MAY 2 3 2010

LINDA LINGLE
GOVERNOR

[redacted]
KATHRYN S. MATAYOSHI
INTERIM SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

[redacted]

May 3, 2010

Ms. Katherine Kealoha, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai`i 96813

Dear Ms. Kealoha:

Subject: Final Environmental Assessment and Finding of No Significant Impact for Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07, TMK: (3) 2-3-015: 001
Hilo, Island of Hawai`i, Hawai`i

The State Department of Education (DOE) has reviewed the comments received during the 30-day public comment period for the Draft Environmental Assessment for the subject project which began on December 8, 2009. The DOE has determined that this project will not have significant environmental impacts and is issuing a Finding of No Significant Impact (FONSI). Please publish this notice in the May 23, 2010 edition of the Environmental Notice.

We have enclosed a completed Office of Environmental Quality Control (QEQC) Publication Form, one hard copy, and one CD copy of the Final Environmental Assessment

Should there be any questions, please contact Brenda Lowrey of the Facilities Development Branch at 377-8312, or our consultant, Brian Takeda, of R. M. Towill Corporation at 842-1133.

Sincerely yours,

Duane Y. Kashiwai
Public Works Administrator
Facilities Development Branch

DYK:to

Enclosures

c: R. M. Towill Corporation

Final Environmental Assessment

Prepared in Accordance with Chapter 343, Hawaii Revised Statutes

Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07

Tax Map Key (TMK): (3) 2-3-015:001
Hilo, Island of Hawai‘i, Hawai‘i

April 2010

Prepared For:
Department of Education
State of Hawai‘i
1151 Punchbowl Street, Room 431
Honolulu, Hawai‘i 96813

R. M. TOWILL CORPORATION
SINCE 1930
2024 North King Street, Suite 200
Honolulu, Hawaii 96819

1-21468-00P

Final Environmental Assessment

Hilo High School New Gymnasium

DOE Job No. Q1-10-02-07

Hilo, Island of Hawai‘i, Hawai‘i
Tax Map Key (TMK): (3) 2-3-015:001

April 2010

Prepared Pursuant to
Chapter 343, Hawai‘i Revised Statutes

Prepared for:
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1151 Punchbowl Street, Room 431
Honolulu, Hawai‘i 96813

Prepared by:
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2024 North King Street, Suite 200
Honolulu, Hawai‘i 96819

Table of Contents

Page

List of Tables

List of Figures

See End of Section 1 – Introduction

See End of Section 2 – Project Description

See End of Section 4 – Description of the Affected Environment, Impacts and Mitigation

See End of Section 5 – Relationship to State and County Land Use Plans and Policies

Appendices

Project Summary

Project:	Hilo High School New Gymnasium DOE Job No. Q1-10-02-07
Landowner/ Applicant:	State of Hawai‘i Department of Education
Accepting Agency:	State of Hawai‘i Department of Education
Agent:	R. M. Towill Corporation
Location:	556 Waiānuenue Avenue, Hilo, Hawai‘i 96720
Tax Map Key:	(3) 2-3-015:001
Proposed Action:	Construction of new school gymnasium
Land Area:	65,000 square feet (approximate)
Present Use:	DOE District Annex Office Complex Cottages
State Land Use District:	Urban
Hilo General Plan Land Use Pattern Allocation Guide Map Designation:	Medium Density Urban
Zoning:	RS-7.5, Single-Family Residential, Detached
Special Management Area:	No
Permits that May be Required:	Building, Grading, and Height Variance Permits, Plan Approval Application, and NPDES Notice of Intent, Form C, Construction Stormwater Permit
Determination:	Finding of No Significant Impact (FONSI)

Section 1
Introduction

1.1 Introduction

The Department of Education (DOE) proposes to construct a new gymnasium at the Hilo High School campus located at 556 Waiānuenue Avenue. See **Figure 1,** Project Location. The purpose of the new gymnasium is to provide an improved facility that will meet current DOE standards and be capable of hosting school sponsored sporting events[1].

Hilo High School is a public, co-educational high school of the DOE serving grades nine through twelve. Hilo High School was established in 1906 and its first class graduation took place in 1909. Hilo High School is located near the Wailuku River in the County of Hawai‘i, Big Island of Hawai‘i, and comprises a land area of approximately 24 acres. The school is located across the street from the Hilo Intermediate School, one of its two feeder schools. The other feeder school is the Prince Jonah Kūhiō Kalaniana‘ole Elementary & Intermediate School located in Pāpa‘ikou, north of downtown Hilo at 27-330 Old Mamalahoa Highway.

The proposed project will be consistent with the DOE Education Specifications (EDSPECS) and the revised Facilities Assessment and Development Schedule (FADS). The present gymnasium is an existing wooden structure that was constructed in 1931. Since that time the facility has been maintained but is in need of replacement due to its age, small size, and limited support facilities.

The proposed project will require the demolition of existing cottages located adjacent to the DOE District Annex Building C to make room for the new gymnasium. The project will include the construction of the gym and provision for parking, grassing, and landscaping. See **Figure 2,** Proposed Gymnasium Site Location.

[1] The Hilo High School Athletic Director Leroy Simms, notes that the existing gymnasium does not meet standards for competitive uses and is limited to athletic practice, physical education classes, and community usage events only. The Athletics program utilizes off-campus facilities for competitive events scheduling on a rental basis. (CSH, 2009).

Project Base Bid

The base bid of the project will include the following:

1. Demolition of the cottages located adjacent to the District Annex Building C and, site and utility preparation for the new gymnasium. The school administrative office functions carried out in the cottages will be relocated to another location. The existing gymnasium will be retained for physical education and other school curriculum.
2. Construction of the new gymnasium space along with restrooms, first aid room, storage room, electrical room, and a covered outdoor lanai and entry area.
3. Interior gymnasium improvements including installation of flooring, appurtenances and ventilation equipment.
4. Site improvements surrounding the gymnasium including a passenger drop-off zone, limited accessible parking and landscaping.

Project Additive Alternates

Additional features which will be built as Phase 2, or considered for additive alternates should further funding become available, will include:

1. The addition of a locker room facility which consists of Girls and Boys locker rooms, a training room, conference room, storage area, Athletic Director's office, wrestling room, and a 2-story lobby space connection to the gym.
2. The addition of a bridge connecting the second floor of the new gym facility to the upper high school campus.
3. Additional parking.
4. The addition of bleacher seating on both sides of the gym, totaling approximately 1,400 seats.

The DOE proposes to commence construction in summer 2010 with construction anticipated at approximately 500 days. State of Hawai‘i funds required for the base bid of the project have been estimated at approximately $9.75 million. If additional funds become available the additive alternates will be included in the project up to the amount of funding available.

1.2 Project Location

The proposed project is located in Hilo on the Island of Hawai‘i. The street address is 556 Waiānuenue Avenue and is located approximately a half mile mauka of the Mamalahoa Highway, near the Wailuku River.

The project site is identified as Tax Map Key (TMK): (3) 2-3-015: parcel 001 (23.585 acres), and is owned by the State of Hawai‘i, DOE. **See Figure 3,** Tax Map Key. The planned location of the gym is in the northeastern portion of the parcel on land that is presently occupied by cottages located adjacent to the DOE District Annex Building C.

Northwest of the project site are residences along the Wailuku River. Southeast of the site, across Waiānuenue Avenue is the Hilo Intermediate School. Southwest of the site is the Hilo High School track & field complex and the main portion of the high school campus. Northeast of the site is Ka‘iulani Street and property owned by the Hilo United Methodist Church. Further northeast along Waiānuenue Avenue are residences and commercial establishments that continue until the intersection with Mamalahoa Highway.

The project site is located outside of the Special Management Area (SMA) as defined in Chapter 205A, Hawai‘i Revised Statutes (HRS) and Rule 9, Special Management Area, of the Planning Commission, County of Hawai‘i. **See Figure 4,** SMA Boundary Map.

1.3 Purpose of the Environmental Assessment

This Final Environmental Assessment (FEA) is prepared pursuant to the completion of the public comment period for the Draft Environmental Assessment (DEA), published in the Office of Environmental Quality Control (OEQC) Bulletin on December 8, 2009. The 30-day public comment period ended on January 7, 2010, and a record of the public comments received and the written responses prepared are included in this document in Section 11, Draft Environmental Assessment Comments and Responses.

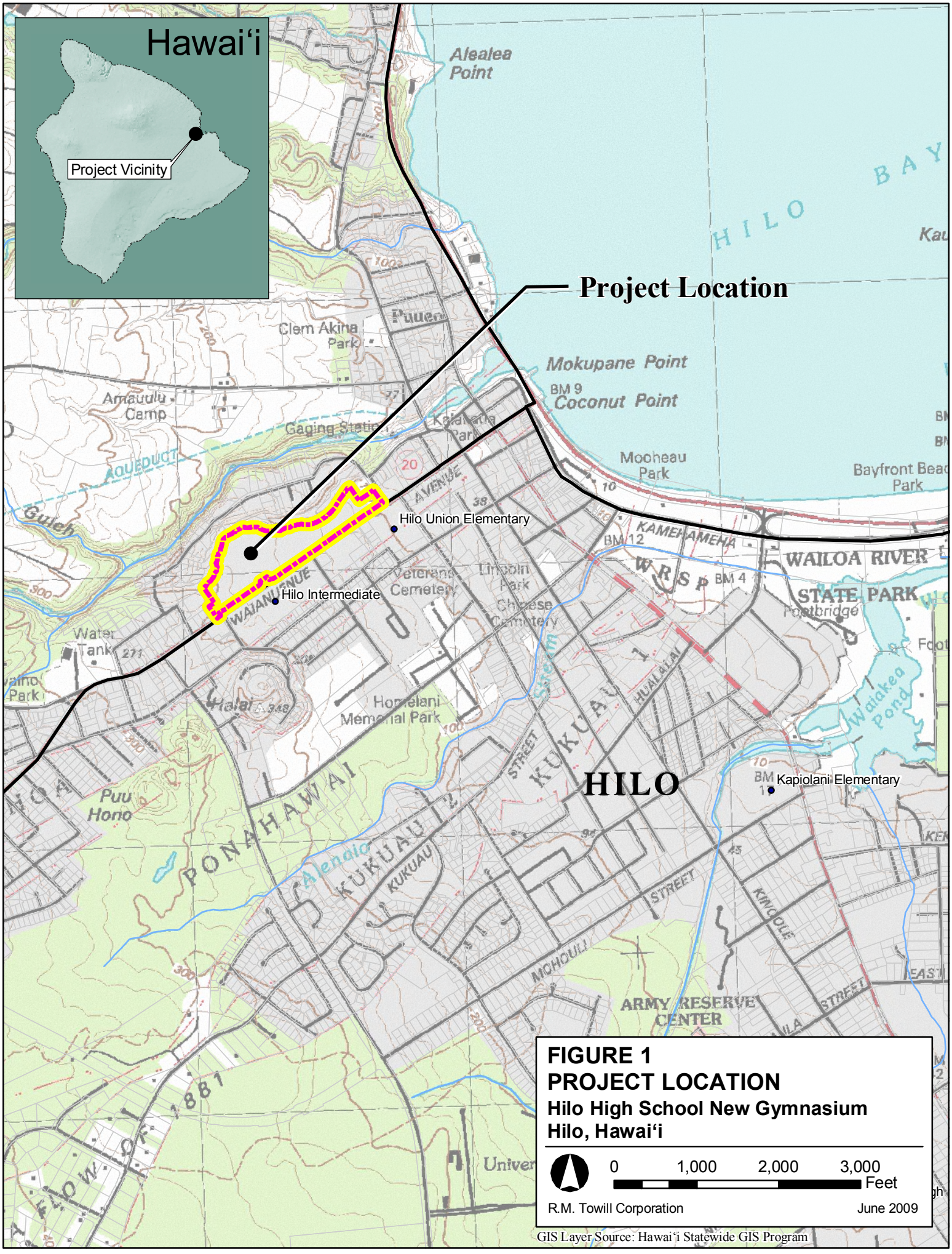
This Environmental Assessment complies with Chapter 343, Section 343-5-1, HRS, which states that an environmental assessment shall be required for actions which,

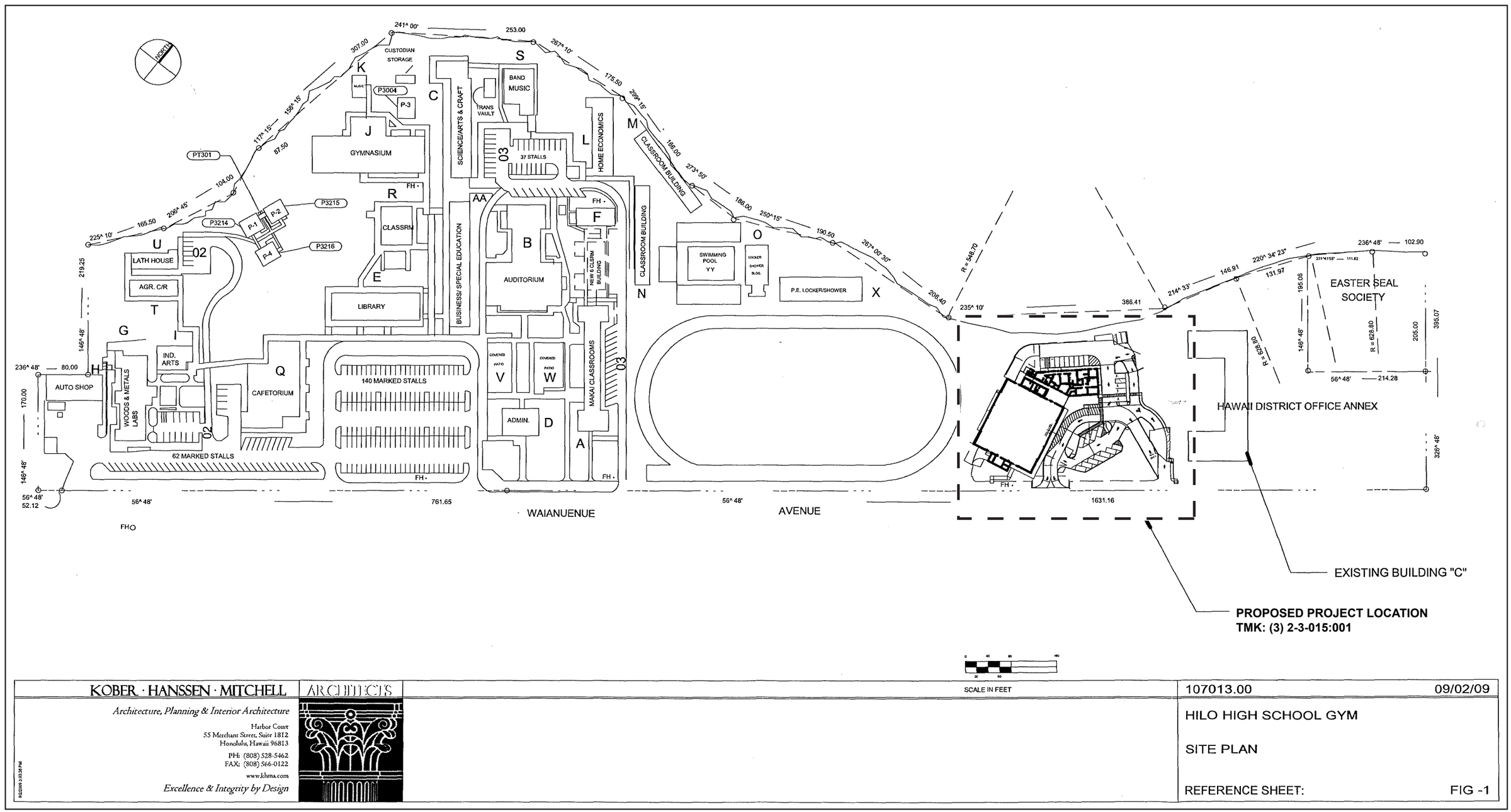
> "[P]ropose the use of state or county lands or the use of state or county funds, other than funds to be used for feasibility or planning studies for possible future programs or projects which the agency has not approved, adopted, or funded, or funds to be used for the acquisition of unimproved real property; provided that the agency shall consider environmental factors and available alternatives in its feasibility or planning studies."

The ownership of the subject property by the DOE and the use of State funds provide the basis for the preparation of this document.

Section 1 – Figures

Environmental Assessment for Hilo High School New Gymnasium
Hilo, Island of Hawai‘i, Hawai‘i


Hawai'i
Project Vicinity
Project Location
Alealea Point
HILO BAY
Clem Akina Park
Puuen
Mokupane Point
BM 9
Coconut Point
Amauulu Camp
Gaging Station
Kalaiaina Park
Aqueduct
Mooheau Park
Bayfront Beach Park
Gulch
Hilo Union Elementary
KAMEHAMEHA AVENUE
BM 12
WAILOA RIVER STATE PARK
Footbridge
Hilo Intermediate
WAIANUENUE AVENUE
Veterans Cemetery
Lincoln Park
Chinese Cemetery
BM 4
Water Tank
Waiakea Pond
Homelani Memorial Park
Puu Hono
PONAHAWAI STREET
KUKUAU STREET
HUALALAI STREET
HILO
BM 11
Kapiolani Elementary
Alenaio Stream
KINOOLE STREET
MOHOULI STREET
ARMY RESERVE CENTER
EAST
1881
FIGURE 1
PROJECT LOCATION
Hilo High School New Gymnasium
Hilo, Hawai'i
0 1,000 2,000 3,000
Feet
R.M. Towill Corporation
June 2009
GIS Layer Source: Hawai'i Statewide GIS Program



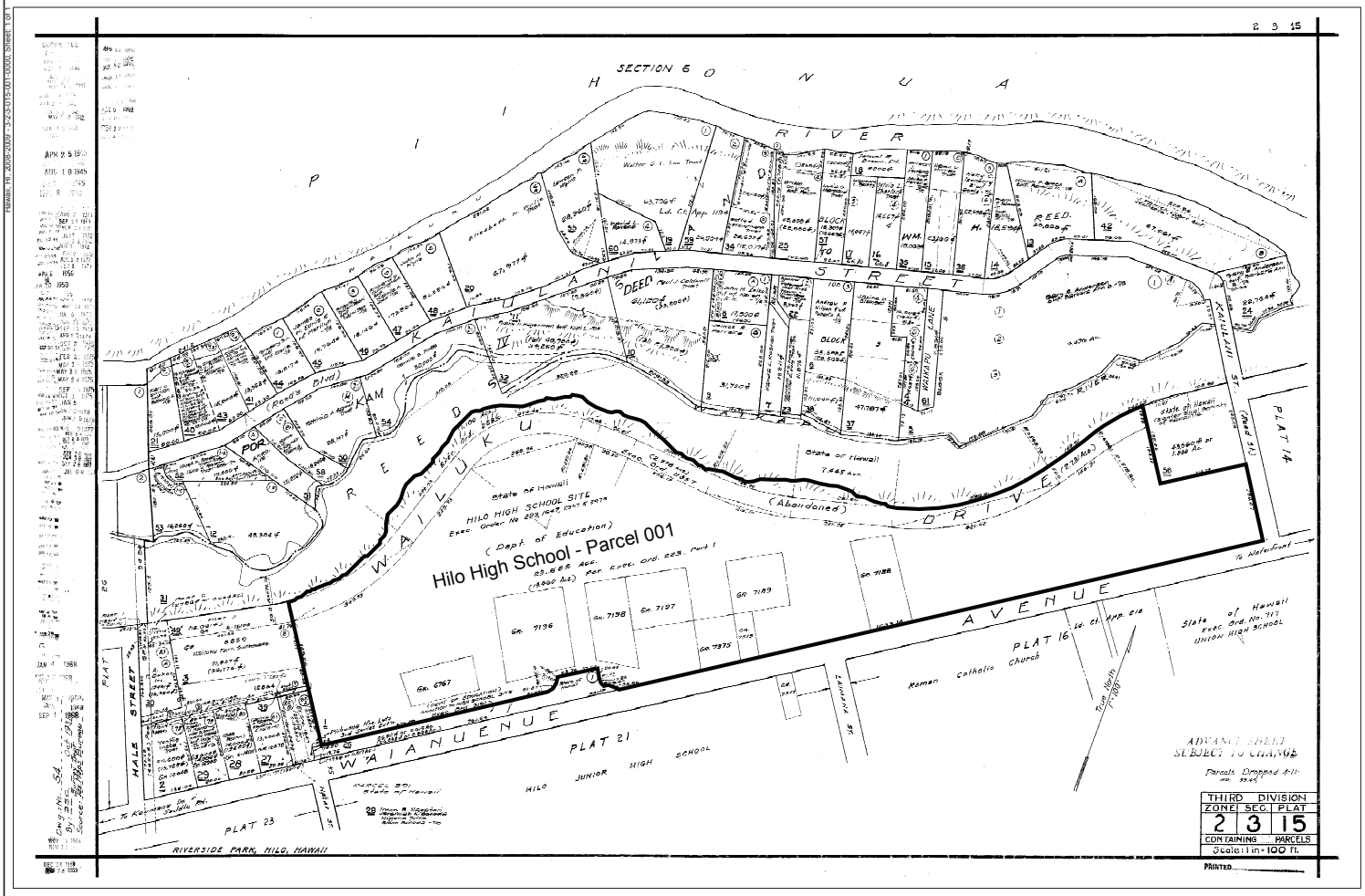
KOBER · HANSSEN · MITCHELL ARCHITECTS		107013.00 09/02/09
Architecture, Planning & Interior Architecture Harbor Court 55 Merchant Street, Suite 1812 Honolulu, Hawaii 96813 PH: (808) 528-5462 FAX: (808) 566-0122 www.khma.com *Excellence & Integrity by Design*		HILO HIGH SCHOOL GYM SITE PLAN REFERENCE SHEET: FIG -1

Source: Kober Hanssen Mitchell Architects, November 2009

FIGURE 2
Proposed Gymnasium Site Location & Plan
Hilo High School New Gymnasium
Hilo, Hawai'i

Refer to Graphic Scale

R. M. TOWILL CORPORATION Nov 2009



Source: Tax Map Key (3) 2-3-015: 001, City & County of Honolulu, Win2Data, Inc., July 2009.

FIGURE 3
Tax Map Key (3) 2-3-015: 001
Hilo High School New Gymnasium
Hilo, Hawai‘i

No Scale

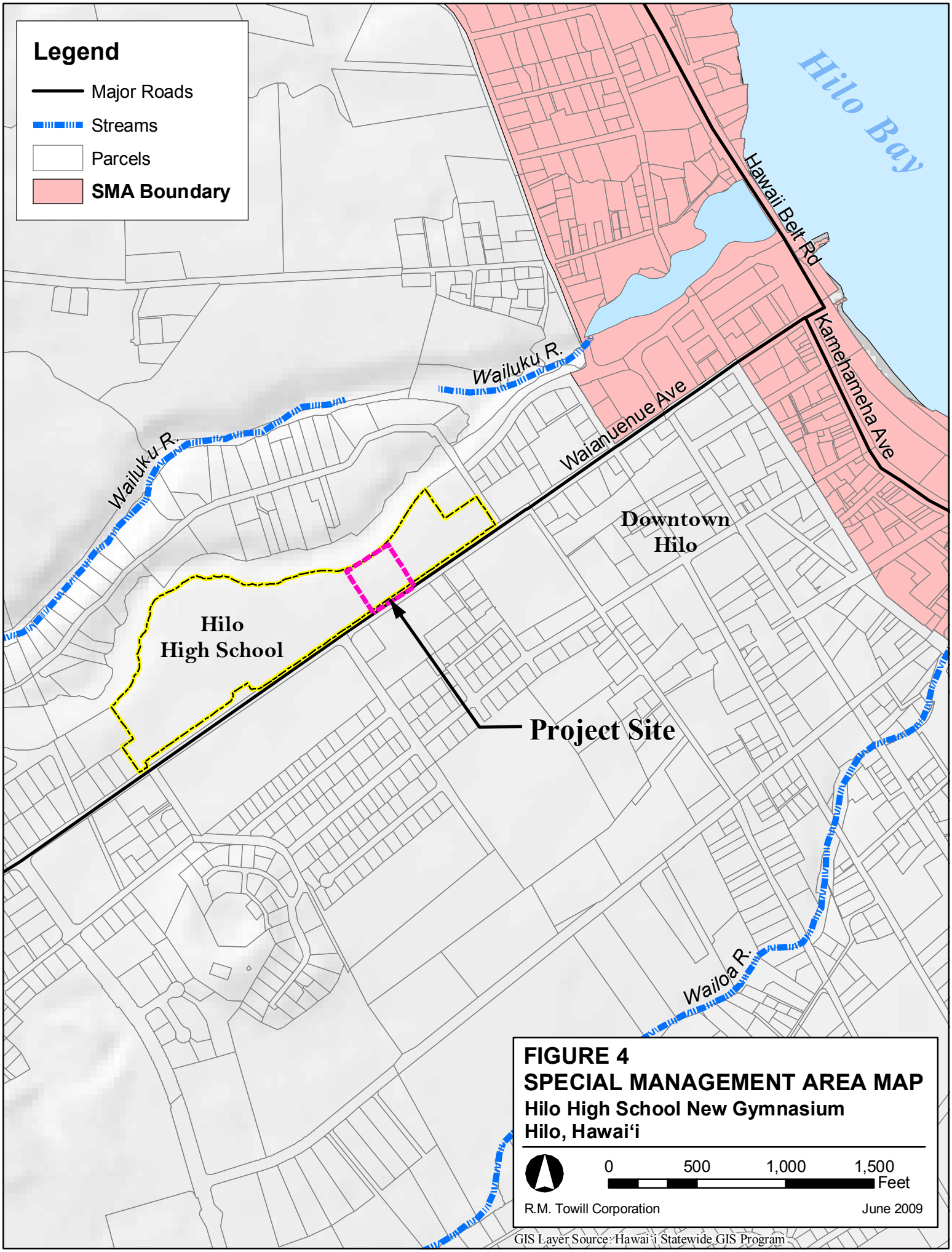


FIGURE 4
SPECIAL MANAGEMENT AREA MAP
Hilo High School New Gymnasium
Hilo, Hawai'i

0 500 1,000 1,500 Feet

R.M. Towill Corporation June 2009

GIS Layer Source: Hawai'i Statewide GIS Program

Section 2
Project Description

The DOE proposes the construction of a new gymnasium at the Hilo High School campus located in Hilo, Island of Hawai‘i. The site address is 556 Waiānuenue Avenue, Hilo, Hawai‘i 96720. See **Figure 1,** Project Location.

The proposed Hilo High school gymnasium is a new athletic facility on the existing campus which will provide the school with new basketball and volleyball courts, wrestling room, locker rooms and support facilities. In addition to providing the school with new facilities, the gymnasium will serve as an emergency shelter for the Hilo community. The new gym is intended to seat up to approximately 1,400 people and be able to host multiple team tournaments as well as school assemblies. The support facilities will include men's and women's locker rooms, a training room, and an athletic director’s office and conference rooms.

The new gym will be sited on the existing campus below the field track. The existing cottages will be removed. The site is approximately 20 feet below the track grade and will require a bridge to be built connecting the gym with the school's existing ADA pathway for accessibility. The building below the new gym (District Annex Building C) is historic and efforts will be made to preserve its visibility and maintain as much distance as possible between the two structures. See **Figure 2**, Proposed Gymnasium Site Location.

Exterior lighting for the gymnasium will be limited to the provision of building and pathway lighting to provide visibility during night time hours. All lighting that is planned to be used will be selected based on reducing unwanted upward glare for the following reasons: (1) To reduce disturbing area residents during night time activities. Because the gymnasium is a covered facility the amount of lighting required is expected to be less that that needed for the adjoining athletic field; (2) To reduce the effects of glare to any threatened or endangered avifaunal species that may overfly the area; and (3) To reduce the effects of glare on Hawai‘i observatories.

The design of the building will include two floors and is intended to complement the color scheme of the existing campus and maintain some of the more prominent architectural features of the nearby buildings while bringing a distinctively more modern feel to the campus. The first

floor of the gymnasium will include the gym athletic flooring, locker rooms, restrooms, and spaces for a ticket booth, concessions, heating room, mechanical room, elevator, and related accessory spaces. The second floor will include a wrestling room, training room, conference room, office, staff restroom and shower, storage room, elevator and accessory spaces. See **Figure 5A**, Proposed First Floor Plan; **Figure 5B**, Proposed Second Floor Plan; **Figure 6A**, Gymnasium Building Elevation 1; and **Figure 6B**, Gymnasium Building Elevation 2. Consultation with the State Historic Preservation Division was taken into consideration in the design of the new gymnasium. The existing Building C, considered a historic structure, will be preserved and the design effort is to prevent the new gymnasium facility from visually overpowering the historic building. The new facility will also be designed to meet LEED Silver requirements.

The proposed project will be constructed according to the best use of available funding as follows:

Project Base Bid

The base bid of the project will include the following:

1. Demolition of the cottages located adjacent to the District Annex Building C and, site and utility preparation for the new gymnasium. The school administrative office functions carried out in the cottages will be relocated to another location. The existing gymnasium will be retained for physical education and other school curriculum.
2. Construction of the new gymnasium space along with restrooms, first aid room, storage room, electrical room, and a covered outdoor lanai and entry area.
3. Interior gymnasium improvements including installation of flooring, appurtenances and ventilation equipment.
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Additional features which will be built as Phase 2, or considered for additive alternates should further funding become available, will include:

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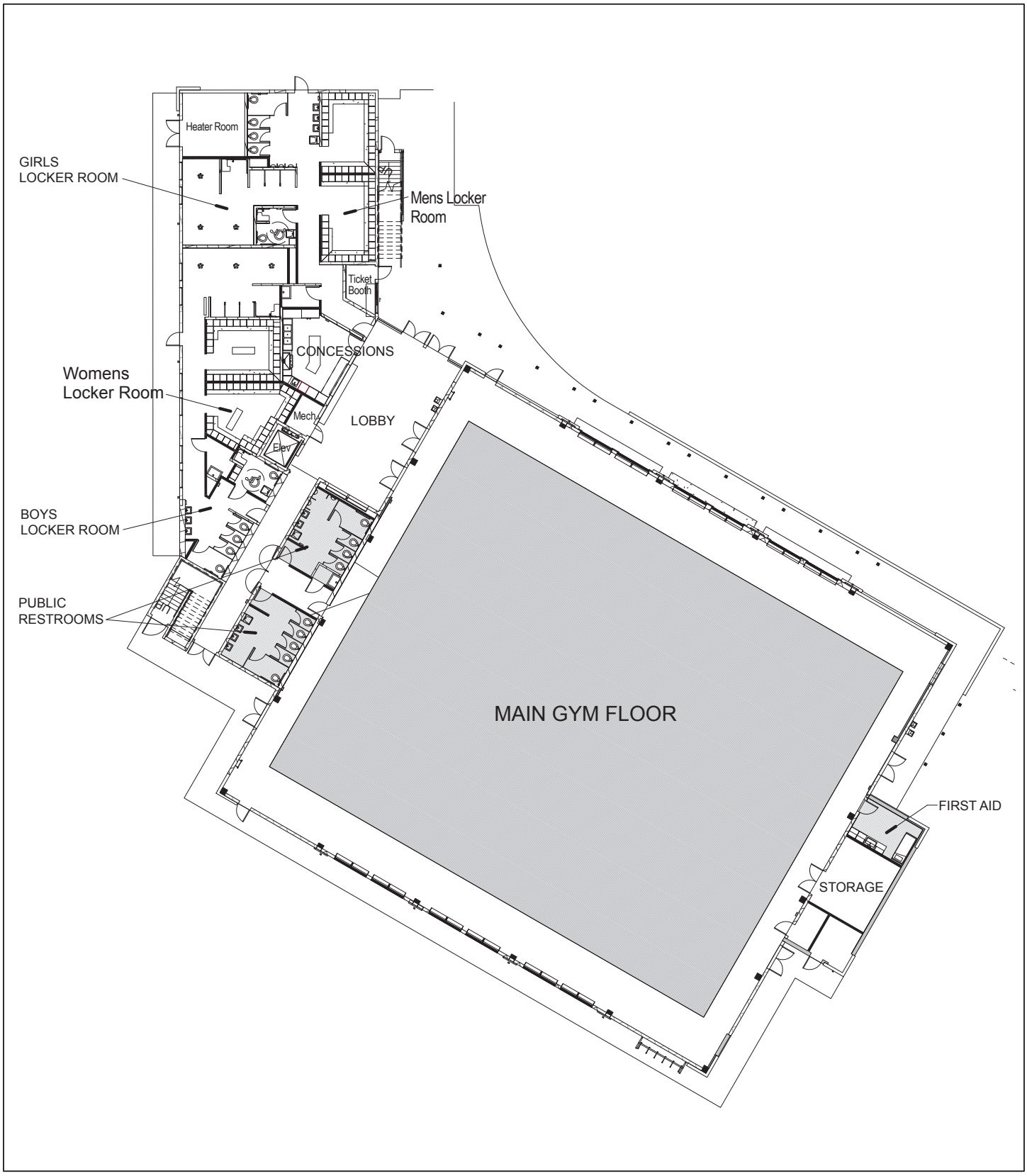
2. The addition of a bridge connecting the second floor of the new gym facility to the upper high school campus.
3. Additional parking.
4. The addition of bleacher seating on both sides of the gym, totaling approximately 1,400 seats.

The existing gymnasium will be retained by the school and used for physical education and other curriculum. Site and utility preparation for the new gymnasium will include connections for power, water, wastewater, and communications.

The gymnasium and support spaces will provide approximately 22,500 net square feet in the completed facility.

Demolition and removal of waste and debris will be to a waste disposal site as approved by the Solid Waste Division, Department of Environmental Management.

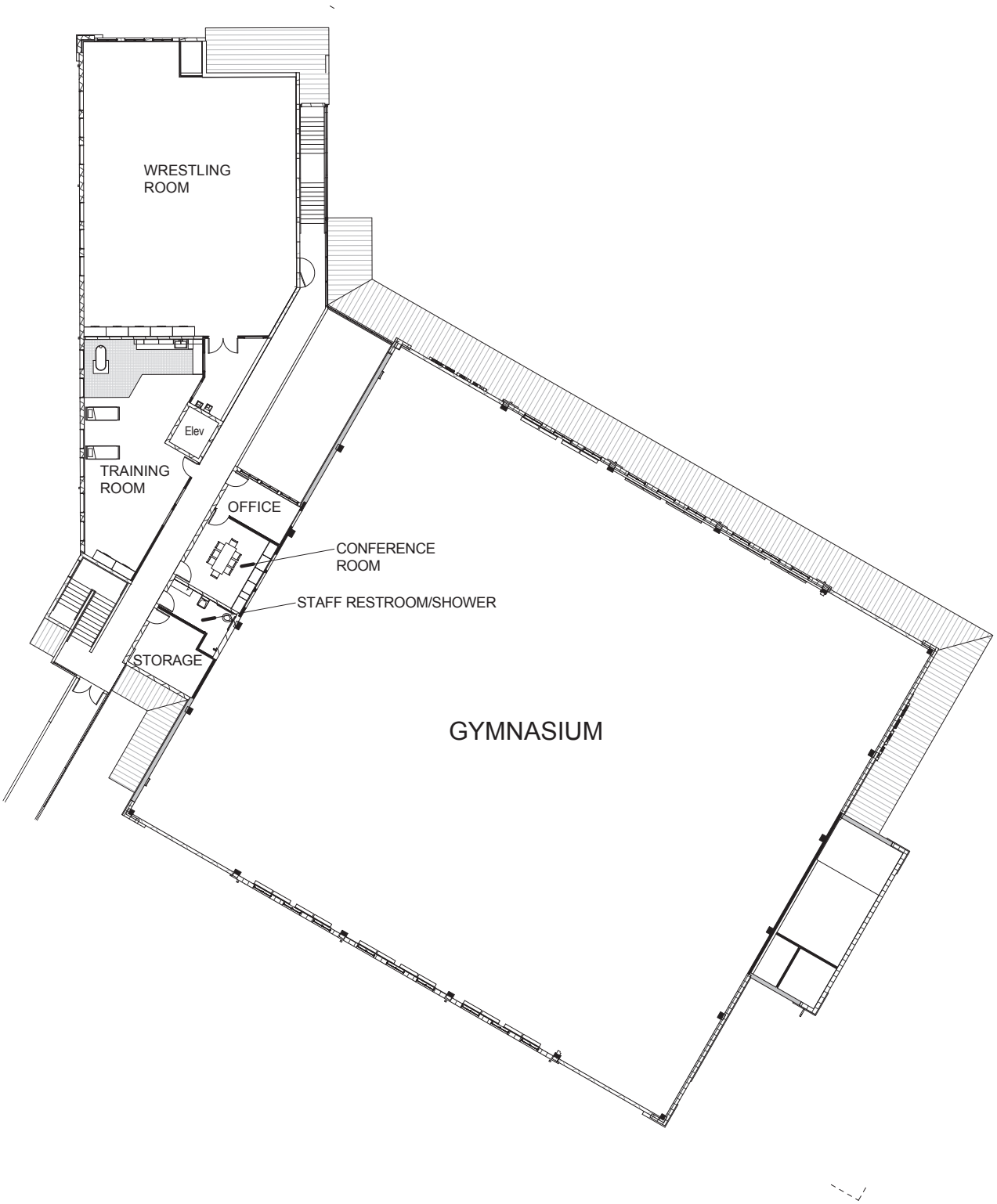


Source: Kober/Hanssen/Mitchell Architects Inc., January 2010

FIGURE 5A
Proposed First Floor Plan
Hilo High School New Gymnasium
Hilo, Hawai'i

Not to Scale

R. M. TOWILL CORPORATION January 2010



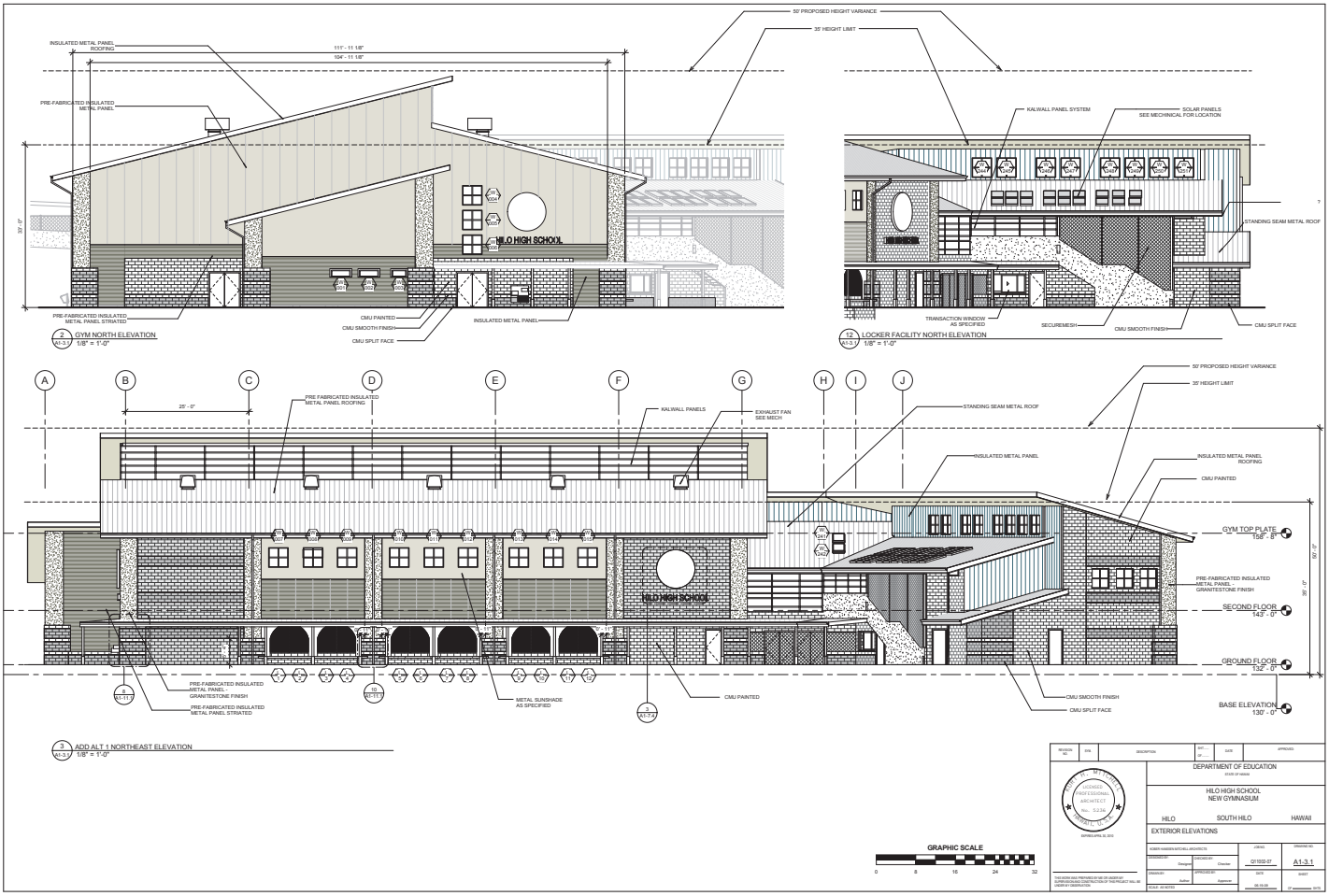
Source: Kober/Hanssen/Mitchell Architects Inc., January 2010

FIGURE 5B
Proposed Second Floor Plan
Hilo High School New Gymnasium
Hilo, Hawai‘i

Not to Scale

R. M. TOWILL CORPORATION

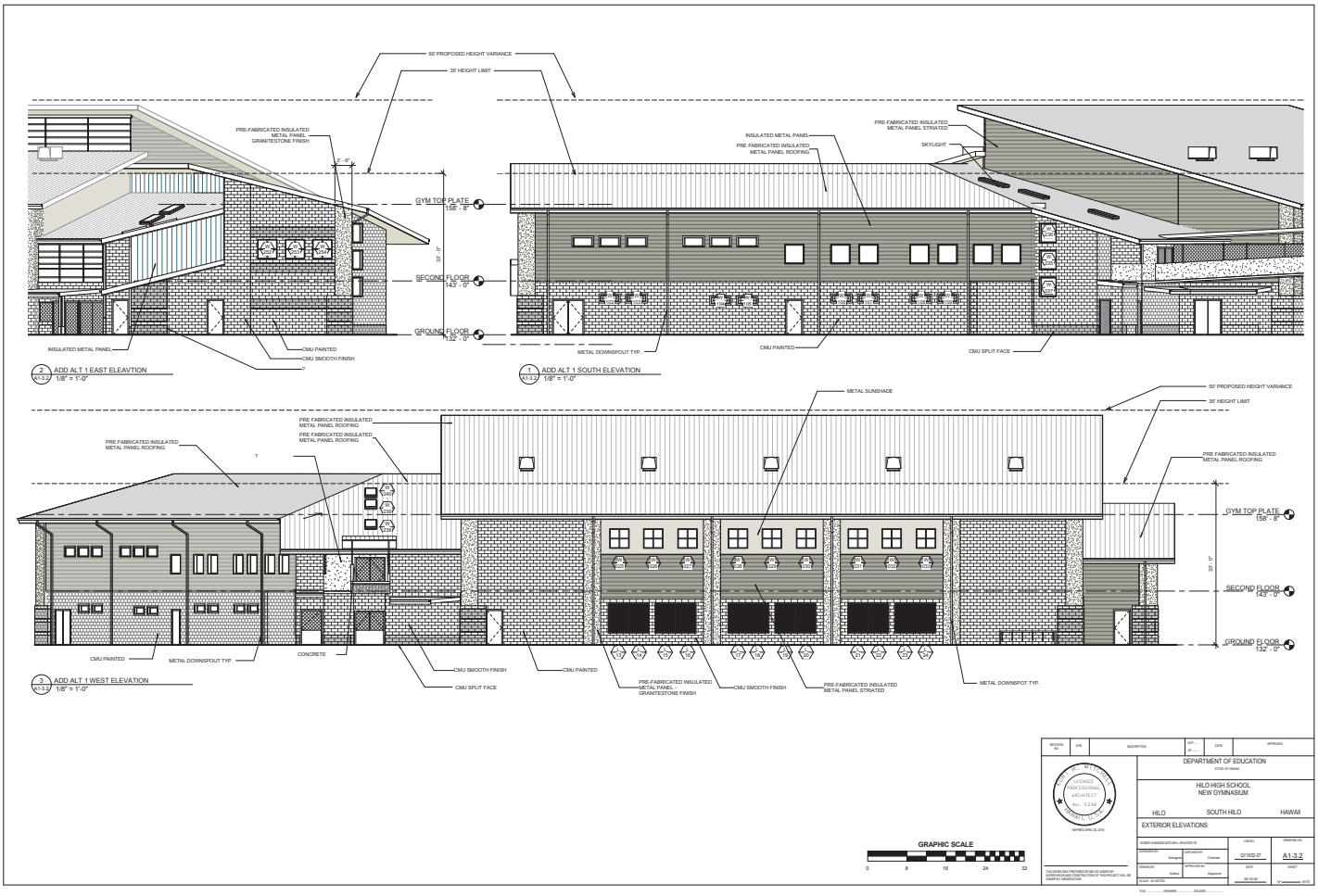
January 2010



Source: Kober/Hanssen/Mitchell Architects Inc., January 2010

FIGURE 6A
Gymnasium Building Elevation 1
Hilo High School New Gymnasium
Hilo, Hawai‘i

No Scale
Reduced Size Drawing



Source: Kober/Hanssen/Mitchell Architects Inc., July 2009

FIGURE 6B
Gymnasium Building Elevation 2
Hilo High School New Gymnasium
Hilo, Hawai‘i

No Scale
Reduced Size Drawing

Section 3
Alternatives

3.1 Alternatives to the Proposed Action

Alternatives to the proposed project that were considered include: (1) the No Action Alternative; (2) the Delayed Action Alternative; and (3) the Preferred Alternative. A description and assessment of each of these alternatives is provided below.

3.2 No Action Alternative

Under the No Action Alternative, the existing project site containing the cottages adjacent to the District Annex Building C and location of the existing gymnasium would remain unchanged. Both facilities would continue to operate and be housed within the existing structures. Although the No Action Alternative would preclude the potential for environmental impacts given no new construction, it would result in the use of a gymnasium that cannot be fully utilized for the hosting of school related sporting events due to its insufficient size.

The No Action Alternative would also fail to accomplish the stated purpose for the proposed project which is to provide the Hilo High School with a new gymnasium to address the requirements of the DOE EDSPECS and the revised FADS.

Because the No Action Alternative does not address the need to provide a new facility and does not address the requirements of the DOE, it is rejected from further consideration.

3.3 Delayed Action Alternative

Under this alternative, the existing gymnasium functions will continue to be provided for an extended period until such time that the proposed project is constructed. The existing gymnasium during this period of delay will continue to be in noncompliance with the standards of the DOE EDSPECS and the revised FADS.

Construction expenditures for the proposed project would be averted in the short-term but would eventually be required at a future date when the project is undertaken. Project costs at this future period in time are expected to be higher due to inflation and price escalation of labor and

materials. The potential for environmental impacts associated with delay of the project are expected to be similar to the preferred alternative and would involve no significant adverse impacts. However, like the No Action Alternative, further delay would fail to address the needs of the DOE and Hilo High School. For these reasons, the Delayed Alternative is also rejected from further consideration.

3.4 Preferred Alternative

The Preferred Alternative is to proceed with the proposed project to construct a new gymnasium and relocate the district administrative office functions of the cottages. This alternative is the only alternative that meets the purpose of upgrading the facility to meet current the requirements of the DOE and Hilo High School, and DOE EDSPECS and FADS.

Section 4
Description of the Affected Environment, Impacts and Mitigation

4.1 Physical Environment

4.1.1 Climate

The Hilo region has a warm semitropical climate and experiences abundant rainfall and relatively light tradewinds. Tradewind speeds remain relatively constant throughout the year with an average annual wind speed of 7.2 miles per hour. Monthly average temperatures range from 76.3° Fahrenheit (F) in the summer months, to 71.7° F during the winter. The total annual rainfall is approximately 129 inches, with average monthly rainfall ranging from 6.2 inches to 15.3 inches. (http://www.climate-zone.com/climate/united-states/hawaii/hilo/).

Potential Impacts and Mitigation Measures

The proposed project will be limited in scope to activities necessary for the construction of a new gymnasium at the Hilo High School. No effect on the existing climate is anticipated or expected.

4.1.2 Topography and Soils

Hilo is located on the eastern side of the Island of Hawai‘i and is approximately 216 miles southeast of Honolulu. The area's topography is mostly sloping, from the tops of the volcanoes Mauna Kea and Mauna Loa to the Pacific Ocean. The topography of the project site is relatively flat based on the existing development of the Hilo High School campus that includes the DOE District Annex Building C and cottages, and the site of the proposed new gymnasium. Elevations range of the project site range from between 128 and 130 feet above Mean Sea Level (msl). See **Figure 1,** Project Location.

Soils information at the project site was obtained from the Soil Survey of Island of Hawaii, State of Hawai‘i, as prepared by the U.S. Department of Agriculture, 1972. According to the Soil Survey, the soil *associations* at the project site are primarily classified as the Hilo series with

rough broken land comprising a much smaller portion of the northwest boundary of the project site (See **Figure 7**, Soils Map).

The Hilo series consists of well drained silty clay loams. These soils formed in a series of volcanic ash layers that give a banded appearance and are gently sloping to steep soils on uplands at elevations ranging from near sea level to 800 feet. The soils *type* found at the project site consists of Hilo silty clay loam, 0 to 10 percent slopes (HoC). This soil type is found low on the windward side of Mauna Kea and is dissected by deep, narrow gulches. In a representative profile the surface layer is dark brown silty clay loam about 12 inches thick. The subsoil is about 48 inches thick and consists of dark-brown, dark reddish brown, and very dark grayish brown silty clay loam. The surface layer is very strongly acid and the subsoil is strongly acid to medium acid. This soil dehydrates irreversibly into fine gravel sized aggregates.

Rough broken land (RB) is a miscellaneous land type that consists of very steep, precipitous land broken by many intermittent drainage channels. It occurs primarily in gulches, and the slope is dominantly 35 to 70 percent. The soil material ranges from very shallow to deep. Stones and rock outcrops are common in some areas. Elevation ranges from near sea level to 3,000 feet.

Potential Impacts and Mitigation Measures

The proposed project is expected to have no significant impact on the topography and soil conditions of the project site. The topography of the project area is relatively flat and soil disturbance will be limited to construction associated grading, preparation of the site for establishment of the building foundation, and grassing and landscaping of the areas immediately surrounding the project site. Construction plans and project activities will be subject to review and approval by the DOE and County of Hawai‘i Departments of Public Works and Planning. This will include the preparation of an Erosion Control Plan (ECP), as required. Erosion controls will be in accordance with the State and County of Hawai‘i requirements.

Protection from construction storm water runoff will be addressed through the use of a Best Management Practices (BMPs) Plan to govern all work to ensure proper treatment

of storm water runoff to waters of the State. This will include the use of vegetative, structural, and management practices, as required, to prevent untreated construction storm water runoff from entering state waters. BMP measures typically applied to a project site will include the following:

Before Construction

Erosion and sediment control measures will be in place and functional before earthwork may begin, and will be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.

During Construction

1. Clearing shall be held to the minimum necessary for grading, equipment operation, and site work.
2. Construction shall be sequenced to minimize the exposure time of cleared surface areas. Areas of one phase shall be stabilized before another phase can be initiated. Stabilization shall be accomplished by protecting areas of disturbed soils from rainfall and runoff by use of structural controls such as berms or sediment basins, or vegetative controls such as grass seeding or hydromulching.
3. Temporary soil stabilization with appropriate vegetation shall be applied on areas that remain unfinished. Permanent soil stabilization using vegetative controls shall be applied as soon as practicable after final grading.
4. All control measures shall be checked and repaired as necessary.
5 Maintenance and fueling of construction equipment and vehicles shall be performed only in designated areas. Sorbent and cleanup materials shall be placed in a conspicuous location to facilitate cleanup in the event of inadvertent leaks or spills. Refueling and maintenance of vehicles and equipment shall not be permitted outside of designated refueling areas.
6. All liquid materials including petroleum, oils, and lubricants (POLs), solvents, and cleaners, shall be stored in sealable containers. No open containers for the storage of such materials will be permitted.

After Construction

Following construction, all equipment no longer necessary to the site will be removed. Construction debris and refuse will be disposed of at an approved facility that accepts construction and demolition debris waste by the contractor.

The preparation of the construction stormwater BMPs plan will be prepared by the DOE or its designed contractor and filed with the DOH prior to the start of construction in accordance with DOH regulations governing the protection of state waters in Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control, Hawai'i Administrative Rules (HAR).

No further mitigation measures beyond the use of erosion control measures and the BMPs Plan are anticipated to be required to address erosion and storm water runoff.

4.1.3 Surface Water

Surface water bodies at the project site include a constructed ditch that was identified as a possible historic site by Cultural Surveys Hawai'i (see Section 4.1.6, Archaeological/Historic Resources). The ditch is located off of the north side of Waiānuenue Avenue. Water is fed to the ditch from a culvert running under the Waiānuenue Avenue Bridge. Water traveling through the ditch feeds into the Wailuku River further northeast of the project site. Approximately 900 feet northeast of the project site is the Wailuku River. **See Figure 1,** Project Location.

Potential Impacts and Mitigation Measures

Given the limited scope and scale of the project the potential for adverse impacts to surface water are not anticipated. The only potential source of impact is expected to be in the form of storm water runoff during periods of inclement weather that flow from the existing District Annex Building C area toward the drainage ditch. In order to address this potential mitigative measures that include the use of a County approved ECP and construction stormwater BMPs plan, will be employed to control against soil, sediment and construction related erosion (See also Section 4.1.2, above, providing further detail).

4.1.4 Flora/Fauna Resources

The project site is within an existing public high school campus that has been in active use since the early 1910s. No threatened or endangered flora or fauna are known to inhabit the site.

Several species of introduced avifauna are expected to be present at the project site and the surrounding region. These species include, but are not limited to the following:

Table 1
Avifauna Expected Present at Project Site

Common Name	Scientific Latin
Common Indian Mynah	*Acridotheres tristis*
House Sparrow	*Passer domesticus*
Spotted or Lace-necked Dove	*Streptopelia chinensis*
Zebra Dove	*Geopelia striata*
Northern Cardinal	*Cardinalis cardinalis*
Red-crested Cardinal	*Paroaria coronata*
Northern Mockingbird	*Mimus polyglottos*
Java Sparrow or Ricebird	*Padda oryzivora*
Meijiro or Japanese White-Eye	*Zosterope Japonicus Japonicus*

Seasonal visits by migratory avifauna to the site may include the Pacific Golden-Plover (*Pluvalis fulva*). Plover are the most abundant migrant in Hawai‘i and much has been learned of their behavior as a consequence of intensive research over the past 20 years (Bruner 2001 and Johnson et al. 1981, 1989 and 2001). The Pacific Golden Plover is not considered a rare, threatened or endangered species.

Overflights of the Pueo (*Asio flammeus sandwichensis*), a subspecies of the short-eared owl (*Asio flammeus*) may also occur in the region as a function of foraging activities. This species is not considered endangered on the Island of Hawai‘i, but is considered endangered on O‘ahu.

It is possible that the 'Ōpe'ape'a or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) and I’o or Hawaiian Hawk (*Buteo* solitarius) may transit or be present in the area[2]. The Hawaiian Hoary

[2] Anecdotal information from area residents, see letter and response to Barbara Anderson, January 7, 2010.

Bat is federally and state listed as endangered and state recognized as indigenous and endemic. The Hawaiian Hawk is federally and state listed as endangered and state recognized as an endemic species. The Department of Land and Natural Resources, and the U. S. Fish and Wildlife Service, were provided mandatory copies of the Draft EA for this project. The DOE will work with these agencies, as required, and comply and coordinate with the recommendations that these agencies may provide to ensure against adverse environmental effects. No response to date from these agencies has identified these species for further mitigation measures.

Other mammal species present at the project site are likely to include domestic cats, dogs, rats, and mice. Potential presence of these species are monitored by DOE and controlled to ensure against adverse effect to the operation of the school.

Plants at the project site are limited to common native and introduced landscape plants and shade trees. Grassing and future landscaping with native or introduced plant species will be undertaken with the establishment of the new gymnasium site.

Potential Impacts and Mitigation Measures

Given the limited scope and scale of the project there is little to no potential for adverse impacts to flora and faunal species at the project site. This is due to the extensive alteration of the landforms within and immediately surrounding the project site, and the regular presence of teachers, students, and other personnel at the high school campus. No adverse impacts are anticipated and no further mitigation measures are proposed.

As noted above for the Hawaiian Hoary Bat and Hawaiian Hawk, the DOE will work with the agencies Department of Land and Natural Resources and the U. S. Fish and Wildlife Service to comply and coordinate with the recommendations these agencies my provide to ensure against adverse environmental effects. No other mitigation measures are anticipated to be required.

4.1.5 Scenic and Visual Resources

The project site is located in the area of the existing cottages located next to the DOE District Annex Building C. The demolition of the cottages will be replaced with a new gym facility that will alter the views of the site. However, within the visual context of the school property with

various buildings and structures that support the operations of the Hilo High School and DOE, this alteration of the view plane should not be considered as a negative impact. In this regard the proposed project is expected to be consistent with the surrounding use of the land to meet an educational purpose and function for the Hilo community.

Potential Impacts and Mitigation Measures

Significant ocean views near the project location are not readily available based on the upgradient location of the Hilo High School and the surrounding school structures and trees.

The design of the proposed gymnasium will be undertaken by a qualified architect licensed in the State of Hawai‘i. As required, all building and structural requirements, including selection of the exterior painting scheme will be developed in accordance with the DOE EDSPECS procedure for the design of the facility to ensure aesthetic appropriateness. The potential for adverse effects to viewplanes are not anticipated and no further mitigation measures are anticipated or proposed.

4.1.6 Historic/Archaeological Resources

An archaeological literature review and field inspection of the proposed project site was completed by Cultural Surveys Hawai‘i, Inc. (CSH) in May 2009. The results of the study are provided in Appendix A, Archaeological Field Inspection and Literature Review Report for the DOE Hilo High School Gymnasium Project, May 2009.

The following is a summary of the CSH report (CSH, 2009). See Appendix A for further detail.

4.1.6.1 Archaeological Investigation Scope of Work

The CSH study included the following tasks:

1. Historical research including the study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near the property.

2. Limited field inspection of the project area to identify any surface archaeological features and/or historic buildings and structures and to investigate and assess the potential for impact to such sites. The assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.

3. Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further cultural resource management work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

4.1.6.2 Study Methodology

The methods employed by CSH during the course of the study included (CSH, 2009):

Document Review

Numerous published and unpublished accounts, surveys, reports, maps and photographs found in public and private collections pertaining to Hilo High School, Piʻihonua Ahupuaʻa and the general South Hilo District were investigated. Historical documents, maps and existing archaeological information pertaining to the sites in the vicinity of this project were researched at the State Historic Preservation Division library, Cultural Surveys Hawaiʻi Library, Lyman Memorial Museum Archives, the University of Hawaiʻi at Mānoa's Hamilton Library, and the Hilo High School Library. Two websites were used for research, including "Ulukau: The Hawaiian Electronic Library" (<www.uluaku.org>) and the University of Michigan's "The United States and its Territories" online library (http://quod.lib.umich.edu/p/philamer/). In addition, Māhele records were examined from the Waihona ʻAina database (<www.waihona.com>).

The research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Field Methods

The fieldwork component of the study was conducted on February 25, 2009 and March 2, 2009 by two CSH archaeologists under the general supervision of Hallett H. Hammatt Ph. D. (principal investigator). In general, the purpose of the field inspection was to develop data on the nature, density, and distribution of archaeological sites within the project area, and also to develop information on the degree of difficulty that vegetation and terrain create for future archaeological studies. The field inspection consisted of a walk-through reconnaissance of the project area. Potential archaeological sites or site areas were documented with brief written descriptions, maps, and photographs.

The descriptions of the buildings in the CSH report are not intended as, and should not be construed as, an architectural inventory survey. The purpose in presenting a brief description of certain architectural properties is simply to facilitate evaluation of the need for any further architectural work.

Piʻihonua literally means "land incline," (Pukui et al. 1974:184). The boundaries of Piʻihonua Ahupuaʻa are Hilo Bay on the *makai* side, Punahoa Ahupuaʻa on the south, and Puʻuʻeo Ahupuaʻa on the north.

In researching mythological and historical accounts, it is very useful to know the significant place names associated with the area of study. Lloyd J. Soehren (2004) has compiled place names from documents and maps for the island of Hawaiʻi and posted them on the website www.ulukau.org. This site was used as a source for place names associated with Piʻihonua Ahupuaʻa. This search yielded nearly 90 place names. A majority of these names were associated with streams, pools, waterfalls, hills, and *kīpuka* (clear place or oasis in a lava flow), while others were described as a "place," boundary point" or "point." Due to the overwhelming number of place names, only those that have the most significance historically or within Hawaiian folklore have been documented.

4.1.6.3 Mythological and Legendary Accounts

Piʻihonua

The Legend of Kana and the Rescue of Hina

The demi-god Kana is associated with the place name "Piʻihonua." "The Legend of Kana"

describes Kana's upbringing in Piʻihonua and the rescue of his kidnapped mother Hina. Martha Beckwith summarized Fornander's version of this legend in her book *Hawaiian Mythology* (CSH, 2009).

The Wailuku River

The Wailuku River is the most substantial waterway within Piʻihonua Ahupuaʻa. This perennial stream is an integral part of the Hilo Watershed system. In times of heavy rain this river becomes a raging, destructive force, hence its name: Wailuku literally means "water of destruction," (Pukui et al. 1974:225). This river is the basis of the most well-known mythologies associated with Piʻihonua Ahupuaʻa (CSH, 2009).

The Battle of the Wailuku River

This legend recounts the battle between the demi-god Maui and the *moʻo* (lizard) Kuna. Some of the most widely recognized features along the Wailuku River are said to have been created during this battle (CSH, 2009).

Hiʻiakaikapoleopele and the Wailuku Bridge (from "How Hawaiʻi was Made Safe Again")
In the legend of Hiʻiakaikapoleopele, favorite sister of the volcano goddess Pele, Hiʻiaka and her companions traveled around Hawaiʻi Island, along coastal and inland trails. After saving the chiefess Punahoa at Hilo Bay, Hiʻaka and her companions stopped to ask an old couple if they were on the right trail to Hilo (CSH, 2009):

> "Yes, follow that trail," the old people answered. "Soon you will come to the Wailuku River. Two logs make a bridge over the river. But do not cross until you have made offering to the gods who guard the bridge."
>
> "Gods?" asked Hiʻiaka.
>
> "Yes, two powerful gods live there in a cave. The logs belong to them. When we want to cross we lay food on the logs—vegetable food or fish. If the gods are pleased they hold the logs firm and we cross safely."
>
> "We have no food," Hiʻiaka said. "We shall make no offering. What then?"
>
> "Then do not try to cross, for the gods will turn these logs beneath your feet and you will fall into the raging river. You will be dashed to death upon the rocks."
>
> Hiʻiaka said no more and the three walked on. Soon they came to the river and the bridge of logs.
>
> "Here is Hiʻiaka!" called a voice from a great cave. "She is one of our family—a goddess."
>
> "She may be one of our family," said another voice, "but I am hungry. Let her pay to cross. Bring an offering of food, O Hiʻiaka. Make offering to the gods for a safe crossing."
>
> "Gods!" shouted Hiʻiaka angrily. "You are no gods! We have no food for you!"

> By this time people had gathered on each side of the river. "They are indeed gods!" these people cried. "We never try to cross without making an offering."
>
> "I'll show you they are no gods!" shouted Hi'iaka as she whirled her *pā'ū* [woman's skirt]. The people saw two frightened figures rushing away to hide in a cave far up the river. Hi'iaka followed them and the two dashed out to find another hiding place. The *pā'ū* of the goddess flashed and the figures were turned to stone.
>
> Hi'iaka returned to the people. "The crossing is safe," she said.
>
> Thankfully people followed the three companions into the village. They set food before them and hung sweet smelling *lei* about their necks. "We have long feared those evil ones," they said. "Now you have given us safe crossing," (Pukui and Curtis 1996:39-40).

4.1.6.4 Traditional and Historical Accounts

Pre-contact and Early Post-contact Settlement Patterns for Hilo

The U.S. Army Engineer Division contracted for an archaeological and historical literature search as part of the Lava Flow Control Study for Hilo, Hawai'i (McEldowney 1979). The search included *ahupua'a* in the Hilo and Puna districts. Relevant to the present project were five geographic and ecological zone classifications for early historic-period land use, which are presented in the report (McEldowney 1979:64)(CSH, 2009):

I: Coastal Settlement, 20-50 feet in elevation, 0-1.5 miles inland
II: Upland Agricultural, 50-1,500 feet in elevation 1.5-4.5 miles inland
III: Lower Forest, 1,500-2,500 feet in elevation
IV: Rainforest, 2,599-5,500 feet in elevation
V: Subalpine/Montane, Over 5,500 feet in elevation

The coastal settlement zone contained both temporary and permanent habitations, with associated garden plots. The gardens were bordered by banana plants, sugarcane and *wauke.* Dry land taro, sweet potatoes and other vegetables were grown within the gardens. Groves of breadfruit and coconuts were interspersed between the houses and the gardens. Wetland taro was grown along the streams, along the coastal fishponds, and in the swampy land near the coast. The upland agricultural zone contained scattered agricultural features and some temporary residences. The main cultivated plants were dry land taro and bananas, with groves of *kukui*, *pandanus*, and mountain apples. The current project area is entirely within the lower bounds of the upland agricultural zone. (CSH, 2009).

The lower forest was used to gather resources such as wood, bird feathers, fiber, and some food crops. The upland rainforest was used mainly by bird catchers to collect feathers and to gather

other resources not available at the lower elevations. In the post-contact era, the forest areas were also used for the collection of resources that could be sold as trade items to foreigners, such as sandalwood and *pulu. Pulu* is the soft substance at the base of *hāpu'u* ferns, which was shipped to California to be used for furniture and mattress stuffing (Baxley 1865:596). In the sub-alpine zone, trails from one district to another are the major features. (CSH, 2009).

Pre-Contact and Early Post-Contact History

In the pre-contact period, the area around Hilo Bay was densely inhabited. Ross Cordy (2000:45) describes the settlement pattern of this area:

> Here [Hilo Bay] houses and heiau were concentrated in clusters near the sandy shore amidst groves of breadfruit, bananas and coconuts, and houses were also scattered inland for 3-6 miles. Dryland fields of kalo [taro] and sweet potatoes were around these houses and extended slightly farther inland. Kipikipi wet kalo fields and fishponds were along the Waimoa and Wailoa streams near the coastal houses.

Handy (1940:125) describes the *kanu kipi (*Hilo name for mound taro patches – Pukui and Elbert 1971:143) method as planting taro on mounds (*kipi*) built on the bottom of the marshy lands along Hilo Bay. Handy also notes that dry taro was planted along the fern-forest zone in the uplands above the bay. (CSH, 2009).

The districts of Hilo and Hāmākua were once ruled by the descendants of paramount chief 'Umi, who ruled from about A.D. 1600-1620 (Cordy 2000:464). He was married to the daughter of Kuluku'ua, chief of Hilo. (CSH, 2009).

Many notable chiefs lived near Hilo Bay, including the chief Keawe-hano, who lived in Punahoa when Kahekili ruled Maui and Kahahana (1773-1785) ruled O'ahu (Cordy 2002:19). (CSH, 2009).

Eventually, the island of Hawai'i came into the control of Kamehameha I. Once in full control of Hawai'i Island, Kamehameha planned to invade the neighboring islands. Kelly et al. (1981:8) believes that ". . . An important part of his preparation was the building of war canoes, and for this Hilo seems to have become his headquarters for considerable periods of time." (CSH, 2009).

After Kamehameha's death, the lands of Hilo, which includes Pi'ihonua, Punahoa, and Waiākea, were given to his son Liholiho (Kamehameha II), heir to the kingdom. (CSH, 2009).

Missionary Accounts of Hilo

In April 1822, members of the London Missionary Society came to Hawai‘i via Tahiti, among them a Tahitian convert named Auna. He was the first missionary to preach in Hilo (Kelly et al. 1981:26). The delegates from the society were hosted by Queen Ka‘ahumanu and her husband Kaumuali‘i, who were making a tour of the islands. The delegates landed in Hilo Bay on May 28, 1822. (CSH, 2009).

The Reverend Ellis, with three American missionaries, returned to Hilo in July and August of 1823 during a walking/canoe tour of the island. Ellis' party was in Hilo for five days in August, staying in a house at Waiākea provided for them by the *konohiki,* Ma‘alo. They preached at Waiākea, Ponahawai, and Pu‘u‘eo to more or less responsive audiences (Ellis 1963: 213-229). (CSH, 2009).

The pioneer company of missionaries, sponsored by the American Board of Commissioners for Foreign Missions in New England, arrived in Hawai‘i in 1820 aboard the Brig *Thaddeus*. With the consent of Liholiho (Kamehameha II) and his chiefs, a missionary couple from the first company of missionaries, Samuel and Nancy Ruggles, and Joseph and Martha Goodrich, a couple from the second company of missionaries, which arrived in the island in 1823, were allowed to set up a new mission in Hilo on the island of Hawai‘i. (CSH, 2009).

The mission did not prosper at first and the natives seemed indifferent to the sermons of Ruggles and Goodrich. This changed in late 1824, when the high chiefess Kapi‘olani came to Hilo to help the missionaries. Mr. Goodrich met her party at the Kīlauea Volcano, where Kapi‘olani descended into the crater, defying the priest of Pele. She returned with Goodrich to Hilo and stayed for ten days. After that, the missionaries had greater success in converting the Hawaiians to Christianity (Kamakau 1992:379-385). In 1825, Ka‘ahumanu visited the mission, and gave the land of Punahoa 2 for the use of the mission (Kelly et al. 1981:36). The ownership of this land was confirmed in 1849 during the Māhele and listed as Land Commission Award 387. The missionaries used this land to raise goats and cultivate vegetables so that they could furnish their own food. Goodrich also experimented with making sugar and molasses from sugar cane at his own small mill (Goodrich 1829, in Kelly et al. 1981:36). (CSH, 2009).

Other visitors to the mission included Kamehameha III, who visited several times between 1828 and 1830, and Kuakini, governor of Hawai‘i, in 1829. Kuakini helped the missionaries build a church near the coast and helped plan for a saw mill at the forest edge. (Lyman 1970:59). (CSH, 2009).

The Reverend David Beldon Lyman and his wife Sarah Joiner Lyman were members of the Fifth Company of missionaries. They arrived in Hilo, Hawai‘i in 1832 and were stationed at Hilo until their deaths. They were joined in 1835 by Reverend Titus Coan, who converted hundreds of natives during “The Great Revival.” In the 1830s, the Reverend Lyman founded the Hilo Boarding School for Hawaiian Native Boys, which was built about half the way between the coast and the Hāla‘i Hills. (CSH, 2009).

Early Foreign Visitors to Hilo Bay

In 1824, the English ship H.M.S. *Blonde* traveled to Hawai‘i to return the bodies of Liholiho and Kamāmalu, the king and his wife, who had died on a visit to London. On a tour of the islands, the *Blonde* anchored in Hilo Bay, which was then renamed Byron Bay for the ship’s commander, Lord Byron. The ship’s company stayed at the village of Waiākea for about three weeks. (CSH, 2009).

Captain Charles Wilkes, of the U.S. Exploring Expedition, stopped at the Hawaiian Islands between December 9, 1840 and March 5, 1841. One of the goals of this scientific expedition was to ascend to the top of Mauna Loa to observe the volcano. (CSH, 2009).

Early Foreign Residents and Merchants, 1790-1880

In the late 1700s and early 1800s, ships involved in the trade between the fur outposts of the Northwest coast and the markets of China and the Far East stopped in the Hawaiian Islands to get food, fresh water, salt, and other supplies needed for the long voyage ahead. This limited exchange began to change when sandalwood was discovered on the forest slopes of the islands, in 1790 or earlier (Kuykendall 1938:85). Soon sandalwood became an important export item for the island, gathered by the people for the great chiefs to pay off their debts to foreign traders. Ellis saw one of these early sandalwood expeditions returning from the mountain above Hilo in 1823 under the *konohiki* (overseer for the chief) Ma‘alo. Presumably the sandalwood would have been transferred to a ship anchored off Hilo Bay at Waiākea. (CSH, 2009).

Supplying foreign ships with food and water continued when whaling ships began to visit the islands. The earliest foreign born merchants of Hilo town were established to cater to this trade. (CSH, 2009).

Samuel Hill traveled to Hawai‘i on the whaler *Josephine* in 1848 (Judd 1929:39), and stopped in Hilo to make an expedition to Kīlauea Volcano. On the way back, he noted the landscape on the lower slopes in back of the town. This would have been within the upland agricultural zone, possibly within or near the project area. (CSH, 2009).

By 1839, Governor Adams Kuakini established a sugar plantation and constructed a sugar mill on Ponahawai Hill (historic name for Hāla‘i Hill) (Lum 1988:26). Sugar cane was planted on the Puna side of Hāla‘i Hills, within Ponahawai and Punahoa Ahupua‘a, reaching as far down as the present location of Kīlauea Avenue (Kelly et al. 1981:49). Early sugar cane mills in the Hilo area were run by several early Chinese “sugar masters” who settled in Hilo and married Hawaiian women. Peggy Kai (1974:45-53) has identified at least seven Chinese men who resided in Hilo before 1852. The sugar plantation and mill were a fairly small endeavor, but by 1851, about 20,000 pounds of sugar was produced on the 55-acre plantation (Kai 1974:61). The plantation was watered from an ‘*auwai* (irrigation ditch) that ran through the Hilo Boarding School grounds (Kai 1974:43). (CSH, 2009).

Pitman left the islands in 1860 to return to his home in Boston (Merry 2000:156). He sold much of his property, including the Hilo stores and his agricultural land, to a Mr. Thomas Spencer, a former ship’s captain. (CSH, 2009).

The Māhele and Traditional Native Hawaiian Settlement in the mid 1800s

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, which introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. The common people (*maka‘āinana*) received their *kuleana* awards (individual land parcels) in 1850. It is through records for Land Commission Awards (LCAs) generated during the Māhele that the first specific documentation of life in Hawai‘i, as it had evolved up to the mid-nineteenth century come to light. Although many Hawaiians did not submit or follow through on claims for their lands, the distribution of LCAs can provide insight into patterns of residence and agriculture. Many of these patterns of residence and agriculture probably had

existed for centuries past. By examining the patterns of *kuleana* (commoner) LCA parcels in the vicinity of the project area, insight can be gained to the likely intensity and nature of Hawaiian activity in the area. (CSH, 2009).

No *kuleana* LCAs were awarded to commoners in the vicinity of the project area suggesting that indigenous Hawaiian land use within the project area may have been limited, though one Land Commission Application (#218) was submitted across the street from the project area, presently the grounds of the Roman Catholic Church. The project area under study lies over an area containing eight Land Grants, and there are several more adjacent to the project area. (CSH, 2009).

Unfortunately, the information provided by Land Grant records is often more limited than that provided by LCAs. The Land Grants that were issued within the bounds of the current project area are concentrated along the southern, or Waiānuenue Avenue, side of the project area. They are listed in Table 4-2, in order of how they lie within the project area (west to east). No other information was found (Waihona ʻAina 2000) regarding the lands grants. (CSH, 2009).

Table 2
Land Grant Records

LG #	Grantee	Notes
6767	Maria Dos Anjos Carvahlo	None
7196	Kahema Paona	Piʻihonua House Lots
7198	Mr. and Mrs. Julia Santos	Piʻihonua House Lots
7197	Kama Kamohalii	Piʻihonua House Lots
7375	Julia Luiz Da Souza	Piʻihonua House Lots
7519	Georgina Louiz Da Souza	None
7189	Lameka Ahulau	Piʻihonua House Lots
7188	Joe Moniz	Piʻihonua House Lots

Coffee Cultivation in Hilo

Early coffee plantations were at Kona and Hilo on the island of Hawaiʻi. Thrum (1876:46-47) comments on the successful growth by, ". . . the Rev. Mr. Goodrich [the missionary] planting the first slips in Hilo, which grew luxuriantly in Hilo. This planting was probably near Goodrich's house near Hilo town. It was soon decided, however, that coffee grew better at higher elevation.

Thrum (1876:48) reports that at Hilo in 1847, a "Dr. Maxwell and Mr. Miller, officers of the U.S.S. *Cyane*, leased of the government 100 acres of the best land for fifty years for the purpose of establishing a coffee plantation, and were to commend operations within six months, but of any after result we have no information." Another early coffee grower in Hilo was Mr. Pitman, who wrote a letter to the agricultural society in 1852 about the coffee blight of that year that was destroying the crop. (CSH, 2009).

Large-Scale Sugar Cultivation

In 1880, Claus Spreckels, known as the "Sugar King," entered into a partnership with William Irwin to form the Hilo Sugar Company. They bought a number of small parcels near Hilo, including lands in Punahoa and at the base of Mauna Kea. In 1884, they added the lands of Spencer's Plantation and the Wainaku Plantation to their own. At its greatest extent, the plantation was 4,800 acres in size; some of the land was leased to individual sugar cane growers living in the Hilo area (Dorrance and Morgan 2000:102-103). (CSH, 2009).

Sugar cane plantations belonging to other companies were also present in the Hilo area around the turn of the century. The Waiakea Sugar Company and Hawaii Mill Company are known to have had plantations in upland Hilo. The extensive sugar cane production in the Hilo area meant an influx of workers, and camps sprung up off of plantation roads. Some of these camps were essentially small villages, complete with schools and shops of their own. In addition, the government began to sell plots of land to private owners (Hawaiian Legislature 1917:384) These plots were classified as "Pi'ihonua house lots," and six of the eight Land Grants existing at the current project area were noted as being such. (CSH, 2009).

In 1910, C. Brewer & Co. became the agent for the Hilo Sugar Company. After World War II, the residential areas of Hilo began to further expand, and in 1965, C. Brewer & Company sold the sugar cane fields around Hilo, and merged their remaining agricultural lands with the Onomea Sugar Company to form the Mauna Kea Sugar Company. Production of sugar cane in the Hilo area ended in 1994, when the Hilo Coast Processing Company, a subsequent company of several merged plantations, shut down (Dorrance and Morgan 2000:104-105). (CSH, 2009).

Hilo Forest Reserve

The following information can be found on the Hawai‘i State Department of Forestry Website (CSH, 2009):

> The Forest Reserve System was created by the Territorial Government of Hawai‘i through Act 44 on April 25, 1903. With Hawaii's increase in population, expanding ranching industry, and extensive agricultural production of sugarcane and later pineapple, early territorial foresters recognized the need to protect mauka (upland) forests to provide the necessary water requirements for the lowland agriculture demands and surrounding communities.

Shortly after the inception of the Forest Reserve System, the Hilo Forest Reserve was created. The commercial success of coffee and sugar in the late 19th century in Hilo had some looking at the forest itself as a potential source of capital. It was quickly decided that a timber industry would do extensive damage to the Hilo watershed. (CSH, 2009).

4.1.6.5 Previous Archaeological Research

Archaeological Studies in the Vicinity of the Project Area

Archaeological studies in and above Hilo town have been widely scattered. The density of finds is low, as found in **Table 3** (See Table 3, Appendix A). Four of the 12 studies yielded no finds, six of the studies identified only one or two sites, and one study functioned to re-examine two sites identified previously (Wolforth 1999; Maly et al. 1996). All but two of the sites (50-10-35-15415, -18074) were determined to be historic, while Site 50-10-35-19431 contained both historic and prehistoric remains. (CSH, 2009).

In 1991 Susan T. Goodfellow conducted an inventory survey for the Noelani Gardens project (see **Figure 8,** Previous Archaeological Studies in Project Area). She identified one site during this project, Site 50-10-35-15415. “Site 15415 consists of two components: (a) several diffuse prehistoric hearths, and (b) historic refuse and recent structural remains…the boundaries of the site are the same as the project area boundaries. The prehistoric component is apparently restricted to the 40 ft beach access area immediately above and behind the pebble beaches (c. 9,600 square feet in area),” (Goodfellow 1991:25). No further work was recommended for this site (Goodfellow 1991:25).

Table 3

Archaeological Studies in the Vicinity of the Project Area

Source	Project	Findings (SIHP # 50-10-35-)*
Rosendahl 1988	Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS), Hilo Judiciary Sites [TMK:[3]2-2-002:001, 054, 055, 056, 062; 2-2-010:016; 2-2-033:011, 012, 013, 014, 019, 020; 2-3-015:001; 2-3-044:009]	No finds
Goodfellow 1991	Archaeologcial Inventory Survey of the Noelani Gardens Project, TMK [3] 2-6-002:001, 002	Diffuse prehistoric hearths and historic refuse (15415). This site is located along the coast, not in the upland zone
Jensen 1991	Archaeological Inventory Survey, Komohana Golf Course, Ponahawai and Punahoa 1-2, South Hilo District, Island of Hawai‘i, TMK [3] 2-3-044:009	Remnants of Hilo Boarding School Ditch (14947) and a “cane house” (14946)
Kennedy 1992	Arch. Inventory Final Report for TMK: 2-6-08:26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, and 39; and TMK:2-6-29:09, 10, 11, 12, 14, and15; Located at Pu‘u‘eo on the Island of Hawai‘i	Rock mound (18074) interpreted as a possible burial
Wickler and Ward 1992	Archaeological and Paleoenvironmental Investigations for Alenaio Stream Flood Control Project, TMK [3] 2-2-006, 007	No finds
Spear 1992	An Archaeological Inventory Survey of HCEOC Project, Pi‘ihonua TMK [3] 2-3-032:001 por.	Cattle wall (18443); retaining wall functioning as erosion control (18444)
Spear 1993a	An Arch. Inventory Survey of Hilo Health Care Center TMK: [3] 2-3-031:001 & [3] 2-3-32:001	No finds
Spear 1993b	An Arch. Inventory Survey of HCEOC (Option II) Parcel Pi‘ihonua, Hilo, TMK:[3] 2-3-32:4]	Portuguese oven remains (19036); historic dump (19037)
Maly, Rosendahl and Walker 1996	Limited Inventory Survey for the Proposed Housing Facility at Hawai‘i Community Correctional Facility, TMK [3] 2-3-023:005	Historic drainage ditches (20848 and 20849)
Walker and Rosendahl 1996	Assessment Study of Hilo Judiciary Complex Project, 7 locations TMK: [3] 2-2-015:033; 2-3-032:001; 2-6-015:001, 002; -016:002; 2-4-049: 018, 019; 2-4-001:012; 2-3-036:003; 2-4-057:001	C-shape (19431), U-shape (19432), complex (19433), complex (19434), sugar cane mill (21133). Above sites are located in TMKs not adjacent to the project area.
Wolforth 1999	Final: Data Recovery for the Housing Facility at the Hawai‘i Community Correctional Center: Investigation into the Network of Ditches in the Hāla‘i Region of Hilo, TMK [3] 2-3-023:005	Historic drainage ditch (20848) was determined to be part of the Hāla‘i Ditch Network, probably dating to the Early Historic period. Drainage ditch (20849) likely dates to the 1920s.
Clark and Rechtman 2004	Assess. Survey for TMK [3] 2-3- 036:019, Ponahawai Ahupua‘a, S. Hilo Dist., Isl. of Hawai‘i	No finds

The project area is located in the coastal settlement zone, which extends from 0-50 feet in elevation (McEldowny 1979), and the site was found directly adjacent to the beach. The current project area is located in the upland agricultural zone; therefore one would most likely expect to find different types of prehistoric archaeological remains, if any. (CSH, 2009).

In 1992 Joseph Kennedy conducted an inventory survey of a substantial section of Puʻuʻeo Ahupuaʻa. He identified one site, Site 50-10-35-18074. This site was described as being a rock mound measuring 2.7 m long, 1.8 m wide and 50 cm high. According to the report for this project, "The exact function of this structure is undetermined at this time, however CSH suspects that Site #18074 may be a grave," (Kennedy 1992:17). It was recommended that more precise determination about function be made prior to any disturbance, though none was planned in that area. No sites similar to this were found within the current project area. (CSH, 2009).

In 1996 Alan Walker and Paul H. Rosendahl conducted an assessment study at several different TMKs around Hilo. The report for this study described a total of five sites. These five sites are all historic in nature, including 47+ features relating to sugar cane cultivation and production (Sites 50-10-35-19431 through -19434) and the old Hilo Sugar Co. Mill (Site 50-10-35-21133) (Walker and Rosendahl 1996:20 and 22). Site 50-10-35-19431 is a c-shaped structure. While the architectural remains are historic, a subsurface prehistoric fire pit and volcanic glass artifact were discovered at the site, indicating "prehistoric occupation prior to early historic sugar cane cultivation," (Walker and Rosendahl 1996:22). The five sites described above are not adjacent to the current project, however, occurring in locations covered by the assessment study not within the bounds shown in **Figure 8**. (CSH, 2009).

Most pertinent to the current project are the three separate historic ditches which were discovered during past studies conducted nearby. Remnants of the Hilo Boarding School ditch (Site 50-10-35-14947) were identified during Peter J. Jensen's 1991 inventory survey (**Figure 8**). The history of this ditch is discussed in some detail in a 1982 report prepared by Marion Kelley and J. Stephen Athens regarding the Alenaio Stream. The ditch, which most likely dates to the early or middle 1800s, provided water to Hilo village (Kelley and Athens 1982). Closest to the current project area were studies conducted by Kepa Maly, Alan Walker and Paul Rosendahl (1996) and Thomas Wolforth (1999) at the Hawaiʻi Community Correction Facility, which is located less

than a quarter of a mile west of Hilo High School. Two ditches were identified and studied at this location. Site 50-10-20848 was determined to be part of the Hāla'i Ditch Network, and probably dates to the Early Historic Period, while Site 50-10-35-20849 is a drainage ditch likely dating to the 1920s (Wolforth 1999). The younger ditch (Site -20849) exhibits sections of faced stone lining. The large number of existing historic ditches present in this area of Hilo makes sense due to its location in the Hilo watershed and due to the extensive agricultural activity that took place there. (CSH, 2009).

Many of the features found during South Hilo archaeological surveys are features associated with sugar cane cultivation, ranching or historic habitation. Water control features such as ditches or flumes are present throughout the upland zone of South Hilo, utilized for all of the aforementioned activities. Throughout this area pre-contact and early post-contact (pre-1850) features were probably largely destroyed by the extensive modification of the land that took place during the sugar cane era, which extended from the early 1800s to the closing of the Hilo Coast Processing Company sugar cane fields in 1994. The subsequent development of homesteads and residential subdivisions has also contributed to modification of the land and probable destruction of early Hawaiian sites. (CSH, 2009).

4.1.6.6 Survey Findings

The field inspection of the project area confirmed the findings of the background research. The field inspection consisted of a pedestrian inspection of the approximately 24-acre Hilo High School project area. An area of dense vegetation located between the athletic track and the District Annex area was not fully investigated as access was restricted. (CSH, 2009).

The field inspection found that the project area consists of Hilo High School campus buildings, a track/athletic field and swimming pool, an outdoor eating area, parking lots and driveways, manicured lawns, agricultural areas, and the District Annex office complex cottages and Building C. A total of five known historic properties were identified within the project area (**Table 4**).

Table 4
Six Identified Historic Properties at Hilo High School

Site Number	Site Type	Function	Construction Date	Notes
CSH-1	Building	Gymnasium	1931	Still in use today, but not sufficient for competitive athletics
CSH-2	Building	Auditorium	1927	Donated by the Alumni Association
CSH-3	Building	Classroom	1922	First Hilo High School building constructed at present campus location. Now called Classroom Building A, but was historically referred to as the "Makai" building
CSH-4	Track	Athletic Facility	1927	Located across Waiānuenue Avenue from Catholic Church
CSH-5	Constructed Ditch and Alignment	Water Control, unknown	Unknown	Bisects project area. More research needed
CSH-6	Building	Classrooms/ Offices	1929	Located in present District Annex complex; originally housed the Old Riverside English Standard school

These historic properties include various buildings which were constructed more than 50 years ago. A woodshop which was reportedly built in 1937 was not identified; none of the present school staff could say where that building had been. It is likely that this building has been replaced with more modern facilities. The "Mauka" building, constructed between 1935 and 1939, burned down in 1977, and the original cafeteria was replaced with modern buildings. A constructed ditch and an alignment were encountered between the school campus and the annex (see **Figures 9** through **13**). These features may be historic resources. Descriptions of each of the six identified historic properties are presented below. The descriptions of the buildings are not intended as, and should not be construed as, an architectural inventory survey. The purpose of presenting a brief description is to facilitate evaluation of the need for any further architectural work. (CSH, 2009).

4.1.6.7 Site Descriptions

CSH-1, 1931 Gymnasium
CSH-1 is the present Hilo High School Gymnasium (**Figures 14 & 15**). The Gymnasium is located near the back, or northern side, of the school campus. According to school staff and literature produced by the school, this building was constructed in 1931. The building

is rectangular with a smaller rectangular annex along its northern side. The main entry for the gym is along its southern side, though it can be accessed adjacent to the annex as well. (CSH, 2009).

CSH-2, 1927 Auditorium
CSH-2 is the school Auditorium (**Figures 16 & 17**). Funds for this T-shaped building were provided by the school's Alumni Association, and it was built in 1927. It was designed by Frank Arakawa, a former Hilo High School Graduate. The PALC (Performing Arts Learning Center) currently uses the auditorium for classes and plays. The building is located north of the administration offices, toward the center of campus. (CSH, 2009).

CSH-3, 1922 Classroom Building
CSH-3 is presently referred to as Classroom Building A (**Figures 18 & 19**). This building was historically called the "Makai Building." Built in 1922, this was the first building to be constructed on the present school campus after the school moved up Waiānuenue Avenue from the present District Annex location. Constructed just below a long terrace, this I-shaped building appears today much as it did in 1922, although now covered walkways connect the building to the Auditorium, Classroom Building BB and the covered eating areas. (CSH, 2009).

CSH-4, Athletic Track
CSH-4 consists of the Hilo High School track (**Figure 20**). The track was constructed in 1927. It is located along Waiānuenue Avenue, across from the Catholic Church and the Hilo Intermediate School athletic fields. The swimming pool complex is located just north of the track. The track and its interior athletic field are used for athletic practice, physical education, and community events only; it does not meet standards for competitive sporting events. It is unknown at this time how many modifications may have been made to the original track facility. (CSH, 2009).

CSH-5, Constructed Ditch and Alignment
CSH-5 is a constructed ditch and an alignment located between the High School's athletic field and the District Annex complex **(Figures 9** through **13)**. The ditch is bordered on the west by a natural embankment. The view of the athletic field from atop the embankment is obstructed by an area of dense vegetation, which is predominately bamboo and royal palms. The lower, eastern embankment has been constructed. The ditch bisects the project area at a roughly northeastern angle, alongside the western driveway into the complex. (CSH, 2009).

The ditch begins directly off of the north side of Waiānuenue Avenue. Water feeds into the ditch from an arch-roofed culvert running under the road. After heading through the project area, water traveling through the ditch drains out into the Waikapu River, a tributary of the Wailuku River. Across Waiānuenue Avenue an open rock-walled channel is visible on the Catholic Church grounds. The channel continues south for a few meters and then turns west, heading *mauka* towards the Hilo Intermediate School. The channel heads back underground at Laimana Street. The source of the water is unknown at this time. (CSH, 2009).

Further research of both the constructed ditch and the alignment would be needed to better determine age. While the source of the water running through the ditch is unknown, there are many springs upslope over which houses and other buildings were constructed. This area of Hilo is known to have had a large ditch system, including two ditches found on the Hawai‘i Community Correctional Center grounds just west, or *mauka*, of the project area. The younger of the two ditches, Site 50-10-35-20849, was faced with stone like a section of CSH-5 is. In the case of the alignment, further research is needed to better determine function. (CSH, 2009).

CSH-6, 1929 District Annex Building C
CSH-6 is Building C of the District Annex complex. This building is the easternmost building in the project area **(Figure 21)**. The SHPD has already expressed that construction activities related to the new gymnasium should remain as far from this building as possible. According to Cheryl Sumida of the Complex Area DOE Office, Building C was constructed in 1929 for the Old Riverside School, which was an English Standard school; Hilo High School had already moved to the present campus. In 1955, two rooms were added to the original E-shaped structure. In 1956, the porte cochère, or covered drive-through/passenger drop-off, was constructed (visible along the right side of **Figure 21**. A garage driveway was also added in 1956. Through 1956 the building is noted as county property. In 1959, the building was turned into District offices. Despite more recent renovations, the building still retains most of its original architecture. (CSH, 2009).

4.1.6.8 Summary and Recommendations

The proposed project involves the construction of a new gymnasium on the District Annex grounds (CSH-6, 1929 District Annex Building C). Hilo High School is on the Hawai‘i Register of Historic Places (SIHP 50-10-35-7522). During the pedestrian inspection five potential historic properties were identified. Building C was built in 1929 and three of the other properties are historic campus buildings dating to the 1920s and 30s. Another historic property is the school’s athletic track, which was built in 1927. For architectural historic properties more than 50 years old, consultation with the SHPD architecture branch is recommended to address historic and architectural significance if construction of the new gymnasium will in any way affect these historic structures. (CSH, 2009).

A sixth probable historic property is a constructed drainage ditch which bisects the school parcel extending from the north side of Waiānuenue Avenue running roughly north to Waikapū Stream. Of the history of these two features little is known at this time. The siting of the new gymnasium specifically takes into account the need to protect the ditch and alignment features (CSH-5). The

construction documents will follow CSH's recommendation to establish and maintain interim protective measures (such as erection of a protective buffer with orange "event fencing") during the duration of construction to protect these features from adverse, inadvertent impact (KHMA/DOE, 2009 and CSH, 2009).

CSH concludes that the historic properties (CSH 1-6) that are briefly documented in their report with written descriptions, and photographs, may be considered as contributing components of the Hilo High School Hawai'i Register of Historic Places site (SIHP # 50-10-35-7522). (CSH, 2009).

In prior consultation with the State Historic Preservation Division regarding appropriate mitigation for construction activities (waste water system improvements) at five other Hilo District schools the SHPD commented:

> We agree that although based on the scope of the [waste water system improvements] project for the five Hilo District schools, there is little likelihood of subsurface deposits in the area in which improvements are to occur. However, given the age of the schools and the potential for historic subsurface remains to be present, monitoring is warranted. Any deposits will likely represent the historic use of the area as a school … Ground altering activities associated with the proposed undertaking may have an effect on remnants of the historic school activities which may be present. We believe that any adverse effect may be mitigated through precautionary monitoring. (SHPD Chapter 6E-42 Historic Preservation Review letter dated October 28, 2006; Log No 2006.3542, Doc No. 0610MK18 – see CSH Report Appendix C).

In view of this prior SHPD determination for Hilo District Schools and given that Hilo High School is a State Register of Historic Places property, CSH recommends consultation with the SHPD regarding the appropriateness of an archaeological monitoring program (to begin with an archaeological monitoring plan for the review and approval of the SHPD prior to construction). (CSH, 2009).

Potential Impacts and Mitigation Measures

The potential for adverse effects to the Hilo High School (SIHP # 50-10-35-7522) associated with the proposed project is expected to be limited to the office cottages located next to "CSH-6, 1929 District Annex Building C." The potential for adverse effects to Building C and the site "CSH-5, Constructed Ditch and Alignment" will be addressed by implementation of the protective measures identified in the CSH Report.

The office cottages will require demolition to allow for the construction of the new gymnasium by the DOE. In order to address the necessary removal of the cottages, SHPD will be consulted regarding documentary requirements that may include (1) the process used to select the site for the new gymnasium; (2) photodocumentation to record the architectural features of the existing structures; and (3) other requirements of the SHPD.

The requirements of HRS, Chapter 6E, involving cultural remains will be addressed through coordination by the construction contractor with the SHPD to prepare an archaeological monitoring plan to ensure that appropriate measures are in place in the event of an inadvertent find during construction. As noted in the CSH report, many of the pre-contact and early post-contact (pre-1850) features were probably largely destroyed by extensive land modifications starting from the 1800s to the more recent construction of homes and the Hilo High School in the early 1900s. In the event of an unexpected burial or finding of significant cultural remains, all work is planned to be halted and SHPD notified at the main office at (808) 692-8015 or at:

State Historic Preservation Division
Hawai‘i Island Office
40 Po‘okela Street, Hilo Hawai‘i, 96720
Phone: (808) 933-7650
Fax: (808) 933-7655

4.1.7 Beach Erosion and Sand Transport

Beach erosion and sand transport are not anticipated based on the location of the project site upgradient and away from any shoreline areas. No activities will directly affect shoreline processes. No impacts are anticipated and no mitigation is required.

4.1.8 Noise

The project site is located in an area surrounded by residential and community facilities. The closest residence is to the north, crossing an existing forested area approximately 400 feet away. Although the project will involve the generation of construction associated noise, it is expected to be temporary and short-term in duration.

Construction equipment is expected to include, but not be limited to, bull dozers, excavators and loaders, flatbed trucks, concrete mixers, concrete delivery trucks, powered hand tools, and other related equipment and vehicles. All internal combustion equipment will be muffled in accordance with standard engine operating practices and state and county laws and regulations.

Because the project is taking place at an existing public school campus, construction may be limited to after school hours, on weekends, or during school holidays. No further mitigation measures during construction, beyond the use of properly muffled engine equipment and limiting the hours of work, are anticipated to be required.

Operation of the new gymnasium will be regulated through HRS, Chapter 342F, Noise Pollution. The agency responsible for enforcing noise is the DOH, Indoor and Radiological Health Branch. According to the DOH, while the generation of noise from any school activity between the hours of 7:00 a.m. through 10:00 p.m. is exempt from the HRS, the principal of the school can be contacted to help resolve any noise related problems that might occur. Any school generated noise outside of these hours is not exempt. In order to control noise from operation of the new gymnasium sound reducing materials are planned within the building to help with interior acoustics to absorb some of the sound to the exterior. Compared to the current gymnasium in which the entire top of the building is acoustically open to the outside, the new gymnasium will have improved sound control.

No further mitigation measures are anticipated to be required during the operation of the gymnasium.

4.1.9 Air Quality

No information was collected on air quality. Because of the regular presence of trade winds and the setting of the site along the Wailuku River edge of Hilo, existing sources of air pollution are not anticipated to be present. Construction activities are expected to have little to no potential for air quality impacts since the project will be of limited duration and where engine exhausts may be a source of potential air pollution, all internal combustion equipment will be governed in accordance with applicable state and county regulations.

During construction, fugitive dust could be generated that would be a nuisance source of air pollution. Where applicable, fugitive dust will be controlled with dust fencing and regular wetting of disturbed areas by the contractor. No further mitigation measures with regards to air quality are anticipated to be required.

4.1.10 Water Quality

Water resources that may be potentially impacted by the project during construction activities are limited to the nearby ditch, identified by Cultural Surveys Hawai‘i, as site CSH-5, Constructed Ditch and Alignment, located south west of the project site, and the Wailuku River located at a distance of approximately 1,000 feet northwest of the project site.

Work activities will involve earthwork including the demolition of the cottages, preparation of the ground for construction of the gymnasium, and related work involve the construction of parking, grassing, and landscaping. During this period unprotected open ground and locations used for the stockpiling of excavated soils may be subject to erosion from storm water runoff. This could result in short term increases in turbidity and siltation of inland and coastal waters downgradient of the site.

As indicated in Section 4.1.2, Topography and Soils, protection from erosion and untreated storm water runoff will be addressed through the use of an Erosion Control Plan (ECP). Protection from construction storm water runoff will be addressed through the use of a BMPs Plan by the construction contractor in accordance with Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control, HAR.

With the stated mitigation measures above, the proposed project is not anticipated to result in potential for adverse impacts to water quality.

4.1.11 Flood Hazard

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Map, the project site is in an area designated as Zone X (see **Figure 22**, Flood Zone Map). The Zone X designation is used for areas located outside the 1-percent annual probability floodplain.

The proposed facility improvement is not expected to be significantly impacted based on its location within the Zone X designation. No further mitigation measures are anticipated or are proposed to be required.

4.1.12 Other Hazards

Seismic Hazard

Natural hazards in Hawai‘i region are infrequent and rarely destructive. Most frequent are small earthquakes that usually go unnoticed. The largest earthquake in the recent past occurred in 2006 approximately 6 miles southwest of the Island of Hawai‘i measuring 6.7 on the Richter scale. This event caused heavy damage to the Kona and Kohala Districts and generated a small tsunami measured by the Pacific Tsunami Warning Center to be approximately 4 inches.

Most of Hawai‘i's earthquakes are directly related to volcanic activity and are caused by magma moving beneath the earth's surface. These earthquakes tend to be concentrated beneath Kilauea and Mauna Loa, the island’s active volcanoes, particularly their south flanks and in the region between them. The northern part of the Big Island is made up of two volcanoes, Mauna Kea and Kohala. Mauna Kea has erupted several times in the last 10,000 years, most recently about 4,500 years ago. This volcano is considered dormant but not extinct.

The U.S. Geological Survey (USGS) has prepared volcanic hazard maps that divide the island into zones that are ranked from 1 through 9 based on the probability of coverage by lava flows. Zone 1 is the area of greatest hazard, and Zone 9 the area of least hazard. The project site is located in Lava Hazard Zone 3. Zone 3 includes other areas on Mauna Loa in which the hazard is gradationally lower than in Zone 2. During the past 750 years, lava flows have covered about 15 to 20 percent of Zone 3 on Mauna Loa. These areas are less affected by rift activity than Zone 2, although the area of Zone 3 that lies on the northwest flank of the volcano is vulnerable to eruptions originating at vents on that flank. The 1859 lava flow covers 10 percent of this area. The part of Hilo that lies south of the Wailuku River is included in Zone 3 of Mauna Loa.

The 2006 International Building Code (IBC) provides minimum design criteria to address the potential for damage due to seismic disturbances. The IBC scale is rated from Seismic Design Category A through E, with A being the lowest level of potential seismic induced ground movement. The project site on the island of Hawai‘i is located within the general Seismic Design

Category D (Appendix D, Significant Changes for the 2006 International Residential Code, FEMA [http://www.bssconline.org/Homebuilders_Guide/Final_June2006/AppendixDfinal.pdf]). To mitigate the potential hazard from earthquakes, structural elements in this project will be built, at a minimum, in compliance with the appropriate standards for IBC Seismic Zone D.

Hurricane Hazard

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. The project area is infrequently subjected to severe storm events. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur.

The severe wind speeds and rising tides associated with a hurricane are expected to pose a potential life and property hazard. Should a hurricane warning be issued during school hours personnel and students at the facility will be evacuated. The Hawai‘i State Civil Defense Agency has identified a number of locations in the South Hilo District that will serve as public emergency shelters. The Hilo High School[3] is identified as one of the locations for an emergency evacuation shelter:

E B de Silva Elementary
278 Ainako Avenue

Hilo High School
556 Waiānuenue Avenue

Hilo Intermediate School
587 Waiānuenue Avenue

Kaumana Elementary School
1710 Kaumana Drive

Waiakea Elementary School
180 West Puainako Street

Waiakea High School
155 Kāwili Street

Waiakeawaena Elementary School
2420 Kīlauea Avenue

Tsunami Hazard

A tsunami is a wave produced by any brief, large-scale disturbance of the ocean floor, principally by a shallow earthquake or earth movement, subsidence, or volcanic eruption. It is characterized by great speeds (up to 950 kilometers/hour), long wavelengths (up to 200

[3] According to the appropriation language for this project, the new gymnasium will also serve as an emergency shelter. The DOE has been working with the State Civil Defense Agency to include hardening criteria into the design of the project (October 2009).

kilometers), long periods (generally 10-60 minutes), and low observable amplitude on the open sea, although it may rise to heights of 30 meters or more and cause much damage on an exposed coast (Geology Glossary, http://csd.unl.edu/general/glossary-letter.asp?Definition=T).

The proposed project is not expected to be adversely impacted as a result of a tsunami induced event. According to the Hawaii Civil Defense Agency, Tsunami Evaluation Hawai‘i Map 1: Hilo Part 1, the Hilo High School is a designated evacuation shelter for the area, and is one of several public evacuation shelters serving the Hilo region.

4.2 Public Facilities

4.2.1 Access

Vehicular access to the Hilo High School is from the Waianuenue Avenue. Multiple roadways fronting the Waianuenue Avenue provides access to both the main campus of the school and the area of the existing District Annex Building C (see **Figure 2**, Proposed Gymnasium Site Location). The proposed parking lot for the new gymnasium will allow for sufficient daily parking with the number of stalls to be determined by the DOE[4]. Because of the location of the new gymnasium the potential for adverse effects to access to the main school campus are not anticipated or expected. The only area with the potential to be affected will be the upper entry of the District Annex Building C (close to the existing office cottages that will be the site of the new gymnasium), located north of the main campus along the Waianuenue Avenue.

During construction there will be temporary periods when access to the District Annex Building C upper level may be restricted to maintain public safety. Access to other areas of the school that are not subject to the use or movement of construction equipment will remain unaffected by project activities. The locations that will be restricted from access will be supervised by construction personnel, will be temporarily fenced, or will be cordoned off with warning tape to maintain public safety.

[4] According to the project architect there are 41 existing stalls including 2 handicapped stalls. 25 of these stalls will be demolished to make way for the new gymnasium. Almost all of these stalls are planned to be replaced as follows:
Existing Remaining Stalls: 16 stalls
Construction of Phase 1: 13 stalls (including 8 handicapped stalls)
Construction of Additive Alternate 3 (if accepted): 11 stalls (including 2 handicapped stalls)
Total Provided: 40 stalls

Because the proposed work will be within the school property, in an area not currently occupied by students, the potential for adverse impacts to public access will be limited to none. No further mitigation measures are anticipated or proposed.

4.2.2 Traffic and Roadways

Construction of the proposed project is not expected to significantly impact the flow of traffic along Waianuenue Avenue on a day-to-day basis. The purpose of the proposed project is to provide Hilo High School with a replacement gymnasium that addresses DOE requirements. The project therefore, is not expected to result in major new personnel requirements or the additional use of school facilities beyond current uses that would create increased demands on the use of the Waiānuenue Avenue.

The school's Athletic Director anticipates that some after school events at the new gym may draw crowds of 500 to 600, with full capacity (1,400 spectators) events occurring once or twice a year[5]. A Final Traffic Impact Analysis Report for full capacity conditions at the proposed gymnasium has been submitted to the DOE by The Traffic Management Consultant (TTMC) in December 2009. The results are provided in Appendix B, Final Traffic Impact Analysis Report for the Proposed Hilo High School Gymnasium, Hilo, Hawai'i, December 10, 2009.

The school is committed to pro-actively addressing traffic concerns for all events prior to the need for mitigation measures recommended in the TTMC. Currently, athletic directors at Hawai'i Island schools inform each other about where to park, what time to arrive, etc… in order to alleviate traffic congestion. This type of coordination will continue and, as needed, it will be formalized by Hilo High School into guidelines to be followed for event use of the gym. These guidelines may include, but are not limited to:

1. Post event parking locations and driving directions to the school's website.
2. Send out flyers ahead of events with a reminder to carpool, and include a map of available school parking lots.[6]

[5] Leroy Simms, Athletic Director, October 19, 2009.

[6] Some of the available parking spaces include: 260 stalls on the Hilo High School campus; 37 stalls at the lower parking lot below Annex Building C; 83 stalls at the Hilo Intermediate School lot on the corner of Waiānuenue Avenue and Halai Street; and 57 stalls at the Hilo Union Elementary School off of Kapi'olani Street.

3. Use of traffic cones and temporary signage at campus driveways to limit left turns out of the campus.
4. Provide school security staff to help direct traffic flow in and out of the various campus driveways.

During construction, effects on transportation are expected to be short-term and will be experienced primarily during the initial and final stages of the project when construction equipment is moved to and from the project site. Occasional increases in construction traffic may result from the periodic movement of construction materials and when vehicles leave the site to remove debris. Construction activity is planned during the daytime hours with no night work anticipated to be required.

As required, construction personnel will use flags or other appropriate signaling devices along Waiānuenue Avenue to maintain safety when construction vehicles must enter and leave the project site. No further mitigation measures to address traffic are anticipated or proposed during the construction period.

4.2.3 Police, Fire and Emergency Services

Police service for the South Hilo District is provided by the Hawai‘i Police Department located at 349 Kapi‘olani Street. In its response to the Draft EA the Police Department indicated that it does not anticipate any significant impacts to traffic or have other public safety concerns regarding the proposed project (see Section 11, Draft Environmental Assessment Comments and Responses).

Fire protection services is provided by the Hawai‘i Fire Department located at 466 Kino‘ole Street in Hilo. In its response to the Draft EA the Fire Department indicated that the project must adhere to the following provisions of the Universal Fire Code (UFC) (see Section 11):

> *UFC Section 10.207*
> *Fire Apparatus Access Roads, Sec. 10.207. (a) General. Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.*
> *(b) Where Required. Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.*
>
> *EXCEPTIONS: 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.*

2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

For high-piled combustible storage, see Section 81.109.

(c) Width. The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

(d) Vertical Clearance. Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

EXCEPTION: Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

(e) Permissible Modifications. Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

(f) Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all weather driving capabilities." (20 tons)

(g) Turning Radius. The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

(h) Turnarounds. All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

(i) Bridges. When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

(j) Grade. The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

(k) Obstruction. The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

(l) Signs. When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both.

UFC Section 10.301(c)
(C) Water Supply. An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants

shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

The DOE will adhere to the relevant provisions of the UFC to ensure appropriate building construction and operating standards, fire apparatus access, and water supply to meet fire requirements.

Treatment for medical emergencies is provided by the Hilo Medical Center located at 1190 Waianuenue Avenue in Hilo. Ambulance service is provided by the County with Advanced Life Support services provided by the Fire Department. In the event that the County ambulance service is not available, ambulance service by a private vendor is provided[7].

No mitigation measures are anticipated as existing police, fire and emergency services are expected to be adequate to support the proposed project.

4.2.4 Water Supply

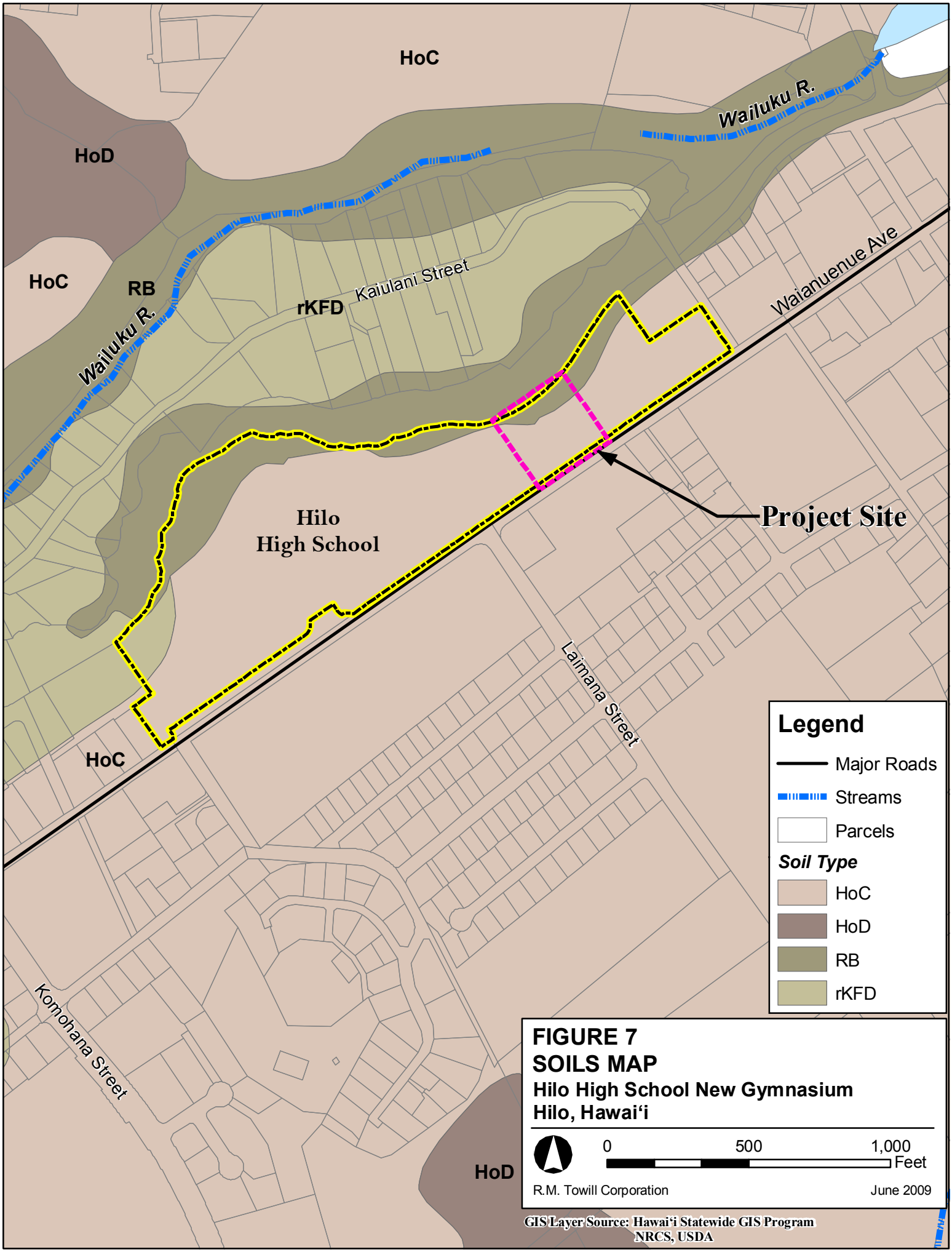
The Hilo High School and the existing gymnasium are served from an existing 16-inch water main located within the Waiānuenue Avenue fronting the proposed project site. According to the Department of Water Supply (DWS) the following provisions will be required in order to ensure water supply to the project[8]:

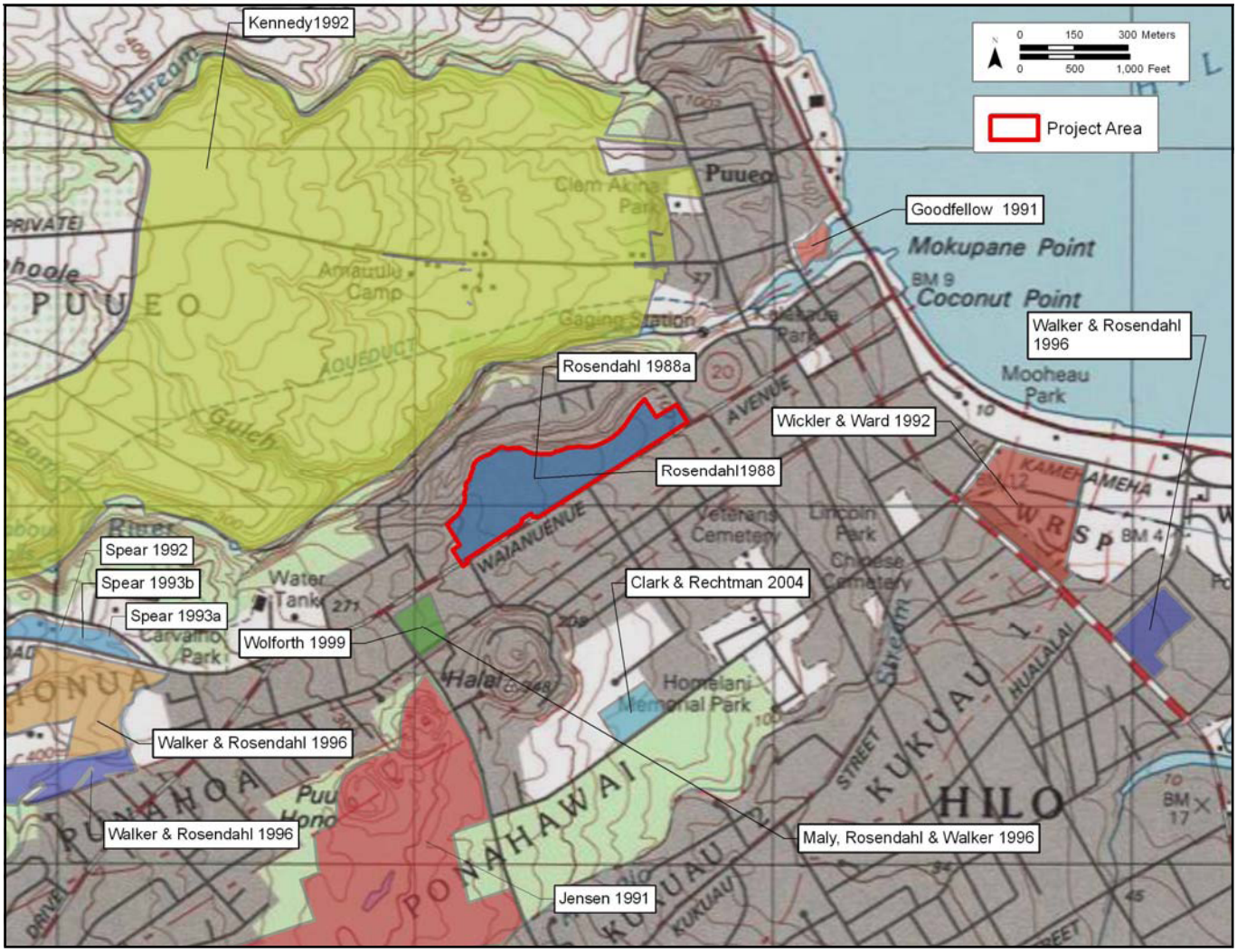
1. The estimated maximum daily water usage calculations prepared by a professional engineer, licensed in the State of Hawai‘i, showing the additional water demand that will be generated by the project shall be submitted to the DWS.

2. The existing meter will be removed and replaced with a larger meter to service the new gymnasium

The DOE intends to comply with the requirements of the DWS. No further mitigation measures are proposed and none are anticipated to be required.

[7] Per discussion with Warren Okabayashi, Institutional Facilities Superintendent, Hilo Medical Center, February 17, 2010.
[8] Letter from DWS, January 15, 2010. The DWS notes that the existing 16-inch waterline within Waiānuenue Avenue is adequate to provide 2,000 gallons per minute of flow for fire protection as required in the County of Hawai‘i’s Water System Standards.


HoC
HoD
HoC
RB
rKFD
Wailuku R.
Wailuku R.
Kaiulani Street
Waianuenue Ave
Project Site
Hilo
High School
Laimana Street
HoC
Komohana Street
HoD
Legend
Major Roads
Streams
Parcels
Soil Type
HoC
HoD
RB
rKFD
FIGURE 7
SOILS MAP
Hilo High School New Gymnasium
Hilo, Hawai'i
0
500
1,000
Feet
R.M. Towill Corporation
June 2009
GIS Layer Source: Hawai'i Statewide GIS Program
NRCS, USDA



Portion of the 1995 U.S. Geological Survey 7.5-Minute Series Topographic Map, Hilo Quadrangle, showing previous archaeological projects in the Hilo area. Note that two studies were conducted by Rosendahl in 1988 at the current project area

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i , Tax Map Key (3) 2-3-015: 001, Cultural Surveys Hawai'i, 2009.

FIGURE 8
PREVIOUS ARCHAEOLOGICAL STUDIES IN PROJECT AREA
Hilo High School New Gymnasium
Hilo, Hawai'i

Refer to Graphic Scale

R. M. TOWILL CORPORATION June 2009

Figure 9

CSH Figure 23. Photograph of the constructed ditch (CSH-5). The constructed embankment and alignment are visible along the left side of the photo, while the culvert under Waianuenue Avenue is visible at the back of the photo. View to the south.

Figure 10

CSH Figure 24. Photograph of the constructed ditch as it leads water off to the river, view to the north.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURES 9 - 10
CSH PHOTOS OF
CONSTRUCTED DITCH
Hilo High School New Gymnasium
Hilo, Hawai'i

Figure 11

CSH Figure 25. Photograph of the culvert running under the Waiānuenue Avenue bridge, view to the southeast.

Figure 12

CSH Figure 26. Photograph of the constructed portion of the eastern embankment; scale is 2 m. View to the northwest.

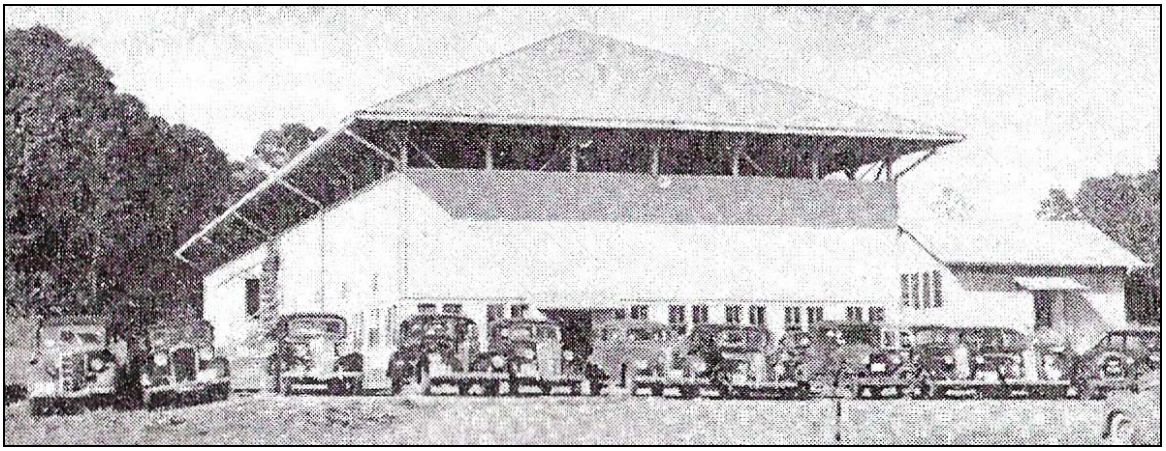
Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURES 11 - 12
CSH PHOTOS OF
CONSTRUCTED DITCH
Hilo High School New Gymnasium
Hilo, Hawai'i

CSH Figure 27. Photograph of the alignment between the ditch and the driveway; scale is 2 m. View to the northwest.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURE 13
CSH PHOTO OF
CONSTRUCTED DITCH
Hilo High School New Gymnasium
Hilo, Hawai'i

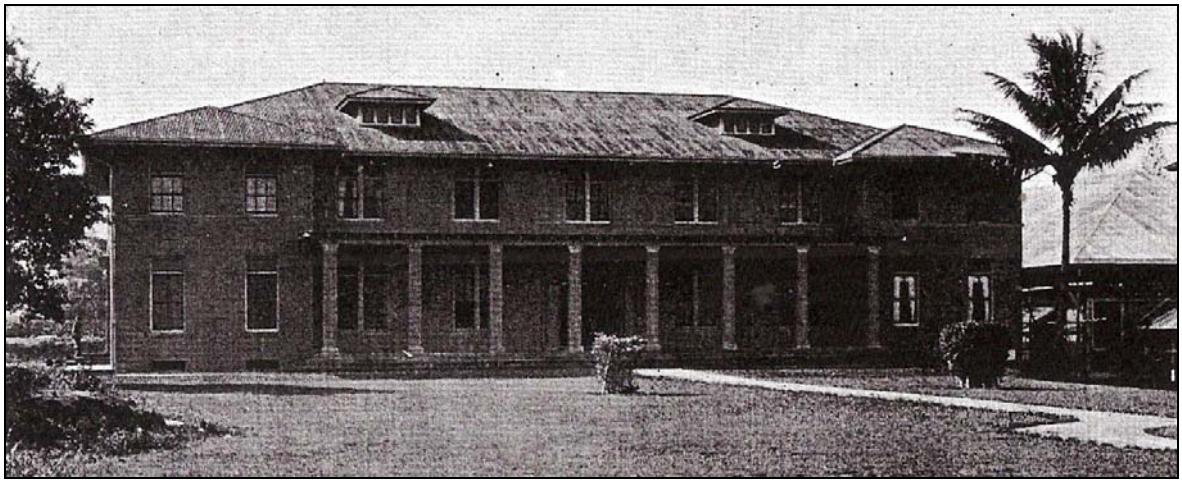


CSH Figure 6. Historic photograph of the Gymnasium; the building remains largely unchanged today (Subica 2006:4).

CSH Figure 19. Photograph of the main entry to the gymnasium at Hilo High School, built in 1931 (CSH-1). View to the north.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURES 14 - 15
CSH PHOTOS OF EXISTING GYMNASIUM
Hilo High School New Gymnasium
Hilo, Hawai'i

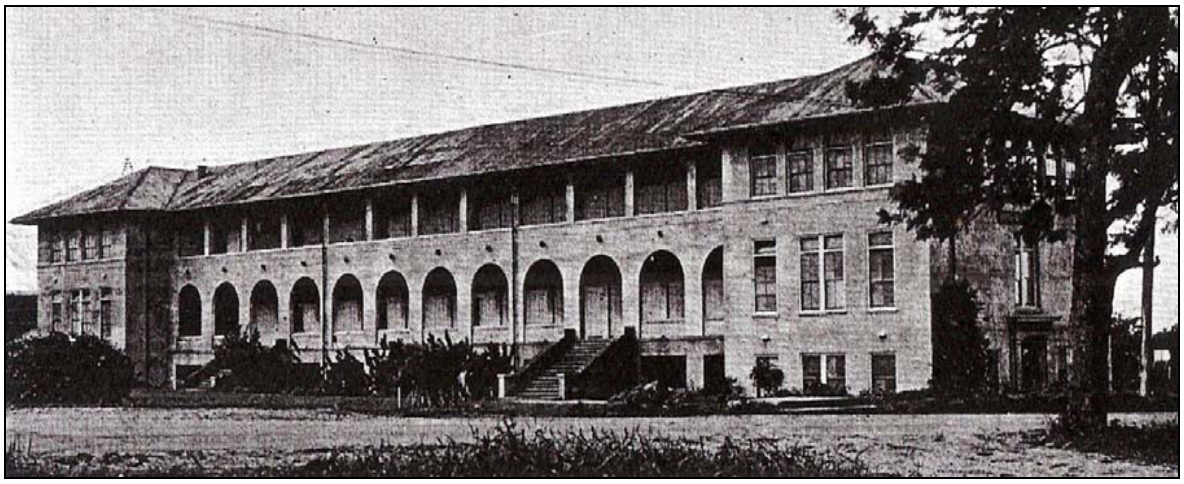


CSH Figure 8. Historic photograph of the Auditorium, from the 1931 Hilo High School Annual.

CSH Figure 20. Photograph of the Auditorium building, built in 1927 (CSH-2). View to the northwest.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURES 16 - 17
CSH PHOTOS OF AUDITORIUM
Hilo High School New Gymnasium
Hilo, Hawai'i



CSH Figure 7. Historic photograph of the Makai Building or Classroom Building A, from the 1931 Hilo High School Annual.

CSH Figure 21. Photograph of Classroom Building A, also known as the Makai Building (CSH-3). This was the first building constructed on the campus, in 1922. View to the southeast.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURES 18 - 19
CSH PHOTOS
OF CLASSROOM BUILDING
Hilo High School New Gymnasium
Hilo, Hawai'i

CSH Figure 22. Photograph of the Hilo High School track (CSH-4), view to the east.

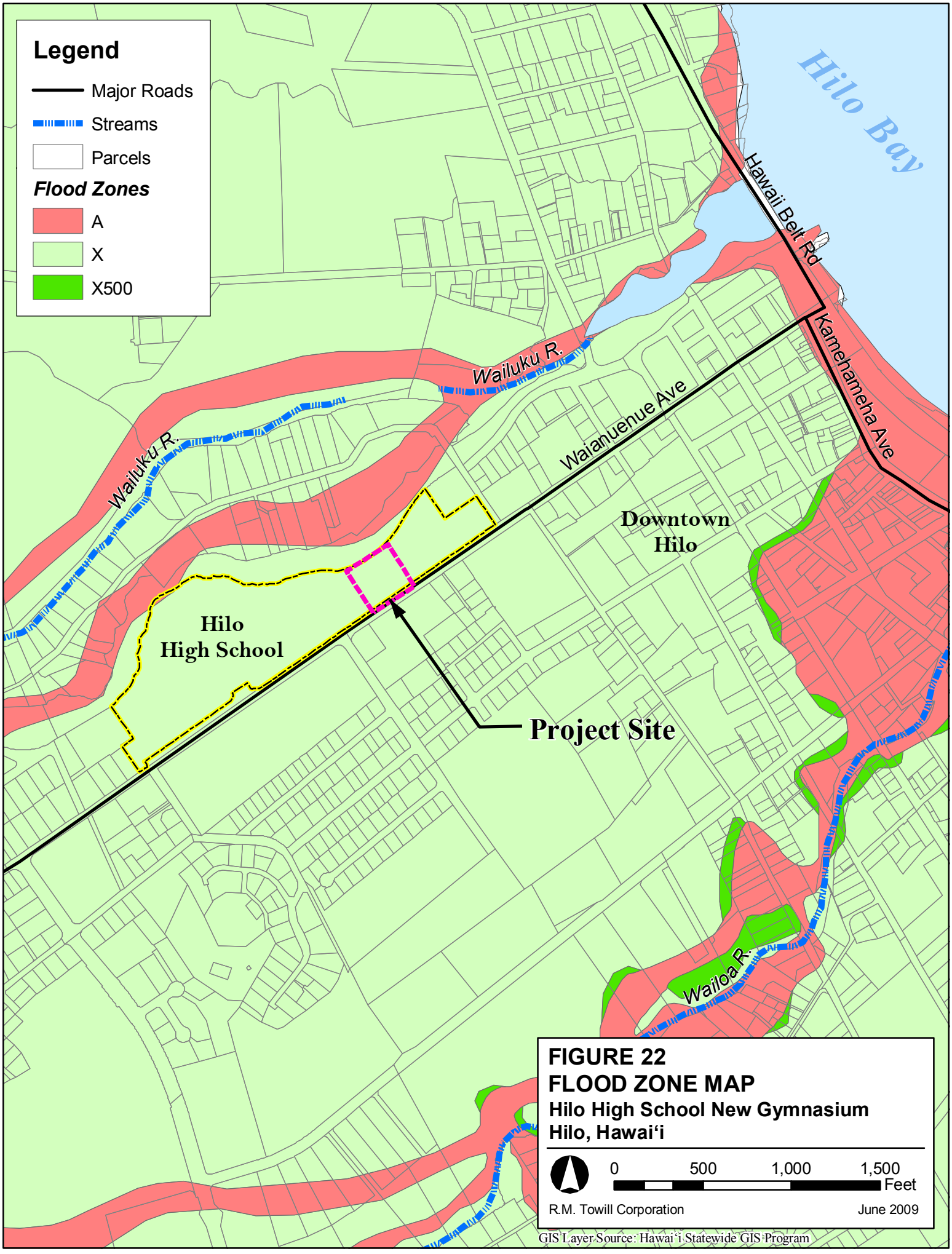
Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURE 20
CSH PHOTO OF ATHLETIC TRACK
Hilo High School New Gymnasium
Hilo, Hawai'i

CSH Figure 28. Photograph of Building C at the District Annex complex, view to the northeast.

Source:
Archaeological Field Inspection and Literature Review Report for the Hilo High School Gymnasium Project, Hilo, Hawai'i, Cultural Surveys Hawaii, Inc., 2009

FIGURE 21
CSH PHOTO OF
DISTRICT ANNEX BUILDING C
Hilo High School New Gymnasium
Hilo, Hawai'i


Legend
Major Roads
Streams
Parcels
Flood Zones
A
X
X500
Hilo Bay
Hawaii Belt Rd
Kamehameha Ave
Waianuenue Ave
Wailuku R.
Wailuku R.
Downtown
Hilo
Hilo
High School
Project Site
Wailoa R.
FIGURE 22
FLOOD ZONE MAP
Hilo High School New Gymnasium
Hilo, Hawai'i
0
500
1,000
1,500
Feet
R.M. Towill Corporation
June 2009
GIS Layer Source: Hawai'i Statewide GIS Program

Section 5
Relationship to State and County Land Use Plans and Policies

5.1 State Land Use District

The project site and the surrounding area are within the State Urban District. No change in the state land use district is required to accommodate the proposed project. See **Figure 23**, State Land Use District Map.

5.2 Hawai‘i County General Plan

The County of Hawaii's General Plan (GP) is a policy document for the long range comprehensive development of the island of Hawaii. The GP was last updated in 2005 and amended by Ordinance No. 06-153 in 2006.

The purposes of the GP are to:

- Guide the pattern of future development in this County based on long-term goals;
- Identify the visions, values, and priorities important to the people of this County;
- Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs.
- Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient.
- Promote and safeguard the public interest and the interest of the County as a whole.
- Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources.
- Effect political and technical coordination in community improvement and development.
- Inject long-range considerations into the determination of short-range actions and implementation.

According to the County of Hawai‘i, the GP provides the legal basis for all subdivision, zoning and related ordinances. It also provides the legal basis for the initiation and authorization for all

public improvements and projects. (http://www.hawaii-county.com/general plan rev/what is general plan.htm).

General Provisions of the GP

A review of the GP generally relating to education finds the proposed project is consistent with the following:

> *Section 10.2.2. Policies, relating to education indicate that the proposed project is consistent with policy (d) Encourage implementation of the Department of Education's 'Educational Specifications and Standards for Facilities.'*
>
> And,
>
> *10.2.3 Standards,*
> *(a) In proposed communities, sufficient acreage shall be reserved for school facilities. Sites shall be free from flooding and drainage problems, excessive slope and shall incorporate appropriate street and driveway design and location to minimize traffic interference, pedestrian hazard, and enable safe and easy access for vehicles, bicycles and pedestrians.*
> *(b) State Department of Education's education specifications and standards for facilities.*

The DOE EDSPECS for High Schools, December 2006, was used as the principal planning document in developing the new gymnasium. Important features of the EDSPECS for this planning process included adherence to the following:

> Chapter 2, Planning, Section 203 –The Charette Process Guide
> The charette process involved use of a series of focused planning and intensive on-site decision making sessions to design the major features of the gymnasium.
>
> Chapter 3, Guidelines for Spaces, Section 373 – Gymnasium
> Specific gymnasium design information is provided to establish the exterior and interior requirements for a high school gymnasium. The specifications provided included, but is not limited to, the following:

"Section 373.1 Area	20,280 SF*
Lobby and Support Rooms	3,210 SF
Main Floor	12,540 SF*
Wrestling Room	1,890 SF
Boy's JV and Varsity Facilities	1,320 SF
Girl's JV and Varsity Facilities	1,320 SF"

> "*Main Floor area based on Design Enrollment of 1,000; area varies with changes in the Design Enrollment. See latest High School Facilities Assessment and Development Schedule (FADS) for complete listing of support room areas and any updates or changes to Gymnasium areas. Verify audience seating capacity with DOE during initial design."

> "373.2 Program Description and Philosophy
> The high school gymnasium must meet the needs of both the physical education program and the interscholastic athletic program along with consideration for multiple uses by other school programs and community groups."
>
> "373.3 Space Description
> The gymnasium should be planned for the instruction of classes, intramurals, and interscholastic athletics with spectator seating. Sports to be accommodated include, but are not limited to: basketball, volleyball, judo, and wrestling. The many spaces inside the gymnasium include:"
>
> "Lobby with ticket booth, public restrooms, concession stand,
> Athletic Director's Office with restroom, shower, and adjacent Conference Room
> Main Floor with direct access to storage rooms and locker facilities
> JV and Varsity Locker/Shower Rooms for Boys and Girls"

The proposed project is also consistent with the requirement for the new gymnasium based on the selection of the site involving the reuse of an existing location that would contribute to the efficient use of space available within the Hilo High School campus. The proposed area for the new gymnasium shell will be approximately 22,500 square feet and the location: is free from flooding and drainage problems; possesses a relatively flat surface without excessive slope; is readily accessible from the existing high school access road to the Waiānuenue Avenue; and can accommodate safe access for vehicles, bicycles, and pedestrians.

Specific Provisions of the GP

The GP identifies the Hilo High School Complex in Section 10.2.4.2, South Hilo, as a public facility that incorporates a number of schools:

> The Hilo High School complex is comprised of Hilo High School, Kalaniana'ole Elementary and Intermediate School, Hilo Intermediate School, DeSilva Elementary School, Ha'aheo Elementary School, Hilo Union Elementary School, Queen Kapi'olani Elementary School, Kaumana Elementary School, and Keaukaha Elementary School and serves about 5,576 students.

General Plan, Section 10.2.4.2.2, Courses of Action, provides for specific action that can be considered as consistent with the proposed project. Action item (e) calls for, *Encourage continual improvements to existing educational facilities*. The proposed project involves the construction of a new gymnasium facility to address the existing deficiency of inadequate space needed to host high school related sports events. The construction of the new facility will address this deficiency.

Land Use Pattern Allocation Guide Map Designation

The Hilo High School is identified in the GP LUPAG map as medium density urban. See **Figure 24**, Land Use Pattern Allocation Guide Map. The proposed project will maintain consistency with this designation. No changes are proposed.

5.3 County of Hawai‘i Zoning

The project site is designated RS-7.5 (single-family residential, minimum lot size of 7,500 square feet). See **Figure 25,** Zoning. According to the Hawai‘i County Code, Chapter 25, Zoning, Article 5, Zoning District Regulations, the purpose of the RS zoning district is to provide for lower or low and medium density residential use, for urban and suburban family life. It applies to areas having facilities, and to carry out the above stated purpose.

The existing educational facility use of the site is a permissible use within the designated RS-7.5 zoning district in accordance with Section 25-5-3. Permitted Uses, item (b)(10), Schools.

5.4 Special Management Area

The County of Hawai‘i has designated the shoreline and certain inland areas of Hawai‘i as being within the Special Management Area (SMA). SMA areas are designated sensitive environments that should be protected in accordance with the State's Coastal Zone Management policies, as set forth in HRS, Section 205A, Coastal Zone Management.

As shown in **Figure 4**, the project site is not located within the SMA.

5.5 Coastal Zone Management, HRS, Chapter 205(A)

The State of Hawai‘i has designated the Coastal Zone Management Program (CZMP) to manage the intent, purpose and provisions of Chapter 205(A)-2, HRS, as amended, for the areas from the shoreline to the seaward limit of the State's jurisdiction, and any other area which a lead agency (State Planning Office, Department of Land and Natural Resources) may designate for the purpose of administering the CZMP.

The following is an assessment of the project with respect to the CZMP objectives and policies as set forth in Chapter 205(A)-2, HRS:

1. Recreational resources
Objective: Provide coastal recreational opportunities accessible to the public.
Policies:
A) Improve coordination and funding of coastal recreational planning and management; and
B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

The proposed project is located within the Hilo High School campus property and will not affect any neighboring park properties. The shoreline area of the Hilo Harbor, located makai of the high school will not be affected by the proposed project. The project will not alter existing shoreline areas.

Water quality will be protected during construction through the application of construction BMPs as described in this Environmental Assessment.

2. Historic resources
Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
Policies:
(A) Identify and analyze significant archaeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

No adverse impacts to historic or archaeological resources are expected from activities associated with construction of the new gymnasium.

Impacts to the office cottages will involve demolition to allow for the construction of the new gymnasium. In order to address the necessary removal of the cottages the SHPD will be consulted regarding documentary requirements that may include (1) the process used to select the site for the new gymnasium; (2) photodocumentation to record the architectural features of the existing structures; and (3) other requirements of the SHPD.

The proposed construction will take place within the high school campus on the site of the existing cottages. Construction and excavation activities to establish the existing school is anticipated to have resulted in significant ground disturbance to the site. It is unlikely that significant historic or archaeological resources would remain present at the project site. However, because there is always the possibility of an inadvertent "find", should any unidentified human or significant cultural remains be uncovered during construction, work will cease in the immediate area and the SHPD will be contacted for appropriate instructions. As required, mitigative measures will be proposed and coordinated with SHPD.

No impacts to traditional or contemporary cultural practices are expected to result from the proposed improvements. The project site is dominated by common, introduced plant species that are not known to be identified with traditional gathering practices. Project activities will not diminish the availability of any plant type found at the project site for use in cultural practices and project activities do not have the potential to disrupt access to coastal areas.

> 3. Scenic and open space resources
> Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
> Policies:
> (A) Identify valued scenic resources in the coastal zone management area;
> (B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural land forms and existing public views to and along the shoreline;
> (C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
> (D) Encourage those developments that are not coastal dependent to locate in inland areas.

The proposed improvements conform to the Coastal Zone Management Program, Objective 3, Scenic and Open Space Resources, which encourages the protection, preservation and, where desirable, restoration or improvement of the quality of coastal scenic and open space resources.

The proposed project will take place within an existing high school campus located approximately one half miles inland of the shoreline. The height of the new gymnasium will be somewhat similar to the existing gymnasium. The proposed facility improvement will be consistent with the school's surrounding within a mostly residential area. Construction of the proposed gym will not substantially interfere with or detract from existing coastal and open space scenic resources.

> 4. Coastal ecosystems
> Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
> Policies:
> (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
> (B) Improve the technical basis for natural resource management;
> (C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
> (D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
> (E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The proposed project is not expected to have any adverse effects on marine resources. Project activities do not involve alterations to stream channels or other water bodies or water resources. The project will not adversely affect marine and coastal resources.

During construction, BMPs will be employed to prevent potential pollutant (sediment) discharges into storm water runoff. Measures to prevent sediment discharges into storm water runoff during construction will be in place and functional before project activities begin and will be maintained throughout the construction period.

> 5. Economic uses
> Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.
> Policies:
> (A) Concentrate coastal dependent development in appropriate areas;
> (B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
> (C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
> (i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

The project is being developed on land presently used for school related purposes. The project has been assessed for social, visual, and environmental impacts in accordance with the Hawai‘i County Code. With the implementation of the mitigation measures as outlined in this document, no adverse impacts are expected to result from this project.

6. Coastal hazards
Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
Policies:
(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
(D) Prevent coastal flooding from inland projects.

According to the Federal Emergency Management Agency (FEMA), the project site is in an area designated as Zone X. The Zone X designation is used for areas outside the 1 percent annual probability floodplain. See **Figure 22**, Flood Map.

The development of the project will be in compliance with the requirements of the Federal Flood Insurance Program and County of Hawai‘i regulations governing flood protection.

Potential seismic hazards will be addressed by compliance with the 2006 International Building Code standards which is planned for adoption by the County of Hawai‘i.

The project site is subject to the potential for loss of property and life during a severe hurricane. Should a hurricane warning be issued during school hours, personnel and students at the facility will be evacuated to an emergency public shelter.

The project site is not anticipated to be adversely affected by a tsunami. The Hilo High School is a designated public evacuation shelter for the area by the State Civil Defense Agency.

7. Managing development
Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
Policies:
(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing

present and future coastal zone development;
(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and
(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

The project site is located in the State Urban Land Use District and is zoned RS-7.5, Single Family Residential. The existing use of the property for an educational facility is a permitted use.

All improvement activities will be conducted in compliance with State and County environmental rules and regulations. This EA is prepared to identify and, where necessary, propose mitigation measures to address anticipated impacts from the construction and operation of the project. This document will be published for public review in compliance with procedures set forth by the Office of Environmental Quality Control (OEQC).

8. Public participation;
Objective: Stimulate public awareness, education, and participation in coastal management.
Policies:
(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mitigation to respond to coastal issues and conflicts.

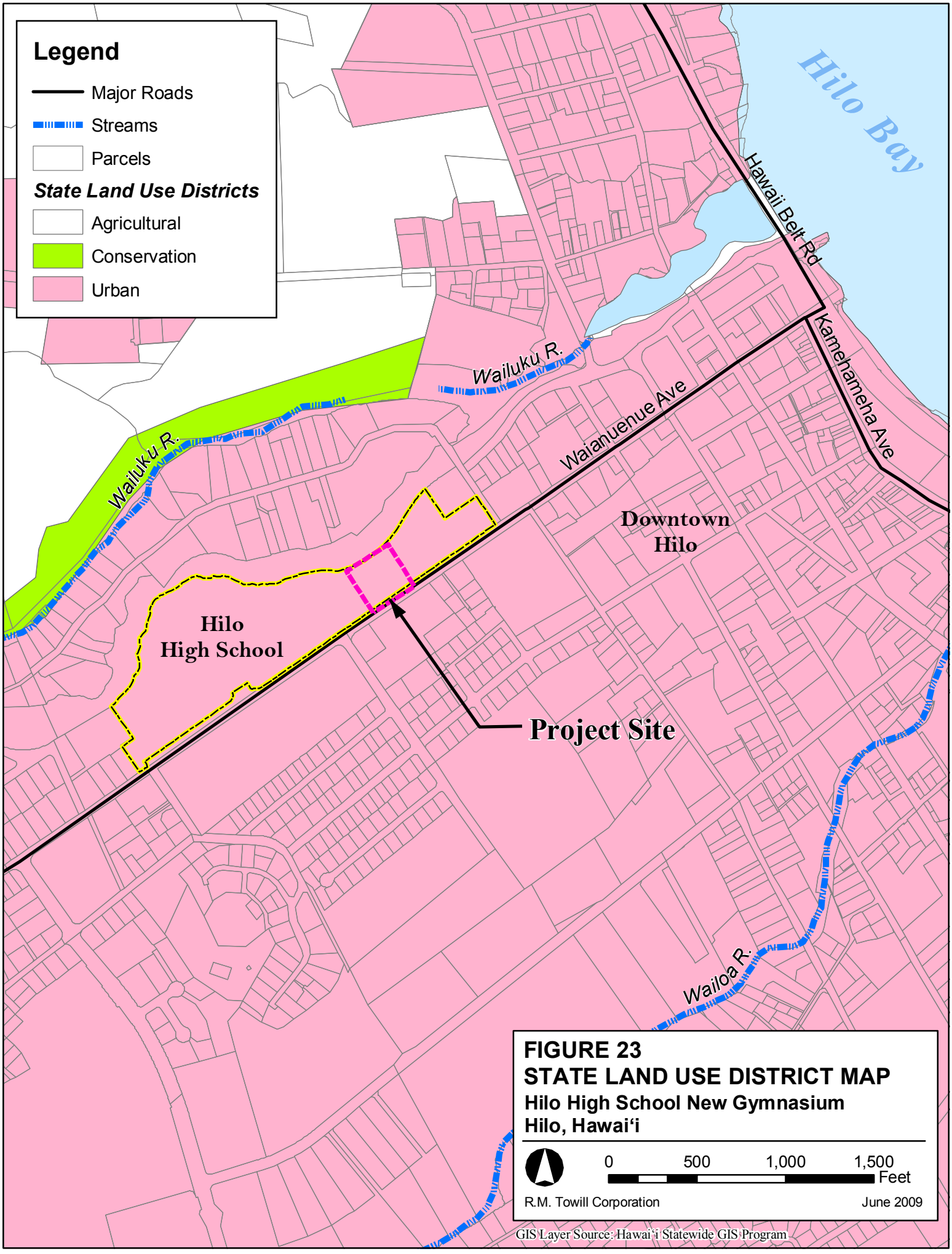
Public involvement in the project has consisted of public meetings with the community, parents, and area residents as part of the DOE's EDSPECS planning process. Public notification of the proposed action will be provided in the OEQC publication, the Environmental Notice. See Section 8, Agencies, Organizations, and Individuals Consulted, for a list of agencies, organizations and individuals consulted. All written public comments will be provided a written response. Mitigation measures will be developed where appropriate to address issues and concerns raised during the public review of the project.

9. Beach protection;
Objective: Protect beaches for public use and recreation.
Policies:
(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

The Hilo High School property boundary is located approximately one half miles from the shoreline. The proposed improvements will be constructed within the subject property that is located inland of the shoreline setback (normally approximately 40 feet from the State Certified Shoreline). The proposed improvements are not expected to interfere with existing recreational or ocean recreational activities, nor interfere with natural shoreline processes due to its location.

> 10. Marine resources
> Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.
> Policies:
> (A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
> (B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
> (C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
> (D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
> (E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The project does not involve research, education, or technological development related to the coastal and marine environment. No impacts to marine resources are anticipated.


Legend
Major Roads
Streams
Parcels
State Land Use Districts
Agricultural
Conservation
Urban
Hilo Bay
Hawaii Belt Rd
Kamehameha Ave
Waianuenue Ave
Wailuku R.
Wailuku R.
Downtown
Hilo
Hilo
High School
Project Site
Wailoa R.
FIGURE 23
STATE LAND USE DISTRICT MAP
Hilo High School New Gymnasium
Hilo, Hawai'i
0
500
1,000
1,500
Feet
R.M. Towill Corporation
June 2009
GIS Layer Source: Hawai'i Statewide GIS Program

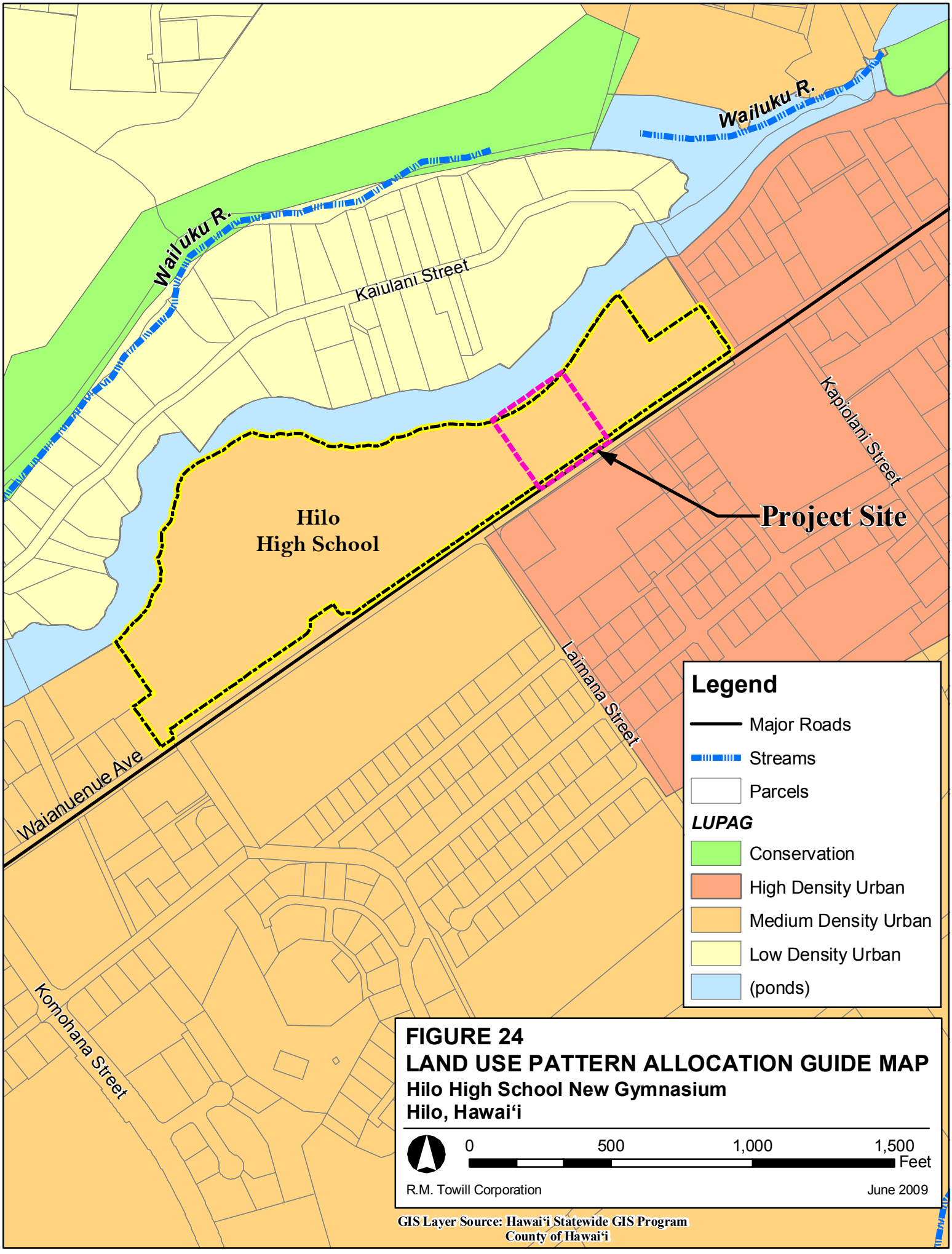
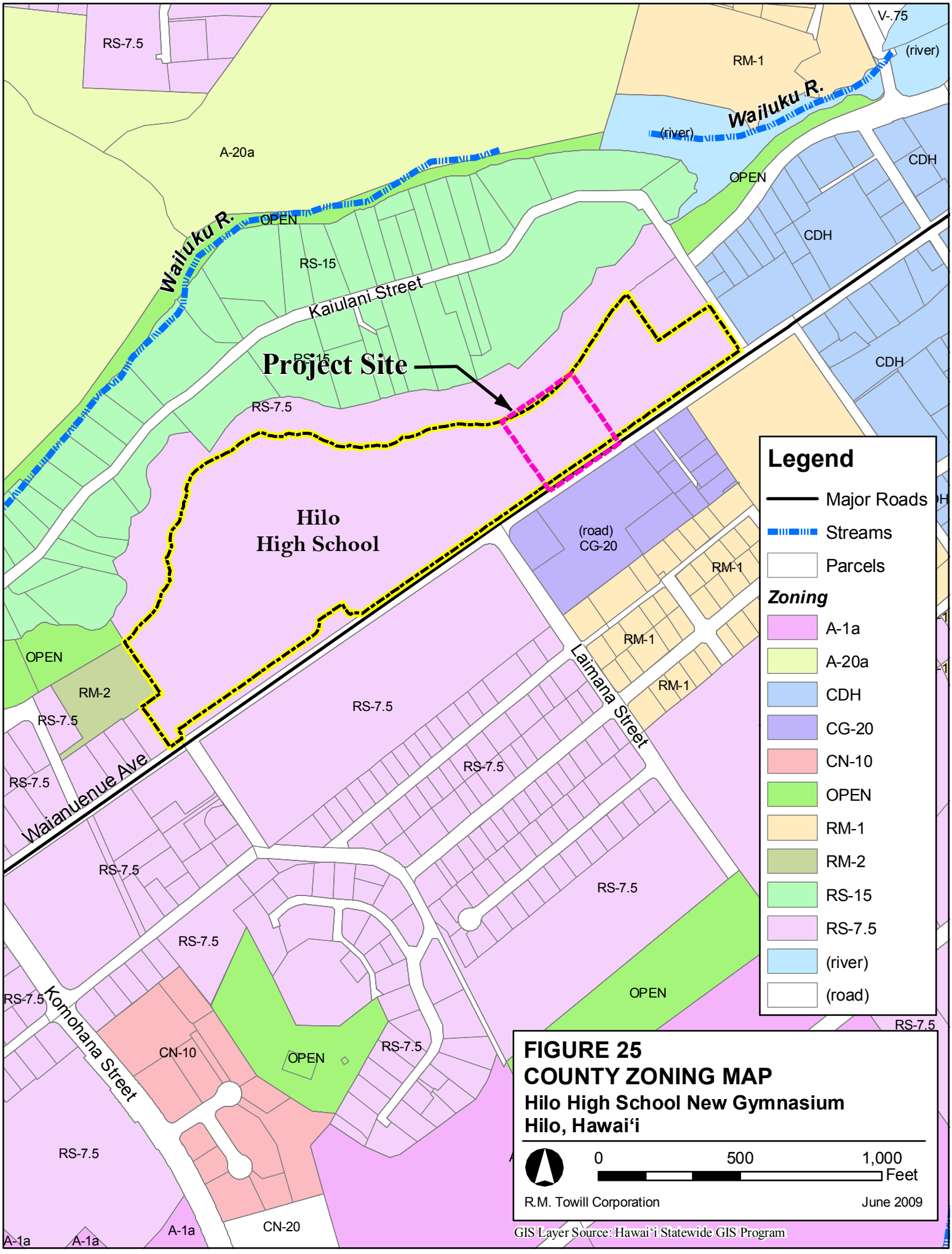


FIGURE 24
LAND USE PATTERN ALLOCATION GUIDE MAP
Hilo High School New Gymnasium
Hilo, Hawai'i


Project Site
Hilo
High School
Kaiulani Street
Wailuku R.
Waianuenue Ave
Laimana Street
Komohana Street
RS-7.5
RS-15
A-20a
RM-1
RM-2
CDH
CG-20
CN-10
OPEN
(river)
(road)
V-.75
A-1a
CN-20
Legend
Major Roads
Streams
Parcels
Zoning
FIGURE 25
COUNTY ZONING MAP
Hilo High School New Gymnasium
Hilo, Hawai'i
0
500
1,000
Feet
R.M. Towill Corporation
June 2009
GIS Layer Source: Hawai'i Statewide GIS Program

Section 6
Necessary Permits and Approvals that May be Required

6.1 County of Hawai‘i

Department of Public Works

- Building Permit Application
- Grading Permit Application

Planning Department

- Building Height Variance
- Plan Approval Application

6.2 State of Hawai‘i

Department of Health

- National Pollutant Discharge Elimination System Notice of Intent Form C (NPDES NOI Form C) Construction Stormwater Permit Application (if construction project site activities including stockpiling and mobilization space are equal to or greater than 1 acre)

Section 7
Cultural Impact Assessment

The potential for adverse impacts to traditional/cultural resources or practices at Hilo High School are not anticipated. The proposed project involves construction activities at an existing site that has been in use for a public educational facility since the early 1900s. During the school year access to the site is restricted to school staff, guests, and high school students. During hours when the school is not in session the site is used for parent-teacher and student functions, and community and public functions.

Construction and accessory use of the site for educational purposes over the past several decades is expected to have resulted in extensive ground disturbance and alteration of the existing landforms. Potential cultural uses and archaeological and cultural sites that may have once been present would have been discovered and recovered, or have been unfortunately destroyed. There are no known traditional or contemporary cultural sites or practices in use beyond those relating to the educational use of the present day school. There will be a temporary disruption of service during construction to enhance this use. However, school based activities and administrative functions will resume upon completion of the project.

There are no known plants on the property that are of significant importance for traditional or cultural uses.

The project site is located approximately one-half mile from the waters of Hilo Harbor and 0.15 miles from the waters of the Wailuku River. Public access to the shoreline will not be affected by the project.

Further consultation to preempt the potential for adverse cultural impacts has also been provided with the distribution of the DEA to agencies and the community for review in accordance with the parties identified in Section 8, Agencies and Organizations Consulted, of this document.

Section 8
Agencies, Organizations and Individuals Consulted

The following agencies, organizations, and individuals will be contacted during the Chapter 343, HRS, environmental review process to disclose the environmental conditions of the site, the proposed undertaking, and the potential impacts and mitigation measures that will be applied to ensure against adverse impacts.

8.1 County of Hawaii

Planning Department
Department of Parks and Recreation
Fire Department
Hawai‘i Civil Defense Agency
Hawai‘i Police Department

8.2 State of Hawai‘i

Department of Education
Department of Land and Natural Resources
    State Historic Preservation Division
Department of Transportation – Highways Division
Department of Civil Defense

8.3 Federal Government

U. S. Army Corps of Engineers

8.4 Elected Officials, Organizations and Individuals

State Senator Dwight Y. Takamine, 1st Senatorial District

State Representative Jerry L. Chang, 2nd Representative District

State Representative Mark Nakashima, 1st Representative District

Hawai‘i County Council Member Donald Ikeda, Council District 2

Section 9
Summary of Impacts and Significance Determination

9.1 Short Term Impacts

The construction contractor will enter and exit the project site from Waiānuenue Avenue. Potential for significant traffic impacts during construction are not expected based on the limited nature of work primarily involving the demolition of the cottages adjacent to the District Annex Building C and construction of an approximately 22,500 square foot gymnasium, parking spaces, and landscaping. As required, the contractor shall post signage and/or signal personnel to maintain safe traffic conditions at the entrance to the school. Upon completion of the project there will be no further potential for impacts to traffic.

Short term generation of noise is expected during construction activities and to a lesser extent from mobilization of vehicles and equipment. Construction equipment is expected to include, but not be limited to, an bulldozer, excavator, loader, flatbed trucks, concrete delivery trucks, cranes, welders and powered hand tools. All equipment will be muffled in accordance with practice and regulations governing the use of such equipment. The period of construction may be limited to after school hours, weekends, and/or during school holidays. Noise associated with construction will end upon completion of the project.

Dust and nuisance related problems are expected to be slight to insignificant because of the limited nature of work. The generation of any fugitive dust will be controlled with regular wetting of the soil by the contractor, as required.

Construction activities will temporarily expose soils on the property. Potential for soil erosion will be mitigated through use of silt fences, berms and/or other applicable erosion control measures.

9.2 Long Term Impacts

Long term benefits derived from this project include a new school gymnasium for the Hilo High School that allow for the hosting of high school and sports related events, and community functions. The facility will ensure compliance with regulations as defined by the DOE EDSPECS and FADS.

No long term adverse impacts are anticipated. Upon completion of work, all equipment used on-site will be demobilized and all debris and waste materials disposed of at an approved County refuse facility.

9.3 Significance Criteria

Based on significance criteria set forth in Hawai‘i Administrative Rules, Title 11, Department of Health, Chapter 200, “Environmental Impact Statement Rules,” the proposed project is not expected to have a significant impact on the environment. Accordingly the recommended determination for the proposed project is a Finding of No Significant Impact (FONSI). The findings and reasons supporting this determination are summarized below.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource

The proposed project will not result in the loss of natural or cultural resources. There are no threatened or endangered flora or fauna species or habitat that are known to be present at the project site as the property has been subjected to extensive human disturbance from students, staff, faculty and visitors to the high school. However, because it is possible that the Hawaiian Hoary Bat and Hawaiian Hawk may transit or be present in the area, the Department of Land and Natural Resources, and the U. S. Fish and Wildlife Service, has been provided a copy of the Draft EA for this project. The DOE will work with these agencies, as required, and comply and coordinate with the recommendations that these agencies may provide. (See also Section 11, Draft Environmental Assessment Comments and Responses).

Archaeological sites (in addition to those already surveyed by Cultural Surveys Hawai‘i) are not expected to be present based on the history and educational use of the subject property.

However, as applicable, the SHPD will be consulted regarding the use of the site of the existing cottages.

2. Curtails the range of beneficial uses of the environment

Presently, the subject property is used as the campus of the Hilo High School. The proposed project will provide a new replacement gymnasium and will be located entirely within the school property. The proposed action does not curtail beneficial uses of the environment.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders

The proposed project is consistent with the environmental policies, goals and guidelines expressed in Chapter 343, HRS. Potential sources of adverse impacts have been identified and appropriate measures have been developed to either mitigate or minimize potential impacts to negligible levels.

4. Substantially affects the economic and social welfare of the community or state

The proposed project will replace an existing gymnasium that was constructed in 1931. The project will enhance the social environment of the Hilo High School by improving a major facility that will be used by both the school and broader Hilo community.

The proposed action will result in temporary short-term employment by the contractor. This is not expected to substantially affect the economic welfare of the community.

5. Substantially affects public health

Factors affecting public health, including air quality, water quality, and noise levels, are expected to be only minimally affected, or unaffected by the proposed construction activity. Potential impacts will be mitigated in accordance with regulations of the State of Hawai‘i and County f of Hawai‘i.

6. Involves substantial secondary impact, such as population changes or effects on public facilities

The proposed project will replace an existing substandard gymnasium with a new structure. The proposed action, based on the limited scale of work, is expected to have little to no substantial secondary or indirect impacts to the area population. The proposed project represents an improvement over the existing condition involving use of a school gymnasium in need of replacement.

7. Involves a substantial degradation of environmental quality

Impacts to air and water quality, noise levels, natural resources, and land use associated with the planned improvements are anticipated to be minimal. Mitigation measures will be employed as practicable to further minimize potentially detrimental effects to the environment resulting from project activities. The proposed project does not involve substantial degradation of environmental quality.

8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions

The proposed project is not expected to cause adverse cumulative impacts to the environment nor involve a commitment for larger actions. The project is limited to the construction of a new gymnasium.

9. Substantially affects a rare, threatened or endangered species

There are no known rare, threatened or endangered plants or animal species on the subject property. Substantial impacts to rare, threatened or endangered species are not anticipated.

10. Detrimentally affects air or water quality or ambient noise levels

On a short-term basis, ambient air and noise conditions will be influenced by construction activities related to the proposed facility improvements. The potential for adverse impacts will be short-term in duration and will be controlled by mitigation measures as described in this Environmental Assessment. Once the project is completed, air and noise in the project vicinity will be allowed to return to preconstruction conditions. Erosion control measures and BMPs will

be employed to prevent any storm water runoff associated with construction activities from entering State waters.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters

The subject property is not located near the shoreline. The project area is located within an area determined by the Federal Emergency Management Agency to be outside of the 1-percent annual chance floodplain. The proposed facility improvements will occur entirely within the existing project boundary and involves the construction of non-residential structures. The proposed action is not expected to be impacted by flood conditions.

The subject property is also outside the tsunami evacuation zone as determined by the Civil Defense Agency.

12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies

The project site is located mauka of the highway and therefore does not affect any existing views. The site improvements will not substantially affect any existing views from surrounding areas.

13. Requires substantial energy consumption

The proposed project will require the use of energy primarily in the form of petroleum-based fuels for construction vehicles and equipment. Electricity will also be required and may be provided by a generator or by direct connection to outlets provided on-site. Other uses of energy use will be in the form of labor to complete the project. Upon completion of the project there will be no further requirement for use of construction associated energy. Energy uses to support the new gymnasium facility will be provided by existing electrical supply lines provided by the Hawaiian Electric Light Company (HELCO).

Section 10
Findings

In accordance with the provisions set forth in Chapter 343, HRS, and the significance criteria in Section 11-200-12 of Title 11, Chapter 200, HAR, it is anticipated that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise levels, social welfare, archaeological sites, or wildlife species or habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.

An Environmental Impact Statement (EIS) will not be required and a Finding of No Significant Impact (FONSI) will be issued for this project.

Section 11
Draft Environmental Assessment Comments and Responses

This FEA has been prepared to address comments received during the 30-day public comment period. As appropriate, project mitigation measures have also been prepared to address substantive issues.

A list of the comment letters received for the DEA is provided below. The comments received and the written responses prepared for the comments are attached and included in this section.

No.	Date	From
1	December 10, 2009	Fire Department
2	December 12, 2009	Police Department
3	December 21, 2009	Dept. of Transportation
4	January 5, 2009	Dept. of Land and Natural Resources
5	January 6, 2010	Kevin Wilcox
6	January 7, 2010	Barbara Anderson
7	January 8, 2009	Planning Department
8	January 15, 2010	Department of Water Supply
9	March 8, 2010	Department of Health

William P. Kenoi
Mayor

Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

December 10, 2009

Mr. Brian Takeda
R.M. Towill Corporation
2024 N. King Street
Suite 200
Honolulu, Hawai'i 96819-3470

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
PROJECT: HILO HIGH SCHOOL NEW GYMNASIUM
DOE JOB NO. Q1-10-0207
TMK: (3) 2-3-015:001

In regards to the above-mentioned draft Environmental Assessment, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"**Fire Apparatus Access Roads**

"**Sec. 10.207.** (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

DARRYL OLIVEIRA
Fire Chief

GA:lpc

2024 North King Street
Suite 200
Honolulu Hawaii 96819-3470
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Chief Darryl J. Oliveira
Hawai'i Fire Department
County of Hawaii
25 Aupuni Street, Suite 2501
Hilo, Hawai'i 96720

Dear Chief Oliveira:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated December 10, 2009. The DOE acknowledges and will comply with the requirements of the Universal Fire Code (UFC), sections 10.207, Apparatus Access Roads, and 10.301(c), Water Supply, concerning the subject project.

We appreciated your review of the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8865

December 17, 2009

Mr. Brian Takeda
Planning Project Coordinator
R.M. Towill Corporation
2024 N. King Street, Suite 200
Honolulu, HI 96819

Dear Mr. Takeda:

Re: Draft Environmental Assessment for New Hilo High School Gym

Staff, upon reviewing the provided documents and visiting the proposed project site, does not anticipate any significant impact to traffic and/or other public safety concerns associated with this proposed project.

Thank you for allowing us the opportunity to comment.

If you need additional information, please contact Captain Kenneth Vieira, Commander of the South Hilo Patrol Division, at (808) 961-2214.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

KV:lli

"Hawai'i County is an Equal Opportunity Provider and Employer"

2024 North King Street
Suite 200
Honolulu Hawaii 96819-3470
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Mr. Derek D. Pacheko
Assistant Police Chief, Area 1 Operations
Police Department
County of Hawaii
349 Kapi'olani Street
Hilo, Hawai'i 96720-8865

Assistant Chief Pacheko:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education, thank you for your letter dated December 17, 2009. We acknowledge that the Police Department does not anticipate any significant impacts to traffic or have other public safety concerns regarding the proposed project.

We appreciated your review of the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda
Planning Project Coordinator

BT/
cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

LINDA LINGLE
GOVERNOR

Planning Section Rec'd
DEC 2 3 2009
Fac. Dev. Branch

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-PS
2.4133

December 21, 2009

Ms. Brenda Lowrey
State of Hawaii
Department of Education
4680 Kalanianaole Highway
Honolulu, Hawaii 96821

Dear Ms. Lowrey:

Subject: Draft Environmental Assessment, Hilo High School New Gymnasium
DOE Job No. Q1-10-0207, Department of Education
Hawaii, South Hilo, TMK: (3) 2-3-015: 001

Thank you for the opportunity to review the Draft Environmental Assessment for the subject proposed new gymnasium that will meet current Department of Education standards for competitive events and will have up to 1,400 seats. We understand that use of the present 78-year old gym is limited to athletic practice, physical education classes, and community usage events because of its small size and limited support facilities and that the school's competitive athletic events are held in off-campus facilities, including the Walter Victor Stadium and the Afook-Chinen Auditorium.

We have the following comments:

1. Section 2, Project Description, indicates that the gym will be constructed in two phases with the basic structure in Phase 1 and bleacher seating on both sides of the gym to accommodate 1,400 people and additional parking in Phase 2. We suggest that the DOE include the number of additional parking spaces for cars and buses to be added to accommodate the anticipated use and show the proposed new parking area in a larger and legible site plan.

2. With the traffic control measures identified in Section IV(B) of the Traffic Impact Analysis Report, we do not anticipate any major traffic impacts on State Route 19 from the proposed project.

If you have any questions, please contact Ken Tatsuguchi, Head Planning Engineer, at the Highways Division, 587-1830.

Very truly yours,

BRENNON T. MORIOKA, Ph.D, P.E.
Director of Transportation

c: Mr. Brian Takeda, Planning Project Coordinator

2024 North King Street
Suite 200
Honolulu Hawaii 96819-3470
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Mr. Brennon T. Morioka, Ph.D., P.E.
Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

Dear Director Morioka:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated December 21, 2009 concerning the subject project. We have prepared the following in response to your comments (your comments have been *italicized* for reference):

1. *Section 2, Project Description, indicates that the gym will be constructed in two phases with the basic structure in Phase 1 and bleacher seating on both sides of the gym to accommodate 1,400 people and additional parking in Phase 2. We suggest that the DOE include the number of additional parking spaces for cars and buses to be added to accommodate the anticipated use and show the proposed new parking area in a larger and legible site plan.*

This comment is acknowledged. The DOE will submit the construction drawings for the new gymnasium and parking area for review by the Department of Public Works and DOT, as appropriate, during the plan review and permitting stage. According to the project architect there are 41 existing stalls including 2 handicapped stalls present at the existing project site. 25 of these stalls will be demolished to make way for the new gymnasium. Almost all of these stalls are planned to be replaced as follows:

Existing Remaining Stalls: 16 stalls
Construction of Phase 1: 13 stalls (including 8 handicapped stalls)
Construction of Additive Alternate 3 (if accepted): 11 stalls (including 2 handicapped stalls)
Total Provided: 40 stalls

2. *With the traffic control measures identified in Section IV(B) of the Traffic Impact Analysis Report, we do not anticipate any major traffic impacts on State Route 19 from the proposed project.*

We acknowledge that the Department of Transportation (DOT) does not anticipate any major traffic impacts to State Route 19 as a result of the proposed project.

We appreciated your review of the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 5, 2010

Department of Education
4680 Kalanianaole Highway
Honolulu, Hawaii 96821

Attention: Ms. Brenda Lowrey, AIA, LED AP

Ladies and Gentlemen:

Subject: Draft Environmental Assessment for Hilo High School New Gymnasium

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Aquatic Resources, Engineering Division, Land Division-Hawaii District, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

for Morris M. Atta
Administrator

Cc: RM Towill Corporation

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2009 DEC 11 A 10:51
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 5, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
__Office of Conservation & Coastal Lands
x Land Division Hawaii District
x Historic Preservation

FROM: for Morris M. Atta
SUBJECT: Draft Environmental Assessment for Hilo High School New Gymnasium
LOCATION: Island of Hawaii
APPLICANT: RM Towill Corporation on behalf of Department of Education

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 12.14.09

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 5, 2009

AQUATIC RESOURCES 2754

DIRECTOR	
COMM. FISH.	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
RCUH/UH	
STATISTICS	
AFRC/FED AID	
EDUCATION	
SECRETARY	
OFFICE SVCS	
TECH ASST	X
Return to:	
Copies to:	
Due Date:	

RECEIVED
LAND DIVISION
2009 DEC 18 A 10:11
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
DEC 8 2009
AQUATIC RESOURCES

MEMORANDUM

TO: **DLNR Agencies:**
- x Div. of Aquatic Resources
- __Div. of Boating & Ocean Recreation
- x Engineering Division
- __Div. of Forestry & Wildlife
- __Div. of State Parks
- x Commission on Water Resource Management
- __Office of Conservation & Coastal Lands
- x Land Division – Hawaii District
- x Historic Preservation

FROM: Morris M. Atta
SUBJECT: Draft Environmental Assessment for Hilo High School New Gymnasium
LOCATION: Island of Hawaii
APPLICANT: RM Towill Corporation on behalf of Department of Education

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(✓) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 16 Dec 2009

RECEIVED
2009 DEC 15 AM 9:59
DIV OF AQUATIC RESOURCES
HILO, HAWAII

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 5, 2009

RECEIVED
LAND DIVISION
2010 JAN -4 A 7:47
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
- x Div. of Aquatic Resources
- __Div. of Boating & Ocean Recreation
- x Engineering Division
- __Div. of Forestry & Wildlife
- __Div. of State Parks
- x Commission on Water Resource Management
- __Office of Conservation & Coastal Lands
- x Land Division – Hawaii District
- x Historic Preservation

FROM: Morris M. Atta
SUBJECT: Draft Environmental Assessment for Hilo High School New Gymnasium
LOCATION: Island of Hawaii
APPLICANT: RM Towill Corporation on behalf of Department of Education

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by January 5, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: Dicky Lee
Date: 12-29-09

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LM/MorrisAtta
REF.: DEA for Hilo High School New Gymnasium
Hawaii.005

COMMENTS

(X) **We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The Flood Insurance Program does not have any regulations for developments within Zone X.**

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Department of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

(X) **The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.**

( ) Additional Comments: _____

( ) Other: _____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: Dicky Lee
CARTY CHANG, ACTING CHIEF ENGINEER

Date: 12-29-09

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R. M. TOWILL CORPORATION
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Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Mr. Morris M. Atta, Administrator
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, Hawai'i 96809

Dear Mr. Atta:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated January 5, 2010 concerning the subject project. The following is prepared in response to the comments received from your various divisions (the comments have been *italicized* for reference):

Land Division – Hawai'i District
We have no comments.

This acknowledges that the Land Division has no comments.

Division of Aquatic Resources
We have no objections.

This acknowledges that the Division of Aquatic Resources has no objections.

Engineering Division
We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The Flood Insurance Program does not have any regulations for developments within Zone X.

The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update

This acknowledges the comments from the Engineering Division. As noted in the Draft EA, the proposed new gymnasium is identified as within Zone X. This designation is not anticipated to significantly impact the proposed project.

The request for water demand and supporting calculations will be forwarded to the DOE for appropriate action, including coordinating the reporting requirements with the Engineering Division.

No other comments were received from other DLNR divisions.

We appreciated your review of the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/
cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

COMMENTS AFTER BRIEF REVIEW OF ENVIRONMENTAL IMPACT STUDY FOR HILO HIGH SCHOOL GYMNASIUM

On 1-6-09
By KEVIN WILCOX

I have reviewed the Hilo High School New Gymnasium DOE Job No. Q1-10-02-07 Draft Enfironmental Assessment dated Nov 2009. I am certainly not against this project out of hand just because I live nearby, the "not in my backyard" principle. I do believe the principle of "good fences make good neighbors" does apply. I do not think this report adequately addresses several issues important to my neighborhood.

TRAFFIC

Main p42-43: sites appendix B report, and states, "the school is committed to pro-actively addressing traffic concerns for all events prior to the need for mitigation…"

- *I think the needed mitigating steps will be quite costly and tedious. The guidelines are only guidelines. With what weight will they be enforced.*
- *who will pay for them?*

APPENDIX B: Draft traffic Impact Analysis, dated Sept 24, 2009

- A 19 page report
- Largely based on observation of an event with estimated 100 people attending, and extrapolated to one with 1,400 people attending
- The reports estimates a full size event will generate 840 vehicle trips, while the full parking availability is only 480 parking places.
  - **"The remaining 340 vehicles are expected to drop off passengers along Waianuenue Ave and/or seek on-street parking in the vicinity"**
  - The 480 available fully utilizes the parking at all 3 adjacent schools, and is up to 1,500 feet away.
  - I question whether 340 street parking is acceptable.
- a mitigating measure proposed is shuttling from off site parking.
  - What off site parking sites would regularly be available for these events that are not already in use most Saturdays?
- An obvious solution that is expensive and possibly unsightly is multilevel parking.
- An intermediate solution is a parking lot at corner of Kaiulani and Wainuinui, downhill from Annex. This idea would also provide reasonable parking within about 500 feet for daily use of the Gym.

NOISE
Main: Page 37: 4.1.8: only addresses construction noise.

- *I do not find discussion of limits to timing and amplification of events. These may be controlled by existing regulations, but I would like to know what the regulations are.*

LIGHTS
1. I did not find the issue of outside lighting addressed in this report.
2. The track light already in existence has already demonstrated that this is a significant issue. It has been the topic of multiple communications between Reed's island homeowners and the high school in the past.
3. I suspect this is no issue, but would like to know this.

SUMMARY OF MY EVALUATION:
Overall, I do not believe this facility is intended simply to replace existing facilities on campus. It will allow for the hosting of larger tournaments and events, bringing in large numbers of people from other schools and islands. This document itself gives strong evidence that the current plan will not be able to adequately handle these events. Parking is the main problem to be addressed. There needs to be budgited either further construction for parking, or a significant per event expenditure (for parking attendants and shuttle services). This facility at this size should not be started unless funding to allow appropriate us of the facility is provided for. Guidelines that will be used to keep impact of parking, noise, crowds, and lights on the local neighborhoods should be more clearly stated.

Mahalo
Kevin Wilcox
225 Kaiulani
kcwilcox@hotmail.com
(808)937-7884
w: 933-0625

deleated from my comments

Impact of view planes (scenic vistas)
See main page 63, item #12: will have to be addressed by residents who can see the proposed site from their property. From Kaiulani Ave Roadway and maps in report does does not appear like a large issue to me. From p109 of PDF, same as p4 of appendix A, it appears there are no structures closer than 300 feet, and it appears to me doubtful this structure would impact on a significant view. The report states the nearest structure is 400 feet away.

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Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Mr. Kevin Wilcox
225 Kaiulani Street
Hilo, Hawai'i 96720

Dear Mr. Wilcox:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education, thank you for your letter dated January 6, 2010. The following has been prepared in response to your comments (your comments have been *italicized* for reference):

Traffic

1. *Main p42-43: sites appendix B report, and states, "the school is committed to pro-actively addressing traffic concerns for all events prior to the need for mitigation…"*
   - *I think the needed mitigating steps will be quite costly and tedious. The guidelines are only guidelines. With what weight will they be enforced.*
   - *who will pay for them?*

The mitigative measures described in the DEA correctly and accurately represent the commitment of the Hilo High School to address the potential for adverse traffic impacts to the community from use of the new facility. The steps described are not merely guidelines. A licensed professional traffic engineer has identified proactive and tangible actions that can be taken to reduce the potential for adverse impacts. In summary, these steps include:

The posting of event parking locations and driving directions to minimize inadvertent travel when coming to school events.

Sending out flyers ahead of scheduled events with a map of parking locations and a reminder to carpool.

The use of traffic cones and temporary signage at campus driveways to limit left turns and reduce congestion.

Providing school security staff to help direct traffic flow into and out of the various campus driveways.

The cost for implementing these steps will be borne by the DOE and Hilo High School.

2. *APPENDIX B: Draft traffic Impact Analysis, dated Sept 24, 2009*
   - *A 19 page report*
   - *Largely based on observation of an event with estimated 100 people attending, and extrapolated to one with 1,400 people attending*
   - *The reports estimates a full size event will generate 840 vehicle trips, while the full parking availability is only 480 parking places.*
     - *"The remaining 340 vehicles are expected to drop off passengers along Waianuenue Ave and/or seek on-street parking in the vicinity"*
     - *The 480 available fully utilizes the parking at all 3 adjacent schools, and is up to 1,500 feet away.*
     - *I question whether 340 street parking is acceptable.*
   - *a mitigating measure proposed is shuttling from off site parking.*
     - *What off site parking sites would regularly be available for these events that are not already in use most Saturdays?*
   - *An obvious solution that is expensive and possibly unsightly is multilevel parking.*
   - *An intermediate solution is a parking lot at corner of Kaiulani and Wainuinui, downhill from Annex. This idea would also provide reasonable parking within about 500 feet for daily use of the Gym.*

The data and findings provided in the Draft Traffic Impact Analysis were performed by a licensed professional traffic engineer who has performed many similar analyses throughout the State of Hawai'i. Consequently, the DOE has no reason to expect that the analysis does not constitute a fair and reasonable expectation of anticipated future conditions associated with the use of the gym.

The design and construction of a multilevel parking facility is neither feasible nor required for the anticipated infrequent use of the proposed new gymnasium. As noted in the DEA these events are anticipated to take place only once or twice per year.

We appreciated your suggestion for parking at the corner of Ka'iulani and Wainuinui streets. The DOE will review this suggestion for future applicability.

Noise

3. *Main: Page 37: 4.1.8: only addresses construction noise.*
   - *I do not find discussion of limits to timing and amplification of events. These may be controlled by existing regulations, but I would like to know what the regulations are.*

The generation of noise is regulated through Hawai'i Revised Statutes (HRS), Chapter 342F, Noise Pollution. The agency responsible for enforcing noise is the State Department of Health (DOH), Indoor and Radiological Health Branch. According to the DOH, while the generation of noise from any school activity between the hours of 7:00 a.m. through 10:00 p.m. is exempt from the HRS, the principal of the school should be contacted to help resolve any noise related problems that might occur. Any school generated noise outside of these hours is not exempt.

While we understand that noise may be of concern to some of our surrounding neighbors, once the new gymnasium is constructed any noise generated from the existing gym will be reduced. In order to control noise from the new gymnasium an acoustical engineer participated in the project's design. Acoustical design provisions are proposed within the building to help with interior acoustics which will also absorb some of the sound to the exterior. Compared to the current gymnasium in which the entire top of the building is open to the outside, this new gym will have much more sound control.

Lights

4. *1. I did not find the issue of outside lighting addressed in this report.*
5. *2. The track light already in existence has already demonstrated that this is a significant issue. It has been the topic of multiple communications between Reed's island homeowners and the high school in the past.*
6. *3. I suspect this is no issue, but would like to know this.*

The new gymnasium will be a covered facility and any outside lighting that is required will be accessory to the facility and will include building and pathway lighting to provide visibility during night time hours. All lighting used is planned to be shielded to reduce the incidence of upward glare. This level of lighting is expected to be significantly less than used for the outdoor track.

Summary

7. *Overall, I do not believe this facility is intended simply to replace existing facilities on campus. It will allow for the hosting of larger tournaments and events, bringing in large numbers of people from other schools and islands. This document itself gives strong evidence that the current plan will not be able to adequately handle these events. Parking is the main problem to be addressed. There needs to be budgited [sic] either further construction for parking, or a significant per event expenditure (for parking attendants and shuttle services). This facility at this size should not be started unless funding to allow appropriate us [sic] of the facility is provided for. Guidelines that will be used to keep impact of parking, noise, crowds, and lights on the local neighborhoods should be more clearly stated.*

While we may not necessarily agree with this assessment we acknowledge the comment and note the following:

The proposed gymnasium is considered a necessary project. The existing 1930s era gymnasium can no longer provide the required level of service needed by the community.

The continued educational use of the existing gymnasium is considered a practical and reasonable use of the facility given the shortage of funding for an alternative use of the existing site.

According to the DOE, the maximum capacity of the proposed gymnasium is expected to occur infrequently and not more than once or twice a year. It is only during these temporary periods when it is anticipated that further effort by the school will be needed to address the potential for traffic congestion. Based on the traffic assessment performed for this project, the use of on-street parking is a viable means of addressing the potential for vehicular congestion

Refer to the comments above pertaining to mitigative measures to address impacts associated with noise and lighting.

We appreciated your review of the subject document. Should you have any further comments please contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

Comments on Draft Environmental Assessment for Hilo High School Gymnasium

January 7, 2010

Barbara Andersen
131 Kaiulani Street
Hilo, Hawai`i 96720

bighouse@bigisland.com

First let me say that our neighborhood, which will be directly affected by this new gymnasium's location, traffic, lighting, parking (or lack of), and noise, was not included in any of the planning discussions, nor were we notified about them. With that in mind, I had a lot of comments for the EA, and I apologize for the length.

Location:

- The height variance request stated: *The gymnasium building will be an integral part of Hilo High School. ...The gym's proposed location which is adjacent to the existing track will be consistent with its immediate surroundings and the overall context among the various school buildings. The architecture of the new gymnasium ...will maintain the character of the school and surrounding buildings.*

- This isn't so. The building closest to it will be the historic Riverside School building ("Existing building 'C'), and the gym doesn't blend with it. No other campus buildings are 'in the immediate surroundings', and the gym's distant location from the main campus does *not* make it an 'integral part' of HHS.
- This lower part of TMK (3)2-3-0:15 is adjacent to the downtown area covered by **EnVision Downtown Hilo 2025**, which extends west to Ka`iulani Street, and seeks to keep buildings low and in keeping with the historic character of Hilo.

Anyone reading the Draft EA, who isn't familiar with Hilo or Hilo High School's location, would assume the old gym is being removed so a new one could be built in its place in the middle of the campus. Actually, the old one will continue to house athletic and evening classes, and the new one will be built ¼ mile down Wai`anuenue Avenue.

I understand the need for an updated gym, but **a gym should be located up in the main campus itself, not a quarter-mile away.** The plans are for a beautiful wish-come-true gym, as one would expect for $21 million(!), but it's in the wrong place. It separates the athletic department from the rest of the school. There will be issues in getting students to the gym (public sidewalks? kids drifting onto Waianuenue Avenue?) for assemblies.

Noise:

- The Draft EA has dealt with construction noise, but not with the ongoing noise of having a 1400-seat gym in the neighborhood, with cheering, foot-pounding on bleachers, microphones, bouncing balls, etc. <u>The noise is one of our biggest concerns.</u> **Gymnasiums are noisy, and from a taller building, sound will carry further**—and there will be *a lot* of noise inside during tournaments, etc. This is a residential area. As it is now, we, through the trees and down near the wooden bridge on Kaiulani, hear daytime assemblies from up at Hilo High School.

- How will noise (going out of the building) be controlled so as not to adversely impact the surrounding neighborhoods? How late at night there will be noise? Its volume? Will the gym be somehow insulated for sound?

Soil & Water:

- <u>Landslide</u>: A few years ago (within the past 5), a chunk of land on the gulch side of the cottages slid downhill. ...Just to let you know. (We live across the gulch, heard and saw it.) Erosion control should be done.

- Waikapu Stream/River is directly below the construction site, into which the 'ditch' empties. It is not listed as being potentially impacted by the construction, but it would be if the ditch was compromised somehow. There are some historic sites along it from just below the DOE to where it meets the Wailuku River at the old Riverside Park and fountain.

- Right now, the 'ditch' is known and frequented by some students, but will be seen and passed by countless people once the gym is completed. It will be out in the open. Is there/will there be a fence or barrier to keep people or things from washing over the cliff into the gulch and Waikapu Stream? It is a long drop.

Traffic:

- The trip-generation study assumes 25% of the attendees would come by bus—highly unlikely in Hilo, where we do not have an extensive, comprehensive bus system like HRT. I think the estimated car count is way too low, but even assuming it to be correct, it is unreasonable to expect the 300-400 cars that cannot park at the schools to find street parking within a reasonable distance to the gym. Hilo doesn't have that kind of street parking, and a potential half of assumed streets for parking (behind a gym) do not exist because of the gulch.

- The traffic pattern plan looks like an exercise in frustration, and a major traffic jam, with jug-handle movements vs. people jostling for parking places, no drop-offs....

- Will a traffic light be needed at the gym's driveway?

- Holding high school assemblies ¼ mile away from the main campus buildings—how many will wander off and leave campus instead of going to the gym? Several hundred students walking down Wai`anuenue sidewalk at one time? Who will keep them on the sidewalk and out of the road? Is there another route to the gym besides the handicap bridge?

Lighting:

- What kind of lighting will there be? Consideration for surrounding neighborhoods, as well as the observatories on Mauna Kea, is needed.

Under **9.3 Significance Criteria & 4.1.4 Flora/Fauna Resources**

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource
The proposed project will not result in the loss of natural or cultural resources. There are no threatened or endangered flora or fauna species or habitat that are known to be present at the project site.

- **Hawaiian Hoary Bats** live in the trees along the top of Waikapu Stream ("the gulch"), especially in the mango trees just makai of the gym site. The bats are rare, endangered and federally protected. When Easter Seals cut down trees and expanded their parking lot several years ago, our gulch bat population dropped drastically, but UHH students tracking bats with radio devices [a couple years ago] said there were bats courting in the area again. The bats fly out to forage from just before dusk until dawn. We do not want bats affected by **the noise and lights** of a gym.
- **The Hawaiian hawk** often nests in the large trees along the top of the gulch.
- Other area birds not listed include the Chinese Thrush.

2. Curtails the range of beneficial uses of the environment
Presently, the subject property is used as the campus of the Hilo High School. The proposed project will provide a new replacement gymnasium and will be located entirely within the school property. The proposed action does not curtail beneficial uses of the environment.

- It may be on DOE property, but the site is not used as the HHS campus. That would imply students are using the site, walking across it, having classes on it, which they are not. It is nearly ¼ mile from the cafeteria, office and classroom buildings. It is not an integral part of the high school campus.

5. Substantially affects public health
Factors affecting public health, including air quality, water quality, and **noise levels**, are expected to be only minimally affected, or unaffected by the proposed construction activity. Potential impacts will be mitigated in accordance with regulations of the State of Hawai'i and County f of Hawai'i.

- This only addresses noise during construction. What about noise when the gym is in use?

7. Involves a substantial degradation of environmental quality
Impacts to air and water quality, **noise** levels, natural resources, and land use associated with the planned improvements are anticipated to be minimal. Mitigation measures will be employed as practicable to further minimize potentially detrimental effects to the environment resulting from project activities. The proposed project does not involve substantial degradation of environmental quality.

- Once again, there will be considerable noise to the surrounding area when the gym is in use.

8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions
The proposed project is not expected to cause adverse cumulative impacts to the environment nor involve a commitment for larger actions. The project is limited to the construction of a new gymnasium.

- It will involve a commitment for larger actions just with the parking issues alone.

9. Substantially affects a rare, threatened or endangered species
There are no known rare, threatened or endangered plants or animal species on the subject property. Substantial impacts to rare, threatened or endangered species are not anticipated.

- See **Hawaiian Hoary Bat**, above.

*10. Detrimentally affects air or water quality or **ambient noise levels***
On a short-term basis, ambient air and noise conditions will be influenced by construction activities related to the proposed facility improvements. The potential for adverse impacts will be short-term in duration and will be controlled by mitigation measures as described in this Environmental Assessment. **Once the project is completed,** air and **noise in the project vicinity will be allowed to return to preconstruction conditions.**

- How will that be, with a gym full of kids and sporting events during the day and at night, not to mention weekends? Please address the noise issue.

- **The W.H. Shipman House is on both the National Register and the Hawaii State Historic Register**, yet was somehow overlooked in the Archaeological part of the draft EA. Shipman House will be heavily impacted by noise from the gym, as it is directly across Waikapu Stream from the proposed gym.
- The myths and area history were very well-done.

- Viewplanes—It will affect the view from the historic Shipman House to the north of the proposed gym. Perhaps that can be solved with [very] tall trees? (The noise is more of a concern.)

- A neighbor, Kathy Montvel-Cohen, emailed to say: There is both a large Monkeypod tree and Bodhi Tree on the makai side of the building's [old Riverside School, "Building C"] parking lot. They are visible from Ka'iulani St. The Bodhi Tree is the one on the right, the Monkeypod on the left, closer to Wai'anuenue. There is a photo of the 'Bodhi Tree' on page 56 of the 1991 book published by The Outdoor Circle entitled, 'Majesty II, The Exceptional Trees of Hawaii'.
- She told me they are protected, so this should go into the report for future information on the property.

Section 10: Findings

<snip> it is anticipated that the project will have no **significant adverse impact to** water quality, air quality, existing utilities, **noise levels**, social welfare, archaeological sites, **or wildlife habitat**. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.

- It *will* have an ongoing impact...There are still the issues of noise, lights and bats, and those are *not* temporary impacts.

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SINCE 1930

Planning
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Environmental Services
Photogrammetry
Surveying
Construction Management

April 28, 2010

Ms. Barbara Anderson
131 Kaiulani Street
Hilo, Hawai'i 96720

Dear Ms. Anderson:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated January 7, 2010. The following has been prepared in response to your comments (your comments have been *italicized* for reference):

1. Location

- *The height variance request stated: The gymnasium building will be an integral part of Hilo High School. ...The gym's proposed location which is adjacent to the existing track will be consistent with its immediate surroundings and the overall context among the various school buildings. The architecture of the new gymnasium ...will maintain the character of the school and surrounding buildings.*
- *This isn't so. The building closest to it will be the historic Riverside School building ("Existing building 'C'), and the gym doesn't blend with it. No other campus buildings are 'in the immediate surroundings', and the gym's distant location from the main campus does not make it an 'integral part' of HHS.*

The proposed new gymnasium was designed in consultation with the State Historic Preservation Division (SHPD) to maintain consistency with the area surroundings and use for a public high school facility. As noted, Building C is recognized as a historic structure and efforts have been taken by the DOE to preserve it. For example, the gym footprint was sited as far away from Building C as possible, and the proposed gym site is parallel to the drainage ditch and as close as possible to Waiānuenue Street. In addition, the gym's apparent visual height was reduced by introducing secondary lower roof elements which helps to reduce the visual appearance of walls and breaks the roof of the new gym into high and low sections which further reduces visual bulk and the sense of height. Landscaping will help to further soften and minimize the height and the size of the gym.

- *This lower part of TMK (3)2-3-0:15 is adjacent to the downtown area covered by **EnVision Downtown Hilo 2025**, which extends west to Ka`iulani Street, and seeks to keep buildings low and in keeping with the historic character of Hilo.*

Anyone reading the Draft EA, who isn't familiar with Hilo or Hilo High School's location, would assume the old gym is being removed so a new one could be built in its place in the middle of the campus. Actually, the old one will continue to house athletic and evening classes, and the new one will be built ¼ mile down Wai`anuenue Avenue.

The Draft EA, Section 2, Project Description, noted that the existing gymnasium will be retained by the school and used for physical education and other curriculum. There was never any representation that the existing gym structure would be demolished or removed.

The new gymnasium will be located next to the existing athletic field and is a logical and practical site for the facility given the clear limitations of space present at the Hilo High School Campus. See Figure 2 Proposed Gymnasium Site Location & Plan, which clearly shows the existing uses and limited space that is available.

*I understand the need for an updated gym, but **a gym should be located up in the main campus itself, not a quarter-mile away.** The plans are for a beautiful wish-come-true gym, as one would expect for $21 million(!), but it's in the wrong place. It separates the athletic department from the rest of the school. There will be issues in getting students to the gym (public sidewalks? kids drifting onto Waianuenue Avenue?) for assemblies.*

The DOE shares the desire to locate the new gymnasium within the existing main campus, however, this is not possible or feasible. The main campus is presently fully utilized with classrooms, cafeteria, auditorium, administration, and other functions that are essential to the operation of the Hilo High School. The decision to locate the new gymnasium was based on practical considerations involving the limited availability of space.

For clarification we note that the proposed project was not the result of a *wish-come-true*, but on the need to provide a facility that is sufficient in space and capable of serving the needs of the students and community. The existing 1930s era gym cannot fulfill these requirements.

2. Noise

- *The Draft EA has dealt with construction noise, but not with the ongoing noise of having a 1400-seat gym in the neighborhood, with cheering, foot-pounding on bleachers, microphones, bouncing balls, etc. The noise is one of our biggest concerns. **Gymnasiums are noisy, and from a taller building, sound will carry further**—and there will be a lot of noise inside during tournaments, etc. This is a residential area. As it is now, we, through the trees and down near the wooden bridge on Kaiulani, hear daytime assemblies from up at Hilo High School.*
- *How will noise (going out of the building) be controlled so as not to adversely impact the surrounding neighborhoods? How late at night there will be noise? Its volume? Will the gym be somehow insulated for sound?*

The present Hilo High School gymnasium was constructed in the 1930s. During this over 80 year period of time it has functioned serving both students and the community by providing a place for local school and indoor sporting events. While we understand that noise may be of concern to some of our surrounding neighbors, once the new gymnasium is constructed any noise generated from the existing gym will be reduced. In order to control noise from the new gymnasium an acoustical engineer participated in the project's design. Acoustical design provisions are proposed within the building to help with interior acoustics which will also absorb some of the sound to the exterior. Compared to the current gymnasium in which the entire top of the building is open to the outside, this new gym will have much more sound control.

3. Soil & Water

- *Landslide: A few years ago (within the past 5), a chunk of land on the gulch side of the cottages slid downhill. ...Just to let you know. (We live across the gulch, heard and saw it.) Erosion control should be done.*
- *Waikapu Stream/River is directly below the construction site, into which the 'ditch' empties. It is not listed as being potentially impacted by the construction, but it would be if the ditch was compromised somehow. There are some historic sites along it from just below the DOE to where it meets the Wailuku River at the old Riverside Park and fountain.*
- *Right now, the 'ditch' is known and frequented by some students, but will be seen and passed by countless people once the gym is completed. It will be out in the open. Is there/will there be a fence or barrier to keep people or things from washing over the cliff into the gulch and Waikapu Stream? It is a long drop.*

Appropriate engineering and safety practices are employed for all DOE construction projects. This includes ensuring that the proposed project is constructed in accordance with all applicable regulatory requirements of the State and County of Hawai'i. As required, fencing will be installed by the DOE to limit pedestrian access to safe areas. The existing ditch will not be affected by this project.

4. Traffic

- *The trip-generation study assumes 25% of the attendees would come by bus—highly unlikely in Hilo, where we do not have an extensive, comprehensive bus system like HRT. I think the estimated car count is way too low, but even assuming it to be correct, it is unreasonable to expect the 300-400 cars that cannot park at the schools to find street parking within a reasonable distance to the gym. Hilo doesn't have that kind of street parking, and a potential half of assumed streets for parking (behind a gym) do not exist because of the gulch.*
- *The traffic pattern plan looks like an exercise in frustration, and a major traffic jam, with jug-handle movements vs. people jostling for parking places, no drop-offs....*
- *Will a traffic light be needed at the gym's driveway?*
- *Holding high school assemblies ¼ mile away from the main campus buildings—how many will wander off and leave campus instead of going to the gym? Several hundred students walking down Wai`anuenue sidewalk at one time? Who will keep them on the sidewalk and out of the road? Is there another route to the gym besides the handicap bridge?*

The DOE is committed to maintaining public safety for the users of its facilities. The situation involving the infrequent use of the gym is expected to occur only one or two times during the year. During these periods the mitigation measures as recommended in the Traffic Impact Analysis will be implemented. As noted in the Draft EA mitigation will include, but not be limited to, the following:

The posting of event parking locations and driving directions to minimize inadvertent travel when coming to school events.

Sending out flyers ahead of scheduled events with a map of parking locations and a reminder to carpool.

The use of traffic cones and temporary signage at campus driveways to limit left turns and reduce congestion.

Providing school security staff to help direct traffic flow into and out of the various campus driveways.

A traffic light is not anticipated to be required at the driveway based on the infrequency of large gymnasium events.

All pedestrians who attend functions at the gymnasium are expected to exercise safety while using the area including the roadway shoulders and sidewalks. This is a normal expectation that is not inconsistent with the public's use of any County of Hawai'i or State right of way.

5. Lighting

- *What kind of lighting will there be? Consideration for surrounding neighborhoods, as well as the observatories on Mauna Kea, is needed.*

The lighting fixture specifications have not yet been determined. However, the selection of lighting fixtures will be based on reducing unwanted upward glare for the following reasons: (1) To reduce disturbing area residents during night time activities. Because the gymnasium is a covered facility the amount of lighting required is expected to be less that that needed for the adjoining athletic field; (2) To reduce the effects of glare to any threatened or endangered avifaunal species that may overfly the area; and (3) To reduce the effects of glare on Hawai'i observatories.

6. Significance Criteria

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource*
   - ***Hawaiian Hoary Bats** live in the trees along the top of Waikapu Stream ("the gulch"), especially in the mango trees just makai of the gym site. The bats are rare, endangered and federally protected. When Easter Seals cut down trees and expanded their parking lot several years ago, our gulch bat population dropped drastically, but UHH students tracking bats with radio devices [a couple years ago] said there were bats courting in the area again. The bats fly out to forage from just before dusk until dawn. We do not want bats affected by **the noise and lights** of a gym.*
   - ***The Hawaiian hawk** often nests in the large trees along the top of the gulch.*
   - *Other area birds not listed include the Chinese Thrush.*

The proposed project is not anticipated to adversely impact the species you have identified. While it is possible that the Hawaiian Hoary Bat and Hawaiian Hawk may be present in the area surrounding the proposed new gymnasium, the area is already subject to extensive human disturbance from students, staff, faculty and visitors to the high school property. We also note that the Department of Land and Natural Resources, and the U. S. Fish and Wildlife Service, have been provided a copy of the Draft EA for this project and will provide guidance, as applicable, regarding the protection of any rare, threatened and endangered species. The DOE will comply with and coordinate the recommendations that these agencies may provide.

2. *Curtails the range of beneficial uses of the environment*
   - *It may be on DOE property, but the site is not used as the HHS campus. That would imply students are using the site, walking across it, having classes on it, which they are not. It is nearly ¼ mile from the cafeteria, office and classroom buildings. It is not an integral part of the high school campus.*

The location proposed for the new gymnasium is on DOE property which is considered appropriate for the construction of a school facility serving both the needs of its students and community. As noted in the Draft EA, the proposed project is necessary because of the age and limited capacity of the existing 1931 era gym.

5. *Substantially affects public health*
   - *This only addresses noise during construction. What about noise when the gym is in use?*
7. *Involves a substantial degradation of environmental quality*
   - *Once again, there will be considerable noise to the surrounding area when the gym is in use.*

See the response to item no. 2, Noise, above.

8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions*
   - *It will involve a commitment for larger actions just with the parking issues alone.*

The commitment required to address the potential for traffic impacts during the larger events that would occur only one to two times during the year will include the mitigation measures as outlined in the Draft EA. No further actions involving larger commitments of resources are anticipated to be required.

9. *Substantially affects a rare, threatened or endangered species*
   - See **Hawaiian Hoary Bat**, above.

See the response to item no. 6.1., Involves an irrevocable commitment to loss or destruction of any natural or cultural resource, above.

10. *Detrimentally affects air or water quality or* ***ambient noise levels***
    - *How will that be, with a gym full of kids and sporting events during the day and at night, not to mention weekends? Please address the noise issue.*

See the response to item no. 2, Noise, above.

- ***The W.H. Shipman House is on both the National Register and the Hawaii State Historic Register****, yet was somehow overlooked in the Archaeological part of the draft EA. Shipman House will be heavily impacted by noise from the gym, as it is directly across Waikapu Stream from the proposed gym.*

The potential for noise impacts to the Shipman House located across the stream are not anticipated. See the response to item no. 2, Noise, above, regarding the potential for noise impacts to area residents.

- *The myths and area history were very well-done.*

- *Viewplanes—It will affect the view from the historic Shipman House to the north of the proposed gym. Perhaps that can be solved with [very] tall trees? (The noise is more of a concern.)*
- *A neighbor, Kathy Montvel-Cohen, emailed to say: There is both a large Monkeypod tree and Bodhi Tree on the makai side of the building's [old Riverside School, "Building C"] parking lot. They are visible from Ka'iulani St. The Bodhi Tree is the one on the right, the Monkeypod on the left, closer to Wai'anuenue. There is a photo of the 'Bodhi Tree' on page 56 of the 1991 book published by The Outdoor Circle entitled, 'Majesty II, The Exceptional Trees of Hawaii'.*
- *She told me they are protected, so this should go into the report for future information on the property.*

The Monkeypod and Bodhi trees identified above will not be affected by the proposed project based on their location outside of the project boundary.

7. Section 10: Findings

- *It will have an ongoing impact...There are still the issues of noise, lights and bats, and those are not temporary impacts.*

This comment is acknowledged. The Final EA will indicate the potential for adverse impacts associated with the generation of noise and use of night time lighting during operation of the gymnasium. See the response to item no. 6.1., Involves an irrevocable commitment to loss or destruction of any natural or cultural resource, above, concerning the potential for adverse effects to the Hawaiian Hoary Bat.

We appreciated your review of the subject document. Should you have any further comments please direct them to the undersigned.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

County of Hawai'i
PLANNING DEPARTMENT
Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720
Phone (808) 961-8288 • Fax (808) 961-8742

January 8, 2010

Mr. Brian Takeda
R.M. Towill Corporation
2024 North King Street
Suite 200
Honolulu, Hawai'i 96819

Dear Mr. Takeda:

SUBJECT: Review of Draft Environmental Assessment
Project: Hilo High School New Gymnasium
TMK: (3) 2-3-015:001; Pi'ihonua, South Hilo, Hawai'i

Thank you for your letter dated December 4, 2009, requesting comments from this office regarding the Draft Environmental Assessment (DEA) for the Hilo High School New Gymnasium.

The Department of Education (DOE) proposes to construct a new gymnasium to provide an improved facility that will meet current DOE standards and be capable of hosting school sponsored sporting events. The proposed project will require the demolition of existing cottages, construction of the gym, and provisions for parking, grassing, and landscaping.

The subject property is zoned RS-7.5 (Single-Family Residential- 7,500 square foot minimum lot size) and is situated within the State Land Use Urban District. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006); the subject property is designated as Medium Density Urban by the Land Use Pattern Allocation Guide. The subject property is not within the Special Management Area (SMA).

The proposed project will include the demolition and removal of the existing cottages located adjacent to the District Annex Building C. The DEA should include discussion as to the disposal of the demolished structures. They must be properly disposed of at an

approved waste disposal site. The County of Hawai'i Environmental Management should be consulted regarding the proper disposal methods.

There are some clarifications regarding Section 6 of the DEA, the necessary permits and approvals that may be required. Section 6 lists the Building Permit Application and Grading Permit Application under the County of Hawai'i Planning Department. Please note that although Planning Department approval is required on these applications, they are both administered by the County of Hawai'i Department of Public Works. In addition, the Plan Approval Application is listed under the State of Hawai'i Department of Education, Facility & Support Services Branch, however, Plan Approval may only be issued by the County of Hawai'i Planning Director.

We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Final Environmental Assessment for our records.

If you have any further questions or if you need further assistance, please feel free to contact this office.

Sincerely,

BJ Leithead Todd

BJ LEITHEAD TODD
Planning Director

BJM:cs
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cc: Department of Education
State of Hawai'i
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April 28, 2010

Ms. Bobby Jean Leithead Todd
Planning Director
Planning Department
County of Hawai'i
Aupuni Center
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720

Dear Ms. Leithead Todd:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated January 8, 2010. We have prepared the following in response to your comments (your comments have been *italicized* for convenience):

1. *The subject property is zoned RS-7.5 (Single-Family Residential- 7,500 square foot minimum lot size) and is situated within the State Land Use Urban District. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006); the subject property is designated as Medium Density Urban by the Land Use Pattern Allocation Guide. The subject property is not within the Special Management Area (SMA).*

   This comment is acknowledged. The additional detail provided will be used in preparing the Final Environmental Assessment (FEA) for this project.

2. *The proposed project will include the demolition and removal of the existing cottages located adjacent to the District Annex Building C. The DEA should include discussion as to the disposal of the demolished structures. They must be properly disposed of at an approved waste disposal site. The County of Hawai'i Environmental Management should be consulted regarding the proper disposal methods.*

   This comment is acknowledged and will be noted in the FEA. All materials generated on-site from the demolition activities will be properly disposed of at a County of Hawai'i approved waste disposal facility. Furthermore, all disposal shall be in accordance with the requirements of the County's Department of Environmental Management, Solid Waste Division.

3. *There are some clarifications regarding Section 6 of the DEA, the necessary permits and approvals that may be required. Section 6 lists the Building Permit Application and Grading Permit Application under the County of Hawai'i Planning Department. Please note that although Planning Department approval is required on these applications, they are both administered by the County of Hawai'i Department of Public Works. In addition, the Plan Approval Application is*

listed under the State of Hawai'i Department of Education, Facility & Support Services Branch, however, Plan Approval may only be issued by the County of Hawai'i Planning Director.

Thank you for noticing and providing this correction. The subject FEA will note the correct administration of the Building, Grading, and Plan Approval Permits.

4. *We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Final Environmental Assessment for our records.*

   This comment is acknowledged. A copy of the FEA for this project will be provided to the County Planning Department upon its publication.

We appreciated the time you have taken to review the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA, Kober Hanssen Mitchell Architects
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DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

January 15, 2010

Mr. Brian Taketa
R.M. Towill Corporation
2024 North King Street, Suite 200
Honolulu, HI 96819

DRAFT ENVIRONMENTAL ASSESSMENT
HILO HIGH SCHOOL NEW GYMNASIUM
TAX MAP KEY 2-3-015:001 (PORTION)

We have reviewed the subject Draft Environmental Assessment (DEA) and have the following comments:

1. Hilo High School and the existing gymnasium are currently served from an existing 16-inch waterline within Waiānuenue Avenue fronting the project site.

2. We will note that the DEA does not appear to address the impacts of the proposed new gymnasium and related facilities on our existing water system. As the project proposes to demolish the existing gymnasium and construct a new, larger gymnasium and related facilities, the Department will request estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, be submitted showing the additional water demand that will be generated by the project.

   Upon review and approval of the calculations, the Department will determine if the facilities serving the existing gymnasium are adequate to support the new gymnasium and related facilities. If the existing facilities are inadequate, the installation of a larger or additional meter may be required and additional facilities charges may apply.

3. If the applicant is proposing to utilize an existing meter to serve the project, the applicant must inform the Department, in writing, the account number of the meter to be used. The Department will make the final determination as to whether an existing meter may be used.

4. The existing 16-inch waterline within Waiānuenue Avenue is adequate to provide 2,000 gallons per minute of flow for fire protection as required per our Water System Standards.

5. Any meter(s) serving the proposed project will require the installation of a reduced pressure type backflow prevention assembly within five feet of the meter on private property. The Department must inspect and approve its installation before water service can be activated.

Should there be any questions, please contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dms

2024 North King Street
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April 28, 2010

Mr. Milton D. Pavao, P.E., Manager
Department of Water Supply
County of Hawai'i
345 Kekūanaō'a Street, Suite 20
Hilo, Hawai'i 96720

Dear Mr. Pavao:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated January 15, 2010. We have prepared the following in response to your comments (your comments have been *italicized* for convenience):

1. *Hilo High School and the existing gymnasium are currently served from an existing 16-inch waterline within Waianuenue Avenue fronting the project site.*

   This comment is acknowledged.

2. *We will note that the DEA does not appear to address the impacts of the proposed new gymnasium and related facilities on our existing water system. As the project proposes to demolish the existing gymnasium and construct a new, larger gymnasium and related facilities, the Department will request estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, be submitted showing the additional water demand that will be generated by the project.*

   Upon review and approval of the calculations, the Department will determine if the facilities serving the existing gymnasium are adequate to support the new gymnasium and related facilities. If the existing facilities are inadequate, the installation of a larger or additional meter may be required and additional facilities charges may apply.

   This comment is acknowledged. The estimated maximum daily water usage calculations will be prepared and submitted by a licensed professional engineer for review and approval by the Department of Water Supply (DWS). The DOE acknowledges that should existing facilities prove inadequate that the assessment of additional facilities charges may apply to this project.

3. *If the applicant is proposing to utilize an existing meter to serve the project, the applicant must inform the Department, in writing, the account number of the meter to be used. The Department will make the final determination as to whether an existing meter may be used.*

   This comment is acknowledged. The DOE is presently reviewing the feasibility of using the existing water meter and understands the necessity of coordinating with the DWS to determine

whether the existing meter may be used or if a new meter is required. This coordination is anticipated to be concluded following the completion of the subject FEA.

4. *The existing 16-inch waterline within Waianuenue Avenue is adequate to provide 2,000 gallons per minute of flow for fire protection as required per our Water System Standards.*

   This comment is acknowledged.

5. *Any meter(s) serving the proposed project will require the installation of a reduced pressure type backflow prevention assembly within five feet of the meter on private property. The Department must inspect and approve its installation before water service can be activated.*

   This comment is acknowledged. The DOE will coordinate with the DWS to address this requirement. As noted above, this point of detail is anticipated to be concluded following the completion of the subject FEA.

We appreciated the time you have taken to review and comment on the subject document. Should you have further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/

cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA, Kober Hanssen Mitchell Architects
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LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to
DOH/CWB

03015PSS.10

March 8, 2010

Mr. Brian Takeda
Planning Project Coordinator
R. M. Towill Corporation
2024 North King Street, Suite 200
Honolulu, Hawaii 96819

Subject: Draft Environmental Assessment (DEA) for
Hilo High School New Gymnasium
DOE Job No. Q1-10-0207
Hilo, Island of Hawaii, Hawaii
TMK: (3) 2-3-015:001

Dear Mr. Takeda:

The Department of Health (DOH), Clean Water Branch (CWB), received your DEA, submitted on behalf of the State of Hawaii, Department of Education, for the subject project. The DOH-CWB has reviewed the document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters

(HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting the applicable Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including excavation, grading, clearing, demolition, uprooting of vegetation, equipment staging, and storage areas that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Discharges of hydrotesting water.

   c. Discharges of construction activity dewatering.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater discharges not covered by an NPDES general permit or discharges to Class AA or Class 1 State waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage is required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

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Surveying
Construction Management

April 28, 2010

Dr. Chiyomi E. Fukino, M.D.
Director of Health
Department of Health
P. O. Box 3378
Honolulu, Hawai'i 96801-3378

Dear Dr. Fukino:

Draft Environmental Assessment (DEA)
Hilo High School New Gymnasium
DOE Job No. Q1-10-02-07
Hilo, Island of Hawai'i, Hawai'i
TMK: (3) 2-3-015: Parcel 001

On behalf of the State Department of Education (DOE), thank you for your letter dated March 8, 2010 concerning the subject project. We have prepared the following in response to your comments (your comments have been *italicized* for reference):

1. *Any project and its potential impacts to State waters must meet the following criteria:*
   a. *Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.*
   b. *Designated uses CHAR, Section 11-54-3), as determined by the classification of the receiving State waters.*
   c. *Water quality criteria CHAR, Sections 11-54-4 through 11-54-8).*

2. *You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters CHAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting the applicable Notice of Intent (NO I) form:*
   a. *Storm water associated with construction activities, including excavation, grading, clearing, demolition, uprooting of vegetation, equipment staging, and storage areas that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.*
   b. *Discharges of hydrotesting water.*
   c. *Discharges of construction activity dewatering.*

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/healthlenvironmental/water/cleanwater/forms/genl-index.html.

3. *For types of wastewater discharges not covered by an NPDES general permit or discharges to Class AA or Class 1 State waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/healthlenvironmental/water/cleanwater/forms/indiv-index.html.*

4. *Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage is required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.*

Your comments regarding our regulatory requirements under the Clean Water Act and Chapters 11-54, Water Quality Standards; and 11-55, Water Pollution Control, are acknowledged. We anticipate that because the area of disturbance for the new gymnasium will exceed 1.0 acres and because the receiving water in Hilo Bay is classified Class "A" Embayment, that a NPDES NOI Form C, Construction Stormwater Permit application, will be prepared and filed prior to site disturbing activities. The potential for the commingling of runoff with non-storm water related pollutants will be addressed through the preparation of the appropriate Construction Stormwater Best Management Practices (BMPs) Plan or Storm Water Pollution Prevention Plan that will be filed with the NOI Form C application.

We appreciated your review of the subject document. Should you have any further comments please do not hesitate to contact us.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

BT/
cc: Duane Kashiwai, Facilities Development Branch
State Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Jennifer Yamauchi, AIA
Kober Hanssen Mitchell Architects
Harbor Court
55 Merchant Street, Suite 1812
Honolulu, Hawaii 96813

03015PSS.10

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

SS:ml

c: Mr. Clifford Furukado, CWB-Hilo, Hawaii District Health Office [via e-mail only]
Mr. Neil Mukai, CWB-Kona, Hawaii District Health Office [via e-mail only]
DOH-EPO #EPO 09-167 [via email only]

References

Department of Geography, University of Hawai‘i, 1983. Atlas of Hawai‘i, University of Hawai‘i Press, Honolulu.

County of Hawai‘i General Plan, 2005 and 2006 Amendment.

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U.S. Department of Agriculture, 1972. Soil Survey of Island of Hawai‘i, State of Hawai‘i. U.S. Department of Agriculture, Soil Conservation Service and University of Hawai‘i Agriculture Experiment Station, Washington, D.C.

Other references are cited in this document as indicated.

Appendix A

Archaeological Field Inspection and Literature Review Report for the DOE Hilo High School Gymnasium Project

Pi'ihonua Ahupua'a, South Hilo District, Island of Hawai'i

TMK [3] 2-3-015:001

May 2009

Prepared For:
Kober/Hanssen/Mitchell Architects
Honolulu, Hawai'i

Prepared by:
Cultural Surveys Hawai'i, Inc.
Kailua, Hawai'i

Archaeological Field Inspection and Literature Review Report for the DOE Hilo High School Gymnasium Project Piʻihonua Ahupuaʻa, South Hilo District, Island of Hawaiʻi TMK [3] 2-3-015:001

Prepared for
Kober/Hanssen/Mitchell Architects

Prepared by
Sarah Wilkinson, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.
Kailua, Hawaiʻi
(Job Code: PIIHONUA 1)

May 2009

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Management Summary

Reference	Archaeological Field Inspection and Literature Review Report for the DOE Hilo High School Gymnasium Project, Pi‘ihonua Ahupua‘a, South Hilo District, Island of Hawai‘i TMK [3] 2-3-015:001 (Wilkinson and Hammatt 2009)
Date	May 2009
CSH Job Code	PIIHONUA 1
Investigation Permit Number	The fieldwork for the field inspection investigation was carried out under the archaeological permit No. 09-20, issued by the Hawai‘i State Historic Preservation Division/ Department of Land and Natural Resources (SHPD/DLNR), per Hawai‘i Administrative Rules (HAR) Chapter 13-282
Project Location	The project area (Hilo high School) is located on Waiānuenue Avenue in the uplands of Hilo town approximately 1.2 km southwest of Hilo Bay in South Hilo District on the Island of Hawai‘i. The project area extends from an elevation of approximately 30 to 75 meters above mean sea level.
Land Jurisdiction	State of Hawaii Department of Education
Project Description	The purpose of the proposed project is to construct a new gymnasium at one of three possible sites on the school grounds. This new gymnasium would meet present standards for hosting competitive events.
Project Acreage	Approximately 24 acres
Historic Preservation Regulatory Context	The proposed project is subject to Hawai’i State environmental and historic preservation review legislation [Hawai’i Revised Statutes (HRS) Chapter 343 and HRS Chapter 6E-8 and HAR Chapter 13-275]. The purpose of this study is to facilitate planning and SHPD decision making regarding appropriate mitigation - if any. This investigation does not fulfill the requirements of an archaeological inventory survey investigation per the rules and regulations of the SHPD/DLNR (per HAR Chapter 13-276). However, the level of work is sufficient to determine if there are any major archaeological concerns within the project area and to develop data on the general nature, density and distribution of archaeological resources, as well as to provide recommendations of any additional cultural resource management work that might be needed prior to land alteration within the project area. This document was prepared to support the project’s historic preservation and environmental review.

Historic Properties Encountered	Hilo High School is on the Hawai‘i Register of Historic Places (SIHP # 10-35-7522). Four of the main buildings within the project area and the athletic track were constructed more than 50 years ago. A possible sixth historic property, a ditch and adjacent alignment, were encountered to the east of the athletic track.
Fieldwork Effort	The fieldwork component of the archaeological literature review and field inspection study was accomplished on February 25, 2009 and March 2, 2009 by archaeologists Sarah Wilkinson, B.A., and Momi Wheeler, B.S., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The fieldwork required approximately three person-days to complete.
Results Summary	During the pedestrian survey, five historic properties and one possible historic property were encountered. The five confirmed historic properties consist of District Annex Building C, the school track, and three Hilo High School campus buildings, which include the Auditorium, Classroom Building A, and the Gymnasium. All of these buildings were constructed between 1922 and 1931, making them more than 50 years old. A wood shop which was built in 1937 was not identified during the field inspection. It is probable that this structure is no longer present on the campus. A possible historic feature was identified between the Hilo High School athletic field and the District Annex office complex. This feature consists of a constructed drainage ditch, which carries water under Waiānuenue Avenue through the project area to the Waikapu River, and an associated alignment. The age of this feature is unknown at this time.
Recommendations	If construction of the new gymnasium will in any way affect architectural structures noted in this study, then CSH recommends consultation with the SHPD architecture branch to address historic and architectural significance and appropriate mitigation – if any. If the new gymnasium construction project is <u>not</u> anticipated to adversely effect the ditch and alignment features (CSH-5) then CSH recommends that interim protective measures (such as erection of a protective buffer with orange “event fencing”) be established and maintained during the duration of construction to protect these archaeological features from adverse, inadvertent impact. If the new gymnasium construction project <u>is</u> anticipated to adversely affect the ditch and alignment features (CSH-5) then CSH recommends prior archaeological inventory survey documentation of these features including following the ditch off

	of the property to the south of Waiānuenue Avenue and further historical documentation. In view of a prior SHPD determination for Hilo District Schools (present Appendix C) and given that Hilo High School is a State Register of Historic Places property, CSH recommends consultation with the SHPD archaeology branch regarding the appropriateness of an archaeological monitoring program (which would typically begin with an archaeological monitoring plan for the review and approval of the SHPD prior to construction).

Table of Contents

List of Figures

List of Tables

Section 1 Introduction

1.1 Project Background

At the request of Kober/Hanssen/Mitchell Architects, Cultural Surveys Hawai‘i, Inc. has completed this archaeological literature review and field inspection study for the proposed Gymnasium construction at Hilo High School, Pi‘ihonua Ahupua‘a, South Hilo District, Hawai‘i Island, TMK [3] 2-3-015:001 (Figure 1 through Figure 3).

The approximately 24-acre Hilo High School current project area is under the land jurisdiction of the Department of Education (DOE). The project consists of the construction of a new gymnasium. The present gymnasium at Hilo High School was built in 1931 (Table 1). According to Hilo High School Athletic Director Leroy Simms, this facility does not meet standards for competitive usage. Thus, the facility is presently used for athletic practice, physical education classes, and community events only. This situation has created a problem for the Hilo High School athletics program, as off-campus facilities have to be scheduled and rented for competitive events. The State of Hawai‘i has allotted monies for the construction of a new gymnasium at Hilo High School. At the time of preparation of this document, it has been decided that the new gymnasium will be constructed on the grounds of the District Annex complex, near the eastern end of the current project area and may consist of an approximately 22,500 square foot building construction area and the development of associated parking (Figure 4 and Figure 5).

The website for Hilo High School provides the following information about the history of the school and its campus:

> During the 1880's, if any youngster on the Big Island wanted to pursue his education beyond the eighth grade, he had to travel to Oahu. There he would board and go to school. Miss Josephine Deyo, principal of Hilo Union School wanted to find a way to keep these young people home while furthering their education. She was also very concerned about those students who could not afford to travel to Honolulu to continue their education.
>
> School authorities hesitated but finally agreed to start a high school at Hilo Union School in September, 1905. Public interest in the high school, at first, was weak but reconsidered when they realized that if this school did not work then all high school students would again have to travel to Oahu to continue their education…
>
> …The first building stood on the Hilo Union campus and consisted of a wooden frame building including 3 classrooms on the first floor and a laboratory, library and assembly hall on the second floor...
>
> In 1907, the school moved to the present District Annex location. It was then called Hilo Junior High School…The school stayed at that location for 15 years.

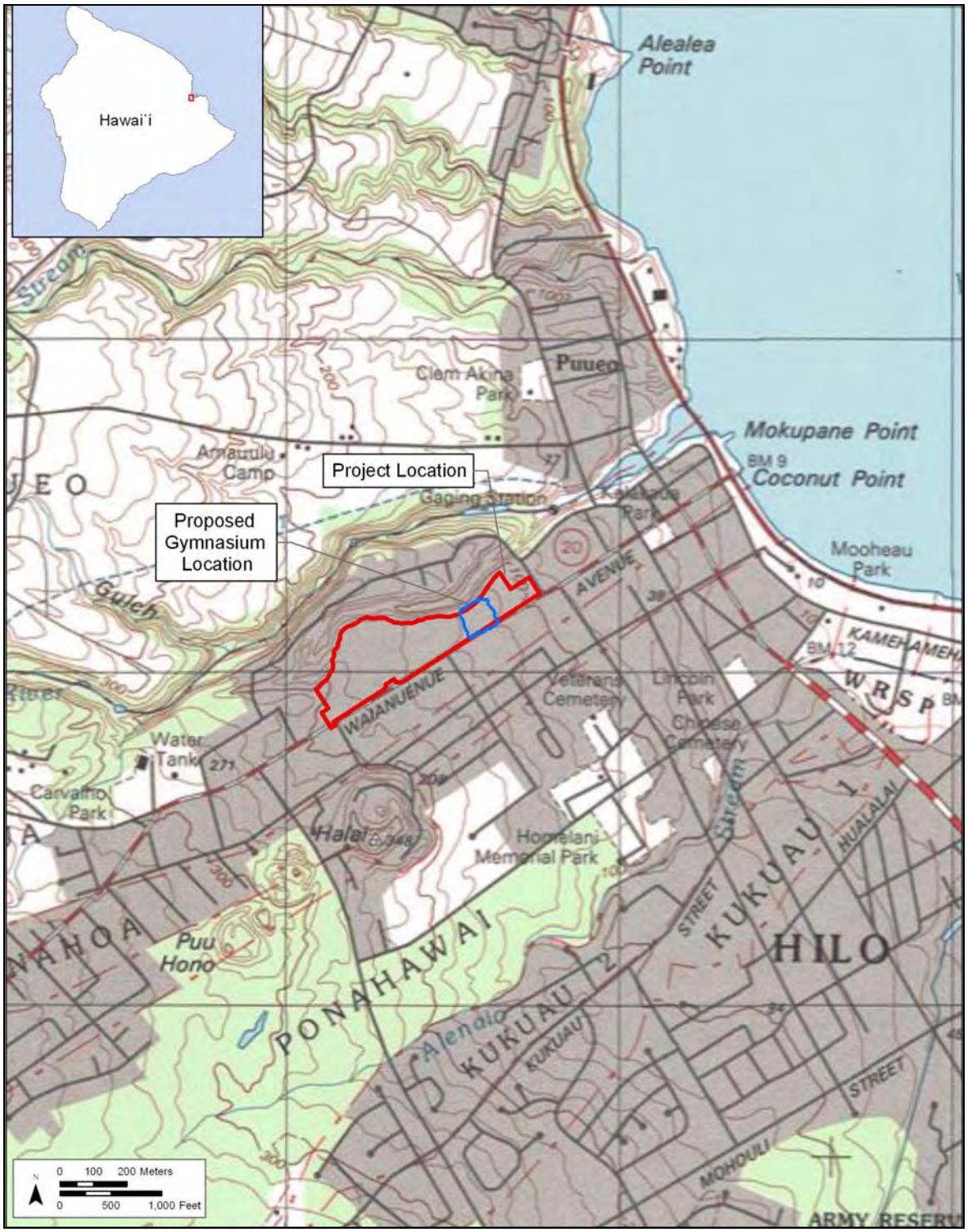

Figure 1. Portions of the Pi‘ihonua (1997) and Hilo (1995) USGS topographic quadrangle maps, showing the project area location in Pi‘ihonua Ahupua‘a

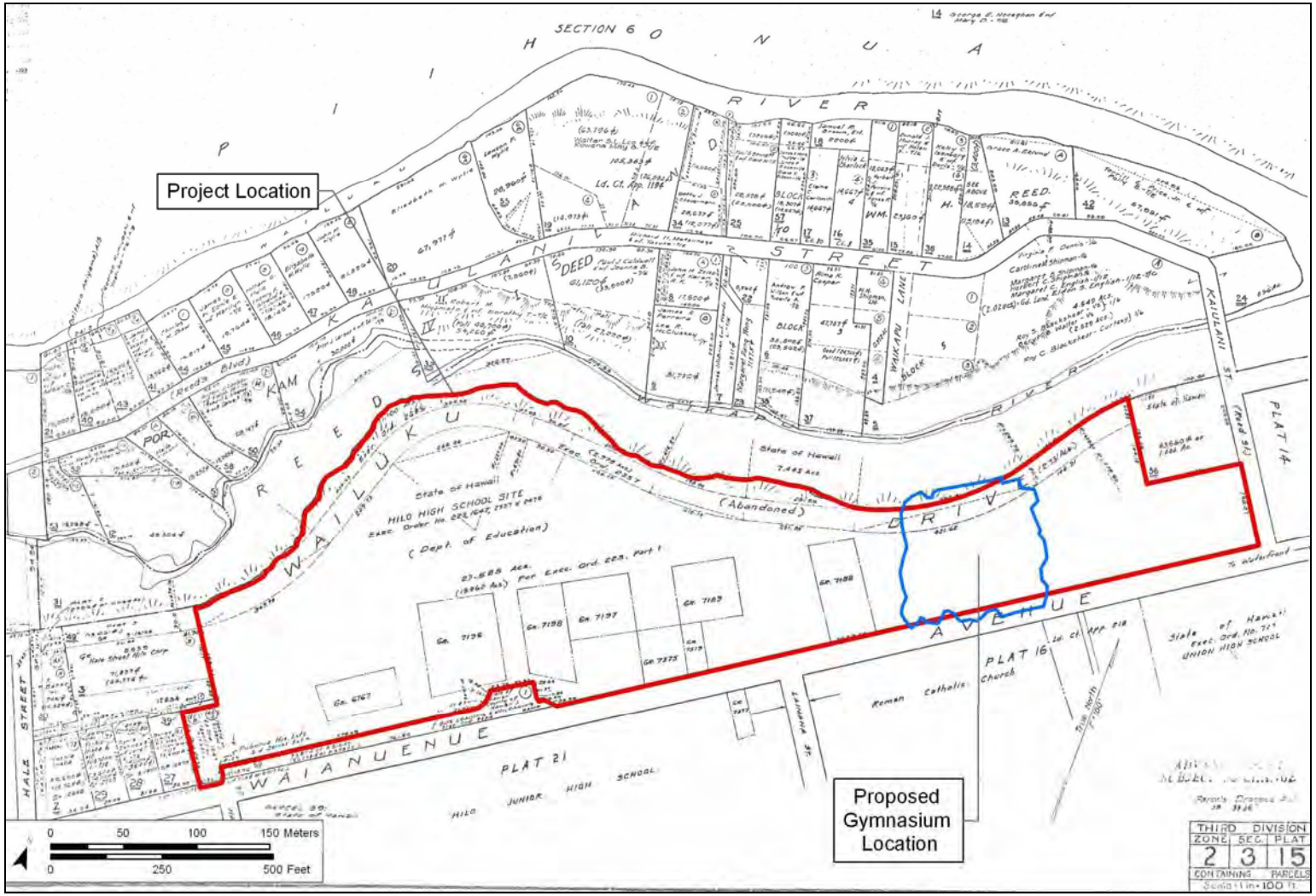

Figure 2. Tax Map Key (TMK) [3] 2-3-015:001, showing the location of the project area

Figure 3. Aerial photograph showing location of the project area (source: Google Earth 2009)

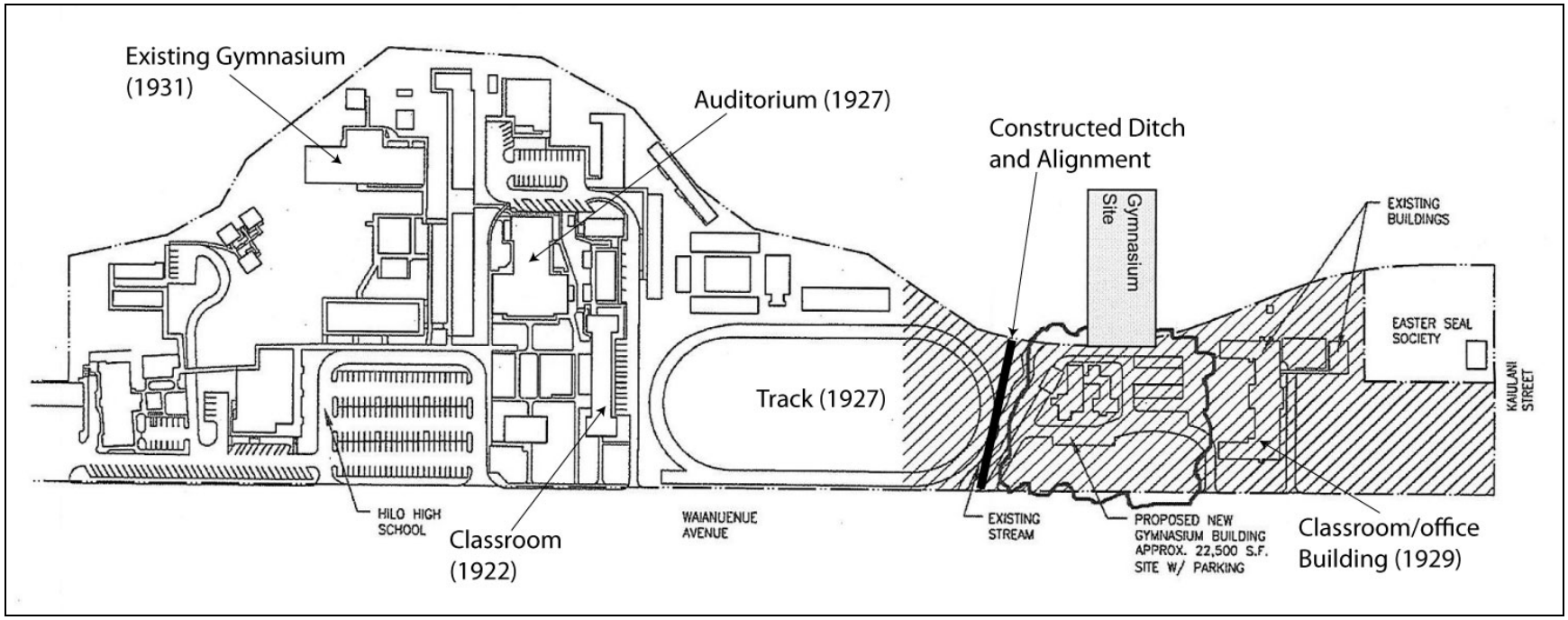

Figure 4. Plan of Hilo High School showing proposed general location for a new gymnasium and associated parking

Figure 5. Photograph of the cottages in the District Annex complex; these cottages will be removed and the new gymnasium will be built at this site (refer to Appendix A). View to the northwest

> Finally in 1922, Hilo Junior High School moved up Waianuenue Avenue to its present location. The only building on campus was the Makai Building. Since that time there have been many changes in the buildings and facilities over the years. The "wild jungle" of guava trees made way for the Mauka Building and the Auditorium Building and the patio area today was then only a gully full of weeds [http://www.hilohs.k12.hi.us/index.php?option=com_content&view=article&id=20&Itemid=45].

Also included on the history page of the school website was a timeline showing major building construction and other landmarks events in the history of Hilo High School (www.hilohs.k12.hi.us). This timeline has been reproduced in Table 1 (below). Historic images of the Gymnasium, the Auditorium and the Makai Building are shown in Figures 6 through 8. Unfortunately, a historic image of District Annex Building C could not be found.

Table 1. Timeline for Hilo High School (at present campus)

Year	Event
1922	First Building- Makai Building (presently Classroom Building A)
1926	Miss Margaret Way's music class created the Hilo High Alma mater
1927	Auditorium Building donated by the Alumni Association. Track built
1931	Gymnasium built (The timeline on the school website states that this building was constructed in 1937; a study of school documents revealed that the gym was actually constructed in 1931 [Subica 2006:4])
1931 and 1934	Cafeteria built (the old F building)
1935	First stage of the Mauka Building built
1936	Second stage of the Mauka Building built
1937	Wood shop built
1939	Third stage of the Mauka Building built
1961	Administration Building Built
1962	Swimming Pool donated by Mrs. John M Ross and Mrs. Isabel Kennedy
1963	The Library and Multi Purpose Room was built
1968	The Cafeteria was built
1970	R-Built
1977	Mauka Building burns down
1979	100-car parking lot finally built
1980	C Building built

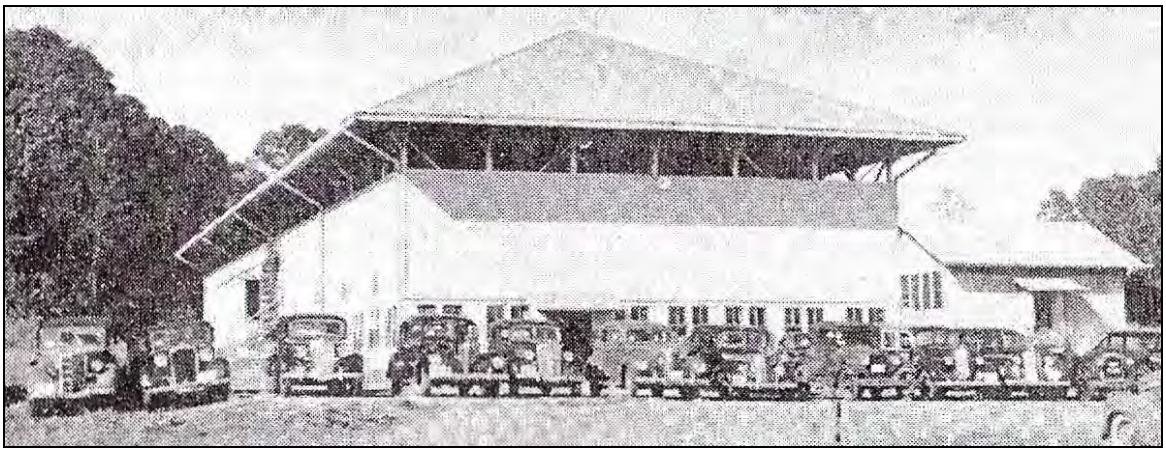

Figure 6. Historic photograph of the Gymnasium; the building remains largely unchanged today (Subica 2006:4)

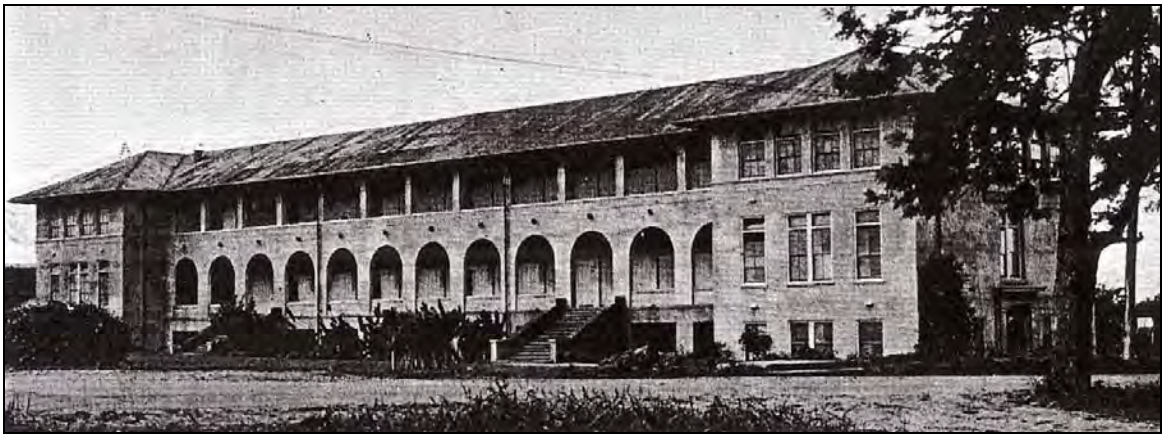

Figure 7. Historic photograph of the Makai Building, or Classroom Building A, from the 1931 Hilo High School Annual

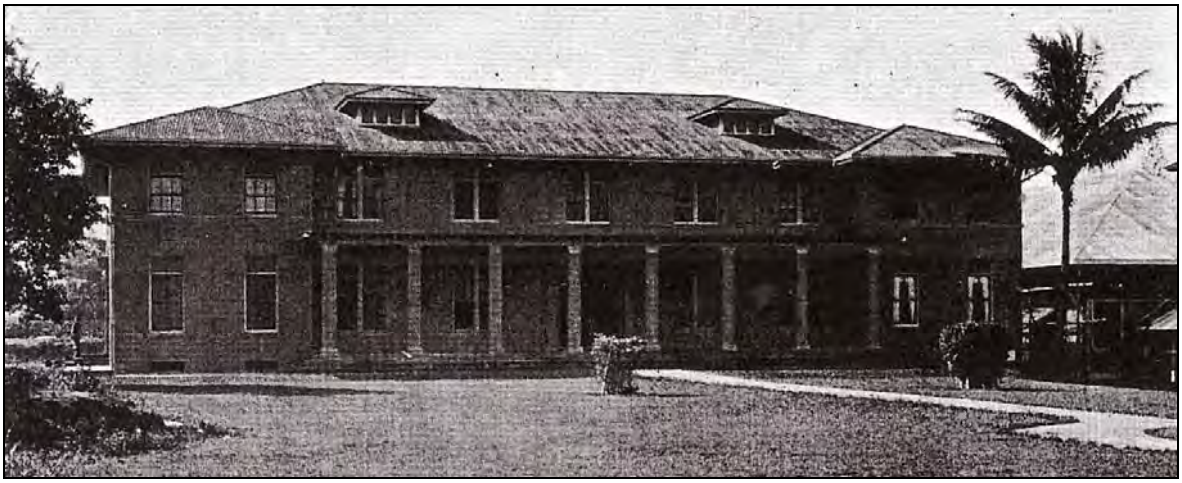

Figure 8. Historic photograph of the Auditorium, from the 1931 Hilo High School Annual

The proposed project is subject to Hawai‘i State environmental and historic preservation review legislation [Hawai‘i Revised Statutes (HRS) Chapter 343 and HRS Chapter 6E-8 and Hawaii Administrative Rules (HAR) Chapter 13-275]. This investigation does not fulfill the requirements of an archaeological inventory survey investigation per the rules and regulations of the State Historic Preservation Division / Department of Land and Natural Resources (SHPD) (per HAR Chapter 13-276). However, the level of work is sufficient to determine if there are any major archaeological concerns within the project area and to develop data on the general nature, density, and distribution of archaeological resources, as well as to provide recommendations of any additional cultural resource management work that might be needed prior to land alteration within the project area. This document was prepared to support the project's historic preservation and environmental review.

1.2 Scope of Work

1. Historical research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
2. Limited field inspection of the project area to identify any surface archaeological features and/or historic buildings and structures and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further cultural resource management work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

1.3 Environmental Setting

1.3.1 Natural Environment

Pi‘ihonua Ahupua‘a represents a section of land that is a major part of the Hilo Watershed. Streams, waterfalls, ponds, and other water features are abundant in this area, supporting lush forest and varied ecosystems where development has not occurred. The Hilo Forest Reserve borders Pi‘ihonua Ahupua‘a to the south, and comprises its westernmost reaches (Figure 9).

The project area is an approximately 24-acre parcel which currently represents the Hilo High School campus and the Hilo School District Annex offices. The project area is bound by Waiānuenue Avenue to the south, the Waikapu River (a tributary of the Wailuku River) to the north, apartments and single-family homes to the west, and Ka‘iulani Street to the east. It is located approximately 1.2 km (kilometers) inland of Hilo Bay. The topography of the project area is moderately sloped toward Hilo Bay to the east, with elevation ranging from approximately 30 to 75 m (meters), or 100 to 245 ft (feet). According to the National Oceanic Atmospheric Administration (NOAA) website, "Within the city of Hilo, average rainfall varies from about 130 inches a year near the shore to as much as 200 inches upslope," (http://www.prh.noaa.gov/hnl/climate/phto_clim.php).

Figure 9. Portion of the USGS 1975 Hawaii topographic map, 1:250,000 series, showing the location of the Hilo Forest Reserve and the Wailuku River in relation to downtown Hilo (marked with a star), Pi‘ihonua, and the project area (in red)

Vegetation in the project area is dominated by maintained lawns, royal palm (*Roystonea regia*), bamboo (*Bambusa vulgaris*) and ornamental trees and shrubs. Other noted vegetation includes *tī* (*Cordyline fruticosa*), monkey pod (*Samanea saman*), breadfruit (*Artocarpus altilis*), plumeria (*Plumeria rubra*), *kukui* (*Aleurites moluccana*), *kamani* (*Calophyllum inophyllum*), heliconia (*Heliconia bihai*), native hibiscus (*Hibiscus brackenridgei*), albezia (*Albizia chinensis*), *lilikoi* (*Passiflora edulis*), banana (*Musa sp.*), papaya (*Carica papaya*), and Elephant ear (*Alocasia odora*). The agricultural department at the school has planted a wide variety of edible and ornamental plants at the western end of the campus.

The predominating soil type within the project area is Hilo Silty Clay Loam, with slopes of 0 to 10 percent (HoC) (Figure 10). The Hilo series is characterized by well-drained silty clay loams which are described as having been "formed in a series of volcanic ash layers that give them a banded appearance. They are gently sloping to steep soils on uplands at an elevation ranging from near sea level to 800 feet," (Foote et al. 1972). The 0 to 10 percent slope type is specifically described as being found low on the windward side of Mauna Kea, where deep, narrow gulches are common. This soil type is categorized as receiving between 120 and 180 inches of rainfall a year, with rapid permeability, slow runoff, slight erosion hazard and good root penetration. Hilo grass, California grass, guava, *‘ōhia*, and tree fern are common to this soil type. Historically, this soil type has been used mainly for sugar cane cultivation, though truck crops, orchards and pasture are also supported (Foote et al. 1972).

A narrow strip of rough broken land runs along almost the entire northern edge of the project area (Figure 10). Rough broken land (RB) "is a miscellaneous land type that consists of very steep, precipitous land broken by many intermittent drainage channels. It occurs primarily in gulches, and the slope is dominantly 35 to 70 percent," (Foote et al. 1972). This land type is found from near sea level to 3,000 feet in elevation, "and the annual rainfall ranges from 50 inches to more than 150 inches. Vegetation varies with rainfall." Soil depth varies greatly in these areas, and areas of bare rock are common. "Rough broken land is suitable for pasture, woodland, wildlife habitat and recreation," (Foote et al. 1972).

Along the northwestern bounds of the project area is a small pocket of Keaukaha extremely rocky muck, 6 to 20 percent slopes (rKFD) (Figure 10). This soil is thin and well-drained, and is found in and around Hilo. "It is undulating to rolling and follows the topography of the underlying *pāhoehoe* lava. Rock outcrops occupy about 25 percent of the area...The soil above the lava is rapidly permeable. The *pāhoehoe* lava is very slowly permeable, but water moves rapidly through the cracks," with some runoff and slight erosion hazard (Foote et al. 1972). Root mat is common atop and in the cracks of the lava. This soil type is found from near sea level to 1,000 feet in elevation, receiving "from 90 inches to more than 150 inches of rainfall annually." This soil type supports native forest plants such as *‘ōhia*, tree fern, and *uluhe* fern, as well as guava. Pasture is possible in cleared areas (Foote et al. 1972).

1.3.2 Built Environment

Hilo High School grounds, associated classroom buildings and athletic fields comprise the more substantial western end of the project area. The Hilo School District Annex offices and associated buildings are located within the narrower eastern end of the project area (see Figure 3 and Figure 4). Roadways, sidewalks, landscaped areas and parking lots are present throughout the project area.

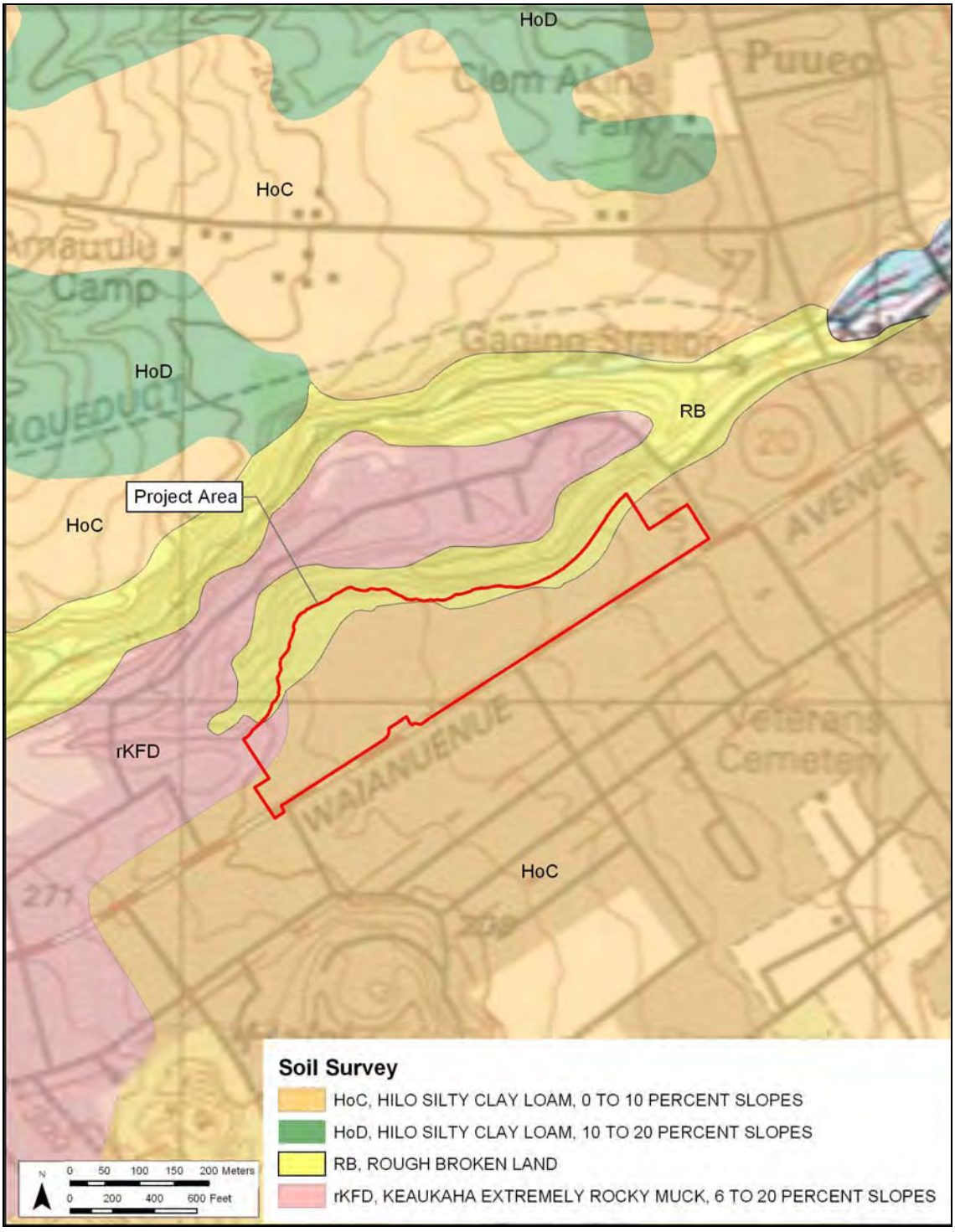

Figure 10. Portion of the 1995 U.S. Geological Survey 7.5-Minute Series Topographic Map, Hilo Quadrangle, with Soil Survey overlay, showing the project area soils (Foote et al. 1972)

Section 2 Methods

2.1 Document Review

Numerous published and unpublished accounts, surveys, reports, maps and photographs found in public and private collections pertaining to Hilo High School, Pi‘ihonua Ahupua‘a and the general South Hilo District were investigated by Cultural Surveys Hawai‘i, Inc. Historical documents, maps and existing archaeological information pertaining to the sites in the vicinity of this project were researched at the State Historic Preservation Division library, Cultural Surveys Hawai‘i Library, Lyman Memorial Museum Archives, the University of Hawai‘i at Mānoa’s Hamilton Library, and the Hilo High School Library. Two websites were used for research, including “Ulukau: The Hawaiian Electronic Library” (<www.uluaku.org>) and the University of Michigan’s “The United States and its Territories” online library (http://quod.lib.umich.edu/p/philamer/). In addition, Māhele records were examined from the Waihona ‘Aina database (<www.waihona.com>).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

2.2 Field Methods

The fieldwork component of the archaeological literature review and field inspection was conducted on February 25, 2009 and March 2, 2009 by two CSH archaeologists, Sarah Wilkinson, B.A., and Momi Wheeler, B.S., under the general supervision of Hallett H. Hammatt Ph. D. (principal investigator). The fieldwork required approximately three partial person-days to complete.

In general, the purpose of the field inspection was to develop data on the nature, density, and distribution of archaeological sites within the project area, and also to develop information on the degree of difficulty that vegetation and terrain create for future archaeological studies. The field inspection consisted of a walk-through reconnaissance of the project area. The spacing between the archaeologists was generally 5-10 m. Potential archaeological sites or site areas were documented with brief written descriptions, maps, and photographs.

The descriptions of the buildings in this report are not intended as, and should not be construed as, an architectural inventory survey. Our purpose in presenting a brief description of certain architectural properties is simply to facilitate evaluation of the need for any further architectural work.

Section 3 Background Research

Pi‘ihonua literally means “land incline,” (Pukui et al. 1974:184). The boundaries of Pi‘ihonua Ahupua‘a are Hilo Bay on the *makai* side, Punahoa Ahupua‘a on the south, and Pu‘u‘eo Ahupua‘a on the north.

In researching mythological and historical accounts, it is very useful to know the significant place names associated with the area of study. Lloyd J. Soehren (2004) has compiled place names from documents and maps for the island of Hawai‘i and posted them on the website www.ulukau.org. This site was used as a source for place names associated with Pi‘ihonua Ahupua‘a. This search yielded nearly 90 place names. A majority of these names were associated with streams, pools, waterfalls, hills, and *kīpuka* (clear place or oasis in a lava flow), while others were described as a “place,” boundary point” or “point.” Due to the overwhelming number of place names, only those that have the most significance historically or within Hawaiian folklore have been discussed below.

3.1 Mythological and Legendary Accounts

3.1.1 Pi‘ihonua

3.1.1.1 The Legend of Kana and the Rescue of Hina

The demi-god Kana is associated with the place name “Pi‘ihonua.” “The Legend of Kana” describes Kana’s upbringing in Pi‘ihonua and the rescue of his kidnapped mother Hina. Martha Beckwith summarizes Fornander’s version of this legend in her book *Hawaiian Mythology:*

> The firstborn of Hakalanileo and Hina is born in the form of a rope and brought up by his grandmother Uli in the uplands of Pi‘ihonua back of Hilo in a house called Halau-ololo. As the child grows, the house has to be lengthened from mountain to sea in order to contain him. The chief Kapepe‘ekauila sails over on the hill Haupu to the island of Mokuola off Hilo bay. Hina climbs upon the hill to take a look about and is borne off to Molokai to become the wife of the Molokai chief. Her husband appeals to his son Niheu, who sends him to Kana, at the sight of whose eyes the father flees terrified. Kana joins the war party, but twice the weight of his hand sinks canoes prepared by all the canoe builders of Hawaii. Finally Uli digs up the canoe Kau-mai-elieli in the uplands of Paliuli. In vain the prophet Moi, brother of Nuakea, warns the Molokai chief of defeat, (Beckwith 1976:464).

Kana and his brother Niheu manage to save their mother when, ultimately, Kana breaks apart the hill Haupu at sea.

3.1.2 The Wailuku River

The Wailuku River is the most substantial waterway within Pi‘ihonua Ahupua‘a. This perennial stream is an integral part of the Hilo Watershed system. In times of heavy rain this river becomes a raging, destructive force, hence its name: Wailuku literally means “water of

destruction," (Pukui et al. 1974:225). This river is the basis of the most well-known mythologies associated with Pi‘ihonua Auhpua‘a.

3.1.2.1 The Battle of the Wailuku River

This legend recounts the battle between the demi-god Maui and the *mo‘o* (lizard) Kuna. Some of the most widely recognized features along the Wailuku River are said to have been created during this battle.

> Hina, the mother of Māui, lived in a cave behind the falls of the Wailuku River on Hawai‘i. There she and her women made *kapa*, chanting as they worked. Now Hina had an enemy, a giant lizard, or *mo‘o*, whose name was Kuna Mo‘o. He liked to trouble Hina. He rolled rocks and logs into the river above the falls, thinking their crash would hurt or frighten the women.
>
> Instead he heard Hina's laughing call, "Aloha, O Kuna Mo‘o! Your rocks and logs make a fine drum to keep time to our chanting."
>
> The great *mo‘o* snapped his jaws in anger. "Their chanting shall end!" he promised as he climbed the mountain.
>
> It was night when he returned, pushing a huge rock. All was quiet in the cave. The women slept and would not hear the noise that he must make. He rolled the great rock into the river below the falls to make a dam. The water could not flow past the rock. Kuna Mo‘o watched it grow deeper and deeper until it began to flow back into the cave. "They will all drown!" he chuckled. "They will drown as they sleep."
>
> Then he heard a sharp cry, "Awake, Hina! Awake! The water rises in our cave."
>
> A moment later he heard the voice of Hina, strong and clear, calling to her mighty son:
>
> "O Māui, fisher of islands,
>
> O Maui, slower of sun,
>
> Listen!
>
> It is Hina who calls,
>
> Hina, your mother,
>
> Shut in the cave at night,
>
> Made prisoner here by the *mo‘o*,
>
> While water pours into our cave.
>
> Come quickly, O Māui my son.
>
> Come in your swift canoe.
>
> Come with your mighty war club
>
> And save us from this Kuna Mo‘o."

> The *mo‘o* chuckled again. “She calls for her son,” he muttered, “But Māui is far away. He cannot hear her call.”
>
> Māui did hear, faintly, as in a dream. He sprang from sleep. Had someone called? He looked about the night sky and saw a small, bright, fleecy cloud above Hawai‘i. “My mother’s cloud!” he thought. “Hina is in trouble and calls for help.” He leapt down the side of Mount Haleakalā with mighty strides. He sprang into his canoe and dug his paddle in the sea.
>
> He reached Hilo. One look at the river told him what had happened. No water flowed. The river had been dammed, and Hina and her women were in danger.
>
> Up the river Māui hurried. He reached the rock which stopped the water’s flow. There was no time to move it. With his club Māui struck the bank and made a water-way around the rock.
>
> Once more the water flowed toward the ocean, and Māui heard his mother and her women chanting his praise. But he did not stop to listen, for he also heard the sound of the *mo‘o* above. The great lizard was fleeing to a hiding place. Māui followed. When he found the *mo‘o*, he struck until the earth trembled. Kuna Mo‘o rushed out, seeking another place to hide. Still Māui followed. Again and again the earth trembled with the blows of his mighty club. The mo‘o hid in a deep pool where Māui could not reach him. The hero poured red-hot lava into the pool and hurled in hot rocks. The water boiled, and Kuna Mo‘o fled again, this time down stream. Above the falls he turned to fight. He sprang at Māui, snapping his jaws. Māui dodged and struck, and the *mo‘o* tumbled over the falls.
>
> As Māui leapt down the cliff he heard the women chanting prayers—prayers for his victory. He found Kuna Mo‘o weak, but still snapping his ugly jaws. Again and again Māui struck until his enemy was dead.
>
> The giant lizard still lies where he fell, a great rock in the Wailuku River. He is beaten by stones and logs and flooded by water just as he tried to beat Hina and drown her in the flood.
>
> As for the deep pool above, though Māui no longer pours in red-hot lava, the waters of the “boiling pots” still bubble and boil as if remembering his mighty battle with Kuna Mo‘o (Curtis 1985:37-40).

To this day the bubbling, boiling pools described in this legend are referred to as the Boiling Pots. Not mentioned in this version of the legend is name of the pool above Rainbow Falls which was the home of Kuna, called Wai-kuna, literally meaning “eel water,” (Pukui et al. 1974:224). Ka-puka-a-Māui, literally “the hole made by Maui,” (Pukui et al. 1974:90), was the first place that Kuna tried to hide from Maui during the battle:

> Kuna heard the crash of the club against the stones of the river bank and fled up the river to his home in the hidden caves by the pools in the river bed. Maui rushed up the river to punish Kuna-mo-o for the trouble he had caused Hina. When he came to the place where the dragon was hidden under deep waters, he took his magic spear and thrust it through the dirt and lava rocks along one side of

> the river, making a long hole, through which the waters rushed, revealing Kuna-mo-o's hiding place. This place of the spear thrust is known among the Hawaiians as Ka puka a Maui, "the door made by Maui." It is also known as "The natural bridge of the Wailuku river," (Westervelt 1910:XIII)

One other place along the Wailuku River, downstream from the site of the battle, is still a well-known feature associated with this legend. When Maui, who was at Haleakalā, heard Hina call him, he rushed to his canoe:

> Down the mountain he leaped to his magic canoe. Pushing it into the sea with two mighty strokes of his paddle lie crossed the sea to the mouth of the Wailuku river. Here even to the present day lies a long double rock, surrounded by the waters of the bay, which the natives call Ka waa o Maui, "The canoe of Maui." It represents to Hawaiian thought the magic canoe with which Maui always sailed over the ocean more swiftly than any winds could carry him," (Westervelt 1910:XIII).

3.1.2.2 Hi‘iakaikapoleopele and the Wailuku Bridge (from “How Hawai‘i was Made Safe Again”)

In the legend of Hi‘iakaikapoleopele, favorite sister of the volcano goddess Pele, Hi‘iaka and her companions traveled around Hawai‘i Island, along coastal and inland trails. After saving the chiefess Punahoa at Hilo Bay, Hi‘aka and her companions stopped to ask an old couple if they were on the right trail to Hilo:

> “Yes, follow that trail,” the old people answered. “Soon you will come to the Wailuku River. Two logs make a bridge over the river. But do not cross until you have made offering to the gods who guard the bridge.”
>
> “Gods?” asked Hi‘iaka.
>
> “Yes, two powerful gods live there in a cave. The logs belong to them. When we want to cross we lay food on the logs—vegetable food or fish. If the gods are pleased they hold the logs firm and we cross safely.”
>
> “We have no food,” Hi‘iaka said. “We shall make no offering. What then?”
>
> “Then do not try to cross, for the gods will turn these logs beneath your feet and you will fall into the raging river. You will be dashed to death upon the rocks.”
>
> Hi‘iaka said no more and the three walked on. Soon they came to the river and the bridge of logs.
>
> “Here is Hi‘iaka!” called a voice from a great cave. “She is one of our family—a goddess.”
>
> “She may be one of our family,” said another voice, “but I am hungry. Let her pay to cross. Bring an offering of food, O Hi‘iaka. Make offering to the gods for a safe crossing.”
>
> “Gods!” shouted Hi‘iaka angrily. “You are no gods! We have no food for you!”
>
> By this time people had gathered on each side of the river. “They are indeed gods!” these people cried. “We never try to cross without making an offering.”

> “I’ll show you they are no gods!” shouted Hi‘iaka as she whirled her *pā‘ū* [woman’s skirt]. The people saw two frightened figures rushing away to hide in a cave far up the river. Hi‘iaka followed them and the two dashed out to find another hiding place. The *pā‘ū* of the goddess flashed and the figures were turned to stone.
>
> Hi‘iaka returned to the people. “The crossing is safe,” she said.
>
> Thankfully people followed the three companions into the village. They set food before them and hung sweet smelling *lei* about their necks. “We have long feared those evil ones,” they said. “Now you have given us safe crossing,” (Pukui and Curtis 1996:39-40).

3.2 Traditional and Historical Accounts

3.2.1 Pre-contact and Early Post-contact Settlement Patterns for Hilo

The U.S. Army Engineer Division contracted for an archaeological and historical literature search as part of the Lava Flow Control Study for Hilo, Hawai‘i (McEldowney 1979). The search included *ahupua‘a* in the Hilo and Puna districts. Relevant to the present project are the geographic and ecological zone classifications for early historic-period land use, which are presented in the report. These five zone classifications (McEldowney 1979:64) are listed below:

I:	Coastal Settlement	20-50 ft in elevation	0-1.5 miles inland
II:	Upland Agricultural	50-1,500 ft in elevation	1.5-4.5 miles inland
III:	Lower Forest	1,500-2,500 ft in elevation	
IV:	Rainforest	2,599-5,500 ft in elevation	
V:	Subalpine/ Montane	Over 5,500 ft in elevation	

The coastal settlement zone contained both temporary and permanent habitations, with associated garden plots. The gardens were bordered by banana plants, sugarcane and *wauke.* Dry land taro, sweet potatoes and other vegetables were grown within the gardens. Groves of breadfruit and coconuts were interspersed between the houses and the gardens. Wetland taro was grown along the streams, along the coastal fishponds, and in the swampy land near the coast. The upland agricultural zone contained scattered agricultural features and some temporary residences. The main cultivated plants were dry land taro and bananas, with groves of *kukui*, *pandanus*, and mountain apples. The current project area is entirely within the lower bounds of the upland agricultural zone.

The lower forest was used to gather resources such as wood, bird feathers, fiber, and some food crops. The upland rainforest was used mainly by bird catchers to collect feathers and to gather other resources not available at the lower elevations. In the post-contact era, the forest areas were also used for the collection of resources that could be sold as trade items to foreigners, such as sandalwood and *pulu. Pulu* is the soft substance at the base of *hāpu‘u* ferns, which was shipped to California to be used for furniture and mattress stuffing (Baxley 1865:596). In the sub-alpine zone, trails from one district to another are the major features.

The settlement pattern of the South Hilo area is best summed by Handy and Handy (1972) in their study on the traditional agricultural patterns of the Hawaiians.

> The population of Hilo was anciently as now concentrated mostly around and out from Hilo Bay, which is still the island's principal port. . . . In lava-strewn South Hilo there were no streams whose valleys or banks were capable of being developed in terraces, but [taro] cuttings were stuck into the ground on the shores and islets for many miles along the course of the Wailuku River far up into the forest zone. . . . on the lava–strewn plain of Waiakea and the slopes between Waiakea and the Wailuku River, dry taro was formerly planted wherever there was enough soil [Handy and Handy 1972:538-539].

3.2.2 Pre-Contact and Early Post-Contact History

In the pre-contact period, the area around Hilo Bay was densely inhabited. Ross Cordy (2000:45) describes the settlement pattern of this area:

> Here [Hilo Bay] houses and heiau were concentrated in clusters near the sandy shore amidst groves of breadfruit, bananas and coconuts, and houses were also scattered inland for 3-6 miles. Dryland fields of kalo [taro] and sweet potatoes were around these houses and extended slightly farther inland. Kipikipi wet kalo fields and fishponds were along the Waimoa and Wailoa streams near the coastal houses.

Handy (1940:125) describes the *kanu kipi (*Hilo name for mound taro patches – Pukui and Elbert 1971:143) method as planting taro on mounds (*kipi*) built on the bottom of the marshy lands along Hilo Bay. Handy also notes that dry taro was planted along the fern-forest zone in the uplands above the bay.

The districts of Hilo and Hāmākua were once ruled by the descendants of paramount chief ‘Umi, who ruled from about A.D. 1600-1620 (Cordy 2000:464). He was married to the daughter of Kuluku‘ua, chief of Hilo. After being held captive by his father-in-law in Hilo:

> . . . ‘Umi and his companions returned to Hamakua and went down to Waipi‘o. There he conferred with his chiefs and his father's old war leaders. It was decided to make war on the chiefs of Hilo and to go without delay by way of Mauna Kea. From back of Ka‘umana they were to descend to Hilo. It was shorter to go by way of the mountain to the trail of Poli‘au and Poli‘ahu's spring at the top of Mauna Kea, and then down toward Hilo. It was an ancient trail used by those of Hamakua, Kohala, and Waimea to go to Hilo. They made ready to go with their fighting parties to Mauna Kea, descended back of Hilo, and encamped just above the stream of Waianuenue without the knowledge of Hilo's people that war was coming from the upland. Hilo's chiefs were unprepared.
>
> A certain fisherman of Pu‘ueo was at sea, catching nehu fish, and he noticed that the water in the ocean was dirty. He was surprised and guessed that there was war in the mountain, and it was that which caused the water to be so dirty. . . . He did not stop to dry his nets, but cooked taro and some nehu fish, picked up his war

> spear, draped his cape of ti leaves over his back, and departed for the upland. The name of this man was Nau.
>
> When Nau arrived away up in the upland of Ka‘umana, he remained at a narrow pass, and the other side of it was the camp [of ‘Umi]. He sat on a flat stone beside the stream and after opening his bundle of nehu fish, ate some with the cooked taro (kuala). . . The spot in which he sat was comfortable and was in a depression. When someone on the other side reached out to go through, he was stabbed with a spear and fell over the cliff, dead [Kamakau 1992:16, 17].

Nau kept the invading force at bay, killing forty men, but at last one of ‘Umi’s warriors jumped over the cliff and killed the fishermen. There was no one to warn the people of Hilo about the invading army, and ‘Umi’s men were able to surround the chief’s house and destroy the chief and his men.

Many notable chiefs lived near Hilo Bay, including the chief Keawe-hano, who lived in Punahoa when Kahekili ruled Maui and Kahahana (1773-1785) ruled O‘ahu (Cordy 2002:19). There was one warrior who was loyal to both chiefs named Kapohu. Kahekili has built a chief’s house on Maui; only chiefs that paid their taxes in feather capes and bird feathers could enter this house. To gain the favor of the Maui king, Kapohu and his friend, Ka-‘akakai, traveled to Hawai‘i to obtain bird feathers. They landed at Kohala, and then split, one traveling around the island by way of Hāmākua and one by way of ‘Ōla‘a in Puna. Ka-‘akakai reached the Hilo area first and made friends with the Hilo chief Keawe-hano, living at the beach of Punahoa, opposite the surfing areas of Huia in Pi‘ihonua and Hikanui at Punahoa (Kamakau 1992:130). When Kapohu reached Punahoa, he saw the chief and his friend sitting outside a house, each wearing a feather helmet, necklace, and feather cape. Kapohu chanted to the chief, and the chief asked him to enter, to the dismay of his friend, Ka-‘akakai (Kamakau 1992:129-131). While entering, Kapohu chanted:

A Kahuku i Ola‘a	From Kahuku to Ola‘a [I have traveled],
Ka uka i Pana‘ewa,	To the uplands of Pana‘ewa
Ka uka o Haili,	To the uplands of Haili
Kapili manu e,	To catch birds with lime,
Kawili manu e,	To catch birds with snares,
Kololio manu e,	To catch birds with lines,
Wiliwili manu e,	To twist the necks of birds,
O ka hulu o ka manu,	For their feathers,
‘Ahu‘ula mai no,	[Give me] a feather cape,
Mahiloe mai no.	[Give me] a feather helmet,
Hulikua mai no.	[Give me] a feather necklace.

[Original Hawaiian text from *Ka Nupepa Ku‘oko‘a*, Mar. 16, 1867; translation in Kamakau 1961:131].

> To these words Keawe-hano responded, “Here is your feather necklace, here is your feather helmet, but the cape you two shall share!” No sooner had he uttered the word share (*mahele*) than Ka-pohu reached for a corner of the feather cape

> that Ka-‘akakai was wearing and drew it over his own shoulders, leaving Ka-‘akakai without any [Kamakau 1992:131].

This story emphasizes the importance of feather collecting in the Hilo area. Soehren’s list of place names in Pi‘ihonua Ahupua‘a mentions a *heiau* (temple) called Papio (www.ulukau.org). According to Thrum, this *heiau* was located “back in the forest,” and was “a *heiau* for canoe builders and bird catchers,” (Thrum 1908:40). The tale also identifies the name of a noted surfing area, named Huia, off the Pi‘ihonua shore.

Early Hawaiian scholars began collecting and writing about Hawai‘i’s history in the mid 1800s. John Papa ‘Ī‘ī describes events that occurred in the Hilo region during the life of Kamehameha I:

> Alapai, ruler of Hawaii [from 1730-1754] and great uncle of Kamehameha, and his wife Keaka took charge of him [Kamehameha]. Some years later, Alapai and his chiefs went to Waiolama in Hilo, where Keoua Kupuapaikalani, the father of Kamehameha, was taken sick and died. Before Keoua died he sent for Kalaniopuu, his older half brother and the chief of Kau, to come and see him. Keoua told Kalaniopuu that he would prosper through Kamehameha’s great strength and asked him to take care of the youth, who would have no father to care for him. Keoua warned Kalaniopuu, saying, “Take heed, for Alapai has no regard for you or me, whom he has reared.” After this conversation, Keoua allowed his brother to go, and Kalaniopuu left that night for Puaaloa [situated in the *ahupua‘a* of Waiākea, in the area called Pana‘ewa].
>
> As Kalaniopuu neared Kalanakamaa [in Waiākea], he heard the death wails for Keoua and hastened on toward Kalepolepo [between Mohouli and Kāwili] where he had left his warriors. There they were attacked by Alapai’s men, who had followed Kalaniopuu from Hilo. First the warriors from the lowland gained, then those from the upland . . . Kalaniopuu continued his journey, and at midnight reached Puaaloa, where he arranged for the coming battle. The next day all went as he had planned; his forward armies led the enemy into the forest of Paieie, where there was only a narrow trail, branchy on either side and full of undergrowth. There his men in ambush arose up against the enemy warriors, and his rear armies closed in behind them . . .
>
> When news reached Alapai that his warriors had been destroyed, he sent another company of warriors to meet Kalaniopuu at Mokaulele on the outer road, which was an ancient road, known from the time of remote antiquity [Ī‘ī 1959:3-4].

According to Kelly et al. (1981:3), the lands fronting Hilo were portioned off into named land sections, consisting of the *ahupua‘a* of Pu‘u‘eo, Pi‘ihonua, Punahoa, Ponahawai, Kūkūau and Waiākea although it is not known when or by what chief. It is assumed that this had been accomplished by the late sixteenth or early seventeenth century.

Samuel Kamakau recorded the events occurring in Hilo during the life of Kamehameha I, and he identified the location of the death of Keōua, father of Kamehameha:

> . . . Keoua, called Ka-lani-kupu-a-pa-i-ka-lani-nui, fell ill of a lingering sickness at Pi‘opi‘o [the site of the present Kamehameha Statue in Hilo, see present Figure 11] adjoining Wailoa in Waiakea and died there in 1752. . . . His older brother Ka-lani-opuu was with his kahu [guardian-attendant] Pua, above Kalepolepo at the time [Kamakau 1992:75].

Following the death of Kalani‘ōpu‘u in 1782, the island of Hawai‘i was to be ruled by Kīwala‘ō, Kalani‘ōpu‘u’s son. The god Kūka‘ilimoku was given to Kamehameha I. Disagreement arose about the division and redistribution of land in the Hilo District. The *ahupua‘a* of Waiākea and Ponahawai were among the contested lands:

> Keoua Kuahu-‘ula heard that the land was being divided. He was a twin son of Ka-lani-‘opu‘u, his twin brother being Keoua Pe‘e-‘ale. The beautiful chiefess Kane-kapo-lei was their mother. Keoua was a handsome man, tall and broad of body, with fine features: a distinguished looking figure with strands of hair so long that they hung down his back. That day about nine o’clock he came to the ruling chief, Kiwala‘o, and said, “Are Ola‘a and Kea‘au ours?” The chief answered, “They have been given away; they are not ours.” “How about Waiakea and Ponahawai?” “They have been given away; they are not ours” [Kamakau 1992: 119-120].

After the death of Kīwala‘ō, the island of Hawai‘i was controlled by three chiefs: Keawema‘uhili, controlled Hilo and Hāmākua; Kēoua-kū‘ahu‘ula, controlled and resided in Ka‘ū; and Kamehameha controlled Kohala and Kona. Kēoua divided the lands of Hilo District between his chiefs and warriors, and “the fat Mullet of Waiakea and Pi‘opi‘o became theirs” (Kamakau 1992:152).

Keawema‘uhili ruled out of Hilo Bay as chief of the Hilo District, dating back to the reign of his brother Kalani‘ōpu‘u. It is likely that the center of rule was at Waiākea Ahupua‘a in Hilo Bay. It was probably the same center of court used by previous rulers and by Kamehameha after unification of the island in 1791.

Once Kamehameha had full control of Hawai‘i Island, Kamehameha planned to invade the neighboring islands. Kelly et al. (1981:8) believes that “. . . An important part of his preparation was the building of war canoes, and for this Hilo seems to have become his headquarters for considerable periods of time.”

When Captain George Vancouver, in his ships the *Discovery* and the *Chatham*, visited Hawai‘i in 1793, they first met up with Kamehameha at Hilo Bay, as he was at that time residing at Waiākea to preside over the Makahiki festival (Menzies 1920:140-141). In 1795, Kamehameha sailed from Hawai‘i to O‘ahu for further conquests. According to John Papa ‘Ī‘ī (1959:15), Kamehameha had to quickly return to the island of Hawai‘i to quell a rebellion. Namakehā, a Maui Chief living in Ka‘ū, fomented a rebellion amongst the people of Ka‘ū, Puna, and Hilo. In 1796, Kamehameha returned to Hawai‘i and defeated Namakehā in a battle at Kaipalaoa, (‘Ī‘ī 1959:15-16). Kaipalaoa, which literally means “whale sea” (Pukui et al. 1974:70), was an ancient surfing area in Pi‘ihonua at what is now the base of Waiānuenue Avenue. Namakehā’s body was sacrificed by Kamehameha on the *heiau* of Kaipalaoa

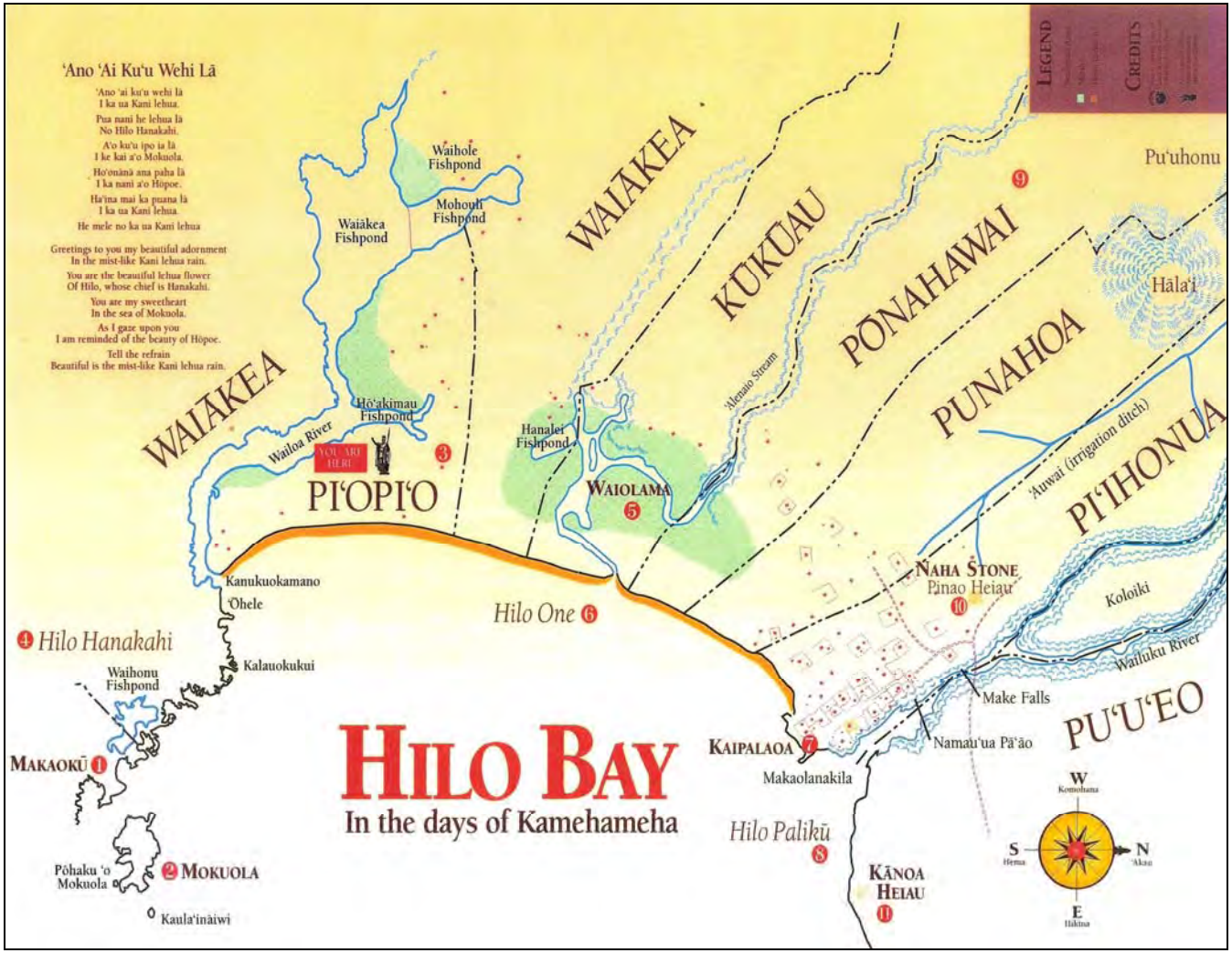

Figure 11. Map of Hilo produced by Kamehameha Schools, showing important places in the life of Kamehameha I. Significant to this report are Site #3, Pi‘opi‘o, the death place of Keōua; Site #10, the probable location of the Pinao Heiau; and Site #7, the location of the Kaipalaoa Heiau

(Kamakau 1992:174). It has been theorized that the correct name of this *heiau* is “Pinao,” (Desha 2000:450). This was the name of the *heiau* where the famous Naha stone was situated (see Figure 11). Pinao literally translates as “dragonfly,” (Pukui et al. 1974:185).

After Kamehameha’s death, the lands of Hilo, which includes Pi‘ihonua, Punahoa, and Waiākea, were given to his son Liholiho (Kamehameha II), heir to the kingdom. When Liholiho was born in 1797, “he was taken to the heiau of Kapailaoa, and the sacred rite of the cutting of his navel cord was performed by the kahuna,” (Kamakau 1961:220). The *‘ili kūpono* of Pi‘opi‘o was granted to his most favored wife Ka‘ahumanu. His chief advisors, John Young and Isaac Davis, were given Kūkūau ‘Ekahi and Kūkūau ‘Elua (the *ahupua‘a* adjacent to the southern border of Ponahawai). Another favored wife, Kaheiheimalie, was given the *ahupua‘a* of Pu‘ueo. Ponahawai Ahupua‘a, Kamehameha gave to his warrior chief Keawe-a-heulu (Kelly et al. 1981:11).

3.2.3 Missionary Accounts of Hilo

In April 1822, members of the London Missionary Society came to Hawai‘i via Tahiti, among them a Tahitian convert named Auna. He was the first missionary to preach in Hilo (Kelly et al. 1981:26). The delegates from the society were hosted by Queen Ka‘ahumanu and her husband Kaumuali‘i, who were making a tour of the islands. The delegates landed in Hilo Bay on May 28, 1822. Auna recorded in his diary the following observation of Hilo.

> Tues. 28th . . . we went on shore at a place called Nukukamanau [Ka-nuku-o-ka-manu], by the side of a very large and rapid stream of water. The place appeared well covered with trees and there was a great deal of taro under cultivation. The houses were thick, and the people very many. . . [Auna, in Kelly et al. 1981:27].

The Reverend Ellis, with three American missionaries, returned to Hilo in July and August of 1823 during a walking/canoe tour of the island. Ellis’ party was in Hilo for five days in August, staying in a house at Waiākea provided for them by the *konohiki*, Ma‘alo. They preached at Waiākea, Ponahawai, and Pu‘u‘eo to more or less responsive audiences (Ellis 1963: 213-229). In Waiākea at the east end of Hilo Bay, Rev. Ellis recorded his impressions of South Hilo:

> The face of the country in the vicinity of Waiakea is the most beautiful we have yet seen . . .
>
> The light and fertile soil is formed by decomposed lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes, and melons, grow to the greatest perfection. . . .
>
> We thought the people generally industrious; for in several of the less fertile parts of the district we saw small pieces of lava thrown up in heaps, and potato vines growing very well in the midst of them, though we could scarcely perceive a particle of soil [Ellis 1963:238-239].

The pioneer company of missionaries, sponsored by the American Board of Commissioners for Foreign Missions in New England, arrived in Hawai‘i in 1820 aboard the Brig *Thaddeus*. With the consent of Liholiho (Kamehameha II) and his chiefs, a missionary couple from the first company of missionaries, Samuel and Nancy Ruggles, and Joseph and Martha Goodrich, a

couple from the second company of missionaries, which arrived in the island in 1823, were allowed to set up a new mission in Hilo on the island of Hawai‘i. Hiram Bingham, pastor of Kawaiaha‘o Church in Honolulu relates the first days of this new mission:

> . . . the mission took a station there [Hilo] in the early part of 1824. To accomplish this at some sacrifice, Mr. and Mrs. Ruggles, freely leaving Kauai, where they had happily labored three years, and Mr. and Mrs. Goodrich, of the reinforcement, were associated and employed to commence the new station at Waiakea, central for the large districts of Hilo and Puna, which extend along the seaboard about eighty miles. They embarked from Honolulu about the middle of January, on board the schooner *Waterwitch*, a vessel of thirty tons, owned by J. Hunnewell, Esq., who kindly volunteered to accompany them, and navigate the vessel for them. They were accompanied by Dr. and Mrs. Blatchley, for a temporary stay, by Messrs. Ellis and Chamberlain, on a missionary excursion, and Mr. and Mrs. Ely, bound to Kona. . . .
>
> They anchored in Hilo bay about sun-set, and landed before dark with a few necessary articles. They at once prepared their lodging in a large thatched building, seventy feet by thirty, designed as a shelter for canoes, timber, and other articles, and, by order of the chiefs at Oahu, appropriated to their use. It was without floor, partitions, or windows; and though the canoes were removed, a large pile of long timber still occupied the central part of the building, near the rude posts that supported the ridge-pole. . . .
>
> The next day, the duties of preaching and public worship engaged their attention. To favor this, Kaahumanu had offered the use of another building of similar structure. It was well filled by the people and missionary company, to whom Mr. Ellis preached. In the midst of the service, a large pet hog, black and fat, asserting equal or superior right to occupancy, marched in, swinging her head armed with huge tusks. The native crowd, not daring to resist her, gave way, forcing the preacher and his friends from their position. The murmurs of surprise and apprehension among the natives rose to boisterous shouting, and the congregation, retreating through the great doors at each end, left the hall of audience to the persecuting beast, whose rights were regarded, by high and low, as superior to those of the people, having been tabued, and often fed from the mouth of a native. Her feeder, more bold or skilful than the rest, approached the animal, and by repeated, gentle passes of the fingers on her bristly back, composed her to a sort of mesmeric sleep, more easily than leviathan is tamed. The congregation then resumed their places, and the preacher was allowed to finish his discourse. This hog was a tabu, pet of Queen Kaahumanu, and bore her name [Bingham 1847:207-208].

The mission did not prosper at first and the natives seemed indifferent to the sermons of Ruggles and Goodrich. This changed in late 1824, when the high chiefess Kapi‘olani came to Hilo to help the missionaries. Mr. Goodrich met her party at the Kīlauea Volcano, where Kapi‘olani descended into the crater, defying the priest of Pele. She returned with Goodrich to Hilo and stayed for ten days. After that, the missionaries had greater success in converting the

Hawaiians to Christianity (Kamakau 1992:379-385). In 1825, Ka‘ahumanu visited the mission, and gave the land of Punahoa 2 for the use of the mission (Kelly et al. 1981:36). The ownership of this land was confirmed in 1849 during the Māhele and listed as Land Commission Award 387 (illustrated in Figure 12). The missionaries used this land to raise goats and cultivate vegetables so that they could furnish their own food. Goodrich also experimented with making sugar and molasses from sugar cane at his own small mill (Goodrich 1829, in Kelly et al. 1981:36).

Other visitors to the mission included Kamehameha III, who visited several times between 1828 and 1830, and Kuakini, governor of Hawai‘i, in 1829. Kuakini helped the missionaries build a church near the coast and helped plan for a saw mill at the forest edge. This saw mill was erected by a group of foreigners who also sold beef, from the wild cattle in the mountains, to the missionaries (Lyman 1970:59).

The Reverend David Beldon Lyman and his wife Sarah Joiner Lyman were members of the Fifth Company of missionaries. They arrived in Hilo, Hawai‘i in 1832 and were stationed at Hilo until their deaths. They were joined in 1835 by Reverend Titus Coan, who converted hundreds of natives during “The Great Revival.” In the 1830s, the Reverend Lyman founded the Hilo Boarding School for Hawaiian Native Boys, which was built about half the way between the coast and the Hāla‘i Hills. Henry Lyman, the son of Reverend David Lyman, remembered the Hilo Boarding School.

> . . . a large thatched building of native construction was erected for the accommodation of the boarding school. Its pupils numbered thirty-five [in 1836] of the brightest Hawaiian boys, chosen from the different primary schools over the whole island. They lived in the big schoolhouse where they were taught by my parents; but their mornings and evenings were spent in manual labor on a little farm nearby, where they raised the vegetables that formed the greater part of their daily food [Lyman 1906:21-22].

3.2.4 Early Foreign Visitors to Hilo Bay

In 1824, the English ship H.M.S. *Blonde* traveled to Hawai‘i to return the bodies of Liholiho and Kamāmalu, the king and his wife, who had died on a visit to London. On a tour of the islands, the *Blonde* anchored in Hilo Bay, which was then renamed Byron Bay for the ship’s commander, Lord Byron. The ship’s company stayed at the village of Waiākea for about three weeks. On their departure, Lord Byron noted:

> Byron Bay will, no doubt, become the site of the capital of Hawaii. The fertility of the district of Hido [*sic*] . . .the excellent water and abundant fish-pools which surround it, the easy access it had to the sandal-wood districts, and also to the sulphur, which will doubtless soon become an object of commerce, and the facilities it affords for refitting vessels, render it a place of great importance [Byron 1826:192-193].

Another member of the expedition, Charles Stewart, noted the upland agricultural area, the zone the project area is located within, was open grassland, with interspersed houses and gardens.

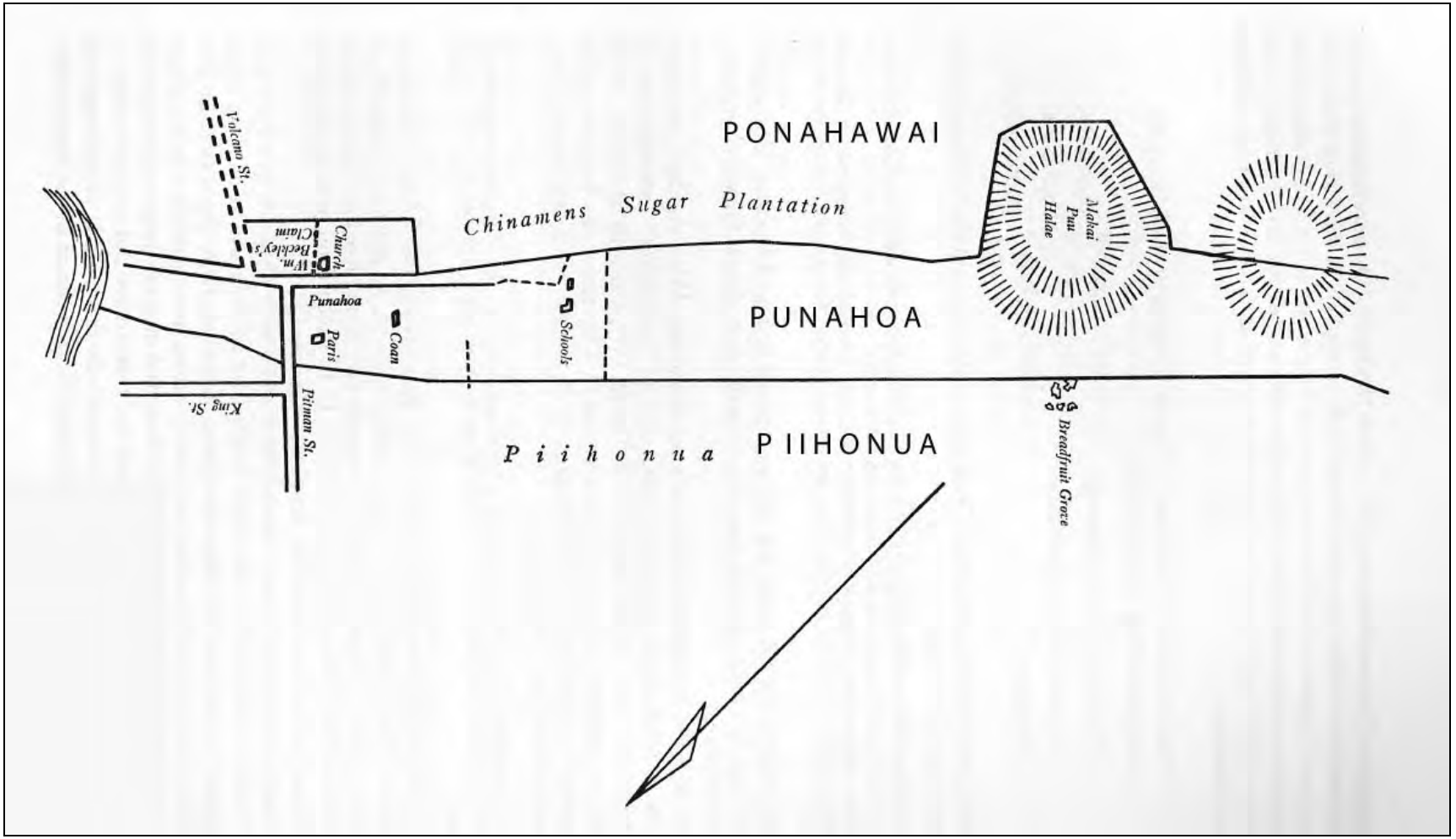

Figure 12. 1849 sketch of LCA 387 in Punahoa and surrounding lands (not to scale); note “Chinamens Sugar Plantation” in the *ahupua‘a* of Ponahawai and the relation of the Hāla‘i Hills to Pi‘ihonua lands (figure in Kai 1974:51)

> For the first four miles the country was open and uneven, and beautifully sprinkled with clumps, groves, and single trees of the bread-fruit, pandanus, and plane tree. We then came to a wood, about four miles in length [Stewart 1970:369].

Captain Charles Wilkes, of the U.S. Exploring Expedition, stopped at the Hawaiian Islands between December 9, 1840 and March 5, 1841. One of the goals of this scientific expedition was to ascend to the top of Mauna Loa to observe the volcano. To carry out this goal, they anchored at Hilo Bay, which Wilkes described:

> The scene which the island presents as viewed from the anchorage in Hilo Bay is both novel and splendid: the shores are studded with extensive groves of cocoa-nut and bread-fruit trees, interspersed with plantations of sugar-cane; through them, numerous streams are seen hurrying to the ocean; to these succeeds a belt some miles in width, free from woods, but clothed in verdure; beyond is a wider belt of forest, whose trees, as they rise higher and higher from the sea, change their character from the vegetation of the tropics to that of polar regions; and above all tower the snow-capped summits of the mountains [Wilkes 1849:143].

3.2.5 Early Foreign Residents and Merchants, 1790-1880

In the late 1700s and early 1800s, ships involved in the trade between the fur outposts of the Northwest coast and the markets of China and the Far East stopped in the Hawaiian Islands to get food, fresh water, salt, and other supplies needed for the long voyage ahead. This limited exchange began to change when sandalwood was discovered on the forest slopes of the islands, in 1790 or earlier (Kuykendall 1938:85). Soon sandalwood became an important export item for the island, gathered by the people for the great chiefs to pay off their debts to foreign traders. Ellis saw one of these early sandalwood expeditions returning from the mountain above Hilo in 1823 under the *konohiki* (overseer for the chief) Ma‘alo. Presumably the sandalwood would have been transferred to a ship anchored off Hilo Bay at Waiākea.

> During the same journey we overtook Maaro, the chief of Waiakea, and three or four hundred people, returning with sandal wood, which they had been cutting in the mountains. Each man carried two or three pieces, from four to six feet long, and about three inches in diameter. . . .
>
> It is sold by weight, and the merchants, who exchange for it articles of European or Chinese manufacture, take it to the Canton market, where it is bought by the Chinese for the purpose of preparing incense to burn in their idol temples [Ellis 1963:214-215].

Supplying foreign ships with food and water continued when whaling ships began to visit the islands. The earliest foreign born merchants of Hilo town were established to cater to this trade. Sometime after the Wilkes expedition in 1838, Henry Lyman was out walking with his father, the missionary David Lyman, and met some interesting early residents of Hilo:

> Here we were welcomed by a short, stout, gray-headed old gentleman, whose kindly features were handsomely set off by an elegant pair of white mutton-chop whiskers. This was Mr. Benjamin P. [Pitman], formerly a resident of Boston,

> who, years before, left his home to seek a fortune among the merchants of Canton. For some reason, after a time he ceased writing to his family; and his wife, naturally growing anxious, sent their only son, Benjamin, Jr., to find out what had become of his father. Arriving in the Orient, he learned that his parent had gone to the Sandwich Islands; and accordingly he followed him thither. There he discovered the old gentleman, but was unable to dislodge him from the tropical paradise in which he was established. The young man, being only nineteen or twenty years old, also soon yielded to the charm of the place, forgetting the maternal home, and marrying a handsome young Hawaiian princess, who made for him an excellent wife and mother of his children. The father and son, not long before the visit of Commodore Wilkes, opened a little shop for the sale of general merchandise; and having the haole field to themselves were very successful in trade [Lyman 1906:68-69].

Samuel Hill traveled to Hawai‘i on the whaler *Josephine* in 1848 (Judd 1929:39), and stopped in Hilo to make an expedition to Kīlauea Volcano. On the way back, he noted the landscape on the lower slopes in back of the town. This would have been within the upland agricultural zone, possibly within or near the project area.

> . . . it was not until near sunset that we discovered any signs of our approach to the little port of Hilo, when we came suddenly upon a piece of meadow land, on which were feeding several head of cattle, with letters marked upon their skins, which as plainly revealed the fact of their captivity as it assured us of the near termination of our journey. In another half-hour we opened a view of Byron’s bay [Hilo Bay]; after which, we crossed some further meadow land, which brought us to the village of Hilo, seated upon the bay near the shore. The place appeared to consist merely of a few scattered huts, among which it was easy to distinguish the residence of an European; and we rode immediately up to that of Mr. Pitman, to whom I had brought the letter of introduction, and from whom we now met a hearty reception . . . [Hill 1856:290].

> It [Hilo] consists, at present, of thirty or forty scattered huts, a Protestant church, a small Romish chapel, the dwellings of the missionaries, a school-house, and several houses belonging to Mr. Pitman, by whom all the proper commerce of the place is carried on [Hill 1856:292].

Benjamin Pitman Jr.’s wife was the chiefess Kino‘ole-o-Liliha, whose father was the high chief Ho‘olulu, an uncle of Kamehameha I. She had extensive lands in ‘Ōla‘a 1 and around Hilo (Pitman 1931). In addition to his wife’s lands, Pittman purchased several other large tracts from Kamehameha III in 1846 and became the owner of a large area. Some of this land he rented to several Chinese entrepreneurs, who had come to Hilo to set up sugar cane fields and sugar cane mills. Henry Lyman, walking with his father in the late 1830s also met up with these Chinese on the Pitman lands.

> On another day, walking a little farther, we found the new road extended beyond a dense grove of breadfruit trees to a considerable enclosure where a number of thatched houses had been recently erected. Two or three almond-eyed gentlemen, with long braids of hair coiled about their heads, were persuading a yoke of half-

> tamed oxen to walk in a circle, dragging after them a beam that rotated three vertical wooden rollers, between which a native boy was insinuating slender stalks of sugar-cane drawn from a pile by his side . . . This was the first sugar-mill established on the island of Hawaii [Lyman 1906:70-71].

Samuel Hill also met noted these early Chinese entrepreneurs on Pitman's estate.

> Mr. PITMAN introduced us, during our stay at Hilo, to a fine estate he had himself planted in the rear of the bay, . . . We found the estate situated upon elevated ground, between one and two miles from the port, commanding a fine view of the bay and the ocean, and in the midst of a country still rising as it recedes from the shore, and comprehending one of the most fertile districts in the island. It produced chiefly sugar as an article of export, at present; but it was in a fair way of adding the profits of a large coffee plantation [Hill 1856:303].
>
> Here our attention was arrested by the presence of two of the Chinese who were superintending the works, which led to Mr. Pitman informing us of the plan he had adopted in the management of his estate, and the especial use he was making of the yellow men. . . . upon finding his estate wonderfully thriving under their [the Chinese] management, he had determined to go farther than this, and to give them a direct interest in its prosperity. . . . he let his estate to the same men he had advanced from labourers to be overseers, at a fixed annual rent, from which arrangement he was reaping great benefit [Hill 1856:305-306].

By 1839, Governor Adams Kuakini established a sugar plantation and constructed a sugar mill on Ponahawai Hill (historic name for Hāla‘i Hill) (Lum 1988:26). Sugar cane was planted on the Puna side of Hāla‘i Hills, within Ponahawai and Punahoa Ahupua‘a, reaching as far down as the present location of Kīlauea Avenue (see Figure 12 for location of "Chinamens Sugar Plantation") (Kelly et al. 1981:49). Early sugar cane mills in the Hilo area were run by several early Chinese "sugar masters" who settled in Hilo and married Hawaiian women. Peggy Kai (1974:45-53) has identified at least seven Chinese men who resided in Hilo before 1852. The sugar plantation and mill were a fairly small endeavor, but by 1851, about 20,000 pounds of sugar was produced on the 55-acre plantation (Kai 1974:61). The plantation was watered from an ‘*auwai* (irrigation ditch) that ran through the Hilo Boarding School grounds (Figure 13) (Kai 1974:43).

Pitman left the islands in 1860 to return to his home in Boston (Merry 2000:156). He sold much of his property, including the Hilo stores and his agricultural land, to a Mr. Thomas Spencer, a former ship's captain. Thrum (1924:123-126) reprints material from a pamphlet on this early Hilo resident, which was probably written by Thomas Spencer himself:

> Thomas Spencer. . . Formerly carried on the ship-chandlery business in Honolulu, but is now in Hilo, having lately purchased a large estate at that place of B. Pitman, where he is extensively engaged in the country store line, having three or more stores. Is interested largely in pulu, and according to his own statement is making money fast. Attempted while in Honolulu to make himself popular through being noisy but failed in it and became notorious as a braggart, making a great cry and little wool [Thrum 1924:123].

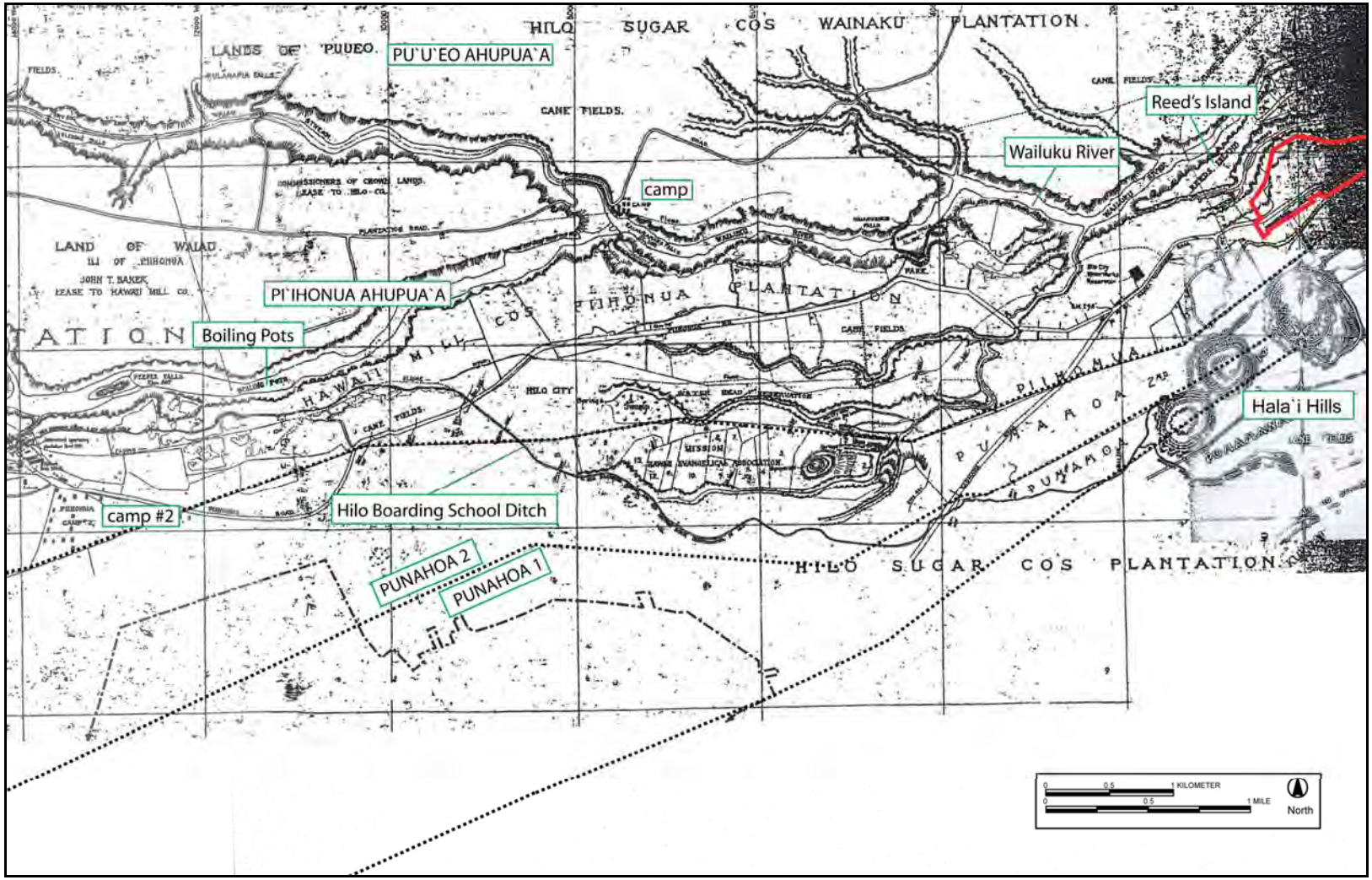

Figure 13. “Hilo Sugar Company Fields” (ca. early 1900s) blueprint in Hawai‘i County Public Works Office, Hilo, Hawai‘i; showing the approximate location of the western end of the project area (in red), and the location of the cane fields, plantation camps and certain topographic features

Thrum adds additional information on this Hilo sugar plantation:

> Among the lands Spencer acquired from Pitman was a tract under lease to the Chinese and planted to cane, known as the Amauulu plantation [in Pu‘ueo Ahupua‘a, north of Pi‘ihonua]. This eventually came under Spencer’s control and gradually won him away from merchandising. Just when he withdrew from the store is not definite, but probably about 1870. . . .
>
> On devoting himself to the sugar business, the old style system of Chinese mill and boiling-house work was done away with, grinding then being done by an overshot water wheel-and a new and modern plant of Watson's Scotch sugar machinery installed. Very naturally the name changed to Spencer’s Plantation [Thrum 1924:123-124]

3.2.6 The Māhele and Traditional Native Hawaiian Settlement in the mid 1800s

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. The common people (*maka‘āinana*) received their *kuleana* awards (individual land parcels) in 1850. It is through records for Land Commission Awards (LCAs) generated during the Māhele that the first specific documentation of life in Hawai‘i, as it had evolved up to the mid-nineteenth century come to light. Although many Hawaiians did not submit or follow through on claims for their lands, the distribution of LCAs can provide insight into patterns of residence and agriculture. Many of these patterns of residence and agriculture probably had existed for centuries past. By examining the patterns of *kuleana* (commoner) LCA parcels in the vicinity of the project area, insight can be gained to the likely intensity and nature of Hawaiian activity in the area.

No *kuleana* LCAs were awarded to commoners in the vicinity of the project area suggesting that indigenous Hawaiian land use within the project area may have been limited, though one Land Commission Application (#218) was submitted across the street from the project area, presently the grounds of the Roman Catholic Church. The project area under study lies over an area containing eight Land Grants, and there are several more adjacent to the project area. The website “Waihona ‘Aina” describes the history behind Land Grants:

> At the time of the Mahele, some of the land was the King’s own land which later became known as Ceded Lands. Other lands in the possession of ali’i were returned to the King in exchange for Commutation of property the ali‘i kept. Some of these returned lands became Government lands and were sold by the government to generate income for the Kingdom, since the King gave up his traditional right to collect taxes and goods following the Mahele…
>
> The earliest LG records (1846) are in both English and Hawaiian. If the Government land was sold to a foreigner the text is in English. If the purchaser were Hawaiian the documents is in Hawaiian. By 1915 the documents became written entirely in English, regardless of the purchaser’s ethnicity…
>
> Robert H. Stauffer, in his 2004 book, Kahana: How the Land Was Lost (Univeristy of Hawai‘i Press, Honolulu, HI) says that about 90 percent of the

> government lands capable of cultivation were sold during the 1850s noting that the large parcels were sold to Haole (foreign residents). Many lands were also subdivided into strips and sold to Hawaiians and others dispossessed Mahele. These maka‘ainana (native citizens) formed Hui with commonly- held-land owned by the group, (p. 109) [https://www.waihona.com/information.asp].

Unfortunately, the information provided by Land Grant records is often more limited than that provided by LCAs. The Land Grants that were issued within the bounds of the current project area are concentrated along the southern, or Waiānuenue Avenue, side of the project area (see Figure 2). They are listed below (Table 2), in order of how they lie within the project area (west to east). No other information was found (Waihona ‘Aina 2000) regarding the lands grants.

Table 2. Land Grants in the Project Area

LG #	Grantee	Notes
6767	Maria Dos Anjos Carvahlo	none
7196	Kahema Paona	Pi‘ihonua House Lots
7198	M. and Mrs. Julia Santos	Pi‘ihonua House Lots
7197	Kama Kamohalii	Pi‘ihonua House Lots
7375	Julia Luiz Da Souza	Pi‘ihonua House Lots
7519	Georgina Louiz Da Souza	none
7189	Lameka Ahulau	Pi‘ihonua House Lots
7188	Joe Moniz	Pi‘ihonua House Lots

3.2.7 Coffee Cultivation in Hilo

The first coffee trees in the islands were planted by Don Paulo Marin on his O‘ahu estate in 1817. An attempt to grow the trees on a plantation was made by Mr. John Wilkinson in 1825 in Mānoa. Other early plantations were at Kona and Hilo on the island of Hawai‘i. Thrum (1876:46-47) comments on the successful growth by, ". . . the Rev. Mr. Goodrich [the missionary] planting the first slips in Hilo, which grew luxuriantly in Hilo. This planting was probably near Goodrich's house near Hilo town. It was soon decided, however, that coffee grew better at higher elevation. Thrum (1876:48) reports that at Hilo in 1847, a "Dr. Maxwell and Mr. Miller, officers of the U.S.S. *Cyane*, leased of the government 100 acres of the best land for fifty years for the purpose of establishing a coffee plantation, and were to commend operations within six months, but of any after result we have no information." Another early coffee grower in Hilo was Mr. Pitman, who wrote a letter to the agricultural society in 1852 about the coffee blight of that year that was destroying the crop.

Samuel Hill, after observing Pitmans' sugar cane lands and mill in his 1848 visit, also toured his coffee plantings:

> From the sugar works we proceeded, still rising, towards the more elevated ground of the coffee plantation. Arrived here, we found ourselves at an elevation which on one side commanded a noble view of the sea beyond the bays with a portion of the coast, and on the other, the mountainous land in the interior of the island. A broad way conducted through an extensive plantation, sown with 22,000 young coffee trees, and producing a considerable number of breadfruit, and tall

> and fine tamarind, trees. The greater part of the coffee trees were very young, and were rearing beneath the broad leaves of the hardier plantain, which protected them from the too-scorching rays of the sun [Hill 1856:317].
>
> The government began to sell land to homesteaders in the 1880s, and coffee was grown on many of these homesteads. However, the coffee industry of Hilo could not compete with similar growers in the Kona region, and coffee operations in Hilo declined between 1905 and 1937. These independent homesteaders would soon be swallowed by larger companies, who uprooted the coffee trees to plant the new king crop, sugar [Cordy 1977:4].

3.2.8 Large-Scale Sugar Cultivation

In 1880, Claus Spreckels, known as the “Sugar King,” entered into a partnership with William Irwin to form the Hilo Sugar Company. They bought a number of small parcels near Hilo, including lands in Punahoa (see Figure 13) and at the base of Mauna Kea. In 1884, they added the lands of Spencer’s Plantation and the Wainaku Plantation to their own. At its greatest extent, the plantation was 4,800 acres in size; some of the land was leased to individual sugar cane growers living in the Hilo area (Dorrance and Morgan 2000:102-103).

Sugar cane plantations belonging to other companies were also present in the Hilo area around the turn of the century. The Waiakea Sugar Company and Hawaii Mill Company (see Figure 13 through Figure 16) are known to have had plantations in upland Hilo. The extensive sugar cane production in the Hilo area meant an influx of workers, and camps sprung up off of plantation roads. Some of these camps were essentially small villages, complete with schools and shops of their own (see “Pi‘ihonua Camp #2,” at the lower right corner of Figure 13; see also Figure 15). In addition, the government began to sell plots of land to private owners (Hawaiian Legislature 1917:384) These plots were classified as “Pi‘ihonua house lots,” and six of the eight Land Grants existing at the current project area were noted as being such.

In 1910, C. Brewer & Co. became the agent for the Hilo Sugar Company. After World War II, the residential areas of Hilo began to further expand, and in 1965, C. Brewer & Company sold the sugar cane fields around Hilo, and merged their remaining agricultural lands with the Onomea Sugar Company to form the Mauna Kea Sugar Company. Production of sugar cane in the Hilo area ended in 1994, when the Hilo Coast Processing Company, a subsequent company of several merged plantations, shut down (Dorrance and Morgan 2000:104-105).

3.2.9 The Hilo Forest Reserve

The following information can be found on the Hawai‘i State Department of Forestry Website:

> The Forest Reserve System was created by the Territorial Government of Hawai‘i through Act 44 on April 25, 1903. With Hawaii's increase in population, expanding ranching industry, and extensive agricultural production of sugarcane and later pineapple, early territorial foresters recognized the need to protect mauka (upland) forests to provide the necessary water requirements for the lowland agriculture demands and surrounding communities.

Figure 14. Portion of an1886 map of Hawai‘i, showing the approximate location of the project in relation to several sugar plantations and mills. Waiakea Plantation lands are noted just southeast of the project area

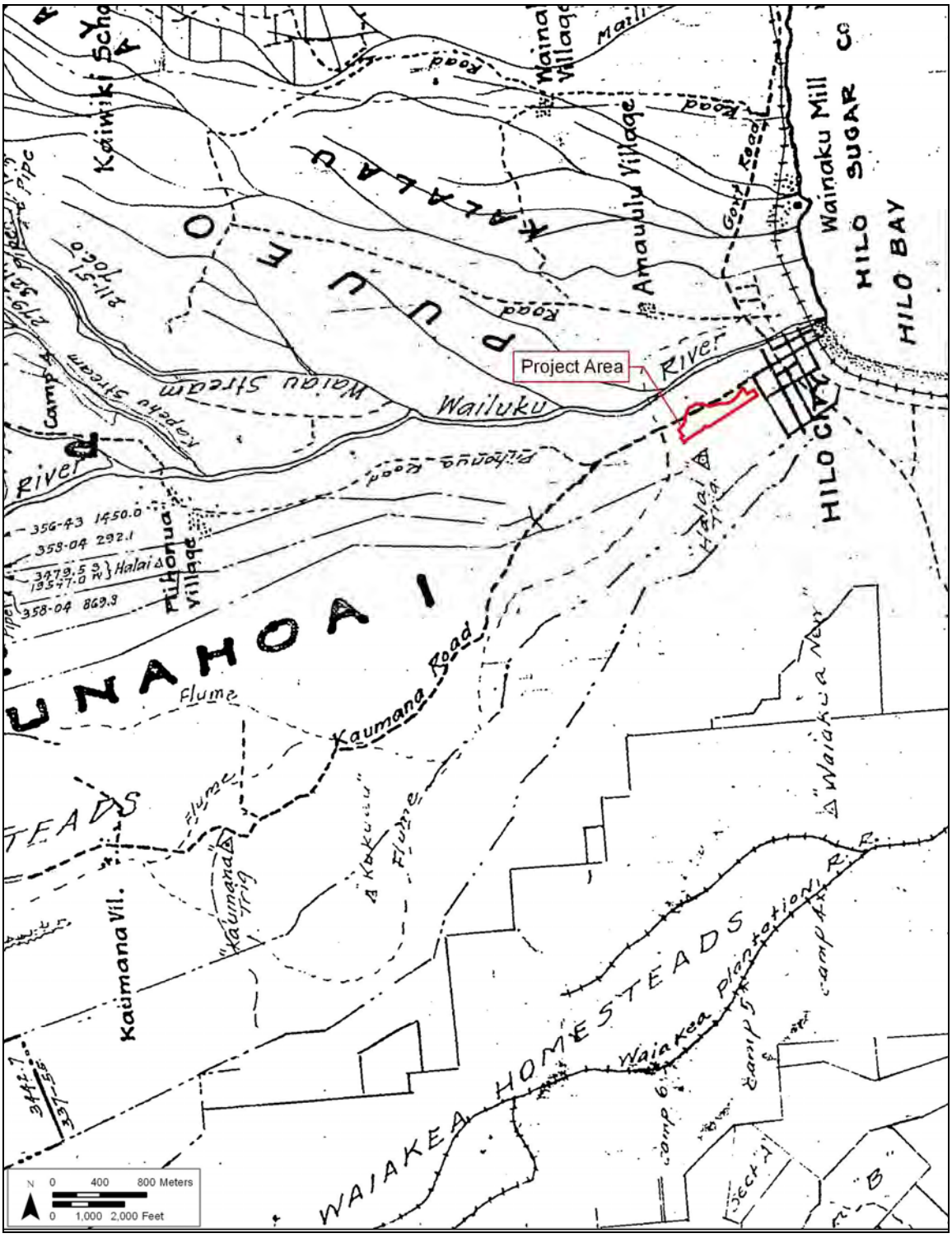

Figure 15. Portion of a1922 map of Hilo and Mauna Kea, showing the approximate location of the project area in relation to the Hāla‘i Hills, the Wailuku River, and various sugar cane flumes and camps. This map also shows the location of Pi‘ihonua Village along Pi‘ihonua Road

Figure 16. Portion of a 1928 Territory of Hawai‘i Survey Map, showing the approximate location of the project area in relation to several sugar mills and camps

> With its inception, the Forest Reserve System (FRS) represented a public-private partnership to protect and enhance important forested mauka lands for their abundance of public benefits and values. Though this original partnership has evolved over the decades, today the tradition is carried on by the Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) for public Forest Reserve lands [http://www.state.hi.us/dlnr/dofaw/frs/page10.htm].

Shortly after the inception of the Forest Reserve System, the Hilo Forest Reserve was created (refer to Figure 9). The commercial success of coffee and sugar in the late 19th century in Hilo had some looking at the forest itself as a potential source of capital. It was quickly decided that a timber industry would do extensive damage to the Hilo watershed. A Report of the Division of Forestry in 1906 argued that the forest of Pi‘ihonua "protects one of the most important springs in the territory—the Wailuku River," recommending that the forest not be lumbered (19-20). The report goes on to explain,

> …the water from this reserve is of great importance to all the plantations along the coast, being at present used for the most part for fluming cane to the mill. From the character of the country many of the streams could be utilized for the production of power. This will be an important consideration when the Hilo District comes to be developed, as it is sometime bound to be. The object of the Hilo Forest Reserve is to protect the sources of this important water supply (Division of Forestry 1906:25).

3.3 Previous Archaeological Research

3.3.1 Archaeological Studies in the Vicinity of the Project Area.

Archaeological studies in and above Hilo town (Figure 17 and Table 3) have been widely scattered. The density of finds is quite low, as can be seen in Table 3. Four of the 12 studies yielded no finds, six of the studies identified only one or two sites, and one study functioned to re-examine two sites identified previously (Wolforth 1999; Maly et al. 1996). All but two of the sites (50-10-35-15415, -18074) were determined to be historic, while Site 50-10-35-19431 contained both historic and prehistoric remains.

In 1991 Susan T. Goodfellow conducted an inventory survey for the Noelani Gardens project (see Figure 17). She identified one site during this project, Site 50-10-35-15415. "Site 15415 consists of two components: (a) several diffuse prehistoric hearths, and (b) historic refuse and recent structural remains…the boundaries of the site are the same as the project area boundaries. The prehistoric component is apparently restricted to the 40 ft beach access area immediately above and behind the pebble beaches (c. 9,600 sq ft in area)," (Goodfellow 1991:25). No further work was recommended for this site (Goodfellow 1991:25). This project area is located in the coastal settlement zone, which extends from 0-50 ft in elevation (McEldowny 1979), and the site was found directly adjacent to the beach. The current project area is located in the upland agricultural zone, therefore one would most likely expect to find different types of prehistoric archaeological remains, if any.

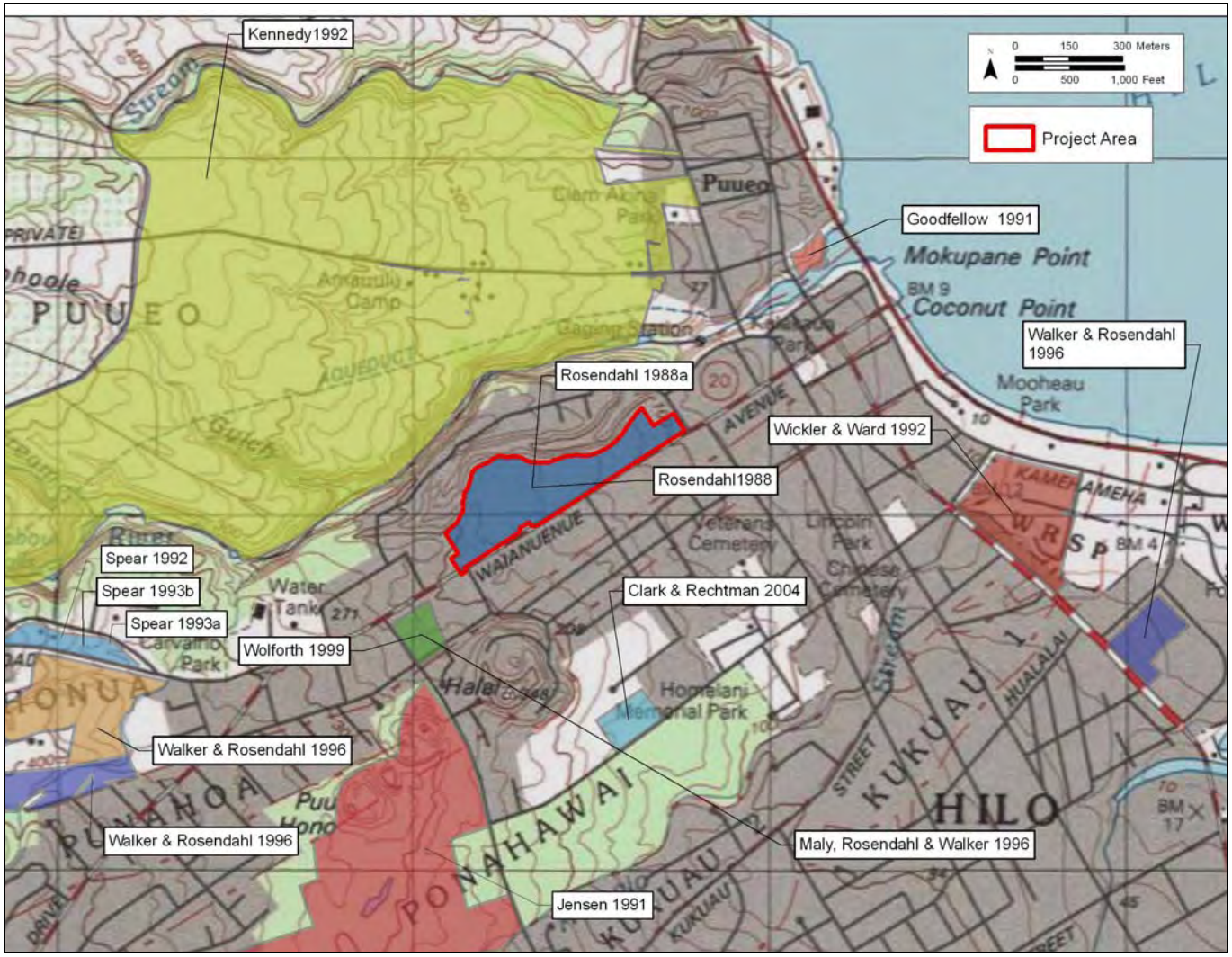

Figure 17. Portion of the 1995 U.S. Geological Survey 7.5-Minute Series Topographic Map, Hilo Quadrangle, showing previous archaeological projects in the Hilo area. Note that two studies were conducted by Rosendahl in 1988 at the current project area

Table 3. Archaeological Studies Near the Current Project Area

Source	Project	Findings (SIHP # 50-10-35-)*
Rosendahl 1988	Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS), Hilo Judiciary Sites [TMK:[3]2-2-002:001, 054, 055, 056, 062; 2-2-010:016; 2-2-033:011, 012, 013, 014, 019, 020; 2-3-015:001; 2-3-044:009]	No finds
Goodfellow 1991	Archaeologcial Inventory Survey of the Noelani Gardens Project, TMK [3] 2-6-002:001, 002	Diffuse prehistoric hearths and historic refuse (15415). This site is located along the coast, not in the upland zone
Jensen 1991	Archaeological Inventory Survey, Komohana Golf Course, Ponahawai and Punahoa 1-2, South Hilo District, Island of Hawai‘i, TMK [3] 2-3-044:009	Remnants of Hilo Boarding School Ditch (14947) and a “cane house” (14946)
Kennedy 1992	Archaeological Inventory Final Report for TMK:2-6-08:26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, and 39; and TMK:2-6-29:09, 10, 11, 12, 14, and15; Located at Puueo on the Island of Hawaii	Rock mound (18074) interpreted as a possible burial
Wickler and Ward 1992	Archaeological and Paleoenvironmental Investigations for Alenaio Stream Flood Control Project, TMK [3] 2-2-006, 007	No finds
Spear 1992	An Archaeological Inventory Survey of HCEOC Project, Pi‘ihonua TMK [3] 2-3-032:001 por.	Cattle wall (18443); retaining wall functioning as erosion control (18444)
Spear 1993a	An Archaeological Inventory Survey of Hilo Health Care Center TMK: [3] 2-3-031:001 & [3] 2-3-32:001	No finds
Spear 1993b	An Archaeological Inventory Survey of H.C.E.O.C. (Option II) Parcel Pi‘ihonua, Hilo, [TMK:[3] 2-3-32:4]	Portuguese oven remains (19036); historic dump (19037)
Maly, Rosendahl and Walker 1996	Limited Inventory Survey for the Proposed Housing Facility at Hawai‘i Community Correctional Facility, TMK [3] 2-3-023:005	Historic drainage ditches (20848 and 20849)

Source	Project	Findings (SIHP # 50-10-35-)*
Walker and Rosendahl 1996	Assessment Study of Hilo Judiciary Complex Project, 7 locations TMK: [3] 2-2-015:033; 2-3-032:001; 2-6-015:001, 002; -016:002; 2-4-049:018, 019; 2-4-001:012; 2-3-036:003; 2-4-057:001	C-shape (19431), U-shape (19432), complex (19433), complex (19434), sugar cane mill (21133). Above sites are located in TMKs not adjacent to the project area.
Wolforth 1999	Final: Data Recovery for the Housing Facility at the Hawai‘i Community Correctional Center: Investigation into the Network of Ditches in the Hāla‘i Region of Hilo, TMK [3] 2-3-023:005	Historic drainage ditch (20848) was determined to be part of the Hāla‘i Ditch Network, probably dating to the Early Historic period. Drainage ditch (20849) likely dates to the 1920s.
Clark and Rechtman 2004	Assessment Survey for TMK [3] 2-3-036:019, Ponahawai Ahupua‘a, South Hilo District, Island of Hawai‘i	No finds

*State Inventory of Historic Places (SIHP) site number

In 1992 Joseph Kennedy conducted an inventory survey of a substantial section of Pu‘u‘eo Ahupua‘a (see Figure 17). He identified one site, Site 50-10-35-18074. This site was described as being a rock mound measuring 2.7 m long, 1.8 m wide and 50 cm high. According to the report for this project, “The exact function of this structure is undetermined at this time, however we suspect that Site #18074 may be a grave,” (Kennedy 1992:17). It was recommended that more precise determination about function be made prior to any disturbance, though none was planned in that area. No sites similar to this were found within the current project area.

In 1996 Alan Walker and Paul H. Rosendahl conducted an assessment study at several different TMKs around Hilo. The report for this study described a total of five sites. These five sites are all historic in nature, including 47+ features relating to sugar cane cultivation and production (Sites 50-10-35-19431 through -19434) and the old Hilo Sugar Co. Mill (Site 50-10-35-21133) (Walker and Rosendahl 1996:20 and 22). Site 50-10-35-19431 is a c-shaped structure. While the architectural remains are historic, a subsurface prehistoric firepit and volcanic glass artifact were discovered at the site, indicating “prehistoric occupation prior to early historic sugar cane cultivation,” (Walker and Rosendahl 1996:22). The five sites described above are not adjacent to the current project, however, occurring in locations covered by the assessment study not within the bounds shown in Figure 17.

Most pertinent to the current project are the three separate historic ditches which were discovered during past studies conducted nearby. Remnants of the Hilo Boarding School ditch (Site 50-10-35-14947) (refer to Figure 13) were identified during Peter J. Jensen’s 1991 inventory survey (Figure 17). The history of this ditch is discussed in some detail in a 1982 report prepared by Marion Kelley and J. Stephen Athens regarding the Alenaio Stream. The ditch, which most likely dates to the early or middle 1800s, provided water to Hilo village (Kelley and Athens 1982). Closest to the current project area were studies conducted by Kepa Maly, Alan Walker and Paul Rosendahl (1996) and Thomas Wolforth (1999) at the Hawai‘i

Community Correction Facility, which is located less than a quarter of a mile west of Hilo High School. Two ditches were identified and studied at this location. Site 50-10-20848 was determined to be part of the Hāla‘i Ditch Network, and probably dates to the Early Historic Period, while Site 50-10-35-20849 is a drainage ditch likely dating to the 1920s (Wolforth 1999). The younger ditch (Site -20849) exhibits sections of faced stone lining. The large number of existing historic ditches present in this area of Hilo makes sense due to its location in the Hilo watershed and due to the extensive agricultural activity that took place there.

Many of the features found during South Hilo archaeological surveys are features associated with sugar cane cultivation, ranching or historic habitation (refer to Table 3). Water control features such as ditches or flumes are present throughout the upland zone of South Hilo, utilized for all of the aforementioned activities. Throughout this area pre-contact and early post-contact (pre-1850) features were probably largely destroyed by the extensive modification of the land that took place during the sugar cane era, which extended from the early 1800s to the closing of the Hilo Coast Processing Company sugar cane fields in 1994. The subsequent development of homesteads and residential subdivisions has also contributed to modification of the land and probable destruction of early Hawaiian sites.

3.3.2 Background Summary and Predictive Model

Based on historic documents and maps, Holly McEldowney presented a settlement and land use model for the Hilo and Puna Districts. This model uses elevation, distance from the coast, vegetation, and land use to subdivide the land into five zones, a coastal settlement zone, an upland agricultural zone, a lower forest zone, a rainforest zone, and a sub-alpine zone. The project area extends from an elevation of 100-245 feet, placing it within the upland agricultural zone, which extends from 50-1,500 feet. The upland agricultural zone contained scattered agricultural features and some temporary residences. The main cultivated plants were dry land taro and bananas, with groves of *kukui*, *pandanus*, and mountain apples.

Early foreign visitors and residents who recorded information on this upland zone include the English missionary William Ellis (1963:251) in 1820, who noted that “The habitations of the natives generally appear in clusters at the opening of the valleys, or scattered over the face of the high land.” In 1824, Charles Stewart (1970:369), a member of the Lord Byron expedition, observed that the area upland of Hilo town was “open and uneven, and beautifully sprinkled with clumps, groves, and single trees of the bread-fruit, *pandanus*, and plane tree” for the first four miles, before they reached the edge of the forest. Captain Wilkes (1849:484) of the 1841 U.S. Exploring Expedition wrote of “a belt some miles in width, free from woods, but clothed in verdure” between the coast and the lower forest.

Thus in the pre-contact and early post-contact period, the upland agricultural zone had habitations clustered along streams used to irrigate taro patches and scattered habitations where dry land taro and other crops were grown. In the post-contact period, many of these scattered habitations and agricultural areas were abandoned, as the number of the native Hawaiians decreased and people moved to population centers, such as Hilo town. The upland areas were used for other purposes, mainly as pasturage for free-roaming cattle.

Chinese sugar masters began to plant and mill sugar cane in the upland Hilo area by the 1830s. There were also experiments with coffee cultivation in the early nineteenth century. Most

of these early small plantations were near the coast or near Hāla‘i Hill. However, sugar cane and coffee began to be planted in the upper elevations by the late nineteenth century, some by individual homesteaders scattered in the upland area. These homesteaders also planted vegetables to sell in the Hilo market. With the termination of the large sugar plantations in the Hilo District, these homestead areas gradually became residential subdivisions and communities, such as the community of Pi‘ihonua, west of the project area.

A review of reports on previous archaeological work in and around Hilo town shows that few pre-contact features have been found. Most of the extant features are associated with cattle ranching, sugar cane cultivation, and historic habitation. Hilo had a system of ditches, built throughout the historic period, which served all of these activities. Remnants of some of these ditches still exist. It is not unreasonable to conclude that some of these ditches are still in use today. Older features were probably either destroyed or modified for coffee cultivation, sugar cane cultivation, ranching, truck farming, and more recent homesteading and subdivision residence.

Section 4 Results of Field Inspection

4.1 Survey Findings

The field inspection of the project area confirmed the findings of the background research. The field inspection consisted of a pedestrian inspection of the approximately 24-acre Hilo High School project area. An area of dense vegetation located between the athletic track and the District Annex complex was not fully investigated as access was restricted (Figure 18).

The field inspection found that the project area consists of Hilo High School campus buildings, a track/athletic field and swimming pool, an outdoor eating area, parking lots and driveways, manicured lawns, agricultural areas, and the District Annex office complex cottages and Building C. A total of five known historic properties were identified within the project area (Table 4). These historic properties include various buildings which were constructed more than 50 years ago. A woodshop which was reportedly built in 1937 was not identified; none of the present school staff could say where that building had been. It is likely that this building has been replaced with more modern facilities. The “Mauka” building, constructed between 1935 and 1939, burned down in 1977, and the original cafeteria was replaced with modern buildings (refer to Table 1). A constructed ditch and an alignment were encountered between the school campus and the annex (Figure 23 to Figure 27). These features may be historic resources. Descriptions of each of identified historic properties are presented in the “Site Descriptions” section below. The descriptions of the buildings are not intended as, and should not be construed as, an architectural inventory survey. Our purpose in presenting a brief description is simply to facilitate evaluation of the need for any further architectural work.

Table 4. Historic Resources Identified within the Project Area

Site Number	Site Type	Function	Construction Date	Notes
CSH-1	Building	Gymnasium	1931	Still in use today, but not sufficient for competitive athletics
CSH-2	Building	Auditorium	1927	Donated by the Alumni Association
CSH-3	Building	Classroom	1922	First Hilo High School building constructed at present campus location. Now called Classroom Building A, but was historically referred to as the “Makai” building
CSH-4	Track	Athletic Facility	1927	Located across Waiāinuenue Avenue from Catholic Church

Site Number	Site Type	Function	Construction Date	Notes
CSH-5	Constructed Ditch and Alignment	Water Control, unknown	Unknown	Bisects project area. More research needed
CSH-6	Building	Classrooms/Offices	1929	Located in present District Annex complex; originally housed the Old Riverside English Standard school

Figure 18. Photograph of the dense vegetation separating the High School track and the District Annex, view to the northwest

4.2 Site Descriptions

4.2.1 CSH-1, 1931 Gymnasium

CSH-1 is the present Hilo High School Gymnasium (Figure 6 and Figure 19). The Gymnasium is located near the back, or northern side, of the school campus. According to school staff and literature produced by the school, this building was constructed in 1931. The building is rectangular with a smaller rectangular annex along its northern side. The main entry for the gym is along its southern side, though it can be accessed adjacent to the annex as well.

Figure 19. Photograph of the main entry to the gymnasium at Hilo High School, built in 1931 (CSH-1). View to the north

4.2.2 CSH-2, 1927 Auditorium

CSH-2 is the school Auditorium (Figure 8 and Figure 20). Funds for this T-shaped building were provided by the school's Alumni Association, and it was built in 1927. It was designed by Frank Arakawa, a former Hilo High School Graduate. The PALC (Performing Arts Learning Center) currently uses the auditorium for classes and plays. The building is located north of the administration offices, toward the center of campus.

Figure 20. Photograph of the Auditorium building, built in 1927 (CSH-2). View to the northwest

4.2.3 CSH-3, 1922 Classroom Building

CSH-3 is presently referred to as Classroom Building A (Figure 7 and Figure 21). This building was historically called the “Makai Building.” Built in 1922, this was the first building to be constructed on the present school campus after the school moved up Waiānuenue Avenue from the present District Annex location. Constructed just below a long terrace, this I-shaped building appears today much as it did in 1922, although now covered walkways connect the building to the Auditorium, Classroom Building BB and the covered eating areas.

Figure 21. Photograph of Classroom Building A, also know as the Makai Building (CSH-3). This was the first building constructed on the campus, in 1922. View to the southeast

4.2.4 CSH-4, Athletic Track

CSH-4 consists of the Hilo High School track (Figure 22). The track was constructed in 1927. It is located along Waiānuenue Avenue, across from the Catholic Church and the Hilo Intermediate School athletic fields. The swimming pool complex is located just north of the track. The track and its interior athletic field are used for athletic practice, physical education, and community events only; it does not meet standards for competitive sporting events. It is unknown at this time how many modifications may have been made to the original track facility.

Figure 22. Photograph of the Hilo High School track (CSH-4), view to the east

4.2.5 CSH-5, Constructed Ditch and Alignment

CSH-5 is a constructed ditch and an alignment located between the High School's athletic field and the District Annex complex (Figure 23 to Figure 27). The ditch is bordered on the west by a natural embankment. The view of the athletic field from atop the embankment is obstructed by an area of dense vegetation, which is predominately bamboo and royal palms. The lower, eastern embankment has been constructed. The ditch bisects the project area at a roughly northeastern angle, alongside the western driveway into the complex.

The ditch begins directly off of the north side of Waiānuenue Avenue. Water feeds into the ditch from an arch-roofed culvert running under the road (Figure 25). After heading through the project area, water traveling through the ditch drains out into the Waikapu River, a tributary of the Wailuku River. Across Waiānuenue Avenue an open rock-walled channel is visible on the Catholic Church grounds. The channel continues south for a few meters and then turns west, heading *mauka* towards the Hilo Intermediate School. The channel heads back underground at Laimana Street. The source of the water is unknown at this time.

The ditch measures up to four meters (13 ft) wide and up to 1.2 m (4 ft) deep. At the time of the field check, the water level was low, but it is clear that the ditch could capacitate a significantly higher flow. The constructed portion of the eastern embankment is located several meters north of the street, past a section of embankment comprised of natural boulder outcrop. The constructed portion was built of stacked large *pāhoehoe* cobbles and small *pāhoehoe* boulders. The embankment was built at an angle, sloping down towards the water, with a rough facing (Figure 26). This constructed portion runs for approximately six meters (19.6 ft) along the Annex driveway. It seems probable that this embankment was constructed around the same time as culvert running under Waiānuenue Avenue.

An alignment of small *pāhoehoe* boulders was observed between the embankment and the Annex driveway (Figure 27). The alignment is 8 m (26 ft) long. At its southern end, the alignment is located approximately 1.8 m (6 ft) from the embankment and 0.8m (2.6 ft) from the driveway. The alignment cuts at an angle toward the ditch, where it creates another section of faced, constructed embankment no more than 2 m (6.5 ft) long. At this northern end, the alignment is two courses wide. The rest of the alignment is only one course wide. The stones are set into the ground, rising slightly above the surface on the down slope (ditch) side. The stones have been cut, are roughly rectangular in shape, and vary in size. It is difficult to tell if this was part of a foundation, as construction of the driveway would have obliterated anything east of the alignment. It is possible that this alignment was a sort of curb for an older driveway, or it may in some way be associated with the embankment/ditch system. The remainder of the embankment appears to be completely natural.

It is unknown when the western driveway at the annex was constructed, but it seems reasonable to believe that the small rectangular boulders that line it (see Figure 27) were set into place contemporaneously. These boulders run in broken sections almost the entire length of the western driveway. The boulders average 0.35 m (1.2 ft) by 0.45 m (1.5 ft) across, and protrude from the ground an average of 0.2 m (0.7 ft).

Figure 23. Photograph of the constructed ditch (CSH-5). The constructed embankment and alignment are visible along the left side of the photo, while the culvert under Waiānuenue Avenue is visible at the back of the photo. View to the south

Figure 24. Photograph of the constructed ditch as it leads water off to the Waikapu River, view to the north

Figure 25. Photograph of the culvert running under the Waiānuenue Avenue bridge, view to the southeast

Figure 26. Photograph of the constructed portion of the eastern embankment; scale is 2 m. View to the northwest

Figure 27. Photograph of the alignment between the ditch and the driveway; scale is 2 m. View to the northwest

Further research of both the constructed ditch and the alignment would be needed to better determine age. While the source of the water running through the ditch is unknown, there are many springs upslope over which houses and other buildings were constructed. This area of Hilo is known to have had a large ditch system, including two ditches found on the Hawai‘i Community Correctional Center grounds just west, or *mauka*, of the project area (refer to Section 3.3 above). The younger of the two ditches, Site 50-10-35-20849, was faced with stone like a section of CSH-5 is. In the case of the alignment, further research is needed to better determine function.

4.2.6 CSH-6, 1929 District Annex Building C

CSH-6 is Building C of the District Annex complex. This building is the easternmost building in the project area (Figure 28). The SHPD has already expressed that construction activities related to the new gymnasium should remain as far from this building as possible (see Appendix A). According to Cheryl Sumida of the County DOE Facilities Department, Building C was constructed in 1929 (see Appendix B) for the Old Riverside School, which was an English Standard school; Hilo High School had already moved to the present campus. In 1955, two rooms were added to the original E-shaped structure. In 1956, the porte cochère, or covered drive-through/passenger drop-off, was constructed (visible along the right side of Figure 28 below). A garage driveway was also added in 1956. Through 1956 the building is noted as county property. In 1959, the building was turned into District offices. Despite more recent renovations, the building still retains most of its original architecture.

Figure 28. Photograph of Building C at the District Annex complex, view to the northeast

Section 5 Summary and Recommendations

At the request of Kober/Hanssen/Mitchell Architects, Cultural Surveys Hawai‘i, Inc. has conducted this Literature and Field Inspection for the proposed Gymnasium construction at Hilo High School, Pi‘ihonua Ahupua‘a, South Hilo District, Hawai‘i Island, TMK [3] 2-3-015:001 (Figure 1 through Figure 3). This proposed project includes the construction of a new gymnasium upon the District Annex grounds (Figure 5 and Figure 5).

Hilo High School is on the Hawai‘i Register of Historic Places (SIHP 50-10-35-7522). During the pedestrian inspection five potential historic properties were identified. Building C at the Hilo District Annex complex was built in 1929. Three of the other historic properties observed during the project area field inspection are historic campus buildings dating to the 1920s and 30s. Another historic property is the school’s athletic track, which was built in 1927. For these architectural historic properties more than 50 years old, consultation with the SHPD architecture branch is recommended to address historic and architectural significance if construction of the new gymnasium will in any way affect these historic structure.

A sixth probable historic property is a constructed drainage ditch which bisects the school parcel extending from the north side of Waiānuenue Avenue running roughly north to Waikapu Stream. Of the history of these two features little is known at this time. If the new gymnasium construction project is not anticipated to adversely effect the ditch and alignment features (CSH-5) then CSH recommends that interim protective measures (such as erection of a protective buffer with orange “event fencing”) be established and maintained during the duration of construction to protect these features from adverse, inadvertent impact. If the new gymnasium construction project is anticipated to adversely affect the ditch and alignment features (CSH-5) then CSH recommends prior archaeological inventory survey documentation of these features including following the ditch off of the property to the south of Waiānuenue Avenue and further historical documentation.

CSH concludes that the historic properties (given temporary designations as CSH 1-6) identified within TMK [3] 2-3-015:001 that are briefly documented in this report with written descriptions, and photographs may be considered as contributing components of the Hilo High School Hawai‘i Register of Historic Places site (SIHP # 50-10-35-7522).

In prior consultation with the State Historic Preservation Division regarding appropriate mitigation for construction activities (waste water system improvements) at five other Hilo District schools the SHPD commented:

> We agree that although based on the scope of the [waste water system improvements] project for the five Hilo District schools, there is little likelihood of subsurface deposits in the area in which improvements are to occur. However, given the age of the schools and the potential for historic subsurface remains to be present, monitoring is warranted. Any deposits will likely represent the historic use of the area as a school … Ground altering activities associated with the proposed undertaking may have an effect on remnants of the historic school activities which may be present. We believe that any adverse effect may be mitigated through precautionary monitoring. (SHPD Chapter 6E-42 Historic

Preservation Review letter dated October 28, 2006; Log No 2006.3542, Doc No. 0610MK18 – see present Appendix C).

In view of this prior SHPD determination for Hilo District Schools and given that Hilo High School is a State Register of Historic Places property, we recommend consultation with the SHPD regarding the appropriateness of an archaeological monitoring program (to begin with an archaeological monitoring plan for the review and approval of the SHPD prior to construction).

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1992 *Archaeological and Paleoenvironmental Investigations for Alenaio Stream Flood Control Project, Hilo, Hawai‘i Island.* International Archaeological Research Institute, Inc., Honolulu, Hawai‘i.

Wilkes, Charles

1849 *Voyage Round The World, Embracing The Principal Events Of The Narrative Of The United States Exploring Expedition.* Geo. W. Gorton, Philadelphia.

Wolforth, Thomas R.

1999 *FINAL: Data Recovery for the Housing Facility at the Hawai`i Community Correctional Center: Investigation into the Network of Ditches in the Hala`i Region of Hilo.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawai‘i.

6.2 Maps and Other Figures

6.2.1 Maps

Google Maps

2009 Google satellite image, Hilo High School, Hilo, Hawai‘i. Electronic Document, http://maps.google.com/, access date unknown.

Hawai‘i County Department of Public Works, Aupuni Center, 101 Pauahi Street Suite 7, Hilo, Hawai‘i

Unkn* Hilo Sugar Company Fields, Hawai‘i County Public Works Office

Hawai‘i Land Survey Division, Department of Accounting and General Services, 1151 Punchbowl St., Room 210, Honolulu, Hawai‘i

1922 Map of Hilo and Mauna Kea Forest Reserves, by Walter E. Wall, Hawai‘i Territory Survey Plat Map No. 0799-A

1928 Map of the Island of Hawai‘i, by Walter E. Wall, Hawai‘i Territory Map

Hawai‘i TMK Service, 222 Vineyard St Ste 401, Honolulu, Hawai‘i

Tax Map Key (TMK) [3] 2-3-015:001

Kamehameha Publishing, 567 South King Street, Suite 118, Honolulu, Hawai‘i

Unkn *Hilo Bay in the Days of Kamehameha*, produced by Kamehameha Schools Alumni Association, Mamalahoe Chapter

Library of Congress, Geography and Map Division, Washington, D.C.

1886 Map of the Island of Hawai‘i, by W.A. Wall, Hawai‘i Government Survey

U.S. Geological Survey Maps/ U.S. Department of War Maps. Available at USGS Information Services, Box 25286, Denver, Colorado

1975 U.S. Geological Survey Topographic Map, 1:250,000 scale

1995 U.S. Geological Survey 7.5 minute topographic map, Hilo Quadrangle

1997 U.S. Geological Survey 7.5 minute topographic map, Piihonua Quadrangle

6.2.2 Maps Reprinted in Books

1849 Sketch map of LCA 387. Reprinted in “Chinese Settlers in the Village of Hilo before 1852,” by Peggy Kai, *Hawaiian Journal of History 8:39-75*.

6.2.3 Other Figures

Unkn Photograph of Gymnasium. Reprinted in *Hilo High Vikings: One Hundred Years of Champions*, by Wayne A. Subica, 2006, Hawaii Plantation Museum, Hilo, Hawaii.

1931 Photograph of Makai Building. Published in the 1931 Hilo High School Annual, Associated Students of Hilo High School, Hilo Tribune Herald, LTD., Hilo.

1931 Photograph of Auditorium. Published in the 1931 Hilo High School Annual, Associated Students of Hilo High School, Hilo Tribune Herald, LTD., Hilo.

***Unkn=Unknown copyright date**

Appendix A Excerpted Meeting Minutes - Design Charette 002, 4/21/9009

KOBER • HANSSEN • MITCHELL **ARCHITECTS**
architecture, planning & interior architecture

MEETING MINUTES – Design Charette 002

New Gymnasium at Hilo High School
State of Hawaii, Department of Education
DOE Job Number Q11002-07
Kober Hanssen Mitchell Architects Job No. 107013.00

DATE/TIME: 04/21/09, 3:00 – 5:30 P.M.

PLACE: Hilo High School Library

MINUTES BY: D.Uchida/KHMA

ATTENDEES: See attached attendee list

Summary of Meeting Discussion:

1) Nick reviews project and what was discussed in the previous Charette

2) Edspec components are discussed

3) Review of what the subcommittee worked on
   i) Girls facilities are moved to a higher priority above boys
   ii) Question raised on what was required on the list
      (1) Misunderstanding on the color coding of items on the edspec list is discussed
   iii) Review of requirements for building and civil defense
   iv) Additional seating is discussed- can area be added to the base bid for seating?
   v) Incremental building process is discussed

4) Questioned raised - "How big a shell can we get? "
   i) Cost is explained as the limiting factor
   ii) Full pad for expansion can not be provided at this time
   iii) Utilities will be stubbed out for future construction
   iv) How does private funding work in the project?
      (1) KHMA will provide a fully designed structure the base bid of which will be built with the additional phases to be added as funding becomes available.
   v) It is noted that our intention is to design a portion of the gym so that the base bid comes in under the budget- a bid over the budget would result in nothing being built.
   vi) Design priority is to get a good initial phase bid and move from there

5) Community concerns are addressed
   a) Have we considered parking for the facility?
   b) Stuart elaborates on the parking to be used for the gym
      i) Hilo High school, intermediate, Union School parking may all potentially be used.
      ii) County is okay with the use of this parking so little parking will be needed to be added on site.
      iii) Concern for overflow of parking into surrounding community is noted.
      iv) Security and coordination will need to be addressed by the school.

Harbor Court, 55 Merchant Street, Suite 1812, Honolulu, Hawaii 96813-4313 T: 808•328•5462 F: 808•566•0122 www.khma.com

New Gymnasium at Hilo High School
State of Hawaii, Department of Education
Project Design Charette 002 - 2

6) Discussion is moved to the site design portion of the charette- some questions may be answered by the building layout.

7) Site constraints are reviewed
   a) 15' front yard setback
   b) Flood Zone
   c) Drainage Ditch
   d) Building "C" - SHPD would lie us to stay as far away as possible from the building as possible. Approval has been given to remove the existing cottages on site.
   e) Existing car ports
   f) Prevailing trade winds are North / north easterly but switch at night.

8) 3 Site design schemes are reviewed showing possible building arrangements and phasing on the site.
   a) Scheme A is a V shaped single floor design
   b) Scheme B is a orthogonally laid out site plan with 2 story additions
   c) Scheme C is a V shape two story design
   d) See attached floor plans for scheme layouts

9) Scheme C is selected for further design and floor plan layout.

10) First and second floor plan room assignments are reviewed-See attached excel file for room floor assignment.

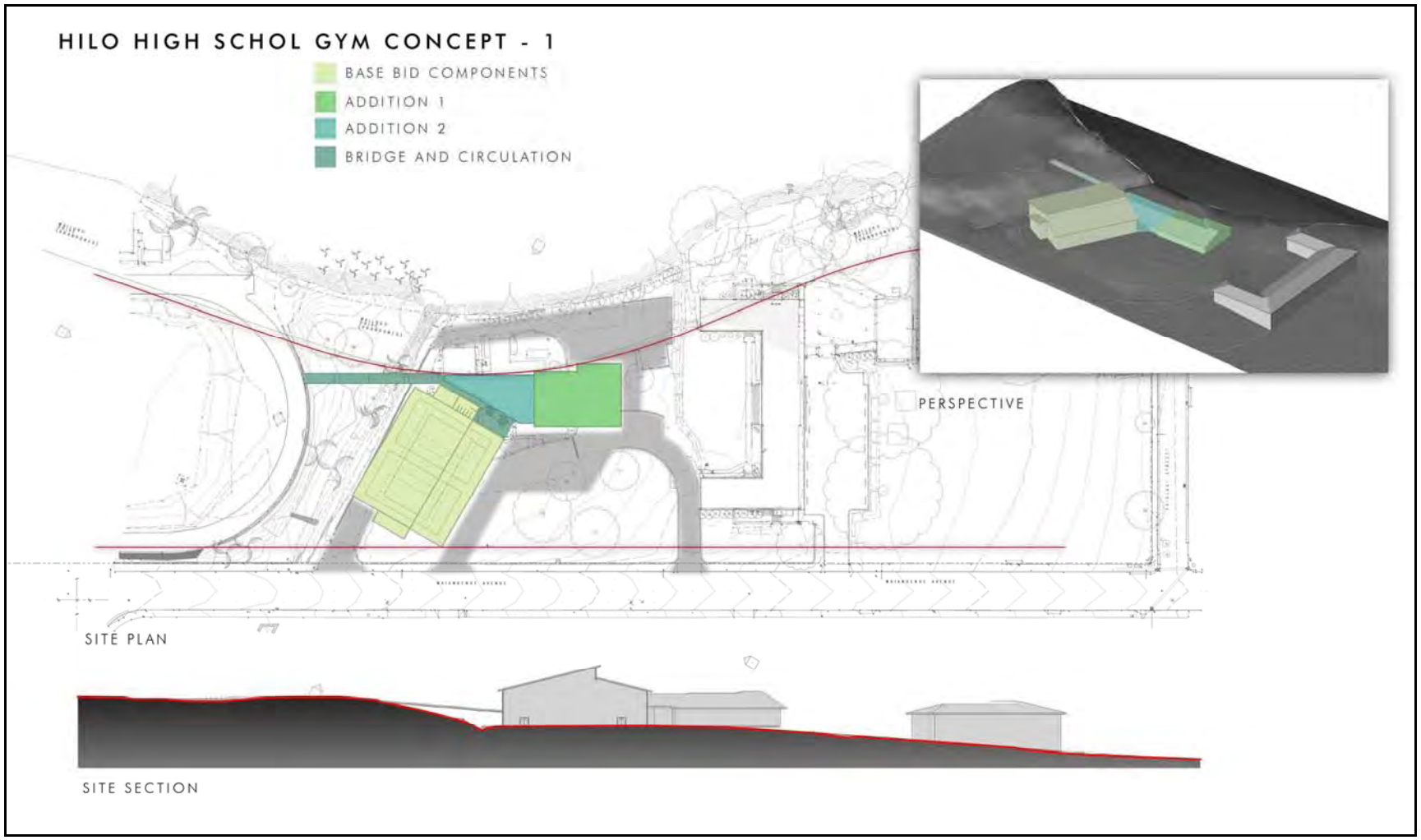
11) Sun direction, rain direction, and security is discussed.

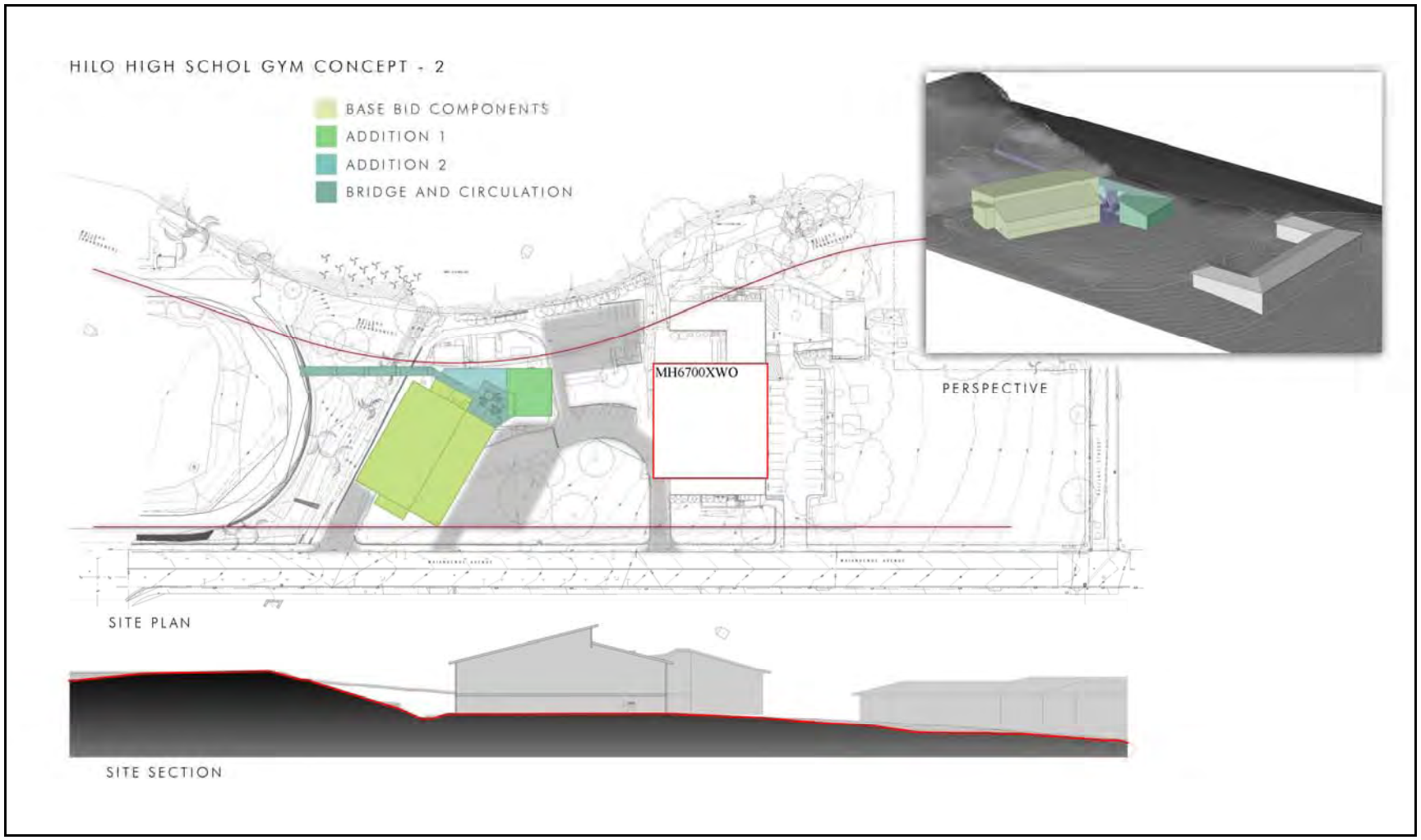
12) Larry Kanda gives an overview of Civil Defense and FEMA requirements for the structure
   a) Hardening - only for structural strength
   b) Resist Categrory 3 hurricane
   c) Protection of windows and doors
   d) Hook up for generator - generator not provided
   e) Purpose is to preserve building, funds are for improvements only
   f) "Can money be used to Air Condition the building?
      i) Possibly , but difficult, building would need to be a "vog shelter"

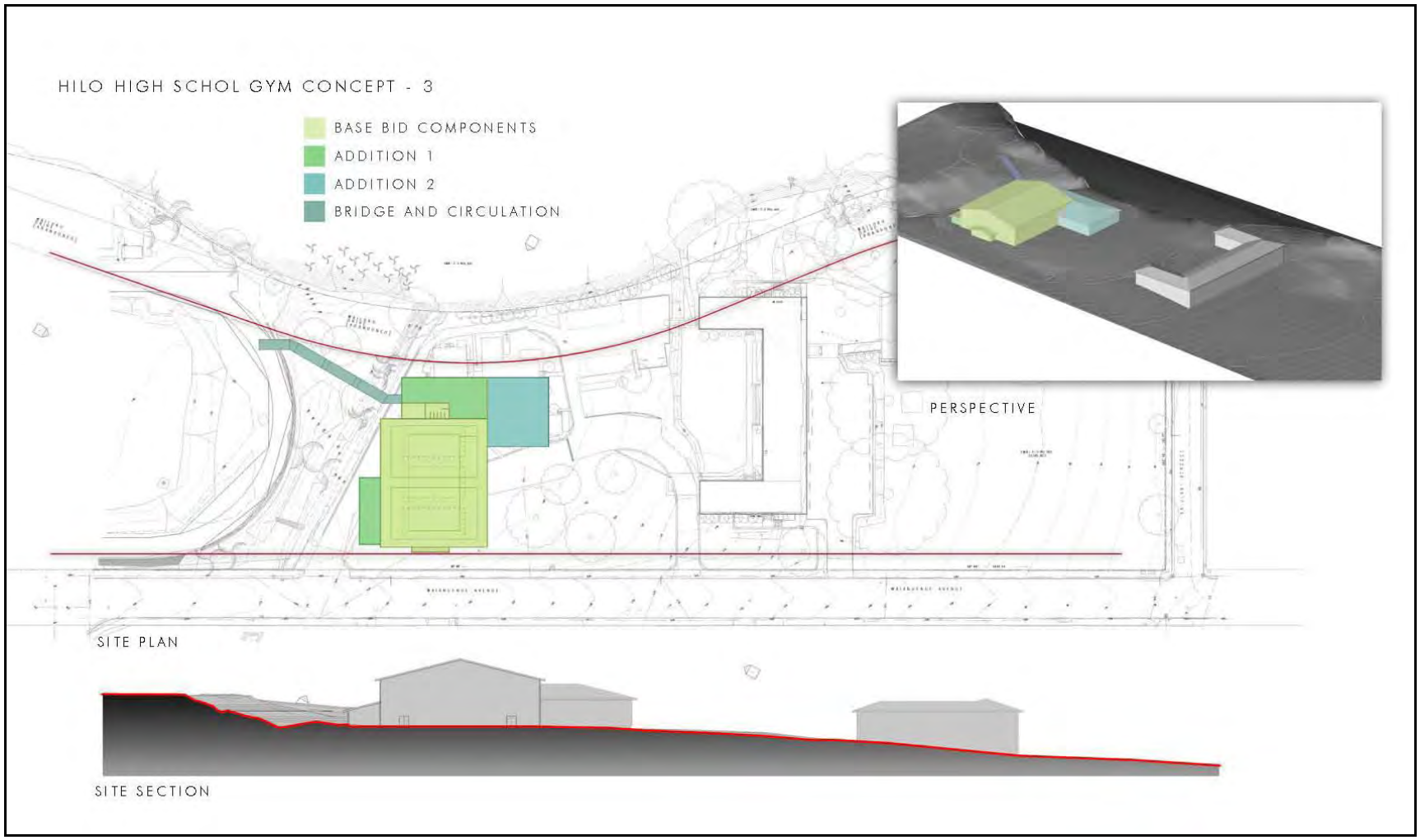
13) The next Charette will be held on May 5 2009 at Hilo High School Library.

This is our understanding of the matters discussed and the conclusions reached. Please give Kober/Hanssen/Mitchell Architects written notification of any errors or omissions within seven calendar days. Otherwise, this Conference Report shall be deemed an accurate record and directive.

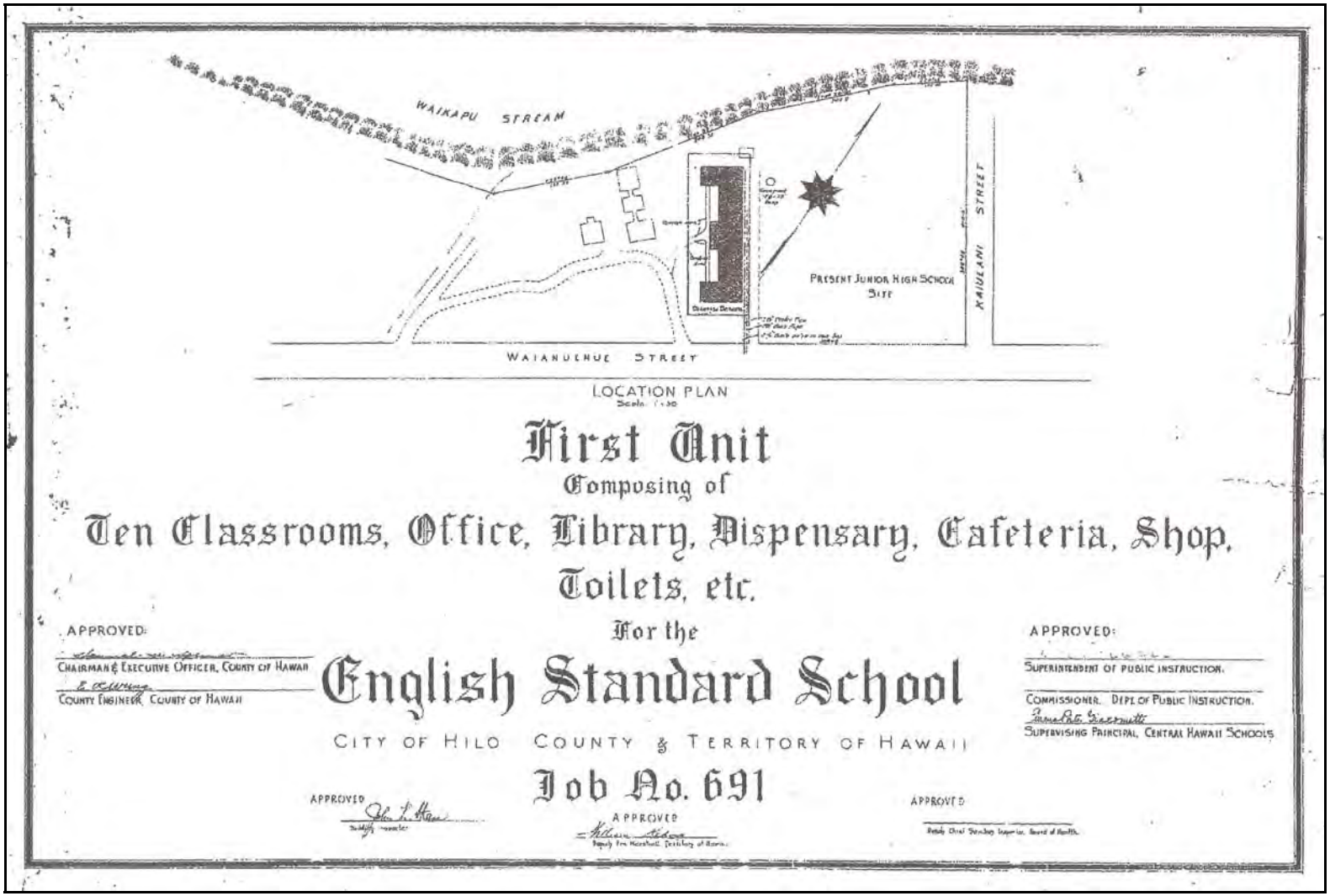
Harbor Court, 55 Merchant Street, Suite 1812, Honolulu, Hawaii 96813-4313 T: 808•528•5462 F: 808•5666•0122 www.khma.com

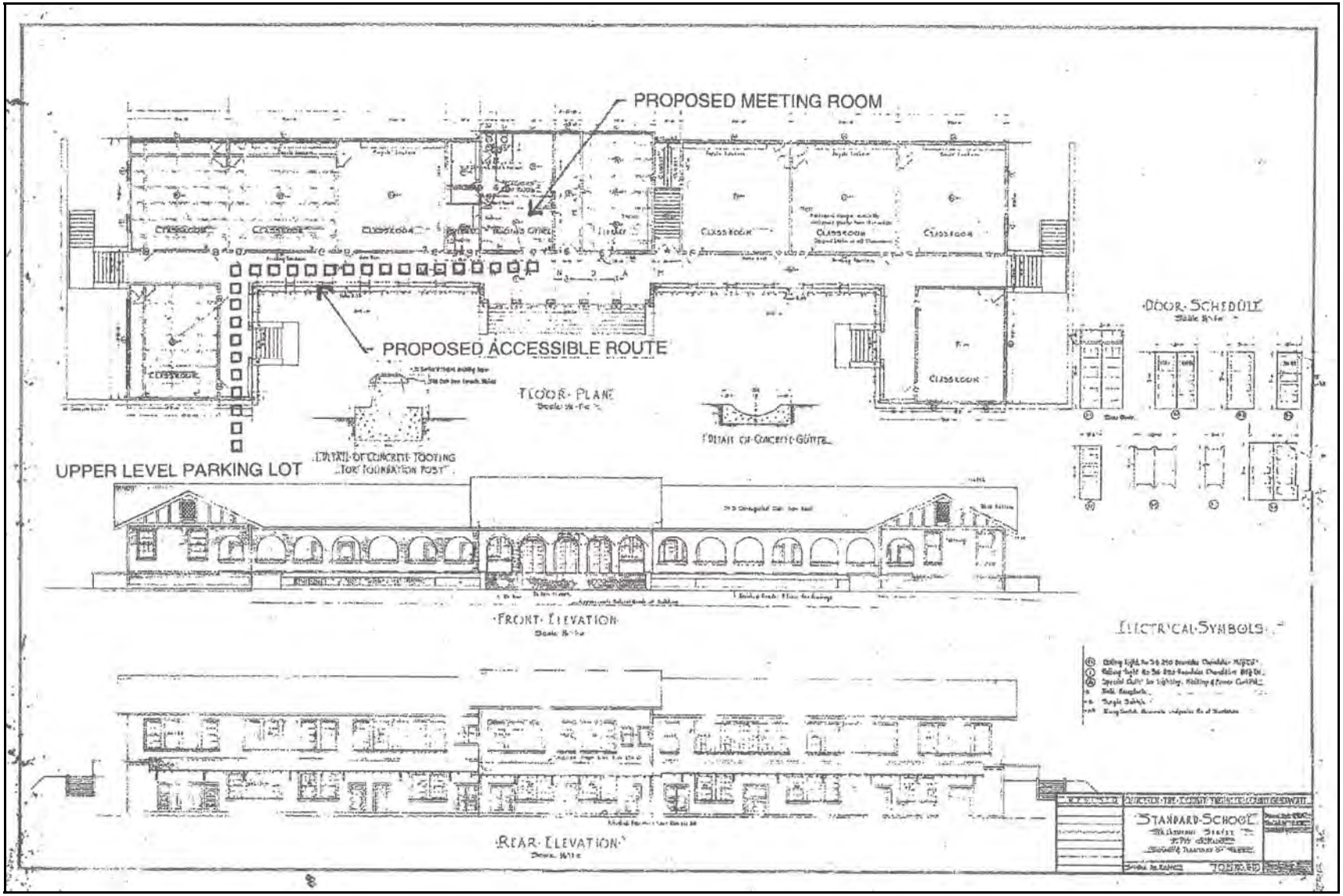

HILO HIGH SCHOL GYM CONCEPT - 1
BASE BID COMPONENTS
ADDITION 1
ADDITION 2
BRIDGE AND CIRCULATION
PERSPECTIVE
SITE PLAN
SITE SECTION

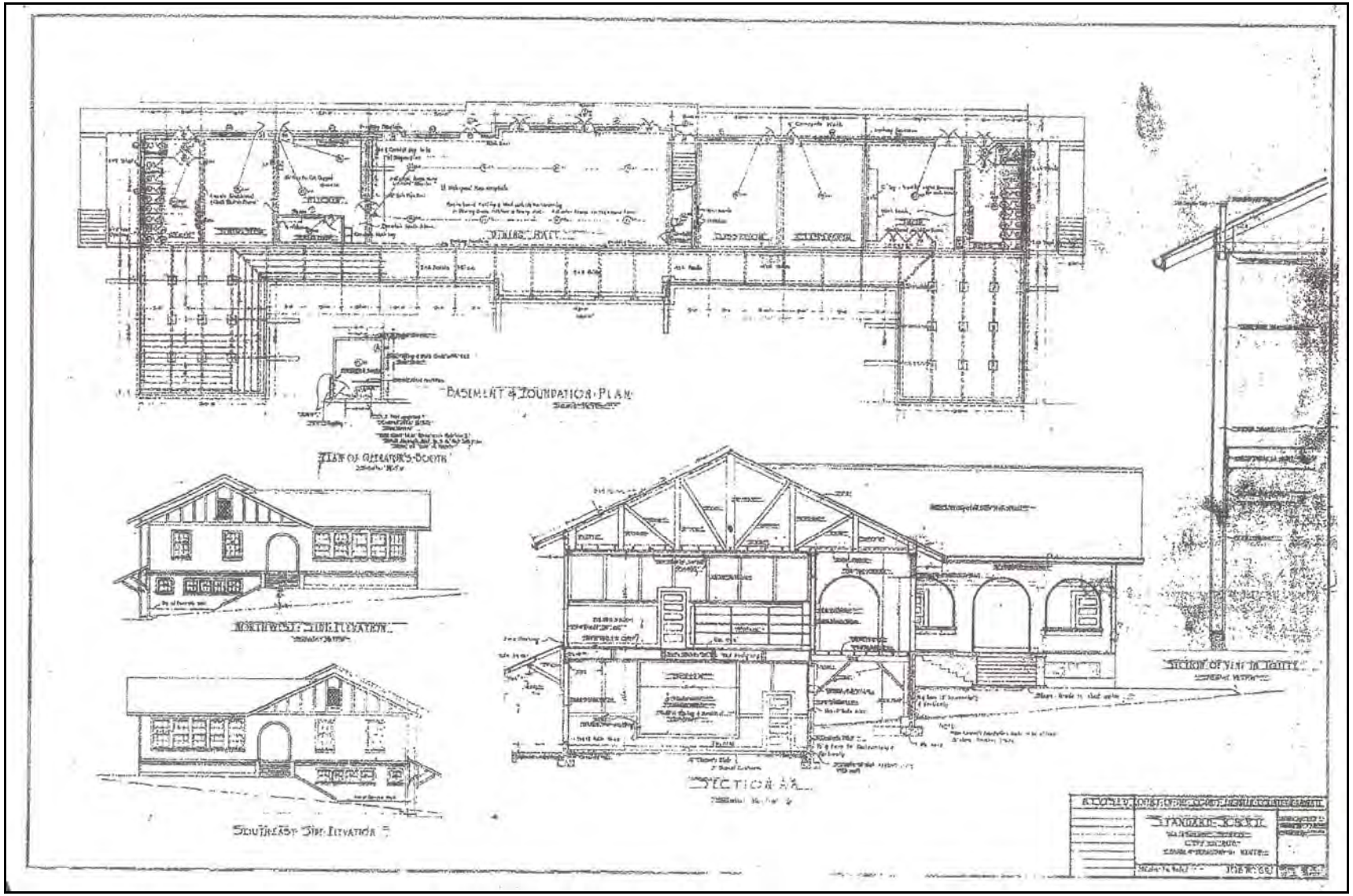

HILO HIGH SCHOL GYM CONCEPT - 2
BASE BID COMPONENTS
ADDITION 1
ADDITION 2
BRIDGE AND CIRCULATION
MH6700XWO
PERSPECTIVE
SITE PLAN
SITE SECTION

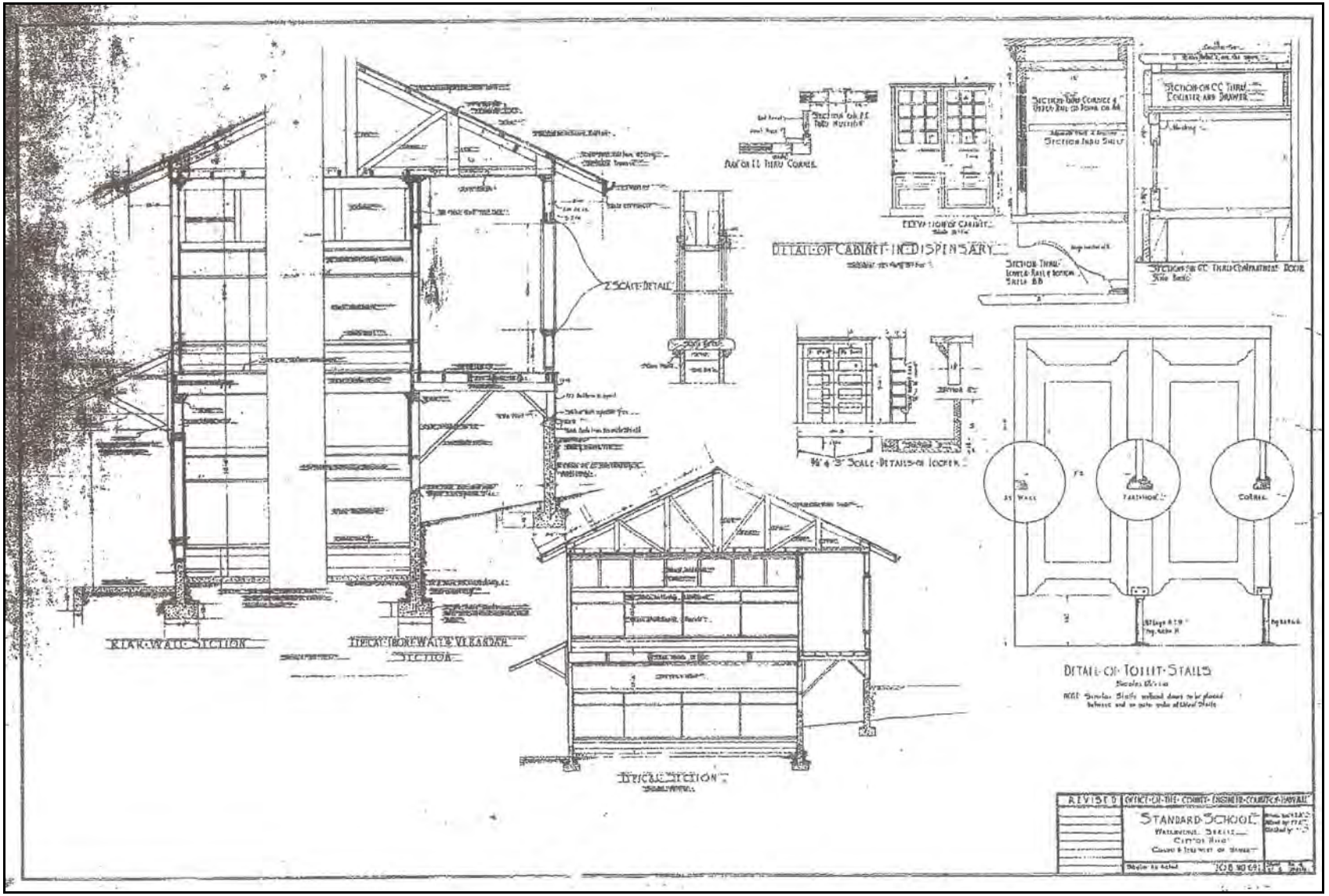

HILO HIGH SCHOL GYM CONCEPT - 3
BASE BID COMPONENTS
ADDITION 1
ADDITION 2
BRIDGE AND CIRCULATION
PERSPECTIVE
SITE PLAN
SITE SECTION

Appendix B Construction Plans for District Annex Building C




PROPOSED MEETING ROOM
PROPOSED ACCESSIBLE ROUTE
UPPER LEVEL PARKING LOT
FLOOR PLAN
DETAIL OF CONCRETE FOOTING FOR FOUNDATION POST
DETAIL OF CONCRETE GUTTER
DOOR SCHEDULE
FRONT ELEVATION
REAR ELEVATION
ELECTRICAL SYMBOLS
STANDARD SCHOOL


BASEMENT & FOUNDATION PLAN
PLAN OF OPERATOR'S BOOTH
NORTHWEST SIDE ELEVATION
SOUTHEAST SIDE ELEVATION
SECTION A-A
SECTION OF VENT IN TOWER


DETAIL OF CABINET IN DISPENSARY
REAR WALL SECTION
TYPICAL STONEWALL VERANDAH SECTION
DETAIL OF TOILET STALLS
STANDARD SCHOOL

Appendix C SHPD Chapter 6E-42 Historic Preservation Review for 5 DOE Hilo Schools (October 10, 2006)

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

October 28, 2006

Hallett H. Hammatt, Ph.D.
Cultural Surveys Hawaii
P.O. Box 1114
Kailua, Hawaii 96734

LOG NO: 2006.3542
DOC NO: 0610MK18
Archaeology

Dear Dr. Hammatt:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Field Inspection and Literature Review for
Hawaii County School Cesspool Upgrades –Hawaii Inter-Island Cesspool Project
Various Ahupuaa, Hilo District, Island of Hawaii
TMK (3) 2-6-020:38, 2-9-002:005, 2-5-005:084, 2-2-042:017, and 1-6-002:001

Thank you for the opportunity to review this report which our staff received on October 17, 2006 (Hammatt *et al.* 2006, *Archaeological Literature Review and Field Check Study of Five DOE Schools, Hilo District, Island of Hawaii, Hawaii Inter-Island DOE Cesspool Project*)…Cultural Surveys Hawaii, Inc., ms. The proposed project is part of an overall effort to improve the existing wastewater systems at Hawaii public schools. Covered under this project on the above mentioned TMKs are Haaheo Elementary School, Hakalau School, Kaumana Elementary, Waiakeawaina Elementary, and Keaau Middle School. The upgrades consist primarily of trenching and pipe replacement as a means to upgrade the systems.

The literature review for each of the schools focuses on the Land Commission Awards in the immediate proximity of the schools and interviews with knowledgeable informants. The result predicts the likelihood of the presence of subsurface deposits representing the pre-Contact and historic period on the school grounds. We note that all of the schools are over 50 years of age, may have extant structures over fifty years of age, and thus are historic properties.

We agree that although based on the scope of the project for the five Hilo District schools, there is little likelihood of subsurface deposits in the area in which improvements are to occur. However, given the age of the schools and the potential for historic subsurface remains to be present, monitoring is warranted. Any deposits will likely represent the historic use of the area as a school. One of the current teachers on the Haaheo campus suggested that an historic church may once have been located on the parcel.

Ground altering activities associated with the proposed undertaking may have an effect on remnants of the historic school activities which may be present. We believe that any adverse effect may be mitigated through precautionary monitoring. Therefore, we recommend the following condition:

Hallett H. Hammatt
Page 2

1) A qualified archaeological monitor or monitors shall be present during all ground-altering activities conducted in the project area in order to document any historic properties which may be encountered during the proposed undertaking and to provide mitigation measures as necessary. An archaeological monitoring plan will need to be submitted to the State Historic Preservation Division for review and acceptance, prior to the commencement of any ground-altering activities. An archaeological monitoring plan must contain the following nine specifications: (1) The kinds of remains that are anticipated and where in the construction area the remains are likely to be found; (2) How the remains and deposits will be documented; (3) How the expected types of remains will be treated; (4) The archaeologist(s) conducting the monitoring has/have the authority to halt the construction in the immediate area of the find in order to carry out the plan; (5) A coordination meeting between the archaeologist and construction crew is scheduled, so that the construction team is aware of the plan; (6) What laboratory work will be done on remains that are collected; (7) A schedule of report preparation; (8) Details concerning the archiving of any collections that are made; and (9) An acceptable report documenting the findings of the monitoring activities shall be submitted to the State Historic Preservation Division for review upon 180 days following the completion of the proposed undertaking.

2) Please notify our Maui and Oahu offices, via facsimile, at onset and completion of the project and monitoring program.

We anticipate receipt of an archaeological monitoring plan which may cover all of the schools within the Hilo District. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall at (808) 243-5169 as soon as possible to resolve these concerns.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

MK:kf:gvf

Appendix B

Final Traffic Impact Analysis Report for the Proposed Hilo High School Gymnasium, Hilo, Hawai‘i

TMK [3] 2-3-015:001

December 10, 2009

Prepared by:
The Traffic Management Consultant (TMC)
Honolulu, Hawai‘i

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

HILO, HAWAII

PREPARED FOR

KOBER/HANSSEN/MITCHELL ARCHITECTS

DECEMBER 10, 2009

PREPARED BY

TMC **THE TRAFFIC MANAGEMENT CONSULTANT**

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

HILO, HAWAII

RANDALL S. OKANEKU
LICENSED
PROFESSIONAL
ENGINEER
No. 4922-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

INSERT SIGNATURE COPY 04/30/2010

SIGNATURE EXPIRATION DATE OF LICENSE

TMC

THE TRAFFIC MANAGEMENT CONSULTANT

RANDALL S. OKANEKU, P.E., PRINCIPAL * 1188 BISHOP STREET, SUITE 1907 * HONOLULU, HI 96813

Table of Contents

List of Figures

Page

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED
HILO HIGH SCHOOL GYMNASIUM
HILO, HAWAII

I. Introduction

A. Project Description

The State of Hawaii Department of Education is proposing to construct a new gymnasium on the Hilo High School campus in Hilo, Hawaii. The gymnasium site is currently occupied by the Hawaii State Department of Education (DOE) District Office Annex. The existing structures will be razed to make way for the new gymnasium. Figure 1 depicts the vicinity map.

The gymnasium will provide basketball and volleyball courts, a wrestling room, and support facilities, such as, locker rooms, training rooms, offices, and conference rooms. The proposed gymnasium will provide a seating capacity for approximately 1,400 people. The proposed gymnasium will provide a venue for multiple team tournaments, school assemblies, and also will serve as an emergency shelter for Hilo community. The proposed site plan is depicted on Figure 2.

During the day, only Hilo High School activities will occur at the gymnasium, which should not have a significant impact on traffic. The increased traffic activity will occur during sporting events or other special events held at the gymnasium, which are expected to be held after 6:00 PM. Therefore, only special event traffic impacts are being analyzed herein. The gymnasium is expected to be completed by the Year 2012.

B. Purpose and Scope of the Study

The purpose of this traffic study is to analyze the traffic impacts of a 1,400 person attendance of a special event at the proposed Hilo High School gymnasium. This report presents the findings and recommendations of the study. The scope of this study includes:

1. Manual traffic count surveys at the following intersections along Waianuenue Avenue:

    a. Halai Street/Hilo High School West Driveway

    b. Hilo High School Exit Driveway/Hilo Middle School Entry Driveway

Figure 1. Vicinity Plan

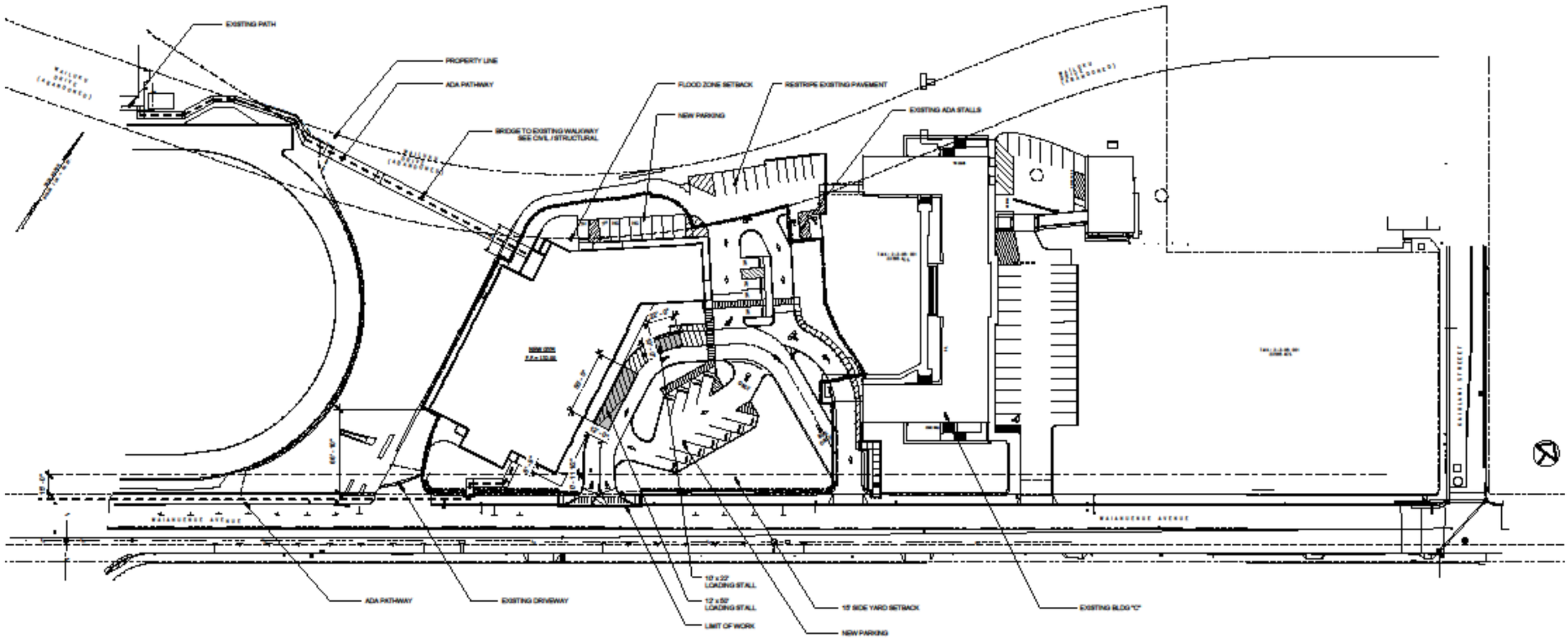


Figure 2. Site Plan

c. Hilo High School Entry Driveway/Hilo Middle School Exit Driveway

d. Hilo High School East Driveway

e. DOE Annex Exit Driveway

f. DOE Annex Entry Driveway

g. Kaiulani Street

h. Kapiolani Street

2. An analysis of the future traffic volumes without the proposed project

3. Identification of traffic impacts that may occur as a result of the proposed Hilo High School gymnasium.

4. Recommendation of traffic and roadway improvements that would mitigate the traffic impacts identified in this study.

C. Capacity Analysis Methodology

The highway capacity analysis, performed for this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board. HCM defines Level of Service (LOS) as "a quality measure describing operational conditions within a traffic stream". Several factors may be included in determining LOS, such as: speed, travel time, freedom to maneuver, traffic interruptions, driver comfort, and convenience. LOS's "A", "B", and "C" are considered satisfactory Levels of Service. LOS "D" is generally considered a "desirable minimum" operating Level of Service. LOS "E" is an undesirable condition, and LOS "F" is an unacceptable condition. Intersection LOS is primarily based upon delay. Worksheets for the capacity analysis are compiled in the Appendix. Table 1 summarizes the HCM criteria for Levels of Service.

Table 1. Level of Service Criteria (HCM)

LOS	At-Grade Intersection Delay (sec/veh)	
	Signalized Control	Unsignalized Control
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

"Volume-to-capacity" (v/c) ratio is a measure indicating the relative traffic demand to the roadway's capacity. HCM defines capacity as “the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic flow, and traffic control conditions.” A v/c ratio of 0.50 indicates that the traffic demand is utilizing 50 percent of the roadway's capacity.

II. Existing Conditions

A. Roadways

Waianuenue Avenue is a two-lane street with parking on both sides of the roadway. Waianuenue Avenue is a two-way roadway except from 7:15 AM to 8:00 AM on school days, when Waianuenue Avenue is a one-way roadway in the makai (east) bound direction. Exclusive left-turn lanes are not provided on Waianuenue Avenue between Halai Street and Kapiolani Street.

Halai Street is a two-way, two-lane local street, which provides access to the Hilo Middle School parking lot. Halai Street is stop-controlled at its intersection with Waianuenue Avenue, opposite the Hilo High School West Driveway.

The Hilo High School Exit Driveway is a one-way, two-lane driveway, which provides egress to the High School's main parking lot. The Hilo High School Exit Driveway is located opposite the Hilo Middle School Entry Driveway. The Hilo High School Exit Driveway and Hilo Middle School Entry Driveway are signalized at Waianuenue Avenue.

The Hilo High School Entry Driveway is a one-way, one lane driveway, which provides ingress to the High School main parking lot. The Hilo High School Entry Driveway is signalized at Waianuenue Avenue, opposite the Hilo Middle School Exit Driveway.

The Hilo High School East Driveway is a two-way, two-lane driveway, which provides access to parking lots along the east side, and to the rear of the school. The Hilo High School East Driveway is stop-controlled at Waianuenue Avenue.

Kaiulani Street is at two-way, two-lane street, which intersects Waianuenue Avenue immediately east of the gymnasium project site. Kaiulani Street is signalized at its Tee-intersection with Waianuenue Avenue, which is located opposite the Hilo Union Elementary School.

Kapiolani Street is a two-lane, two-way local street, which provides access to Hilo Union Elementary School via Haili Street, which runs parallel to Waianuenue Avenue between Haili Street and Kamehameha Avenue.

B. Existing Peak Hour Traffic Volumes and Operating Conditions

1. Field Investigation and Data Collection

Manual traffic count surveys were conducted at Hilo High School on May 18, 2009, during the afternoon peak period of traffic from 1:30 PM to 7:30 PM. The field investigation coincided with the High School Spring Band Concert, which was held at the Hilo High School auditorium on May 18, 2009. Supplemental peak hour traffic count surveys were conducted in the vicinities of Hilo Middle School and Hilo Union Elementary School on August 25, 2009 from 4:00 PM to 7:00 PM. The Appendix includes the traffic count survey data.

2. Existing PM Peak Hour Traffic

The PM peak hour of traffic occurred between 5:30 PM and 6:30 PM. Waianuenue Avenue carried about 700 vehicles per hour (vph), total for both directions. Eight (80) vph entered the High School's main parking lot during the PM peak hour of traffic. The intersections and driveways within the study area on Waianuenue Avenue operated at LOS "B" or better during the existing PM peak hour of traffic. Figure 3 depicts the existing PM peak hour traffic volumes.

III. Year 2012 Traffic Analysis Without Project

A. Long-Range Travel Forecast

The travel forecast, adopted for use in this study, was generated from the long-range forecast model, developed in the Hawaii Long Range Land Transportation Plan (HLRLTP), prepared for the State of Hawaii Department of Transportation, in cooperation with the County of Hawaii Department of Public Works and Planning Department, dated January 1998. Specific traffic assignments were not presented in the HLRLTP; therefore an area-wide growth factor was developed, based upon the trip tables for traffic analysis zones in Hilo. An average area-wide growth factor of 1.62 percent per year was applied uniformly over the existing traffic volumes to estimate future traffic demands to the Year 2012, the first complete year after the construction of the proposed gymnasium.

B. Year 2012 PM Peak Hour Traffic Analysis Without Project

The intersections and driveways within the study area on Waianuenue Avenue are expected to continue to operate at LOS "B" or better during the Year 2012 PM peak hour of traffic without the proposed project. Figure 4 depicts the Year 2012 PM peak hour of traffic without the proposed project.

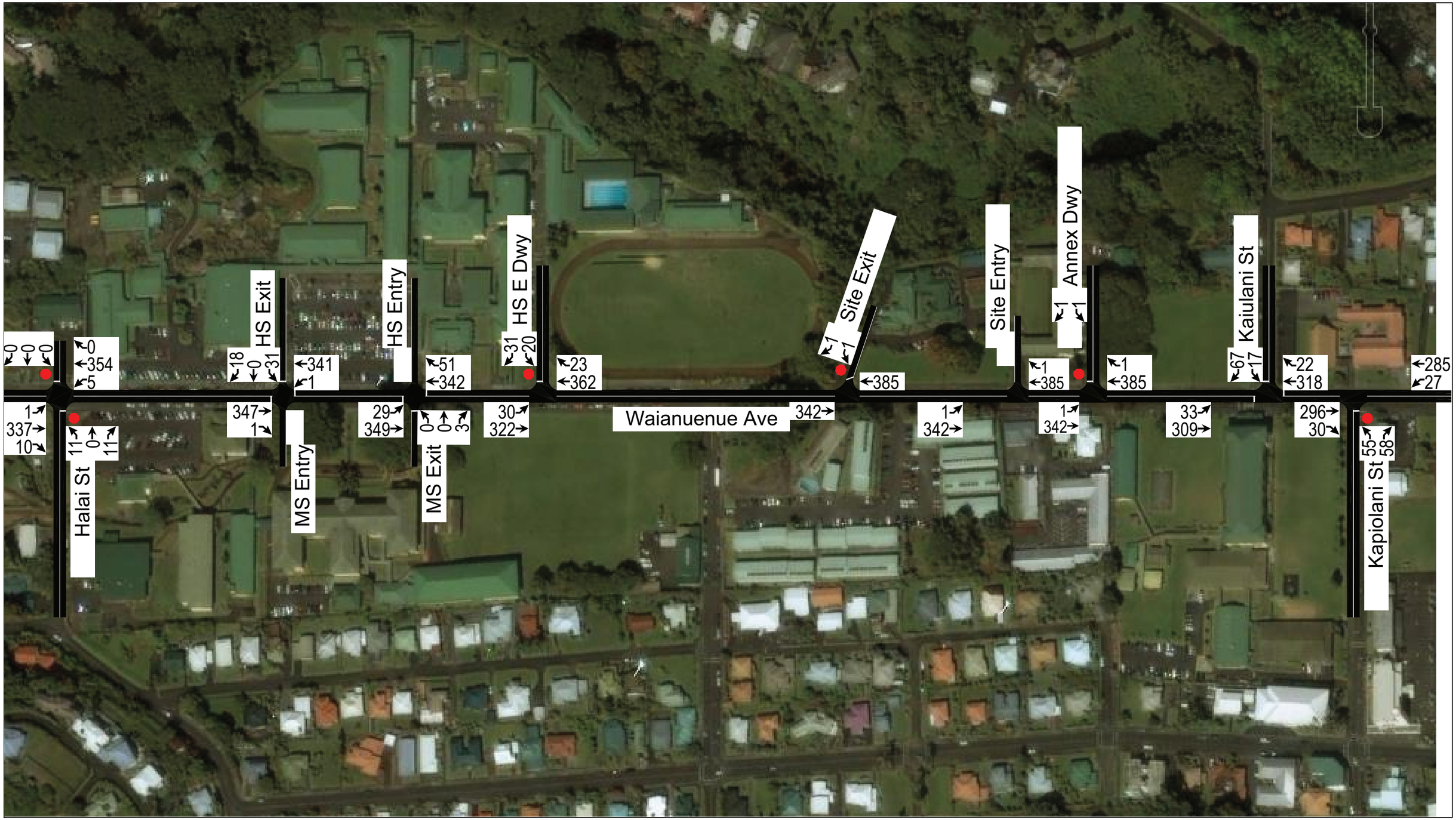


Figure 3. Existing PM Peak Hour Traffic

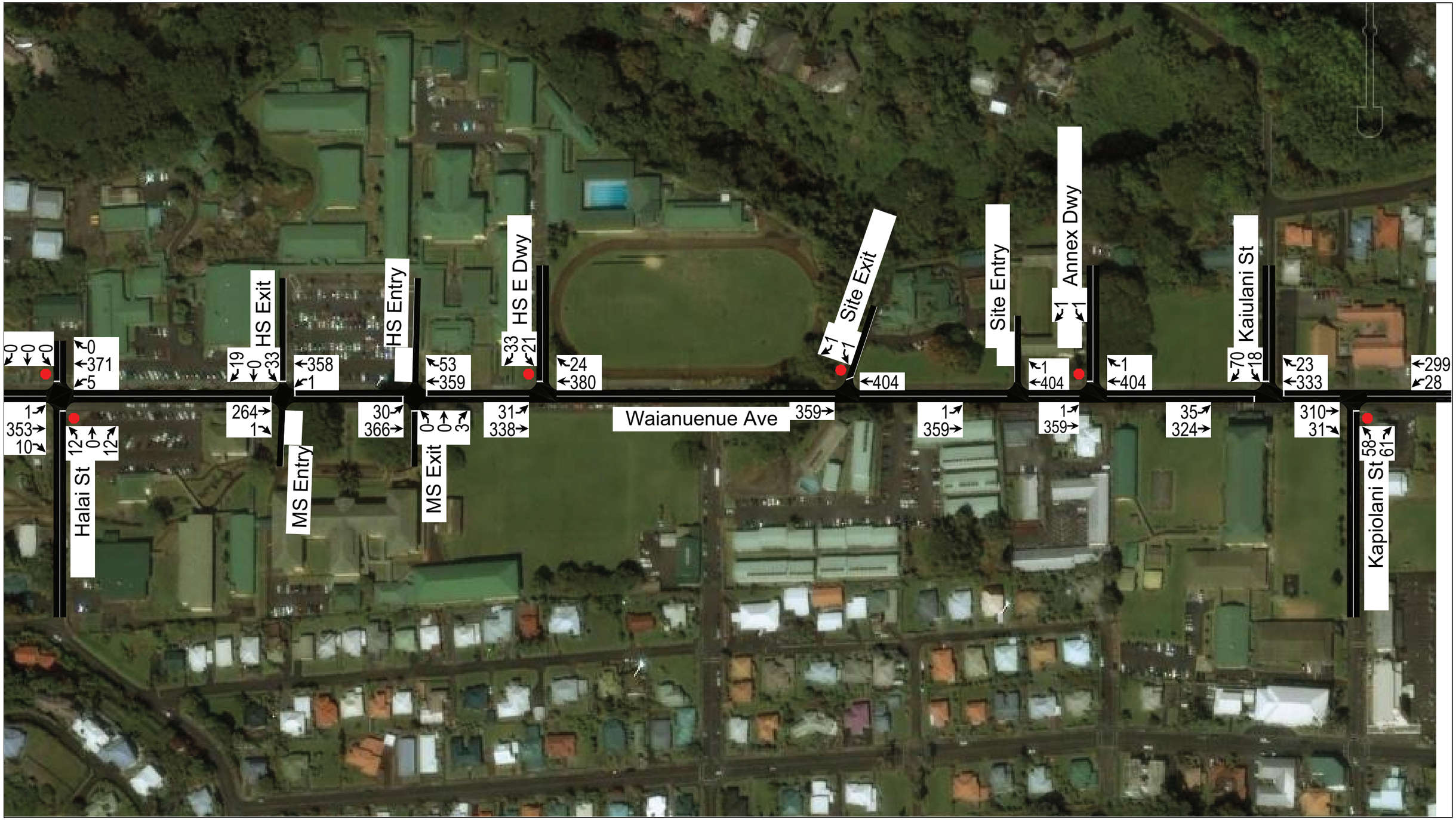


Figure 4. PM Peak Hour Traffic Without Project

IV. Traffic Impact Analysis

A. Trip Generation Study

A site trip generation study was conducted at Hilo High School during their Spring Concert performance on May 18, 2009. The traffic volume entering the main parking lot was correlated with the estimated concert attendance to develop the trip generation rate for a special event held at the proposed gymnasium.

Eighty (80) vehicles per hour were observed entering the Hilo High School main parking lot from 5:30 PM to 6:30 PM for the High School Spring Band Concert, which had an estimated attendance of about 100 people. A trip generation rate of 0.80 vehicle trip/ person was used to estimate the trip generation for a special event held at the proposed gymnasium.

For an event with an attendance of 1,400 people, it is assumed that 25 percent of the attendees would arrive by bus, and the remaining 75 percent of the attendees would arrive by automobile. The total trips generated by a capacity event held at the proposed gymnasium are estimated at 840 vehicles and 12 buses.

B. Proposed Traffic Mitigation Measures

Traffic demands along Waianuenue Avenue is expected to increase significantly. In order to keep traffic flowing on Waianuenue Avenue, left-turn movements should be prohibited at key intersections and driveways; left-turn movements from unsignalized side streets and driveways also should be prohibited to reduce excessive delays; and on street parking and drop off zones on Waianuenue Avenue should be limited to facilitate turning movements, as well as through traffic. Subject to the approval from the County of Hawaii, the following traffic mitigation measures are proposed at the following intersections/driveways along Waianuenue Avenue prior to the start of a 1,400 person special event at the proposed gymnasium:

1. Halai Street Intersection

    a. Prohibit parking, stopping, dropping off, and picking up on both sides of Waianuenue Avenue within 100 feet of the intersection/driveway.

    b. Prohibit the left-turn movement from Halai Street onto Waianuenue Avenue.

    c. Restrict traffic exiting the Hilo High School West Driveway to the right-turn movement only.

2. High School Exit Driveway/Middle School Entry Driveway

    a. Prohibit parking, dropping off, and picking up on both approaches of Waianuenue Avenue within 250 feet of the driveways.

    b. Prohibit the left-turn movement from mauka bound Waianuenue Avenue into the Middle School Entry Driveway.

3. High School Entry Driveway/Middle School Exit Driveway

    a. Prohibit parking, dropping off, and picking up on both approaches of Waianuenue Avenue within 250 feet of the driveways.

    b. Prohibit the left-turn movement from makai bound Waianuenue Avenue into the High School Entry Driveway.

4. High School East Driveway

    a. Prohibit parking, stopping, dropping off, and picking up on mauka bound Waianuenue Avenue within 100 feet of the driveway.

    b. Restrict traffic on the Hilo High School East Driveway to the right-turn-in and right-turn-out movements only.

5. Laimana Street

    a. Prohibit the left-turn movement from mauka bound Waianuenue Avenue into the Laimana Street.

    b. Restrict traffic on Laimana Street to the right-turn movement only.

6. Site Exit Driveway

    a. Restrict traffic on the Site Exit Driveway at Waianuenue Avenue to the right-turn-out movement only.

    b. Provide Police-directed pedestrian crossing at the Site Exit Driveway.

7. Site Entry Driveway

    a. Prohibit the left-turn movement from makai bound Waianuenue Avenue into the Site Entry Driveway.

    b. Prohibit parking, dropping off, and picking up on mauka bound Waianuenue Avenue within 100 feet of the driveway.

8. Annex Driveway

    a. Prohibit parking, stopping, dropping off, and picking up on mauka bound Waianuenue Avenue within 100 feet of the driveway.

    b. Restrict traffic at the Annex Driveway to the right-turn-in and right-turn-out movements only.

9. Kaiulani Street Intersection

    a. Prohibit parking, stopping, dropping off, and picking up on both approaches of Waianuenue Avenue within 250 feet on the intersection.

    b. Prohibit the left-turn movement from makai bound Waianuenue Avenue into Kaiulani Street.

10. Restrict traffic at the intersection of Waianuenue Avenue and Kapiolani Street to the right-turn-in and right-turn-out movements only.

The restricted left-turn traffic to and from the streets and driveways should be redirected to execute "jug-handle" movements to head in the desired directions. For example, vehicles on makai bound Waianuenue Avenue, entering the High School main parking lot, should be redirected to turn right at the Middle School Entry Driveway and cross Waianuenue Avenue from the Middle School Exit Driveway to the High School Entry Driveway.

The restricted left-turn traffic from the High School East Driveway, the Site Exit Driveway, and the Annex Driveway should be redirected to execute a "jug handle" movement by turning right onto mauka bound Waianuenue Avenue, turning right again into the High School Entry Driveway, drive through the High School main parking lot, and turn left from the High School Exit Driveway onto makai bound Waianuenue Avenue.

Ululani Street, Wailuku Drive, and Kaiulani Street could provide a similar "jug handle" movement at the makai end of Waianuenue Avenue. For example, left-turn traffic from Kapiolani Street should be redirected to turn right onto makai bound Waianuenue Avenue, turn left onto Ululani Street, turn left again onto Wailuku Drive, turn left again onto Kaiulani Street, and turn right onto mauka bound Waianuenue Avenue. Similarly, the left-turn movement from mauka bound Waianuenue Avenue into Kapiolani Street should be redirected to turn right onto Ululani Street, turn left onto Wailuku Drive, turn left onto Kaiulani Street, turn left again onto Waianuenue Avenue, and turn right into Kapiolani Street. Figure 5 depicts the proposed traffic circulation on Waianuenue Avenue.

C. Traffic Assignment

The site traffic assignment is based upon the available special event parking in the area. Of the 840 vehicle trips generated by a special event held at the proposed gymnasium, the special event parking could accommodate only 480 vehicles. The remaining 340 vehicles are expected to drop off passengers along Waianuenue Avenue and/or seek on-street parking in the vicinity. Table 2 summarizes the special event parking that can be made available to special events held at the Hilo High School gymnasium. On-street parking was not included in the available special event parking.

Figure 5. Proposed Traffic Circulation

Table 2. Special Event Parking		
Location	**Number of Stalls**	**% Assignment**
Gymnasium	42	9%
Annex	37	8%
Hilo High School - West Driveway	69	14%
Hilo High School - Main Driveway	140	29%
Hilo High School - East Driveway	52	11%
Hilo Middle School	83	17%
Hilo Union Elementary School	57	12%
Totals	480	100%

The PM peak hour site traffic assignment is depicted on Figure 6.

D. Year 2012 PM Peak Hour Traffic Impact Analysis With Project

During the PM peak hour with the proposed project, all the intersections and driveways within the study area are expected to operate at LOS "C" or better. Figure 7 depicts the PM peak hour traffic with the proposed project.

V. Recommendations and Conclusions

A. Recommendations

With the approval of the County of Hawaii, the following traffic mitigation measures should be implemented prior to the start of a special event at the proposed gymnasium:

1. Halai Street Intersection

    a. Parking, stopping, dropping off, and picking up on both sides of Waianuenue Avenue should be prohibited within 100 feet of the intersection/driveway to facilitate the through movement around the left-turn vehicles.

Figure 6. PM Peak Hour Site Traffic Assignment

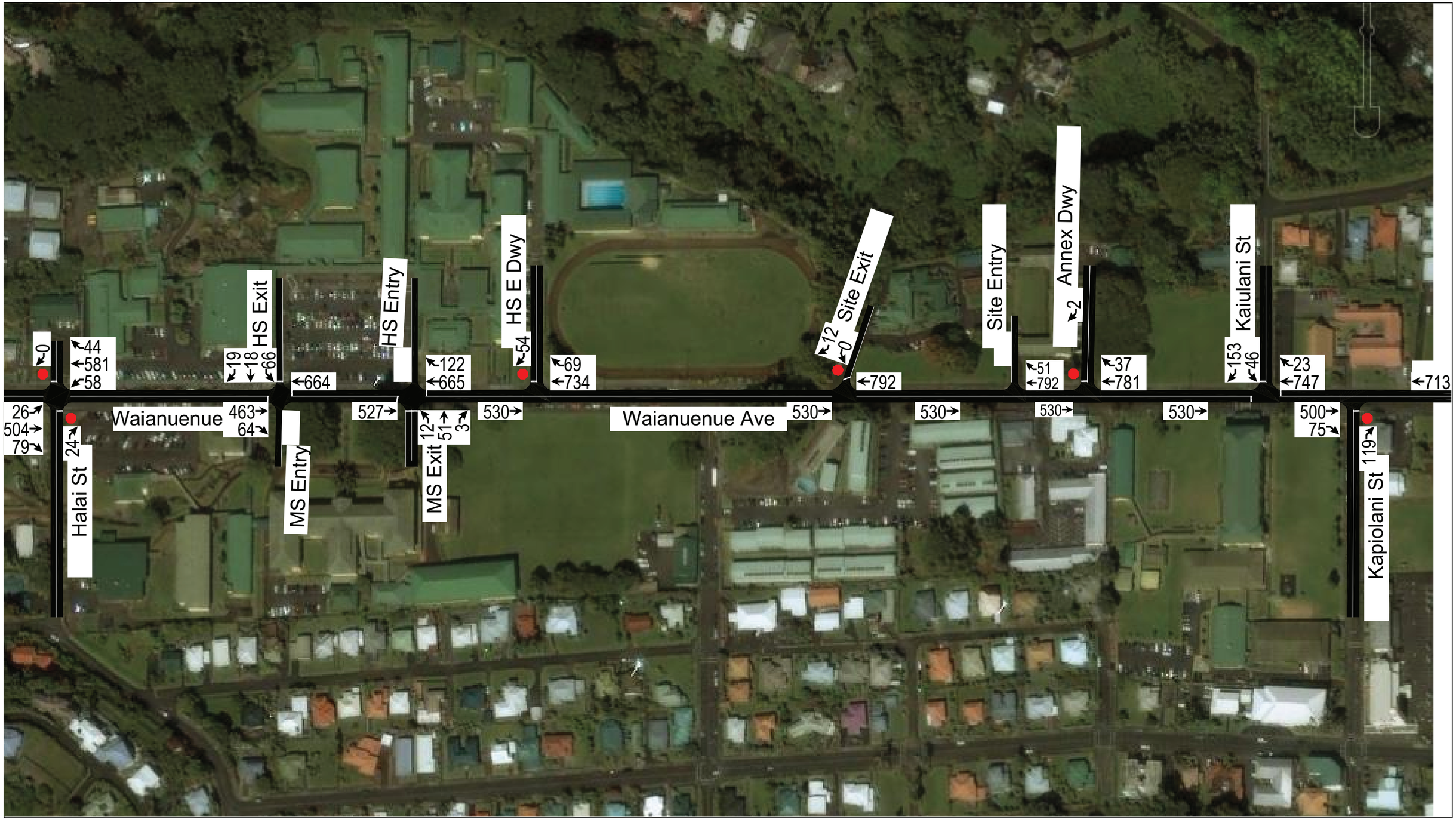


Figure 7. PM Peak Hour Traffic With Project

b. Traffic turning from Halai Street onto Waianuenue Avenue should be restricted to the right-turn movement only to prevent excessive delay on the left-turn movement. Halai Street traffic turning onto mauka bound Waianuenue Avenue should use alternate routes via Punahele Street.

c. Traffic exiting the Hilo High School West Driveway onto Waianuenue Avenue also should be restricted to the right-turn movement only at Waianuenue Avenue. Traffic turning onto makai bound Waianuenue Avenue should be redirected to the High School Exit Driveway.

2. High School Exit Driveway/Middle School Entry Driveway

   a. Parking, dropping off, and picking up on both approaches of Waianuenue Avenue should be prohibited within 250 feet of the driveways to maintain the through capacity of Waianuenue Avenue.

   b. The left-turn movement from mauka bound Waianuenue Avenue into the Middle School Entry Driveway should be prohibited. Mauka bound traffic on Waianuenue Avenue can access the Middle School Entry driveway by turning right into the High School main parking lot and crossing Waianuenue Avenue from the High School Exit Driveway to the Middle School Entry Driveway.

3. High School Entry Driveway/Middle School Exit Driveway

   a. Parking, dropping off, and picking up on both approaches of Waianuenue Avenue should be prohibited within 250 feet of the driveways to maintain the through capacity of Waianuenue Avenue.

   b. The left-turn movement from makai bound Waianuenue Avenue into the High School Entry Driveway should be prohibited to prevent excessive delays to through traffic. Makai bound traffic on Waianuenue Avenue can access the High School Entry driveway by turning right into the Middle School Entry Driveway and crossing Waianuenue Avenue from the Middle School Exit Driveway to the High School Entry Driveway.

4. High School East Driveway

   a. Parking, stopping, dropping off, and picking up on mauka bound Waianuenue Avenue should be prohibited within 100 feet of the High School East Driveway to facilitate the right-turn movement into the Driveway.

   b. Traffic to/from the Hilo High School East Driveway should be restricted to the right-turn-in and right-turn-out movements only at Waianuenue Avenue to prevent excessive delays on the other traffic movements. Makai bound traffic from the East Driveway should be redirected to make a "jug handle" movement through the High School main parking lot.

5. Laimana Street

    a. The left-turn movement from mauka bound Waianuenue Avenue into the Laimana Street should be prohibited to prevent excessive delays to through traffic.

    b. Traffic on Laimana Street should be restricted to the right-turn movement only at Waianuenue Avenue to prevent excessive delays on the left-turn movement.

6. Site Exit Driveway

    a. Traffic on the Site Exit Driveway should be restricted to the right-turn movement only at Waianuenue Avenue to prevent queuing back into the project site. Makai bound traffic from the Site Exit Driveway should make a "jug handle" movement through the High School main parking lot.

    b. Police-directed pedestrian crossing should be provided at the Site Exit Driveway.

7. Site Entry Driveway

    a. The left-turn movement from makai bound Waianuenue Avenue into the Site Entry Driveway should be prohibited to prevent excessive delays to through traffic.

    b. Parking, dropping off, and picking up on mauka bound Waianuenue Avenue should prohibited within 100 feet of the driveway to facilitate the right-turn movement into the Site Entry Driveway.

8. Annex Driveway

    a. The left-turn movement from makai bound Waianuenue Avenue into the Annex Driveway should prohibited to prevent excessive delays to through traffic.

    b. Parking, stopping, dropping off, and picking up on mauka bound Waianuenue Avenue, within 100 feet of the driveway, should be prohibited to facilitate the right-turn movement into the Annex Driveway.

    c. Traffic on the Annex Driveway should be restricted to the right-turn movement only to prevent excessive delay on the left-turn movement. Makai bound traffic from the Annex Driveway should make a "jug handle" movement through the High School main parking lot.

9. Kaiulani Street Intersection

    a. Parking, stopping, dropping off, and picking up on Waianuenue Avenue should be prohibited within 250 feet of the intersection to maintain the through capacity of Waianuenue Avenue.

    b. The left-turn movement from makai bound Waianuenue Avenue into Kaiulani Street should be prohibited to prevent excessive delays to through traffic. Left-turn traffic to Kaiulani Street should be redirected to turn left onto Ululani Street, turn left again onto Wailuku Drive, and turn right onto Kaiulani Street.

10. Kapiolani Street Intersection

    a. The left-turn movement from mauka bound Waianuenue Avenue into Kapiolani Street should be prohibited to prevent excessive delays to through traffic. The left-turn traffic to Kapiolani Street should be detoured to turn right onto Ululani Street, turn left onto Wailuku Drive, turn left again onto Kaiulani Street, turn left onto makai bound Waianuenue Avenue, and turn right onto Kapiolani Street.

    b. Traffic to/from Kapiolani Street should be restricted to the right-turn-in and right-turn-out movements only to prevent excessive delays on the other traffic movements. Left-turn traffic from Kapiolani Street should be redirected to turn right onto makai bound Waianuenue Avenue, turn left onto Ululani Street, turn left again onto Wailuku Drive, turn left onto Kaiulani Street, and turn right onto mauka bound Waianuenue Avenue. Left-turn traffic from mauka bound Waianuenue Avenue into Kapiolani Street also should be redirected to turn right onto Ululani Street, turn left again onto Wailuku Drive, turn left again onto Kaiulani Street, turn left onto makai bound Waianuenue Avenue, and turn right into Kapiolani Street.

B. Conclusions

A 1,400 person attendance at a special event at the proposed gymnasium can be expected to generate significant traffic demands on Waianuenue Avenue. The parking lanes on both side of Waianuenue Avenue can facilitate right-turn movements into driveways. The curb lanes on Waianuenue Avenue in the vicinity of the proposed gymnasium can be expected to become active passenger drop-off/pick-up zones. Pedestrian traffic across Waianuenue Avenue should be restricted to signalized intersections and Police-directed pedestrian crossings.

A shuttle bus system should be implemented between the visitor accommodations and off-site parking lots and the proposed gymnasium to reduce the traffic and parking impacts to the surrounding neighborhood. Parking attendants, equipped with communication devices, should be stationed at off-site parking lots to direct motorists to available parking. The traffic mitigation measures recommended herein are expected to accommodate the special event traffic generated by the proposed gymnasium at Hilo High School.

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

APPENDIX A

TRAFFIC COUNT DATA

TRAFFIC COUNT DATA **FILE NAME: Waianuenue PM**

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave
N-S STREET Annex Driveways

PERIOD: PM Peak
NORTH:
TECHNICIAN: PT video
DATE: 5/18/09

		Waianuenue Ave						Dwys							
TIME		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	TOTAL	
13:30	13:45	4	80	0	0	94	4	0	0	0	0	0	2	184	
13:45	14:00	1	85	0	0	91	1	0	0	0	1	0	1	180	
14:00	14:15	2	118	0	0	90	3	0	0	0	5	0	2	220	
14:15	14:30	2	153	0	0	145	2	0	0	0	4	0	2	308	**892**
14:30	14:45	2	170	0	0	160	2	0	0	0	3	0	2	339	1047
14:45	15:00	1	129	0	0	115	1	0	0	0	2	0	1	249	1116
15:00	15:15	2	150	0	0	118	1	0	0	0	3	0	1	275	1171
15:15	15:30	0	133	0	0	94	2	0	0	0	4	0	2	235	1098
15:30	15:45	0	119	0	0	109	0	0	0	0	3	0	1	232	991
15:45	16:00	0	147	0	0	118	2	0	0	0	7	0	1	275	1017
16:00	16:15	0	71	0	0	75	0	0	0	0	2	0	0	148	890
16:15	16:30	1	95	0	0	124	1	0	0	0	3	0	3	227	882

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave W of Laimana St

PERIOD: PM Peak
NORTH:
TECHNICIAN: PT video
DATE: 5/18/09

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	TOTAL	
16:30	16:45	0	107	0	0	120	0	0	0	0	0	0	0	227	877
16:45	17:00	0	88	0	0	136	0	0	0	0	0	0	0	224	826
17:00	17:15	0	102	0	0	98	0	0	0	0	0	0	0	200	878
17:15	17:30	0	91	0	0	108	0	0	0	0	0	0	0	199	850
17:30	17:45	0	85	0	0	114	0	0	0	0	0	0	0	199	822
17:45	18:00	0	88	0	0	104	0	0	0	0	0	0	0	192	790
18:00	18:15	0	87	0	0	92	0	0	0	0	0	0	0	179	769
18:15	18:30	0	88	0	0	75	0	0	0	0	0	0	0	163	733
18:30	18:45	0	76	0	0	85	0	0	0	0	0	0	0	161	695
18:45	19:00	0	58	0	0	90	0	0	0	0	0	0	0	148	651
19:00	19:15	0	41	0	0	74	0	0	0	0	0	0	0	115	587
PM PEAK HOUR															
14:15	**15:15**	**7**	**602**	**0**	**0**	**538**	**6**	**0**	**0**	**0**	**12**	**0**	**6**	**1171**	**1171**
PHF		**0.88**	**0.89**			**0.84**	**0.75**				**1.00**		**0.75**		
17:30	**18:30**	**0**	**348**	**0**	**0**	**385**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**733**	**822**
PHF			**0.99**			**0.93**									

TRAFFIC COUNT DATA **FILE NAME: Hilo High PM** Sec 3

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave
N-S STREET Hilo High Driveway

PERIOD: PM Peak
NORTH:
TECHNICIAN: PT video
DATE: 8/25/09

		Main				E Dwy				W Dwy					
TIME		EBL	WBR	SBR	SBL	EBL	WBR	SBR	SBL	EBL	WBR	SBR	SBL	TOTAL	HRLY
17:30	17:45	4	20	5	9	2	4	1	0	0	0	0	0	45	
17:45	18:00	10	13	3	7	8	3	5	8	0	0	0	0	57	
18:00	18:15	7	12	7	10	12	9	15	9	0	0	0	0	81	
18:15	18:30	8	6	3	5	8	7	10	3	0	0	0	0	50	233
Peak Hour															
17:30	**18:30**	**29**	**51**	**18**	**31**	**30**	**23**	**31**	**20**	**0**	**0**	**0**	**0**	**233**	**233**
PHF		**1.04**	**1.06**	**0.64**	**0.78**	**0.63**	**0.64**	**0.52**	**0.56**						
PHF			1.05			0.68			0.53					**0.72**	**PHF**

TRAFFIC COUNT DATA **FILE NAME: Hilo Union PM** Sec 3

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave
N-S STREET Kaiulani St/Kapiolani St

PERIOD: PM Peak
NORTH:
TECHNICIAN: PT video
DATE: 8/25/09

		Kapiolani St		Waianuenue Ave				Kaiulani St		Waianuenue Ave					
TIME		NBL	NBR	EBR	WBL	EBL	WBR	SBR	SBL	WBT	EBT	0	0	TOTAL	HRLY
17:00	17:15	6	28	6	9	19	4	27	11	102	98	0	0	310	
17:15	17:30	10	17	13	11	12	0	26	12	91	108	0	0	300	
17:30	17:45	12	19	9	10	8	6	14	4	85	114	0	0	281	
17:45	18:00	21	12	9	2	10	9	15	4	88	104	0	0	274	1165
18:00	18:15	10	15	5	7	6	5	18	4	87	92	0	0	249	1104
18:15	18:30	12	12	7	8	9	2	20	5	88	75	0	0	238	1042
18:30	18:45	11	11	7	7	7	5	9	4	76	85	0	0	222	983
18:45	19:00	5	8	11	6	8	5	9	5	58	90	0	0	205	914
Peak Hour															
17:30	**18:30**	**55**	**58**	**30**	**27**	**33**	**22**	**67**	**17**	**348**	**385**	**0**	**0**	**1042**	
PHF		**1.15**	**0.76**	**0.83**	**0.68**	**1.03**	**0.92**	**1.20**	**1.06**	**1.02**	**0.84**			**0.93**	

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave
N-S STREET Halai St

PERIOD: PM Peak
NORTH:
TECHNICIAN: Video
DATE: 8/25/09

		Waianuenue Ave						Halai St							
TIME		NBR	NBL	EBR	WBL	EBL	WBR	SBR	SBL	WBTh	EBTh	0	0	TOTAL	HRLY
16:00	16:15	5	6	2	1	0	0	0	0	71	75	0	0	160	
16:15	16:30	3	3	2	3	0	0	0	0	96	127	0	0	234	
16:30	16:45	4	1	4	4	0	0	0	0	107	120	0	0	240	
16:45	17:00	2	6	1	1	0	0	0	0	88	136	0	0	234	868
17:00	17:15	2	6	3	3	1	0	0	0	102	98	0	0	215	923
17:15	17:30	0	1	1	0	0	0	0	0	91	108	0	0	201	890
17:30	17:45	4	2	4	0	0	0	0	0	85	114	0	0	209	859
17:45	18:00	2	4	2	3	0	0	0	0	88	104	0	0	203	828
18:00	18:15	3	2	4	2	0	0	0	0	87	92	0	0	190	803
18:15	18:30	2	3	0	0	0	0	0	0	88	75	0	0	168	770
18:30	18:45	1	4	1	2	0	0	0	0	76	85	0	0	169	730
18:45	19:00	0	0	2	1	0	0	0	0	58	90	0	0	151	678
Peak Hour															
17:30	**18:30**	**11**	**11**	**10**	**5**	**0**	**0**	**0**	**0**	**348**	**385**	**0**	**0**	**770**	**859**
PHF		**0.69**	**1.38**	**0.63**	**#####**					**1.02**	**0.84**				

TRAFFIC COUNT DATA

FILE NAME: Hilo Middle PM East

PROJECT: Hilo High School Gym
LOCATION: Hilo, Hawaii
E-W STREET Waianuenue Ave
N-S STREET Hilo Middle School

PERIOD: PM Peak Hour
NORTH:
TECHNICIAN: Video
DATE: 8/25/09

		Middle School Main Dwy				High School W Dwy				E Dwy					
TIME		EBL	WBR	SBR	SBL	EBL	WBR	SBR	SBL	EBL	WBR	SBR	SBL	TOTAL	HRLY
17:30	17:45	4	20	5	9	2	4	1	0	0	0	0	0	45	
17:45	18:00	10	13	3	7	8	3	5	8	0	0	0	0	57	
18:00	18:15	7	12	7	10	12	9	15	9	0	0	0	0	81	
18:15	18:30	8	6	3	5	8	7	10	3	0	0	0	0	50	233
Peak Hour															
17:30	**18:30**	**29**	**51**	**18**	**31**	**30**	**23**	**31**	**20**	**0**	**0**	**0**	**0**	**233**	**PHF**
PHF		**1.04**	**1.06**	**0.64**	**0.78**	**0.63**	**0.64**	**0.52**	**0.56**					**0.72**	

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

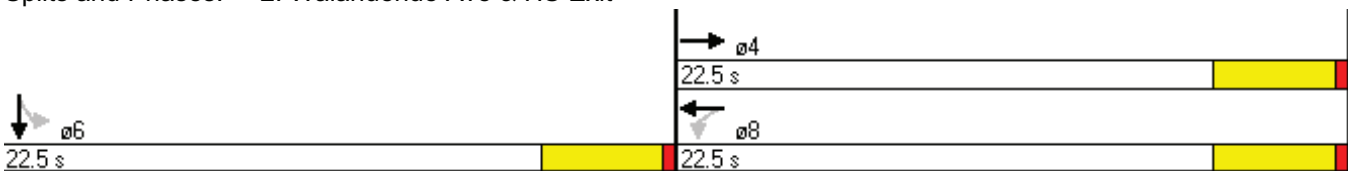
APPENDIX B

EXISTING PM PEAK HOUR TRAFFIC CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	347	1	1	341	0	0	0	0	31	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1859	0	0	1861	0	0	0	0	0	1713	0
Flt Permitted					0.995						0.971	
Satd. Flow (perm)	0	1859	0	0	1853	0	0	0	0	0	1713	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2									20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			250			140			235	
Travel Time (s)		10.2			5.7			3.2			5.3	
Peak Hour Factor	0.92	0.99	0.25	0.25	0.93	0.92	0.92	0.92	0.92	1.00	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	0	371	0	0	0	0	0	51	0
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Total Split (s)	0.0	22.5	0.0	22.5	22.5	0.0	0.0	0.0	0.0	22.5	22.5	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.5	4.5	4.0
Act Effct Green (s)		12.7			12.7						18.1	
Actuated g/C Ratio		0.32			0.32						0.45	
v/c Ratio		0.60			0.63						0.06	
Control Delay		15.7			16.6						5.9	
Queue Delay		0.0			0.2						0.0	
Total Delay		15.7			16.7						5.9	
LOS		B			B						A	
Approach Delay		15.7			16.7						5.9	
Approach LOS		B			B						A	
Queue Length 50th (ft)		64			68						4	
Queue Length 95th (ft)		119			126						19	
Internal Link Dist (ft)		370			170			60			155	
Turn Bay Length (ft)												
Base Capacity (vph)		845			841						789	
Starvation Cap Reductn		0			86						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.42			0.49						0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 39.9			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 29.6%		ICU Level of Service A	
Analysis Period (min) 15			

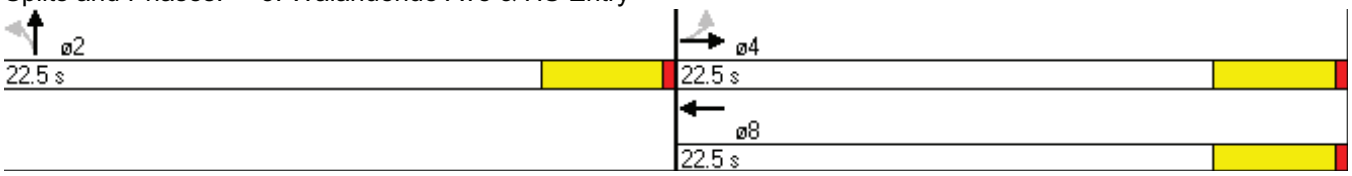
Splits and Phases: 2: Waianuenue Ave & HS Exit

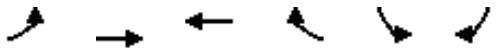


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	349	0	0	342	51	0	0	3	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1855	0	0	1818	0	0	1611	0	0	0	0
Flt Permitted		0.949										
Satd. Flow (perm)	0	1768	0	0	1818	0	0	1611	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					29			348				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		250			255			140			235	
Travel Time (s)		5.7			5.8			3.2			5.3	
Peak Hour Factor	1.00	0.99	0.92	0.92	0.93	0.64	0.92	0.92	0.75	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	382	0	0	448	0	0	4	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Total Split (s)	22.5	22.5	0.0	0.0	22.5	0.0	22.5	22.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.0	4.0	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0
Act Effct Green (s)		18.0			18.0			18.0				
Actuated g/C Ratio		0.40			0.40			0.40				
v/c Ratio		0.54			0.60			0.00				
Control Delay		13.9			10.6			0.0				
Queue Delay		1.5			0.0			0.0				
Total Delay		15.4			10.6			0.0				
LOS		B			B			A				
Approach Delay		15.4			10.6			0.0				
Approach LOS		B			B			A				
Queue Length 50th (ft)		71			95			0				
Queue Length 95th (ft)		134			174			0				
Internal Link Dist (ft)		170			175			60			155	
Turn Bay Length (ft)												
Base Capacity (vph)		707			745			853				
Starvation Cap Reductn		169			0			0				
Spillback Cap Reductn		0			0			0				
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.71			0.60			0.00				

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Waianuenue Ave & HS Entry

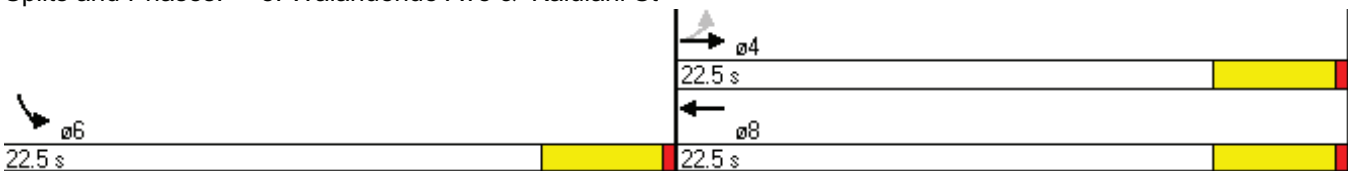




Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	33	309	318	22	17	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1853	1846	0	1645	0
Flt Permitted		0.944			0.990	
Satd. Flow (perm)	0	1758	1846	0	1645	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9		67	
Link Speed (mph)		30	30		30	
Link Distance (ft)		350	180		260	
Travel Time (s)		8.0	4.1		5.9	
Peak Hour Factor	1.00	0.99	0.93	0.92	1.00	1.00
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	345	366	0	84	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Total Split (s)	22.5	22.5	22.5	0.0	22.5	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.0	4.5	4.0
Act Effct Green (s)		18.0	18.0		18.0	
Actuated g/C Ratio		0.40	0.40		0.40	
v/c Ratio		0.49	0.49		0.12	
Control Delay		7.8	12.6		4.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		7.8	12.6		4.2	
LOS		A	B		A	
Approach Delay		7.8	12.6		4.2	
Approach LOS		A	B		A	
Queue Length 50th (ft)		55	65		3	
Queue Length 95th (ft)		85	122		21	
Internal Link Dist (ft)		270	100		180	
Turn Bay Length (ft)						
Base Capacity (vph)		703	744		698	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.49	0.49		0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 9.6		Intersection LOS: A	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

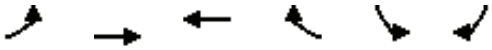
Splits and Phases: 8: Waianuenue Ave & Kaiulani St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	337	10	5	354	0	11	0	11	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.99	0.92	1.00	0.93	0.92	1.00	0.92	0.46	0.92	0.92	0.92
Hourly flow rate (vph)	4	340	11	5	381	0	11	0	24	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					450							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	381			351			744	744	346	768	750	381
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			351			615	615	346	643	621	188
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	97	100	100	100
cM capacity (veh/h)	1183			1208			342	344	697	317	342	729

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	355	386	35	0
Volume Left	4	5	11	0
Volume Right	11	0	24	0
cSH	1183	1208	526	1700
Volume to Capacity	0.00	0.00	0.07	0.00
Queue Length 95th (ft)	0	0	5	0
Control Delay (s)	0.1	0.1	12.3	0.0
Lane LOS	A	A	B	A
Approach Delay (s)	0.1	0.1	12.3	0.0
Approach LOS			B	A

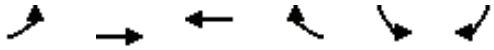
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	30	322	362	23	20	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.99	1.00	0.93	0.92	0.92
Hourly flow rate (vph)	30	325	362	25	22	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		255				
pX, platoon unblocked					0.86	
vC, conflicting volume	387				760	374
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				636	374
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				94	95
cM capacity (veh/h)	1172				369	672

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	355	387	55
Volume Left	30	0	22
Volume Right	0	25	34
cSH	1172	1700	508
Volume to Capacity	0.03	0.23	0.11
Queue Length 95th (ft)	2	0	9
Control Delay (s)	0.9	0.0	12.9
Lane LOS	A		B
Approach Delay (s)	0.9	0.0	12.9
Approach LOS			B

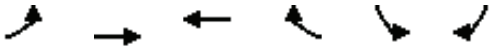
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	342	385	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	345	414	0	1	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		860	840			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	414				759	414
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398				748	398
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1144				374	642

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	345	414	2
Volume Left	0	0	1
Volume Right	0	0	1
cSH	1700	1700	473
Volume to Capacity	0.20	0.24	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	12.6
Lane LOS			B
Approach Delay (s)	0.0	0.0	12.6
Approach LOS			B

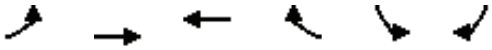
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		30.3%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	342	385	1	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	1	345	414	1	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1200	500			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	415				762	415
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	293				679	292
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1140				375	671

Direction, Lane #	EB 1	WB 1
Volume Total	347	415
Volume Left	1	0
Volume Right	0	1
cSH	1140	1700
Volume to Capacity	0.00	0.24
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS	A	
Approach Delay (s)	0.0	0.0
Approach LOS		

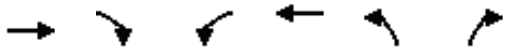
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	342	385	1	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	1	345	414	1	1	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			350			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	415				762	415
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	259				656	258
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1141				376	682

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	347	415	2
Volume Left	1	0	1
Volume Right	0	1	1
cSH	1141	1700	485
Volume to Capacity	0.00	0.24	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	0.0	0.0	12.5
Approach LOS			B

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		30.3%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	296	30	27	285	55	58
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.83	0.68	0.93	1.00	0.78
Hourly flow rate (vph)	299	36	40	306	55	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	180					
pX, platoon unblocked			0.87		0.87	0.87
vC, conflicting volume			335		703	317
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			168		588	147
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		86	91
cM capacity (veh/h)			1233		399	787

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	335	346	129
Volume Left	0	40	55
Volume Right	36	0	74
cSH	1700	1233	557
Volume to Capacity	0.20	0.03	0.23
Queue Length 95th (ft)	0	2	22
Control Delay (s)	0.0	1.2	13.4
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	13.4
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

APPENDIX C

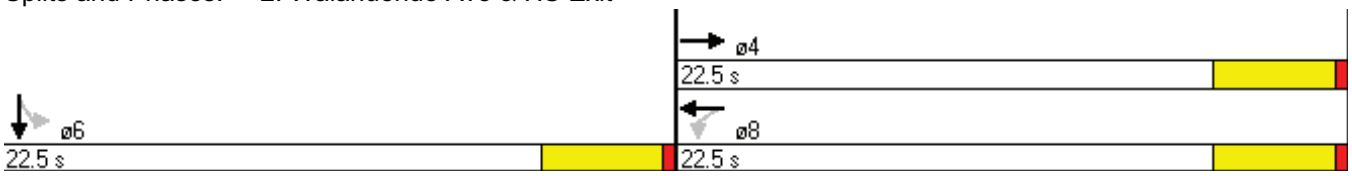
PM PEAK HOUR TRAFFIC WITHOUT PROJECT

CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	264	1	1	358	0	0	0	0	33	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1859	0	0	1861	0	0	0	0	0	1711	0
Flt Permitted					0.996						0.970	
Satd. Flow (perm)	0	1859	0	0	1855	0	0	0	0	0	1711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2									21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			250			140			235	
Travel Time (s)		10.2			5.7			3.2			5.3	
Peak Hour Factor	0.92	0.99	0.25	0.25	0.93	0.92	0.92	0.92	0.92	1.00	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	389	0	0	0	0	0	54	0
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Total Split (s)	0.0	22.5	0.0	22.5	22.5	0.0	0.0	0.0	0.0	22.5	22.5	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.5	4.5	4.0
Act Effct Green (s)		13.3			13.3						18.2	
Actuated g/C Ratio		0.33			0.33						0.45	
v/c Ratio		0.44			0.64						0.07	
Control Delay		12.8			16.7						6.1	
Queue Delay		0.0			0.3						0.0	
Total Delay		12.8			16.9						6.1	
LOS		B			B						A	
Approach Delay		12.8			16.9						6.1	
Approach LOS		B			B						A	
Queue Length 50th (ft)		46			72						4	
Queue Length 95th (ft)		89			133						20	
Internal Link Dist (ft)		370			170			60			155	
Turn Bay Length (ft)												
Base Capacity (vph)		834			832						779	
Starvation Cap Reductn		0			100						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.32			0.53						0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 40.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

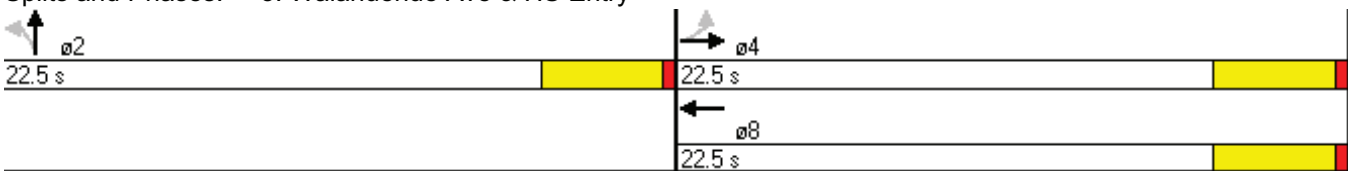
Splits and Phases: 2: Waianuenue Ave & HS Exit

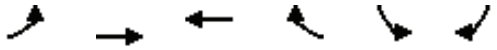


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	366	0	0	359	53	0	0	3	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1855	0	0	1818	0	0	1611	0	0	0	0
Flt Permitted		0.948										
Satd. Flow (perm)	0	1766	0	0	1818	0	0	1611	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					29			329				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		250			255			140			235	
Travel Time (s)		5.7			5.8			3.2			5.3	
Peak Hour Factor	1.00	0.99	0.92	0.92	0.93	0.64	0.92	0.92	0.75	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	400	0	0	469	0	0	4	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Total Split (s)	22.5	22.5	0.0	0.0	22.5	0.0	22.5	22.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.0	4.0	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0
Act Effct Green (s)		18.0			18.0			18.0				
Actuated g/C Ratio		0.40			0.40			0.40				
v/c Ratio		0.57			0.63			0.00				
Control Delay		14.4			11.2			0.0				
Queue Delay		1.8			0.0			0.0				
Total Delay		16.2			11.2			0.0				
LOS		B			B			A				
Approach Delay		16.2			11.2			0.0				
Approach LOS		B			B			A				
Queue Length 50th (ft)		75			101			0				
Queue Length 95th (ft)		141			184			0				
Internal Link Dist (ft)		170			175			60			155	
Turn Bay Length (ft)												
Base Capacity (vph)		706			745			842				
Starvation Cap Reductn		166			0			0				
Spillback Cap Reductn		0			0			0				
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.74			0.63			0.00				

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 54.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Waianuenue Ave & HS Entry

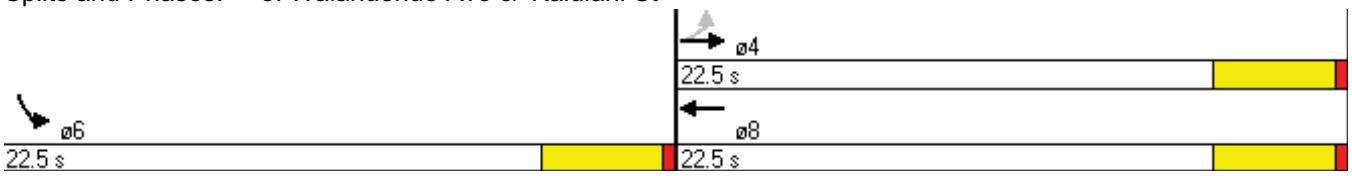


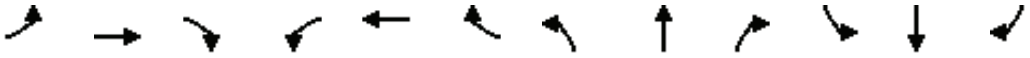


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	324	333	23	18	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1853	1846	0	1647	0
Flt Permitted		0.940			0.990	
Satd. Flow (perm)	0	1751	1846	0	1647	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9		70	
Link Speed (mph)		30	30		30	
Link Distance (ft)		350	180		260	
Travel Time (s)		8.0	4.1		5.9	
Peak Hour Factor	1.00	0.99	0.93	0.92	1.00	1.00
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	362	383	0	88	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Total Split (s)	22.5	22.5	22.5	0.0	22.5	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.0	4.5	4.0
Act Effct Green (s)		18.0	18.0		18.0	
Actuated g/C Ratio		0.40	0.40		0.40	
v/c Ratio		0.52	0.51		0.13	
Control Delay		8.0	13.0		4.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		8.0	13.0		4.2	
LOS		A	B		A	
Approach Delay		8.0	13.0		4.2	
Approach LOS		A	B		A	
Queue Length 50th (ft)		54	69		3	
Queue Length 95th (ft)		87	129		21	
Internal Link Dist (ft)		270	100		180	
Turn Bay Length (ft)						
Base Capacity (vph)		700	744		701	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.52	0.51		0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 54.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Waianuenue Ave & Kaiulani St

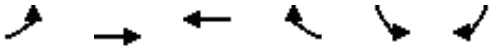




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	353	10	5	371	0	12	0	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.99	0.92	1.00	0.93	0.92	1.00	0.92	0.46	0.92	0.92	0.92
Hourly flow rate (vph)	4	357	11	5	399	0	12	0	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					450							
pX, platoon unblocked	0.84						0.84	0.84		0.84	0.84	0.84
vC, conflicting volume	399			367			779	779	362	805	784	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	191			367			643	643	362	674	649	191
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			96	100	96	100	100	100
cM capacity (veh/h)	1163			1191			323	327	683	296	324	715

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	371	404	38	0
Volume Left	4	5	12	0
Volume Right	11	0	26	0
cSH	1163	1191	506	1700
Volume to Capacity	0.00	0.00	0.08	0.00
Queue Length 95th (ft)	0	0	6	0
Control Delay (s)	0.1	0.1	12.7	0.0
Lane LOS	A	A	B	A
Approach Delay (s)	0.1	0.1	12.7	0.0
Approach LOS			B	A

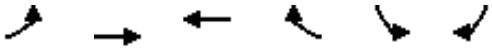
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	31	338	380	24	21	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.99	1.00	0.93	0.92	0.92
Hourly flow rate (vph)	31	341	380	26	23	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		255				
pX, platoon unblocked					0.85	
vC, conflicting volume	406				796	393
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	406				669	393
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				93	95
cM capacity (veh/h)	1153				348	656

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	372	406	59
Volume Left	31	0	23
Volume Right	0	26	36
cSH	1153	1700	488
Volume to Capacity	0.03	0.24	0.12
Queue Length 95th (ft)	2	0	10
Control Delay (s)	0.9	0.0	13.4
Lane LOS	A		B
Approach Delay (s)	0.9	0.0	13.4
Approach LOS			B

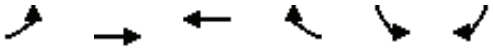
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	359	404	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	363	434	0	1	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		860	840			
pX, platoon unblocked	0.97				0.97	0.97
vC, conflicting volume	434				797	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	399				773	399
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1122				355	630

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	363	434	2
Volume Left	0	0	1
Volume Right	0	0	1
cSH	1700	1700	454
Volume to Capacity	0.21	0.26	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	13.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.0
Approach LOS			B

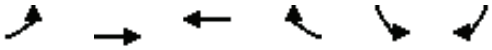
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	359	404	1	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	1	363	434	1	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1200	500			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	435				800	435
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298				709	297
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1119				354	657

Direction, Lane #	EB 1	WB 1
Volume Total	364	435
Volume Left	1	0
Volume Right	0	1
cSH	1119	1700
Volume to Capacity	0.00	0.26
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS	A	
Approach Delay (s)	0.0	0.0
Approach LOS		

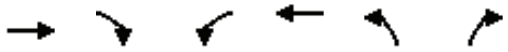
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	359	404	1	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	1	363	434	1	1	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			350			
pX, platoon unblocked	0.86				0.86	0.86
vC, conflicting volume	435				800	435
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266				689	266
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1120				355	667

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	364	435	2
Volume Left	1	0	1
Volume Right	0	1	1
cSH	1120	1700	463
Volume to Capacity	0.00	0.26	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.0	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	310	31	28	299	58	61
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.83	0.68	0.93	1.00	0.78
Hourly flow rate (vph)	313	37	41	322	58	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	180					
pX, platoon unblocked			0.87		0.87	0.87
vC, conflicting volume			350		736	332
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			171		617	150
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		85	90
cM capacity (veh/h)			1216		379	776

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	350	363	136
Volume Left	0	41	58
Volume Right	37	0	78
cSH	1700	1216	537
Volume to Capacity	0.21	0.03	0.25
Queue Length 95th (ft)	0	3	25
Control Delay (s)	0.0	1.2	14.0
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	14.0
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

HILO HIGH SCHOOL GYMNASIUM

APPENDIX D

PM PEAK HOUR TRAFFIC WITH MITIGATION

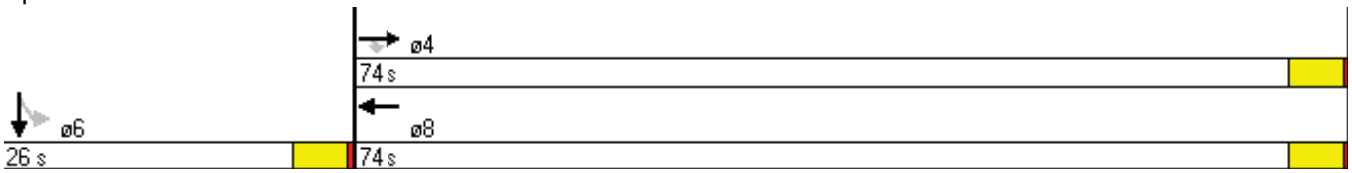
CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	463	64	0	664	0	0	0	0	66	18	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1565	1330	0	1565	0	0	0	0	1770	1496	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1565	941	0	1565	0	0	0	0	1348	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70								21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			250			140			260	
Travel Time (s)		10.2			5.7			3.2			5.9	
Confl. Peds. (#/hr)			100	100						100		100
Peak Hour Factor	0.92	0.99	0.92	0.92	0.93	0.92	0.92	0.92	0.92	1.00	0.92	0.92
Parking (#/hr)		12	12		12							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	468	70	0	714	0	0	0	0	66	41	0
Turn Type			Perm							Perm		
Protected Phases		4			8						6	
Permitted Phases			4							6		
Total Split (s)	0.0	74.0	74.0	0.0	74.0	0.0	0.0	0.0	0.0	26.0	26.0	0.0
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.0	4.0	4.0	4.0	4.5	4.5	4.0
Act Effct Green (s)		69.5	69.5		69.5					21.5	21.5	
Actuated g/C Ratio		0.70	0.70		0.70					0.22	0.22	
v/c Ratio		0.43	0.10		0.66					0.23	0.12	
Control Delay		8.1	1.6		3.3					34.9	20.1	
Queue Delay		0.0	0.0		0.1					0.0	0.0	
Total Delay		8.1	1.6		3.4					34.9	20.1	
LOS		A	A		A					C	C	
Approach Delay		7.3			3.4						29.2	
Approach LOS		A			A						C	
Queue Length 50th (ft)		114	0		15					35	10	
Queue Length 95th (ft)		172	12		18					73	39	
Internal Link Dist (ft)		370			170			60			180	
Turn Bay Length (ft)												
Base Capacity (vph)		1088	675		1088					290	338	
Starvation Cap Reductn		0	0		17					0	0	
Spillback Cap Reductn		23	0		0					0	0	
Storage Cap Reductn		0	0		0					0	0	
Reduced v/c Ratio		0.44	0.10		0.67					0.23	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green, Master Intersection			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 7.0		Intersection LOS: A	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	

Analysis Period (min) 15

Splits and Phases: 2: Waianuenue Ave & HS Exit

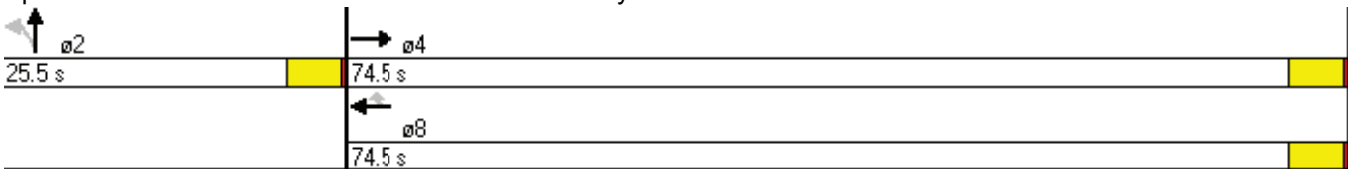


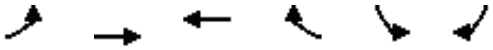
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	527	0	0	665	122	12	51	3	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1118	0	0	1565	1330	1770	1812	0	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	1118	0	0	1565	941	1348	1812	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						191		3				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		250			255			140			260	
Travel Time (s)		5.7			5.8			3.2			5.9	
Confl. Peds. (#/hr)	100					100	100		100			
Peak Hour Factor	1.00	0.99	0.92	0.92	0.93	0.64	0.92	0.92	0.75	0.92	0.92	0.92
Parking (#/hr)		60			12	12						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	532	0	0	715	191	13	59	0	0	0	0
Turn Type						Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases						8	2					
Total Split (s)	0.0	74.5	0.0	0.0	74.5	74.5	25.5	25.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Act Effct Green (s)		70.0			70.0	70.0	21.0	21.0				
Actuated g/C Ratio		0.70			0.70	0.70	0.21	0.21				
v/c Ratio		0.68			0.65	0.27	0.05	0.15				
Control Delay		11.1			11.8	1.7	32.2	32.2				
Queue Delay		0.0			0.0	0.0	0.0	0.0				
Total Delay		11.1			11.9	1.7	32.2	32.2				
LOS		B			B	A	C	C				
Approach Delay		11.1			9.7			32.2				
Approach LOS		B			A			C				
Queue Length 50th (ft)		78			220	0	7	29				
Queue Length 95th (ft)		342			336	3	23	65				
Internal Link Dist (ft)		170			175			60			180	
Turn Bay Length (ft)												
Base Capacity (vph)		783			1096	716	283	383				
Starvation Cap Reductn		0			0	0	0	0				
Spillback Cap Reductn		0			8	0	0	0				
Storage Cap Reductn		0			0	0	0	0				
Reduced v/c Ratio		0.68			0.66	0.27	0.05	0.15				

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 95 (95%), Referenced to phase 4:EBT and 8:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	

Analysis Period (min) 15

Splits and Phases: 3: Waianuenue Ave & HS Entry



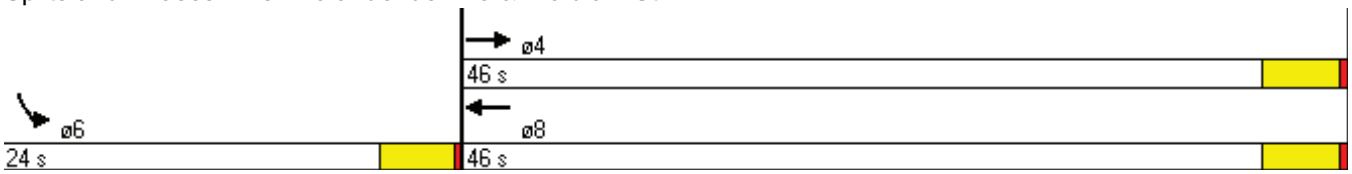


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	530	747	23	46	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1565	1549	0	1383	0
Flt Permitted					0.989	
Satd. Flow (perm)	0	1565	1549	0	1321	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4		116	
Link Speed (mph)		30	30		30	
Link Distance (ft)		350	180		260	
Travel Time (s)		8.0	4.1		5.9	
Confl. Peds. (#/hr)	100			100	100	100
Peak Hour Factor	1.00	0.99	0.93	0.92	1.00	1.00
Parking (#/hr)		12	12	12		
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	535	828	0	199	0
Turn Type						
Protected Phases		4	8		6	
Permitted Phases						
Total Split (s)	0.0	46.0	46.0	0.0	24.0	0.0
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.0
Act Effct Green (s)		38.3	38.3		19.6	
Actuated g/C Ratio		0.57	0.57		0.29	
v/c Ratio		0.60	0.93		0.41	
Control Delay		12.5	32.7		12.3	
Queue Delay		0.0	0.0		0.0	
Total Delay		12.5	32.7		12.3	
LOS		B	C		B	
Approach Delay		12.5	32.7		12.3	
Approach LOS		B	C		B	
Queue Length 50th (ft)		127	277		27	
Queue Length 95th (ft)		213	#544		80	
Internal Link Dist (ft)		270	100		180	
Turn Bay Length (ft)						
Base Capacity (vph)		976	967		487	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.55	0.86		0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 67			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 65.0%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

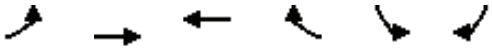
Splits and Phases: 8: Waianuenue Ave & Kaiulani St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	504	79	58	581	44	0	0	24	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.99	0.92	1.00	0.93	0.92	1.00	0.92	0.46	0.92	0.92	0.92
Hourly flow rate (vph)	104	509	86	58	625	48	0	0	52	0	0	0
Pedestrians		100			100			100			100	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		8			8			8			8	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					450							
pX, platoon unblocked	0.76						0.76	0.76		0.76	0.76	0.76
vC, conflicting volume	773			695			1701	1749	752	1734	1768	849
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	543			695			1764	1827	752	1808	1852	643
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			93			100	100	85	100	100	100
cM capacity (veh/h)	715			826			31	39	345	25	38	302

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	104	595	58	673	52	0
Volume Left	104	0	58	0	0	0
Volume Right	0	86	0	48	52	0
cSH	715	1700	826	1700	345	1700
Volume to Capacity	0.15	0.35	0.07	0.40	0.15	0.00
Queue Length 95th (ft)	13	0	6	0	13	0
Control Delay (s)	10.9	0.0	9.7	0.0	17.3	0.0
Lane LOS	B		A		C	A
Approach Delay (s)	1.6		0.8		17.3	0.0
Approach LOS					C	A

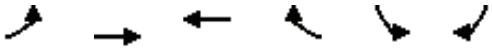
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	530	734	69	0	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.99	1.00	0.93	0.92	0.92
Hourly flow rate (vph)	0	535	734	74	0	59
Pedestrians		100	100		100	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		8	8		8	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		255				
pX, platoon unblocked					0.78	
vC, conflicting volume	908				1469	934
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	908				1461	934
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	78
cM capacity (veh/h)	687				93	271

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	535	734	74	59
Volume Left	0	0	0	0
Volume Right	0	0	74	59
cSH	1700	1700	1700	271
Volume to Capacity	0.31	0.43	0.04	0.22
Queue Length 95th (ft)	0	0	0	20
Control Delay (s)	0.0	0.0	0.0	21.9
Lane LOS				C
Approach Delay (s)	0.0	0.0		21.9
Approach LOS				C

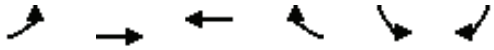
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	530	792	0	0	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	535	852	0	0	13
Pedestrians		100	100			
Lane Width (ft)		12.0	12.0			
Walking Speed (ft/s)		4.0	4.0			
Percent Blockage		8	8			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		860	840			
pX, platoon unblocked	0.63				0.69	0.63
vC, conflicting volume	852				1487	952
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	474				1101	632
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	95
cM capacity (veh/h)	688				148	278

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	535	852	13
Volume Left	0	0	0
Volume Right	0	0	13
cSH	1700	1700	278
Volume to Capacity	0.31	0.50	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	18.6
Lane LOS			C
Approach Delay (s)	0.0	0.0	18.6
Approach LOS			C

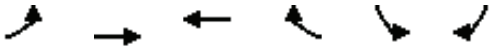
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	530	792	51	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	535	852	55	0	0
Pedestrians		100	100		100	
Lane Width (ft)		12.0	12.0		0.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		8	8		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1200	500			
pX, platoon unblocked	0.56				0.58	0.56
vC, conflicting volume	1007				1615	1079
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612				1504	742
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	537				71	211

Direction, Lane #	EB 1	WB 1
Volume Total	535	907
Volume Left	0	0
Volume Right	0	55
cSH	1700	1700
Volume to Capacity	0.31	0.53
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	530	781	37	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.99	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	535	840	40	0	2
Pedestrians					100	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					8	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			350			
pX, platoon unblocked	0.53				0.53	0.53
vC, conflicting volume	980				1495	960
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	515				1491	477
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	508				66	285

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	535	880	2
Volume Left	0	0	0
Volume Right	0	40	2
cSH	1700	1700	285
Volume to Capacity	0.31	0.52	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	17.7
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.7
Approach LOS			C

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	500	75	0	713	0	119
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.83	0.68	0.93	1.00	0.78
Hourly flow rate (vph)	505	90	0	767	0	153
Pedestrians	100			100	100	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	8			8	8	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	180					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			695		1517	750
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			474		1522	544
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	57
cM capacity (veh/h)			782		86	355

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	595	767	153
Volume Left	0	0	0
Volume Right	90	0	153
cSH	1700	1700	355
Volume to Capacity	0.35	0.45	0.43
Queue Length 95th (ft)	0	0	52
Control Delay (s)	0.0	0.0	22.6
Lane LOS			C
Approach Delay (s)	0.0	0.0	22.6
Approach LOS			C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		