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KATHRYN S. MATAYOSHI
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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

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

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

FILE COPY
OCT 08 2014

Director
Office of Environmental Quality Control
Department of Health, State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Director:

With this letter, the State of Hawai'i Department of Education, Office of School Facilities and Support Services, Facilities Development Branch hereby transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the Farrington High School Development Master Plan situated at TMK: (1) 1-6-021:005 and (1) 1-6-003: 047, 048, 082, 083, and 999, in the Honolulu District on the island of O'ahu for publication in the next available edition of the Environmental Notice.

The State of Hawai'i Department of Education, Office of School Facilities and Support Services, Facilities Development Branch has not received any comments during the 30-day public comment period on the draft environmental assessment and anticipated finding of no significant impact.

Enclosed is a completed OEQC Publication Form, two copies of the FEA-FONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions please contact me at 586-0439.

Sincerely,

Jonathan T. Weintraub
Architect
Facilities Development Branch

Enclosures

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (FEBRUARY 2013 REVISION)

Project Name	Farrington High School Development Master Plan
Island:	O'ahu
District:	Honolulu
TMK:	(1) 1-6-021:005 and (1) 1-6-003:047, 048, 082, 083, and 999
Permits:	Chapter 6E, State Historic Preservation Law National Pollutant Discharge Elimination System Building Permit Grading/Trenching Permit Zoning Waiver Sewer Connection Application Street Usage Permit

Proposing/Determination Agency:
State of Hawaii Department of Education
Office of School Facilities and Support Services
Facilities Development Branch
P.O. Box 2360
Honolulu, Hawai'i 96804
Contact: Jonathan Weintraub
(808) 586-0439

Accepting Authority: N/A *(for EIS submittals only)*

Consultant:
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawai'i 96826
Contact: Milton Arakawa
(808) 946-2277

Status:

X FEA-FONSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The proposed action pertains to the implementation of the master plan which provides a roadmap for the campus' future physical development over a 9 phase 15 year time frame. Many of the existing facilities are aging, outdated, overused, and in poor condition. The master plan takes a broad look at solving inadequate facilities of aging schools by renovating and reconfiguring campus buildings creating a flexible suite of classrooms and adjoining open spaces. The intent is to advance 21st Century Learning by implementing the concepts of "college and career readiness" and smaller learning communities. The master plan retains significant buildings and landmarks along North King Street, including Building "A" which was designed by noted Territorial architect C.W. Dickey. Slightly higher buildings are proposed near the mauka portion of campus. The amphitheater, which is encircled by Building "A" will be enhanced by an adjacent new Student Quad area. A new track and field, gymnasium, swimming pool and tennis courts would be located on the Diamond Head half of the campus. The master plan includes enhancing of pedestrian pathways, activating open spaces through seating, shading, and passive recreational opportunities, and beautifying campus edges and entries.

FINAL ENVIRONMENTAL ASSESSMENT

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

Honolulu, Island of Oʻahu, State of Hawaiʻi

State of Hawaiʻi
Department of Education

Architects Hawaiʻi Ltd.

MVE Institutional, Inc.

Wilson Okamoto Corporation

October 2014

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

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

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

Director
Office of Environmental Quality Control
Department of Health, State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawai'i 96813

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Enclosures

FINAL ENVIRONMENTAL ASSESSMENT

FARRINGTON HIGH SCHOOL
LONG RANGE DEVELOPMENT MASTER PLAN

Honolulu, Oʻahu, Hawaiʻi

Prepared For:

Department of Education
Office of School Facilities and Support Services
Facilities Development Branch
Queen Liliʻuokalani Building
1390 Miller Street
Honolulu, Hawaiʻi 96813

Architects Hawaiʻi Ltd.
733 Bishop Street, Suite 3100
Honolulu, Hawaiʻi 96813

MVE Institutional
3 MacArthur Place, Suite 850
Santa Ana, California 92707

Prepared By:

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaiʻi 96826

WOC Job No. 8429-01

October 2014

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PREFACE

This ~~Draft~~ Final Environmental Assessment (EA) / ~~Anticipated~~ Finding of No Significant Impact (FONSI) has been prepared pursuant to Chapter 343, Hawai'i Revised Statutes (HRS), and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), Department of Health, State of Hawai'i. The State of Hawai'i Department of Education is proposing a Long Range Development Master Plan (henceforth "Master Plan") for Governor Wallace Rider Farrington High School (FHS) within urban Honolulu on the island of O'ahu. The project requires the use of State land and funds, therefore, the project is subject to the State environmental review process.

The master plan is intended to provide guidance for the redevelopment of FHS over a 15 year period (2013-2028), and proposes a range of campus improvements that will provide students, faculty, and the surrounding community access to quality educational, athletic and cultural facilities. The master plan involves nine phases of development which encompass significant renovation, demolition, and construction to the existing campus and support facilities. The master plan will replace obsolete buildings and infrastructure across the entire campus.

~~It is anticipated that a~~ This EA is proposing a Finding of No Significant Impact (FONSI) as no significant impacts are anticipated as a result of implementing the proposed project. ~~will be issued and filed with the State Office of Environmental Quality Control (OEQC) by the approving agency following public review of the Draft EA.~~

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SUMMARY

Proposing Agency:	State of Hawai‘i Department of Education
Approving Agency:	State of Hawai‘i Department of Education
Location:	Honolulu, O‘ahu, Hawai‘i
Tax Map Keys (TMKs):	(1) 1-6-021:005 and (1) 1-6-003: 047, 048, 082, 083, and 999
Recorded Fee Owner:	City and County of Honolulu, State of Hawai‘i, Unknown
Existing Use:	A public high school encompassing approximately 27 acres with 15 major buildings comprising classrooms, industrial education shops, athletics facilities, an auditorium, and library/media center.
State Land Use Classification:	Urban
Development Plan Designation:	High School (State)
County Zoning Designation:	Residential (R-5)
Proposed Action:	The proposed action assessed herein is for the implementation of the master plan which provides a roadmap for the school’s future physical development over a 9 phase 15 year time frame. The master plan addresses the renovation of Buildings “A”, “B” (Library), and “S” (Auditorium) located along North King Street. Replacement of all other existing buildings with new classrooms and support facilities are proposed. The focus is on campus organization and arrangement, going vertical instead of horizontal, locating vehicular parking at the perimeter and creating more open and pedestrian friendly spaces.
Impacts:	Applicable construction and permanent best management practices and erosion control measures will be implemented to address soil erosion issues. No significant impacts on flora and fauna are anticipated as a result of construction or operation of the project. Since there are several known historic sites in the study area and a potential for subsurface burials, archaeological monitoring is proposed for any subsurface activity. Renovations and modifications to Building “A”, which is on the National Register of Historic Places, will be done in conjunction with a historic architect and the State Historic Preservation Division.

The auditorium is proposed to be renovated. The existing dedication plaque at the swimming pool is proposed to be re-installed at the new facility. Documentation requirements will be coordinated with the State Historic Preservation Division for other buildings which may be considered eligible for the Register. Air quality, noise and hazardous materials impacts will be mitigated by compliance with applicable Department of Health rules. Although enrollment is expected to increase, students are expected to continue using public transportation, the provided bus service, or alternate modes of transportation (i.e., biking, walking, etc.) to travel to and from school. Traffic operations in the vicinity of the high school are expected to remain similar to conditions without the proposed project. As such, the implementation of the Farrington High School Master Plan is not expected to have a significant impact on the surrounding roadways. No significant impacts regarding water, wastewater, drainage, electrical and communications systems are anticipated. However, further coordination with applicable agencies should occur prior to start of construction for each phase to ensure that no significant impacts occur.

~~Anticipated~~ Determination: Finding of No Significant Impact (FONSI)

Parties Consulted During Pre-Assessment:

Federal Agencies
National Oceanic and Atmospheric Administration, Pacific Islands Regional Office
U.S. Army Corps of Engineers
U.S. Department of the Interior, Fish and Wildlife Service

State Legislative Branch
Senator Donna Mercado Kim
Senator Suzanne Chun Oakland
Representative Karl Rhoads
Representative John Mizuno

State Agencies
Department of Accounting and General Services
Department of Business, Economic Development and Tourism
Department of Business, Economic Development and Tourism, Energy Office
Department of Business, Economic Development and Tourism, Land Use Commission
Department of Business, Economic Development and Tourism, Office of Planning
Department of Defense
Department of Defense, State Civil Defense
Department of Health
Department of Health, Clean Water Branch
Department of Health, Environmental Management Division
Department of Health, Environmental Planning Office
Department of Land and Natural Resources
Department of Land and Natural Resources, Historic Preservation Division
Department of Transportation
Office of Environmental Quality Control
Office of Hawaiian Affairs
University of Hawai‘i at Mānoa Environmental Center

City Council
Councilmember Carol Fukunaga
Councilmember Joey Manahan

City and County of Honolulu Agencies
Board of Water Supply
Department of Community Services
Department of Design and Construction
Department of Environmental Services

Department of Facility Maintenance
Department of Parks and Recreation
Department of Planning and Permitting
Department of Transportation Services
Honolulu Fire Department
Honolulu Police Department

Utility Companies
Verizon Hawai'i
Hawai'i Gas
Hawaiian Electric Company
Oceanic Cable

Other Interested Parties and Individuals
Kalihi-Palama Neighborhood Board No. 15

Draft Environmental Assessment Consultation:

The Draft Environmental Assessment for the Farrington High School was published in the Office of Environmental Quality Control Environmental Notice of August 8, 2014. Publication initiated a 30-day public review period ending on September 8, 2014. No comments were received during the public comment period.

However, an early consultation letter from the State Historic Preservation Division was received after the Draft EA had been submitted to OEQC for publication. The letter and response are included in Appendix D.

1. INTRODUCTION

1.1 Background Information

The State of Hawai‘i Department of Education is proposing a Long Range Development Master Plan (henceforth “Master Plan”) for Governor Wallace Rider Farrington High School (FHS) within urban Honolulu on the island of O‘ahu. The Master Plan is intended to provide guidance for the redevelopment of FHS over the next 15 years (2013-2028), and proposes a range of school improvements that will provide students, faculty, and the surrounding community access to quality educational, athletic and cultural facilities. The Master Plan proposes multiple phases of development which encompasses significant renovation, demolition, and construction to the existing school and support facilities. The Master Plan will renovate and replace obsolete buildings and infrastructure across the entire campus.

FHS is located in the Kalihi District within urban Honolulu. See Figure 1-1. FHS currently occupies an area of approximately 27 acres identified by Tax Map Keys (TMK) 1-6-021:005, and 1-6-003: 047, 048, 082, 083, and 999. The school is bounded by Houghtailing Street, North King Street, Kalihi Street, and the Lunalilo (H-1) Freeway.

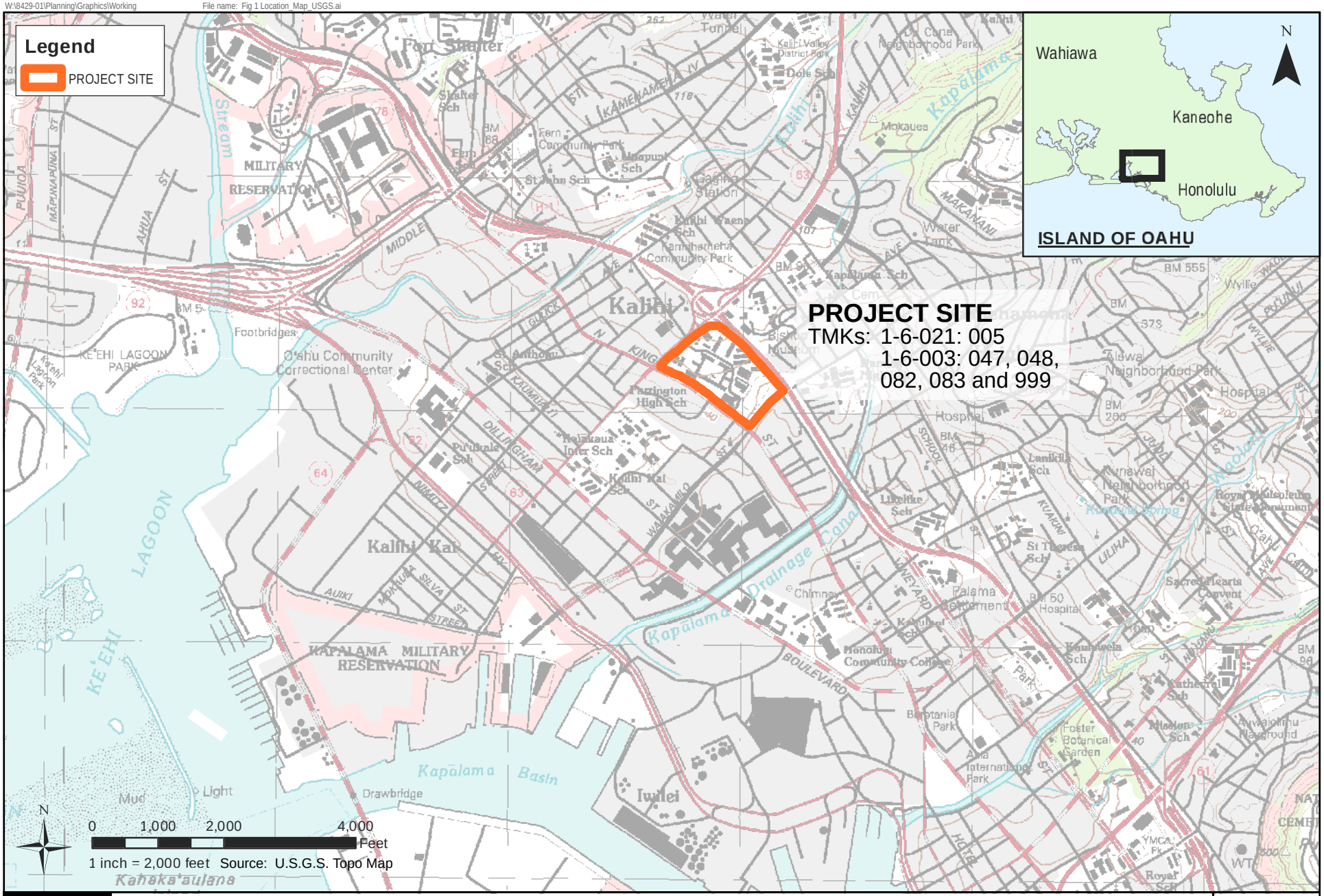
FHS was established in 1936 where Kamehameha Homes is currently located across the current site makai of North King Street. FHS moved to its current campus in 1940. Noted Territorial architect, C.W. Dickey, designed the main building (identified as Building “A”) which is also the main entry to the school from North King Street. This building is on the National Register of Historic Places. The school has a rich historical legacy, as well as notable graduates such as Hawai‘i Supreme Court Associate Justice Simeon Acoba Jr., former Governor Benjamin Cayetano, and professional athletes Jesse Sapolu and Wally Yonamine, to name a few.

A majority of FHS buildings were constructed in the late 1950’s and early 1960’s during a time of rapid growth within the City and County of Honolulu and the State of Hawai‘i. The campus evolved into 15 major buildings comprising classrooms, industrial education shops, athletics facilities, an auditorium, and library/media center. See Figure 1-2 and Figure 1-3. Currently, FHS accommodates approximately 2,500 students which varies from year to year, in grades 9-12. Currently, there are a total of 221 faculty and staff.

1.1.1 Surrounding Uses

The project site is bounded on the makai (southwest) side by the Kamehameha Homes development, Kalakaua Middle School, Kalakaua Recreation Center and the Kalakaua District Park. Further makai is the largely industrial area of Kalihi. Immediately ewa (northwest) of the project site are predominantly single family residential uses. Commercial uses abut the busy North King Street corridor. On the mauka (northeast) side of the project site across the H-1 Freeway is the Bishop Museum. Further mauka are the Kamehameha Shopping Center and the predominantly residential areas of Upper Kalihi, Kapālama, and Kalihi Valley. Kalihi Street extends mauka and joins with the Likelike Highway which provides a major link with the WIndward side of the island. On the Diamond Head (southeast) side of the project site is an automobile dealership across Houghtailing Street. Further Diamond Head are single family residential uses.

W:\8429-01\Planning\Graphics\Working File name: Fig 1 Location_Map_USGS.ai



FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

LOCATION MAP

FIGURE 1-1

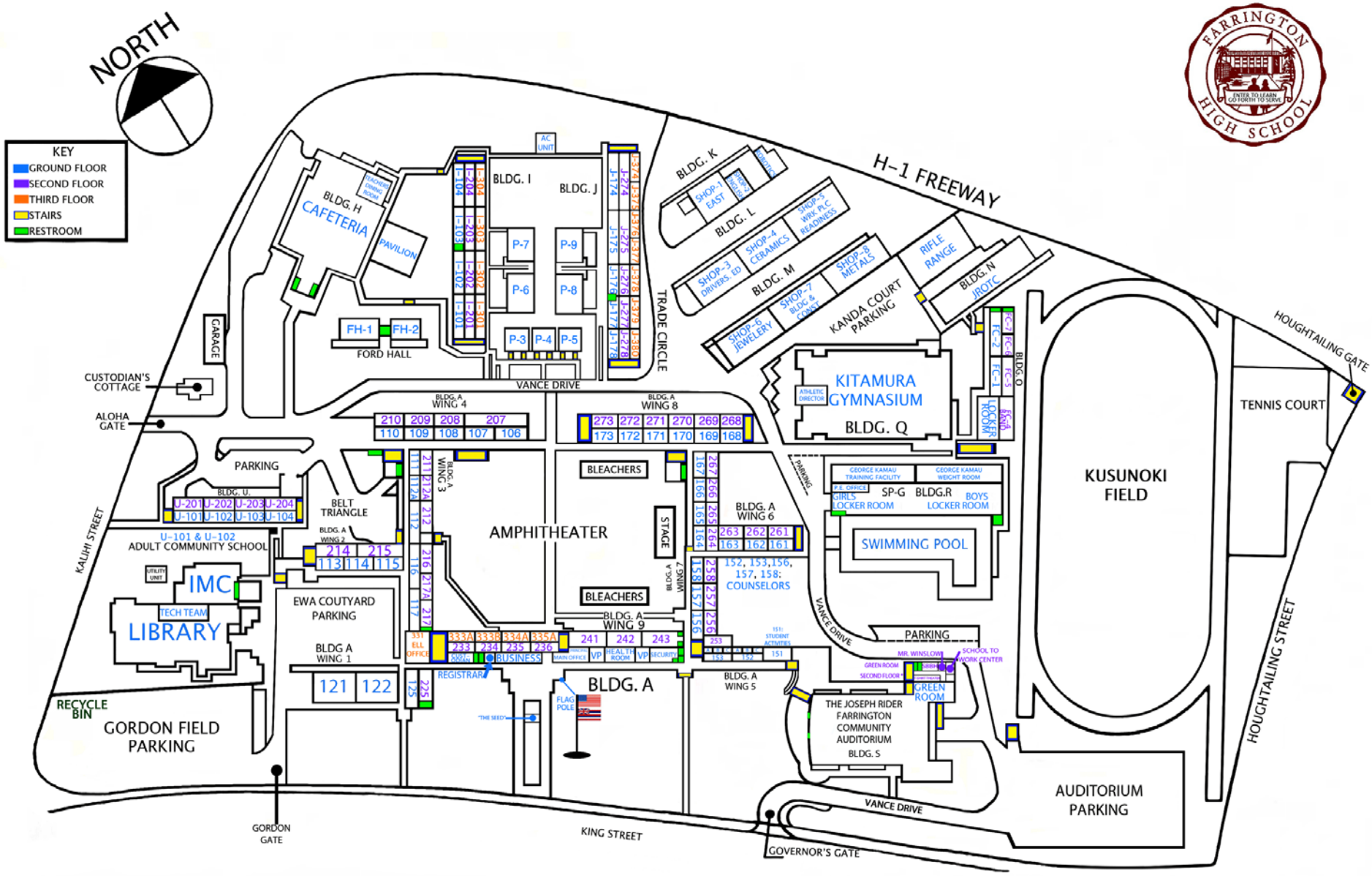
Source: Architects Hawaii

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

AERIAL VIEW OF EXISTING CAMPUS

FIGURE 1-2

W:\8429-01\Planning\Graphics\Working File name: Fig 1-3 Campus_Map.ai



Campus Map updated 2010 by students of Project EAST Engineering Academy Chairperson: Mrs. Diane Tom Ogata

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

EXISTING CAMPUS MAP

FIGURE 1-3

2. PROJECT DESCRIPTION

2.1 Project Purpose and Need

While the buildings constructed in the 1950's and 1960's accommodated educational needs for the surrounding community, the campus layout was implemented without the benefit of a long range master plan. See Figure 2-1 and Figure 2-2. Thus, the existing campus development has resulted in a number of notable issues:

1) School buildings are distributed across the campus in a haphazard fashion with no clear hierarchy of campus spaces, circulation and/or relationship to open spaces.
2) The building density, lack of open green space, and minimal shade trees has created an island heat effect due to the amount of hardscape and lack of vegetation.
3) Classrooms along the periphery and adjacent to Lunalilo Freeway, Kalihi and North King Streets contend with vehicular noise, air quality and temperature issues which affect student performance in the classrooms.
4) The library is decentralized and in an inconvenient location on campus.
5) Parking areas are spread throughout the campus, which creates limited outdoor open area environments with the exception of the Amphitheater.
6) Integration of public and private transportation access within the campus is all but non-existent. Accommodations for drop off/pick up areas, pedestrian amenities, open space, parking and loading areas, bicycle parking, emergency access and accommodations for the physically challenged are generally substandard and/or non-existent.
7) Classrooms, support buildings, and athletic facilities are outdated, overused, and in poor physical condition.

There is a significant need to upgrade the physical facilities on the campus in accordance with the Master Plan.

It is noted that the size of the existing FHS campus is approximately half the size of a typical DOE high school campus, by current standards. Future growth of the campus, however, is constrained horizontally by its location being bounded on all four sides by major vehicle thoroughfares. While there is a significant need to upgrade the physical facilities at FHS, it is also one of the largest schools in the State of Hawai'i and will need to be fully operable during the period of construction. Thus, there is a need to phase future improvements to minimize impact on the students, faculty and staff while ensuring that improvements can be completed within an optimum time frame.

View of cafeteria located near Kalihi Street and H-1 Freeway.

View of portion of Building “A” from North King Street.

View of Vance Drive and Aloha Gate entrance on Kalihi Street.

View of portion of athletic field dirt and cinder track. Existing tennis courts located in background.

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

PHOTOS OF EXISTING CAMPUS CONDITIONS

FIGURE

2-1

Portable classrooms located in area between Building “I” and “J”.

View of Amphitheater Stage. Looking Diamond Head.

View of metal frame Industrial Arts Buildings located adjacent to H-1 Freeway.

View of amphitheater looking ‘Ewa. The amphitheater is the setting for a number of school events such as graduations.

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

PHOTOS OF EXISTING CAMPUS CONDITIONS

FIGURE 2-2

2.2 Project Description

The proposed Master Plan takes a broad look at addressing notable issues relating to existing campus development.

A significant factor which is considered in the formulation of a Master Plan is the fact that educational philosophies have changed over time. FHS emphasizes "college and career readiness" which can help to better prepare students for their chosen career paths after high school. When students reach their junior and senior years of school, they are encouraged to join academies. FHS has nine academies: Law and Justice, Sports Industry, Business, Higher Education, Culinary Arts, Engineering, Creative Arts and Technology, Health, and Teaching.

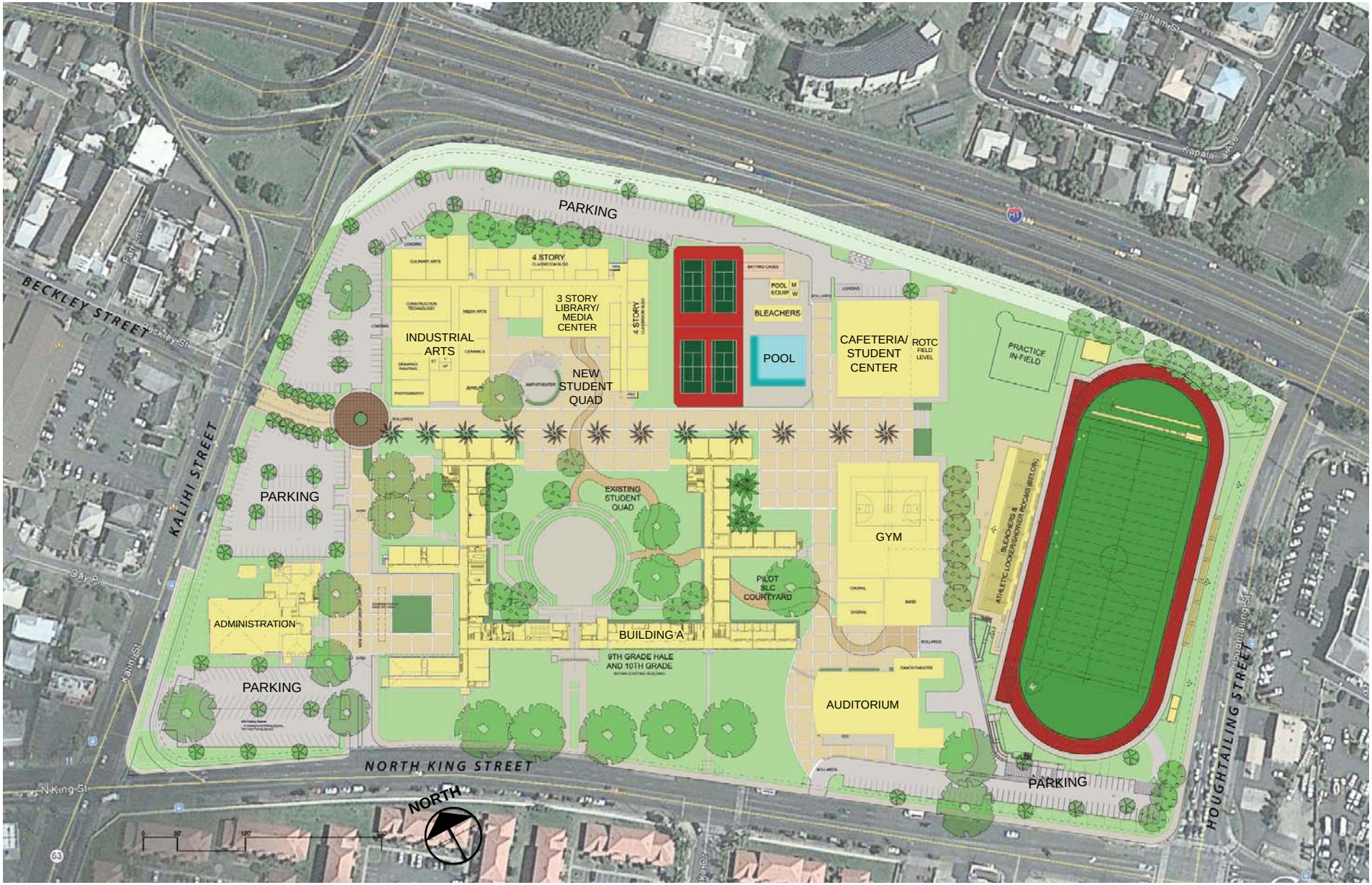
Another major factor is an evolution of methods of learning. The concept of smaller learning communities is being utilized. Student learning is becoming more personalized and collaborative. So, in order to better educate students, teaching must also become more personalized and collaborative. Instead of the traditional model of assigning one teacher to one classroom, a group of teachers are assigned to an academy. The teachers collaborate with each other on the classroom teaching duties. Smaller and more intimate learning communities are the result with the intent to optimize hands-on, project-based learning and to facilitate collaboration among teachers, counselors and students.

The Master Plan involves renovating and reconfiguring campus buildings creating a flexible suite of classrooms and adjoining open spaces. See Figure 2-3 and Figure 2-4. A physical result is to create a welcoming, pedestrian-friendly campus by restricting vehicles to the campus periphery and providing furniture and other site amenities to encourage outdoor gathering. This includes the enhancement of pedestrian pathways, activating open spaces through seating, shading, passive recreational amenities, and beautifying campus edges and entries. See Figure 2-5 and Figure 2-6.

The existing amphitheater encircled by Building "A" forms a significant open space within the central portion of the campus. The Master Plan enhances this by creating a new Student Quad area mauka of the amphitheater. Portions of the mauka wings of Building "A" are proposed to be removed in order to create a larger central open space and gathering area. The mauka wings were added to Building "A" in the 1950's and are not part of the original construction. The new Student Quad area would be bordered by a new 2 story Industrial Arts facility, 4-story classroom building and the new 3 story Library/Media Center. In addition to Building "A", these new buildings form the center of campus instruction.

A new track and field, gymnasium, cafeteria, swimming pool and tennis courts would be located on the Diamond Head half of the campus. In order to efficiently utilize land area, the new gymnasium building would also house physical education facilities, band and choral rooms. The cafeteria also would contain ROTC classrooms located on a lower floor. The existing library structure near the corner of North King Street and Kalihi Street is proposed to be reused as the Administration Building.

W:\8429-01\Planning\Graphics\Working File name: Fig2-3 Conceptual_Master_Plan.ai



Source: AHL

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

CONCEPTUAL MASTER PLAN

FIGURE 2-3

Source: MVEI

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

CONCEPTUAL BUILDING MASSING ILLUSTRATING MULTI-FLOOR BUILDINGS IN RELATION TO OPEN SPACE

FIGURE

2-4

Source: MVEI

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

CONCEPTUAL VIEW OF AMPHITHEATER AND NEW QUAD AREA

FIGURE 2-5

Source: MVEI

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

CONCEPTUAL VIEW OF PLAZA THROUGH CENTRAL CAMPUS

FIGURE 2-6

The total existing floor area on the FHS campus is approximately 278,900 square feet. There are 339 existing parking stalls. The Master Plan envisions retaining significant buildings and landmarks along North King Street, slightly higher buildings near the mauka portion of campus, additional open space and pedestrian orientation, with parking located on the periphery which results in a total floor area of approximately 336,800 square feet with approximately 450 parking stalls. Maximum enrollment is anticipated to be 2,650 students.

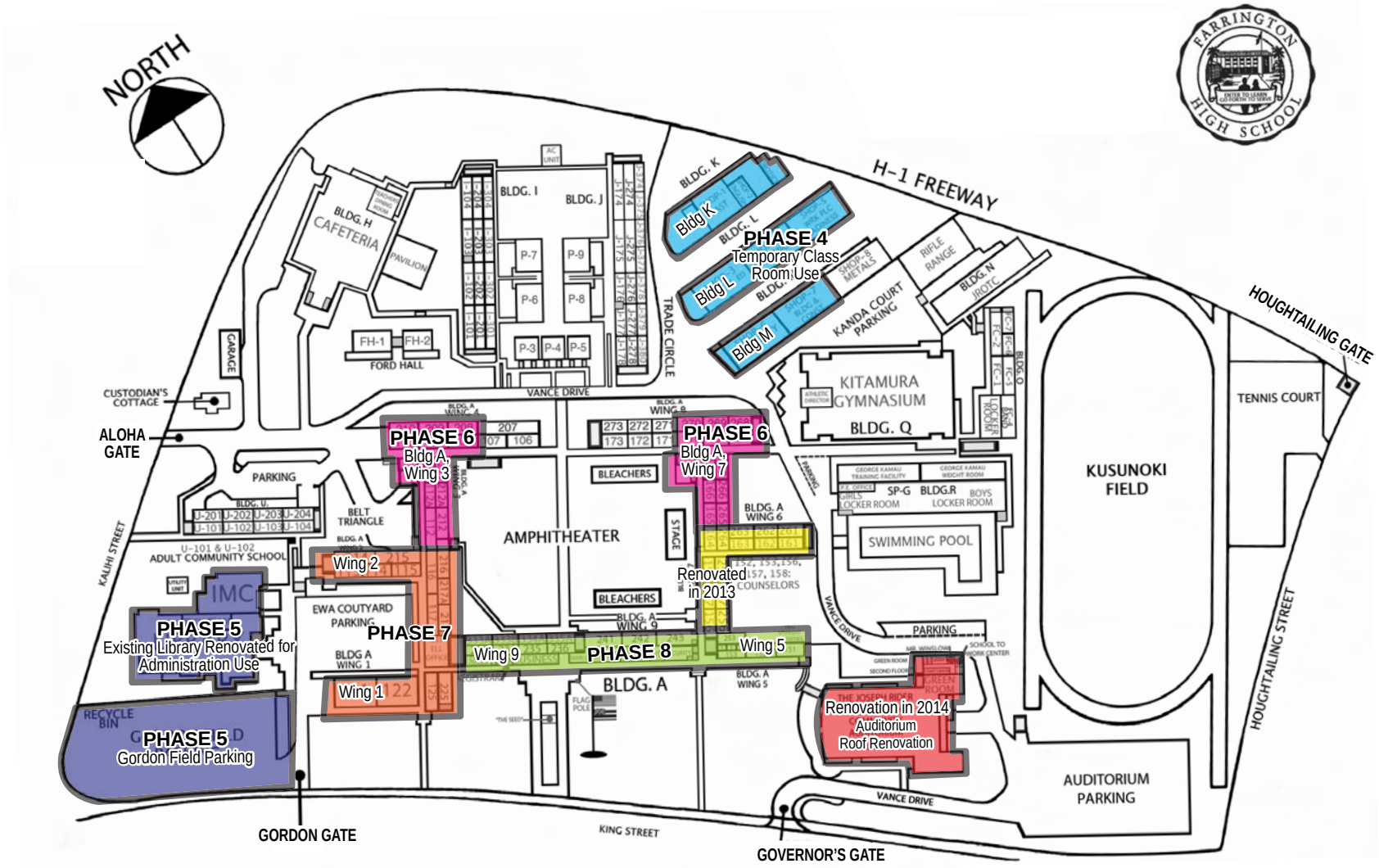
Another key strategy in the Master Plan pertains to preserving and highlighting the people and places instrumental to FHS' history and legacy through a series of building and landscape upgrades, signage programs, and student generated exhibits. This includes restoring exterior defining elements of Building "A" as well as preserving the front lawn area along North King Street.

As part of the implementation, FHS proposes to enact a series of resource conservation initiatives, including student-led recycling programs, energy saving competitions, organic gardening, rainwater harvesting, and solar energy generation.

Development of the Master Plan has conceptually been divided into nine (9) phases. See Figure 2-7 and Figure 2-8. The scope of this EA does not address renovation/repair to the Auditorium (which was damaged due to a natural disaster) which is already scheduled for repair. The EA also does not address Building A; Wing 6 and the makai portion of Wing 7, since renovations were completed in 2013. Conceptual descriptions of the various phases are as follows:

Phase 1: The first phase includes the demolition of existing Kusunoki Field and perimeter track, tennis courts and the parking lot adjacent to North King Street. A new Track and Field (T&F) with bleachers and Press Box, Athletic Locker/Shower (ALS) facility, and modified parking lot would be constructed. The new T&F will provide a synthetic turf field, a 6-lane polyurethane track, 2,500 seat capacity "home" bleachers (with Press Box) and an additional 500 seat visitor bleacher section (option). The ALS facility will contain athletic locker rooms/toilets/showers, storage spaces, Coach and Trainer rooms, public toilets and a concession space located under the home bleacher. The new T&F will serve the school's functions (football, soccer, graduation, ROTC, marching band, etc.) and be available for community use. A batting cage, shot put area, stand alone storage building, ticket booths, field lighting (option) and a visitor toilet building (option) will be located adjacent and around the T&F. Parking improvements are included for the area at the corner of Houghtailing and North King Streets and an area behind Building "A"; Wings 4 and 8 to accommodate displaced parking.

Phase 2: Work includes the demolition of the existing swimming pool, and Building "R" (bleachers, training and locker facilities) and surface parking. New construction includes a new Gymnasium, Physical Education facilities (under the Gym and at field level), Band and Choral Rooms, and temporary surface parking.



LEGEND

- RENOVATED IN 2013
- RENOVATION IN 2014
- PHASE 4
- PHASE 5
- PHASE 6
- PHASE 7
- PHASE 8

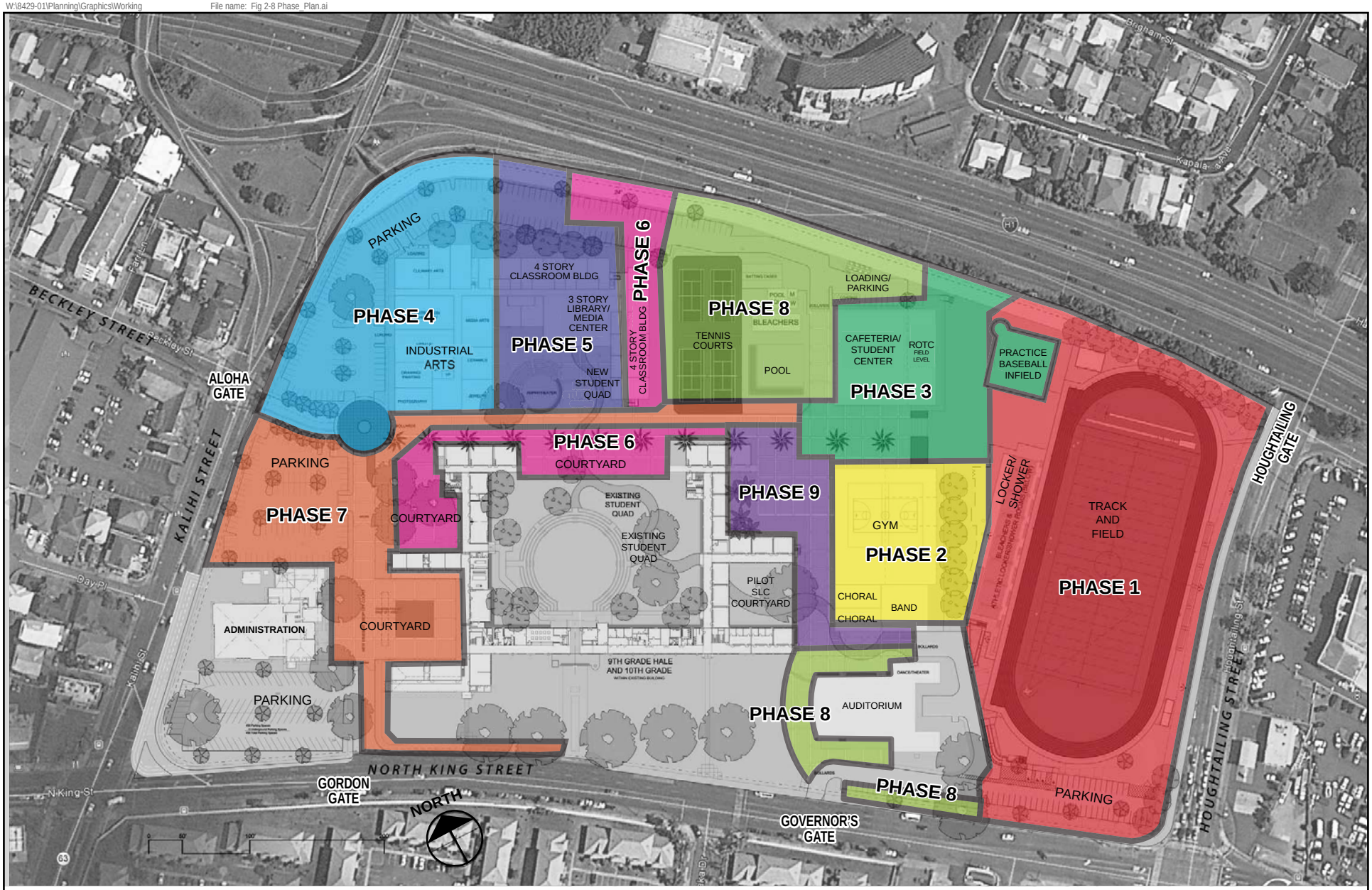
Source: AHL

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

RENOVATION PHASING

FIGURE 2-7

W:\8429-01\Planning\Graphics\Working File name: Fig 2-8 Phase_Plan.ai



Source: AHL

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

NEW CONSTRUCTION PHASING

FIGURE 2-8

Phase 3: Work includes the demolition of the Kitamura Gymnasium (Building "Q"), Building "N" (ROTC Building/Rifle Range), a portion of Building "M", Building "O" and Kanda Court parking.

New construction includes a new two story structure with a Cafeteria/Student Union Center on the top floor and a ROTC facility on the ground floor (field level). A practice infield (for baseball and softball) will be added adjacent to the T&F.

Phase 4: Work includes the demolition of the cafeteria (Building "H") Ford Hall (Building "G"), and other structures in this sector (pavilion, garage and custodian's cottage). New construction includes a two story Industrial Arts Building. The existing Aloha Gate entry along Kalihi Street will be realigned with Beckley Street. An on grade parking lot will be constructed along the Northeast area of the campus along the perimeter of school property. Once the Industrial Arts building is constructed, shop classes from Buildings "K", "L", and "M" would relocate to the new facility, and the existing buildings would be renovated for temporary classroom use.

Phase 5: Work includes demolition of the 3-story Building "I" and portable classrooms P-3 to P-9. New construction includes a 3 story Library/Media Center and 4-story Classroom Building, a new Student Quad and small amphitheater, and an extension of the Northeast parking lot along the perimeter of school property. When the new Library/Media Center is completed, the existing library (Building "B") would be renovated as the new Administration Building. The adjacent Gordon Field parking lot located at the corner of Kalihi and North King Streets would also be renovated.

Phase 6: Work includes the demolition of the 3-story Building "J" and associated AC enclosure, a portion of Building "A"; Wings 4 and 8, the Belt Triangle parking area and the temporary parking area built in Phase 1. A 4 story classroom building would be located adjacent to the Library/Media Center (Phase 5). After its completion, portions of Building "A" (Wings 3, 4, 7 and 8) would be renovated. An extension of the Amphitheater landscaping/hardscape is proposed to create a larger open area. Further extension of the Northeast parking lot is planned from Phase 5.

Phase 7: Work includes demolition of the two story Building "U" and adjacent parking lot and a portion of Vance Drive. This would be replaced by a new parking lot and landscaping/hardscape adjacent to Kalihi Street and Building "A" Wing 3. Modifications will be made along a portion of North King Street for a deceleration lane, widening of the driveway at the Gordon Gate entrance and 'Ewa Courtyard parking. Building "A"; Wings 1, 2 and the makai portion of Wing 3 would be renovated.

Phase 8: Work includes the demolition of Buildings "K", "L", and "M" (adjacent to the H-1 Freeway), the walkway fronting the Auditorium (Building "S"), and a landscaped area adjacent to North King Street and Vance Drive. New construction includes a new swimming pool, four (4) tennis courts, the final extension of the Northeast parking lot, and extension of the auditorium parking lot. Renovation work will include Building "A"; Wings 5 and 9 and walkway improvements fronting the auditorium.

Phase 9: Work includes demolition of the remainder of Vance Drive between the pool and Auditorium. New construction to include pedestrian walkway (doubling as Fire lane) and landscaping/hardscape improvements.

2.3 Project Cost and Schedule

Since FHS is a fully developed site within an existing urban neighborhood and the school needs to be fully operable during the period of construction, nine phases of construction are proposed. This is needed in order to minimize disruption to existing school instruction and activities. At the same time, the intent would be to accelerate design and construction in order to complete implementation of the Master Plan so that all of the upgrades to the campus can be completed in a relatively timely manner. The projected implementation time frame for the school improvements is 2013-2028. Phase 1 has dedicated funding of $15 million. Requests for funding for Phase 2 and future phases have already started and is anticipated to continue along the implementation time frame for the project.

It is noted that cumulative design and construction costs over a 15 year period are difficult to estimate to a precise degree. Based on the conceptual drawings of the Master Plan, the projected total costs for 9 phases of design and construction taking into account estimates for design and construction cost escalation would be approximately $255 million.

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3. DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES

3.1 Climate

The climate of O‘ahu is relatively moderate throughout most of the year and is characterized as semi-tropical with two seasons. The summer period runs from May through September and is generally warm and dry, with predominantly northeast trade winds. In contrast, the winter season runs from October through April and is associated with lower temperatures, higher rainfall and less prevalent trade winds.

The project is located in the Honolulu area which has a climate typical of the Leeward coastal lowlands of O‘ahu. The area is characterized by abundant sunshine, persistent tradewinds, relatively constant temperatures, moderate humidity, and the infrequency of severe storms. Northeasterly tradewinds prevail throughout the year although its frequency varies.

The mean temperature measured at Honolulu International Airport ranges from 70 degrees in the winter to 84 degrees Fahrenheit in the summer. Average annual precipitation is measured as approximately 30 inches, with rainfall occurring mostly between October and March.

Impacts and Mitigation Measures

No significant impacts on climate in the project area are anticipated. Construction and operation of the proposed project are not anticipated to affect temperatures, wind, or rainfall levels in the project area.

3.2 Physiography

3.2.1 Geology and Topography

The island of O‘ahu is a volcanic doublet formed by the Wai‘anae Range to the west and the younger Ko‘olau Range to the east. Both are remnants of shield volcanoes, but the term “range” indicates that they have lost most of their original shield outlines and are now long, narrow ridges shaped largely by erosion.

O‘ahu’s southern central coast, geographically referred to as the Honolulu plain, is underlain by a broad, elevated coral reef which has been partly covered by alluvium carried down from the mountains. Later post-erosional eruptions sent lava down the valleys and involved formation of volcanic cones such as Diamond Head and Tantalus.

The project site is located within the relatively flat coastal plain. Elevations range from approximately 75 feet above sea level near the northern boundary of the site at the Kalihi Street/H-1 Freeway intersection to approximately 25 feet above sea level along the Houghtailing Street boundary. Average slope is approximately 3 percent.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on geology or topography are anticipated during construction or operation of the proposed project. Farrington High School is a fully developed site within the urban core of Honolulu. A number of the

existing buildings will be renovated and rehabilitated while new building construction is also involved. Utility work as well as foundation work are also involved. Construction of the proposed project, however, will not involve any major land disturbing activities involving mass grading or significant revisions to site contours. Applicable best management practices and erosion control measures will be implemented to ensure no adverse impact to the existing geology and topography.

3.2.2 Soils

According to the U.S. Department of Agriculture, Natural Resource Conservation Service, soils within the project site are classified Honouliuli clay, 0 to 2 percent slopes (HxA), ‘Ewa silty clay loam, 6 to 12 percent slopes (EaC), and Kawaihapai stony clay loam, 2 to 6 percent slopes (KlaB). See Figure 3-1.

Honouliuli clay, 0 to 2 percent slopes (HxA) occurs in the lowlands along the coastal plains. In a representative profile, the soil is reddish-brown, very sticky and very plastic clay throughout. The surface layer is generally about 15 inches thick. The soil is neutral to mildly alkaline. Permeability is moderately slow. Runoff is slow, and the erosion hazard is no more than slight. Workability is slightly difficult because of the very sticky and very plastic clay. The shrink-swell potential is high.

‘Ewa silty clay loam, 6 to 12 percent slopes (EaC) is from a series of well-drained soils in basins and on alluvial fans. On this soil, runoff is slow to medium and the erosion hazard is slight to moderate.

Kawaihapai stony clay loam, 2 to 6 percent slopes (KlaB) consists of well-drained soils in drainageways and on alluvial fans on the coastal plains. These soils formed in alluvium derived from basic igneous rock in humid uplands. Runoff is slow and the erosion hazard is slight.

Impacts and Mitigation Measures

In the short- and long- term, no significant impacts on soils are anticipated during the construction or operation of the proposed project. Farrington High School is a fully developed site within the urban core of Honolulu. The project would involve some fine grading for new construction activities. Utility work as well as foundation work are also involved. Construction of the proposed project, however, will not involve any major land disturbing activities involving mass grading or significant revisions to site contours. Applicable best management practices and erosion control measures will be implemented. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant

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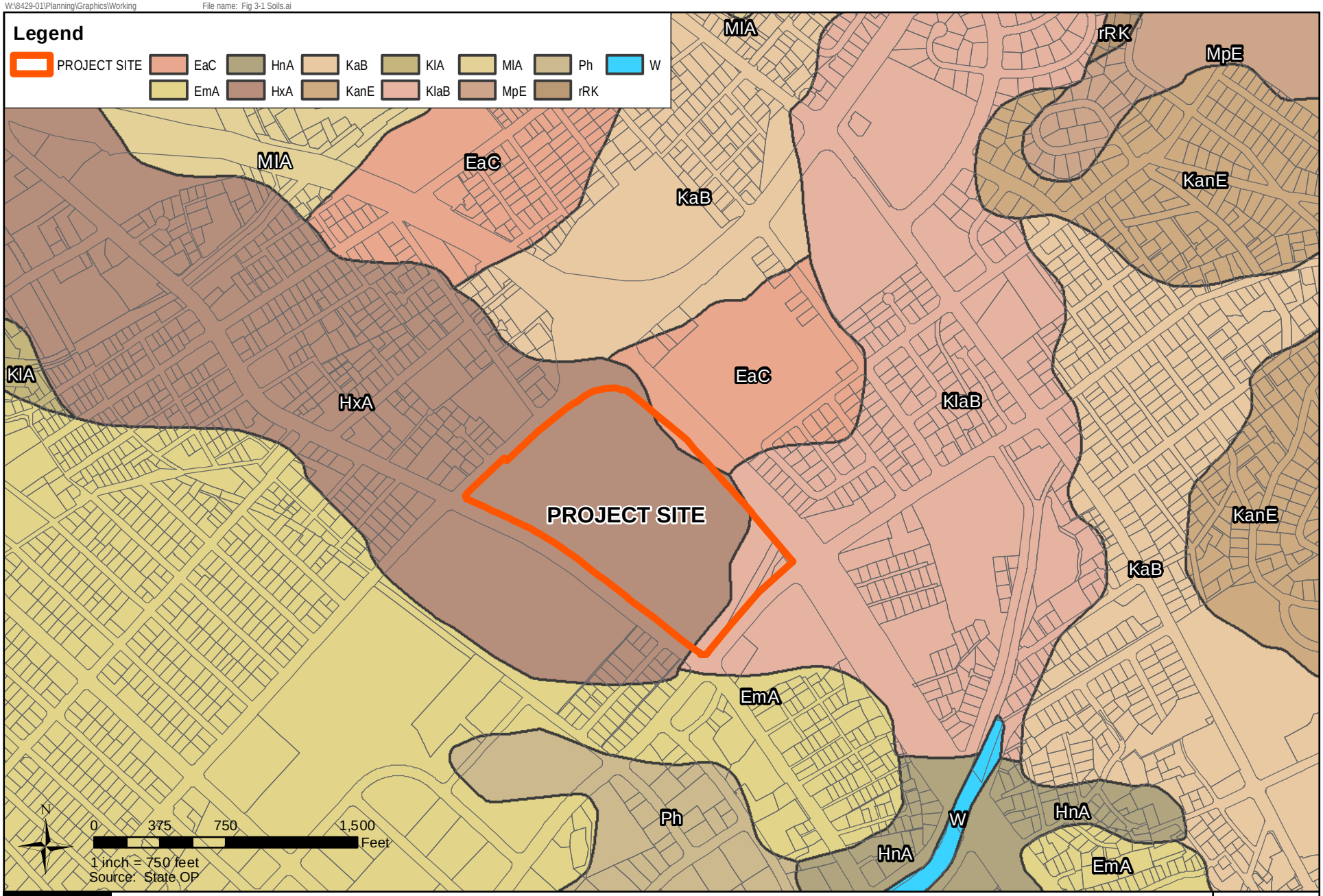

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

SOIL SURVEY MAP

FIGURE 3-1

impacts with regard to soils and erosion. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

3.3 Hydrology

3.3.1 Surface and Coastal Waters

There are no surface water resources located within the project site. The nearest surface waters are Kalihi Stream and Kapālama Drainage Canal. Kalihi Stream is located approximately 1,800 feet to the northwest of the subject property and eventually empties into Keehi Lagoon near the seaplane runway. Kapālama Drainage Canal is located approximately 1,500 feet to the southeast of the subject property and empties into the Kapālama Basin.

According to the National Wetlands Inventory, Kalihi Stream is identified as a Riverine Upper Perennial Unconsolidated Bottom Permanently Flooded (R3UBH) wetland and Palustrine Emergent Persistent Seasonally Flooded wetland (PEM1C).

Portions of Kapālama Canal closest to the project site are classified as Estuarine Subtidal Unconsolidated Bottom Subtidal wetland (E1UBL).

Kalihi Stream eventually empties into Keehi Lagoon near the seaplane runway. These waters are classified as Estuarine Subtidal Unconsolidated Bottom Subtidal wetland (E1UBL). Kapālama Drainage Canal empties into Kapalama Basin which is classified as Marine Subtidal Unconsolidated Bottom Subtidal Excavated (M1UBLx).

According to the Hawai'i Stream Assessment, both streams are perennial streams which flow to the sea year-round. The nearest coastal water offshore of the project site is Keehi Lagoon and Kapālama Basin which are part of Honolulu Harbor. Both outlets are approximately a mile from the project site. Pursuant to Hawai'i Administrative Rules (HAR) Title 11, Chapter 54, Water Quality Standards, the coastal waters in the vicinity of the project site are classified as Class A marine waters. Class A marine waters are recognized as waters to be used for "recreational purposes and aesthetic enjoyment to be protected. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class".

Impacts and Mitigation Measures

No short- or long-term significant impacts on surface and/or coastal waters in the project vicinity are anticipated during construction or operation of the proposed project. There are no streams or wetlands on or within close proximity to the project site. Construction of the proposed project will not involve major land disturbing activities. The project involves redevelopment and renovation of existing buildings

and hardscape. Applicable erosion control measures and best management practices will be implemented in order to mitigate any possible adverse effects relating to runoff. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to surface and coastal waters. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

3.3.2 Groundwater

The State Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM) has established a groundwater hydrologic unit and coding system for groundwater resource management. The proposed project site is located within the Honolulu Sector Area which is comprised of six Aquifer System Areas identified as Wai'alae – East, Wai'alae – West, Pālolo, Nu'uanu, Kalihi and Moanalua. The project site is located within the Kalihi Aquifer System (30103) area which has an estimated yield of 9 million gallons per day (mgd).

Impacts and Mitigation Measures

No short- or long-term significant impacts on groundwater in the project vicinity are anticipated during construction or operation of the proposed project. The project has been connected to the Board of Water Supply system for many decades. The project involves redevelopment and renovation of existing buildings and hardscape. Applicable erosion control measures and best management practices will be implemented in order to mitigate any possible adverse effects relating to runoff. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to groundwater. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

3.4 Natural Hazards

3.4.1 Flood and Tsunami Hazard

According to the Flood Insurance Rate Map (FIRM), (Community Panel Number 0353G) prepared by the Federal Emergency Management Agency (FEMA), the project site is designated Zone X, an area determined to be outside of the 0.2% annual chance floodplain. There are no base flood elevations or depths shown within this zone. See Figure 3-2.

According to the Tsunami Evacuation Zone maps for O'ahu, the project site is not within the tsunami evacuation zone.

Impacts and Mitigation Measures

FHS is an already fully developed urban site. In the short- and long-term, no significant impacts on flood hazards in the project area are anticipated as the proposed improvements are not anticipated to increase flood risks or cause any adverse flood-related impacts at the project site or lower elevation properties. For development done in the various phases, all drainage improvements, excavation and grading will be coordinated with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts regarding flood and tsunami hazards.

3.5 Natural Environment

3.5.1 Flora and Fauna

The project site is located in a highly altered urban environment. Lawn areas of the project site are a mixture of grass and weedy species. Other larger plant species on the project site include Monkeypod (*Samanea saman*), Koa haole (*Leucaena leucocephala*), Kiawe (*Prosopis pallida*), Kukui (*Aleurites moluccana*), Hibiscus (*Hibiscus brackenridgei*), Plumeria (*Plumeria rubra*), Hong Kong Orchid (*Bauhinia x blakeana*), Alexandra palm (*Archontophoenix alexandrae*), Manila palm (*Veitchia merrillii*), Pink Tecoma (*Tabebuia heterophylla*), and Brassia (*Schefflera actinophylla*).

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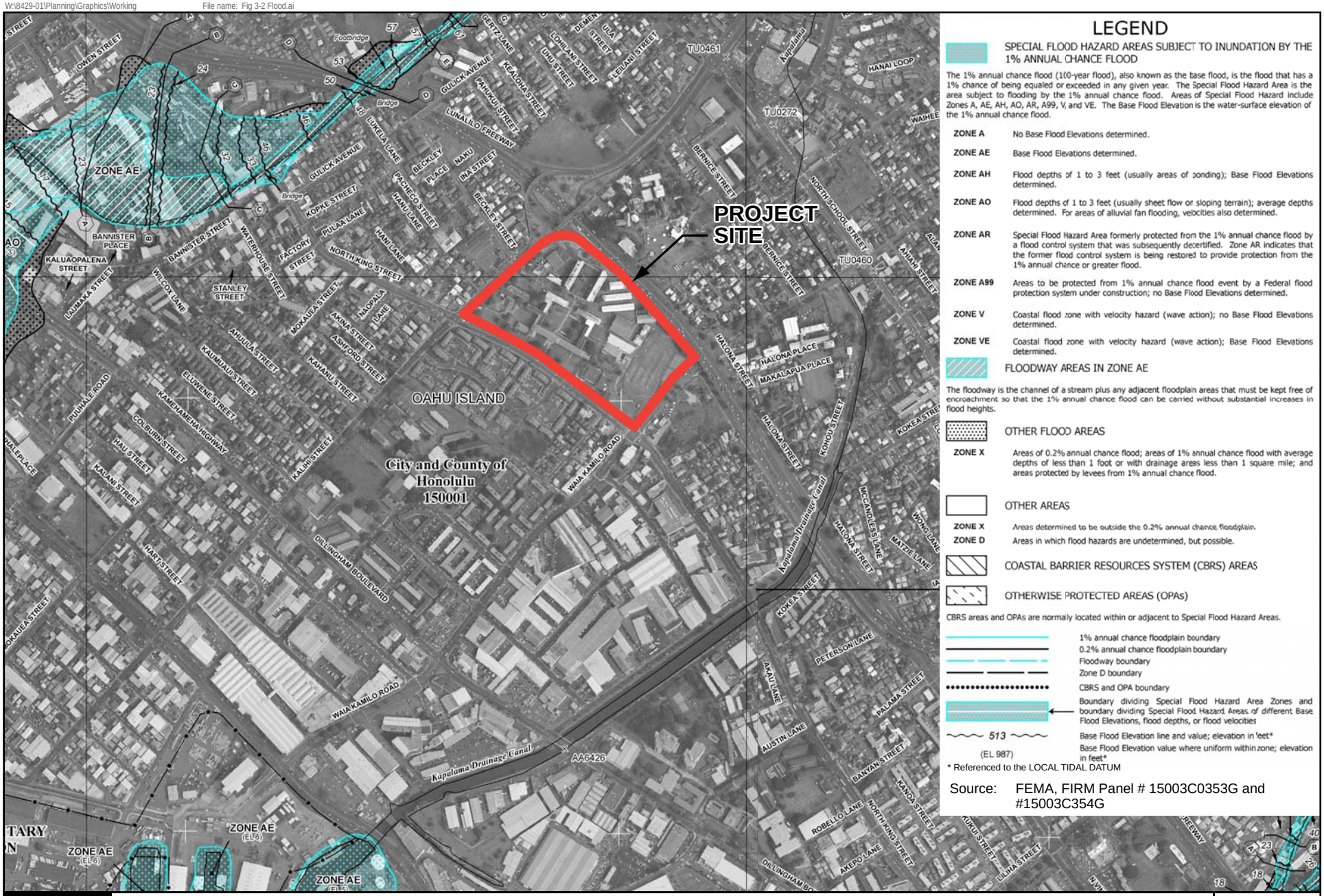

LEGEND

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

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 (EL 987) — Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the LOCAL TIDAL DATUM

Source: FEMA, FIRM Panel # 15003C0353G and #15003C354G

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

FLOOD INSURANCE RATE MAP

FIGURE 3-2

Avifauna and fauna present at the project site have adapted to the urban environment. Feral cats, dogs, and rodents are common to urban environments and are likely present at the project site.

No threatened or endangered flora or fauna species exist at the project site.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on flora and fauna are anticipated as a result of the construction and operation of the proposed project.

A major portion of the work for the project will involve renovation of existing buildings. Demolition of existing buildings and new construction would involve displacement of existing flora within an urban environment. However, with renovation and new construction, new landscaping will be installed.

It is noted that seabird species such as young Wedge-tailed Shearwater (*Puffinus pacificus*) may occasionally overfly the site during breeding season. The fledglings may become disoriented by exterior lighting on the ground. The project improvements will have security downlighting. Full cutoff dark night fixtures will be used to the extent possible. The new track and field is proposed with night lighting. The existing field contains night lighting on one side of the track and field (although currently inoperable). The new track and field would contain lighting on both sides which would allow a more downward throw of night lighting to minimize possible impact on seabird species. The proposed project is located in the midst of a fully developed dense urban area and should not result in any additional potential impact regarding seabird species. There will also be no light spillage beyond school grounds.

3.6 Historic and Archaeological Resources

An Archaeological Literature Review and Field Inspection (LR&FI) with Cultural Section was conducted for the proposed project by Cultural Surveys Hawai‘i, Inc. See Appendix A. The following discussion summarizes the findings of the study.

The study notes the project site is part of the Kapālama Ahupua‘a. The lands of Kapālama are mentioned in historical accounts of battles and conquests. Background research has indicated Kapālama was a focus for habitation and agriculture in the pre-Contact and post-Contact periods, although it was not as densely inhabited as Nu‘uanu Valley to the east and Kalihi Valley to the west. During and after the Māhele, the importance of Kapālama is evident in the fact that Kamehameha kept these lands for himself and then passed them on to his family through his grandchildren Moses Kekūāiwa, Victoria Kamāmalu, and Lot Kamehameha, and eventually to Bernice Pauahi Bishop where they became part of her estate. Roughly 100 *kuleana* lots were awarded to Hawaiian commoners in Kapālama. These *kuleana* lands were located on the flood plains to the east of Waiakamilo/Houghtailing Street and included house and *lo‘i* for the cultivation of *kalo*. Land Commission Award (LCA) documents from 1885 indicate the areas east and west of the project site were intensively utilized for both permanent habitation and agriculture.

The study notes that former taro land makai of School Street, which in part had been converted to rice fields between the 1870's and 1910, were becoming housing and industrial subdivisions in the early twentieth century. This land use change was facilitated by the construction of Kapālama Canal. The canal channelized Kapālama and Hiuhelewai Streams and allowed for sub-street storm drain runoff collection. During the last half of the twentieth century, the Kapālama area continued to undergo changes associated with the urban expansion of Honolulu. Increased housing, industrial and commercial activities continue to the present.

It is possible that, in this time period, the level plain of Kapālama and Kalihi around King Street was used to inter victims of the 1853 smallpox epidemic. However, if this is the case, the study notes the location of the cemetery is unknown.

The field inspection of the project noted three above-ground feature types of special interest, stone gateposts at the front entrance of the high school and stone walls throughout the campus, a brick alignment, probably over a buried foundation, near the east wing of the main school building, and a number of loose, rectangular blocks used as curbstones in the central section of the school lot. The gateposts and rock walls may have been constructed when the lot was used for the Kamehameha Boys' School, but since they are now part of the Farrington High School campus, the study notes that they should be considered part of State Inventory of Historic Properties (SIHP) #-9768, the Farrington High School structures and grounds. The bricks are also part of SIHP # -9768, but the buried foundation stones were once part of the Bernice Pauahi Bishop Memorial Chapel, designated SIHP # -7555. The loose basalt "Kamehameha Blue Stone" blocks may be remnants of the chapel (SIHP #-7555) or remnants of another Kamehameha Boys' School structure (SIHP # -1353) demolished to provide room for the construction of Farrington High School.

Fung Associates Inc. conducted a "Summary of Historic Issues" for Farrington High School. The school is located on the Hawai'i Register of Historic Places. See Appendix B. Building "A", designed by prominent Territorial architect C.W. Dickey and constructed in 1939, along North King Street is the only building noted on the registration form. It is the only building on campus built in the Moderne style. It is a predominantly two-story structure of beige painted concrete walls adorned by floriated and geometric reliefs. The metal grillwork on the front of the building reflects the same geometric pattern as the relief above it. The report recommends that the front lawn space and the view (between North King Street and the main façade) should be maintained.

Similar to the findings of the foregoing LR&FI, the Fung Associates study notes that there are three stone pillars along North King Street near Governor's Gate which are recommended to remain since they pre-date the development of FHS. Since the property was formerly owned by Kamehameha Schools, the report also recommends the recognition of a chapel that once occupied the site near Building "A" and incorporate stones from the chapel as part of the Master Plan.

Other buildings on the campus over 50 years old may be eligible for historic listing but are not considered high preservation value.

- The Joseph Rider Farrington Auditorium, built in 1953, is adjacent to Building "A" along North King Street. Repair and renovation of the auditorium's roof is proceeding.
- Wings 4 and 8 of Building "A" were added in 1957-8 by Architect Ernest Hara & Associates to the mauka side of the building.
- The Swimming Pool facility, built in 1954 as a Memorial to World War II Farrington Alumni veterans. The pool is currently not in use and in disrepair due to maintenance costs and other operational issues.
- The ROTC Facility was built in 1961 and is near the H-1 Freeway. Although this is not an architecturally significant building, the facility has provided training for many students who have graduated and since furthered their military careers.
- Other buildings more than 50 years old include: Buildings "G", "H", "I", "J", "K", "L", "M", "O", "Q" and the caretaker's cottage

Impacts and Mitigation Measures

Based on historic sites within the study area and the potential for subsurface burials in the vicinity, the known foundations of the Bishop Memorial Chapel, and the possibility of other Kamehameha Boys' School structure foundations, the LR&FI recommends an archaeological monitoring program as appropriate mitigation for any subsurface activity associated with the renovation work at Farrington High School. Archaeological monitoring will facilitate the identification and treatment of any burials that might be discovered during project construction, and will mitigate the project's effect on non-burial archaeological deposits. Under Hawai'i State historic preservation legislation, "Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, ongoing activities which may adversely affect historic properties" (HAR Section 13-279-3).

With regard to archaeological issues which arose as a result of the FHS electrical upgrade project (which is not part of this EA), the State Historic Preservation Division (SHPD) determined that Building "A"(SIHP #50-80-14-9768) was listed on the State Register of Historic Places on June 28, 1993, and that potential exists to encounter subsurface historic properties within the FHS campus (January 22, 2011; Log No. 2010.3949, Doc. No. 1101RS03). Based on this determination, SHPD requested an archaeological monitoring plan be submitted for review and approval prior to upgrading of the electrical system and other work related to the electrical upgrade project. The archaeological monitoring plan (Stine et al. 2011) was reviewed and accepted by SHPD on December 30, 2011 (Log No. 2011.3310, Doc. No. 1112NN17). Subsequently, in 2014, SHPD requested that the existing archaeological monitoring plan (Stine et al. 2011) be amended to apply to all ground disturbing activities specified in Phase 1 (January 10, 2014; Log No. 2014.00046; Doc. No. 1401AB10). This pertains to improvements to the FHS track and field and tennis courts and is part of the subject EA.

Building "A" is proposed to be retained with the exception of a portion of Wings 4 and 8 which are not part of the original building. The intent is to retain and celebrate character defining features of the building such as the massing and the distinctive bas

relief sculptures on the exterior faces of the building. Much of the interior floor plan configurations remain but it is not of great historic value. Thus, interiors are proposed to be reconfigured to meet the goals implementing the concept of smaller learning communities. Renovations and modifications to Building "A" will be done in conjunction with a historic architect and the State Historic Preservation Division.

The Auditorium is proposed to be renovated. The repair and renovation of the roof also provides the opportunity to incorporate historic elements within its interior. Portions of Wings 4 and 8 of Building "A" are proposed to be demolished. These wings were added to Building "A" in 1957-1958. The demolition would open up the connection of the Existing Quad area in Building "A" with a planned new Student Quad. In addition to providing a significant open space and pedestrian amenity, this provides the main cluster of academic instruction near the center of campus.

The swimming pool is proposed to be replaced with a new pool adjacent to the new cafeteria. The existing dedication plaque is proposed to be re-installed at the new pool facility.

The existing ROTC facility is proposed to be demolished but a replacement facility is being planned below the new cafeteria/student center and at the field level. It would be located adjacent to the existing facility.

Other buildings which may be eligible (Buildings "G", "H", "I", "J", "K", "L", "M", "O", "Q" and the caretaker's cottage) are planned to be systematically demolished as new spaces are constructed or renovated. Prior to demolition, possible documentation requirements will be coordinated with SHPD.

The intent is to work closely with SHPD throughout the nine phase 15 year project. FHS is a fully developed site within an existing urban neighborhood and the school needs to be fully operable during the period of construction. Thus, nine phases of construction are proposed in order to minimize disruption to existing school instruction and activities. At the same time, the intent would be to accelerate design and construction in order to complete implementation of the master plan so that all of the upgrades to the campus can be completed in a relatively timely manner.

In order to initiate Phase 1 in a timely manner, an intensive level architectural inventory survey of the campus which would involve Phases 2 through 9 of the project will be done by the Historic Architect prior to initiation of Phase 2. It is noted that there are no buildings which are affected during the Phase 1 grading and construction work.

The existing archaeological monitoring plan (Stine et al. 2011) will be revised to include all ground-disturbing activities specified in Phase I (January 10, 2014; Log No. 2014.00046; Doc. No. 1401AB10). We concur that archaeological monitoring should occur during all ground-disturbing activities associated with construction during Phases 2 through 9. Prior to initiation of Phase 2, coordination will be undertaken with SHPD in further revising the monitoring plan to include Phases 2 through 9.

3.7 Air Quality

The State of Hawai‘i Department of Health (DOH), Clean Air Branch, monitors the ambient air quality in the State for various gaseous and particulate air pollutants. The U.S. Environmental Protection Agency (EPA) has set national ambient air quality standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), ozone (O_3), and particulate matter (PM_{10} and PM_2). Hawai‘i has also established a state ambient air standard for hydrogen sulfide (H_2S). The primary purpose of the statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that these air quality standards are met.

Air pollution in Hawai‘i is caused by many different man-made and natural sources. There are industrial sources of pollution, such as power plants and petroleum refineries; mobile sources, such as cars, trucks and buses; agricultural sources, such as sugar cane burning, and natural sources, such as windblown dust and volcanic activity. The DOH Clean Air Branch is responsible for regulating and monitoring pollution sources to ensure that the levels of criteria pollutants remain well below the State and federal ambient air quality standards.

The State maintains five air quality monitoring stations on the island of O‘ahu. There are two stations in fairly close proximity to the project site. The Sand Island Station monitors O3, PM2.5, Wind Direction and Wind Speed. Air quality at this site is considered “Moderate” with an index value of 60. Index values between 51 and 100 indicate that air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people.

The Honolulu site is located on the roof of the Department of Health building (Kinau Hale) on Punchbowl Street in Downtown Honolulu. This site monitors CO, SO2, PM2.5, and PM10. Air quality at this site is considered “Good” with an index value of 20. Index values between 0 and 50 indicate that air quality is considered satisfactory, and air pollution poses little or no risk.

Due to generally prevailing tradewinds, air quality at the project site is generally good. There are industrial sources of air pollution in the Sand Island area. Thus, air quality is considered “Moderate”. In urban Downtown Honolulu, air quality is considered “Good”.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on air quality are anticipated as a result of the construction and operation of the proposed project. A portion of the construction of the proposed project will involve interior renovations within existing buildings. There are land disturbing activities such as demolition and foundation work for new buildings, clearing and grubbing for landscaping purposes, and possible utility repairs and upgrades. Fugitive dust will be controlled by methods such as dust fences, water spraying and sprinkling of loose or exposed soil or ground surface areas. As deemed appropriate, planting of landscaping will be done as soon as possible on completed areas to also help control dust. Respective contractors will be responsible to minimize air quality impacts during the various phases of construction.

Exhaust emissions from construction vehicles are anticipated to have negligible impact on air quality in the project vicinity as the emissions would be relatively small and readily dissipated. In the long-term, some vehicular emissions is expected, however, due to the generally prevailing tradewinds, the emissions would be readily dissipated.

3.8 Noise

The existing noise environment at the project site is characteristic of an urban setting. Ambient noise in the project area is predominantly attributed to vehicular traffic traveling along the H-1 Freeway, Kalihi Street, North King Street, and Houghtailing Street. Also contributing to the acoustic environment is noise from wind and birds.

Impacts and Mitigation Measures

In the short-term, the potential for adverse noise impacts from short term construction activities exist, particularly during school classroom hours when construction activities occur. However, a portion of the construction will involve interior alterations which should minimize noise impacts. Construction noise levels are typically highest during earthwork (75 to 85 dBA at 100 feet). The use of sound attenuating barriers between the construction sites and classroom buildings will be used during classroom hours, as appropriate.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control" regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. Possible mitigation measures may include the use of properly muffled construction equipment, the use of equipment staging and material storage areas away from classroom buildings and noise sensitive neighbors, scheduling very noisy activities to after school hours, and the use of broadband back up alarms by construction equipment which are less audible that the high frequency beeper type alarms. It shall be the contractor's responsibility to minimize noise impacts during the various phases of construction and to maintain noise levels within regulatory limits.

In the long-term, much of the space allocated for parking is along the periphery of the site. The library, classroom buildings, associated student quad spaces and pedestrian spaces are located closer to the interior of the site. This provides an additional buffer from the busy thoroughfares which form the boundaries of the site. The intent of the design is also to create a more welcoming and friendly interior open space experience for students and faculty.

Activities at the track and field facility represent potential concentrations of high level noise emitters in the form of crowd noise during sporting events which will occur at these facilities. Typical sound levels in spectator areas are intermittent rather than continuous. Crowd level noise during indoor events such as at the gym or auditorium can be attenuated by the facility enclosures. However, while crowd noise levels during outdoor sporting events are not attenuated, current traffic noise from adjacent major thoroughfares aids in minimizing impacts on nearby properties. Noise levels

from the track and field facility would be occasional and intermittent during event usage as opposed to fairly constant levels of traffic noise along the H-1 Freeway, Houghtailing Street and North King Street.

3.9 Hazardous Materials

Implementation of the nine phase Master Plan requires renovation, rehabilitation, repair and demolition of various buildings and facilities. Prior to construction on each phase, consultation shall be undertaken with appropriate agencies to determine possible applicable testing protocols for asbestos, lead paint analysis, and other applicable materials.

Impacts and Mitigation Measures

The Department of Health Environmental Health Program regulates asbestos and lead paint. State asbestos rules are noted in Title 11, Chapters 501, 502, 503, and 504, HAR. Lead based paints are regulated in Title 11, Chapter 41, HAR. Buildings should also be inventoried for PCB containing light ballasts and mercury containing lamps. PCB containing light ballasts and mercury containing lamps are normally handled per Universal Waste regulations. Any hazardous materials will be handled in accordance with all applicable Federal, State and local regulations.

3.10 Traffic

A Traffic Impact Assessment Report (TIAR) was prepared by Wilson Okamoto Corporation to analyze the potential traffic-related effects of the proposed project. The findings of this TIAR are summarized below and included herein as Appendix C.

Area Roadway System

Farrington High School is located adjacent to King Street between Kalihi Street and Houghtailing Street. Near the northwest corner of the campus, Kalihi Street intersects Beckley Street. In the vicinity of the project site, Kalihi Street is a predominantly four-lane, two-way roadway generally oriented in the north-south direction while Beckley Street is a two-lane, two-way roadway generally oriented in the east-west direction. At this signalized intersection, the northbound approach of Kalihi Street has an exclusive left-turn lane and two through lanes while the southbound lane has two lanes that serve through and right-turn traffic movements. The Beckley Street approach of the intersection has one lane that serves left-turn and right-turn traffic movements.

South of the Beckley Street intersection, Kalihi Street intersects a driveway for Farrington High School (FHS). At this unsignalized T-intersection, both directions of Kalihi Street have three lanes that serve all allowable movements. The FHS driveway approach of the intersection has one stop-controlled lane that serves left-turn and right-turn traffic movements.

Further south, Kalihi Street intersects King Street. At this signalized intersection, both approaches of Kalihi Street have exclusive left-turn lanes, a through lane, and shared through and right-turn lanes. In the vicinity of the project, King Street is a predominantly four-lane, two-way roadway oriented generally in the east-west direction. At the intersection with Kalihi Street, the westbound approach of King Street has exclusive turning lanes and two

through lanes while the eastbound approach has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane.

East of the intersection with Kalihi Street, King Street intersects two driveways for FHS and Haka Drive. At these intersections, the westbound approach of King Street has three lanes that serve all allowable movements while the eastbound approach has two lanes that serve all allowable movements. At the unsignalized intersections with the FHS driveways, the driveway approaches have one stop-controlled lane that serves left-turn and right-turn traffic movements. At the signalized intersection with Haka Drive, the Haka Drive approach has exclusive turning lanes.

Further east, King Street intersects Houghtailing Street and Waiakamilo Road. At this signalized intersection, both approaches of King Street have exclusive left-turn lanes, one through lane, and shared through and right-turn lanes. Waiakamilo Road is a predominantly four-lane, two-way roadway generally oriented in the north-south direction that transitions to Houghtailing Street north of King Street. At the intersection with King Street the northbound approach of Waiakamilo Road has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane while the southbound approach of Houghtailing Street has exclusive turning lanes and two through lanes.

Existing, and Projected Year 2020 (Without Project) Traffic Conditions

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Synchro" software, developed by Trafficware. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

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

Field investigations were conducted on October 15, 2013 as well as November 19, 2013 and consisted of manual turning movement count surveys during the morning peak hours between 6:00 AM and 9:00 AM, and the afternoon peak hours between 3:00 PM and 6:00 PM at the following intersections:

- Kalihi Street and Beckley Street (AM, LOS "B"; PM, LOS "C")
- Kalihi Street and Farrington High School Driveway (AM, LOS "A"; PM, LOS "A")
- Kalihi Street and King Street (AM, LOS "D"; PM, LOS "E")
- King Street and Farrington High School Driveways (AM, LOS "B"; PM, LOS "B")
- King Street and Haka Drive (AM, LOS "C"; PM, LOS "C")
- King Street, Houghtailing Street, and Waiakamilo Road (AM, LOS "D"; PM, LOS "C")

Existing LOS conditions are listed above, and calculations are included in Appendix C. Existing and Projected Year 2020 LOS Traffic Operating Conditions are included below as Table 3-1.

Table 3-1: Existing and Projected Year 2020 (Without Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Exist	Year 2020 w/out Proj	Exist	Year 2020 w/out Proj
Kalihi St/ Beckley St	Eastbound	B	B	C	C
	Northbound	B	B	B	B
	Southbound	B	B	B	B
Kalihi St/ FHS Dwy	Westbound	B	B	B	B
	Southbound	A	A	A	A
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	B	C	B	B

Table 3-1: Existing and Projected Year 2020 (Without Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Exist	Year 2020 w/out Proj	Exist	Year 2020 w/out Proj
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	D	E	D	D
	Southbound	D	D	D	D

Under Year 2020 without project conditions, traffic operations are expected to remain similar to existing conditions. Along Kalihi Street, traffic operations at the intersections with Beckley Street and the FHS driveway are expected to continue operating at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period. At the intersection with King Street, traffic operations are expected to continue operating at LOS "E" or better during both peak periods. Along King Street, traffic operations at the intersections with the FHS driveways and Haka Drive are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period. However, traffic operations during the AM peak period are expected to deteriorate from LOS "B" to LOS "C" at the intersection of King Street and the western FHS driveway southbound approach. At the intersection with Houghtailing Street and Waiakamilo Road, traffic operations are expected to operate at LOS "D" or better during the AM peak period except for the northbound approach which is expected to deteriorate from LOS "D" to LOS "E". For the PM Peak period, traffic operations are expected to operate at LOS "D" or better.

Impacts and Mitigation Measures

Projected Traffic Conditions Year 2020 (With Project):

Projected Year 2020 LOS Traffic Operating Conditions (with and without project) are described below in Table 3-2.

Table 3-2: Projected Year 2020 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2020 w/out Proj	Year 2020 w/ Proj	Year 2020 w/out Proj	Year 2020 w/ Proj
Kalihi St/ Beckley St/ FHS Dwy*	Eastbound	B	C	C	C
	Westbound	-	B	-	B
	Northbound	B	C	B	C
	Southbound	B	B	B	B
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	C	B	B	B
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D

Table 3-2: Projected Year 2020 (Without and With Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Year 2020 w/out Proj	Year 2020 w/ Proj	Year 2020 w/out Proj	Year 2020 w/ Proj
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	E	E	D	D
	Southbound	D	D	D	D

Under Year 2020 with project conditions, traffic operations in the project vicinity are generally expected to remain similar to without project conditions despite the anticipated increases in traffic along the surrounding roadways. At the intersection of Kalihi Street with Beckley Street and the FHS driveway, traffic operations at the intersection with Beckley Street and the FHS driveway are expected to operate at LOS "C" or better during both peak periods. Along King Street, traffic operations at the intersection with Kalihi Street are expected to continue operating at LOS "E" or better during both peak periods while those at the intersection with Haka Drive are expected to continue operating at LOS "C" or better during both peak periods. Similarly, traffic operations at the intersection with the eastern driveway for FHS are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period, while those at the intersection with Houghtailing Street and Waiakamilo Road are expected to continue operating at LOS "E" or better during the AM peak period and LOS "D" or better during the PM peak period. At the intersection of King Street with the western driveway, traffic operations are expected to improve slightly to LOS "B" or better during both peak periods due to the planned modifications to the parking areas adjacent to that driveway.

Projected Traffic Conditions Year 2028 (With Project):

The Year 2028 cumulative peak hour traffic conditions with the proposed Farrington High School Campus are summarized in Table 3-3. The cumulative volumes consist of site-generated traffic superimposed over Year 2028 projected traffic demands. The projected Year 2020 (with project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix C.

Table 3-3: Projected Year 2020 and Year 2028 With Project LOS
Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2020 w/ Proj	Year 2028 w/ Proj	Year 2020 w/ Proj	Year 2028 w/ Proj
Kalihi St/ Beckley St/ FHS Dwy*	Eastbound	C	C	C	C
	Westbound	B	B	B	B
	Northbound	C	C	C	C
	Southbound	B	B	B	B
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	B	B	B	B
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	E	E	D	D
	Southbound	D	D	D	D

Under Year 2028 with project conditions, traffic operations in the project vicinity are expected to remain similar to Year 2020 with project conditions despite the anticipated increase in enrollment at the Farrington High School Campus. Along

Kalihi Street, traffic operations at the intersections with Beckley Street and the FHS driveway are expected to continue operating at LOS "C" or better during both peak periods while those at the intersection with King Street are expected to continue operating at LOS "E" or better during both peak periods. Along King Street, traffic operations at the intersections with the western FHS driveway is expected to continue operating at LOS "B" or better during both peak periods while those at the intersection with Haka Drive are expected to continue operating at LOS "C" or better during both peak periods. Similarly, traffic operations at the intersection with the eastern FHS driveway are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period while those at the intersection with Houghtailing Street and Waiakamilo Road are expected to continue operating at LOS "E" or better during the AM peak period and LOS "D" or better during the PM peak period.

Recommendations:
Based on the findings of the subject TIAR, the following recommendations are suggested to be incorporated in project designs:

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

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

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

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

5. Prepare a Traffic Management Plan (TMP) for the high school to minimize the impact of school related vehicles on the surrounding roadways. This plan should address daily school and special event traffic.

6. Due to the long implementation schedule for the proposed Master Plan improvements, consider preparing Traffic Assessment Reports periodically (approximately every 5 years) to verify projected traffic conditions in the vicinity.

7. At the intersection of Kalihi Street with Beckley Street, provide the following to accommodate the proposed realignment of the Farrington High School driveway:

    - Modify the northbound approach of the intersection to provide an exclusive left turn lane, one through lane, and a shared through and right-turn lane.

- Modify the southbound approach to provide an exclusive left-turn lane, one through lane, and a shared through and right-turn lane.
- Modify the traffic signal system, timing, and phasing to accommodate the anticipated intersection modifications.
- Potential freeway encroachment issues should be coordinated with the State Department of Transportation.

Conclusion:
Farrington High School currently serves approximately 2400 students in grades 9-12. The proposed Master Plan entails the redevelopment of many of the existing high school facilities and modifications to the school's parking areas and accesses. These improvements are intended to serve the existing student body as well as the expected increase in enrollment at the high school that is anticipated to occur either with, or without the implementation of the proposed improvements. Although Farrington High School's enrollment is expected to increase, students are expected to continue to utilize public transportation, the provided bus service, or alternate modes of transportation (i.e., biking, walking, etc.) to travel to and from school. With the implementation of the aforementioned recommendations, traffic operations in the vicinity of the high school are expected to remain similar to conditions without the proposed project. As such, the implementation of the Master Plan is not expected to have a significant impact on the surrounding roadways. However, the high school is located in a densely developed area with a high volume of pedestrian and vehicular traffic. As such, a traffic management plan for the school is recommended to minimize the effect of school related vehicles on the surrounding roadways.

3.11 Visual Resources

The project site is located in an urban residential and industrial-commercial mixed use area. The existing views from the site consist of the surrounding urbanized area and roadways. On the northeast or mauka side of the project site are the H-1 Freeway. Mauka of the freeway are the Bernice Pauahi Bishop Museum and residential areas of Upper Kalihi and Kapālama. Across Houghtailing Street to the southeast is an automobile dealership. Along the southwest or makai of the project site across North King Street is the Kamehameha Homes residential development. It is noted, though, that North King Street forms a corridor of mostly low rise commercial businesses along its frontage. Makai of Kamehameha Homes are the Kalakaua Intermediate School and Kalihi Kai Elementary School which abut additional residential areas. Further makai is the light industrial and heavy industrial areas of Kalihi. To the northwest of the project site is the residential area around Beckley Street.

Views of the project site from North King Street consist of the front lawn, Monkeypod trees, the historic two story and three story Building "A", the auditorium, athletic field, and parking. From Kalihi Street, portions of the library, the 2 story Building "U", parking, the Aloha Gate entrance, the cafeteria and scattered landscaping can be seen. Along the H-1 Freeway, portions of the 3 story Building "I" and Building "J" are visible as well as the one story Buildings "K", "L", and "M" which comprise the Industrial Arts Buildings. Portions of the H-1 Freeway frontage are screened by Monkeypod and Rainbow shower trees. Along

Houghtailing Street, the athletic facility is visible although much of the view from the street is blocked by a retaining wall and fencing.

Impacts and Mitigation Measures

The overall campus Master Plan emphasizes smaller more personalized learning environments with significant open space and pedestrian amenities for the enhancement of student life within the central portion of the campus. Automobile parking is concentrated at the periphery of the campus. A number of existing buildings are being renovated while several new buildings involve an additional level of building height. Along North King Street, the auditorium and historically significant Building "A" are being renovated. Along Kalihi Street, the Gordon Field parking lot and the existing library building are being renovated. The existing library building is intended to be the new Administration building. Further mauka, there will be new and renovated parking areas. A new parking area extends along the Kalihi Street H-1 Freeway entrance. New buildings in this area are set back from the freeway. The new buildings in this area would be 4 story classroom buildings that contrast with the school's existing 3 story buildings. There is also a 3 story new library/media center. Also along the H-1 Freeway frontage are tennis courts, swimming pool, and a 1-1/2 story cafeteria and ROTC building. Along Houghtailing Street, the athletic facility is being redeveloped in generally the same location.

The proposed project does not involve significant visual impacts resulting from construction or operation. Much of the work involved with the project involves renovation or reconstruction of existing buildings and facilities along the Houghtailing Street, North King Street and Kalihi Street frontages. Slightly higher building heights are planned primarily along the H-1 Freeway frontage. However, due to parking being placed along the project boundary, new buildings are afforded an additional setback which helps to mitigate possible visual issues.

3.12 Socio-Economic Characteristics

The project site is located within the Kapālama Census Tract (CT 56). However, data from the Kamehameha Heights (CT 48), Palama (CT 55), Iwilei-ʻĀnuenue (CT 57), Waiakamilo Road (CT 58), Umi Street (CT 60), and Kalihi Waena (CT 61) are also presented since these communities are an integral part of the Kalihi-Palama District of Oʻahu. Demographic and other information was reviewed from the U.S. Census 2010 for the above listed CTs and the City and County of Honolulu and is shown on Table 3-4.

Table 3-4
Demographic Characteristics

	KAMEHAMEHA HEIGHTS CT 48	PALAMA CT 55	KAPĀLAMA CT 56	IWILEI-ʻĀNUENUE CT 57	WAIAKAMILO ROAD CT 58	UMI STREET CT 60	KALIHI WAENA CT 61	CITY & COUNTY OF HONOLULU
Population	6,225	2,139	6,083	2,059	3,573	5,627	4,061	953,207
INCOME								
Median Household	$85,567	$50,694	$46,008	$35,294	$32,051	$71,725	$90,517	$72,292

Income								(a)
Persons Below Poverty Level	11.5%	5.8%	12.4%	39.2%	28.8%	10.4%	2.5%	9.6%
RACE								
White	5.1%	2.5%	2.7%	14.1%	2.1%	1.4%	1.4%	22.4%
Black	0.4%	0.3%	0.4%	2.6%	0.4%	0.2%	0.3%	2.8%
American Indian	0.1%	0	0.1%	0.4%	0.2%	0	0	0.3%
Asian	59.8%	73.4%	78.4%	47.0%	65.0%	82.1%	81.3%	43.3%
Native Hawaiian	11.5%	13.0%	7.1%	18.5%	13.2%	8.0%	5.8%	9.6%
Two or More Races	22.7%	10.3%	10.8%	16.7%	18.3%	8.1%	10.8%	22.7%
SOCIO-ECONOMIC CHARACTERISTICS								
Population with High School Degree or Higher	81.9%	63.3%	73.3%	73.8%	64.4%	72.2%	76.1%	90.4%
Population with Bachelor's Degree or Higher	22.3%	13.7%	17.2%	13.9%	12.9%	8.4%	11.5%	31.5%
Foreign Born Population	30.1%	43.6%	49.2%	29.7%	57.6%	57.3%	54.1%	19.7%
Non-English Speaking Population	45.2%	56.1%	63.0%	39.2%	73.1%	68.8%	62.5%	28.1%
Owner-Occupied Housing Units	55.7%	32.0%	38.2%	17.6%	39.9%	31.7%	45.8%	56.4% (b)
Median Value of Owner-Occupied Units	$604,100	$395,200	$448,800	$412,700	$259,700	$387,600	$613,400	$557,810
Average Household Size	3.65	3.54	3.61	1.99	3.37	4.22	4.93	2.98 (c)

(a) - 2008-2012
(b) – Homeownership rate, 2008-2012
(c) - Persons per household

Source: U.S. Census Bureau, *American Fact Finder, Profile of General Population and Housing Characteristics: 2010*.
U.S. Census Bureau, *Honolulu County: Quick Facts from the U.S. Census Bureau*.

Based upon the data presented in the table, the communities in the Kalihi District exhibit a range of incomes. The Kamehameha Heights (CT 48) and Kalihi Waena (CT 61) areas show higher median household incomes of $85,567 and $90,517, respectively. The Umi Street (CT 60) area has a median household income of $71,725. The other areas exhibit lower median household incomes. Palama (CT 55) is at $50,694. Kapālama (CT 56) is at $46,008. Iwilei-ʻĀnuenue (CT 57) shows a median household income of $35,294. Waiakamilo Road (CT 58) is at $32,051. In comparison, median household income for the City and County of Honolulu as a whole is $72,292.

Within the City and County of Honolulu as a whole, 9.6% of the population is considered below poverty level. The percentages are higher in Kamehameha Heights (11.5%), Kapālama (12.4%), Iwilei-ʻĀnuenue (39.2%), Waiakamilo Road (28.8%), and Umi Street (10.4%). However, Palama (5.8%) and Kalihi-Waena (2.5%) exhibit lower percentages than the City and County of Honolulu as a whole.

By racial mix, all the noted census tracts in the Kalihi District have higher percentages of Asian populations than the City and County of Honolulu as a whole. Asian populations range from a low of 47.0% in the Iwilei-ʻĀnuenue CT 57 to a high of 82.0 % in the Umi Street CT 60. Native Hawaiian individuals range from a low of 5.8% in Kalihi Waena CT 61 to a high of

18.5% within Iwilei-ʻĀnuenue CT 57. Within the City and County of Honolulu as a whole, individuals identified as Hawaiian equal 9.6% of the population. Individuals of two or more races range from 8.1% within Umi Street CT 60 to 22.7% within Kamehameha Heights CT 48. The percentage of individuals identified as two or more races within the City as a whole is 22.7%. Except for the 14.1% white population in Iwilei-ʻĀnuenue CT 57, proportions of White, Black and American Indian individuals are quite low in all noted census tracts.

Regarding socio-economic characteristics, percentages of persons who have obtained a high school degree or higher within the noted Kalihi District census tracts are below the percentages for the City and County of Honolulu as a whole. Persons with high school degrees or above ranged from 63.3% in Palama CT 55 to 81.9% in Kamehameha Heights CT 48. This compares to 90.4% for the City as a whole. Persons with a Bachelor's degree or higher within the noted Kalihi census tracts are also lower than the percentages of the City as a whole. Persons with Bachelor's degrees or above ranged from 8.4% in Umi Street CT 60 to 22.3% in Kamehameha Heights CT 48. Within the City and County of Honolulu, 31.5% of individuals have attained a Bachelor's degree or higher.

Percentages of foreign born individuals as well as non-English speaking individuals are higher in all the noted Kalihi census tracts when compared to the City and County of Honolulu as a whole. Foreign born populations range from a low of 29.7% in the Iwilei-ʻĀnuenue CT 57 to a high of 57.6% in Waiakamilo Road CT 58. A total of 19.7% of the population of the City considered themselves foreign born. In the noted Kalihi census tracts, non-English speaking individuals ranged from a low of 39.2% in the Iwilei-ʻĀnuenue CT 57 to a high of 68.8% in Umi Street CT 60. Within the City and County of Honolulu as a whole, non-English speaking individuals total 28.1% of the population.

Percentages of owner-occupied housing units are lower in the noted Kalihi census tracts than the City and County of Honolulu as a whole. It ranges from a low of 17.6% in Iwilei-ʻĀnuenue CT 57 to 55.7% in Kamehameha Heights CT 48. Within the City, 56.4% of the housing stock are owner-occupied units. Median values for owner-occupied units are generally lower than the City as a whole. Kamehameha Heights CT 48 and Kalihi Waena CT 61 have median values above the City median of $557,810. The remaining census tracts are below the median.

Regarding average household size, the noted Kalihi census tracts are generally higher than the City as a whole. With the exception of Iwilei-ʻĀnuenue CT 57 which has an average household size of 1.99, the remaining census tracts range from 3.37 in Waiakamilo Road CT 58 to 4.93 in Kalihi Waena CT 61. The average household size in the City as a whole is 2.98.

Impacts and Mitigation Measures

In the short- term, construction expenditures related to the project will provide positive benefits to the local economy. This would include creation of construction and construction support jobs, and the purchase of materials from local suppliers, as well as indirect benefits to local retail businesses resulting from construction activities.

Farrington High School has been an integral part of the Kalihi community for several generations. It has a rich history of providing educational opportunities within the

primary urban center of Honolulu. Over time, the physical plant has become outdated and is aging. The proposed project is intended to renovate, upgrade and redevelop the school to current educational standards and to serve the community in which it is located. The emphasis on the formation of academies and smaller learning communities at FHS is intended to further college and career readiness with the intent of boosting academic achievement. It provides the opportunity for FHS to offer a variety of higher educational as well as career and vocational options.

3.13 Public Services and Facilities

3.13.1 Police Fire, and Medical Services

Police protection is provided by the City and County of Honolulu Police Department (HPD). The project area is a part of District 5 – Kalihi, Sector 3, which covers the areas of Kalihi Kai, Palama and Sand Island. It is served by the Kalihi Substation located at 1865 Kamehameha IV Road, approximately 0.8 miles to the north of the project site.

Fire protection is provided by the City and County of Honolulu Fire Department (HFD). The project area is a part of Battalion 1 and is served by the Kalihi Fire Station (Engine 6), which is located at 1742 North King Street, approximately 300 feet to the west of the project site. Other nearby fire stations provide back up support for the Kalihi Station when required. These include the Kalihi Kai Fire Station (Engine 31), located at 1334 North Nimitz Highway, approximately 0.7 mile to the southwest of the project site, and the Kalihi Uka Fire Station (Engine 32), located at 1861 Kamehameha IV Road, approximately 0.8 mile to the north of the project site.

Being in urban Honolulu, the project site is located within close proximity to several major medical facilities. Kuakini Medical Center, located at 347 North Kuakini Street, is approximately 1 mile to the southeast of the project site. St. Francis Medical Center, located at 2226 Liliha Street, is approximately 1.2 miles to the east of the project site. Queen's Medical Center, located at 1301 Punchbowl Street, is approximately 1.7 miles to the southeast of the project site. Straub Clinic & Hospital, located at 888 South King Street, is approximately 2.3 miles to the southeast of the project site.

Emergency medical service is provided by the City's Emergency Services Department, Emergency Medical Services Division. The Department has 19 ambulance units and two Rapid Response units under two districts. All ambulance units are designated as advanced life support units, meaning they are staffed by at least two people. The project area is served by District 1, which includes the western region of O'ahu.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on police, fire, and medical services are anticipated.

In the long-term, the proposed project may require occasional police and fire protection, as well as medical services, however it would likely not represent a significant amount relative to the overall regional demand.

3.13.2 Education

The project site is located within the State Department of Education's (DOE) Honolulu District. Complex area schools include Dole Middle School and Kalakaua Middle School. Elementary feeder schools include Fern Elementary School, Kaewai Elementary School, Kalihi Elementary School, Kalihi Kai Elementary School, Kalihi Uka Elementary School, Kalihi Waena Elementary School, Kapālama Elementary School, Linapuni Elementary School, and Puuhale Elementary School.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts or increased demand on schools are anticipated. Farrington High School is already one of the largest high schools in the State of Hawai'i in terms of enrollment. The proposed project will benefit the larger Kalihi community as well as current students and faculty of FHS by providing needed upgrades to classroom and support spaces. The proposed project is not anticipated to induce population growth and is, therefore, not expected to affect student enrollment at public school facilities in the area.

3.13.3 Recreational Facilities

The County has several parks located in the project vicinity. Nearby County recreational facilities to the project site are the 1.2 acre Kalihi Waena Neighborhood Park, and the 19 acre Kalakaua District Park and Recreation Center. Mauka of the H-1 Freeway are the 8.6 acre Kamehameha Community Park, the 1.2 acre Peter Buck Mini Park, and the 5.5 acre Lanakila District Park.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts or increased demand on recreational facilities in the project vicinity are anticipated. The proposed project is intended to support the existing and projected student and faculty population of FHS. The project is not anticipated to induce population growth and associated demands on recreational facilities and parks.

3.13.4 Solid Waste Collection and Disposal

Residential solid waste collection and disposal service is provided by the City and County of Honolulu Department of Environmental Services. Commercial solid waste collection and disposal service is provided by private haulers. Solid waste collected in the Wai'anae area is hauled to the Campbell Industrial Park H-POWER Plant for eventual disposal at the Waimānalo Gulch Sanitary Landfill. Construction and demolition material is disposed of at the privately-owned PVT landfill in Nānākuli.

Impacts and Mitigation Measures

No short- or long-term significant impacts to municipal solid waste collection and disposal facilities are anticipated as a result of the construction and operation of the proposed project.

Construction of the proposed project will generate solid waste typical of building construction related activities over the short-term. The contractor will be required to

remove all debris from the site, and properly dispose of it at the PVT landfill in conformance with County regulations.

Solid waste collection for the campus will be provided by a private hauler under contract with DOE. The project is not anticipated to significantly affect the City's solid waste collection and disposal service.

3.14 Infrastructure and Utilities

3.14.1 Water System

Water service in the project area is provided by the City and County of Honolulu Board of Water Supply (BWS). There are 42 inch, 20 inch, and 6 inch waterlines on Houghtailing Street adjacent to the project site. North King Street contains 42 inch, 24 inch, and 12 inch waterlines. Along Kalihi Street, there are 42 inch and 6 inch waterlines adjacent to the project site.

There is an on-site network of waterlines within the FHS campus fed from a 6 inch meter along North King Street.

Impacts and Mitigation Measures

In the short- and long- term, the project is not anticipated to result in significant increased demand on the water system in the area. FHS is already one of the largest public schools in the State. No significant increase in enrollment is expected over the short and long term. However, since the existing water infrastructure is aging, appropriate assessments, repairs, and upgrades may be necessary. Prior to the commencement of construction for each phase, FHS will work with the BWS on appropriate improvements which may be required as a result of the Master Plan and applicable rules and regulations. In addition, as the proposed project is intended to support the existing and projected student and faculty population of FHS, the project is not anticipated to induce population growth and associated demand on water.

3.14.2 Wastewater System

Wastewater service in the area is provided by the City and County of Honolulu Department of Environmental Services (ENV). There is an existing 10 inch gravity line adjacent to the project site along Kalihi Street and an existing 8 inch gravity line on Houghtailing Street. A series of gravity lines and force mains convey wastewater to the Sand Island Wastewater Reclamation Facility for treatment and disposal.

Impacts and Mitigation Measures

No significant impacts are anticipated regarding extent of wastewater flows on the existing wastewater system as a result of the construction and operation of the proposed improvements. Prior to construction start on the 9 phases, the DOE will work with the Department of Planning and Permitting Wastewater Branch on any appropriate improvements which may be required as a result of the Master Plan and applicable rules and regulations.

3.14.3 Drainage System

There are existing drainline, catch basin and manhole improvements adjacent to the project site. There is an existing 36 inch drainline within the Kalihi Street right of way and a 24 inch drainline within the Houghtailing Street right of way. Off-site drainage is routed through a series of drainlines eventually connecting with Kapālama Canal, Honolulu Harbor, and the Pacific Ocean.

Impacts and Mitigation Measures

In the short- and long-term, no significant overall increases in runoff are anticipated as a result of the proposed project. FHS is already a fully developed urban site. No significant increases in impermeable area are anticipated. However, specific drainage calculations will be done as designs are finalized for each phase of construction. The proposed improvements to the campus will comply with applicable provisions of the Department of Planning and Permitting December 2012 revised drainage standards. FHS will work with applicable review agencies to ensure that appropriate drainage reports, assessments, repairs and upgrades will be undertaken to ensure that each phase complies with the overall Master Plan and applicable rules and regulations.

3.14.4 Electrical and Communications Systems

Electrical power on the island of O‘ahu is provided by Hawaiian Electric Company (HECO). A significant electrical source for the project area is the Downtown Power Plant.

Telephone service in the Kalihi area, like the rest of the State, is provided by Hawaiian Telcom.

Oceanic Time Warner Cable of Hawai‘i is the local CATV provider in the region.

Impacts and Mitigation Measures

In the short- and long-term, the proposed project is not anticipated to significantly impact or increase overall demand on electrical and communication systems in the area. FHS is already one of the largest public schools in the State. No significant increase in enrollment is expected over the short and long term. However, since the existing electrical, telephone and cable infrastructure is aging, appropriate assessments, repairs, and upgrades may be necessary. Prior to the commencement of construction for each phase, FHS will work with the appropriate agencies on improvements which may be required as a result of the proposed project.

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4. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

This section discusses the State and City and County of Honolulu land use plans, policies and controls relating to the proposed project.

4.1 State Land Use Plans and Policies

4.1.1 Hawai‘i State Plan

The Hawai‘i State Plan, Chapter 226, HRS, provides goals, objectives, policies, and priorities for the State. The Hawai‘i State Plan also provides a basis for determining priorities, allocating limited resources, and improving coordination of State and County Plans, policies, programs, projects, and regulatory activities. It establishes a set of themes, goals, objectives, and policies that are meant to guide the State's long-range growth and development activities. The proposed project is consistent with the following applicable objectives and policies:

Sec. 226-11 Objectives and policies for the physical environment – land-based, shoreline, and marine resources.

(a) Planning for the State's physical environment with regard to land-based shoreline, and marine resources shall be directed towards achievement of the following objectives:

(1) Prudent use of Hawai‘i's land-based, shoreline, and marine resources.

(2) Effective protection of Hawai‘i's unique and fragile environmental resources.

(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:

(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.

(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai‘i.

(8) Pursue compatible relationships among activities, facilities, and natural resources.

Discussion: In the short- and long- term, no significant impacts on land-based, shoreline, and marine resources are anticipated during the construction or operation of the proposed

project. Construction of the proposed project will not involve any major land disturbing activities. A mix of demolition and renovation of various structures is planned. This involves clearing for building foundation work, utility repairs and upgrades, parking lot establishment, and clearing and grubbing for landscaping purposes. Applicable best management practices and erosion control measures will be implemented. These include but may not be limited to: stabilized construction vehicle entrance, grate inlet protection, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Excavation and grading activities will be regulated by the County's grading ordinance. For development done on the various phases, coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to land-based, shoreline and marine resources.

Sec. 226-21 Objective and policies for socio-cultural advancement – education.

(a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement to the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.

(b) To achieve the educational objective, it shall be the policy of this State to:

(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs;

(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands;

(6) Emphasize equality in educational programs in Hawaii's institutions to promote academic excellence; and

(9) Support research programs and activities that enhance the education programs of the State.

Discussion: The proposed project will allow Farrington High School to replace obsolete and aging buildings, facilities, infrastructure, and equipment across the entire campus. Moreover, improvements are proposed in accord with an overall master plan which optimizes the use of the existing campus land area constrained by four major thoroughfares. The campus upgrades will serve as an impetus for FHS students to help achieve a higher level of academic achievement and career readiness which will better prepare them for the future.

4.1.2 State Land Use District

The State Land Use Law, Chapter 205, HRS, is intended to preserve, protect and encourage the development of lands in the State for uses that are best suited to the public health and welfare of Hawai'i's people. Under Chapter 205, HRS, all lands in the State of Hawai'i are classified by the State Land Use Commission (LUC) into one of four major categories of

State Land Use Districts. These districts are identified as the Urban District, Agricultural District, Conservation District, and Rural District.

The LUC's Land Use District Boundary map for the Island of O'ahu depicts the lands within the project area as being designated within the State Urban District. Pursuant to Section 205-2(b), HRS, Urban Districts shall include activities or uses as provided by ordinances or regulations of the county in which the Urban District is situated.

4.1.3 Hawai'i Coastal Zone Management Program

The National Coastal Zone Management (CZM) Program was created through passage of the Coastal Zone Management Act of 1972. Hawai'i's CZM Program, adopted as Chapter 205A, HRS, provides a basis for protecting, restoring and responsibly developing coastal communities and resources. The Hawai'i CZM area includes all lands within the State and the areas seaward to the extent of the State's management jurisdiction. Hence, the proposed project site is located in the CZM area. A discussion of the project's consistency with the objectives and policies of the CZM Program is provided below.

(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
- *(i) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: 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 use 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; Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.*

(vi) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(vii) 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 approximately one mile from the shoreline at the mouth of Kapālama Stream and Honolulu Harbor.

In the short- and long- term, no significant impacts on recreational resources are anticipated during the construction or operation of the proposed project. Construction of the proposed project will not involve any major land disturbing activities. Best management practices and erosion control measures will be implemented to comply with applicable water quality standards as well as regulate point and nonpoint sources of pollution to protect the recreational value of coastal waters. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to coastal recreational opportunities. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

Public access to the shoreline will not be affected by the proposed project.

(2) Historic Resources

Objective:

(A) 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.

Based on historic sites within the study area and the potential for subsurface burials in the vicinity, the known foundations of the Bishop Memorial Chapel, and the possibility of other Kamehameha Boys' School structure foundations, an archaeological monitoring program is recommended as appropriate mitigation for any subsurface activity associated with the renovation work at Farrington High School. Archaeological monitoring will facilitate the identification and treatment of any burials that might be discovered during project construction, and will mitigate the project's effect on non-burial archaeological deposits. Under Hawai'i State historic preservation legislation, "Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, ongoing activities which may adversely affect historic properties" (HAR Section 13-279-3).

With regard to architectural considerations, Building "A" is proposed to be retained with the exception of a portion of Wings 4 and 8 which are not part of the original building. The intent is to retain and celebrate character defining features of the building such as the massing and the distinctive bas relief sculptures on the exterior faces of the building. Much of the interior floor plan configurations remain but it is not of great historic value. Thus, interiors are proposed to be reconfigured to meet the goals implementing the concept of smaller learning communities. Renovations and modifications to Building "A" will be done in conjunction with a historic architect and the State Historic Preservation Division.

The Auditorium is proposed to be renovated. The repair and renovation of the roof also provides the opportunity to incorporate historic elements within its interior. Portions of Wings 4 and 8 of Building "A" are proposed to be demolished. These wings were added to Building "A" in 1957-1958. The demolition would open up the connection of the Existing Quad area in Building "A" with a planned new Student Quad. In addition to providing a significant open space and pedestrian amenity, this provides the main cluster of academic instruction near the center of campus.

The swimming pool is proposed to be replaced with a new pool adjacent to the new cafeteria. The existing dedication plaque is proposed to be re-installed at the new pool facility.

The existing ROTC facility is proposed to be demolished but a replacement facility is being planned on the ground floor of the new cafeteria/student center. It would be located adjacent to the existing facility.

Other buildings which may be eligible (Buildings "G", "H", "I", "J", "K", "L", "M", "O", and "Q") are planned to be systematically demolished as new spaces are constructed or renovated. Prior to demolition, possible documentation requirements will be coordinated with SHPD.

(3) Scenic and Open Space Resources

Objective:

(A) 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 landforms 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 which are not coastal dependent to locate in inland areas.

No significant impacts to visual resources are anticipated as a result of the construction or operation of the proposed project. FHS is already one of the largest public schools in the State and does not anticipate that enrollment will grow significantly. Although many of the buildings on the mauka side of the campus will be redeveloped with slightly higher building heights, there is still a significant amount of building renovation retaining existing structure height. Parking is being placed along the periphery of the project so new buildings are afforded an additional setback which helps to mitigate possible view issues. Building heights and views from outside of the campus should not change significantly.

(4) Coastal Ecosystems

Objective:

(A) 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 located approximately one mile from the shoreline at the mouth of Kapālama Stream and Honolulu Harbor.

In the short- and long- term, no significant impacts on coastal ecosystems are anticipated during the construction or operation of the proposed project. Construction of the proposed project will not involve any major land disturbing activities. Erosion control measures will be implemented to comply with applicable water quality standards as well as regulate point and nonpoint sources of pollution to protect the recreational value of coastal waters. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to coastal ecosystems. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

(5) Economic Uses

Objective:

(A) 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 developments such as harbors and ports, and coastal related development such as visitor 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.

In the short-term, construction expenditures will provide positive benefits to the local economy. This would include creation of some construction and construction support jobs, and the purchase of materials from local suppliers, as well as indirect benefits to local retail businesses resulting from construction activities.

In the long-term, the proposed project will provide the opportunity for FHS to offer a variety of college, career and vocational education options which will help students to attain higher educational and workforce development goals which can benefit the State's economy.

(6) Coastal Hazards

Objectives:

(A) 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 pollution hazards;

(B) Ensure that developments comply with requirements of the Federal Flood Insurance Program;

(C) Prevent coastal flooding from inland projects.

According to the Flood Insurance Rate Map (FIRM), (Community Panel Number 0353G) prepared by FEMA, the project site is designated Zone X, an area determined to be outside of the 0.2% annual chance floodplain. There are no base flood elevations or depths shown within this zone.

According to the Tsunami Evacuation Zone maps for O'ahu, the project site is not within the tsunami evacuation zone.

In the short- and long-term, no significant impacts on flood hazards in the project area are anticipated as the proposed improvements are not anticipated to increase flood risks or cause any adverse flood-related impacts at the project site or lower elevation properties. Construction of the proposed project will not involve any major land disturbing activities. Erosion control measures will be implemented to comply with applicable water quality standards as well as regulate point and nonpoint sources of pollution to mitigate significant impacts relating to coastal hazards attributable to the project. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to surface and coastal waters. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality

Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

(7) Managing Development

Objective:

(A) Improve the development review process, communication, and public participation in the management of coastal resource 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 Hawai'i State environmental review process, Chapter 343, HRS, requires project review by government agencies and affords the public the opportunity to provide comments on the proposed project. Applicable State and County requirements will be adhered to in the design and construction phases of the proposed improvements.

(8) Public Participation

Objective:

(A) 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 mediations to respond to coastal issues and conflicts.

The Hawai'i State environmental review process, Chapter 343, HRS, requires project review by government agencies and affords organizations and the general public the opportunity to provide comments on the proposed project.

(9) Beach Protection

Objective:
(A) 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 proposed project does not involve the construction of improvements in the shoreline setback nor require any shoreline erosion-protection structures.

(10) Marine Resources

Objective:
(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:
(D) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
(E) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
(F) 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;
(G) 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
(H) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

In the short- and long- term, no significant impacts on marine resources are anticipated during the construction or operation of the proposed project. Construction of the proposed project will not involve any major land disturbing activities. Erosion control measures will be implemented to comply with applicable water quality standards as well as regulate point and nonpoint sources of pollution to protect marine resources. As applicable for each phase, these include but may not be limited to: temporary sediment basins, temporary diversion

berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed.

Coordination will be undertaken with the appropriate agencies during permitting and construction in order to ensure that the proposed project will not result in significant impacts with regard to marine resources. A National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff from construction activities would be required for instances when more than one acre of land area will be cleared. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54 and 11-55 Water Pollution Control, Department of Health. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.

4.2 City and County of Honolulu Land Use Plans and Policies

4.2.1 City and County of Honolulu General Plan

The City and County of Honolulu last updated its General Plan in October of 2002. The General Plan for the City and County of Honolulu is a written commitment by the City and County government to a future for the Island of O'ahu that it considers desirable and attainable. The Plan is a two-fold document: First, it is a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of the people of O'ahu. These objectives contain both statements of desirable conditions to be sought over the long run and statements of desirable conditions which can be achieved within an approximately 20-year time horizon. Second, the General Plan is a statement of broad policies that facilitate the attainment of the objectives of the Plan.

The General Plan is a guide for all levels of government, private enterprise, neighborhood and citizen groups, organizations, and individual citizens in eleven areas of concern:

(1) Population;
(2) Economic activity;
(3) Natural environment;
(4) Housing,
(5) Transportation and utilities;
(6) Energy;
(7) Physical development and urban design;
(8) Public safety;
(9) Health and education;
(10) Culture and recreation; and
(11) Government operations and fiscal management.

The proposed project is relevant and consistent with the following applicable goals, objectives, policies, and actions of the *City and County of Honolulu General Plan*:

VII. Health and Education

Objective B
To provide a wide range of educational opportunities for the people of Oʻahu

Policy 4
Encourage the construction of school facilities that are designed for flexibility and high levels of use.

Policy 5
Facilitate the appropriate location of learning institutions from the preschool through the university levels.

Discussion: In the long-term, the proposed project will provide the opportunity for Farrington High School to replace obsolete buildings, facilities, infrastructure, and equipment across the entire campus. Moreover, improvements are proposed in accord with an overall master plan which optimizes the use of the existing campus land area constrained by four major thoroughfares. The campus upgrades provide the tools for FHS students to achieve a higher standard of academic and career readiness and better prepare for their future.

4.2.2 Primary Urban Center Development Plan

The island of Oʻahu is divided into eight Development/Sustainable Communities. These eight regional plans reflect each area's vision, and are intended to guide City land use approvals, infrastructure improvements and private sector investment decisions. The project site is located within the region encompassed by the Primary Urban Center Development Plan.

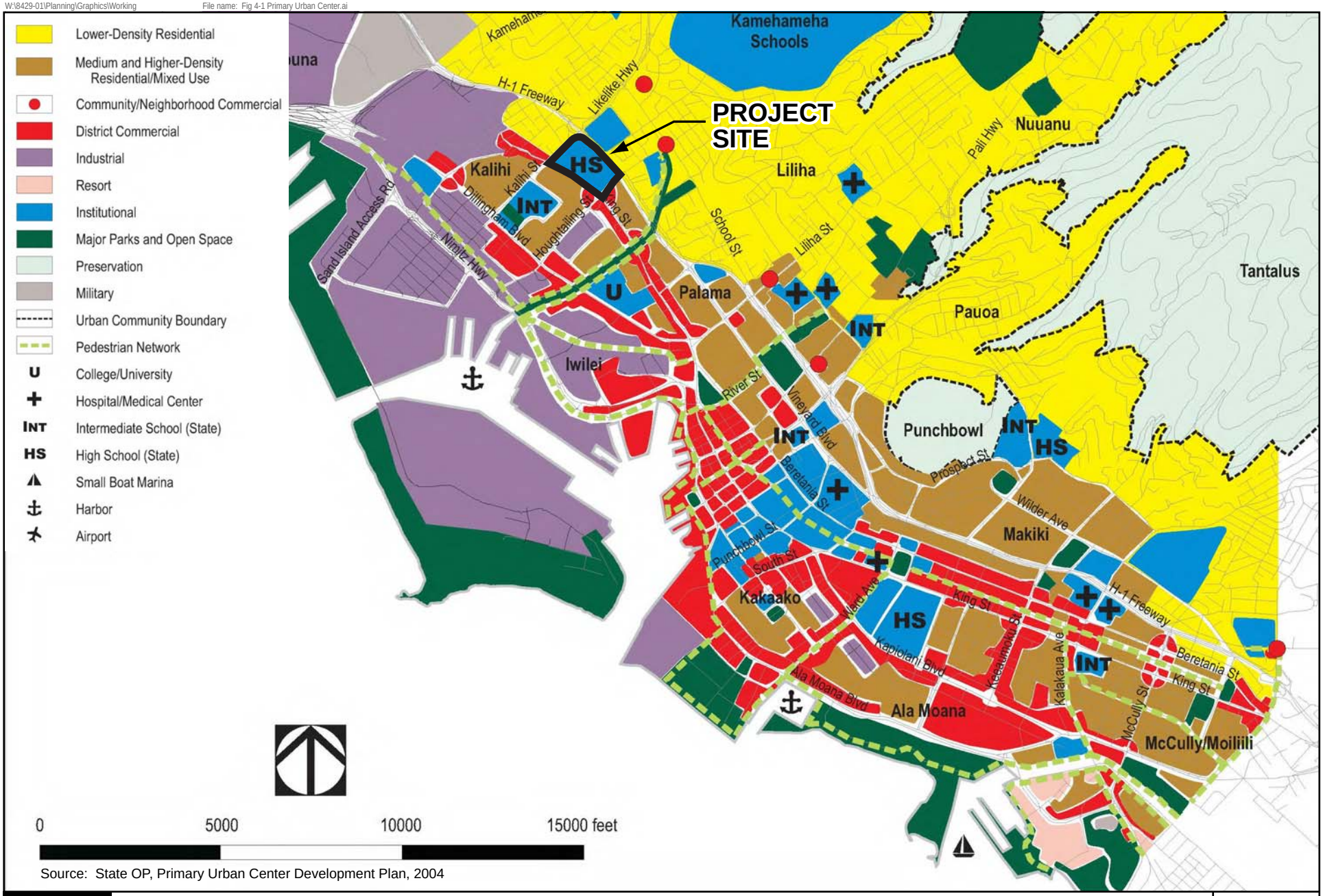
The Plan vision and implementing policies and guidelines support expanded choices for residents; provide business and economic development opportunities for present and future enterprises; and enhance the attractiveness of the city and its many neighborhoods for those who live and visit there. The Primary Urban Center Land Use Map designates the existing site as a High School (State). See Figure 4-1.

The proposed project is consistent with the following applicable policies and guidelines of the Plan:

3.1.2 Policies

- ***Preserve historic and cultural sites****. Preserve and protect sites that have high preservation value because of their good condition or unique features. Protection includes planning and design of adjacent uses to avoid conflicts or abrupt contrasts that detract from or destroy the physical integrity and historic or cultural value of the site. Retain, whenever possible, significant vistas associated with historic, natural and man-made features. Allow adaptive*

W:\8429-01\Planning\Graphics\Working File name: Fig 4-1 Primary Urban Center.ai



Source: State OP, Primary Urban Center Development Plan, 2004

FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

PRIMARY URBAN CENTER LAND USE MAP

FIGURE 4-1

reuse of historic buildings to serve a new function and/or enhance interpretive value without destroying the historic value of a site.

3.1.3 Guidelines

- *Preserve the architectural character, landscape setting and visual context of historic landmarks through appropriate zoning standards and development controls, as necessary, and public outreach programs such as design guidelines for the maintenance, renovation or expansion of older dwellings.*

Discussion: The intent of the proposed project is to retain and enhance the original Building "A" which was designed by noted Territorial architect C.W. Dickey and is listed on the National Register of Historic Places. The front lawn space between North King Street and the Building "A" main façade will also be maintained. Other notable buildings such as the Joseph Rider Farrington Auditorium, Governor's Gate will be renovated. Three stone pillars along North King Street also will remain since they pre-date the development of Farrington High School. The site of the former Bishop Memorial Chapel will also be noted. Remaining buildings older than 50 years of age may be in the form a history book of the entire campus. These buildings may require Historic American Buildings Survey (HABS) level documentation.

4.7.2 Policies

- *Support the development of a high quality educational system of schools and post-secondary institutions that increase the attractiveness of the Primary Urban Center as a place to live and work.*

4.7.3 Guidelines

- *Identify ways for the City and the general community to improve conditions within and near school and college campuses. For example, the City could take a lead role in enhancing street appearance, security, and traffic and pedestrian safety near campuses.*

Discussion: The implementation of the Master Plan provides much needed upgrades to the school. FHS is already one of the older as well as one of the bigger schools in the Primary Urban Center. The project implements the Primary Urban Center policy of increasing the attractiveness of the Primary Urban Center as a place to live and work.

4.2.3 City and County of Honolulu Zoning

The purpose and intent of the City and County of Honolulu Land Use Ordinance is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the O'ahu General Plan and development plans, and to promote and protect the public health, safety, and welfare.

According to the City and County of Honolulu Department of Planning and Permitting (DPP), the project site is zoned Residential (R-5). See Figure 4-2. As a "public use and structure" within the R-5 District, it is considered a permitted use. However, a zoning waiver may be required to allow portions of new buildings and certain rooftop features to exceed the maximum 25-foot height limit.

4.2.4 City and County of Honolulu Special Management Area

Pursuant to the Hawai'i CZM Program, Chapter 205A, HRS, the counties have enacted ordinances establishing Special Management Areas (SMA). Any "development" within the SMA requires either an SMA Use Permit - Minor or an SMA Use Permit - Major. The type of permit is generally determined by the valuation of the development. If the valuation of the development is less than $500,000.00, an SMA Use Permit - Minor is required. If the valuation is greater than $500,000.00, an SMA Use Permit - Major is required. The SMA Use Permits are administered by the City and County Department of Planning and Permitting. Through the SMA permit system, the County assesses and regulates developments proposed for areas located within the SMA and the proposed developments are evaluated for compliance with CZM objectives and policies and SMA guidelines set for the Chapter 205A, HRS. The proposed project site is not located within the SMA and will, therefore, not require any type of SMA Use Permit.

4.3 Permits and Approvals

The following is a list of permits, approvals, and reviews that may be required prior to construction and operation of the proposed project.

<u>State of Hawai'i</u>

Department of Land and Natural Resources
- Chapter 6E, HRS, State Historic Preservation Law

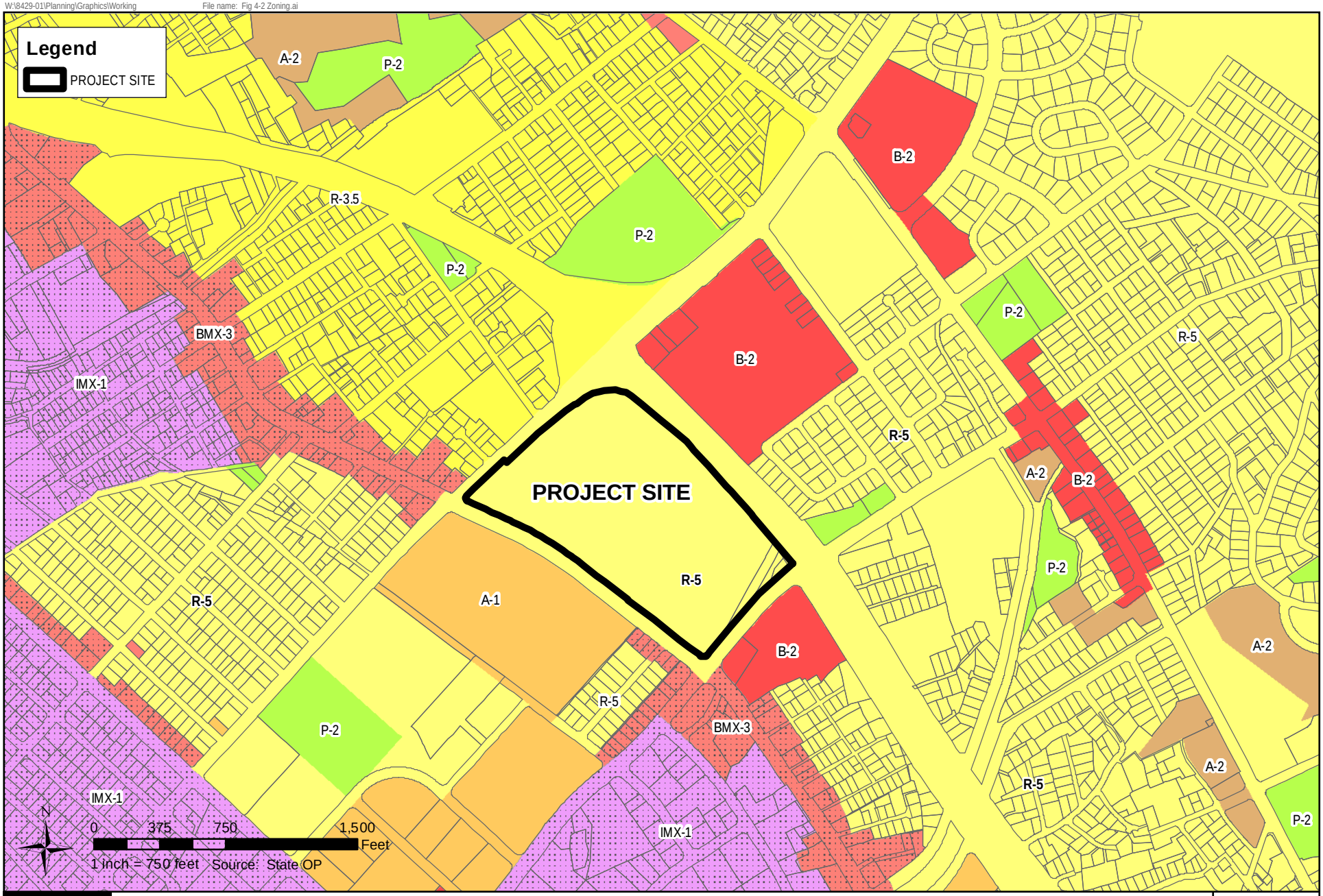
Department of Health
- National Pollutant Discharge Elimination System

<u>City and County of Honolulu</u>

Department of Planning and Permitting
- Zoning Waiver
- Building Permit
- Grading Permit/Trenching Permit
- Sewer Connection Application

Department of Transportation Services
- Street Usage Permit

W:\8429-01\Planning\Graphics\Working File name: Fig 4-2 Zoning.ai



FARRINGTON HIGH SCHOOL LONG RANGE DEVELOPMENT MASTER PLAN

CITY AND COUNTY OF HONOLULU ZONING MAP

FIGURE 4-2

5. ALTERNATIVES

5.1 No Action Alternative

Under the no action alternative, any renovation and/or construction on the FHS campus would not be pursued. Many of the existing structures are already in need of repairs simply to keep operating at a minimum standard. For example, many of the existing structures are not equipped to handle increased electrical loads of modern classrooms. Computers, audio visual aids, printers, and other communication devices require electrical circuitry able to handle increased loads which were not envisioned when the buildings were originally designed. Some structures, most notably the existing swimming pool, are simply not operable and are closed for access to students and faculty. Another issue is existing lighting at the track and field. Although the light poles are in existence, it is not in operation. Under the no action alternative, additional deterioration of the physical facilities can be anticipated and additional structures and facilities can be anticipated to become dysfunctional. The learning environment would continue to deteriorate most likely negatively affecting student achievement and well being.

Should no action be taken, environmental impacts would be avoided, construction costs spared, and the need for permits precluded in the short term. However, eventual repairs and/or redevelopment would result in greater environmental impacts, substantially greater costs, and most likely require more permits.

5.2 Demolition and Reconstruction in One Phase

This alternative would involve the demolition and reconstruction of FHS in one phase. This alternative would require one large legislative appropriation in order to effectuate. A possible comparison could be the relatively recent appropriation for the Kīhei High School in Kīhei, Maui. The Environmental Impact Statement for the Kīhei High School dated August 28, 2012 involved a vacant 77 acre site with construction divided in two phases. The first phase includes all the backbone on-site and off-site infrastructure and all essential classrooms and other buildings for 800 students. The cost of the first phase was estimated at $120 million with a projected opening for Year 2016. The second phase would include additional classrooms and other amenities when enrollment increases justify the improvements and when funding is available. The maximum projected student population is 1,650 students. The cost of Phase II was estimated at $30 million and completion was projected perhaps 10 years after completion of Phase I.

Should this be pursued at FHS, an advantage of this alternative is that demolition and reconstruction of FHS can likely be completed in a relatively shorter time frame than phased construction, perhaps 3-5 years. It will likely take a longer period of time than the Kihei High School example since FHS accommodates a larger enrollment thereby needing proportionately more improvements and more time. Costs are likely to be significantly greater since the FHS site would require demolition and must work to minimize construction impacts to neighbors in the urban setting.

There are also a number of historical sites and structures on the FHS campus. The notable example is Building “A” which is on the National Register of Historic Places. This alternative

assumes the demolition of Building "A". This would result in an irreplaceable loss of a significant historic resource.

A significant negative aspect of this alternative involves the fact that the facilities at the FHS campus cannot be used during the period of construction. Students, faculty and staff would need to be redeployed to other public educational institutions during the years of construction. This involves approximately 2,500 students and 221 faculty and staff which need to be reassigned to other high schools in the vicinity. This causes major negative disruption and dislocation in the lives of not only the FHS students and faculty and staff, but the students, faculty and staff of neighboring high schools. For instance, classroom crowding would increase which likely will negatively affect learning. Curricula at different schools may differ from FHS which also affects learning continuity. Social adjustments for students, faculty and staff would also be significant which may negatively affect behavior and achievement.

5.3 Deferral of Demolition and Reconstruction

The alternative assumes a deferral of demolition and reconstruction of FHS so that it could be done in one phase. The discussion would be similar to the foregoing alternative except that it is being deferred. A major difference are that costs will be gradually higher every year construction is deferred. Based on the current climate, escalation in construction costs can be expected to rise at roughly 8% per year. If Kīhei High School, for illustration purposes, defers construction for 9 years, from 2012 to 2021, the requested appropriation can be expected to double (Rule of 72). So, instead of a $120 million request, a request of $240 million would be needed to construct the same improvements for Phase I. It is noted that the actual escalation rate may be higher or lower than 8%. If a 6% escalation rate is assumed, construction costs can be expected to double in 12 years. Or conversely, if a 12% escalation rate is assumed, then construction costs can be expected to double in 6 years.

5.4 Renovation of All Existing Structures

This alternative involves renovating all of the existing structures in its current location. This alternative would involve upgrading the outward appearance of the buildings and spaces on campus. For historic structures like Building "A" along North King Street, renovation to restore and enhance the structure would allow the reuse of a significant historic structure for the future.

The FHS campus currently includes 15 major buildings, the majority of which were built in the 1950's and 1960's. However, the placement of buildings were not guided by a master plan or organizational strategy. The result has been a lack of clearly defined pedestrian paths and open spaces. Parking is spread throughout the campus. With renovation, this existing condition will persist. Many of the classrooms are also located close to the periphery of the campus near major roadways. These classrooms have noise, air quality and temperature issues. With renovation, this may address some of the aging aspects of the physical structure, but the issues of noise, air quality and temperature would still persist. The library is also located in an inconvenient location at a corner of the campus near Kalihi Street and North King Street. Public and private transportation access is generally substandard. With a

renovation alternative, this presents limited opportunities for improvement. Certain buildings may also be considered outmoded or obsolete. This may include the metal frame Industrial Arts buildings or the portable classrooms which would be retained under this alternative. Thus, the outmoded or obsolete conditions would persist. It is noted that none of the existing classroom spaces meet the requirements of 21st Century Education. They are not flexible and adaptable and do not contain the required data and power required to meet today's or tomorrow's needs.

Renovation would likely be less expensive than reconstruction although it may involve unforeseen costs. It may also take less time to construct than full reconstruction if the entire campus is vacated at one time. However, this would also involve significant negative consequences as discussed in the foregoing demolition and reconstruction alternatives. Should renovation be phased, this would likely take a longer period of time than reconstruction. This may also result in additional dislocation of teachers and classrooms. Since no new floor area is being added, there will be less flexibility in accommodating teachers and classrooms during the period of construction.

Since existing buildings on the FHS campus are older, renovation involves unknown complications during the period of construction which can add to construction cost and time. Older buildings will likely have hazardous materials issues (asbestos, lead paint, etc.) which will require significant mitigation efforts to remove and/or contain them. Most of the infrastructure (power, water, sewage, equipment, etc.) are already at or near their life expectancy, so that will need to be replaced as well. Building walls and roofs may not meet current wind and earthquake requirements which will need to be modified to be code compliant.

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6. ~~ANTICIPATED~~ DETERMINATION OF FONSI

The proposed project involves the following improvements:

Potential impacts of the proposed improvements have been evaluated in accordance with the significance criteria of Section 11-200-12 of the Department of Health's Administrative Rules. Discussion of the project's conformance to the criteria is presented as follows:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The project involves the renovation and rehabilitation of Building "A" which is on the National Register of Historic Places. Other noteworthy features include the stone gateposts along North King Street and stone walls throughout the campus, a brick alignment, and a number of loose rectangular blocks used as curbstones in the central section of the school lot. There are also a number of buildings which are over 50 years of age on the campus. Any improvements as it may affect these buildings and sites will be coordinated with the State Historic Preservation Division (SHPD). Archaeological monitoring is being recommended. Applicant will work with the SHPD in complying with applicable requirements. There are no known significant natural resources on the subject property.

There should be no destruction or loss of any significant, endangered, or threatened botanical, faunal, geological, or other natural resources. There are no federally delineated Critical Habitat within or close to the project site, thus construction and operation of the proposed project will not result in any impacts to federally designated Critical Habitats.

(2) Curtails the range of beneficial uses of the environment;

The proposed project will not curtail the beneficial uses of the environment as the project site is fully developed within a dense urban environment. The entire site has been in use as a public high school for the last 74 years. Since existing facilities are aging and outmoded, appropriate facilities are being renovated and redeveloped. Land disturbing activities include demolition, foundation work, utility repairs and upgrades, and parking lot construction. Construction and operation of the new facilities will be performed in accordance with Federal, State and County regulations, thereby minimizing potential impacts to air and water quality and ambient noise levels.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

The proposed project does not conflict with long-term environmental policies, goals, and guidelines of the State of Hawai‘i. As presented in this EA, there are potential temporary impacts associated primarily with short-term construction-related activities and can be mitigated through adherence to standard construction mitigation practices.

(4) Substantially affects the economic or social welfare of the community or state;

In the short term, construction expenditures will provide positive benefits to the local economy. This would include creation of some construction and construction support jobs, and the purchase of materials from local suppliers, as well as indirect benefits to local retail businesses resulting from construction activities, but not at a level that would generate any significant population expansion.

In the long-term, the proposed project will provide the opportunity for FHS to upgrade aging and deteriorated facilities to offer its students a range of college, career and vocational readiness opportunities which can help to boost academic achievement. Upgrades to the physical plant also provides a school which elevates the well-being of students and faculty.

(5) Substantially affects public health;

No significant adverse short- or long-term impacts on public-health are anticipated as a result of the proposed project. Typical short-term construction-related impacts (e.g., noise and air quality) are anticipated, but will be temporary and will comply with State and County regulations. Standard construction and permanent best management practices will be followed to mitigate substantial impacts on public health. Land disturbing activities include demolition, foundation work, utility repairs and upgrades, and parking lot construction. Public health benefits include enhanced wellness for those who make use of the athletic facilities.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

Substantial effects on public facilities are not anticipated. FHS is already one of the largest public schools in the State and growth in student enrollment is not expected to substantially change. The proposed project is not anticipated to induce population growth in the area or region. Public infrastructure such as water, wastewater, drainage, and utility infrastructure has served the urban neighborhood for many years. The project will coordinate with applicable review agencies with jurisdiction over their respective infrastructure systems to comply with applicable requirements.

(7) Involves a substantial degradation of environmental quality;

The proposed project is not anticipated to involve a substantial degradation of environmental quality. Long term impacts to air and water quality, noise levels and natural resources will be minimal. Typical short-term construction-related impacts (e.g., noise and air quality) are anticipated, but will be temporary and will comply with State and County regulations.

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

The proposed Master Plan assesses the cumulative impacts of all nine phases of construction. The proposed actions do not have a considerable effect upon the environment. There are no commitments for further action beyond the Master Plan scope.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat;

There will be no destruction or loss of any significant, endangered, or threatened botanical, faunal, geological, or other natural resources. There are no federally delineated Critical Habitat within or close to the project corridor, thus construction and operation of the proposed project will not result in any impacts to federally designated Critical Habitats.

(10) Detrimentally affects air or water quality or ambient noise levels;

No long-term significant impacts to air quality, water quality, or noise levels within the project site are anticipated as a result of the construction and operation of the proposed project.

Land disturbing activities include demolition, foundation work, utility repairs and upgrades, and parking lot construction. Construction and operation of the new facilities will be performed in accordance with Federal, State and County regulations, thereby minimizing potential impacts to air and water quality.

In the short-term, noise from construction activities such as demolition, clearing and paving will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may also increase as a result of operating power equipment during the construction period.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control" regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits.

In the long-term, no significant noise impacts are anticipated once the construction of the proposed project has been completed. Since the project is not expected to significantly increase roadway capacity or travel demand, ambient noise levels in the vicinity attributable to the project should not change significantly.

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

No short- or long-term significant impacts are anticipated as the project site is not located within an environmentally sensitive area.

According to the FIRM, the project site is designated Zone X, an area determined to be outside of the 0.2% annual chance floodplain. There are no base flood elevations or depths shown within this zone.

According to the Tsunami Evacuation Zone maps for O'ahu, the project site lies entirely within the tsunami evacuation zone.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,

According to the Primary Urban Center Development Plan, there are significant panoramic views from the Downtown/Punchbowl area to the Tripler Hospital area and to the Salt Lake area. The FHS campus is not in the sightline of those east-west views as noted in the Primary Urban Center Development Plan. The overall campus Master Plan emphasizes smaller more intimate classroom learning spaces with significant open space and pedestrian amenities for the enhancement of student life within the central portion of campus. A number of existing buildings are being renovated while several new buildings involve an additional level of building height. Parking is also being proposed along the periphery of the site which allows for an additional setback from public rights of way thereby helping to mitigate possible view issues. The proposed project does not involve significant view impacts resulting from construction or operation.

(13) Requires substantial energy consumption.

School enrollment as well as the amount of faculty and staff should not change appreciably. Energy usage should not change substantially. Operation of the proposed project will not result in a significant increase in energy consumption.

7. CONSULTATION

7.1 Pre-Assessment Consultation

The following agencies and organizations were consulted during the preparation of the Draft EA. Of the ~~16~~ 21 parties that formally replied ~~during the pre-assessment period~~, some had no comments while others provide substantive comments as indicated by the ✓ and ✓✓, respectively. All written comments are reproduced in Appendix D.

Federal Agencies

National Oceanic and Atmospheric Administration, Pacific Islands Regional Office
✓✓ U.S. Army Corps of Engineers
U.S. Department of the Interior, Fish and Wildlife Service

State Legislative Branch

Senator Donna Mercado Kim
Senator Suzanne Chun Oakland
Representative Karl Rhoads
Representative John Mizuno

State Agencies

✓ Department of Accounting and General Services
Department of Business, Economic Development and Tourism
Department of Business, Economic Development and Tourism, Energy Office
Department of Business, Economic Development and Tourism, Land Use Commission
✓✓ Department of Business, Economic Development and Tourism, Office of Planning
Department of Defense
Department of Defense, State Civil Defense
Department of Health
✓✓ Department of Health, Clean Water Branch
Department of Health, Environmental Management Division
✓✓ Department of Health, Environmental Planning Office
✓✓ Department of Land and Natural Resources
✓✓ Department of Land and Natural Resources, Historic Preservation Division
✓✓ Department of Transportation
✓✓ Office of Environmental Quality Control
Office of Hawaiian Affairs
University of Hawai‘i at Mānoa Environmental Center

City Council

Councilmember Carol Fukunaga
Councilmember Joey Manahan

City and County of Honolulu Agencies

✓✓ Board of Water Supply
✓ Department of Community Services
✓ Department of Design and Construction

Department of Environmental Services
✓✓ Department of Facility Maintenance
✓ Department of Parks and Recreation
✓✓ Department of Planning and Permitting
✓✓ Department of Transportation Services
✓✓ Honolulu Fire Department
✓ Honolulu Police Department

Utility Companies
✓ ~~Verizon Hawai'i~~ Hawaiian Telcom
✓✓ Hawai'i Gas
✓✓ Hawaiian Electric Company
Oceanic Cable

Other Interested Parties and Individuals
Kalihi-Palama Neighborhood Board No. 15

7.1.1 Neighborhood Board Meetings

As a part of the pre-assessment consultation effort, a presentation of the Master Plan was provided to the Kalihi-Palama Neighborhood Board at its meeting of May 21, 2014. The purpose of the presentation was to update the Board and the community of the status of the Master Plan effort and to note the intent to prepare a Draft EA for the proposed project.

Although not part of the EA process per se, Farrington High School's principal and vice principal did discuss principles of 21st century learning as well as ongoing and proposed campus improvements with the Kalihi-Palama Neighborhood Board at its meeting of August 21, 2013.

7.2 Draft Environmental Assessment Consultation

The Draft Environmental Assessment for the Farrington High School was published in the Office of Environmental Quality Control Environmental Notice of August 8, 2014. Publication initiated a 30-day public review period ending on September 8, 2014. No comments were received during the public comment period.

However, an early consultation letter from the State Historic Preservation Division was received after the Draft EA had been submitted to OEQC for publication. The letter and response are included in Appendix D.

8. REFERENCES

Federal Emergency Management Agency, *Flood Insurance Rate Map Panel No. 0353G*. gis.hawaiinfip.org/

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City and County of Honolulu, Department of Planning and Permitting, *Primary Urban Center Development Plan,* June 2004.

State of Hawai'i Department of Health, *Hawai'i Ambient Air Quality Data*, Clean Air Branch. Internet. Available at: http://health.hawaii.gov/cab/Hawai'i-ambient-air-quality-data/

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U.S. Census Bureau, Honolulu County – Quick Facts from the U.S. Census Bureau: http://quickfacts.census.gov/qfd/states

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APPENDIX A

Archaeological Literature Review and Field Inspection

With Cultural Section

Farrington High School Master Plan Project

Cultural Surveys Hawai‘i, Inc.

May 2014

Draft

Archaeological Literature Review and Field Inspection with Cultural Section, Farrington High School Master Plan Project, Kapālama Ahupua‘a, Honolulu (Kona) District, O‘ahu TMKs: [1] 1-6-003:047, -048, -082, -083, -999 and 1-6-021:005 por.

Prepared for
Wilson Okamoto Corporation

Prepared by
Cary Stine B.A.,
David W. Shideler, M.A.,
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Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: KAPALAMA 17)

June 2014

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Management Summary

Reference	Archaeological Literature Review and Field Inspection with Cultural Section, Farrington High School Master Plan Project, Kapālama Ahupua‘a, Honolulu (Kona) District, O‘ahu TMKs: [1] 1-6-003:047, -048, -082, -083, -999 and 1-6-021:005 por. (Stine et al. 2014)
Date	June 2014
Project Number (s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: KAPALAMA 17
Investigation Permit Number	The fieldwork component of the study was carried out under archaeological permit numbers 11-17 and 14-04 and issued by the Hawai‘i State Historic Preservation Division (SHPD), per Hawai‘i Administrative Rules (HAR) §13-283.
Project Location	The Farrington High School property is located *makai* (seaward) of the H-1 Freeway, *mauka* (inland) of King Street, and between Kalihi and Houghtailing Streets in Kapālama Ahupua‘a, Honolulu District, O‘ahu, TMKs: [1] 1-6-003:047, -048, -082, -083, -999 and 1-6-021:005 por.
Project Acreage	27.25 acres (11.03 hectares)
Land Jurisdiction	State of Hawai‘i
Agencies	State of Hawai‘i Department of Education (DOE); SHPD
Project Description	The purpose of this study was to gather historical and archaeological background information which will serve to aid the client in determining whether additional archaeological research in the form of an archaeological inventory survey (AIS) is needed.
Historic Preservation Regulatory Context	This investigation does not fulfill the requirements of an AIS (per HAR §13-276). Rather, it serves as a document to facilitate the proposed project’s planning, and it supports historic preservation review compliance by identifying any major archaeological concerns within the study area. This document develops data on the general nature, density, and distribution of archaeological resources as can be gleaned from available sources.
Fieldwork Effort	Fieldwork was conducted on 19 December 2011, 11 November 2013, and 15 May 2014. The fieldwork required one person-day to complete. In general, the purpose of the field inspection was to inspect the project area for cultural resources that may be affected by any future projects.

Results Summary	Two historic properties were identified within the project area. State Inventory of Historic Properties (SIHP) # 50-80-14-9768, the Wallace Rider Farrington High School, was placed on the State Register of Historic Places in 1993. SIHP # 50-80-14-7555 consists of the subsurface remnants of the Bishop Memorial Chapel. The chapel foundations were observed during high school renovation efforts in 2011 and placed on the State Register of Historic Places in 2013. The former location of the chapel is marked with a brick alignment in an open grassy area between two wings of the main school building. Several basalt blocks used as curbstones may also be a remnant of the chapel. There are also several walls and gatepost pillars on the high school grounds that may be related to structures built for the Kamehameha Boys' School. Some of the buildings for the Boys' School became part of the Bernice Pauahi Bishop Museum (SIHP # 50-80-14-1353) Historic documentation, however, does identify the plain of Kaiwi‘ula (place name meaning "red bone") as an area used to bury smallpox victims during an 1853 epidemic of the disease. There is no exact location for this cemetery, but the plain of Kaiwi‘ula was near the main coastal trail, now part of the King Street alignment.
Mitigation Recommendations	Based on the presence of historic properties within the project area possibly related to the Kamehameha Boys' School, the Bishop Museum Complex (SIHP # 50-80-14-1353), the Wallace Rider Farrington High School (SIHP # 50-80-14-9768), a subsurface foundation remnant of the Bishop Memorial Chapel (SIHP # 50-80-14-7555), and the possible presence of burials related to the 1853 smallpox epidemic, an archaeological monitoring program is recommended as appropriate mitigation for any subsurface activity within the project area. Early consultation with the SHPD is also recommended to obtain its concurrence with this recommendation or its recommendations for follow-up archaeological work.

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Section 1 Introduction

1.1 Project Background

At the request of Wilson Okamoto Corporation, Cultural Surveys Hawai'i, Inc. (CSH) has prepared this archaeological literature review and field inspection (LRFI) report for the Farrington High School Master Plan Project, Kapālama Ahupua'a, Honolulu (Kona) District, O'ahu TMKs: [1] 1-6-003:047, -048, -082, -083, -999 and 1-6-021:005 por. The project area consists of the Farrington High School property, located *makai* of the H-1 Freeway, *mauka* of King Street, and between Kalihi Street and Waiakamilo/Houghtailing Street. The project area is shown on a 1998 U.S. Geological Survey (USGS) topographic map (Figure 1), a tax map plat (

Figure 2), and a 2009 aerial photograph (Figure 4).

The proposed project involves renovations to the Wallace Rider Farrington High School property. A portion of the campus was once part of the Kamehameha Boys' School, which had several buildings such as Bishop Hall that were built for the school but were later incorporated into the Bernice Pauahi Bishop Museum complex. The Bishop Museum is listed on the National Register of Historic Places and the Hawai'i Register of Historic Places as State Inventory of Historic Properties (SIHP) site # 50-80-40-1353. Farrington High School is listed on the Hawai'i Register of Historic Places as SIHP # 50-80-14-9768. Both of these historic properties would be potentially affected by the renovation activity. The project area consists of approximately 27.25 acres (11.03 hectares).

The purpose of this study was to gather historical and archaeological information which will serve to aid the client in determining whether additional archaeological work in the form of an archaeological inventory survey (AIS) is needed. This investigation does not fulfill the requirements of an AIS (per Hawai'i Administrative Rules [HAR] §13-276). Rather, it serves as a document to facilitate the proposed project's planning, and it supports historic preservation review compliance by identifying any major archaeological concerns within the project area. This document develops data on the general nature, density, and distribution of archaeological cultural resources as can be gleaned from available sources.

1.2 Scope of Work

The scope of work for this project includes the following:

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.

Limited field inspection of the project area to identify any surface archaeological features 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.

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

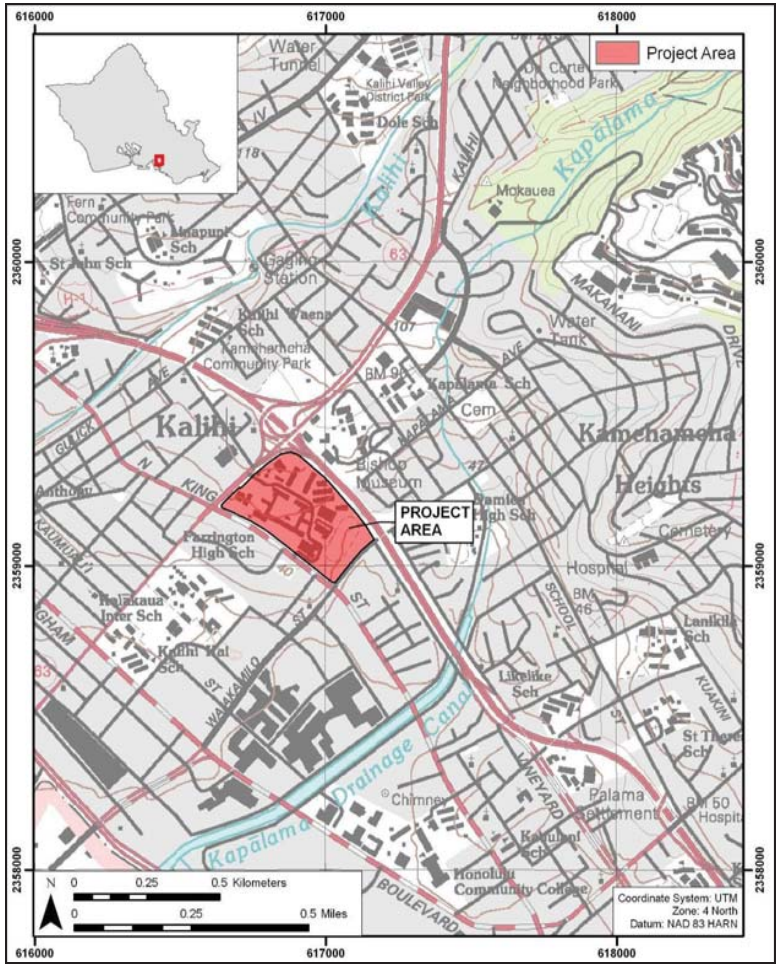

Figure 1. Portion of 1998 Honolulu USGS 7.5-minute series topographic quadrangle, showing the location of the project area

Figure 2. Tax Map Key (TMK) [1] 1-6-021, showing a portion of the study area (parcel 005) within Kapālama Ahupua'a (Hawai'i TMK Service 2010)

Figure 3. Tax Map Key (TMK) [1] 1-6-003, showing a portion of the study area (parcels 047, -048, -082, -083 and -999) within Kapālama Ahupua‘a (Hawai‘i TMK Service 2010)

Figure 4. Aerial photograph (Google Earth 2009) showing the location of the project area

recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

Coordination with the client and the State Historic Preservation Division (SHPD).

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is located within the traditional Hawaiian land unit (*ahupua‘a*) of Kapālamanear its west border with Kalihi Ahupua‘a. This traditional land division is perpetuated in modern taxmaps with Kapālama falling within TMKs Section 1-6 (see

Figure 2 and Figure 3). The valley of Kapālama was once watered by two small streams, the Kapālama and Niuhelewai Streams. Kapālama Ahupua‘a is pie-shaped with its apex at approximately 2,000 ft above mean sea level (AMSL) on the ridge that separates Nu‘uanu and Kalihi Valleys. The shore frontage (presently “Kapālama Basin”) is part of the Honolulu Harbor protected shoreline. In 1961, the development of the Kapālama Canal, located 500 m to the east of Farrington High School, channelized the lower streams.

Temperatures in the project area range from 60–90 degrees Fahrenheit, while rainfall varies from 20–50 inches per year (Juvik and Juvik 1998:62-64). According to U.S. Department of Agriculture soil survey data (Figure 5), sediment types in the project area are predominantly comprised of Honouliuli Clay 0-2% slopes (HxA), with Kawaihapai very stony clay loam 2-6% slopes (KlaB) on the southeast side, and a small exposure of Ewa Silty Clay Loam 6-12% slopes (EaC) in the northeast edge (Foote et al. 1972).

The Honouliuli series is described as follows:

> . . . well-drained soils on coastal plains […] These soils developed in alluvium and derived from basic igneous material. They are nearly level and gently sloping.
>
> These soils are used for sugarcane, truck crops, orchards, and pasture. The natural vegetation consists of *kiawe*, *koa haole*, fingergrass, bristly foxtail (*Setaria verticillata*), and bermudagrass (*Cynodon dactylon*). [Foote et al. 1972:43]

The Kawaihapai series:

> . . . consists of well-drained soils in drainage-ways and on alluvial fans […] These soils formed in alluvium derived from basic igneous rock in humid uplands. They are nearly level to moderately sloping.
>
> These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of *kiawe*, *koa haole*, lantana, and bermudagrass. [Foote et al. 1972:63-64]

The Ewa series:

> . . . consists of well-drained soils in basins and on alluvial fans […] These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping.

> These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass (*Chloris* spp.), *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena glauca*), *klu* (*Acacia farnesiana*), and *‘uhaloa* (*Waltheria americana*). [Foote et al. 1972:29]

1.3.2 Built Environment

The study area is the 27.25-acre campus of Wallace Rider Farrington High School, which is listed on the Hawai‘i Register of Historic Places as SIHP # 50-80-14-9768. The study area is located within an urban environment within the neighborhoods of Kalihi and Kapālama and is surrounded by modern urban development including streets, sidewalks, and utility infrastructure.

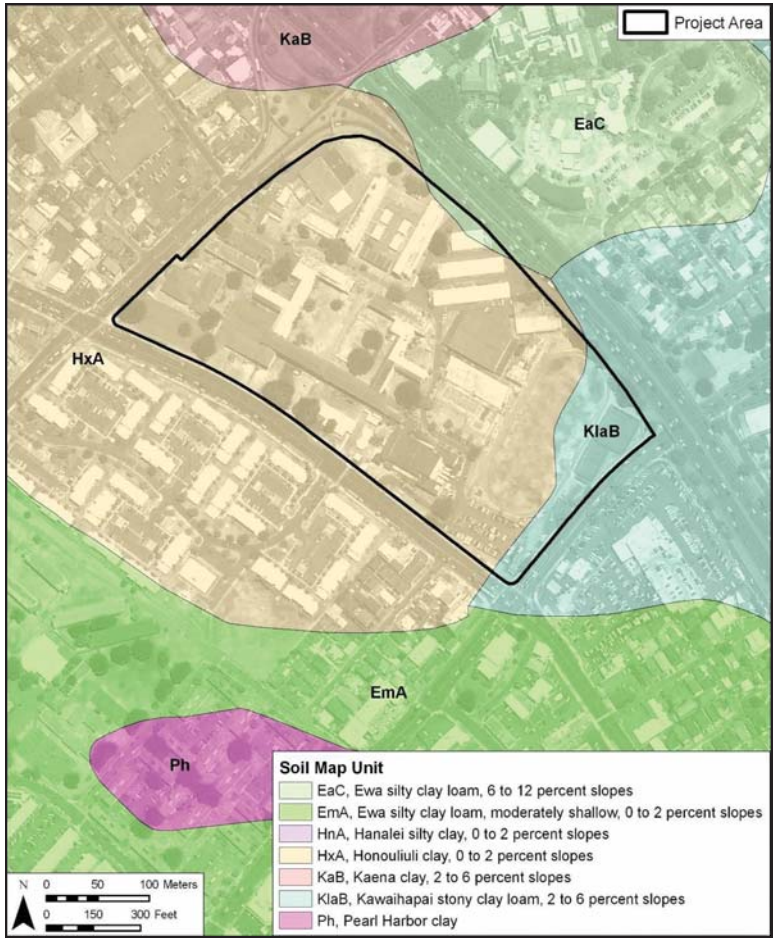

Figure 5. Aerial photograph (source: USGS Orthoimagery 2005) with overlay of the *Soil Survey of Hawaii* (Foote et al. 1972), showing sediment types in the vicinity of the project area

Section 2 Methods

2.1 Field Methods

The fieldwork component of this literature review and field inspection was carried out under archaeological research permit numbers 11-17 and 14-04, issued by the Hawai'i SHPD, per HAR §13-13-282. Fieldwork was conducted, under the general supervision of Hallett H. Hammatt, Ph.D., on 19 December 2011, and 11 November 2013 by Cary Stine, B.A and on 15 May 2014 by Constance R. O'Hare, B.A. and David W. Shideler, M.A. The fieldwork required one person-day to complete.

In general, the purpose of the field inspection was to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. Fieldwork consisted of a pedestrian survey of the study area, a GPS survey of the project area, and photographic documentation of the landscape and any above-ground structures.

2.2 Document Review

Historical background research included a study of archival and published sources at the University of Hawai'i at Mānoa Hamilton library, the Hawai'i State Public Library, the Bernice Pauahi Bishop Museum (BPBM) Archives and Library, and the CSH library. Historic maps and photographs were collected from the Hawai'i State Survey office, from published books, and from the BPBM photographic collection. Archaeological reports concerning the study area and its vicinity were reviewed at the SHPD library. LCA testimony was downloaded from the Waihona 'Aina online database (Waihona 'Aina 2000). All of these sources were consulted in order to construct a history of land use and to assess the potential for the presence of subsurface cultural deposits and human burials within the study area.

Section 3 Legendary and Traditional Background Research

3.1 Place Names

Place names can refer to natural geographic locations such as streams, peaks, rock formations, ridges, and offshore islands and reefs, or they can refer to Hawaiian divisions, such as the *ahupua‘a* (large land division), the *‘ili* (smaller land divisions within an *ahupua‘a*), a garden, or a fishpond. Hawaiian place names are often descriptive, matching their literal translation, but sometimes they refer to historical or legendary figures. The definitive source for Hawaiian place name meanings is the book *Place Names of Hawaii* by Mary Kawena Pukui, Samuel Ebert, and Esther Mo‘okini (Pukui et al. 1974). All place name meanings listed in this report are from this source unless otherwise noted. The main geographical points and land divisions in and surrounding Kapālama are shown on Figure 6. Many of these place names are associated with *mo‘olelo* (stories), *mele* (chants), and ‘*ōlelo* (proverbs), which are discussed in the next section (Legends of Kapālama).

The current study area, located in the Kona District, is within the traditional *ahupua‘a* of Kapālama. According to *Place Names of Hawaii*, the project area is located in an area called the plains of **Kaiwi‘ula** (Pukui et al. 1974:71). The plains of Kaiwi‘ula were believed to be located along a footpath between the taro patches of Kapālama and Kalihi streams (‘Ī‘ī 1959:95), thus within both Kahili and Kapālama Ahupua‘a. In his study on place names in land documents, however, Lloyd Soehren (2014) found only one reference to the name Kaiwi‘ula, which was an *‘ili* (small land division) within Kalihi only.

Kapālama Ahupua‘a extends from the sea coast to the head of Kapālama Gulch at approximately 4 km from the coast. Unlike most O‘ahu Kona District *ahupua‘a,* it does not extend all the way to the Ko‘olau Mountains; instead it is “cut off” by Kalihi Ahupua‘a on the western boundary and Nu‘uanu Ahupua‘a on the eastern boundary (see Figure 6). The place name Kapālama is often understood to refer to an enclosure (*pā*) of *lama* wood that surrounded the place of residence of high ranking *ali‘i* (chiefs) (Pukui et al. 1974:87). McAllister (1933:88) relates: “Kapalama is said to have obtained its name from an establishment in which the young *ali‘i* were kept just before pairing off for offspring.” This information probably came from Nathaniel Emerson, who translated David Malo’s *Ka Mo‘olelo Hawai‘i*. Emerson added many notes to his English translation, including the following:

> *Hoonoho ia* means put in an establishment, placed under the care of a guardian or duenna [chaperone]. Such an establishment was surrounded by an enclosure, *pa*, made of the sacred *lama* . . . Hence this special care or guardianship was called *palama*. It is said that an establishment of this kind was anciently placed at that suburb of Honolulu which to this day bears the name of *Ka-pa-lama*. [Malo 1951:139; note by N.B. Emerson]

Westervelt (1996:204) attributes the O‘ahu place name to a chiefess of O‘ahu who lived in that area. This chiefess was named Kapālama, the grandmother of Lepeamoa (Hawaiian for “cockscomb”). A chief of Kaua‘i, named Keahua, traveled to O‘ahu to take Kauhao, the daughter of Kapālama, as his wife. He angered a *kupua* (supernatural being that can change form) called

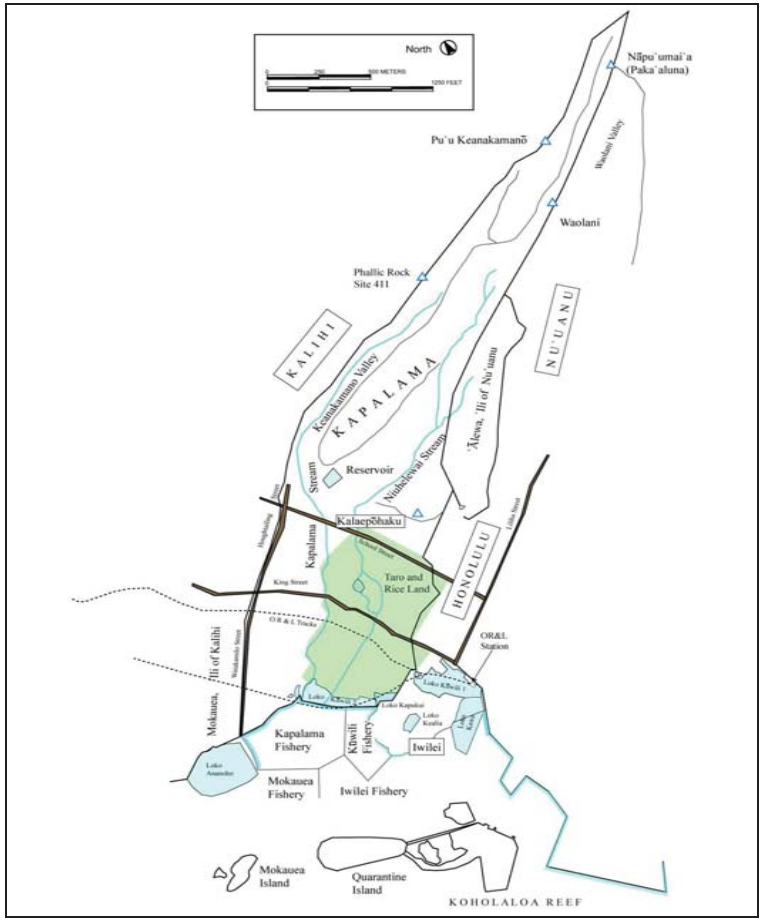

Figure 6. Map showing place names of Kapālama (source: U.S. Army War Department 1919); at the coast is the eastern edge of Ananoho Pond (possibly “dweller’s cave”; Thrum 1922:627) in Kalihi

Akuapehuale (god of swollen billows), who forced the couple to hide in the uplands of the Wailua River valley of Kaua‘i.

The highest peak in Kapālama is **Nāpu‘umai‘a** (“the banana hills”), 1,870 ft AMSL (above mean sea level) at the head of **Waolani** (“heavenly mountain area”) Valley, the western section of Nu‘uanu. An alternate name for this high peak may be **Pāka‘aluna** (meaning unknown). **Waolani** is also the name of a peak (1,414 ft AMSL) on the ridge separating Kapālama from Nu‘uanu’s Waolani Valley. The boundary with Nu‘uanu then extends along the western boundary of **‘Ālewa** (“suspended on a height”) Heights and then down to the coast on the east side of a high, rocky area called **Kalaepōhaku** (“the stone promontory”). The lower eastern boundary of Kapālama is ambiguous, as the early development of Honolulu town obscured boundary lines in the Honolulu coastal plain. On one early map, the eastern boundary of the *ahupua‘a* extends all the way to Nu‘uanu Stream, and includes within the *ahupua‘a* the large *‘ili* of **Kūwili** (“stand swirling”) and **Iwilei** (“collarbone *or* a unit of measurement”), and the ponds (*loko*) **Kūwili I** and **Kawa** (possibly “precipice or leaping place”; Pukui and Elbert 1986:139). During the Māhele, Iwilei was considered an *‘ili* of Honolulu, rather than Kapālama, and thus the eastern boundary of Kapālama extended only to the western point of Kūwili I Pond, generally following the modern alignment of Pālama and Alaneo streets, west of Liliha Street.

Keanakamanō (“the cave of the shark”) is the name of a peak (approximately 1,500 ft AMSL) at the head of a narrow valley, also called Keanakamanō, on the western side of Kapālama. Tradition also talks of a cave called Keanakamanō, but its exact location is unknown. At the level coastal flats, the western boundary extends from the mouth of Keanakamanō Valley.

3.2 Legends of Kapālama

3.2.1 Kapālama and Lepeamoa, the Bird Maiden of Pālama

The place name **Kapālama** is often understood to refer to an enclosure (*pā*) of *lama* wood that surrounded the place of residence of high ranking *ali‘i* (chiefs) (Pukui et al. 1974:87). Westervelt (1923:165) attributes the O‘ahu place name to a chiefess of O‘ahu who lived in that area. This chiefess was Kapālama, the grandmother of Lepeamoa (Hawaiian for “cockscomb”). There are several retellings of this story (Knudsen 1946:63-69; Pukui and Curtis 1994:118-126; Westervelt 1963a:204-245), but all seem to use Westervelt (1923) as their source. A chief of Kaua‘i, named Keāhua, traveled to O‘ahu to take Kauhao, the daughter of Kapālama, as his wife. He angered the *kupua* (supernatural being that can change form) called Akuapehuale (god of swollen billows), who forced the couple to hide in the uplands of the Wailua River valley of Kaua‘i.

Keāhua’s daughter was born as an egg, and was adopted by the chiefess Kapālama to raise on O‘ahu at her home, also named Kapālama. When the egg hatched, Lepeamoa was a bird with feathers all the colors of the rainbow. She became able to turn herself into a beautiful young woman wearing a feather *lei*. The girl was so beautiful that a rainbow was always present above her. The girl was guarded by her ancestress, Keaolewa (“the moving cloud”), who could also change forms between human and bird. The lower ridge separating Kapālama and Nu‘uanu (‘Ālewa Heights) may have been named for this ancestress.

The parents of Lepeamoa had another child, a son called Kau‘ilani, who was so strong that he was able to defeat the *kupua* who had threatened his parents. On Kaua‘i, there are several place names associated with this story. Kauhao (meaning “the scooping”) is the name of a deep valley in the *ahupua‘a* of Miloli‘i in the Waimea District. Lepeamoa is a point at the mouth of Ka‘auhau Valley in the same *ahupua‘a*. The valley in Wailua Ahupua‘a in the Puna District where Kau‘ilani defeated Akuapehuale was named Keāhua (meaning “hillock”) after the chief, his father (Wichman 1998:81, 158).

After Kau‘ilani’s victory over the *kupua*, he went to O‘ahu to find his sister, searching for the rainbow sign of her presence. In her compound, he found Kapālama, who advised him to hide in Lepeamoa’s house, wait until she was asleep in her bird form, and catch and hold her until she acknowledged him as her brother. Her advice worked, and Lepeamoa lived with her brother thereafter (Westervelt 1923:164-184).

Additional stories are told of Kau‘ilani and his magical sister Lepeamoa. In one story, the Maui chief, Mauinui, had a fighting rooster. This rooster was also a *kupua* that could change forms; by the use of its magic it always defeated any challenger. The O‘ahu chief Kakuhihewa was hosting the Maui chief at his residence in Waikīkī and was losing many goods while betting on the cock-fighting, which the Maui chief’s rooster always won. Kakuhihewa had heard about the hero Kau‘ilani and asked him if he could find some way to defeat the Maui rooster. When Kau‘ilani agreed, Kakuhihewa gave him his daughter in marriage. Kau‘ilani asked for the help of his sister, who turned into a beautiful hen to fight the rooster. The two combatants both changed forms several times during the battle, but eventually Lepeamoa won. The daughter of the king had a child, called Kamano, who Lepeamoa took back to Kapālama to care for (Westervelt 1923:227-245).

3.2.2 Stories of Heros and Gods

In the legend of Palila, the hero’s war club could magically carry him far distances in a single flight. Palila came to the plain of Keahumoa in ‘Ewa to participate in the athletic games given by the O‘ahu king, Ahuapau. The residence of this chief was said to be at Kalaepōhaku, near Wailuakio in Kapālama (Fornander 1918:V:1:142). Kalaepōhaku Peak (meaning “the stone promontory”) is near the intersection of School and Alaneo streets in Kapālama.

A place named Niuhelewai (*lit*. “coconut going in water”) in lower Kapālama, located *makai* of King Street (Fornander 1917b:IV:3:530-531; Fornander 1919a:V:2:368) was associated with the deity Haumea and the hero, Kaulu, who was known for his great strength.

Kaulu was born in Kailua on the windward side of O‘ahu. His older brother Kaeha was taken by the spirits to a realm of gods in the sky. For love of his brother, Kaulu followed him to this realm, playing a number of tricks on the gods including Makali‘i, the god of plenty, who had a magic fish net that would fill with fish whenever used. After playing the tricks, Kaulu then had to rescue his brother from the wrath of the various spirits. The brothers finally returned to the land of men on O‘ahu, setting down at Moanalua (*ahupua‘a* west of Kapālama).

> *A hiki laua ma Moanalua, i Papakolea, hoonoho o Kaulu ia Kaeha ilaila; hele mai la o Kaulu a loaa o Haumea i Kapālama. He ‘kua o Haumea no Oahu nei, e noho ana ia i Niuhelewai, he wahine of Haumea.*

> When they arrived at Papakolea, Moanalua, Kaulu left Kaeha at this place while he continued on his way to Kapālama in search of Haumea. Haumea was a spirit that lived at Niuhelewai, Oahu. It was a female spirit. [Fornander 1917b:IV:3:530-531]

Haumea, the goddess of childbirth, had a home at Niuhelewai in Kapālama; she challenged anyone who passed by, often killing them. Kaulu challenged Haumea to a fight on the following day. That night he flew back up to the spirit land in the clouds and borrowed the magic nets of Makali‘i, and then threw them over Haumea’s house. When Haumea could not break through these nets, she fell asleep in exhaustion, tangled in the nets. While asleep, Kaulu burned down her house, killing her.

3.2.3 Legend of the Tapa Board

A brief mention is made of Kapālama in the Legend of the Tapa Board, which has several different versions (Pooloa 1919; Raphaelson 1925; Sterling and Summers 1978:25-26, 149; Thrum 1910:129-131). Tapa was placed on a wooden board (also called an anvil), and beaten by women with tapa sticks to soften and smooth out the fibers. This pounding made a resonant sound, and women could often identify the owner of the board by the sound that was made. One day a woman in Kahuku on O‘ahu took her favorite tapa board to a pool to clean it and left it at the side of the pool. The next day the board was missing. The pool is identified as Waiakaole, Punaho‘olapa, or Waikalai, all in Kahuku, in various versions. The woman first searched the windward districts of the island, but never heard the distinctive ringing sound of her own favorite board. After several months without finding her board, she traveled to the leeward side of O‘ahu.

> She went from Kahuku on the Koolau side to Kaneohe where she spent the night. There was no sign of the anvil in Koolau, because the sign she sought was the sound it made . . . She went on and spent the night at Wailupe but did not find hers. She heard other anvils but they were not hers. The night turned into day and she went on to Kapālama where she slept but did not hear what she sought till she came to Waipahu. [*Ka Loea Kalaiaina*, 10 June 1899; English translation in Sterling and Summers 1978:25]

At Waipahu Spring in the ‘Ewa District, she finally heard the sound of her own board. She followed the sound to the uplands of Waikele and found a woman beating tapa on her board. The woman claimed that she had found the board one day floating on the water at a spring near her house. This legend illustrates the belief by the ancient Hawaiians that there were underground streams and passages that led from one side of the island to the other. In one version of this story, the people of ‘Ewa followed the woman back to Kahuku so that she could prove that the board was the same one she had lost. They wrapped a bundle of *ti* leaves and cast them into the pool near the house of the Kahuku woman. Then returning to ‘Ewa, they saw the same bundle of *ti* leaves a few days later in Waipahu at the spring. Because of this, the Waipahu spring was called Ka-puka-na-wai-o-Kahuku, which means “outlet of water from Kahuku.”

3.2.4 Keanakamanō, the Cave of the Shark

Near the Kamehameha Schools there was once a cave called Keanakamanō, which means “cave of the shark” (Sterling and Summers 1978:323). The Hawaiians have many stories

concerning legendary caves that connected inland springs to the sea or extended below the Ko‘olau Mountains, connecting the leeward and windward sides of the island.

> On the Kamanaiki side of the Kalihi Valley there was once a shallow cave called Keana Kamano. It was called the cave of the sharks because the big shark gods from Pearl Harbor often went there to rest.
>
> Keana Kamano led into the fabulous underground cave believed in olden times to occupy the center of the island of Oahu.
>
> One branch of the cave led around and under the mountains to Pearl Harbor. Another branch of the cave led to the center of the Island where there was a sacred pool for swimming.
>
> Hawaiians living today can tell of elders who once traveled these caves and who once swam in the sacred pool. An earthquake about 1900 closed up the caves and no one has been known to travel them since.
>
> It may be that the cave-in of the Wilson Tunnel occurred over the old lava tube leading to Pearl Harbor. [Taylor 1954]

An access street, called Kealamanō (“the way of the shark”) on the Kamehameha Schools’ Kapālama Heights campus is named for this cave. The shark referred to is Kamohoali‘i, king of the sharks, who is the older brother of Pele, the Hawaiian volcano goddess. On the long trip of Pele’s family to Hawai‘i, it was Kamohoali‘i who acted as the navigator. Don Mitchell, who said that earthquakes in 1900 caused the collapse of the cave states the following:

> His [Kamohoali‘i] favorite pastime was to swim through the extensive water-filled lava tubes or tunnels that extended from Pearl Harbor to areas under Kalihi Valley. As the tunnels rose above sea level, he assumed his human form and walked to his cave, Keanakamanō, on Kapālama Heights. [Mitchell 1993:146]

3.2.5 Pāka‘aluna Heiau and the Legend of the Kihapū

Samuel Kamakau (1991) says that the first *heiau* (temple) in the Islands were built in Waolani Valley by Wākea, said by some to be the progenitor of the Hawaiian race:

> In Waolani, Wākea built the first *heiau* houses for the gods. These were Kupuanu‘u, Kupualani, Pāka‘a-lana-lalo, and Pāka‘a-lana-luna. They were in the valley of Waolani. On the ridge that joins Waolani and Kapālama were two *heiau*, one overlooking the valley of Ke‘ana-o-ka manō and the other overlooking Nu’uanu valley. These were the *heiau* where, it was said, most of the *‘e‘epa* people lived and most of the people of wondrous fame who lived at Waolani lived. [Kamakau 1991:130]

The Hawaiian word “*luna*” means “high” and the word “*lalo*” means low, suggesting that Pāka‘a-lana-luna was at a higher elevation than Pāka‘a-lana-lalo. An 1851 outline sketch of Kapālama may indicate where Pāka‘a-lana-luna Heiau was located. At the *mauka* end of the *ahupua‘a*, a peak on the east side is marked “Pakaaluna,” while a peak on the west side, is marked “Puu Keanakamano” (in Keanakamanō Valley). It is possible that Pāka‘alanaluna Heiau

was built on Pāka‘aluna Peak. On modern maps, this peak is called Nāpu‘umai‘a and is located at the head (*mauka* end) of Waolani Valley.

Samuel Kamakau (1991:19-21) relates a legend about two *heiau* named Pāka‘alana, one in Waipi‘o Valley on Hawai‘i Island and one near Waolani Valley in Nu‘uanu on O‘ahu. There was once a boy named Kapuni:

> *He keiki o Kapuni na Kauhola. Ua olelo ia oia he Alii i hanau i ka la hookahi, a hele no, a nui no, a kanaka makua no, a elemakule no, a make no i ka la hookahi.*
>
> *Ma Waipio kahi i hanau ai, a ua waiho ia iloko o* ***Pakaalana*** *o ka Heiau, a ua hoolilo ia i akua* [Kamakau, *Kā Nūpepa Kū‘oko‘a,* 13 July 1865].
>
> Kapuni was the son of Kauhola. It is said that he was a chief born, walked, grew, became a mature man and an elderly man all in one day. He was born at Wai-pi‘o, Hawai‘i, was laid away at **Paka‘alana** *heiau,* and became a god. [Kamakau 1991:19]

One day two gods passed Kapuni’s home in Waipi‘o and saw him leaping far into the air, only to fall back to the ground. One god caught him in one of his leaps, and cut off a part of his body (his testicles), so that he would be light enough to leap high and to fly. The boy traveled with the gods to Kahiki (the ancestral Hawaiian homeland) and then to Kaua‘i, where they heard the sound of a conch shell (*pū*) blown by the *‘e‘epa* (legendary gnomes) at the Waolani temple in Nu‘uanu Valley.

Kapuni decided that he wanted that shell, even though the gods warned him that it was well-guarded by the *‘e‘epa*. Nevertheless, the three traveled to O‘ahu, landing at Pāka‘aluna Heiau, above where the shell was kept. Kapuni rested on a stone there in the land called Niolapa (an *‘ili* of Nu‘uanu). Kamakau provides some information on this location:

> *Hoi mai lakou nei mai Kauai mai, a luna o Kahakea, noho lakou a po. Lele mai lakou a kela pohaku pili ilaila (oia ka pili o Kapuni), aia ka Heiau e kani ai o ka pahu iluna aku o Waolani, iluna o ka puu, o Pakaaluna ka inoa o ua Heiau la.* [Kamakau, *Ka Nūpepa Kū‘oko‘a*, 13 July 1865]
>
> They came from Kaua‘i and stayed for a night above Kahakea, then leaped over to that rock (the one associated with Kapuni) there by the heiau where the pahu drums were sounded, above Waolani. Pāka‘a-luna [Pāka‘a-lana-luna] was its name. [Kamakau 1991:20]

Kapuni stole the shell from the *paehumu* (taboo enclosure) outside of the *heiau*, and the three leapt into the air, and flew north over the ocean to Moloka‘i. During this leap, the shell touched the ocean water and sent out a clear blast. The god of the temple heard the sound, and chased the thieves, but Kapuni and his friends hid in the waves and the god could not find them. They took the shell to a *heiau* in Hainoa, in the North Kona District of Hawai‘i Island. The *heiau* became a gathering place for the gods, who often blew on the trumpet shell.

In a continuation of this tale (Fornander 1917c:IV:3:558-560; Kamakau 1991:21-22; Skinner 1900:248-252; Westervelt 1963b:105-111; Westervelt 1987:214-218), Kiha was a chief of Hawai‘i dwelling in Waipi‘o Valley. He had dedicated a *heiau* in Kawaihae and had placed a *tabu* of silence until the dedication of this temple. The sound of the shell broke this *tabu*, and

Kiha determined to find the shell and take it for himself. He enlisted the aid of a dog, named Pupualenalena, who was an excellent thief. The dog stole the shell, jumping over the walls of the *heiau* in Hainoa and bringing the magical object back to Kiha in Waipi‘o Valley.

> The shell was renowned for its wonderful sound, and could call the warriors of the king from any distance when the king caused it to be blown. It was known as Kiha’s shell, the Kiha-pu. [Westervelt 1963b:110]

In other stories of the *kihapū* (Emerson 1988:130-131; Gowen 1908:19-26; Kalākaua 1990:251-265; Pukui and Curtis 1949:229-235), the owner of the shell is the Hawaiian chief Kiha, his son, Liloa, or his grandson, Umi, who ruled the island of Hawai‘i from ca. 1560-1620 (Cordy 2002:191). In one story, Kiha of Waipi‘o was the owner of the magic shell, which had been passed down through his family. It was stolen by a band of thieves who, fleeing Hawai‘i, finally made their way to Waolani Valley. The thieves’ leader, a man named Ika, became cruel to his followers, one of whom decided to bring about his downfall by silencing the shell and thus negating the powers the shell gave to Ika. A priest at the temple in Waolani placed a *pe‘a* mark, or *tabu* cross, on the shell. When Ika next tried to blow the shell, it made an ordinary sound, not the loud, supernatural sound it had once made. A priest was consulted, who told Ika the magic of the shell could only be restored if it was taken back to Hawai‘i. The thieves returned to their old haunts above Waipi‘o Valley and Kiha, learning of their return, determined to steal the shell back. He enlisted the help of the dog, Pupualenalena, who stole the shell and fled back to the valley. On the way, he dropped the shell once, breaking off the part with the *pe‘a* mark, and restoring the supernatural sound of the shell. When Kiha regained the shell, he summoned his men to capture the band of thieves, who were sacrificed in the temple of Pāka‘alana in Waipi‘o.

These legends are interesting in that two *heiau* named Pāka‘alana, one on Hawai‘i and one on O‘ahu, are both associated with the Kihapū legend. King Kalākaua said of the Waipi‘o *heiau*:

> Its *tabus* were the most sacred on Hawai‘i, and a descendant of Paoo officiated there as high priest. It was connected with the palace enclosure by a sacred stone pavement, which it was death for any but royal and privileged feet to touch, and on its walls were over a hundred gods. [Kalākaua 1990:178]

Several early authors noted that the shell came into the possession of Kamehameha I, and was passed down through his family, finally being incorporated into the collection of the Bishop Museum (Fornander 1880:72). According to the Bishop Museum Ethnology Database (Bishop Museum 2014), the *kihapū* is currently part of the museum collection.

3.2.6 Fishponds of Kapālama and Iwilei

According to Māhele documents, Kūwili Pond (Kūwili I), Kawa Pond, and the land surrounding them in the *‘ili* of Kūwili were considered part of the *ahupua‘a* of Honolulu, not Kapālama. However, these ponds are surrounded by Kapālama lands and were an important resource for the inhabitants of the area.

Kūwili literally means “stand swirling” (Pukui et al. 1974:125). Kūwili [Kūwili I] Pond is mentioned in the legend of Kū‘ula, the fish god of Hawai‘i. ‘Ai‘ai, son of Kū‘ula, gave the sacred *pā* (fishhook) called Kahuai to his son, Puniaiki, who used it to summon a school of *aku* (*Katsuwonus pelamys*; ocean bonito) in Honolulu harbor. The *aku* “unprecedented in number,

fairly leaped into the canoes . . . and the shore people shouted as the *akus* which filled the harbor swam toward the fishpond of Kuwili and on to the mouth of Leleo stream" (Manu 1998:247-248). No oral traditions, legends, or other ethnographic information have been found regarding Kawa Fishpond. The Hawaiian word *"kawa"* literally translates as a precipice or leaping place, or the pool below a precipice into which swimmers leap (Pukui and Elbert 1986:139).

Three other ponds are labeled on historic maps, Loko Kūwili II and Loko Kapukui in Kapālama and Loko Kealia in Iwilei. Pukui et al. (1974) do not give meanings for Loko Kapukui or Loko Kealia, but *keālia* is the Hawaiian word for salt bed, which may indicate that at least one of these ponds was used for salt collection.

3.3 Winds, Rains, and Seas of Kapālama

Each small geographic area on O'ahu had a Hawaiian name for its own wind, rain, and seas. The name of the winds of O'ahu are listed in a chant concerning a powerful gourd called the wind gourd of La'amaomao. When the gourd was opened, a specific wind could be called to fill the sails of a canoe and take the person in the desired direction. The chant lists the winds of the Honolulu area from east to west.

> Kukalahale is of Honolulu,
>
> 'Ao'oa is of Māmala,
>
> 'Ōluniu is of Kapālama,
>
> Haupe'epe'e is of Kalihi,
>
> Ko-momona is of Kahauiki.
>
> [Nakuina 1990:43]

The names of the seas of southeastern O'ahu are listed in a chant for the high chief, Kūali'i, paramount chief of the Hawaiian Islands from 1720 to 1740 (Cordy 2002:19). From the east end of Waikīkī to the west boundary of the Kona district at Moanalua Ahupua'a, the seas were described as follows:

> A sea for surf swimming is Kahaloa [*sic*] [in Waikīkī]
>
> A sea for net fishing is Kalia [in Waikīkī]
>
> A sea for going naked is Mamala [mouth of Honolulu Harbor]
>
> A sea for swimming is Kapuuone [in Kapālama/Kalihi]
>
> A sea for surf-swimming sideways is Makaiwa [in Kapālama/Kalihi]
>
> A sea for catching *'anae* [mullet] is Keeia [in Moanalua]
>
> A sea for crabs is Leleiwi [in Moanalua].
>
> [Fornander 1880:390]

3.4 Traditional Accounts of Battles in Kapālama

3.4.1 Kū'ali'i's (AD 1720-1740) Defeat of the Rebelling Ko'olaupoko Chiefs

Kū'ali'i was originally a Maui chief, but through a series of battles with the 'Ewa and Kona chiefs, he also unified O'ahu under his rule around AD 1720-1740 (Cordy 2002:19). Keanakamanō is the name of both the upper valley of Kapālama and the ridge that separates it from Waolani Valley, a portion of Nu'uanu Ahupua'a to the east. Somewhere in Waolani Valley stood an important *heiau* called Kawaluna.

> In the valley of Waolani, a side valley from the great Nuuanu, stood one of the sacred *Heiaus* called Kawaluna, which only the highest chief of the island was entitled to consecrate at the annual sacrifice. As Moi [king] of Oahu the undoubted right to perform the ceremony was with Kuali'i, and he resolved to assert his prerogative and try conclusions with the Kona chiefs, who were preparing to resist what they considered an assumption of authority by the Koolaupoko chief. Crossing the mountain by the Nu'uanu and Kalihi passes, Kualii assembled his men on the ridge of Keanakamano, overlooking the Waolani valley, descended to the *Heiau*, performed the customary ceremony on such occasions, and at the conclusion fought and routed the Kona forces that had ascended the valley to resist and prevent him. The Kona chiefs submitted themselves, and Kuali'i returned to Kailua. [Fornander 1996:280]

Thomas Thrum (1906) mentions only one *heiau* in Waolani Valley by name:

> Kawaluna.....Waolani, Nu'uanu.—Of heiau and luakini class, consecrated by Kuali'i about 1685. Tradition credits the construction of several in this locality to the time of Wakea. [Thrum 1906:44]

According to the report of the battle between Kūali'i and the rebellious O'ahu chiefs, this *heiau* was probably on the Waolani Valley floor, as Kūali'i "assembled his men on the ridge of Keanakamanō, overlooking the Waolani valley, [and] descended to the Heiau . . . " (Fornander 1996:280).

In a chant for the high chief Kūali'i, the O'ahu lands under his authority are listed as though someone is traveling around the island of O'ahu. The chant also seems to be a play on words, as a portion of the definition of the place name also appears in the stated action (e.g., let us go up for **lama**-Kapālama):

Let us abide in the hollow—of Moanalua;	*E noho kaua i ka lua—o Moanalua*;
We will bend the hau—at Kauahuiki;	*Hoopiopio hau kaua—o Kahauiki*;
And go zigzagging down the edge—of Kalihi;	*Hookeekee lihi kaua—o Kahlihi*;
Let us go up for lama-in Kapālama;	***E pii kaua i ka lama—o Kapālama*;**
Then bundle and fasten on the back—at Hononunu;	*E nunu a paa hoawe—o Hononunu*;
There my hair is anointed—at Waikiki . . .	*Kiki kuu oho ilaila—o Waikiki . . .*

[Fornander1917a:IV: 2:400-401]

3.4.2 Kahahawai'a defeat of Kahāhana (AD 1780-1783)

Niuhelewai Stream was the location for a famous battle between Kahahawa'i, the war chief of Kahekili, king of Maui, and the O'ahu ruling chief Kahāhana. Fornander (1919b: V:2:498) states in a footnote to a story that Niuhelewai was the name of the locality of the Pālama cane field between the fire and pumping stations. Ross Cordy (2002:19) places Kahāhana's reign of O'ahu around the year 1780 to his death in 1783 after this battle.

> *I ka wa e noho ana o Kahekili he 'lii no Maui, a o Kahahana he 'lii no Oahu nei iloko oia kau i holo mai ai o Kahahawai me na koa e kaua ia Oahu. Ma keia kaua ana ua hee a ua luku ia na kanaka Oahu, ma Niuhelewai, a ua hoi ka wai i uka o ka muliwai, no ka piha i na kanaka.*
>
> Translation:
>
> When Kahekili was reigning as king of Maui, and Kahahana was king of Oahu, it was during this period that Kahahawai with a number of warriors came to make war on Oahu. In this battle the people of Oahu were defeated and slaughtered at Niuhelewai, and the waters of the stream were turned back, the stream being dammed by the corpses of the men. [Fornander 1919b:V:2:498-499]

3.4.3 The Rebellions of the 'Ewa and Kona Chiefs (post-1783)

After Kahāhana's death, the chiefs of Maui took over O'ahu. Some of the chiefs from the O'ahu districts of 'Ewa and Kona conceived a plot to murder their new overlords, but the Maui chiefs were warned. Although the main backers of the plot were the chiefs of Waipi'o, 'Ewa, they were temporarily able to convince Kahekili that the conspiracy originated on Kaua'i, thus the phrase, *Waipi'o kīmopō*, "Waipio'o of the secret rebellion" (Pukui 1983:#2918:319). Eventually the truth was revealed and:

> *A no kēia mea, ulu maila ke kaua kūloko o Kona me 'Ewa, nā moku o O'ahu i luku nui 'ia; ua luku 'ia nā moku o O'ahu i luku nui 'ia; ua luku 'ia nā kāne, nā wāhine a me nā keiki, a ua pani kūmano 'ia nā kahawai a me nā muliwai i nā heana o nā kānaka o Kona a me 'Ewa. 'O nā kahawai i 'oi aku ka nui o nā heana, a ho'i hou ka wai i uka, 'o ia nō 'o Makaho a me Niuhelewai ma Kona, a 'o Kaho'ā'ia'i ho'i ko 'Ewa. He kūmukena ka nui o nā mea he make, ke lilo ka wai i mea 'awa-'awa ke inu aku. Ua 'ōlelo mai ho'i ka po'e 'ike maka 'O ka lolo ka mea i 'awa-'awa ai 'o ka wai.'* [Kamakau 1996:91, *Ka Nūpepa Kū'oko'a*, 30 March 1867]
>
> Translation:
>
> . . . the districts of Kona and 'Ewa were attacked, and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona [in Kapālama] and of Kahoa'ai'ai in 'Ewa were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the Oahu chiefs were killed and the chiefesses tortured. [Kamakau 1992:138]

3.4.4 Kamehameha's Invasion and Conquest of O'ahu (AD 1795)

In 1795, the Hawaiian chief Kamehameha sailed his invasion fleet to O'ahu, landing on the leeward shore from "Wai'alae to Waikiki" (Desha 2000:407). For three days, Kamehameha and his warrior chiefs prepared to battle the O'ahu forces and wrest the island from the native chiefs, in order to unite all the Hawaiian Islands under his rule. Some of the preparations consisted of ceremonial rites.

> For three days this organization went on, and on the third night after his landing on O'ahu, he climbed with Keaweokahikona and two O'ahu ali'i who had turned to Kamehameha's side. They climbed up above Hauhaukoi, Kapālama. This was a journey for Kamehameha to drink *'awa*, as this was the place where the royal *heiau* of Lonoikekūpali'i stood . . . The *'awa*-drinking platform (papa'inu'awa) was set up, and immediate preparations for the *'awa*-drinking ceremony for Kamehameha were begun. When the cups of *'awa* for Kamehameha and his companions were ready, they drank, and at the end of the ceremony, they returned to Waik#k# where Kamehameha's armies were encamped. [Desha 2000:407]

Neither Thomas Thrum (1906, 1908) nor J. Gilbert McAllister (1933), two early documenters of O'ahu *heiau*, list Lonoikekūpali'i. According to this description, the *heiau* was in the *'ili* of Hauhaukoi. In the Waihona 'Aina database (Waihona 'Aina 2000), Hauhaukoi is listed as an *'ili* of Honolulu, rather than Kapālama; it was located along the eastern border of Kapālama.

3.4.5 Keanakamanā, the Cave of the Shark

Near Kamehameha Schools there was once a cave called Keanakamanō, which means "cave of the shark" (Sterling and Summers 1978:323). The Hawaiians have many stories concerning legendary caves that connected inland springs to the sea or extended below the Ko'olau Mountains, connecting the leeward and windward sides of the island.

> On the Kamanaiki side of the Kalihi Valley there was once a shallow cave called Keana Kamano. It was called the cave of the sharks because the big shark gods from Pearl Harbor often went there to rest.
>
> Keana Kamano led into the fabulous underground cave believed in olden times to occupy the center of the island of Oahu.
>
> One branch of the cave led around and under the mountains to Pearl Harbor. Another branch of the cave led to the center of the Island where there was a sacred pool for swimming.
>
> Hawaiians living today can tell of elders who once traveled these caves and who once swam in the sacred pool. An earthquake about 1900 closed up the caves and no one has been known to travel them since.
>
> It may be that the cave-in of the Wilson Tunnel occurred over the old lava tube leading to Pearl Harbor. [Taylor 1954]

An access street, called Kealamanō ("the way of the shark") on the Kamehameha Schools Kapālama Heights campus is named for this cave. The shark referred to is Kamohoali'i, king of the sharks, who is the older brother of Pele, the Hawaiian volcano goddess. On the long trip of

Pele's family to Hawai'i, it was Kamohoali'i who acted as the navigator. Don Mitchell, who said that earthquakes in 1900 caused the collapse of the cave (1993:146), states the following:

His [Kamohoali'i] favorite pastime was to swim through the extensive water-filled lava tubes or tunnels that extended from Pearl Harbor to areas under Kalihi Valley. As the tunnels rose above sea level, he assumed his human form and walked to his cave, Keanakamanō, on Kapālama Heights. [Mitchell 1993:146]

3.4.6 Traditional Accounts of Battles at Niuhelewai Stream in Kapālama

The *ahupua'a* of Kapālama has two streams, the Kapālama and the Niuhelewai ("coconut going [in] water"). They merge and extend through the central fertile former taro and rice fields, an area also called Niuhelewai. This area drained into a pond called Kūwili II.

A place named Niuhelewai, located *makai* of King Street (Fornander 1917b:IV:3:530-531; Fornander 1919a:V:2:368), was associated with the deity Haumea and the hero, Kaulu, who was known for his great strength (see Section 3.2.2). Niuhelewai Stream was the location for a famous battle between Kahahawa'i, the war chief of Kahekili, king of Maui, and the O'ahu ruling chief Kahāhana (ca. AD 1780-1783). Ross Cordy (2002:19) places Kahāhana's reign of O'ahu around the year 1780 to his death in 1783 after this battle. Fornander (1919:498) states in a footnote to a story that Niuhelewai was the name of the locality of the Pālama cane field between the fire and pumping stations:

> When Kahekili was reigning as king of Maui, and Kahahana was king of O'ahu, it was during this period that Kahahawai with a number of warriors came to make war on O'ahu. In this battle the people of O'ahu were defeated and slaughtered at Niuhelewai, and the waters of the stream were turned back, the stream being dammed by the corpses of the men. [Fornander 1919a:V:2:498-499]

The location is uncertain but the reference to the "*muliwai*" (lagoonal backwater) being backed up suggests the location of the battle dead was more seaward.

After Kahāhana's death, the chiefs of Maui took over O'ahu. Some of the chiefs from the O'ahu districts of 'Ewa and Kona conceived a plot to murder their new overlords, but the Maui chiefs were warned and (ca. 1790) retaliated:

> . . . the districts of Kona and 'Ewa were attacked, and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona [in Kapālama] and of Kahoa'ai'ai in 'Ewa were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the Oahu chiefs were killed and the chiefesses tortured. [Kamakau 1992:138]

Thus, we have accounts of two separate massacres, seemingly of some magnitude, at "Niuhelewai" Kapālama (ca. 1782 and 1790). We have no specific knowledge of the location of the battles or the nature of the disposal of the dead. It is not inconceivable that there are one or more areas in which the skeletal remains of these massacres are still extant.

Section 4 Historic Background

4.1 Early Post-Contact Period

Kapālama Ahupua'a offered desirable environmental conditions for traditional Hawaiian subsistence practices. The well-watered flood plain would have allowed for the development of an extensive *lo'i* (irrigated taro) system, and the protected shoreline and fringing reef would have allowed for ease of ocean access to the productive near-shore fisheries. E.S. Craighill Handy, who gathered information on former planting areas from local informants in the 1930s and 1940s, reported the following:

> Kapālama had two streams watering its terrace area [for taro], which was almost continuous from Iwilei up to the foothills above School Street, an area measuring about three quarters of a mile both in depth inland and in breadth. [Handy 1940:79]

The lower lands were used for taro cultivation; the uplands also had considerable resources. In the early nineteenth century, sandalwood trees were still present in the forests. These trees were extensively harvested between 1810 and 1830 as the fragrant wood could be sold to ship captains sailing to China to trade for exotic Asian goods.

Otto von Kotzebue's journal and map of Honolulu provide one of our earliest accounts of the environs of seaward Kapālama ca. 1817. The following account is of a trip towards Pearl Harbor commencing near the mouth of Nu'uanu Stream:

> The way now lies to the west, through a beautifully cultivated valley, which is bounded towards the north by romantic scenery of woody mountains, and on the south by the sea. The artificial taro fields, which may justly be called taro lakes, excited my attention. Each of them forms a regular square of 160 feet, and is enclosed with stone all round like our basins. This field, or rather this pond . . . contains two feet of water. In the spaces between the fields, which are from three to six feet broad, there are very pleasant shady avenues, and on both sides bananas and sugar cane are planted . . . [T]he fish which are caught in distant streams thrive admirable when put into them. In the same manner as they here keep river-fish, they manage in the sea with sea-fish, where they sometimes take advantage of the outward coral reefs, and draw from them to the shore a wall of coral stone. Such a reservoir costs much labor, but not so much skill as the taro fields, where both are united. I have seen whole mountains covered with such fields, through which the water gradually flowed; each sluice formed a small cascade, which ran through avenues of sugarcane, or banana into the next pond, and afforded an extremely picturesque prospect. Sugar plantations and taro fields alternately varied our way, with scattered habitations, and we had gone unawares five miles to the large village of Mouna Roa [Moanalua] . . . [Kotzebue 1967:339-341]

Kotzebue's 1817 map of Honolulu (Figure 7), although undoubtedly somewhat schematic, shows large taro fields (and trees) similar to his written description on both sides of the mouth of Kalihi and Nu'uanu streams extending to the coast. The path shown was probably the main trail and the route traveled by Kotzebue himself. The 1817 map does not show any taro fields in Kapālama, but a later 1855 map by La Passé (Figure 8) does show extensive taro *lo'i* (irrigated patches) in the *makai* section of Kapālama.

In his history of Hawai'i, written in the 1860s, John Papa 'Ī'ī described the appearance of the trail (around the year 1810) from Nu'uanu to Moanalua through Kapālama:

> When the trail reached a certain bridge, it began going along the banks of taro patches, up to the other side of Kapālama, to the plain of Kaiwiula; on to the taro patches of Kalihi; down to the other stream and up the other side; turned right to the houses of the Portuguese people . . . ['Ī'ī 1959: 95]

While somewhat general, the 'Ī'ī account supports that of von Kotzebue in relating an abundance of *lo'i* where the main trail crossed Nu'uanu and Niuhelewai streams, Kapālama Stream, a relatively uncultivated plain as the trail traversed the western section of Kapālama in the *'ili* of Kaiwi'ula (area now occupied by the current study area), and then to more *lo'i* on Kalihi Stream.

Kamehameha I, after the devastations to the population caused by the wars of conquest and a ca. 1804 epidemic, encouraged people to replant the land and set aside several large tracts, including tracts in Kapālama, to grow crops for their own use and for trade with visiting ships. The Hawaiian historian, Samuel Kamakau, noted, "After the pestilence had subsided the chiefs again took up farming, and Kamehameha cultivated land at Waikiki, Honolulu, and Kapālama, and fed the people" (Kamakau 1992:190).

John Papa 'Ī'ī, knew personally that, "He [Kamehameha] also lived in Honolulu, where his farms at Kapālama, Keoneula, and other places became famous. These tasks Kamehameha tended to personally, and he participated in all the projects" ('Ī'ī 1959:69).

Rev. Hiram Bingham, arriving in Honolulu in 1820, described a predominantly Native Hawaiian environment—still a "village" —on the brink of western-induced transformation:

> We can anchor in the roadstead abreast of Honolulu village, on the south side of the island, about 17 miles from the eastern extremity . . . Passing through the irregular village of some thousands of inhabitants, whose grass thatched habitations were mostly small and mean, while some were more spacious, we walked about a mile northwardly to the opening of the valley of Pauoa, then turning south-easterly, ascending to the top of Punchbowl Hill, an extinguished crater, whose base bounds the north-east part of the village or town . . .Below us, on the south and west, spread the plain of Honolulu, having its fish-ponds and salt making pools along the sea-shore, the village and fort between us and the harbor, and the valley stretching a few miles north into the interior, which presented its scattered habitations and numerous beds of kalo (arum esculentum) in its various stages of growth, with its large green leaves, beautifully embossed on the silvery water, in which it flourishes. [Bingham 1981:92-93]

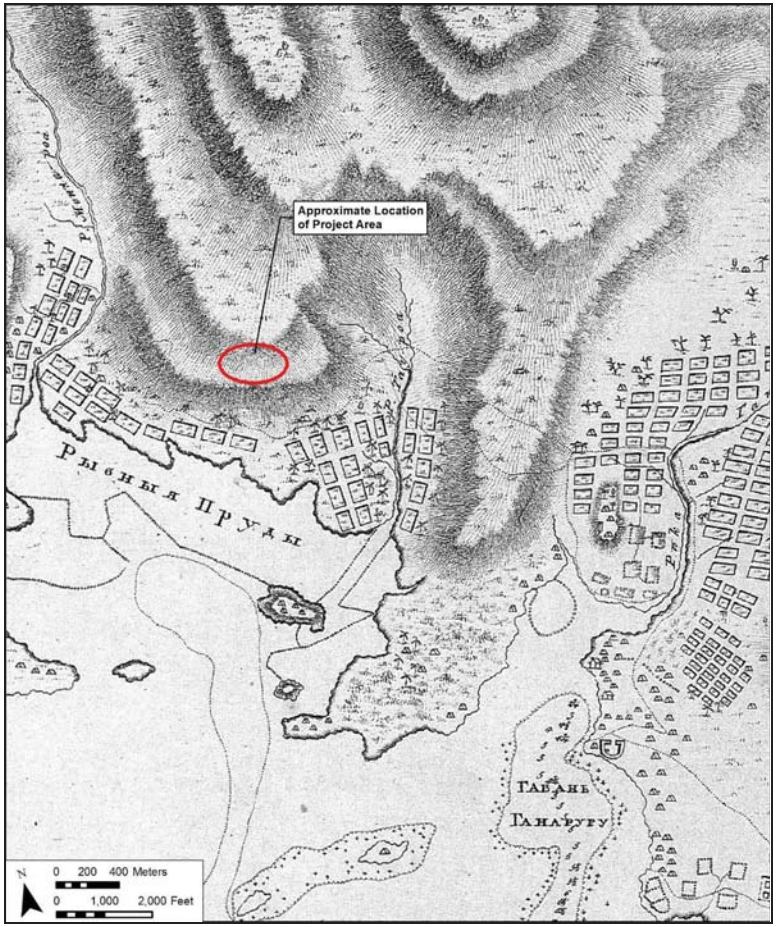

Figure 7. 1817 map of South O'ahu, drawn by Otto von Kotzebue, commander of the Russian vessel *Rurick* (reprinted in Fitzpatrick 1986:48-49) showing approximate location of the project area relative to major landmarks; note while this map is inaccurate in detail it does serve to show the intensive Hawaiian land use in the vicinity

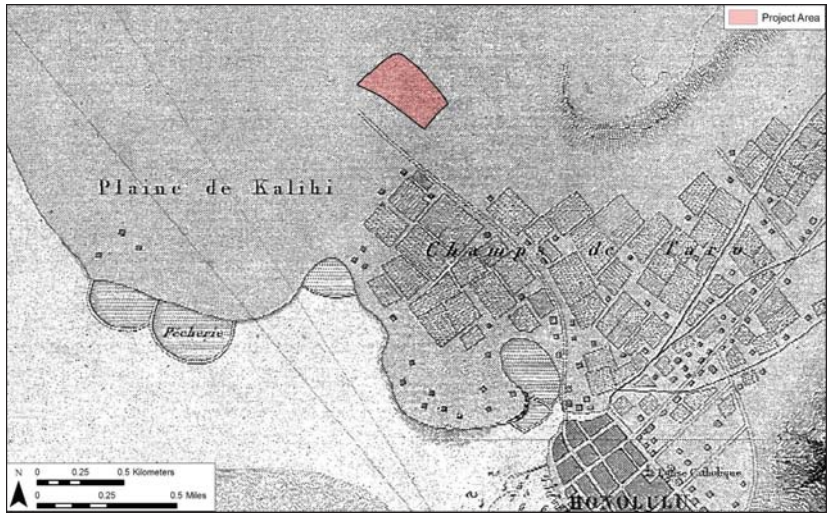

Figure 8. Map of Honolulu by Joseph de La Passé, a lieutenant aboard the French vessel *L'Eurydice*, drawn in 1855 and published in 1858 (reprinted in Fitzpatrick 1986:82-83) showing *lo'i*, habitations, and fishponds southeast of the project area

4.2 Mid-1800s and the Māhele

In the 1790s, after Kamehameha had conquered O'ahu, Kapālama is specifically mentioned, along with Nu'uanu, Mānoa, and Waikīkī, as having been "farmed" by Kamehameha. The desirability of Kapālama Ahupua'a is evidenced in that Kamehameha "kept of himself" the *ahupua'a* during the post-1795 division of O'ahu lands (Kame'eleihiwa 1992:59). Kapālama remained with the Kamehameha Dynasty through his grandchildren Moses Kekūāiwa, Victoria Kamāmalu and Lot Kamehameha, eventually becoming part of the Bernice Pauahi Bishop Estate.

4.2.1 Māhele Awards in Kapālama

At the Māhele, or division of all lands between Kamehameha III and 251 other ranking members of the Kingdom of Hawai'i in 1848, the *ahupua'a* of Kapālama was awarded as part of LCA 7714-B to Moses Kekūāiwa, son of Kekūanao'a and Kīna'u. Kīna'u had earlier been married to Kamehameha I. The land passed down in turn to his sister Victoria Kamāmalu, to her brother Lot Kamehameha, to his half-sister Ruth Ke'elikōlani, and then to her first cousin, Bernice Pauahi Bishop. The will of Bernice Bishop set many of her lands aside as a trust to provide financial aid to educational and charitable institutions, including the founding of Kamehameha Schools to educate Hawaiian youth (Mitchell 1993:9).

Subsequent to the Māhele award for the bulk of the *ahupua'a*, individual *kuleana* (commoner) lots were awarded pursuant to the 1850s Kuleana Act (that confirmed Native tenant rights to apply for lands they actively used). The first detailed map of Kapālama, made by J.F. Brown in 1885, shows a traditional Hawaiian landscape of small *kuleana* LCA parcels extending across the Kapālama plain on both sides of Kapālama Stream (Figure 9 and Figure 10). This area was clearly intensively utilized for both permanent habitation and agriculture. Mid-nineteenth century Māhele documents identify these *kuleana* parcels as comprising house sites and irrigated taro fields (Table 1). The map also indicates large areas set aside for rice fields near the central *'auwai* (irrigation ditch) on land managed by the *konohiki* (land agent for the *ali'i*; in this case Moses Kekūāiwa).

The *kuleana* to Hawaiian commoners were located on the flood plain to the east of Waiakamilo/Houghtailing Street and included house lots and *lo'i* (pond fields) for the cultivation of *kalo* (taro). The absence of LCA parcels on the west bank of the stream near the project area was likely due to the inability to irrigate there. Only one LCA overlaps with the project area, the Konohiki Award LCA 7714B to Moses Kekūāiwa. Konohiki awards were given to *ali'i*, who, unlike commoners, were not required to give information on the use of the land, so it is not known if the lot was used as a house lot or for agriculture or for pasture. Roughly over 100 *kuleana* lots were awarded in Kapālama. These are shown on an outline map (Figure 10) of the LCA parcels (traced from the 1885 Brown map) and listed in Figure 11.

One consequence of note during this time period was an event that took place in 1853; an epidemic of smallpox broke out in Honolulu and the graveyards were filling up with no more space for the dead. The solution was to bury the deceased in areas where there were no large populations. An area possibly near the current project area was one of these places where the dead were known to be buried. This area was known as the plains of Kaiwi'ula in early historic accounts.

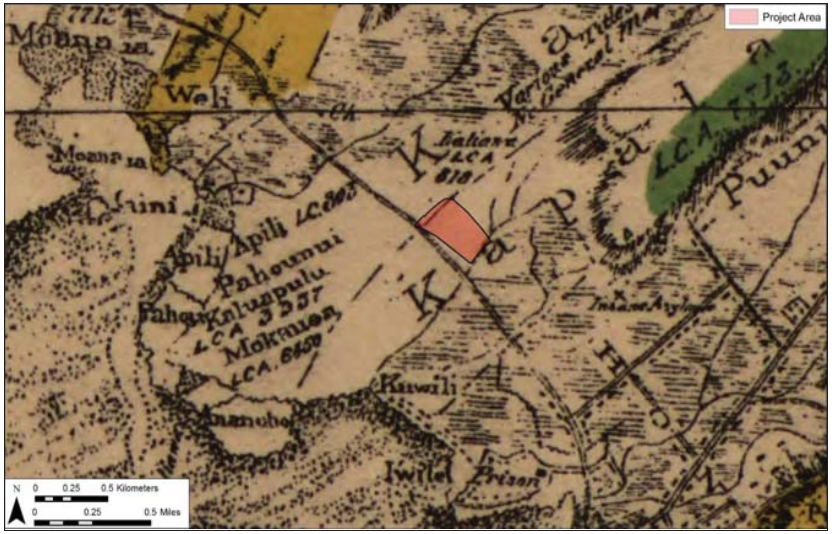

Figure 9. 1881 Oahu, Hawaiian Islands map by R. Covington

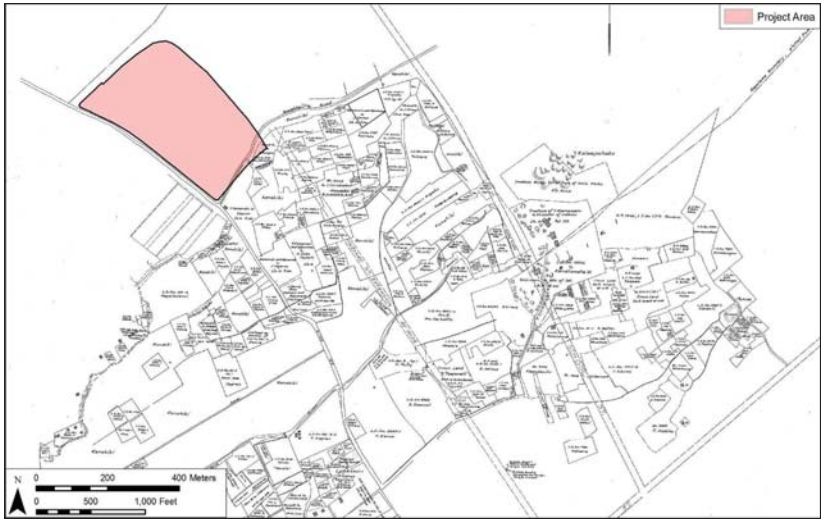

Figure 10. 1885 map (portion) by J.F. Brown of the *makai* sections of Kapālama and Iwilei, showing the distribution of Land Commission Award (LCA) parcels extending across the Kapālama plain on both sides of Niuhelewai (Kapālama) Stream

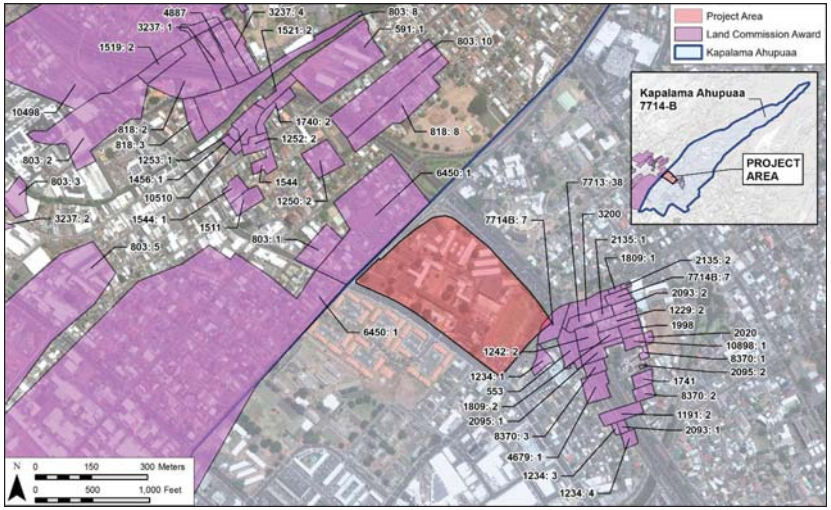

Figure 11. 2005 aerial photograph (USGS Orthoimagery), with overlay of LCA parcels in Kalihi and Kapālama near the study area (note the entire *ahupua'a* of Kapālama is LCA 7714-B)

Table 1. LCAs in Kalihi and Kapālama in the Vicinity of the Study Area (in numeric order)

LCA Number	Contents of Award
553	Nine *lo'i* (1.07 acres); awarded to Ku'ula
591	One *lo'I*; awarded to John Meek
803	*Lo'i*, pastures (*kula* land), and *loko* (fishpond) (292.41 ac); awarded to Alexander Adams
818	One farm with the fishing grounds called Kaliheawa, situated in Kalihi; awarded to George Beckley
1191	Four *lo'i*, one house, and one irrigation ditch on the *'ili* of Kaluaipilau awarded to Kuloa
1229	Eight *lo'i* and one house in the *'ili* of Kealia awarded to Keliinui
1234	Seven *lo'i*, one house, and one irrigation ditch awarded to Palau
1242	Two *lo'i* and one house awarded to Pi
1250	Three *lo'i* in the *'ili* of Kaliawa awarded to Keawe
1252	Three *lo'i* and two *kula* in the *'ili* of Kaunapo awarded to Kauwaa
1253	Six *lo'i* in the *'ili* of Keoki awarded to Kahuakai
1519	Six *lo'i*, one *kula*, two houses one fence in the *'ili* of Kaliawa awarded to Koikumuole
1521	Seventeen *lo'i* and one house in the *'ili* of Niau awarded to Haula
1544	Eight *lo'i* and one house in the *'ili* of Apili awarded to Kuloa
1740	Nine *lo'i* and one house in the *'ili* of Inaipuhi awarded to Kapuunoni
1741	Two *lo'i*, one *kula, one* house in the *'ili* of Kealia awarded to Kamookahi
1809	One *lo'i*, one house, and two irrigation ditches in the *'ili* of Maliko awarded to Palau
1998	One *lo'i*, one irrigation ditch awarded to Napaupau
2020	Two *lo'i* in the *'ili* of Kaluapilau awarded to Pa
2093	Two *lo'i* and one irrigation ditch in the *'ili* of Maliko awarded to Keliipaahana
2095	Five *lo'i*, one house, and one irrigation ditch in the *'ili* of Kamookahi awarded to Kaioe
2135	One *lo'i*, one house, and one irrigation ditch in the *'ili* of Maliko awarded to Kio
3200	One *lo'i*, one house, and one *kula* awarded to John
3237	Lot awarded to Hewahewa; no description of land use in award

LCA Number	Contents of Award
4679	Three *lo'i* in the *'ili* of Kamookahi awarded to Paewahine
4887	Four *lo'i* and two houses in the *'ili* of Kaaleo awarded to Thomas
6450	*'Ili* of Mokauea (737.76 ac) awarded to Kaunuohua; no description of land use in award
7713	No description of land use in award; awarded to Kamamalu
7714B	No description of land use in award; awarded to Kekuaiwa
8370	Three *lo'i* in the *'ili* of Kamookahi awarded to Kahinu
10498	Six *pō'alima* [land worked for the *ali'i*] *kalo* patches and one pasture; awarded to Nahinu
10898	Three *lo'i* in the *'ili* of Kamookahi awarded to Piipii

> When the graveyard in Honuakaha was filled, Keone'ula was taken for a burial ground as well as the plains of Kaiwi'ula and the rocky lands of Mau'oki and Laepohaku. [Kamakau 1992:417]

According to *Place Names of Hawai'i* the location of the plains of Kaiwi'ula are on the current Bishop Museum grounds (Pukui et al. 1974:71). The plains of Kaiwi'ula were believed to be located along a footpath between the taro patches of Kapālama and Kalihi streams ('Ī'ī, 1959:95). Although the current project area is located on a high plain between Kalihi and Kapālama streams it is believed the old trail that ran through the plains of Kaiwi'ula was basically that of modern day King Street running on the *makai* side of the current Farrington High School property ('Ī'ī, 1959:93) (see Figure 8, Figure 9, and Figure 10). However, Lloyd Soehren places Kaiwi'ula within Kalihi Ahupua'a, not within Kapālama.

4.3 Kalihi-Kapālama in the Twentieth Century

4.3.1 Residential and Commercial Development of Kalihi and Kapālama

In the twentieth century, the coastal and central sections of Kalihi and Kapālama became a suburb of Honolulu. The lower areas, within the current project area, were often grouped together as Kalihi-Kapālama or Kalihi-Pālama. Thus the twentieth century developments of these two *ahupua'a* will be discussed together. Historic maps document the traditional Hawaiian landscape of Kalihi-Kapālama and the development of the project area road corridors during the second half of the nineteenth century and the first decades of the twentieth century.

An 1897 map of Honolulu by M.D. Monsarrat (Figure 12) indicates the Kalihi-Pālama area as the western edge of the greater Honolulu urban area. King Street is the main east-west thoroughfare (almost certainly developed following a main Hawaiian trail), paralleled by the tracks of the Oahu Railway and Land Company. Kamehameha IV Road and Kalihi Road are the main *mauka-makai* roads. The fishponds on the Kalihi coast are still in use, but the area inland has been converted from taro fields to rice fields. The project area is situated within the central

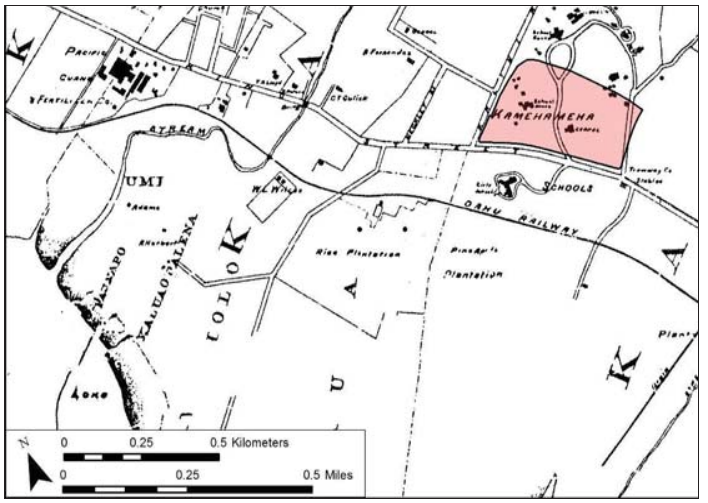

Figure 12. 1897 map of Honolulu by M.D. Monsarrat, Registered Map 1910, showing residential and commercial development of Kapālama; note location of [Bishop Memorial] Chapel in the east half of campus within the project area (shaded in pink) and location of the Tramway Company stables opposite the southeast corner of the project area

portion of the first campus of Kamehameha Schools. The inland portion of the Kamehameha Schools campus of 1897, to the northeast, would become the Bernice Pauahi Bishop Museum.

4.3.2 Hawaiian Tramway and the What Cheer House

The first public transport system in Honolulu was the Spring Pioneer Omnibus Line, established in 1868 as a horse and wagon operation in downtown Honolulu, extending up to Nu'uanu and School streets (Simpson and Brizdle 2000:11). This carriage company operated mainly in Honolulu, but at least one must have had regular trips out to Ewa, as Thomas Thrum (1882:43) in his *Hawaiian Annual* printed a list of the fare rates for various trips, including 25 cents for the trip "to or from any point between second bridge, Nuuanu avenue, and the harbor, and between the 'What Cheer House' on the Ewa road." The What Cheer House was on the west side of Niuhelewai Stream at the junction of Houghtailing and King streets. There was a "What Cheer Inn" for travelers in San Francisco at around the same time, and this may have been a traditional name for refreshment stations along a traveled route.

In 1884, the first rail system was developed by an English firm called Skinner and Company, who called their company Hawaiian Tramways, Limited. This outfit consisted of mule-drawn tramway cars, pulled along steel rails. The company had 12 miles of rail in Honolulu by 1888 and by 1896 the railway system extended to Nu'uanu Valley and the "native settlements at Palama" (Simpson and Brizdle 2000:18). The 1897 map (see Figure 12) has a box at the corner of Houghtailing and King streets labeled "Tramway Co. Stables" near or at the location of the older What Cheer Inn, indicating this was still an established stop for carriages. In 1901, electric streetcars were introduced by the Honolulu Rapid Transit Company. The mule-drawn trams could not compete and the transit company bought the Tramways Company firm in 1903. The rails were soon dismantled and the horses and mules were sold.

The first advertisement for the What Cheer House occurs in several papers in January 1872, (*Hawaiian Gazette* 1872). Opened by a Mr. C.C. Bennett, a businessman with a stationeer's shop in Honolulu, it not only seemed to be a place for the rental carriage companies to check in, but also a place to stop for luncheon, with "temperance drinks," and if so desired, a place to rent horses to explore the beautiful plantations of upper Kalihi Valley.

Mention of the inn appears in several early newspaper accounts, especially having to do with the dangers of the roads and the bridge across the Niuhelewai River. A reporter in 1887 took a carriage ride on the road, noting the many taro and rice patches on each side. He found a large crowd at the bridge, surrounding the overturned carriage of Mr. Wilcox in the rising flood waters of the gulch. The reporter related the story of how Mr. Wilcox got his wife out of the carriage, where the water was up to the dashboard, and retreated to higher ground at the What Cheer House (*Hawaiian Gazette* 11 January 1887:5).

The house was built in 1872 (or renovated as an Inn) by Mr. C.C. Bennett, and was still referred to as a traveler's stop in 1883 (*Daily Bulletin* 30 March 1883:2). Newspapers in 1887 advertised the establishment, now owned by J. Gracia, as a place where cattle and farming tools were auctioned (*Daily Herald* 13 January 1887:3), thus it likely ceased to be an inn between 1883 and 1887. An 1887 newspaper report on the opening of the new Kamehameha School for Boys in Palama noted that the school was "on a gentle slope a short distance *mauka* of the road to Ewa, one of the entrance gates being at the so called 'What Cheer House' (*Hawaiian Gazette*

4 October 1887:4). In 1889, the Bishop Estate purchased the old building for $25 (*Daily Bulletin* May 16, 1888:3). By 1899, newspapers (*Evening Bulletin* 29 June 1899:5) refer to the area as the place where the What Cheer house was once standing, so the house was probably demolished between 1889 and 1899.

4.3.3 Kamehameha Schools and the Bishop Museum

Large tracts of land in the Hawaiian Islands were inherited by Bernice Pauahi Bishop, great-granddaughter of Kamehameha I, from her first cousin Ruth Ke'elikōlani, half-sister of Alexander Liholiho (Kamehameha IV) and Lot Kapuāiwa (Kamehameha V). In her will, Bishop directed that her lands, estimated at one-ninth of the lands of the Kingdom, be used to set up a trust to found and provide upkeep for the Kamehameha Schools for Native Hawaiian children (Rose 1980:7). Pauahi's will stated:

> I give, devise and bequeath all the rest, residue and remainder of my estate real and personal, wherever situated unto the trustees below named, their heirs and assigns forever, to hold upon the following trusts, namely: To erect and maintain in the Hawaiian Islands two schools, each for boarding and day scholars, one for boys and one for girls, to be known as, and called the Kamehameha Schools. [Rose 1980:7]

A site in Kapālama called Kaiwi'ula, meaning "the red bone," was chosen for the first Kamehameha Schools for Boys, which opened in 1887. The construction of many wood-framed buildings followed, such as a principal's house, dormitories, faculty cottages, a preparatory school, a dining hall and kitchen, gymnasiums, and manual school shops. Two stone buildings were first constructed. Bishop Hall (part of SIHP # 80-14-1353), the main administration building for the school, was completed in 1891 (Figure 13). A main hall for the Kamehameha School for Girls was completed in 1894.

An 1889 account of the Boys' School gave the following information on the regimen for the attending students:

> The course of study is planned for four years, and aims to give a good training in colloquial and written English, mathematics, vocal music, geography, book-keeping, history, hygiene, with special lessons in practical morality. . . Carpentry, blacksmithing, plumbing, printing, sewing, cooking, laundry work, stone-cutting, wood-turning furnish the manual training which supplements and helps the ordinary work of the school-room . . . The diet is simple but substantial, including bread, milk, coffee, potatoes, poi, salmon, beef, bananas, oranges. The charms of the location delight the eye with the rare combination of valley, mountain, plain, and sea, all standing out clear in the tropical atmosphere with its varied and glowing tints. [C.M. Hyde in Thrum 1889:64]

Kamehameha Schools decided to relocate their campus to Kapālama Heights in 1931 due to deterioration of many of the wood-framed buildings. The Kamehameha School for Girls was moved first on the upper slopes of the new land. The original main hall for the school was torn down and the land was razed to build a low-rent housing project called Kamehameha Homes. The Boys School was moved to Kapālama Heights in 1938 (Mitchell 1993:29-67). The original

Figure 13. 1930 aerial photo of the Kamehameha Schools (Kamehameha Schools Archives); note location of Bishop Memorial Chapel near southeast corner of campus; square shadows to the east of the chapel on King Street are probably the current stone gateposts at Farrington High School

lower and new Kamehameha Heights upper campuses are shown in two historic photographs (Figure 14 and Figure 15). The grounds, the chapel, and the preparatory buildings were sold to the territorial government in order to build the Wallace R. Farrington High School (Mitchell 1993:1-42).

Mr. Charles Bishop was also interested in preserving the many artifacts in the possession of his late wife and the late Queen Emma, who in 1884 willed her "native curiosities" to him "on the condition that at some future day then, together will all similar articles belonging to the late Bernice Pauahi Bishop . . . be presented to him as trustees of an institution to be called the Kamehameha Museum . . . " (Rose 1980:10). The trustees of Bishop Estate chose a site near the Kamehameha School for Boys and the museum, housed in Bishop Hall, opened to the public in 1891. The official name of the institution was the Bernice P. Bishop Museum, but it was also called *Hale Hō'ike'ike o Kamehameha,* or Museum of Kamehameha, the name Queen Emma preferred (Rose 1980:21).

In 1894, a new Polynesian Hall was added, in 1903 a Hawaiian Hall, in 1911 the Pākī Hall, and in 1925 the Konia Hall. In 1947, Kamehameha Schools moved their campus to Kapālama Heights and the former school grounds were transferred to the Bishop Museum Trust. Bishop Hall was formally transferred to the Bernice P. Bishop Museum in 1980 (Rose 1980:18-62).

Of interest to the current project area is the origin of the stone used to build the stone structures, first used as buildings at the original Kamehameha Schools campus and later used as exhibit halls for the Bishop Museum. The northern side of the campus was located on the *makai* corner of Kalihi and North School streets, north of the current project area. A teacher at the Kamehameha Schools, Donald D. Kilolani Mitchell, wrote a history of the Kamehameha Schools campuses. He states the following:

> Records show that during the first years many tons of rock were cleared from the surface and quarried from deposits below ground. Some of the clearing was done by the Kamehameha Schools boys. Two Honolulu companies which furnished rock ballast for outgoing ships secured many tons from the Kamehameha campus.
>
> In addition to the scattered and half-buried rocks, each of which harbored several huge centipedes, there were quarries worked by Portuguese stonecutters. One of the campus deposits was located Waikīkī [east] of Bishop Hall. The other Waikīkī of the site of the Jabulka Entrance Gallery. Excellent stone came from a quarry above School Street near Houghtailing. Hewn stone from these quarries, especially the latter, were used in building Bishop Museum and Bishop Hall. They were also used to build the first Bishop Memorial Chapel and several buildings in Honolulu. The quarries were filled with rubble and soil when the supply of suitable stone was exhausted. Hundreds of carloads of soil were brought to allow the growth of trees, shrubs and lawns. [Mitchell 1993:11].

4.3.4 Bernice Pauahi Bishop Memorial Chapel

The Bernice Pauahi Bishop Memorial Chapel was constructed of the same fine-grained gray undressed basalt blocks, called "Kamehameha Blue" stones (Wright 1980:3), from which many of the Bishop Museum buildings were built. Undressed stones have a rough surface and irregular

Figure 14. Aerial photograph, ca. 1911, showing the future Farrington High School campus area (King Street pictured at bottom of photo) showing Bishop Memorial Chapel in right foreground, then clockwise, the Preparatory Department Main Hall, School for Boys, BPBM buildings, and Manual Training building (picture from Mitchell 1993:61)

Figure 15. Aerial photograph, 1938, showing grading of Kapālama Heights, and first buildings for the modern Kamehameha School for Girls (picture from Mitchell 1993:63)

edges, and are not cut so that the faces are flat. The chapel was constructed of roughly regularly sized rectangular blocks, as can be seen in the undated photograph (Figure 16). It was constructed in memory of Bernice Pauahi Bishop by her husband Charles Reed Bishop who commissioned noted Hawai'i architect Charles W. Dickey to design the structure in a Gothic Revival style with a towering steeple and stained-glass windows. It was completed and dedicated in 1897 and the final service in the church was held in 1938. It was unused from 1938 to 1954. According to a pamphlet about the chapel:

> The Territory finally razed the chapel to make room for the Farrington High School auditorium. The chapel was vacant for 16 years and suffered the indignities commonly inflicted by vandals. Kamehameha Schools was only able to salvage several hundred stone building blocks, the chapel's metal hinges and door locks and the two-manual reed organ that replaced the original 1898 organ when it was destroyed by termites. The reed organ is now in Bishop Museum. The building blocks, metal hinges and door locks were incorporated into the design of the current Kamehameha Schools chapel and heritage center. [Zisk 1997]

An alumni of Farrington High School who was attending the school when the chapel was demolished remembers that the stones from the chapel were first temporarily stacked in the athletic field area of the lower campus. According to one source (Cheever and Cheever 2005:63), 259 stones from the demolished chapel were transported to the new upper campus and reused in various structures at the Kamehameha Schools, including the wall shown in Figure 17. An overlay of a 1927 fire insurance map and a modern aerial (Figure 18) indicate the project area would have been located between the two east wings of the main Farrington High School building (Building A). A 1940 photograph (Figure 19) shows the close proximity of the chapel to the school before it was demolished to build a new auditorium.

4.3.5 Farrington High School 1940

The present project area of Wallace Rider Farrington High School was established in its current location in 1940, formerly the site of Kamehameha Preparatory School. Farrington High School (TMKs: [1] 1-6-003:047, -048, -082, -083, -999 and 1-6-021:005 por.) was placed on the State Register of Historic Places on 28 June 1993 and listed as SIHP # 50-80-14-9768.

> The school is named in honor of the late Wallace Rider Farrington (1871-1933), who served as the sixth governor of the Territory of Hawai'i from 1921 to 1929 in addition to prior office as Mayor of Honolulu and separate terms as editor of both the Honolulu Advertiser and Honolulu Star-Bulletin.
>
> Designed by noted Hawai'i architect Charles W. Dickey (1871-1942), the campus sits on 26 acres . . . Mr. Dickey is widely known for designing some of the most famous buildings in Hawai'i such as the Alexander & Baldwin Building, Halekulani Hotel, Queen's Hospital, the old Waikiki Theater, Varsity Theater, and Kamehameha Schools—Kapālama campus buildings. [Governor Wallace Rider Farrington High School 2014]

Figure 16. Bernice Pauahi Bishop Chapel; note undressed, rectangular building stones (Hawai'i State Archives)

Figure 17. Upper Kamehameha Schools Campus, lower wall built of undressed, rectangular building stones from the original, demolished Bishop Memorial Chapel (see Figure 15) (Cheever and Cheever 2005:63)

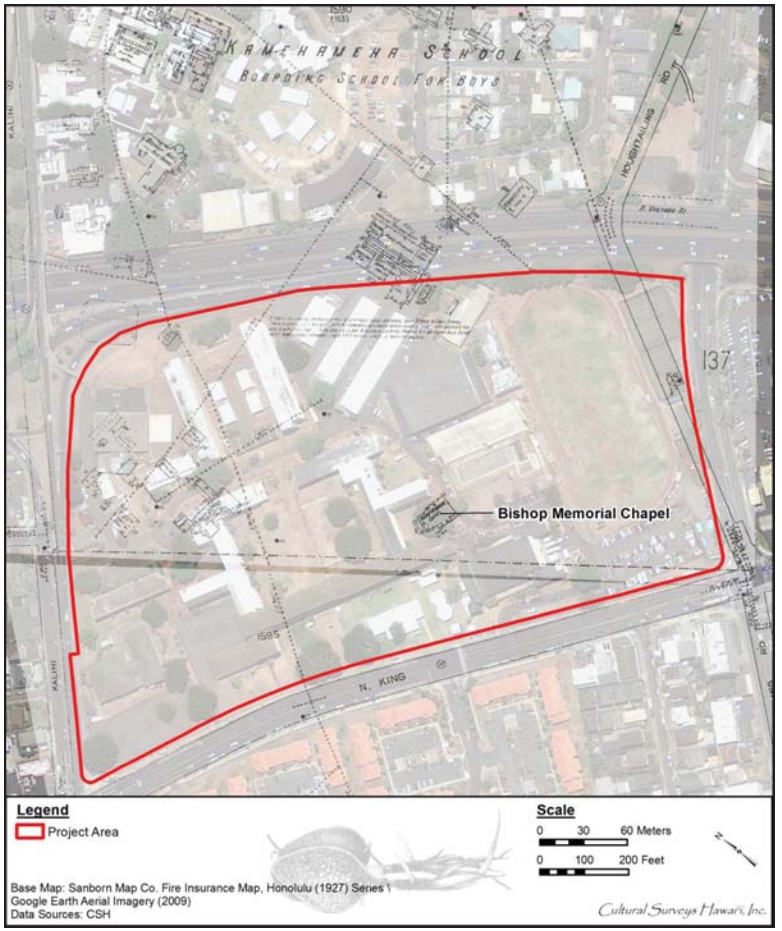

Figure 18. Overlay of 1927 map (Sanford Fire Insurance Company 1927) with Bernice Pauahi Bishop Museum Chapel location over 2009 aerial photograph (Google Earth 2009)

Figure 19. 1940 photograph of Bernice Pauahi Bishop Memorial Chapel next to the east end of the main building (Building A) of Farrington High School (Kamehameha School Archives)

> At the beginning of WWII in 1941, the U.S. Army took over the school's facilities and the main building (now known as Building A) . . . and converted it into a temporary hospital. [Governor Wallace Rider Farrington High School 2014]

4.3.6 University of Hawai'i Oral History Study (UH): Kalihi-Kapālama

In 1984, the University of Hawai'i interviewed several long-time residents of the Kalihi-Kapālama area. These included Native Hawaiians and later immigrants to the area, including those of Chinese, Japanese, American, Portuguese, Puerto Rican, and Filipino ancestry.

These interviewees suggested different ethnic groups initially lived in different areas, specialized in different occupations, and moved in at different times. The Native Hawaiians lived near where the O'ahu Community Correctional Center (OCCC) would later be built and were mostly fishermen and dock workers. The first immigrants to move into the area were the Chinese, Japanese, and later the Filipinos and Samoans. Some Chinese and Japanese also lived near the coast, managing the fishponds and the salt beds. The Chinese had a slaughterhouse near the OCCC (UH 1984:31-133). Hawaiians and Chinese maintained taro patches in the back of Kalihi Waena School (UH 1984:136). The Chinese and Japanese leased Bishop Estate lands (in back of Kalākaua School) to raise flowers, fruits, and vegetables (UH 1984:131). The Portuguese worked on the railroad station or at the Honolulu Construction & Draying Company (UH 1984:130). The Portuguese dominated the upper valley of Kalihi. Filipinos began to move in prior to 1940, when the Catholic orphanage was founded and a Filipino community was built.

Entertainment in the first part of the twentieth century included going to the movie theaters, such as the Kalihi Theater on the corner of Pu'uhale and King streets, the Victory Theater on

King Street, and the Pālama Theater on King Street. There was a boxing arena called Houston Arena *makai* of King Street (now covered by Kapālama Canal). Children played baseball, football, basketball, and volleyball at the school playgrounds and athletic fields.

George Houghtailing, Hawaiian-American

George Houghtailing, born at the Kapi'olani Maternity Home in 1905, told of his family's long ties to Kapālama. His grandfather came to Hawai'i around 1845, married a Hawaiian woman and had 12 children. He ran the Bay Horse Saloon on Bethel and Hotel Street in Honolulu. During the Māhele he was given several *kuleana*, later consolidated into a 15-acre tract along a road later named after him, Houghtailing Road. The family home (Figure 20) was between School and Vineyard streets, now the location of Damien High School, as described by Mr. Houghtailing:

> On the premises there was a large pond which had a natural spring and which also fed the lower land where we had taro patches and cultivated the other truck gardening on the land. The land was quite open. We had a couple of bay horses and raised chickens and pigs for family consumption. There was a large open area fronting Houghtailing Road which was used as a park for the neighborhood kids. [UH 1984:1099]

Mr. Houghtailing located the ponds, taro fields, and rice patches from School Street to Liliha Street; other taro patches were in the area "between Palama Street and Liliha Street, below School Street down to what in now Vineyard Street" (UH 1984:1100). These rice ponds and taro patches, usually operated by Chinese, were cultivated up to the 1920s, when many were filled in for the development of residential subdivisions. Japanese took over some of the land as truck farms, and Japanese also gradually took over the small stores once operated by Chinese. Additionally, he recalled the development of one of the first subdivisions, the McInerny Tract, which was developed around 1918-1920. Before its development, Mr. Houghtailing recalled other crops grown in the area:

> The upper part of McInerny Tract used to be planted with pineapple. The other part was more grazing and open area where guavas and other natural types of fruits, like mangoes, grew.
>
> The sugarcane fields in the Palama area, ran all the way up to what would be now the Dole [cannery] parking lot and then also up to the rear boundary of the Houghtailing property. It extended above what is now Vineyard Street . . . The management of that plantation at that time was the Honolulu Plantation, where the mill was located in Aiea. They cut the cane by hand and hauled it to the mill by train. Cane growing in the Kapālama area phased out about the late '20s. I think.
>
> The phasing out program took place because lands were being purchased by the federal government to expand military reservations, including Hickam Field. In the midst of the cane field in the Kapālama area, in the early '30s, the first boxing area was built and called the 'Houston Arena.' The arena was located midway between King Street and Dillingham Boulevard on the Diamond Head side of the Kapālama Drainage Canal. The arena was named Houston, after the then delegate to Congress from Hawaii. [UH 1984:1102]

Figure 20. 1912-1913 photograph of the Houghtailing plantation house on the corner of Houghtailing and Kōhou streets, the present location of Damien High School (Honolulu Advertiser photograph)

Mr. Houghtailing said that some ethnic groups were associated with certain occupations, such as the Hawaiian waterfront stevedores, known as *hui po'olā*, or the Portuguese masons who did a lot of the building work around Punchbowl, and the Japanese construction workers who came to the area in the 1930s. Along Waiakamilo Road, farmers raised pigs and chickens or had dairies. The more prominent families of the area, like the Desha's, the Hoopili's, the Auld's, the Long's, and the Aluli's, were concentrated in the middle section of Kapālama. Electricity came to the area around 1914, and the roads were improved with macadam in the 1920s (UH 1984 1108-1108).

Houghtailing remembered that the Pālama Settlement became the hub of the middle section of Kapālama. Community children went there to swim in the pool or to participate in sports such as basketball, tennis, football, and track (UH 1984:1109).

After WWII, the Catholic Diocese of Honolulu decided that another Catholic secondary school was needed for Central O'ahu. The property at the corner of Houghtailing and School Street was selected when the Houghtailing family offered the parcel to the diocese at a nominal price. Construction began in 1962, with the men of the Congregation of Christian Brothers and local community members pitched in to build the school. The lot was described as "uneven, overgrown swamp land that included four acres of taro patches." In two years the campus opened as the Damien Memorial High School [Damien Memorial High School 2008].

Arthur Akinika, Japanese

Arthur Akinika, born of Japanese immigrants in 1909, was a lifelong resident of Kapālama. He stated that the first new immigrants to Kalihi were former Chinese and Japanese sugar cane plantation workers who moved to the area as a direct result of the 1900 bubonic plague and the resulting Chinatown fire:

> Towards the end of the last century, Honolulu suffered an epidemic of bubonic plague. In order to keep the plague from spreading, a part of Chinatown was burned. But the fire got out of control, and so many people were left homeless. Many of them moved to Kapālama. Chinese migrants had already moved into Kapālama to cultivate taro. I recall from my earlier childhood that many Chinese farmers lived in the area Waikiki *makai* of where I grew up [on the corner of School and Houghtailing streets]. [UH 1984:10-11]

During his boyhood, Akinika remembered that much of the Kapālama area owned by the Bishop Estate was planted in sugar cane "as close to 500 feet from where we live (and) all the way over to almost Auld Lane, and including the area *makai* of King Street. (King Street passed through) in the middle . . . " (UH 1984:13)

Akinika also noted that the development of Kalihi-Kapālama was greatest during the period from 1911 to 1920. Before 1911, ten subdivisions were built in the Kalihi-Kapālama area, from 1911 to 1920, 40 subdivisions were added, but from 1921 to the time of his interview in 1984, only an additional 17 subdivisions had been built. Water mains, sewer, and electricity first came to the area when the McInerny Tract (in Pu'unui 'Ili, Nu'uanu) was opened up in the late 1940s (UH 1984:11, 14).

Tokoi Okudara, Okinawan

Tokoi Okudara of Okinawan descent was a hog farmer in the Kamehameha IV Road-Kalihi Mauka area. He said there were fewer than 40 families hog farming in 1935. But in the 1940s "nearly every available space in the valley was occupied. At that time I think had close to ninety [families hog farming in mauka Kalihi Valley]" (UH 1984:424). Okudara explained how hog farms were set up in Kalihi Valley:

> Some [farms] had a little more [than an acre of land], some had about two acres. But on the average, been an acre, acre and a half. 'Cause in order to do hog farming you have to have at least an acre because you have to have the acreage to wash down the pen and send the flow out. You send one section, that thing drains, get dried, and you cannot keep flowing the waste to a certain section alone because it cannot absorb that fast, you know. Whatever flows out they used to plant this *honohono* grass, cut that and feed that to the animals, see. So that's how you recycle the waste; get the grass and feed them. That in turn controls the growth of weed and whatnot. Of course, it might have smelled there, but we were far away so it doesn't bother those Downtown. [UH 1984:424-245]

Many of these hog farmers were evicted from their homes and farms after WWII, when there was a critical shortage of housing. Eviction notices were first sent out around 1948 by the Hawai'i Housing Authority and the Kalihi Valley Homes were built (UH 1984:436).

Joe A. Joseph, Portuguese-Hawaiian

Joe A. Joseph, a Portuguese-Hawaiian life-long resident of Kalihi was born in 1913. His father operated the Joseph Dairy, located near the present site of the Kalihi Shopping Center. In the interview, he explained the operation of the dairy in the 1920s:

> You know, the cows come in, they put their head in, and you block 'em in. We had eight. We milk two . . . eight at a time. I think there was eight stanchions. And all these cows go in one time. Then we'd feed the grain. Then you going to start milking the cow. Milk that cow, put the grain in the other one. They you ready to put grain here, this cow. They stay there and eat. When the whole eight of 'em is finish milking, take 'em out, then they bring another batch. That's the milk for that day. Then we put the milk away in the cooler, see? And ready to deliver in the morning, next morning. [UH 1984:504]

Albert Nawahi Like, Hawaiian

Albert Nawahi Like was born in 1900 in Chinatown, Honolulu. His father operated a Hawaiian language newspaper, *Ke Aloha 'Aina*. Like later became a teacher, at one time working at a school for leprosy patients in Kalihi Kai. Mr. Like remembered that the area *mauka* of the first Kamehameha Schools campus (now the Kapālama Elementary school location) was a dairy at Kamehameha Shopping Center:

> Kam Shopping. Used to be an open kiawe field—pastures, you see. Then, on the Ewa mauka side was a big taro patch. Then, after that, they did away with the taro patch . . . just about 1920 . . . But then after that, it became an open pasture where *honohono* grass grew up. Then, the Kamehameha School dairy people would go there and get their grass to feed their cows.
>
> Then came that cutting out of School Street . . . That was, I think, it was the late 20s when they cut it. Then, that pasture land was still a pasture land until 1941 when the World War came . . . But 1941, when the war came on, that whole area *mauka* of our property became a military reservation. As the war was on, we had all this training going on. In the meantime, the shopping center was not developed yet, see . . . Then, *mauka* came up—the [Kamehameha] Shopping Center . . . Yeah, was the late [50's] . . . [UH 1984:688-692]

4.3.7 Twentieth Century Developments

A 1919 U.S. War Department map shows the great changes in Kalihi-Kapālama in the early twentieth century (Figure 21). In Upper Kalihi, subdivisions extend from Kalihi Street and Kamehameha IV Road. Kalihi was bound on the west side by the new Fort Shafter Military Reservation. Kamehameha Schools and the new sports field had expanded. In lower Kalihi-Kapālama, the rice fields below King Street had disappeared under a dense grid of residential streets. All five fishponds, however, were still present, and salt beds were shown just northeast of Apili Pond. In lower Kalihi, four important new areas were marked off: the O'ahu Jail, the Kalihi Receiving Station, the Kalihi Kai School (unlabeled), and the Boy's Home.

A 1943 U.S. War Department map (Figure 22) illustrates the density of homes along the street grids in lower and upper Kalihi-Kapālama. In upper Kalihi, Farrington High School had now taken the place of the Kamehameha Schools. Just *makai* of Farrington High School was an extensive area of what appears to be army barracks. The Kapi'olani Home at the upper end of Myers Street was first pictured (unlabeled). In lower Kalihi, only two of the five fishponds had been filled in and the salt beds were gone. The Kalihi Kai School on Dillingham Highway was also shown (unlabeled).

The 1953 U.S. Army Map Service map (Figure 23) illustrates the large number of schools and churches near the project area. Labeled are Fern School, Kalihi Waena School, Kalākaua School, St. Anthony's School, and Pu'uhale School. The extensive WWII barracks thrown up ten years earlier on the *makai* side of King Street were now gone. In Lower Kalihi, all five fishponds had been filled in and replaced by the Kapālama Military Reservation.

4.3.8 H-1 Freeway History

The project area is bordered by the H-1 freeway along its northeast (*mauka*) side. Construction for the freeway in the area of Kalihi-Kapālama started in 1960 from Fort Shafter to Houghtailing Street (Figure 24). Although this was not the place of origin for the H-1 freeway system it was the first time federal money was to be used in Hawai'i for an Interstate freeway system. Prior to 1960 the H-1 freeway was called the Lunalilo Freeway (AARoads).

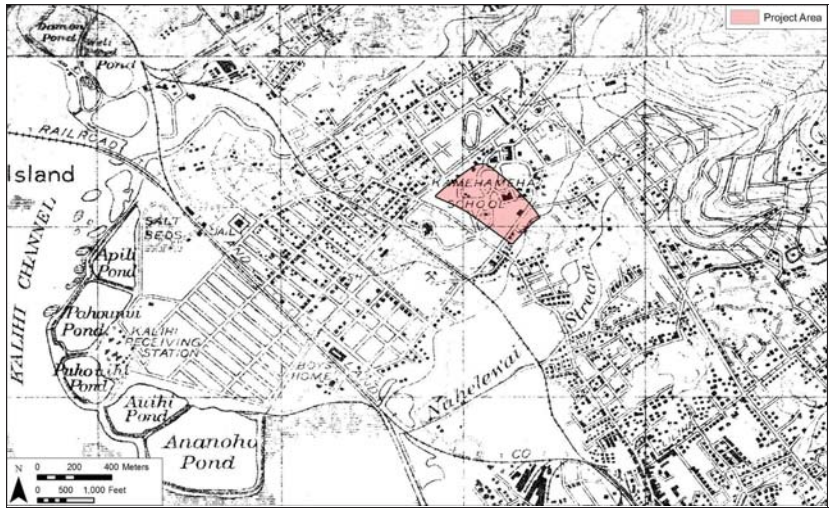

Figure 21. 1919 U.S. Army War Department map showing commercial and residential development in Upper Kalihi and Kapālama

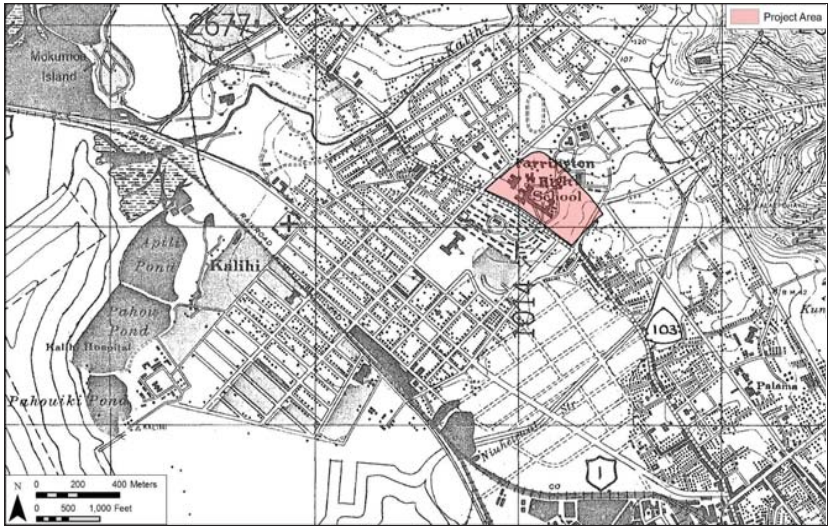

Figure 22. 1943 U.S. Army War Department map showing residential development in Upper Kalihi-Kapālama

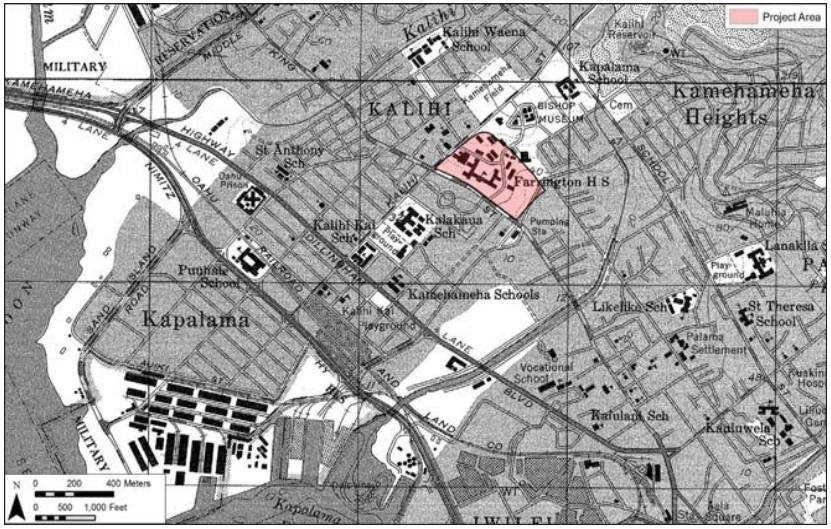

Figure 23. 1953 U.S. Army Map Service map showing residential development in Upper Kalihi-Kapālama

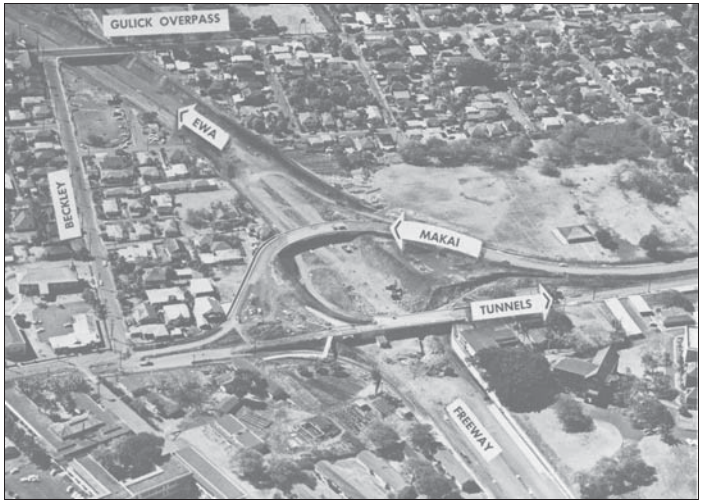

Figure 24. A 1960 Hawai'i State Department of Transportation aerial photograph of Lunalilo Freeway construction from Gulick Avenue to Kalihi Street (note development of the north part of the Farrington High School campus, at lower left, has changed regarding its current structures)

Section 5 Previous Archaeological Research

Development in Kapālama and Kalihi around the location of the project area is primarily residential with some light industry. Most of the development in the area including Farrington High School itself occurred prior to the late 1970s when archaeological investigation became standard for project planning and construction activities. As a result, few archaeological studies have been conducted in Kalihi and Kapālama. A total of seven previous archaeological investigations have been conducted near the study area and are highlighted in bold text in Table 2 and Figure 25, and discussed further in Section 5.1.

Table 2. Previous Archaeological Studies in the Vicinity of the Study Area

Author	SIHP # 50-80-14	Report Description and Results
NRHP sites	-1353	Bernice Pauahi Bishop Museum Complex; note some buildings originally constructed for the Kamehameha Boys' School
HRHP site	-9768	Governor Wallace Rider Farrington High School
HRHP site	-7555	Bernice Pauahi Bishop Memorial Chapel (demolished) foundation
Neller 1980	-1302	Kapālama field reconnaissance conducted during building renovation of Pālama Fire Station; massive charcoal deposit observed in a trench, but its significance not determined
Dixon 1993	-1353	Upper Kapālama at the Bishop Museum; no evidence of pre-Contact cultural deposits; historic artifacts found in backfill
Jourdane 1994	-4929	Inadvertent discovery during water line utility trenching; previously disturbed and intact human remains of an individual; believed to be historic
Nakamura et al. 1994		Archaeological assessment of lands in Kapālama on corner of North King and Houghtailing Streets, Kapālama; no significant finds
Borthwick et al. 1995		AIS of Kamehameha Homes project, Kapālama; no significant finds
Hammatt 1995	-4929	Archaeological disinterment and investigation of an inadvertent burial find at Austin Lane; disinterred historic burial and associated artifacts
McIntosh and Cleghorn 2006		Before sewer improvements, Pacific Legacy conducted testing and monitoring to determine if nearby historic graves from Ka'ahumanu and Maluhia Cemeteries extended under Kapālama Avenue; ten trenches excavated, no findings

Author	SIHP # 50-80-14	Report Description and Results
Dey and Hammatt 2008		1520 North School Street (former location of Kam Bowl); monitoring of building foundation removal; no culturally significant material observed
Hammatt and Chiogioji 2008		AIS of proposed Board of Water Supply Kalihi Beretania 24-Inch Water Main project, Nu'uanu and Kapālama; no finds but notes Judd Street and Nu'uanu Avenue bridges as possible historic properties
Burke et al. 2010		Archaeological monitoring for a Traffic Management System PH 1 project; no finds
O'Hare et al. 2010		Archaeological literature review and field inspection for the Honolulu Community College Advanced Technology Training Center project; recommended an archaeological monitoring program
Pammer and Monahan 2011		Archaeological literature review and field inspection for Kapālama Shopping Center Redevelopment project; no surface or subsurface finds; recommended an archaeological monitoring program
Hunkin et al. 2012		Archaeological monitoring for Phase 1 Kalihi/Nu'uanu Sewer Rehabilitation project; no finds
Hammatt 2013		Addendum to the archaeological inventory survey plan for the City Center (Construction Phase 4) of the Honolulu High-Capacity Transit Corridor project
Hunkin and Hammatt 2013		Archaeological monitoring for the Kalihi Valley Sewer System Improvements project; no finds

5.1 Prior Archaeological Studies in the Vicinity

5.1.1 Palama Fire Station (Neller 1980)

Earl Neller (1980) found a massive charcoal deposit in a trench during the renovation of the old Pālama Fire Station at North King Street and Austin Lane, but the significance of this deposit was not determined. The Pālama Fire Station, built in 1901, was assigned SIHP # 50-80-14-1302.

5.1.2 Bernice Pauahi Bishop Museum Grounds, the Great Lawn (Dixon 1993)

Bernice Pauahi Bishop Museum (BPBM) completed an archaeological monitoring project to install electrical service for the Space Exhibit in August 1992 (Dixon 1993). Museum staff recognized the potential for subsurface pre- and post-Contact Hawaiian cultural material and human remains as well as the possibility of early historic material on the museum property. Stratigraphy and backdirt was observed during mechanical trenching conducted on the Great

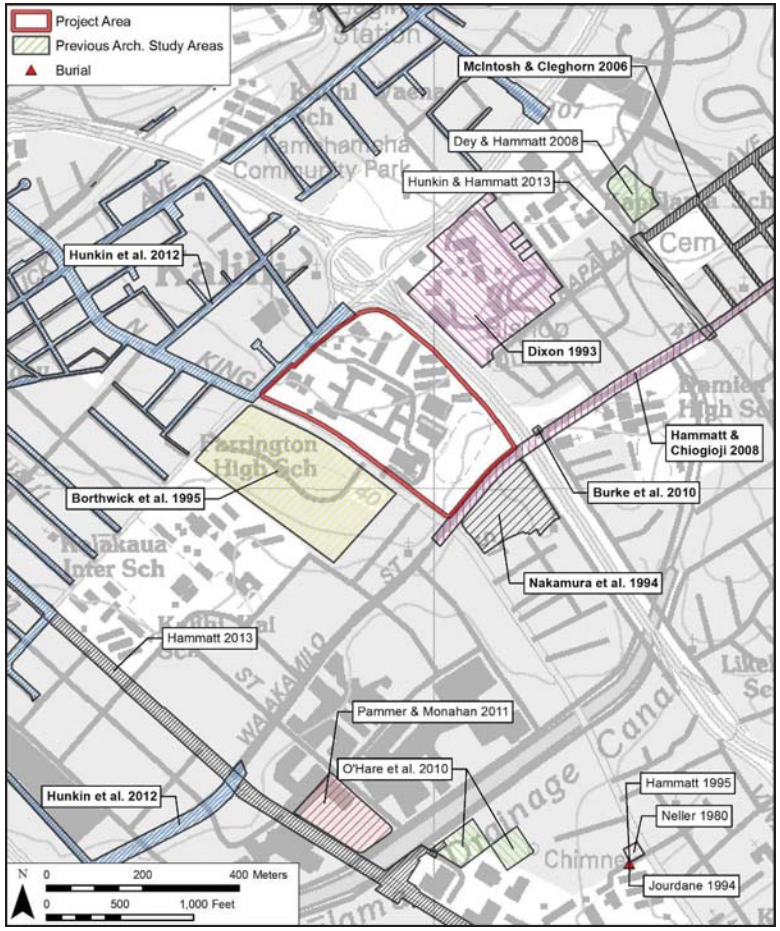

Figure 25. Previous archaeological studies in Kalihi and Kapālama in the vicinity of the study area on a 1998 Honolulu USGS 7.5-minute topographic Honolulu quadrangle map

Lawn. Dixon found no evidence of pre-Contact deposits; however some historic artifacts were found in a fill layer possibly dating back to the period when Kamehameha School occupied the property. This fill layer and artifacts were given the BPBM site # 50-Oa-A6-26 and were incorporated into the Bishop Museum Historic Complex, which was listed on the National Register of Historic Places in 1982 (SIHP # 50-80-14-1353).

5.1.3 Corner of North King and Houghtailing (Nakamura et al. 1994)

The BPBM (Nakamura et al. 1994) carried out an archaeological assessment of land in Kapālama on the corner of North King and Waiakamilo. The property was surveyed for archaeological resources and assessed for potential archaeological and historical resources. Though no archaeological resources were found, several historic properties were identified based on their age, including storefronts along King Street as well as several residences (Nakamura et al. 1994:21-22). Historical research, as well as informal interviews of long-time residents, suggest the parcel had a long history of agricultural use, beginning with pre-Contact and historic wetland taro cultivation and most recently was used by Chinese immigrants for truck farming. Nakamura et al. (1994) recommend this site for further study as an example of the changing nature of a traditional *ahupua'a* in historic O'ahu.

5.1.4 Board of Water Supply, Austin Street Burial (Jourdane 1994; Hammatt 1995)

A human burial (SIHP # -4929) was found during the digging of a trench for the Board of Water Supply on Austin Street (Jourdane 1994). Hammatt (1995) concluded this historic coffin burial was possibly associated with the former Kaumakapili Church cemetery.

5.1.5 Kamehameha Homes Project, Kapālama (Borthwick et al. 1995)

CSH (Borthwick et al. 1995) carried out an archaeological inventory survey (AIS) of the Kamehameha Homes project in Kapālama, the former location of the Kamehameha School for Girls. Sixteen backhoe excavated trenches were excavated throughout the project area. No significant finds were reported.

5.1.6 Puea and Ka'ahumanu Cemeteries (McIntosh and Cleghorn 2006)

In 2006, Pacific Legacy (McIntosh and Cleghorn 2006) conducted pre-construction testing along the Puea and Ka'ahumanu Cemeteries before improvements were made to the Kamehameha Heights water system, due to concerns that unmarked graves could lie outside the modern boundary of the cemeteries (see Figure 25). No cultural deposits or human remains were found in the ten test trenches along the north and east streets bounding the cemeteries. Residential development from the nineteenth and twentieth centuries was also thought to be possibly present. An archaeological monitoring program was recommended.

5.1.7 Walgreens Development Project, North School Street (Dey and Hammatt 2008)

In 2008, CSH completed an archaeological monitoring program for a Walgreens development project. Background research identified no historic sites, a low potential for pre-Contact or early post-Contact Hawaiian cultural remains, and a low to moderate potential for early historic

remains. Subsequent fieldwork confirmed a lack of pre-Contact or early post-Contact cultural material within that project area.

5.1.8 Board of Water Supply Kalihi Beretania 24-Inch Water Main Project (Hammatt and Chiogioji 2008)

CSH (Hammatt and Chiogioji 2008) carried out an AIS of the proposed Board of Water Supply Kalihi Beretania 24-Inch Water Main project in Nu'uanu and Kapālama. No prehistoric properties were identified within the project area but the study emphasized the need to consider the Judd Street and Nu'uanu Avenue bridges as historic properties. Background research showed the project area to be part of an expansive agricultural system during the pre- and early post-Contact period. As the project area was confined to roadway corridors, subsequent testing revealed mostly grading and fill disturbance from roadway construction and utility trenching. No pre- or early post-Contact cultural material was observed during archaeological testing within the project area.

5.1.9 Traffic Management System Project, Houghtailing Street by the H-1 (Burke et al. 2010)

In 2010, CSH (Burke et al. 2010) completed an archaeological monitoring program for a Traffic Management System PH 1 project. Background research identified no sites but suggested a potential for early historic remains. Subsequent field monitoring produced no significant finds within the project area.

5.1.10 Honolulu Community College (O'Hare et al. 2010)

CSH prepared an archaeological literature review and field inspection report for the Honolulu Community College Advanced Technology Training Center project, located on the northwest side of the HCC campus. It was noted that although the study area had been extensively modified throughout the twentieth century, and no surface archaeological features remain, background research suggests intact pre-Contact and early post-Contact cultural deposits associated with traditional Hawaiian habitation, agriculture, and burials may lie undisturbed beneath fill layers within the Honolulu Community College Advanced Technology Training Center project study area(s). Post-Contact cultural deposits associated with Western settlement and residential development from the nineteenth and twentieth centuries were also thought to be possibly present.

Field results included observations of both exposed banks of the Kapālama Canal. Notable was the prevalence of edible bivalve mollusk species. The abundance of these species in the east Kapālama Channel bank suggested a pattern of deliberate human predation (i.e., these shells appear to represent archaeological midden). Also observed in the east Kapālama Channel bank were water-rounded basalt cobbles that in some places appeared to be grouped, possibly constituting archaeological features.

5.1.11 Kapālama Shopping Center (Pammer and Monahan 2011)

This archaeological literature review and field inspection included five test excavations. In general, the stratigraphy consisted of the asphalt parking lot surface over modern and historic fill,

over naturally deposited sediments, and over the coral shelf (a very loose cobbly layer with weak cementation.

5.1.12 Phase I Kalihi/Nu'uanu Sewer Rehabilitation Project (Hunkin et al. 2012)

CSH (Hunkin et al. 2012) monitored 10.2 miles of trench excavations within Kalihi, Kapālama, and Nu'uanu Ahupua'a to replace existing sewer lines including the section of Kalihi Street adjacent to the current project area. No cultural finds were observed within the vicinity of the current project area, however an isolated human bone fragment was recovered from fill deposits in Nu'uanu.

5.1.13 Honolulu High Capacity Transit Corridor (Hammatt 2013)

CSH performed AIS testing for the Honolulu High-Capacity Transit Corridor project (City Center) within numerous locations between Middle Street and Ala Moana Center. Testing identified multiple sites, two of which were identified adjacent to the current project area—SIHP #s -7426 (subsurface wetland deposit) and -7506 (subsurface incinerated trash deposit). The wetland sediments were identified within 28 AIS test excavations along Dillingham Boulevard, *makai* of the current project area (T-054 through T-082). The incinerated trash deposits were encountered within three test excavations (T-064, T-066, and T-067) located within the HCC campus at the corner of Dillingham Boulevard and Kokea Street.

5.1.14 Kalihi Valley Sewer Improvements (Hunkin and Hammatt 2013)

In 2010, CSH archaeologists monitored project-related excavations for a Kapālama section of the Kalihi Valley Sewer Improvements project on School Street between Kapālama Avnnue and Houghtailng Street. Four sewer line trenches were drawn and the soil stratigraphy was described. The stratigraphy usually consisted of a thick (90 cm) layer of fill below the asphalt over a natural sandy loam with some cinder and water-rounded basalt pebble inclusions. No historic artifacts or traditional Hawaiian cultural deposits were observed during the monitoring.

5.2 Background Summary and Predictive Model

Based on background research, the primary area of traditional Hawaiian settlement and intensive agriculture within Kalihi and Kapālama seems to have been in the upper valleys, as well as near streams and springs. The project sits within the central area of Kapālama between the upper valleys and the coastal plain and in a dry plain area west of Niuhelewai Stream. Agriculture and habitation were intensive to the west (along Kalihi Stream) and just to the east (along Niuhelewai or Kapālama Stream), but does not appear to have been intensive in the immediate project area.

Traditional Hawaiian land use indicated in the LCA documentation consisted of habitation, irrigated taro fields (*lo'i*), *kula* (dryland plots used for cultivation and/or pasture), and aquaculture via fishponds. The majority of *kuleana* land claims located near the study area were located near the freshwater sources of Kalihi and Niuhelewai streams as they were the most arable sources of land. The project area lies on a high plain between both these streams. This is the area described as an uncultivated plain in John Papa 'ā'ī's (1959) account of the area in 1810, until you reached "the taro patches of Kalihi." Major strife is indicated ca. 1782 in the defeat of

the O‘ahu ruling chief Kahāhana when the dead backed up the lagoonal backwaters (*muliwai*) of Niuhelewai Stream—but this may have been well seaward of Farrington High School. Another uncertainty pertains to the indicated ca. 1855 burial ground on the plains of Kaiwi‘ula which may have been near Farrington High School.

The area later became the location of the Kamehameha Preparatory Schools from 1887 through 1947. In 1938 the lower section of Kamehameha Boys’ School campus was cleared and Farrington High School was constructed and completed in 1940.

By the twentieth century, the coastal and central sections of Kalihi and Kapālama had become suburbs of Honolulu. Much development in Kalihi and Kapālama primarily occurred prior to the late 1970s when archaeological investigation became standard during construction activities. As a result, few archaeological studies have been conducted in this area. However, seven previous archaeological investigations have been conducted adjacent to the study area (Borthwick et al. 1995; Burke et al. 2010; Dixon 1993; Hammatt and Chiogioji 2008; Nakamura et al. 1994) (see Figure 25 and Table 2). Documented historic properties near the study area have included post-Contact subsurface fill material and related artifacts probably associated with the early Kamehameha Schools period of occupation on BPBM property (SIHP # -1353, Dixon 1993).

Based on a review of historic documentation and previous archaeological research, it is recognized that the Farrington High School is a historic property (SIHP # -9768) of sufficient import to be placed on the State Register of Historic Places. It is likely surface historic properties related to traditional Hawaiian culture are not present within the project area due to historic and modern ground disturbances. Subsurface historic properties may be present from the Kamehameha Schools period of occupation as was encountered at BPBM during utility trenching (Dixon 1993).

Section 6 Results of Field Inspection

6.1 Initial Field Inspections

A field inspection was carried out by Cary Stine, B.A. under the overall supervision of David Shideler, M.A. on 19 December 2011, and 11 November 2013. The study area comprised of the campus of Farrington High School which is on the Hawai‘i State Register of Historic Places, SIHP # -9768. Photographs taken of the project area during the course of the field inspection are provided in Figure 26 through Figure 63.

During the 2011 and 2013 field visits, a complete pedestrian inspection of the study area was conducted. No surface historic properties were observed within the study area. All sections of the study area displayed evidence of extensive previous excavation, grading and fill to create straight, level or gradually sloping roadways. The level of ground disturbance for road construction and the installation of utilities make it less likely that undisturbed subsurface cultural properties are present within the corridor. Research reveals, however, that the project area contains multiple LCA parcels that can dramatically increase the potential for subsurface historic properties, including cultural layers related to wetland agriculture, Hawaiian habitation, and trash pits related to post-Contact residence and commerce in Kapālama. Subsurface sites may be present in portions of the corridor where excavation activities for road construction and utility installation have been minimal.

6.2 Third Field Inspection

A third field inspection was conducted 15 May 2014 by Constance R. O’Hare, B.A. and David W. Shideler, M.A at the Farrington High School campus to make a GPS survey and to examine several areas more closely. The current buildings on the campus are shown in Figure Figure 64 and the GPS survey of the campus is shown in Figure 65.

6.2.1 Mortared Basalt Pillars—Gateposts

At the front entrance to Farrington High School on the *mauka* side of King Street, there are three large, square gate posts made of brown cut, coarse-grained basalt, irregular-sized stones mortared together (Figure 66 and Figure 67). As previously noted in the background history section, there were several historic structures in this area before the construction of Farrington High School. A horse-drawn tramway provided rides to residents who wished to ride into the “country” to visit friends and relatives or to have a picnic or take refreshments along the way. Many stopped at the What Cheer Inn, located at the intersection of Houghtailing and King Street, located near the current Farrington High School southeast corner. The What Cheer Inn was built in 1872 and probably demolished around 1888. Early historical accounts of the history of Kamehameha Schools indicate the school was “on a gentle slope a short distance *mauka* of the road to Ewa, one of the entrance gates being at the so called ‘What Cheer House’” (*Hawaiian Gazette* 4 October 1887:4). During the May 2014 field inspection, these stone gate posts were examined to see if they could date to the inn and tramway time period. The three gate posts are large, tall posts on King Street in the central section, not on the eastern corner at which the What

Figure 26. In front of library looking toward Building U, view to northeast

Figure 27. In front of library looking toward King Street, view to southeast

Figure 28. In front of library looking toward Building A, Wings 1 and 3, view to south

Figure 29. In front of library looking toward Building A, Wings 4 and 3, view to southeast

Figure 30. North corner of Building A, Wing 2, view to southwest

Figure 31. North corner of Building A, Wing 3, view to south

Figure 32. In front of Building H, looking toward Buildings A and U, view to southwest

Figure 33. In front of Building H, looking toward Buildings G and I, view to south

Figure 34. North corner of project area looking toward Building H (left), Kalihi Street out of view to right, view to southwest

Figure 35. North corner of study area looking toward Building I (left), Buildings A in background (right), view to south

Figure 36. North corner of study area looking toward Buildings J and K, H-1 freeway on the left, view to southeast

Figure 37. Building H on the left, Building I on the right, Bishop Hall (former Kamehameha School for Boys building) on the Bishop Museum campus in the background, view to east

Figure 38. Looking toward large basalt boulders and the south corner of Building H, view to west

Figure 39. Looking toward Building H in background, Building G to the right, view to east

Figure 40. View of access road, Buildings I and J to the left, Building A, Wings 4 and 8 to the right, and Building Q (Gym) in the background, view to southeast

Figure 41. Portables P-8 and P-9 to the left, Building J on the right, and the Bishop Museum Main Hall Building visible in the background, view to northeast

Figure 42. View of access road, Building A Wings 8 and 4 to the left, Buildings M, J, and L to the right, view to northwest

Figure 43. View of access road, Building A, Wing 6 on the left, Building Q (Gym) in the background, Building R to the right, view to southeast

Figure 44. View of access road, Building A, Wing 6 on the right, Building S (Auditorium) in the background, view to southwest

Figure 45, View of southern courtyard area with Building A, Wing 5 on the left and Wing 7 on the right, view to west

Figure 46. View of southern courtyard area with Building A, Wing 5 and Building S, left background, view to southwest

Figure 47. View of southern courtyard area with Building A, Wing 5 on the right, the access road and Building S on the left, view to southwest

Figure 48. View of southern courtyard area with Building A, Wing 5 on the left and Wing 7 on the right, view to west

Figure 49. View of southern courtyard area with Building A, Wing 7 on the left and Wing 6 in front, view to northeast

Figure 50. View of southern courtyard area, west corner, with Building A, Wing 5 in front and Wing 7 on the right, view to southwest

Figure 51 View of southern courtyard area from west corner, Wing 5 on the right and Building YY (Pool) in the background, view to east

Figure 52. Construction yard staging area for school renovation activities, pool area fencing on the right, view to southeast

Figure 53. Building A, central courtyard, Wing 8 to the left and Wing 7 in front, view to southeast

Figure 54. Building A, central courtyard, Wing 7 to the left and Wing 9 to the right, view to south

Figure 55. Building A, central courtyard, Wing 9 in front and Wing 3 to the right, view to southwest

Figure 56. Building A, central courtyard, Wing 3, view to west

Figure 57. View of southwest end of Building I, view to north

Figure 58. View of west end of Building L, view to southeast

Figure 59. View of Building J on the left and Building L on the right, view to northeast

Figure 60. View of southwest end of Building J, view to north

Figure 61. View of west end of Building L on the left and Building M on the right, view to east

Figure 62. View of west end of Building M on the left and Building N on the right, view to east

Figure 63. View of access road, building A, Wings 8 and 4 to the left, Buildings J and L to the right, view to northwest

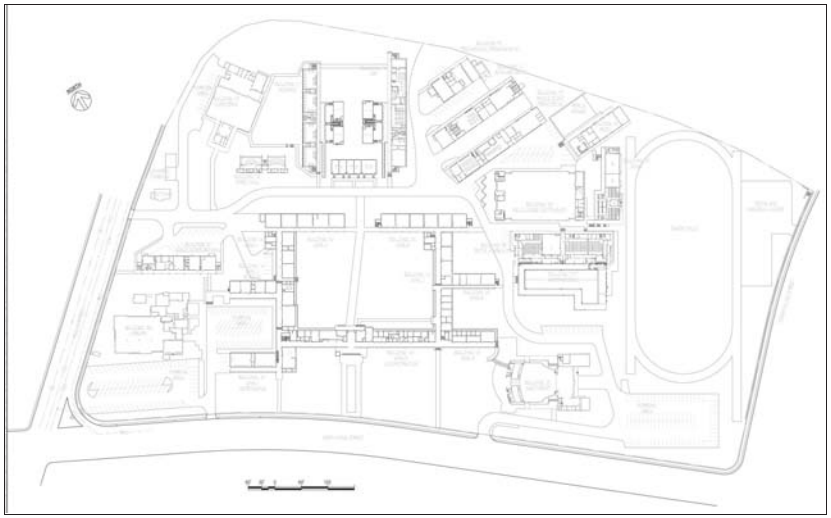

Figure 64. Plan view of Farrington High School buildings and schoolyard (map courtesy of Farrington High School)

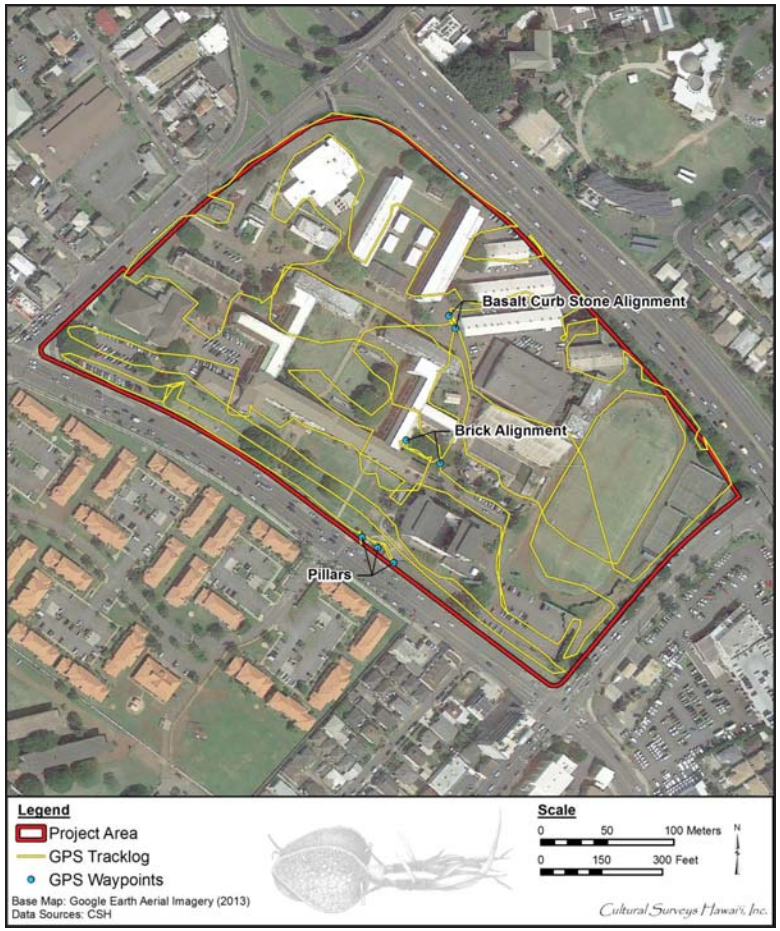

Figure 65. Map of GPS survey, 20 May 2014; note location of three stone pillars on King Street, the brick alignment in the former location of the Bernice Pauahi Bishop Memorial Chapel, and the basalt curbstones northwest of the brick alignment

Figure 66. Three basalt pillar gateposts on King Street in front of Farrington High School; pillars made of rough cut brown irregular-sized basalt stones with mortar (CSH photograph, view to east); note metal hook for gate in picture at right

Figure 67. Wall from east pillar to southeast corner of Farrington High School lot; note overlapping stones under the pillar indicate the wall was built first

Cheer House once stood. Also, as shown in the field inspection photo, there is a wall attached to the eastern gatepost that extends to the east. This is not an addition, as the stones below the post overlap with the wall. Therefore, these gate posts do not date to this time period, but were constructed during the use of the land by Kamehameha Schools or Farrington High School. The posts may be the small rectangular structures on King Street shown on a 1930 photograph of the Kamehameha Schools campus (see Figure 13). The stone pillars presently on the campus would be part of SIHP # -9768, the Farrington High School structures and grounds.

6.2.2 Rock Walls

The other walls in the school yard are of similar construction as the gateposts, cut (shaped with a chisel or saw to create a flat surface), variously sized brownish stones mortared or cut to fit together (Figure 68). They probably do not date to the earliest period of construction at Kamehameha Schools, when the boys themselves used local field stones to build unmortared or mortared walls. They may date to a later period of the school when Portuguese stone cutters and masons worked at the site, or they may have been built during the construction of Farrington High School. The stone walls presently on the campus would be part of SIHP # -9768, the Farrington High School structures and grounds.

6.2.3 Bernice Pauahi Bishop Memorial Chapel

In the central eastern section of the school yard, between the two east wings of the main building, an alignment of bricks that marks an open, grassy area (Figure 69). As shown on a 1927 map (see Figure 18), the Bernice Pauahi Memorial Chapel was once located in an open grassy area. When the chapel was demolished in 1954, the foundation stones were still present and they were assigned SIHP # -7444. The bricks outline the *makai*, south side of this open area and probably act as an earth retaining feature, as there is a large culvert between the open area and the main school building. The bricks do not look worn, and are unlikely to date to the time of the chapel's use. They were probably placed in the area when the chapel was demolished and the ground was releveled. The foundation stones of the chapel are possibly still buried in the soil in the area outlined by these bricks.

6.2.4 Kamehameha Blue Stone Blocks

Approximately 100 m north of the former chapel location there is an interior road. Loose large, evenly sized undressed gray basalt blocks are used as curbstones on the east side of this road (Figure 70). These are unlike the stones found in the three gateposts at the front of the campus, and on the numerous walls throughout the schoolyard. They are gray, not brown; undressed, not cut; rectangular, not irregular; and roughly the same size as the other stones on the curb. They are similar in size and shape to those shown in the upper campus Kamehameha Schools wall shown in Figure 17. When the Bernice Pauahi Bishop Memorial Chapel was demolished in 1954, the blocks were temporarily moved to the athletic field to the east before transport to the upper campus, according to Alfredo Corco, a Farrington High School Alumni (personal communication). It is possible these loose curbstones are some of the blocks that were once part of the chapel and were left on the lower campus, and thus would be part of SIHP # -7555. However, as noted, many structures on the Kamehameha Boys' School campus were built of local "Kamehameha Blue Stone" and these blocks may be remnants of some other structure

Figure 68. Stone walls of brown basalt with cut faces on the Farrington High School campus, at front gate on King Street (CSH photo, view north) and in garden area near Beretania Street (CSH photo, view north)

Figure 69. Open, grassy area between east wings of main building, former location of Bernice Pauahi Bishop Memorial Chapel, marked on the south (*makai*) side by a brick alignment

Figure 70. Undressed gray basalt ("Kamehameha Blue" stones) building blocks of uniform size used as road curbstones; possibly building stones from the demolished Bernice Pauahi Bishop Museum Memorial Chapel

demolished when Farrington High School was built. Any blocks from structures built for the Kamehameha Boys' School or the Bishop Museum would be considered part of the Bishop Museum Complex or SIHP # -1353.

Section 7 Summary and Recommendations

At the request of Wilson Okamoto Corporation, CSH has conducted an archaeological literature review and field inspection study for the Farrington High School Master Plan, Kapālama Ahupua‘a, Kona District, O‘ahu. This report includes the results of cultural, historical, and archaeological background research, as well as a field inspection. The purpose of this project was to gather historical, ethnographic, and cultural information that may inform development of the proposed renovation project. The background research focused on summarizing the project area’s traditional and historic land use, cultural significance, and the types and locations of potential cultural resources within the project area and its vicinity. Fieldwork consisted of a pedestrian inspections of the project area road corridor on 19 December 2011 and 11 November 2013. As the entire 9,280 sq m (99,889 sq ft) project area consisted of in-use paved roadways and active stream drainages, no subsurface testing was undertaken.

The lands of Kapālama are mentioned in historical accounts of battles and conquests: Kū‘ali‘i’s defeat of the rebelling Ko‘olaupoko *ali‘i* in AD 1720-1740; Kahahawai‘a defeat of Kahāhana in AD 1780-1783; the rebellions of the ‘Ewa and Kona Chiefs post-1783; and Kamehameha’s invasion and conquest of O‘ahu in AD 1795.

Background research has indicated Kapālama was a focus for habitation and agriculture in the pre-Contact and post-Contact periods, although it was not as densely inhabited as Nu‘uanu Valley to the east and Kalihi Valley to the west. Stretching out from the base of the ridge towards Honolulu Harbor was the well-watered taro area of Kapālama described by Handy and Handy (1972:475) as “almost continuous from Iwilei up to the foothills of above School Street, an area measuring about three quarters of a mile both in depth inland and in breadth.” Historic information indicates that traditionally, habitation was focused within the same well-watered plain, which extended to the shoreline. John Papa ‘Ī‘ī (1959:58) noted “innumerable people all over the farming area.”

During and after the Māhele, the importance of Kapālama is evident in the fact that Kamehameha kept these lands for himself and then passed them on to his family through his grandchildren Moses Kekūāiwa, Victoria Kamāmalu, and Lot Kamehameha, and eventually to Bernice Pauahi Bishop where they became part of her estate. Roughly 100 *kuleana* lots were awarded to Hawaiian commoners in Kapālama. These *kuleana* lands were located on the flood plains to the east of Waiakamilo/Houghtailing Street and included house and *lo‘i* for the cultivation of *kalo*.

The first detailed map of Kapālama, made by J.F. Brown in 1885, shows a traditional Hawaiian landscape of small *kuleana* LCA parcels extending across the Kapālama plain (see Figure 10). LCA documents indicate the areas east and west of the current project area were intensively utilized for both permanent habitation and agriculture.

The former taro land *makai* of School Street, which in part had been converted to rice fields between the 1870s and 1910, were becoming housing and industrial subdivisions in the early twentieth century. This land use change was facilitated by the construction of Kapālama Canal. The canal channelized Kapālama and Niuhelewai streams and allowed for sub-street storm drain runoff collection. During the last half of the twentieth century, the Kapālama area continued to

undergo changes associated with the urban expansion of Honolulu. Increased housing, industrial and commercial activities continue to occur today.

It is possible that in this time period the level plain of Kapālama and Kalihi around King Street was used to inter victims of the 1853 smallpox epidemic. If so, the location of this cemetery is unknown.

The field inspection of the project noted three above-ground feature types of special interest, stone gateposts at the front entrance of the high school and stone walls throughout the campus, a brick alignment, probably over a buried foundation, near the east wing of the main school building, and a numer of loose, rectangular blocks used as curbstones in the central section of the school lot. The gateposts and rock walls may have been constructed when the lot was used for the Kamehameha Boys’ School, but since they are now part of the Farrington High School campus, they should probably be considered part of SIHP # -9768, the Farrington High School structures and grounds. The bricks are also part of that site, but the buried foundation stones were once part of the Bernice Pauahi Bishop Memorial Chapel, designated SIHP # -7555. The loose basalt “Kamehameha Blue Stone” blocks may be remnants of the chapel (SIHP # -7555) or remnants of another Kamehameha Boys’ School structure (SIHP # -1353) demolished to provide room for the construction of Farrington High School.

Based on historic sites within the study area and the potential for subsurface burials in the vicinity, the known foundations of the Bishop Memorial Chapel, and the possibility of other Kamehameha Boys’ School structure foundations, an archaeological monitoring program is recommended as appropriate mitigation for any subsurface activity associated with the renovation work at Farrington High School. Archaeological monitoring will facilitate the identification and treatment of any burials that might be discovered during project construction, and will mitigate the project’s effect on non-burial archaeological deposits. Under Hawai‘i State historic preservation legislation, “Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities which may adversely affect historic properties” (HAR §13-279-3).

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APPENDIX B

Summary of Historic Issues

Fung Associates Inc.

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architecture ■ preservation ■ planning ■ interiors

SUMMARY OF HISTORIC ISSUES

Wallace Rider Farrington High School is listed on the Hawaii Register of Historic Places. The campus is comprised of fifteen (15) major buildings with building "A" as the only building noted on the registration form (see attached National Register of Historic Places form). Building "A" was designed by prominent Territorial architect Charles W. Dickey and is representative of the huge growth of secondary educational priorities in Hawaii – from a plantation society where secondary education was not encouraged to a society more closely aligned with American society's emphasis on education.

Overall Master Plan Site Considerations

- The Master plan should respect the original use of the property once owned by Kamehameha Schools and include recognition of a chapel that once occupied the site near Building A; Wings 5, 6, & 7 and incorporate stones from the chapel as part of the Master plan. See location on attached Historic Assessment map.
- The Master Plan should respect Building "A" with reference to the following:
    - The view of the main façade from North King Street should not be blocked. While SHPD understands the need for security, any fencing scheme along North King Street should not block the view of the main façade.
    - The front lawn space (between North King Street and the main façade) should be maintained.
    - The three (3) stone pillars along North King Street should remain since they pre-date the development of Farrington High School.
- Building "A" should be the highlight of the campus.

Building A Considerations

- View of the main entry to the building from North King Street.

- View of the front lawn between North King Street and the building

- **Character defining features:** These features should be kept and celebrated as part of any future renovation plans.
    - Massing
    - Distinctive decorative bas relief sculptures on the exterior faces of the building.

Bas relief grille pattern at quad façade of Wing 9

Bas relief grille pattern at Wing 7

Bas relief at front façade and quad façade of Wing 9.

- Open Quad (East end)

- Original details such as metal stair hand railings*, guard rails*, lights, planters, copper leaders.

Light fixture Guard rail Stair railing

*The metal pipe guard and stair rails, although historic in nature, would be in non-compliance to current building codes in terms of life safety and ADA accessibility. Modifications to these elements need consultation with an historic architect and the State Historic Preservation Division (SHPD).

Art Moderne planter on the left and flagpole base to the right

Leader box and downspout

Ventilation grille

- Wood casement windows (only a few remaining) – Wing 1

- "Wallace Rider Farrington High School" metal lettering at the main façade facing North King Street.

- Open lanai along Wing 9

- Grille work at the ground level may be added for security purposes along Wing 9

- 1939 Cornerstone (Wing 1)

  - The original paint color of the building has not been confirmed, but a proposal to do paint sampling is being proposed.

- **Features in original drawings:** These features have been removed, but should be considered as an option in the Master Plan and any renovation/ alteration. See attached (original) drawings.
  - Portions of original Bas relief grille pattern and Bas relief work (see Sheets 6, 7, & 8)
  - Original horizontal banded windows (hopper and double hung) (see Sheets 9 & 10)
  - Panel doors/transom windows (current solid doors, wood jalousie windows) (see Sheets 9 & 10)
  - Front office lobby which has been enclosed (see Sheet 15)
- **Interior (Typical Classrooms):**
  - A majority of the rooms have a suspended acoustic tile grid ceiling, Vinyl Composition Tile (VCT) flooring and painted walls, all of which are not part of historic character.
  - A majority of original floor plan configurations remain, though it is not of great historic value as the vast majority of walls, original built-ins, lights, etc. have been altered and/or removed. What remains may be used as inspiration for future design, but not enough remains to be character defining.
  - A few of the original five-panel doors and green chalkboards remain. These can be used as design elements whose character can be part of future renovation guidelines.

Two typical 5 panel doors and chalkboard (on the right)

Other Buildings over 50 years old Considerations

Though other buildings may be eligible for historic listing, they are not considered high preservation value and were thus agreed with SHPD to be documented if they were to be demolished and/or severely altered.

- Auditorium (Building S)
    - Built in 1953, this building is along North King Street, is adjacent to Building A; Wing 5, facing the open lawn area, and highly valued by the school. Although a portion of the roof collapsed on November 23rd 2012, the DOE is planning to repair and renovate the auditorium which would create the opportunity to incorporate historic elements within the interior.

- Building A, Wings 4 & 8 were added in 1957-58 by architect Ernest Hara & Associates. SHPD was open to the possibility of eliminating these two wings in order to open up the connection of the open Quad area with the rest of the campus, but it would also require that replacement classrooms be provided.
- Documentation prior to demolition will be required if such a proposal is implemented

View of Wing 4

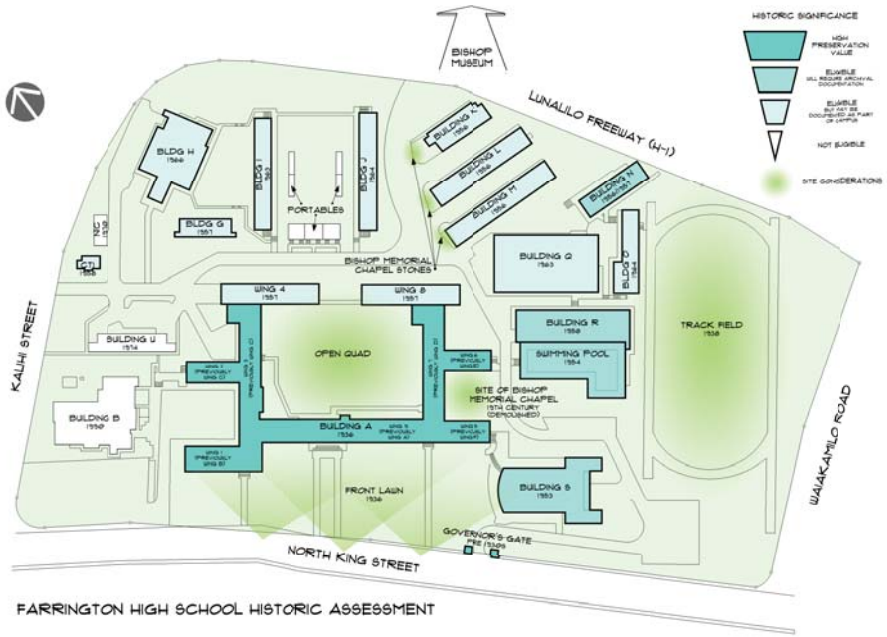
- Pool facility (Building R)
    - Built in 1954 as a Memorial to WWII Farrington Alumni veterans, the pool had fallen into disrepair due to maintenance costs and other operational issues. There is no plan to renovate this facility.
    - The pool is a sensitive subject within the local community and there is a recommendation to replace the pool as part of the master plan. Should the pool be replaced the existing dedication plaque is proposed to be re-installed for the new facility. Should the pool not be replaced, a visible display area for the plaque will be developed.

- The ROTC facility (Building N)
    - Built in 1961 plays an important role in Farrington High School's history.
    - Although not an architecturally significant building, the facility has provided training for many students who have graduated and since furthered their military career.
    - The facility once had a rifle range, but due to its proximity to H-1 freeway, that aspect is no longer used for that purposes.

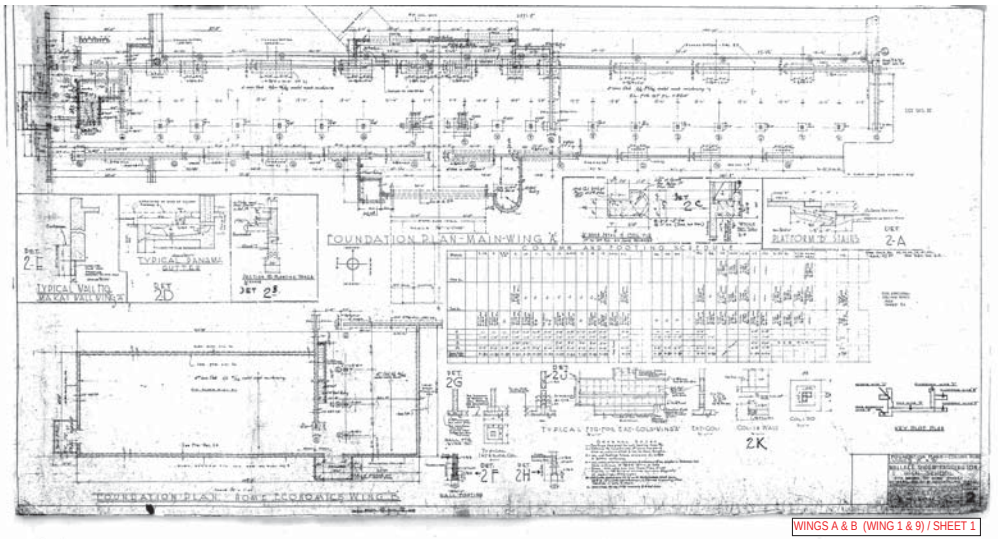
- In summary, documentation of the above noted buildings and other buildings on campus may be in the form of a history book of the entire campus. The buildings mentioned above may also require Historic American Buildings Survey (HABS) level documentation when any construction project commences.

Attachments:

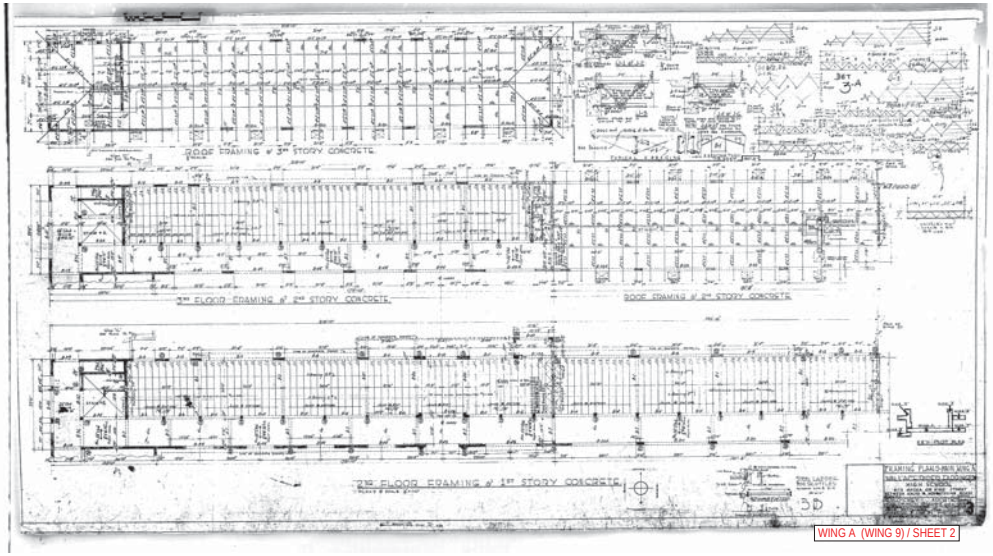
- Historic Assessment Site Plan
- Original Building A Plans (identified by: original building or wing name / current wing no. / sheet number)
- Minutes of October 15, 2012 meeting with SHPD
- National Register of Historic Places Registration Form for Farrington High School



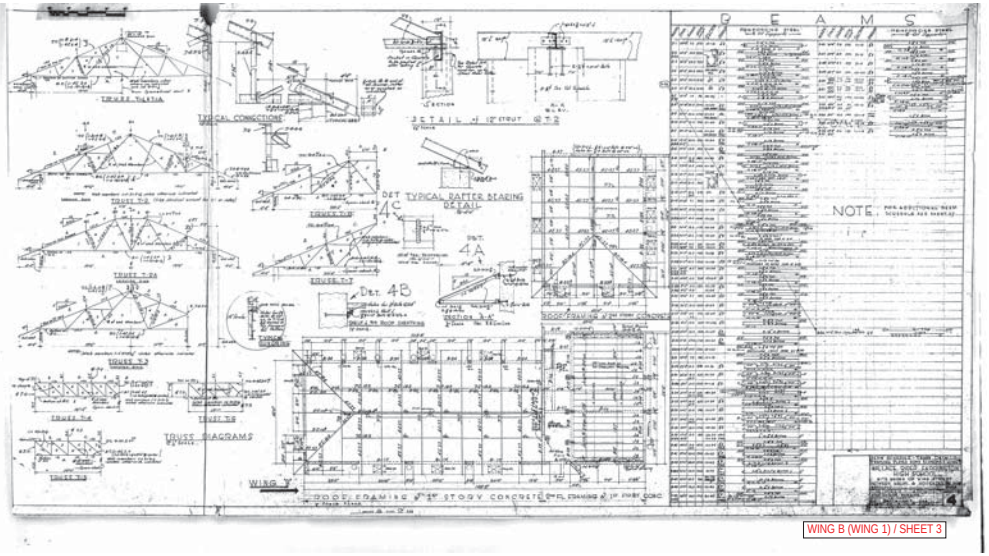
FARRINGTON HIGH SCHOOL HISTORIC ASSESSMENT



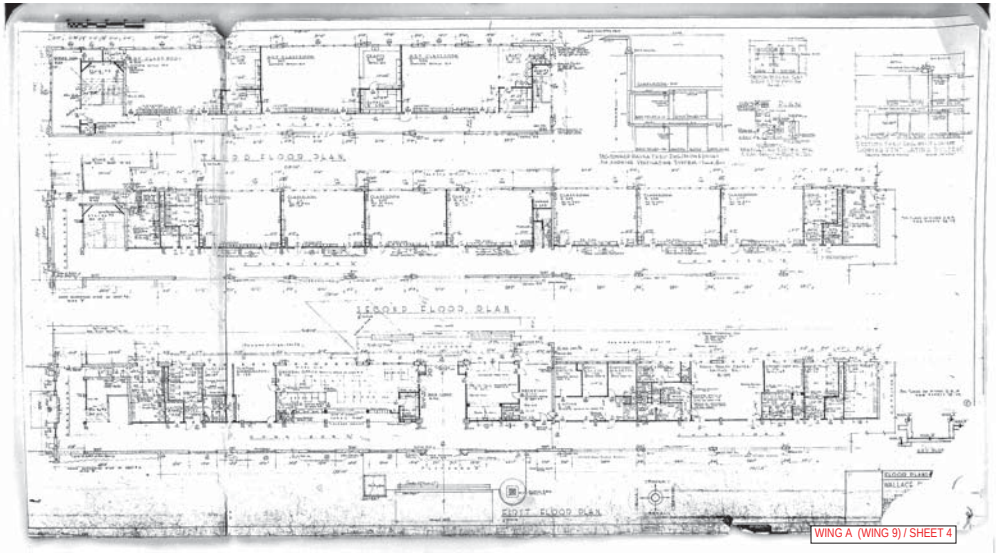
WINGS A & B (WING 1 & 9) / SHEET 1



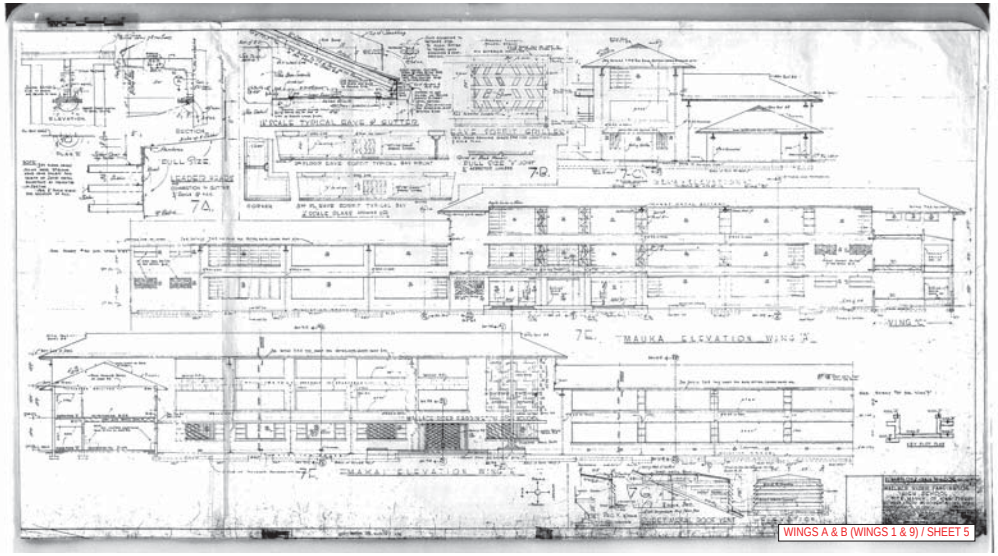
WING A (WING 9) / SHEET 2



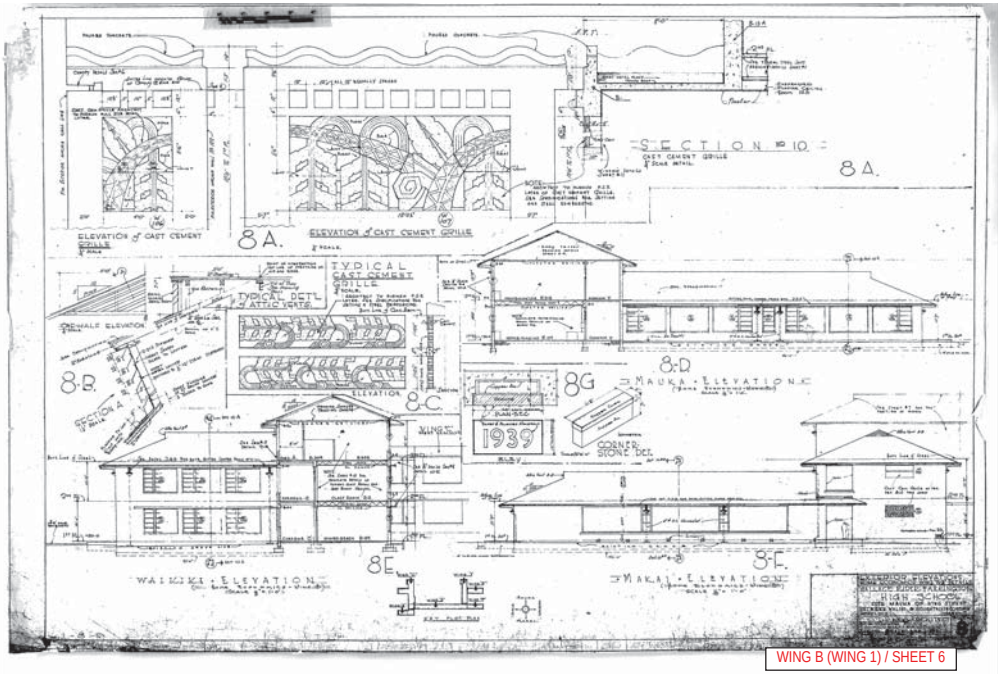
WING B (WING 1) / SHEET 3



WING A (WING 9) / SHEET 4



WINGS A & B (WINGS 1 & 9) / SHEET 5



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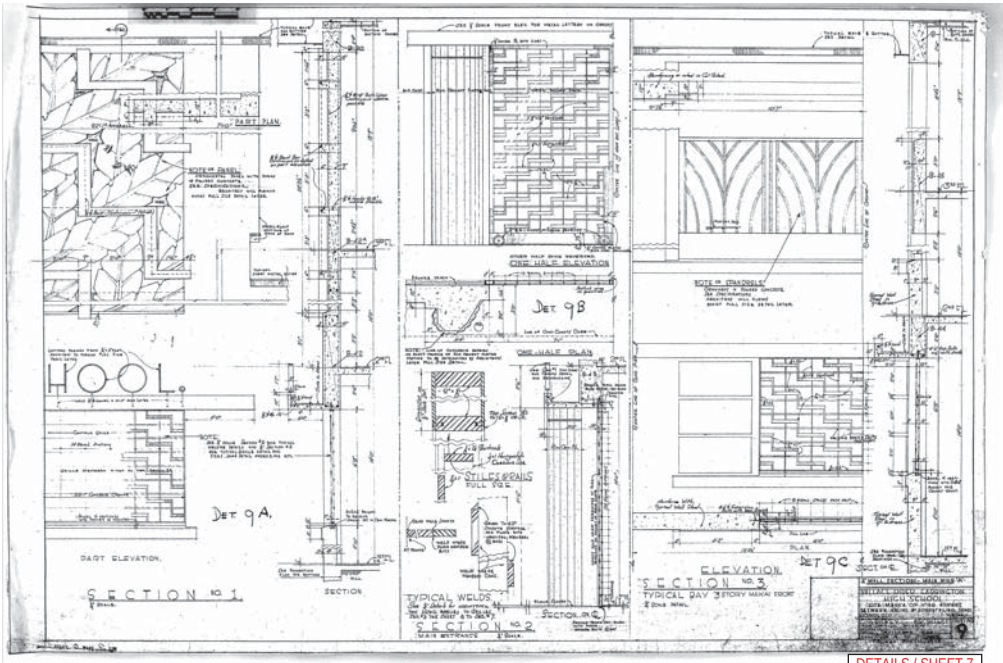
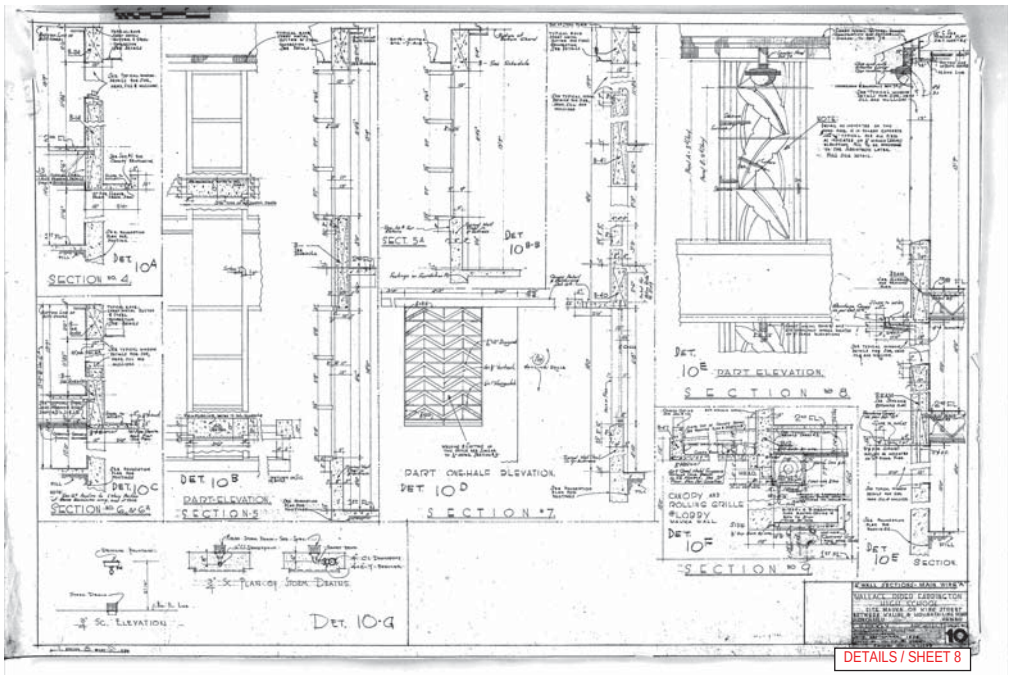


DETAILS / SHEET 7



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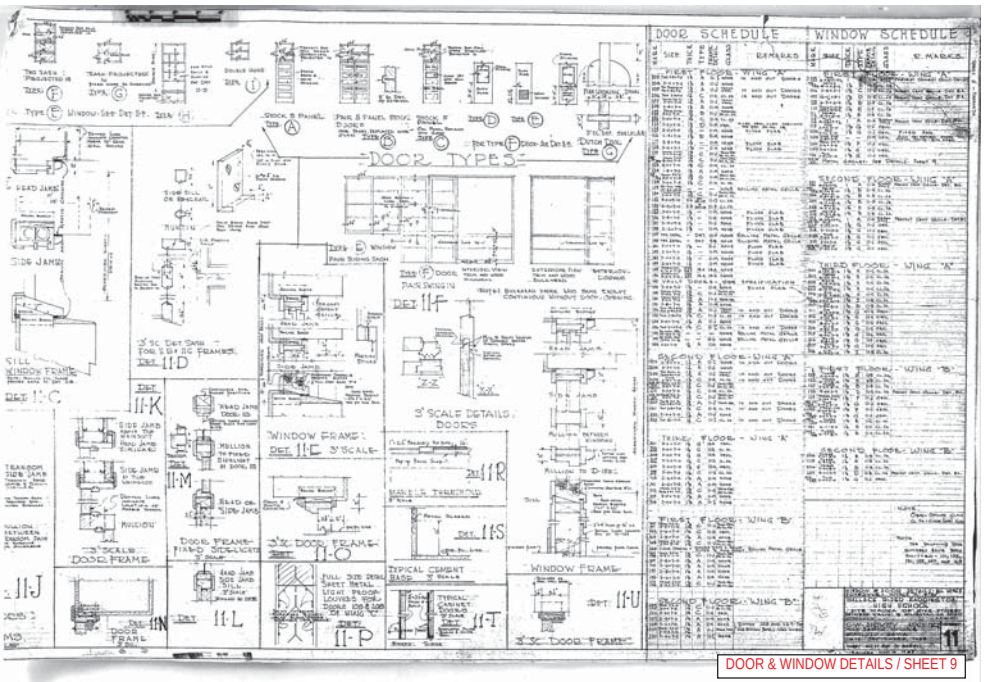
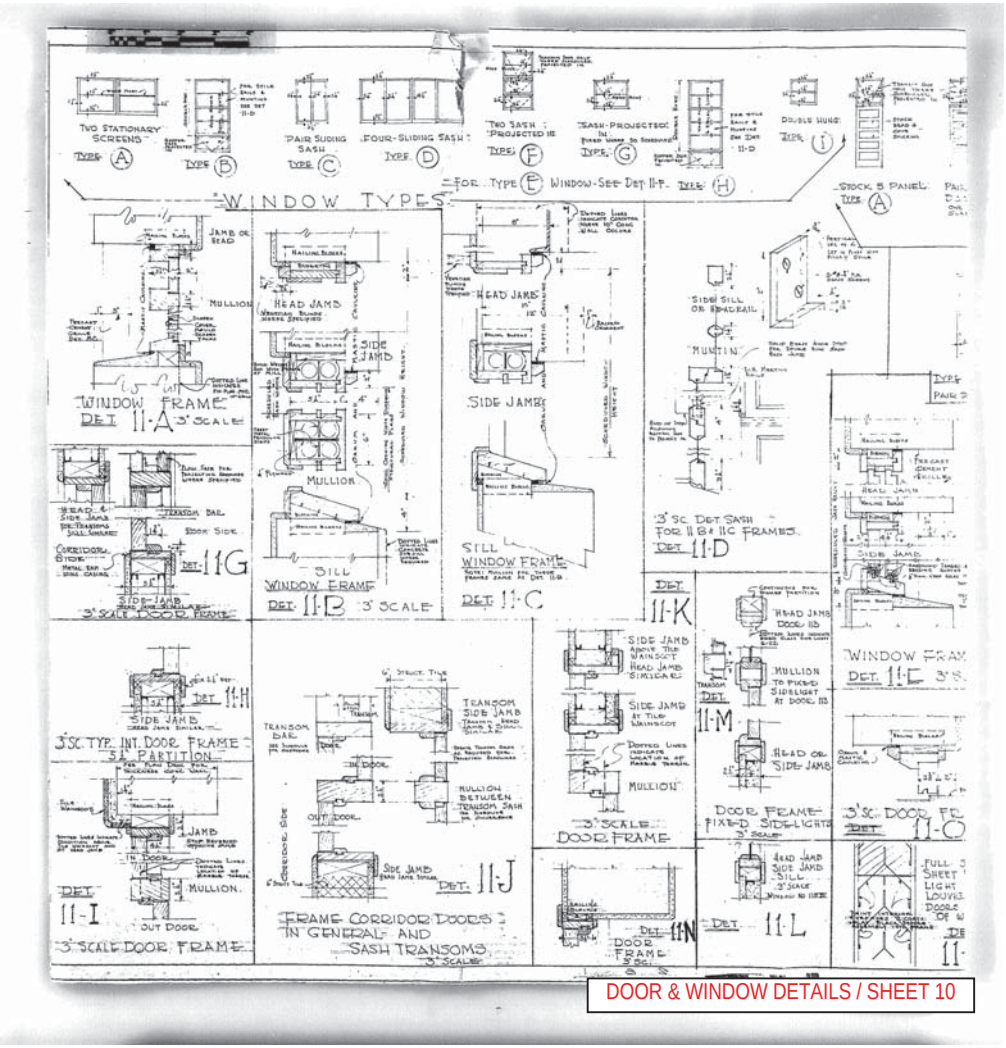
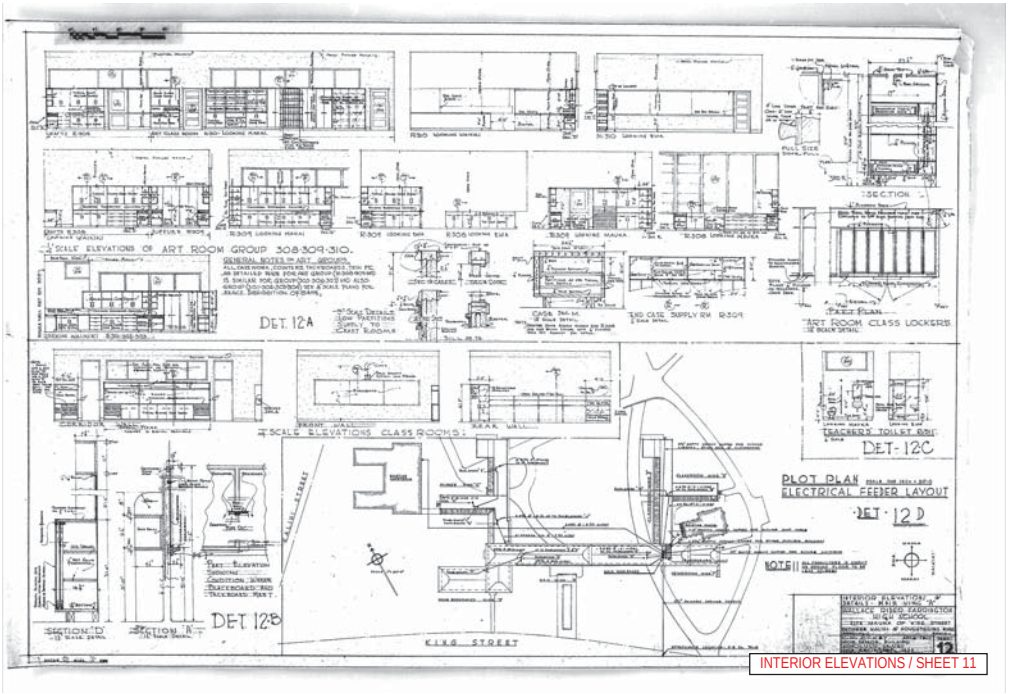


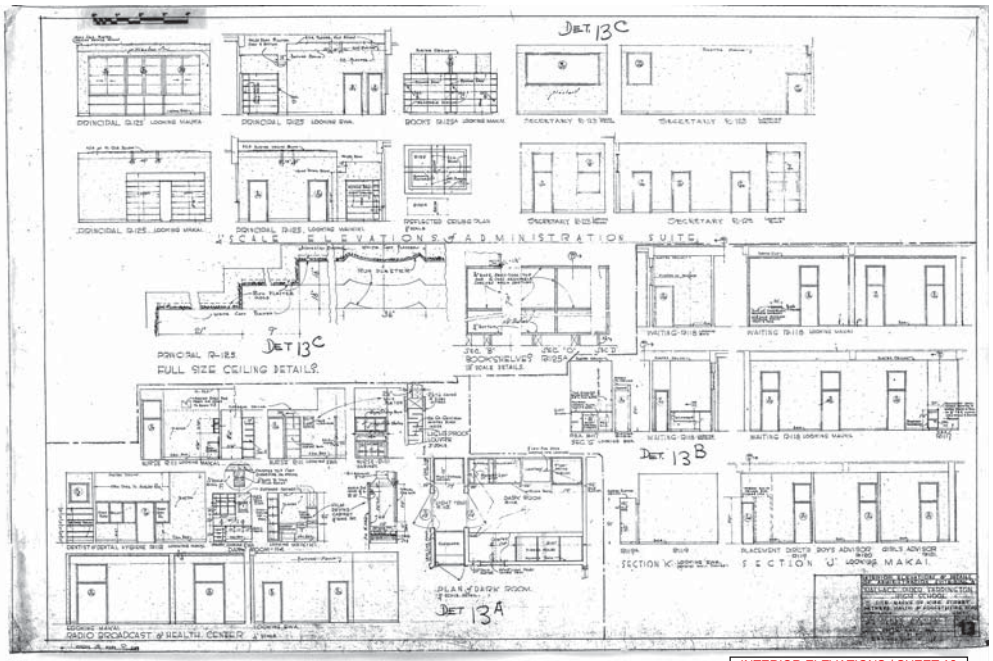
DOOR & WINDOW DETAILS / SHEET 9



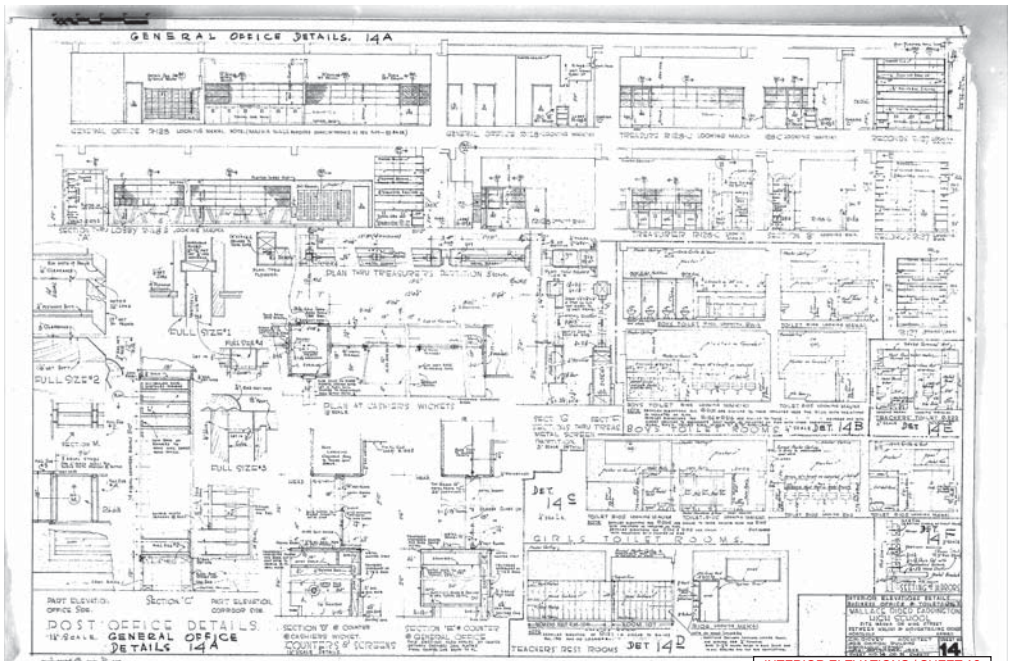
DOOR & WINDOW DETAILS / SHEET 10



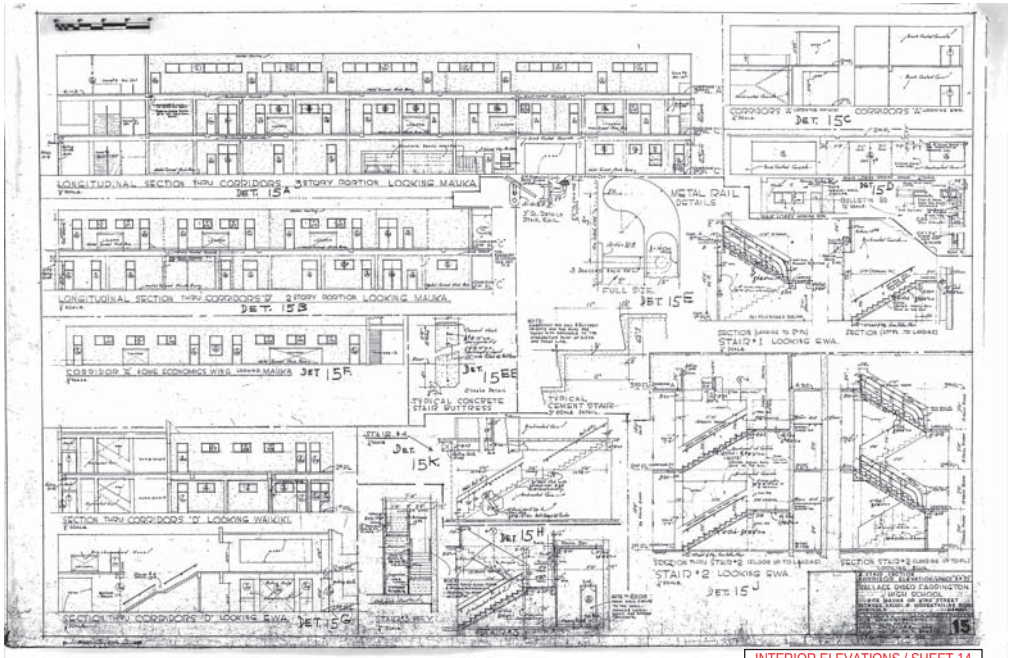
INTERIOR ELEVATIONS / SHEET 11



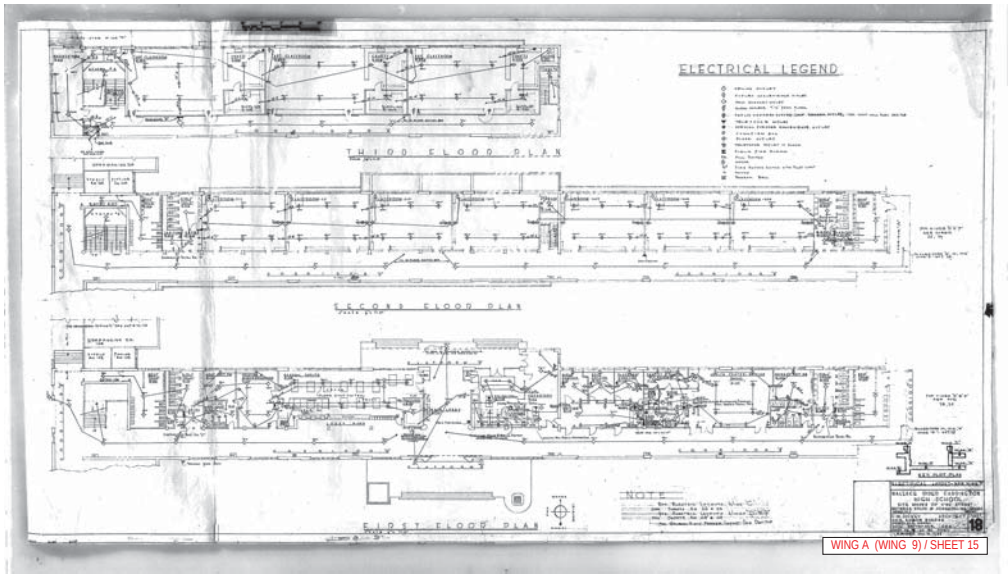
INTERIOR ELEVATIONS / SHEET 12



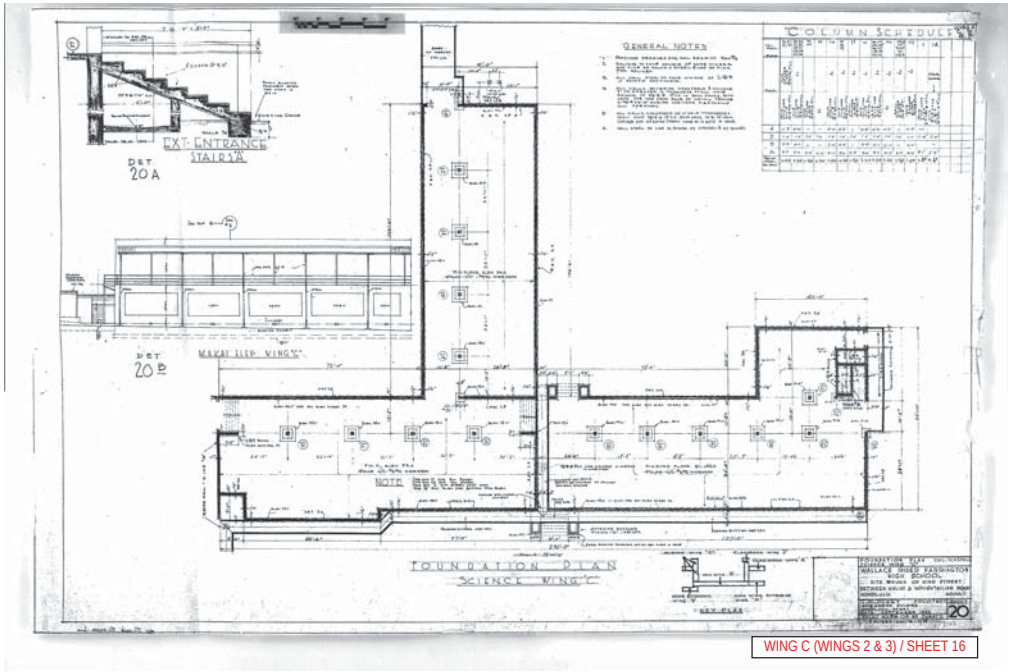
INTERIOR ELEVATIONS / SHEET 13



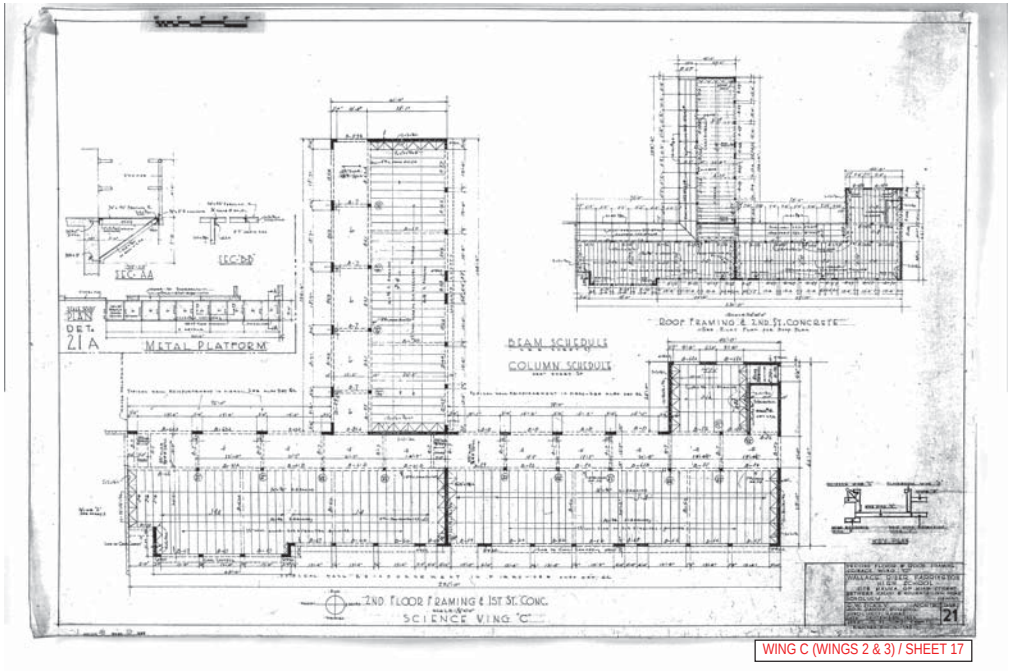
INTERIOR ELEVATIONS / SHEET 14



WING A (WING 9) / SHEET 15



WING C (WINGS 2 & 3) / SHEET 16



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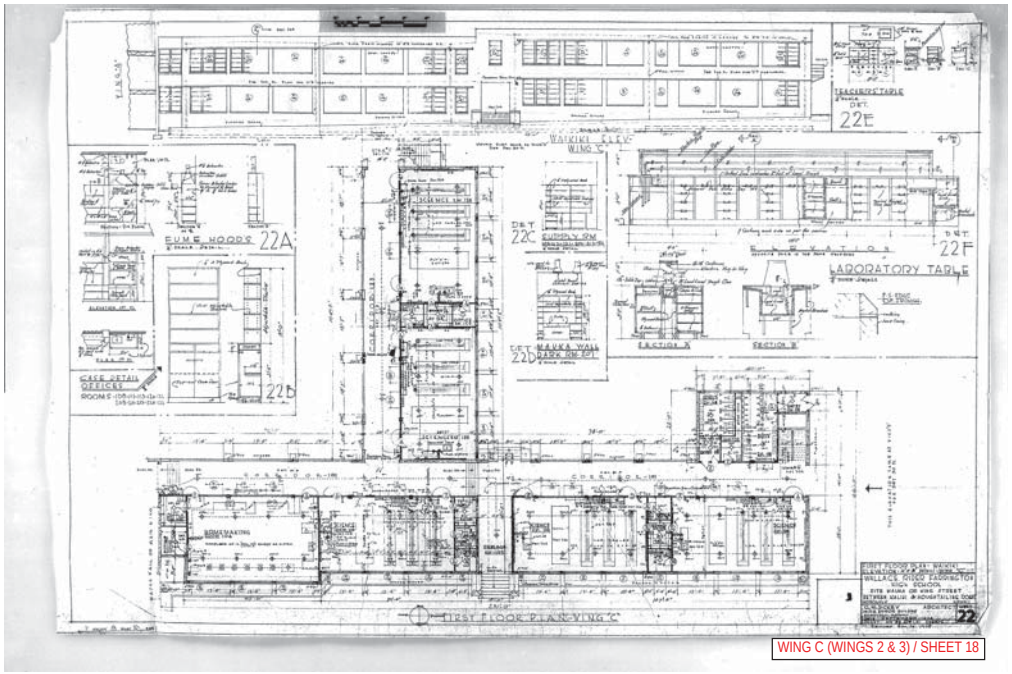

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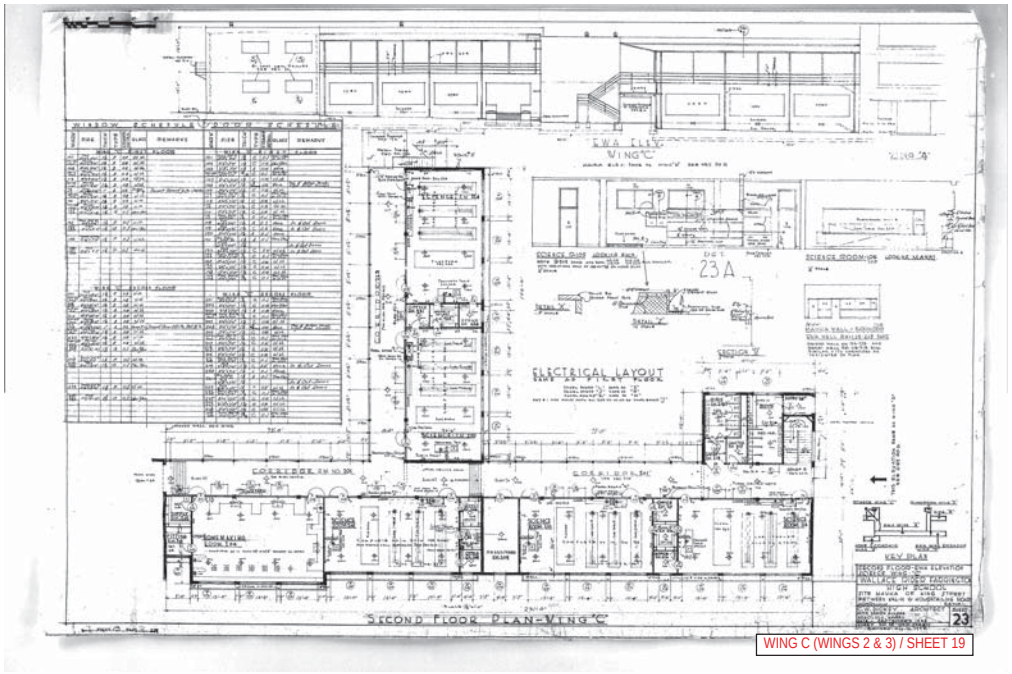

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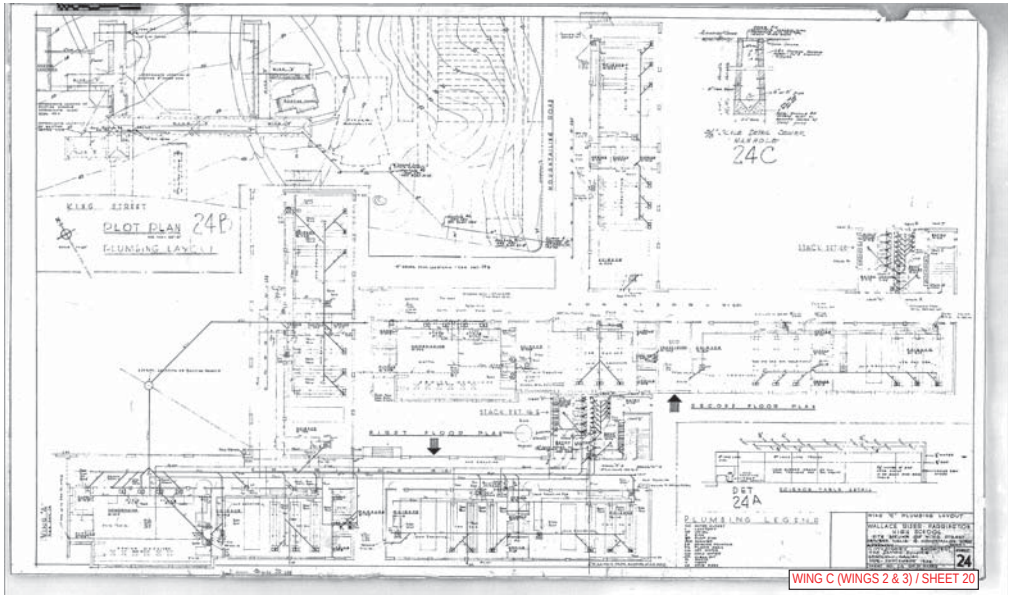

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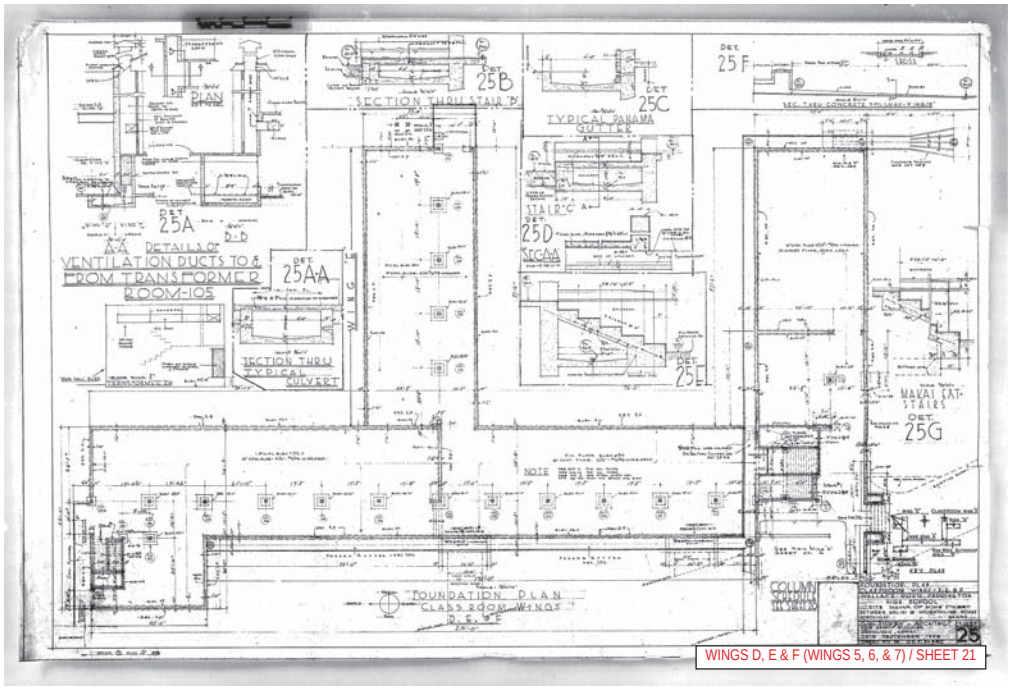
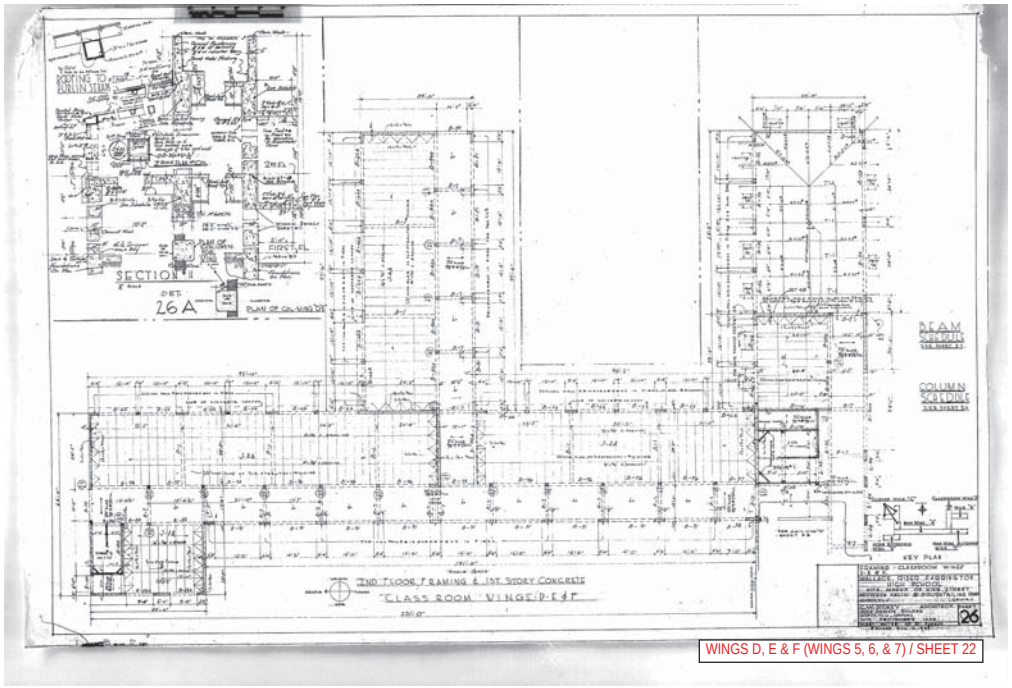


WINGS D, E & F (WINGS 5, 6, & 7) / SHEET 21



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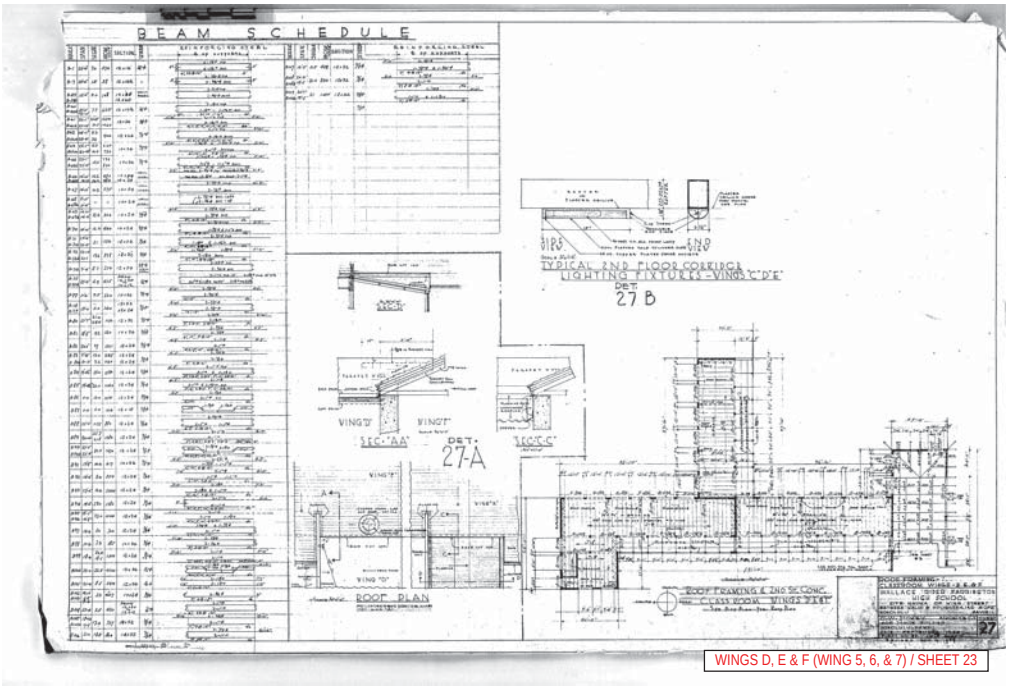

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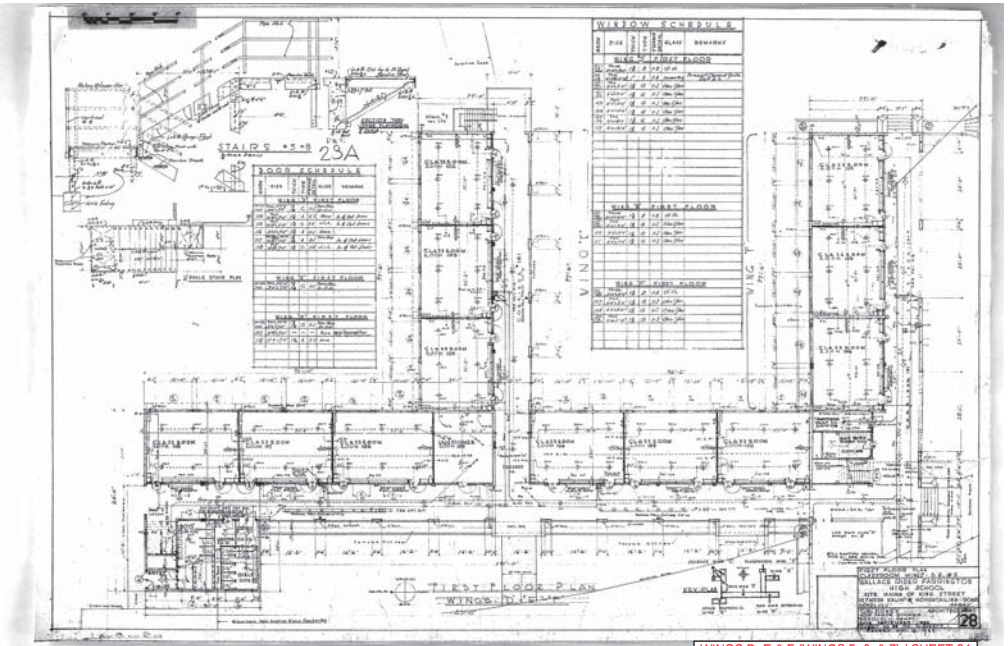

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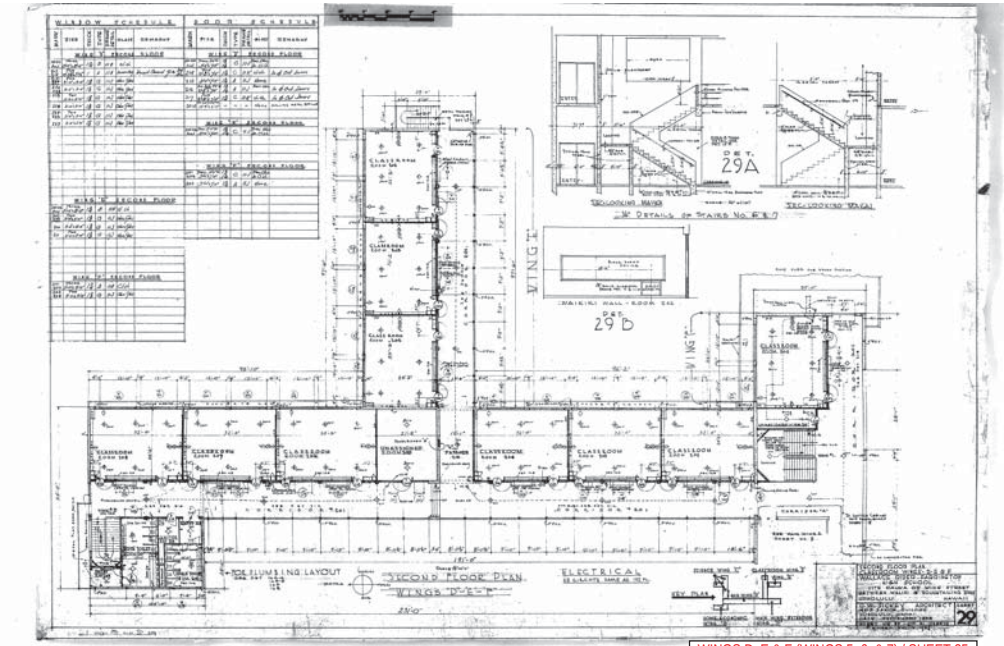

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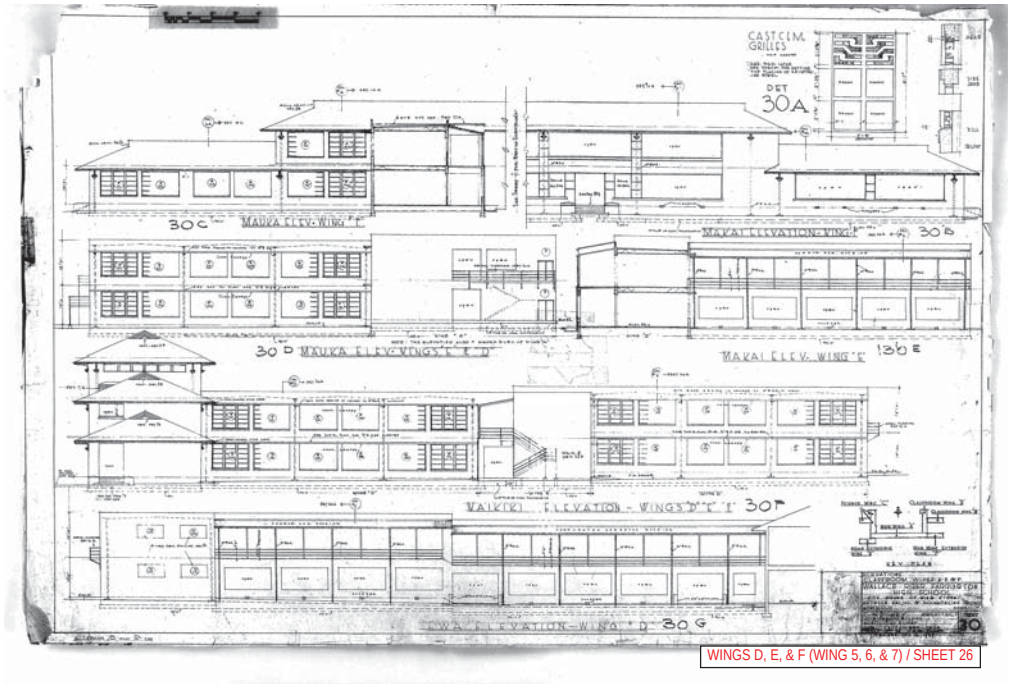

WINGS D, E, & F (WING 5, 6, & 7) / SHEET 26

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MEETING MINUTES
By: Michelle
October 15, 2012

Project:	FARRINGTON HIGH SCHOOL HISTORIC PRESERVATION MEETING WITH SHPD	
Meeting Date:	October 15, 2012	
Time:	9:00 AM – 11:00 AM	
Location:	Farrington High School (FHS)	
Attendees:	DOE	Jonathan Weintraub, Brenda Lowrey
	FHS	Ron Oyama
	AHL	Terry McFarland, Garret Horimoto, James Hoapili, Shao Yu Lin
	MVEI	Bob Simons, Judy Cheng
	SHPD	Angie Westfall
	FAI	Tonia Moy, Michelle Cheang

I. Tour
- Visited: Building A front lawn (fronting North King Street), auditorium (Building S), Building A courtyard (Wings 6 and 7; SLC), swimming pool, track & field, shop buildings (Buildings K, L, and M), Building N (ROTC), cafeteria, library, and amphitheater (quadrangle).

II. Overall
- FHS has a lot of history and there is a desire to preserve not only the structures, but also the spirit of the school, faculty, and students (past and present).
- The goal is to modernize the campus versus doing repair and maintenance (R&M).
- FHS and the buildings evolved over many years. As a result, the amount (density) of buildings throughout the campus limits the amount of open space.
    - The density of the buildings are a concern because one of the goals is to keep as much open space as possible and to create more classrooms.
- Demolishing the school (and re-building) is not an option and cost prohibitive. There is a need to add more density (classroom space), but that needs to be tendered with budget constraints.
- Due to the undersized cafeteria and limited open and shaded areas on campus, many students eat in the classrooms.
    - Students want more shade and areas to sit.
- The library is heavily used, but insufficient in size based on the school population.
- Barriers along the front of the school facing North King Street should be transparent (ie: chainlink instead of wall) due to security concerns.
- A student union is proposed for health support services, possible exhibition of FHS memorabilia, and for informal student gathering.

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- It was suggested that a place be designated on campus to show the history of FHS and showcase some of the important memorabilia. As stated per the meeting with Mr. Al Torco, the student's education should come first versus buildings, but aspects should be preserved.

- SHPD stated the interior of classrooms may also have historic integrity depending on the building.
- Correspondence with SHPD
  - It was proposed that meetings with SHPD will happen throughout the master planning phase at major milestones.
  - Fung Associates (Tonia Moy) will be the primary contact with SHPD and notify them of meetings and/or arrange reviews at major milestones of the Master Planning process.
  - AHL will establish phases and historic criteria (with SHPD input) for the master plan.
- Problems Identified
  - There are security concerns with FHS being an open campus. Numerous groups and organizations use the campus during the evening hours and over the weekends. Homeless people also use the school for overnight shelter.
  - Noise disruption to classrooms located nearest to the freeway.
  - FHS is one of the smallest campuses with one of the largest student populations that includes students from five (5) nearby federal housing complexes around the Kalihi area.
  - Campus is land locked and unable to expand.

III. FHS Historic Buildings

- 2 stone pillars at Governor's Gate dates from the time of the location of the original Kamehameha Schools (prior to 1930s). The low rock wall heading toward Waiakamilo Road was built later.
- Building A, Wings 4 and 8 were built in 1957 and discussed to be possibly removed to open up the quadrangle and make it more pedestrian friendly. SHPD concurs with the removal of Wings 4 and 8 as a viable option if necessary.
  - Removal of additions (Wings 4 and 8) in Building A will support the pedestrian view and access on campus.
  - Removal of Building A, Wings 4 and 8, is a viable option, but the challenge would be to replace the removed classrooms elsewhere on campus.
  - A paint analysis for letters, trim, and the façade wall is needed for assessment of the original colors and as part of the design guide before the façade can be painted.
  - The front east courtyard of Building A previously housed Bernice Pauahi Bishop Memorial Chapel. Foundation stones remain within the courtyard as well as near the Shop Buildings K, L, and M.
- The pool and bleachers were understood to be an important historic structure for FHS. However, since maintenance, replacement and/or renovation isn't feasible, SHPD concurs with its removal but will require documentation as mitigation.
- Currently the existing track & field is used as a practice field for FHS. Athletic events are held at Roosevelt High School. Per FHS, one third of the student body

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participates in sports. The goal is to renovate the existing track & field into a playing field for FHS.

- Building S (auditorium) is not economically feasible to be replaced.
- The amphitheater or central quadrangle is an important gathering place. Many activities such as pep rallies, marching band practices, and graduations are held in the quad.

IV. Vehicular Traffic

- Master plan goal is to access a main pedestrian access (main street) in the middle of campus and push vehicular access to the exterior periphery.
- Parents and city busses stop on North King Street and Kalihi Street to drop off students, which block traffic.
  - Students arrive and depart FHS via the city bus system, walking, driving, or dropped off. There is no school bus service.
- From a historic preservation standpoint, a drop off in front of the lawn and creating more paved surfaces may not be the best solution. More research into other possible solutions for a drop-off is needed.
- New drop off area may need approval from the City.

V. Conclusion

- SHPD comments:
  1. Create a nice façade with Building A and make it a focal point of the campus.
  2. Side streets should be taken a look at to make it more pedestrian and vehicular friendly (possible drop-offs).
  3. SHPD will require documentation of buildings before removal of structures on campus. (Pool, bleachers, ROTC building, etc.)
  4. SHPD supports the use of parking structures versus on-grade parking lots.
  5. SHPD encourages an attractive treatment to possible acoustic solutions on the freeway side of campus.
     a. SHPD stated if a wall were to be added to the rear of the campus (adjacent to H-1 freeway) to address the freeway noise, they would encourage a wall with some design feature be provided versus a plain wall.

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NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Farrington, Wallace Rider, High School

other names/site number N/A

2. Location

street & number 1564 N. King ☒ N/A not for publication

city or town Kalihi ☒ N/A vicinity

state Hawaii code HI county Honolulu code 003 zip code _____

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☐ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

_____
Signature of certifying official/Title Date

_____
State of Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

_____
Signature of certifying official/Title Date

_____
State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

☐ entered in the National Register.
☐ See continuation sheet.

☐ determined eligible for the National Register
☐ See continuation sheet.

☐ determined not eligible for the National Register.

☐ removed from the National Register.

☐ other, (explain:) _____

5. Classification

Ownership of Property (Check as many boxes as apply)
☐ private
☐ public-local
☒ public-State
☐ public-Federal

Category of Property (Check only one box)
☒ building(s)
☐ district
☐ site
☐ structure
☐ object

Number of Resources within Property (Do not include previously listed resources in the count.)

Contributing	Noncontributing	
1	0	buildings
		sites
		structures
		objects
1	0	Total

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register
0

6. Function or Use

Historic Functions (Enter categories from instructions)
Education: secondary school

Current Functions (Enter categories from instructions)
EDUCATION: secondary school

7. Description

Architectural Classification (Enter categories from instructions)
Moderne

Materials (Enter categories from instructions)
foundation Concrete
walls Concrete
roof Slate
other _____

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

Farrington, Wallace Rider High School
Name of Property

Honolulu, HI
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] **B** Property is associated with the lives of persons significant in our past.
- [X] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] **A** owned by a religious institution or used for religious purposes.
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

ARCHITECTURE
EDUCATION

Period of Significance

1936-1939

Significant Dates

1936
1939

Significant Person
(Complete if Criterion B is marked above)

Cultural Affiliation

Architect/Builder

Dickey, Charles W.

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [ ] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [ ] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [X] State Historic Preservation Office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Name of repository:

10. Geographical Data

Acreage of Property 8 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1			
2			
3			
4			

- [ ] See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Belinda B. Nettles

organization Student, University of Hawaii Manoa date May 7, 1993

street & number 2524 S. Pleasant Point telephone (904) 344-2988

city or town Inverness state FL zip code 34450

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name State of Hawaii, Department of Education

street & number P.O. Box 2360 telephone (808) 737-4743

city or town Honolulu state HI zip code 96804

Farrington, Wallace Rider High School
Honolulu County, HI

Description

Wallace Rider Farrington High School, named in honor of a Hawaii governor who advocated education, is located in the urban setting of Kalihi. The approximately 26 acre campus is surrounded by four major streets. In front of the school is King Street and the Kamehameha Homes settlement. On the west side of the school Kalihi Street integrates into the Likelike highway and to the rear is the H-1 highway. On the east side is Houghtailing Street and beyond that is a business district. This campus houses seventeen buildings which roughly form a semi-circle around the main building, which is fronted by a wide grassy lawn which has a couple trees and sparse landscape. Only the main building, Building A, is included in this nomination.

Building A is the only building on the campus of the Moderne style. Prominent Hawaii architect Charles W. Dickey designed the building. It is a predominately two-story structure of beige painted reinforced concrete walls adorned by floriated and geometric reliefs. The metal grillwork on the front of the building reflects the same geometric pattern as the relief above it.

The building follows a highly modified U shape with a grassy courtyard located between the wings. The base of the "U" faces King Street and is mainly two-stories with a three-story central portion and two one-story extensions on each end. At the West end of the U's base, the building juts down slightly toward King Street before continuing westward with the single-story portion. The parallel wings which form the upper portion of the U are entirely two-levels. These wings have flat roofs compared to the hipped roof of the front section. Each of these wings has a small perpendicular two-story wing protruding outward which is attached at approximately the center point of each wing. The northern end of the wings which form the tops of the U-shape originally terminated with small westward facing portions which contain bathrooms and stairways. Two additional wings were added around 1958 to the north end of these wings, each extends across the top of the courtyard so that it almost encloses it. The building is overall in basically sound condition.

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(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

The main entrance can be reached by ascending concrete steps onto a broad stoop. It is off-centered in the three story portion of the building. To the left of the entrance is a square concrete planter and on the right is a flagpole with a large circular concrete base. The entrance way is flanked by fluted concrete columns. On the wall to the right are two metal plaques with information regarding the persons associated with the school's construction. On each side of the entrance are lamps of glass and metal trim. To the right of the entrance is a two-story high concrete relief in a geometric design. The school's name is spelled out in metal letters placed on a horizontal ledge which projects out from the wall above the first floor openings of this portion of the building.

The entire building has single-loaded corridors with wide walkways. On the open side of these walkways is an approximately three foot high solid railing. This is on all the walkways along the front of the building and the first floor of the other original wings. In the three story portion, the ground floor openings have metal grilles which reflect the same geometric design of the reliefs located on the front of the building. Between the openings on the second and third floors are concrete piers which rise from the top of the second story railing. These create a vertical element in an otherwise horizontal facade. On the second floor of the wings, the walkways are lined by metal posts and railings.

The back of the main building has two floriated concrete vents on the back and side walls of the secretary's office. The concrete posts which separate the window sections for the second and third floors also have leaf relief patterns and compliment the vent. On the far right side on the first and second floor are four rectangular floral patterns. The first four bays of the first floor has an overhang with a rippled concrete design resembling waves. Above the remaining bays of the ground floor and along the entire second floor are narrow concrete overhangs above the windows. The backs of the other wings are basically plain.

Within the courtyard formed by the building are three portable classrooms toward the back left hand side. On the other side of the courtyard are two metal portable bleachers. These have not been included in the count of noncontributing resources because of their temporary nature. The courtyard also contains groups of shade trees with benches placed beneath them.

The main building maintains much of its exterior integrity. The only changes made to it have been routine painting and the replacement of original windows with jalousies. A slate roof replaced asbestos shingles in the 1980's. Wiring from updated alarm, bell, and intercom systems is apparent along the ceilings of the interior corridors. There have also been security grates installed on the corridor windows during the 1980's. The bathrooms have been renovated and the cabinetry has been replaced in a number of the classrooms. Yet overall the main building seems to have retained its structural integrity.

Statement of Significance

Wallace Rider Farrington High School was built in 1939 by prominent local architect Charles W. Dickey. The building was constructed during a turning point for the public secondary education system in Hawaii and Farrington's creation was part of a major expansion of the school system. For these reasons, Wallace Rider Farrington High School meets National Register criteria A and C.

Prior to the 1890's secondary education was the responsibility of independent or private schools. From 1920 to 1930 the number of students in grades 7-12 grew from 4719 to 19,700 of which 4905 students were in grades 10-12 alone. The growth is attributed to a number of factors. During this period social legislation raised the minimum employment age. Hawaii also had a surplus of labor in the sugar fields so the industry now supported youth to attend school because it would no longer deprive the industry of workers. The two school board superintendents during this time, Givens and Crawford, believed secondary education was important and devoted much time and interest to it. The 1920s were a prosperous decade for Hawaii and there was vocational education offered in the secondary schools to teach trades to the local youth. At first public interest was not in favor of increasing public secondary education. However, since having an American school system at the time of annexation helped influence Congress, it was believed that a strong secondary system would be an argument in favor of statehood and serve as protection against becoming a commission government.

The school population continued to increase rapidly until there were 12,716 students in the 10-12 grades in 1938. This put a great strain on school facilities and during the 1930's at least fourteen new high school programs were created. Farrington was created in 1936 and was originally located on the opposite side of King Street in the buildings of the then empty Kamehameha Girls' School. This site is now the location of Kamehameha Homes. The present school site was originally home to the Kamehameha Boys' School. The present building was built in 1938-39 with part of the project funded by Public Works Administration monies. The 1939-1940 school directory lists Farrington as having 2054 students and a staff of 66, including secretaries. Since that time it has continued to proudly serve the local community.

As mentioned earlier, the architect was Charles W. Dickey who was a prominent builder in Hawaii during the 1920s and 1930s. He designed a number of public and private buildings including the Auditorium at the Kamehameha Schools, the Immigration Station, the Mabel Smyth Building and the Alexander and Baldwin Building. A number of his buildings still remain, but many have been destroyed, including the Bernice Puahi Memorial Chapel which used to be located on the property of Farrington High School. This chapel was constructed of blue lava stone and the wall and pillars along King Street near the auditorium remain from this earlier building. Farrington is one of the few examples of Dickey's school designs which he built in both Hawaii and California. The building is also a rare surviving exmple of the Art Moderne / Art Deco style in Hawaii.

Bibliography

Farrington High School Clippings [microfilm]. Honolulu: Advanced Micro-Image Systems Hawaii, 1987.

Honolulu Advertiser. December 10, 1939.

Jay, Robert. The Architecture of Charles W. Dickey: Hawaii and California. Honolulu: University of Hawaii Press, 1992.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 9, 10 Page 3

Farrington, Wallace Rider High School
Honolulu County, HI

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McAlester, Virginia and Lee. A Field Guide to American Houses. New York: Alfred A. Knopf, 1990.

Poppeliers, John C., et al. What Style Is It? Washington D.C.: Preservation Press, 1983.

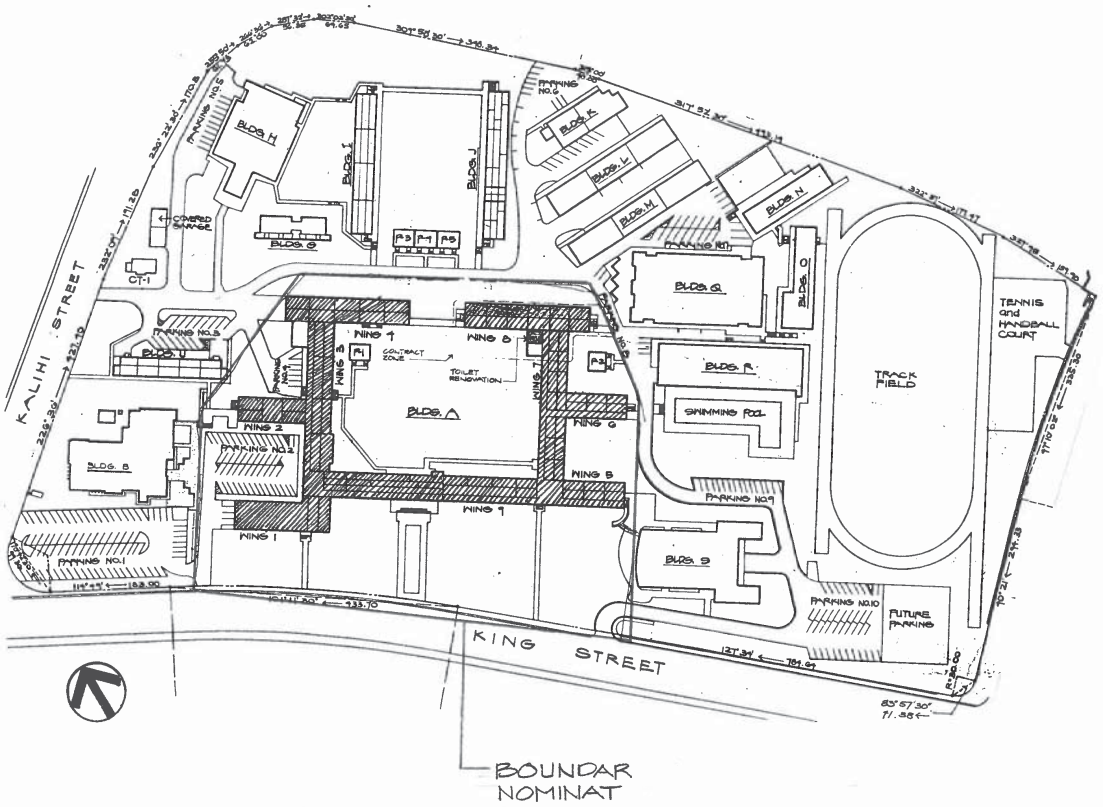
Wist, Benjamin Othello. A Century of Public Education in Hawaii, October 15, 1840 - October 15, 1940. Honolulu: The Hawaii Educational Review, 1940.

Verbal Boundary Description

The boundary of the property is the area immediately surrounding Building A to include the courtyard and front lawn up to King Street.

Boundary Justification

This is the only building associated with Charles W. Dickey and the entire front lawn and courtyard should be maintained to protect the integrity of the building's setting.



FARRINGTON HIGH SCHOOL

NOT TO SCALE

APPENDIX C

Traffic Impact Analysis Report

Wilson Okamoto Corporation

June 2014

Traffic Impact Report

Farrington High School Master Plan

Prepared for:
Architects Hawaii Ltd.

Prepared by:
Wilson Okamoto Corporation

June 2014

TRAFFIC IMPACT REPORT

FOR THE

FARRINGTON HIGH SCHOOL

MASTER PLAN

Prepared for:

Architects Hawaii Ltd.
733 Bishop Street, Suite 3100
Honolulu, HI 96813

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #8429-02

June 2014

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LIST OF FIGURES

LIST OF APPENDICIES

I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from implementation of the Master Plan improvements for Farrington High School (FHS) in Kalihi on the island of Oahu. The proposed project entails the redevelopment of the majority of the campus to provide additional classrooms, offices, and recreational/auxiliary spaces.

B. Scope of Study

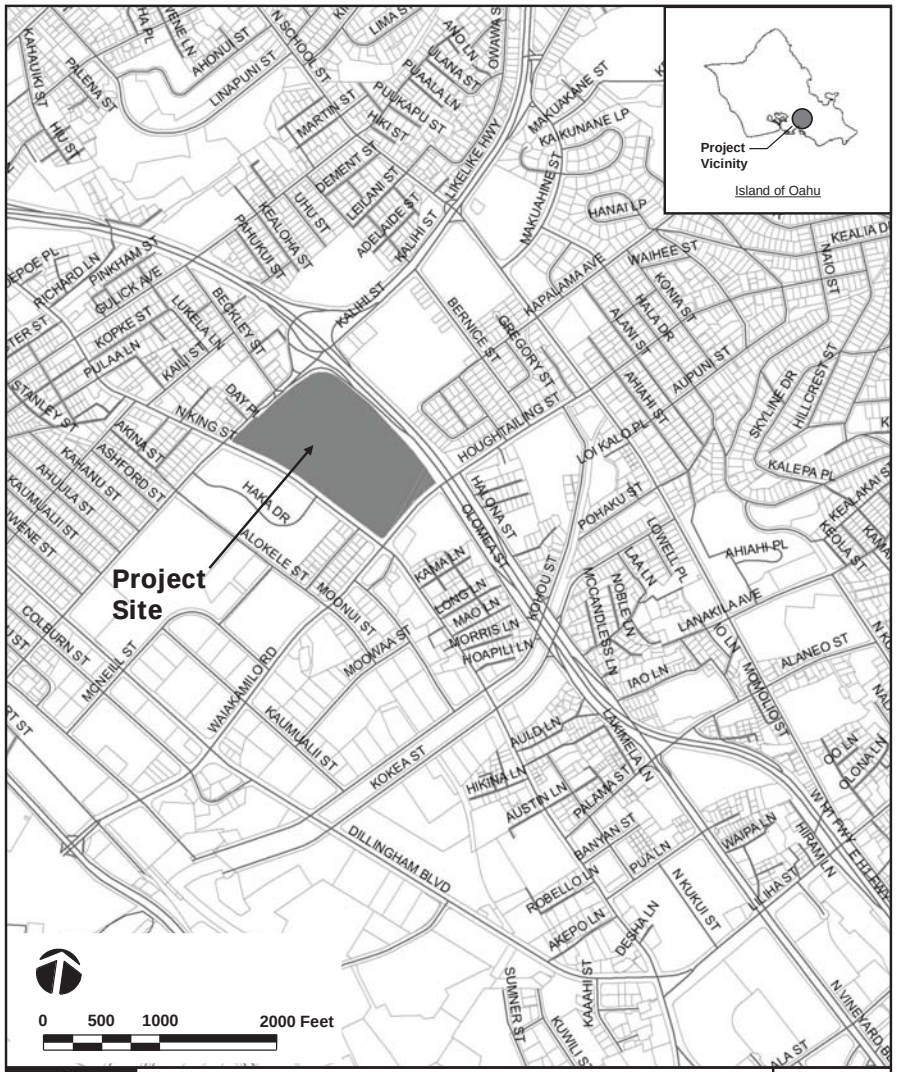
This report presents the findings and conclusions of the traffic study, the scope of which includes:

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

II. PROJECT DESCRIPTION

A. Location

The existing Farrington High School is located adjacent to King Street between Kalihi Street and Houghtailing Street in Kalihi on the island of Oahu (see Figure 1). The project site is further identified as Tax Map Keys (TMKs): 1-6-021: por. 005 and 1-6-003: por. 047, 048, 082, 083, 999. Access to the high school will continue to be provided via driveways off King Street and Kalihi Street.



WILSON OKAMOTO CORPORATION

Farrington High School Development Master Plan

LOCATION AND VICINITY MAP

FIGURE 1

B. Project Characteristics

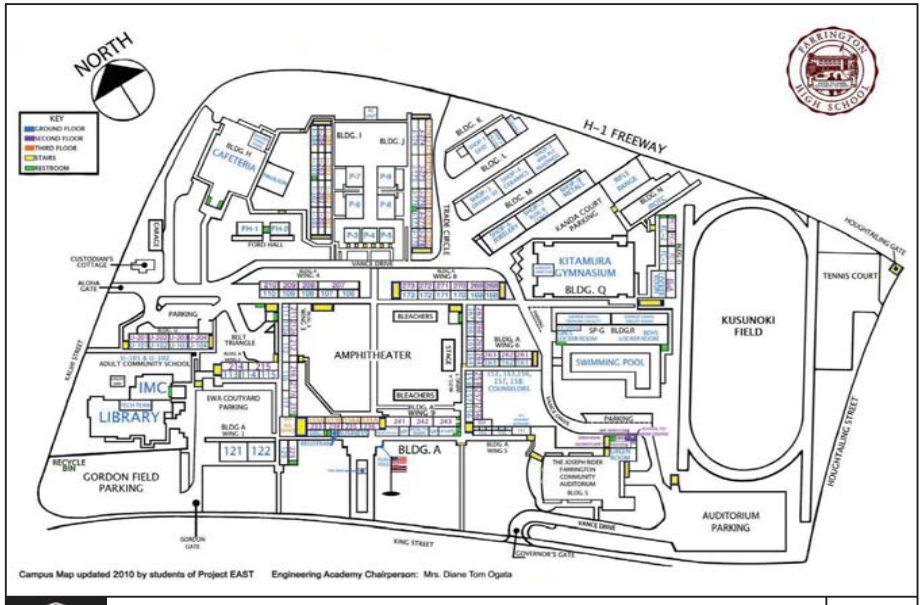
The Farrington High School currently serves an enrollment of 2,400 students in grades 9-12 and approximately 150 faculty and staff. The Master Plan for the high school is expected to be implemented in nine (9) phases over the next 14 years. Phases 1 through 4 are expected to be completed by the Year 2020 and include the following:

- Replacement of the existing athletic facilities along Houghtailing Street, existing Cafeteria/Student Center, existing ROTC facilities, and existing band/choral rooms with a new Track and Field Facility, Athletic Locker/Shower Facility, new Gymnasium, new PE facilities, new band and choral rooms, new two-story structure incorporating the Cafeteria/Student Union Center and ROTC facility, new practice fields, and modified parking areas.
- Replacement of the existing Cafeteria and surrounding structures along Kalihi Street with a new two-story Industrial Arts Building.
- Construction of new parking areas along the northeast perimeter of the school.
- Relocation of the school driveway along Kalihi Street to align with the Kalihi Street and Beckley Street intersection.

Phases 5 through 9 are expected to be completed by the Year 2028 and include the following:

- Replacement of existing classrooms on the north side of the campus with a new three-story Library/Media Center, two new four-story classroom buildings, new Student Quad and small amphitheater, new swimming pool and tennis courts, and additional parking areas.
- Renovation of the existing buildings surrounding the existing student quad adjacent to King Street.
- Replacement of the existing parking area adjacent to the existing student quad with a new parking area closer to Kalihi Street. Access to the parking area will be provided off Kalihi Street instead of King Street.
- Improvements to the school driveways/accesses off King Street.

Student enrollment is expected to increase with or without the implementation of the Master Plan improvements at the high school. By the Year 2020, enrollment is expected to increase to 2525 student and to 2650 students by the Year 2028. Figure 2 shows the existing map for the school campus and Figures 3 and 4 show the proposed project site plan and phasing.



WILSON OKAMOTO CORPORATION

Farrington High School Development Master Plan

EXISTING CAMPUS MAP

FIGURE 2

WILSON OKAMOTO CORPORATION

Farrington High School Development Master Plan

PROPOSED SITE PLAN

FIGURE 3

WILSON OKAMOTO CORPORATION

Farrington High School Development Master Plan

PHASING PLAN

FIGURE 4

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

Farrington High School is located adjacent to King Street between Kalihi Street and Houghtailing Street. Near the northwest corner of the campus, Kalihi Street intersects Beckley Street. In the vicinity of the project site, Kalihi Street is a predominantly four-lane, two-way roadway generally oriented in the north-south direction while Beckley Street is a two-lane, two-way roadway generally oriented in the east-west direction. At this signalized intersection, the northbound approach of Kalihi Street has an exclusive left-turn lane and two through lanes while the southbound lane has two lanes that serve through and right-turn traffic movements. The Beckley Street approach of the intersection has one lane that serves left-turn and right-turn traffic movements.

South of the Beckley Street intersection, Kalihi Street intersects a driveway for Farrington High School (FHS). At this unsignalized T-intersection, the both directions of Kalihi Street have three lanes that serve all allowable movements. The FHS driveway approach of the intersection has one stop-controlled lane that serves left-turn and right-turn traffic movements.

Further south, Kalihi Street intersects King Street. At this signalized intersection, both approaches of Kalihi Street have exclusive left-turn lanes, a through lane, and shared through and right-turn lanes. In the vicinity of the project, King Street is a predominantly four-lane, two-way roadway oriented generally in the east-west direction. At the intersection with Kalihi Street, the westbound approach of King Street has exclusive turning lanes and two through lanes while the eastbound approach has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane.

East of the intersection with Kalihi Street, King Street intersects two driveways for FHS and Haka Drive. At these intersections, the westbound approach of King Street has three lanes that serve all allowable movements while the eastbound approach has two lanes that serve all allowable movements. At the unsignalized intersections with the FHS driveways, the driveway approaches have one stop-controlled lane that serves left-turn and right-turn traffic movements. At the

signalized intersection with Haka Drive, the Haka Drive approach has exclusive turning lanes.

Further east, King Street intersects Houghtailing Street and Waiakamilo Road. At this signalized intersection, both approaches of King Street have exclusive left-turn lanes, one through lane, and shared through and right-turn lanes. Waiakamilo Road is a predominantly four-lane, two-way roadway generally oriented in the north-south direction that transitions to Houghtailing Street north of King Street. At the intersection with King Street the northbound approach of Waiakamilo Road has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane while the southbound approach of Houghtailing Street has exclusive turning lanes and two through lanes.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted on October 15, 2013 as well as November 19, 2013 and consisted of manual turning movement count surveys during the morning peak hours between 6:00 AM and 9:00 AM, and the afternoon peak hours between 3:00 PM and 6:00 PM at the following intersections:

- Kalihi Street and Beckley Street
- Kalihi Street and Farrington High School Driveway
- Kalihi Street and King Street
- King Street and Farrington High School Driveways
- King Street and Haka Drive
- King Street, Houghtailing Street, and Waiakamilo Road

Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Synchro" software, developed by Trafficware. The analysis is based on the concept of

Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

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

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

2. Existing Peak Hour Traffic

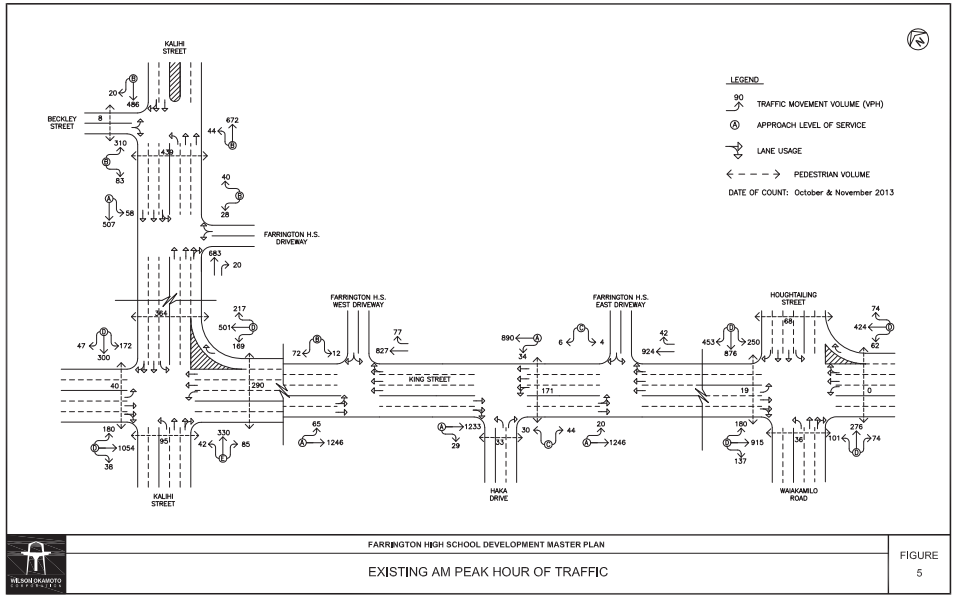
a. General

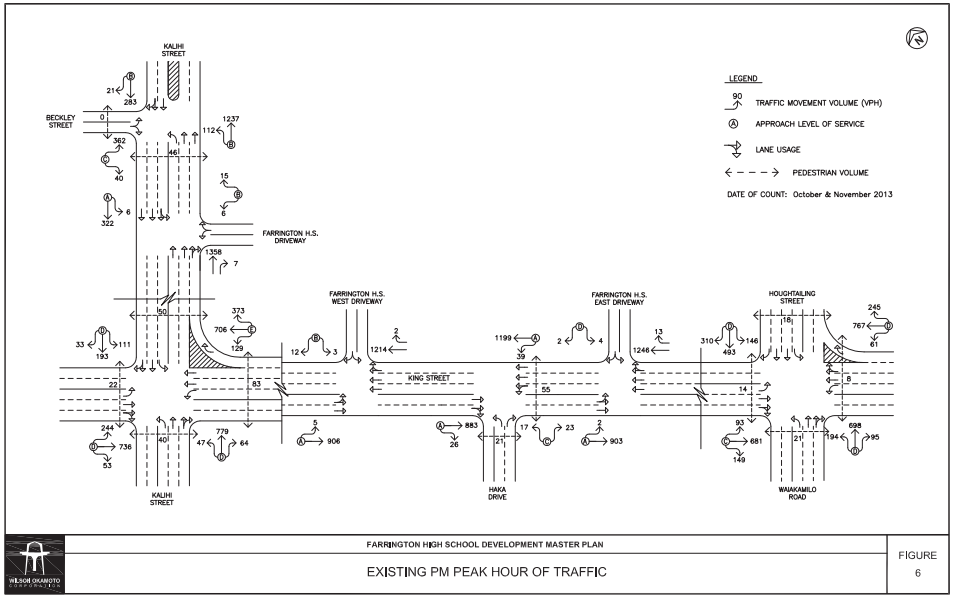
Figures 5 and 6 show the existing AM and PM peak period traffic volumes and operating conditions. The AM peak hour of traffic generally occurs between 7:15 AM and 8:15 AM. The PM peak hour of traffic generally occurs between the hours of 4:00 PM and 5:00 PM. The analysis is based on these peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Kalihi Street and Beckley Street

At the intersection with Beckley Street, Kalihi Street carries 716 vehicles northbound and 506 vehicles southbound during the AM peak period. An increase in total volume was noticed during the PM peak period, with Kalihi Street carrying 1,349 vehicles northbound and 304 vehicles southbound. Both approaches of Kalihi Street operate at LOS "B" during both peak periods.

The eastbound approach of Beckley Street carries 393 vehicles during the AM peak period and 402 vehicles during the PM peak





period. The eastbound approach of Beckley Street operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively.

A crosswalk is provided across Kalihi Street on the south side of the intersection. In addition, a crosswalk is provided across the Beckley Street approach. During the AM peak period, 439 pedestrians were observed crossing Kalihi Street and 8 pedestrians were observed crossing Beckley Street. During the PM peak period, 46 pedestrians were observed crossing Kalihi Street and zero pedestrians were observed crossing Beckley Street.

c. Kalihi Street and Farrington High School Driveway

At the intersection with the Farrington High School driveway, Kalihi Street carries 703 vehicles northbound and 565 vehicles southbound during the AM peak period. A higher volume was noticed during the PM peak period, with Kalihi Street carrying 1,365 vehicles northbound and 328 vehicles southbound. The critical movement on Kalihi Street is the southbound approach which operates at LOS "A" during both peak periods.

The westbound driveway approach for Farrington High School carries 68 vehicles during the AM peak period and 21 vehicles during the PM peak period. The westbound approach operates at LOS "B" during both peak periods.

d. Kalihi Street and King Street

At the intersection with King Street, Kalihi Street carries 457 vehicles northbound and 519 vehicles southbound during the AM peak period. A slightly higher volume was noticed during the PM peak period, with Kalihi Street carrying 890 vehicles northbound and 337 vehicles southbound. The northbound approach of Kalihi Street operates at LOS "E" and LOS "D" during the AM and PM peak periods, respectively, while the southbound approach operates at LOS "D" during both peak periods.

King Street carries 1,272 vehicles eastbound and 887 vehicles westbound during the AM peak period. A slightly higher volume was noticed during the PM peak period, with King Street carrying 1,033 vehicles eastbound and 1,208 vehicles westbound. The eastbound approach of King Street operates at LOS "D" during both peak periods while the westbound approach operates at LOS "D" and LOS "E" during the AM and PM peak periods, respectively.

Crosswalks are provided across Kalihi Street on the north and south sides of the intersection. In addition, crosswalks are provided across King Street on the east and west sides of the intersection. During the AM peak period, 364 pedestrians and 95 pedestrians were observed crossing Kalihi Street on the north and south sides of the intersection, respectively, while 290 pedestrians and 40 pedestrians were observed crossing King Street on the east and west sides of the intersection. During the PM peak period, 50 pedestrians and 40 pedestrians were observed crossing Kalihi Street on the north and south sides of the intersection, respectively, while 83 pedestrians and 22 pedestrians were observed crossing King Street on the east and west sides of the intersection.

e. King Street and Farrington High School Driveway (West)

At the intersection with the western driveway for Farrington High School, King Street carries 1,311 vehicles eastbound and 904 vehicles westbound during the AM peak period. A slightly lower volume was noticed during the PM peak period, with King Street carrying 911 vehicles eastbound and 1,216 vehicles westbound. The critical movement on King Street is the eastbound approach which operates at LOS "A" during both peak periods.

The western Farrington High School driveway approach carries 84 vehicles southbound at this intersection during the AM peak period and 15 vehicles southbound during the PM peak period. This approach operates at LOS "B" during both peak periods.

f. King Street and Haka Drive

At the intersection with Haka Drive, King Street carries 1262 vehicles eastbound and 924 vehicles westbound during the AM peak period. During the PM peak period, King Street carries 915 vehicles eastbound and 1,238 vehicles westbound. Both approaches of King Street operate at LOS "A" during both peak periods.

The Haka Drive approach of the intersection carries 74 vehicles northbound during the AM peak period and 40 vehicles northbound during the PM peak period. This approach operates at LOS "C" during both peak periods.

A crosswalk is provided across King Street on the east side of the intersection. In addition, a crosswalk is provided across the Haka Drive approach. During the AM peak period, 171 pedestrians were observed crossing King Street and 33 pedestrians were observed crossing Haka Drive. During the PM peak period, 55 pedestrians were observed crossing King Street and 21 pedestrians were observed crossing Haka Drive.

g. King Street and Farrington High School Driveway (East)

At the intersection with the eastern driveway for Farrington High School, King Street carries 1,266 vehicles eastbound and 966 vehicles westbound during the AM peak period. During the PM peak period, King Street carries 905 vehicles eastbound and 1,259 vehicles westbound. The critical movement on King Street is the eastbound approach which operates at LOS "A" during both peak periods.

The eastern driveway for Farrington High School carries 10 vehicles southbound at this intersection during the AM peak period and 6 vehicles during the PM peak period. The southbound approach operates at LOS "C" and LOS "D" during the AM and PM peak periods, respectively.

h. King Street, Houghtailing Street, and Waiakamilo Road

At the intersection with Houghtailing Street and Waiakamilo Road, King Street carries 1,232 vehicles eastbound and 560 vehicles westbound during the AM peak period. A slightly higher volume was noticed during the PM peak period, with King Street carrying 923 vehicles eastbound and 1,073 vehicles westbound. The eastbound approach of King Street operates at LOS "D" and LOS "C" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "D" during both peak periods.

The Houghtailing Street approach of the intersection carries 1,579 vehicles southbound during the AM peak period and lower volume of 949 vehicles southbound during the PM peak period. This approach operates at LOS "D" during both peak periods.

The northbound approach of the intersection is comprised of Waiakamilo Road which carries 451 vehicles during the AM peak period and a higher volume of 987 vehicles during the PM peak period. The Waiakamilo Road approach operates at LOS "D" during both peak periods.

Crosswalks are provided across King Street on the east and west sides of the intersection. In addition, crosswalks are provided across Houghtailing Street and Waiakamilo Road on the north and south sides of the intersection, respectively. During the AM peak period, zero pedestrians and 19 pedestrians were observed crossing King Street on the east and west sides of the intersection, respectively, while 68 pedestrians were observed crossing Houtailing Street and 36 pedestrians crossing Waiakamilo Road. During the PM peak period, 8 pedestrians and 14 pedestrians were observed crossing King Street on the east and west sides, respectively, while 18 pedestrians were observed crossing Houghtailing and 21 pedestrians crossing Waiakamilo Road.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 9th Edition," 2012. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per additional student. It should be noted that the planned improvements at the school are intended to serve the existing students at the high school. As such, the only new trips to and from school are expected to be generated by the anticipated increases in enrollment. The new trips generated by the increased enrollment were adjusted to account for students using public transportation, the provided bus service, or alternate modes of transportation (i.e., biking, walking, etc.). The applied adjustment was based on the existing trip generation characteristics of the high school derived from the collected field data. Table 1 summarizes the adjusted trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 1: Adjusted Peak Hour Trip Generation

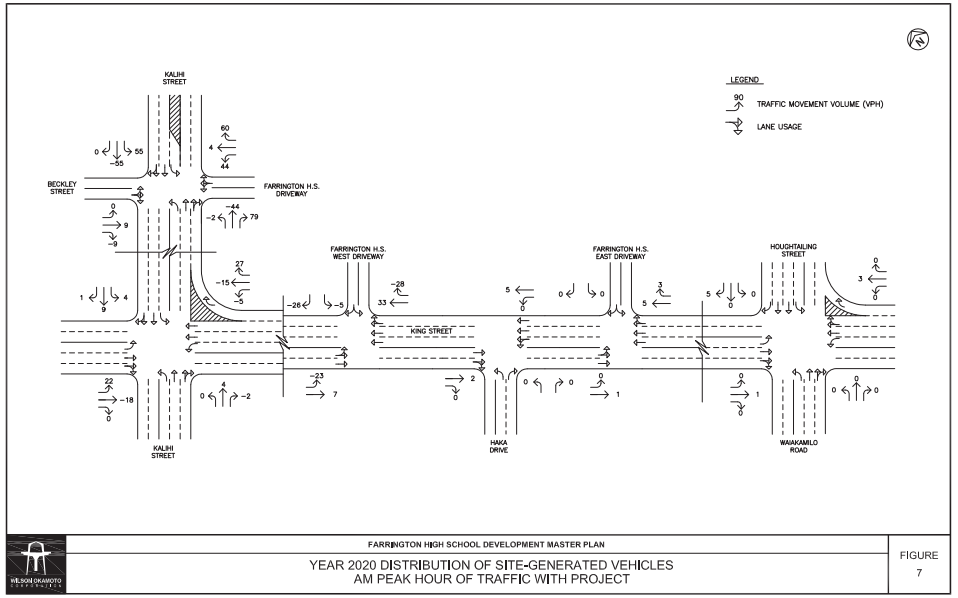
YEAR 2020		
HIGH SCHOOL INDEPENDENT VARIABLE:		# of additional students = 125
		PROJECTED TRIP ENDS
AM PEAK	ENTER	18
	EXIT	9
	TOTAL	27
PM PEAK	ENTER	4
	EXIT	4
	TOTAL	8

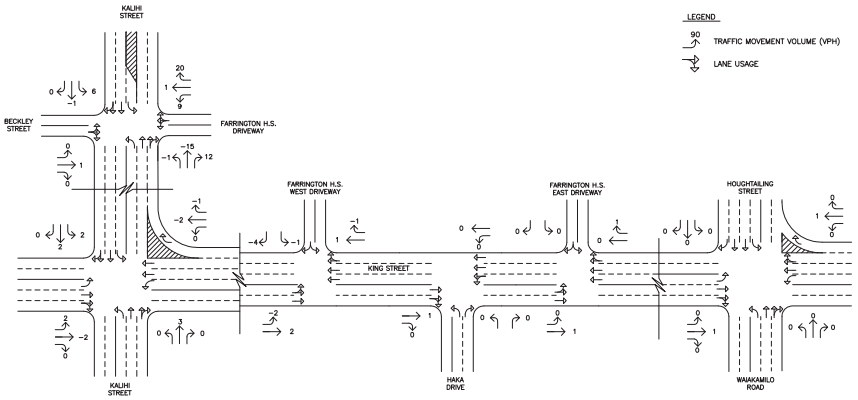
Table 1: Adjusted Peak Hour Trip Generation (Cont'd)

YEAR 2028 (FROM YEAR 2020)		
HIGH SCHOOL INDEPENDENT VARIABLE: # of additional students = 125		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	19
	EXIT	9
	TOTAL	28
PM PEAK	ENTER	4
	EXIT	5
	TOTAL	9
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	37
	EXIT	18
	TOTAL	55
PM PEAK	ENTER	8
	EXIT	9
	TOTAL	17

2. Trip Distribution

Figures 7 thru 10 show the distribution of site-generated vehicular trips at the study intersections during the Year 2020 and the Year 2028 peak periods. Access to the high school will continue to be provided via a driveway off Kalihi Street and two driveways off King Street. The proposed improvements in the Farrington High School Master Plan entails realignment of the driveway off Kalihi Street, modifications to the parking areas off King Street, and the creation of new parking areas along the northeast side of the campus. Existing trips at the intersection of Kalihi Street with the FHS driveway were reassigned to the intersection with Beckley Street. In addition, the modifications to the parking areas off King Street are expected result in a decrease in trips utilizing the western driveway while those at the eastern driveway are expected to remain similar to existing conditions. The existing parking area adjacent to the student quad is expected to be replaced by a new parking area accessed off Kalihi Street. As such, a portion of the trips utilizing the western driveway along King Street are expected to use the

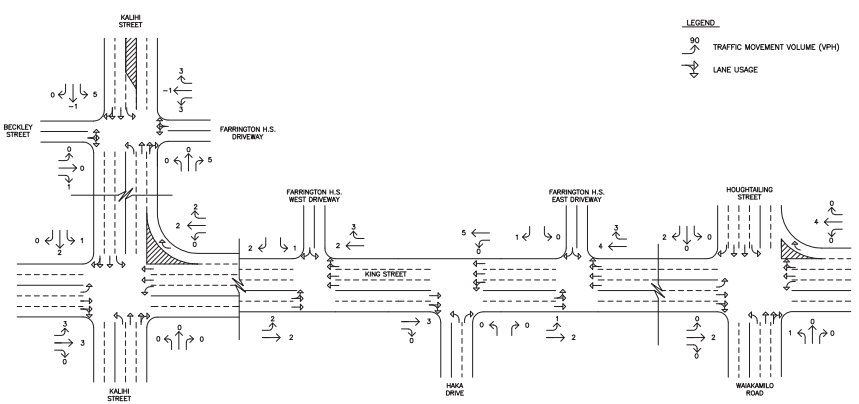




FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2020 DISTRIBUTION OF SITE-GENERATED VEHICLES
PM PEAK HOUR OF TRAFFIC WITH PROJECT

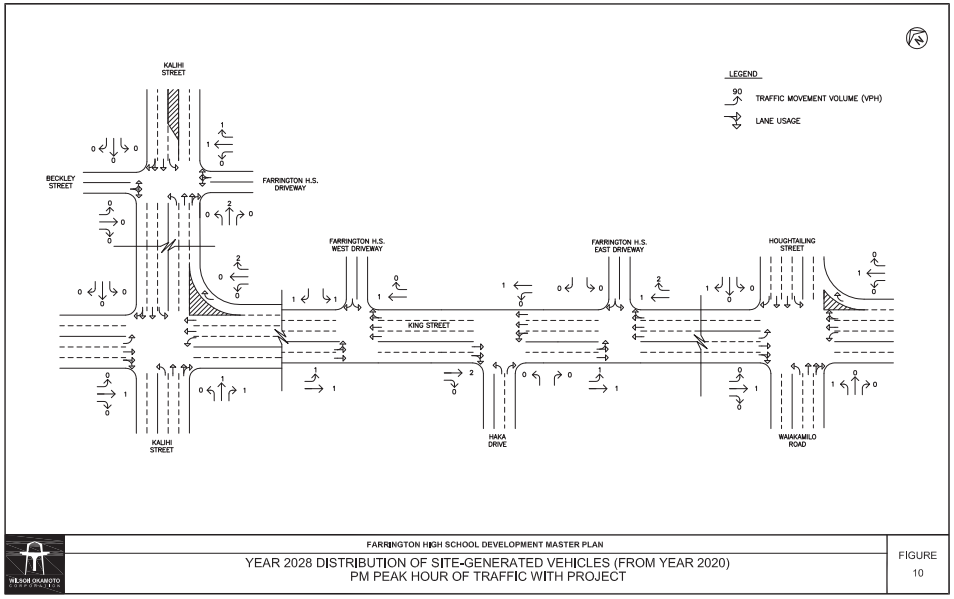
FIGURE 8



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2028 DISTRIBUTION OF SITE-GENERATED VEHICLES (FROM YEAR 2020)
AM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 9



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2028 DISTRIBUTION OF SITE-GENERATED VEHICLES (FROM YEAR 2020)
PM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 10

driveway along Kalihi Street instead. Finally, since most of the new parking areas are expected to be located along the northeast side of the campus, all new trips generated by the anticipated enrollment increases were conservatively assumed to use the Kalihi Street driveway. The redistribution of existing trips and the distribution of new trips at the study intersections were assumed to remain similar to existing conditions.

B. Through Traffic Forecasting Methodology

The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at survey stations located along King Street and Kalihi Street in the vicinity of the project site. The historical data indicates relatively stable traffic volumes along King Street and declining traffic volumes along Kalihi Street. As such, an annual traffic growth rate of approximately 0.5% was conservatively assumed along King Street in the project vicinity. Using 2014 as the Base Year, growth rate factors of 1.03 and 1.07 were applied to the existing through traffic demands along King Street to achieve the projected Year 2020 and Year 2028 traffic demands, respectively.

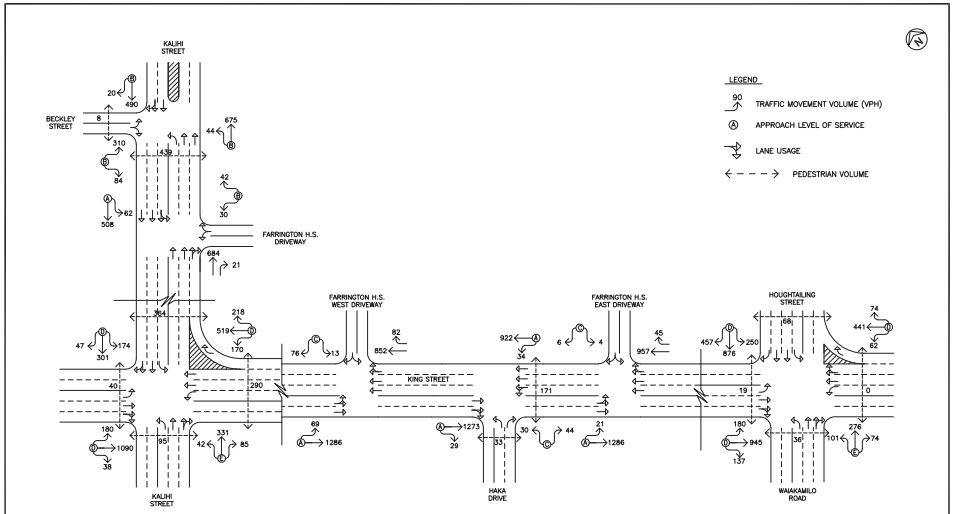
C. Year 2020 Total Traffic Volumes

1. Without Project

The projected Year 2020 AM and PM peak period traffic volumes and operating conditions without the implementation of the proposed Farrington High School Master Plan improvements are shown in Figures 11 and 12, and summarized in Table 2. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.

Table 2: Existing and Projected Year 2020 (Without Project) LOS Traffic Operating Conditions

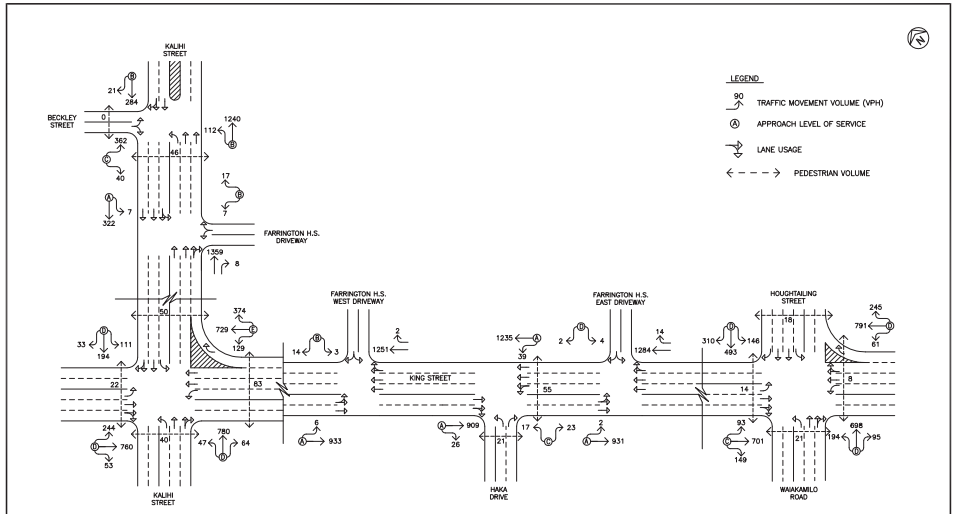
Intersection	Approach	AM		PM	
		Exist	Year 2020 w/out Proj	Exist	Year 2020 w/out Proj
Kalihi St/ Beckley St	Eastbound	B	B	C	C
	Northbound	B	B	B	B
	Southbound	B	B	B	B



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2020 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 11



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2020 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 12

Table 2: Existing and Projected Year 2020 (Without Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Exist	Year 2020 w/out Proj	Exist	Year 2020 w/out Proj
Kalihi St/ FHS Dwy	Westbound	B	B	B	B
	Southbound	A	A	A	A
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	B	C	B	B
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	D	E	D	D
	Southbound	D	D	D	D

Under Year 2020 without project conditions, traffic operations are expected to remain similar to existing conditions. Along Kalihi Street, traffic operations at the intersections with Beckley Street and the FHS driveway are expected to continue operating at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period. At the intersection with King Street, traffic operations are expected to continue operating at LOS "E" or better during both peak periods. Along King Street, traffic operations at the intersections with the FHS driveways and Haka Drive are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period. However, traffic operations during

the AM peak period are expected to deteriorate from LOS "B" to LOS "C" at the intersection of King Street and the western FHS driveway southbound approach. At the intersection with Houghtailing Street and Waiakamilo Road, traffic operations are expected to operate at LOS "D" or better during the AM peak period except for the northbound approach which is expected to deteriorate from LOS "D" to LOS "E". For the PM Peak period, traffic operations are expected to operate at LOS "D" or better.

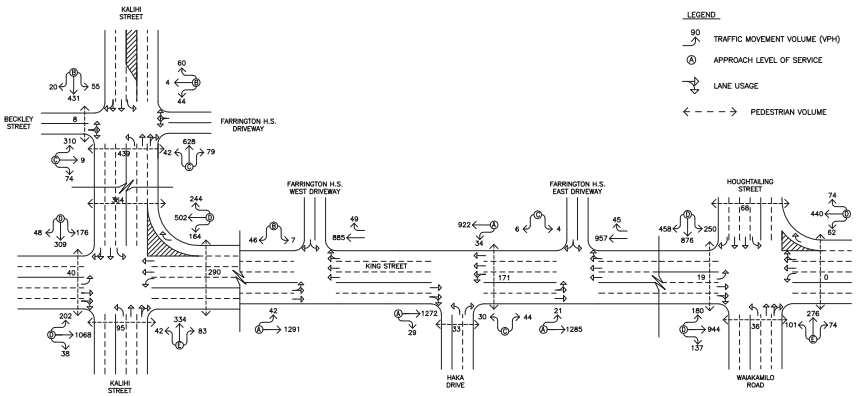
2. With Project

The Year 2020 cumulative AM and PM peak hour traffic conditions with the implementation of the Master Plan for Farrington Highway School is shown in Figures 13 and 14, and summarized in Table 3. The cumulative volumes consist of site-generated traffic superimposed over Year 2020 projected traffic demands. The intersection of Kalihi Street and Beckley Street is assumed to be modified to accommodate the proposed realignment of the FHS driveway. The projected Year 2020 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 3: Projected Year 2020 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2020 w/out Proj	Year 2020 w/ Proj	Year 2020 w/out Proj	Year 2020 w/ Proj
Kalihi St/ Beckley St/ FHS Dwy*	Eastbound	B	C	C	C
	Westbound	-	B	-	B
	Northbound	B	C	B	C
	Southbound	B	B	B	B
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D

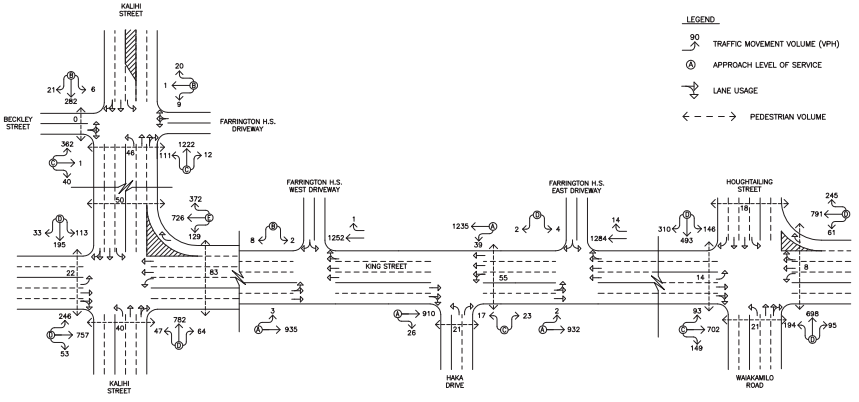
*Intersection modified to accommodate realignment of FHS driveway.



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2020 AM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 13



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2020 PM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 14

Table 3: Projected Year 2020 (Without and With Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Year 2020 w/out Proj	Year 2020 w/ Proj	Year 2020 w/out Proj	Year 2020 w/ Proj
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	C	B	B	B
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	E	E	D	D
	Southbound	D	D	D	D

Under Year 2020 with project conditions, traffic operations in the project vicinity are generally expected to remain similar to without project conditions despite the anticipated increases in traffic along the surrounding roadways. At the intersection of Kalihi Street with Beckley Street and the FHS driveway, traffic operations at the intersection with Beckley Street and the FHS driveway are expected to operate at LOS "C" or better during both peak periods. Along King Street, traffic operations at the intersection with Kalihi Street are expected to continue operating at LOS "E" or better during both peak periods while those at the intersection with Haka Drive are expected to continue operating at LOS "C" or better during both peak periods. Similarly, traffic operations at the intersection with the eastern driveway for FHS are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period, while those at the intersection with Houghtailing Street and Waiakamilo Road are expected to continue operating at LOS "E" or better during the AM peak period and

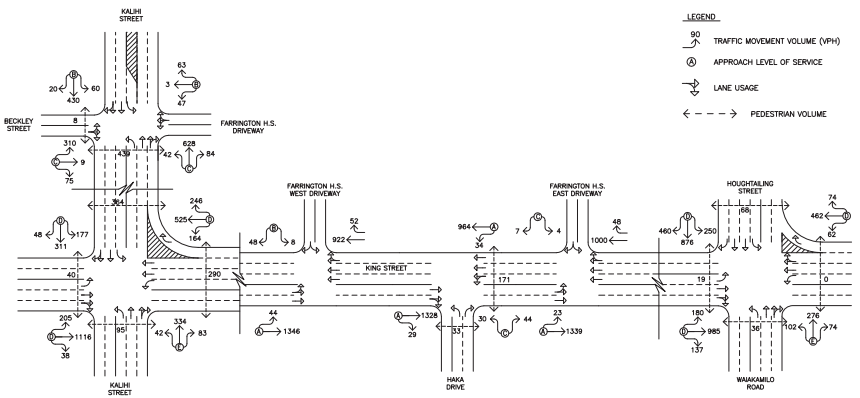
LOS "D" or better during the PM peak period. At the intersection of King Street with the western driveway, traffic operations are expected to improve slightly to LOS "B" or better during both peak periods due to the planned modifications to the parking areas adjacent to that driveway.

D. Year 2028 Total Traffic Volumes

The Year 2028 cumulative peak hour traffic conditions with the proposed Farrington High School Campus are shown in Figures 15 and 16, and summarized in Table 4. The cumulative volumes consist of site-generated traffic superimposed over Year 2028 projected traffic demands. The projected Year 2020 (with project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix F.

Table 4: Projected Year 2020 and Year 2028 With Project LOS Traffic Operating Conditions

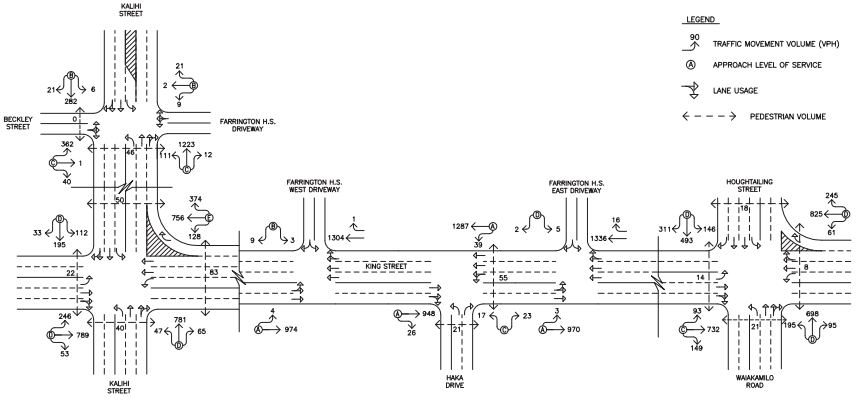
Intersection	Approach	AM		PM	
		Year 2020 w/ Proj	Year 2028 w/ Proj	Year 2020 w/ Proj	Year 2028 w/ Proj
Kalihi St/ Beckley St/ FHS Dwy*	Eastbound	C	C	C	C
	Westbound	B	B	B	B
	Northbound	C	C	C	C
	Southbound	B	B	B	B
Kalihi St/ King St	Eastbound	D	D	D	D
	Westbound	D	D	E	E
	Northbound	E	E	D	D
	Southbound	D	D	D	D
King St/ FHS Dwy (West)	Eastbound	A	A	A	A
	Southbound	B	B	B	B
King St/ Haka Dr	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	C	C	C	C
King St/ FHS Dwy (East)	Eastbound	A	A	A	A
	Southbound	C	C	D	D



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2028 AM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 15



FARRINGTON HIGH SCHOOL DEVELOPMENT MASTER PLAN

YEAR 2028 PM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 16

Table 4: Projected Year 2020 and Year 2028 With Project LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2020 w/ Proj	Year 2028 w/ Proj	Year 2020 w/ Proj	Year 2028 w/ Proj
King St/ Houghtailing St/ Waiakamilo Rd	Eastbound	D	D	C	C
	Westbound	D	D	D	D
	Northbound	E	E	D	D
	Southbound	D	D	D	D

Under Year 2028 with project conditions, traffic operations in the project vicinity are expected to remain similar to Year 2020 with project conditions despite the anticipated increase in enrollment at the Farrington High School Campus. Along Kalihi Street, traffic operations at the intersections with Beckley Street and the FHS driveway are expected to continue operating at LOS "C" or better during both peak periods while those at the intersection with King Street are expected to continue operating at LOS "E" or better during both peak periods. Along King Street, traffic operations at the intersections with the western FHS driveway is expected to continue operating at LOS "B" or better during both peak periods while those at the intersection with Haka Drive are expected to continue operating at LOS "C" or better during both peak periods. Similarly, traffic operations at the intersection with the eastern FHS driveway are expected to continue operating at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period while those at the intersection with Houghtailing Street and Waiakamilo Road are expected to continue operating at LOS "E" or better during the AM peak period and LOS "D" or better during the PM peak period.

V. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

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

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

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

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

5. Prepare a Traffic Management Plan (TMP) for the high school to minimize the impact of school related vehicles on the surrounding roadways. This plan should address daily school and special event traffic.

6. Due to the long implementation schedule for the proposed Master Plan improvements, consider preparing Traffic Assessment Reports periodically (approximately every 5 years) to verify projected traffic conditions in the vicinity.

7. At the intersection of Kalihi Street with Beckley Street, provide the following to accommodate the proposed realignment of the Farrington High School driveway:

   - Modify the northbound approach of the intersection to provide an exclusive left turn lane, one through lane, and a shared through and right-turn lane.
   - Modify the southbound approach to provide an exclusive left-turn lane, one through lane, and a shared through and right-turn lane.
   - Modify the traffic signal system, timing, and phasing to accommodate the anticipated intersection modifications.

VI. CONCLUSION

The existing Farrington High School in Kalihi currently serves approximately 2400 students in grades 9-12. The proposed Master Plan entails the redevelopment of many of the existing high school facilities, as well as, modifications to the school's parking areas and accesses. These Master Plan improvements are intended to serve the existing student body as well as the expected increase in enrollment at the high school which will occur with or without the planned improvements. In addition, although enrollment is expected to increase, students are expected to continue using public transportation, the provided bus service, or alternate modes of transportation (i.e., biking, walking, etc.) to travel to and from school. With the implementation of the aforementioned recommendations, traffic operations in the vicinity of the high school are expected to remain similar to without project conditions. As such, the implementation of the Farrington High School Master Plan is not expected to have

a significant impact on the surrounding roadways. However, the high school is located in a densely developed area with a high volume of pedestrian and vehicular traffic. As such, a traffic management plan for the school is recommended to minimize the effect of school related vehicles on the surrounding roadways.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counted By:CY, KG
Counter:D4-3890, D4-5675
Weather:Clear

File Name : KalBec AM
Site Code : 00000002
Start Date : 10/15/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					Westboun d	Kalihi Street Northbound					Beckley Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	77	7	0	84	0	6	101	0	2	109	63	0	4	1	68	261
06:15 AM	0	106	2	0	108	0	8	137	0	2	147	80	0	4	0	84	339
06:30 AM	0	94	4	0	98	0	9	147	0	11	167	95	0	7	0	102	367
06:45 AM	0	65	1	0	66	0	7	151	0	9	167	99	0	5	0	104	337
Total	0	342	14	0	356	0	30	536	0	24	590	337	0	20	1	358	1304
07:00 AM	0	91	0	0	91	0	5	153	0	32	190	115	0	4	1	120	401
07:15 AM	0	83	3	0	86	0	10	148	0	81	239	77	0	26	0	103	428
07:30 AM	0	136	5	0	141	0	15	160	0	152	327	77	0	21	3	101	569
07:45 AM	0	147	7	0	154	0	14	191	0	166	371	86	0	24	2	112	637
Total	0	457	15	0	472	0	44	652	0	431	1127	355	0	75	6	436	2035
08:00 AM	2	120	5	0	127	0	5	173	2	40	220	70	0	12	3	85	432
08:15 AM	0	96	7	0	103	0	12	183	0	7	202	72	0	17	0	89	394
08:30 AM	0	107	6	0	113	0	8	183	0	1	192	83	0	12	0	95	400
08:45 AM	0	92	2	0	94	0	10	162	0	2	174	86	0	8	0	94	362
Total	2	415	20	0	437	0	35	701	2	50	788	311	0	49	3	363	1588
Grand Total	2	1214	49	0	1265	0	109	1889	2	505	2505	1003	0	144	10	1157	4927
Apprch %	0.2	96	3.9	0			4.4	75.4	0.1	20.2		86.7	0	12.4	0.9		
Total %	0	24.6	1	0	25.7	0	2.2	38.3	0	10.2	50.8	20.4	0	2.9	0.2	23.5	

	Kalihi Street Southbound				Westbound	Kalihi Street Northbound				Beckley Street Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:30 AM														
07:30 AM	0	136	5	141	0	**15**	160	0	175	77	0	21	98	414
07:45 AM	0	**147**	**7**	**154**	0	14	**191**	0	**205**	**86**	0	**24**	**110**	**469**
08:00 AM	**2**	120	5	127	0	5	173	**2**	180	70	0	12	82	389
08:15 AM	0	96	7	103	0	12	183	0	195	72	0	17	89	387
Total Volume	2	499	24	525	0	46	707	2	755	305	0	74	379	1659
% App. Total	0.4	95	4.6			6.1	93.6	0.3		80.5	0	19.5		
PHF	.250	.849	.857	.852	.000	.767	.925	.250	.921	.887	.000	.771	.861	.884

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:CY, KG
Counter:D4-3890, D4-5675
Weather:Clear

File Name : KalBec PM
Site Code : 00000004
Start Date : 10/15/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					Westboun d	Kalihi Street Northbound					Beckley Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	0	68	7	0	75	0	14	266	2	9	291	87	0	8	0	95	461
03:15 PM	0	69	7	0	76	0	26	238	0	22	286	79	0	13	0	92	454
03:30 PM	0	89	4	0	93	0	27	286	0	9	322	85	0	11	0	96	511
03:45 PM	0	86	4	0	90	0	37	325	0	9	371	99	0	8	0	107	568
Total	0	312	22	0	334	0	104	1115	2	49	1270	350	0	40	0	390	1994
04:00 PM	0	72	4	0	76	0	29	302	0	6	337	85	0	12	0	97	510
04:15 PM	0	72	3	0	75	0	26	306	0	10	342	102	0	10	0	112	529
04:30 PM	0	74	9	0	83	0	32	289	0	5	326	94	0	10	0	104	513
04:45 PM	0	65	5	0	70	0	25	340	0	26	391	81	0	8	0	89	550
Total	0	283	21	0	304	0	112	1237	0	47	1396	362	0	40	0	402	2102
05:00 PM	0	71	9	0	80	0	35	291	0	5	331	72	0	22	0	94	505
05:15 PM	0	105	5	0	110	0	30	318	0	17	365	63	0	23	0	86	561
05:30 PM	0	88	6	0	94	0	22	280	0	8	310	49	0	10	0	59	463
05:45 PM	0	85	5	0	90	0	23	279	0	13	315	56	0	10	0	66	471
Total	0	349	25	0	374	0	110	1168	0	43	1321	240	0	65	0	305	2000
Grand Total	0	944	68	0	1012	0	326	3520	2	139	3987	952	0	145	0	1097	6096
Apprch %	0	93.3	6.7	0			8.2	88.3	0.1	3.5		86.8	0	13.2	0		
Total %	0	15.5	1.1	0	16.6	0	5.3	57.7	0	2.3	65.4	15.6	0	2.4	0	18	

	Kalihi Street Southbound				Westbound	Kalihi Street Northbound				Beckley Street Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:45 PM														
03:45 PM	0	**86**	4	**90**	0	**37**	**325**	0	**362**	99	0	8	107	**559**
04:00 PM	0	72	4	76	0	29	302	0	331	85	0	**12**	97	504
04:15 PM	0	72	3	75	0	26	306	0	332	**102**	0	10	**112**	519
04:30 PM	0	74	**9**	83	0	32	289	0	321	94	0	10	104	508
Total Volume	0	304	20	324	0	124	1222	0	1346	380	0	40	420	2090
% App. Total	0	93.8	6.2			9.2	90.8	0		90.5	0	9.5		
PHF	.000	.884	.556	.900	.000	.838	.940	.000	.930	.931	.000	.833	.938	.935

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GL
Counter:TU-0649
Weather:Clear

File Name : KalFarEnt AM
Site Code : 00000005
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					Farrington High School Entrance Westbound					Kalihi Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
06:00 AM	2	0	0	2	4	0	0	1	0	1	0	0	5	0	5	0	10
06:15 AM	3	0	0	5	8	0	0	3	2	5	0	0	1	0	1	0	14
06:30 AM	1	0	0	1	2	1	0	0	4	5	0	0	0	0	0	0	7
06:45 AM	3	0	0	4	7	2	0	2	5	9	0	0	0	0	0	0	16
Total	9	0	0	12	21	3	0	6	11	20	0	0	6	0	6	0	47
07:00 AM	1	0	0	2	3	1	0	2	3	6	0	0	8	0	8	0	17
07:15 AM	7	0	0	11	18	3	0	3	8	14	0	0	4	0	4	0	36
07:30 AM	13	0	0	19	32	10	0	8	16	34	0	0	8	0	8	0	74
07:45 AM	31	0	0	22	53	11	0	19	10	40	0	0	6	0	6	0	99
Total	52	0	0	54	106	25	0	32	37	94	0	0	26	0	26	0	226
08:00 AM	7	0	0	9	16	4	0	10	7	21	0	0	2	0	2	0	39
08:15 AM	0	0	0	5	5	0	0	0	15	15	0	0	0	0	0	0	20
08:30 AM	0	0	0	2	2	0	0	0	14	14	0	0	0	0	0	0	16
08:45 AM	0	0	0	2	2	0	0	0	7	7	0	0	0	0	0	0	9
Total	7	0	0	18	25	4	0	10	43	57	0	0	2	0	2	0	84
Grand Total	68	0	0	84	152	32	0	48	91	171	0	0	34	0	34	0	357
Apprch %	44.7	0	0	55.3		18.7	0	28.1	53.2		0	0	100	0			
Total %	19	0	0	23.5	42.6	9	0	13.4	25.5	47.9	0	0	9.5	0	9.5	0	

	Kalihi Street Southbound				Farrington High School Entrance Westbound				Kalihi Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:15 AM														
07:15 AM	7	0	0	7	3	0	3	6	0	0	4	4	0	17
07:30 AM	13	0	0	13	10	0	8	18	0	0	8	8	0	39
07:45 AM	**31**	0	0	**31**	**11**	0	**19**	**30**	0	0	6	6	0	**67**
08:00 AM	7	0	0	7	4	0	10	14	0	0	2	2	0	23
Total Volume	58	0	0	58	28	0	40	68	0	0	20	20	0	146
% App. Total	100	0	0		41.2	0	58.8		0	0	100			
PHF	.468	.000	.000	.468	.636	.000	.526	.567	.000	.000	.625	.625	.000	.545

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:DY
Counter:TU-0649
Weather:Clear

File Name : KalFarEnt PM
Site Code : 00000005
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					Farrington High School Entrance Westbound					Kalihi Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
03:00 PM	1	0	0	21	22	0	0	9	20	29	0	0	0	0	0	0	51
03:15 PM	0	0	0	8	8	2	0	7	8	17	0	0	0	0	0	0	25
03:30 PM	2	0	0	7	9	0	0	7	9	16	0	0	0	0	0	0	25
03:45 PM	4	0	0	16	20	2	0	4	16	22	0	0	3	0	3	0	45
Total	7	0	0	52	59	4	0	27	53	84	0	0	3	0	3	0	146
04:00 PM	1	0	0	8	9	1	0	4	8	13	0	0	2	0	2	0	24
04:15 PM	0	0	0	10	10	1	0	5	12	18	0	0	1	0	1	0	29
04:30 PM	2	0	0	10	12	1	0	3	10	14	0	0	2	0	2	0	28
04:45 PM	3	0	0	14	17	3	0	3	14	20	0	0	2	0	2	0	39
Total	6	0	0	42	48	6	0	15	44	65	0	0	7	0	7	0	120
05:00 PM	2	0	0	3	5	1	0	7	3	11	0	0	3	0	3	0	19
05:15 PM	1	0	0	15	16	2	0	9	15	26	0	0	4	0	4	0	46
05:30 PM	1	0	0	17	18	1	0	9	17	27	0	0	7	0	7	0	52
05:45 PM	2	0	0	11	13	2	0	4	11	17	0	0	4	0	4	0	34
Total	6	0	0	46	52	6	0	29	46	81	0	0	18	0	18	0	151
Grand Total	19	0	0	140	159	16	0	71	143	230	0	0	28	0	28	0	417
Apprch %	11.9	0	0	88.1		7	0	30.9	62.2		0	0	100	0			
Total %	4.6	0	0	33.6	38.1	3.8	0	17	34.3	55.2	0	0	6.7	0	6.7	0	

	Kalihi Street Southbound				Farrington High School Entrance Westbound				Kalihi Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 05:00 PM														
05:00 PM	**2**	0	0	**2**	**1**	0	7	8	0	0	3	3	0	13
05:15 PM	**1**	0	0	**1**	**2**	0	**9**	**11**	0	0	4	4	0	16
05:30 PM	**1**	0	0	**1**	**1**	0	9	10	0	0	**7**	**7**	0	**18**
05:45 PM	2	0	0	2	2	0	4	6	0	0	4	4	0	12
Total Volume	6	0	0	6	6	0	29	35	0	0	18	18	0	59
% App. Total	100	0	0		17.1	0	82.9		0	0	100			
PHF	.750	.000	.000	.750	.750	.000	.806	.795	.000	.000	.643	.643	.000	.819

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC, RJ
Counter:D4-5675, D4-5677
Weather:Clear

File Name : KingKal AM
Site Code : 00000003
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					King Street Westbound					Kalihi Street Northbound					King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	22	56	3	18	99	22	85	12	5	124	3	41	6	3	53	30	103	8	2	143	419
06:15 AM	32	73	5	4	114	29	76	11	14	130	3	77	8	5	93	34	177	7	3	221	558
06:30 AM	39	77	4	15	135	37	80	24	13	154	5	73	12	4	94	35	278	0	7	320	703
06:45 AM	27	64	6	18	115	33	84	19	20	156	6	80	19	17	122	45	291	3	1	340	733
Total	120	270	18	55	463	121	325	66	52	564	17	271	45	29	362	144	849	18	13	1024	2413
07:00 AM	36	56	2	36	130	31	116	33	37	217	7	84	18	14	123	44	257	12	8	321	791
07:15 AM	46	65	6	51	168	34	102	43	40	219	10	83	14	22	129	31	288	12	7	338	854
07:30 AM	43	71	7	114	235	55	140	54	100	349	7	86	20	39	152	53	235	6	13	307	1043
07:45 AM	41	101	23	158	323	49	133	58	110	350	12	78	25	17	132	38	259	10	16	323	1128
Total	166	293	38	359	856	169	491	188	287	1135	36	331	77	92	536	166	1039	40	44	1289	3816
08:00 AM	42	63	11	41	157	31	126	62	40	259	13	83	26	17	139	58	272	10	4	344	899
08:15 AM	30	81	5	24	140	31	114	36	22	203	8	87	12	6	113	54	260	16	4	334	790
08:30 AM	40	63	3	7	113	31	125	39	7	202	13	89	13	10	125	41	254	11	3	309	749
08:45 AM	29	61	15	3	108	22	90	23	12	147	12	110	15	9	146	59	207	6	3	275	676
Total	141	268	34	75	518	115	455	160	81	811	46	369	66	42	523	212	993	43	14	1262	3114
Grand Total	427	831	90	489	1837	405	1271	414	420	2510	99	971	188	163	1421	522	2881	101	71	3575	9343
Apprch %	23.2	45.2	4.9	26.6		16.1	50.6	16.5	16.7		7	68.3	13.2	11.5		14.6	80.6	2.8	2		
Total %	4.6	8.9	1	5.2	19.7	4.3	13.6	4.4	4.5	26.9	1.1	10.4	2	1.7	15.2	5.6	30.8	1.1	0.8	38.3	

	Kalihi Street Southbound				King Street Westbound				Kalihi Street Northbound				King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**46**	65	6	117	34	102	43	179	10	83	14	107	31	**288**	**12**	331	734
07:30 AM	43	71	7	121	**55**	**140**	54	**249**	7	**86**	20	113	53	235	6	294	777
07:45 AM	41	**101**	**23**	**165**	49	133	58	240	12	78	25	115	38	259	10	307	**827**
08:00 AM	42	63	11	116	31	126	**62**	219	**13**	83	**26**	**122**	**58**	272	10	**340**	797
Total Volume	172	300	47	519	169	501	217	887	42	330	85	457	180	1054	38	1272	3135
% App. Total	33.1	57.8	9.1		19.1	56.5	24.5		9.2	72.2	18.6		14.2	82.9	3		
PHF	.935	.743	.511	.786	.768	.895	.875	.891	.808	.959	.817	.936	.776	.915	.792	.935	.948

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC, RJ
Counter:D4-5675, D4-5677
Weather:Clear

File Name : KingKal PM
Site Code : 00000003
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Kalihi Street Southbound					King Street Westbound					Kalihi Street Northbound					King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	38	45	4	28	115	41	158	68	28	295	9	137	14	12	172	57	176	13	8	254	836
03:15 PM	20	39	7	11	77	36	131	65	9	241	9	198	20	8	235	63	167	7	10	247	800
03:30 PM	19	55	9	19	102	36	149	76	22	283	13	196	23	18	250	49	190	11	11	261	896
03:45 PM	35	45	9	5	94	42	200	93	37	372	10	148	17	13	188	58	201	13	1	273	927
Total	112	184	29	63	388	155	638	302	96	1191	41	679	74	51	845	227	734	44	30	1035	3459
04:00 PM	17	45	4	14	80	35	175	95	24	329	4	203	14	11	232	69	190	11	4	274	915
04:15 PM	30	50	9	12	101	25	182	86	21	314	15	167	13	10	205	57	184	10	5	256	876
04:30 PM	28	54	10	12	104	34	185	78	26	323	9	197	15	14	235	74	191	14	6	285	947
04:45 PM	36	44	10	12	102	35	164	114	12	325	19	212	22	5	258	44	171	18	7	240	925
Total	111	193	33	50	387	129	706	373	83	1291	47	779	64	40	930	244	736	53	22	1055	3663
05:00 PM	24	38	5	18	85	37	184	92	16	329	10	156	12	12	190	67	185	21	11	284	888
05:15 PM	33	40	10	26	109	32	158	91	12	293	11	203	13	19	246	52	174	7	7	240	888
05:30 PM	19	51	5	20	95	24	201	95	27	347	12	152	13	18	195	58	186	8	5	257	894
05:45 PM	28	37	16	22	103	20	182	83	18	303	15	160	6	8	189	45	120	10	6	181	776
Total	104	166	36	86	392	113	725	361	73	1272	48	671	44	57	820	222	665	46	29	962	3446
Grand Total	327	543	98	199	1167	397	2069	1036	252	3754	136	2129	182	148	2595	693	2135	143	81	3052	10568
Apprch %	28	46.5	8.4	17.1		10.6	55.1	27.6	6.7		5.2	82	7	5.7		22.7	70	4.7	2.7		
Total %	3.1	5.1	0.9	1.9	11	3.8	19.6	9.8	2.4	35.5	1.3	20.1	1.7	1.4	24.6	6.6	20.2	1.4	0.8	28.9	

	Kalihi Street Southbound				King Street Westbound				Kalihi Street Northbound				King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	17	45	4	66	**35**	175	95	305	4	203	14	221	69	190	11	270	862
04:15 PM	30	50	9	89	25	182	86	293	15	167	13	195	57	184	10	251	828
04:30 PM	28	**54**	**10**	**92**	34	**185**	78	297	9	197	15	221	**74**	**191**	14	**279**	**889**
04:45 PM	**36**	44	10	90	35	164	**114**	**313**	**19**	**212**	**22**	**253**	44	171	**18**	233	889
Total Volume	111	193	33	337	129	706	373	1208	47	779	64	890	244	736	53	1033	3468
% App. Total	32.9	57.3	9.8		10.7	58.4	30.9		5.3	87.5	7.2		23.6	71.2	5.1		
PHF	.771	.894	.825	.916	.921	.954	.818	.965	.618	.919	.727	.879	.824	.963	.736	.926	.975

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:BE
Counter:TU-0651
Weather:Clear

File Name : FarEnt(West) AM
Site Code : 00000004
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Farrington High School (West) Entrance Southbound					King Street Westbound					Northbound	King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	5	5	0	0	0	0	0	0	1	0	0	0	1	6
06:15 AM	0	0	1	7	8	0	0	6	0	6	0	3	0	0	0	3	17
06:30 AM	0	0	3	6	9	0	0	3	0	3	0	7	0	0	0	7	19
06:45 AM	3	0	1	5	9	0	0	7	0	7	0	2	0	0	0	2	18
Total	3	0	5	23	31	0	0	16	0	16	0	13	0	0	0	13	60
07:00 AM	2	0	6	9	17	0	0	13	0	13	0	7	0	0	0	7	37
07:15 AM	3	0	15	6	24	0	0	19	0	19	0	15	0	0	0	15	58
07:30 AM	3	0	18	8	29	0	0	23	0	23	0	13	0	0	0	13	65
07:45 AM	5	0	23	4	32	0	0	28	0	28	0	23	0	0	0	23	83
Total	13	0	62	27	102	0	0	83	0	83	0	58	0	0	0	58	243
08:00 AM	1	0	16	4	21	0	0	7	1	8	0	14	0	0	0	14	43
08:15 AM	0	0	2	2	4	0	0	3	0	3	0	4	0	0	0	4	11
08:30 AM	0	0	4	4	8	0	0	5	0	5	0	4	0	0	0	4	17
08:45 AM	0	0	2	2	4	0	0	1	0	1	0	3	0	0	0	3	8
Total	1	0	24	12	37	0	0	16	1	17	0	25	0	0	0	25	79
Grand Total	17	0	91	62	170	0	0	115	1	116	0	96	0	0	0	96	382
Apprch %	10	0	53.5	36.5		0	0	99.1	0.9			100	0	0	0		
Total %	4.5	0	23.8	16.2	44.5	0	0	30.1	0.3	30.4	0	25.1	0	0	0	25.1	

	Farrington High School (West) Entrance Southbound				King Street Westbound				Northbound	King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:15 AM														
07:15 AM	3	0	15	18	0	0	19	19	0	15	0	0	15	52
07:30 AM	3	0	18	21	0	0	23	23	0	13	0	0	13	57
07:45 AM	5	0	23	28	0	0	28	28	0	23	0	0	23	79
08:00 AM	1	0	16	17	0	0	7	7	0	14	0	0	14	38
Total Volume	12	0	72	84	0	0	77	77	0	65	0	0	65	226
% App. Total	14.3	0	85.7		0	0	100			100	0	0		
PHF	.600	.000	.783	.750	.000	.000	.688	.688	.000	.707	.000	.000	.707	.715

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:BE
Counter:TU-0651
Weather:Clear

File Name : FarEnt(West) PM
Site Code : 00000004
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Farrington High School (West) Entrance Southbound					King Street Westbound					Northbound	King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	1	0	13	4	18	0	0	5	1	6	0	2	0	0	0	2	26
03:15 PM	0	0	7	3	10	0	1	1	0	2	0	1	0	0	0	1	13
03:30 PM	2	0	10	10	22	0	0	3	0	3	0	4	0	0	0	4	29
03:45 PM	1	0	9	6	16	0	0	1	0	1	0	0	0	0	0	0	17
Total	4	0	39	23	66	0	1	10	1	12	0	7	0	0	0	7	85
04:00 PM	1	0	2	7	10	0	0	1	0	1	0	0	0	0	0	0	11
04:15 PM	0	0	6	6	12	0	0	0	0	0	0	2	0	0	0	2	14
04:30 PM	1	0	2	1	4	0	0	0	0	0	0	1	0	0	0	1	5
04:45 PM	1	0	2	6	9	0	0	1	0	1	0	2	0	0	0	2	12
Total	3	0	12	20	35	0	0	2	0	2	0	5	0	0	0	5	42
05:00 PM	3	0	0	6	9	0	0	6	0	6	0	0	0	0	0	0	15
05:15 PM	2	0	2	18	22	0	0	4	0	4	0	3	0	0	0	3	29
05:30 PM	0	0	4	9	13	0	0	1	0	1	0	2	0	0	0	2	16
05:45 PM	1	0	5	7	13	0	0	5	0	5	0	5	0	0	0	5	23
Total	6	0	11	40	57	0	0	16	0	16	0	10	0	0	0	10	83
Grand Total	13	0	62	83	158	0	1	28	1	30	0	22	0	0	0	22	210
Apprch %	8.2	0	39.2	52.5		0	3.3	93.3	3.3			100	0	0	0		
Total %	6.2	0	29.5	39.5	75.2	0	0.5	13.3	0.5	14.3	0	10.5	0	0	0	10.5	

	Farrington High School (West) Entrance Southbound				King Street Westbound				Northbound	King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:00 PM														
03:00 PM	1	0	13	14	0	0	5	5	0	2	0	0	2	21
03:15 PM	0	0	7	7	0	1	1	2	0	1	0	0	1	10
03:30 PM	2	0	10	12	0	0	3	3	0	4	0	0	4	19
03:45 PM	1	0	9	10	0	0	1	1	0	0	0	0	0	11
Total Volume	4	0	39	43	0	1	10	11	0	7	0	0	7	61
% App. Total	9.3	0	90.7		0	9.1	90.9			100	0	0		
PHF	.500	.000	.750	.768	.000	.250	.500	.550	.000	.438	.000	.000	.438	.726

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Counter:TU-0649, TU-0650
Weather:Clear

File Name : KingHakaEastDwy AM
Site Code : 00000002
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Farrington High School (East) Entrance Southbound					King Street Right = Right Turn Into Farrington High School East Driveway Westbound					Haka Drive Northbound					King Street Left = Left Turn Into Farrington High School East Driveway, Right = Right Turn Into Haka Drive Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	0	0	1	88	0	2	91	3	0	3	3	9	2	120	1	0	123	223
06:15 AM	0	0	0	1	1	4	120	3	1	128	4	0	3	7	14	0	217	0	0	217	360
06:30 AM	0	0	0	0	0	9	126	4	4	143	7	0	5	5	17	2	315	1	0	318	478
06:45 AM	1	0	4	2	7	4	140	3	6	153	3	0	5	4	12	0	336	6	0	342	514
Total	1	0	4	3	8	18	474	10	13	515	17	0	16	19	52	4	988	8	0	1000	1575
07:00 AM	3	0	2	4	9	5	178	10	19	212	10	0	9	12	31	3	312	1	0	316	568
07:15 AM	2	0	2	7	11	6	211	18	10	245	5	0	14	8	27	5	338	6	0	349	632
07:30 AM	1	0	1	2	4	10	274	9	44	337	9	0	11	14	34	7	278	4	0	289	664
07:45 AM	0	0	1	8	9	10	224	10	98	342	11	0	10	8	29	5	314	7	0	326	706
Total	6	0	6	21	33	31	887	47	171	1136	35	0	44	42	121	20	1242	18	0	1280	2570
08:00 AM	1	0	2	0	3	8	215	5	19	247	5	0	9	3	17	3	303	12	0	318	585
08:15 AM	0	0	1	1	2	10	186	7	7	210	4	0	3	4	11	3	304	2	0	309	532
08:30 AM	0	0	4	0	4	3	179	5	2	189	8	0	1	6	15	0	299	4	0	303	511
08:45 AM	0	0	3	0	3	10	174	3	5	192	0	0	6	6	12	2	262	4	0	268	475
Total	1	0	10	1	12	31	754	20	33	838	17	0	19	19	55	8	1168	22	0	1198	2103
Grand Total	8	0	20	25	53	80	2115	77	217	2489	69	0	79	80	228	32	3398	48	0	3478	6248
Apprch %	15.1	0	37.7	47.2		3.2	85	3.1	8.7		30.3	0	34.6	35.1		0.9	97.7	1.4	0		
Total %	0.1	0	0.3	0.4	0.8	1.3	33.9	1.2	3.5	39.8	1.1	0	1.3	1.3	3.6	0.5	54.4	0.8	0	55.7	

	Farrington High School (East) Entrance Southbound				King Street Right = Right Turn Into Farrington High School East Driveway Westbound				Haka Drive Northbound				King Street Left = Left Turn Into Farrington High School East Driveway, Right = Right Turn Into Haka Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**2**	0	**2**	**4**	6	211	**18**	235	5	0	**14**	19	5	**338**	6	**349**	**607**
07:30 AM	1	0	1	2	**10**	**274**	9	**293**	9	0	11	20	**7**	278	4	289	604
07:45 AM	0	0	1	1	10	224	10	244	**11**	0	10	**21**	5	314	7	326	592
08:00 AM	1	0	2	3	8	215	5	228	5	0	9	**14**	3	303	**12**	318	563
Total Volume	4	0	6	10	34	924	42	1000	30	0	44	74	20	1233	29	1282	2366
% App. Total	40	0	60		3.4	92.4	4.2		40.5	0	59.5		1.6	96.2	2.3		
PHF	.500	.000	.750	.625	.850	.843	.583	.853	.682	.000	.786	.881	.714	.912	.604	.918	.974

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Weather:Clear

File Name : KingHakaEastDwy PM
Site Code : 00000002
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Farrington High School East Driveway Southbound					King Street Right = Right Turn Into Farrington High School East Driveway Westbound					Haka Drive Northbound					King Street Left = Left Turn Into Farrington High School East Driveway, Right = Right Turn Into Haka Drive Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	1	0	3	0	4	9	230	4	19	262	5	0	9	3	17	0	202	8	0	210	493
03:15 PM	0	0	5	0	5	9	218	3	15	245	5	0	6	2	13	0	214	4	0	218	481
03:30 PM	1	0	4	0	5	10	261	3	12	286	4	0	5	9	18	0	228	7	0	235	544
03:45 PM	0	0	2	0	2	5	300	8	7	320	7	0	7	2	16	1	239	5	0	245	583
Total	2	0	14	0	16	33	1009	18	53	1113	21	0	27	16	64	1	883	24	0	908	2101
04:00 PM	2	0	1	0	3	10	303	2	11	326	5	0	8	2	15	0	211	6	0	217	561
04:15 PM	1	0	0	0	1	11	322	3	4	340	4	0	3	4	11	1	225	4	0	230	582
04:30 PM	0	0	1	0	1	7	294	0	20	321	4	0	8	8	20	0	200	8	0	208	550
04:45 PM	1	0	0	0	1	11	327	8	20	366	4	0	4	7	15	1	247	8	0	256	638
Total	4	0	2	0	6	39	1246	13	55	1353	17	0	23	21	61	2	883	26	0	911	2331
05:00 PM	2	0	3	0	5	5	283	6	9	303	6	0	6	1	13	0	208	7	0	215	536
05:15 PM	1	0	4	0	5	12	302	9	30	353	2	0	8	4	14	0	228	6	0	234	606
05:30 PM	1	0	3	0	4	11	289	10	18	328	7	0	9	5	21	0	199	9	0	208	561
05:45 PM	1	0	6	0	7	8	253	10	11	282	4	0	5	5	14	0	152	6	0	158	461
Total	5	0	16	0	21	36	1127	35	68	1266	19	0	28	15	62	0	787	28	0	815	2184
Grand Total	11	0	32	0	43	108	3382	66	176	3732	57	0	78	52	187	3	2553	78	0	2634	6596
Apprch %	25.6	0	74.4	0		2.9	90.6	1.8	4.7		30.5	0	41.7	27.8		0.1	96.9	3	0		
Total %	0.2	0	0.5	0	0.7	1.6	51.3	1	2.7	56.6	0.9	0	1.2	0.8	2.8	0	38.7	1.2	0	39.9	

	Farrington High School East Driveway Southbound				King Street Right = Right Turn Into Farrington High School East Driveway Westbound				Haka Drive Northbound				King Street Left = Left Turn Into Farrington High School East Driveway, Right = Right Turn Into Haka Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**2**	0	**1**	**3**	10	303	2	315	**5**	0	**8**	**13**	0	211	6	217	548
04:15 PM	1	0	0	1	**11**	322	3	336	4	0	3	7	**1**	225	4	230	574
04:30 PM	0	0	1	1	7	294	0	301	4	0	8	12	0	200	**8**	208	522
04:45 PM	1	0	0	1	11	**327**	**8**	**346**	4	0	4	8	1	**247**	8	**256**	**611**
Total Volume	4	0	2	6	39	1246	13	1298	17	0	23	40	2	883	26	911	2255
% App. Total	66.7	0	33.3		3	96	1		42.5	0	57.5		0.2	96.9	2.9		
PHF	.500	.000	.500	.500	.886	.953	.406	.938	.850	.000	.719	.769	.500	.894	.813	.890	.923

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Weather:Clear

File Name : KinWaiHou AM
Site Code : 00000001
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Houghtailing Street Southbound					King Street Westbound					Waiakamilo Road Northbound					King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	12	91	62	3	168	3	29	2	0	34	2	18	5	3	28	12	89	20	0	121	351
06:15 AM	16	143	64	5	228	9	41	8	0	58	9	25	9	6	49	43	146	35	4	228	563
06:30 AM	31	161	80	3	275	10	53	10	0	73	15	38	11	0	64	74	192	44	1	311	723
06:45 AM	38	204	74	2	318	11	68	8	3	90	9	60	9	2	80	71	226	37	8	342	830
Total	97	599	280	13	989	33	191	28	3	255	35	141	34	11	221	200	653	136	13	1002	2467
07:00 AM	53	198	111	13	375	6	62	42	4	114	19	71	15	7	112	42	226	26	5	299	900
07:15 AM	70	197	107	15	389	18	98	19	0	135	20	66	12	5	103	72	262	36	3	373	1000
07:30 AM	71	228	158	20	477	14	102	17	0	133	22	87	17	16	142	29	205	28	12	274	1026
07:45 AM	62	262	114	22	460	15	116	17	0	148	25	77	21	6	129	35	212	39	2	288	1025
Total	256	885	490	70	1701	53	378	95	4	530	86	301	65	34	486	178	905	129	22	1234	3951
08:00 AM	47	189	74	11	321	15	108	21	0	144	34	46	24	9	113	44	236	34	2	316	894
08:15 AM	48	194	70	5	317	22	108	18	0	148	24	67	14	6	111	48	232	27	1	308	884
08:30 AM	49	162	53	8	272	10	101	16	0	127	24	68	15	2	109	51	206	41	1	299	807
08:45 AM	44	187	46	10	287	14	117	28	0	159	22	73	31	3	129	46	218	31	1	296	871
Total	188	732	243	34	1197	61	434	83	0	578	104	254	84	20	462	189	892	133	5	1219	3456
Grand Total	541	2216	1013	117	3887	147	1003	206	7	1363	225	696	183	65	1169	567	2450	398	40	3455	9874
Apprch %	13.9	57	26.1	3		10.8	73.6	15.1	0.5		19.2	59.5	15.7	5.6		16.4	70.9	11.5	1.2		
Total %	5.5	22.4	10.3	1.2	39.4	1.5	10.2	2.1	0.1	13.8	2.3	7	1.9	0.7	11.8	5.7	24.8	4	0.4	35	

	Houghtailing Street Southbound				King Street Westbound				Waiakamilo Road Northbound				King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	70	197	107	374	18	98	19	135	20	66	12	98	72	262	36	370	977
07:30 AM	71	228	158	457	14	102	17	133	22	87	17	126	29	205	28	262	978
07:45 AM	62	262	114	438	15	116	17	148	25	77	21	123	35	212	39	286	995
08:00 AM	47	189	74	310	15	108	21	144	34	46	24	104	44	236	34	314	872
Total Volume	250	876	453	1579	62	424	74	560	101	276	74	451	180	915	137	1232	3822
% App. Total	15.8	55.5	28.7		11.1	75.7	13.2		22.4	61.2	16.4		14.6	74.3	11.1		
PHF	.880	.836	.717	.864	.861	.914	.881	.946	.743	.793	.771	.895	.625	.873	.878	.832	.960

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Site Code : 00000001
Start Date : 11/19/2013
Page No : 1

Groups Printed- Unshifted

	Houghtailing Street Southbound					King Street Westbound					Waiakamilo Road Northbound					King Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	37	126	71	4	238	11	129	40	5	185	45	135	21	7	208	31	139	35	4	209	840
03:15 PM	38	144	62	8	252	21	144	42	0	207	39	151	26	7	223	31	168	41	1	241	923
03:30 PM	28	156	89	3	276	11	158	51	4	224	39	177	26	9	251	34	179	29	0	242	993
03:45 PM	35	138	80	0	253	16	162	54	3	235	52	146	19	4	221	27	181	23	8	239	948
Total	138	564	302	15	1019	59	593	187	12	851	175	609	92	27	903	123	667	128	13	931	3704
04:00 PM	53	148	81	8	290	15	198	69	1	283	57	157	26	4	244	19	175	36	5	235	1052
04:15 PM	43	117	83	3	246	15	196	47	2	260	45	171	27	6	249	15	172	29	2	218	973
04:30 PM	23	106	70	2	201	12	171	54	4	241	52	192	21	7	272	29	154	38	4	225	939
04:45 PM	27	122	76	5	230	19	202	75	1	297	40	178	21	4	243	30	180	46	3	259	1029
Total	146	493	310	18	967	61	767	245	8	1081	194	698	95	21	1008	93	681	149	14	937	3993
05:00 PM	20	108	76	3	207	18	181	74	1	274	52	159	25	7	243	25	157	28	5	215	939
05:15 PM	26	134	86	5	251	11	178	72	3	264	60	141	23	2	226	21	181	38	1	241	982
05:30 PM	32	127	92	7	258	18	168	59	5	250	52	140	17	6	215	28	148	27	5	208	931
05:45 PM	22	134	76	6	238	13	177	54	0	244	44	132	21	4	201	11	109	26	7	153	836
Total	100	503	330	21	954	60	704	259	9	1032	208	572	86	19	885	85	595	119	18	817	3688
Grand Total	384	1560	942	54	2940	180	2064	691	29	2964	577	1879	273	67	2796	301	1943	396	45	2685	11385
Apprch %	13.1	53.1	32	1.8		6.1	69.6	23.3	1		20.6	67.2	9.8	2.4		11.2	72.4	14.7	1.7		
Total %	3.4	13.7	8.3	0.5	25.8	1.6	18.1	6.1	0.3	26	5.1	16.5	2.4	0.6	24.6	2.6	17.1	3.5	0.4	23.6	

	Houghtailing Street Southbound				King Street Westbound				Waiakamilo Road Northbound				King Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	53	148	81	282	15	198	69	282	57	157	26	240	19	175	36	230	1034
04:15 PM	43	117	83	243	15	196	47	258	45	171	27	243	15	172	29	216	960
04:30 PM	23	106	70	199	12	171	54	237	52	192	21	265	29	154	38	221	922
04:45 PM	27	122	76	225	19	202	75	296	40	178	21	239	30	180	46	256	1016
Total Volume	146	493	310	949	61	767	245	1073	194	698	95	987	93	681	149	923	3932
% App. Total	15.4	51.9	32.7		5.7	71.5	22.8		19.7	70.7	9.6		10.1	73.8	16.1		
PHF	.689	.833	.934	.841	.803	.949	.817	.906	.851	.909	.880	.931	.775	.946	.810	.901	.951

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR A TWO-LANE HIGHWAY

The primary measures of service quality for Class I two-lane highways are percent time-spent-following and average travel speed. For Class II two-lane highways, service quality is based only on percent time-spent-following. LOS criteria are defined for peak 15-min flow periods and are intended for application to segments of significant length.

Level of Service A describes the highest quality of traffic service, when motorists are able to travel at their desired speed. Without strict enforcement, this highest quality would result in average speeds of 55 mi/h or more on two-lane highways in Class I. The passing frequency required to maintain these speeds has not reached a demanding level, so that passing demand is well below passing capacity, and platoons of three or more vehicles are rare. Drivers are delayed no more than 35 percent of their travel time by slow-moving vehicles. A maximum flow rate of 490 pc/h total in both directions may be achieved with base conditions. On Class II highways, speeds may fall below 55 mi/h, but motorists will not be delayed in platoons for more than 40 percent of their travel time.

Level of Service B characterizes traffic flow with speeds of 50 mi/h or slightly higher on level-terrain Class I highways. The demand for passing to maintain desired speeds becomes significant and approximates the passing capacity at the lower boundary of LOS B. Drivers are delayed in platoons up to 50 percent of the time. Service flow rates of 780 pc/h total in both directions can be achieved under base conditions. Above this flow rate, the number of platoons increases dramatically. On Class II highways, speeds may fall below 50 mi/h, but motorists will not be delayed in platoons for more than 55 percent of their travel time.

Level of Service C describes further increases in flow, resulting in noticeable increases in platoon formation, platoon size, and frequency of passing impediments. The average speed still exceeds 45 mi/h on level-terrain Class I highways, even though unrestricted passing demand exceeds passing capacity. At higher volumes the chaining of platoons and significant reductions in passing capacity occur. Although traffic flow is stable, it is susceptible to congestion due to turning traffic and slow-moving vehicles. Percent time-spent-following may reach 65 percent. A service flow rate of up to 1,190 pc/h total in both directions can be accommodated under base conditions. On Class II highways, speeds may fall below 45 mi/h, but motorists will not be delayed in platoons for more than 70 percent of their travel time.

Level of Service D describes unstable traffic flow. The two opposing traffic streams begin to operate separately at higher volume levels, as passing becomes extremely difficult. Passing demand is high, but passing capacity approaches zero. Mean platoon sizes of 5 to 10 vehicles are common, although speeds of 40 mi/h still can be maintained under base conditions on Class I highways. The proportion of no-passing zones along the roadway section usually has little influence on passing. Turning vehicles and roadside distractions cause major shock waves in the traffic stream. Motorists are delayed in

"Highway Capacity Manual," Transportation Research Board, 2000.

platoons for nearly 80 percent of their travel time. Maximum service flow rates of 1,830 pc/h total in both directions can be maintained under base conditions. On Class II highways, speeds may fall below 40 mi/h, but in no case will motorists be delayed in platoons for more than 85 percent of their travel time.

At **Level of Service E**, traffic flow conditions have a percent time-spent-following greater than 80 percent on Class I highways and greater than 85 percent on Class II. Even under base conditions, speeds may drop below 40 mi/h. Average travel speeds on highways with less than base conditions will be slower, even down to 25 mi/h on sustained upgrades. Passing is virtually impossible at LOS E, and platooning becomes intense, as slower vehicles or other interruptions are encountered.

The highest volume attainable under LOS E defines the capacity of the highway, generally 3,200 pc/h total in both directions. Operating conditions at capacity are unstable and difficult to predict. Traffic operations seldom reach near capacity on rural highways, primarily because of lack of demand.

Level of Service F represents heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity and speeds are highly variable.

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	310	83	44	672	486	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.97		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1741		1770	3539	3518	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1741		1770	3539	3518	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	360	97	51	781	565	23
RTOR Reduction (vph)	13	0	0	0	3	0
Lane Group Flow (vph)	444	0	51	781	585	0
Turn Type			Prot			
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	19.8		3.8	25.3	17.5	
Effective Green, g (s)	19.8		3.8	25.3	17.5	
Actuated g/C Ratio	0.37		0.07	0.48	0.33	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	649		127	1686	1159	
v/s Ratio Prot	c0.26		0.03	c0.22	0.17	
v/s Ratio Perm						
v/c Ratio	0.68		0.40	0.46	0.50	
Uniform Delay, d1	14.0		23.6	9.3	14.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.0		2.1	0.2	0.3	
Delay (s)	17.0		25.6	9.5	14.7	
Level of Service	B		C	A	B	
Approach Delay (s)	17.0			10.5	14.7	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kalihi St & Farrington HS Entrance

6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	28	40	683	20	58	507
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	33	47	794	23	67	590
Pedestrians	40					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			575			86
pX, platoon unblocked	0.95	0.91			0.91	
vC, conflicting volume	1177	449			857	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478	181			633	
tC, single (s)	*5.8	*5.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	94			92	
cM capacity (veh/h)	500	765			828	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	79	529	288	185	236	236
Volume Left	33	0	0	67	0	0
Volume Right	47	0	23	0	0	0
cSH	628	1700	1700	828	1700	1700
Volume to Capacity	0.13	0.31	0.17	0.08	0.14	0.14
Queue Length 95th (ft)	11	0	0	7	0	0
Control Delay (s)	11.6	0.0	0.0	4.1	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	11.6	0.0		1.2		
Approach LOS	B					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1054	38	169	501	217	42	330	85	172	300	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.91		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3488		1770	3539	1583	1770	3121		1770	3412	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3488		1770	3539	1583	1770	3121		1770	3412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1109	40	178	527	228	44	347	89	181	316	49
RTOR Reduction (vph)	0	1	0	0	0	141	0	13	0	0	7	0
Lane Group Flow (vph)	189	1148	0	178	527	87	44	423	0	181	358	0
Confl. Peds. (#/hr)			95						364			40
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	21.6	56.6		20.6	55.6	55.6	6.9	27.9		20.7	41.7	
Effective Green, g (s)	21.6	56.6		20.6	55.6	55.6	6.9	27.9		20.7	41.7	
Actuated g/C Ratio	0.15	0.39		0.14	0.38	0.38	0.05	0.19		0.14	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	1354		250	1350	604	84	597		251	976	
v/s Ratio Prot	c0.11	c0.33		0.10	0.15		0.02	c0.14		c0.10	0.10	
v/s Ratio Perm						0.05						
v/c Ratio	0.72	0.85		0.71	0.39	0.14	0.52	0.71		0.72	0.37	
Uniform Delay, d1	59.2	40.7		59.8	32.8	29.5	67.8	55.1		59.8	41.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	5.1		9.2	0.2	0.1	5.8	3.8		9.8	0.2	
Delay (s)	68.6	45.8		69.0	33.0	29.6	73.6	59.0		69.6	41.8	
Level of Service	E	D		E	C	C	E	E		E	D	
Approach Delay (s)		49.0			39.0			60.3			51.0	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM Average Control Delay	48.2	HCM Level of Service		D
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	145.8	Sum of lost time (s)		15.0
Intersection Capacity Utilization	79.8%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	65	1246	827	77	12	72
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	68	1312	871	81	13	76
Pedestrians					22	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked	0.99				0.70	0.99
vC, conflicting volume	974				1726	353
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	939				1105	312
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				93	90
cM capacity (veh/h)	705				176	727

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	506	874	348	348	255	88
Volume Left	68	0	0	0	0	13
Volume Right	0	0	0	0	81	76
cSH	705	1700	1700	1700	1700	502
Volume to Capacity	0.10	0.51	0.20	0.20	0.15	0.18
Queue Length 95th (ft)	8	0	0	0	0	16
Control Delay (s)	2.6	0.0	0.0	0.0	0.0	13.7
Lane LOS	A					B
Approach Delay (s)	1.0		0.0			13.7
Approach LOS						B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	69.3%	ICU Level of Service		C
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1233	29	34	890	30	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.52
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3521			5075	1770	823
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3521			4419	1770	823
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1271	30	35	918	31	45
RTOR Reduction (vph)	2	0	0	0	0	42
Lane Group Flow (vph)	1299	0	0	953	31	3
Confl. Peds. (#/hr)		33	33			
Confl. Bikes (#/hr)						171
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	38.3			38.3	3.8	3.8
Effective Green, g (s)	38.3			38.3	3.8	3.8
Actuated g/C Ratio	0.74			0.74	0.07	0.07
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2588			3249	129	60
v/s Ratio Prot	c0.37				c0.02	
v/s Ratio Perm				0.22		0.00
v/c Ratio	0.50			0.29	0.24	0.05
Uniform Delay, d1	2.9			2.3	22.8	22.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2			0.1	1.0	0.4
Delay (s)	3.1			2.4	23.8	22.9
Level of Service	A			A	C	C
Approach Delay (s)	3.1			2.4	23.2	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	3.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	52.1	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	1246	924	42	4	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	1285	953	43	4	6
Pedestrians					17	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.84	
vC, conflicting volume	1013				1675	356
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1013				1424	356
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				97	99
cM capacity (veh/h)	671				154	700

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	449	856	381	381	234	10
Volume Left	21	0	0	0	0	4
Volume Right	0	0	0	0	43	6
cSH	671	1700	1700	1700	1700	289
Volume to Capacity	0.03	0.50	0.22	0.22	0.14	0.04
Queue Length 95th (ft)	2	0	0	0	0	3
Control Delay (s)	0.9	0.0	0.0	0.0	0.0	17.9
Lane LOS	A					C
Approach Delay (s)	0.3		0.0			17.9
Approach LOS						C

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	58.6%	ICU Level of Service	B	
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	915	137	62	424	74	101	276	74	250	876	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3419		1770	3460		1770	3380		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3419		1770	3460		1770	3380		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	953	143	65	442	77	105	288	77	260	912	472
RTOR Reduction (vph)	0	6	0	0	8	0	0	13	0	0	0	215
Lane Group Flow (vph)	188	1090	0	65	511	0	105	352	0	260	912	257
Confl. Peds. (#/hr)			36						19			
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	22.2	57.6		9.2	44.6		14.4	37.1		28.8	51.5	51.5
Effective Green, g (s)	22.2	57.6		9.2	44.6		14.4	37.1		28.8	51.5	51.5
Actuated g/C Ratio	0.15	0.38		0.06	0.29		0.09	0.24		0.19	0.34	0.34
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	257	1290		107	1011		167	821		334	1194	534
v/s Ratio Prot	c0.11	c0.32		0.04	0.15		0.06	0.10		c0.15	c0.26	
v/s Ratio Perm												0.16
v/c Ratio	0.73	0.84		0.61	0.51		0.63	0.43		0.78	0.76	0.48
Uniform Delay, d1	62.4	43.5		70.0	44.9		66.6	48.8		58.9	45.2	40.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	5.3		9.4	0.4		7.2	0.4		10.9	3.0	0.7
Delay (s)	72.6	48.7		79.4	45.3		73.8	49.2		69.8	48.1	40.7
Level of Service	E	D		E	D		E	D		E	D	D
Approach Delay (s)		52.2			49.1			54.7			49.4	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	50.9	HCM Level of Service		D
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	152.7	Sum of lost time (s)		15.0
Intersection Capacity Utilization	80.0%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	362	40	112	1237	283	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.99		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1758		1770	3539	3503	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1758		1770	3539	3503	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	369	41	114	1262	289	21
RTOR Reduction (vph)	5	0	0	0	6	0
Lane Group Flow (vph)	405	0	114	1262	304	0
Turn Type			Prot			
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	20.7		7.6	33.5	21.9	
Effective Green, g (s)	20.7		7.6	33.5	21.9	
Actuated g/C Ratio	0.33		0.12	0.54	0.35	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	585		216	1906	1233	
v/s Ratio Prot	c0.23		0.06	c0.36	0.09	
v/s Ratio Perm						
v/c Ratio	0.69		0.53	0.66	0.25	
Uniform Delay, d1	18.0		25.6	10.3	14.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.5		2.3	0.9	0.1	
Delay (s)	21.5		27.9	11.2	14.4	
Level of Service	C		C	B	B	
Approach Delay (s)	21.5			12.6	14.4	
Approach LOS	C			B	B	

Intersection Summary				
HCM Average Control Delay	14.6	HCM Level of Service		B
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	62.2	Sum of lost time (s)		8.0
Intersection Capacity Utilization	63.4%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
3: Kalihi St & Farrington HS Entrance

6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	15	1358	7	6	322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	6	15	1386	7	6	329
Pedestrians	44					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	4					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			540			116
pX, platoon unblocked	0.79	0.78			0.78	
vC, conflicting volume	1555	740			1437	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009	86			984	
tC, single (s)	*5.8	*5.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	237	732			521	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	21	924	469	72	131	131
Volume Left	6	0	0	6	0	0
Volume Right	15	0	7	0	0	0
cSH	458	1700	1700	521	1700	1700
Volume to Capacity	0.05	0.54	0.28	0.01	0.08	0.08
Queue Length 95th (ft)	4	0	0	1	0	0
Control Delay (s)	13.2	0.0	0.0	1.2	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.2	0.0		0.2		
Approach LOS	B					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	47.8%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	736	53	129	706	373	47	779	64	111	193	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3474		1770	3539	1583	1770	3435		1770	3424	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3474		1770	3539	1583	1770	3435		1770	3424	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	257	775	56	136	743	393	49	820	67	117	203	35
RTOR Reduction (vph)	0	3	0	0	0	153	0	3	0	0	8	0
Lane Group Flow (vph)	257	828	0	136	743	240	49	884	0	117	230	0
Confl. Peds. (#/hr)			40						83			22
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	27.3	50.1		17.1	39.9	39.9	7.4	48.5		14.8	55.9	
Effective Green, g (s)	27.3	50.1		17.1	39.9	39.9	7.4	48.5		14.8	55.9	
Actuated g/C Ratio	0.18	0.33		0.11	0.27	0.27	0.05	0.32		0.10	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1156		201	938	420	87	1107		174	1272	
v/s Ratio Prot	c0.15	0.24		0.08	c0.21		0.03	c0.26		c0.07	0.07	
v/s Ratio Perm						0.15						
v/c Ratio	0.80	0.72		0.68	0.79	0.57	0.56	0.80		0.67	0.18	
Uniform Delay, d1	59.0	44.0		64.0	51.4	47.9	70.0	46.5		65.5	31.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.3	2.1		8.7	4.6	1.9	8.1	4.1		9.8	0.1	
Delay (s)	72.3	46.1		72.7	56.1	49.8	78.1	50.6		75.3	31.9	
Level of Service	E	D		E	E	D	E	D		E	C	
Approach Delay (s)		52.3			55.9			52.1			46.2	
Approach LOS		D			E			D			D	

Intersection Summary					
HCM Average Control Delay	52.9	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.78				
Actuated Cycle Length (s)	150.5	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	79.8%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	906	1214	2	3	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	954	1278	2	3	13
Pedestrians					20	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked	0.95				0.82	0.95
vC, conflicting volume	1300				1786	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1143				1176	248
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	569				207	757

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	323	636	511	511	258	16
Volume Left	5	0	0	0	0	3
Volume Right	0	0	0	0	2	13
cSH	569	1700	1700	1700	1700	494
Volume to Capacity	0.01	0.37	0.30	0.30	0.15	0.03
Queue Length 95th (ft)	1	0	0	0	0	2
Control Delay (s)	0.3	0.0	0.0	0.0	0.0	12.5
Lane LOS	A					B
Approach Delay (s)	0.1		0.0			12.5
Approach LOS						B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	883	26	39	1199	17	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.94
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3519			5076	1770	1486
Flt Permitted	1.00			0.89	0.95	1.00
Satd. Flow (perm)	3519			4522	1770	1486
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	960	28	42	1303	18	25
RTOR Reduction (vph)	2	0	0	0	0	24
Lane Group Flow (vph)	986	0	0	1345	18	1
Confl. Peds. (#/hr)		21	21			55
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	37.0			37.0	2.2	2.2
Effective Green, g (s)	37.0			37.0	2.2	2.2
Actuated g/C Ratio	0.75			0.75	0.04	0.04
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2646			3401	79	66
v/s Ratio Prot	0.28				c0.01	
v/s Ratio Perm				c0.30		0.00
v/c Ratio	0.37			0.40	0.23	0.02
Uniform Delay, d1	2.1			2.2	22.7	22.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	1.5	0.1
Delay (s)	2.2			2.2	24.2	22.6
Level of Service	A			A	C	C
Approach Delay (s)	2.2			2.2	23.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	903	1246	13	4	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	982	1354	14	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.90	
vC, conflicting volume	1368				1857	459
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1368				1735	459
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	100
cM capacity (veh/h)	498				117	627

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	329	654	542	542	285	7
Volume Left	2	0	0	0	0	4
Volume Right	0	0	0	0	14	2
cSH	498	1700	1700	1700	1700	160
Volume to Capacity	0.00	0.38	0.32	0.32	0.17	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.1	0.0	0.0	0.0	0.0	28.4
Lane LOS	A					D
Approach Delay (s)	0.0		0.0			28.4
Approach LOS						D

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization		36.4%	ICU Level of Service	A
Analysis Period (min)		15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	681	149	61	767	245	194	698	95	146	493	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3411		1770	3411		1770	3476		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3411		1770	3411		1770	3476		1770	3539	1521
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	709	155	64	799	255	202	727	99	152	514	323
RTOR Reduction (vph)	0	16	0	0	27	0	0	10	0	0	0	164
Lane Group Flow (vph)	97	848	0	64	1027	0	202	816	0	152	514	159
Confl. Peds. (#/hr)			21				8					14
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.6	38.4		6.1	35.9		14.9	29.3		12.1	26.5	26.5
Effective Green, g (s)	8.6	38.4		6.1	35.9		14.9	29.3		12.1	26.5	26.5
Actuated g/C Ratio	0.08	0.36		0.06	0.34		0.14	0.28		0.11	0.25	0.25
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	144	1237		102	1156		249	962		202	886	381
v/s Ratio Prot	c0.05	0.25		0.04	c0.30		c0.11	c0.23		0.09	0.15	
v/s Ratio Perm												0.10
v/c Ratio	0.67	0.69		0.63	0.89		0.81	0.85		0.75	0.58	0.42
Uniform Delay, d1	47.3	28.6		48.8	33.1		44.1	36.2		45.4	34.8	33.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.8	1.6		11.5	8.6		17.9	7.0		14.6	1.0	0.7
Delay (s)	59.0	30.2		60.3	41.7		62.0	43.2		60.1	35.8	34.0
Level of Service	E	C		E	D		E	D		E	D	C
Approach Delay (s)		33.1			42.7			46.9			38.9	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM Average Control Delay	40.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	105.9	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2020 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	310	84	44	675	490	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.97		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1741		1770	3539	3519	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1741		1770	3539	3519	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	360	98	51	785	570	23
RTOR Reduction (vph)	13	0	0	0	3	0
Lane Group Flow (vph)	445	0	51	785	590	0
Turn Type			Prot			
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	19.9		3.8	25.3	17.5	
Effective Green, g (s)	19.9		3.8	25.3	17.5	
Actuated g/C Ratio	0.37		0.07	0.48	0.33	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	651		126	1683	1158	
v/s Ratio Prot	c0.26		0.03	c0.22	0.17	
v/s Ratio Perm						
v/c Ratio	0.68		0.40	0.47	0.51	
Uniform Delay, d1	14.0		23.6	9.4	14.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.0		2.1	0.2	0.4	
Delay (s)	17.0		25.7	9.6	14.7	
Level of Service	B		C	A	B	
Approach Delay (s)	17.0			10.6	14.7	
Approach LOS	B			B	B	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	49.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
3: Farrington HS Entrance & Kalihi St

6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	42	684	21	62	508
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	35	49	795	24	72	591
Pedestrians	40					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			575			86
pX, platoon unblocked	0.95	0.91			0.91	
vC, conflicting volume	1189	450			860	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	539	209			657	
tC, single (s)	*5.8	*5.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	93			91	
cM capacity (veh/h)	463	748			818	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	84	530	290	190	236	236
Volume Left	35	0	0	72	0	0
Volume Right	49	0	24	0	0	0
cSH	595	1700	1700	818	1700	1700
Volume to Capacity	0.14	0.31	0.17	0.09	0.14	0.14
Queue Length 95th (ft)	12	0	0	7	0	0
Control Delay (s)	12.0	0.0	0.0	4.3	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	12.0	0.0		1.2		
Approach LOS	B					

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	45.0%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1090	38	170	519	218	42	331	85	174	301	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.91		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3489		1770	3539	1583	1770	3119		1770	3412	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3489		1770	3539	1583	1770	3119		1770	3412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1147	40	179	546	229	44	348	89	183	317	49
RTOR Reduction (vph)	0	1	0	0	0	140	0	13	0	0	7	0
Lane Group Flow (vph)	189	1186	0	179	546	89	44	424	0	183	359	0
Confl. Peds. (#/hr)			95						364			40
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	21.8	59.2		20.7	58.1	58.1	6.9	28.2		20.9	42.2	
Effective Green, g (s)	21.8	59.2		20.7	58.1	58.1	6.9	28.2		20.9	42.2	
Actuated g/C Ratio	0.15	0.40		0.14	0.39	0.39	0.05	0.19		0.14	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	259	1386		246	1380	617	82	590		248	966	
v/s Ratio Prot	c0.11	c0.34		0.10	0.15		0.02	c0.14		c0.10	0.11	
v/s Ratio Perm						0.06						
v/c Ratio	0.73	0.86		0.73	0.40	0.14	0.54	0.72		0.74	0.37	
Uniform Delay, d1	60.8	41.0		61.4	32.8	29.4	69.5	56.7		61.4	42.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	5.4		10.2	0.2	0.1	6.6	4.2		10.9	0.2	
Delay (s)	70.6	46.4		71.7	33.0	29.5	76.1	60.9		72.3	43.0	
Level of Service	E	D		E	C	C	E	E		E	D	
Approach Delay (s)		49.7			39.4			62.3			52.8	
Approach LOS		D			D			E			D	

Intersection Summary					
HCM Average Control Delay	49.1	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	149.0	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	81.0%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	69	1286	852	82	13	76
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	73	1354	897	86	14	80
Pedestrians					22	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked					0.69	
vC, conflicting volume	1005				1784	364
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1005				1230	364
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				91	88
cM capacity (veh/h)	672				146	690

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	524	902	359	359	266	94
Volume Left	73	0	0	0	0	14
Volume Right	0	0	0	0	86	80
cSH	672	1700	1700	1700	1700	446
Volume to Capacity	0.11	0.53	0.21	0.21	0.16	0.21
Queue Length 95th (ft)	9	0	0	0	0	20
Control Delay (s)	2.9	0.0	0.0	0.0	0.0	15.2
Lane LOS	A					C
Approach Delay (s)	1.1		0.0			15.2
Approach LOS						C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1273	29	34	922	30	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.52
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3522			5075	1770	823
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3522			4412	1770	823
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1312	30	35	951	31	45
RTOR Reduction (vph)	2	0	0	0	0	42
Lane Group Flow (vph)	1340	0	0	986	31	3
Confl. Peds. (#/hr)		33	33			
Confl. Bikes (#/hr)						171
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	39.5			39.5	3.8	3.8
Effective Green, g (s)	39.5			39.5	3.8	3.8
Actuated g/C Ratio	0.74			0.74	0.07	0.07
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2610			3270	126	59
v/s Ratio Prot	c0.38				c0.02	
v/s Ratio Perm				0.22		0.00
v/c Ratio	0.51			0.30	0.25	0.05
Uniform Delay, d1	2.9			2.3	23.4	23.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2			0.1	1.0	0.4
Delay (s)	3.1			2.4	24.4	23.5
Level of Service	A			A	C	C
Approach Delay (s)	3.1			2.4	23.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	3.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	21	1286	957	45	4	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	22	1326	987	46	4	6
Pedestrians					17	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.84	
vC, conflicting volume	1050				1733	369
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1050				1483	369
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				97	99
cM capacity (veh/h)	649				141	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	464	884	395	395	244	10
Volume Left	22	0	0	0	0	4
Volume Right	0	0	0	0	46	6
cSH	649	1700	1700	1700	1700	270
Volume to Capacity	0.03	0.52	0.23	0.23	0.14	0.04
Queue Length 95th (ft)	3	0	0	0	0	3
Control Delay (s)	1.0	0.0	0.0	0.0	0.0	18.8
Lane LOS	A					C
Approach Delay (s)	0.3		0.0			18.8
Approach LOS						C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	945	137	62	441	74	101	276	74	250	876	457
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3422		1770	3463		1770	3380		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3422		1770	3463		1770	3380		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	984	143	65	459	77	105	288	77	260	912	476
RTOR Reduction (vph)	0	6	0	0	8	0	0	13	0	0	0	216
Lane Group Flow (vph)	188	1121	0	65	528	0	105	352	0	260	912	260
Confl. Peds. (#/hr)			36						19			
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	22.3	59.1		9.4	46.2		14.4	37.2		28.9	51.7	51.7
Effective Green, g (s)	22.3	59.1		9.4	46.2		14.4	37.2		28.9	51.7	51.7
Actuated g/C Ratio	0.14	0.38		0.06	0.30		0.09	0.24		0.19	0.33	0.33
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	255	1308		108	1035		165	813		331	1183	529
v/s Ratio Prot	c0.11	c0.33		0.04	0.15		0.06	0.10		c0.15	c0.26	
v/s Ratio Perm												0.16
v/c Ratio	0.74	0.86		0.60	0.51		0.64	0.43		0.79	0.77	0.49
Uniform Delay, d1	63.3	43.9		70.8	44.8		67.6	49.8		59.9	46.1	41.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.6	5.7		9.1	0.4		7.8	0.4		11.6	3.2	0.7
Delay (s)	73.9	49.6		79.9	45.3		75.4	50.1		71.5	49.3	41.7
Level of Service	E	D		E	D		E	D		E	D	D
Approach Delay (s)		53.1			49.0			55.8			50.6	
Approach LOS		D			D			E			D	

Intersection Summary					
HCM Average Control Delay	51.8	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	154.6	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	80.8%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	362	40	112	1240	284	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.99		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1758		1770	3539	3503	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1758		1770	3539	3503	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	369	41	114	1265	290	21
RTOR Reduction (vph)	5	0	0	0	6	0
Lane Group Flow (vph)	405	0	114	1265	305	0
Turn Type			Prot			
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	20.7		7.6	33.5	21.9	
Effective Green, g (s)	20.7		7.6	33.5	21.9	
Actuated g/C Ratio	0.33		0.12	0.54	0.35	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	585		216	1906	1233	
v/s Ratio Prot	c0.23		0.06	c0.36	0.09	
v/s Ratio Perm						
v/c Ratio	0.69		0.53	0.66	0.25	
Uniform Delay, d1	18.0		25.6	10.3	14.3	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.5		2.3	0.9	0.1	
Delay (s)	21.5		27.9	11.2	14.4	
Level of Service	C		C	B	B	
Approach Delay (s)	21.5			12.6	14.4	
Approach LOS	C			B	B	

Intersection Summary				
HCM Average Control Delay	14.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	62.2	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	63.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
3: Farrington HS Entrance & Kalihi St

6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	7	17	1359	8	7	322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	7	17	1387	8	7	329
Pedestrians	44					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	4					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			575			81
pX, platoon unblocked	0.79	0.78			0.78	
vC, conflicting volume	1559	741			1439	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998	96			993	
tC, single (s)	*5.8	*5.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	241	725			519	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	924	470	73	131	131
Volume Left	7	0	0	7	0	0
Volume Right	17	0	8	0	0	0
cSH	457	1700	1700	519	1700	1700
Volume to Capacity	0.05	0.54	0.28	0.01	0.08	0.08
Queue Length 95th (ft)	4	0	0	1	0	0
Control Delay (s)	13.3	0.0	0.0	1.3	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.3	0.0		0.3		
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	760	53	129	729	374	47	780	64	111	194	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3476		1770	3539	1583	1770	3435		1770	3424	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3476		1770	3539	1583	1770	3435		1770	3424	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	257	800	56	136	767	394	49	821	67	117	204	35
RTOR Reduction (vph)	0	3	0	0	0	153	0	3	0	0	8	0
Lane Group Flow (vph)	257	853	0	136	767	241	49	885	0	117	231	0
Confl. Peds. (#/hr)			40						83			22
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	27.6	51.7		17.2	41.3	41.3	7.5	48.8		14.8	56.1	
Effective Green, g (s)	27.6	51.7		17.2	41.3	41.3	7.5	48.8		14.8	56.1	
Actuated g/C Ratio	0.18	0.34		0.11	0.27	0.27	0.05	0.32		0.10	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	1178		200	958	429	87	1099		172	1260	
v/s Ratio Prot	c0.15	0.25		0.08	c0.22		0.03	c0.26		c0.07	0.07	
v/s Ratio Perm						0.15						
v/c Ratio	0.80	0.72		0.68	0.80	0.56	0.56	0.80		0.68	0.18	
Uniform Delay, d1	59.8	44.2		65.0	51.8	47.8	70.9	47.5		66.6	32.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.5	2.2		9.1	4.9	1.7	8.1	4.4		10.5	0.1	
Delay (s)	73.4	46.4		74.1	56.6	49.5	79.0	51.9		77.1	32.7	
Level of Service	E	D		E	E	D	E	D		E	C	
Approach Delay (s)		52.6			56.3			53.3			47.3	
Approach LOS		D			E			D			D	

Intersection Summary				
HCM Average Control Delay	53.6	HCM Level of Service		D
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	152.5	Sum of lost time (s)		20.0
Intersection Capacity Utilization	80.5%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	933	1251	2	3	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	982	1317	2	3	15
Pedestrians					20	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked	0.97				0.81	0.97
vC, conflicting volume	1339				1842	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1243				1342	337
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	531				165	693

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	334	655	527	527	265	18
Volume Left	6	0	0	0	0	3
Volume Right	0	0	0	0	2	15
cSH	531	1700	1700	1700	1700	443
Volume to Capacity	0.01	0.39	0.31	0.31	0.16	0.04
Queue Length 95th (ft)	1	0	0	0	0	3
Control Delay (s)	0.4	0.0	0.0	0.0	0.0	13.5
Lane LOS	A					B
Approach Delay (s)	0.1		0.0			13.5
Approach LOS						B

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	40.0%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/11/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	909	26	39	1235	17	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.94
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3519			5076	1770	1484
Flt Permitted	1.00			0.89	0.95	1.00
Satd. Flow (perm)	3519			4517	1770	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	988	28	42	1342	18	25
RTOR Reduction (vph)	1	0	0	0	0	24
Lane Group Flow (vph)	1015	0	0	1384	18	1
Confl. Peds. (#/hr)		21	21			55
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	38.3			38.3	2.2	2.2
Effective Green, g (s)	38.3			38.3	2.2	2.2
Actuated g/C Ratio	0.76			0.76	0.04	0.04
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2669			3426	77	65
v/s Ratio Prot	0.29				c0.01	
v/s Ratio Perm				c0.31		0.00
v/c Ratio	0.38			0.40	0.23	0.02
Uniform Delay, d1	2.1			2.1	23.3	23.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	1.6	0.1
Delay (s)	2.2			2.2	24.9	23.2
Level of Service	A			A	C	C
Approach Delay (s)	2.2			2.2	23.9	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	2.6	HCM Level of Service		A
HCM Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	50.5	Sum of lost time (s)		10.0
Intersection Capacity Utilization	72.3%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	931	1284	14	4	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1012	1396	15	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.90	
vC, conflicting volume	1411				1914	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1411				1796	473
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	100
cM capacity (veh/h)	479				108	616

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	339	675	558	558	294	7
Volume Left	2	0	0	0	0	4
Volume Right	0	0	0	0	15	2
cSH	479	1700	1700	1700	1700	149
Volume to Capacity	0.00	0.40	0.33	0.33	0.17	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	30.3
Lane LOS	A					D
Approach Delay (s)	0.1		0.0			30.3
Approach LOS						D

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.1%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	701	149	61	791	245	194	698	95	146	493	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3414		1770	3414		1770	3476		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3414		1770	3414		1770	3476		1770	3539	1521
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	730	155	64	824	255	202	727	99	152	514	323
RTOR Reduction (vph)	0	16	0	0	26	0	0	9	0	0	0	163
Lane Group Flow (vph)	97	869	0	64	1053	0	202	817	0	152	514	160
Confl. Peds. (#/hr)			21				8					14
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.6	39.3		6.1	36.8		14.9	28.9		12.2	26.2	26.2
Effective Green, g (s)	8.6	39.3		6.1	36.8		14.9	28.9		12.2	26.2	26.2
Actuated g/C Ratio	0.08	0.37		0.06	0.35		0.14	0.27		0.11	0.25	0.25
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	143	1260		101	1180		248	943		203	871	374
v/s Ratio Prot	c0.05	0.25		0.04	c0.31		c0.11	c0.23		0.09	0.15	
v/s Ratio Perm												0.11
v/c Ratio	0.68	0.69		0.63	0.89		0.81	0.87		0.75	0.59	0.43
Uniform Delay, d1	47.6	28.4		49.1	33.0		44.5	37.0		45.7	35.4	33.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.1	1.6		12.3	8.8		18.2	8.4		14.0	1.1	0.8
Delay (s)	59.7	30.0		61.4	41.8		62.7	45.3		59.7	36.5	34.6
Level of Service	E	C		E	D		E	D		E	D	C
Approach Delay (s)		33.0			42.9			48.8			39.4	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM Average Control Delay	41.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	106.5	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

APPENDIX E

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2020 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT**

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑↑			↑↑	
Volume (vph)	310	9	74	44	4	60	42	628	79	55	431	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.93		1.00	0.98		1.00	0.99	
Flt Protected		0.96			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1746			1688		1770	3483		1770	3516	
Flt Permitted		0.72			0.79		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1313			1359		1770	3483		1770	3516	
Peak-hour factor, PHF	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Adj. Flow (vph)	360	10	86	48	4	65	49	730	86	60	501	23
RTOR Reduction (vph)	0	9	0	0	37	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	447	0	0	80	0	49	807	0	60	521	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.8			28.8		4.3	21.5		4.7	21.9	
Effective Green, g (s)		28.8			28.8		4.3	21.5		4.7	21.9	
Actuated g/C Ratio		0.43			0.43		0.06	0.32		0.07	0.33	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		564			584		114	1118		124	1149	
v/s Ratio Prot							0.03	c0.23		c0.03	0.15	
v/s Ratio Perm		c0.34			0.06							
v/c Ratio		0.79			0.14		0.43	0.72		0.48	0.45	
Uniform Delay, d1		16.5			11.6		30.2	20.1		30.0	17.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.5			0.1		2.6	2.3		3.0	0.3	
Delay (s)		24.0			11.7		32.8	22.4		32.9	18.1	
Level of Service		C			B		C	C		C	B	
Approach Delay (s)		24.0			11.7			23.0			19.6	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM Average Control Delay	21.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	62.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑↑			↑↑	
Volume (vph)	202	1068	38	164	502	244	42	334	83	176	309	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.91		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3489		1770	3539	1583	1770	3132		1770	3411	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3489		1770	3539	1583	1770	3132		1770	3411	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	213	1124	40	173	528	257	44	352	87	185	325	51
RTOR Reduction (vph)	0	1	0	0	0	163	0	12	0	0	7	0
Lane Group Flow (vph)	213	1163	0	173	528	94	44	427	0	185	369	0
Confl. Peds. (#/hr)			95						364			40
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	23.8	57.5		20.1	53.8	53.8	6.9	28.0		21.1	42.2	
Effective Green, g (s)	23.8	57.5		20.1	53.8	53.8	6.9	28.0		21.1	42.2	
Actuated g/C Ratio	0.16	0.39		0.14	0.37	0.37	0.05	0.19		0.14	0.29	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	287	1368		243	1298	581	83	598		255	981	
v/s Ratio Prot	c0.12	c0.33		0.10	0.15		0.02	c0.14		c0.10	0.11	
v/s Ratio Perm						0.06						
v/c Ratio	0.74	0.85		0.71	0.41	0.16	0.53	0.71		0.73	0.38	
Uniform Delay, d1	58.5	40.7		60.5	34.6	31.3	68.3	55.6		60.0	41.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	5.2		9.5	0.2	0.1	6.4	4.0		9.8	0.2	
Delay (s)	68.4	45.8		70.0	34.8	31.4	74.7	59.6		69.8	42.0	
Level of Service	E	D		E	C	C	E	E		E	D	
Approach Delay (s)		49.3			40.2			61.0			51.2	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM Average Control Delay	48.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	146.7	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	80.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	42	1291	885	49	7	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	1359	932	52	7	48
Pedestrians					22	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked					0.69	
vC, conflicting volume	1005				1747	358
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1005				1195	358
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				95	93
cM capacity (veh/h)	672				161	695

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	497	906	373	373	238	56
Volume Left	44	0	0	0	0	7
Volume Right	0	0	0	0	52	48
cSH	672	1700	1700	1700	1700	483
Volume to Capacity	0.07	0.53	0.22	0.22	0.14	0.12
Queue Length 95th (ft)	5	0	0	0	0	10
Control Delay (s)	1.8	0.0	0.0	0.0	0.0	13.4
Lane LOS	A					B
Approach Delay (s)	0.6		0.0			13.4
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1272	29	34	922	30	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.52
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3522			5075	1770	823
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3522			4413	1770	823
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1311	30	35	951	31	45
RTOR Reduction (vph)	2	0	0	0	0	42
Lane Group Flow (vph)	1339	0	0	986	31	3
Confl. Peds. (#/hr)		33	33			
Confl. Bikes (#/hr)						171
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	39.5			39.5	3.8	3.8
Effective Green, g (s)	39.5			39.5	3.8	3.8
Actuated g/C Ratio	0.74			0.74	0.07	0.07
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2610			3270	126	59
v/s Ratio Prot	c0.38				c0.02	
v/s Ratio Perm				0.22		0.00
v/c Ratio	0.51			0.30	0.25	0.05
Uniform Delay, d1	2.9			2.3	23.4	23.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2			0.1	1.0	0.4
Delay (s)	3.1			2.4	24.4	23.5
Level of Service	A			A	C	C
Approach Delay (s)	3.1			2.4	23.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	3.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	21	1285	957	45	4	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	22	1325	987	46	4	6
Pedestrians					17	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.84	
vC, conflicting volume	1050				1732	369
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1050				1482	369
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				97	99
cM capacity (veh/h)	649				142	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	463	883	395	395	244	10
Volume Left	22	0	0	0	0	4
Volume Right	0	0	0	0	46	6
cSH	649	1700	1700	1700	1700	270
Volume to Capacity	0.03	0.52	0.23	0.23	0.14	0.04
Queue Length 95th (ft)	3	0	0	0	0	3
Control Delay (s)	1.0	0.0	0.0	0.0	0.0	18.8
Lane LOS	A					C
Approach Delay (s)	0.3		0.0			18.8
Approach LOS						C

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	60.4%	ICU Level of Service		B
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	944	137	62	440	74	101	276	74	250	876	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3421		1770	3463		1770	3380		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3421		1770	3463		1770	3380		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	983	143	65	458	77	105	288	77	260	912	477
RTOR Reduction (vph)	0	6	0	0	8	0	0	13	0	0	0	216
Lane Group Flow (vph)	188	1120	0	65	527	0	105	352	0	260	912	261
Confl. Peds. (#/hr)			36						19			
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	22.3	59.1		9.4	46.2		14.4	37.2		28.9	51.7	51.7
Effective Green, g (s)	22.3	59.1		9.4	46.2		14.4	37.2		28.9	51.7	51.7
Actuated g/C Ratio	0.14	0.38		0.06	0.30		0.09	0.24		0.19	0.33	0.33
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	255	1308		108	1035		165	813		331	1183	529
v/s Ratio Prot	c0.11	c0.33		0.04	0.15		0.06	0.10		c0.15	c0.26	
v/s Ratio Perm												0.16
v/c Ratio	0.74	0.86		0.60	0.51		0.64	0.43		0.79	0.77	0.49
Uniform Delay, d1	63.3	43.8		70.8	44.8		67.6	49.8		59.9	46.1	41.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.6	5.7		9.1	0.4		7.8	0.4		11.6	3.2	0.7
Delay (s)	73.9	49.6		79.9	45.2		75.4	50.1		71.5	49.3	41.7
Level of Service	E	D		E	D		E	D		E	D	D
Approach Delay (s)		53.1			49.0			55.8			50.6	
Approach LOS		D			D			E			D	

Intersection Summary					
HCM Average Control Delay	51.8	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	154.6	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	80.8%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	362	1	40	9	1	20	111	1222	12	6	282	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1759			1670		1770	3534		1770	3503	
Flt Permitted		0.72			0.90		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1330			1518		1770	3534		1770	3503	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	369	1	41	10	1	22	113	1247	13	7	288	21
RTOR Reduction (vph)	0	4	0	0	14	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	407	0	0	19	0	113	1259	0	7	303	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		27.1			27.1		7.8	33.2		0.6	26.0	
Effective Green, g (s)		27.1			27.1		7.8	33.2		0.6	26.0	
Actuated g/C Ratio		0.37			0.37		0.11	0.46		0.01	0.36	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		494			564		189	1609		15	1249	
v/s Ratio Prot							c0.06	c0.36		0.00	0.09	
v/s Ratio Perm		c0.31			0.01							
v/c Ratio		0.82			0.03		0.60	0.78		0.47	0.24	
Uniform Delay, d1		20.7			14.6		31.1	16.8		36.0	16.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		10.6			0.0		5.0	2.6		21.2	0.1	
Delay (s)		31.4			14.6		36.1	19.4		57.2	16.6	
Level of Service		C			B		D	B		E	B	
Approach Delay (s)		31.4			14.6			20.7			17.5	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM Average Control Delay	22.2	HCM Level of Service		C
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	72.9	Sum of lost time (s)		12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	246	757	53	129	725	372	47	782	64	113	195	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3476		1770	3539	1583	1770	3435		1770	3425	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3476		1770	3539	1583	1770	3435		1770	3425	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	259	797	56	136	763	392	49	823	67	119	205	35
RTOR Reduction (vph)	0	3	0	0	0	159	0	3	0	0	8	0
Lane Group Flow (vph)	259	850	0	136	763	233	49	887	0	119	232	0
Confl. Peds. (#/hr)			40						83			22
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	27.7	51.5		17.2	41.0	41.0	7.5	48.8		15.2	56.5	
Effective Green, g (s)	27.7	51.5		17.2	41.0	41.0	7.5	48.8		15.2	56.5	
Actuated g/C Ratio	0.18	0.34		0.11	0.27	0.27	0.05	0.32		0.10	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1172		199	950	425	87	1098		176	1267	
v/s Ratio Prot	c0.15	0.24		0.08	c0.22		0.03	c0.26		c0.07	0.07	
v/s Ratio Perm						0.15						
v/c Ratio	0.81	0.73		0.68	0.80	0.55	0.56	0.81		0.68	0.18	
Uniform Delay, d1	59.9	44.4		65.1	52.1	47.9	71.0	47.6		66.4	32.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	2.3		9.3	5.0	1.4	8.1	4.4		9.8	0.1	
Delay (s)	73.7	46.7		74.4	57.1	49.3	79.1	52.1		76.2	32.6	
Level of Service	E	D		E	E	D	E	D		E	C	
Approach Delay (s)		53.0			56.5			53.5			47.0	
Approach LOS		D			E			D			D	

Intersection Summary				
HCM Average Control Delay	53.8	HCM Level of Service		D
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	152.7	Sum of lost time (s)		20.0
Intersection Capacity Utilization	80.7%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	935	1252	1	2	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	984	1318	1	2	8
Pedestrians					20	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked	0.97				0.81	0.97
vC, conflicting volume	1339				1837	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1243				1337	337
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	99
cM capacity (veh/h)	531				167	693

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	331	656	527	527	265	11
Volume Left	3	0	0	0	0	2
Volume Right	0	0	0	0	1	8
cSH	531	1700	1700	1700	1700	426
Volume to Capacity	0.01	0.39	0.31	0.31	0.16	0.02
Queue Length 95th (ft)	0	0	0	0	0	2
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	13.7
Lane LOS	A					B
Approach Delay (s)	0.1		0.0			13.7
Approach LOS						B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	910	26	39	1235	17	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.94
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3520			5076	1770	1484
Flt Permitted	1.00			0.89	0.95	1.00
Satd. Flow (perm)	3520			4517	1770	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	989	28	42	1342	18	25
RTOR Reduction (vph)	1	0	0	0	0	24
Lane Group Flow (vph)	1016	0	0	1384	18	1
Confl. Peds. (#/hr)		21	21			55
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	38.3			38.3	2.2	2.2
Effective Green, g (s)	38.3			38.3	2.2	2.2
Actuated g/C Ratio	0.76			0.76	0.04	0.04
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2670			3426	77	65
v/s Ratio Prot	0.29				c0.01	
v/s Ratio Perm				c0.31		0.00
v/c Ratio	0.38			0.40	0.23	0.02
Uniform Delay, d1	2.1			2.1	23.3	23.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	1.6	0.1
Delay (s)	2.2			2.2	24.9	23.2
Level of Service	A			A	C	C
Approach Delay (s)	2.2			2.2	23.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	932	1284	14	5	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1013	1396	15	5	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.90	
vC, conflicting volume	1411				1914	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1411				1797	473
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	100
cM capacity (veh/h)	479				108	616

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	340	675	558	558	294	8
Volume Left	2	0	0	0	0	5
Volume Right	0	0	0	0	15	2
cSH	479	1700	1700	1700	1700	141
Volume to Capacity	0.00	0.40	0.33	0.33	0.17	0.05
Queue Length 95th (ft)	0	0	0	0	0	4
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	31.9
Lane LOS	A					D
Approach Delay (s)	0.1		0.0			31.9
Approach LOS						D

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	703	149	61	791	245	194	698	95	146	493	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3414		1770	3414		1770	3476		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3414		1770	3414		1770	3476		1770	3539	1521
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	732	155	64	824	255	202	727	99	152	514	323
RTOR Reduction (vph)	0	16	0	0	26	0	0	9	0	0	0	163
Lane Group Flow (vph)	97	871	0	64	1053	0	202	817	0	152	514	160
Confl. Peds. (#/hr)			21				8					14
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.6	39.3		6.1	36.8		14.9	28.9		12.2	26.2	26.2
Effective Green, g (s)	8.6	39.3		6.1	36.8		14.9	28.9		12.2	26.2	26.2
Actuated g/C Ratio	0.08	0.37		0.06	0.35		0.14	0.27		0.11	0.25	0.25
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	143	1260		101	1180		248	943		203	871	374
v/s Ratio Prot	c0.05	0.26		0.04	c0.31		c0.11	c0.23		0.09	0.15	
v/s Ratio Perm												0.11
v/c Ratio	0.68	0.69		0.63	0.89		0.81	0.87		0.75	0.59	0.43
Uniform Delay, d1	47.6	28.5		49.1	33.0		44.5	37.0		45.7	35.4	33.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.1	1.7		12.3	8.8		18.2	8.4		14.0	1.1	0.8
Delay (s)	59.7	30.1		61.4	41.8		62.7	45.3		59.7	36.5	34.6
Level of Service	E	C		E	D		E	D		E	D	C
Approach Delay (s)		33.0			42.9			48.8			39.4	
Approach LOS		C			D			D			D	

Intersection Summary					
HCM Average Control Delay	41.2	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.88				
Actuated Cycle Length (s)	106.5	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

APPENDIX F

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2028 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	310	9	75	47	3	63	42	628	84	60	430	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.92		1.00	0.98		1.00	0.99	
Flt Protected		0.96			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1746			1687		1770	3480		1770	3516	
Flt Permitted		0.72			0.78		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1300			1351		1770	3480		1770	3516	
Peak-hour factor, PHF	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Adj. Flow (vph)	360	10	87	51	3	68	49	730	91	65	500	23
RTOR Reduction (vph)	0	9	0	0	39	0	0	10	0	0	3	0
Lane Group Flow (vph)	0	448	0	0	83	0	49	811	0	65	520	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.5			30.5		4.6	23.3		6.5	25.2	
Effective Green, g (s)		30.5			30.5		4.6	23.3		6.5	25.2	
Actuated g/C Ratio		0.42			0.42		0.06	0.32		0.09	0.35	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		548			570		113	1121		159	1225	
v/s Ratio Prot							0.03	c0.23		c0.04	0.15	
v/s Ratio Perm		c0.34			0.06							
v/c Ratio		0.82			0.15		0.43	0.72		0.41	0.42	
Uniform Delay, d1		18.4			12.9		32.6	21.7		31.1	18.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.2			0.1		2.7	2.3		1.7	0.2	
Delay (s)		27.6			13.0		35.3	24.0		32.8	18.2	
Level of Service		C			B		D	C		C	B	
Approach Delay (s)		27.6			13.0			24.6			19.9	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	1116	38	164	525	246	42	334	83	177	311	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.91		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3490		1770	3539	1583	1770	3129		1770	3410	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3490		1770	3539	1583	1770	3129		1770	3410	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	1175	40	173	553	259	44	352	87	186	327	51
RTOR Reduction (vph)	0	1	0	0	0	161	0	12	0	0	7	0
Lane Group Flow (vph)	216	1214	0	173	553	98	44	427	0	186	371	0
Confl. Peds. (#/hr)			95						364			40
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	24.3	60.8		20.2	56.7	56.7	6.9	28.4		21.2	42.7	
Effective Green, g (s)	24.3	60.8		20.2	56.7	56.7	6.9	28.4		21.2	42.7	
Actuated g/C Ratio	0.16	0.40		0.13	0.38	0.38	0.05	0.19		0.14	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	1409		237	1332	596	81	590		249	967	
v/s Ratio Prot	c0.12	c0.35		0.10	0.16		0.02	c0.14		c0.11	0.11	
v/s Ratio Perm						0.06						
v/c Ratio	0.76	0.86		0.73	0.42	0.16	0.54	0.72		0.75	0.38	
Uniform Delay, d1	60.3	41.0		62.6	34.7	31.2	70.3	57.4		62.1	43.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.8	5.7		10.7	0.2	0.1	7.2	4.4		11.5	0.3	
Delay (s)	71.1	46.7		73.3	34.9	31.3	77.6	61.8		73.7	43.6	
Level of Service	E	D		E	C	C	E	E		E	D	
Approach Delay (s)		50.4			40.7			63.2			53.5	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM Average Control Delay	49.9	HCM Level of Service		D
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	150.6	Sum of lost time (s)		20.0
Intersection Capacity Utilization	81.5%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	44	1346	922	52	8	48
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	1417	971	55	8	51
Pedestrians					22	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked					0.68	
vC, conflicting volume	1047				1821	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1047				1263	373
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				94	93
cM capacity (veh/h)	648				144	683

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	519	945	388	388	249	59
Volume Left	46	0	0	0	0	8
Volume Right	0	0	0	0	55	51
cSH	648	1700	1700	1700	1700	445
Volume to Capacity	0.07	0.56	0.23	0.23	0.15	0.13
Queue Length 95th (ft)	6	0	0	0	0	11
Control Delay (s)	2.0	0.0	0.0	0.0	0.0	14.3
Lane LOS	A					B
Approach Delay (s)	0.7		0.0			14.3
Approach LOS						B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	71.0%	ICU Level of Service		C
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/6/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1328	29	34	964	30	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.52
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3522			5075	1770	823
Flt Permitted	1.00			0.87	0.95	1.00
Satd. Flow (perm)	3522			4401	1770	823
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1369	30	35	994	31	45
RTOR Reduction (vph)	1	0	0	0	0	42
Lane Group Flow (vph)	1398	0	0	1029	31	3
Confl. Peds. (#/hr)		33	33			
Confl. Bikes (#/hr)						171
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	41.8			41.8	3.8	3.8
Effective Green, g (s)	41.8			41.8	3.8	3.8
Actuated g/C Ratio	0.75			0.75	0.07	0.07
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2648			3309	121	56
v/s Ratio Prot	c0.40				c0.02	
v/s Ratio Perm				0.23		0.00
v/c Ratio	0.53			0.31	0.26	0.05
Uniform Delay, d1	2.8			2.2	24.6	24.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2			0.1	1.1	0.4
Delay (s)	3.0			2.3	25.7	24.6
Level of Service	A			A	C	C
Approach Delay (s)	3.0			2.3	25.1	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	3.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	23	1339	1000	48	4	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	24	1380	1031	49	4	7
Pedestrians					17	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.83	
vC, conflicting volume	1097				1810	385
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1097				1566	385
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				97	99
cM capacity (veh/h)	623				126	675

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	484	920	412	412	256	11
Volume Left	24	0	0	0	0	4
Volume Right	0	0	0	0	49	7
cSH	623	1700	1700	1700	1700	261
Volume to Capacity	0.04	0.54	0.24	0.24	0.15	0.04
Queue Length 95th (ft)	3	0	0	0	0	3
Control Delay (s)	1.1	0.0	0.0	0.0	0.0	19.4
Lane LOS	A					C
Approach Delay (s)	0.4		0.0			19.4
Approach LOS						C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	985	137	62	462	74	102	276	74	250	876	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3425		1770	3466		1770	3379		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3425		1770	3466		1770	3379		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	1026	143	65	481	77	106	288	77	260	912	479
RTOR Reduction (vph)	0	6	0	0	7	0	0	13	0	0	0	221
Lane Group Flow (vph)	188	1163	0	65	551	0	106	352	0	260	912	258
Confl. Peds. (#/hr)			36						19			
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	22.3	61.4		9.9	49.0		14.4	37.3		29.0	51.9	51.9
Effective Green, g (s)	22.3	61.4		9.9	49.0		14.4	37.3		29.0	51.9	51.9
Actuated g/C Ratio	0.14	0.39		0.06	0.31		0.09	0.24		0.18	0.33	0.33
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	250	1334		111	1078		162	800		326	1165	521
v/s Ratio Prot	c0.11	c0.34		0.04	0.16		0.06	0.10		c0.15	c0.26	
v/s Ratio Perm												0.16
v/c Ratio	0.75	0.87		0.59	0.51		0.65	0.44		0.80	0.78	0.50
Uniform Delay, d1	65.0	44.5		71.9	44.5		69.2	51.3		61.5	47.8	42.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.0	6.5		7.7	0.4		9.1	0.4		12.7	3.5	0.7
Delay (s)	77.0	51.0		79.5	44.9		78.3	51.6		74.2	51.3	43.1
Level of Service	E	D		E	D		E	D		E	D	D
Approach Delay (s)		54.6			48.5			57.6			52.5	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM Average Control Delay	53.2	HCM Level of Service		D
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	157.6	Sum of lost time (s)		15.0
Intersection Capacity Utilization	81.9%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Beckley St & Kalihi St

6/6/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	362	1	40	9	2	21	111	1223	12	6	282	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1759			1674		1770	3534		1770	3503	
Flt Permitted		0.72			0.90		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1328			1527		1770	3534		1770	3503	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	369	1	41	10	2	23	113	1248	13	7	288	21
RTOR Reduction (vph)	0	4	0	0	14	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	407	0	0	21	0	113	1260	0	7	303	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		27.1			27.1		7.8	33.2		0.6	26.0	
Effective Green, g (s)		27.1			27.1		7.8	33.2		0.6	26.0	
Actuated g/C Ratio		0.37			0.37		0.11	0.46		0.01	0.36	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		494			568		189	1609		15	1249	
v/s Ratio Prot							c0.06	c0.36		0.00	0.09	
v/s Ratio Perm		c0.31			0.01							
v/c Ratio		0.82			0.04		0.60	0.78		0.47	0.24	
Uniform Delay, d1		20.7			14.6		31.1	16.8		36.0	16.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		10.6			0.0		5.0	2.6		21.2	0.1	
Delay (s)		31.4			14.6		36.1	19.4		57.2	16.6	
Level of Service		C			B		D	B		E	B	
Approach Delay (s)		31.4			14.6			20.7			17.5	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM Average Control Delay	22.2	HCM Level of Service		C
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	72.9	Sum of lost time (s)		12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: N King St & Kalihi St

6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	246	789	53	128	756	374	47	781	65	112	195	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3478		1770	3539	1583	1770	3432		1770	3424	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3478		1770	3539	1583	1770	3432		1770	3424	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	259	831	56	135	796	394	49	822	68	118	205	35
RTOR Reduction (vph)	0	3	0	0	0	158	0	3	0	0	8	0
Lane Group Flow (vph)	259	884	0	135	796	236	49	887	0	118	232	0
Confl. Peds. (#/hr)			40						83			22
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	27.9	53.2		17.2	42.5	42.5	7.5	49.1		15.2	56.8	
Effective Green, g (s)	27.9	53.2		17.2	42.5	42.5	7.5	49.1		15.2	56.8	
Actuated g/C Ratio	0.18	0.34		0.11	0.27	0.27	0.05	0.32		0.10	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	1196		197	972	435	86	1089		174	1257	
v/s Ratio Prot	c0.15	0.25		0.08	c0.22		0.03	c0.26		c0.07	0.07	
v/s Ratio Perm						0.15						
v/c Ratio	0.81	0.74		0.69	0.82	0.54	0.57	0.81		0.68	0.18	
Uniform Delay, d1	60.9	44.7		66.1	52.5	47.8	72.0	48.6		67.4	33.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.5	2.4		9.5	5.5	1.4	8.4	4.8		10.0	0.1	
Delay (s)	75.4	47.1		75.6	58.0	49.2	80.4	53.4		77.4	33.3	
Level of Service	E	D		E	E	D	F	D		E	C	
Approach Delay (s)		53.5			57.2			54.8			47.8	
Approach LOS		D			E			D			D	

Intersection Summary				
HCM Average Control Delay	54.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	154.7	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	81.5%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: N King St & Farrington HS West Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	972	1304	1	3	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	1023	1373	1	3	9
Pedestrians					20	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		491	440			
pX, platoon unblocked	0.95				0.81	0.95
vC, conflicting volume	1394				1913	478
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1226				1273	261
tC, single (s)	4.1				*5.8	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	526				181	742

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	345	682	549	549	276	13
Volume Left	4	0	0	0	0	3
Volume Right	0	0	0	0	1	9
cSH	526	1700	1700	1700	1700	418
Volume to Capacity	0.01	0.40	0.32	0.32	0.16	0.03
Queue Length 95th (ft)	1	0	0	0	0	2
Control Delay (s)	0.3	0.0	0.0	0.0	0.0	13.9
Lane LOS	A					B
Approach Delay (s)	0.1		0.0			13.9
Approach LOS						B

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	39.7%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

HCM Signalized Intersection Capacity Analysis
10: N King St & Haka Dr

6/9/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	948	26	39	1287	17	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.91	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.93
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3520			5077	1770	1479
Flt Permitted	1.00			0.89	0.95	1.00
Satd. Flow (perm)	3520			4507	1770	1479
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1030	28	42	1399	18	25
RTOR Reduction (vph)	2	0	0	0	0	23
Lane Group Flow (vph)	1056	0	0	1441	18	2
Confl. Peds. (#/hr)		21	21			55
Turn Type			Perm			Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	39.8			39.8	3.4	3.4
Effective Green, g (s)	39.8			39.8	3.4	3.4
Actuated g/C Ratio	0.75			0.75	0.06	0.06
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2633			3372	113	95
v/s Ratio Prot	0.30				c0.01	
v/s Ratio Perm				c0.32		0.00
v/c Ratio	0.40			0.43	0.16	0.02
Uniform Delay, d1	2.4			2.5	23.5	23.3
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	0.7	0.1
Delay (s)	2.5			2.6	24.2	23.4
Level of Service	A			A	C	C
Approach Delay (s)	2.5			2.6	23.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: N King St & Farrington HS East Entrance

6/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	970	1336	16	5	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1054	1452	17	5	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		108	581			
pX, platoon unblocked					0.89	
vC, conflicting volume	1470				1995	493
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1470				1872	493
tC, single (s)	4.1				*5.7	*5.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	100
cM capacity (veh/h)	455				102	602

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	355	703	581	581	308	8
Volume Left	3	0	0	0	0	5
Volume Right	0	0	0	0	17	2
cSH	455	1700	1700	1700	1700	134
Volume to Capacity	0.01	0.41	0.34	0.34	0.18	0.06
Queue Length 95th (ft)	1	0	0	0	0	4
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	33.6
Lane LOS	A					D
Approach Delay (s)	0.1		0.0			33.6
Approach LOS						D

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
13: N King St & Houghtailing St

6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	732	149	61	825	245	195	698	95	146	493	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3418		1770	3418		1770	3476		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3418		1770	3418		1770	3476		1770	3539	1521
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	762	155	64	859	255	203	727	99	152	514	324
RTOR Reduction (vph)	0	15	0	0	25	0	0	10	0	0	0	160
Lane Group Flow (vph)	97	902	0	64	1089	0	203	816	0	152	514	164
Confl. Peds. (#/hr)			21				8					14
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.6	40.3		6.2	37.9		15.0	28.5		12.2	25.7	25.7
Effective Green, g (s)	8.6	40.3		6.2	37.9		15.0	28.5		12.2	25.7	25.7
Actuated g/C Ratio	0.08	0.38		0.06	0.35		0.14	0.27		0.11	0.24	0.24
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	142	1285		102	1208		248	924		201	848	365
v/s Ratio Prot	c0.05	0.26		0.04	c0.32		c0.11	c0.23		0.09	0.15	
v/s Ratio Perm												0.11
v/c Ratio	0.68	0.70		0.63	0.90		0.82	0.88		0.76	0.61	0.45
Uniform Delay, d1	48.0	28.4		49.4	32.9		44.8	37.8		46.1	36.2	34.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.7	1.8		11.5	9.4		18.6	10.0		14.9	1.2	0.9
Delay (s)	60.7	30.1		60.8	42.3		63.3	47.8		61.0	37.5	35.6
Level of Service	E	C		E	D		E	D		E	D	D
Approach Delay (s)		33.0			43.3			50.9			40.5	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM Average Control Delay	42.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	107.2	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

APPENDIX D

Pre-Assessment Consultation Comment and Response Letters

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

May 13, 2014, 2014

Regulatory Office

File No. POH-2014-00084

Mr. Milton Arakawa
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 15 2014
WILSON OKAMOTO CORPORATION

Dear Mr. Arakawa:

The U.S. Army Corps of Engineers (Corps) has evaluated the information submitted on April 16, 2014, for the proposed Governor Wallace Rider Farrington High School Development Master Plan. The project site is located within TMKs #1-6-021:005 and 1-6-003:047, 048, 082, 083, and 999; Latitude 21.330927° N., Longitude 157.873064° W.) Honolulu, Island of Oahu, Hawaii. Your project has been assigned number POA-2014-00084, which should be referred to in all correspondence with us.

The Corps' regulatory authorities are based on two laws: Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403), which prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from the Corps; and Section 404 of the Clean Water Act (CWA), which prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a Corps' permit. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include "muskegs", swamps, marshes, bogs, and similar areas.

Based on the information you provided the proposed work would not occur in wetlands and/or Waters of the U.S. and would, therefore, not be within the Corps' jurisdiction.

If changes to the plans or location of the work are necessary for any reason, your revised plans must be submitted to our office immediately for review and approval prior to conducting work in waters of the U.S. Additionally, nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations.

You may contact Mary Romero via email at mary.r.romero@usace.army.mil, by mail at the address above, or by phone at (808) 835-4300 if you have questions. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form is available at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Office

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
Fax: 808.946.2253
www.wilsonokamoto.com

8429-01
July 25, 2014

Mr. George P. Young, P.E.
Chief, Regulatory Office
Department of the Army
U.S. Army Corps of Engineers
Honolulu District
Fort Shafter, Hawai'i 96858-5440

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999
File No. POH-2014-00084

Dear Mr. Young:

Thank you for your letter dated May 13, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the proposed work would not occur in wetlands and/or waters of the U.S. and would, therefore, not be within the Corps' jurisdiction.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

MA

NEIL ABERCROMBIE
GOVERNOR

Dean H. Seki
Comptroller

Maria E. Zielinski
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

APR 24 2014

(P)1140.4

RECEIVED
APR 25 2014
WILSON OKAMOTO CORPORATION

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Environmental Assessment Pre-Assessment Consultation
Governor Wallace Rider Farrington High School
Development Master Plan
TMK: 1-6-021:005, and 1-6-003:047,048,082, 083, and 999

Thank you for the opportunity to provide comments for the subject project. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities in this area and we have no comments to offer at this time.

If you have any questions, your staff may call Mr. Alva Nakamura of the Public Works Division at 586-0488.

Sincerely,

DEAN H. SEKI
Comptroller

c: Mr. Jonathan Weintraub, Department of Education, DEU-PS, FDB
Mr. Garret Horimoto, Architects Hawaii, Ltd.

WILSON OKAMOTO CORPORATION
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8429-01
July 25, 2014

Mr. Dean Seki, Comptroller
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawai'i 96810-0119

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Seki:

Thank you for your letter dated April 24, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the proposed project does not impact any of the Department's projects or existing facilities.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

NEIL ABERCROMBIE
GOVERNOR

LEO R. ASUNCION
ACTING DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

Ref. No. P-14385

May 14, 2014

Mr. Milton Arakawa
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Pre-Assessment Consultation Request for Draft Environmental Assessment for the Governor Wallace Rider Farrington High School Development Master Plan, Honolulu, Oahu, Hawaii; TMK: (1) 1-6-021:005, and 1-6-003: 047, 048, 082, 083, and 999

Thank you for the opportunity to provide comments on the Farrington High School Development Master Plan. We have reviewed the documents you submitted to us by letter dated April 16, 2014, and have the following comments to offer:

1. The entire state is defined to be within the Coastal Zone Management Area, see HRS § 205A-1 (definition of "coastal zone management area"). The Draft Environmental Assessment (Draft EA) should include a discussion of the proposed project's ability to meet the objectives and policies set forth in HRS § 205A-2.

2. The Draft EA should include the Coastal Zone Management Act, HRS Chapter 205A, in a list of "relationships to land use plans, policies, and controls."

3. The Draft EA should include a list of any Federal, State, or county permits required for this master plan project.

4. Please consider utilizing the Office of Planning's *Stormwater Impact Assessment* to identify and evaluate information on hydrology (i.e. proximity to drainage ways, stream channels, sensitive ecosystems in receiving waters), stressors (i.e. water quality and pollutants), sensitivity of resources (i.e. aquatic resources and riparian resources), and management considerations. This guidance document will assist in integrating stormwater impact assessment within your review process.

   The purpose of this document is to provide guidance on assessing stormwater impacts in the planning phase of project development. The goal is to provide a suggested framework and various tools for integrating stormwater impacts assessment. The

Appendices include a list of Data Resources, Best Management Practice Techniques and a Reviewers Checklist. The *Stormwater Impact Assessment* guidance document can be found at http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_stormwater_impact_assessments_guidance.pdf.

If you have any questions regarding this comment letter, please contact Josh Hekekia of our Hawaii CZM Program at 587-2845.

Sincerely,

Leo R. Asuncion
Acting Director

WILSON OKAMOTO CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
Fax: 808.946.2253
www.wilsonokamoto.com

8429-01
July 25, 2014

Mr. Leo R. Asuncion, Acting Director
Office of Planning
State of Hawai'i
235 South Beretania Street, 6th Floor
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Asuncion:

Thank you for your letter dated May 8, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following response to your comments.

We understand that the entire state is within the Coastal Zone Management Area. The Draft Environmental Assessment will include a discussion of the proposed project's ability to meet the objectives and policies set forth in Section 205A-2, HRS. This would be included in the Draft EA section on "relationships to land use plans, policies and controls".

The Draft EA will include a list of any Federal, State or county permits required for this project.

The Department of Education will consider utilizing the Office of Planning's *Stormwater Impact Assessment* to identify and evaluate information on hydrology, stressors, sensitivity of resources, and management considerations.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LINDA ROSEN, M.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD/CWB

05011PJF.14

May 12, 2014

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 14 2014
WILSON OKAMOTO CORPORATION

Dear Mr. Arakawa:

**SUBJECT: Comments on Environmental Assessment (EA)
Pre-Assessment Consultation for
Governor Wallace Rider Farrington High School Development Master Plan
Honolulu, Island of Oahu, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated April 16, 2014 (received on April 21, 2014), requesting comments on the subject document. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. Your applicant 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://health.hawaii.gov/epo/files/2013/10/CWB_Oct22.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. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for pollutant discharges into State surface waters and for certain situations involving storm water (HAR, Chapter 11-55).

a. Discharges into Class 2 or Class A State waters can be covered under an NPDES general permit only if all of the NPDES general permit requirements are met. Please see the DOH-CWB website (http://health.hawaii.gov/cwb/) for the NPDES general permits and instructions to request coverage.

b. All other discharges into State surface waters and discharges into Class 1 or Class AA State waters require an NPDES individual permit. To request NPDES individual permit coverage, please see the DOH-CWB forms website located at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms/.

c. NPDES permit coverage for storm water associated with construction activities is required if your project will result in the disturbance of one (1) acre or more 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. NPDES permit coverage is required before the start of the construction activities.

   Land disturbance includes, but is not limited to clearing, grading, grubbing, uprooting of vegetation, demolition (even if leaving foundation slab), staging, stockpiling, excavation into pavement areas which go down to the base course, and storage areas (including areas on the roadway to park equipment if these areas are blocked off from public usage, grassed areas, or bare ground).

3. If the project involves work in, over, or under waters of the United States, it is highly recommend that your applicant contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are 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.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

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

JF:np

WILSON OKAMOTO CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
Fax: 808.946.2253
www.wilsonokamoto.com

8429-01
July 25, 2014

Mr. Alec Wong, P.E. Chief
Clean Water Branch
State of Hawai'i
Department of Health
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Wong:

Thank you for your letter dated May 12, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following responses to your comments.

We will review your Department's Standard Comments on your website. Applicable comments shall be adhered to during project implementation.

We appreciate the information provided regarding the antidegradation policy, designated uses, and water quality criteria on any project and its impact on State waters (Chapter 11-54, HAR). The project will comply with applicable provisions.

Thank you for the information on National Pollutant Discharge Elimination System (NPDES) provisions. Prior to the start of construction, coordination will be undertaken with the Department of Health on applicable requirements.

Early consultation with the Corps of Engineers has also been undertaken to ascertain applicable requirements. The sharing of additional information regarding Section 401 Water Quality Certification provisions is appreciated and compliance with applicable provisions is also acknowledged. We also acknowledge that all discharges related to project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 are required, must comply with the State's Water Quality Standards.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LINDA ROSEN, M.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:
EPO 14-062
EA Farrington High School

April 28, 2014

RECEIVED
MAY 01 2014
WILSON OKAMOTO CORPORATION

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

SUBJECT: Environmental Assessment Pre-Assessment Consultation
Governor Wallace Rider Farrington High School Development Master Plan
TMK: 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999; Honolulu, Oahu, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated April 16, 2014. Thank you for allowing us to review and comment on the subject document. The document was routed to the relevant Environmental Health divisions and offices. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments at: http://health.hawaii.gov/epo/home/landuse-planning-review-program/.
You are required to adhere to all applicable standard comments.

You may also wish to review the recently revised Water Quality Standards Maps that have been updated for all islands. The new Water Quality Standards Maps (2013) can be found at:
http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/water-quality-standards/

The EPO suggests that you examine the many sources available on strategies to support the sustainable and healthy design of communities and buildings, including the following sites:
Sanitation Branch, Swimming Pool information: http://health.hawaii.gov/san/swimming-pool-information/;
U.S. Green Building Council's LEED program: www.usgbc.org/leed;
Smart Growth America: www.smartgrowthamerica.org;
International Well Building Standard: http://delosliving.com;
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability; and
U.S. Health and Human Services: www.hhs.gov/about/sustainability.

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at:
www.cdc.gov/healthyplaces/hia.htm; and
www.epa.gov/research/healthscience/health-impact-assessment.htm.

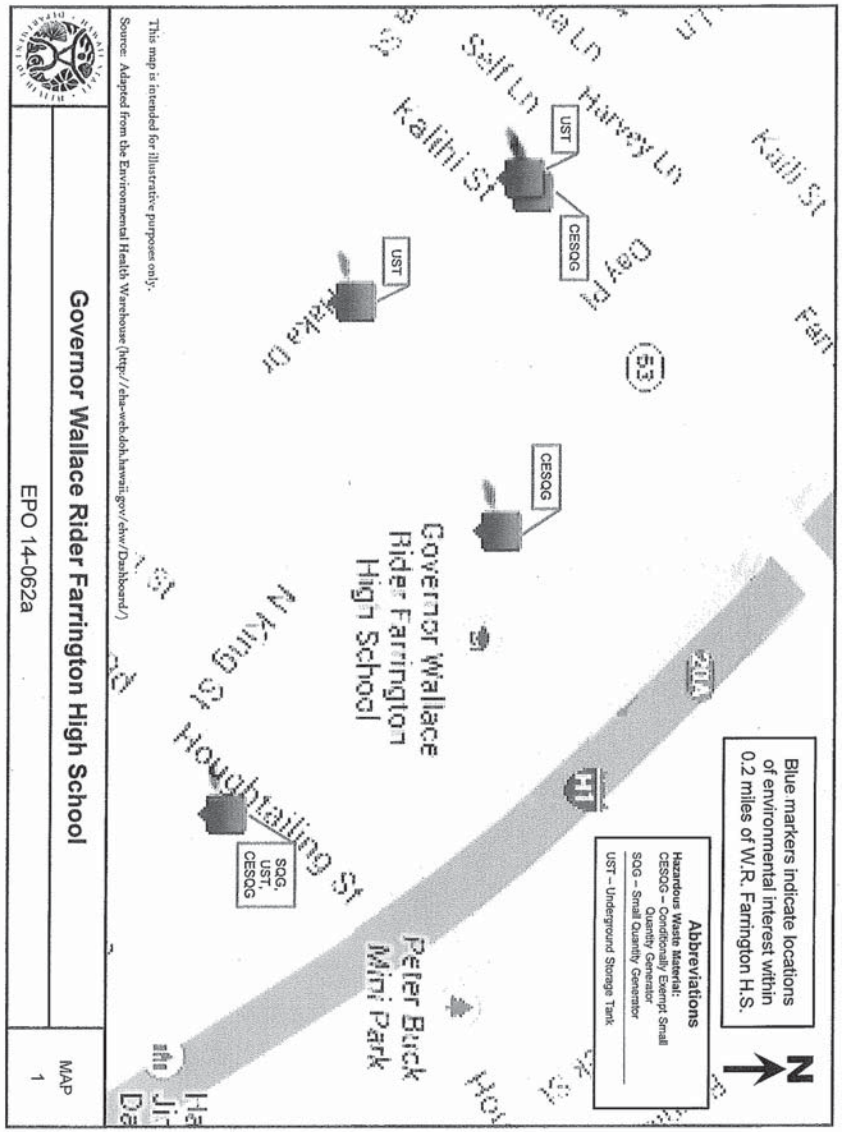
We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

Attachment – Governor Wallace Rider Farrington High School, EPO 14-062a, Map 1

c: Clean Water Branch, Hazard Evaualtion & Emergency Response Office, Indoor & Radiological Health Branch, Sanitation Branch (via email)



WILSON OKAMOTO
CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
Fax: 808.946.2253
www.wilsonokamoto.com

8429-01
July 25, 2014

Ms. Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office
State of Hawai'i
Department of Health
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Ms. McIntyre:

Thank you for your letter dated April 28, 2014 regarding the subject Draft EA pre-assessment consultation. We will review your Department's Standard Comments on your website. Applicable comments shall be adhered to during project implementation.

We will also review the recently revised Water Quality Standards Maps as well as the sustainable design resources you have referenced and will take them into consideration in project design. To the extent feasible, opportunities for energy efficiency and achievement of environmental standards will be pursued as part of the proposed phasing work.

Your recommendation of conducting a Health Impact Assessment shall be taken into consideration as well.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

May 14, 2014

Wilson Okamoto Corporation
Attention: Mr. Milton Arakawa, Project Manager
1907 South Beretania Street, Suite 400 via email: marakawa@wilsonokamoto.com
Honolulu, Hawai`i 96826

Dear Mr. Arakawa,

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation, Governor Wallace Rider Farrington High School Development Master Plan, Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999, Honolulu, O`ahu, Hawai`i

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 comments.

At this time, enclosed are comments from (1) Land Division – Oahu District; (2) Engineering Division; and (3) Commission on Water Resource Management. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

April 22, 2014

MEMORANDUM

TO: **DLNR Agencies:**
__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
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation, Governor Wallace Rider Farrington High School Development Master Plan

LOCATION: Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999

APPLICANT: State of Hawai`i Department of Education, by its consultant Wilson Okamoto Corporation

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2014. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: T Chee
Print Name: Jimmy Chee
Date: 4/24/2014

COMMENTS:
TMK(1)1-6-003:047 and 083 are not under the management jurisdiction of the Department of Education (DOE). An executive order setting aside the land to DOE would be in order. Land Division will work with DOE regarding the setting aside of the parcels for school purposes.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

April 22, 2014

MEMORANDUM

TO: DLNR Agencies:
__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
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation, Governor Wallace Rider Farrington High School Development Master Plan

LOCATION: Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999

APPLICANT: State of Hawai`i Department of Education, by its consultant Wilson Okamoto Corporation

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2014. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: Carty S. Chang, Chief Engineer
Date: 4/25/14

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
REF: EA Pre-Assessment Consultation for Wallace Rider Farrington HS Development Master Plan Oahu.027

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

(X) Please take note that the project site according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program (NFIP) does not regulate developments within Zone X.

( ) 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. 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. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.
( ) Mr. Stanford Iwamoto at (808) 241-4896 of the County of Kauai, Department of Public Works.

(X) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

(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: _____

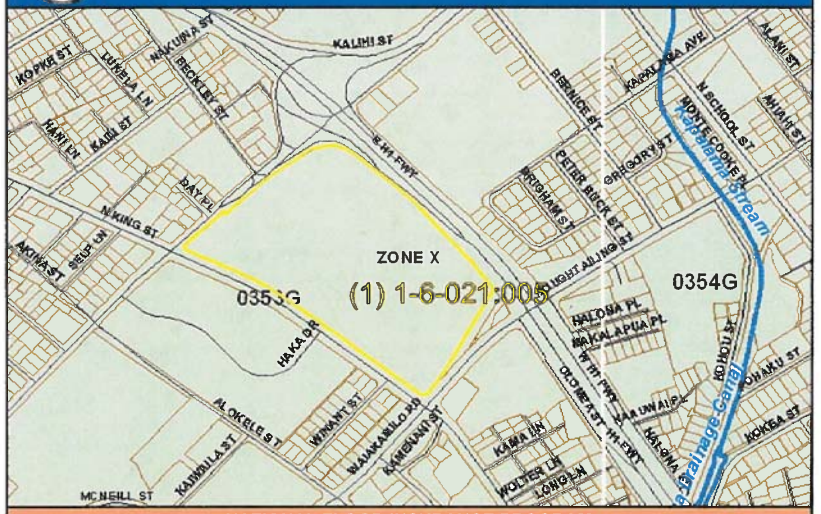
( ) Other: _____

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

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 4/25/14

State of Hawaii
FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HONOLULU
TMK NO:	(1) 1-6-021-005
PARCEL ADDRESS:	1564 N KING ST HONOLULU, HI 96817
FIRM INDEX DATE:	JANUARY 19, 2011
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	15003C0353G
PANEL EFFECTIVE DATE:	JANUARY 19, 2011

PARCEL DATA FROM:	APRIL 2014
IMAGERY DATA FROM:	MAY 2006

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
City and County of Honolulu	
Mario Siu-Li, CFM	(808) 768-8098
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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

April 22, 2014

MEMORANDUM

TO: **DLNR Agencies:**
__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
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation, Governor Wallace Rider Farrington High School Development Master Plan

LOCATION: Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999

APPLICANT: State of Hawai`i Department of Education, by its consultant Wilson Okamoto Corporation

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2014. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: William M. Tam Deputy Director
Date: May 14, 2014

FILE ID: RFD.3965.3
DOC ID: 11576

RECEIVED
LAND DIVISION
2014 MAY 14 AM 9:51
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
KAMANA BEAMER
MILTON D. PAVAO
LINDA ROSEN, M.D., M.P.H.
JONATHAN STARR
TED YAMAMURA

WILLIAM M. TAM
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

May 14, 2014

REF: RFD.3965.3

TO: Russell Tsuji, Administrator
Land Division

FROM: William M. Tam, Deputy Director
Commission on Water Resource Management

SUBJECT: EA Pre-Assesment Consultation, Governor Wallace Rider Farrington High School Development Plan

FILE NO.:
TMK NO.: 1-6-021:005, and 1-6-003:047, 048, 082, 083 and 999

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☐ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☐ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. 'Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/.

☐ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

☐ 6. We recommend the use of alternative water sources, wherever practicable.

☐ 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program

DRF-IA 03/20/2013

☐ 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf

☐ 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/info_permits.htm.

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) required before any well construction work begins.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER:
The Commission strongly encourages the proposed implementation of water conservation measures, best management practices to mitigate stormwater runoff, and the reuse of stormwater and other alternative non-potable sources, where practicable. The Commission has published a Water Conservation Manual for State of Hawaii Facilities (2007) that lists conservation measures for restrooms and shower facilities; kitchens, cafeterias, and staff rooms; and landscaping. The Commission has also published a Handbook for Stormwater Reclamation and Reuse Best Management Practices in Hawaii (2008). Please visit the Commission's website at http://hawaii.gov/dlnr/cwrm to view or download a copy of these documents.

The Commission encourages the use of xeriscaping or drught-tolerant plantings. To help you select the type of plants appropriate for the climate in your area, visit the Board of Water Supply's website at http://www.boardofwatersupply.com/cssweb/display.cfm?sid=1360.

For project landscaped areas we recommend following the Landscape Industry Council of Hawaii's irrigation water conservation best practices (http://landscapehawaii.org/_library/images/lich_irrigation_water_position_statement%2020110107.pdf).

A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/products/index.html.

If there are any questions, please contact Lenore Ohye at 587-0216.

WILSON OKAMOTO CORPORATION
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8429-01
July 25, 2014

Mr. Russell Y. Tsuji
Land Adminstrator
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawai'i 96809

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Tsuji:

Thank you for your e-mail transmittal dated May 14, 2014, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following response to your comments.

DOE will work with the Land Division regarding the setting aside of lands designated as TMK: 1-6-003: 047 and 083 for school purposes.

As designs are formulated for each phase of construction, water demands and calculations will be provided to the Engineering Division of DLNR. The use of water conservation measures, best management practices to mitigate stormwater runoff, and the reuse of stormwater and other alternative non-potable sources will also be considered during the design of each phase.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR

FORD N. FUCHIGAMI
INTERIM DIRECTOR

Deputy Directors
RANDY GRUNE
AUDREY HIDANO
ROSS HIGASHI
JADINE URASAKI
IN REPLY REFER TO:
DIR 0607
HWY-PS 2.7309

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

June 3, 2014

RECEIVED
JUN 05 2014
WILSON OKAMOTO CORPORATION

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School Development
Master Plan, Honolulu, Hawaii
TMK: (1) 1-6-021:005 and (1) 1-6-003:047, 048, 082, 083 and 999

Thank you for consulting with us regarding the subject project. We have the following comments:

1. The EA should discuss and evaluate project impacts on our State highway facilities especially Interstate Route H-1, Kalihi Street, Likelike Highway, Nimitz Highway, etc.

2. The EA should include discussion or applicable requirements such as but not limited to:

   a. Preparation of a Traffic Impact Report for our review and approval that addresses/identifies measures to mitigate all project generated traffic as well as community concerns;
   b. Construction vehicle and heavy equipment type that will be used at the job site. A permit is required from the Highways Division to transport oversized/overweight equipment/loads within our State highway facilities;
   c. Construction activity hours and project completion time;
   d. Dust, odor and noise pollution;
   e. Inconvenience to the motoring public, students, bicyclists, pedestrians, etc.;
   f. Security/safety of completed facility;
   g. Submittal of applicable project construction plans including grading and drainage plans for our review and approval.

If you have any questions, please contact Gary Ashikawa, Systems Planning Engineer, Highways Division, Planning Branch, at 587-6336. Please reference file review number 2014-092 in all contacts and correspondence regarding these comments.

Very truly yours,

FORD N. FUCHIGAMI
Interim Director of Transportation

WILSON OKAMOTO CORPORATION

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8429-01
July 25, 2014

Mr. Ford N. Fuchigami
Interim Director of Transportation
Department of Transportation
State of Hawai'i
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Fuchigami:

Thank you for your letter dated June 3, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following responses to your comments.

The EA will review and discuss possible project impacts on nearby State transportation facilities.

A Traffic Impact Analysis Report will be included within the EA document.

Since the master plan is envisioned to be implemented in 9 phases over 15 years, the details as far as construction vehicle and heavy equipment type and construction activity hours are not known at this juncture. Items such as dust, odor, and noise pollution, possible inconvenience to the motoring public, and safety and security of the facilities are important concerns which will be fully addressed as plans proceed past the conceptual design stage. Project construction plans for each phase including grading and drainage plans will be submitted to DOT for review and approval prior to building permit approval.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR

VACANT
DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813
Telephone (808) 586-4185
Facsimile (808) 586-4186
Email: oeqchawaii@doh.hawaii.gov

May 2, 2014

Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawai'i 96826

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School Development Master Plan
Tax Map Keys (TMK) 1-7-021: 005, and 1-6-003: 047, 048, 082, 083, and 999
Honolulu, O'ahu, Hawai'i

Aloha Mr. Arakawa:

The Office of Environmental Control is in receipt of your April 16, 2014 letter, soliciting comments about the subject project. The letter states the proposed development involves the use of State funds and lands, making the project subject to the Hawai'i Environmental Policy Act (HEPA) Chapter 343, Hawai'i Revised Statutes and Chapter 11-200, Hawai'i Administrative Rules. After review of your letter, maps, conceptual plans and various phases, OEQC offers these comments:

1. Please consult with the State Historical Preservation Division for clearance of proposed activities around the historic building on site.
2. The draft EA must include a complete list of the different permits the master plan development will require throughout the various phases.
3. The EA should provide a timeline of the various development phases in the master plan.
4. The EA must discuss all mitigation measures to address development impacts to air quality, noise, traffic circulation, pedestrian safety, visual/aesthetic impacts, water quality, etc.

5. Please review Section 11-200-10 of the Hawai'i Administrative Rules for other content requirements of an EA.
6. Finally, we recommend a review of Act 155 of 2013 (Twenty-first Century School) and incorporate any relevant applicable aspects of the Act to the master plan development.

Thank you very much for the opportunity to provide comments about the proposed development to improve Governor Wallace Rider Farrington High School. Please feel free to contact our office at (808) 586-4185 if you have further questions.

Sincerely,

Herman Tulolosega
Senior Planner

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8429-01
July 25, 2014

Mr. Herman Tuiolosega
Senior Planner
State of Hawai'i
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Tuiolosega:

Thank you for your letter dated May 2, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following response to your comments.

Consultation and coordination with the State Historic Preservation Division has already commenced and will continue throughout the implementation of various phases of the master plan.

The Draft EA intends to include a complete list of different permits the master plan development will require through the various phases of the project. The EA will include information on timing of the various development phases. The EA will discuss all proposed mitigation measures to address impacts resulting from the proposed development.

Your reminder to review Section 11-200-10, HAR, as well as Act 155 of 2013 (Twenty-first Century School) is appreciated.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

May 7, 2014

RECEIVED
MAY 13 2014
WILSON OKAMOTO CORPORATION

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Your Letter Dated April 16, 2014 on the Environmental Assessment Pre-Assessment Consultation for the Governor Wallace Rider Farrington High School Development Master Plan – Tax Map Key: 1-6-021: 005; 1-6-003: 047, 048, 082, 083, 999

Thank you for the opportunity to comment on the Farrington High School Development Master Plan.

The existing water system is adequate to accommodate the proposed improvements. However, please be advised that this information is based upon current data, and therefore, the Board of Water Supply reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Water for Life . . . Ka Wai Ola

WILSON OKAMOTO CORPORATION

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8429-01
July 25, 2014

Mr. Ernest Y.W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai'i 96843

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Lau:

Thank you for your letter dated May 7, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the existing water system is adequate to accommodate the proposed improvements, but that the final decision on the availability of water will be confirmed when the building permit application is submitted for approval. The Department of Education intends to work with the Board of Water Supply regarding conformance with applicable requirements including Water System Facilities Charges, fire protection requirements, cross-connection control and backflow prevention requirements, prior to issuance of building permit applications for each phase.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813 • AREA CODE 808 • PHONE: 768-7762 • FAX: 768-7792

KIRK CALDWELL
MAYOR

PAMELA A. WITTY-OAKLAND
DIRECTOR

GARY K. NAKATA
DEPUTY DIRECTOR

April 29, 2014

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
Artesian Plaza, Suite 400
1907 South Beretania Street
Honolulu, Hawaii 96826

RECEIVED
MAY 05 2014
WILSON OKAMOTO CORPORATION

Dear Mr. Arakawa:

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School
Development Master Plan
Tax Map Keys: 106-021:005, and 1-6-003:047, 048, 082, 083, and 999, Honolulu, Oahu, Hawaii

We have reviewed your letter dated April 16, 2014, and the attached information regarding the subject project.

Our review of the information provided indicates that the proposed Governor Wallace Rider Farrington High School Development Master Plan project will have no adverse impacts on any Department of Community Services' activities or projects at this time.

Thank you for providing us with the opportunity to comment on this matter.

Sincerely,

Pamela A. Witty-Oakland
Director

PAW:sgk

WILSON OKAMOTO CORPORATION

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8429-01
July 25, 2014

Ms. Pamela A. Witty-Oakland, Director
Department of Community Services
City and County of Honolulu
715 South King Street, Suite 311
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Ms. Witty-Oakland:

Thank you for your letter dated April 29, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the proposed project will have no adverse impacts on any of the Department's activities or projects at this time.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

CHRIS T. TAKASHIGE, P.E., CCM
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

May 8, 2014

Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 09 2014
WILSON OKAMOTO CORPORATION

Attn: Milton Arakawa

Dear Mr. Arakawa:

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School Development Master Plan

The Department of Design and Construction does not have comments to offer on the environmental assessment pre-assessment consultation.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

Chris T. Takashige, P.E., CCM
Director

CTT: cf (559179)

WILSON OKAMOTO CORPORATION

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8429-01
July 25, 2014

Mr. Mark K. Yonamine, P.E., Acting Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Yonamine:

Thank you for your letter dated May 8, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the Department has no comments to offer on the environmental assessment pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Ulu'ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROSS S. SASAMURA, P.E.
DIRECTOR AND CHIEF ENGINEER

EDUARDO P. MANGLALLAN
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 14-386

May 15, 2014

RECEIVED
MAY 19 2014

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation Governor Wallace Rider Farrington High School Development Master Plan
Tax Map Keys (TMK) 1-6-021: 005 and 1-6-003: 047, 048, 082, 083 and 999, Honolulu

Thank you for the opportunity to review and to give our input regarding the subject Environmental Assessment (EA) project dated April 16, 2014.

Our comments are as follows:

- Provide necessary BMP's for the project site including catch basin located near the intersection of North King Street and Houghtailing Street on the North King Street side of the subject property.
- All work to be performed within the City's North King Street and Houghtailing Street right-of-ways (includes the unimproved sidewalk area), shall require the proper City permits (Street Usage Permit and Grading/Trenching Permit).
- All work within the City road's right-of-ways shall be to City standards.

If you have any questions, please call Mr. Kyle Oyasato of the Division of Road Maintenance at 768-3697.

Sincerely,

Ross S. Sasamura, P.E.
Director and Chief Engineer

WILSON OKAMOTO CORPORATION

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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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8429-01
July 25, 2014

Mr. Ross S. Sasamura, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
1000 Ulu'ohia Street, Suite 215
Kapolei, Hawai'i 96707

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Sasamura:

Thank you for your letter dated May 15, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following responses to your comments.

We will provide the necessary BMP's for the project site including the catch basin located near the intersection of North King Street and Houghtailing Street on the North King Street side of the property.

We acknowledge that all work to be performed within the City's North King Street and Houghtailing Street right of way (including the unimproved sidewalk area) requires proper City permits (Street Usage Permit and Grading/Trenching Permit).

Plans for all work within the City's right of way will be coordinated with the applicable City agencies to ensure that work will be done to City standards.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHELE K. NEKOTA
DIRECTOR DESIGNATE

JEANNE C. ISHIKAWA
DEPUTY DIRECTOR

April 30, 2014

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 01 2014
WILSON OKAMOTO CORPORATION

Dear Mr. Arakawa:

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School
Development Master Plan
Tax Map Keys: 1-6-021:005 and 1-6-003: 047, 048, 082, 083 and 999

Thank you for the opportunity to review and comment at the Pre-Consultation stage of the Governor Wallace Rider Farrington High School Development Master Plan.

The Department of Parks and Recreation has no comment. As the proposed project will have no impact on any program or facility of the Department, you may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner at 768-3017.

Sincerely,

Michele K. Nekota
Director Designate

MKN:jr
(559337)

WILSON OKAMOTO CORPORATION

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8429-01
July 25, 2014

Ms. Michele K. Nekota, Director Designate
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawai'i 96707

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Mā'ili, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Ms. Nekota:

Thank you for your letter dated April 30, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the proposed project will have no impact on any program or facility of the Department.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR

GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2014/ELOG-704 (hs)

June 3, 2014

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

In response to your letter on April 21, 2014, regarding the Environmental Assessment (EA) Pre-Assessment Consultation on Governor Wallace Rider Farrington High School Development Master Plan, (Tax Map Keys: 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999), we have the following comments:

1. A Sewer Connection Application will be required for review and approval prior to building permit approval.

2. The EA should address any drainage impacts between the pre-development and post development conditions. The proposed improvements to the campus should also comply with the December 2012 revised drainage standards which require the implementation of Low Impact Development concepts for handling storm water discharges.

3. The project description notes a lack of adequate shade trees and landscaping throughout the campus. The EA should, therefore, indicate trees and landscaping to be preserved and those proposed to be added, removed, or replaced.

4. The EA should address how the proposed project conforms to the Primary Urban Center Development Plan.

5. A Construction Traffic Management Plan will be required if there will be significant construction related impacts on the surrounding street system. Every effort should be made to minimize impacts from these construction activities, as they relate to traffic and parking.

6. Walkways within the school should direct pedestrians to cross at street intersections and crosswalks.

7. An assessment of the probable increase in vehicular traffic on Beckley Street should be addressed due to the implementation of the new driveway on Kalihi Street.

8. The makai corners of the site are within the half mile Transit-Oriented Development radius of the Kapalama and Kalihi Stations with significant pedestrian traffic to Farrington High School from the Ewa Side, and there is major redevelopment planned on the Diamond Head side along the Kapalama Canal. Since high school students walk and ride transit a great deal, we suggest improving the walking experience along the site's perimeters especially on King Street, Kalihi Street, and Houghtailing Street. Widening and moving the sidewalks onto the site with street trees at the curb would create a safer and more comfortable pedestrian experience.

9. Strong pedestrian connections from Day Street and Beckley Street would also be appropriate.

10. If the parking along Kalihi Street and at the corner of Kalihi Street and King Street remains, we suggest the pedestrian walkways should be well-connected from sidewalk to street and that landscaping be used to enhance the walking experience between street and parking.

Should you have any questions, please contact Harold Senter of our staff at 768-8055.

Very truly yours,

for George I. Atta, FAICP
Director

GIA:bkg
1144527

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8429-01
July 25, 2014

Mr. George I. Atta, FAICP
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Atta:

Thank you for your letter dated June 3, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following responses to your comments.

We will coordinate with DPP on the submittal of sewer connection applications, as applicable.

Specific drainage calculations will be done as designs are finalized for each phase of construction. The proposed improvements to the campus will comply with applicable provisions of DPP's December 2012 revised drainage standards which require the implementation of Low Impact Development concepts for handling storm water discharges.

The lack of adequate shade trees and landscaping is recognized as a significant issue on the campus. The concepts of creating and enhancing open spaces on the campus as well as separating pedestrian and vehicle traffic are important components of the master plan. Since there are 9 planned phases, each phase should formulate a landscape plan which implements this vision.

The EA will include a discussion as to how the proposed project conforms to the Primary Urban Center Development Plan.

The need for a Construction Traffic Management Plan will be assessed as designs proceed for each phase of construction. We acknowledge that significant construction related impacts on the surrounding street system should be minimized.

The design for walkways within the school directing pedestrians to cross at intersection and crosswalks will be considered as the detailed designs for each phase are developed.

The traffic study will review possible effects of master plan implementation on Beckley Street due to the planned relocation of the Aloha Gate driveway.

Widening and moving sidewalks along North King, Kalihi and Houghtailing Streets to enhance the walking experience will be considered. We acknowledge that the Kapālama and Kalihi rail transit stations are planned in fairly close proximity to the school and that a safer and more comfortable pedestrian experience is desirable.

There is a current crosswalk across Kalihi Street at Beckley Street. Additional pedestrian connections and intersection improvements at Beckley Street as well as Day Street will be coordinated with the Department of Transportation Services and State Department of Transportation.

The parking lot at the corner of Kalihi Street and North King Street is proposed to remain as part of the master plan. As specific designs for the parking lot improvements are done, sidewalk and landscaping improvements to enhance the walking experience will be considered.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

TP4/14-559328R

May 9, 2014

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

SUBJECT: Pre-Consultation for Draft Environmental Assessment (DEA) Governor Wallace Rider Farrington High School Development Master Plan; Tax Map Key (TMK): 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999; Honolulu, Oahu, Hawaii

In response to your letter dated April 16, 2014, we have the following comments:

1. The DEA should include a traffic impact assessment report (TIAR). The TIAR should discuss the traffic impacts on the surrounding City roadways as a result of the project, including the short-term impacts during construction and short- and long-term proposed mitigating measures applying complete streets principles.

2. The area Neighborhood Board, as well as the area residents, businesses, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.

3. A street usage permit from the City's Department of Transportation Services (DTS) should be obtained for any construction-related work that may require the temporary closure of any traffic lane on a City street.

4. The DEA should include a description of Public Transit and the impact of your project on Public Transit bus and paratransit operations during construction. Several City bus transit routes (Routes 1, 7, A, and 10), use the boundary roads of Kalihi Street, North King Street and Houghtailing Street. Several bus stops are located along these boundary segments,

which serve these routes. Basic information is available on our websites: www.thebus.org and www.honolulu.gov/dts. If your project affects bus routes and services, you should contact our staff at 768-8370 to coordinate your planned activities.

5. If appropriate, construction notes should include the following note regarding transit services:

   "This project may affect bus routes, bus stops, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 852-6016 and paratransit operations: 454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction."

6. Any construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.) to minimize any possible disruption to traffic on the local streets.

We reserve further comment pending submission of the DEA.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

Michael D. Formby
Director

cc: Mr. Jonathan Weintraub, DOE, DEU-PS, FDB
Mr. Garret Horimoto, Architects Hawaii, Ltd.

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
Fax: 808.946.2253
www.wilsonokamoto.com

8429-01
July 25, 2014

Mr. Michael D. Formby
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Formby:

Thank you for your letter dated May 9, 2014 regarding the subject Draft EA pre-assessment consultation. We have the following responses to your comments.

A traffic impact assessment report (TIAR) is being done to include as part of the Draft EA. The TIAR will discuss the traffic impacts on the surrounding City roadways as a result of the project, including the short-term impacts during construction and short- and long-term proposed mitigating measures applying complete streets principles.

During the past several months, the project has been discussed with the Kalihi-Palama Neighborhood Board in two separate meetings. As implementation of the construction phases begins, the intent is to provide periodic updates to the Neighborhood Board.

A requirement to obtain a street usage permit for any construction-related work that may require temporary closure of any traffic lane on a City street is acknowledged.

The Draft EA will include a description of Public Transit and the impact of the project on Public Transit bus and paratransit operations during construction.

The inclusion of construction notes regarding effect on transit services (bus routes, bus stops, and paratransit operations) will be included for various phases of construction which may propose closure of any street, traffic lane, sidewalk, or bus stop.

It is acknowledged that construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 am to 3:30 pm) to minimize any possible disruption to traffic on the local streets.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

May 12, 2014

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
Artesian Plaza
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Environmental Assessment Preassessment Consultation
Governor Wallace Rider Farrington High School
Development Master Plan
Tax Map Keys: 1-6-021: 005 and 1-6-003: 047, 048, 082, 083, and 999

In response to your letter of April 16, 2014, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1, Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

   A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1, UFC™, 2006 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet from a water supply on a

fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1, UFC™, 2006 Edition, Section 18.3.1, as amended.)

3. The unobstructed width and unobstructed vertical clearance of a fire apparatus access road shall meet county requirements. (NFPA 1, UFC™, 2006 Edition, Section 18.2.3.4.1.1, as amended.)

4. Submit civil drawings to the HFD for review and approval.

Should you have questions, please contact Acting Battalion Chief Terry Seelig of our Fire Prevention Bureau at 723-7151 or tseelig@honolulu.gov.

Sincerely,

SOCRATES D. BRATAKOS
Assistant Chief

SDB/SY:bh

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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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8429-01
July 25, 2014

Mr. Socrates D. Bratakos
Assistant Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, Hawai'i 96813-5007

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Bratakos:

Thank you for your letter dated May 12, 2014 regarding the subject Draft EA pre-assessment consultation. We offer the following responses to your comments.

Plans for the location of fire department access roads will be coordinated with the Fire Department prior to each phase to ensure compliance with applicable National Fire Protection Association standards. Plans shall be submitted prior to each phase relating to the provision of water supply capable of meeting required fire flow as well as required unobstructed width and vertical clearance of the fire apparatus access road. Applicable civil drawings will be submitted to the Fire Department prior to each phase.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

KIRK CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE EO-WS

May 14, 2014

Mr. Milton Arakawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 15 2014
WILSON OKAMOTO CORPORATION

Dear Mr. Arakawa:

This is in response your letter dated April 16, 2014, requesting comments on an Environmental Assessment, Pre-Assessment Consultation, for the Governor Wallace Rider Farrington High School Development Master Plan project.

The Honolulu Police Department currently has no concerns regarding the project.

If there are any questions, please contact Major Lester Hite of District 5 (Kalihi) at 723-8202 or via e-mail at lhite@honolulu.gov.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By Randal K. Macadangdang
RANDAL K. MACADANGDANG
Assistant Chief
Support Services Bureau

Serving and Protecting With Aloha

WILSON OKAMOTO CORPORATION

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www.wilsonokamoto.com

8429-01
July 25, 2014

Mr. Randal K. Macadangdang, Assistant Chief
Support Services Bureau
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawai'i 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Macadangdang:

Thank you for your letter dated May 14, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that the Department has no concerns regarding the project.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

Hawaiian Telcom

May 28, 2014

JUN 05 2014

Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826
Attention: Mr. Milton Arakawa, Project Manager

Dear Mr. Arakawa:

Subject: **Environmental Assessment (EA) Pre-Assessment Consultation**
Governor Wallace Rider Farrington High School Development Master Plan
Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999
Honolulu, Oahu, Hawaii

Thank you for the opportunity to review and comment on the environmental assessment pre-assessment consultation phase for the subject project.

In response to your letters dated April 16, 2014 that was addressed to Gerald Noda and Winslow I. Tanabe, Hawaiian Telcom does not have any comments to offer at this time.

Please submit future correspondence to:

Jon Uyehara
Senior Manager – OSP Engineering
Network Engineering & Planning
P.O. Box 2200
Mail Code: HIA10
Honolulu, HI 96841

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,

Les Loo
Network Engineer – OSP Engineering
Network Engineering & Planning

cc: File [Kalihi]

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Honolulu, Hawaii, 96826 USA
Phone: 808.946.2277
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8429-01
July 25, 2014

Mr. Les Loo
Network Engineer – OSP Engineering
Network Engineering and Planning
Hawaiian Telcom
P.O. Box 2200
Honolulu, Hawai'i 96841

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Loo:

Thank you for your letter dated May 28, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that Hawaiian Telcom does not have any comments at this time. Future correspondence will be routed to Mr. Jon Uyehara, as you requested.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

MA

RECEIVED
MAY 08 2014
WILSON OKAMOTO CORPORATION

May 6, 2014

Mr. Milton Arakawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Arakawa:

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
Governor Wallace Rider Farrington High School
Development Master Plan
Tax Map Keys (TMK) 1-6-021: 005, and 1-6-003: 047, 048, 082, 083, and 999
Honolulu, O'ahu, Hawai'i

In response to your letter dated April 16, 2014, we do not anticipate any conflicts with the proposed project. Attached is a copy of a Gas Map indicating our current gas facilities.

All information provided by Hawaii Gas, including but not limited to maps, prints, and site indications are approximations only of its facilities and its pipelines. The party receiving such information shall have sole responsibility for field verification to determine the actual locations of such facilities and pipelines.

Thank you for the opportunity to review the Environmental Assessment. Should there be any questions, or if additional information is desired, please feel free to contact Jared Pasalo at 594-5008.

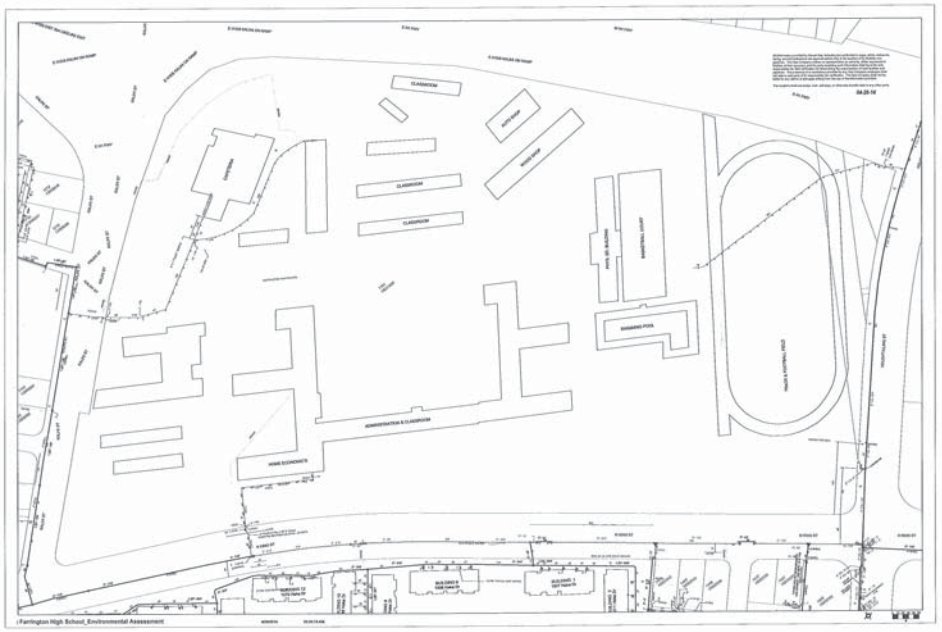
Sincerely,

Hawaii Gas

Keith K. Yamamoto
Manager, Engineering

KKY:krs
14-154

Attachments: Gas Map



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8429-01
July 25, 2014

Mr. Keith Yamamoto
Manager, Engineering
Hawai'i Gas
P.O. Box 3000
Honolulu, Hawai'i 96802-3000

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Yamamoto:

Thank you for your letter dated May 6, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the transmittal of the Gas Map of your current facilities and understand that field verification is necessary to determine the actual locations of such facilities and pipelines.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

From: Liu, Rouen
To: Milton Arakawa
Subject: Pre-Assessment consultation - request for comments on Farrington High School Development Master Plan
Date: Friday, May 16, 2014 5:25:38 PM

Dear Mr. Arakawa
Thank you for the opportunity to comment on the subject project. Hawaiian Electric Company has no objections to the project. Should HECO have existing easements and facilities on the subject property, we will need continued access for maintenance of our facilities.
We appreciate your efforts to keep us apprised of the subject project in the planning process. As the Development Master Plan comes to fruition, please continue to keep us informed. Further along in the design, we will be better able to evaluate the effects on our system facilities.
If you have any questions, please call me at 543-7245.

Sincerely,
Rouen Q. W. Liu
Permits Engineer

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8429-01
July 25, 2014

Mr. Rouen Q.W. Liu, Permits Engineer
Hawaiian Electric Company
P.O. Box 2750
Honolulu, Hawai'i 96840

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Mr. Liu:

Thank you for your transmittal dated May 16, 2014 regarding the subject Draft EA pre-assessment consultation. We appreciate the information that HECO has no objections to the project. Should HECO have existing easements and facilities on the property, it is acknowledged that continued access for maintenance will be needed. As the design process moves forward for each phase, coordination with HECO will be undertaken to ensure that proposed plans meet HECO's applicable requirements.

Your transmittal, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Ltd.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
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

HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES
601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

July 23, 2014

RECEIVED
JUL 28 2014
WILSON OKAMOTO CORPORATION

Mr. Milton Arakawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, HI 96826

LOG NO: 2014.01775,
2014.01893
DOC NO: 1405GC13
Archaeology, Architecture

Dear Mr. Arakawa:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
Pre-Consultation for an Environmental Assessment
Governor Wallace Rider Farrington High School Development Master Plan
Kapālama Ahupua'a, Kona District, Island of O'ahu
TMK: (1) 1-6-003:047, 048, 082, 083, 999, and 1-6-021:005

Thank you for initiating early consultation for developing an Environmental Assessment (EA) for the proposed Governor Wallace Rider Farrington High School Development Master Plan (MP). We received this request on April 25, 2014, we apologize for the delayed review. Your letter indicates Wilson Okamoto Corporation is seeking SHPD comments on the proposed project, which involves the use of State funds. The documents submitted indicate that the MP will provide guidance for the re-development of Farrington High School (FHS) over the next 15 years, including a range of campus improvements which will include significant demolition, construction, and renovation to the existing campus and facilities. The proposed renovations include Buildings A, B (Library), and S (Auditorium), and replacement of all other existing buildings with new classrooms and support facilities. The MP has been conceptually divided into nine (9) construction phases. Subsequent phases will be done as funding becomes available and as existing uses within the construction zone are relocated.

Architecture
Governor Wallace Rider Farrington High School is listed on the National Register of Historic Places. The current nomination of the high school is limited to include only building A. However, all buildings within the Governor Wallace Rider Farrington High School and landscape features (including but not limited to retaining walls, decorative stone walls, and pathways) are eligible for listing on the State and National Register of Historic Places.

Archaeology
SHPD previously determined that Building A (SIHP #50-80-14-9768) was listed on the State Register of Historic Places on June 28, 1993, and that potential exists to encounter subsurface historic properties within the Farrington High School Campus (January 22, 2011; Log No. 2010.3949, Doc. No. 1101RS03). Based on this determination, SHPD requested an archaeological monitoring plan be submitted for review and approval prior to upgrading of the electrical system and other work related to the electrical upgrade project. The archaeological monitoring plan (Stine et al. 2011) was reviewed and accepted by SHPD on December 30, 2011 (Log No. 2011.3310, Doc. No. 1112NN17). Subsequently in 2014, SHPD requested the existing archaeological monitoring plan (Stine et al. 2011) be amended to apply to all ground-disturbing activities specified in Phase I (January 10, 2014; Log No. 2014.00046; Doc. No. 1401AB10).

Determination
Based on the above information, we believe **historic properties will be affected** by the proposed redevelopment plans as outlined within the project description submitted. Therefore, SHPD recommends the following:

1) An intensive level architectural inventory survey be conducted of the proposed project area, and report of findings be submitted to our office for review pursuant to Hawaii Administrative Rule §13-275-5.

Please refer to the Hawai'i Historic Preservation Division's *Guidelines: Architectural Historic Resource Surveys* (available from SHPD on request).

2) On-site archaeological monitoring occur during all ground-disturbing activities associated with construction Phases 2 through 9. Revise the existing archaeological monitoring plan (Stein et al. 2011) to include the entire school campus (TMK: (1) 1-6-003:047, 048, and 082, 083 and 999, 1-6-021:005) and to include all school re-development and/or campus improvements identified in the Master Plan.

Please contact Jessica Puff at Jessica.L.Puff@hawaii.gov for any questions regarding architectural resources. Please contact Susan Lebo at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov if you have any questions regarding archaeological resources or this letter.

Aloha,

Theresa K. Donham
Archaeology Branch Chief

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8429-01
September 8, 2014

Ms. Theresa K. Donham
Archaeology Branch Chief
Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96806

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for the
Governor Wallace Rider Farrington High School
Development Master Plan
Honolulu, O'ahu, Hawai'i
TMK: 1-6-021:005 and 1-6-003:047, 048, 082, 083 and 999

Dear Ms. Donham:

Thank you for your letter dated July 23, 2014 regarding the subject Draft EA pre-assessment consultation. We note that we received your letter after we had already filed the Draft EA with the Office of Environmental Quality Control. We have the following responses to your comments.

With regard to architectural issues, we acknowledge that Governor Wallace Rider Farrington High School (FHS) is listed on the National Register of Historic Places. The current nomination of the high school is limited to only Building "A". However, all buildings within FHS and landscape features (including but not limited to retaining walls, decorative stone walls and pathways) are eligible for listing on the State and National Register of Historic Places.

With regard to archaeological issues which arose as a result of the FHS electrical upgrade project, we note that SHPD determined that Building "A" (SIHP #50-80-14-9768) was listed on the State Register of Historic Places on June 28, 1993, and that potential exists to encounter subsurface historic properties within the FHS campus (January 22, 2011; Log No. 2010.3949, Doc. No. 1101RS03). Based on this determination, SHPD requested an archaeological monitoring plan be submitted for review and approval prior to upgrading of the electrical system and other work related to the electrical upgrade project. The archaeological monitoring plan (Stine et al. 2011) was reviewed and accepted by SHPD on December 30, 2011 (Log No. 2011.3310, Doc. No. 1112NN17). Subsequently, in 2014, SHPD requested that the existing archaeological monitoring plan (Stine et al. 2011) be amended to apply to all ground disturbing activities specified in Phase 1 (January 10, 2014; Log No. 2014.00046; Doc. No. 1401AB10). This pertains to improvements to the FHS track and field and tennis courts and is part of the subject EA.

We understand the concerns raised by SHPD and intend to work closely with SHPD throughout the nine phase 15 year project. FHS is a fully developed site within an existing urban neighborhood and the school needs to be fully operable during the period of construction. Thus, nine phases of construction are proposed in order to minimize disruption to existing school instruction and activities. At the same time, the intent would be to accelerate design and construction in order to complete implementation of the master plan so that all of the upgrades to the campus can be completed in a relatively timely manner.

In order to initiate Phase 1 in a timely manner, the Historic Architect intends to provide an intensive level Architectural Inventory Survey of the campus prior to Phase 2 development that will cover all subsequent phases. There are no buildings affected for the Phase 1 construction work.

We are recommending to the Architect to have the existing archaeological monitoring plan for FHS (Stein et al. 2011) revised to include all ground-disturbing activities in Phase I (January 10, 2014; Log No. 2014.00046; Doc. No. 1401AB10). We concur that archaeological monitoring should occur during all ground-disturbing activities associated with construction during Phases 1 through 9. Prior to initiation of Phase 2, the Historic Architect will work with SHPD in further revising the monitoring plan to include Phases 2 through 9.

Your letter, along with this response, will be reproduced and included in the forthcoming Final EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Milton Arakawa, AICP
Project Manager

cc: Mr. Jonathan Weintraub, Department of Education
Mr. Garret Horimoto, Architects Hawai'i, Limited

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