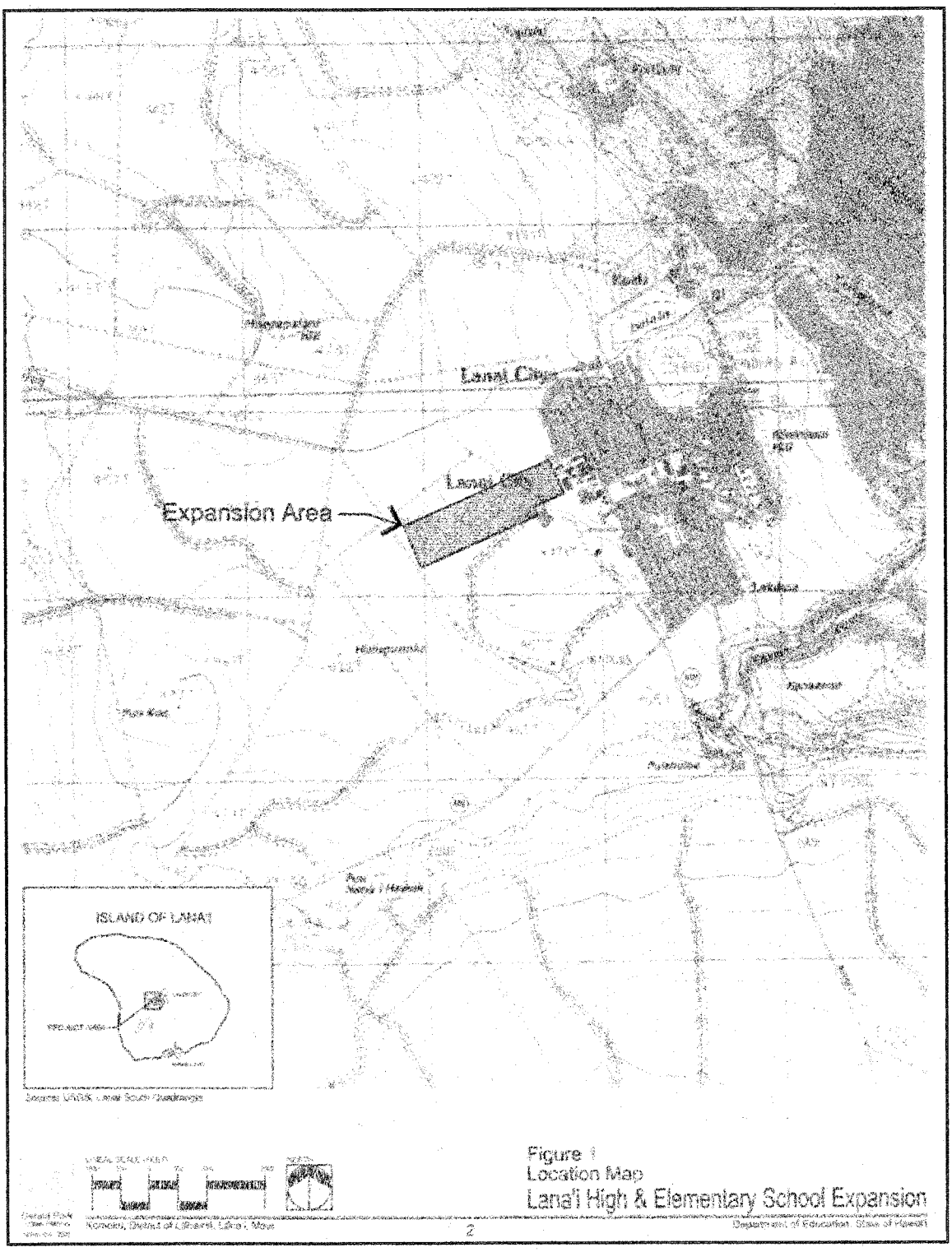

Figure 1. Location of Lāna'i High and Elementary School approximate 50-acre expansion area (figure courtesy of Gerald Park Urban Planner).

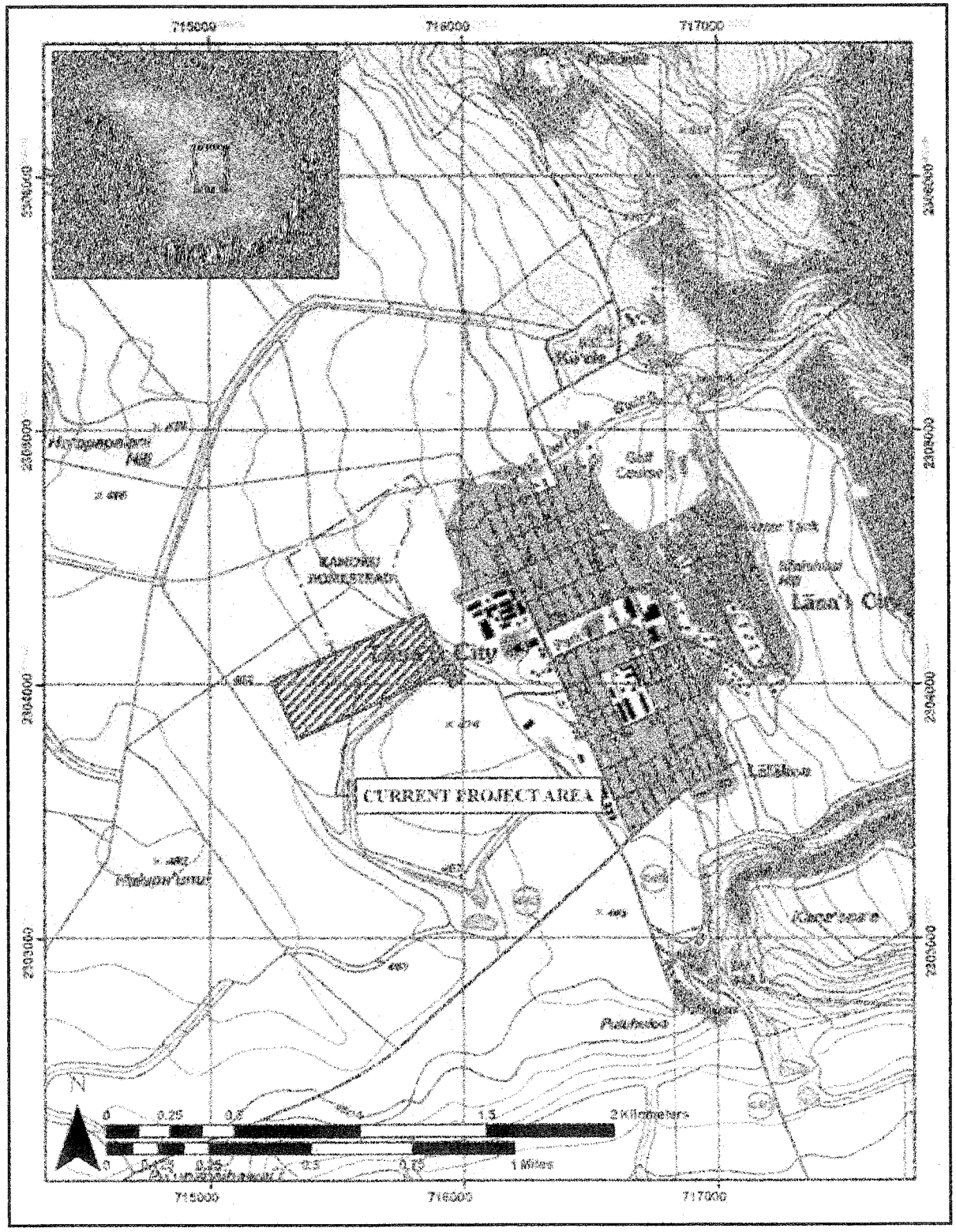

Figure 2. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle showing the location of the 42-acre archaeological inventory survey coverage area (delineated in red diagonal hatching and labeled Current Project Area)

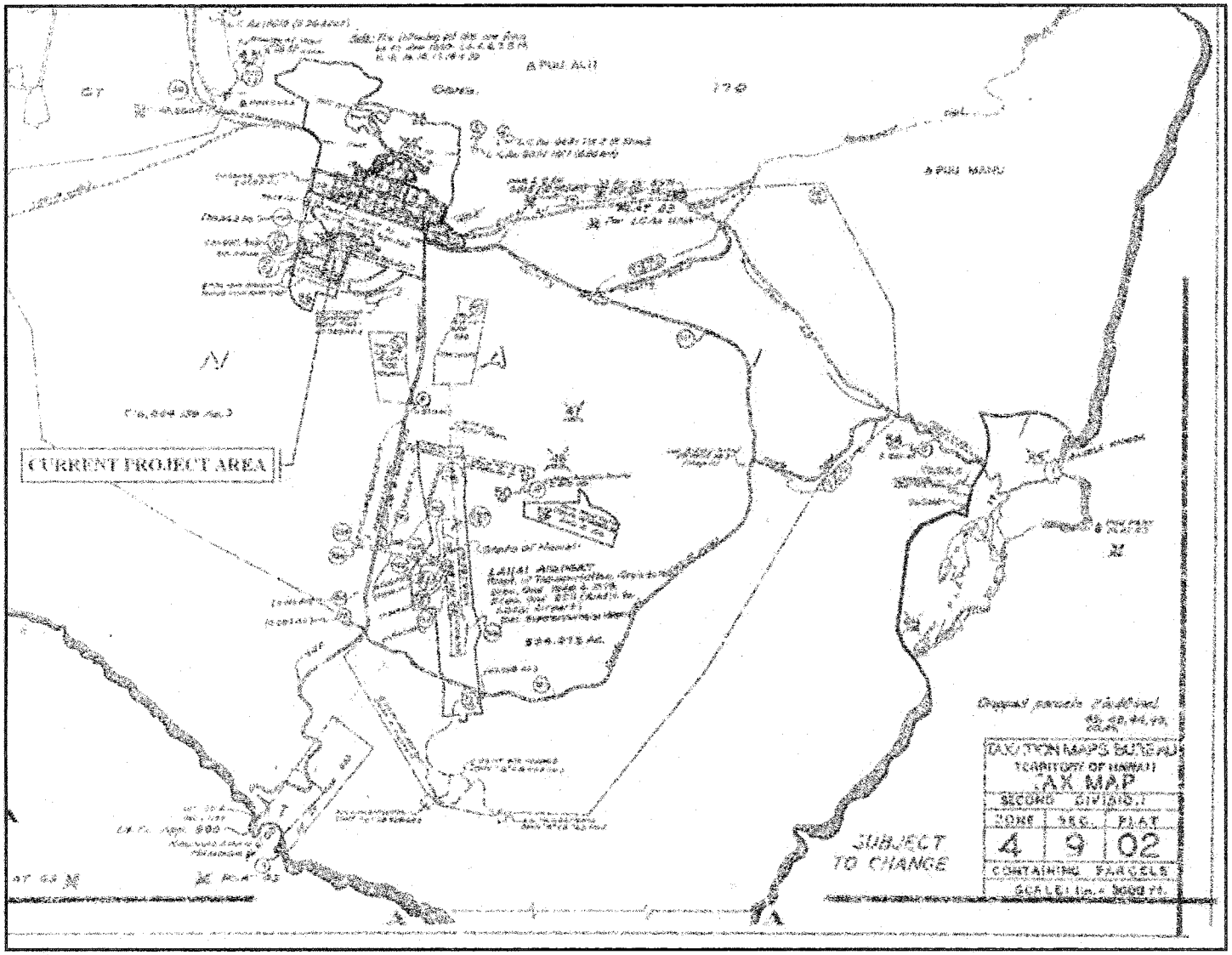

Figure 3. A portion of TMK 4-09-02 showing location of project area (delineated with red diagonal hatching)

1.2 Scope of Work

The following archaeological inventory survey scope of work was proposed to satisfy state and county historic preservation review requirements:

1. A complete ground survey of the entire project area for the purpose of historic property identification and documentation. Any identified historic properties would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation would include photographs and scale drawings of selected historic properties. Any identified historic properties would be assigned State Inventory of Historic Properties numbers by the State (SIHP) and located using a GPS and/or GIS Software;
2. Subsurface testing, if necessary, would be focused on locating and evaluating subsurface deposits, such as buried cultural layers and/or deposits with significant paleo-environmental data, which could not be located by surface pedestrian inspection. If appropriate samples from these excavations were found, they would be analyzed for chronological and paleo-environmental information;
3. Research on historic and archaeological background, including search of historic maps, written records, and Land Commission Award documents. This research would focus on the specific area with general background on the traditional Hawaiian land divisions, *ahupua'a* and *moku*, emphasizing settlement patterns;
4. Preparation of a survey report that would include the following:
    a. A topographic map of the survey area showing all historic properties;
    b. Description of all identified historic properties with selected photographs, scale drawings, and discussions of function;
    c. Historical and archaeological background sections summarizing precontact and historic era land use as they relate to the project area's historic properties;
    d. A summary of historic property categories and their significance in an archaeological and historic context; and
    e. Recommendations based on all information generated that will specify what steps should be taken to mitigate impact of development on the project area's significant historic properties - such as data recovery (excavation) and preservation of specific areas.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is situated within the upper plateau region of Lāna'i island, just to the north of Lāna'i City. Elevation ranges between 460 to 480 feet above mean sea level (amsl) where the temperature ranges between 60° and 80° F. The sediments of the area are of the Waihuna Series. This series consists of well drained and moderately well drained soils on alluvial fans and in depressions. More specifically, the sediments within the project area are Waihuna clay (WoA), which is the most extensive soil in the series. In a representative profile, the surface layer is

about 34 cm thick and underlain by relatively soft, weathered pebbles and stones. The soil is strongly acid in the surface layer due to pineapple cultivation (Foote et al. 1972:129) (Figure 4).

With the entire island lying in the rain shadow of Mauna E'eka (the West Maui Mountains) on Maui and winds across Lāna'i Island dominated by consistent northeasterly trades, the overall environment of the island as a whole is one of drier leeward environment. The average annual rainfall in the area ranges from 25-35 inches (699-800 mm) with the heaviest rains in January and the lightest in June. This growing environment currently supports a vegetation community where the dominant plant species within the previously cultivated pineapple field consist of a dense growth of Lantana (*Lantana camara*) and low-growing or "scrubby" Christmas berry (*Schinus terebinthifolius*) trees. Also abundant within the project area are Guinea grass, Balloon plant (*Asclepias physocarpus*), 'Uhaloa (*Waltheria indica uhaloa*), and sourgrass (*Digitaria inslularis*).

1.3.2 Built Environment

The primary features of the nearby built environment included the playing fields and playground associated with the county park to the southeast, the Hawaiian Homestead turn-key lots to the north, and Lāna'i High and Elementary School to the east. Overall development surrounding the project area is nominal as the majority of the study area is surrounded by fallow pineapple fields.

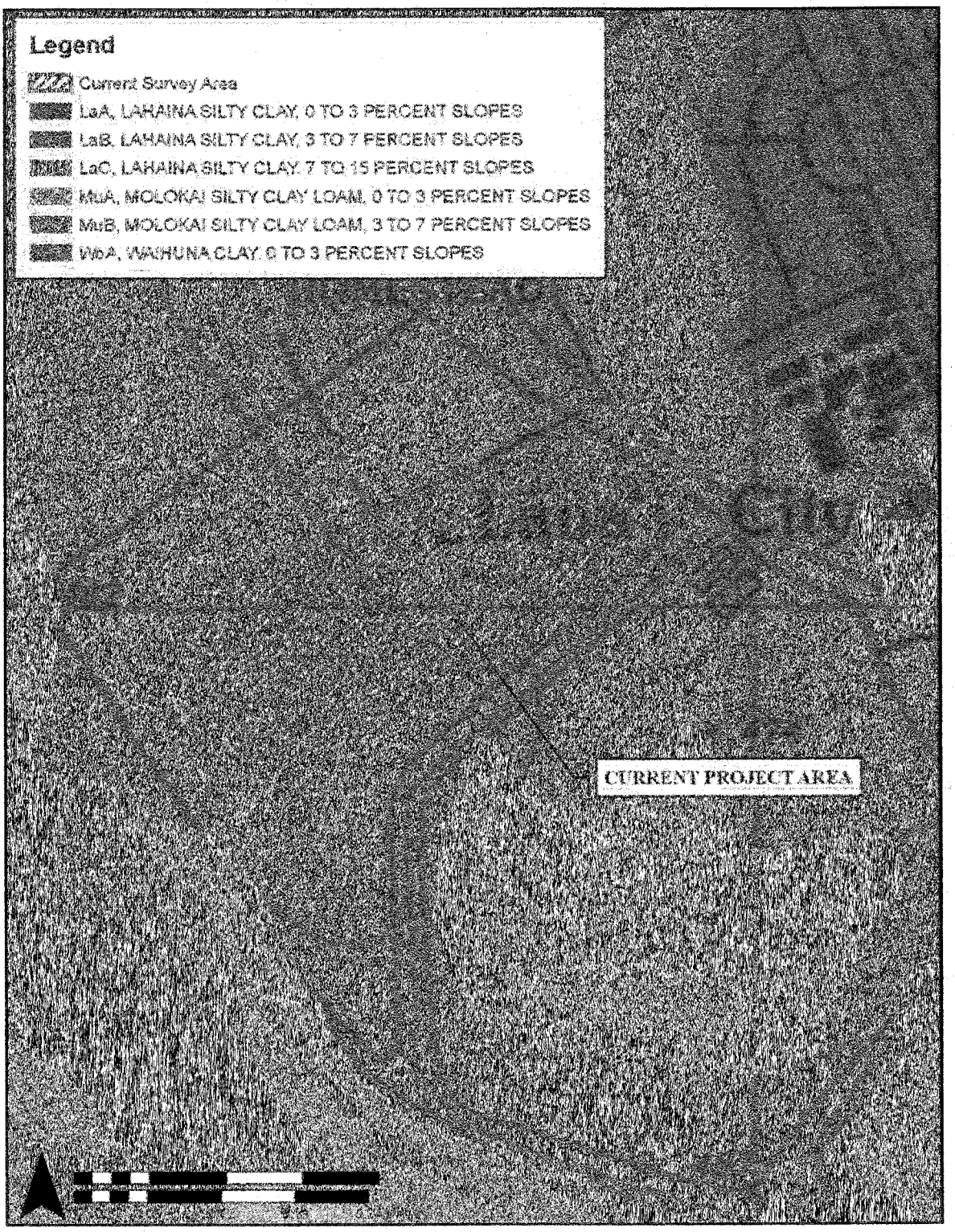

Figure 4. A portion of the Soil Survey Map for the Island of Lāna'i showing the location of the current project area (delineated in black diagonal cross hatching) (U.S. Department of Agriculture 2001).

Section 2 Methods

2.1 Field Methods

A complete ground survey of the entire project area was undertaken for the purpose of historic property identification and documentation. The pedestrian inspection of the study area was accomplished through systematic sweeps, with four archaeologists generally spaced at 15 meter intervals. Potential historic properties identified within the project area were documented by way of:

1. a written description;
2. digital photographs; and
3. located with the Trimble ProXR GPS survey equipment (sub-meter accuracy).

2.2 Subsurface Testing

Due to the dense vegetation and low overhead shrubbery, as well as information gathered during the background research, backhoe testing was not undertaken at this time.

2.3 Document Review

Document review included a search for, and examination of, archival sources, historic maps, traditional practices assessments, and previous archaeological reports from the SHPD and CSH libraries. These references were accessed in order to formulate a predictive model of the types of historic properties that may have been encountered in the area.

Section 3 Background Research

The division of Lāna'i's lands into political districts may have occurred under the direction of the chiefs of Maui, as Lāna'i historically appeared to be "subject or tributary to Maui" during the times of Kamalalawalu (about 1550-1600 AD) (Fornander 1919 Part I: 206-8). The island was apportioned into the following thirteen *ahupua'a* land divisions that were established during traditional times: Ka'ā, Kamoku, Kalulu, Kaunolū, Keāliakapu, Keāliaaupuni, Pālāwai, Kāma'o, Ka'ohai, Pawili, Maunalei, Mahana, and Paoma'i. Unlike *ahupua'a* divisions of the other seven major islands of the Hawaiian Chain, some of the *ahupua'a* divisions on Lāna'i Island have the unique characteristic of traversing across the island from one coastline to the other (Hawai'i Department of Survey 1903:66; Figure 5). The current project area is located along the upper plateau of Kamoku Ahupua'a within the *mokupuni* of Lāna'i (Moffat and Fitzpatrick 1995:23).

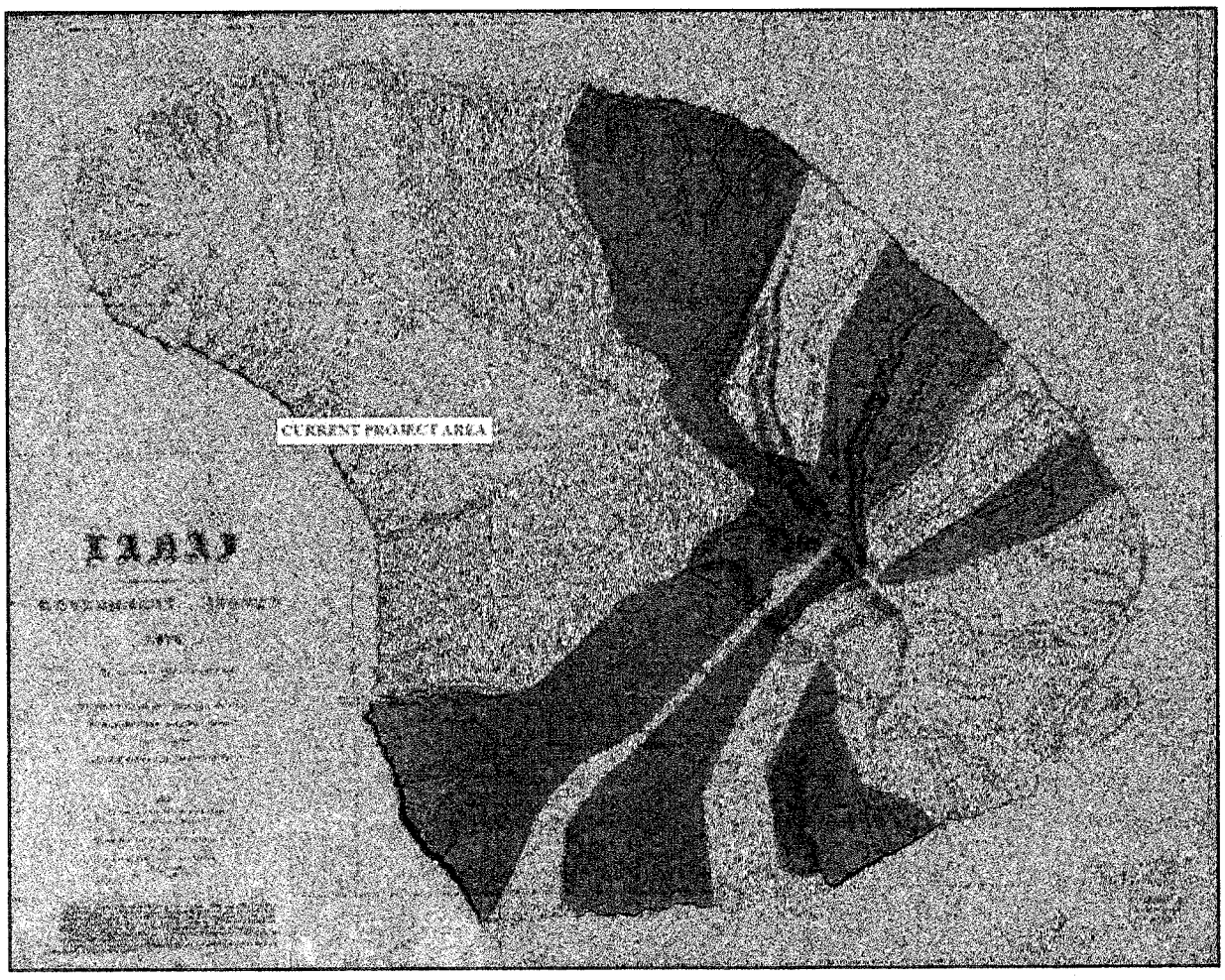

Figure 5. The J. F. Brown and M. D. Monsarrat map (1878) showing Kamoku Ahupua'a as a traditional land division of the island of Lāna'i (crown land in yellow, government lands in green).

The *ahupua'a* of Kamoku is representative of the traditional *ahupua'a* formation from ocean to mountain and includes 8,291 acres of the western portion of Lāna'i from the shoreline upslope to the base of the high northwest to southeast trending ridge crest of the island. The following

description of Kamoku Ahupua'a was presented in Part 3 of the *Hawaiian Investigation* to the U.S. Senate Committee on Pacific Islands and Porto Rico (1903:1340):

> The ahupua'a of Kamoku on this island is a large and valuable tract extending from the sea to the top of the mountain ridge where a good supply of drinking water from a spring is obtained not far from the Gibson homestead. The government road crosses the land a short distance below the homestead. From this point commences a beautiful stretch of country extending for miles around. The soil is very rich and is capable of producing large crops of corn and potatoes.

3.1 Traditional and Historical Background

The most comprehensive summary of traditional accounts pertaining to the "formation of Lāna'i, first habitation, general traditions, early history and place names" appears in Kenneth P. Emory's *The Island of Lāna'i: A Survey of Native Culture* (1924). Emory suggests through "genealogies and traditions" that Lāna'i "began to be populated by important numbers about 1400 A.D." (Emory 1924:123). Based on the number of house sites he observed and approximately five persons per household, Emory estimated the pre-1778 population of the island at around 3,000 (1924:122). The traditional life style focused on subsistence farming and fishing within the context of the *ahupua'a* or traditional land unit.

3.1.1 Mythological and Traditional Accounts

In terms of place names and people that may be related to various mythological and traditional accounts for Lāna'i, Tomonari-Tuggle and others (2000:23) noted that there are no royal genealogies that are preserved and only a few of the names of Lāna'i chiefs are mentioned in the traditions. Literal translations of several of the place names for land areas near to the project area are listed below (see also Figure 6). Most all translations are taken from Emory (1924) and supplemented by Pukui and others (1974) where appropriate:

Kamoku	*Lit.,* the district or the cut-off portion (Pukui et al. 1976:82); the piece cut off (Emory 1924:31)/
Kō'ele	*Lit.,* dark sugar cane (Pukui et al. 1976:114); Place seized by a chief (Emory 1924:33)
Hulupu'uniu	Whirling feather hill (Emory 1924:30)
Hokuao	Morning star (Emory 1924:29)
Makapaia	Enclosed eyes (Emory 1924:34)
Pu'u Nana o Hawai'i	Hill to view Hawai'i (Emory 1924:36)
Keaaku	The standing root (Emory 1924:32)
Pulehuloa	Big roasting (Emory 1924:36)
Kaumaikahoku	The stars are out (Emory 1924:32)
Kaiholena	The iholena banana (Emory 1924:31)

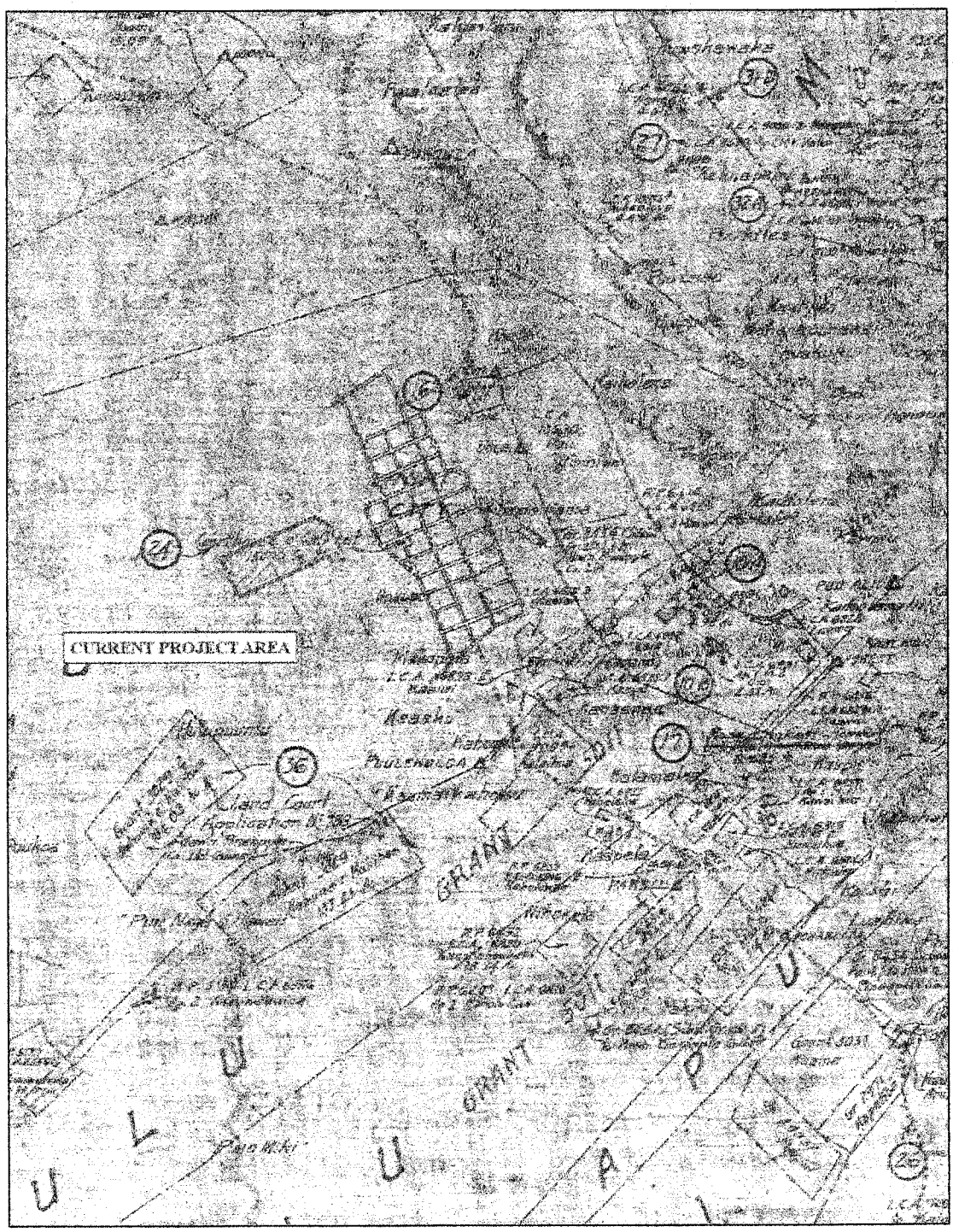

Figure 6. Hawaiian Pineapple Company, Ltd. (1929) survey map showing, placenames, areas of Land Commission Awards, and development of Lāna'i City relative to the current project area.

Prior to Polynesian occupation, the current project area was probably below the fringe of the native Hawaiian forest. Even in the early 1900s vestiges of this forest could be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (Gay, 1965:51). Clearing

of this forest was undoubtedly initiated by the traditional Polynesian agriculturist. In Emory's 1920 survey of Lāna'i, he did not observe any house sites within the project area but noted that the upper plateau lands were utilized intensively for agriculture. Not only was the project area likely below the fringe of the forest line it was also likely below or *makai* of the lands used for intensive traditional agriculture as well.

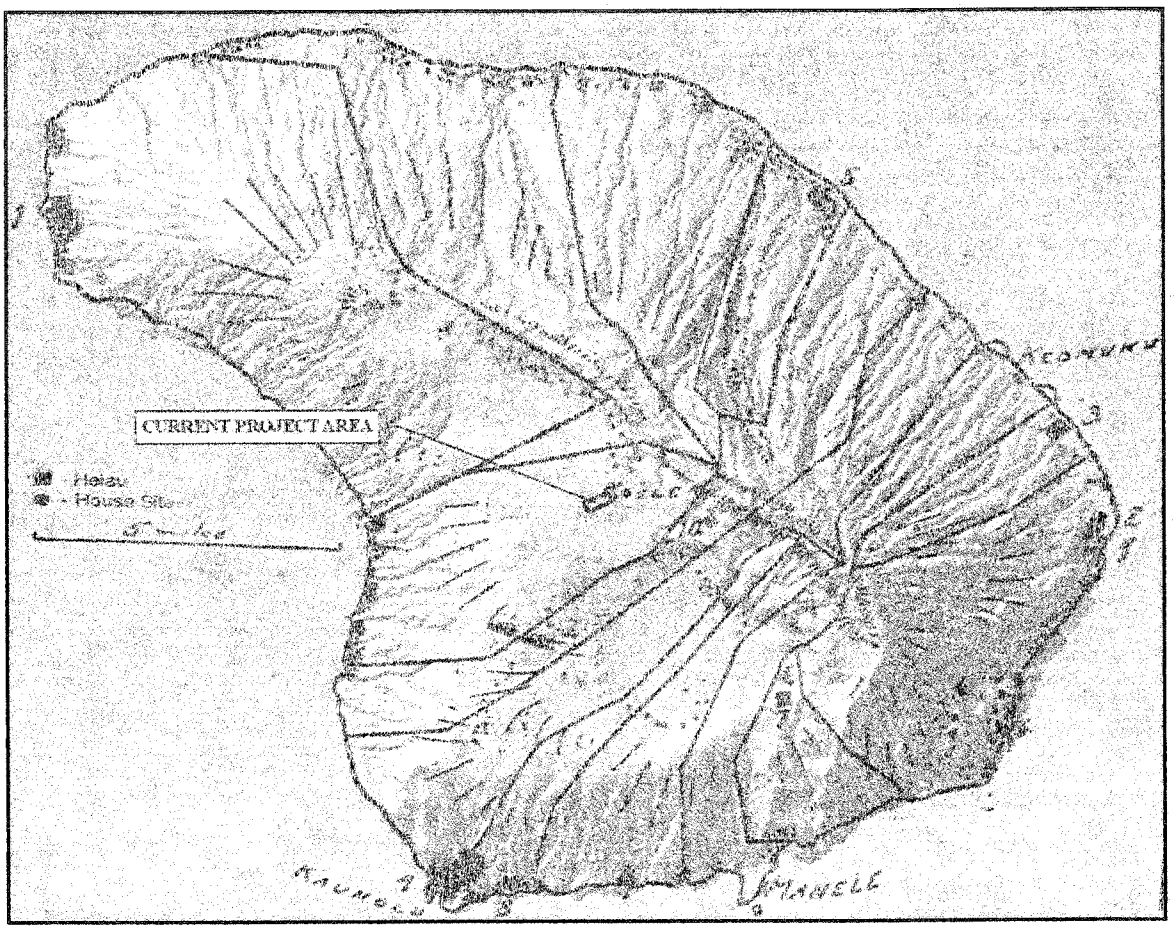

Figure 7. Map of Lāna'i showing *ahupua'a* and the distribution of house sites and *heiau* known to Kenneth Emory in 1921 in relation to the current project area (green dots represent visible house sites, rectangles correspond to *heiau* locations, and the numeric reference ranks the *heiau* [brown rectangles] according to size). (Emory 1924:49)

Early historical accounts of Lāna'i generally attest to the general barrenness and small population (Ellis 1963, Menzies 1920). However, in 1779 Capt. King of the Cook expedition related that Lāna'i "appeared to be well inhabited" and "that it abounds in roots such as yams, sweet potatoes and tarrow" (Emory 1924:6). Emory deduced that the differences in these early descriptions were probably due to the devastating raid on Lāna'i and Kaho'olawe by Kalani'ōpu'u. The *ahupua'a* of Kamoku figures prominently in the recollections of this raid. S.M. Kamakau writes:

> During Kalani'ōpu'u's occupancy of Lāna'i, the food ran out, and the men had to eat the root of a wild plant called *kīpala*, this had a loosening effect upon the bowels when eaten in quantity. The war is therefore called "The-land-of-loose-

> bowels (Kamoku-Hī)" and it is a war still talked of [circa 1866] among the descendants on Lāna'i (Kamakau 1996:91).

Kamoku refers to the *ahupua'a* where the *kūpala* grew thick, and *Hī* refers to a form of dysentery/diarrhea that could result from eating too much *kūpala*. "*Kūpala*" may refer to a variety of famine foods such as an endemic cucurbit (*Sicyos pachycarpus*), and a wild sweet potato or morning glory (Pukui and Elbert 1984:170).

Another explanation of the name of the district "Kamoku - the piece cut off" suggested to Emory that the etymology and history of a similarly named *ahupua'a* in the Hamakua district of the Big Island. In Hamakua C.J. Lyons (Emory 1969:31) recorded an *ahupua'a* of Kamoku that was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name."

3.1.2 Early Historic Period

Orr (2001: 17-18) places the early Historic Period beginning in AD 1795. Specific events for the project vicinity are difficult to pinpoint but several significant events for the island as a whole are noteworthy. Kamehameha conquered O'ahu and Maui in 1795 and soon unified all of the Hawaiian Islands. In 1798, he returned to Lāna'i to make a summer residence at Kaunolū. The sandalwood trade began in 1810 and by the early to mid 1800s there was an increased reliance on western technology, supplies, and commerce which had a dramatic economic impact across the islands. With the death of Kamehmeha in 1819 and the arrival of western missionaries in 1820, Hawai'i experienced dramatic changes. Western influence brought increased ship traffic to Lāna'i and in 1826, the American ship "London" wrecked on Lāna'i but was rescued by an American military schooner (Ashford 1974:18). Between 1830 and 1842 there was a women's penal colony established on Lāna'i at Kaena and the male penal colony was established on Kaho'olawe.

Table 1 provides census data adapted from from Emory (1924) and Schmitt (1973) for different time periods. While, population stability is suggested during 1832 and 1836, the trend shows a steady population decline for the Lāna'i that follows similar trends for the other Hawaiian Islands.

Table 1. Population Estimates for Lāna'i from Various Time Periods

Emory estimate (pre-1778)	Missionary estimate (1823)	Missionary census (1832)	Missionary census (1836)	Official census (1850)
3,000	2500	1600	1200	604

It is perhaps noteworthy that during the early Historic Period, there appear to be some discrepancies in historical accounts of the physical descriptions of Lāna'i. Captain King's description previously presented indicates that the island had every appearance of being agriculturally productive and well populated. However, by 1792, Archibald Menzies, who was the surgeon attached to the Vancouver Expedition, described Lāna'i as follows:

> ...observing the state and naked appearance of the island which seemed thinly covered with shriveled grass in a scorched state. No hamlets or plantations were to be seen, no trees or bushes adorned the face of the country, which swelled out gradually to a moderate height, so that we have reason to think that the island is but very thinly inhabited (Menzies 1920).

Emory (1924) suggested that the dramatic differences portrayed in these descriptions may be attributed to the effects of Kalani'ōpu'u's raid. Fornander (1996:156) states that Kalani'ōpu'u "ravaged the island thoroughly." Kamakau's account of Kalani'ōpu'u's men having to resort to eating *kūpala* would seem to support this theory.

3.1.3 Mid- to late-1800s

In 1848, the Mahele initiated extreme social, economic, and political changes within traditional Hawaiian culture on all of the islands. The Mahele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title and ownership to land they had cultivated and inhabited through a Land Commission Award, in addition to the outright purchase of other government lands. At the end of the Mahele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years of 1850 and 1865 (Moffat and Fitzpatrick 1995:51). In many cases, the purchases or leases to non-Hawaiians included entire *'ili* (a subdivision of an *ahupua'a*) or *ahupua'a* (land division usually extending from mountain to sea).

An additional aspect of the Mahele was the sale of land to naturalized foreigners. These changes in land tenure had a significant impact across the Hawaiian Islands, in particular Lāna'i. By the mid-1800s much of the upper plateau lands of Kamoku and adjacent *ahupua'a* had been become open *pili* grasslands. This is indicated in the native and foreign testimonies given during the mid-1800s as part of the Mahele and Kuleana Acts. The *ahupua'a* of Kamoku, in which the project area lies, was "omitted" (Interior Department Memos 1860-70s) at the time of the Mahele (1848) and was subsequently leased as government lands (ca. 1860) (Hammatt, et al. 1988:20).

Based on tax map keys, historic maps, and a search of the Waihona 'Aina database (Waihona Aina 2000) there are few LCA records for any lands within Kamoku Ahupua'a near the current project area (Table 2), the scarcity a possible result of the omission during the original division of lands. Examination of the Land Court Map of Lāna'i commissioned by Hawaiian Pineapple Company (1929; see Figure 6) shows only three Land Commission Awards (LCAs) in the upland area of Kamoku Ahupua'a. One of these went to Noa Pali, LCA# 10630 located *mauka* and northeast of the Lāna'i City and the current project area, who was the *konohiki* (headman) and school superintendent of Kamoku. In 1856, Noa Pali corresponded with the Minister of the Interior (under Kamehameha IV) requesting that Kamoku be sold to him because he had been living there since Kamehameha III had granted him the lands in 1841. At this time, there appears to have been confusion as to who owned *ahupua'a* of Kamoku; however, by 1858 it appeared on a list of Crown Lands and Royal Domain of the Hawaiian Kingdom (Kingdom of Hawaii

Legislative Assembly 1890:158). It is apparent that at the time of the Mahele, Pali was cultivating lands "all over" (Waihona 'Aina 2000) and was wanting to consolidate is holdings within a 112.25 acre area. Pali indicates the following (Maly 2009):

> Pali, Sworn: The reason for my thinking of joining them together as one, is because there are many places of mine which are cultivated here and there, and where are built houses. I go from one place to another to cultivate, as announced in the Elele [newspaper]. Therefore I've joined my places together. It is as the witnesses have stated above. My claims for the other places are ended.

Table 2. Summary of Land Commission Awards (LCAs) identified within the upland areas of Kamoku Ahupua'a (Waihona 'Aina 2000 and Maly 2009).

LCA #	Claimant	Ahupua'a	Land Use
10630	Pali	Kamoku and Kalulu	Houselots; Sweet Potatoes; Gourd fields; *Moku mauu* (grass land/pasture sections)
03719B	Kalaihoa	Kamoku	Apana=1 (no description of land use provided)
6833:1-3	Kaaiai	Kamoku and Kalulu	*Moku mauu* =2; Houselot=1

In the 1860s a Chinese immigrant, Ahsee, procured a lease for lands within Kamoku to raise goats. Concurrently, Walter Murray Gibson arrived at the Pālāwai Basin Mormon Commune and ultimately gained control, through government leases, over most of Lāna'i becoming Hawai'i's "Premier of Everything". During the 1880s, Gibson's Lāna'i Ranch eventually had up to 18,000 goats and 12,000 sheep that were permitted to forage freely, virtually denuding the island of vegetation and causing severe erosion problems.

In 1888, Gibson left the islands for California after a series of troubles as Prime Minister of Hawai'i. His interests in Lāna'i were left to his daughter Talula and her husband, Fredrick Hayselden and from 1888 to 1902, the Hayseldens were essentially in charge of Lāna'i. At this time, Kō'ele was the sheep ranch center for the island. Tabrah (1976:79) noted that in 1898 there were 174 people on the island and approximately 50,000 sheep. In an effort to control erosion, eucalyptus, and Norfolk pine were planted at Kō'ele and thousands of acres across the island were planted in Bermuda grass (also see Maui County Council 1998).

Charles Gay bought up the Gibson holdings in 1902. The Gay family eventually bought virtually the entire island in fee simple. The ranch center was still at Kō'ele, the location where Gibson's headquarters had been moved in the 1870s. The Gays also successfully cultivated pineapples on Lāna'i, both at Keōmuku and Lālākoa. The Gay family went into considerable debt to get the island converted to fee simple ownership, and was unable to retain the vast holdings. The family was forced to liquidate all holdings, except some 600 acres.

3.1.4 1900s

The period from 1910 to 1922 represents a shift from primarily sheep to cattle ranching. From 1910 to 1917, the Lāna'i Company Ltd. downsized its sheep operations and eventually sold its holdings to Harry and Frank Baldwin. At this point in time, they successfully converted the island into a cattle ranching operation. At the height of this operation, the ranching center at Kō'ele had approximately thirty buildings that included: the ranch manager house, an office, a

store, a bachelor's quarters, a blacksmith shop, additional residences, and stables (Maui County Council 1998).

In 1922 James Dole purchased most of the island of Lāna'i and began a swift changeover to commercial pineapple cultivation. The rapid commercialization included the building of Lāna'i City and Kaumalapau Harbor. "In 1924 Lāna'i City began as a simple plantation town with only 150 residents" (Savrann 1989: unnumbered pages). The 1929 aerial photograph below clearly depicts the current project area and surrounding lands heavily cultivated in commercial pineapple agriculture (Figure 8).

Figure 8. An aerial photograph of Lāna'i City dated 1929 showing approximate project area outlined in red (aerial courtesy of Castle and Cooke Resorts, LLC.)

In 1961, James D. Dole's pineapple lands on the island of Lāna'i were merged with the assets of Castle & Cooke, a prominent Hawai'i-based corporation. World-wide prices for pineapple

continued to drop throughout the 1970's as competing countries, most notably Cuba and the Philippines, supplied the market with cheaper pineapple. While pineapple cultivation continued on Lāna'i through the 1970s it is clear that some of the fields starting to transition into fallow agricultural lands (Figure 9) and during the 1980's, Castle & Cooke began a long-term program to phase the island out of pineapple cultivation, and expand tourism on Lāna'i. In 1988, David Murdock, Chairman of Castle & Cooke, Inc., opened a resort hotel and companion championship golf course at Mānele Bay. A second resort hotel and golf course in the uplands of Kō'ele was opened in 1990. The final pineapple harvest and phasing out of all pineapple operations in 1993 (Boyd 1996) marked the end of an era for Lāna'i Island leaving much of the lands that were once in pineapple, including the current project area, are open and fallow.

Figure 9. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing the current project area (hatched in red) in relation to the Maui County Park and Lāna'i High and Elementary School (located to the immediate northeast) and lands being transitioned to fallow to the north.

3.2 Previous Archaeological Research

Archaeological studies that address the general history of Lāna'i, with specific mentions of the *ahupua'a* of Kamoku include: Emory (1924), the statewide survey of Lāna'i Island, Hommon (1974), Ahlo (1985), Kaschko (1986), Nagata (1987), Walker and Haun (1987), Hammatt, Borthwick and Shideler (1988), Hammatt and Borthwick (1988, 1989, 1990, 1993a, 1993b, 1993c), Borthwick and Hammatt (1989, 1990, 1992), Borthwick, Hammatt, and Chiogioji (1990), Hammatt, Shideler, and Borthwick (1990), Hammatt and Chiogioji (1991), Colin and Hammatt (1996), Creed *et al.* (2000), Raymond (2003), Hammatt and Schideler (2004), Dockhall, Formolo, and Hammatt (2004), and Lee-Greig and Hammatt (2005).

Previous archaeological studies specific to upper plateau of Kamoku Ahupua'a are listed in Table 3 according to year and depicted on Figure 10 with an expanded explanation of studies conducted in the immediate vicinity of the current project area immediately following.

Table 3. Archaeological Studies within, and adjacent to, the outer limits of Lāna'i City.

Reference	Year	Location	Description
Emory	1924	Island Wide	Archaeological Reconnaissance: Island-wide survey that recorded house sites to the north of Kamoku Ahupua'a.
Hommon	1974	Island Wide	Archaeological Inventory Survey: Kō'ele nominated as a historic district and assigned state site number 50-40-1004 which included three houses and one church.
Hammatt and Borthwick	1988	Lālākoa III Subdivision	Archaeological Inventory Survey: A scatter of various materials were observed and documented in a fallow pineapple field: historic era artifacts observed but not collected; coarse-grained basalt fragments collected and determined to come from recently introduced road gravel; numerous fine-grained basalt flakes and basalt artifacts (one finished adze fragment, eight adze performs, a core, and thirteen retouched flakes) collected and determined to have been imported with road gravel from the Ko'i Adze quarry.
Hammatt et al.	1988	Kō'ele	Archaeological Data Recovery: Excavation and analysis of recovered ranch era historic material from two trash pits correlated with events during ranching era.
Borthwick and Hammatt	1989	Iwi'ole Dorms	Archaeological Reconnaissance: Observed basalt and volcanic flake scatters in a disturbed context within fallow pineapple fields were.
Hammatt and Borthwick	1989	1) Kō'ele Golf Course; 2) Kō'ele Single Family Housing; 3) Queens Multi-Family Housing; and	Archaeological Reconnaissance: Reconnaissance of multiple areas: 1) Four historic ranching era features (three associated with the water system and a historic scatter from the Gay's Homestead), a volcanic glass source, and a lithic concentration were recorded. In addition, 28 lithic artifacts collected within the former pineapple fields in association with road gravel;

Reference	Year	Location	Description
		4) Waialua Annex Subdivision (Olopua Woods Subdivision)	2) No historic properties identified; 3) A few basalt flakes encountered in a concentration of road gravel 4) A scatter of basalt flakes mixed with road gravel and modern cultural materials was observed on a fallow pineapple field dirt road and presumed to have been "mechanically transported"
Hammatt and Borthwick	1990	Kō'ele Golf Course	Archaeological Inventory Survey: Survey of 100-acres behind the Kō'ele golf course. No historic properties identified.
Borthwick and Hammatt	1992	Proposed Kō'ele Reservoir	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Chiogioji	1992	Waialua Annex Subdivision	Archaeological Investigation and Monitoring: Previously recorded scatter was not relocated during sewer line installation likely due to grubbing activities.
Hammatt and Chiogioji	1992	Lāna'i City	Archaeological Investigation: No historic properties identified.
Hammatt and Borthwick	1993	Sewerline from Kō'ele to Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Creed et al.	2000	DHHL Lots, Lāna'i City	Archaeological Inventory Survey: Encountered debris from firs Lāna'i Airport. No significant historic properties identified.
Raymond	2003	Lāna'ihale	Cultural Resource Investigations: Reconnaissance of the summit fenceline. No historic properties identified within the project APE.
Dockall et al.	2004	Behind Kō'ele Golf Course Clubhouse	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Shideler	2004	Lower west slope of Niniwai Hill	Archaeological Inventory Survey: Documentation of Kihamanienie Church (Site 50-50-98-1946) and associated graveyard
Conley-Kapoi and Hammatt	2005	Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Lee-Greig and Hammatt	2005	Courts Affordable Multifamily Housing Development, Central Lāna'i City	Archaeological Field Inspection with Subsurface Testing: No historic properties identified.

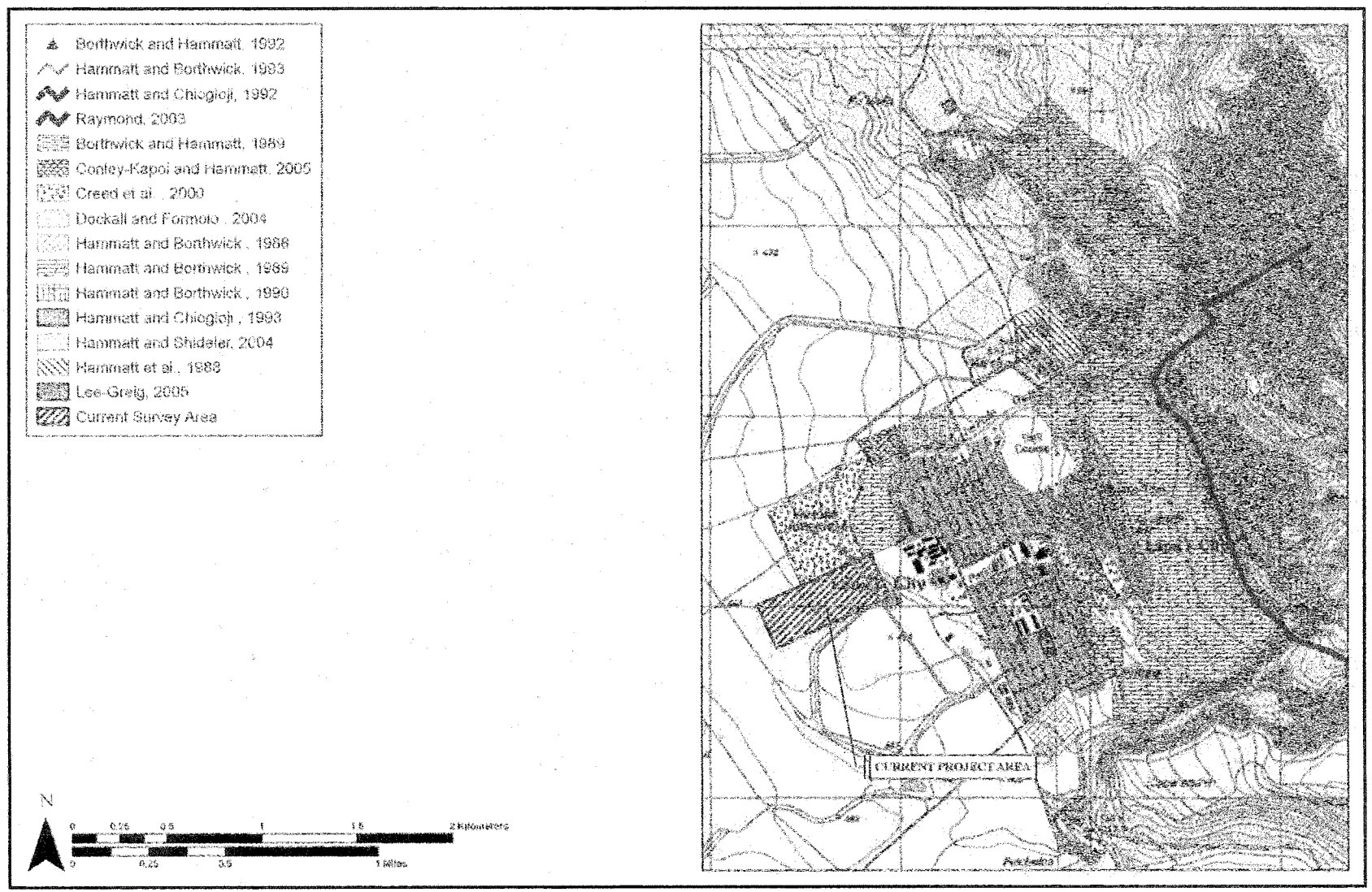

Figure 10. A Portion of the South Lāna'i 7.5-minute U.S.G.S. topographic quadrangle showing the locations of previous archaeological investigations and current project area.

Of the studies summarized in Table 3 above, four archaeological studies were carried out within and directly adjacent to the current project area. An archaeological reconnaissance was conducted of three areas consisting of the Kō'ele Golf Course; the Kō'ele Single Family Housing; the Queens Multi-Family; and the Waialua Annex Subdivision (currently known as the Olopua Woods Subdivision) (Hammatt and Borthwick 1989). Pertinent to this study is the reconnaissance of the planned 30-acre Waialua Annex Subdivision (Hammatt and Borthwick 1989:27). The pedestrian reconnaissance identified a single concentrated surface scatter of road gravels, modern trash (bottle glass and spent gun cartridges) intermixed with basalt flakes (Hammatt and Borthwick 1989:28). The presence of the scatter on the surface and mixed nature of the materials indicated that the scatter was a secondary deposit likely transported through mechanical means with the roadbed gravels (Hammatt and Borthwick 1989:28). Observations of the nearby Iwiole Gulch embankments clearly showed the pineapple plow zone ranging from 30-70 cm thick with black plastic fragments (Hammatt and Borthwick 1989:28). This range for the plow zone is consistent with soils documented during backhoe testing conducted for the expansion of the Kanepu'u Subdivision (Conley-Kapoi and Hammatt 2005; see also Figure 10).

In 1992, CSH conducted an investigation and archaeological monitoring of a short length of sewer line within the Waialua Annex Subdivision following the completion of the above reconnaissance (Hammatt and Chiogioji 1992). An inspection of the surface following initial grubbing resulted in no significant findings. During this project site inspection, the material scatter identified during the reconnaissance was not relocated likely due to the ongoing grubbing activities at that time (Hammatt and Chiogioji 1992). Inspection of soil stratigraphy of the sewer line trenches also confirmed the observations made during the reconnaissance survey that the upper stratum (0-75 cm) represented the highly disturbed plow zone consisting of material associated with commercial pineapple cultivation (Hammatt and Chiogioji 1992:5-8). No historically significant cultural materials were identified during the inspection of the sewer line trench sidewalls (Hammatt and Chiogioji 1992:8).

Hammat and Borthwick (1993) conducted an archaeological inventory survey approximately 13,000 feet of sewer line, which traverses the northeastern portion of the current survey area, for the proposed Kō'ele Waste Water Treatment Project. While special attention was given to locating flake or midden scatters in the former pineapple fields, no evidence of pre-contact activity was identified within the project corridor (Hammatt and Borthwick 1993:16).

Finally, an inventory survey of a fifty-acre Department of the Hawaiian Home Lands parcel (Creed et al. 2000) in former pineapple lands in northwest Lāna'i City was conducted by CSH. With the exception of some historic debris associated with Lāna'i's first airport and modern trash (car parts, PVC pipe fragments, and other trash) the inventory survey found nothing of significance (Creed et al. 2000:18).

3.3 Background Summary and Predictive Model

The thick soils of the plateau lands of central Lāna'i were in traditional use for dryland agriculture. This use, although fading, continued into the mid 1850s and is reflected in the *kuleana* testimony for Kamoku and the adjacent *ahupua'a* that mention cultivation of sugar cane, sweet potatoes and gourds. It is not coincidental that all of the LCAs in Kamoku, Kalulu and Kaunolū are well above 1,000 feet in elevation where rainfall was adequate to support dryland

crops. Physical remnants of this settlement in along this wetter elevation was identified during Emory's island-wide survey (1924) where house sites were found *mauka* and along the base of Lānaihale, the ridge crest of Lāna'i Island of the current project area.

Before widespread pineapple cultivation, traces of the ancient upland forest were observed as late as the early 1900s (Gay 1964:51). Clearly the precontact agricultural pattern involved forest clearing, probably including slash-and-burn methods.

During the mid-to late-1800s the plateau was transformed to open grassland as grazing of goats and later sheep became a dominant land use. In the late 1920s, after successful experimental planting, the entire plateau area of Lāna'i was eventually plowed for large-scale commercial pineapple cultivation.

Lāna'i City was constructed in the 1920s as an entirely new residential area, specific to the Dole Pineapple Plantation. The city has been expanded upon recently in association with the changeover to tourism as the main economic force on Lāna'i City and the increasing need for housing.

Archaeological and historical data suggest that the project area and adjacent areas were suitable for both dryland agriculture and habitation. In Emory's 1920 survey of Lāna'i, house sites were documented within the Kamoku Ahupua'a less than a kilometer to the north-north/west and less and two kilometers to the south-south/east in the adjacent Kalulu Ahupua'a (Figure 7). These habitation sites are located in areas with similar natural environments to that of the project area. The parcel is also situated at an elevation were rainfall was documented as being adequate to support dryland crops. For these reasons, it seems possible that precontact habitation and/or agriculture activities could have been conducted within the boundaries of the project area.

Previous studies in and around the vicinity have documented lithic scatters and/or artifacts in a disturbed context (Borthwick and Hammatt 1989 and Hammatt and Borthwick 1988 and 1989). In addition, there has been documentation of historic ranching era materials encountered in the Kō'ele region to the northeast. With the history of pineapple cultivation for more than 70 years within the project area, the chances of encountering an intact archaeological site, either surface or sub-surface would be nominal however. The agricultural activities would have destroyed or severely impacted all structural and/or subsurface deposits. While cultural material may be observed occasionally, their archaeological context would be anticipated to have been massively impacted if not completely destroyed.

Section 4 Results of Fieldwork

The pedestrian survey of the 42-acres was accomplished over a period of two days. On September 24th, 2008 the botanical survey and archaeological inventory survey occurred concurrently. The archaeological survey crew consisted of Mr. Gerald Park, Hallett Hammatt, Ph.D, Michael Willman B.A., and Tanya Lee-Greig, M.A., and occasionally encountered the project botanist Eric Guinther of AECOS Consultants. An additional day of survey was conducted and completed by Todd McCurdy, M.A. and Tanya Lee-Greig, M.A on November 17th, 2008. A total of six person days were required to complete the fieldwork for the archaeological assessment of this parcel.

4.1 Survey Findings

The vegetation of the project area consisted of dense, head high lantana and grasses resulting in poor overall ground visibility (Figure 11 and Figure 12). Patches of ground were visible in areas of low-growing patches of Christmasberry that have been subject to grazing by axis deer (Figure 13). These cleared areas were thoroughly inspected for indications of cultural activities represented by remnant traditional or historic era cultural materials. Over the course of the pedestrian survey, it became clear that the entire project area had been heavily modified by agricultural associated with commercial pineapple cultivation.

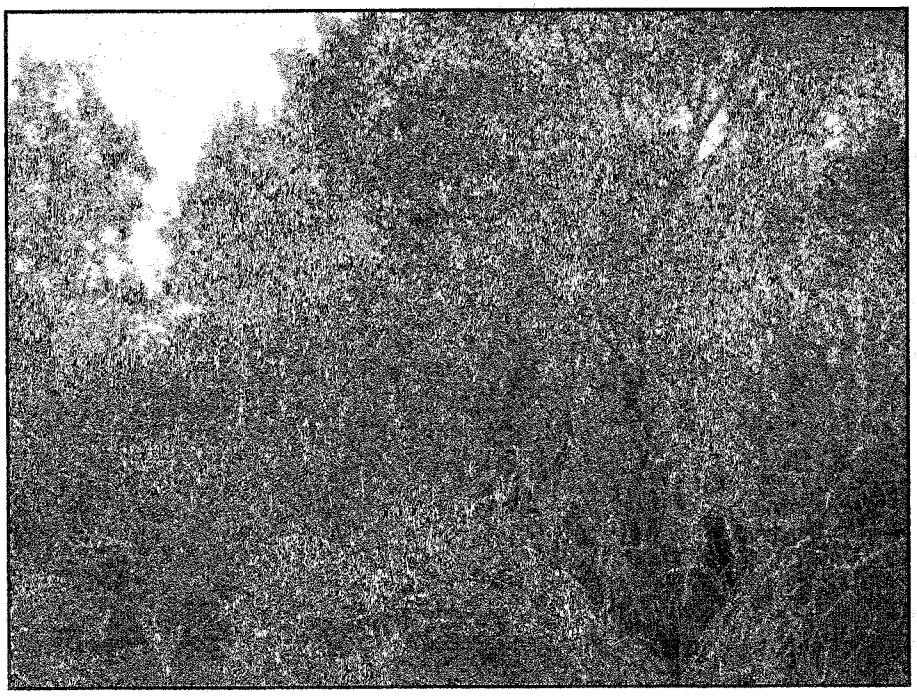

Figure 11. Project area, view to southwest from northeastern boundary, vegetation density typical.

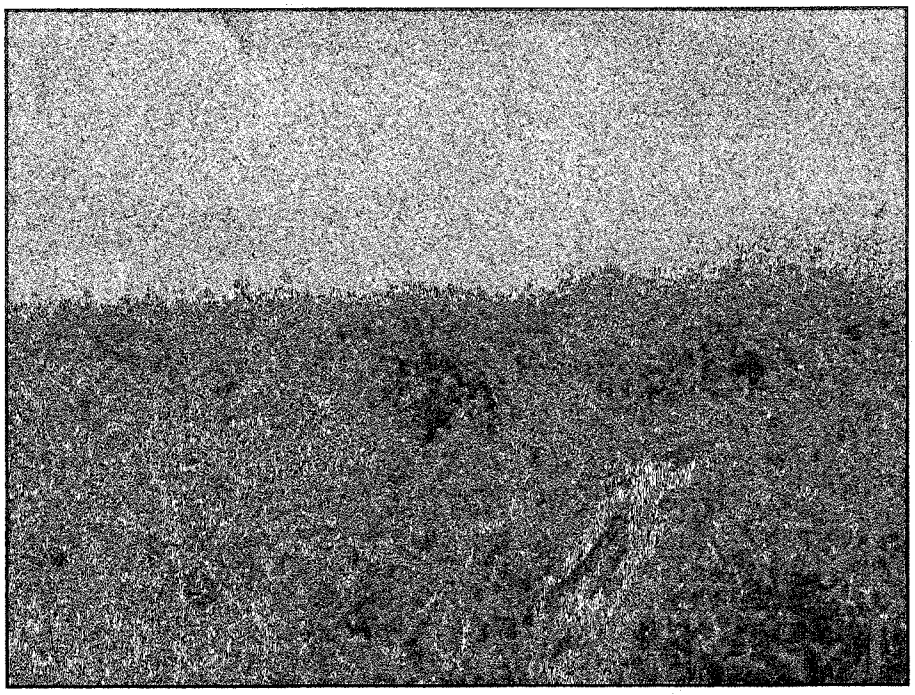

Figure 12. Project area, view to northeast from within the current project area, vegetation density typical.

Figure 13. Typical undergrowth in Christmas berry patches (E. Guinther photographer; Guinther 2008).

A single fenceline, was observed running 10° -190° across the project area and appears to have been associated with late pineapple cultivation (Figure 14). Construction of the fenceline consisted of seven strands of straight wire that were connected to the fence poles using fence staples (sometimes referred to as U-nails; Figure 15). The fence posts themselves consisted of milled wood poles and posts that were consistently 12 cm in diameter and 5 cm sq. respectively. This fenceline is in good condition and does not appear to have been degraded by weathering.

With the exception of the modern fenceline, scattered modern trash and remnants of pineapple cultivation (bottle glass, PVC pipe fragments, abandoned vehicle parts, and black plastic fragments) no significant historic properties or cultural materials were observed.

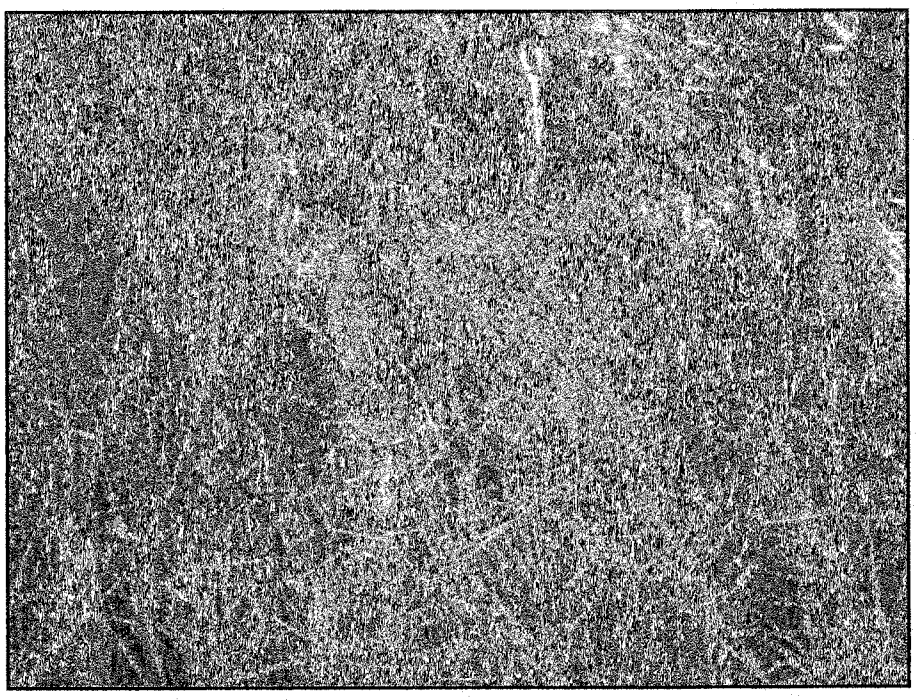

Figure 14. Modern era fenceline.

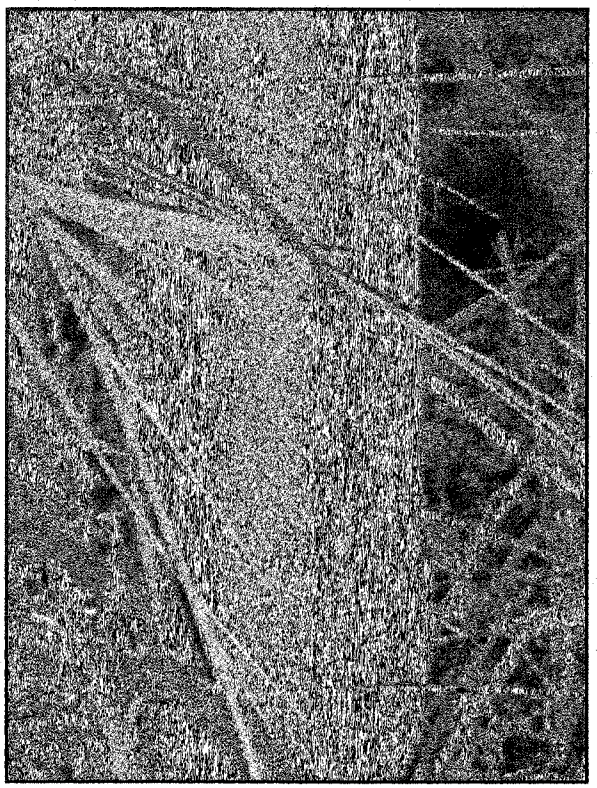

Figure 15. Method of fenceline wire attachment.

Section 5 Summary and Interpretation

The entire project area was examined for surface cultural materials through systematic pedestrian inspection resulting in no significant findings. It is clear from the document research and aerial photo analysis (see Figure 8 and Figure 9) that the current project area had been in continuous and active pineapple cultivation for at least 50 years, from the late historic period up into the modern era leaving little probability for significant historic properties on the surface or in a subsurface context. The single fenceline that was encountered during the pedestrian survey is interpreted as a post-1950s fenceline based on the condition of both the milled wood and wire strands. As the densely vegetated environment of the current survey area posed difficulties for mechanical subsurface testing and the high degree of ground modification within the project area indicates a low probability of *in situ* subsurface deposits within the project area, as evidenced by observations in neighboring parcels (Conley-Kapoi and Hammatt 2005; Creed et al. 2000:18; Hammatt and Borthwick 1993:16; and Hammatt and Chiogioji 1992), no subsurface testing was undertaken.

Section 6 Project Effect and Mitigation Recommendations

6.1 Project Effect

Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area and the lack of significant surface findings, the proposed project does not appear to impose adverse visual, auditory or other environmental effects to any known historic properties located on lands within and adjacent to the project area. Therefore, CSH recommends a project specific effect determination of "no historic properties affected."

6.2 Mitigation Recommendations

While the pedestrian survey did not identify any significant surface historic properties at the time of the survey, it should be noted that poor ground visibility throughout the majority of the project area made the identification of low density surface artifact scatters difficult to recognize, if such site types are indeed present within the project area. Therefore, it is recommended that precautionary archaeological monitoring of the initial grubbing activities associated with the proposed project be instituted as a means to thoroughly evaluate the current project area for historic properties. Continuation and/or termination of the monitoring program following grubbing activities should be re-evaluated with SHPD based on the initial monitoring findings.

6.3 Disposition of Materials

All data generated during the course of this work (i.e. forms and digital photographs) are currently housed at the Maui office of Cultural Surveys Hawai'i, Inc. 1993 Main Street, Wailuku, Hawai'i 96763.

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APPENDIX C

Cultural Impact Assessment for the Lānaʻi High and Elementary School Expansion Project in Kamoku Ahupaʻa, Lahaina District, Island of Lānaʻi Island, TMK (2) 4-9-002: 058 por. and (2) 4-9-014: 002.

Cultural Impact Assessment

for the Lāna'i High and Elementary School

Expansion Project in Kamoku Ahupua'a, Lahaina District, Island of Lāna'i

TMK: (2) 4-9-002:058 (por) and (2) 4-9-014:002

DRAFT

Prepared for

Gerald Park Urban Planner

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Management Summary

Reference	Cultural Impact Assessment for the Lāna'i High and Elementary School Expansion Project, Kamoku Ahupua'a, Lahaina District, Lāna'i Island [TMK: (2) 4-9-002: 058 (por.) and TMK (2) 4-9-014: 002]
Date	August 2009 DRAFT
Project Number (s)	CSH Job Code: Kamoku 4
Project Location and Land Jurisdiction	The subject project site is located in Lāna'i City. The expansion site is a 50 acre parcel which extends southwest of the existing school site. The proposed project area is located south of the Department of Hawaiian Home Lands Kamoku Homestead parcel.
Agencies	State of Hawaii Department of Education
Project Description	The Lāna'i High and Elementary School expansion area is located southwest and adjacent to the existing school and includes a County of Maui park and fallow pineapple field. Lāna'i High and Elementary School master plan will guide the schools expansion over the next 25 years. The full build-out of this plan would include the development of a Pre-school, Elementary School, Middle School, High School and Community College all located on the subject project site.
Project Acreage	50 Acres
The region of influence (ROI), hereafter referred to as the "study area".	The study area will include the *ahupua'a* of Kamoku focusing on the upland region that includes Lāna'i City, Kō'ele, Kaiholena and Nininiwai.
Fieldwork Effort	A site inspection was conducted on March 18, 2009 and interviews were conducted between March and April 2009.

Recommendation	The Lāna'i High and Elementary School expansion is viewed positively by the community as a necessary improvement to Lāna'i's primary educational facility. Those consulted for this cultural impact statement support the expansion and there are no known traditional, historic or modern day practices that would be negatively impacted by the project. The school expansion is viewed as an enhancement to the community as it will build on their historically strong support for the school and the overall education of their children. As a result of the consultation process, it was found that no traditional or cultural resources will be adversely impacted by the proposed school expansion. In contrast, the school expansion will add to this community's tradition and pursuit of education. As noted above, Hawaiian stone artifacts have been found throughout the general area that includes the present project area. It is thus recommended that the project implement the archaeological monitoring procedure outlined in the companion archaeological inventory survey report prepared by Cultural Surveys Hawai'i for the Lāna'i High and Elementary School expansion project.

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Section 1 Introduction

1.1 Project Background

At the request of Gerald Park Urban Planner, on behalf of the Hawai'i State Department of Education (DOE), Cultural Surveys Hawai'i, Inc. (CSH) conducted a cultural impact assessment for the Lāna'i High and Elementary School expansion project. The current study area includes the *ahupua'a* of Kamoku, and focuses on the upland regions that include Lāna'i City, Kō'ele, Kaiholena and Nininiwai all located in the Lāhaina District, Lāna'i Island (TMK [2] 4-9-002:058 por.) (Figure 1, Figure 2 and Figure 3). More specifically, the project expansion parcel is located to the southwest of Fraser Avenue and Lāna'i High and Elementary School. The expansion area includes a County Park (TMK [2] 4-9-014: 002) and undeveloped, fallow pineapple fields.

The Department of Education, State of Hawai'i, has prepared a Lāna'i High and Elementary School Master Plan to guide the physical expansion and development of the school over the next 25 years. This Master Plan proposes to use the existing school facilities and grounds and approximately 50.0 acres of land adjoining the existing campus to accommodate the proposed expansion that incorporates the P-20 concept where learning can begin before pre-school and extend well beyond college. Inherent in the P-20 concept is the close proximity of Pre-School, Elementary School, Middle School, High School, Community College, associated athletic complexes and faculty housing, whereby components of each educational level are located on one campus, thus resulting in several campuses on a single property. These campuses are separated to maintain safety and security for students of all ages but are still linked to unify the separate schools into one educational complex.

The County of Maui proposes to transfer approximately 50.017 acres to the Department of Education, State of Hawaii for the proposed expansion. The acreage is derived from two separate parcels. One parcel of 8.017 acres (TMK [2] 4-9-014: 002) is a County park adjoining the school. The park, which is improved with a softball field, basketball courts, tennis courts, and a play structure, is shared with the school. The second parcel of approximately 42 acres is a portion of TMK (2) 4-9-002: 058 that is currently comprised of 115 acres of vacant agricultural lands. The cultural impact assessment has been conducted per the State of Hawai'i Environmental Regulations.

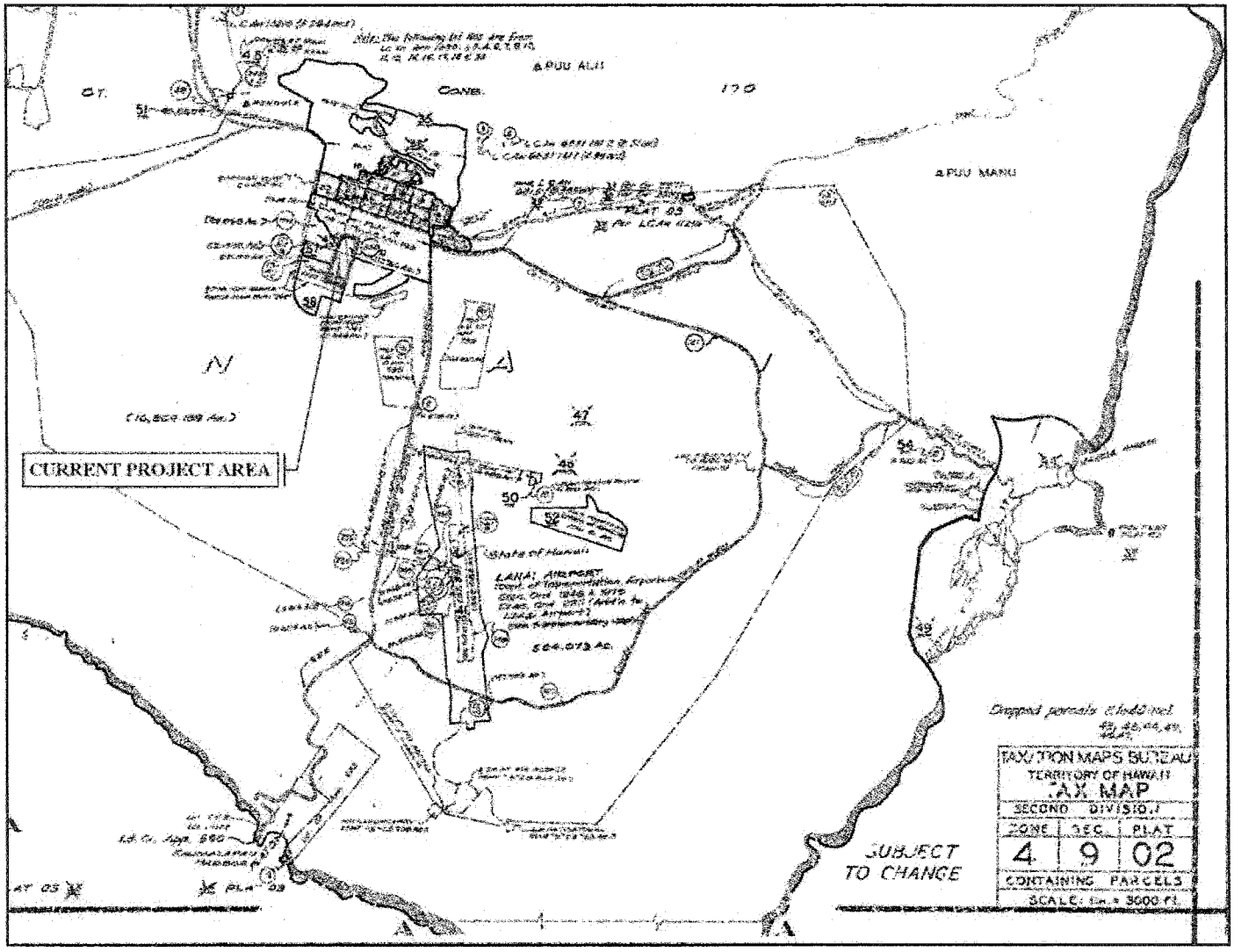

Figure 1. A portion of TMK 4-09-02 showing location of project area (delineated with red diagonal hatching)

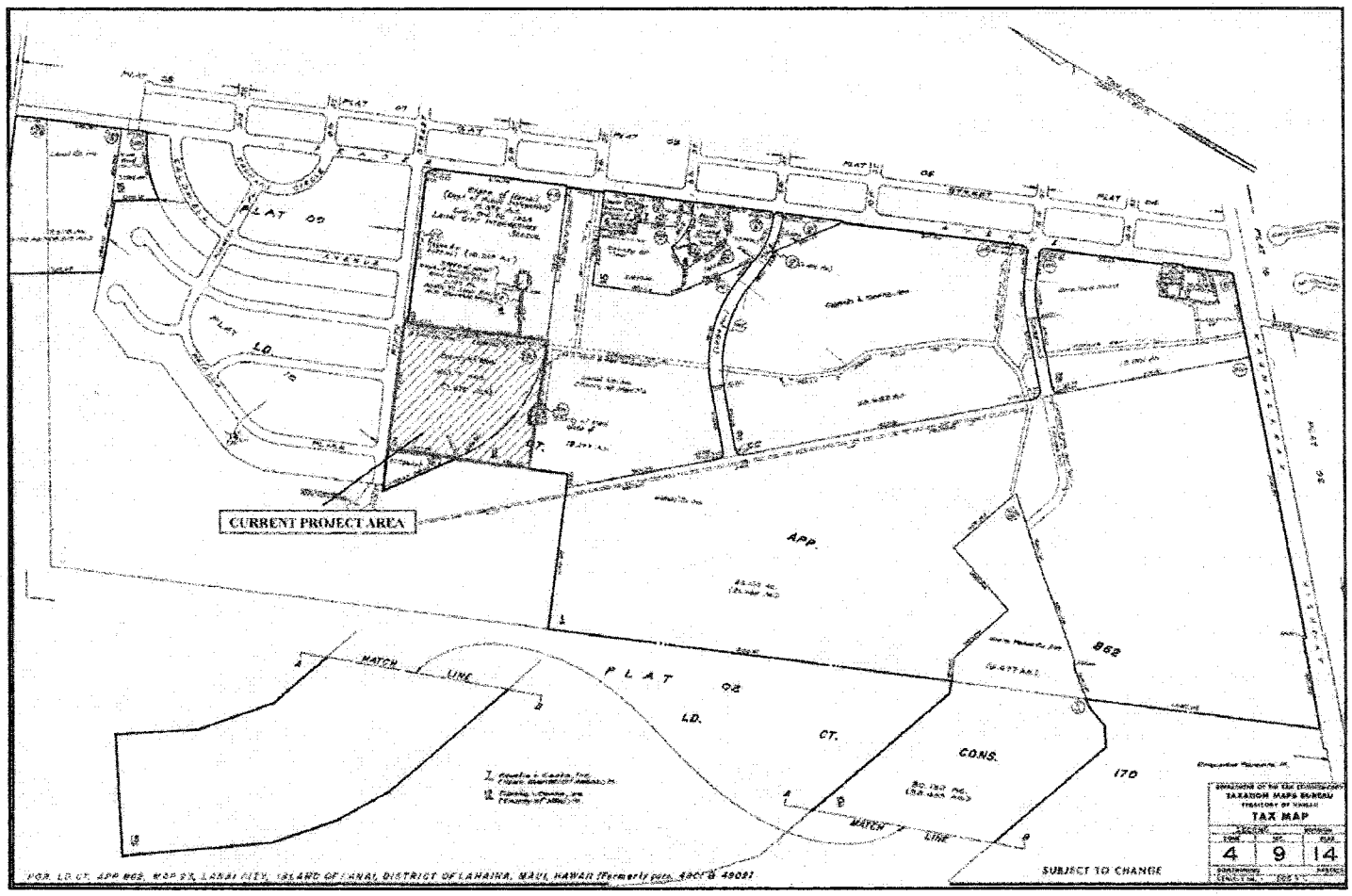

Figure 2. A portion of TMK 4-09-14 showing location of project area (delineated with red diagonal hatching)

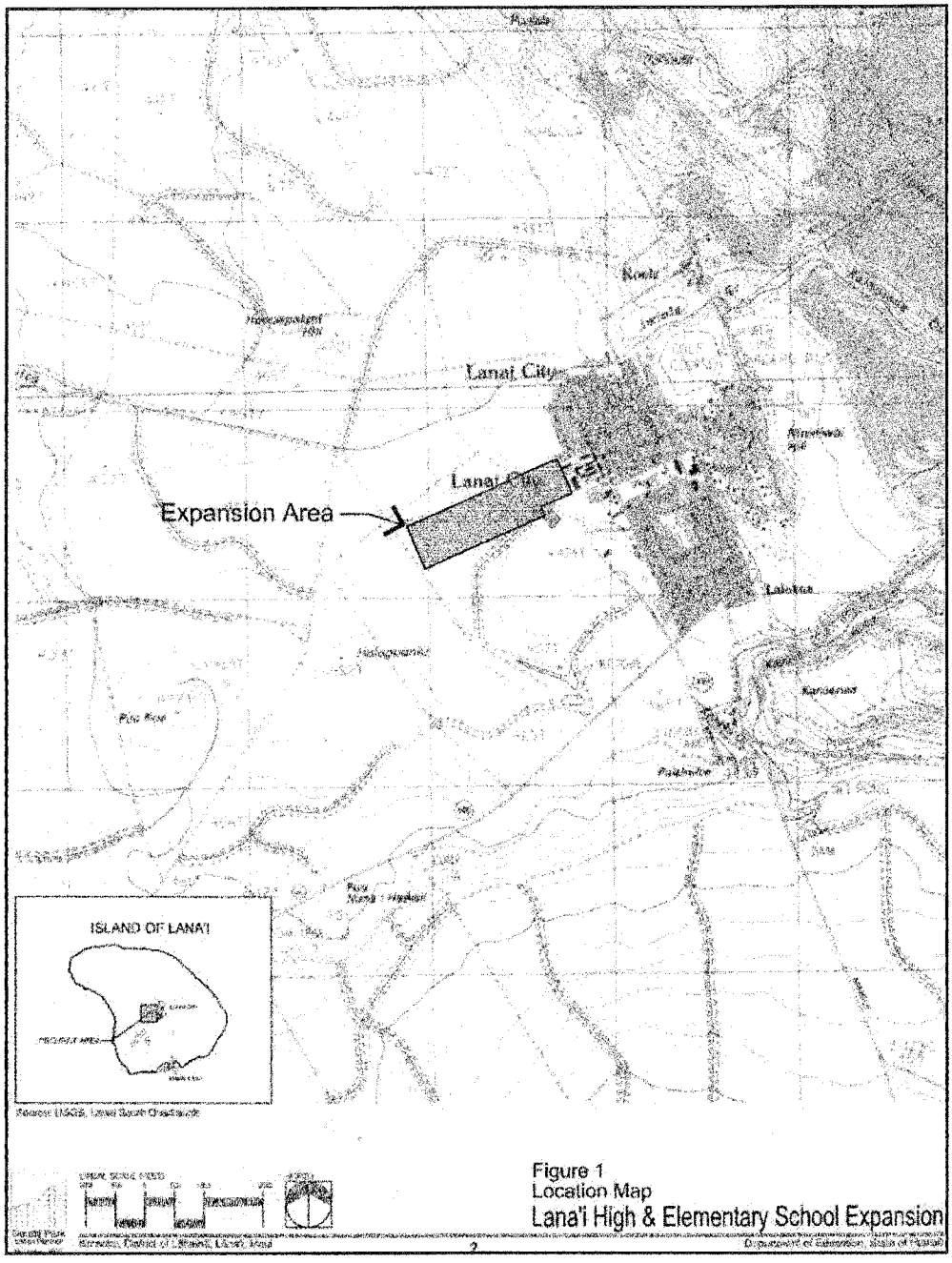

Figure 3. Topographic map showing the location of the current project area (figure provided by Gerald Park Urban Planner).

1.2 Scope of Work

The scope for the cultural impact assessment is summarized as follows:

1. Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plants, animal and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of the existing archaeological information pertaining to archaeological sited within the study area to reconstruct traditional land use activities and to identify and describe the cultural resources, practices, and beliefs associated with the parcel and identify present uses, if appropriate.
3. Interviews with persons knowledgeable about the past and present cultural practices in the project area and its surrounding area. We anticipate both formal and informal interviews.
4. Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed undertaking on the cultural practices and features identified.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is situated within the upper plateau region of Lāna'i island, just to the southwest of Lāna'i City. Elevation ranges between 460 to 480 feet above mean sea level (amsl) where the temperature ranges between 60° and 80° F. The sediments of the area are of the Waihuna Series. This series consists of well drained and moderately well drained soils on alluvial fans and in depressions. More specifically, the sediments within the project area are Waihuna clay (WoA), which is the most extensive soil in the series. In a representative profile, the surface layer is about 34 cm thick and underlain by relatively soft, weathered pebbles and stones. The soil is strongly acid in the surface layer due to pineapple cultivation (Foote et al. 1972:129).

With the entire island lying in the rain shadow of Mauna E'eka (the West Maui Mountains) on Maui and winds across Lāna'i Island dominated by consistent northeasterly trades, the overall environment of the island as a whole is one of drier leeward environment. The average annual rainfall in the area ranges from 25-35 inches (699-800 mm) with the heaviest rains in January and the lightest in June. This growing environment currently supports a vegetation community where the dominant plant species within the previously cultivated pineapple field consist of a dense growth of Lantana (*Lantana camara*) and low-growing or "scrubby" Christmas berry (*Schinus terebinthifolius*) trees. Also abundant within the project area are Guinea grass, Balloon plant (*Asclepias physocarpus*), 'Uhaloa (*Waltheria indica uhaloa*), and sourgrass (*Digitaria inslularis*).

1.3.2 Built Environment

The primary features of the nearby built environment included the playing fields and playground associated with the county park to the northeast and the Hawaiian Homestead turn-

key lots to the north. Overall development surrounding the project area is nominal as the majority of the study area is surrounded by fallow pineapple fields.

Section 2 Methods

This section details the methods used by CSH personnel during the fieldwork and preparation of this cultural impact assessment. Interviews and consultation was conducted by lead researcher, Colleen Dagan, B.S. and contributing researcher Tanya L. Lee-Greig, M.A. under the overall guidance of Hallett H. Hammatt, Ph.D. Field inspections, interviews and consultations were accomplished over a three month period from March 2009 to June 2009. Document research was conducted by the researchers named above with contributions from Robert H. Hill, B.A.

2.1 Document Review and Research

Numerous published and unpublished accounts, surveys, reports, maps and photographs found in public and private collections pertaining to Lāna'i City and the study area were investigated by Cultural Surveys Hawai'i Inc. English language historical documents, maps, and archaeological studies were researched at the DLNR/SHPD library, the Survey Office of the Department of Accounting and General Services (DAGS), the Maui County Planning Department, and the Cultural Surveys Hawai'i (CSH) library; in addition to private collections held by others in the community. Research regarding the history of the Hawaiian Pineapple Company was conducted using the services of the Bailey House Museum, in Wailuku, Maui. Online research regarding the past and present cultural landscape of Lāna'i Island by Kepā Maly and the online resources of the Lāna'i Culture and Heritage Center (Maly 2009) were utilized for current information regarding the traditional history of the island. Online reports of meetings of Hui Mālama Pono O Lāna'i were accessed at http://huimalama.tripod.com. In addition, all relevant Land Commission Awards (LCA) and Royal Patents were researched using resources associated with the Waihona 'Aina online database (Waihona 'Aina Corp. 2002) and Lāna'i Culture and Heritage Center (Maly 2009).

2.2 Scoping and Community Outreach

2.2.1 Government Agencies, Advisory Councils and Local Community Organizations

In order to identify individuals with knowledge of the traditional cultural practices of the study area of the proposed project, CSH initiated contact with government agencies, advisory councils, and local community organizations (See Section 4 Community Consultations). Letters and project area maps showing the location of the Lāna'i High and Elementary School expansion area were mailed out with the following accompanying text:

> Aloha, Cultural Surveys Hawai'i Inc. (CSH), a Hawai'i-based archaeological company, is conducting a Cultural Impact Assessment (CIA) for the Lāna'i High and Elementary School Expansion project. The project description is as follows:
>
> The Department of Education, State of Hawai'i, has prepared a Lāna'i High and Elementary School Master Plan to guide the physical expansion and development of the school over the next 25 years. The Master Plan proposes to use the existing school facilities and grounds and approximately 50.0 acres of land to the west of the existing campus to accommodate the proposed expansion.

Lana'i High and Elementary School is bordered by Fraser Avenue on the east, Lāna'i Park and Tennis Courts on the west, a County of Maui recreation complex on the south, and 5th Street and the Department of Hawaiian Home Lands Lāna'i Residence Lots subdivision on the north.

The County of Maui proposes to transfer approximately 50.017 acres to the Department of Education, State of Hawaii for the proposed expansion. The acreage is derived from two separate parcels. One parcel of 8.017 acres (TMK 4-9-014: 002) is a County park adjoining the school. The park, which is improved with a softball field, basketball courts, tennis courts, and a play structure, is shared with the school. The second parcel of approximately 42 acres is a portion of tax map key 4-9-002: 058 comprising 115 acres. Currently, this acreage is vacant, fallow land that was previously used for pineapple cultivation. A Location Map is attached.

The Lāna'i High and Elementary School Master Plan incorporates the P-20 concept in which learning can begin before pre-school and extend well beyond college. Pre-School, Elementary, School, Middle School, High School, and Community College components are located on one campus, resulting in several campuses within a campus. These campuses are separated to maintain safety and security for students of all ages but are still linked to unify the separate schools into one educational complex. The proposed Lāna'i High and Elementary School Master Plan is attached.

Construction costs over the 25 year life of the Master Plan are estimated at $17.4 million (2008) and will be funded by the State of Hawaii. Phased construction of facilities is anticipated based on educational needs, availability of State funds, and funding priorities.

The region of influence (ROI), hereafter referred to as the "study area", will include the *ahupua'a* of Kamoku which incorporates the existing Lāna'i High and Elementary School campus and the proposed expansion area. If, throughout the course of research, CSH identifies traditional cultural practices significant to the study area that are outside the above described boundaries, CSH will include research of those areas.

The purpose of the cultural impact assessment is to identify and evaluate any potential impacts to traditional cultural practices occurring within the ROI that may result from the proposed project.

We are seeking your *kōkua* or help and guidance regarding the following aspects of our study:

General history and present and past land use of the study area.

Knowledge of cultural resources within the project area which may be impacted, including traditional plant gathering sites, historic sites, archaeological sites, and burials.

Knowledge of traditional gathering practices in the area – both past and ongoing.

Cultural associations of the project area, such as legends and traditional uses.

Referrals of *kūpuna* or elders who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua`a* lands.

Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the Lāna'i High and Elementary School Expansion area.

I invite you to contact me, Colleen Medeiros Dagan B.S., at 1-808-242-9882. You may also contact me by e-mail at cdagan@culturalsurveys.com if you have any information or *mana'o* that you are willing to share.

Section 3 Background Research

The division of Lāna'i into political districts may have occurred under the direction of the chiefs of Maui, as Lāna'i historically appeared to be "subject or tributary to Maui" during the times of Kamalalawalu (about 1550-1600 AD) (Fornander 1919 Part I: 206-8). The island was apportioned into the following thirteen *ahupua'a* land divisions that were established during traditional times: Ka'ā, Kamoku, Kalulu, Kaunolū, Keāliakapu, Keāliaaupuni, Pālāwai, Kāma'o, Ka'ohai, Pawili, Maunalei, Mahana, and Paoma'i. Unlike *ahupua'a* divisions of the other seven major islands of the Hawaiian chain, some of the *ahupua'a* divisions on Lāna'i Island have the unique characteristic of traversing across the island from one coastline to the other (Hawai'i Department of Survey 1903:66; Figure 4). The current project area is located along the upper plateau of Kamoku Ahupua'a within the *mokupuni* of Lāna'i (Moffat and Fitzpatrick 1995:23).

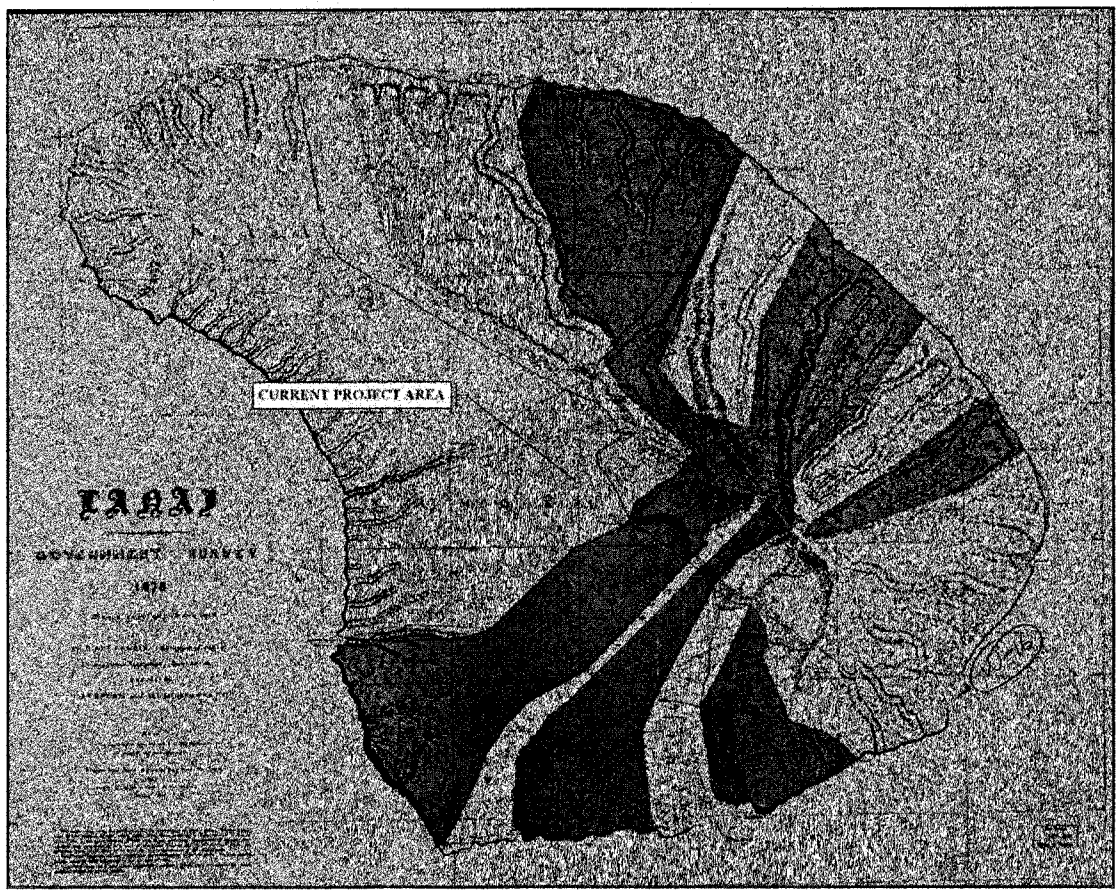

Figure 4. The J. F. Brown and M. D. Monsarrat map (1878) showing Kamoku Ahupua'a as a traditional land division of the island of Lāna'i (crown land in yellow, government lands in green).

The *ahupua'a* of Kamoku is representative of the traditional *ahupua'a* formation from ocean to mountain and includes 8,291 acres of the western portion of Lāna'i from the shoreline upslope to the base of the high northwest to southeast trending ridge crest of the island. The following

description of Kamoku Ahupua'a was presented in Part 3 of the *Hawaiian Investigation* to the U.S. Senate Committee on Pacific Islands and Porto Rico (1903:1340):

> The ahupua'a of Kamoku on this island is a large and valuable tract extending from the sea to the top of the mountain ridge where a good supply of drinking water from a spring is obtained not far from the Gibson homestead. The government road crosses the land a short distance below the homestead. From this point commences a beautiful stretch of country extending for miles around. The soil is very rich and is capable of producing large crops of corn and potatoes.

3.1 Traditional Historical Background

The most comprehensive summary of traditional accounts pertaining to the "formation of Lāna'i, first habitation, general traditions, early history and place names" appears in Kenneth P. Emory's *The Island of Lāna'i: A Survey of Native Culture* (1924). Emory suggests through "genealogies and traditions" that Lāna'i "began to be populated by important numbers about 1400 A.D." (Emory 1924:123). Based on the number of house sites he observed and approximately five persons per household, Emory estimated the pre-1778 population of the island at around 3,000 (1924:122). The traditional life style focused on subsistence farming and fishing within the context of the *ahupua'a* or traditional land unit.

3.1.1 Mythological and Traditional Accounts

Before being inhabited by humans, Lāna'i was inhabited by spirits. The gods Kane, Kanaloa and their younger brother Kaneapua lived at Kaunolu. After drinking water from a spring in which Kaneapua had accidentally urinated in, the two brothers Kane and Kanaloa left Kaneapua alone on Lāna'i. It is then said that Kaneapua had a cousin Halulu who was a bird monster. Halulu lived in a cave on a cliff where he ate men for food (Emory 1992: 12).

Back on Maui, a mischievous boy named Kaululaau lived at Lele (Lahaina). Kaululaau was the son of the Maui chief Kakaalaneo and he was said to have nearly decimated the breadfruit population of Lele. He did this by pulling the trees out by the roots to attain the hard to reach fruits. His father became worried that the people of Lele would soon lose this food source if his son was not controlled and had him abandoned on Lāna'i to live with the spirits. But his prankster mind was able to fool the spirits there. Kaululaau was able to deceive the spirits. They could not find him while he slept to kill him and they all died off from the work of trying to find Kaululaau (Emory 1924: 13-14).

From this time on, Lāna'i was able to be inhabited by man. It is said that this time would have been around 1400 A.D., when the upland area of the Kamoku Ahupua'a began to be cultivated for traditional Hawaiian agricultural crops. This area of upland forest was a location where soils were rich and water was available to support native dry land crops such as sweet potato, yams, dry land taro as well as more lush fruits found in the valleys such as bananas. Native forest plants and trees could also be easily accessed from this location.

With the war between Kalani'ōpu'u and Kahikili and the formers raid on Lāna'i in 1778, Lāna'i lost a vast segment of its agriculturalists. With the population decimated and the crops exhausted by Kalani'ōpu'u's army, these agricultural lands became windswept and barren never

to be cultivated in the traditional way by Hawaiians again. Mr. Samuel Kamakau makes a statement expressing that the devastated landscape is a scar of past wars (Kamakau 2002: 90-91).

In terms of place names and people that may be related to various mythological and traditional accounts for Lāna'i, Tomonari-Tuggle and others (2000:23) noted that there are no royal genealogies that are preserved and only a few of the names of Lāna'i chiefs are mentioned in the traditions. Literal translations of several of the place names for land areas near to the project area are listed below (see also Figure 5). Most translations are taken from Emory (1924) supplemented by Pukui and others (1974) where appropriate:

Table 1. Kamoku Ahupua'a Place Names

Kamoku	*Lit.*, the district or the cut-off portion (Pukui et al. 1976:82); the piece cut off (Emory 1924:31)/
Kō'ele	*Lit.*, dark sugar cane (Pukui et al. 1976:114); Place seized by a chief (Emory 1924:33)
Hulupu'uniu	Whirling feather hill (Emory 1924:30)
Hokuao	Morning star (Emory 1924:29)
Makapaia	Enclosed eyes (Emory 1924:34)
Pu'u Nana o Hawai'i	Hill to view Hawai'i (Emory 1924:36)
Keaaku	The standing root (Emory 1924:32)
Pulehuloa	Big roasting (Emory 1924:36)
Kaumaikahoku	The stars are out (Emory 1924:32)
Kaiholena	The iholena banana (Emory 1924:31)

Hawaiian place names typically tell the story or significance of an area. Three place names near the project area may give some insight as to how this place was utilized in traditional times. These place names include Hōkūau, Kaumaikahōkū, Pu'u nānā i Hawai'i.

Hōkūau is located near the eastern corner of the proposed school expansion area. Hōkūau translated means "morning star" and is located on plateau lands (Emory 1924: 29). It is further described as the name given to Venus when seen in the morning (Elbert and Pukui 1986:76). Possibly, this was a good spot from which to view Venus just before dawn. Kaumaikahōkū is located approximately one half mile south of Lāna'i City. Its name means "The stars are out". Emory notes that this name describes the normally cloudless skies above this place (1924: 32). Approximately two miles west of Kaumaikahōkū, is Pu'u nānā i Hawai'i. This would be the "Hill to view Hawai'i (Emory 1924:36). From this place, it appears that one might have a view of Hawai'i to the southeast. These three place names seem to indicate that these specific upland areas were excellent viewing vantage points.

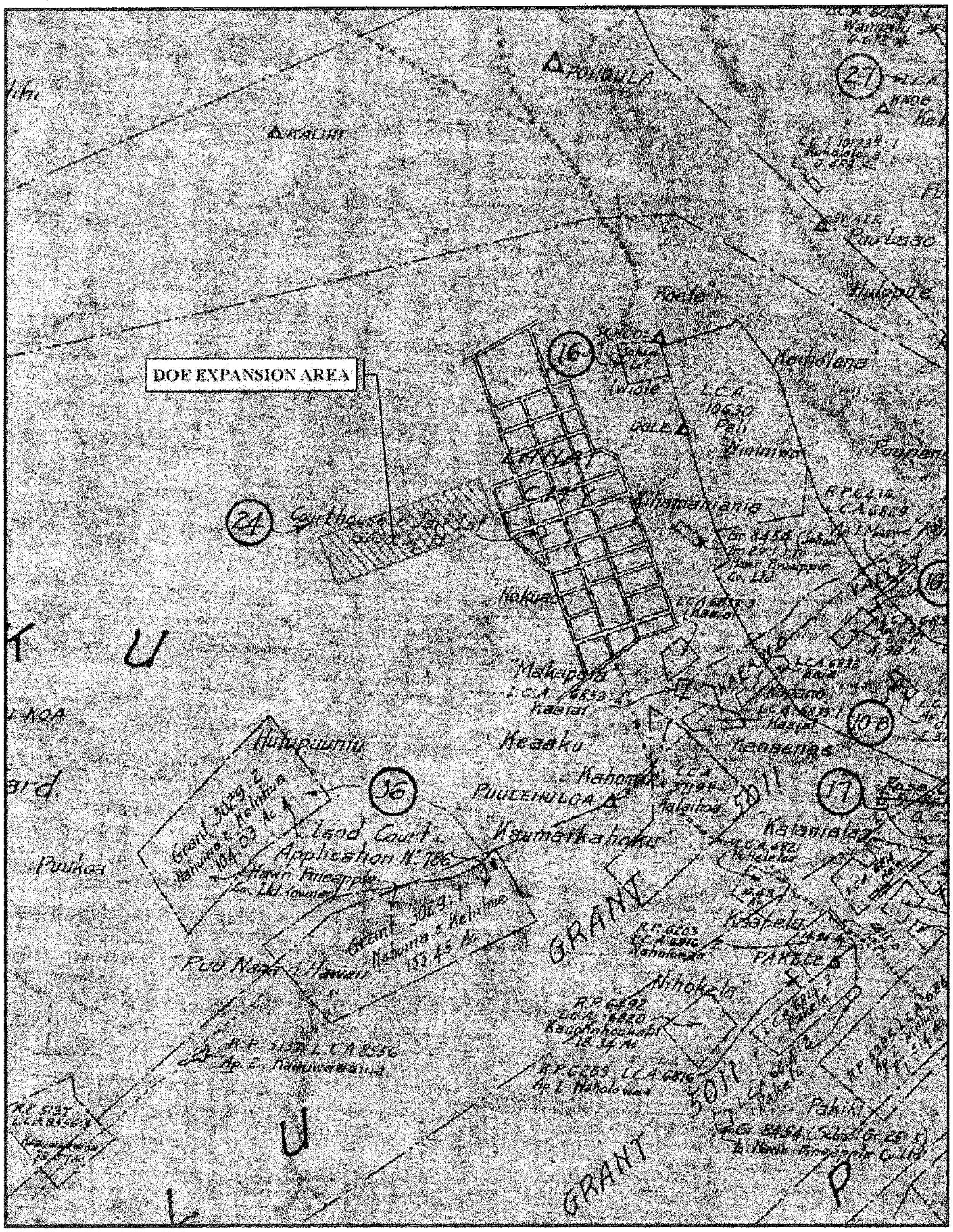

Figure 5. Hawaiian Pineapple Company, Ltd. (1929) survey map showing, place names, areas of Land Commission Awards, and development of Lāna‘i City relative to the current project area.

Prior to Polynesian occupation, the current project area was probably below the fringe of the native Hawaiian forest. Even in the early 1900s vestiges of this forest could be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (Gay, 1965:51). Clearing of this forest was undoubtedly initiated by the traditional Polynesian agriculturist. In Emory's 1920 survey of Lāna'i, he did not observe any house sites within the project area but noted that the upper plateau lands were utilized intensively for agriculture (Figure 6). Not only was the project area likely below the fringe of the forest line it was also likely below or *makai* of the lands used for intensive traditional agriculture.

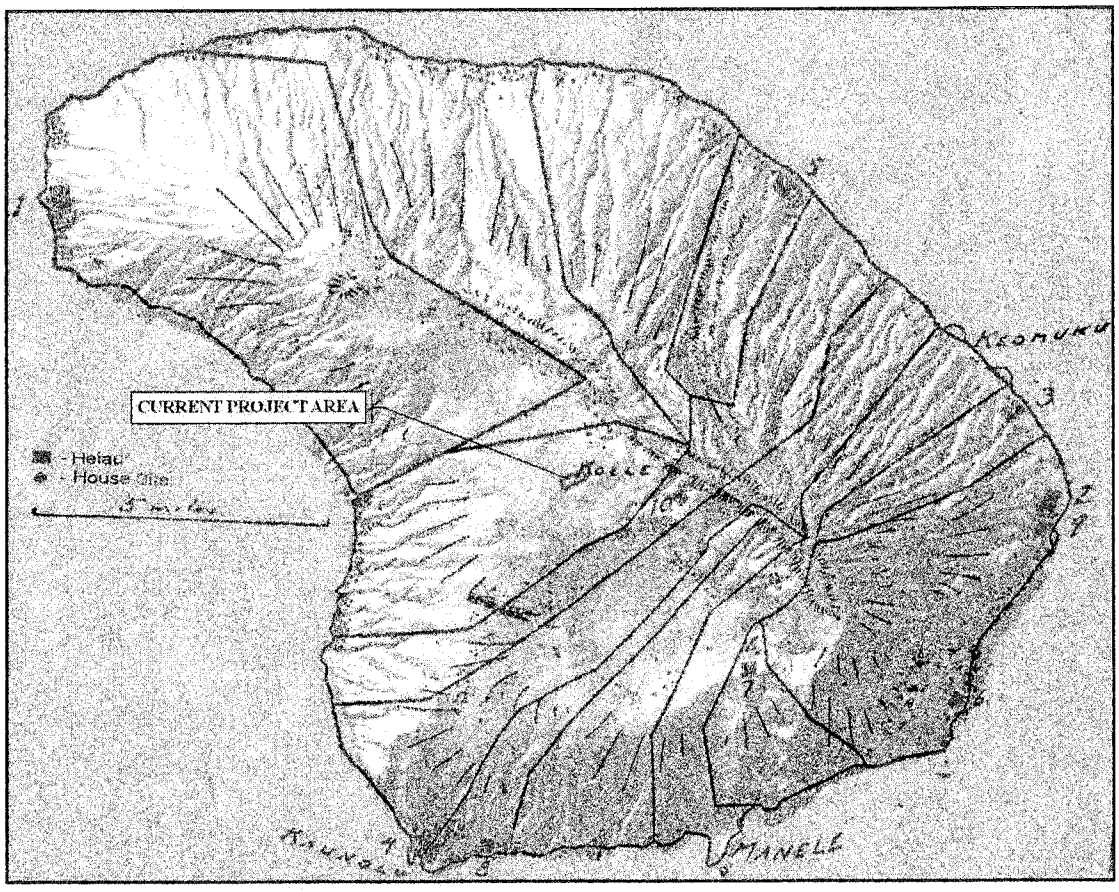

Figure 6. Map of Lāna'i showing *ahupua'a* and the distribution of house sites and *heiau* known to Kenneth Emory in 1921 in relation to the current project area (green dots represent visible house sites, rectangles correspond to *heiau* locations, and the numeric reference ranks the *heiau* [brown rectangles] according to size). (Emory 1924:49)

Early historical accounts of Lāna'i attest to the general barrenness and small population (Ellis 1963, Menzies 1920). However, in 1779 Capt. King of the Cook expedition related that Lāna'i "appeared to be well inhabited" and "that it abounds in roots such as yams, sweet potatoes and tarrow" (Emory 1924:6). Emory deduced that the differences in these early descriptions were probably due to the devastating raid on Lāna'i and Kaho'olawe by Kalani'ōpu'u. The *ahupua'a* of Kamoku figures prominently in the recollections of this raid. S.M. Kamakau writes:

> During Kalani'ōpu'u's occupancy of Lāna'i, the food ran out, and the men had to eat the root of a wild plant called *kūpala*, this had a loosening effect upon the bowels when eaten in quantity. The war is therefore called "The-land-of-loose-bowels (Kamoku-Hī)" and it is a war still talked of [circa 1866] among the descendants on Lāna'i (Kamakau 1992:91).

Kamoku refers to the *ahupua'a* where the *kūpala* grew thick, and *Hī* refers to a form of dysentery/diarrhea that could result from eating too much *kūpala*. "*Kūpala*" may refer to a variety of famine foods such as an endemic cucurbit (*Sicyos pachycarpus*), and a wild sweet potato or morning glory (Pukui and Elbert 1986:184).

Another explanation of the name of the district "Kamoku - the piece cut off" suggested to Emory that the etymology and history of a similarly named *ahupua'a* in the Hamakua district of the Big Island, in Hamakua C.J. Lyons (Emory 1969:31) recorded an *ahupua'a* of Kamoku that was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name.

3.1.2 Early Historic Period

Orr (2001: 17-18) places the early Historic Period beginning in AD 1795. Specific events for the project vicinity are difficult to pinpoint but several significant events for the island as a whole are noteworthy. Kamehameha conquered O'ahu and Maui in 1795 and soon unified all of the Hawaiian Islands. In 1798, he returned to Lāna'i to make a summer residence at Kaunolū. The sandalwood trade began in 1810 and by the mid-1800s there was an increased reliance on western technology, supplies, and commerce which had a dramatic economic impact across the islands. With the death of Kamehmeha in 1819 and the arrival of western missionaries in 1820, Hawai'i experienced dramatic changes. Western influence brought increased ship traffic to Lāna'i and in 1826, the American ship "London" wrecked on Lāna'i but was rescued by an American military schooner (Ashford 1974:18). Between 1830 and 1842 there was a women's penal colony established on Lāna'i at Kaena and the male penal colony was established on Kaho'olawe.

Table 2 provides census data adapted from Emory (1924) and Schmitt (1973) for different time periods. While, population stability is suggested during 1832 and 1836, the trend shows a steady population decline for Lāna'i that follows similar trends on the other Hawaiian Islands.

Table 2. Population Estimates for Lāna'i from Various Time Periods

Emory estimate (pre-1778)	Missionary estimate (1823)	Missionary census (1832)	Missionary census (1836)	Official census (1850)
3,000	**2500**	**1600**	**1200**	**604**

It is perhaps noteworthy that during the early Historic Period, there appear to be some discrepancies in historical accounts of the physical descriptions of Lāna'i. Captain King's description previously presented indicates that the island had every appearance of being agriculturally productive and well populated. However, by 1792, Archibald Menzies, who was the surgeon attached to the Vancouver Expedition, described Lāna'i as follows:

> ...observing the state and naked appearance of the island which seemed thinly covered with shriveled grass in a scorched state. No hamlets or plantations were to be seen, no trees or bushes adorned the face of the country, which swelled out gradually to a moderate height, so that we have reason to think that the island is but very thinly inhabited (Menzies 1920).

Emory (1924) suggested that the dramatic differences portrayed in these descriptions may be attributed to the effects of Kalani'ōpu'u's raid. Fornander (1996:156) states that Kalani'ōpu'u "ravaged the island thoroughly." Kamakau's account of Kalani'ōpu'u's men having to resort to eating *kūpala* would seem to support this theory.

3.1.3 Mid- to late-1800s

In 1848, the Mahele initiated extreme social, economic, and political changes within traditional Hawaiian culture on all of the islands. The Mahele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title and ownership to land they had cultivated and inhabited through a Land Commission Award (LCA), in addition to the outright purchase of other government lands. At the end of the Mahele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years 1850 and 1865 (Moffat and Fitzpatrick 1995:51). In many cases, the purchases or leases to non-Hawaiians included entire *'ili* (a subdivision of an *ahupua'a*) or *ahupua'a* (land division usually extending from mountain to sea).

An additional aspect of the Mahele was the sale of land to naturalized foreigners. These changes in land tenure had a significant impact across the Hawaiian Islands, in particular Lāna'i. By the mid-1800s much of the upper plateau lands of Kamoku and adjacent *ahupua'a* had been become open *pili* grasslands. This is indicated in the native and foreign testimonies given during the mid-1800s as part of the Mahele and Kuleana Acts. The *ahupua'a* of Kamoku, in which the project area lies, was "omitted" (Interior Department Memos 1860-70s) at the time of the Mahele (1848) and was subsequently leased as government lands (ca. 1860) (Hammatt, et al. 1988:20).

Based on tax maps, historic maps, and a search of the Waihona 'Aina database (Waihona Aina 2000) there are few LCA records for any lands within Kamoku Ahupua'a near the current project area (Table 3), the scarcity a possible result of the omission during the original division of lands. Examination of the Land Court Map of Lāna'i commissioned by Hawaiian Pineapple Company (1929; see Figure 5) shows only three Land Commission Awards (LCAs) in the upland area of Kamoku Ahupua'a. One of these went to Noa Pali, LCA# 10630 located *mauka* and northeast of the Lāna'i City and the current project area, who was the *konohiki* (headman) and school superintendent of Kamoku. In 1856, Noa Pali corresponded with the Minister of the Interior (under Kamehameha IV) requesting that Kamoku be sold to him because he had been living there since Kamehameha III had granted him the lands in 1841. At this time, there appears to have been confusion as to who owned *ahupua'a* of Kamoku; however, by 1858 it appeared on

a list of Crown Lands and Royal Domain of the Hawaiian Kingdom (Kingdom of Hawaii Legislative Assembly 1890:158). It is apparent that at the time of the Mahele, Pali was cultivating lands "all over" (Waihona 'Aina 2000) and was wanting to consolidate his holdings within a 112.25 acre area.

Table 3. Summary of Land Commission Awards (LCAs) identified within the upland areas of Kamoku Ahupua'a.

LCA #	Claimant	Ahupua'a	Land Use
1063	**Pali**	**Kamoku**	**Houselot=1; Sweet Potatoes=1; Bitter Melon/Gourd=1; Various Other Plants**
03719B	**Kalaihoa**	**Kamoku**	**Apana=1 (no description of land use provided)**
6833:1-3	**Kaaiai**	**Kamoku and Kalulu**	**Pili grass areas=2; Houselot=1**

In the 1860s a Chinese immigrant, Ahsee, procured a lease for lands within Kamoku to raise goats. Concurrently, Walter Murray Gibson arrived at the Pālāwai Basin Mormon Commune and ultimately gained control, through government leases, over most of Lāna'i becoming Hawai'i's "Premier of Everything". During the 1880s, Gibson's Lanai Ranch eventually had up to 18,000 goats and 12,000 sheep that were permitted to forage freely, virtually denuding the island of vegetation and causing severe erosion problems.

In 1888, Gibson left the islands for California after a series of troubles as Prime Minister of Hawai'i. His interests in Lāna'i were left to his daughter Talula and her husband, Fredrick Hayselden and from 1888 to 1902, the Hayseldens were essentially in charge of Lāna'i. At this time, Kō'ele was the sheep ranch center for the island. Tabrah (1976:79) noted that in 1898 there were 174 people on the island and approximately 50,000 sheep. In an effort to control erosion, eucalyptus, and Norfolk pine were planted at Kō'ele and thousands of acres across the island were planted in Bermuda grass (also see Maui County Council 1998).

Charles Gay bought up the Gibson holdings in 1902. The Gay family eventually bought virtually the entire island in fee simple. The ranch center was still at Kō'ele, the location where Gibson's headquarters had been moved in the 1870s. The Gays also successfully cultivated pineapples on Lāna'i, both at Keōmuku and Lālākoa. The Gay family went into considerable debt to get the island converted to fee simple ownership, and was unable to retain the vast holdings. The family was forced to liquidate all holdings, except some 600 acres.

3.1.4 1900s

The period from 1910 to 1922 represents a shift from primarily sheep to cattle ranching. From 1910 to 1917, the Lanai Company Ltd. downsized its sheep operations and eventually sold its holdings to Harry and Frank Baldwin. At this point in time, they successfully converted the island into a cattle ranching operation. At the height of this operation, the ranching center at Kō'ele had approximately thirty buildings that included: the ranch manager house, an office, a store, a bachelor's quarters, a blacksmith shop, additional residences, and stables (Maui County Council 1998).

In 1922 James Dole purchased most of the island of Lāna'i and began a swift changeover to commercial pineapple cultivation. The rapid commercialization included the building of Lāna'i City and Kaumālapa'u Harbor. "In 1924 Lāna'i City began as a simple plantation town with only 150 residents" (Savrann 1989: unnumbered pages). The 1929 aerial photograph below clearly depicts the current project area and surrounding lands heavily cultivated in commercial pineapple agriculture (Figure 7).

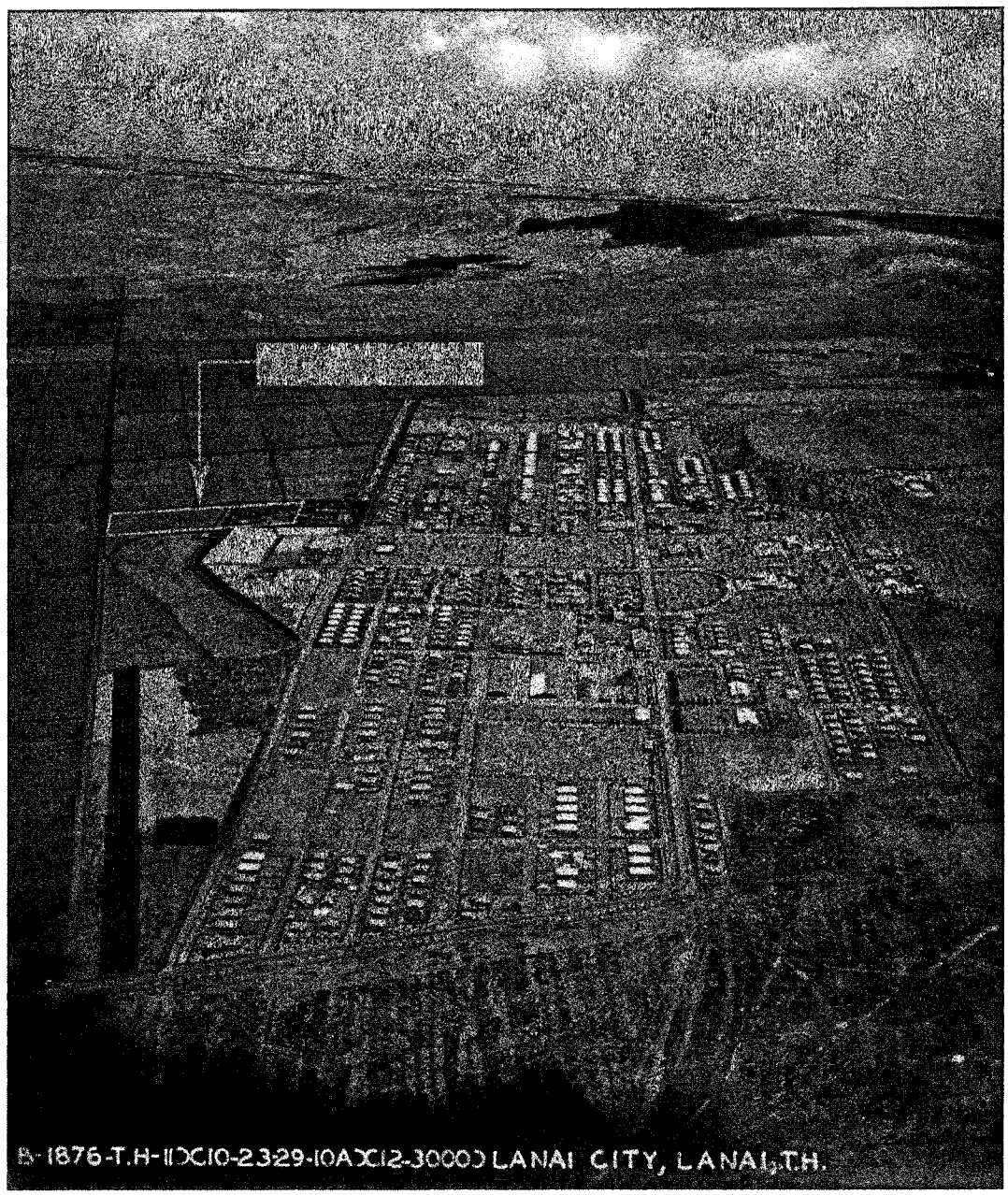

Figure 7. An aerial photograph of Lāna'i City dated 1929 showing approximate project area outlined in red (aerial courtesy of Castle and Cooke Resorts, LLC.)

In 1961, James D. Dole's pineapple lands on the island of Lāna'i were merged with the assets of Castle & Cooke, a prominent Hawai'i-based corporation. World-wide prices for pineapple continued to drop throughout the 1970's as competing countries, most notably Cuba and the Philippines, supplied the market with cheaper pineapple. While pineapple cultivation continued on Lāna'i through the 1970s it is clear that some of the fields starting to transition into fallow agricultural lands (Figure 8) and during the 1980's, Castle & Cooke began a long-term program to phase the island out of pineapple cultivation, and expand tourism on Lāna'i. In 1988, David Murdock, Chairman of Castle & Cooke, Inc., opened a resort hotel and companion championship golf course at Mānele Bay. A second resort hotel and golf course in the uplands of Kō'ele was opened in 1990. The final pineapple harvest and phasing out of all pineapple operations in 1993 (Boyd 1996) marked the end of an era for Lāna'i Island leaving much of the lands that were once in pineapple, including the current project area, open and fallow.

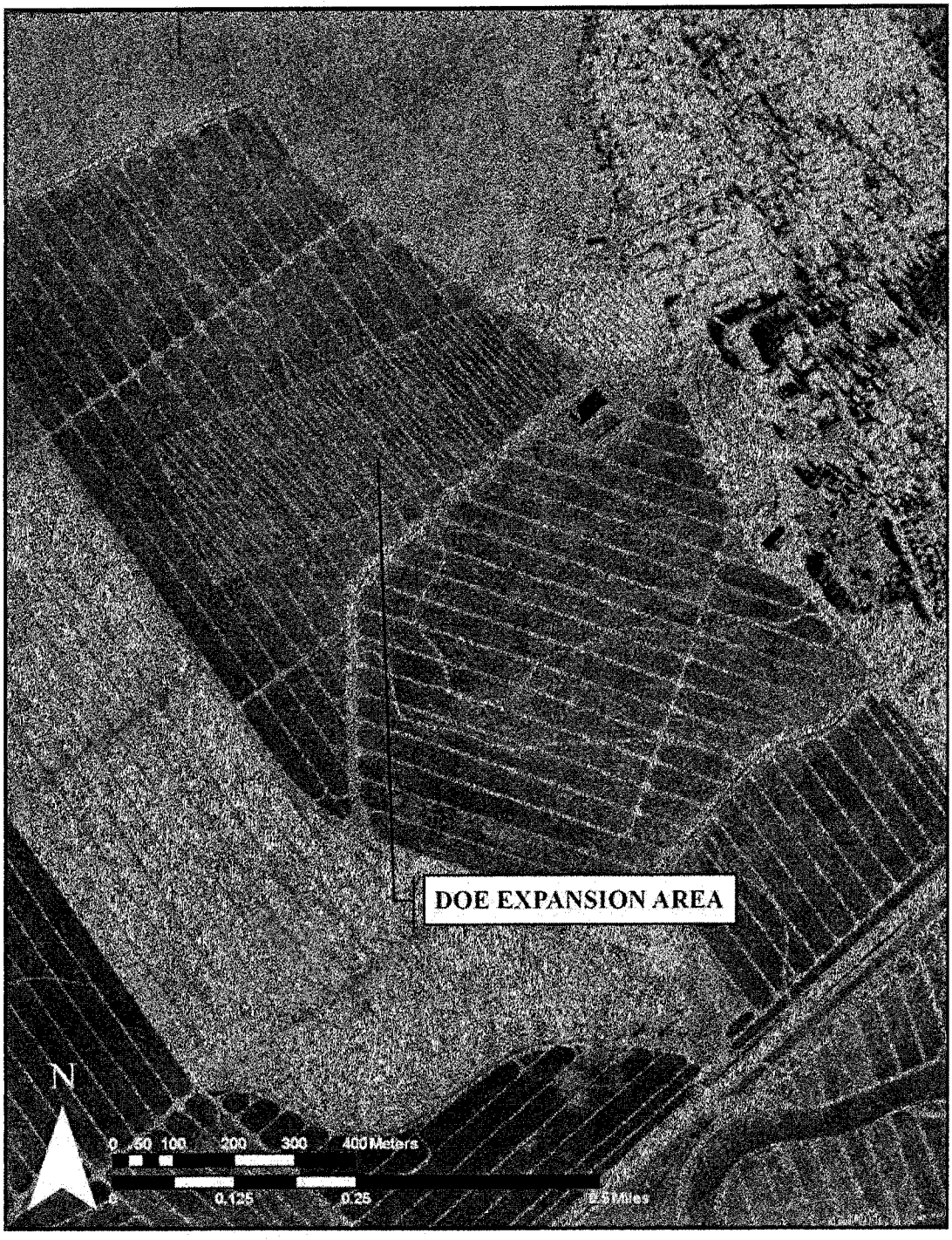

Figure 8. A portion of the 1979 USGS Orthophotoquad, Lāna'i City Quadrangle 7.5' Series showing the current project area (hatched in red) in relation to the Maui County Park and Lāna'i High and Elementary School (located to the immediate northeast) and lands being transitioned to fallow to the north.

3.2 Archaeological Research

Archaeological studies that address the general history of Lāna'i, with specific mentions of the *ahupua'a* of Kamoku include: Emory (1924), the statewide survey of Lāna'i Island, Hommon (1974), Ahlo (1985), Kaschko (1987), Nagata (1987), Walker and Haun (1987), Hammatt, Borthwick and Shideler (1988), Hammatt and Borthwick (1988, 1989, 1990, 1993a, 1993b, 1993c), Borthwick and Hammatt (1989, 1990, 1992), Borthwick, Hammatt, and Chiogioji (1990), Hammatt, Shideler, and Borthwick (1990), Hammatt and Chiogioji (1992), Colin and Hammatt (1996), Creed *et al.* (2000), Raymond (2003), Hammatt and Schideler (2004), Dockhall, Formolo, and Hammatt (2004), and Lee-Greig and Hammatt (2005).

Archaeological studies specific to upper plateau of Kamoku Ahupua'a are listed in Table 4 according to year and depicted on Figure 9 with an expanded explanation of studies conducted in the immediate vicinity of the current project area immediately following.

Table 4. Archaeological Studies within or adjacent to, the outer limits of Lāna'i City.

Reference	Year	Location	Description
Emory	1924	Island Wide	Archaeological Reconnaissance: Island-wide survey that recorded house sites to the north of Kamoku Ahupua'a.
Hommon	1974	Island Wide	Archaeological Inventory Survey: Kō'ele nominated as a historic district and assigned state site number 50-40-1004 which included three houses and one church.
Hammatt and Borthwick	1988	Lālākoa III Subdivision	Archaeological Inventory Survey: A scatter of various materials was observed and documented in a fallow pineapple field: historic era artifacts observed but not collected; coarse-grained basalt fragments collected and determined to come from recently introduced road gravel; numerous fine-grained basalt flakes and basalt artifacts (one finished adze fragment, eight adze performs, a core, and thirteen retouched flakes) collected and determined to have been imported with road gravel from the Ko'i Adze quarry.
Hammatt et al.	1988	Kō'ele	Archaeological Data Recovery: Excavation and analysis of recovered ranch era historic material from two trash pits correlated with events during ranching era.
Borthwick and Hammatt	1989	Iwi'ole Dorms	Archaeological Reconnaissance: Observed basalt and volcanic flake scatters in a disturbed context within fallow pineapple fields were.
Hammatt and Borthwick	1989	1) Kō'ele Golf Course; 2) Kō'ele Single Family Housing; 3) Queens Multi-Family Housing; and	Archaeological Reconnaissance: Reconnaissance of multiple areas: 1) Four historic ranching era features (three associated with the water system and a historic scatter from the Gay's Homestead), a volcanic glass source, and a lithic concentration were recorded. In addition, 28 lithic artifacts collected within the former pineapple fields in association with road gravel;

Reference	Year	Location	Description
		4) Waialua Annex Subdivision (Olopua Woods Subdivision)	2) No historic properties identified; 3) A few basalt flakes encountered in a concentration of road gravel 4) A scatter of basalt flakes mixed with road gravel and modern cultural materials was observed on a fallow pineapple field dirt road and presumed to have been "mechanically transported"
Hammatt and Borthwick	1990	Kō'ele Golf Course	Archaeological Inventory Survey: Survey of 100-acres behind the Kō'ele golf course. No historic properties identified.
Borthwick and Hammatt	1992	Proposed Kō'ele Reservoir	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Chiogioji	1992	Waialua Annex Subdivision	Archaeological Investigation and Monitoring: Previously recorded scatter was not relocated during sewer line installation likely due to grubbing activities.
Hammatt and Chiogioji	1992	Lāna'i City	Archaeological Investigation: No historic properties identified.
Hammatt and Borthwick	1993	Sewerline from Kō'ele to Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Creed et al.	2000	DHHL Lots, Lāna'i City	Archaeological Inventory Survey: Encountered debris from first Lāna'i Airport. No significant historic properties identified.
Raymond	2003	Lāna'ihale	Cultural Resource Investigations: Reconnaissance of the summit fenceline. No historic properties identified within the project APE.
Dockall et al.	2004	Behind Kō'ele Golf Course Clubhouse	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Shideler	2004	Lower west slope of Niniwai Hill	Archaeological Inventory Survey: Documentation of Kihamanienie Church (SIHP # 50-50-98-1946) and associated graveyard
Conley-Kapoi and Hammatt	2005	Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Lee-Greig and Hammatt	2005	Court Affordable Multifamily Housing Development, Central Lāna'i City	Archaeological Field Inspection with Subsurface Testing: No historic properties identified.

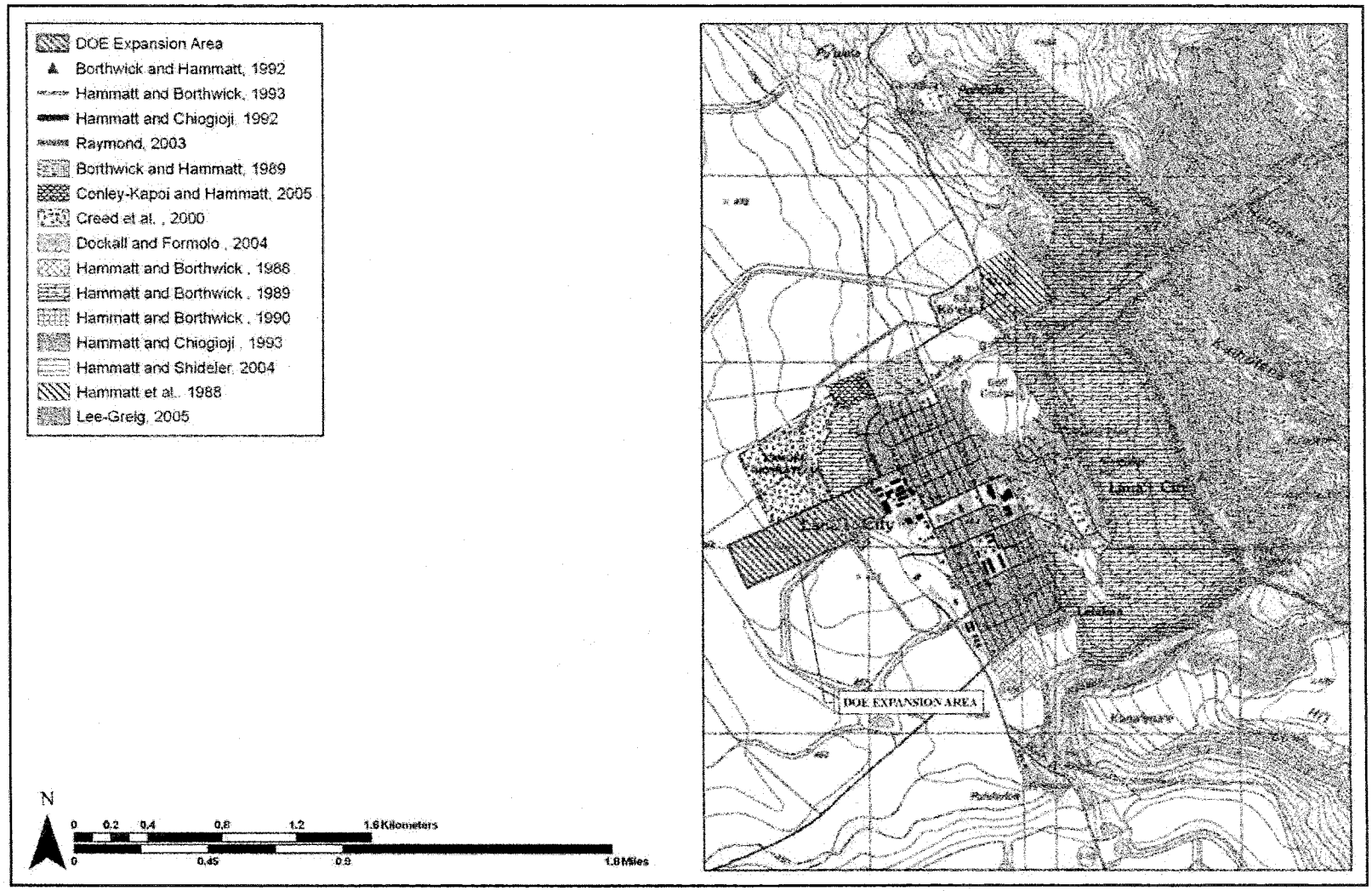

Figure 9. A Portion of the South Lāna'i 7.5-minute U.S.G.S. topographic quadrangle showing the locations of previous archaeological investigations and current project area.

Of the studies summarized in Table 4 above, four archaeological studies were carried out within or directly adjacent to the current project area. An archaeological reconnaissance was conducted of three areas consisting of the Kō'ele Golf Course; the Kō'ele Single Family Housing; the Queens Multi-Family; and the Waialua Annex Subdivision (currently known as the Olopua Woods Subdivision) (Hammatt and Borthwick 1989). Pertinent to this study is the reconnaissance of the planned 30-acre Waialua Annex Subdivision (Hammatt and Borthwick 1989:27). The pedestrian reconnaissance identified a single concentrated surface scatter of road gravels, modern trash (bottle glass and spent gun cartridges) intermixed with basalt flakes (Hammatt and Borthwick 1989:28). The presence of the scatter on the surface and mixed nature of the materials indicated that the scatter was a secondary deposit likely transported through mechanical means with the roadbed gravels (Hammatt and Borthwick 1989:28). Observations of the nearby Iwiole Gulch embankments clearly showed the pineapple plow zone ranging from 30-70 cm thick with black plastic fragments (Hammatt and Borthwick 1989:28). This range for the plow zone is consistent with soils documented during backhoe testing conducted for the expansion of the Kanepu'u Subdivision (Conley-Kapoi and Hammatt 2005; see also Figure 9).

In 1992, CSH conducted an investigation and archaeological monitoring of a short length of sewer line within the Waialua Annex Subdivision following the completion of the above reconnaissance (Hammatt and Chiogioji 1992). An inspection of the surface following initial grubbing resulted in no significant findings. During this project site inspection, the material scatter identified during the reconnaissance was not relocated likely due to the ongoing grubbing activities at that time (Hammatt and Chiogioji 1992). Inspection of soil stratigraphy of the sewer line trenches also confirmed the observations made during the reconnaissance survey that the upper stratum (0-75 cm) represented the highly disturbed plow zone consisting of material associated with commercial pineapple cultivation (Hammatt and Chiogioji 1992:5-8). No historically significant cultural materials were identified during the inspection of the sewer line trench sidewalls (Hammatt and Chiogioji 1992:8).

Hammat and Borthwick (1993) conducted an archaeological inventory survey approximately 13,000 feet of sewer line, which traverses the northeastern portion of the current project area, for the proposed Kō'ele Waste Water Treatment Project. While special attention was given to locating flake or midden scatters in the former pineapple fields, no evidence of pre-contact activity was identified within the project corridor (Hammatt and Borthwick 1993:16).

Finally, an inventory survey of a fifty-acre Department of the Hawaiian Home Lands parcel (Creed et al. 2000) in former pineapple lands in northwest Lāna'i City was conducted by CSH. With the exception of some historic debris associated with Lāna'i's first airport and modern trash (car parts, PVC pipe fragments, and other trash) the inventory survey found nothing of significance (Creed et al. 2000:18).

Section 4 Community Consultations

Cultural Surveys Hawai'i Inc. contacted the following individuals and Hawaiian organizations between March and June 2009 requesting their *kōkua* and guidance regarding knowledge of traditional cultural practices and cultural resources of Kamoku *ahupua'a*. The following table presents these organizations and individuals. Individuals who expressed personal knowledge of the study area and gave their consent to share their *mana'o* for this study, both formally and informally, are presented in Section 5 Summaries of *Kama'āina* Interviews. Formal letters of response to the scoping letter sent out by CSH (see Section 2 Scoping and Community Outreach) have been appended to this study (Appendix C).

Table 5. Community Contacts

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
Mrs. Yevonne Alboro	Lāna'i Senior Center Employee	Y	S	Mrs. Alboro helped CSH organize *kūpuna* interviews.
Mr. Duane and Mrs. Shelia Black	Retired Plantation Administrator	Y	Y	
Ms. Phyllis "Coochie" Cayan	DLNR-State Historic Preservation Division, History and Culture Branch Chief (Former Lāna'i resident)	Y	S	CSH sent letter of inquiry. Mrs. Cayan suggested contacting Mr. Kepa Maly and utilizing the research he has compiled, Mr. Albert Morita, Aunty Irene Perry as well as Kūpuna at the Senior Center. She recommended including the *mo'olelo* and mythology of Lāna'i. Mrs. Cayan also stated that she sits on the alumni board for the school and said it would be nice to have more space at the school.
Mrs. Maggie Masicampo	Lāna'i Senior Center Manager	Y	S	Mrs. Masicampo helped organize *kūpuna* interviews and referred CSH to numerous contacts.
Mrs. Alberta Morita DeJetley	Commercial Farmer/Editor/Owner	Y	Y	See 5.1.2 below.

[1] Key:

Y=Yes
N=No
A=Attempted (at least 3 attempts were made to contact individual, with no response)
S=Some knowledge of project area
DC=Declined to comment
DP=Declined to participate
U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
	of *Lana'i Today*			
Anonymous *Kama'āina*	*Kama'āina*	Y	Y	See 5.1.8 below.
Mrs. Martha Evans	Lanaians for Sensible Growth	Y	Y	CSH sent letter of inquiry. Mrs. Evans made referrals to several individuals she thought might like to share. They include: Mr. Kepa Maly, Mr. Sol Kaopuiki, Mr. Pierce Myers, Mr. Bob Saiki, Mrs. Vivian Eskaran, Mrs. Sugar Gima and her son Mr. Reynold Butch Gima, Mr. Howard and Mrs. Molly Sakamoto, Mr. Larry Kawasaki, Mr. Dennis Hokama, Aunty Irene Perry, Aunty Lei Kanipai, Mrs. Jane Gavriel, and Mrs. Leila Tamashiro. Mrs. Evans also shared her own recollections, see 5.1.1 below.
Mrs. Sugar (Minami) Gima	*Kama'āina*	Y	N	Mrs. Gima was present during the interview at the Senior Center but did not participate.
Mr. Reynold Butch Gima	*Kama'āina,* mother's family ran the Minami Gardens in the 1930's located at the site of the Lāna'i High and Elementary School.	Y	S	Recommended contacting his mother, Sugar Gima, and his Aunt Susan Miyamoto and interviewing them.
Mr. Robert Hera	Held several positions with Dole Company over thirty plus year career, including the title of Superintendent of the company.	Y	Y	CSH sent letter of inquiry.. See 5.1.5 below.
Aunty Lei Kanipae	*Kupuna*	A	--	
Mr. Sol Kaopuiki	*Kupuna*	Y	Y	CSH sent letter of inquiry.
Ms. Mona Kapaku	Department of Hawaiian Homelands – Maui District Supervisor	Y	N	CSH mailed letter of inquiry.Ms. Kapaku had no concerns regarding cultural impacts. Referrals were made to Uncle Sol Kaho'ohalahala and *ohana*, Mrs. Woolsey,

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
				Mrs. Kewenaole and daughter Jojo Renikie.
Mr. Kepa Maly	Executive Director, Lāna'i Culture and Heritage Center	Y	Y	CSH mailed letter of inquiry. Mr. Maly made referrals to the following individuals; Ms. Magge Masicampo, Mr. Noboru "Squeaky" Oyama, Ms. Kay Okamoto, Ms. Susan Miyamoto, Sugar Gima, Butch Gima and Mr. Shigeto Minami.
Mrs. Susan (Minami) Miyamoto	Mrs. Myiamoto is from the Minami family, Sugar Gima's sister.	Y	Y	See 5.1.7 below.
Mr. Albert Morita	*Kupuna*, Retired DLNR, Division of Forestry and Wildlife	Y	Y	See 5.1.3 below. CSH mailed letter of inquiry.
Mr. Clyde Namu'o	OHA-Administrator, Native Hawaiian Historic Preservation Council	Y	S	CSH sent letter of inquiry. OHA recommended that CSH contact Mr. Kepa Maly, Mr. Sol Kaho'ohalahala and Mrs. Martha Evans. OHA also suggested CSH consult the Lāna'i community on all three cultural impact assessment projects (Lāna'i High and Elementary School, Senior Center Demolition and Construction of New Facility and the Affordable Housing Project) simultaneously.
Mr. Gary Onuma	*Kupuna*, Castle & Cooke Game Manager, *Kama'āina*	Y	Y	See 5.1.4. CSH sent letter of inquiry.
Mr. Noboru "Squeaky" Oyama	*Kupuna*	Y	Y	See 5.3.2 below.
Ms. Pua Paoa	Maui/ Lāna'i Islands Burial Council, Lāna'i Island Representative	Y	S	CSH sent letter of inquiry. Referred CSH to Uncle Sol Kaopuiki and Aunty Lei Kamipae
Aunty Irene Perry	*Kupuna*	Y	Y	See 5.3.1 below.
Ms. Sandra Ropa	Hui Malama Pono O Lāna'i	Y	S	CSH sent letter of inquiry. See 5.1.9 below.
Mr. Glenn Richardson	Former member, Maui/ Lāna'i Islands Burial Council, Lāna'i Island Representative,	A	--	CSH sent letter of inquiry.

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
	Kama'āina			
Mr. Bob Saiki	School Principal in 1960's	A	--	
Mr. Howard Sakamoto	School Principal in 1970's	A	--	
Mrs. Molly Sakamoto	Mr. Howard Sakamoto's wife and *kama'āina* of Lāna'i	A	--	
Maui County Cultural Resources Commission		Y	Y	See 5.2. below.
Mrs. Momi Suzuki	*Kama'āina,* Mrs. Suzuki is the daughter of Aunty Irene Perry.	Y	S	CSH sent letter of inquiry. Ms. Suzuki explained that although she does not have much knowledge regarding traditional practices of the area, she believes the school expansion is a necessity. Mrs. Suzki made a referral to Mr. Squeaky Oyama.
Mrs. Jackie Woosley	Hui Malama O Lāna'i	A	--	CSH sent letter of inquiry.

Section 5 Summaries of Kama'āina Interviews

5.1 Informal Interviews and Consultation

The following are summaries of informal interviews conducted over the phone and in person between March and June 2009. Individuals were informed that they may remain anonymous throughout any portion of the consultation process.

5.1.1 Mrs. Martha Evans

Mrs. Martha Evans is the Vice Principal of Lāna'i High and Elementary School. She has been a resident of Lāna'i since the 1970's when she moved there to work as a teacher. A person of Hawaiian ancestry, Mrs. Evans is also a member of the grass roots organization, Lanaians for Sensible Growth, as well as the Chair of the Lāna'i Archaeology Committee. Mrs. Evans submitted her *mana'o* via e-mail on March 15, 2009. Mrs. Evans recalled stories regarding night marchers when she first moved into the teacher cottages located adjacent to the school:

> I do remember hearing a story about the night marchers when I first moved into the teacher cottages adjacent to the school. (It's been awhile since I have thought about this so my recollection may be rather fuzzy.) There were 7 or 8 cottages on the school parcel back in the 70's. The first cottage was large -- it was moved in the late 90's or early 00's and is now located at the beginning of Lanai Ave, *makai* side as a private residence/bed-and-breakfast. The second was a duplex unit (2-units), the third was a smaller cottage, followed by two dormitory-style houses with 4-bedrooms each. Those were followed by two smaller cottages of 2-bedrooms each. Anyway, it is said the trail came from the area above Lanai Avenue, cutting through the yard at the *mauka* corner of Lanai and Sixth St. It came down through several properties and then cut through the school and along Cottage Row, passing in front of the last cottage. At times people would hear things and talk would also go to the night marchers. There was a rock located outside of the last cottage that had some kind of significance although I can't remember what it was.

Mrs. Evans also mentioned a farm and piggery that Mr. Bob Sakai ran located in the lower portion of the school parcel. In addition to her own recollections, Mrs. Evans referred CSH to numerous individuals. (See Section 4 Table 5.)

5.1.2 Mrs. Alberta (Morita) de Jetely

Mrs. Alberta de Jetley has lived betwen Lāna'i or Hana, Maui since 1961. She currently operates Bennie's Farm and the monthly newspaper publication, *Lana'i Today.* Mrs. de Jetley's concerns are focused largely on the future of Lāna'i's economy, sustainability and overall viability as a community. Mrs. de Jetley runs the community paper because she thinks it is a critical part of supporting small business and the community's interests on Lāna'i. She feels she has a vested interest in the well being and economy of Lāna'i, and wants to see it do well. She believes that stopping growth on Lāna'i will have a negative effect on the community's future

and feels that the community needs to be "pro-business" if it wants to have a viable economy. She states, "we should be working on ways to promote the community".

Regarding the Lāna'i High and Elementary School expansion, she explained that there was a need prior to the economic crisis, but that currently the unemployment rate is high and families are leaving Lāna'i, she states: "Enrollment is down, there are no jobs and people are leaving". She can think of no impacts that the school expansion would have on the area. Mrs. de Jetley remembers the expansion area being in pineapple cultivation. Mrs. de Jetley recalls Kō'ele as having been the center of the islands population before the pineapple plantation built Lāna'i City.

Although she knows of the state hunting lands located further *makai* of the expansion area, she does not consider hunting in these areas of deer, sheep and game birds a traditional Hawaiian activity.

5.1.3 Mr. Albert Morita

Mr. Albert Morita is *kama'āina* of Lāna'i, a retired Department of Land and Natural Resources (DLNR), Division of Conservation and Resources Enforcement (DOCARE) officer and currently sits on the board of directors for the Lāna'i Culture and Heritage Center (LCHC). His familiarity with the study area comes from growing up on Lāna'i and working in the field for 30 years as a DOCARE officer.

Mr. Morita explained that the project area has been in pineapple cultivation as long as he can remember. He explains that as a child, stone artifacts were often found during the plowing of the pineapple fields. He remembers mainly *ulu maika*, and fire pits (*imu*), and therefore believes there is a likelihood that these things may be uncovered during grading and grubbing for the school expansion.

The lower elevations west of the city, from the sea cliffs (*pali*) to the edge of the pineapple fields were territorial hunting grounds since the 50's and remain today under the State DLNR as hunting grounds. These lands were used as ranchlands before hunting. In addition, Hunting Unit 3 has been included in the hunting area. One can hunt large game; axis deer, dall sheep, and bird game; turkey, pheasant, gray Franklyn, chucker, and doves (lace necked and barred) in this area.

Regarding more traditional practices, Mr. Morita recalls individuals collecting verbena (*ha'uōwī*) to make a poultice for bruises on themselves or their horses, in lands on the outskirts of town. He also recalls individuals harvesting *'uhaloa (Waltheria indica)*, which grows wild in the same areas, for its medicinal purposes.

Mr. Morita draws attention to the area of Hōkūau. He explains that according to Robert Hobdeys map in the book titled "The Story of Lāna'i " by George C. Munro, this area is located east of the project area. Its meaning is Morning Star. Mr. Morita suggested researching this area more thoroughly due to its proximity to the project area. He also suggested Kenneth P. Emory's work. Mr. Morita comments on the above mentioned map and book noting their accuracy and intimate knowledge of Lāna'i and is grateful this family got together to write it. It is a very important historical document.

Mr. Morita also notes the rectangular shapes located at the eastern corner of the project area as being sewer ponds utilized prior to the county sewer.

Overall, Mr. Morita does not see the school expansion impacting hunting practices or sporadic plant collection. He said that some deer may be displaced but that they are resilient when it comes to finding new habitat. He explained that Lāna'i is in need of this school expansion.

5.1.4 Mr. Gary Onuma

Mr. Gary Onuma worked as a Game Manager for Castle & Cooke and grew up near the project area, therefore, he is intimately familiar with the area. As a child Mr. Onuma recalls finding stone artifacts, but explains that the area has been heavily cultivated since the 1930's and archaeological feature remnants would be scarce today. He also explains that there is a hunting area just below town, where axis deer can be found. He explains that some axis deer live in the expansion area and will be displaced by construction, but insists that axis deer find new habitat easily. Mr. Onuma mentions the sewage treatment plant nearby and states that it may be a cause of bad odor.

5.1.5 Mr. Robert Hera

Mr. Robert Hera moved to Lāna'i with his family from Kona in 1936. His family had been working on the coffee farms. They came to Lāna'i on the S.S. Humuula, a steam freight ship. Both he and his parents worked for Dole Company upon arrival in Lāna'i. Throughout his thirty-year career with Dole, Mr. Hera held a variety of positions outside of actual pineapple field work, they included positions in agriculture and engineering, water systems and utilities departments. In addition to the utilities maintenance, Mr. Hera helped with the general upkeep of the city, eventually becoming a superintendent with the company.

Mr. Hera explained that the Lāna'i High and Elementary expansion area has been in pineapple cultivation for as long as he can remember. He does not think that the expansion will impact any cultural activities. The project area is near an area that was used for school recreation, sports, track and field etc. He explains that there is nothing there now.

Mr. Hera spoke of the teachers cottages, located near the school, describing how pilots during WWII used to fly over and drop letters for the teachers. He said he also used to entertain at the teacher cottages, playing Hawaiian music. He spoke of an airstrip that was once in the area. It was destroyed: trenches were dug through it after Pearl Harbor was bombed to avoid the possibility of enemy planes landing there. Sikorsky aircraft used to land there as well.

Mr. Hera's sentiment is that anything that will benefit the school, will benefit the community of Lāna'i. He is a graduate of Lāna'i High School and often feels that Maui County overlooks the needs of the Lāna'i residents.

5.1.6 Mr. Shigeto Minami

Mr. Shigeto Minami's family ran Minami Gardens. Minami Gardens was located at the present day site of the Lāna'i High and Elementary School. Mr. Minami was born in 1929 and is 80 years old. His father was Jusaku (Nakao) Minami and his mother was Fujiyo Minami. He explains that his family took his mother's last name because there were no boys in her family to carry it on, a Japanese tradition under such circumstances. His sisters are Sugar Gima and Susan Miyamoto who currently live on Lāna'i.

Mr. Minami said that his father was the *luna* of a womens "gang". He supervised this work group whose field duties included such activities as *ho hana* (weeding) and picking pineapple. His father worked in their garden after work and on the weekends.

Mr. Minami said his grandmother, Nami, worked in the garden every day, with one other individual who was employed full time. The hired person also boarded with them. Mr. Minami's clearest recollection regarding the gardens was loading their truck with vegetables and driving through the "Camp" (Lāna'i City) to sell their goods. He said he remembers ringing a bell to let people know they were in town. Most people had their own gardens so he believes that the majority of their produce was bought by the single men.

Mr. Minami referred to the style of gardening as "truck farming". He said they grew potatoes, carrots, lettuce, cabbage, "all the normal things". He thinks they probably sold the produce in town once a week. He said they must have leased the farm from the plantation because when it was decided to move the school from Kō'ele to the garden location, they had to move the garden down by the Protestant church, about a mile away.

Mr. Minami does not know what was at this location before his family's garden. Nor does he remember finding Hawaiian stone artifacts while gardening. He said that he doesn't remember there being very many Hawaiians living in town. Mr. Minami graduated in 1947; his class had 31 students. He, like all the other school kids, walked to school at Kō'ele before it was moved into town.

He remembers the garden being his playground when he was in the first grade. They had chickens, and a big tree in which his father built a play house. He recalls a tall hedge bounding what would be the Fraser Avenue side of the farm; he recalls it being sisal. He estimates that the garden was about three acres. Sometimes after school and on weekends he worked in the garden and during the summer he worked in the pineapple fields, after he was 12 yrs old.

5.1.7 Mrs. Susan (Minami) Miyamoto

Mrs. Susan Miyamoto moved to Lāna'i from Paia, Maui in 1924. She was five years old at the time. Her family ran the Minami Garden, a truck garden, located at the site of the Lāna'i High and Elementary School. The Minami Garden was in operation at this location from 1924 until 1937. When it was decided that the school would be relocated from Kō'ele to their garden site, they moved the garden about a mile away, near the site of the Protestant church.

Mrs. Miyamoto recalls her family's garden as being very big, she guesses about three acres. She remembers a tall hedge that grew along the end that now boarders Fraser Avenue. She said they grew cabbage, won bok and head cabbage as well as *araimo*, or Japanese taro/potatoes. She describes "thinning" lettuce to properly space it, packaging potatoes and bundling cabbage. Mrs. Miyamoto explains that she and her siblings did not work in the garden all day; they attended school up at Kō'ele and only worked after school and sometimes on the weekends. She said that her father and her grandmother did most the gardening and during the summers, she and her siblings worked in the pineapple fields.

Her father's main job was as a luna for a "*wahine* gang" or women's work group, for the plantation. It wasn't until after finishing his plantation work did he tend his garden. They sold vegetables after *pauhana* time out of what Mrs. Miyamoto describes as "not a truck, but an old car" about two times a week. She said they also grew and sold bananas.

The Minami family lived across the street, in one of the original plantation homes behind the current Senior Center. When asked what the lands north and west of their garden looked like, Mrs. Miyamoto states, there was "nothing" there. She explained that pineapple cultivation did not extend into those areas, she described the pineapple fields as being "much further down". To the south, near the current day gym location was Mr. Okamoto's house. When asked if she remembers finding Hawaiian artifacts while working in the garden, she says she did not. Neither does she recall individuals utilizing the area in traditional ways for plant gathering or ceremonies. She does remember the Hawaiian families though, and she states, "not like hapa, but pure Hawaiians".

Mrs. Miyamoto was in the last class to graduate from the school while it was still at its Kō'ele location. She graduated in 1935, when the school only went to tenth grade.

5.1.8 Kamā'aina

An individual, who wishes to remain anonymous, familiar with the school expansion lands does not foresee any adverse impacts the project will have on hunting practices west of project area. There are axis deer that now live in the pineapple fields near Lāna'i City, this individual explains that although they will be displaced they are a hardy breed and will not have difficulties finding new habitat. This individual explained that the nearest state-leased hunting lands are near the airport, 5 to 15 minutes out of town. The state leases 30,000 acres from Castle and Cooke for use as hunting lands. This individual believes that these hunting lands comprise the most popular game mammal hunting area in the State of Hawai'i and that the hunting season contributes significantly to Lāna'i's economy. Sport hunting in these areas began in the 1950's when the then territory of Hawai'i originally acquired the lease to these lands.

Typically, hunting seasons work around the animals breeding seasons. The axis deer season is from late February to mid-May, the mouflon sheep season is from late July to late October and the game bird season is in the fall from November to January. Some of the game birds that can be found on the state-leased lands west of the project area include ring-necked pheasant (*kolohala*), wild turkey, Grey Francolin, Gambles Quail and the Erckel Francolin.

5.1.9 Mrs. Sandra (Kamipae) Ropa

Mrs. Sandra Ropa is a member of Hui Malama Pona O Lāna'i Archaeological Committee and is the daughter of Aunty Lei (Kaopuiki) Kamipae. She was born in 1943 and grew up on Lāna'i. Although it was her mother's generation that lived on the island before the pineapple plantation began, she recalls some of her knowledge and experiences growing up.

Mrs. Ropa explained that her grandfather was a Christian minister who forbade all things Hawaiian, yet he spoke and preached only in Hawaiian. Mrs. Ropa's mother, Aunty Lei, grew up with a thorough understanding of the Hawaiian language but was not allowed to speak Hawaiian at school, the result being that she could understand Hawaiian yet could not speak it very well. Mrs. Ropa's described finding *ulu maika* in the pineapple fields as a common occurrence. As a child, she explained, her grandfather would not let her keep these items or bring them into the house.

Mrs. Ropa recalls her grandparents having a garden down at Kaumālapa'u where they grew foods that could tolerate the brackish water located there. Her grandparents grew cabbage, corn

and string beans. She said she grew up eating deer and fish as well. She recalls her grandparents bartering their vegetables for fish. She also recalls an abundance of wild tomatoes that grew in the pineapple fields, she said the wild turkeys have eaten them all. Mrs. Ropa recalls the time when a few Hawaiian families lived at Kō'ele and worked for the Ranch. She explains that as a teenager she didn't pay much attention to these things.

Regarding the planned school expansion, Mrs. Ropa explained that before the economic crisis, the school expansion was needed. She relays some uncertainty regarding the future of the community in the current economic situation.

5.2 Maui County Cultural Resource Commission (CCRC), June 4, 2009

Mrs. Colleen Medeiros Dagan and Mrs. Tanya Lee-Grieg of Cultural Surveys Hawai'i attended this meeting to gather information on traditional and cultural practices in the upland areas of Kamoku. Commissioners in attendance included Mr. Eric Frederickson, Mr. Raymond Hutaff, Mrs. Veronica Marquez, Lee Mr. Kalei Moikeha and Mrs. Nani Watanabe.

Mr. Kepa Maly shared some of his knowledge about the area in a written statement which includes land claim awards for Kamoku as well as the land survey meets and bounds description *ahupua'a* boundaries. Mr. Raymond Hutaff stated his feelings regarding the ahupua'a name and the purpose of the ahupua'a itself as being a significant cultural land tradition.

Mr. Steve Bumbar, Vice President of Castle & Cooke Resorts LLC, explained that his company has produced a DVD of *kūpuna* interviews called "Aka Aina". He explained that interviews were of *kūpuna* of various ethnicities. Mr. Bumbar also spoke of a walled off section of Kaiholena Gulch behind the 17th hole of the golf course, The Experience at Kō'ele. Mrs. Watanabe makes reference to another set of *kūpuna* interviews available called "Reflections of Lāna'i".

The commissioners discussed discoveries of stone artifacts such as *ulu maika* and sling stones in pineapple fields in the Kamoku and Kalulu ahupua'a. Mr. Eric Frederickson and former Lāna'i resident, Mrs. Watanabe, were both familiar with these discoveries. Mr. Frederickson explainined that it is understood that these finds have all been taken out of context due to pineapple cultivation. It was explained to the commissioners that there were no known cultural or archaeological sites within the Lāna'i High and Elementary School expansion area.

Mrs. Watanabe confirmed that the water from the reservoir behind the Lodge at Kō'ele was utilized as drinking water in historic times. When asked specifically about the existence of a spring at Kō'ele, Mrs. Watanabe said that she did not know of any spring, only the reservoir which she remembered being dry when she played in it as a child.

5.3 Formal Interviews

Formal Interviews were conducted on March 27 and April 9, 2009. Formal interviews were conducted using an Olympus Digital Voice Recorder and transcribed using Sony Digital Voice Editor by Ms. Noelani Hessler, B.A. Mrs. Sarah Wilkinson B.A. and Mrs. Colleen Dagan B.S. between March and May 2009.

5.3.1 Aunty Irene (Cockett) Perry

Aunty Irene Perry was born in Keōmoku in 1917. Her father was Robert Cockett from Maui. Aunty Irene said that she lived on Maui briefly before returning to Keōmoku. Sometime around 1928 her family moved up to Kō'ele and her father worked for the ranch. They lived in a house next to the main ranch house. She spent her childhood playing, fishing and traveling via horseback to her tutu's (Keli'ihananui's) home at Palawai Basin.

As a child living in Keōmoku, Aunty Irene used to ride on horseback up to Lāna'i City. From Keōmoku, she explained, they traveled up through Lāna'ihale to get to Kō'ele. "all over and through the mountain and down".

Aunty Irene attended school at Kō'ele. Driving around Kō'ele, Aunty Irene pointed to the hill where the original school was located She also pointed to the location of the old slaughter house and a pasture that was utilized for grazing after the company gave up pineapple.

Aunty Irene described how teachers brought to Lāna'i had trouble staying. She explains:

> At school ...we had teacher come over...we'd—they were on one or two months, three months and then they'd go back, they don't like Lāna'i because nothing to do, so we were in the same grade. And then the new teacher come, and they'd come over, stay for a half a year, and they'd take off, and go back, so we'd no school about one, two, three months, and then they'd come back and I'm in the same grade.

Aunty Irene explains that she did not graduate. Aunty Irene describes growing up at Keōmoku, fishing and preparing dried fish, turtle and *he'e*. They remember carrying these dried snacks as well as *kālua* pig to school in their shirt pocket.

When asked what her knowledge regarding the high occurrence of Hawaiian stone artifacts said to have been found during plowing of the pineapple fields was, she said she was aware of all the stone artifacts but did not know exactly how the area was utilized by Hawaiians in traditional times.

5.3.2 Noboru "Squeaky" Oyama and Mr. Takeo Yamato

Mr. Oyama, known as Squeaky, was interviewed at the Senior Center on March 27, 2009. Mr. Oyama moved to Lāna'i with his family in 1925. He was born in Wailuku, Maui. His father worked with horses in Kahului, with the Kahului Raching Association and moved to Lāna'i to work as the plantation's stable man. In 1925 the plantation utilized horses and plows for the agricultural work. Mr. Oyama said his father was in charge of all the stables and also worked in the capacity of a veterinarian. Also participating in the interview was Mr. Takeo Yamato, a long-time Lāna'i resident.

When asked about the school, Mr. Oyama recalls the schools original location as being near Cavendish, up on a hill top. He remembers it being a three-bedroom home that was actually picked up and moved to its current location in Lāna'i City, using tractors, in 1937.

Mr. Oyama described what Lāna'i City was like, specifically the shops and shop owners located immediately around Dole Park. Looking at a map of Lāna'i City, Mr. Oyama explained

that the Minami Garden used to be located where the school is now. He referred to it as a "truck garden" and said that they grew vegetables there. He described the area located behind the current day gym, adjacent to the school, as being the place where the ladies would "trim the crown".

Mr. Takeo Yamato recalls finding *ulu maika* in the pineapple fields and Mr. Oyama confirmed that *ulu maika* were "...all over the place." Mr. Yamato and Mr. Oyama talk about hiking *mauka* of the city as kids and picking *lilikoi* and guava. Mr. Yamato explains that up until about ten years ago, he would access *mauka* regions from Lāna'i City to collect *pepeiao* an edible fungus. He said that one could find *pepeiao* growing on *kukui* nut trees. Mr. Yamato and Mr. Oyama agree that *pepeiao* added to chop suey is delicious! Mr. Yamato goes on to explain that *pepeiao* can be easily dried and keeps for years. By soaking the dried fungus in water, it easily freshens up and is ready to cook. He stated that he has also collected bamboo shoots annually until recently, due to the construction of a fence that has blocked his access.

Mr. Oyama is unsure of how necessary the school expansion will be in the coming years, he said that he hears about lots of unemployment due to a slow economy.

5.3.3 Senior Center *Kūpuna*

In a recorded interview on April 9, 2009, a group of seven ladies were recorded "talking story" at the Lāna'i Senior Center. Of the seven ladies, five of them -- Mrs. Suzanne Kincaid, Mrs. Margret Hubin, Mrs. Helen "Cookie" Hashimoto, Mrs. Alfansa Lopez and Aunty Irene Perry -- shared stories about growing up on Lāna'i. Mrs. Sugar Gima and Mrs. Chitose Oshiro were present, but did not add to the conversation.

The ladies shared stories about participation in school and community sports events and dances. Mrs. Cookie Hashimoto said that there were several softball teams in the community. Mrs. Hashimoto recalls three women's teams; the Federation team (Filipino Federation of America), the Lāna'i High School team and the Office team, which she played on. Mrs. Lopez recalls the time the Globe Trotters came to Lāna'i and put on an exhibition game with the high school basketball team.

They speak of school dances as well but also of "public dances". In the mid-1940's, during the war, clubs would sponsor these public dances. There was live music and food and the women describe attending these events with a bunch of their girlfriends or "stag". The following is a portion of their conversation:

> Mrs. Cookie Hashimoto (CH): Right, right, right. During the wartime we used to have a social dances in the streets, people used to sponsor, yep, and we used to play and go to social dance.
>
> Mrs. Colleen Dagan (CD): What were those like?
>
> CH: Well, you know, a lot of fun, because you go stag and get a lot of girlfriends [Everybody laughs]. Stag, a bunch of girls stag--
>
> Mrs. Alfansa Lopez (AL): No more one particular partner eh--

CD: How old were you guys when those were happening?

CH: A teenager.

Mrs. Suzanne Kincaid (SK): There was no restriction [wartime curfew] on going to dances yeah.

CH: Yeah, they tried, but usually they had about 11:00 [pm], 10:30-11:00.

AL: There's no curfew, but well, some mothers don't trust yeah, so the mothers waiting outside, waiting for us 'til the dance pau!

SK: That was your mother, my mother never came [Laughs, several exchanges at once].

AL: My mother had one flashlight [Laughs]. My mother came, I could see the reflection of her glasses [Laughs].

At the public dances Hawaiian music as well as popular American music was played. The women describe dancing, being asked to dance and talk about learning to dance in the basement of the gym:

CH: Well, Hawaiian music, what's that dance …not like today kine, they had ah, jitterbug and that but not that like today.

SK: Remember the Filipino man he says, "Do you wanna dance?" some of us he asked and I says, "I don't jitterbug" and he says "I never asked you to jitterbug" and I says, "I don't dance."

AL: And then those days, they don't come and ask you, "May I have this dance?" They go like this [pointing motions, laughing],

CH: Yeah, reserve dance already, reserve dance! Because I guess you know, they know that people around yeah. Cause, then, well some of them say, "May I have this dance?"

AL: The proper way ah--

CH: Cause then they ask you, oh--

SK: Only had this way when they stared turning out, may I have this dance.

AL: They teach you how to,

CH: 'Cause you know why- they used to have the student body dances. Oh, yeah, when I was seventh grade, we used go under, you know the gym, the basement, yeah, we used to go there to learn.

CD: To learn to dance?

CH: To dance.

CD: The basement of the gym?

CH: Yeah, but those are the school days, that we have our seventh, eighth grade yeah, that was the school days, that's where we learned to dance all different steps.

CD: Different steps, like what?

CH: Fox trot, what that, waltz, and another one, what was it now? Three major dance, fox trot, waltz and what the other one, there were three major dance. Yeah.

CD: So were those the major social things, the dances?

CH: Yeah, those were the, those days used to go to school, a student body, used to have a dance for them, for the classes,

These ladies also talk about heading *mauka* and gathering *lilikoi* and guava.

Section 6 Traditional Cultural Practices

The identification of traditional cultural practices for a cultural impact assessment takes into account, past, current and potential future cultural practices. Traditional cultural practices include those practices of any ethnic group who has influenced the culture of the study area and include subsistence hunting practices as well as traditional Hawaiian cultural practices. Traditional cultural practices are identified by community members through the consultation process.

6.1 Gathering for Plant Resources

6.1.1 Medicinal Plant Gathering

Gathering of plant resources in the upland portion of the study area consists of the collection of *ha'uōwī* (*Verbena litoralis*) and *'uhaloa* (*Waltheria indica*). The leaves, stems and roots of *'uhaloa* were grinded and strained and made to gargle to soothe a sore throat (Abbott 1992: 101). Mr. Morita recalls *ha'uōwī* being used as a poultice for bruises on individuals and horses. He remembers individuals collecting these medicinal plants from around Lāna'i City, in areas of fallow pineapple fields.

6.1.2 Subsistence Plant Gathering

Mr. Yamato explains that he used to hike into the forest *mauka* of Lāna'i City to collect *pepeiao akua*, commonly referred to as *pepeiao* (*Auricularia auricula*), a tree fungus that both Mr. Yamato and Mr. Oyama agreed is excellent in chop suey. Mr. Yamato said it often grew on *kukui* nut trees (*Aleurites molucana*). Mr. Yamato also explained that *pepeiao,* when dried, could be stored for years and freshens up nicely by soaking in water when ready to use. Mr. Yamato said that he continued to collect *pepeiao* until about ten years ago.

Mr. Yamato also describes traveling *mauka* to collect bamboo shoots. He said that he continued to collect bamboo shoots about once a year until a fence was recently constructed blocking his access. Guava (*Psidium guajava*) and *Lilikoi* or passion fruit (*Passiflora edulis*) are two other fruits that Mr. Yamato, Mr. Oyama, Aunty Irene Perry and several of the ladies at the senior center remember collecting.

6.1.3 Gathering *Maile*

Aunty Irene also recalled collecting *maile* (*Alyxia oliviformis*) from the mountains. It is unclear where exactly where she went to gather this plant or for what purpose. *Maile* has been known to be utilized as a decorative lei in *hula.*

6.2 Trails and Traditional Access Routes

No traditional Hawaiian trails within the present study area were mentioned during the consultation process. However, several individuals consulted described accessing the upland areas *mauka* of Lāna'i City for recreation and to gather edible foods such as *lilikoi*, guava, bamboo shoots and *pepeiao*. It is unclear as to what routes they utilized, however, it was noted that one access point had recently been fenced and access blocked.

6.3 Traditional Hawaiian Stone Tool and Craft Manufacture

Native Hawaiians utilized *pohaku*, stones of various qualities, for a variety of purposes. The *ulu maika* stone was designed as a sort of bowling disk used to play a game called *Maika. Maika* was a common traditional game played during the *Makahiki* season, the time of peace. To play this game, two stakes would be set in the ground about six inches apart. The player would then stand a distance from the stakes, further being more challenging, and attempt to roll the *ulu maika* between the stakes. Slingstones or *pohaku ma'a* were used as a weapon in warfare, hunting, and also as sport.

Throughout the consultation process, it was revealed that Hawaiian stone artifacts including *ulu maika, pohaku ma'a* and *imu* stones (fire pits) have been discovered and are known to be a common occurrence in the pineapple fields surrounding the school and throughout formerly cultivated areas on Lāna'i. Mr. Kepa Maly, in a written statement regarding Hawaiian habitation of this upland area, said, "Kamoku was noted for its upland forest and springs, with areas which the Hawaiians developed into an extensive forested dry land agricultural system, in Kō'ele, Kaiholena and Nininiwai region" (June 4, 2009 Maui County Cultural Resource Commission meeting). Although several individuals had found stone artifacts and surmised that Hawaiians had clearly left these items behind, few consulted were familiar with more detailed knowledge concerning Hawaiian habitation of these areas.

Mr. Albert Morita spoke of finding *ulu maika* and *imu.* He believes there is a strong possibility of uncovering more of these during construction for the school expansion. Mr. Gary Onuma also mentions the occurrence of Hawaiian stone artifacts, but explains that the expansion area has been heavily cultivated since the 1930's and that any archaeological features would likely be scarce today. Mrs. Sandra Ropa recalls finding Hawaiian stone artifacts in the pineapple fields as a child and vividly remembers not being allowed to bring them into the house. Mr. Takeo Yamato also said that he found *ulu maika* in the pineapple fields and Mr. Oyama confirmed that *ulu maika* were, "...all over the place."

6.4 Fresh Water Resources

As mentioned above (6.3), Mr. Maly has stated: "Kamoku was noted for its upland forest and springs, with areas which the Hawaiians developed into an extensive forested dry land agricultural system, in Kō'ele, Kaiholena and Nininiwai region." The mention of freshwater "springs" in these areas prompted further research of these resources. The place names of Nininiwai, meaning pouring water (Emory, 1924; 31) and Kaiholena, the name of the gulch, associated spring and the *iholena* variety of banana (Emory 1924: 31), speaks to the known and relative lushness of these upland areas, Kaiholena being the location of one of the principal springs on the island (Emory 1924: 47).

In his book, *The Story of Lāna'i,* Mr. George C. Munro, the manager of the Lanai Ranch from 1911 to 1930, recalls a large boulder that had been modified to collect water located at Kō'ele. Several holes measuring three inches wide and three inches deep had been made in the surface of this boulder (Munro 2007: 126). This boulder and its whereabouts were not mentioned by any individuals consulted. It was also said that Mr. Frederick Hayselden (Walter Murray Gibson's son-in-law in charge of the ranch in the late 1800's) built eight to ten cement lined cisterns

whose purpose was to catch water that dripped off the roofs of buildings at Kō'ele (Munro 2007: 128).

Mr. Munro also described a reservoir dug by Mr. Hayselden as being located behind the ranch manager's house. This reservoir caught storm water from the Kaiholena Gulch and was used to water livestock. This same reservoir exists today as a pond at what is now the Lodge at Koele, a Four Seasons Resort. In an April 2009 article in *The Lāna'i Times*, Aunty Irene Perry speaks of the days when she lived at Kō'ele in a house next to the main ranch managers house. Mr. Kenne Williams, the author of the article, explains that this same pond was the source of Aunty Irene's drinking water. Aunty Irene is quoted as saying, "Sometimes when it would rain, the pond would overflow and run down the hill" (Lāna'i Times, Williams 2009:10). This statement substantiates that this historic reservoir did, in fact, catch storm waters and shows that it was utilized for the same purpose many years after it was built. Aunty Irene recalls getting supplies of water from Maui as well, carried over on the sampan that the Kaoupuiki family ran between the islands.

This reservoir was also dry for a time. Mrs. Nani Watanabe (CCRC) recalls playing in it as a child in the 1940's and explains that it was dry. In a 1988 archaeological study, it was also described as being dry (Hammatt *et al* 1988: 5). It is known that Kaiholena stream was an intermittent stream and did not flow year round, but it is unknown if other activities had caused the stream to flow elsewhere or to not flow at all during the times when the reservoir was dry.

Another reservoir described by Mr. Munro was located "at the lower end of Kaiholena Gulch" and is described as a stone lined, with the capacity to hold 400,000 gallons (Munro 2007:128). It is said that water from up the valley was piped into this reservoir. In addition, Mr. Munro describes a pump and waterline installed to pump water from Maunalei Gulch into Kaiholena reservoir (Munro 2007: 129). At the June 4, 2009 CCRC meeting, Mr. Steve Bumbar made mention of a reservoir located behind the 17th hole at the golf course, the Experience at Koele. Descriptions from these two sources, coupled with research of historic and modern day photos, suggests these are the same reservoir, although it is unknown if any remnant of this reservoir exists today.

Fresh water resources also include brackish wells located in the coastal area at Kaumālapa'u. Mrs. Sandra Ropa recalls her grandparents' home and describes a garden that they grew that could tolerate the brackish water available there. Mr. George Munro also describes brackish wells located at Kaumālapa'u. He noted that these ancient Hawaiian wells were shallow and sealed on the seaward side by a mixture of mud and straw in an effort to minimize salt water seepage. One of these wells was located in Kaumālapa'u Gulch. Mr. Munro describes the water in this wall as being ten feet below the surface (Munro 2007: 125).

6.5 Agricultural Practices

Mr. Munro begins his chapter on agriculture with the following passage:

> Hawaiians are believed to have first colonized Lāna'i about the year 1400. Their first cultivations would likely be along the shore of the east side and in taro patches in Maunalei Gulch. The shore areas got very little rainfall, but water from the mountains soaked them during the wet season. These lowlands and taro patches would not be injured by such work, as yearly freshets bring rich soil from

> the mountains and deposit it on these lands. They may have found later that the extensive uplands on the west side had more rainfall but were not subject to flooding from freshets. The soil rich with the deposits of centuries from the forest that had covered it, was light enough to be easily handled with their primitive tools. As the population increased, therefore, they took up cultivation in that area (Munro 2007: 47).

The few mid-nineteenth century Land Commission Award (LCA) claims for lands within Kamoku Ahupua'a near the current project area may reflect the long-term effects of Kalani'ōpu'u's raid on Lāna'i in 1778. It is said that Kalani'ōpu'u's raid was so thorough that virtually all of Lāna'i's inhabitants were killed. His forces then raided their crops leaving nothing left to eat but the famine food of *kupala* (Kamakau 1992: 09-91). Mr. Munro goes on to explain that by killing all who farmed the western uplands, and raiding all the crops, the soils were left exposed. With no one to reestablish cultivation, these soils were blown away, thus leaving portions of the island denuded of its topsoil (Munro 2007: 47).

The four Kamoku LCA grants made at the time of the *Māhele* include LCA 3719 to Kalaihoa, LCA 6833 to Kaaiai, LCA 8556 to Kaauwaeaina and LCA 10630 to the Noa Pali. These claims consisted of *moku mauu* (grass lands or pastures), sweet potato plots and gourd fields. Pali was the *konohiki* of the area and his LCA extended into neighboring Kalulu and Kaunolu ahupua'a. Munro mentions the probable crops in these areas to have been taro, sweet potato and yams (Munro 2007: 47)

Mr. Maly also described the area as having been utilized by Hawaiians in traditional times for dry land agriculture as well as forest resources. Stone artifacts such as *ulu maika*, sling stones and various lithic tools, found over the years despite intense cultivation of the pineapple fields.

Historic research and community consultation found that historic gardening practices also occurred in the study area. Not only did individual families typically have their own gardens, but a truck garden called Minami Gardens was located at the school site before the school was moved from its Kō'ele location. Mr. Jusaku Minami, ran the family garden which may have extended from Fraser Avenue to where the county park is today. Mr. Minami worked at the garden after hours as he maintained a day job with the pineapple company where he worked as a *luna* for a *wahine* gang. His mother, Nami, as well as one other individual worked in the garden full-time. They grew Japanese potatoes or *araimo*, carrots lettuce, cabbage, bananas and *won bok.*

Minami Gardens supplied Lāna'i City with supplemental produce. Family members including daughter, Mrs. Susan Miyamoto and son Mr. Shigeto Minami, would accompany their father in an old car through the camp to sell their produce. Mr. Shigeto Minami recalls ringing a bell to let people know they were there. He explains that most families had their own smaller gardens, but that they provided vegetables to the camp stores and to the single men who had traveled from abroad to work in the pineapple plantation. It is believed that the garden operated at the current school location from about 1924, when the Minamis moved to Lāna'i, until about 1937. Mr. Shigeto Minami explained that when plans were made to move the school from Kō'ele to the garden location, their garden was moved about a mile away, by the Protestant church.

The Minami family lived across the street, behind the current Senior Center, in one of the original plantation homes. Minami family members and *kūpuna* asked about the landscape surrounding the current school location explained that it was not cultivated in pineapple. They explained that the pineapple fields began considerably further *makai* in the 1920's, and that the school location and the ball park located west of it was Minami Gardens. Historic maps and aerial photographs of the area indicate that the county park portion of the proposed expansion area might not have been cultivated in pineapples.

6.6 Hunting Practices and Deer Habitat

State of Hawai'i Hunting Units 1 and 3 (public hunting areas) are located approximately two miles northwest and west of the school expansion area. The game mammals and game birds that populate these areas include axis deer, mouflon sheep, *kolohala* or the Chinese ring-necked pheasant, wild turkeys, gray francolin, gambles quail, erckel francolin and doves.

Lāna'i residents, as well as other residents of the state, hunt as a subsistence practice. And this practice has become a strong tradition in some communities. While many Lanaians might agree that hunting is a strong tradition on Lāna'i and individuals such as Mrs. Sandra Ropa explained that food supplied from hunting deer was a significant part of their diet, Mrs. Alberta de Jetley notes, however, that sport hunting is not a traditional Hawaiian practice, but rather an introduced recreational sport.

Kamā'aina contacted during consultation explained that the state leases these lands from Castle & Cooke and that sport hunting activities has continued since the 1950's. It is believed that these public hunting areas are the most popular game mammal hunting areas in the state contributing significantly to the Lāna'i lifestyle and economy.

Contacts consulted said that a small population of axis deer have made their home in the fallow pineapple fields adjacent to the school expansion site. Mr. Albert Morita and Mr. Gary Onuma both agree that although these deer will be displaced by the expansion, they are a hardy animal and can easily adjust to new habitat.

6.7 Honoring the *Kūpuna*

The Lāna'i Senior Center is across Fraser Avenue from Lāna'i High and Elementary School and within the study area (see Dagan *et al* 2009, in press). It is where many senior citizens (*kupuna*) of varied ethnicities congregate daily. They come here to socialize; talk story with friends, have lunch, watch T.V and relax. For those seniors who cannot travel on their own, there is a Maui Economic Opportunity (MEO) bus that shuttles them from their homes to the center and back each day. For those seniors who cannot make it to the center, Mrs. Masicampo and Mrs. Alboro deliver hot lunches to them at their homes every day.

The Senior Center offers a variety of classes, often free of charge. Some of these classes include hula lessons, ukulele lessons, and hunter education classes. In addition, the Senior Center is the most popular location to book for celebrations such as birthdays, reunions, graduation parties and wedding receptions. Nearly all business and community meetings take place at the Senior Center and it is described as Lāna'i's Town Hall.

Throughout the consultation process this sentiment was repeated by Mrs. de Jetley, who said that the community enjoys the warm and homey atmosphere and Mr. Onuma who explained that the Senior Center is heavily utilized by the Lāna'i community as a place where the seniors have lunch, socialize and attend classes as well as their "town hall" where families throw parties, and groups hold community meetings. Mr. Hera also mentioned that he utilized the Senior Center when teaching hunters education classes. He said the Senior Center serves the community in many ways that reach beyond the actual Senior Center services. Mr. Noburo stated that the Senior Center is constantly being used by all the different organizations. It was further explained by Mr. Kepa Maly and Mr. Riki Hokama that the population on Lāna'i is ageing and that the seniors depend on the services the Senior Center provide.

Most important are the *kupuna* themselves. Traditionally, elders of most cultures are honored and cared for. Being the individuals who have given life to all others and for their knowledge and their experience, *kupuna* at the Lāna'i Senior Center are highly respected and well cared for. The reverence and care given the *kupuna* form a distinct cultural focal point in this community.

6.8 Pursuit of Knowledge – Ka'imi'ike

Originally at Kō'ele, then moved to its present location, Lāna'i High and Elementary School has been the main educational facility on the island since the ranching era. Through the consultation process it was explained that when the Japanese immigrated to the island in the twenties to attain work on Dole's pineapple plantation, they brought with them a strong tradition and love for education. This desire to excel in education was quickly accepted and emulated by all ethnic groups on Lāna'i. Individuals consulted relay a sense of healthy competition; not only did they enjoy school and school activities but they strived to do well, get the best grades and be the best sportsman. This sentiment continues today.

The school was also at the center of community activities: sports, dances and social events. The women interviewed at the Senior Center spoke fondly of their years at teenagers attending dances and playing sports (Section 5.3.3). This was their life: school and school activities. And when they had families of their own, the school became central to their lives again.

It was explained during the consultation process that the Lāna'i community, with their devotion to education, organized themselves in such a way that they secured funding from the legislature for the continued growth and improvement of the school. This funding went towards the construction of one classroom or building every year.

Those parents who worked on the plantation were keenly aware of the physical demands of plantation work and also understood that a good education would enable their children to attend college, with the hopes of eventually carving out a better lives for themselves. Lanaians of the plantation era and as well as Lanaians today continue to encourage their kids to attain a higher education. As a result, Lāna'i High and Elementary School has one of the highest numbers of graduating seniors going on to either four year colleges or vocational schools. During the plantation days it was said that they export two things: pineapples and kids. This speaks to the emphasis placed on education, and that parents encouraged and expected their children to leave Lāna'i to attain a higher education. Today, this mind set continues. With the shift from pineapple to high-end resorts, it is said that more Lāna'i residents are returning after college because they are able to secure competitive jobs in the tourism industry.

Section 7 Summary and Recommendations

From mythological times, Lāna'i has always been unique. First inhabited by spirits and eventually made habitable for mortals by the trickster Kaululā'au, Lāna'i today retains a distinctive culture. The islands natural resources, although somewhat limited, have traditionally kept its population small. Regardless, the Hawaiians that populated Lāna'i in ancient times lived well given the resources available. They utilized the forests resources as well as developing dry land agriculture on the western plateau lands near the project area. Their most extensive *lo'i* were located in the Maunalei Gulch and along the northeastern side of the island. Historic literature shows that ancient Lanaians lived with an inseparable connection to Maui and as subjects of the Maui chiefs. But crucial changes would take place beginning with the devastating raid by Kalani'ōpu'u known as Kamokuhi'. This was a war that is said to have left a scar on this island in the form of denuded soils and barren lands (Section 3). From the time of the Kamokuhi' raid in 1778 until the arrival of the first missionaries, it is said that the *ahupua'a* of Kamoku was left largely uncultivated (Munro 2007; 47). Then, with the *Mahele aina* came the division and privatization of lands on Lāna'i. Vast acreages transferred from Kamehemaha III and the *kanaka maoli* through several different property owners including; Walter Murray Gibson, Charles Gay, W. M. Giffard, James Dole and now David Murdock of Castle & Cooke Resorts. These different owners saw the island through very different phases of its history; from the Mormon colonist settlement at Palawai, to the ranching era of Lanai Ranch. From the Hawaiian Pineapple Company plantation to a five-star resort vacation destination.

Lāna'i has truly developed a culture of its own. Lāna'i High and Elementary School and the Lāna'i Senior Center can be likened to the main arteries of the heart of Lāna'i. This community places the highest value on the education of their youth and respect and care for its elders. It was said during the consultation process that excellence in education became a tradition here during the plantation era. Today, an emphasis on education continues to be of highest importance as the school and pursuit of education are a part of the cultural identity of this community. Mr. Robert Hera succinctly stated that anything that will benefit the school, will benefit the community of Lāna'i (Section 5.1.5.)

With a high percentage of all graduating seniors attending colleges and/or vocational schools, Lāna'i High and Elementary School has been a model for schools, students and parents state-wide. Lanaians at one time had a saying, "we export two things on Lāna'i, pineapples and kids. The schools vision, for students to be "Tenacious, Observant, Respectful, Compassionate and Honorable" or TORCH, combines with their school emblem to represents the passing of the flame of knowledge.

Lanains are diverse group, throughout history they have endured many changes in a relatively short period. Much of their flexibility comes from their overall attitude which seems to embrace change and make those changes positive ones that support the betterment of their community. This constructive and adaptive outlook was evident throughout the consultation process.

7.1 Recommendations

As a result of the consultation process, it was found that no traditional or cultural resources will be adversely impacted by the proposed school expansion. In contrast, the school expansion will add to this community's tradition and pursuit of education.

As noted above, Hawaiian stone artifacts have been found throughout the general area that includes the present project area. It is thus recommended that the project implement the archaeological monitoring procedure outlined in the companion archaeological inventory survey report prepared by Cultural Surveys Hawai'i for the Lāna'i High and Elementary School expansion project.

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APPENDIX D

Phase I Environmental Site Assessment. Project No. 808-00253-PH 1, Lanai City, Hawaii.

Phase I Environmental Site Assessment

Lanai High & Elementary School Master Plan Project

Lanai City, Hawaii
TMKs: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (Portion) & (2) 4-9-002: 058 (Portion)

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ENPRO Project Number: 904-00047-PHI
July 14, 2009

PROJECT AT A GLANCE™

Phase I Environmental Site Assessment

Project Number: 904-00047-PHI

Assessment Component	No Further Action(†)	Routine Solution	Phase II ESA	Report Reference Section	
				Project Site	Adjoining Property
Hazardous Materials	X				
Underground Storage Tanks	X				
Aboveground Storage Tanks	X				
Solid Waste	X				
PCBs	X				
Historical Use			X	**4.1, 4.5.2, 5.1**	
Wells	X				
Surface Areas	X				
Operations			X		**5.2, 6.1.2**
Significant Data Gaps	X				

BOLD = Identified issues.

(†) = Based on this preliminary study, it appears that further investigation in this area is not a priority concern for this site at the present time.

(‡) = Costs depicted are for investigation/program development activities. Remediation costs, if required, will be identified as a result of investigation/program development activities

ACTION ITEMS

Project Site: Lanai High & Elementary School Adjoining Lands
Lanai City, Hawaii
TMKs: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (Portion) &
(2) 4-9-002: 058 (Portion)

Based on our investigation, ENPRO recommends the following action items:

1. Sample the soil of the eastern portion of the project site and analyze for hydrocarbon-related contaminants, heavy metals and pesticides to assess possible impacts associated with former illegal dumping activities and sewer pond on the eastern portion of the project site.

2. Sample the soil across the project site and analyze for chemicals associated with former pineapple cultivation onsite.

3. Sample the soil of the southeastern portion of the project site and analyze for hydrocarbon-related contaminants and heavy metals to assess possible impacts associated with use of the adjacent property to the southeast as a junk yard.

4. Sample the soil of the northeastern portion of the project site and analyze for hydrocarbon-related contaminants and heavy metals to assess possible impacts associated with use of a portion of the adjacent high school property to the northeast as an auto shop teaching facility for over fifty years.

Table of Contents

Executive Summary

CDS International, as agent for the State of Hawaii Department of Education, retained ENPRO Environmental (ENPRO) to conduct a Phase I Environmental Site Assessment of the Lanai High and Elementary School adjoining lands located in Lanai City, Hawaii, identified by TMKs: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (portion) and (2) 4-9-002: 058 (portion), (the "project site"). The project site included all of TMKs (2) 4-9-014: 002 and (2) 4-9-014: 005, the northwestern portion of TMK (2) 4-9-014: 011 and the east/southeastern portion of TMK (2) 4-9-002: 058. The objective of this assessment was to provide an independent, professional opinion regarding *recognized environmental conditions (RECs)*, as defined by the American Society for Testing and Materials (ASTM), associated with the project site.

This assessment was performed under the conditions of, and in accordance with ENPRO's Proposal Number 09B-0047-LNY rev dated February 27, 2009, CDS International's Contract Number CO70605 dated September 3, 2008, the *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31. Any exceptions, additions to, or deletions from the ASTM or AAI practice, details of the work performed, sources of information, and findings are presented in the report. Limitations of the assessment are described in Sections 1.4 and 1.5.

The project site, currently owned by the County of Maui and Castle & Cooke Resorts, LLC is approximately fifty acres.

The historical research presented in this report has established the use of the property since 1954, when the property was depicted as being in agricultural use. The northeastern portion of the property, identified as TMK (2) 4-9-014: 002, appeared to be overgrown by trees and bushes and the portion identified as TMK (2) 4-9-014: 005 appeared to be developed with one building and several objects/structures to the north of the building.

This assessment has revealed the following *recognized environmental conditions (RECs)*, as defined by ASTM, in connection with the property:

- Historical presence of a sewer pond on the eastern portion of the project site (TMK (2) 4-9-014: 005).

  This finding is considered a *recognized environmental condition* because of the potential presence of heavy metals and pesticides on the eastern portion

of the project site due to materials that may have accumulated in the sewer pond.

- Historical use of the eastern portion of the project site (TMK (2) 4-9-014: 005) as irrigation stand.

  This finding is considered a *recognized environmental condition* because of the potential presence of pesticides on the eastern portion of the project site due to mixing activities of chemicals in the holding tank on the trailer rig of the irrigation trucks.

- Former illegal dumping on the eastern portion of the project site (TMK (2) 4-9-014: 002).

  This finding is considered a *recognized environmental condition* because of the potential presence of hydrocarbon-related contaminants, heavy metals and pesticides on the eastern portion of the project site due to the nature of materials that may have been disposed of on the project site.

- Historical use of the project site for agricultural land, specifically for growing pineapple.

  This finding is considered a *recognized environmental condition* because of the potential presence of chemicals associated with former pineapple cultivation onsite.

- Use of the adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, motor boats, cars, used batteries, etc. These materials were observed to be stored approximately 200 feet from the southeast boundary of the project site.

  This finding is considered a *recognized environmental condition* because of the potential presence of hydrocarbon-related contaminants and heavy metals associated with storage and disposal of miscellaneous debris on the adjacent property.

- Use of the adjacent property to the northeast of the project site as an auto shop teaching facility by Lanai High & Elementary School since the 1950s. The auto shop building was located approximately fifty feet from the northeast boundary of the project site.

This finding is considered a *recognized environmental condition* because of the potential presence of hydrocarbon-related contaminants associated with auto repairing activities on the adjacent property.

1.0 INTRODUCTION

CDS International, as agent for the State of Hawaii Department of Education, retained ENPRO Environmental (ENPRO) to conduct a Phase I Environmental Site Assessment of the Lanai High & Elementary School adjoining lands located in Lanai City, Hawaii, identified by TMKs: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (portion) and (2) 4-9-002: 058 (portion), (the "project site"). The project site included all of TMKs (2) 4-9-014: 002 and (2) 4-9-014:005, the northwestern portion of TMK (2) 4-9-014: 011 and the east/southeastern portion of TMK (2) 4-9-002: 058.

1.1 Purpose

The objective of this environmental site assessment is to provide an independent, professional opinion regarding recognized environmental conditions, as defined by the American Society for Testing and Materials (ASTM, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E 1527-05), associated with the project site. The term *recognized environmental condition* is defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property, or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be *de minimis* is not a *recognized environmental condition.*

1.2 Detailed Scope of Services

This assessment was performed under the conditions of, and in accordance with ENPRO's Proposal Number 09B-0047-LNY rev dated February 27, 2009, CDS International's Contract Number CO70605 dated September 3, 2008, and in accordance with the *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31. The scope of services in conducting this assessment included:

Records Review

A review of environmental records, including regulatory agency reports, permits, registrations, and consultant's reports for evidence of *recognized environmental conditions* available from the property owner or site contact.

An investigation of historical use of the project site by examining locally available aerial photographs, fire insurance maps, property tax files, recorded land title records, USGS topographical maps, building department records, zoning/land use records and other readily available historical information for evidence of prior land use that could have led to *recognized environmental conditions*.

A review of an environmental database search report of federal and state regulatory agency records pertinent to the project site and offsite facilities located within ASTM-specified search distances from the project site.

A review of readily available information describing the general geology and topography of the project site, local groundwater characteristics, sources of water, power and sewer, and proximity to ecologically sensitive receptors that may be impacted by *recognized environmental conditions.*

Site Reconnaissance

A site walkthrough inspection of the property for visible evidence of *recognized environmental conditions* including existing or potential soil and groundwater contamination, as evidenced by staining or discoloration; stressed vegetation; indications of waste dumping or burial; pits, ponds or lagoons; containers of hazardous substances or petroleum products; electrical and hydraulic equipment that may contain polychlorinated biphenyls (PCBs), such as transformers or lifts; and underground and aboveground storage tanks.

A site property line visual assessment was conducted of adjacent properties for evidence of potential offsite *recognized environmental conditions* that may affect the project site.

Interviews

Interviews with available key site personnel regarding current and previous site activities on the property, especially those involving the use of hazardous substances and petroleum products, were conducted. Interviews are summarized in Section 5 of this report. Completed property questionnaires are presented in the Appendix.

Report

Evaluation and compilation of the information gathered for the development of this report.

1.3 Significant Assumptions

ENPRO, in part, has relied on information supplied by the client or the client's agent(s), listed in Section 5, and assumes such information to be factual.

The commercial regulatory database search report, summarizing federal and state regulatory agency records, is provided by a contracted data research firm. The information provided is assumed to be correct unless otherwise noted.

Unless otherwise discovered during review, all other sources of information, whether verbal or written, are assumed to be factual.

1.4 Limitations and Exceptions

Most areas of the property were not available for direct inspection due to dense vegetation.

No opinion regarding environmental conditions in areas that were not inspected can be formed.

As a matter of necessity, ENPRO relies largely on readily available sources of information such as the Client, public records, interviews, and contracted research firms for recognizing potential environmental liabilities at a project site/facility. Requests for information resources are made to collect relevant data on current and past practices conducted at the project site/facility. ENPRO may not receive all information requested or be able to confirm received information during the course of the environmental site assessment. Therefore, ENPRO shall not be held responsible for errors, omissions, or misrepresentations resulting from missing documentation or from inaccurate information provided by such sources.

This Phase I Environmental Site Assessment is limited to issues addressed by *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31. Additionally, the following limitations are from the ASTM standard and apply to this assessment:

> *4.5.1 Uncertainty Not Eliminated — No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental*

conditions in connection with a property. Performance of this practice or E 1528 is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with a property, and both practices recognize reasonable limits of time and cost.

4.5.2 Not Exhaustive — Appropriate inquiry does not mean an exhaustive assessment of a clean property. There is a point at which the cost of information obtained or the time required to gather it outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. One of the purposes of this practice is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing an environmental site assessment and the reduction of uncertainty about unknown conditions resulting from additional information.

4.5.3 Level of Inquiry Is Variable — Not every property will warrant the same level of assessment. Consistent with good commercial or customary practice, the appropriate level of environmental site assessment will be guided by the type of property subject to assessment, the expertise and risk tolerance of the user, and the information developed in the course of the inquiry.

4.5.4 Comparison With Subsequent Inquiry — It should not be concluded or assumed that an inquiry was not appropriate merely because the inquiry did not identify recognized environmental conditions in connection with a property. Environmental site assessments must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent environmental site assessments should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use of developing technology or analytical techniques, or other factors.

13.1.5 List of Additional Issues — Following are several non-scope considerations that persons may want to assess in connection with commercial real estate. No implication is intended as to the relative importance of inquiry into such non-scope considerations, and this list of non-scope considerations is not intended to be all-inclusive:

13.1.5.1 Asbestos-Containing Materials,
13.1.5.2 Radon,
13.1.5.3 Lead-Based Paint,
13.1.5.4 Lead in Drinking Water,
13.1.5.5 Wetlands,
13.1.5.6 Regulatory Compliance,
13.1.5.7 Cultural and Historical Resources,

13.1.5.8 *Industrial Hygiene,*
13.1.5.9 *Health and Safety,*
13.1.5.10 *Ecological Resources,*
13.1.5.11 *Endangered Species,*
13.1.5.12 *Indoor Air Quality, and*
13.1.5.13 *Biological Agents, and*
13.1.5.14 *Mold*

Additionally, the following limitation regarding the AAI standard applies to this assessment:

ASTM allows the prospective owner or grantee to provide information regarding recorded environmental liens on the property. ENPRO's Phase I Environmental Site Assessment service does not include a search for environmental liens that may have been placed on the title of the subject property.

1.5 Data Gaps

Data gaps are not uncommon in environmental site assessments and not all data gaps are significant. The significance is determined by other information and professional experience as to whether the data gap raises reasonable concerns about activities that may present a *recognized environmental condition.* According to *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31, significant data gaps must be noted.

ENPRO did not encounter any significant data gaps during the performance of this Phase 1 Environmental Site Assessment.

1.6 Special Terms and Conditions

This Phase 1 Environmental Site Assessment did not include any special terms or conditions.

1.7 User Reliance

The information and opinions rendered in this report are intended for CDS International and the State of Hawaii Department of Education. ENPRO shall not distribute nor publish this report without the consent of CDS International and the State of Hawaii Department of Education except as required by law or court order. The information and

opinions expressed in this report are given in response to a limited assignment and should be considered and implemented in light of that assignment.

The services provided by ENPRO in completing this project were consistent with normal standards of the profession. No other warranty, expressed or implied, is made.

In all cases, the information and opinions expressed in this report reflect only those conditions and circumstances existing at the time the report was conducted.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

The project site, located in Lanai City, Hawaii (Figures 1, 2 and 3), is in a residential/agricultural setting. The longitude and latitude for the project site are shown in Table 1.

The project site is further described by the County of Maui Tax Assessor's Office as Tax Map Keys: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (portion) and (2) 4-9-002: 058 (portion); however, the project site only includes all of TMKs (2) 4-9-014: 002 and (2) 4-9-014: 005, the northwestern portion of TMK (2) 4-9-014: 011, and the east/southeastern portion of TMK (2) 4-9-002: 058. The project site is located in an area zoned P1 and PK3: "Public Land & Regional Park District".

Table 1

Location and Legal Description of Project Site

Location Description	Project Site
Address	Lanai City, Hawaii
TMKs	(2) 4-9-014: 002 (2) 4-9-014: 005 (2) 4-9-014: 011 (Portion) (2) 4-9-002: 058 (Portion)
Latitude (North)	20.823908 - 20°49'26.07"
Longitude (West)	156.721389 - 156°55'43.17"
Elevation	Approximately 470 feet above mean sea level
Distance and Direction to Surface Waters	Honopu Bay/Pacific Ocean, four miles to the west Iwi'ole Gulch, approximately 2,000 feet to the north

2.2 Site and Vicinity General Characteristics

The project site is located in Lanai City, in the central portion of the island of Lanai. The project site included sections of four irregular-shaped parcels, totaling approximately fifty acres. There were no on site structures, except for a tennis/basketball court and a

playground on the portion identified as TMK (2) 4-9-014: 002. Primary access to the site was from Fraser Avenue, east of the project site.

2.3 Current Use of the Property

The project site, most recently owned by the County of Maui and Castle & Cooke Resorts, LLC, is mostly vacant land, with exception of TMK (2) 4-9-014: 002 which is used as a ball field, a tennis/basketball court and a playground.

2.4 Descriptions of Structures, Roads & Other Improvements

A ball field, a tennis/basketball court and a playground were observed on the portion identified as TMK (2) 4-9-014: 002.

Unpaved roads were observed on the northeastern portion of TMK (2) 4-9-002: 058.

Storm water runoff from the project site is expected to flow to the southwest via sheet flow and eventually discharge to the Pacific Ocean. A significant portion of storm water falling on the site is expected to percolate into the unpaved, vegetated land.

Evidence of additional discharge sources was not observed at the project site.

2.5 Current Uses of Adjacent and Nearby Properties

The area surrounding the project site consisted of a school, residential properties, vacant/vegetated land, wastewater treatment facility and a junkyard. Adjoining properties were observed from the project site and from public access lands for signs of *recognized environmental conditions* and their potential to pose an environmental concern to the project site. These properties are listed and described in Table 2.

Table 2

Summary of Adjacent and Nearby Property Use

Direction	Name	Use
Southeast	None	Junkyard
Southwest	None Lanai City Auxiliary Wastewater Treatment Plant	Vacant/Vegetated land Wastewater Treatment
Northeast	Residential Properties Lanai High & Elementary School	Residential School
West/Northwest	None	Vacant/Vegetated Land

3.0 USER PROVIDED INFORMATION

Per ASTM, the "User" is the party seeking to use Practice E 1527-05 to perform an environmental site assessment of the property. A user may include a purchaser, a potential tenant, an owner, a lender or a property manager, all associated with the property. According to ASTM, "the user has specific obligations for completing a successful application of this practice." The Users of this report are CDS International and the State of Hawaii Department of Education.

3.1 Environmental Liens or Activity and Use Limitations

Mr. Glen Miura, the president of CDS International, and Mr. Pierce Myers, the Lanai High & Elementary School Principal and representative of the State of Hawaii Department of Education, did not report any environmental liens or activity use limitations associated with the property.

3.2 Specialized Knowledge

Mr. Miura reported the following specialized knowledge of *recognized environmental conditions* in connection with the property:

- The project site was formerly used for pineapple cultivation
- Former illegal dumping may have occurred on the eastern portion of the project site

Mr. Myers reported the following specialized knowledge of *recognized environmental conditions* in connection with the property:

- The project site was used for cultivation of pineapple for approximately fifty years. Pineapple cultivation activities began in the area in the 1920s or 1930s and ended in the late 1980s.

3.3 Commonly Known or Reasonably Ascertainable Information

The adjacent property to the southeast of the project site is used as a junkyard.

3.4 Valuation Reduction for Environmental Impairment

Mr. Miura and Mr. Myers did not provide information on any reduction of valuation due to environmental impairment.

3.5 Owner, Property Manager, and Occupant Information

Mr. Sol Kahoohalahala, the Representative of the County of Maui (owner of the project site), provided the following information relevant to *recognized environmental conditions* associated with the project site:

- The project site was formerly used for pineapple cultivation.
- Former illegal dumping occurred on the eastern portion of the project site.
- A sewer pond was formerly located on the eastern portion of the project site. The sewer pond was the product of sewage runoff coming from Lanai City.
- The portion of the project site identified by TMK (2) 4-9-014: 005, was used as an irrigation stand. Two concrete pads and a water tank were located on this parcel. Field irrigation trucks would park on the concrete pads to mix fertilizers and chemicals with water from the water tower. Mixing took place in the holding tank on the trailer rig.
- The portion of the project site identified by TMK (2) 4-9-014: 002 was used by Lanai High & Elementary School for the agricultural program. An above ground fuel tank was located on the property.

3.6 Reasons for Performing Phase I Environmental Site Assessment

Mr. Miura stated that the purpose for conducting the Phase I Environmental Site Assessment was to comply with a state requirement for expanding the Lanai High & Elementary School.

4.0 RECORDS REVIEW

4.1 Title Records

Readily available records at the County of Maui Tax Assessor's Office were reviewed to assess past ownership of the project site. Significant ownership transactions are summarized in Table 3.

Table 3
Summary of Title Information

Tax Map Key	Date	Property Transaction
(2) 4-9-014: 001	1959	Owned by Hawaiian Pineapple Co., Ltd
(2) 4-9-014: 001	08/25/59	Leased to County of Maui
(2) 4-9-014: 001	10/03/60	Change of corporate name to Dole Corporation
(2) 4-9-014: 001	05/01/64	Deeded to Castle & Cooke, Ltd
(2) 4-9-002: 058	09/23/98	New parcel from TMK (2) 4-9-014: 001
(2) 4-9-002: 058	11/13/98	Warranty deeded to County of Maui
(2) 4-9-014: 002	1964	New parcel from TMK (2) 4-9-014: 001
(2) 4-9-014: 002	1964	Deeded to County of Maui
(2) 4-9-014: 005	1955	Owned by Hawaiian Pineapple Co., Ltd
(2) 4-9-014: 005	02/25/55	Deeded to County of Maui
(2) 4-9-014: 011	1979	Owned by Castle & Cooke, Inc.
(2) 4-9-014: 011	1980	Leased to County of Maui
(2) 4-9-014: 011	12/16/96	Castle & Cooke, Inc. changed name to Dole Food Company, Inc.
(2) 4-9-014: 011	12/16/96	Dole Food Company, Inc. changed name to Lanai Company, Inc.
(2) 4-9-014: 011	01/04/01	Lanai Company, Inc. changed name to Castle & Cooke Resorts, LLC.

The tax records indicate that Hawaiian Pineapple Co., Ltd/Dole Corporation/Castle & Cooke, Ltd owned the project site since 1955. Due to the nature of the pineapple business and the use of pesticides and herbicides, Hawaiian Pineapple Co., Ltd/Dole

Corporation/Castle & Cooke, Ltd's ownership was noted for possible *recognized environmental conditions* that could impact the project site. Based on the historical information and interviews obtained during this assessment, it is ENPRO's opinion that the project site was used for pineapple-related agriculture from the 1920s to the late 1980s or early 1990s. The future plans for the project site includes the redevelopment of the land into several structures associated with the expansion of the Lanai High and Elementary School. According to the Hawaii Department of Health (HDOH), in the event that a property use changes from agricultural, soil sampling may be warranted to evaluate possible contamination from pesticides, herbicides, and other agricultural chemicals. A copy of the State of Hawaii Department of Health *Pesticides in Former Agricultural Lands and Related Areas Updates on Investigation and Assessment* is included in the appendix.

Copies of the title records reviewed for this project are provided in the Appendix.

4.2 Standard Environmental Record Resources: Federal, State and Local Database Search

The regulatory database search report prepared by Environmental Data Resources, Inc. (EDR) was reviewed to evaluate the project site and listed properties within ASTM-recommended search distances. Federal, state and local databases reviewed are included in the Appendix section of this report.

Project site

The project site was not listed in the EDR regulatory database search report.

Adjacent and Nearby Properties

The EDR regulatory database search report identified a total of six listings within the ASTM minimum search distances from the project site.

None of the listed sites are expected to present an environmental concern to the project site because, based upon ENPRO's review:

1. They only hold an operating permit (which does not imply a problem) or,
2. They were identified for past regulatory requirements that require no future action or,
3. They are too distant and/or hydrogeologically down gradient or cross gradient relative to the project site.

The EDR regulatory database search report identified forty "orphan" sites within the ASTM minimum search distances from the project site. Based on our review of the orphan sites listed, ENPRO's requested regulatory files for the following sites:

- FAA Lanai, Southwest of Lanai City, FINDS
- Dole Pineapple Pesticide, Lanai Avenue, FINDS
- Lanai City, Lanai City, FINDS

4.3 Additional Environmental Record Resources: State and Local Agency Environmental Record Sources

Based on ENPRO's review of the EDR regulatory database search report, regulatory files from the State of Hawaii Department of Health (DOH) were requested and reviewed. Our review considers both proximity to the project site and local hydrogeologic conditions to identify which sites and which environmental violations may be interpreted to have a potential impact to the project site's environmental conditions.

4.3.1 Department of Health, Solid and Hazardous Waste Branch

Based on our review of the EDR regulatory database search report, we requested the following regulatory files from the State of Hawaii Department of Health (DOH), Solid and Hazardous Waste Branch:

- TMK (2) 4 – 9 – 002: 058
- TMK (2) 4 – 9 – 014: 011
- TMK (2) 4 – 9 – 014: 005
- TMK (2) 4 – 9 – 014: 002
- Lanai High & Elementary School, 555 Frasier Avenue, Lanai City
- Oshiro Enterprises, Inc., 850 Frasier Avenue, Lanai City
- Dole Lanai Plantation (Kaumalapau Highway Field 5520), southwest corner of the intersection of Ninth Street and Fraser Avenue, Lanai City
- Dole Lanai Plantation (Emulsion Plant), west of Fraser Avenue, between Tenth and Twelfth Streets, Lanai City
- Dole Lanai Plantation (Power Plant), southwest corner of the intersection of Ninth Street and Lanai Avenue, Lanai City
- ORPHAN SITE: FAA – Lanai, Lanai City
- ORPHAN SITE: Dole Pineapple Pesticide, Lanai, Lanai Avenue
- ORPHAN SITE: Lanai City, Lanai City

The State of Hawaii Department of Health (DOH), Solid and Hazardous Waste Branch reported the following:

1- Oshiro Enterprises, Inc., 850 Fraser Road

- Two tanks were listed for this site. Each was listed as a 2,500 gallon gasoline tank. The tanks were installed on July 1, 1952 and removed by Brewer Environmental Industries, Inc. on May 3, 1993. A June 22, 1993 *Underground Storage Tank (UST) Closure Report*, prepared by Brewer Environmental Industries, Inc., stated that soil samples collected at the time of UST closure did not indicate the presence of petroleum hydrocarbon contamination onsite. DOH issued a *No Further Action* (NFA) letter for these tanks on January 19, 2001.

It is ENPRO's opinion that Oshiro Enterprises, Inc. located at 850 Fraser Road, does not have *recognized environmental conditions* that are expected to affect the project site because it is too distant from the project site. Furthermore, it is our interpretation that the facility was identified for past regulatory requirements that require no future action.

2- Dole Lanai Plantation, Lanai City

- A May 28, 1991 report entitled *Phase II Site Characterization at Dole Packaged Foods Company, Lanai plantation, Hawaii*, prepared by Unitek Environmental Consultants, Inc. (UEC), discussed the results of additional soil sampling at three sites in Lanai City (Site 1 was located at Lanai Avenue/Ninth Street; Site 2 and Site 3 were located at Fraser Avenue). The additional soil sampling was in response to releases identified by UEC in 1990 during the removal of seven USTs.
    - Laboratory analyses of soil samples collected from Site 1 indicated levels of TPH-oil below the DOH cleanup goals and relatively low levels of organic lead.
    - Laboratory analyses of soil samples collected from Site 2 indicated levels of TPH-diesel above DOH cleanup goals.
    - Laboratory analyses of soil samples collected from Site 3 indicated levels of TPH-diesel, benzene, ethylbenzene and chlorinated compounds above DOH cleanup goals.

  The report recommended further site characterization of Sites 2 and 3 to determine the vertical extent of the identified contamination.

- A May 30, 1991 letter from Mr. Eric Sadoyama (DOH, UST Section) to Ms. Carolyn Winters (DOH, UST Section Leader), summarized the actions regarding the status of the USTs at the Dole Lanai Plantation. The letter listed a total of thirteen USTs removed from the following Dole Lanai Plantation facilities: Power Plant (southwest corner of the intersection of Ninth Street and Lanai Avenue), Kaumalapau Highway, Emulsion Plant (west of Fraser Avenue, between Tenth and Twelfth Streets), Labor Yard (Lanai Avenue/Ninth Street intersection), Shop (Lanai Avenue/Ninth Avenue) and DD Farm (off Kaumalapau Highway). Releases were reported from all USTs except for the USTs removed from the Labor Yard and DD Farm.

It is ENPRO's opinion that none of the Dole Lanai Plantation sites listed above represent a *recognized environmental condition* that is expected to affect the project site because they are too distant from the project site. Further details regarding the Emulsion Plant, the Kaumalapau Highway Field 5520 and the Power Plant are provided below.

3- Dole Lanai Plantation (Emulsion Plant), West of Fraser Avenue, between Tenth and Twelfth Streets, Lanai City

- Several letters issued between 2001 and 2008 from the DOH to Castle & Cooke Resorts, LLC regarding petroleum contaminated soil on the property were available for review. The letters were in response to soil sampling and soil characterization associated with a release from two 10,000 gallon USTs at the property (release ID 900128).

- A letter from the DOH to Castle & Cooke Resorts, LLC, dated May 11, 2007 stated that grossly contaminated soil, containing 1,2-dichloropropane (1,2-DCP) remains in place at the facility. According to the letter, an Exposure Prevention Management Plan is not a valid cleanup option for the release unless complete vertical and horizontal delineation of soil and groundwater contamination is achieved.

It is ENPRO's opinion that Dole Lanai Plantation (Emulsion Plant) does not represent a *recognized environmental condition* that is expected to affect the project site because it is too distant from the project site.

4- Dole Lanai Plantation (Kaumalapau Highway Field 5520, Transfer Station), southwest corner of the intersection of Ninth Street and Fraser Avenue, Lanai City

- A January 18, 1994 *Letter Report, Site Sampling Activities and Soil Management Unit Closures, Dole Packaged Foods Company Transfer Station, Lanai Plantation, Lanai, Hawaii*, prepared by Brewer Environmental Services, reported the removal of three USTs from the Dole Lanai facility: One 7,050 gallon diesel tank (L2); one 10,390 gallon gasoline tank (L3); and one 11,280 gallon gasoline tank (L4). Evidence of a release was discovered during removal of the USTs. Site characterization and remediation activities were performed, including excavation and removal of impacted soil. DOH issued an *NFA* letter on August 31, 2001.

It is ENPRO's opinion that Dole Lanai Plantation (Kaumalapau Highway Field 5520, Transfer Station), does not represent a *recognized environmental condition* that is expected to affect the project site because it is too distant, and hydrogeologically down-gradient from the project site. Furthermore, it is our interpretation that the facility was identified for past regulatory requirements that require no future action.

5- Dole Lanai Plantation (Power Plant), southwest corner of the intersection of Ninth Street and Lanai Avenue, Lanai City

- An April 2003 report entitled, *UST Closure and Release Response Report, Lanai Power Plant, Lanai, Hawaii*, prepared by EnviroServices & Training Center, LLC, described the removal of one 5,500 gallon diesel UST as well as excavation of petroleum contaminated soil. Closure and release response activities were performed on January 13, 2003. Additionally, the report mentioned the removal of one 25,000 gallon diesel UST from the facility in October 1989 by Unitek Environmental Consultants and subsequent soil remediation due to petroleum impacted soil discovered during the UST removal activities.
- A September 2006 report entitled, *Additional Release Response Report, Lanai Power Plant, Lanai, Hawaii*, prepared by EnviroServices & Training Center, LLC, described additional release response activities at the former Lanai Power Plant. The report stated that petroleum impacted soil had been delineated to an area directly beneath the Power Plant structure and the analytical data for soil samples collected from a petroleum contaminated soil stockpile generated during initial release response activities indicated that residual constituent concentrations were well below DOH Tier 1 Action Levels. DOH issued an *NFA* letter on February 12, 2007.

It is ENPRO's opinion that Dole Lanai Plantation (Power Plant) does not represent a *recognized environmental condition* that is expected to affect the project site because it is too distant from the project site. Furthermore, it is our interpretation that the facility was identified for past regulatory requirements that require no future action.

Based on our review of the readily available regulatory files we received from the Solid and Hazardous Waste Branch, it is our opinion that none of the identified sites have *recognized environmental conditions* that, in our opinion, are expected to affect the project site.

4.3.2 Department of Health, Hazard Evaluation and Emergency Response Office (HEER)

Based on our review of the EDR regulatory database search report, we requested the following regulatory files from the State of Hawaii Department of Health (DOH), Hazard Evaluation and Emergency Response Office (HEER).

- TMK (2) 4 – 9 – 002: 058
- TMK (2) 4 – 9 – 014: 011
- TMK (2) 4 – 9 – 014: 005
- TMK (2) 4 – 9 – 014: 002
- Lanai High & Elementary School, 555 Frasier Avenue, Lanai City
- Oshiro Enterprises, Inc., 850 Frasier Avenue, Lanai City
- Dole Lanai Plantation (Kaumalapau Highway Field 5520), southwest corner of the intersection of Ninth Street and Fraser Avenue, Lanai City
- Dole Lanai Plantation (Emulsion Plant), west of Fraser Avenue, between Tenth and Twelfth Streets, Lanai City
- Dole Lanai Plantation (Power Plant), southwest corner of the intersection of Ninth Street and Lanai Avenue, Lanai City
- ORPHAN SITE: FAA – Lanai, Lanai City
- ORPHAN SITE: Dole Pineapple Pesticide, Lanai, Lanai Avenue
- ORPHAN SITE: Lanai City, Lanai City

The State of Hawaii Department of Health (DOH), Hazard Evaluation and Emergency Response Office (HEER) reported the following:

1- Dole Lanai Plantation, Lanai City

- An April 15, 1988 *CERCLA Inspection Report*, prepared by Ecology and Environment, Inc. The inspection was conducted on April 28,

1987 to determine whether the Dole Lanai Plantation was eligible for inclusion on the National Priorities List under CERCLA in response to two particular areas of concern which could have had the potential to impact public health and the environment. These two areas were identified as old dumpsite (the report stated that the old dumpsite covered an area of approximately two acres, however the location of the old dumpsite was not identified in the report) and field trucks wash down rack area (to the southeast of the project site), as well as the rest of the plantation were evaluated. A summary of the report's conclusions and recommendations are as follows:

- Old Dumpsite

"Even though there were allegations of improper disposal of Dichloropropene-Dichloropropane (D-D) drums and other pesticide containers, there was no documentation to verify these occurrences. The inspection revealed that there were old truck body parts and other metal debris, but no strong odors of any type were noticeable. The potential effects of D-D and similar agricultural chemicals on terrestrial and coral-reef ecosystems are unknown."

- Wash Down Rack Area (Ponds Area)

The rinsing of Dole's trucks (after field use) was formerly conducted at the wash down rack area. This wash water, likely containing pesticides, would flow via an open ditch into two settling ponds.

"Elevated levels of the pesticides bromacil and diuron were detected in 1983 when the Department of Agriculture took water samples in the ponds area. Subsequent action by Dole included posting warning signs demarking contaminated water and a chain link fence. However, public access to this area was still easy and it was recommended that a secure fence be installed around the ponds area to prevent any further access to the area."

According to the report, the Dole Lanai Plantation was ineligible for inclusion on the National Priorities List because of the lack of evidence of contaminant migration, a low human receptor population, and circumstances limiting the jurisdiction of CERCLA over pesticides.

The location of the Old Dumpsite was not identified in the available report. It is commonly known that illegal dumping throughout the island of Lanai has been a difficult problem. Due to the fact that most of the project site has been out of use since approximately the 1980s and random illegal dumping has been reported in the vicinity, common illegal dumping activity is considered a *recognized environmental conditions* that could impact the project site.

It is ENPRO's opinion that the Wash Down Rack Area (Ponds Area) does not represent a *recognized environmental condition* that is expected to affect the project site because it is too distant from the project site.

2- Dole Pineapple Pesticide, Lanai Avenue

The Hazard Evaluation and Emergency Response Office database reported five drum/dump sites listed under Dole Pineapple Pesticide. A map showing the sites is included in the appendix section of this report, along with a list of pesticides used by Dole Pineapple Company; however, the Lanai Dump Site was the only site identified within one-quarter mile of the project site.

The sites listed were identified as follows:

- **Lanai Drum Site Number 1:** Located approximately two miles north of the project site;
- **Lanai Drum Site Number 2:** Located approximately 1.6 miles northeast of the project site;
- **Lanai Drum Site Number 3:** Located approximately 2.6 miles northwest of the project site;
- **Lanai Dump Site, Palawai Basin:** Located approximately 2.5 miles south of the project site;
- **Lanai Dump Site:** Located approximately 1,000 feet southeast of the project site.

The Hazard Evaluation and Emergency Response Office reported the following for the Lanai Dump Site:

- In a May 11, 1992 letter from the DOH to the U.S. EPA, DOH requested that the Lanai Dump Site be listed into the CERCLIS database to initiate a Preliminary Assessment in response to information submitted to the Hazard Evaluation and Emergency Response Office from a Lanai resident. The resident reported that the site was used as a dump site for cars and drums which may have contained hazardous substances.

- A September 24, 1992 letter from the DOH to the U.S. EPA stated that the Preliminary Assessment of the *Lanai Dumping Site* had been completed and recommended further evaluation based on the following:
    1. Unknown waste quantity potentially remaining on site.
    2. Presence of leaking underground storage tanks which contained hazardous substances.
- A September 24, 1992 letter from the DOH to the U.S. EPA stated that the Preliminary Assessment of the *Lanai Chemical Mixing Area* had been completed and recommended that no further evaluation be conducted based on the following:
    1. "Due to the island's topography, the area appears to be a naturally occurring low spot. Given the site's location in an agricultural setting, it seems likely that the presence of pesticides in the area is due to its legal application and not from misuse."
- An October 13, 1992 letter from the DOH to Dole Packaged Foods Corporation stated that exploratory excavations were scheduled for October 20 and 21, 1992 for further evaluation of five sites on Lanai (Lanai Drum Sites Number 1, 2, 3, Lanai Dump Site, and Lanai Dump Site Palawai Basin).
- A DOH Site Screening Sheet, dated March 20, 1996 stated that *No Further Action* was warranted to the Lanai Dump Site, due to a "no potential human health or environmental threat" category classification of the site.

Based on our review of the readily available regulatory files we received, it is our opinion that the Lanai Dump Site does not have *recognized environmental conditions* that are expected to affect the project site because it is our interpretation that the facility is too distant from the project site and it was identified for past regulatory requirements that require no future action.

4.3.3 Building, Planning, and/or Zoning Departments

The County of Maui Department of Planning was contacted on September 18, 2008 to obtain zoning information for the project site. A representative from the department indicated that the county zoning for the project site was P1 and PK3: Public Land & Regional Park District. Additionally, it was indicated that the project site is within the following state zonings:

- Urban and Agricultural (TMK 4-9-002: 058)
- Urban (TMK 4-9-014: 005)
- Urban (TMK 4-9-014: 002)
- Agricultural (TMK 4-9-014: 011)

4.3.4 Fire Department

The County of Maui Fire Communication Center was contacted on April 10, 2009 to obtain information regarding any fires, complaints, permits, violations involving hazardous materials use, USTs or aboveground storage tanks (ASTs) on record for the project site and/or adjoining properties. ENPRO has not received a response from the County of Maui Fire Communication Center as of the date of this report. Should our review of these files at a later date impact our findings, conclusions or recommendations, ENPRO shall forward an addendum letter to such effect.

4.4 Physical Setting Sources

4.4.1 Topography

Review of the topographic map published by the U.S. Geological Survey in 1992 indicated the following:

The project site was located in Lanai City, in the central portion of the island of Lanai. The project site elevation was approximately 470 feet above mean sea level.

No individual structures were depicted on the project site. The project site region was coded in white, indicating an undeveloped area.

The project site region was moderately sloping to the southwest. The nearest body of water was Iwi'ole gulch, located approximately 2,000 feet to the north.

4.4.2 Soils

A review of the soil type of the area was performed. The soil survey of the island of Lanai is published by the USDA Natural Resources Conservation Service in cooperation with the United States Department of Agriculture Soil Conservation Service and University of Hawaii Agricultural Experiment Station. The soil survey is available at http://www.ctahr.hawaii.edu/soilsurvey/soils.htm and was accessed on April 24, 2009. The following information is pertinent to the project site:

The project site was situated on soil classified as Waihuna clay.

Waihuna clay consists of well-drained and moderately well drained soils on alluvial fans and in depressions on the islands of Lanai and Molokai. These soils formed in old, fine-textured alluvium. They are nearly level to moderately steep. Elevations are mainly between 1,000 and 2,000 feet, but they range from 400 to 2,000 feet.

Permeability for Waihuna clay is described as moderately slow. This soil is described as having a moderate corrosivity for uncoated steel.

Waihuna clay soil is used for pineapple. Natural vegetation consists of Natal redtop, lantana, and guineagrass.

4.4.3 Geology/Hydrogeology

Groundwater beneath the project site occurs in one distinct aquifer within the Leeward Aquifer System of the Central Aquifer Sector.

The aquifer is classified as a high level, unconfined, dike aquifer, occurring in dike compartments. The groundwater status is reported as currently in use for drinking water. The salinity of the groundwater within this aquifer is described as fresh (<250 milligrams per liter Cl^-). The groundwater is further described as irreplaceable, with a high vulnerability to contamination (Mink and Lau, 1993).

The hydrogeologic gradient in the vicinity of the project site is anticipated to be moderate, with a general trend to the southwest.

4.5 Historical Use Information on the Property

4.5.1 Historical Maps

EDR/Sanborn indicated no coverage available for the project site and surrounding properties. A copy of the correspondence from EDR/Sanborn, indicating no coverage available, is included in the Appendix section of this report.

4.5.2 Aerial Photographs

The following aerial photographs were reviewed as part of this assessment:

- R. M. Towill Corporation, dated 1954 (Figure 4). The scale of this photograph was approximately one inch equals 750 feet. The project site appeared to be in use as agricultural land (pineapple field), except for the

northeastern portion, identified as TMK (2) 4-9-014: 002, which appeared to be overgrown by trees and bushes and the portion identified as TMK (2) 4-9-014: 005, which appeared to be developed with one building and several objects/structures to the north of the building, including a truck apparently leaving the parcel and going towards the pineapple fields.

- R. M. Towill Corporation, dated 1959 (Figure 5). The scale of this photograph was approximately one inch equals 750 feet. The portions of project site identified by TMK (2) 4-9-014: 011 and TMK (2) 4-9-002: 058 appeared to be in use as agricultural land (pineapple fields). The portion identified by TMK (2) 4-9-014: 002, appeared to be developed with ten structures, a pond and several small agricultural fields. The portion of the project site identified by TMK (2) 4-9-014: 005 appeared to be developed with one structure.

- U.S. Department of Agriculture Soil Conservation Service, dated 1965 (Figure 6). The scale of this photograph was approximately one inch equals 2,000 feet. Details of the project site were obscured by poor photographic resolution; however, the project site appeared to be in use as agricultural land, except for the northeastern portion, which appeared to be vacant.

- R. M. Towill Corporation, dated 1967 (Figure 7). The scale of this photograph was approximately one inch equals 1,160 feet. The portions of project site identified by TMK (2) 4-9-014: 011 and TMK (2) 4-9-002: 058 appeared to be in use as agricultural land (pineapple fields). The portion identified by TMK (2) 4-9-014: 002, appeared to be developed with six structures, two ponds and several small agricultural fields. The portion of the project site identified by TMK (2) 4-9-014: 005 appeared to be developed with one structure.

- EDR, dated 1992 (Figure 8). The scale of this photograph was approximately one inch equals 1,000 feet. Details of the project site were obscured by poor photographic resolution; however, the southwestern portion of the project site appeared to be in use as agricultural land.

- Google Earth, 2008 (Figure 9). The scale of this photograph is unknown. The project site appeared to be overgrown by trees and bushes, similar to what was observed at the time of our site reconnaissance.

4.6 Historical Use Information on Adjoining Properties

4.6.1 Historical Maps

EDR/Sanborn indicated no coverage available for the project site and surrounding properties. A copy of the correspondence from EDR/Sanborn, indicating no coverage available, is included in the Appendix section of this report.

4.6.2 Aerial Photographs

The following aerial photographs were reviewed as part of this assessment:

- R. M. Towill Corporation, dated 1954 (Figure 4). The scale of this photograph was approximately one inch equals 750 feet. The areas surrounding the project site to the north, south and west appeared to be in use as agricultural land. Lanai City and Lanai High & Elementary School were depicted to the east/northeast of the project site.

- R. M. Towill Corporation, dated 1959 (Figure 5). The scale of this photograph was approximately one inch equals 750 feet. The areas surrounding the project site to the north, south and west appeared to be in use as agricultural land. Lanai City and Lanai High & Elementary School were depicted to the east/northeast of the project site.

- U.S. Department of Agriculture Soil Conservation Service, dated 1965. The scale of this photograph was approximately one inch equals 2,000 feet. Details of the project site and adjoining properties were obscured by poor photographic resolution; however, the areas surrounding the project site to the north, south and west appeared to be in use as agricultural land. Lanai City and a school were depicted to the east/northeast of the project site.

- R. M. Towill Corporation, dated 1967 (Figure 7). The scale of this photograph was approximately one inch equals 1,160 feet. The areas surrounding the project site to the north, south and west appeared to be in use as agricultural land. Lanai City and Lanai High & Elementary School were depicted to the east/northeast of the project site.

- EDR, dated 1992. The scale of this photograph was approximately one inch equals 1,000 feet. Details of the project site and adjoining properties were obscured by poor photographic resolution; however, the area surrounding the project site appeared to be developed similar to what was observed at the time of our site reconnaissance.

- Google Earth, 2008. The scale of this photograph is unknown. The area surrounding the project site appeared to be developed similar to what was observed at the time of our site reconnaissance.

Agricultural use of land may be a cause for environmental concern because of pesticides and herbicides commonly used in agriculture. The future plans for the project site includes the redevelopment of the land into several structures associated with the expansion of the Lanai High and Elementary School. Even though historical research has not identified the project site as an area of mixing or storage of chemicals, based on the State of Hawaii Department of Health, HEER Office new guidelines on the assessment of pesticides in former agricultural lands and related areas, May 2007, ENPRO recommends that the project site be tested for residual contamination prior to redevelopment, as pesticides may have been regularly applied on the project site in the past. A copy of the DOH letter can be found in the Appendix section of this report.

4.7 Previous Environmental Reports

During this assessment ENPRO reviewed the following environmental reports:

Phase I Environmental Site Assessment of TMKs: (2) 4-9-014: 005, (2) 4-9-014: 011 (Portion) & (2) 4-9-002: 058 (Portion), Lanai City, Hawaii prepared for CDS International by ENPRO Environmental and dated December 3, 2008 (ENPRO project number 808-00253-PHI).

The report indicated the following *recognized environmental conditions*, as defined by ASTM, in connection with the property:

- Historical use of the project site for agricultural land, specifically for growing pineapple. This finding was considered a *recognized environmental condition* because of the potential presence of chemicals associated with former pineapple cultivation onsite.

- Use of the adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, old motor boats, old cars, used batteries, etc. This finding was considered a *recognized environmental condition* because of the potential presence of hydrocarbon-related contaminants and heavy metals associated with storage and disposal of miscellaneous debris on the adjacent property.

- Historical presence of a sewer pond on the eastern portion of the project site. This finding is considered a *recognized environmental condition* because of the potential presence of heavy metals and pesticide accumulation on the

eastern portion of the project site due to materials that may have been disposed of in the sewer pond.

Phase I Environmental Site Assessment of Former Agricultural Land, Identified by TMK: (2) 4-9-002:057, Lanai City, Hawaii prepared for Townscape, Inc. by Terrasano LLC and dated December 2000.

This assessment was conducted for the adjacent property to the north of the project site. The report indicated the following *recognized environmental conditions that*, in our opinion, are expected to affect the project site:

- Pineapple was grown on Lana'i Island from the 1920s to the late 1980s or early 1990s. When pineapple production was reduced on the island, field 5311 was one of the first to be discontinued for pineapple cultivation (according to a field map, included in the appendix section of this report, the project site was also part of field 5311). Field 5311 was reportedly used for placement of excess soil and fill material during the construction of the Lanai Lodge and subdivision.

- Solid waste was identified in several areas of the property during the site reconnaissance. Near the entrance to the property along Fifth Street was a portion that appeared to be used as a dumpsite by local residents (this area appears to be adjacent to the northern boundary of the project site). One soil sample at a depth of one foot was collected for this location. The soil sample was analyzed for heavy metals, chlordane, DDT, DDD, DDE, heptachlor and lindane. DDT and DDE were detected at 0.011 and 0.010, respectively. The detected levels were well below the PRG screening levels. Among the heavy metals tested, cadmium (16 mg/kg) and chromium (520 mg/kg) exceeded the EPA PRG screening levels.

5.0 INTERVIEWS

Interviews with individuals having past or present knowledge of the project site, such as owners, key site managers, occupants, and neighbors are routinely conducted to obtain information indicating *recognized environmental conditions* in connection with the property. The following individuals were available to interview:

Table 4

Key Site Interviews

Interviewee Name	Relationship to Property	Length of Time Familiar with Property	Date of Interview
Mr. Glen Miura	President of CDS International	Approximately Two Years	5/7/2009
Mr. Pierce Myers	Principal of Lanai High & Elementary School, Adjacent Property to the Northeast and Representative of the State of Hawaii Department of Education	Approximately Twenty-Eight Years	05/13/09
Mr. Sol Kahoohalahala	Representative of the County of Lanai, Owner of the Subject Property	Since 1951	05/19/09
Mr. Lawrence Kawasaki	Former Teacher of Lanai High & Elementary School, Adjacent Property to the Northeast	Sixty-four Years	4/15/09
Mr. Ralph Masuda	Representative of Castle & Cooke, LLC, Owner of the Subject Property	Since Early 1970s	5/18/09

5.1 Project Site

Mr. Glen Miura, President of CDS International, reported the following significant environmental issue regarding the project site:

- The project site was formerly used for pineapple cultivation;
- Former illegal dumping may have occurred on the eastern portion of the project site.

Mr. Pierce Myers, Principal of Lanai High & Elementary School, adjacent property to the northeast of the project site, reported the following significant environmental issue regarding the project site:

- The project site was used for cultivation of pineapple for approximately fifty years. Pineapple cultivation activities began in the area in the 1920s or 1930s and ended in the late 1980s.

Mr. Sol Kahoohalahala, Representative of the County of Lanai, reported the following significant environmental issues regarding the project site:

- The project site was formerly used for pineapple cultivation
- Former illegal dumping occurred on the eastern portion of the project site
- A sewer pond was formerly located on the eastern portion of the project site. The sewer pond was the product of sewage runoff coming from Lanai City.
- The portion of the project site identified by TMK (2) 4-9-014: 005, was used as an irrigation stand. Two concrete pads and a water tank were located on this parcel. Field irrigation trucks would park on the concrete pads to mix fertilizers and chemicals with water from the water tower. Mixing took place in the holding tank on the trailer rig.
- The portion of the project site identified by TMK (2) 4-9-014: 002 was formerly used by Lanai High & Elementary School as a site for the agricultural and farm school projects. An above ground fuel tank was located on the property.
- Former field workers for Castle & Cooke, LLC, had threatened to file a lawsuit against Castle & Cooke, LLC concerning possible releases of *Hazardous Substances* or *Petroleum Products* on the Lanai pineapple fields' areas and possibly on the project site.

Mr. Lawrence Kawasaki, former teacher of Lanai High & Elementary School, adjacent property to the northeast of the project site, reported the following significant environmental issues regarding the project site:

- The project site was formerly used for pineapple cultivation;
- The northeastern portion of the project site, identified by TMK: (2) 4-9-014: 002, was formerly used by Lanai High & Elementary School as a site for the agricultural and farm school projects.

Mr. Ralph Masuda, Representative of Castle & Cooke, LLC, owner of the project site, reported the following significant environmental issues regarding the project site:

- The project site was formerly used for pineapple cultivation.

5.2 Adjoining and Adjacent Properties

Mr. Myers reported the following activities on the adjacent property to the southeast of the project site:

- Property is currently used by GasPro for storage and dispensing of propane tanks;
- Property is currently used for boat repair activities;
- In the past thirty years, the property has been used for heavy equipment storage.
- Former illegal dumping occurred on this site.

Mr. Kawasaki reported the following activities on the Lanai High & Elementary School, adjacent property to the northeast of the project site:

- Building N, the Auto Shop building, has been used for teaching auto repairing activities since the 1950s.

Mr. Kawasaki, Mr. Kahoohalahala and Mr. Masuda reported the following activities on the nearby property to the southeast of the project site:

- A sewer pond was located to the southeast of the project site, in an area nearby the current Lanai City Auxiliary Wastewater Treatment Plant. The sewer pond was the product of equipment rinsing/washing activities performed on the Dole industrial facilities formerly located in Lanai City. The wash water would flow via ditches and settle into the sewer pond.

6.0 SITE RECONNAISSANCE

Site reconnaissance was performed by Ms. Roberta Bitzer on April 15, 2009. The site reconnaissance was conducted on foot and using a four-wheel drive vehicle. Most areas of the property were not available for inspection due to dense vegetation.

No opinion is provided regarding environmental conditions in areas that were not inspected.

Table 5 summarizes the site inspection and findings. All features that were observed during the site reconnaissance, or that were discovered to have been historically present at the project site, are noted in the table. Also indicated in the table are items that may present concerns to the project site. Additional information about items noted in the table can be found in the referenced section of this report.

Table 5

Site Inspection Findings

Onsite Environmental Features	Currently / Historically Present	Possible Environmental Concern	Report Section
Hazardous Substances or Petroleum Products	Y	Y	3.2, 3.5, 5.1
Underground Storage Tank, UST	N	N	
Aboveground Storage Tank, AST	N	N	
Odors	N	N	
Air Emissions *(stacks, hoods, other point sources)*	N	N	
Pools of Liquid	N	N	
Drums	N	N	
Unidentified Substance Containers	N	N	
Electrical Equipment/Possible PCBs	N	N	
Hydraulic Equipment/Possible PCBs	N	N	

Table 5 (continued)

Site Inspection Findings

Onsite Environmental Features	Currently / Historically Present	Possible Environmental Concern	Report Section
Stains or Corrosion	N	N	
Drains	Y	N	6.5
Sumps	N	N	
Pits, Ponds, or Lagoons	N	N	
Stained Soil or Pavement	N	N	
Stressed Vegetation	N	N	
Evidence of Spills or Releases	N	N	
Artificially Filled Areas *(Solid Waste Disposal)*	Y	Y	3.2, 3.5, 5.1
Waste Water	N	N	
Wells	N	N	
Septic Systems *(cisterns, cesspools, dry wells)*	N	N	
Dry Cleaning Operations	N	N	
Agricultural Use *(pesticides/herbicides/fungicides)*	Y	Y	4.1, 4.5, 5.1
Oil/Gas Production or Exploration	N	N	
Remedial Activities	N	N	
Other	Y	N	6.5

6.1 Hazardous Substances and Petroleum Products

6.1.1 Project Site

Visual observation for the use and/or storage of hazardous substances and petroleum products was performed.

No hazardous substances and/or petroleum products were observed generated, stored, accumulated, transported, or disposed on site.

6.1.2 Adjoining or Nearby Sites

The following activities related to hazardous substances and/or petroleum products on adjoining or nearby sites were observed at the time of the project site reconnaissance.

- Junkyard – Adjacent property to the southeast
    - Storage/disposal of scrap metal including, but not limited to, propane tanks, old motor boats, old cars, used batteries, etc. These materials were observed to be stored approximately 200 feet from the southeast boundary of the project site.
- Lanai City Auxiliary Wastewater Treatment Plant – nearby property to the southwest
    - Gasoline and diesel fuel storage. These products were located approximately 2,000 feet from the south boundary of the project site.
- Lanai High & Elementary School, Auto Shop (Building N) – Adjacent property to the northeast
    - Auto repairing activities and use/storage of petroleum products. An out of use underground structure also was observed on the northwestern side of Building N (Photograph 7). The auto repairing activities and the underground structure were located approximately fifty feet from the northeast boundary of the project site.

6.2 Storage Tanks

6.2.1 Underground Storage Tanks

Project Site

Visual observations for manways, vent pipes, fill connections, concrete pressure dispersion pads, and dispenser pumps were conducted throughout project site. Evidence indicating historical or current existence of USTs was not observed.

Adjoining or Nearby Sites

Visual observations for manways, vent pipes, fill connections, concrete pressure dispersion pads, and dispenser pumps were conducted throughout the accessible areas of adjacent properties. No evidence of the presence of USTs was noted.

A review of State of Hawaii Department of Health (DOH) UST registration lists was conducted to determine the presence of underground storage tank systems in the vicinity of the project site. (See section 4.3 for details).

The presence of underground storage tank systems and leaking underground storage tank systems registered to properties in the vicinity of the project site was indicated. (See section 4.3.1 for details).

None of the USTs/LUSTs registered to the surrounding properties appear to have a reasonable potential to impact the project site. (See section 4.3.1 for details).

6.2.2 Aboveground Storage Tanks

Project Site

Visual observations for vent pipes, secondary containment walls, or other evidence of above ground storage tanks were conducted throughout project site. Evidence indicating historical or current existence of ASTs was not observed.

Adjoining or Nearby Sites

Visual observations for vent pipes, secondary containment walls, or other evidence of above ground storage tanks were conducted throughout the accessible areas of adjacent properties.

One diesel AST and one gasoline AST were observed on the Lanai City Auxiliary Wastewater Treatment Plant, the nearby property to the southwest. The ASTs were located approximately 2,000 feet from the south boundary of the project site.

It is ENPRO's opinion that the above referenced ASTs are not expected to have a potential to negatively impact the project site because they are too distant from the project site.

6.2.3 Solid Waste

Project Site

At the time of our investigation, non-hazardous solid waste was not generated onsite.

Adjoining or Nearby Sites

At the time of our investigation, non-hazardous solid waste was generated on adjoining or nearby sites. Waste was in the form of general municipal refuse. General

municipal refuse was placed into dumpsters located on the adjacent sites and disposed on a regular interval basis.

Additionally, the adjacent property to the southeast of the project site was used for the storage/disposal of scrap metal including, but not limited to, propane tanks, motor boats, cars, used batteries, etc. These materials were observed to be stored approximately 200 feet from the southeast boundary of the project site.

6.3 Polychlorinated Biphenyls (PCBs)

Visual observation for electrical equipment or electrical components that use dielectric fluid, hydraulic lift equipment and fluorescent light ballasts that potentially include PCB-containing fluids was conducted. PCBs are heavily regulated under the Toxic Substances Control Act (TSCA), which obligates a property owner to clean up any spills occurring on their property.

6.3.1 Electrical Transformers/Capacitors

One recloser, identified as recloser number 1225, belonging to Maui Electric Company (MECO), was observed on the northeastern portion of the project site. Minimum evidence of corrosion on the outside of the recloser was noted during the project site reconnaissance.

An inquiry was sent to MECO regarding the PCB content of the recloser. MECO responded to the inquiry and indicated that the recloser is "PCB-free."

Details regarding correspondence with MECO can be found in the Appendix section of this report.

6.3.2 Hydraulic Lift Equipment

Visual observation for hydraulic lift equipment or components containing hydraulic fluid that potentially contains PCBs was conducted.

No in-ground hydraulic lift equipment was observed on site at the time of our reconnaissance.

6.3.3 Fluorescent Light Ballasts

Fluorescent light fixtures are present on the tennis/basketball courts located on the northeastern portion of the project site, identified as TMK (2) 4-9-014: 002. Many

fluorescent light fixtures manufactured prior to 1980 may have contained ballasts with PCBs.

6.4 Wells

Evidence of wells (supply, monitoring or dry wells) was not observed during the assessment.

6.5 Other Observations

The following describes additional observations of the project site:

Odors:	Not Observed
Pools of liquid:	Not Observed
Drums:	Not Observed
Drains and Sumps:	Storm drains located on the northeastern portion of the project site
Pits, ponds, lagoons:	Not Observed
Stained soil or pavement:	Not Observed
Stressed vegetation:	Not Observed
Waste water features:	Not Observed
Septic systems:	Not Observed
Sewer Manholes:	Sewer manholes signs on the northeastern portion of the project site.

6.6 Additional Environmental Issues of Concern, Non-ASTM

The following environmental conditions were evaluated for the potential to impact the property though they are not considered *recognized environmental conditions* as defined by ASTM.

Asbestos-Containing Materials

In July 1989, under the Toxic Substances Control Act (TSCA), the United States Environmental Protection Agency (USEPA) promulgated an Asbestos Ban Phaseout Rule. Beginning in 1990 and taking effect in three stages, the rule prohibits the importation, manufacture, and processing of ninety-four percent of all remaining asbestos products in the

United States over a period of seven years. Presently, asbestos has not been prohibited from all construction building materials.

No sampling for asbestos containing materials was conducted as part of this investigation.

No suspect asbestos containing materials were observed on the project site.

Radon

Radon is a naturally occurring radioactive gas formed by the decay of uranium in bedrock and soil. The potential adverse health effects associated with radon gas depend on several factors including concentration of the gas and duration of exposure. The concentration of radon gas in a building depends on subsurface soil conditions, the integrity of the building's foundation, and the building's ventilation system.

Due to the geologic composition of basalt bedrock and the soils that derive from them, as well as the composition of marine-related sediments found in Hawaii, the State of Hawaii has been determined to have a low radon potential (G.M. Reimer, U.S. Geological Survey). Therefore, investigation of radon is not recommended for this property.

Lead-Based Paint

There is no commercial property definition of what is a lead-based paint. Regulations specifically addressing lead-based paint include Housing and Urban Development (HUD) (1995) guidelines and the Consumer Product Safety Act (1977). These regulations are for housing and consumer products.

OSHA regulations apply to worker protection during renovation and demolition activities.

Sensitive Ecological Areas

According to the EDR report, a federal wetland was depicted within one-quarter of a mile to the southwest of the project site.

7.0 FINDINGS

The following table lists known, suspected, or historical *recognized environmental conditions (RECs)*, or *de minimis* conditions associated with the project site.

Table 6

Site Conditions and Recognized Environmental Conditions (RECs)

Condition	Known REC	Suspected REC	Historical REC	*de minimis*
Former illegal dumping on the eastern portion of the project site (TMK (2) 4-9-014: 002).		X		
Historical presence of a sewer pond on the eastern portion of the project site (TMK (2) 4-9-014: 005).		X		
Former use of the eastern portion of the project site (TMK (2) 4-9-014: 005) as irrigation stand.		X		
Historical use of the project site as agricultural land, specifically for cultivation of pineapple.			X	
Use of the adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, old motor boats, old cars, used batteries, etc.		X		
Use of the adjacent property to the northeast of the project site as an auto shop teaching facility by Lanai High & Elementary School since the 1950s.		X		

7.1 Data Gaps

A data gap by itself is not inherently significant. The significance is determined by other information and professional experience as to whether the data gap raises reasonable concerns about activities that may present a *recognized environmental condition.* According to *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31, the Phase I Environmental Site Assessment

report shall identify and comment on significant data gaps that affect the ability of the environmental professional to identify *recognized environmental conditions* and identify the sources of information that were consulted to address the data gap.

ENPRO did not encounter any significant data gaps during the performance of this Phase 1 Environmental Site Assessment.

8.0 OPINIONS

The following table lists the identified *recognized environmental conditions (RECs)*, our opinion regarding the potential for the *recognized environmental conditions* to impact the project site, and the rationale supporting our opinion.

Table 7

Summary of Identified Recognized Environmental Conditions (RECs)

Identified REC	Potential to Impact Property	Rationale
Former illegal dumping on the eastern portion of the project site (TMK (2) 4-9-014: 002).	Low	Possible presence of pesticides, hydrocarbon-related chemicals and heavy metals onsite due to the unknown nature of the materials disposed on the project site.
Historical presence of a sewer pond on the eastern portion of the project site (TMK (2) 4-9-014: 005).	Low	Possible presence of heavy metals and pesticides on the eastern portion of the project site due to materials that may have been disposed of in the sewer pond.
Former use of the eastern portion of the project site (TMK (2) 4-9-014: 005) as irrigation stand.	Medium	Possible presence of pesticides on the eastern portion of the project site due to mixing activities of chemicals in the holding tank on the trailer rig of the irrigation trucks.
Historical use of the project site as agricultural land, specifically for cultivation of pineapple.	Medium	Possible presence of residual chemicals used onsite for pineapple cultivation. A list of chemicals used by Dole for their pineapple operations is provided in the Appendix section of this report. Email correspondence with the DOH regarding targeted categories of pesticides related with former sugarcane and pineapple fields is provided in the Appendix of this report.
Use of the adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, old motor boats, old cars, used batteries, etc.	Medium	Possible presence of hydrocarbon-related chemicals and heavy metals onsite due to the nature of the materials stored and disposed on the adjacent property to the southeast of the project site.
Use of the adjacent property to the northeast of the project site as an auto shop teaching facility by Lanai High & Elementary School since the 1950s.	Low	Possible presence of hydrocarbon-related chemicals onsite due to auto repairing activities and petroleum based products used and stored on the adjacent property to the northeast of the project site.

9.0 CONCLUSIONS

ENPRO has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of *ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and *All Appropriate Inquiries* (AAI) which includes 40 CFR Part 312, §312.21 and §312.31 for the Lanai High & Elementary School adjoining lands located in Lanai City, Hawaii, identified by TMKs: (2) 4-9-014: 002, (2) 4-9-014: 005, (2) 4-9-014: 011 (portion) and (2) 4-9-002: 058 (portion), (the "project site"). The project site included all of TMKs (2) 4-9-014: 002 and (2) 4-9-014: 005, the northwestern portion of TMK (2) 4-9-014: 011 and the east/southeastern portion of TMK (2) 4-9-002: 058. Any exceptions to or deletions from, this practice are described in Sections 1.4 and 1.5 of this report.

This assessment has revealed the following evidence of *recognized environmental conditions (RECs)* that have the potential to impact the project site:

Table 8

Identified Recognized Environmental Conditions With the Potential to Impact the Project Site

Recognized Environmental Conditions (RECs)
Former illegal dumping on the eastern portion of the project site (TMK (2) 4-9-014: 002).
Historical presence of a sewer pond on the eastern portion of the project site (TMK (2) 4-9-014: 005).
Former use of the eastern portion of the project site (TMK (2) 4-9-014: 005) as irrigation stand.
Historical use of the project site as agricultural land, specifically for cultivation of pineapple.
Use of the adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, old motor boats, old cars, used batteries, etc.
Use of the adjacent property to the northeast of the project site as an auto shop teaching facility by Lanai High & Elementary School since the 1950s.

10.0 RECOMMENDATIONS

Based on the findings and conclusions, ENPRO makes the following recommendations:

Table 9

Table of Recommendations

Recognized Environmental Conditions (RECs)	Recommendation
Former illegal dumping on the eastern portion of the project site (TMK (2) 4-9-014: 002).	Sample soil on the eastern portion of the project site for pesticides, hydrocarbon-related contaminants and heavy metals.
Historical presence of a sewer pond on the eastern portion of the project site (TMK (2) 4-9-014: 005).	Sample soil on the eastern portion of the project site for heavy metals and pesticides.
Former use of the eastern portion of the project site (TMK (2) 4-9-014: 005) as irrigation stand.	Sample soil on the eastern portion of the project site for pesticides.
Historical use of project site as agricultural land, specifically for cultivation of pineapple.	Sample soil across the site and analyze for chemicals associated with pineapple cultivation.
Use of adjacent property to the southeast of the project site for storage and disposal of scrap metal including propane tanks, old motor boats, old cars, used batteries, etc.	Sample soil on the southeastern portion of the project site for hydrocarbon-related contaminants and heavy metals.
Use of the adjacent property to the northeast of the project site as an auto shop teaching facility by Lanai High & Elementary School since the 1950s.	Sample soil on the northeastern portion of the project site for hydrocarbon-related contaminants and heavy metals.

11.0 REFERENCES

Publications:

Names of Publication:	Aquifer Identification and Classification for Lanai: Groundwater Protection Strategy For Hawaii
Author of Publication:	Mink, J.F. and L.S. Lau
Published by:	Water Resources Research Center, University of Hawaii at Manoa, Honolulu, Hawaii
Date of Publication:	1993
Information Obtained:	Groundwater data

Names of Publication:	Ownership records and Tax Map Key maps
Author of Publication:	County of Maui
Information Obtained:	Ownership records

Names of Publication:	Aerial Photograph
Author of Publication:	USDA Soil Conservation Service
Date of Publication:	1965
Information Obtained:	Historical use

Names of Publication:	Aerial Photograph
Author of Publication:	R.M. Towill Corporation
Date of Publication:	1954, 1959, 1967
Information Obtained:	Historical use

Names of Publication:	Aerial Photograph
Author of Publication:	EDR
Date of Publication:	1992
Information Obtained:	Historical use

Names of Publication:	Aerial Photograph
Author of Publication:	Google Earth
Date of Publication:	2008
Information Obtained:	Historical use

Names of Publication:	Code of Federal Regulations, Title 40, Part 761, Rules for Controlling PCBs under the Toxic Substance Control Act,
Author of Publication:	U.S. Environmental Protection Agency
Date of Publication:	December 14, 1990
Information Obtained:	PCB regulations

Names of Publication:	Soil Survey for the Island of Lanai, State of Hawaii
Author of Publication:	Foote, Donald E. et al.
Published by:	U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawaii Agricultural Experiment Station. Also available at http://www.ctahr.hawaii.edu/soilsurvey/soils.htm accessed on April 24, 2009.
Date of Publication:	1972
Information Obtained:	Soil classification

Names of Publication:	The EDR Radius Map Report
Author of Publication:	Environmental Data Resources, Inc.
Date of Publication:	August 28, 2008
Information Obtained:	Regulatory database records

Names of Publication:	Topographic Maps, Lanai Quadrangle, Hawaii
Author of Publication:	United States Geological Survey (USGS)
Date of Publication:	1984 and 1992
Information Obtained:	Historical use

Contacts:

Agency or Business:	CDS International
Name/Title of Representative:	Mr. Glen Miura
Location of Agency or Business:	1001 Bishop Street, Suite 400, Honolulu, Hawaii
Telephone Number:	808-628-7052
Date Information was Received:	May 8, 2009
Information Obtained:	Historical and current use of the property

Agency or Business:	Lanai High & Elementary School
Name/Title of Representative:	Mr. Pierce Myers
Location of Agency or Business:	555 Fraser Avenue, Lanai City, Hawaii
Telephone Number:	808-565-7224
Date Information was Received:	May 13, 2009
Information Obtained:	Historical and current use of the property and adjoining properties

Agency or Business:	Lanai High & Elementary School

Name/Title of Representative:	Mr. Lawrence Kawasaki
Location of Agency or Business:	555 Fraser Avenue, Lanai City, Hawaii
Telephone Number:	808-565-7224
Date Information was Received:	April 15, 2009
Information Obtained:	Historical and current use of the property

Agency or Business:	Castle & Cooke Resorts, LLC
Name/Title of Representative:	Mr. Ralph Masuda, Representative of Castle & Cooke, LLC.
Location of Agency or Business:	P.O. Box 630310, Lanai City, Hawaii
Telephone Number:	808-244-5432
Date Information was Received:	May 18, 2009
Information Obtained:	Historical and current use of the project site and adjoining property to the southeast

Agency or Business:	County of Maui
Name/Title of Representative:	Mr. Sol Kahoohalahala, Representative of County of Maui.
Location of Agency or Business:	200 S. High Street, Wailuku, HI 96793
Telephone Number:	808-270-7768
Date Information was Received:	May 19, 2009
Information Obtained:	Historical and current use of the project site and adjoining properties

Agency or Business:	City and County of Honolulu Fire Communication Center
Location of Agency or Business:	636 South Street
Telephone Number:	808-723-7139
Date Information was Received:	Information not received as the date of this report
Information Obtained:	Regulatory records

Agency or Business:	Solid and Hazardous Waste Branch (SHWB)
Location of Agency or Business:	919 Ala Moana Boulevard
Telephone Number:	808-586-4226
Date Information was Received:	April 21, 2009
Information Obtained:	Regulatory records

Agency or Business:	Hazard Evaluation and Emergency Response (HEER)
Location of Agency or Business:	919 Ala Moana Boulevard
Telephone Number:	808-586-4249
Date Information was Received:	April 21, 2009
Information Obtained:	Regulatory records

12.0 DECLARATION OF ENVIRONMENTAL PROFESSIONALS

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared by : _____

Roberta Bitzer
Project Manager
May 28, 2009

Reviewed by: _____

Kenton Beal
Technical Director
May 28, 2009

13.0 APPENDICES

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APPENDIX E

Traffic Impact Report for the Proposed Lanai High and Elementary School.

TRAFFIC IMPACT REPORT

FOR THE PROPOSED

LANAI HIGH & ELEMENTARY SCHOOL

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the proposed Lanai High & Elementary School on the island of Lanai. The proposed project entails the modification and expansion of the existing school adjacent to Fraser Avenue.

B. Scope of Study

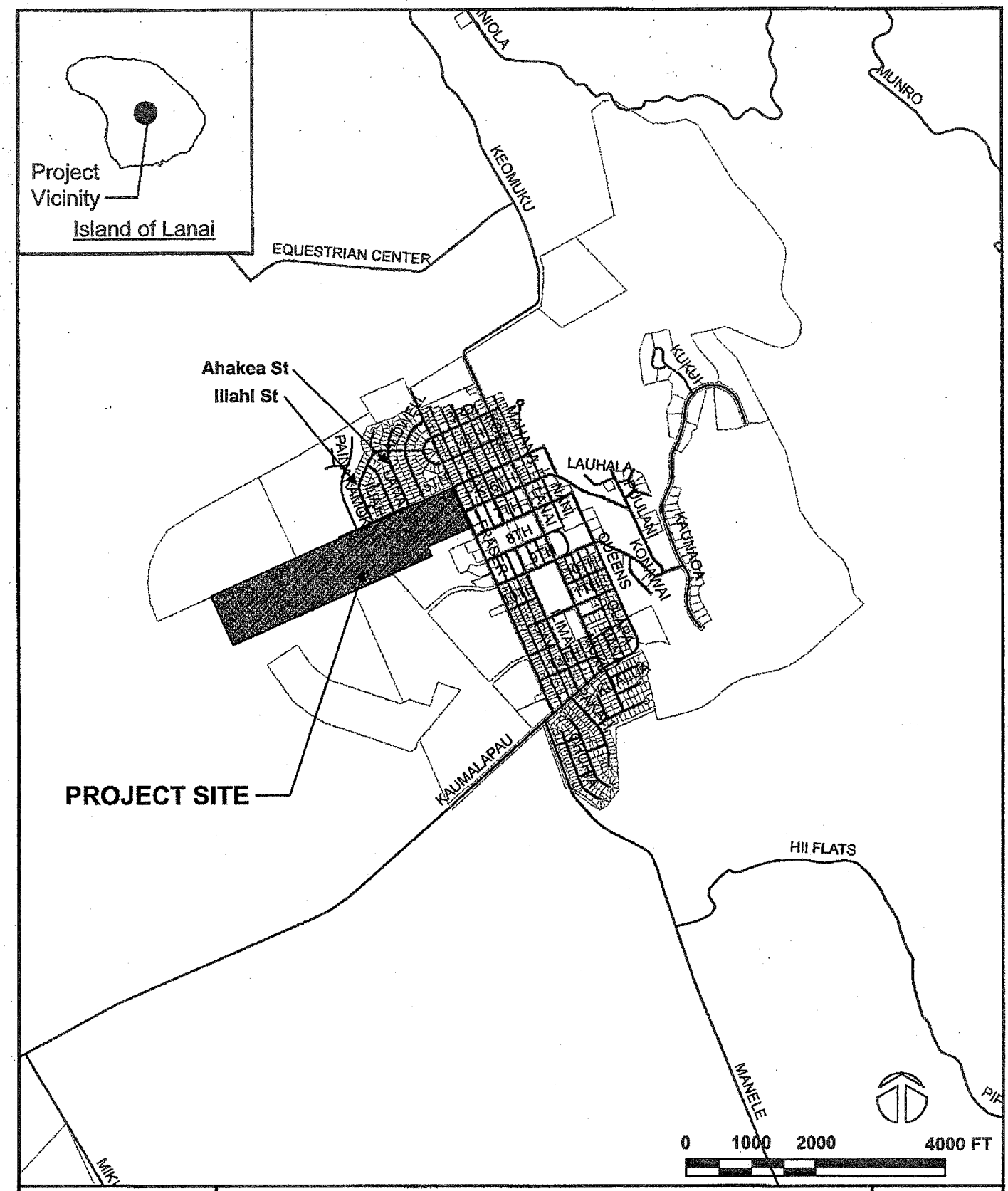
This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposing site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

II. PROJECT DESCRIPTION

A. Location

The existing Lanai High & Elementary School is located adjacent to Fraser Avenue between 5th Street and 7th Street in Lanai City on the island of Lanai (see Figure 1). Primary vehicular access to the school is currently provided via a driveway off Fraser Avenue between 5th Street and 6th Street with a student drop-off area designated at a parking lot off Fraser Avenue between 6th Street and 7th Street. The existing driveway along Fraser Avenue is expected to be relocated further south with nine new driveways planned along 5th Street to provide additional access to the school.



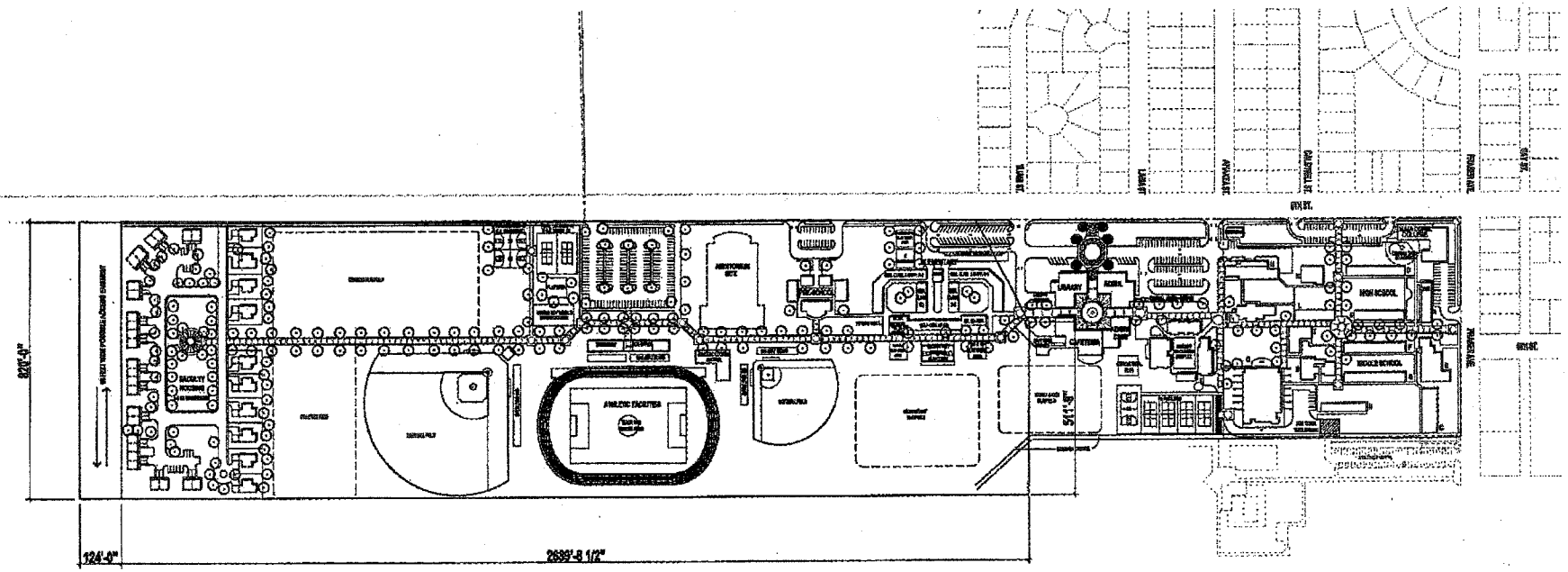
WILSON OKAMOTO CORPORATION ENGINEERS - PLANNERS	LANAI HIGH & ELEMENTARY SCHOOL	Figure 1
	LOCATION MAP AND VICINITY MAP	

B. Project Characteristics

The existing Lanai High & Elementary School is the only public school on the island of Lanai serving students in grades K-12 with a current enrollment of ~640 students. Although the school does not currently have an official middle school, the breakdown of the student population by age groups is approximately 292 elementary, 156 middle, and 192 high school students. The proposed project entails modification and expansion of the existing school campus to provide the following:

- New Elementary School (320 students)
- Modified spaces for a Middle School (170 students)
- Modified spaces for a High Schools (210 students)
- New Preschool (40 students)
- New Community college (40 students)
- New Support facilities
- New Administration Buildings
- New Library
- New Cafeteria
- New Auditorium
- New Athletic Fields and Facilities
- New Faculty Housing
- New At-Grade Parking Areas

In conjunction with the project, 5th Street is expected to be extended to the western edge of the project site. The proposed improvements will be implemented over a 25 year period with completion expected by the Year 2034. Access to the school will be provided via a relocated driveway off Fraser Avenue and nine new driveways off 5th Street as mentioned previously. The relocated driveway off Fraser Avenue will still be located between 5th Street and 6th Street and is assumed to primarily serve the new community college. Along 5th Street, the first two driveways will provide access to an adjacent parking lot is also assumed to primarily serve the community college. The third driveway will be located at the intersection with Ahakea Street and will provide access to the school's central parking lot. This parking lot is assumed to primarily serve the faculty and staff for the elementary, middle, and high schools. The fourth driveway along 5th Street will be located at the intersection with Iliahi Street while the fifth driveway will be located further west.



50.00 ACRES
2,178,000 SF or
50.00 ACRES

THE ABOVE PLAN INDICATES A LOT AREA OF 50.00 ACRES OF COUNTY LAND DEDICATED TO THE LANAI SCHOOL MASTER PLAN . THE FACULTY HOUSING IS INCLUDED IN THE 50.00 ACRES.

A 124' WIDE EASEMENT HAS BEEN PLACED ON MAKAI END OF THE PROPERTY FOR FUTURE CONNECTION TO LAND ON THE OTHER SIDE OF THE DEDICATED LAND AREA.

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LANAI HIGH & ELEMENTARY SCHOOL

PROJECT SITE PLAN

FIGURE 2

These two driveways will provide access the student drop-off area for the elementary, middle, and high schools, as well as, another small parking lot. The sixth and seventh driveways will provide access to the new Preschool to the southwest while the eighth driveway will provide access the new athletic fields and facilities. The ninth driveway will be located near the western edge of the project site and will provide access to the new faculty housing. Figure 2 shows the proposed project site plan.

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

The project site is located adjacent to Fraser Avenue, a two-way, two-lane roadway generally oriented in the north-south direction that serves as one of the major access roads through Lanai City between Kaumalapau Highway and the northern edge of the city. At the northwest corner of the of the project site, Fraser Avenue intersects 5th Street. At this unsignalized intersection, both approaches of Fraser Avenue have one lane that serves all traffic movements. 5th Street is a two-way, two-lane roadway generally oriented in the east-west direction that provides access to the residential uses along its alignment. At the intersection with Fraser Avenue, both approaches of 5th Street have one stop-controlled lane that serves all traffic movements.

Southeast of the intersection with 5th Street, Fraser Avenue intersects 6th Street. At this unsignalized T-intersection, the northbound approach of Fraser Avenue has one lane that serves through and right-turn traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements. 6th Street is a two-way, two-lane roadway generally oriented in the east-west direction that provides access to the residential and commercial uses along its alignment. At the intersection with Fraser Avenue, the westbound approach of 6th Street has one stop-controlled lane that serves left-turn and right-turn traffic movements.

Further southeast, Fraser Avenue intersects 7th Street. At this unsignalized T-intersection, the northbound approach of Fraser Avenue has one lane that serves through and right-turn traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements. 7th Street is a two-way, two-lane

roadway generally oriented in the east-west direction that provides access to the commercial uses along its alignment. At the intersection with Fraser Avenue, the westbound approach of 7th Street has one stop-controlled lane that serves left-turn and right-turn traffic movements. During a portion of the morning peak period, the southbound left-turn traffic movement along Fraser Avenue is prohibited with traffic cones placed along the centerline of the roadway to ensure the restriction. The coning extends through the upstream intersection with the driveway for a parking lot that is utilized as a drop-off area for the school. As such, only southbound vehicles along Fraser Avenue are able to access the parking lot. Vehicles originating from areas to the east utilize the surrounding roadway network to access 6th Street and turn left onto Fraser Avenue to access the drop-off area. Similarly, northbound vehicles along Fraser Avenue detour along 7th Street, Gay Street, and 6th Street and turn left onto Fraser Avenue to access the drop-off area.

Southwest of the intersection with Fraser Avenue, 5th Street intersects Ahakea Street and Iliahi Street. At these unsignalized T-intersections, the eastbound approaches of Fraser Avenue have one lane that serves left-turn and through traffic movements while the westbound approaches have one lane that serves through and right-turn traffic movements. Ahakea Street and Iliahi Street are two-way, two-lane roadways generally oriented in the north-south direction that provide access to the residential uses along their alignment. At the intersections with Fraser Avenue, both southbound approaches have one lane that serves left-turn and right-turn traffic movements.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted on October 1-2, 2008, and consisted of manual turning movement count surveys along Fraser Avenue and 5th Street in the project vicinity. The manual turning movement count surveys were conducted between the morning commuter peak hours of 6:30 AM and 8:30 AM, and the afternoon

commuter peak hours of 3:30 PM and 5:30 PM at the following intersections:

- Fraser Avenue and 5th Street
- Fraser Avenue and the school driveway
- Fraser Avenue and 6th Street
- Fraser Avenue and the parking lot driveway
- Fraser Avenue and 7th Street
- 5th Street and Ahakea Street
- 5th Street and Iliahi Street

Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS).

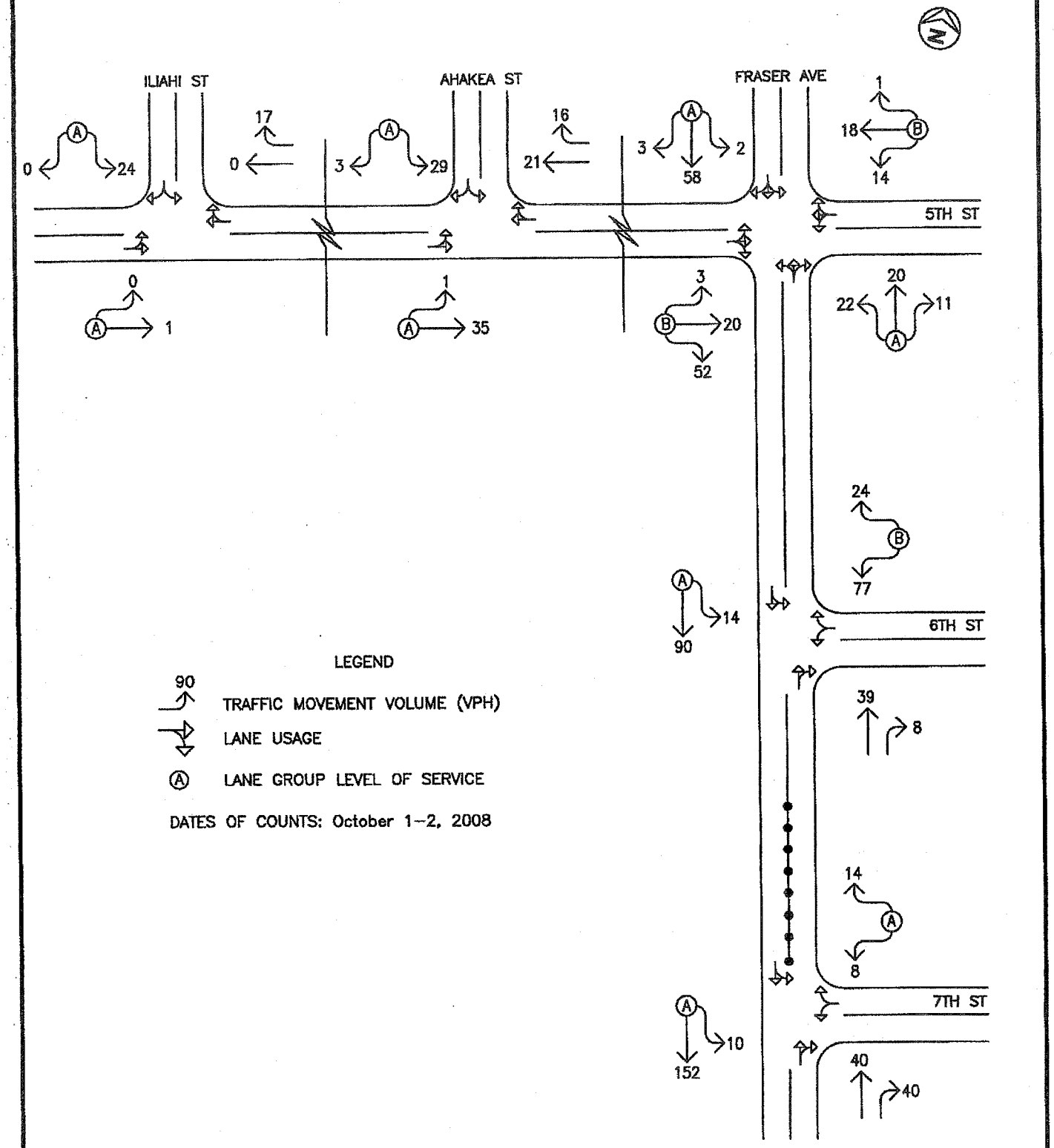
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Existing Peak Hour Traffic

a. General

Figures 3 and 4 show the existing AM and PM peak hour traffic volumes and operating traffic conditions. The AM commuter



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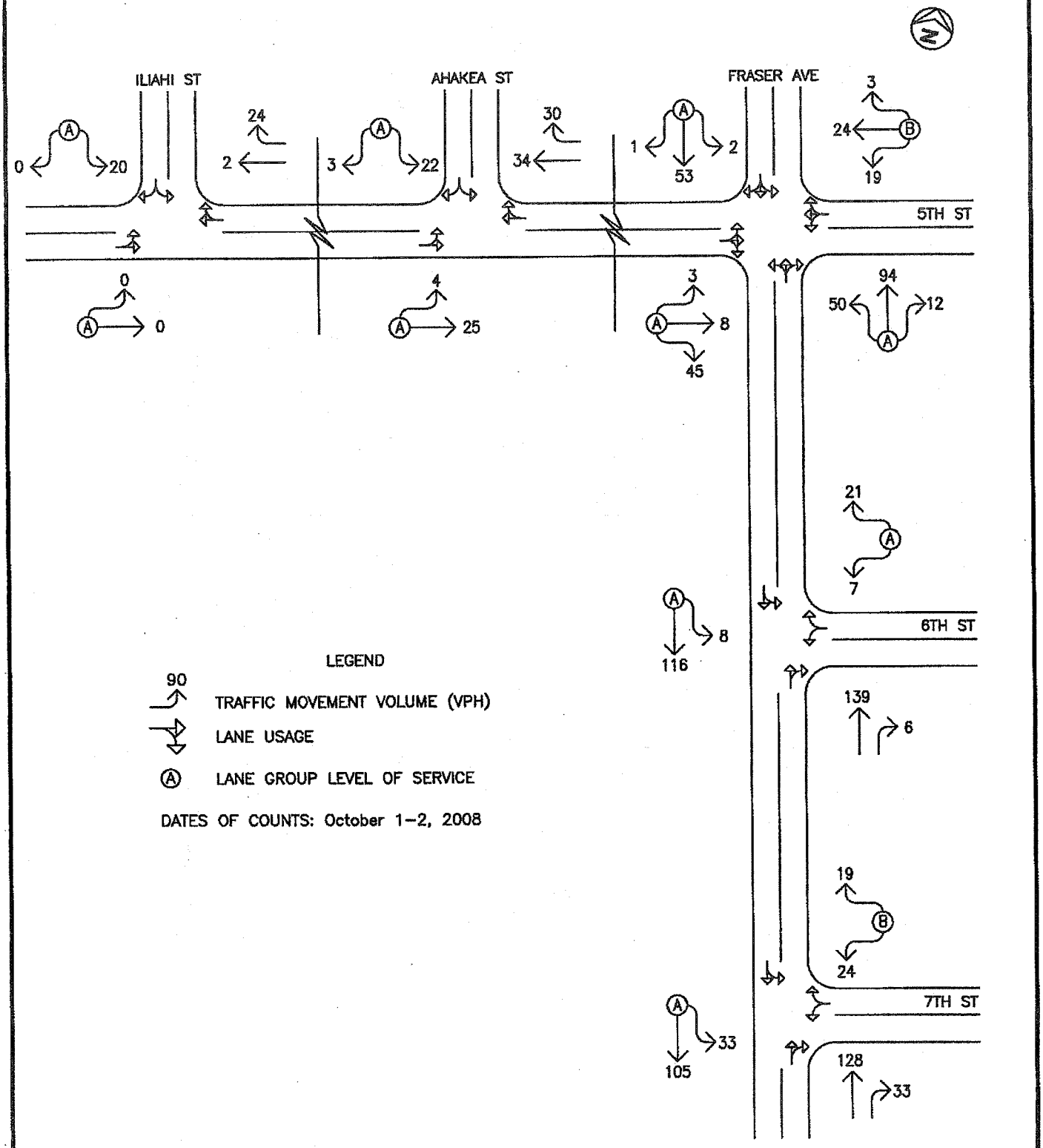
LANAI HIGH & ELEMENTARY SCHOOL

EXISTING AM PEAK HOUR OF TRAFFIC

FIGURE 3



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EXISTING PM PEAK HOUR OF TRAFFIC

FIGURE 4

peak hour of traffic occurs between 7:00 AM and 8:00 AM in the vicinity of the school. In the afternoon, the PM commuter peak hour of traffic generally between the hours of 3:30 PM and 4:30 PM. The analysis is based on these peak hour time periods to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Fraser Avenue and 5th Street

At the intersection with 5th Street, Fraser Avenue carries 53 vehicles northbound and 63 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is higher with 156 vehicles traveling northbound and 56 vehicles traveling southbound. Both approaches of Fraser Avenue operate at LOS "A" during both peak periods.

The 5th Street approaches of the intersection carry 75 vehicles eastbound and 33 vehicles westbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is approximately the same with 56 vehicles traveling eastbound and 46 vehicles traveling westbound. The eastbound approach of 5th Street operates at LOS "B" and LOS "A" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "B" during both peak periods.

c. Fraser Avenue and 6th Street

At the intersection with 6th Street, Fraser Avenue carries 47 vehicles northbound and 104 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, traffic volumes are higher with 145 vehicles traveling northbound and 124 vehicles traveling southbound. The critical traffic movement on the Fraser Avenue approaches is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

The 6th Street approach of the intersection carries 101 vehicles westbound during the AM peak hour of traffic. During the PM peak hour, the traffic volume is lower with 28 vehicles traveling westbound. The 6th Street approach of the intersection operates at LOS "B" and LOS "A" during the AM and PM peak periods, respectively.

d. Fraser Avenue and 7th Street

At the intersection with 7th Street, Fraser Avenue carries 80 vehicles northbound and 162 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is higher with 161 vehicles traveling northbound and 138 vehicles traveling southbound. The critical traffic movement on the Fraser Avenue approaches of the intersection is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

The 7th Street approach of the intersection carries 22 vehicles westbound during the AM peak hour of traffic. During the PM peak hour, the traffic volume is higher with 43 vehicles traveling westbound. The 7th Street approach of the intersection operates at LOS "A" and LOS "B" during the AM and PM peak periods, respectively.

e. 5th Street and Ahakea Street

At the intersection with Ahakea Street, 5th Street carries 36 vehicles eastbound and 37 vehicles westbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is higher with 29 vehicles traveling eastbound and 64 vehicles traveling westbound. The critical traffic movement on the 5th Street approaches is the eastbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

The Ahakea Street approach of the intersection carries 32 vehicles southbound during the AM peak hour of traffic. During the

PM peak hour, the traffic volume is slightly lower with 25 vehicles traveling southbound. The Ahakea Street approach of the intersection operates at LOS "A" during both peak periods.

f. 5th Street and Iliahi Street

At the intersection with Iliahi Street, 5th Street carries 1 vehicle eastbound and 17 vehicles westbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is higher with no vehicles observed traveling eastbound and 26 vehicles traveling westbound. The critical traffic movement on the 5th Street approaches is the eastbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

The Iliahi Street approach of the intersection carries 24 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, the traffic volume is slightly lower with 20 vehicles traveling southbound. The Iliahi Street approach of the intersection operates at LOS "A" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 8th Edition," 2008. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per student. Although field observations indicated that many of the existing students walk to and from school, all of the new site-generated trips were conservatively assumed to be new vehicular trips along the surrounding roadways. In addition, although the project includes new faculty housing, all trips during the commuter peak periods associated with the housing were assumed to be pedestrian trips to and from the adjacent school.

Table 1 summarizes the project site trip generation characteristics applied to the AM and PM peak hours of traffic to measure the impact resulting from the proposed Lanai High & Elementary School improvements.

Table 1: Peak Hour Trip Generation

ELEMENTARY SCHOOL		
INDEPENDENT VARIABLE:		Enrollment increase = 28 students
		PROJECTED TRIP ENDS
AM PEAK	ENTER	4
	EXIT	3
	TOTAL	7
PM PEAK	ENTER	2
	EXIT	2
	TOTAL	4
MIDDLE SCHOOL		
INDEPENDENT VARIABLE:		Enrollment increase = 14 students
		PROJECTED TRIP ENDS
AM PEAK	ENTER	4
	EXIT	4
	TOTAL	8
PM PEAK	ENTER	1
	EXIT	1
	TOTAL	2
HIGH SCHOOL		
INDEPENDENT VARIABLE:		Enrollment increase = 18 students
		PROJECTED TRIP ENDS
AM PEAK	ENTER	5
	EXIT	3
	TOTAL	8
PM PEAK	ENTER	1
	EXIT	1
	TOTAL	2

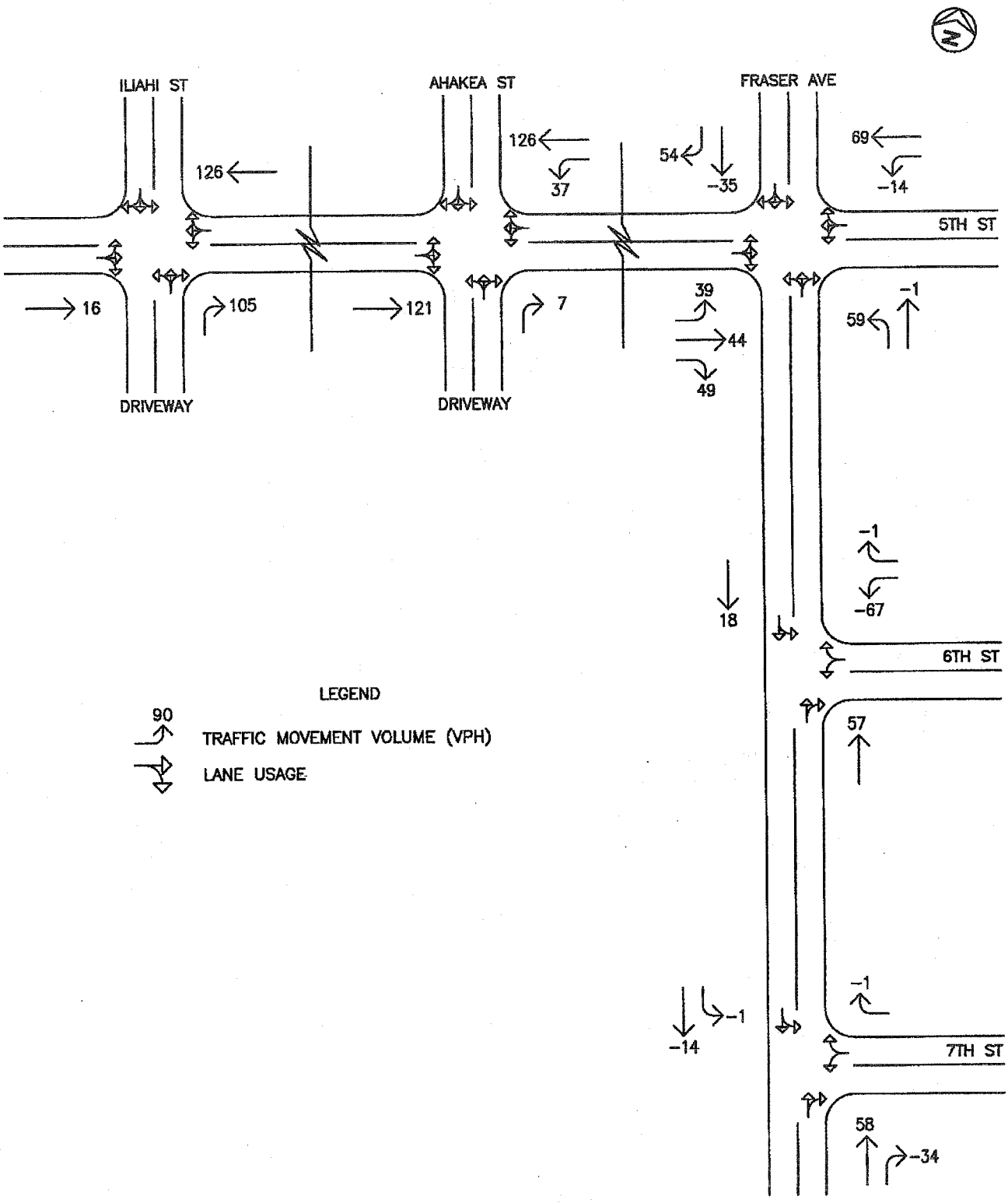
Table 1: Peak Hour Trip Generation (Cont'd)

PRESCHOOL (DAY CARE CENTER)		
INDEPENDENT VARIABLE:		Enrollment = 40 students
		PROJECTED TRIP ENDS
AM PEAK	ENTER	18
	EXIT	16
	TOTAL	34
PM PEAK	ENTER	16
	EXIT	18
	TOTAL	34
COMMUNITY COLLEGE		
INDEPENDENT VARIABLE:		Enrollment = 40 students
		PROJECTED TRIP ENDS
AM PEAK	ENTER	32
	EXIT	7
	TOTAL	39
PM PEAK	ENTER	44
	EXIT	24
	TOTAL	68
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	63
	EXIT	33
	TOTAL	106
PM PEAK	ENTER	64
	EXIT	46
	TOTAL	110

2. Trip Distribution

a. General

Figures 5 and 6 show the distribution of site-generated vehicular trips at the study intersections during the AM and PM peak hours. Access to the school is currently provided via a driveway off Fraser Avenue between 5th Street and 6th Street with a designated student drop-off area located at a parking lot between 6th Street and 7th Street.



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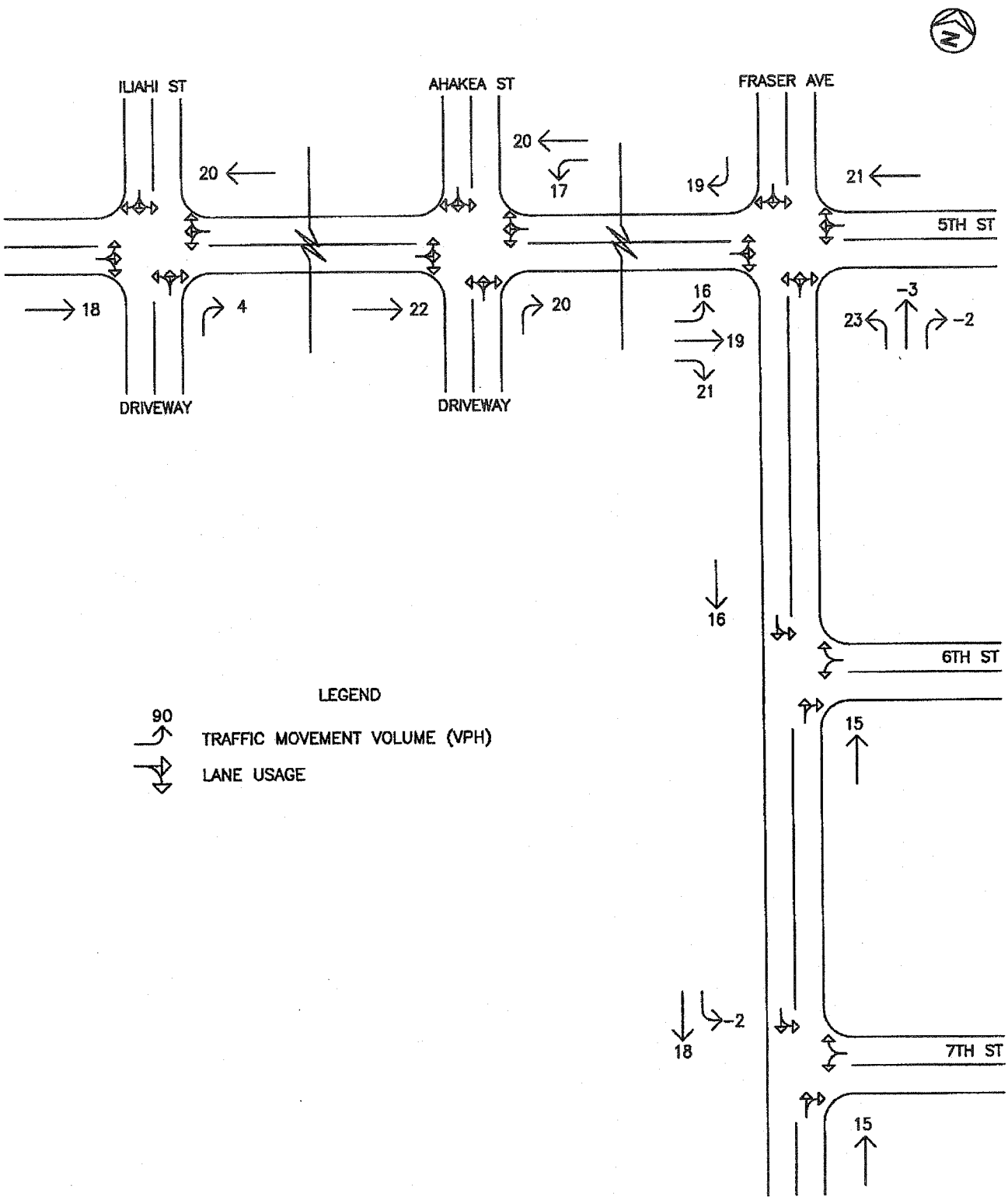
DISTRIBUTION OF SITE-GENERATED VEHICLES
AM PEAK HOUR OF TRAFFIC

FIGURE 5



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DISTRIBUTION OF SITE-GENERATED VEHICLES
PM PEAK HOUR OF TRAFFIC

FIGURE 6

b. Reassignment of Existing Trips

With the proposed project, the traffic currently accessing the school via the driveway along Fraser Avenue would instead access the school via the new driveway at the intersection with Ahakea Street. In addition, the traffic currently utilizing the school drop-off area off Fraser Avenue would instead utilize the new drop-off area off 5th Street via the driveways at and near Iliahi Street. The directional distribution of existing trips was based on the distribution of population and activity centers within Lanai City. As such, 30% of the trips were assumed to be traveling to/from areas to the north, 35% were assumed to be traveling to/from areas to the south, and 35% were assumed to be traveling to/from areas to the east. All existing site-generated trips were reassigned along the surrounding roadway network based upon their assumed origin and destination.

c. Distribution of New Trips

New trips to and from the school were distributed between the school driveways based upon their related use. Faculty and staff were assumed to utilize the driveway along 5th Street at the intersection with Ahakea Street while trips associated with elementary, middle, and high school students were assumed to utilize the driveways at and near the intersection with Iliahi Street. Similarly, trips associated with preschool students were assumed to utilize the driveways west of Iliahi Street near the new preschool. Trips related to students, faculty, and staff for the community college were assumed to utilize either the driveways off 5th Street between Fraser Avenue and Ahakea Street or the driveway off Fraser Avenue. The community college-related trips were distributed between 5th Street and Fraser Avenue based on the relative distribution of parking stalls in the parking lots off those roadways. The directional distribution of new trips was based on the

distribution of population and activity centers within Lanai City. As such, 30% of the trips were assumed to be traveling to/from areas to the north, 35% were assumed to be traveling to/from areas to the south, and 35% were assumed to be traveling to/from areas to the east. These trips were routed through the surrounding roadway network based on their assumed origin and destination.

B. Through Traffic Forecasting Methodology

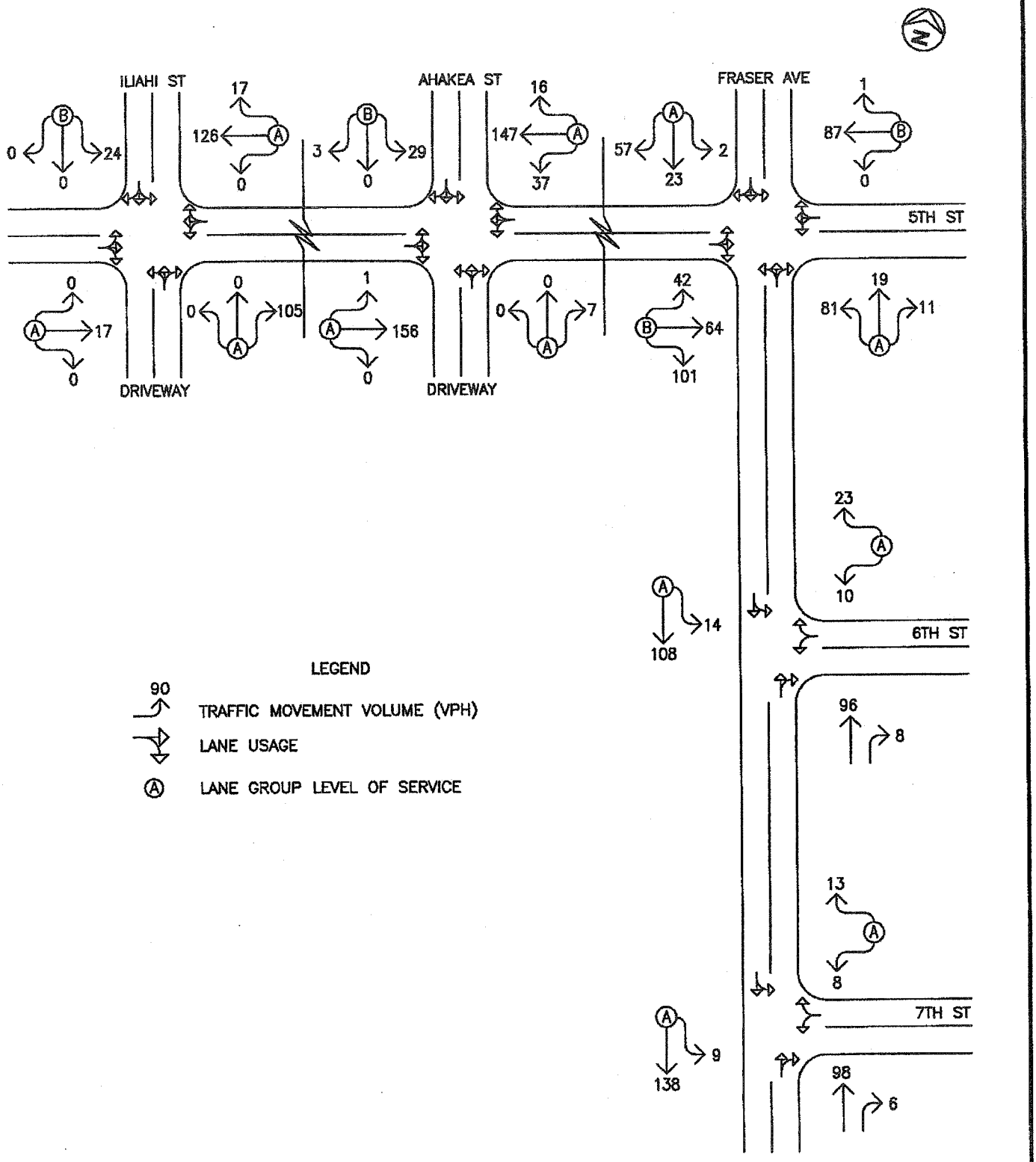
The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at survey stations located in the vicinity of the project site. However, the historical data indicates that traffic volumes in the vicinity of the school are relatively stable. As such, traffic conditions in the vicinity of the school are expected to remain similar to existing conditions in the Year 2034 without the proposed project.

C. Total Traffic Volumes With Project

Figures 7 and 8 show the Year 2034 cumulative AM and PM peak hour traffic conditions resulting from the proposed modification and expansion of the existing Lanai High & Elementary School. The cumulative volumes consist of site- generated traffic superimposed over existing traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

V. TRAFFIC IMPACT ANALYSIS

The Year 2034 cumulative AM and PM peak hour traffic conditions with the implementation of the proposed improvements at the Lanai High & Elementary School are summarized in Table 2. The existing operating conditions are provided for comparison purposes. LOS calculations are included in Appendix D.



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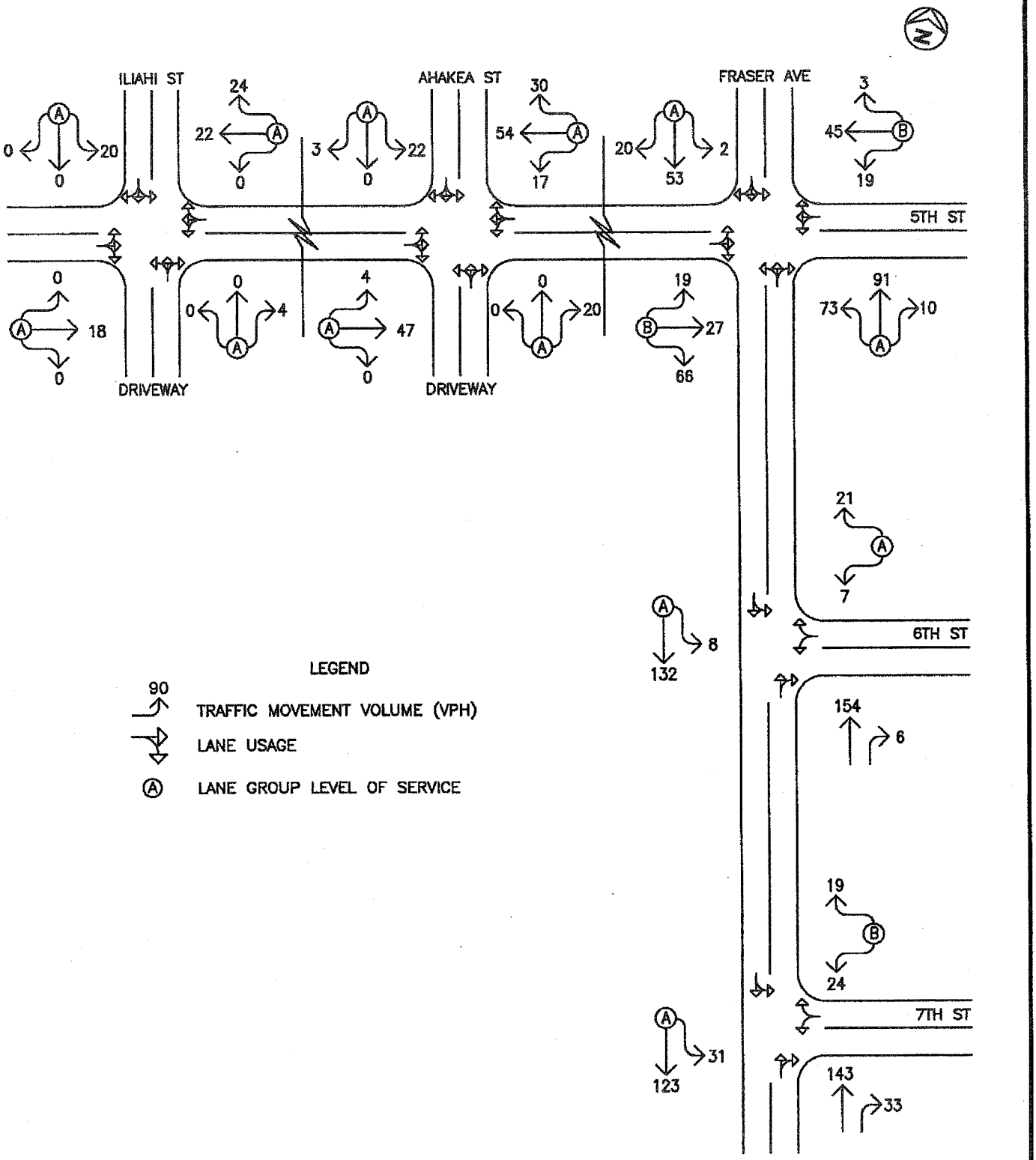
LANAI HIGH & ELEMENTARY SCHOOL

YEAR 2034 WITH PROJECT AM PEAK HOUR OF TRAFFIC

FIGURE 7



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YEAR 2034 WITH PROJECT PM PEAK HOUR OF TRAFFIC

FIGURE 8

Table 2: Existing and Projected With Project LOS Traffic Operating Conditions

Intersection	Critical Movement		AM		PM	
			Exist	Year 2034 w/ Proj	Exist	Year 2034 w/ Proj
Fraser Ave/ 5th Street	Eastbound	LT-TH-RT	B	B	A	B
	Westbound	LT-TH-RT	B	B	B	B
	Northbound	LT-TH-RT	A	A	A	A
	Southbound	LT-TH-RT	A	A	A	A
Fraser Ave/ 6th Street	Southbound	LT-TH	A	A	A	A
	Westbound	LT-RT	B	A	A	A
Fraser Ave/ 7th Street	Southbound	LT-TH	A	A	A	A
	Westbound	LT-TH	A	A	B	B
5th Street/ Ahakea Street	Eastbound*	LT-TH-RT	A	A	A	A
	Westbound	LT-TH-RT	-	A	-	A
	Northbound	LT-TH-RT	-	A	-	A
	Southbound*	LT-TH-RT	A	B	A	A
5th Street/ Iliahi Street	Eastbound*	LT-TH-RT	A	A	A	A
	Westbound	LT-TH-RT	-	A	-	A
	Northbound	LT-TH-RT	-	A	-	A
	Southbound*	LT-TH-RT	A	B	A	A

*Approach modified to accommodate new intersection configuration.

Traffic operations along Fraser Avenue in the vicinity of the school are expected, in general, to remain similar to existing conditions despite the anticipated changes in travel patterns as a result of the proposed improvements at the school and the addition of new site-generated vehicles to the surrounding roadway network. The westbound approach of the intersection with 6th Street is expected to improve to LOS "A" during the AM peak period while the eastbound approach of the intersection with 5th Street is expected to deteriorate to LOS "B" during the PM peak period. The remaining critical movements at these intersections, as well as, the intersection with 7th Street are expected to continue operating at levels-of-service similar to existing conditions. Along 5th Street, the critical movements at

the intersections with Ahakea Street and Iliahi Street are expected to operate at LOS "A" during both peak periods with the exception of the southbound approaches of both intersections which are expected to operate at LOS "B" during the AM peak period.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study:

1. Maintain sufficient sight distance for motorists to safely enter and exit all project driveways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Provide sufficient turning radii at all project driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

5. Align the second driveway along 5th Street with Caldwell Street to minimize turning conflicts for entering and exiting vehicles.

6. Align the third driveway along 5th Street with Ahakea Street to minimize turning conflicts for entering and exiting vehicles.

7. Align the fourth driveway along 5th Street with Iliahi Street to minimize turning conflicts for entering and exiting vehicles.

8. Provide adequate and safe pedestrian crossings in the vicinity of the school along roadways surrounding the project site.

VII. CONCLUSION

Extensive improvements are planned at the Lanai High & Elementary School to modify and expand the existing school. The proposed project entails the construction of a new elementary school, preschool, community college, support buildings and facilities, athletic fields and facilities, faculty housing, and parking areas, as well as, the modification of existing buildings for the middle and high school. With the implementation of the aforementioned recommendations, the critical traffic movements at the intersections in the

project vicinity are anticipated to continue operating at levels of service similar to existing conditions. As such, the proposed project is not expected to have a significant impact on the traffic operations in the project vicinity.