NEIL ABERCROMBIE
GOVERNOR

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SUPERINTENDENT

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
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OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

FILE COPY

FEB 08 2014

January 28, 2014

TO: Mr. Herman Tuiolosega, Acting Director
Office of Environmental Quality Control
Department of Health

FROM: Duane Y. Kashiwai, Public Works Administrator
Facilities Development Branch
Department of Education

SUBJECT: Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the Kapolei II Elementary School, New School Kapolei, Oahu, Hawaii TMK: (1) 9-1-160:024 and (1) 9-1-158:062

The State of Hawai'i, Department of Education (DOE) hereby transmits the draft environmental assessment and anticipated Finding of No Significant Impact (DEA-AFONSI) for the Kapolei II Elementary School, New School situated at Tax Map Key (1) 9-1-160;024 and (1) 9-1-158:062, in the City of Kapolei for publication in the February 8, 2014 issue of *The Environmental Notice*.

We have enclosed a completed OEQC publication form, two printed copies of the DEA-AFONSI, and a CD containing a PDF file of the DEA and the publication form in MS Word. The OEQC publication form and project summary will also be e-mailed to your office.

If you have any questions, please call Gaylyn Nakatsuka of the Facilities Development Branch at (808) 377-8315.

DYK:GN:jmb

Enclosures

Revision

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

Project Name: **Kapolei II Elementary School**
Island: **O'ahu**
District: **'Ewa**
TMK: **(1) 9-1-160:24 and (1) 9-1-158:62**
Permits: **Construction and building permits; Kapolei Urban Design Approval, NPDES**
Proposing/Determination Agency: **Hawai'i State Department of Education; Gaylyn Nakatsuka, Planning Section, Facilities Development Branch, Office of School Facilities & Support Services, 4680 Kalanianaole Highway, TB1A, Honolulu, HI 96821, 808-377-8315**
(*Address, Contact Person, Telephone*)
Accepting Authority:
(for EIS submittals only)
Consultant: **Joanne Hiramatsu, Belt Collins Hawaii LLC, 2153 N. King Street, Suite 200, Honolulu, HI 96819, 808-521-5361**
(*Address, Contact Person, Telephone*)
Status (check one only):

_x_DEA-AFNSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.
__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.
__FEA-EISPN	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 PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
__FEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 Determination

The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

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

The State Department of Education proposes construction of a new elementary school on Kunehi Street in Kapolei in response to population growth in the Kapolei area and high enrollments at existing schools. Kapolei II Elementary is being designed as a Twenty-First Century Learning Environment for children in PK through Grade 5. It will be designed to serve up to 750 students.

The school would include more than100,000 square feet of enclosed space, along with a data center. More than 122,000 square feet of outdoor physical education space would also be provided. The project will be designed to meet LEED Silver standards or better. Space has been identified for potential expansion – for portable classrooms and a two-story classroom building – if in time it is necessary to expand enrollment.

The site has long been disturbed and has been filled and graded. Infrastructure has been developed for the Mehana subdivision, anticipating the construction of the school. No historical or cultural resources are on the site; no impacts on such resources are expected.

The main socio-economic impact and impact on public facilities would be the provision of a new school, serving students and increasing school capacity in the region. No significant impact on traffic is expected.

DRAFT ENVIRONMENTAL ASSESSMENT

Kapolei II Elementary School
Kapolei, ‘Ewa District, O‘ahu, Hawai‘i

Graphic provided by KYA Design

January 2014

Prepared for:
Hawai‘i State Department of Education

Belt Collins Hawaii LLC
2153 N. King Street, Suite 200
Honolulu, HI 96819

Project Profile

Proposed Action:	Kapolei II Elementary School Department of Education (DOE) Job No. Q82001-10
Street Address:	511 Kunehi Street Kapolei, Hawaiʻi 96707
Proposing Agency:	Department of Education Facilities Development Branch, Planning Section State of Hawaiʻi 1151 Punchbowl Street Honolulu, Hawaiʻi 96813
Accepting Agency:	Department of Education Facilities Development Branch, Planning Section State of Hawaiʻi 1151 Punchbowl Street Honolulu, Hawaiʻi 96813
Tax Map Key: Land Area: Landowner:	(1) 9-1-160:24 and (1) 9-1-158:62 (1) 9-1-160:24: 12.349 acres; (1) 9-1-158:62: 5,000 square feet (0.115 acres) D. R. Horton – Schuler Homes LLC
Existing Use: State Land Use District : Zoning: Development Plan (DP) Area: DP Urban Land Use Map: Special Management Area: Flood Insurance Rate Map (FIRM): Requirement for Environmental Assessment:	Vacant Urban A-1 Apartment and R-5 Residential ʻEwa Low and Medium Density Residential Not within Special Management Area Zone D; areas in which flood hazards are undetermined, but possible. Chapter 343, HRS, § 343-5(1); proposed use of State or County lands or use of State or County funds
Determination:	Anticipated Finding of No Significant Impact (FONSI)

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Acronyms and Abbreviations

BMP	Best Management Practices
BPNAS	Barbers Point Naval Air Station
BWS	Board of Water Supply (City and County of Honolulu)
cfs	Cubic feet per second
City	City and County of Honolulu
CUP	Conditional Use Permit
CZM	Coastal Zone Management
DLNR	Department of Land and Natural Resources (State of Hawaiʻi)
DOE	Department of Education (State of Hawaiʻi)
DOH	Department of Health (State of Hawaiʻi)
DP	Development Plan
DPP	Department of Planning and Permitting (City and County of Honolulu)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Factory Mutual
FONSI	Finding of No Significant Impact
gpm	gallons per minute
HAR	Hawaiʻi Administrative Rules
HDPE	High Density Polyethylene
HECO	Hawaiian Electric Company
HPOWER	Honolulu Program of Waste Energy Recovery
HRS	Hawaiʻi Revised Statutes
JCIP	James Campbell Industrial Park
kV	Kilovolts
Ldn	Day-night Average Sound Level
LEED	Leadership in Energy and Environmental Design
LOS	Level of Service
MG	million gallons

MGD	million gallons per day
mg/L	milligrams per liter
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control
OR&L	Oahu Railway and Land Company
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
R-1	Effluent treated to a level found acceptable for irrigation use in landscaping and some agricultural activities (subject to Dept. of Health regulation)
ROH	Revised Ordinances of Honolulu
SHPD	State Historic Preservation Division
SMA	Special Management Area
State	State of Hawaii
TIAR	Traffic Impact Assessment Report
TMK	Tax Map Key
TMP	Traffic Management Plan
U.S.	United States
WWTP	Waste water treatment plant

1 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

1.1 INTRODUCTION

The Department of Education (DOE), State of Hawaiʻi (State), is proposing to build a second elementary school in Kapolei (see Figures 1 through 6). The existing school in the Villages of Kapolei is located on Kamaʻaha Loop, approximately half a mile east of Fort Barrette Road. The existing school opened in 1993, and has operated with enrollments at or above its design guidelines for many years. It was planned to serve the Villages of Kapolei, while Kapolei II Elementary School would primarily serve residents of the City of Kapolei. The new school would be designed to serve up to 750 students in a Twenty-First Century Learning Environment with spaces for students in grades in Pre-K through 5. Facilities would include classrooms, a cafeteria, administrative space, class gardens, play areas, and a data center. Parking and space for bus loading will be provided. Space has been identified for additional classrooms if needed to serve a larger student population. The school site lies within the City of Kapolei. That area was recognized as a Secondary Urban Center by the City and County of Honolulu (City) in the 1977 *General Plan*, and designated as Urban by the State Land Use Commission in 1988. The Estate of James Campbell refined plans for the City of Kapolei, and submitted a request to the City for changes in the ʻEwa Development Plan Land Use Map in 1988. An Environmental Impact Statement (EIS) was finalized at that time.[1] The proposed changes were incorporated in subsequent versions of the ʻEwa Development Plan, including the latest, passed as Ordinance 13-26 in July 2013.

The EIS for the Kapolei Town Center (i.e., the City of Kapolei) included studies of demography, economics, biological resources, air quality and archaeology of an 879-acre area, along with the results of workshops on community facilities needs for the Secondary Urban Center. Traffic and noise impact studies were also conducted. This Environmental Assessment (EA) deals with an area of approximately 12.5 acres within the City of Kapolei. It updates information in the 1988 EIS by detailing the history of development in the area, incorporating findings of subsequent studies for nearby facilities, and including results of a new traffic study.

The school site occupies Tax Map Key (TMK) (1) 9-1-160:24. It is bounded by Fort Barrette Road (Barbers Point Access Road) to the east and Kunehi Street to the west. On the north side is an undeveloped commercial parcel, while a series of residential parcels on Luakālai

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[1] Helber, Hastert & Kimura, Planners. *Kapolei Town Center: Final Environmental Impact Statement.* Prepared for the Estate of James Campbell. Honolulu, HI: 1988.

Street in the Lā Hiki section of Mehana is to the south. A small parcel, (1) 9-1-158-62, provides an additional access by way of Luakālai Street.

1.2 PROJECT PURPOSE AND NEED

Kapolei has experienced increases in population and housing since the early 1990s. Since the year 2000, new housing has been built west of Fort Barrette Road in the area designated the City of Kapolei (as opposed to the Villages of Kapolei and other subdivisions to the east). The City anticipates considerable population growth, both regionally and in the City of Kapolei:[2]

Table 1: Population Growth

	2005 (est.)	2010 (est.)	2035 (est.)	Increase 2010 to 2035
‘Ewa Development Plan Area	82,595	94,504	164,556	70,052
Villages of Kapolei subarea	12,071	14,012	14,471	459
City of Kapolei subarea	242	756	8,577	7,821

Figure 1 shows the location of the project and the City of Kapolei in relation to the island and nearby areas. Figure 2 shows the project in relation to some of the nearby public facilities. Figure 3 shows the outlines of the TMKs of the project, while Figure 4 provides a preliminary site plan of the school facilities.

The purpose of the project is to provide school facilities needed by the growing population of the City of Kapolei and its surroundings. The population increase anticipated in the City of Kapolei and nearby subdivisions will generate demand for schools sufficient to fill another elementary school in the next few years.

[2] Department of Planning and Permitting, City and County of Honolulu, revised projections for Development Plan areas and subareas, issued 2009. Posted at http://www.honoluludpp.org/Portals/0/pdfs/planning/demographics2/Projections/2000-2035byDPSA.pdf.

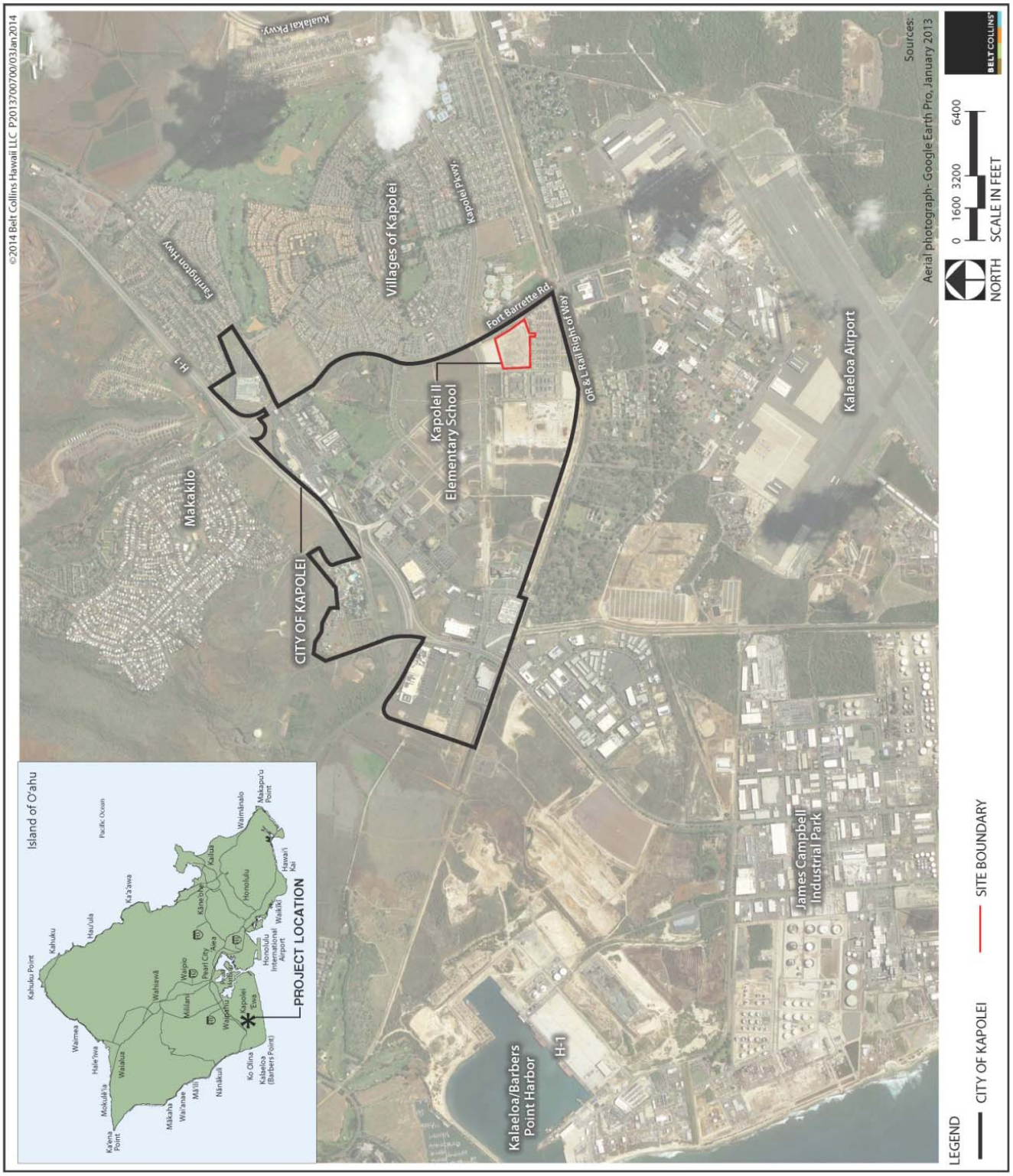

Figure 1: Location Map

Figure 2: Project Site and Nearby Public Facilities

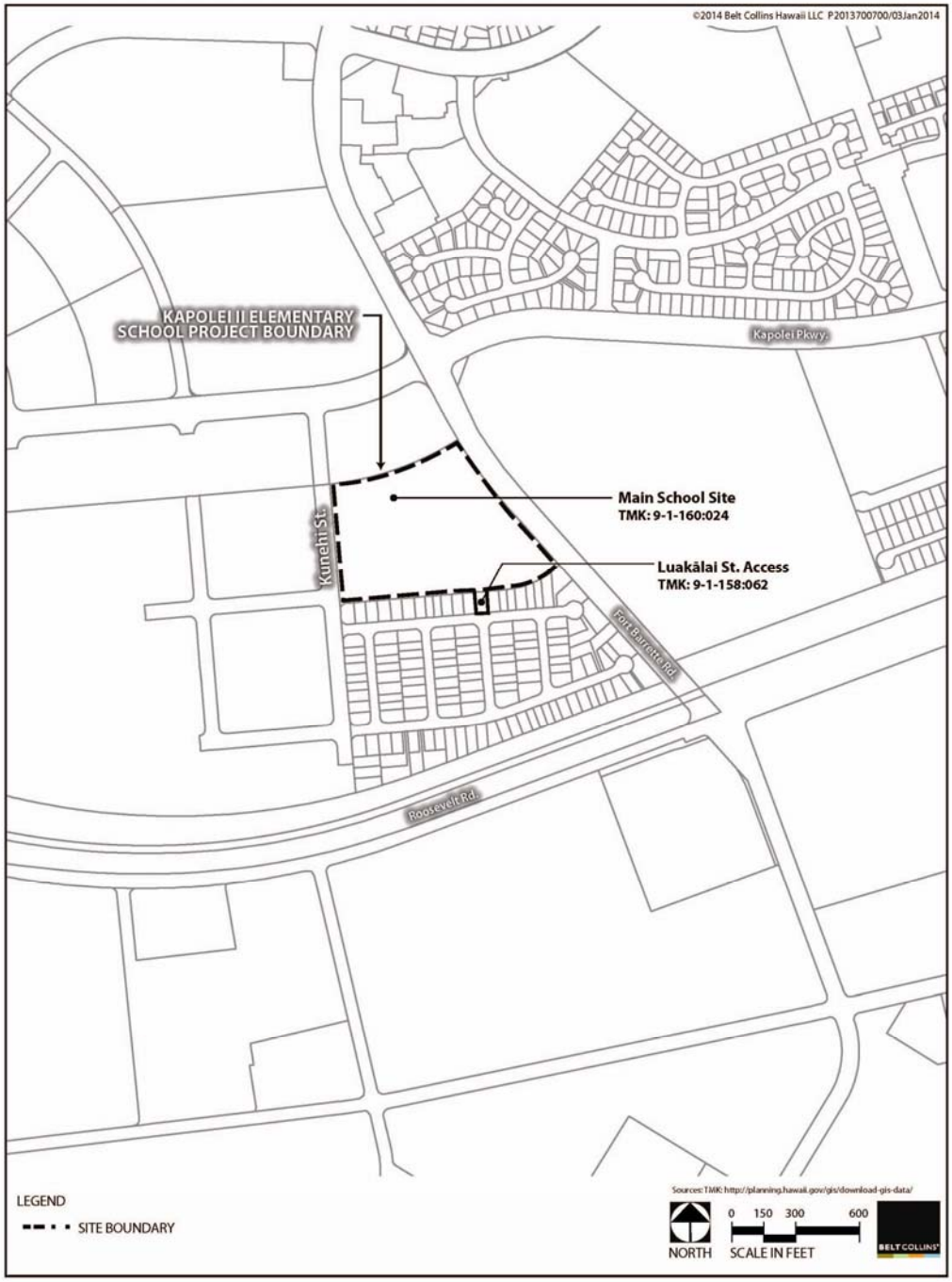

Figure 3: TMK Map

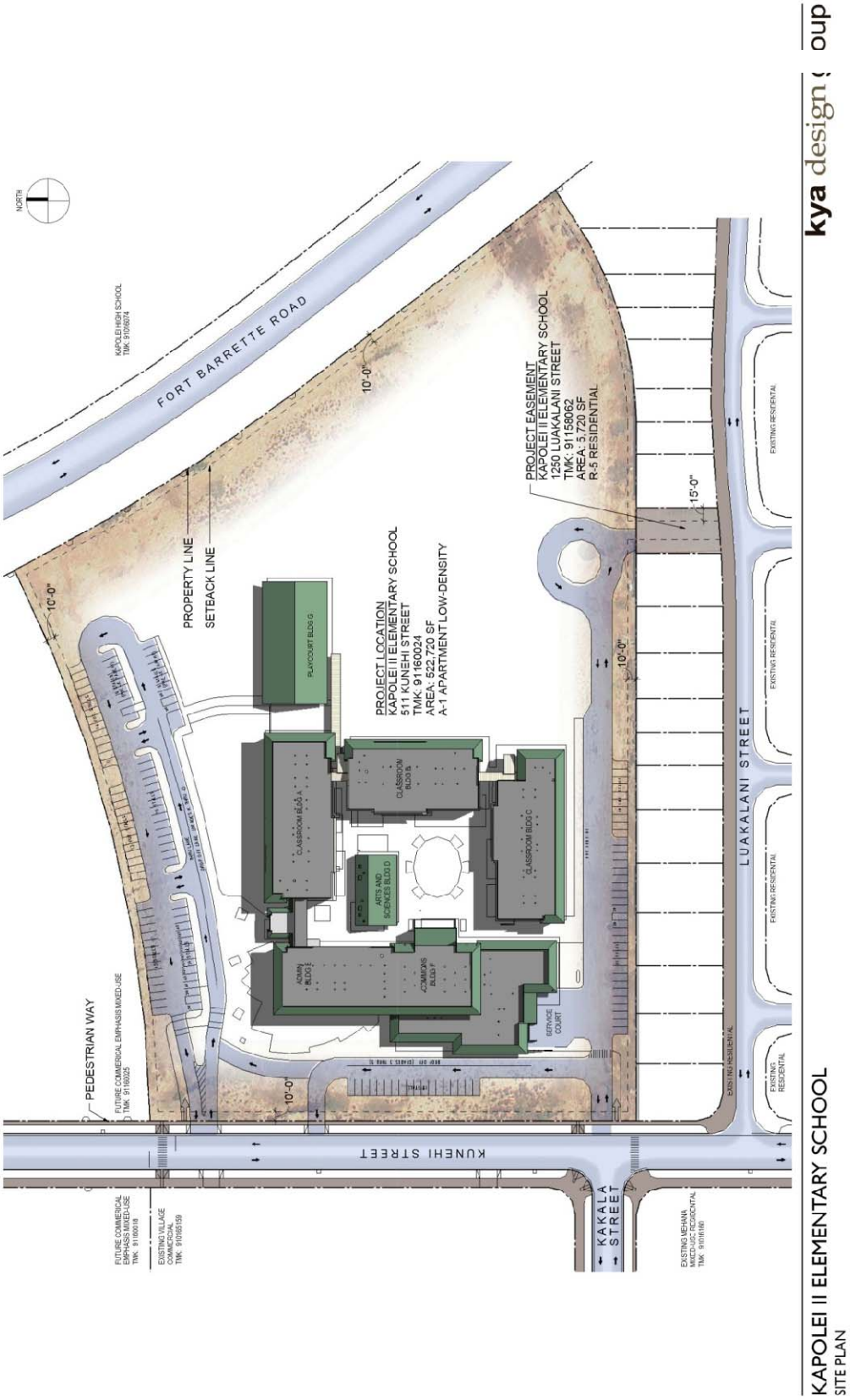

Figure 4: **Preliminary Site Plan**

1.3 PROJECT DESCRIPTION

1.3.1 Site Plan and Buildings

The school would include more than 100,000 square feet of enclosed space, along with a data center. In the future, four portable classrooms, and a possible two story classroom building could be added if needed. More than 122,000 square feet of outdoor physical education space will also be provided. Figures 4 through 6 show the proposed school layout and appearance.

The project will be designed to achieve a Leadership in Energy and Environmental Design (LEED) Silver rating equivalent under LEED 2009 for Schools. Design considerations to promote sustainability include minimizing energy consumption, incorporating renewable energy sources, providing daylighting, reducing water usage, managing indoor air quality, minimizing site disturbance, and using materials with low volatile organic compounds.

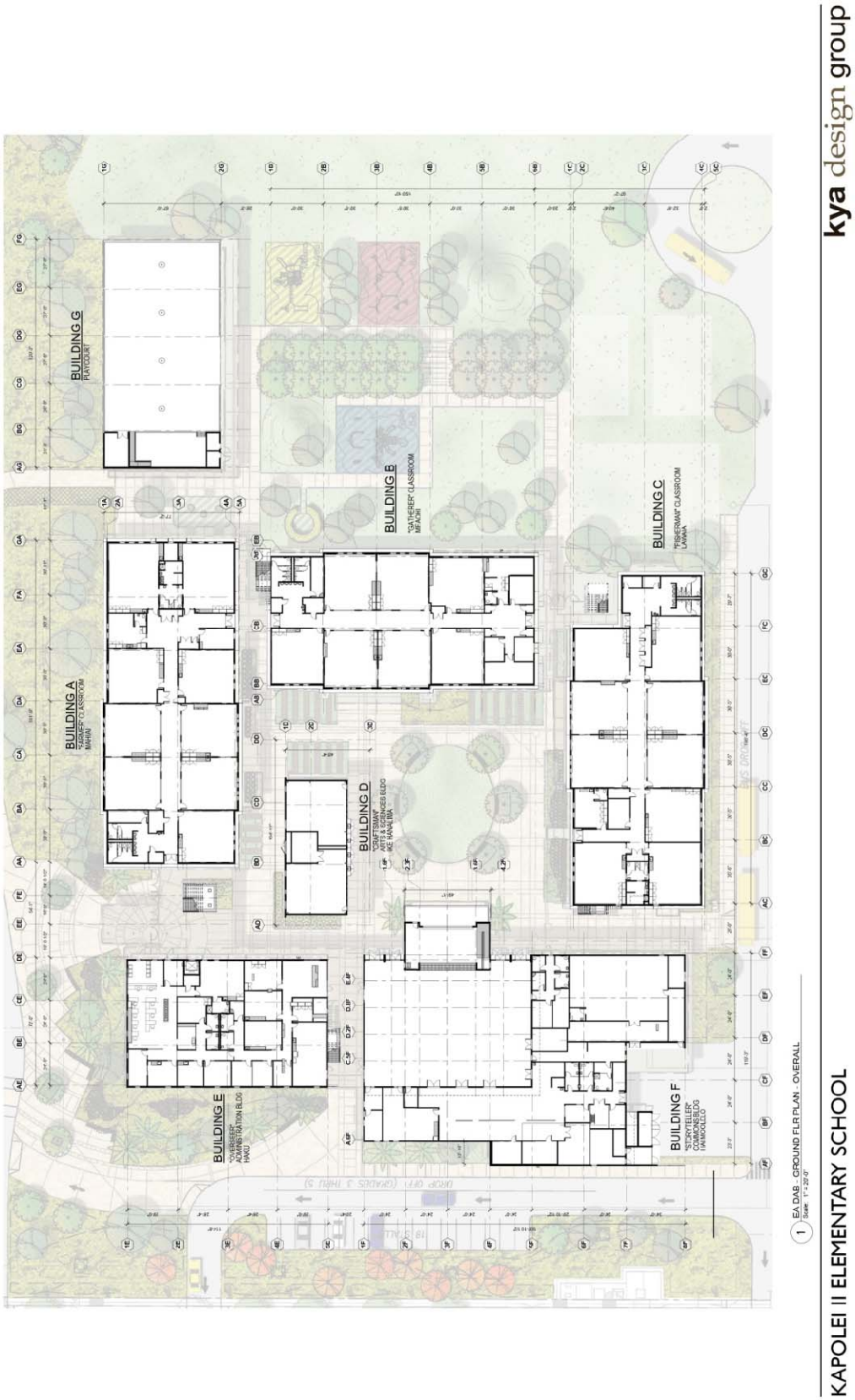

Figure 5: **Preliminary Ground Floor Plan**

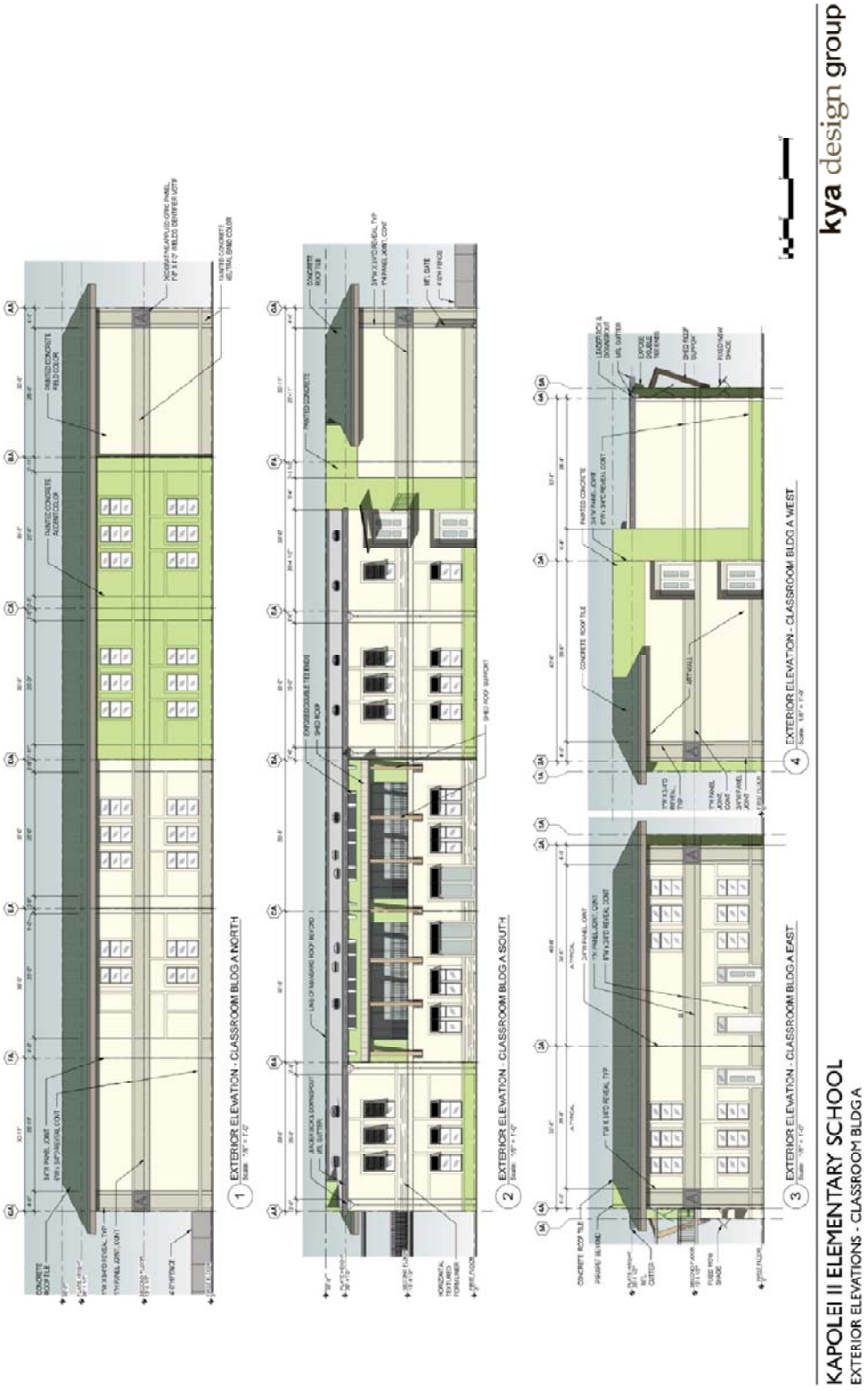

Figure 6: Preliminary Exterior Elevation, Building A

1.3.2 Roadways, Circulation and Parking

The project site is served by roadways which have been constructed to City and State roadway standards. The site is bordered on the west by a 75' wide collector roadway, Kunehi Street (City roadway), which provides access to the site and serves the Mehana residences to the south. The site is also bordered on the east by Fort Barrette Road (State roadway), a major north-south corridor between the H-1 Freeway and Kalaeloa.

Entrances on Kunehi Street will provide access to parking and drop-off areas. An additional access from Luakālai Street will be reserved for emergency use. The preliminary site plan includes 142 parking spaces, including at least five spaces for disabled persons. Space for bus loading will also be provided.

1.3.3 Infrastructure

Both potable and non-potable water will be supplied via existing distribution lines in Kunehi Street. The existing potable water line is adequate to supply the school's needs and provide the required fire flow and water pressure. Currently, the irrigation distribution system in the vicinity is not providing effluent treated to a level found acceptable for irrigation use in landscaping and some agricultural activities (R-1) water.

Sewage will be discharged through an existing main in Kunehi Street. The sewer system feeds to the Honouliuli waste water treatment plant, where treated and reclaimed non-potable water is produced. Solid waste will be transported to the Honolulu Program of Waste Energy Recovery (HPOWER) Waste to Energy plant and to the City's municipal solid waste landfill at Waimanalo Gulch.

Gas service is not currently piped to the vicinity of the school, so a propane gas tank will be located on site to support the cooking equipment and water heater for the kitchen.

Electrical power to the school will be provided by Hawaiian Electric Company (HECO). Hawaiian Telcom is the service provider for telephone and Internet service to the school. Oceanic Time Warner Cable will provide cable TV service to the school.

1.3.4 Demolition and Staging

Existing pavement, curbing, vegetation and utilities within the construction site will be demolished and removed as necessary.

The project will use a staging/storage area on site during construction. Construction waste will be disposed of off-site, in conformity with City and State regulations. A dust fence will be erected around the school site from the beginning of clearance and construction.

1.3.5 Project Cost and Schedule

The order of magnitude cost for construction of the proposed project is $38.288 million. The cost includes a design-build process, along with permits and fees.

Construction of the new school facilities is expected to begin before the summer of 2014 and be substantially completed by mid-2015.

1.4 ALTERNATIVES TO THE PROPOSED ACTION

During the design of the proposed school, alternative building heights and footprints were considered. None would involve a significant difference in the relationship of the school to its surroundings or to the functioning of the school. The No Action Alternative, i.e., the future baseline against which impacts of the project can be measured, would leave the project site undeveloped. The students who are proposed to attend Kapolei II Elementary School would be distributed among the other schools of the region. Most of these are at or over capacity. The school with the lowest enrollment locally, Barbers Point Elementary, is not easily reached from most of the Kapolei-Makakilo area. It is also an older facility, not yet enhanced for Twenty-first Century Learning performance.

The No Action Alternative would compel the DOE to rely on modular structures and outdated buildings to accommodate the needs of the children of the Kapolei region. It would reduce the provision of effective learning environments needed by those children.

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2 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

2.1 LAND USE

2.1.1 Existing Conditions

2.1.1.1 Region

The project is located on the ʻEwa Plain, in the southwest region of Oʻahu, within the Honouliuli ahupuaʻa. The ʻEwa Plain was not densely inhabited in the pre-contact era. In the later 19th century, the Plain was used for sugar cane cultivation and the ground was disturbed, excavated, and filled with transported soils.

Next to the project site, Fort Barrette Road was a major access to Barbers Point Naval Air Station (BPNAS). It remains a major roadway, linking ʻEwa Beach and the Kalaeloa Redevelopment area (the former Naval Air Station) with Kapolei and the H-1 Freeway. Kapolei Parkway, north of the project site, also is a major east-west corridor for the ʻEwa Plain, extending from Ocean Pointe through the Villages and City of Kapolei to Kalaeloa Boulevard.

Puʻu o Kapolei, a volcanic cone about a half mile north of the project site, was once the site of a heiau. A coastal gun emplacement, Fort Barrette, was built on the hill during the 1930s. Parts of the fort remain within Kapolei Regional Park.

BPNAS was built during World War II, expanding the Marine Corps' ʻEwa Air Station. BPNAS closed in 1999. The former air station, now known as Kalaeloa, is a redevelopment area administered by the Hawaiʻi Community Development Authority. The air field is operated by the Hawaiʻi State Department of Transportation as a general aviation airport. It continues to be used by the Coast Guard. A public school, Barbers Point Elementary, housing and other facilities remain in use.

In the last decade, residential development has begun in the blocks to the south and west of the project site. Single family homes have been built on Luakālai Street, with lots abutting the project site. The lot north of the project site is reserved for eventual commercial development. Further to the north and west are office and commercial buildings, including State and City offices. Figure 7 shows the project site within the *City of Kapolei Urban Design Plan.*

SOURCE: Group 70 International. *City of Kapolei Urban Design Plan.*

Figure 7: City of Kapolei Urban Design Conceptual Plan

2.1.1.2 Project Site

The project site has been designated for eventual development of an elementary school for years.[3] The site is being acquired by the State from the developer for this use. It is currently vacant, except for underground utilities serving the surrounding neighborhood.

The State Land Use designation of the project site is Urban. The project site is zoned A-1, except for the access lot from Luakālai Street, which is zoned R-5 (see Figures 8 and 9). As a public use, the school is a permitted use in these zoning districts.

2.1.2 Impacts and Mitigation Measures

Neither the proposed action nor the no action alternation would result in any land use changes affecting the surrounding area. No mitigation is required.

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[3] The site has been identified for the Kapolei II Elementary School since the acquisition, by D.R. Horton – Schuler Division, of the Mehana area for residential development. Infrastructure for Mehana was planned and constructed with the school use in mind.

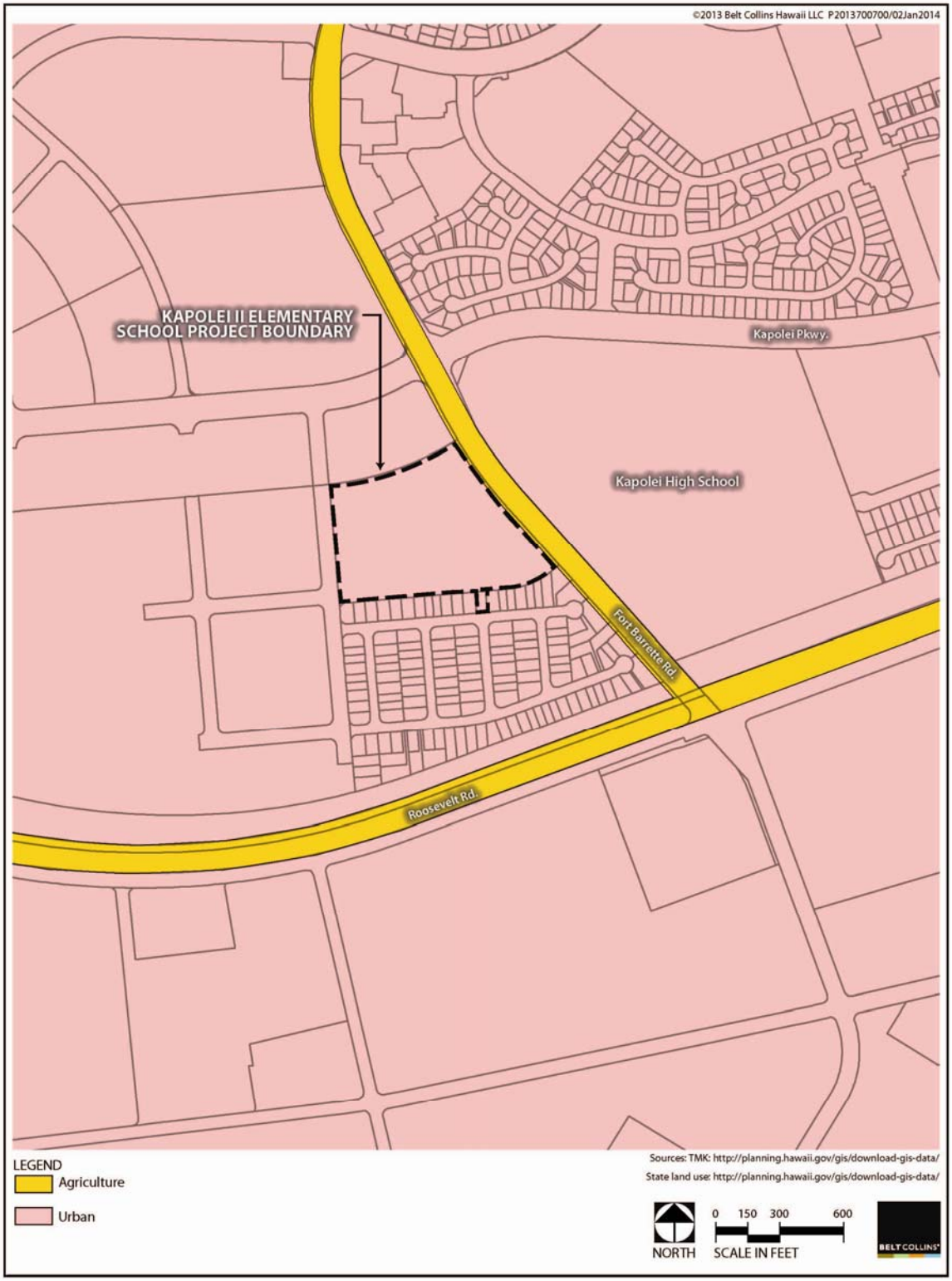

Figure 8: State Land Use Map

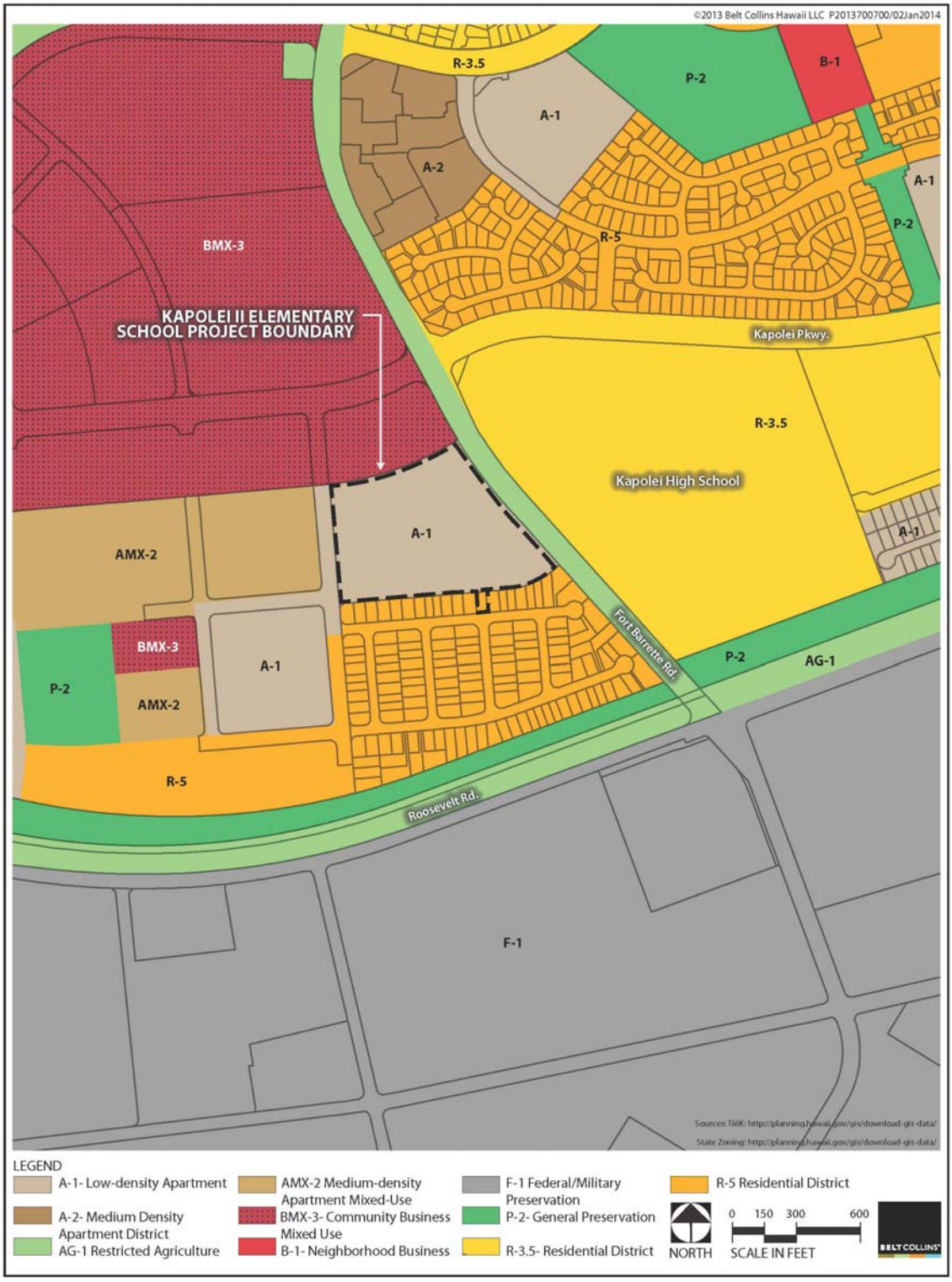

Figure 9: Zoning Map

2.2 PHYSIOGRAPHY

2.2.1 Existing Conditions

2.2.1.1 Topography

The existing school is situated to the west of Fort Barrette Road, approximately 1.9 miles north of Nimitz Beach and the Barbers Point Coast Guard station on the south coast line and 3.2 miles east of Ko'Olina and Barbers Point/Kalaeloa Commercial Harbor.

The topography of the existing site is relatively flat, with slopes less than 1%. Elevations at the site and in the immediate vicinity range from approximately 50 to 60 feet above mean sea level (msl).

2.2.1.2 Soils

According to the United States (U.S.) Department of Agriculture, National Resources Conservation Services Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx), the native soil on the project site was mainly HxA, Honouliuli clay, 0 to 2 percent slopes (as shown in Figure 10). The erosion hazard for HxA is described as slight and runoff potential is considered high.

The southeast corner of the site was identified as part of a quarry extending to the south. However, the land has been filled and is now flat. Other soils in the project area include coral rock and 'Ewa silty clay. Coraline soils have been imported to the site as fill during the plantation era and in subsequent years.

The project site has been mass graded as part of the Mehana at Kapolei development. Approximately one-half of the site drains to the east and the remainder of the site drains to the west (in conformance with the drainage master plans). Most of the site has been filled with imported coralline soils at depths between 4 to 12 feet. No undisturbed surface soils remain.

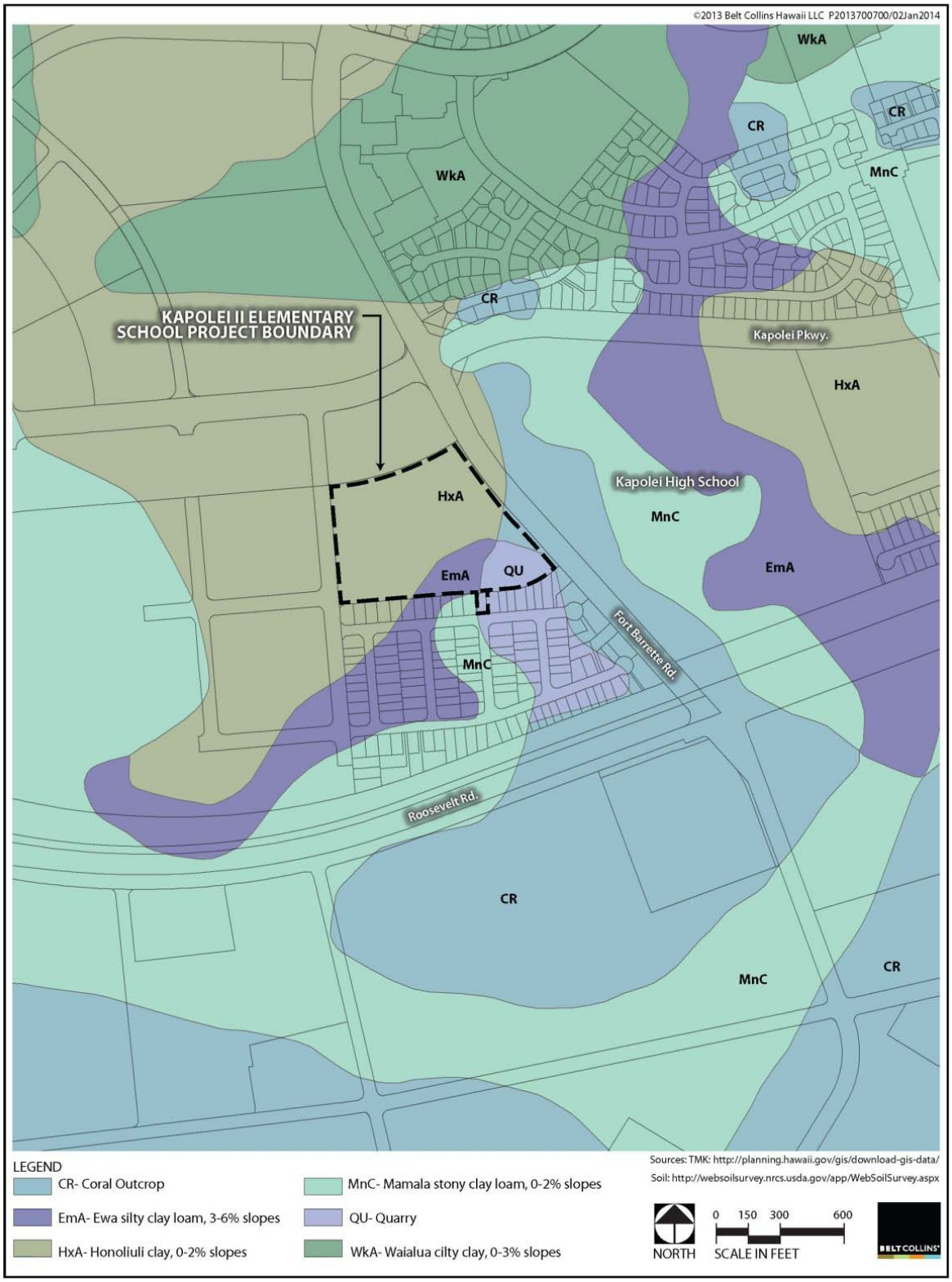

Figure 10: Soils

2.2.1.3 Groundwater and Surface Water

Based on the *Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii*, the project area is located in the 'Ewa Aquifer System of the Pearl Harbor Aquifer Sector.[4] Two aquifer types exist within the Ewa aquifer system. The first contains groundwater that is basal and unconfined and found in sedimentary-type geology. Water from this aquifer is not used for drinking or ecological purposes, has a moderate salinity of 1,000 to 5,000 milligrams per liter (mg/L) of chloride, is replaceable, and has a high vulnerability to contamination. The second aquifer type contains groundwater that is basal and confined and found in flank-type geology. It is not used for drinking or ecological purposes, has a low salinity of 250 to 1,000 mg/L of chloride, is irreplaceable, and has a low vulnerability to contamination.

The Underground Injection Control line runs south of the project, approximately along Roosevelt Road. The school site is in the mauka area, where injection wells are prohibited in order to protect sources of drinking water.[5]

There are no streams, ponds or wetlands on the project site or in the immediate vicinity.

In 1969, runoff from the Kapolei area resulted in extensive flood damage at BPNAS. Flooding has recurred in the Kalaeloa Redevelopment Area.

The project site is included in the *Drainage Master Plan for Mehana at Kapolei*, prepared by Bills Engineering, Inc. which is included in the scope of the overall *Drainage Master Plan for the City of Kapolei*, prepared by Engineering Concepts, Inc. Storm water runoff from the project site in its fully developed condition has been accounted for in the design and construction of the downstream drainage infrastructure.

Recent percolation tests indicate that the onsite soils will percolate at a rate of at least 7.6 minutes per inch (more than 7 inches per hour). Offsite drainage does not run on and enter the site from the parcels to the north or from the south of the project.

Two of the major mauka-makai drainage corridors, which are designed to accommodate the City of Kapolei as well as upstream tributary areas and the Mehana development, border the school site. Within Kunehi Street, a 42" diameter drainage trunk line runs southward past the site and two 24" diameter drain pipe stub-outs were provided for the school's use. According to the drainage master plan, this drainage trunk line has an approximate tributary area of 23 acres and is designed for a total peak flow of 88 cubic feet per second (cfs). Adjacent to Fort Barrette Road, a 54" and 60" diameter drainage trunk line runs

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4 Mink, J. and L.S. Lau, *Aquifer Identification and Classification for Oahu.* Water Resources Research Center Technical Report No. 179. Honolulu, HI: 1990. Posted at http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/1961/wrrctr179.pdf?sequence=3

5 The Safe Drinking Water Branch of the Department of Health is responsible under Hawaii Administrative Rules Title 11, Chapter 23. See their website for mapping of the line (http://health.hawaii.gov/sdwb/uicprogram/).

southward within the boundary of the school site (via 20' wide easement) and three grated drain inlets along this trunk line collect runoff from the eastern half of the site. That drainage trunk line has an approximate tributary area of 50 acres and is designed for a total peak flow of 324 cfs. Both drainage trunk lines discharge into the regional City of Kapolei Makai Drainage Channel, which runs along the north boundary of the Oahu Railway and Land Company (OR&L) railroad right of way, and connects to the existing James Campbell Industrial Park (JCIP) Drainage Channel. The JCIP Channel is a trapezoidal channel, at least 30 feet wide (70 feet wide near the mouth to the ocean) and has depths of up to 15 feet. The JCIP Channel receives all storm drainage from the City of Kapolei.

According to the drainage master plan, the (fully developed condition) estimated 10-year storm peak flows generated within the school site are 18 cfs, contributing to the Kunehi Street drain line, and 22 cfs, contributing to the Fort Barrette Road line.

2.2.1.4 Climate

Recorded temperatures at the National Oceanic and Atmospheric Administration (NOAA) Cooperative Station 'Ewa Plantation 741, about 2.7 miles east of the school site, range from an average annual maximum of 84.3° (F) to an average annual minimum of 65.7° (F). The maximum daily extreme temperature recorded is 93° (F), while the minimum daily recorded temperature is 49° (F).[6]

The 'Ewa Plain is one of the drier areas of Oahu. The average annual rainfall at the project site is approximately 18 inches.[7]

2.2.2 Impacts and Mitigation Measures

The project is not expected to impact soils or groundwater. There will be a slight alteration to topography. Installation of landscaping and drainage systems will control runoff onsite. No mitigation is required.

Under the no action alternative, there would be no impacts relating to physiography.

2.3 FLORA

2.3.1 Existing Conditions

A biological survey was conducted of the entire City of Kapolei project area in 1986. It identified no rare, threatened or endangered plant species. The biologists were aware of

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6 Western Regional Climate Center, http://www.wrcc.dri.edu/summary/Climsmhi.html, Cooperative Climatological Data Summaries, NOAA Cooperative Stations, website accessed November 20, 2012.

7 The nearest stations used to generate 30-year mean rainfall were a Barbers Point station (16.6 inches per year) to the south and Oahu Sugar field 43 (19.1 inches). Both stations are now inoperative. Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

two endangered species found in nearby sites, but found no specimens in the project area. As noted at the time, the vegetation of the area has been disturbed and extensively modified for a long time.

Since that time, the Kapolei II Elementary project site has been cleared and graded. Grass and street trees have been planted next to sidewalks, and a few invasive plants have established themselves within the school site. Ornamentals (hibiscus bushes) have been planted near utility boxes along Kunehi Street.

2.3.2 Impacts and Mitigation Measures

The proposed project would have no adverse impact on listed plant species or habitat. No mitigation is required.

The landscaping plan for the school combines areas in which planned uses, such as class gardens and turf-covered active play zones, limit planting choices with areas designed to recreate the ‘Ewa Plain plant community. The proposed species are adapted to very low water use and the hot, sunny conditions of the site. Whenever possible, endemic species will be used. Irrigation will use R-1 water when this is provided to the site. With the native plant palette, irrigation can be reduced after establishment to very minimal water usage. This design further reduces maintenance costs for trimming and weed control.

2.4 FAUNA

2.4.1 Existing Conditions

In the course of the biological survey of the City of Kapolei project area, a total of 17 bird species was recorded. The only native species observed was the Pacific Golden Plover (*Pluvialis dominica*, or kolea), a migratory species that is widespread on ‘Oahu. The only mammal observed was the cat. Tracks of mongoose were also noted. Mice and rats are also likely to be present.

More recent studies conducted for development at sites in the area have similarly found no evidence of native fauna[8].

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[8] Rana Biological Consulting, Inc. “Biological Assessment Survey.” In Wilson Okamoto Corporation, *Final Environmental Assessment, University of Hawaii Pacific Health Research Laboratory at Kalaeloa.* Honolulu, HI, 2012. Posted at http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2012-11-08-FEA-University-of-Hawaii-Pacific-Health-Research-Laboratory-at-Kalaeloa.pdf.; Lee Sichter LLC. *Ka Makana Ali‘i, Conceptual Master Plan, Final Environmental Assessment.* Kailua, HI, 2011. http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2012-01-23-FEA-Ka-Makana-Alii.pdf

2.4.2 Impacts and Mitigation Measures

The proposed project would have no significant adverse impacts on fauna populations in the region. The project area is already disturbed. Although not observed during the survey, there is potential for the endangered Hawaiian hoary bat (*Lasiurus cinereus*) to use the airspace or roost in trees in the area. The proposed improvements would be limited to a relatively small area that now has no tree cover. The project would accordingly have no effect on roosting sites. No mitigation is required.

At other sites in Hawai'i, outdoor lighting may need to be shielded in order not to disorient shearwaters and other seabirds flying overhead.[9] The DOE will make sure that outdoor lights are oriented downward shielded as a precaution.

2.5 AIR QUALITY

2.5.1 Existing Conditions

The U.S. Environmental Protection Agency (EPA) sets national ambient air quality standards (NAAQS) and the State Department of Health (DOH) sets ambient air quality standards for the State. The nearest monitoring station to the proposed action is the Kapolei Station located approximately 1.2 miles to the west south west in the Kapolei Business Park. The Kapolei Station monitors a wide range of air quality indicators, since it is near the heavy industrial operations of JCIP. A recent summary of observations shows no case in which averages approached, much less exceeded, Federal and State standards. On a few occasions, New Year's fireworks and dust due to construction traffic were identified as the source of short-term exceedances.[10] According to the *State of Hawaii Annual Summary 2011 Air Quality Data*, the State was in attainment of all NAAQS in 2011, excluding exceedances due to the effects of volcanoes and fireworks from New Year's celebrations.

2.5.2 Impacts and Mitigation Measures

Construction activities may result in short-term air quality impacts, including the generation of dust and emissions from construction vehicles and equipment. To avoid or minimize these temporary impacts, the contractor will be required to comply with the DOH Hawai'i Administrative Rules (HAR), Title 11, Chapter 60.1, "Air Pollution Control." Compliance with State regulations will require adequate measures to control fugitive dust. Such measures could include:

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9 Newell's shearwater (*Puffinus auricularis newelli*) is listed as threatened; other shearwaters and seabirds are of concern under the federal Migratory Bird Treaty Act. As noted above, none of these have been observed at the project site.

10 Hawai'i State Department of Health, Clean Air Branch, *2012 Annual Report on Air Emissions from Facilities at Campbell Industrial Park.* Honolulu, HI: 2012. Posted at http://health.hawaii.gov/cab/files/2013/05/cip_report_2012.pdf

- Planning different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dusty equipment to areas of least impact;
- Watering of exposed dirt areas;
- Starting from the initial grading phase, landscaping and rapid covering of bare areas, including slopes;
- Controlling of dust from unpaved access roads;
- Controlling dust from debris being hauled away from the project site; and
- Installing a dust barrier/fence.

A dust barrier will be installed at the start of construction. Watering and other dust control measures will be implemented as needed to minimize dust and comply with State regulations.

During operations, the use of the site for school activities would have no long-term impact on air quality. No mitigation is required.

2.6 ACOUSTICAL ENVIRONMENT

2.6.1 Existing Conditions

Noise in the immediate vicinity is generated by traffic and residential activity. When the nearby airfield was used by the U.S. Navy, noise levels at the project site were estimated at less than 60 day-night sound level (Ldn), i.e., below levels identified as unacceptable for residential areas.[11] Since that time, the number of air operations has decreased greatly.

A noise study conducted for the Kapolei II Elementary School project by D.L. Adams Associates is included as Appendix C of this report. It provides data on both long-term and short-term noise levels at the site, taking into account current conditions and projected development. It considers various standards from State and City regulations for noise at residential areas and schools.

2.6.2 Impacts and Mitigation Measures

Construction activities will generate noise that can have short-term impacts on nearby homes. To mitigate short-term construction-related noise impacts, compliance with the provisions of HAR 11-46, "Community Noise Control," will be exercised. A noise permit will be required if the noise levels from construction activity are expected to exceed specified standards. It will be the contractor's responsibility to minimize noise by properly maintaining mufflers and other noise-attenuating equipment. Project management can minimize the occurrence of construction activity generating high noise events outside of

[11] Helber, Hastert & Kimura, *Kapolei Town Center Final Environmental Impact Statement.,* Section 3.7 and Appendices K and L.

daylight work hours. If construction work is required during evenings, night, and weekend hours, a variance will be sought from the DOH.

The proposed exterior construction of the school buildings is sufficient to minimize noises from vehicular traffic and aircraft flyovers audible in the interior of the buildings. No additional mitigation will be required.

2.7 NATURAL HAZARDS

2.7.6 Existing Conditions

2.7.6.1 Flood

The Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA) for the City indicate that the project site is within Zone D, areas in which flood hazards are undetermined but possible. See Figure 11.

2.7.6.2 Earthquakes

Most earthquake activity in the State occur on and around the island of Hawaiʻi. On Oʻahu, the most recent earthquakes occurred in 2010 and 2011. In 2010, the U.S. Geological Survey reported a 3.6-magnitude earthquake in the Kaʻiwi Channel east of Oʻahu. The epicenter of the 2011 earthquake (4.0-magnitude) was located offshore south of the island.

2.7.6.3 Hurricane

Since record keeping began in the 1950s, eight hurricanes affected the Hawaiian Islands and 12 others posed threats by their passage. Hurricane ʻIniki on Kauaʻi was the most recent Category 4 hurricane to strike Hawaiʻi.

2.7.6.4 Tsunami

The proposed project is not located within a Tsunami Evacuation Zone.

2.7.6.5 Wildfires

Due to low rainfall, undeveloped areas in ʻEwa are subject to brush fires from time to time. However, the project site is cleared and surrounded by residential development, so the risk of wildfire is minimal.

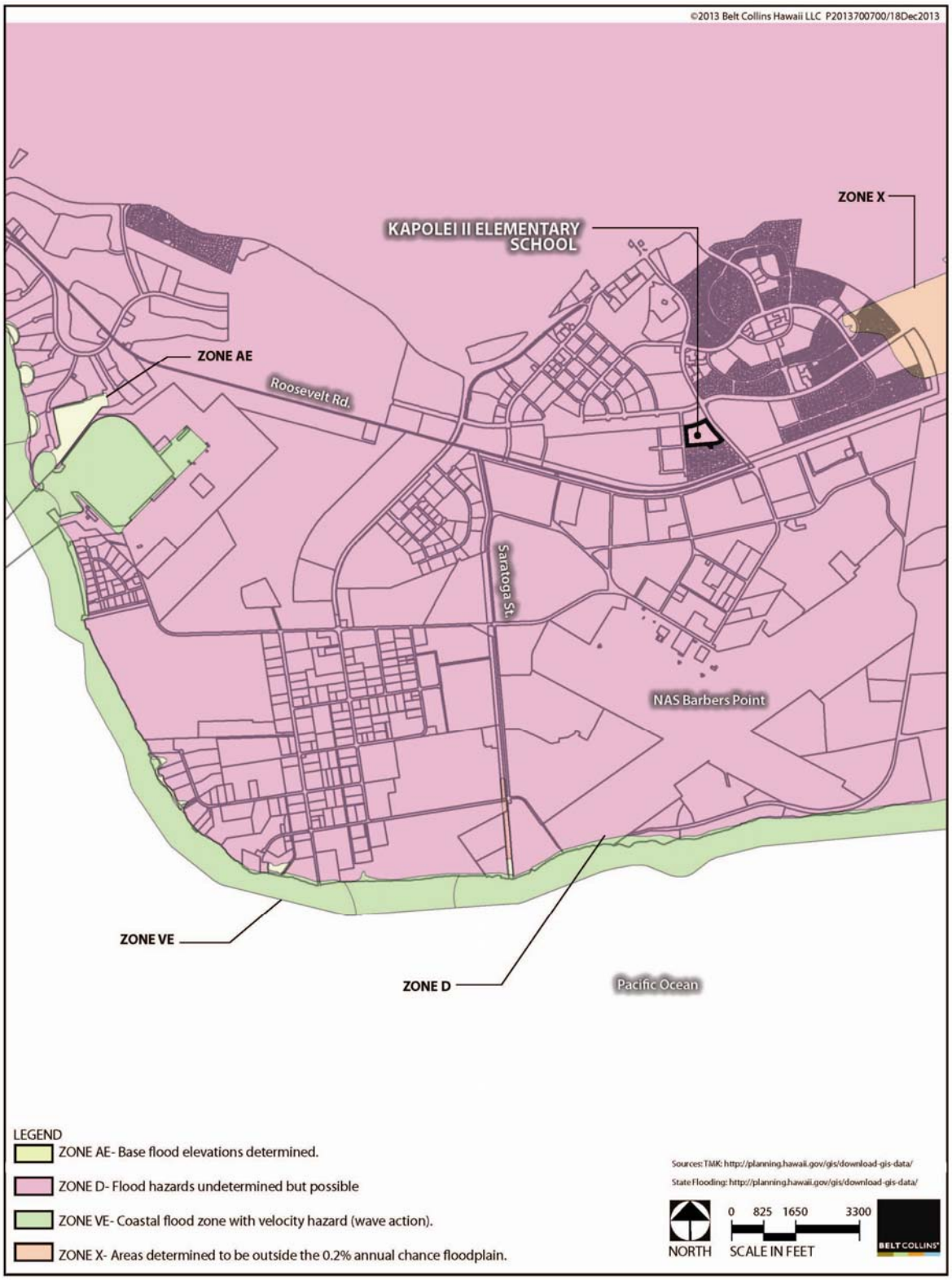

Figure 11: Flood Map

2.7.7 Impacts and Mitigation Measures

No flood or wildfire impacts are expected. The proposed facilities will be designed according to applicable structural and architectural standards to address seismic and hurricane risks. No additional mitigation is required. With no action, there would be no natural hazard impacts.

2.8 SCENIC RESOURCES

2.8.1 Existing Conditions

The site is a level area surrounded by homes and roadways. In the distance, Puʻu Makakilo and the Waiʻanae Mountains can be seen over the buildings of the City of Kapolei.

The ʻEwa Development Plan identifies distant views of the shoreline from the H-1 Freeway above the ʻEwa Plain, along with mauka and makai views, as scenic resources of the region.

Puʻu o Kapolei, about a half-mile north of the school site, is a known wahi pana. It is mentioned in accounts of Hiʻiaka, the sister of Pele, and Kamapuaʻa. It has been associated with annual solar observations for Native Hawaiians.[12]

2.8.2 Impacts and Mitigation Measures

The proposed action will result in minor visual alterations. Views from the nearest public street will change, but not be significantly affected. The new buildings will be consistent in scale with the surrounding residential community. The project will not interfere with vistas recognized as scenic resources. No mitigation is required.

2.9 ARCHAEOLOGICAL RESOURCES

2.9.1 Existing Resources

No recognized historic site or property is located within the project site. A heiau was once located on Puʻu o Kapolei, to the north, but no remnant of it has existed for decades. The OR&L railroad line, currently maintained by the Hawaii Railway Society, is recognized as a historic resource. Its train runs on Sunday afternoons. The rail line crosses Fort Barrette Road at the edge of the Kalaeloa area, some two-tenths of a mile to the south of the project site. Lā Hiki, part of the Mehana residential area, separates the school site from the rail line.

A preliminary archaeological reconnaissance survey was conducted of the City of Kapolei area in 1986. The survey identified an agricultural ditch and a military structure as possibly of historic interest. Both are located mauka of the H-1 Freeway, away from the project site.

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[12] A YouTube video records chants associated with the sun setting over Puʻu o Kapolei, as seen from Waikīkī beach in May 2012 (Posted at http://www.youtube.com/watch?v=jrf5Wj74QwY).

Pu‘u o Kapolei, about a half mile mauka of the project site, is a major feature in the cultural landscape. A heiau, of which no remnant remains, was located on its slope. A coastal artillery installation was located on the hill and enclosed in concrete fortifications during World War II. The battery site is still a landmark. ‘Ahahui Sivila Hawai‘i o Kapolei, the Hawaiian Civic Club of Kapolei, has established gardens and a hula mound on the site, and has collaborated with other community groups to clear and then paint a bunker. The rededication effort has since been set back by a fire at the bunker. Research of previous archaeological studies indicates that pre-contact cultural deposits and burials are uncommon in the immediate vicinity of the project.[13]

For the Mehana residential subdivisions next to the school site, D. R. Horton – Schuler Homes LLC has cleared land and excavated for necessary infrastructure in compliance with HAR Chapter 13 regulations on responses to any unanticipated finds. No significant finds were indicated in State Historic Preservation files for the TMK plats surrounding the school site, reviewed in response to a request made in November 2013.

The school site is currently the property of D.R. Horton – Schuler Homes LLC. The Educational Contribution Agreement for the Mehana subdivision specified that the school site "*shall not contain any known historical or archaeological sites. HORTON-ESTATE [D.R. Horton and the Estate of James Campbell] shall be responsible for verifying such state with the DLNR-State Historic Preservation Division (SHPD) and/or provide appropriate mitigation measures that are acceptable to the SHPD and the DOE.*"[14]

2.9.2 Impacts and Mitigation Measures

No impacts on archaeological resources are expected due to construction of the new school. In the event that historic, cultural, or burial sites or artifacts are identified during construction ground disturbance activity, personnel involved with the construction work would cease all work in the immediate area of the find and the appropriate agencies would

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13 Recent summaries of information on archaeological findings and on the cultural context can be found in Kumu Pono Associates, *Ethnographic & Traditional Cultural Property Study Honouliuli to Moanalua, Oahu.* Honolulu, HI, 2012. Posted at http://www.kumupono.com/West%20Oahu%20Ethnography/west_oahu_ethnography.html; Cultural Surveys Hawai‘i, Inc. "Archaeological Literature Review and Field Inspection." In Wilson Okamoto Corporation. *Final Environmental Assessment, University of Hawaii Pacific Health Research Laboratory at Kalaeloa.* Honolulu, HI, 2012. Posted at http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2012-11-08-FEA-University-of-Hawaii-Pacific-Health-Research-Laboratory-at-Kalaeloa.pdf.; Pacific Legacy, "Archaeological Assessment of The Proposed Ka Makana Ali‘i Mixed-Use Complex, Kapolei, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island." and "Final Cultural Impact Assessment of The Proposed Ka Makana Ali‘i Mixed-Use Complex, Kapolei, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island." In lee Sichter LLC. *Ka Makana Ali‘i, Conceptual Master Plan, Final Environmental Assessment.* Kailua, HI, 2012. Posted at http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2012-01-23-FEA-Ka-Makana-Alii.pdf; Cultural Surveys Hawai‘i, Inc. "Draft Archaeological Literature Review and Field Inspection for The ‘Ewa Elementary School Eight (8) Classroom Building Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island." and "Cultural Impact Assessment, For the ‘Ewa Elementary School Eight (8) Classroom Building Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island." In Belt Collins Hawaii, *Draft Environmental Assessment, ‘Ewa Elementary School Eight-Classroom Building, ‘Ewa, O‘ahu, Hawai‘i.* Honolulu, HI, 2013. To be posted by OEQC in 2014.

14 "Educational Contribution Agreement for KAPOLEI PARKWAY RESIDENTIAL ("MEHANA") signed in May and June 2005.

be notified pursuant to applicable laws. In the event of discoveries of burials during construction, recognized cultural authorities and lineal descendants would be notified and consulted on matters of burial treatment.

2.10 CULTURAL RESOURCES

2.10.1 Existing Conditions

The *Final Environmental Impact Assessment* for the City of Kapolei did not include a Cultural Impact Assessment; none was required at the time. Cultural resources in the region have been documented in other studies.

For this EA, Belt Collins Hawaii LLC sought information and guidance from recent studies, local cultural experts and Native Hawaiian organizations. One local cultural expert, Mr. Shad Kāne, provided guidance. Detailed reports emphasize the importance of Puʻu o Kapolei and of trails through the ʻEwa Plain, but do not mention any past or ongoing cultural activity at the school site and its immediate environs.

On the arid ʻEwa Plain, sinkholes have been identified as sites where artifacts from traditional agriculture or burials may sometimes be located. At the school project site, no such sinkhole exists. About an acre at the southeast corner of the project site was part of a larger quarry (shown in Figure 10). As such, it was disturbed after traditional occupation of the area, and has since been filled.

Cultural practitioners gather plants from vegetated areas in the Kalaeloa Community Development District. The school site, however, has been cleared of plant material and has no current known cultural uses.

2.10.2 Impacts and Mitigation Measures

Should historic, cultural, or burial sites or artifacts be identified during construction ground disturbance activity, personnel involved with the construction work should cease all work in the immediate area of the find and the appropriate agencies notified pursuant to applicable laws. In the event of discoveries of burials during construction, recognized cultural authorities and lineal descendants should be notified and consulted on matters of burial treatment. Additionally, cultural and lineal descendants would be granted access rights to iwi kupuna to conduct customary and traditional burial practices on-site.

The development and naming of a new school provide opportunities to recognize and respect local traditions. The use of Hawaiian names, traditions and motifs can be an important basis for linking a school with local kupuna and the community, so long as informed stakeholders understand and have a voice in the process of defining the school's identity. It is DOE practice for the first principal of a new school to meet with community stakeholders before the school opens. The school name and a shared vision of the school in the community are expected to emerge through that process.

2.11 SOCIO-ECONOMIC CONSIDERATIONS

2.11.1 Existing Conditions

The population of the 'Ewa Development Plan Area totaled 101,397 as of the 2010 Census. The population growth rate for the decade leading up to the Census was 3.97% per year, while the population of the City as a whole grew only by 0.85% per year. [15] Growth was rapid along the eastern side of the Development Plan Area, i.e., along Fort Weaver Road, and in the Villages of Kapolei. Residential development has more recently occurred in the immediate area surrounding the project site.

Over the long term, the student population will largely come from the City of Kapolei. While the population grows in that area, some students will come from other sites in the vicinity. The exact boundaries for the school population will not be delineated until the school is nearly ready to open. Census data on the Kapolei Zip Code Tabulation Area from 2010 provides indications of the demographic characteristics of the school's population:

- Kapolei's population is relatively young – the median age is 32.8 years, while the county median is 37.8;
- Households are larger than the county average of 2.95; and
- The share of households with children is higher than the County average (49.8%versus 34.8%).
- The share of the population with mixed ancestry (as indicated by the Racial Identifications/Total Population figure in Table 2) is higher than the County and State averages. This is in line with the high share of Hawaii-born young families in the local population.

(Figure 12 shows the boundaries of the 'Ewa Development Plan area and the smaller area, identified here with the 96707 Zip Code Tabulation area.)

Plans for development of the City of Kapolei involve some 3,214 housing units. As of June 30, 2010, only 65 units had been built. [16]

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[15] In Section 1.2, a lower figure was given for "estimated" 2010 population. It was taken from projections developed in 2009, and used in comparison with 2035 projections produced for the Development Plan Area and its subareas.

[16] Department of Planning and Permitting, City and County of Honolulu. *Annual Report on the Status of Land Use on Oahu: Fiscal Year 2010.* Honolulu, HI: 2011. Posted at http://www.honoluludpp.org/Portals/0/pdfs/planning/dpar2/dpar2010.pdf . The total of 3,214 units includes 714 units in a "Senior Village" at Leihano. If those units did not house school children, the number of units within the City of Kapolei eventually likely to house students at Kapolei II Elementary School would be about 2,500.

Table 2: Demographic Characteristics, 2010, Kapolei Zip Code Tabulation Area

	Number	Share
Population		
Total	38,817	
Age		
Under 5 years	3,076	7.9%
5 to 9 years	3,052	7.9%
10 to 14 years	3,090	8.0%
15 to 19 years	3,097	8.0%
Median Age (years)	32.8	
Race (alone or in combination with other races)		
White	17,276	44.5%
Black or African American	1,961	5.1%
American Indian and Alaska Native	1,092	2.8%
Asian	21,951	56.5%
Native Hawaiian and Other Pacific Islander	13,370	34.4%
Some Other Race	1,089	2.8%
Racial Identifications/Total population		146.2%
Hispanic or Latino		
Hispanic or Latino (of any race)	4,735	12.2%
Housing and Households		
Total housing units	12,461	
Occupied housing units	11,253	90.3%
Vacant housing units	1,208	9.7%
Households	11,253	
Households with individuals under 18 years	5,604	49.8%
Households with individuals 65 years and over	2,035	18.1%
Average household size	3.38	

SOURCE: 2010 Census tabulations posted at http://files.hawaii.gov/dbedt/census/Census_2010/demographic/demo_profile_zipcode/2010dp_96707.pdf

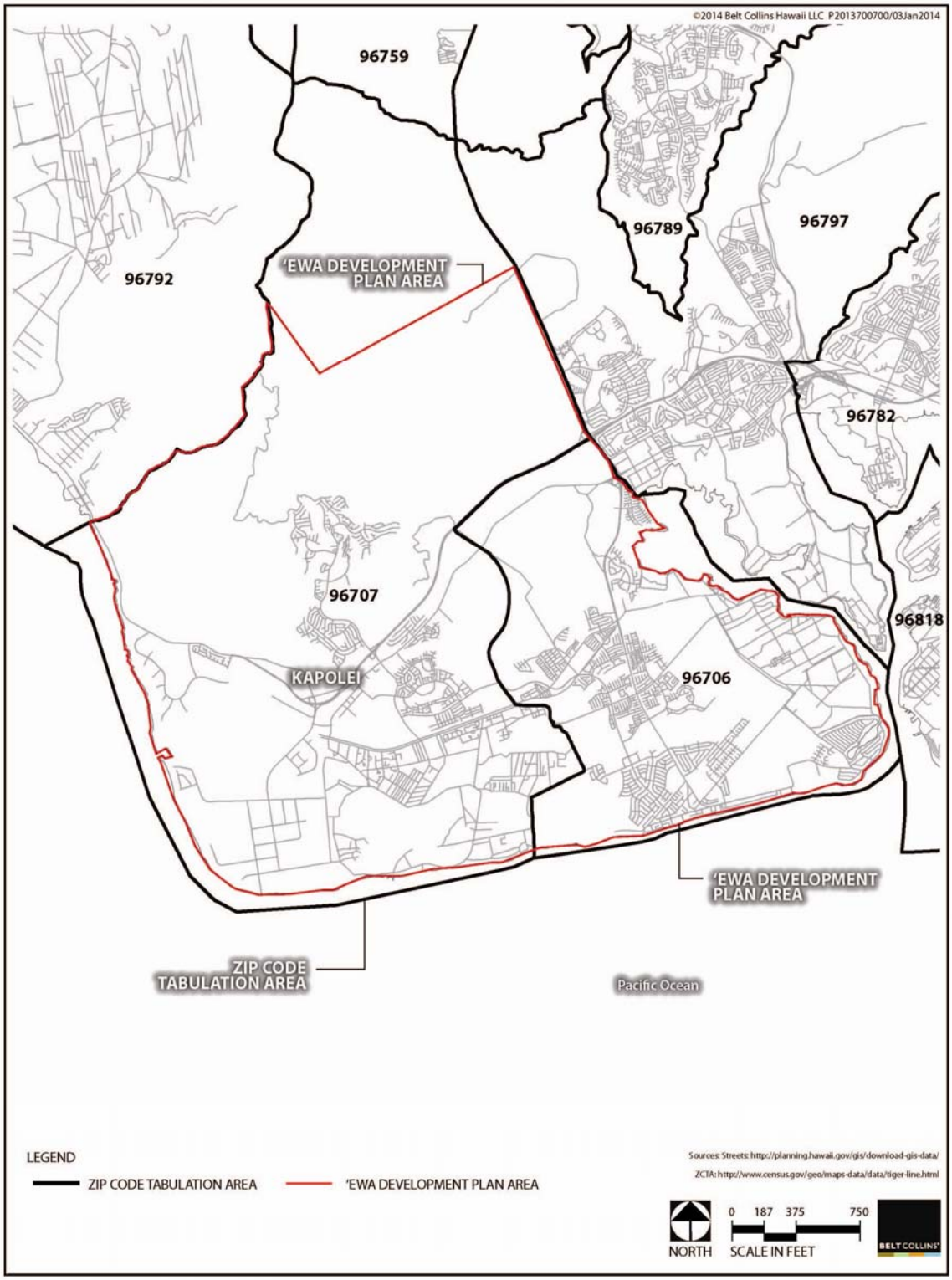

Figure 12: 'Ewa Development Plan Area and Kapolei Zip Code Tabulation Area

2.11.2 Impacts and Mitigation Measures

The proposed action is not expected to impact area population. The new school is proposed in response to ongoing and expected population increase in ʻEwa, leading to increasing enrollments. It is being designed to incorporate "Twenty-first Century Learning" standards to benefit students and to provide an efficient working environment for faculty and staff.

The estimated design-build construction cost of the proposed action is $38.288 million. Assuming that some 4.21 person-years of design and construction work are engaged per million dollars spent, the direct design and construction workforce for the school would amount to 161 person-years.[17] The bulk of that amount would be in the 2014-2015 construction period of about 18 months.

During the construction stage of the project, indirect jobs would be created in the construction trades, material and supply vendors, and related fields. Induced effects would occur as firms and workers in these industries spend income gained from work on the project. Indirect and induced jobs in the Hawaiʻi economy associated with construction would amount to approximately 271 person-years.[18]

The school's planned capacity is 750 students. Elementary schools in the Campbell-Kapolei complex area had, on average, 6.97 instructional faculty members, administrators and student support staff per 100 students, so the professional staff of the school can be forecast as reaching about 52 full-time equivalent positions.[19] Additional staff on-site could account for about eight full-time equivalent positions.[20] The total annual wages would be around $2.95 million. About 33 indirect and induced jobs would be associated with the direct jobs at Kapolei II Elementary.[21] (Unlike the indirect and induced jobs associated with construction, these would continue over time.)

Fiscal impacts (i.e., changes in government revenues) would occur through the expenditure of funds for the school, followed by taxes on subsequent cash flows. Revenues from general excise taxes and income taxes associated with construction are likely to amount to about 10 percent of construction spending, or $3.8 million.

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17 The ratio used is based on the construction job count and General Excise tax base for construction for 2012, as reported in the *State of Hawaii Data Book. 2012.*

18 Type II Input-Output multiplier for construction: 2.68 per the State Input-Output Model for 2007. (DBEDT, *Inter-County Input-Output Study.* Honolulu, HI: 2012. Posted at http://hawaii.gov/dbedt/info/economic/data_reports/2007-inter-county-io.

19 Fall enrollments and staffing as reported in School Status and Improvement Reports for SY 2011-2012 for 11 elementary schools. The range was from 5.98 to 7.60 professional staff per 100 students. These reports were posted at http://arch.k12.hi.us/school/ssir/ssir.html in October 2013.

20 Personal communication, Tammy Keller, Business Office, Kapolei Complex, December 2013. This count does not include cafeteria personnel.

21 The Input-Output Model provides multipliers for government jobs (1.64) and educational services (1.47). The latter is presumably based on private schools. For this report, an average of the two multipliers (1.55) was used, showing that about 0.55 jobs in the economy were created along with every public school job.

2.12 TRANSPORTATION

2.12.1 Existing Conditions

2.12.1.1 Roads and Traffic

The school site is located adjacent to Fort Barrette Road and to Kunehi Street. An undeveloped lot separates it from Kapolei Parkway. An additional access on the south side of the site links the school with Laukālai Street.

Fort Barrette Road is much used. It served as part of the direct route between Kapolei and ʻEwa Beach from 1999 (when BPNAS closed and Roosevelt Road became open to the public at large) and the present. Recently, Kapolei Parkway has been completed between eastern ʻEwa and Fort Barrette Road. The new route is in better condition than the old route through BPNAS, and also has access to Kualakaʻi Parkway. In the next few years, Kapolei Parkway is to extend through the City of Kapolei to the commercial district on Kalaeloa Boulevard, completing a major east-west corridor.

Traffic congestion has been a major concern in ʻEwa, but development of new roadways has helped to relieve problems.

A Traffic Impact Analysis Report has been drafted by Wilson Okamoto Corporation for this project. It is incorporated as Appendix B of this EA. It analyzes existing conditions, year 2018 conditions without the project, and year 2018 conditions with project.

Based on counts in February and November 2013, current traffic at the Kunehi Street/Kapolei Parkway and Kapolei Parkway/Fort Barrette Road intersections, and at the Fort Barrette Road/Kamaʻaha Avenue intersection further north, flows at acceptable levels even at peak morning and afternoon hours.[22] Without the project, traffic at these intersections would continue to be at acceptable levels, except for the southbound traffic on Fort Barrette Road at Kapolei Parkway during the AM peak period. That traffic movement would be at level of service (LOS) "E," even with improved phasing of traffic signals at that intersection.

2.12.1.2 Public Transportation and Paratransit

TheBus Route 41 provides service along Fort Barrette Road from Kapolei Parkway towards Kalaeloa, on the way to and from ʻEwa Beach. Route 415 runs along Fort Barrette Road between downtown Kalaeloa and the Kapolei Transit Center. The Transit Center is located on Haumea Street, between Ulohia and Wakea streets, about a mile north of the project site. From that location, Routes C and 40 provide transportation both to the Waiʻanae Coast and to Downtown Honolulu.

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[22] This comment is based on the Level of Service (LOS) analysis in the TIAR, with LOS "A " through "D" taken to be an acceptable flow for an urban area, and LOS "E" or "F" to be undesirable. For LOS methodology and calculations, see Appendix B.

Paratransit service in the form of The Handi-Van is generally provided island-wide from approximately 4:00 AM through 1:00 AM. Twenty-four hour service is available in areas within ¾ of a mile along TheBus Route 40 on Farrington Highway – near but not reaching the project site.

2.12.2 Impacts and Mitigation Measures

According to the Traffic Impact Assessment Report (Appendix B), a total of 199 vehicle trips would be associated with the school during the morning peak period, and 70 trips during the afternoon peak period. A large share would be for residents of Mehana, near the school site. Traffic on Kunehi Street would increase notably during the morning peak period. However, the school traffic would not affect LOS on the nearby roads, as Table 3 indicates.

Table 3: Level of Service Operating Conditions at Intersections Near Kapolei II Elementary

Intersection	Approach	AM			PM		
		Existing	2018 without Project	2018 with Project	Existing	2018 without Project	2018 with Project
Kunehi St./Kapolei Pkwy	Eastbound	-	A	A	-	A	A
	Westbound	A	A	A	A	A	A
	Northbound	B	B	C	B	B	C
	Southbound	-	C	D	-	B	C
Kapolei Pkwy/ Fort Barrette Road	Eastbound	D	D	D	D	D	D
	Westbound	D	D	D	D	D	D
	Northbound	D	D	D	C	D	D
	Southbound	D	E	E	C	D	D
Fort Barrette Road/Kama‘aha Avenue	Eastbound	D	D	D	D	D	D
	Westbound	D	D	D	D	D	D
	Northbound	C	C	C	C	D	D
	Southbound	D	D	D	C	C	C

Since the school will generate only a modest increase in traffic volumes, no mitigation is needed for traffic congestion. However, the Traffic Impact Assessment Report (TIAR) includes recommendations for further study, notably:

- Consider preparing a Construction Traffic Management Plan to minimize the impact of construction traffic on the surrounding roadways and neighborhood;
- During the design phase of the project, consider the incorporation of complete streets concepts if possible; and
- Consider preparing a Traffic Management Plan (TMP) for the school to minimize the impact of school-related traffic (daily and special events) on the surrounding roadways. The TMP should include recommendations to ensure that the designated crossing points to the proposed school are safe.

The DOE and its contractors will develop the two plans suggested above. Complete Streets and Safe Routes to School concepts are strongly supported by the Department. However, the school grounds are simply the destination point for student travel; collaboration with transportation agencies, landowners and the community will be needed to ensure safe travel and to encourage travel on foot or by bicycle.

2.13 INFRASTRUCTURE

2.13.1 Existing Conditions

Water. The project site is included in the scope of the *Kapolei Regional Potable Water Master Plan*, prepared by Engineering Concepts, Inc. and the *Water Master Plan for Mehana at Kapolei*, prepared by Bills Engineering, Inc. in 2005.

The Board of Water Supply's (BWS) 215' (elevation) pressure system provides potable water service to the entire Kapolei region, including the project site. Potable water storage is provided by the BWS' Barbers Point Reservoirs 1, 2 & 3 and the Kapolei Reservoir which has a combined storage capacity of 16 million gallons (MG). Water distribution is done via the BWS water system, which includes up to 30" diameter transmission mains within Farrington Highway and a network of 16" and 12" diameter distribution mains within the City of Kapolei roadways.

Within Kunehi Street, an existing 12" diameter potable water main fronts the project site, and is capable of delivering the domestic water demands for the school and the required fire flow of 2,000 gallons per minute (gpm) for a two-hour duration, with a residual pressure of 20 pounds per square inch (psi). An existing 12" diameter service lateral is provided to the site boundary with a static water pressure of approximately 68 psi.

An existing 6" diameter non-potable BWS water main is located within the upper portion of Kunehi Street. It terminates at the northern end of the project site. The static water pressure is approximately 69 psi at this point. An existing 1-1/2" non-potable water lateral is provided to the site boundary for irrigation purposes. The non-potable water system is intended to provide R-1 treated effluent from the Honouliuli Wastewater Treatment Plant (WWTP) in the future when the R1 water is available to the region. In the meantime, the non-potable water system is energized with potable water.

According to the Mehana water master plan, the budgeted potable water demand for the project site is approximately 0.039 million gallons per day (MGD) which equates to an expanded enrollment of 950 students. The budgeted irrigation demand for the project site is approximately 0.049 MGD based on a unit demand of 4,000 gallons per acre per day over the entire site.

Sewer. The project site is included in the *Revised Sewer Master Plan for the City of Kapolei*, prepared by Engineering Concepts, Inc. (2012) and the *Master Plan for the Makakilo*

Interceptor Replacement Sewer, prepared by Bills Engineering, Inc. The *Revised Sewer Master Plan For Mehana at Kapolei* (Bills Engineering, 2013) is currently under review by the City. The entire region is served by the City's Honouliuli WWTP.

The school site is served by an existing 12" diameter (polyvinyl chloride) PVC gravity sewer main which is located within Kunehi Street. An existing 8" diameter sewer lateral is provided to the project boundary at the southeast corner of the site. The existing sewer main connects to the 36" diameter West Beach Interceptor Sewer just south of the Kunehi Street terminus, above the OR&L railroad right of way. From there, the sewer system is tributary to the existing 42" diameter Kapolei Interceptor Sewer and 30" diameter Makakilo Interceptor Sewer, and ultimately the Honouliuli WWTP. The Makakilo Interceptor Replacement Sewer project is presently in the design phase and intends to upsize the pipes to 36" and 48" to provide additional capacity for future development to the west.

According to the master plans, the budgeted average daily sewer requirement for the school is 0.024 MGD based on an expanded enrollment of 950 students.[23]

Drainage. The project site is included in the *Drainage Master Plan for Mehana at Kapolei*, prepared by Bills Engineering, Inc. which is included in the scope of the overall *Drainage Master Plan for the City of Kapolei*, prepared by Engineering Concepts, Inc. Storm water runoff from the project site in its fully developed condition has been accounted for in the design and construction of the downstream drainage infrastructure.

The project site has been mass graded as part of the Mehana at Kapolei development such that approximately one-half of the site drains to the east and the remainder of the site drains to the west (in conformance with the drainage master plans). Most of the site has been filled with imported coralline soils at depths between 4 to 12 feet. Recent percolation tests indicate that the onsite soils will percolate at a rate of at least 7.6 minutes per inch (more than 7 inches per hour). Offsite runoff from the parcels to the north and to the south of the project does not enter the site.

Two of the major mauka-makai drainage corridors, which are designed to accommodate the City of Kapolei as well as upstream tributary areas and the Mehana development, border the school site. Within Kunehi Street, a 42" diameter drainage trunk line runs southward past the site and two 24" diameter drain pipe stub-outs are provided for the school. According to the drainage master plan, this drainage trunk line has an approximate tributary area of 23 acres and is designed for a total peak flow of 88 cfs. Adjacent to Fort Barrette Road, a 54" and 60" diameter drainage trunk line runs southward within the boundary of the school site (via 20' wide easement) and three grated drain inlets along this trunk line collect runoff from the eastern half of the site. That drainage trunk line has an approximate tributary area

[23] The school is being designed for an enrollment of 750 students. Space has been allocated for additional classrooms if the need arises to serve more students. The water and wastewater master plans for the subdivision identify a maximal capacity, not the design enrollment of the school.

of 50 acres and is designed for a total peak flow of 324 cfs. Both drainage trunk lines discharge into the regional City of Kapolei Makai Drainage Channel, which runs along the north boundary of the OR&L railroad right-of-way and connects to the existing JCIP Drainage Channel. The JCIP Channel is a trapezoidal channel, at least 30 feet wide (70 feet wide near the mouth to the ocean) and has depths of up to 15 feet. The JCIP Channel serves all of the City of Kapolei.

According to the drainage master plan, the 10-year storm peak flows generated on the school site when fully developed are 18 cfs, contributing to Drain Line "N" in Kunehi Street and 22 cfs, contributing to Drain Line "F" along Fort Barrette Road.

Electrical Power and Communications. HECO will provide primary electrical power which will terminate at a HECO owned transformer within the property, adjacent to Kunehi Street. The secondary electrical distribution system within the site will be owned and maintained by the DOE. HECO upgrades (work outside the property) are not anticipated.

Hawaiian Telcom has an existing terminal box along Kunehi Street that provides fiberoptic cabling and Oceanic Time Warner Cable has an existing terminal cabinet along Kunehi Street. The school site will connect to the existing telephone and cable systems and route the underground lines within the school site.

2.13.2 Impacts and Mitigation Measures

Water. The school's culinary water and fire protection needs will be met by an onsite potable water system consisting of 8" and 12" diameter PVC water mains, fire hydrants and small diameter culinary and fire sprinkler service laterals to the buildings. The onsite water system will be owned and maintained by the DOE. Water service to the site will be provided by the BWS via a proposed 8" x 2" factory mutual (FM) meter and an 8" diameter reduced pressure principle backflow preventer at the point of connection to the onsite water system. The onsite water system will be designed to meet current fire codes and provide a minimum of two hours of flow at 2,000 gpm at each hydrant with a residual pressure of 20 psi.

The proposed culinary water demand is estimated to be 0.045 MGD and the proposed irrigation demand is approximately 0.037 MGD. Both of these demands are within the budgeted amounts in the *Master Plan.*

The BWS has indicated that the existing water system is adequate to accommodate the proposed school. However, BWS reserves the right to change this position pending final approval of the building permit.

Sewer. The school will be served by an onsite private gravity sewer system (non-City), consisting of 6" and 8" PVC pipe and County standard pre-cast concrete sewer manholes, which will be owned and maintained by the DOE. The onsite sewer system is proposed to

connect to the City's gravity sewer system at the existing 8" diameter sewer stubout lateral on the southeast corner of the site.

Projected sewer flows for the school conform to the sewer master plans and it is expected that the City sewer systems have adequate capacity to accommodate these flows.

Drainage. The installation of impervious surfaces such as roofs and pavements will result in an increase in storm water runoff volume and peak flows compared to the existing condition of the site. However, with regard to the fully developed site, the project's calculated peak flows are much less than the master planned (allowable runoff) values due to the compact site design and vast amounts of landscaped areas. The calculated 10-year storm peak flows generated by the site include 11 cfs, contributing to Drain Line "N" on Kunehi Street and 8 cfs, contributing to Drain Line "F" along Fort Barrette Road. This reduction in peak flow is a positive impact to the regional drainage systems.

Although the regional drainage systems have been designed to accommodate runoff from the fully developed site, the proposed onsite improvements will be designed to capture increases in runoff and infiltrate excess runoff into the soil. The site will also be designed to retain and infiltrate the 1" rainfall in accordance with the City's current *Rules Relating to Storm Drainage Standards.* The use of curbs in the parking lots will be minimal and paved surfaces (in the courtyard as well as parking lots) will be sloped toward the planter areas to capture and retain storm runoff. A significant bioswale will be installed downstream of the main parking lot to capture pollutants and infiltrate excess runoff. The proposed playfield on the eastern half of the site will be graded to retain approximately 0.5 to 1.0 acre-feet of storm water runoff while allowing excess runoff to enter the existing drainage system along Fort Barrette Road. For safety reasons, the depth of storm water retention on the playfield will be less than 6".

The onsite underground drainage systems will consist of 18" and 24" diameter high density polyethylene (HDPE) pipes and grated drain inlets and will be designed to accommodate the 10-year and 50-year storms (as applicable) according to the City's drainage standards. The onsite drainage system will connect to the existing 24" diameter drain pipe stub-outs along the Kunehi Street boundary.

The project will be required to file with the DOH, Clean Water Branch a National Pollutant Discharge Elimination System (NPDES) Permit for Construction Storm Water Discharges. Best management practices (BMPs) will be implemented during construction to minimize any discharge of pollutants from the site. BMPs will include but not be limited to, stabilized gravel pad (or tire wash-down station) at entry points; dust fence along the perimeter of the site; silt fences and filter socks; sediment basins; minimize the area of disturbance; keep the site moist; and good housekeeping practices such as covering sources of contaminants and keeping the site clean.

Electrical Power. HECO will provide primary and secondary service within the property. HECO work outside the property is not anticipated. There is existing primary switchgear along Kunehi Street near the intersection with Kakala Street. The existing electrical service to the site is 12.47 kilovolts (kV). The proposed construction will include a new underground 12.47 kV primary service from the existing switchgear to a new pad mounted transformer near the corner of Kunehi Street and Kakala Street. The new pad mounted transformer will step the voltage down to the secondary utilization voltage of 277/480V, 3 Phase, 4 Wire. The secondary service to the building will also be underground from the pad mounted transformer to the electrical service room in Building F. The estimated total load on the new service is approximately 2,500 amps at 277/480V, 3 Phase. The secondary service cables will consist of eight sets of 4-#500 MCM each set in a 3" conduit.

Propane Gas Service. Piped natural gas is not presently available to the project site. Therefore, the gas loads will be served by an on-site propane gas storage system. The propane tank will be located on the school building property near the dock drive off of Kakala Street. Propane gas will be piped underground to the school building. The gas service will serve the kitchen cooking equipment and the water heater serving the kitchen area.

Telephone Service. Hawaiian Telcom will provide telephone and Internet service to the project. Hawaiian Telcom work outside the property is not anticipated. There is an existing telephone terminal box along Kunehi Street near the intersection with Kakala Street. The existing service to the site is fiber optic cabling. There will be a new underground telephone service consisting of two (2) 3" conduits from the existing terminal box to a new telecom service entrance board in the Data Center portion of Building F of the new school building. The telephone service to the building will be underground from the pad mounted terminal board to the telephone service termination board in the Data Center.

Cable Television Service. Oceanic Time Warner Cable Company will provide television service to the property. Oceanic Time Warner Cable Company work outside the property is not anticipated. There is an existing cable television terminal cabinet along Kunehi Street near the intersection with Kakala Street. The existing service to the site is coaxial cabling. There will be a new underground cable television service consisting of one (1) 3" conduit from the existing Oceanic Time Warner Cable Terminal box to a new television service entrance board in the Data Center portion of Building F of the new school building. The television service to the building will be underground from the pad mounted television terminal cabinet to the television service termination board in the Data Center.

Utilities will be designed according to applicable standards. Construction plans will be reviewed, as required, by the appropriate agencies.

2.14 SOLID WASTE

2.14.1 Existing Conditions

A private contractor would be used for collecting and disposing of solid waste. Most municipal solid waste on O'ahu is disposed of at the City's HPOWER Waste to Energy Plant and at the Waimanalo Gulch Sanitary Landfill.

2.14.2 Impacts and Mitigation Measures

Short-term impacts to the solid waste system would be limited to waste materials generated during demolition and construction. All construction materials will be properly transported, stored, and used. Demolition debris, as well as soil, rocks, vegetation, and construction debris, will be properly disposed at DOH-approved City disposal or recycling facilities, and in accordance with applicable City, State, and Federal requirements. No construction waste materials will be buried or disposed on-site.

Generation of solid waste from the proposed school during normal operation is anticipated to be up to 90 tons per school year. [24] Recycling of plastics, aluminum cans and paper may potentially reduce the amount of solid waste by as much as 48%[25, 26].

2.15 PUBLIC FACILITIES AND SERVICES

2.15.1 Existing Conditions

Police. The school site is located within the Honolulu Police Department's District 8 (Kapolei). The District 8 headquarters is located on Kamokila Boulevard, about 0.9 miles from the school site.

Fire and Emergency. The engine company nearest to the school is Engine 43, housed at the East Kapolei Fire Station, approximately 1.3 miles away. Other fire stations in the region include the Makakilo, Kapolei, 'Ewa Beach, Waikele and Waipahu Stations.

Emergency medical services are deployed from the Kapolei Fire Station, in the Kapolei Business Park.

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[24] Amount calculated from generation rates found in State of California, Department of Resources, Recycling, and Recovery, Estimated Solid Waste Generation Rates for Institutions, accessed December 6, 2012, http://www.calrecycle.ca.gov/WasteChar/WasteGenRates/Institution.htm.

[25] Table 2-10 Waste Composition in Honolulu 2005-2006, Beck, R.W., *Integrated Solid Waste Management Plan Update* prepared for the City and County of Honolulu, October 2008.

[26] City and County of Honolulu, Department of Environmental Services, Oahu Recycling Rate, accessed December 5, 2012, http://www.opala.org.

Medical. The nearest hospital is the Queen's Medical Center – West Oahu. The Queen's facility is located approximately 4.1 miles away. It is anticipated to re-open by mid-2014. Clinics and other medical services are located in Kapolei, about a mile from the school.

Parks and Recreation. The Kapolei area includes parks and land for future park development. Kapolei Community Park, in the Villages of Kapolei, covers 12 acres. The 69-acre Regional Park north of the school project site includes open play areas and an archery range as well as the Puʻu o Kapolei cultural site. Kapolei Green is a 5.6-acre Neighborhood Park west of the school site. The Kalaeloa District includes playfields, beach parks and areas for future park development. The Kroc Center, recently opened on Kualakaʻi Parkway, is run by the Salvation Army. It provides sports fields, pools, a gymnasium, an art center and additional facilities to its members.

2.15.2 Impacts and Mitigation Measures

The proposed action—addition of an elementary school—is not expected to affect the delivery of police, fire, emergency or medical services in the region.

Access will be available for fire department vehicles to the school grounds and inside the school buildings. Plans will be submitted to the Fire Department for review to assure compliance with Fire Department standards. As noted above, the available water pressure will be sufficient to assure fire flow.

The school buildings will be built in conformance with the 2006 International Building Code. Assembly areas in buildings, i.e., the cafetorium, will be hardened and might be designated by State and County authorities as emergency shelter space.

In the event of an emergency during school hours, the response will depend on the nature of the emergency and on the regional emergency response network. With pollutants monitored by the DOH from a location in Kapolei Business Park, the school will be able to respond to emissions by cutting off air flow from outside to some buildings, if necessary. If public safety concerns warrant, school gates can be closed. The school administration will be in communication with Honolulu Police Department personnel at the Kapolei station.

The school will have its own playfields, and will not depend on other recreational facilities on a regular basis.

2.16 CUMULATIVE IMPACTS

Cumulative impacts are those which result from incremental effects of the proposed action when added to other past, present, and reasonably foreseeable actions in the same region of influence, including actions by other agencies or entities. Cumulative impacts can result from individually minor but collectively substantial actions taking place over a period of time.

The proposed action is planned in a region that has experienced and will continue to experience population growth and further development. Addition of a new school is part of the planned response to that growth, and not expected to result in any significant cumulative impacts beyond contributing to the quality of life for the community.

3 RELATIONSHIP TO PUBLIC AND LAND USE POLICIES

3.1 STATE POLICIES

3.1.1 Hawaii State Plan

The Hawaiʻi State Planning Act (Planning Act) has served as a guide for the long-range development of the State since its adoption into law in 1978 as Hawaiʻi Revised Statutes (HRS) Chapter 226. The Planning Act identifies goals, objectives, and policies for the State to: (1) provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; (2) improve coordination of Federal, State, and County plans, policies, programs, projects, and regulatory activities; and (3) establish a system for plan formulation and program coordination to provide for an integration of all major State and County activities.

The proposed action is consistent with several of the objectives and policies stated in HRS §226-21 - Objectives and Policies for the Socio-Cultural Advancement – Education, which include:

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

(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.

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

(3) Provide appropriate educational opportunities for groups with special needs.

(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.

(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.

3.1.2 State Environmental Policy

The proposed action is consistent with the State Environmental Policy, as stated in HRS Chapter 344, to "enhance the quality of life" by "creating opportunities for the residents of Hawaiʻi to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments." The proposed action will provide needed school facilities to promote educational opportunities which are anticipated to improve quality of life.

3.1.3 State Land Use Classification

State Land Use Districts are established by the State Land Use Commission in accordance with HRS Chapter 205. There are four classifications of land under this districting system: Agricultural, Conservation, Rural, and Urban. The purpose of the districts is to regulate the use of lands within the State to accommodate population growth and development as needed, and to protect important agricultural and natural resources areas. The school site is located within the Urban district. Activities or uses within the Urban district are regulated by the City. A public elementary school is an appropriate use within the Urban district.

3.1.4 Coastal Zone Management/Special Management Area

Hawaii's Coastal Zone Management (CZM) Program was enacted in 1977 (HRS Chapter 205A) through the passage of the Federal CZM Act of 1972. The CZM program protects and manages Hawaiʻi's coastal resources through land and water use regulations. The entire land area of Hawaiʻi is within the CZM area, so new development must further or be in compliance with CZM objectives and policies. Those objectives[27] are:

(1) Recreational resources;

(A) Provide coastal recreational opportunities accessible to the public.

(2) Historic resources;

(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.

(3) Scenic and open space resources;

(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

(4) Coastal ecosystems;

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

(5) Economic uses;

(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

(6) Coastal hazards;

(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

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[27] HRS 205A-2.

(7) Managing development;

(A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

(8) Public participation;

(A) Stimulate public awareness, education, and participation in coastal management.

(9) Beach protection;

(A) Protect beaches for public use and recreation.

(10) Marine resources;

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

Development of a new elementary school nearly two miles inland from the coastline is in compliance with CZM objectives and policies.

Special Management Areas (SMA) have been established throughout the State under the CZM Program, and land use rules and regulations for those specially designated areas are administered by the individual county planning authorities. The project area is located outside of the SMA and does not require an SMA Use Permit.

3.2 COUNTY POLICIES

3.2.1 General Plan

The General Plan (1992, amended 2002) for the City is a written commitment by the City to guide Oahu to a future considered desirable and attainable. The project is consistent with the following policies and guidelines in Chapter IX, 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.

The General Plan is in the process of being updated. Objective IX.B of the General Plan is unchanged as of a Public Review Draft of the Proposed 2013 Edition of the Oʻahu General Plan dated November 2012.

3.2.2 'Ewa Development Plan

The City's 'Ewa Development Plan (DP) program provides a framework for implementing General Plan objectives and policies for the growth and development of O'ahu at a regional level.

In July 2013, Ordinance 13-26 took effect, adopting a revised 'Ewa DP. The proposed action is consistent with DOE projections presented in the 'Ewa DP which state that ten new elementary schools, three new middle schools, and two new high schools will be needed by 2030.

The updated 'Ewa DP recognizes Kapolei II Elementary as having a capacity of 400 to 750 students.[28]

3.2.3 Land Use Ordinance

The project is in an area zoned A-1 Agriculture and a small 5,000 square feet lot is zoned R-5 Residential. The project is consistent with the Land Use Ordinance as a public facility use which supports and complements residential neighborhood activities. Although public schools are permitted in A-1 and R-5 areas, the Department of Planning and Permitting (DPP) was contacted to determine whether a Conditional Use Permit (CUP) would be required. According to the DPP, a CUP would not be required because it is a public facility.

3.2.4 'Ewa Highway Master Plan and Transportation Impact Fees

Revised Ordinances of Honolulu (ROH), Chapter 33A, states "impact fees shall be charged and assessed for all new land development activities that require a building permit in the Ewa region" with a few exceptions. The ROH also states that the fees are to be borne by those who "directly contribute to expanding the population and increasing economic activity in the Ewa region through new land development activities." Construction of the new school will require a building permit. While the project type does not appear on the exemption list, the project is not a population contributor, rather is a response to the expanding population. This type of impact fee would normally be assessed and paid prior to the issuance of a building permit.

The fee can be calculated on the basis of the square footage under roof, using the rate of $2,019/1,000 square feet for Industrial and Other facilities. At that rate, the total fee for the school would amount to more than $230,000. The fee could change, since the 'Ewa impact fees will be recalculated for new roadways and user groups. However, the revised ordinance has not been finalized, much less submitted to the County Council, so it is unlikely to affect the project.

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[28] Table 4.3 shows existing and planned schools in the area. The updated DP is posted at http://www4.honolulu.gov/docushare/dsweb/Get/Document-141182/806jrd66.pdf.

Some developers have credits in the impact fee system because they have already constructed improvements or otherwise contributed to the system. The State is the major roadway developer in ʻEwa. Accordingly, impact fees for the Kapolei II Elementary School could be offset by such credits.

3.3 SUMMARY OF REQUIRED PERMITS AND APPROVALS

The following is a summary of permits and approvals that may be required for construction of the proposed action.

Table 4: Summary of Required Permits and Approvals for the Project

Permits/Approvals	Approving Agency
State of Hawaiʻi	
Construction Plans Approval	Department of Education
	Department of Health
National Pollutant Discharge Elimination System (NPDES) Permit	Department of Health
Community Noise Permit and/or Noise Variance	Department of Health
City and County of Honolulu	
Construction Plans Approval	Department of Planning and Permitting
	Department of Transportation Services
	Board of Water Supply
	Department of Environmental Services
Building Permit	Department of Planning and Permitting
Street Usage Permit	Department of Planning and Permitting
Grading, Grubbing, and Stockpiling Permit	Department of Planning and Permitting
Trenching Permit	Department of Planning and Permitting
Storm Drain Connection Permit	Department of Planning and Permitting
City of Kapolei	
Urban Design Approval	Kapolei Urban Design Board; James Campbell Companies with Department of Planning and Permitting

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4 PRELIMINARY DETERMINATION

This Draft EA demonstrates that the proposed action will have no significant adverse impact on the environment and that an EIS is not warranted. A Finding of No Significant Impact (FONSI) is anticipated for this project.

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5 FINDINGS AND REASONS SUPPORTING THE PRELIMINARY DETERMINATION

The following findings and reasons indicate that the proposed action will have no significant adverse impacts on the environment based on the 13 significance criteria as provided in HAR 11-200-12.

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

   Construction of the proposed school would not result in significant loss or destruction of any natural or cultural resources. The building will be constructed on land which has been previously disturbed. Other related improvements, such as utility connections, will also be done in previously disturbed areas. The project is not anticipated to affect any threatened or endangered species or their habitat.

2) *Curtails the range of beneficial uses of the environment.*

   No curtailment of beneficial uses of the environment is anticipated. There are few, if any, alternative beneficial uses of the existing school site other than educational activities. The proposed action will enhance those activities.

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.

   As demonstrated in Section 3.1.2 of this document, the proposed action is consistent with the State's long-term environmental policies and guidelines as expressed in HRS, Chapter 344.

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

   The proposed project is expected to improve the economic and social well-being of the community and surrounding region. Students will be educated in a new facility designed for learning. Construction activities associated with the proposed improvements will mobilize existing labor and generate income and secondary effects in the local economy. Construction of a new school to provide a Twenty First Century Learning Environment furthers the State's goal of providing education for a future skilled and informed workforce.

5) *Substantially affects public health.*

   Existing State DOH regulations are intended to protect air and water quality and control noise. The proposed improvements would not result in the uncontrolled and unsupervised use of hazardous materials or construction methods that could detrimentally affect the area's public health and safety. The construction contractor

will be required comply with applicable permit requirements to avoid or minimize impacts on air and water quality, in accordance with HAR Title 11, Chapter 60.1, Air Pollution Control, and the project-specific NPDES permit. Construction noise will be minimized through compliance with HAR Chapter 11-46, Community Noise Control.

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

Population growth has resulted in a substantial increase in school enrollment. This growth has occurred, and will continue, independent of the proposed project. The project itself would not generate population changes but is a response to population growth in the area. There would be no substantial secondary impacts on public services and facilities.

7) *Involves a substantial degradation of environmental quality.*

The proposed action would not involve degradation of environmental quality during either construction or operations. The new building will be located within an existing school campus, on previously disturbed areas. Temporary construction-related impacts will be avoided or minimized through compliance with applicable DOH permit requirements.

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

The proposed project occupies a site planned for this use, and serves a growing population. It is not expected to have a cumulative or considerable effect on the environment or a commitment for larger actions.

9) *Substantially affects a rare, threatened, or endangered species, or its habitat.*

No rare, threatened, or endangered species or their habitat have been identified on or in the immediate vicinity of the project site.

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

The anticipated impacts associated with project construction will be temporary. These impacts will be avoided or minimized by the implementation of BMPs and mitigation measures in accordance with applicable permit requirements. Long-term detrimental impacts to air, water quality, or ambient noise levels are not expected.

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.*

The project area is located about two miles from the shoreline and, therefore, not in the vicinity of an estuary or coastal waters. It is not located in a flood plain or tsunami zone, and it is not in an area subject to erosion or geologic hazards. The school is outside the SMA. The proposed action is not expected to impact freshwater resources.

12) *Substantially affects scenic vistas and view planes identified in county or state plans or studies.*

The proposed action will not affect identified scenic vistas or view planes.

13) *Requires substantial energy consumption.*

Installation of air conditioning and electrical systems in the new school will increase electrical utility demand. However, the building will be designed to comply with the International Energy Code and the Revised Ordinances of Honolulu Chapter 32. In addition, various energy efficient design strategies will be utilized to further minimize energy consumption and to achieve an equivalent of LEED silver rating or better. (As a result, the proposed action will likely involve less energy consumption than would the use of older, retrofitted facilities and temporary classrooms.) Some energy resources will be consumed during project construction.

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6 EARLY CONSULTATION

Early consultation letters for the project were transmitted to the following agencies and organizations for review and comment. This correspondence, including agency responses, is included in Appendix A.

AGENCIES AND INTERESTED PARTIES	Responses Included in Appendix
Federal Government	
Department of the Army, Corps of Engineers	
Environmental Protection Agency	
State of Hawaiʻi	
Department of Land and Natural Resources	X
Department of Land and Natural Resources, State Historic Preservation Division	
Department of Hawaiian Home Lands	
Office of Hawaiian Affairs	
Department of Accounting and General Services	X
Department of Health, Clean Water Branch	X
Department of Health, Clean Air Branch	X
Department of Health, Environmental Planning Office	X
Department of Business Economic Development and Tourism, Office of Planning	X
Department of Transportation	X
Senator Mike Gabbard	
Representative Sharon Har	
City and County Agencies	
Board of Water Supply	
Department of Design and Construction	X
Department of Emergency Management	X
Department of Emergency Services	
Department of Environmental Services	
Department of Parks and Recreation	

AGENCIES AND INTERESTED PARTIES	Responses Included in Appendix
Department of Planning and Permitting	X
Department of Transportation Services	X
Fire Department	X
Police Department	X
Council Chair, Ernest Y. Martin	
Council Member Kymberly Marcos Pine	
Utility Companies	
Hawaiian Electric Company	X
Other Organizations	
D.R Horton, Schuler Division	
Kapolei Property Development LLC	
Makakilo / Kapolei / Honokai Hale Neighborhood Board No. 34	
Oahu Island Burial Council	
The Nature Conservancy of Hawaii	
Historic Hawaii Foundation	X
Mr. Shad Kāne	

7 REFERENCES

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APPENDIX A

EARLY CONSULTATION

1. EARLY CONSULTATION LETTERS: SAMPLE REQUEST LETTER AND FIGURES

November 12, 2013
2013700700 / 13P-089

Environmental Protection Agency
Region IX, Pacific Islands Office
P.O. Box 50003
Honolulu, Hawaii 96850

Dear Sir or Madam:

Environmental Assessment (EA) Early Consultation
Proposed Kapolei II Elementary School
Department of Education Job No. Q82001-10
Tax Map Key: 9-1-016:158 and 9-1-158:62
ʻEwa, Oʻahu, Hawaiʻi

On behalf of the State of Hawaiʻi, Department of Education (DOE), we would like to inform you of the proposed new Kapolei II Elementary School (see enclosed Figures 1 and 2). The purpose and need for the school is to accommodate increasing enrollment from the surrounding area, notably the anticipated build-out of the City of Kapolei.

The school site occupies TMK (1) 9-1-16:158. It is bounded by Fort Barrette Road (Barbers Point Access Road) to the east and Kunehi Street to the west. On the north side is an undeveloped commercial parcel, while a series of residential parcels on Luakālai Street in the Lā Hiki section of Mehana is to the south. A small parcel, (1) 9-1-158-62, provides an additional access by way of Luakālai Street. The new school would be designed to serve up to 750 students in a Twenty First Century Learning Environment with spaces for students in grades Pre-K through 5. Facilities would include classrooms, a cafeteria, administrative space, class gardens, play areas, and space for eventual expansion, if needed. Parking and spaces for busses would be provided. Figure 1 shows the site in relation to existing development in Kapolei. Figure 2 is a preliminary site and landscaping plan for the school.

As part of this proposed project, an EA will be prepared in compliance with Chapter 343, Hawaii Revised Statutes (HRS). The EA will reference the studies prepared for the approved Environmental Impact Statement for the Kapolei Town Center. New traffic and noise studies will be prepared. If you wish to provide preliminary input on the project at this time or be a consulted party while the EA is being prepared, please review the above introductory information and attached figures and submit your written comments to the address below by December 12, 2013. Comments received during this period will be considered in the preparation of the Draft EA. When the draft is complete, a copy will be sent to you for further review and input.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
Belt Collins Hawaii is an Equal Opportunity Employer

If you have any questions, please contact the undersigned at 521-5361, extension 309 or by email at jhiramatsu@beltcollins.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH/JTK:ajk

Enclosures: Figure 1: Kapolei Development Around Project Site
Figure 2: Preliminary Site and Landscape Plan, Kapolei II Elementary School

cc: Ms. Gaylyn Nakatsuka - DOE

feet 2000

LEGEND	
★	Project Site
	Projects Completed as of 2012
	Leihano (Under Construction)

Figure 1
Kapolei Development Around Project Site

Sources:
Aerial imagery is from Google Earth and is approximately matched to lot lines for illustrative purposes.

BELT COLLINS

Figure 2: Preliminary Site and Landscape Plan, Kapolei II Elementary School

2. COMMENTS RECEIVED IN 2013, WITH RESPONSES

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

December 11, 2013

Belt Collins Hawaii LLC
Attention: Ms. Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@beltcollins.com

Dear Ms. Hiramatsu,

SUBJECT: Environmental Assessment (EA) Early Consultation, Proposed Kapolei II Elementary School, Department of Education Job No. Q82001-10

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; and (2) Engineering Division. 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

November 27, 2013

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) Early Consultation Proposed Kapolei II Elementary School, Department of Education Job No. Q82001-10
LOCATION: Tax Map Key: 9-1-016:158 and 9-1-158:62, 'Ewa, O`ahu, Hawai`i
APPLICANT: State of Hawai`i, Department of Education (DOE) by its consultant, Belt Collins Hawaii LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document.

Please submit any comments by December 11, 2013. 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: _____
Date: DEC 2nd, 2013

cc: Central Files

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

November 27, 2013

MEMORANDUM

RECEIVED
LAND DIVISION
2013 DEC -6 PM 2:47
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: FR:

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: TO: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment (EA) Early Consultation Proposed Kapolei II Elementary School, Department of Education Job No. Q82001-10
LOCATION: Tax Map Key: 9-1-016:158 and 9-1-158:62, 'Ewa, O`ahu, Hawai`i
APPLICANT: State of Hawai`i, Department of Education (DOE) by its consultant, Belt Collins Hawaii LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document.

Please submit any comments by December 11, 2013. 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: 12/5/13

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
REF: EA Early Consultation for Proposed Kapolei II Elementary School, DOE Job. No. Q82001-10, Ewa
Oahu 019

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 D, an area where flood hazards are undetermined.

( ) 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 or Ms. Ardis Shaw-Kim at (808) 768-8296 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) 270-7813 of the County of Maui, Department of Planning.
( ) Mr. Stanford Iwamoto at (808) 241-4884 of the County of Kauai, Department of Public Works.

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

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

( ) Additional Comments: _____

( ) Other: _____

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

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 12/5/13

January 22, 2014
2013-70-0700 / 14P-015

Mr. Russell Y. Tsuji, Land Administrator
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 11, 2013, and the Land and Engineering Divisions' input on the Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will include your information in the Draft EA, which is scheduled to be available for public review in the coming months.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
Belt Collins Hawaii is an Equal Opportunity Employer

NEIL ABERCROMBIE
GOVERNOR

RECEIVED
2013 NOV 20 PM 4:01
BELT COLLINS HAWAII

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

NOV 19 2013

(P)1272.3

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Environmental Assessment (EA) Early Consultation
Proposed Kapolei II Elementary School
Department of Education Job No. Q82001-10
Tax Map Key: 9-1-016:158 and 9-1-158:62
Ewa, Oahu, Hawaii

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, please call me at 586-0400 or your staff may call Mr. Alva Nakamura of the Public Works Division at 586-0488.

Sincerely,

DEAN H. SEKI
Comptroller

c: Ms Gaylyn Nakatsuka, DOE

January 22, 2014
2013-70-0700 / 14P-010

Mr. Dean Seki, Comptroller
Department of Accounting & General Services
State of Hawaii
P.O. Box 119
Honolulu, HI 96810-0119

Dear Mr. Seki:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated November 19, 2013, regarding the Kapolei II Elementary School Environmental Assessment (EA) and acknowledge you have no comments at this time.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
Belt Collins Hawaii is an Equal Opportunity Employer

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
2013 NOV 27 PM 1:46
BELT COLLINS HAWAII

LORETTA J. FUDDY, A.C.S.W., 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

11070PCTM.13

November 26, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt CollinsHawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Comments on the Environmental Assessment Early Consultation for the Proposed Kapolei II Elementary School Project Ewa, Island of Oahu, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated November 12, 2013, requesting comments on your project. 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. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://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. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the CWB Individual NPDES Form through the e-Permitting Portal and the hard copy certification statement with $1,000 filing fee. Please open the e-Permitting Portal

website at: https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the "CWB Individual NPDES Form." Follow the instructions to complete and submit this form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you 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 Hawaii Administrative Rules (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

CTM:jst

January 22, 2014
2013-70-0700 / 14P-009

Mr. Alec Wong, P.E., Chief
Clean Water Branch
Department of Health
State of Hawai‘i
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Wong:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O‘ahu, Hawai‘i

We thank you for your letter, dated November 26, 2013, and your input on the State Department of Education’s preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest in the Draft EA, which is scheduled to be available for public review in the coming months.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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GOVERNOR OF HAWAII

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BELT COLLINS HAWAII

LORETTA J. FUDDY, A.C.S.W., 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:

13-1029A CAB

December 10, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Environmental Assessment Early Consultation
Proposed Kapolei II Elementary School Project, Ewa, Oahu, Hawaii
Tax Map Key: 9-1-016:158 and 9-1-158:62

A significant potential for fugitive dust emissions exists during all phases of demolition and construction. The activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance problems.

We encourage the contractor to implement a dust control plan, which does not require approval by the Department of Health, to comply with the fugitive dust regulations. Dust control measures may include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing dust from shoulders and access roads;
e) Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling dust from debris being hauled away from the project site. Also, controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility.

If you have any questions, please contact Mr. Barry Ching of the Clean Air Branch at 586-4200.

Sincerely,

NOLAN S. HIRAI, P.E.
Manager, Clean Air Branch

BC:rg

January 22, 2014
2013-70-0700 / 14P-014

Mr. Nolan S. Hirai, P.E., Manager
Clean Air Branch
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Hirai:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 10, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest in the Draft EA, which is scheduled to be available for public review in the coming months. The Department of Education and the contractor (Kiewit) are aware of both State regulations concerning fugitive dust and effective procedures to deal with this problem in the Kapolei area.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
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GOVERNOR OF HAWAII

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

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

RECEIVED
2013 NOV 26 PM 1:19
BELT COLLINS HAWAII

In reply, please refer to:
File:
13-215
Kapolei II Elementary School

November 22, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Environmental Assessment Early Consultation
Proposed Kapolei II Elementary School
Department of Education Job No. Q82001-10
Tax Map Key: 9-1-016: 158 and 9-1-158: 62, Ewa, Oahu, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated November 12, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the Clean Air Branch, Clean Water Branch, Indoor & Radiological Health Branch, Solid & Hazardous Waste Branch, Wastewater Branch, and the Hazard Evaluation & Emergency Response Office. 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 standard comments specifically applicable to this application.

EPO suggests the applicant examine the many sources available on strategies to support the sustainable design of communities, including the:
State of Hawaii, Office of Planning: www.planning.hawaii.gov and the new 2013 ORMP;
U.H., School of Ocean and Earth Science and Technology: www.soest.hawaii.edu;
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability; and
U.S. Green Building Council's LEED program: www.usgbc.org/leed.

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. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We require a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to: epo@doh.hawaii.gov. We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office

January 22, 2014
2013-70-0700 / 14P-013

Laura Leialoha Phillips McIntyre, AICP, Manager
Environmental Planning Office
Department of Health
State of Hawai‘i
919 Ala Moana Blvd., Suite 312
Honolulu, HI 96814

Dear Ms. McIntyre:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O‘ahu, Hawai‘i

We thank you for your letter, dated November 22, 2013, and your input on the State Department of Education’s preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest in the Draft EA, which is scheduled to be available for public review in the coming months.

The proposed school will be built to LEED silver standard. It will incorporate design and operations procedures to reduce energy and water use.

Per your request, we are confirming receipt of your letter, along with letters from the Clean Air Branch and Clean Water Branch of your Department. These letters will be included in the Environmental Assessment.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk
cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
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OFFICE OF PLANNING
STATE OF HAWAII

NEIL ABERCROMBIE
GOVERNOR

JESSE K. SOUKI
DIRECTOR
OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http:/planning.hawaii.gov/

RECEIVED
2013 DEC 18 AM 10: 03
BELT COLLINS HAWAII

Ref. No. P-14209

December 17, 2013

Ms. Joanne E. Hiramatsu, Director of Planning
Belt Collins Hawaii, LLC.
2153 N. King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Environmental Assessment (EA) Early Consultation for Proposed Kapolei II Elementary School, Department of Education Job No. Q82001-10, Ewa, Oahu; TMK: 9-1-016:158 and 9-1-1-158:62

Thank you for the opportunity to provide early consultation comments on the new Kapolei II Elementary School development project in Ewa, Oahu.

We have reviewed the documents received by letter dated November 18, 2013, and have the following comments to offer:

1. The entire state is defined to be within the Coastal Zone Management Area, see Hawaii Revised Statutes (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. During the construction phase of this project, there is a possibility that nonpoint pollution may be generated and may have an impact on coastal waters. Please review the Hawaii Watershed Guidance, which provides a summary and links to management measures that may be implemented to minimize coastal nonpoint pollution impact. Specifically, please examine the management measures described in the section on Urban Areas/Urban Runoff (pages 120-122).

   The Hawaii Watershed Guidance can be viewed or downloaded from the Office of Planning website at http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HIWatershedGuidance Final.pdf.

3. For potential impacts to water resources from stormwater and inundation concerns, please consider utilizing the Office of Planning's Stormwater Impact Assessment, to incorporate into the environmental review process. Specifically examine Stormwater Design & Mitigation (page 11) and Low-Impact Development Concepts (page 14) of the Stormwater Impact 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.

4. The Draft EA should include the Coastal Zone Management Act, HRS Chapter 205A, in the list of "Relationship to Land Use Plans, Policies, and Controls."

If you have any questions regarding this comment letter, please contact Josh Hekekia of our Hawaii CZM Program at 587-2845.

Sincerely,

Jesse K. Souki
Director

c: Ms. Gaylyn Nakatsuka, Department of Education

January 22, 2014
2013-70-0700 / 14P-012

Mr. Jessie K. Souki, Director
Office of Planning
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Souki:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 17, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest in the Draft EA, which is scheduled to be available for public review in the coming months.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
RANDY GRUNE
AUDREY HIDANO
JADINE URASAKI

IN REPLY REFER TO:
STP 8.1432

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

December 24, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Kapolei II Elementary School
Department of Education, Job Number Q82001-10
Environmental Assessment (EA), Early Consultation
TMK: (1) 9-1-016:158 and 9-1-158:062

Our Department of Transportation's comments on the subject EA, Early Consultation are as follows:

DOT Airports Division

The project may be impacted by aircraft noise and overflights from Honolulu International Airport and Kalaeloa Airport.

DOT Highways Division

The Draft EA should discuss and evaluate the project's contribution to the cumulative traffic impacts on State highways facilities.

If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7977.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

January 22, 2014
2013-70-0700 / 14P-011

Mr. Glenn M. Okimoto, Ph.D., Director
Department of Transportation
State of Hawai'i
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Okimoto:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 24, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. The Draft EA, which is scheduled to be available for public review in the coming months, includes a Traffic Impact Assessment Report and a Noise Study. These reports address your concerns with traffic and noise from air transportation.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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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

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KIRK CALDWELL
MAYOR

CHRIS T. TAKASHIGE, P.E., CCM
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

December 13, 2013

Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Attn: Joanne Hiramatsu

Dear Ms. Hiramatsu:

Subject: Environmental Assessment (EA) Early Consultation Proposed Kapolei II Elementary School Department of Education Job No. Q82001-10 Tax Map Key: 9-1-016:158 and 9-1-158:62 Ewa, Oahu, Hawaii

The Department of Design and Construction does not have any comments to offer on the environmental assessment early consultation.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

for M. Yonamine

Chris T. Takashige, P.E., CCM
Director

CTT: cf (538357)

January 22, 2014
2013-70-0700 / 14P-001

Mr. Chris T. Takashige, P.E., CCM, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, HI 96813

Dear Mr. Takashige:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 13, 2013, regarding the Kapolei II Elementary School Environmental Assessment (EA) and acknowledge you have no comments at this time.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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DEPARTMENT OF EMERGENCY MANAGEMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
PHONE: (808) 723-8960 • FAX: (808) 523-3439

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KIRK CALDWELL
MAYOR

MELVIN N. KAKU
DIRECTOR

PETER J.S. HIRAI
DEPUTY DIRECTOR

November 25, 2013

Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: EA Early Consultation Proposed Kapolei II Elementary School
DOE Job No. Q82001-10, Tax Map Key: 9-1-016:158 and 9-1-158:62
`Ewa, O`ahu, Hawai`i

The City and County of Honolulu, Department of Emergency Management (DEM) recognizes the need to accommodate the increasing enrollment of school children grades Pre-K through 5. We also recognize that emergency safeguard considerations need to be built into new school plans being developed to include classrooms and buildings which can serve as:

- Shelter-In-Place venues for students and school staff in the event of a possible active shooter on campus or hazardous material dispersed into the atmosphere from nearby Campbell Industrial Park
- Emergency Evacuation Shelter to accommodate the increasing number of people in the Kapolei area in the event of a hurricane, fire or other disaster that would force people to seek shelter away from their homes

Your consideration to include these features in this new school's building construction plans would be greatly appreciated. Should you have any questions, feel free to contact me at 808-723-8960.

Sincerely,

Melvin N. Kaku
Director

cc: DOE Safety, Security and Emergency Preparedness Branch

January 22, 2014
2013-70-0700 / 14P-004

Mr. Melvin N. Kaku, Director
Department of Emergency Management
City and County of Honolulu
850 South King Street
Honolulu, HI 96813

Dear Mr. Kaku:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated November 25, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest—shelter in place venues and emergency evacuation shelter design—in the Draft EA, which is scheduled to be available for public review in the coming months.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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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

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KIRK CALDWELL
MAYOR

GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2013/ELOG-2185 (MS)

December 2, 2013

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

SUBJECT: Pre-Assessment Consultation for Environmental Assessment
Development of Kapolei II Elementary School
1250 Luakalai Street - Kapolei
Tax Map Key 9-1-158: 62

This is in response to your letter dated November 12, 2013, requesting comments regarding the preparation of the Draft Environmental Assessment (EA) for development of the above property. The new Kapolei II Elementary School will be located on a site zoned R-5 Residential District. Based on the summary information and location map you submitted, we offer the following preliminary comments:

1. The Draft EA should include a discussion on relevant plans and policies, including but not limited to the City's General and Development Plans and Urban Design Plan. Also, discuss how the project conforms or is consistent with the Land Use Ordinance, specifically the R-5 Residential District Development Standards.

2. A preliminary site plan was provided with the letter. The Draft EA should include a site plan (drawn to scale) showing the boundaries of the site, and existing and proposed structures and parking. The site plan should also identify the required yard setbacks and site access.

3. Please note that the site is within the Ewa Highway Master Plan. A discussion of its applicability should be included in the Draft EA.

Thank you for the opportunity to review the project. We would like to review the Draft EA when it becomes available. If you have any questions, please contact Malynne Simeon of our staff at 768-8023.

Very truly yours,

for George I. Atta, FAICP
Director

GIA:nw

January 22, 2014
2013-70-0700 / 14P-002

Mr. George I. Atta, FAICP, Director
Department of Planning and Permitting
City and County of Honolulu
650 South Street, 7th Floor
Honolulu, HI 96813

Dear Mr. Atta:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 2, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. The Draft EA, which is scheduled to be available for public review in the coming months, will address your areas of concern, including fit with City and County Plans, the Land Use Ordinance, and the 'Ewa Highway Master Plan.

The project is designed to conform with City standards. The school site is zoned A-1, and only a secondary access is on R-5 land. Setbacks are shown in the preliminary site plan. A final site plan with measured setbacks will be submitted for permit applications.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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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

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KIRK CALDWELL
MAYOR

MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

TP11/13-539092R

December 20, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Pre-Consultation for Draft Environmental Assessment (DEA) Kapolei II Elementary School, Department of Education Job No. Q82001-10; Tax Map Keys (TMK): 9-1-016: 158 and 9-1-158:62; Ewa, Oahu, Hawaii

In response to your letter dated November 18, 2013, we have the following comments:

1. The DEA should include a traffic impact assessment report (TIAR). The TIAR should discuss the traffic and pedestrian impacts on the surrounding City roadways as a result of the project, including short-term impacts during construction and any proposed mitigating measures consistent with the City's Complete Streets policy. The TIAR should also discuss and recommend mitigative measures (i.e., speed bumps, etc.) to ensure that the designated pedestrian crossing points to the future school are safe.

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. The DEA should include a description of public transit routes in the area and the impact of your project on TheBus and paratransit operations during construction. There are several bus stops near the project. Two stops are on Kapolei Parkway near Fort Barrette Road serves Routes 41 and 411. Another, two stops are on Roosevelt Avenue near Fort Barrette

Road/Enterprise Avenue serve Routes 41 and 415. Basic information is available on our websites: www.thebus.org and www.honolulu.gov/dts. For more details, you may contact our staff at 768-8370.

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: Ms. Gaylyn Nakatsuka,
Department of Education

January 22, 2014
2013-70-0700 / 14P-003

Mr. Michael D. Formby, Director
Department of Transportation Services
City and County of Honolulu
850 South King Street
Honolulu, HI 96813

Dear Mr. Formby:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated December 10 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. The Draft EA, which is scheduled to be available for public review in the coming months, includes a Traffic Impact Assessment Report and a discussion of public transportation in the environs. Your concerns with Complete Streets and Safe Routes to School will be addressed in future Construction Traffic Management and Traffic Management Plans.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

638 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

2013 DEC -2 PM 2:04
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

November 27, 2013

Ms. Joanne Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Environmental Assessment Early Consultation
Proposed Kapolei II Elementary School
Department of Education Job No. Q82001-10
Tax Map Keys: 9-1-016: 158 and 9-1-158: 062

In response to your letter of November 12, 2013, 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 (46 m) 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 ft (15 m) 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 (45 720 mm) 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. Submit civil drawings to the HFD for review and approval.

Should you have questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151 or sbratakos@honolulu.gov.

Sincerely,

ROLLAND J. HARVEST
Assistant Chief

RJH/SY:bh

January 22, 2014
2013-70-0700 /14P-005

Mr. Rolland J. Harvest, Assistant Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, HI 96813-5007

Dear Mr. Harvest:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated November 27, 2013, regarding the Kapolei II Elementary School Environmental Assessment (EA). Your areas of concern—fire department access to buildings and fire flow—have been considered in project design and will be addressed in the Draft EA, which is scheduled to be available for public review in the coming months.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

RECEIVED
2013 DEC -2 PM 2:04
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KIRK CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE KN-WS

November 26, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

This is in response to your letter dated November 12, 2013, requesting comments on an Environmental Assessment Early Consultation for the proposed, new Kapolei II Elementary School project in Ewa.

The Honolulu Police Department has no specific concerns at this time. We are accepting your offer to be consulted in the preparation of the environmental assessment, particularly in the traffic study.

Thank you for the opportunity to review the subject application.

If there are any questions, please contact Major Kerry Inouye of District 8 (Kapolei) at 723-8403 or via e-mail at kinouye@honolulu.gov.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By for
RANDAL K. MACADANGDANG
Assistant Chief
Support Services Bureau

January 22, 2014
2013-70-0700 / 14P-006

Mr. Randal K. Macadangdang, Assistant Chief
Support Services Bureau
Police Department
801 South Beretania Street
Honolulu, HI 96813

Dear Mr. Macadangdang:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your letter, dated November 26, 2013, regarding the Kapolei II Elementary School Environmental Assessment (EA) and acknowledge you have no comments at this time.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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Joanne Hiramatsu

From: Liu, Rouen [rouen.liu@heco.com]
Sent: Friday, December 20, 2013 11:02 AM
To: Joanne Hiramatsu
Subject: EA Early Consultation - proposed Kapolei II Elementary School

Dear Ms. Hiramatsu,

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 Kapolei II Elementary School project 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 Liu
Permits Engineer
Hawaiian Electric Company

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January 22, 2014
2013-70-0700 / 14P-007

Mr. Rouen Q.W. Liu, Permits Engineer
Hawaiian Electric Company
820 Ward Avenue
Honolulu, HI 96813

Dear Mr. Liu:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, O'ahu, Hawai'i

We thank you for your email, dated December 20, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. The DOE will continue to coordinate with and include Hawaiian Electric Company in the review of its improvement plans.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk

cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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Joanne Hiramatsu

From: Kiersten Faulkner [Kiersten@historichawaii.org]
Sent: Monday, December 30, 2013 3:21 PM
To: Joanne Hiramatsu
Subject: Kapolei II Elementary School EA

Aloha Joanne,
Historic Hawai'i Foundation received the notice for early consultation for an environmental assessment for the proposed Kapolei II Elementary School.

Have any known historic or cultural resources been identified that may be affected by the project? In addition to any resources on the site, we are also concerned with indirect and cumulative effects that may occur from off-site traffic improvements. In particular, are any new or expanded crossings of the historic OR&L railroad right of way likely to be proposed? I can't tell from the location map if it is in the vicinity of the OR&L or not.

Please let me know, both about OR&L and any other historic properties.

Mahalo,
Kiersten

Kiersten Faulkner, AICP
Executive Director
Historic Hawaii Foundation
680 Iwilei Rd., Ste. 690
Honolulu, HI 96817
Tel: 808-523-2900
FAX: 808-523-0800
Email: kiersten@historichawaii.org
WEB: www.historichawaii.org

HISTORIC HAWAI'I FOUNDATION

January 22, 2014
2013-70-0700 /14P-008

Ms. Kiersten Faulkner, AICP, Executive Director
Historic Hawaii Foundation
680 Iwilei Road, Suite 690
Honolulu, HI 96817

Dear Ms. Faulkner:

Early Consultation for Environmental Assessment
Proposed Kapolei II Elementary School
Tax Map Key: (1) 9-1-160:24 and 9-1-158: 62
Kapolei, Oʻahu, Hawaiʻi

We thank you for your letter, dated December 17, 2013, and your input on the State Department of Education's preparation of an Environmental Assessment (EA) for the proposed Kapolei II Elementary School. We will address your areas of interest in the Draft EA, which is scheduled to be available for public review in the coming months.

No historic properties or remains have been found on the site, which has long been disturbed by plantation agriculture, and more recently by clearing for urban development. The makai boundary of the school site is about 0.2 miles from the OR & L crossing at Fort Barrette Road. School related traffic is not expected to affect the level of service on that roadway at intersections nearer to the school site. No new crossings of the railroad right of way are anticipated. Please note that, since the Hawaii Railway Society train operates on Sundays, when school is not in session, we anticipate no interaction between the school and railway operations.

We look forward to your continued participation in this EA review process.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

JEH:jdk
cc: Gaylyn Nakatsuka, DOE

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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APPENDIX B

TRAFFIC IMPACT REPORT

Traffic Impact Report

Kapolei II Elementary School

Prepared for:
Kiewit Building Group, Inc.
KYA Design Group, Inc.

Prepared by:
Wilson Okamoto Corporation

December 2013

TRAFFIC IMPACT REPORT

FOR THE

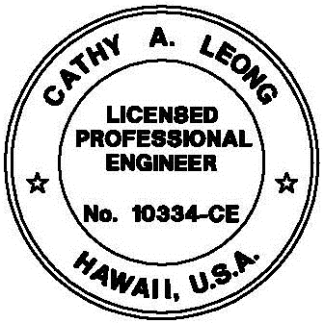
KAPOLEI II ELEMENTARY SCHOOL

Prepared for:

Kiewit Building Group, Inc.
650 Iwilei Road
Honolulu, HI 96817
and
KYA Design Group, Inc.
934 Pumehana Street
Honolulu, HI 96826

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #10027-01



December 2013

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from a proposed Kapolei II Elementary School located in Kapolei on the island of Oahu. The new elementary school is intended to accommodate the increasing demand in the Kapolei region in support of the existing Kapolei Elementary School.

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.

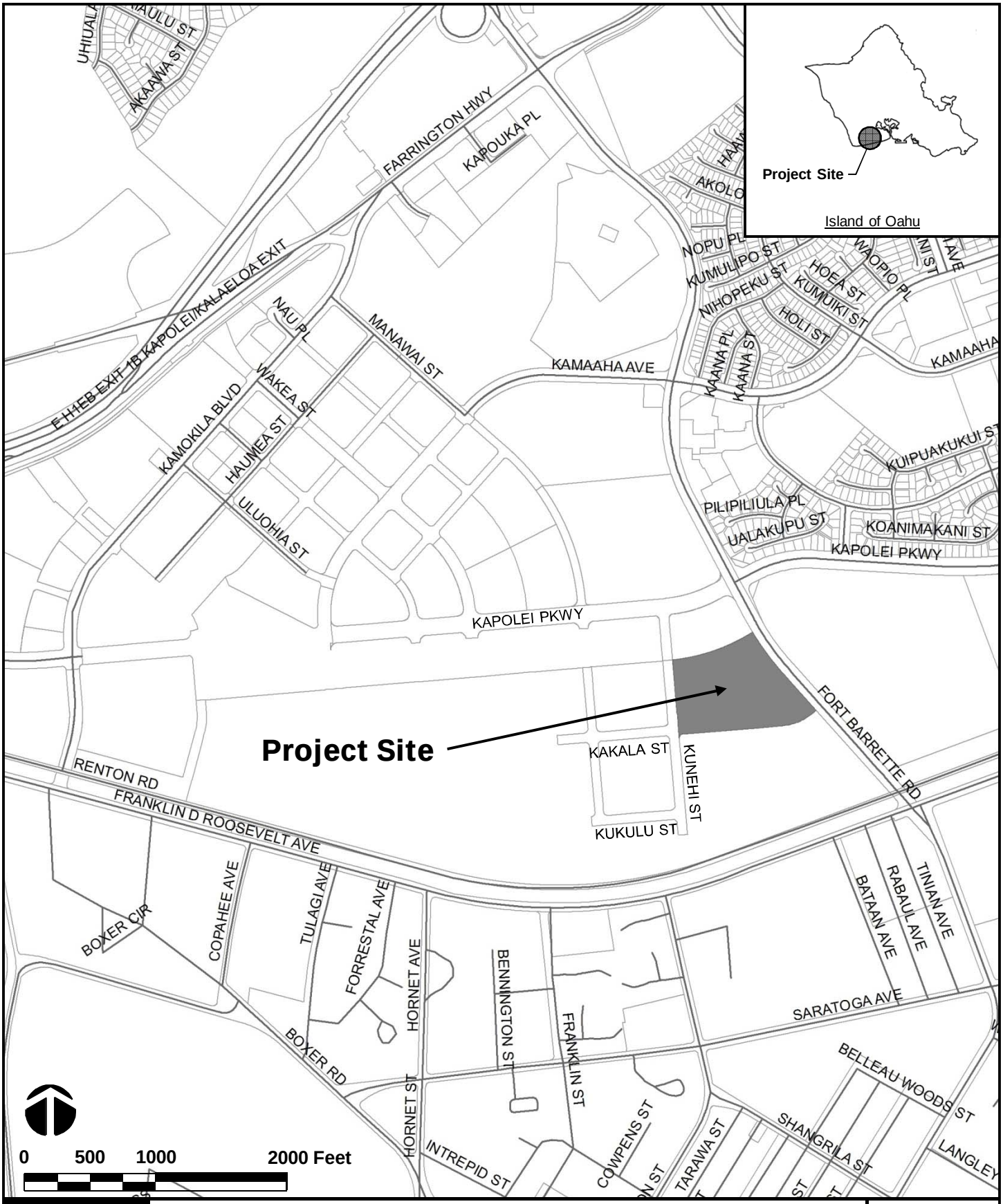
II. PROJECT DESCRIPTION

A. Location

The proposed project site is located adjacent to Kunehi Street south of Kapolei Parkway within the Mehana Subdivision in Kapolei on the island of Oahu (see Figure 1). Primary access to the proposed school will be provided via driveways off Kunehi Street.

B. Project Characteristics

The proposed project entails the development of a new elementary school within the Kapolei area. The elementary school is expected to serve a maximum enrollment of 750 students and include classrooms, administrative offices, support facilities, and parking areas. Figure 2 shows the proposed site plan.

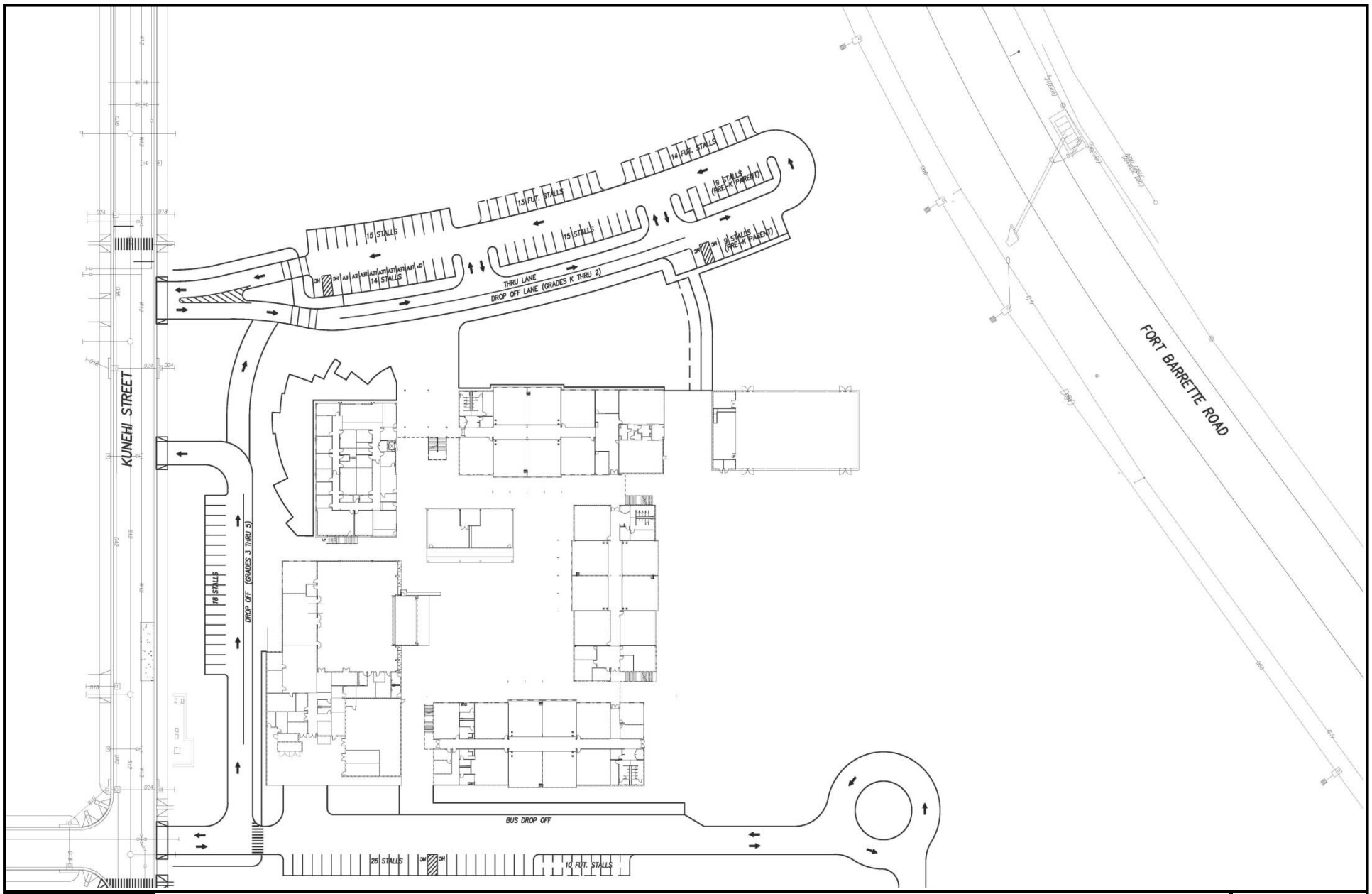


WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

LOCATION MAP AND VICINITY MAP

FIGURE 1



WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

PROJECT SITE PLAN

FIGURE 2

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

The proposed project site is located adjacent to Kunehi Street, a two-lane, two-way roadway generally oriented in the north-south direction between Kapolei Parkway and Kukulu Street. At the unsignalized T-intersection with Kapolei Parkway, Kunehi Street has one stop-controlled lane that serves left-turn and right-turn traffic movements. In the vicinity of the project site, Kapolei Parkway is a predominantly six-lane, two-way roadway generally oriented in the east-west direction. At the intersection with Kunehi Street, the eastbound approach of Kapolei Parkway has two through lanes and a shared right-turn and through lane while the westbound approach has three through lanes and an exclusive left-turn lane.

East of the intersection with Kunehi Street, Kapolei Parkway intersects Ft. Barrette Road. At this signalized intersection, both directions of Kapolei Parkway have exclusive turning lanes and one through lane. In the vicinity of the project site, Ft. Barrette Road is a predominantly two-lane, two-way roadway generally oriented in the north-south direction. At the intersection with Kapolei Parkway, the northbound approach of Ft. Barrette Road has exclusive turning lanes and one through lane while the southbound approach has an exclusive left-turn lane and a shared through and right-turn lane.

North of the intersection with Kapolei Parkway, Ft. Barrette Road intersects Kamaaha Avenue. At this signalized intersection, the northbound approach of Ft. Barrette Road has two exclusive left-turn lanes, a through lane, and an exclusive right turn lane while the southbound approach has exclusive turning lanes and one through lane. Both approaches of Kamaaha Avenue have exclusive turning lanes and one through lane at this intersection.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted in February and November 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:

- Kunehi Street and Kapolei Parkway
- Kapolei Parkway and Ft. Barrette Road
- Ft. Barrette Road and Kamaaha Avenue

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.

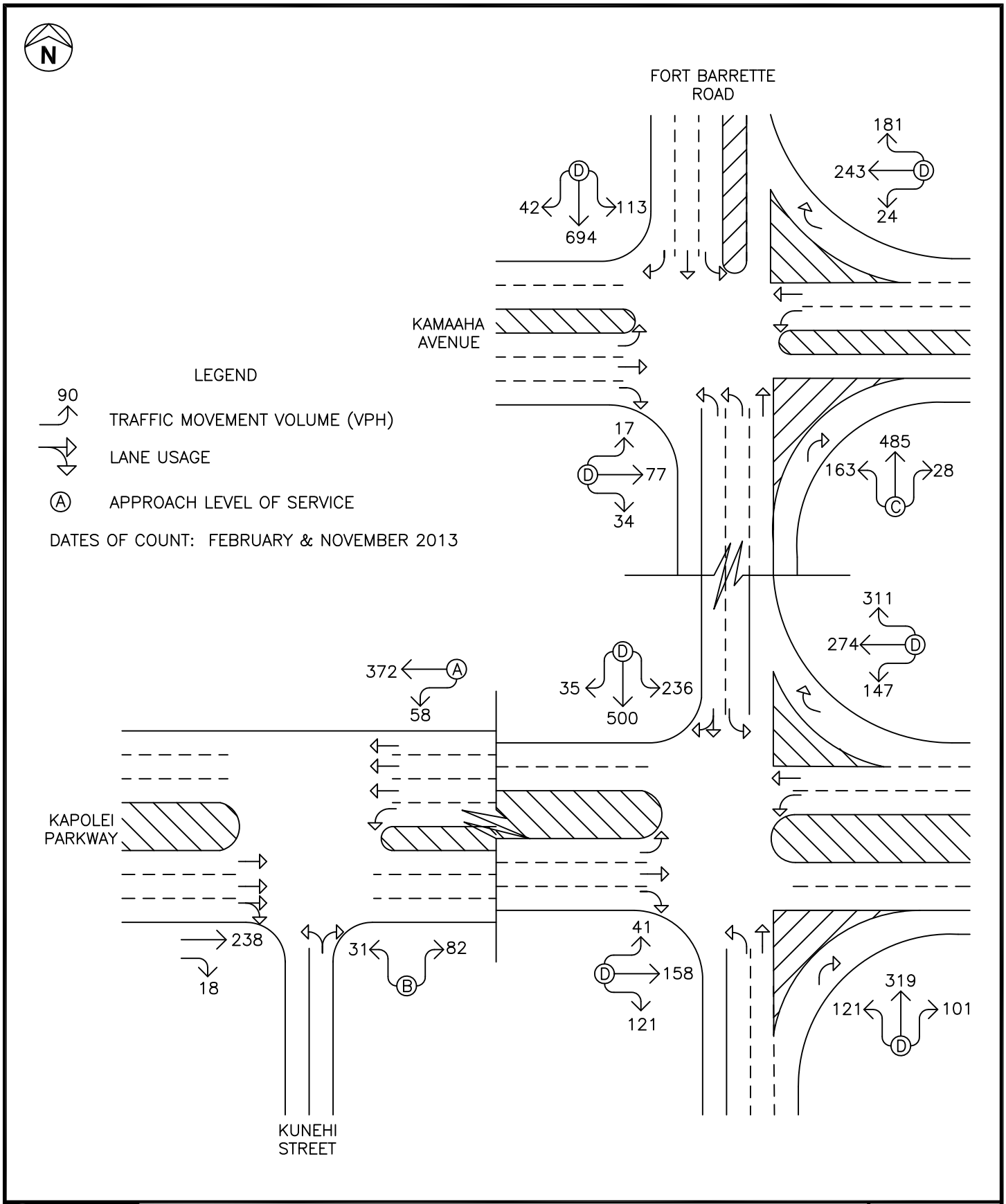
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"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 3 and 4 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 4:30 PM and 5:30 PM.

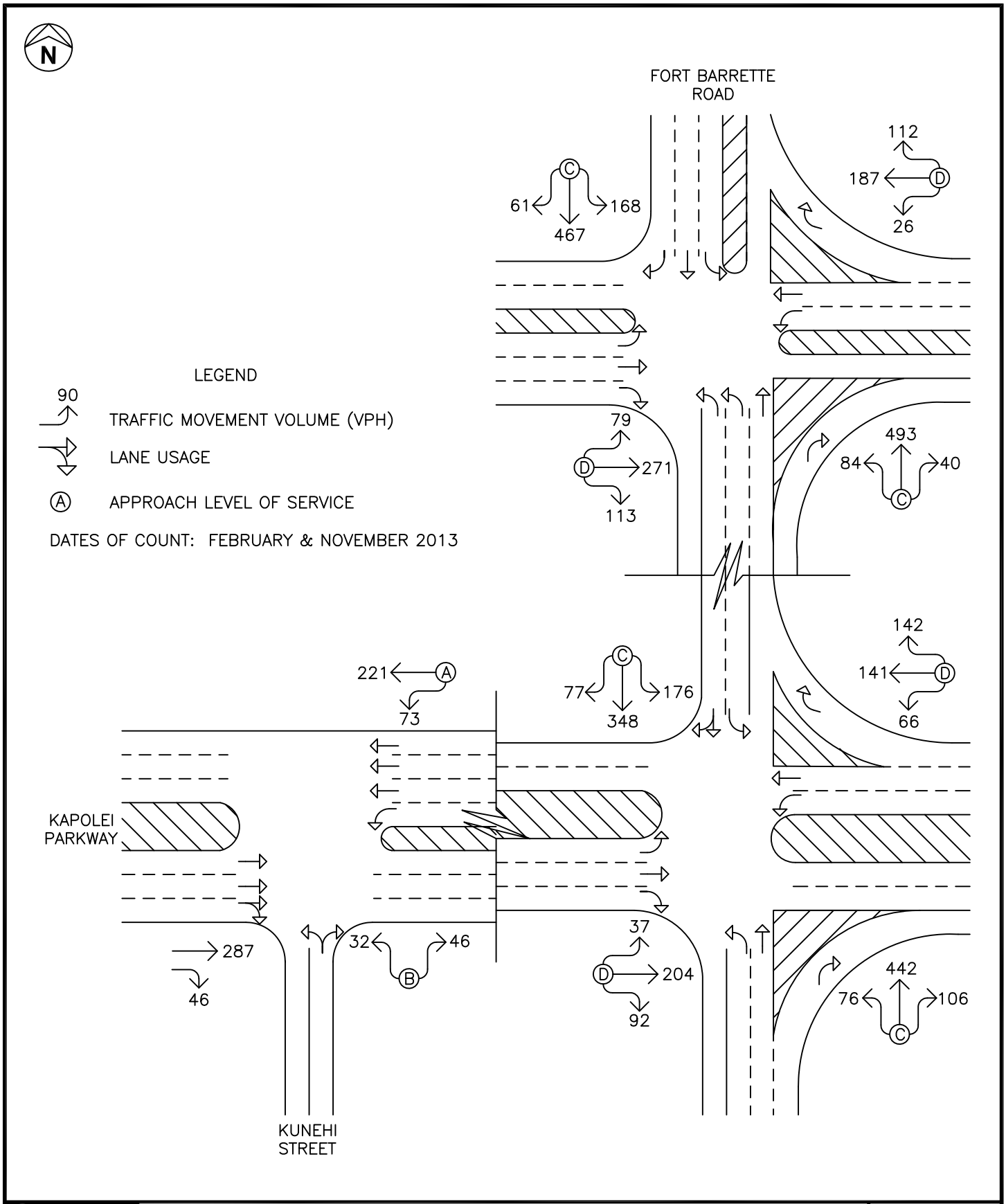


WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

EXISTING AM PEAK HOUR OF TRAFFIC

FIGURE 3



WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

EXISTING PM PEAK HOUR OF TRAFFIC

FIGURE 4

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. Kunehi Street and Kapolei Parkway

At the intersection with Kapolei Parkway, the Kunehi Street approach carries 113 vehicles northbound during the AM peak period and 78 vehicles northbound during the PM peak period. The northbound approach of Kunehi Street operates at LOS "A" during both peak periods.

Kapolei Parkway carries 256 vehicles eastbound and 430 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is slightly lower with 333 vehicles traveling eastbound and 294 vehicles traveling westbound. The westbound approach of Kapolei Parkway operates at LOS "A" during both peak periods.

c. Kapolei Parkway and Ft. Barrette Road

At the intersection with Kapolei Parkway, Ft. Barrette Road carries 541 vehicles northbound and 771 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is lower with 624 vehicles traveling northbound and 601 vehicles traveling southbound. Both approaches of Ft. Barrette Road operate at LOS "D" and LOS "C" during the AM and PM peak periods, respectively.

Kapolei Parkway carries 320 vehicles eastbound and 732 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 333 vehicles traveling eastbound and 349 vehicles traveling westbound. Both approaches of Kapolei Parkway operate at LOS "D" during both peak periods.

d. Ft. Barrette Road and Kamaaha Avenue

At the intersection with Kamaaha Avenue, Ft. Barrette Road carries 676 vehicles northbound and 849 vehicles southbound during

the AM peak period. During the PM peak period, traffic volumes are less with 617 vehicles traveling northbound and 696 vehicles traveling southbound. The northbound approach of Ft. Barrette Road operates at LOS "C" during both peak periods while the southbound approach operates at LOS "D" and LOS "C" during the AM and PM peak periods, respectively.

Kamaaha Avenue carries 128 vehicles eastbound and 448 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 463 vehicles traveling eastbound and 325 vehicles traveling westbound. Both approaches of Kamaaha Avenue operate at LOS "D" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 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 student. The new elementary school is intended to accommodate the increasing demand in the Kapolei region in support of the existing Kapolei Elementary School. A large portion of the students attending the school are expected to live within the adjacent Mehana Subdivision. As such, a portion of the entering trips during the AM peak period and a portion of the exiting trips during the PM peak period are expected to have origins/destinations within that subdivision. Table 1 summarizes the external project site trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 1: External Peak Hour Trip Generation

ELEMENTARY SCHOOL INDEPENDENT VARIABLE: # of students = 750		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	47
	EXIT	152
	TOTAL	199
PM PEAK	ENTER	55
	EXIT	15
	TOTAL	70

2. Trip Distribution

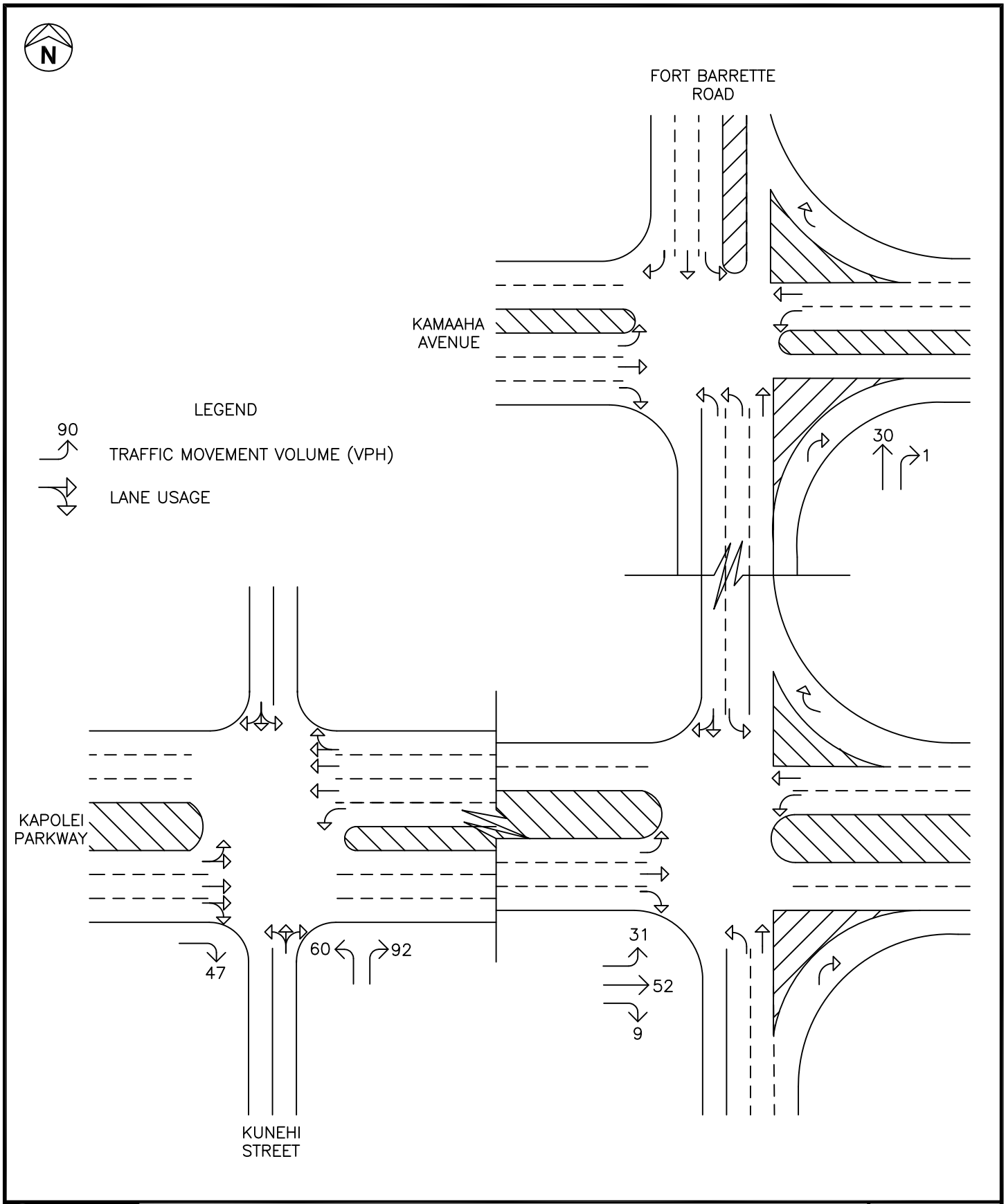
Figures 5 and 6 show the distribution of external site-generated vehicular trips at the study intersections during the Year 2018 peak periods. Access to Kapolei II Elementary School will be provided via driveways off Kunehi Street. The directional distribution of vehicles was based upon the trip distribution percentages derived from the Oahu Metropolitan Planning Organization (OMPO) 2035 regional travel forecasting model. The trips were then routed though the surrounding roadway network based upon their assumed origin/destination and the relative convenience of the available routes. Appendix D includes the trip distribution percentages.

B. Through Traffic Forecasting Methodology

The section of Kapolei Parkway in the vicinity of proposed school is fairly new and not yet complete. As such, there is no available historical data to obtain a historical trend for the growth of traffic along that roadway. For the purpose of this report, an average annual growth rate of 2.0% per year was conservatively assumed in the project vicinity to account for ambient growth in traffic. Using 2013 as the Base Year, a growth rate of 1.10 was applied to the existing traffic demands at the study intersections to achieve the projected Year 2018 traffic demands.

C. Other Considerations

The section of Kapolei Parkway within the project vicinity is expected to be extended further west to connect to an existing segment of the roadway west of Parkway will serve as an alternate east-west route through the Kapolei area. The

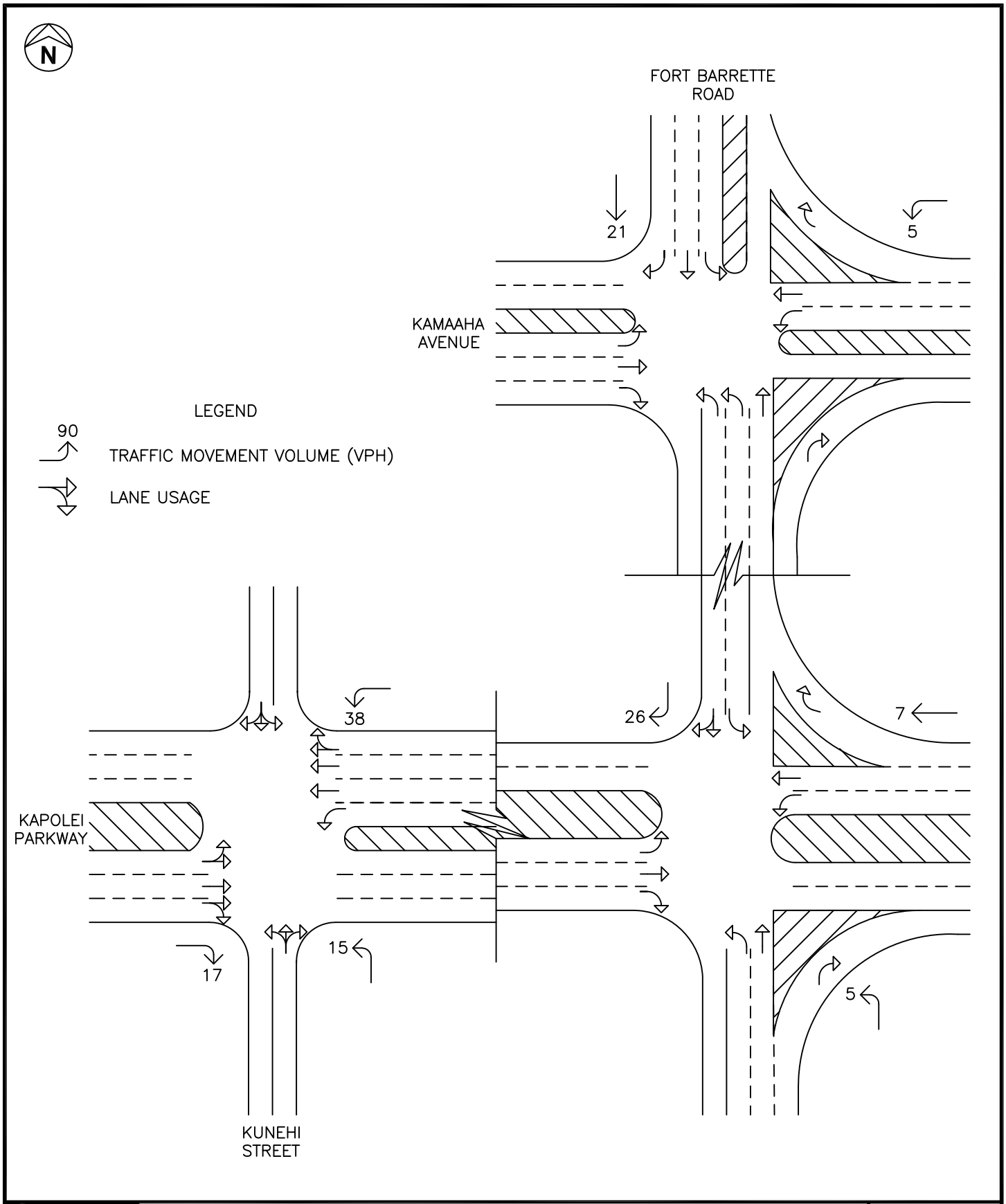


WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

DISTRIBUTION OF SITE-GENERATED VEHICLES - AM PEAK PERIOD

FIGURE 5



WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

DISTRIBUTION OF SITE-GENERATED VEHICLES - PM PEAK PERIOD

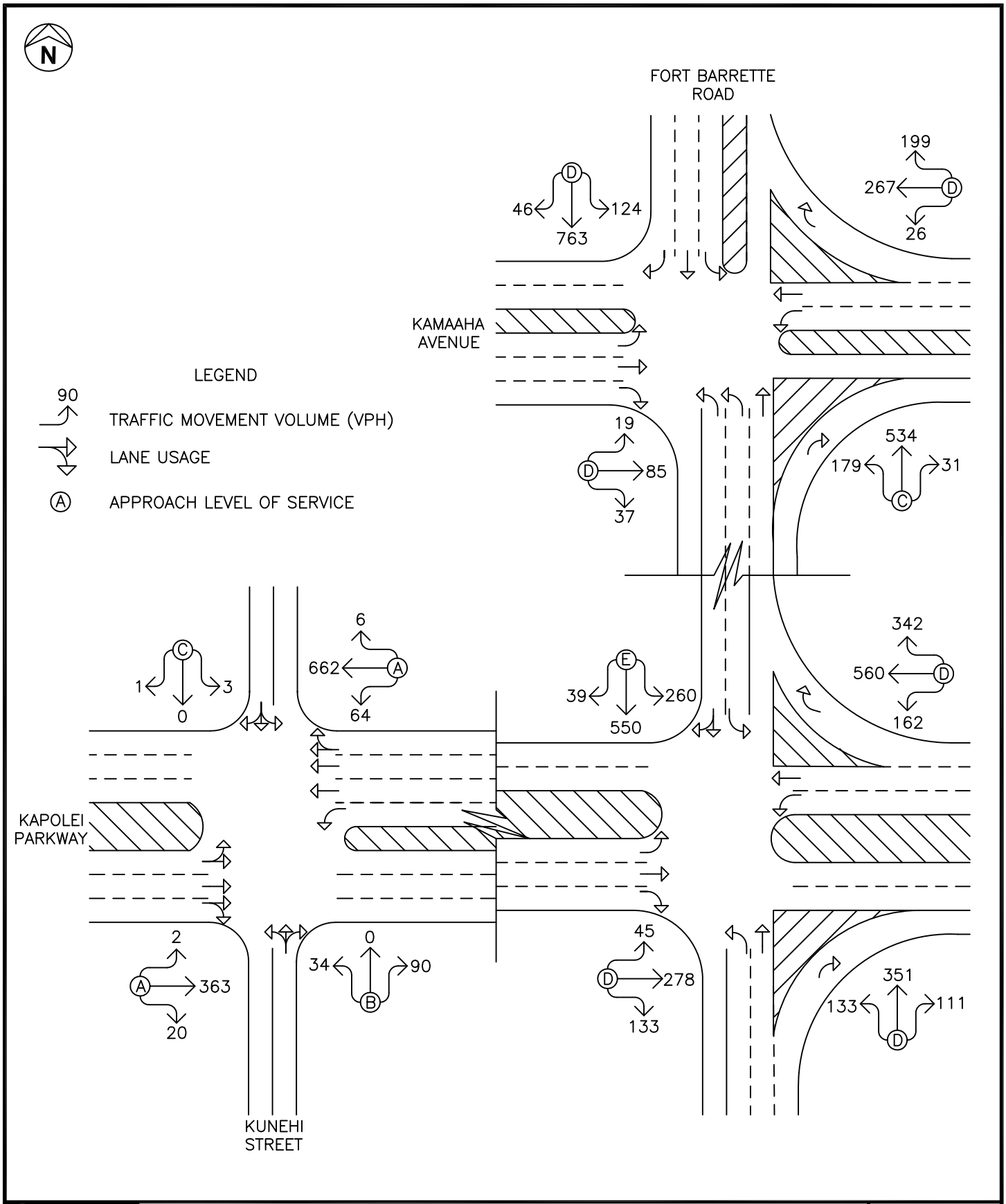
FIGURE 6

traffic distribution within the region is expected to shift due to the availability of a new east-west route. As such, the volume of through traffic along Kapolei Parkway is expected to increase as motorists choose to utilize that roadway instead of Kamokila Boulevard and Roosevelt Avenue. Based upon the projections included in the "Comprehensive Transportation Analysis Report for Kapolei," the through volumes along Kapolei Parkway were modified to reflect the anticipated route changes under without project conditions.

In addition, a new project is planned adjacent to Kunehi Street north of Kapolei Parkway. Phase 1 of the Ilima at Leihano Senior Living Development is expected to be completed by the Year 2015 and include approximately 90 beds. Primary access to Phase 1 of the project will be provided via an extension of Kunehi Street on the north side of Kapolei Parkway. Although the development is expected to include additional phases in the future, the details and implementation schedule for these phase are not know at this time. As such, only the traffic associated with Phase 1 of the development was incorporated into without project conditions.

D. Total Traffic Volumes Without Project

The projected Year 2018 AM and PM peak period traffic volumes and operating conditions without the proposed Kapolei II Elementary School are shown in Figures 7 and 8, and summarized in Table 2. The traffic signal phasing and timing at the intersection of Kapolei Parkway with Ft. Barrette Road is assumed to be modified to accommodate the anticipated increases in traffic along Kapolei Parkway. These modifications are assumed to include the removal of the existing split phasing of the eastbound and westbound approaches of the intersection. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix E.

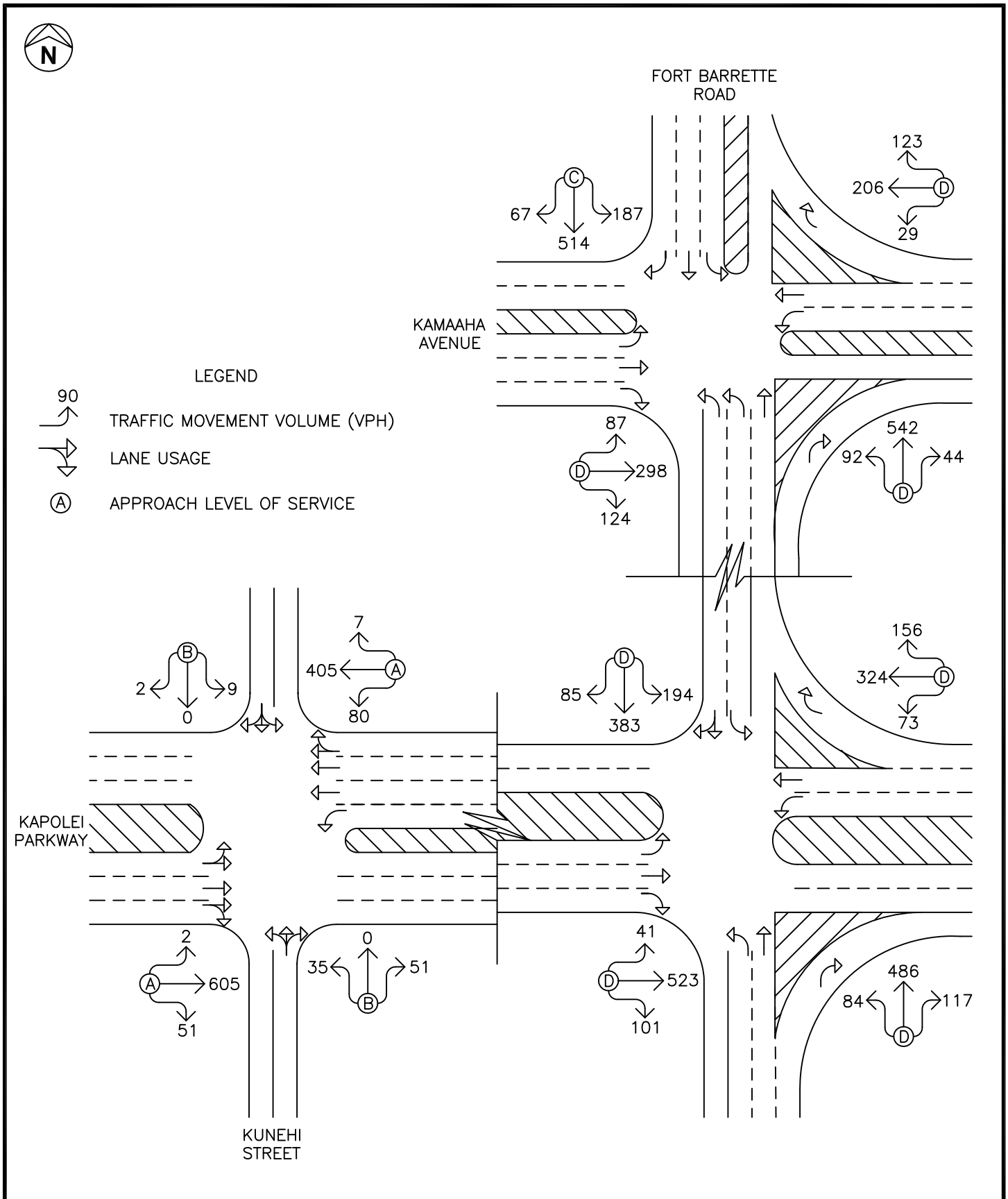


KAPOLEI II ELEMENTARY SCHOOL

YEAR 2018 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 7

WILSON OKAMOTO CORPORATION



KAPOLEI II ELEMENTARY SCHOOL

YEAR 2018 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 8

WILSON OKAMOTO CORPORATION

Table 2: Existing and Projected Year 2018 (Without Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Exist	Year 2018 w/out Proj	Exist	Year 2018 w/out Proj
Kunehi St/ Kapolei Pkwy	Eastbound	-	A	-	A
	Westbound	A	A	A	A
	Northbound	B	B	B	B
	Southbound	-	C	-	B
Kapolei Pkwy/ Ft. Barrette Rd*	Eastbound	D	D	D	D
	Westbound	D	D	D	D
	Northbound	D	D	C	D
	Southbound	D	E	C	D
Ft Barrette Rd/ Kamaaha Ave	Eastbound	D	D	D	D
	Westbound	D	D	D	D
	Northbound	C	C	C	D
	Southbound	D	D	C	C

*Traffic signal phasing and timing modified.

Under Year 2018 without project conditions, traffic operations are expected to deteriorate from existing conditions due to the anticipated shifts in traffic distribution within the Kapolei region, expected growth in ambient traffic along the surrounding roadways, and development of other projects in the vicinity. At the intersection of Kunehi Street with Kapolei Parkway, the approaches of the intersection are expected to operate at LOS "C" or better during the AM peak period and LOS "B" or better during the PM peak period. Along Ft. Barrette Road, the approaches of the intersection with Kapolei Parkway are expected to operate at LOS "D" during both peak periods with the exception of the southbound approach during the AM peak period which is expected to operate at LOS "E." At the intersection with Kamaaha Avenue, the approaches of the intersection are expected to operate at LOS "D" or better during both peak periods.

E. Total Traffic Volumes With Project

Figures 9 and 10 show the Year 2018 cumulative AM and PM peak hour traffic conditions that result from the projected external traffic and the Kapolei II Elementary School. The cumulative volumes consist of site-generated traffic superimposed over Year 2018 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

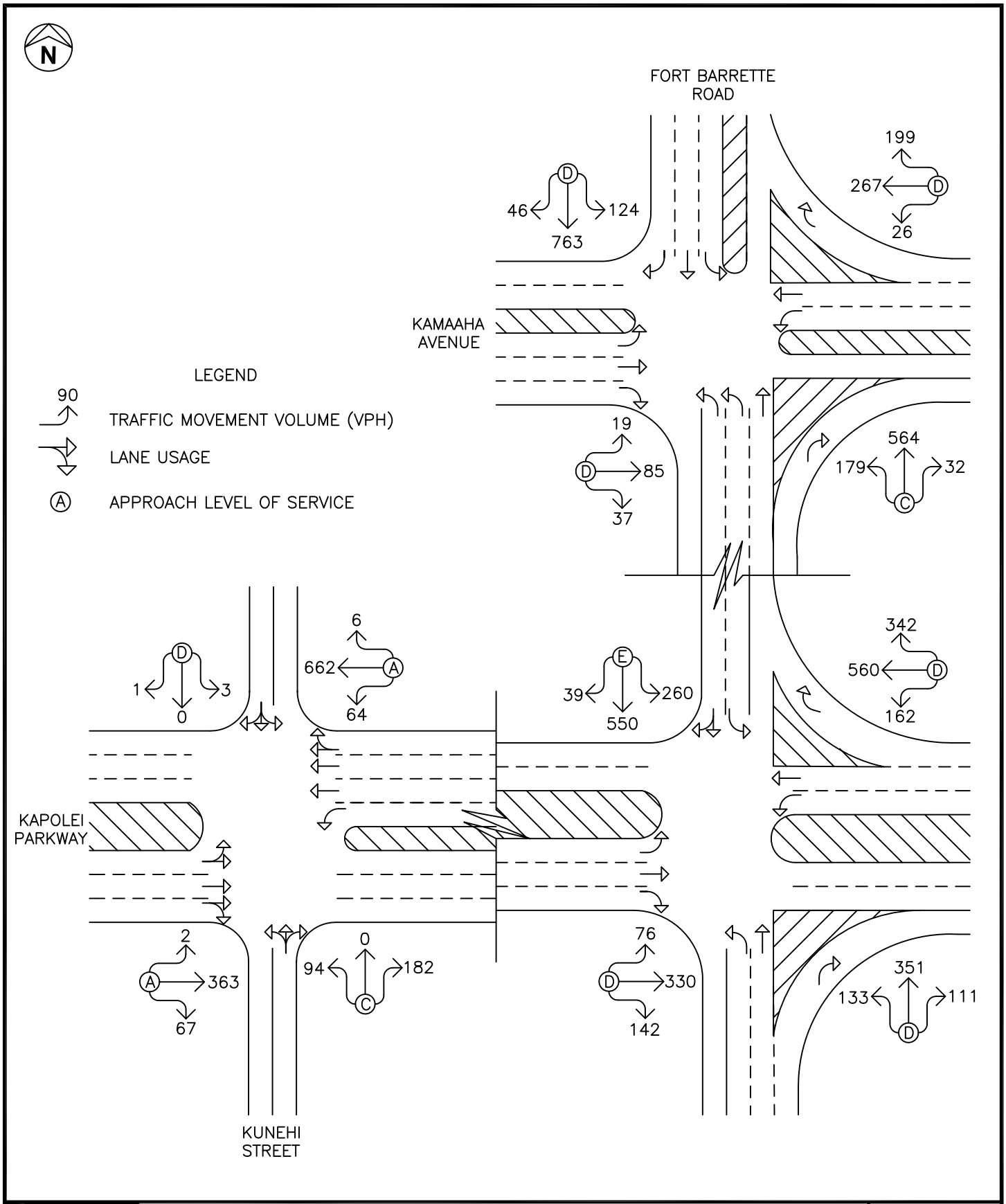
V. TRAFFIC IMPACT ANALYSIS

The projected Year 2018 AM and PM peak period traffic volumes and operating conditions with the proposed Kapolei II Elementary School are summarized in Table 3. The projected Year 2018 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix F.

Table 3: Projected Year 2018 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		w/out Proj	w/ Proj	w/out Proj	w/ Proj
Kunehi St/ Kapolei Pkwy	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	B	C	B	C
	Southbound	C	D	B	C
Kapolei Pkwy/ Ft. Barrette Rd	Eastbound	D	D	D	D
	Westbound	D	D	D	D
	Northbound	D	D	D	D
	Southbound	E	E	D	D
Ft. Barrette Rd/ Kamaaha Ave	Eastbound	D	D	D	D
	Westbound	D	D	D	D
	Northbound	C	C	D	D
	Southbound	D	D	C	C

Under Year 2018 with project conditions, traffic operations along Ft. Barrette Road are generally expected to remain similar to without project conditions despite the addition of site-generated vehicles to the surrounding roadways. Traffic operations at the intersections with Kapolei Parkway and Kamaaha Avenue are expected to continue operating at LOS "D" or better during both peak periods with the exception of the southbound approach of the

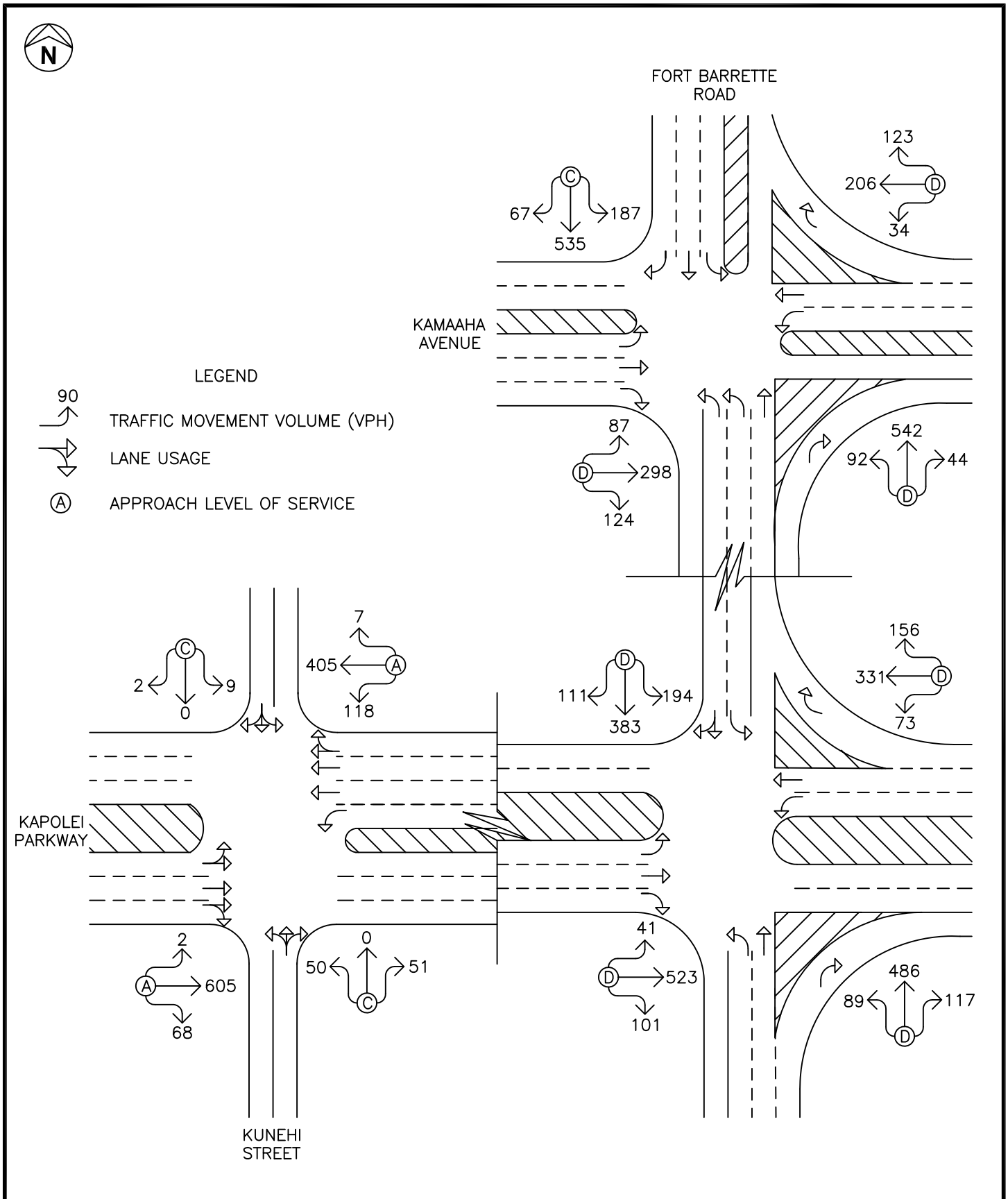


WILSON OKAMOTO CORPORATION

KAPOLEI II ELEMENTARY SCHOOL

YEAR 2018 AM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 9



KAPOLEI II ELEMENTARY SCHOOL

YEAR 2018 PM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 10

WILSON OKAMOTO CORPORATION

Kapolei Parkway intersection which is expected to continue operating at LOS "E" during the AM peak period. At the intersection of Kapolei Parkway and Kunehi Street, the approaches of the intersection are expected to operate at slightly lower levels of service due to the anticipated increases in traffic along Kunehi Street. Both approaches of Kapolei Parkway are expected to continue operating at LOS "A" during both peak periods while the Kunehi Street approaches are expected to operate at LOS "D' or better during the AM peak period and LOS "C" or better during the PM peak period.

VI. 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. During the design phase of the project, consider the incorporation of complete streets concepts if possible.

6. Consider preparing a Traffic Management Plan (TMP) for the school to minimize the impact of school-related traffic (daily and special events) on the surrounding roadways. The TMP should include recommendations to ensure that the designated pedestrian crossing points to the proposed school are safe.

7. Consider preparing a Construction Traffic Management Plan (CTMP) to minimize the impact of construction-related activities on the surrounding roadways and neighborhood.

VII. CONCLUSION

In conjunction with the continued development within the Kapolei region, new schools are planned in the region to support the increasing demand. The Kapolei II Elementary School is expected to support the existing Kapolei Elementary School by

accommodating up to 750 students. With the implementation of the aforementioned recommendations, traffic operations in the vicinity of the new school are expected to remain similar to without project conditions. Although the Kapolei II Elementary School is not expected to have a significant impact on traffic operations in the vicinity, consideration should be given to the preparation of a Construction Traffic Management Plan (CTMP) and Traffic Management Plan (TMP) for the school to minimize the impact of construction-related activities, as well as, daily and special event traffic related to the school.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC
Counter:D4-5672
Weather:Clear

File Name : KapKun AM
Site Code : 00000001
Start Date : 2/12/2013
Page No : 1

Groups Printed- Unshifted

	Southbound	Kapolei Parkway Westbound					Kunehi Street Northbound					Kapolei Parkway Eastbound					
Start Time	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	4	29	0	0	33	7	0	19	0	26	0	8	1	0	9	68
06:15 AM	0	7	19	0	0	26	8	0	14	1	23	0	22	1	0	23	72
06:30 AM	0	7	32	0	0	39	9	0	17	1	27	0	25	5	0	30	96
06:45 AM	0	13	33	0	0	46	10	0	18	1	29	0	33	2	0	35	110
Total	0	31	113	0	0	144	34	0	68	3	105	0	88	9	0	97	346
07:00 AM	0	9	36	0	0	45	8	0	17	0	25	0	46	2	0	48	118
07:15 AM	0	11	64	0	0	75	6	0	20	5	31	0	48	2	1	51	157
07:30 AM	0	7	98	0	0	105	13	0	34	0	47	0	71	3	0	74	226
07:45 AM	0	20	91	0	0	111	5	0	16	7	28	0	49	8	1	58	197
Total	0	47	289	0	0	336	32	0	87	12	131	0	214	15	2	231	698
08:00 AM	0	20	50	0	0	70	7	0	12	0	19	0	38	5	0	43	132
08:15 AM	0	6	25	0	0	31	5	0	12	1	18	0	23	4	2	29	78
08:30 AM	0	7	36	0	0	43	9	0	5	2	16	0	22	5	1	28	87
08:45 AM	0	16	30	0	0	46	11	0	15	0	26	0	15	7	0	22	94
Total	0	49	141	0	0	190	32	0	44	3	79	0	98	21	3	122	391
Grand Total	0	127	543	0	0	670	98	0	199	18	315	0	400	45	5	450	1435
Apprch %		19	81	0	0		31.1	0	63.2	5.7		0	88.9	10	1.1		
Total %	0	8.9	37.8	0	0	46.7	6.8	0	13.9	1.3	22	0	27.9	3.1	0.3	31.4	

	Southbound	Kapolei Parkway Westbound				Kunehi Street Northbound				Kapolei Parkway Eastbound				
Start Time	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	0	11	64	0	75	6	0	20	26	0	48	2	50	151
07:30 AM	0	7	**98**	0	105	**13**	0	**34**	**47**	0	**71**	3	**74**	**226**
07:45 AM	0	**20**	91	0	**111**	5	0	16	21	0	49	**8**	57	189
08:00 AM	0	20	50	0	70	7	0	12	19	0	38	5	43	132
Total Volume	0	58	303	0	361	31	0	82	113	0	206	18	224	698
% App. Total		16.1	83.9	0		27.4	0	72.6		0	92	8		
PHF	.000	.725	.773	.000	.813	.596	.000	.603	.601	.000	.725	.563	.757	.772

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC
Counter:D4-5672
Weather:Clear

File Name : KapKun PM
Site Code : 00000001
Start Date : 2/12/2013
Page No : 1

Groups Printed- Unshifted

	Southbound	Kapolei Parkway Westbound					Kunehi Street Northbound					Kapolei Parkway Eastbound					
Start Time	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	0	22	54	0	0	76	5	1	9	2	17	0	48	6	0	54	147
03:15 PM	0	21	39	0	0	60	11	0	17	4	32	0	55	2	0	57	149
03:30 PM	0	14	67	0	0	81	16	0	15	1	32	0	58	12	0	70	183
03:45 PM	0	17	64	0	0	81	6	0	11	0	17	0	63	8	0	71	169
Total	0	74	224	0	0	298	38	1	52	7	98	0	224	28	0	252	648
04:00 PM	0	13	36	0	0	49	4	0	11	0	15	0	45	7	0	52	116
04:15 PM	0	20	42	0	0	62	6	0	10	0	16	0	51	6	0	57	135
04:30 PM	0	22	45	0	0	67	8	0	5	1	14	0	67	13	0	80	161
04:45 PM	0	14	42	0	0	56	12	0	11	0	23	0	68	11	0	79	158
Total	0	69	165	0	0	234	30	0	37	1	68	0	231	37	0	268	570
05:00 PM	0	26	43	0	0	69	5	0	11	1	17	0	50	13	0	63	149
05:15 PM	0	11	53	0	0	64	7	0	19	1	27	0	50	9	0	59	150
05:30 PM	0	27	51	0	0	78	9	0	13	0	22	0	48	8	0	56	156
05:45 PM	0	16	41	0	0	57	6	0	11	1	18	0	55	15	0	70	145
Total	0	80	188	0	0	268	27	0	54	3	84	0	203	45	0	248	600
Grand Total	0	223	577	0	0	800	95	1	143	11	250	0	658	110	0	768	1818
Apprch %		27.9	72.1	0	0		38	0.4	57.2	4.4		0	85.7	14.3	0		
Total %	0	12.3	31.7	0	0	44	5.2	0.1	7.9	0.6	13.8	0	36.2	6.1	0	42.2	

	Southbound	Kapolei Parkway Westbound				Kunehi Street Northbound				Kapolei Parkway Eastbound				
Start Time	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 03:00 PM														
03:00 PM	0	**22**	54	0	76	5	**1**	9	15	0	48	6	54	145
03:15 PM	0	21	39	0	60	11	0	**17**	28	0	55	2	57	145
03:30 PM	0	14	**67**	0	**81**	**16**	0	15	**31**	0	58	**12**	70	**182**
03:45 PM	0	17	64	0	81	6	0	11	17	0	**63**	8	**71**	169
Total Volume	0	74	224	0	298	38	1	52	91	0	224	28	252	641
% App. Total		24.8	75.2	0		41.8	1.1	57.1		0	88.9	11.1		
PHF	.000	.841	.836	.000	.920	.594	.250	.765	.734	.000	.889	.583	.887	.880

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC, TO
Counter:D4-5675, D4-5677
Weather:Clear

File Name : FtBarKapPkwy AM
Site Code : 00000002
Start Date : 11/12/2013
Page No : 1

Groups Printed- Unshifted

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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	10	81	13	0	104	7	26	20	1	54	5	39	6	2	52	8	12	11	0	31	241
06:15 AM	11	102	22	0	135	14	28	12	0	54	3	38	5	1	47	7	20	19	0	46	282
06:30 AM	27	90	17	0	134	13	43	17	0	73	7	36	6	1	50	7	20	25	1	53	310
06:45 AM	39	110	18	0	167	16	41	26	0	83	13	34	7	2	56	11	31	16	1	59	365
Total	87	383	70	0	540	50	138	75	1	264	28	147	24	6	205	33	83	71	2	189	1198
07:00 AM	47	109	9	0	165	28	54	34	0	116	14	52	10	5	81	8	29	25	0	62	424
07:15 AM	68	131	11	0	210	28	62	59	0	149	19	59	20	8	106	12	40	33	1	86	551
07:30 AM	73	126	9	0	208	39	74	99	0	212	37	89	39	12	177	8	42	52	0	102	699
07:45 AM	63	139	10	0	212	60	81	113	0	254	42	92	31	7	172	9	49	22	0	80	718
Total	251	505	39	0	795	155	271	305	0	731	112	292	100	32	536	37	160	132	1	330	2392
08:00 AM	32	104	5	0	141	20	57	40	0	117	23	79	11	1	114	12	27	14	0	53	425
08:15 AM	25	102	10	0	137	13	34	35	0	82	12	75	8	2	97	16	24	8	0	48	364
08:30 AM	28	75	12	0	115	11	27	27	0	65	10	71	15	2	98	7	14	7	0	28	306
08:45 AM	24	65	9	0	98	14	30	34	0	78	11	51	8	1	71	9	25	7	0	41	288
Total	109	346	36	0	491	58	148	136	0	342	56	276	42	6	380	44	90	36	0	170	1383
Grand Total	447	1234	145	0	1826	263	557	516	1	1337	196	715	166	44	1121	114	333	239	3	689	4973
Apprch %	24.5	67.6	7.9	0		19.7	41.7	38.6	0.1		17.5	63.8	14.8	3.9		16.5	48.3	34.7	0.4		
Total %	9	24.8	2.9	0	36.7	5.3	11.2	10.4	0	26.9	3.9	14.4	3.3	0.9	22.5	2.3	6.7	4.8	0.1	13.9	

	Ft. Barrette Road Southbound				Kapolei Parkway Westbound				Ft. Barrette Road Northbound				Kapolei Parkway 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	68	131	**11**	210	28	62	59	149	19	59	20	98	**12**	40	33	85	542
07:30 AM	**73**	126	9	208	39	74	99	212	37	89	**39**	**165**	8	42	**52**	**102**	687
07:45 AM	63	**139**	10	**212**	**60**	**81**	**113**	**254**	**42**	**92**	31	165	9	**49**	22	80	**711**
08:00 AM	32	104	5	141	20	57	40	117	23	79	11	113	12	27	14	53	424
Total Volume	236	500	35	771	147	274	311	732	121	319	101	541	41	158	121	320	2364
% App. Total	30.6	64.9	4.5		20.1	37.4	42.5		22.4	59	18.7		12.8	49.4	37.8		
PHF	.808	.899	.795	.909	.613	.846	.688	.720	.720	.867	.647	.820	.854	.806	.582	.784	.831

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:GC, TO
Counter:D4-5675, D4-5677
Weather:Clear

File Name : FtBarKapPkwy PM
Site Code : 00000002
Start Date : 11/12/2013
Page No : 1

Groups Printed- Unshifted

	Ft. Barrette Road Southbound					Kapolei Parkway Westbound					Ft. Barrette Road Northbound					Kapolei Parkway 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	36	78	9	0	123	23	35	36	0	94	17	88	29	5	139	15	36	22	0	73	429
03:15 PM	31	65	6	1	103	17	45	40	1	103	18	89	24	7	138	14	50	10	0	74	418
03:30 PM	37	65	7	0	109	13	45	32	0	90	10	116	43	1	170	15	45	14	0	74	443
03:45 PM	32	67	17	2	118	20	38	53	0	111	24	101	31	3	159	21	41	17	3	82	470
Total	136	275	39	3	453	73	163	161	1	398	69	394	127	16	606	65	172	63	3	303	1760
04:00 PM	45	103	20	0	168	18	48	22	0	88	12	105	27	3	147	8	49	15	0	72	475
04:15 PM	38	81	11	0	130	25	46	41	0	112	19	92	26	3	140	10	46	14	0	70	452
04:30 PM	30	88	23	0	141	21	34	30	2	87	20	111	20	6	157	15	51	23	0	89	474
04:45 PM	45	78	17	0	140	18	35	44	0	97	22	110	34	2	168	8	57	36	1	102	507
Total	158	350	71	0	579	82	163	137	2	384	73	418	107	14	612	41	203	88	1	333	1908
05:00 PM	47	87	15	0	149	11	35	40	0	86	11	101	28	3	143	9	46	15	0	70	448
05:15 PM	54	95	22	0	171	16	37	28	0	81	23	120	24	2	169	5	50	18	0	73	494
05:30 PM	29	100	5	0	134	18	43	35	2	98	17	89	23	5	134	8	40	16	0	64	430
05:45 PM	41	98	13	0	152	18	37	30	0	85	17	98	19	2	136	6	35	17	0	58	431
Total	171	380	55	0	606	63	152	133	2	350	68	408	94	12	582	28	171	66	0	265	1803
Grand Total	465	1005	165	3	1638	218	478	431	5	1132	210	1220	328	42	1800	134	546	217	4	901	5471
Apprch %	28.4	61.4	10.1	0.2		19.3	42.2	38.1	0.4		11.7	67.8	18.2	2.3		14.9	60.6	24.1	0.4		
Total %	8.5	18.4	3	0.1	29.9	4	8.7	7.9	0.1	20.7	3.8	22.3	6	0.8	32.9	2.4	10	4	0.1	16.5	

	Ft. Barrette Road Southbound				Kapolei Parkway Westbound				Ft. Barrette Road Northbound				Kapolei Parkway 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 04:30 PM																	
04:30 PM	30	88	**23**	141	**21**	34	30	85	20	111	20	151	**15**	51	23	89	466
04:45 PM	45	78	17	140	18	35	**44**	**97**	22	110	**34**	166	8	**57**	**36**	**101**	**504**
05:00 PM	47	87	15	149	11	35	40	86	11	101	28	140	9	46	15	70	445
05:15 PM	**54**	**95**	22	**171**	16	**37**	28	81	**23**	**120**	24	**167**	5	50	18	73	492
Total Volume	176	348	77	601	66	141	142	349	76	442	106	624	37	204	92	333	1907
% App. Total	29.3	57.9	12.8		18.9	40.4	40.7		12.2	70.8	17		11.1	61.3	27.6		
PHF	.815	.916	.837	.879	.786	.953	.807	.899	.826	.921	.779	.934	.617	.895	.639	.824	.946

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, HI 96826

Counted By:JL, DY
Counter:TU-0650, TU-0649
Weather:Clear

File Name : BarKam AM
Site Code : 00000001
Start Date : 11/12/2013
Page No : 1

Groups Printed- Unshifted

	Ft. Barrette Road Southbound					Kamaaha Avenue Westbound					Ft. Barrette Road Northbound					Kamaaha Avenue 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	90	4	2	108	2	37	49	1	89	15	51	3	0	69	1	8	2	1	12	278
06:15 AM	7	127	6	1	141	5	39	36	0	80	18	42	0	0	60	2	12	5	0	19	300
06:30 AM	11	140	3	2	156	5	38	31	1	75	5	49	0	0	54	2	5	2	0	9	294
06:45 AM	14	154	8	1	177	8	37	39	1	85	13	57	1	0	71	3	12	1	0	16	349
Total	44	511	21	6	582	20	151	155	3	329	51	199	4	0	254	8	37	10	1	56	1221
07:00 AM	18	154	6	0	178	5	44	46	6	101	15	73	3	0	91	3	17	4	0	24	394
07:15 AM	27	209	8	0	244	2	50	38	2	92	18	110	8	0	136	1	14	4	0	19	491
07:30 AM	34	195	10	0	239	10	60	38	1	109	45	135	9	0	189	7	20	6	0	33	570
07:45 AM	20	191	18	1	230	6	80	80	0	166	75	150	8	0	233	5	18	16	0	39	668
Total	99	749	42	1	891	23	234	202	9	468	153	468	28	0	649	16	69	30	0	115	2123
08:00 AM	32	99	6	6	143	6	53	25	6	90	25	113	3	0	141	4	25	8	0	37	411
08:15 AM	12	103	9	1	125	5	27	40	1	73	19	109	3	0	131	5	27	9	0	41	370
08:30 AM	17	111	8	4	140	3	31	32	2	68	13	75	5	0	93	4	17	14	0	35	336
08:45 AM	13	86	7	1	107	7	39	17	0	63	17	89	2	0	108	3	23	8	1	35	313
Total	74	399	30	12	515	21	150	114	9	294	74	386	13	0	473	16	92	39	1	148	1430
Grand Total	217	1659	93	19	1988	64	535	471	21	1091	278	1053	45	0	1376	40	198	79	2	319	4774
Apprch %	10.9	83.5	4.7	1		5.9	49	43.2	1.9		20.2	76.5	3.3	0		12.5	62.1	24.8	0.6		
Total %	4.5	34.8	1.9	0.4	41.6	1.3	11.2	9.9	0.4	22.9	5.8	22.1	0.9	0	28.8	0.8	4.1	1.7	0	6.7	

	Ft. Barrette Road Southbound				Kamaaha Avenue Westbound				Ft. Barrette Road Northbound				Kamaaha Avenue 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	27	**209**	8	**244**	2	50	38	90	18	110	8	136	1	14	4	19	489
07:30 AM	**34**	195	10	239	**10**	60	38	108	45	135	**9**	189	**7**	20	6	33	569
07:45 AM	20	191	**18**	229	6	**80**	**80**	**166**	**75**	**150**	8	**233**	5	18	**16**	**39**	**667**
08:00 AM	32	99	6	137	6	53	25	84	25	113	3	141	4	**25**	8	37	399
Total Volume	113	694	42	849	24	243	181	448	163	508	28	699	17	77	34	128	2124
% App. Total	13.3	81.7	4.9		5.4	54.2	40.4		23.3	72.7	4		13.3	60.2	26.6		
PHF	.831	.830	.583	.870	.600	.759	.566	.675	.543	.847	.778	.750	.607	.770	.531	.821	.796

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Groups Printed- Unshifted

	Ft. Barrette Road Southbound					Kaamaha Avenue Westbound					Ft. Barrette Road Northbound					Kaamaha Avenue 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	42	93	8	0	143	3	44	26	4	77	12	124	7	0	143	17	43	25	0	85	448
03:15 PM	41	106	11	1	159	6	24	33	0	63	12	128	3	0	143	13	51	20	1	85	450
03:30 PM	46	119	9	3	177	9	35	30	0	74	15	148	4	0	167	11	50	12	0	73	491
03:45 PM	44	112	7	1	164	5	27	17	1	50	23	150	1	0	174	10	57	17	3	87	475
Total	173	430	35	5	643	23	130	106	5	264	62	550	15	0	627	51	201	74	4	330	1864
04:00 PM	30	115	7	0	152	7	34	23	0	64	11	112	5	0	128	18	67	34	0	119	463
04:15 PM	45	116	15	4	180	7	48	27	0	82	18	118	6	0	142	10	55	14	0	79	483
04:30 PM	42	120	16	9	187	10	31	25	0	66	18	128	12	0	158	17	80	20	1	118	529
04:45 PM	48	106	15	2	171	5	54	26	4	89	16	148	10	0	174	18	55	27	1	101	535
Total	165	457	53	15	690	29	167	101	4	301	63	506	33	0	602	63	257	95	2	417	2010
05:00 PM	34	133	13	4	184	6	64	32	1	103	27	107	11	0	145	24	68	37	0	129	561
05:15 PM	44	108	17	1	170	5	38	29	0	72	23	110	7	0	140	20	68	29	0	117	499
05:30 PM	55	114	7	4	180	13	64	41	0	118	10	94	5	0	109	20	45	20	0	85	492
05:45 PM	32	125	14	4	175	8	41	26	4	79	9	115	6	0	130	22	59	20	0	101	485
Total	165	480	51	13	709	32	207	128	5	372	69	426	29	0	524	86	240	106	0	432	2037
Grand Total	503	1367	139	33	2042	84	504	335	14	937	194	1482	77	0	1753	200	698	275	6	1179	5911
Apprch %	24.6	66.9	6.8	1.6		9	53.8	35.8	1.5		11.1	84.5	4.4	0		17	59.2	23.3	0.5		
Total %	8.5	23.1	2.4	0.6	34.5	1.4	8.5	5.7	0.2	15.9	3.3	25.1	1.3	0	29.7	3.4	11.8	4.7	0.1	19.9	

	Ft. Barrette Road Southbound				Kaamaha Avenue Westbound				Ft. Barrette Road Northbound				Kaamaha Avenue 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 04:30 PM																	
04:30 PM	42	120	16	178	**10**	31	25	66	18	128	**12**	158	17	**80**	20	117	519
04:45 PM	**48**	106	15	169	5	54	26	85	16	**148**	10	**174**	18	55	27	100	528
05:00 PM	34	**133**	13	**180**	6	**64**	**32**	**102**	**27**	107	11	145	**24**	68	**37**	**129**	**556**
05:15 PM	44	108	**17**	169	5	38	29	72	23	110	7	140	20	68	29	117	498
Total Volume	168	467	61	696	26	187	112	325	84	493	40	617	79	271	113	463	2101
% App. Total	24.1	67.1	8.8		8	57.5	34.5		13.6	79.9	6.5		17.1	58.5	24.4		
PHF	.875	.878	.897	.967	.650	.730	.875	.797	.778	.833	.833	.886	.823	.847	.764	.897	.945

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group.

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

"Highway Capacity Manual," Transportation Research Board, 2000.

Level of Service E describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

"Highway Capacity Manual," Transportation Research Board, 2000.

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	238	18	58	372	31	82
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	309	23	75	483	40	106
Pedestrians					12	
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)				594		
pX, platoon unblocked						
vC, conflicting volume			344		644	127
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			344		644	127
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		89	88
cM capacity (veh/h)			1199		376	891

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	124	124	85	75	161	161	161	147
Volume Left	0	0	0	75	0	0	0	40
Volume Right	0	0	23	0	0	0	0	106
cSH	1700	1700	1700	1199	1700	1700	1700	648
Volume to Capacity	0.07	0.07	0.05	0.06	0.09	0.09	0.09	0.23
Queue Length 95th (ft)	0	0	0	5	0	0	0	22
Control Delay (s)	0.0	0.0	0.0	8.2	0.0	0.0	0.0	12.2
Lane LOS				A				B
Approach Delay (s)	0.0			1.1				12.2
Approach LOS								B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Kunehi St & Kapolei Pkwy

12/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	287	46	73	221	32	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	299	48	76	230	33	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				583		
pX, platoon unblocked						
vC, conflicting volume			347		552	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			347		552	124
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		92	95
cM capacity (veh/h)			1209		435	904

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	120	120	108	76	77	77	77	81
Volume Left	0	0	0	76	0	0	0	33
Volume Right	0	0	48	0	0	0	0	48
cSH	1700	1700	1700	1209	1700	1700	1700	627
Volume to Capacity	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.13
Queue Length 95th (ft)	0	0	0	5	0	0	0	11
Control Delay (s)	0.0	0.0	0.0	8.2	0.0	0.0	0.0	11.6
Lane LOS				A				B
Approach Delay (s)	0.0			2.0				11.6
Approach LOS								B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	158	121	147	274	311	121	319	101	236	500	35
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1845	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1845	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.92	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	49	190	146	177	298	375	146	384	122	284	602	42
RTOR Reduction (vph)	0	0	127	0	0	301	0	0	86	0	2	0
Lane Group Flow (vph)	49	190	19	177	298	74	146	384	36	284	642	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	14.7	14.7	14.7	22.0	22.0	22.0	12.2	33.1	33.1	21.4	42.3	
Effective Green, g (s)	14.7	14.7	14.7	22.0	22.0	22.0	12.2	33.1	33.1	21.4	42.3	
Actuated g/C Ratio	0.13	0.13	0.13	0.20	0.20	0.20	0.11	0.30	0.30	0.19	0.38	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	233	246	209	350	368	313	194	554	471	340	701	
v/s Ratio Prot	0.03	c0.10		0.10	c0.16		0.08	0.21		c0.16	c0.35	
v/s Ratio Perm			0.01			0.05			0.02			
v/c Ratio	0.21	0.77	0.09	0.51	0.81	0.24	0.75	0.69	0.08	0.84	0.92	
Uniform Delay, d1	43.1	46.6	42.4	39.8	42.6	37.5	48.0	34.6	28.1	43.2	32.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	13.9	0.2	1.2	12.4	0.4	15.2	3.7	0.1	16.1	16.6	
Delay (s)	43.5	60.6	42.6	40.9	55.0	37.9	63.2	38.3	28.1	59.3	49.4	
Level of Service	D	E	D	D	D	D	E	D	C	E	D	
Approach Delay (s)		51.6			44.5			42.0			52.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	111.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	204	92	66	141	142	76	442	106	176	348	77
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1812	
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)	39	215	97	69	148	149	80	465	112	185	366	81
RTOR Reduction (vph)	0	0	81	0	0	129	0	0	75	0	7	0
Lane Group Flow (vph)	39	215	16	69	148	20	80	465	37	185	440	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	16.1	16.1	16.1	12.7	12.7	12.7	7.8	31.7	31.7	14.9	38.8	
Effective Green, g (s)	16.1	16.1	16.1	12.7	12.7	12.7	7.8	31.7	31.7	14.9	38.8	
Actuated g/C Ratio	0.17	0.17	0.17	0.13	0.13	0.13	0.08	0.33	0.33	0.16	0.41	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	298	314	267	235	248	210	144	619	526	276	736	
v/s Ratio Prot	0.02	c0.12		0.04	c0.08		0.05	c0.25		c0.10	0.24	
v/s Ratio Perm			0.01			0.01			0.02			
v/c Ratio	0.13	0.68	0.06	0.29	0.60	0.09	0.56	0.75	0.07	0.67	0.60	
Uniform Delay, d1	33.7	37.3	33.3	37.3	38.9	36.3	42.1	28.3	21.8	37.9	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	6.1	0.1	0.7	3.8	0.2	4.6	5.1	0.1	6.3	1.3	
Delay (s)	33.9	43.3	33.4	38.0	42.8	36.5	46.7	33.5	21.8	44.2	23.5	
Level of Service	C	D	C	D	D	D	D	C	C	D	C	
Approach Delay (s)		39.5			39.3			33.1			29.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Ft. Barrette Rd & Kamaaha Ave

12/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	77	34	24	243	181	163	485	28	113	694	42
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	21	96	42	30	304	226	204	606	35	141	868	52
RTOR Reduction (vph)	0	0	34	0	0	181	0	0	19	0	0	26
Lane Group Flow (vph)	21	96	8	30	304	45	204	606	16	141	868	26
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.0	19.4	19.4	3.2	20.6	20.6	9.1	47.9	47.9	13.2	52.0	52.0
Effective Green, g (s)	2.0	19.4	19.4	3.2	20.6	20.6	9.1	47.9	47.9	13.2	52.0	52.0
Actuated g/C Ratio	0.02	0.19	0.19	0.03	0.20	0.20	0.09	0.46	0.46	0.13	0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	34	348	296	54	370	314	301	860	731	225	934	793
v/s Ratio Prot	0.01	0.05		c0.02	c0.16		0.06	0.33		c0.08	c0.47	
v/s Ratio Perm			0.00			0.03			0.01			0.02
v/c Ratio	0.62	0.28	0.03	0.56	0.82	0.14	0.68	0.70	0.02	0.63	0.93	0.03
Uniform Delay, d1	50.5	36.1	34.4	49.5	39.8	34.3	45.9	22.3	15.2	42.9	24.1	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.0	0.4	0.0	11.8	13.6	0.2	5.9	2.6	0.0	5.4	15.0	0.0
Delay (s)	79.5	36.6	34.5	61.4	53.4	34.5	51.8	24.9	15.2	48.3	39.1	13.1
Level of Service	E	D	C	E	D	C	D	C	B	D	D	B
Approach Delay (s)		41.7			46.2			31.0			39.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	103.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	271	113	26	187	112	84	493	40	168	467	61
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
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)	83	285	119	27	197	118	88	519	42	177	492	64
RTOR Reduction (vph)	0	0	91	0	0	96	0	0	27	0	0	34
Lane Group Flow (vph)	83	285	28	27	197	22	88	519	15	177	492	30
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.6	22.3	22.3	2.5	17.2	17.2	4.4	33.8	33.8	14.6	44.0	44.0
Effective Green, g (s)	7.6	22.3	22.3	2.5	17.2	17.2	4.4	33.8	33.8	14.6	44.0	44.0
Actuated g/C Ratio	0.08	0.24	0.24	0.03	0.18	0.18	0.05	0.36	0.36	0.16	0.47	0.47
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	144	445	378	47	343	292	162	675	574	277	879	747
v/s Ratio Prot	c0.05	c0.15		0.02	0.11		0.03	c0.28		c0.10	0.26	
v/s Ratio Perm			0.02			0.01			0.01			0.02
v/c Ratio	0.58	0.64	0.08	0.57	0.57	0.07	0.54	0.77	0.03	0.64	0.56	0.04
Uniform Delay, d1	41.2	31.8	27.5	44.8	34.7	31.4	43.4	26.2	19.1	36.8	17.7	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	3.1	0.1	15.9	2.3	0.1	3.7	5.3	0.0	4.8	0.8	0.0
Delay (s)	46.7	35.0	27.5	60.7	37.0	31.5	47.1	31.5	19.1	41.6	18.4	13.3
Level of Service	D	C	C	E	D	C	D	C	B	D	B	B
Approach Delay (s)		35.2			37.0			32.8			23.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX D

TRIP DISTRIBUTION

DISTRIBUTION OF VEHICLE TRIPS

		Percent of Trips for Land Use Types to/from Subareas and Cordon Entry/Exit Stations							
		Commercial		Residential		Recreation/Resort		Industrial/Harbor	
Subarea or Cordon Sta	Gate	AM	PM	AM	PM	AM	PM	AM	PM
H-1 Fwy West	1	9.0	9.0	3.0	5.0	4.0	18.0	11.0	11.2
H-1 Fwy East	2	19.0	17.0	33.0	28.0	28.5	35.0	24.6	18.2
Farrington Hwy East	3	9.0	9.0	4.0	5.0	4.2	7.5	3.1	3.8
Kapolei Pkwy East	4	11.0	13.0	14.0	12.0	2.4	2.0	5.2	6.5
Roosevelt East	5	4.0	3.0	0.0	0.8	1.8	1.0	7.1	2.8
Makakilo Dr	6	9.0	12.7	3.0	3.6	2.0	3.7	8.1	9.0
Kalaeloa Blvd South	7	6.0	8.1	10.0	13.4	5.5	3.0	20.0	22.3
Villages of Kapolei	8	13.0	9.0	0.6	0.1	4.0	2.0	8.0	6.8
Kalaeloa Redev	9	6.0	5.0	6.0	11.0	4.0	2.0	1.8	4.1
Ko Olina	10	1.0	3.7	5.0	4.6	31.0	15.0	7.3	7.4
Kapolei Shop Ctr Area (590)	11	6.0	1.0	6.0	4.0	3.6	3.0	1.0	2.0
Kapolei Office Core (592)	12	1.0	2.5	4.4	3.5	2.0	0.8	0.5	0.5
Kapolei Power Ctr Area (589)	13	2.0	1.0	4.0	3.0	2.5	2.0	1.0	2.0
Kapolei Government Office Core (593)	14	4.0	6.0	7.0	6.0	4.5	5.0	1.3	3.4
Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2018 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT

HCM Unsignalized Intersection Capacity Analysis
3: Kunehi St & Kapolei Pkwy

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	363	20	64	662	6	34	0	90	3	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.77	0.77	0.77	0.77	0.92	0.77	0.92	0.77	0.92	0.92	0.92
Hourly flow rate (vph)	2	471	26	83	860	7	44	0	117	3	0	1
Pedestrians								12				
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)					594							
pX, platoon unblocked												
vC, conflicting volume	866			509			955	1533	182	1308	1543	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	866			509			955	1533	182	1308	1543	290
tC, single (s)	4.1			4.1			*6.5	6.5	*5.9	*6.5	6.5	*5.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			*2.5	4.0	*2.3	*2.5	4.0	*2.3
p0 queue free %	100			92			86	100	90	98	100	100
cM capacity (veh/h)	773			1041			323	105	1218	174	103	1066

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	2	189	189	120	83	344	344	178	161	4
Volume Left	2	0	0	0	83	0	0	0	44	3
Volume Right	0	0	0	26	0	0	0	7	117	1
cSH	773	1700	1700	1700	1041	1700	1700	1700	692	220
Volume to Capacity	0.00	0.11	0.11	0.07	0.08	0.20	0.20	0.10	0.23	0.02
Queue Length 95th (ft)	0	0	0	0	6	0	0	0	22	2
Control Delay (s)	9.7	0.0	0.0	0.0	8.8	0.0	0.0	0.0	11.8	21.7
Lane LOS	A				A				B	C
Approach Delay (s)	0.0				0.8				11.8	21.7
Approach LOS									B	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
3: Kunehi St & Kapolei Pkwy

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	605	51	80	405	7	35	0	51	9	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.96	0.96	0.96	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Hourly flow rate (vph)	2	630	53	83	422	8	36	0	53	10	0	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)					586							
pX, platoon unblocked												
vC, conflicting volume	429			683			971	1257	237	860	1280	144
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	429			683			971	1257	237	860	1280	144
tC, single (s)	4.1			4.1			*6.5	6.5	*5.9	*6.5	6.5	*5.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			*2.5	4.0	*2.3	*2.5	4.0	*2.3
p0 queue free %	100			91			89	100	95	97	100	100
cM capacity (veh/h)	1126			906			318	154	1144	358	149	1293

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	2	252	252	179	83	169	169	92	90	12
Volume Left	2	0	0	0	83	0	0	0	36	10
Volume Right	0	0	0	53	0	0	0	8	53	2
cSH	1126	1700	1700	1700	906	1700	1700	1700	556	413
Volume to Capacity	0.00	0.15	0.15	0.11	0.09	0.10	0.10	0.05	0.16	0.03
Queue Length 95th (ft)	0	0	0	0	8	0	0	0	14	2
Control Delay (s)	8.2	0.0	0.0	0.0	9.4	0.0	0.0	0.0	12.7	14.0
Lane LOS	A				A				B	B
Approach Delay (s)	0.0				1.5				12.7	14.0
Approach LOS									B	B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
7: Ft. Barrette Rd & Kapolei Pkwy

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	278	133	162	560	342	133	351	111	260	550	39
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1844	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1844	
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)	47	293	140	171	589	360	140	369	117	274	579	41
RTOR Reduction (vph)	0	0	105	0	0	199	0	0	86	0	10	0
Lane Group Flow (vph)	47	293	35	171	589	161	140	369	31	274	610	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.6	28.9	28.9	14.0	38.3	38.3	11.0	30.8	30.8	20.8	40.6	
Effective Green, g (s)	4.6	28.9	28.9	14.0	38.3	38.3	11.0	30.8	30.8	20.8	40.6	
Actuated g/C Ratio	0.04	0.25	0.25	0.12	0.33	0.33	0.10	0.27	0.27	0.18	0.35	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	71	470	399	216	623	529	170	501	425	321	653	
v/s Ratio Prot	0.03	0.16		c0.10	c0.32		0.08	0.20		c0.15	c0.33	
v/s Ratio Perm			0.02			0.10			0.02			
v/c Ratio	0.66	0.62	0.09	0.79	0.95	0.30	0.82	0.74	0.07	0.85	0.93	
Uniform Delay, d1	54.2	38.0	32.7	48.8	37.1	28.2	50.8	38.2	31.2	45.4	35.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.8	2.6	0.1	17.7	23.2	0.3	26.4	5.6	0.1	19.2	20.6	
Delay (s)	75.0	40.5	32.8	66.6	60.3	28.6	77.2	43.7	31.3	64.6	56.3	
Level of Service	E	D	C	E	E	C	E	D	C	E	E	
Approach Delay (s)		41.7			51.1			48.9			58.8	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	51.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Ft. Barrette Rd & Kapolei Pkwy

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	523	101	73	324	156	84	486	117	194	383	85
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1812	
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)	43	551	106	77	341	164	88	512	123	204	403	89
RTOR Reduction (vph)	0	0	72	0	0	108	0	0	86	0	7	0
Lane Group Flow (vph)	43	551	34	77	341	56	88	512	37	204	485	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.4	37.3	37.3	7.1	39.0	39.0	8.6	34.9	34.9	15.4	41.7	
Effective Green, g (s)	5.4	37.3	37.3	7.1	39.0	39.0	8.6	34.9	34.9	15.4	41.7	
Actuated g/C Ratio	0.05	0.33	0.33	0.06	0.34	0.34	0.07	0.30	0.30	0.13	0.36	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	83	605	514	109	633	538	132	566	481	237	658	
v/s Ratio Prot	0.02	c0.30		c0.04	0.18		0.05	c0.27		c0.12	0.27	
v/s Ratio Perm			0.02			0.04			0.02			
v/c Ratio	0.52	0.91	0.07	0.71	0.54	0.10	0.67	0.90	0.08	0.86	0.74	
Uniform Delay, d1	53.4	37.1	26.7	52.8	30.6	25.9	51.7	38.3	28.4	48.6	31.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.4	18.0	0.1	18.8	0.9	0.1	12.0	17.9	0.1	25.8	4.3	
Delay (s)	58.7	55.1	26.8	71.6	31.5	26.0	63.7	56.2	28.5	74.4	36.0	
Level of Service	E	E	C	E	C	C	E	E	C	E	D	
Approach Delay (s)		51.0			35.2			52.4			47.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	114.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Ft. Barrette Rd & Kamaaha Ave

12/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	85	37	26	267	199	179	534	31	124	763	46
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	100	44	31	314	234	211	628	36	146	898	54
RTOR Reduction (vph)	0	0	36	0	0	188	0	0	19	0	0	26
Lane Group Flow (vph)	22	100	8	31	314	46	211	628	17	146	898	28
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.6	20.8	20.8	3.2	21.4	21.4	8.3	51.6	51.6	12.2	55.5	55.5
Effective Green, g (s)	2.6	20.8	20.8	3.2	21.4	21.4	8.3	51.6	51.6	12.2	55.5	55.5
Actuated g/C Ratio	0.02	0.19	0.19	0.03	0.20	0.20	0.08	0.48	0.48	0.11	0.51	0.51
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	42	359	305	52	369	314	264	891	757	200	959	814
v/s Ratio Prot	0.01	0.05		c0.02	c0.17		0.06	0.34		c0.08	c0.48	
v/s Ratio Perm			0.01			0.03			0.01			0.02
v/c Ratio	0.52	0.28	0.03	0.60	0.85	0.15	0.80	0.70	0.02	0.73	0.94	0.03
Uniform Delay, d1	52.0	37.1	35.3	51.7	41.7	35.7	48.9	22.1	14.8	46.2	24.5	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.4	0.0	17.0	16.9	0.2	15.4	2.6	0.0	12.5	15.8	0.0
Delay (s)	63.3	37.5	35.3	68.7	58.6	35.9	64.4	24.7	14.8	58.7	40.3	12.9
Level of Service	E	D	D	E	E	D	E	C	B	E	D	B
Approach Delay (s)		40.4			49.9			33.8			41.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	107.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	298	124	29	206	123	92	542	44	187	514	67
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
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)	92	314	131	31	217	129	97	571	46	197	541	71
RTOR Reduction (vph)	0	0	101	0	0	104	0	0	28	0	0	36
Lane Group Flow (vph)	92	314	30	31	217	25	97	571	18	197	541	35
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.1	23.1	23.1	3.1	19.1	19.1	5.2	38.1	38.1	15.8	48.7	48.7
Effective Green, g (s)	7.1	23.1	23.1	3.1	19.1	19.1	5.2	38.1	38.1	15.8	48.7	48.7
Actuated g/C Ratio	0.07	0.23	0.23	0.03	0.19	0.19	0.05	0.38	0.38	0.16	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	125	429	365	54	355	302	178	709	602	279	906	770
v/s Ratio Prot	c0.05	c0.17		0.02	0.12		0.03	c0.31		c0.11	0.29	
v/s Ratio Perm			0.02			0.02			0.01			0.02
v/c Ratio	0.74	0.73	0.08	0.57	0.61	0.08	0.54	0.81	0.03	0.71	0.60	0.04
Uniform Delay, d1	45.6	35.6	30.2	47.8	37.1	33.3	46.3	27.7	19.4	39.9	18.6	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.0	6.3	0.1	13.9	3.1	0.1	3.4	6.6	0.0	7.9	1.1	0.0
Delay (s)	65.6	42.0	30.3	61.8	40.2	33.4	49.7	34.3	19.4	47.8	19.7	13.5
Level of Service	E	D	C	E	D	C	D	C	B	D	B	B
Approach Delay (s)		43.2			39.6			35.5			26.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX F

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2018 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

HCM Unsignalized Intersection Capacity Analysis
3: Kunehi St & Kapolei Pkwy

12/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	363	67	64	662	6	94	0	182	3	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	3	471	87	83	860	8	122	0	236	4	0	1
Pedestrians								12				
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)					594							
pX, platoon unblocked												
vC, conflicting volume	868			570			986	1566	213	1429	1606	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	868			570			986	1566	213	1429	1606	290
tC, single (s)	4.1			4.1			*6.5	6.5	*5.9	*6.5	6.5	*5.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			*2.5	4.0	*2.3	*2.5	4.0	*2.3
p0 queue free %	100			92			60	100	80	97	100	100
cM capacity (veh/h)	772			988			307	100	1170	127	94	1065

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	3	189	189	181	83	344	344	180	358	5
Volume Left	3	0	0	0	83	0	0	0	122	4
Volume Right	0	0	0	87	0	0	0	8	236	1
cSH	772	1700	1700	1700	988	1700	1700	1700	598	163
Volume to Capacity	0.00	0.11	0.11	0.11	0.08	0.20	0.20	0.11	0.60	0.03
Queue Length 95th (ft)	0	0	0	0	7	0	0	0	99	2
Control Delay (s)	9.7	0.0	0.0	0.0	9.0	0.0	0.0	0.0	19.6	27.8
Lane LOS	A				A				C	D
Approach Delay (s)	0.0				0.8				19.6	27.8
Approach LOS									C	D

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
3: Kunehi St & Kapolei Pkwy

12/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	605	68	118	405	7	50	0	51	9	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.96	0.96	0.96	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Hourly flow rate (vph)	2	630	71	123	422	8	52	0	53	10	0	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)					587							
pX, platoon unblocked												
vC, conflicting volume	429			701			1059	1345	245	939	1377	144
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	429			701			1059	1345	245	939	1377	144
tC, single (s)	4.1			4.1			*6.5	6.5	*5.9	*6.5	6.5	*5.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			*2.5	4.0	*2.3	*2.5	4.0	*2.3
p0 queue free %	100			86			81	100	95	97	100	100
cM capacity (veh/h)	1126			892			268	129	1131	306	124	1293

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	2	252	252	197	123	169	169	92	105	12
Volume Left	2	0	0	0	123	0	0	0	52	10
Volume Right	0	0	0	71	0	0	0	8	53	2
cSH	1126	1700	1700	1700	892	1700	1700	1700	436	355
Volume to Capacity	0.00	0.15	0.15	0.12	0.14	0.10	0.10	0.05	0.24	0.03
Queue Length 95th (ft)	0	0	0	0	12	0	0	0	23	3
Control Delay (s)	8.2	0.0	0.0	0.0	9.7	0.0	0.0	0.0	15.9	15.5
Lane LOS	A				A				C	C
Approach Delay (s)	0.0				2.2				15.9	15.5
Approach LOS									C	C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	330	142	162	560	342	133	351	111	260	550	39
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1844	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1844	
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)	80	347	149	171	589	360	140	369	117	274	579	41
RTOR Reduction (vph)	0	0	109	0	0	201	0	0	86	0	10	0
Lane Group Flow (vph)	80	347	40	171	589	159	140	369	31	274	610	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.8	32.1	32.1	14.7	39.0	39.0	11.6	31.7	31.7	20.3	40.4	
Effective Green, g (s)	7.8	32.1	32.1	14.7	39.0	39.0	11.6	31.7	31.7	20.3	40.4	
Actuated g/C Ratio	0.07	0.27	0.27	0.12	0.33	0.33	0.10	0.27	0.27	0.17	0.34	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	116	503	427	219	611	519	172	497	422	302	627	
v/s Ratio Prot	0.05	0.19		c0.10	c0.32		0.08	0.20		c0.15	c0.33	
v/s Ratio Perm			0.03			0.10			0.02			
v/c Ratio	0.69	0.69	0.09	0.78	0.96	0.31	0.81	0.74	0.07	0.91	0.97	
Uniform Delay, d1	54.3	38.9	32.5	50.5	39.2	29.8	52.5	39.8	32.6	48.3	38.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.7	3.9	0.1	16.4	27.4	0.3	24.6	5.9	0.1	28.9	29.1	
Delay (s)	70.1	42.8	32.6	66.9	66.6	30.1	77.2	45.7	32.6	77.3	67.7	
Level of Service	E	D	C	E	E	C	E	D	C	E	E	
Approach Delay (s)		43.9			54.9			50.3			70.6	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	56.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	118.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	523	101	73	331	156	89	486	117	194	383	111
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	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1800	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1800	
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)	43	551	106	77	348	164	94	512	123	204	403	117
RTOR Reduction (vph)	0	0	72	0	0	108	0	0	86	0	9	0
Lane Group Flow (vph)	43	551	34	77	348	56	94	512	37	204	511	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.4	37.3	37.3	7.1	39.0	39.0	8.7	34.9	34.9	15.4	41.6	
Effective Green, g (s)	5.4	37.3	37.3	7.1	39.0	39.0	8.7	34.9	34.9	15.4	41.6	
Actuated g/C Ratio	0.05	0.33	0.33	0.06	0.34	0.34	0.08	0.30	0.30	0.13	0.36	
Clearance Time (s)	5.0	5.0	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	3.0	3.0	
Lane Grp Cap (vph)	83	605	514	109	633	538	134	566	481	237	652	
v/s Ratio Prot	0.02	c0.30		c0.04	0.19		0.05	c0.27		c0.12	0.28	
v/s Ratio Perm			0.02			0.04			0.02			
v/c Ratio	0.52	0.91	0.07	0.71	0.55	0.10	0.70	0.90	0.08	0.86	0.78	
Uniform Delay, d1	53.4	37.1	26.7	52.8	30.7	25.9	51.7	38.3	28.4	48.6	32.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.4	18.0	0.1	18.8	1.0	0.1	15.3	17.9	0.1	25.8	6.1	
Delay (s)	58.7	55.1	26.8	71.6	31.7	26.0	67.0	56.2	28.5	74.4	38.7	
Level of Service	E	E	C	E	C	C	E	E	C	E	D	
Approach Delay (s)		51.0			35.3			52.9			48.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	114.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Ft. Barrette Rd & Kamaaha Ave

12/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	85	37	26	267	199	179	564	32	124	763	46
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	100	44	31	314	234	211	664	38	146	898	54
RTOR Reduction (vph)	0	0	36	0	0	188	0	0	20	0	0	26
Lane Group Flow (vph)	22	100	8	31	314	46	211	664	18	146	898	28
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.6	20.8	20.8	3.2	21.4	21.4	8.3	51.6	51.6	12.2	55.5	55.5
Effective Green, g (s)	2.6	20.8	20.8	3.2	21.4	21.4	8.3	51.6	51.6	12.2	55.5	55.5
Actuated g/C Ratio	0.02	0.19	0.19	0.03	0.20	0.20	0.08	0.48	0.48	0.11	0.51	0.51
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	42	359	305	52	369	314	264	891	757	200	959	814
v/s Ratio Prot	0.01	0.05		c0.02	c0.17		0.06	0.36		c0.08	c0.48	
v/s Ratio Perm			0.01			0.03			0.01			0.02
v/c Ratio	0.52	0.28	0.03	0.60	0.85	0.15	0.80	0.75	0.02	0.73	0.94	0.03
Uniform Delay, d1	52.0	37.1	35.3	51.7	41.7	35.7	48.9	22.8	14.8	46.2	24.5	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.4	0.0	17.0	16.9	0.2	15.4	3.4	0.0	12.5	15.8	0.0
Delay (s)	63.3	37.5	35.3	68.7	58.6	35.9	64.4	26.2	14.8	58.7	40.3	12.9
Level of Service	E	D	D	E	E	D	E	C	B	E	D	B
Approach Delay (s)		40.4			49.9			34.5			41.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	107.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	298	124	34	206	123	92	542	44	187	535	67
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	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	3433	1863	1583	1770	1863	1583
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)	92	314	131	36	217	129	97	571	46	197	563	71
RTOR Reduction (vph)	0	0	101	0	0	104	0	0	28	0	0	36
Lane Group Flow (vph)	92	314	30	36	217	25	97	571	18	197	563	35
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.1	23.1	23.1	3.1	19.1	19.1	5.2	38.1	38.1	15.8	48.7	48.7
Effective Green, g (s)	7.1	23.1	23.1	3.1	19.1	19.1	5.2	38.1	38.1	15.8	48.7	48.7
Actuated g/C Ratio	0.07	0.23	0.23	0.03	0.19	0.19	0.05	0.38	0.38	0.16	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	125	429	365	54	355	302	178	709	602	279	906	770
v/s Ratio Prot	c0.05	c0.17		0.02	0.12		0.03	c0.31		c0.11	0.30	
v/s Ratio Perm			0.02			0.02			0.01			0.02
v/c Ratio	0.74	0.73	0.08	0.67	0.61	0.08	0.54	0.81	0.03	0.71	0.62	0.04
Uniform Delay, d1	45.6	35.6	30.2	48.0	37.1	33.3	46.3	27.7	19.4	39.9	18.9	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.0	6.3	0.1	26.9	3.1	0.1	3.4	6.6	0.0	7.9	1.3	0.0
Delay (s)	65.6	42.0	30.3	74.9	40.2	33.4	49.7	34.3	19.4	47.8	20.2	13.5
Level of Service	E	D	C	E	D	C	D	C	B	D	C	B
Approach Delay (s)		43.2			41.2			35.5			26.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

ENVIRONMENTAL NOISE ASSESSMENT REPORT

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Environmental Noise Assessment Report
Kapolei II Elementary School
Ewa, Oahu, Hawaii

January 2014

DLAA Project No. 13-45A
Contact: Dana Dorsch (ddorsch@dlaa.com)

Prepared for:
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1.0 EXECUTIVE SUMMARY

1.1 The proposed Kapolei II Elementary School is a cluster of two story buildings over 100,000 gross square feet, along with a 3,200 square feet data center. In the future, four portable classrooms and a future two story classroom building might be added if necessary. Approximately 122,470 square feet of outdoor physical education components will also be provided. The proposed site is 12.349 acres located in the Ewa District, on the island of Oahu and is bounded by Fort Barrette road to the east, a vacant lot reserved for commercial construction and Kapolei Parkway to the north, Kunehi Street to the West and the La Hiki at Mehana residential subdivision to the south.

1.2 The ambient sound levels on site are relatively dynamic and depend on the vehicular traffic patterns of the surrounding roadways. Thus, higher ambient noise levels are apparent during peak traffic hours but drop off at night. Ambient noise levels range from 53 to 67 dBA during the daytime hours. The dominant noise sources are traffic, wind, birds, and occasional aircraft flyovers.

1.3 Development of project area will involve excavation, grading, and other typical construction activities. Construction activities are not expected to impact adjacent properties. Noise from construction activities should be short term and must comply with State Department of Health noise regulations.

1.4 The project design will incorporate stationary mechanical equipment that is typical of a school facility. Noise from this mechanical equipment and other exterior equipment must meet the State Department of Health noise regulations, which stipulate maximum permissible noise limits at the property line.

1.5 A vehicular traffic noise analysis was completed and noise level contours were calculated throughout the project site. The traffic volume projections indicate an insignificant increase in traffic noise levels at the school site. Traffic noise levels are also not expected to impact the surrounding residential neighborhoods or Kapolei High School.

1.6 Aircraft noise due to operations at nearby Kalaeloa Airport and the Honolulu International Airport may be audible at the project site. However, flights directly above the site are infrequent and the project site is on the L_{dn} 55 noise contour for both airports. Therefore, a significant noise impact due to aircraft noise is not expected.

1.7 Exterior noise levels at the school site do not exceed the State Department of Education EDSPECS noise limit of L_{10} 65 dBA and the ANSI noise guideline of L_{dn} 65 dBA. The proposed layout and exterior construction of the school will be designed such that exterior noise sources will not disturb learning activities and interfere with speech intelligibility.

2.0 PROJECT DESCRIPTION

The proposed Kapolei II Elementary School is a cluster of two story buildings over 100,000 gross square feet, along with a 3,200 square feet data center. In the future, four portable classrooms and a future two story classroom building might be added if necessary. Approximately 122,470 square feet of outdoor physical education components will also be provided. The proposed site is 12.349 acres located in the Ewa District, on the island of Oahu and is bounded by Fort Barrette road to the east, a vacant lot reserved for commercial construction and Kapolei Parkway to the north, Kunehi Street to the West and the La Hiki at Mehana residential subdivision to the south.

3.0 NOISE STANDARDS

Various local and federal agencies have established guidelines and standards for assessing environmental noise impacts and have set noise limits as a function of land use. A brief description of common acoustic terminology used in these guidelines and standards is presented in Appendix A.

3.1 State of Hawaii Department of Health (HDOH) Community Noise Rule

The State of Hawaii Community Noise Control Rule [Reference 1] defines three classes of zoning districts and specifies corresponding maximum permissible sound levels due to stationary noise sources such as air-conditioning units, exhaust systems, generators, compressors, pumps, etc. The Community Noise Control Rule does not address most moving sources, such as vehicular traffic noise, aircraft noise, or rail transit noise. However, the Community Noise Control Rule does regulate noise related to agricultural, construction, and industrial activities, which may not be stationary.

The maximum permissible noise levels for stationary mechanical equipment are enforced by the State Department of Health (HDOH) for any location at or beyond the property line and shall not be exceeded for more than 10% of the time during any 20-minute period. The specified noise limits which apply are a function of the zoning and time of day as shown in Figure 1. With respect to mixed zoning districts, the rule specifies that the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level. In determining the maximum permissible sound level, the background noise level is taken into account by the HDOH.

The criteria for impulsive or impact noise is separate from stationary noise due to the nature of the sound. The HDOH defines impulsive noise as " any sound with a rapid rise and decay of sound pressure level, lasting less than one second, caused by sudden contact between two or more surfaces…". Noise from pile driving is considered impulsive noise and the maximum permissible noise level is 10 dB above the specified noise limits for stationary sources, as shown in Figure 1.

3.2 U.S. Federal Highway Administration (FHWA)

The FHWA regulation contains highway traffic noise abatement criteria (NAC) for seven land use activity categories and assigns corresponding maximum hourly equivalent sound levels, L_{eq}, for traffic noise exposure [Reference 2, 3]. These NAC are summarized in Figure 2 for each land use activity. For example, schools fall under Categories C and D and have a corresponding maximum exterior L_{eq} of 67 dBA and maximum interior L_{eq} of 52 dBA. In determining traffic noise impacts, primary consideration is given to exterior areas where frequent human use occurs. The interior impact criterion is defined for certain land use facilities that have sensitive interior uses, such as hospitals, churches, and schools.

3.3 State of Hawaii Department of Transportation (HDOT)

The HDOT has adopted FHWA's design goals for traffic noise exposure in its Noise Analysis and Abatement Policy [Reference 4]. According to the policy, a traffic noise impact occurs when the predicted traffic noise levels "approach" or exceed FHWA's design goals or when the predicted traffic noise levels "substantially exceed the existing noise levels." The policy also states that "approach" means at least 1 dB less than FHWA's design goals and "substantially exceed the existing noise levels" means an increase of at least 15 dB.

3.4 Federal Aviation Administration (FAA)

The FAA addresses guidelines for compatible land use that surrounds airports [Reference 5]. Noise contour maps are expressed in terms of yearly day-night average sound levels, L_{dn}, due to aircraft operations. The FAA states that schools outside of the L_{dn} 65 noise contour are compatible without restrictions. Schools between the L_{dn} 65 and 75 contours are only compatible if noise mitigation measures are incorporated into the building structure. Schools located inside of the L_{dn} 75 noise contour are generally not compatible. The compatibility of other land uses, such as residential, commercial, manufacturing, public, and recreation, are shown in Table 1.

3.5 State of Hawaii Department of Transportation (HDOTA), Airports Division

The State of Hawaii, Department of Transportation, Airports Division has adopted noise restrictions that are similar to the FAA's, but more stringent [Reference 6]. Similar to the FAA, HDOTA expresses land use compatibility guidelines based on yearly day-night average sound levels, L_{dn}, due to aircraft operations. In most cases, the HDOTA states maximum noise limits that are 5 dB lower than the FAA. The HDOTA guidelines specify 60 dBA as the maximum allowable L_{dn} level for school uses without any mitigation measures. However, for schools sites located between the 60 and 75 L_{dn} contours, HDOTA states:

> "Because the L_{dn} noise descriptor system represents a 24-hour average of individual aircraft noise events, each of which can be unique in respect to amplitude, duration, and tonal content, the NLR requirements should be evaluated for the specific land use, interior acoustical requirements, and

properties of the aircraft noise events. NLR requirements should not be based solely upon the exterior L_{dn} exposure level.

The compatibility of other land uses, such as residential, manufacturing, public, and recreation, are shown in Table 2.

3.6 State of Hawaii Department of Education EDSPECS (HDOE)

HDOE Educational Specifications for Elementary Schools [Reference 7] states that all school spaces shall meet a background ambient nosie level not to exceed 50 dBA. Libraries and main reading rooms should meet a background ambient noise level not to exceed 45 dBA. Air conditioning shall be provided to facilities exposed to exterior noise levels greater than L_{10} = 65dBA if the exterior noise sources cannot be mitigated with measures such as a sound barrier. Additionally, if the site is close to busy roads or other exterior noise sources, the budget should account for the cost of noise mitigation measures.

3.7 ANSI Standard S12.60 – 2002 (ANSI)

Per ANSI Standard S12.60 – 2002, Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools [Reference 8], school facilities should be sited and designed to limit the noise levels inside learning spaces from transportation noise sources such as aircraft and vehicular traffic. All core learning spaces shall meet the guideline for maximum A-weighted steady background noise levels of 35 dBA. An STC rating of 50 is the minimum for the exterior walls and roofs of a core learning space. However, this rating does not ensure conformance to the background noise limits for noise from major outdoor noise sources.

Furthermore, learning facilities should not be located at sites where the yearly average day-night average sound level, L_{dn}, exceeds 60 dB to 65 dB for conventional construction methods. However, if the external walls are designed to a minimum STC rating of 50, a site L_{dn} of 65 dB to 75 dB is acceptable. Under no conditions should a new learning facility be located at a site where the yearly average day-night average sound level exceeds, or is predicted to exceed, 75 dBA.

4.0 EXISTING ACOUSTICAL ENVIRONMENT

Two types of noise measurements were conducted to assess the existing acoustical environment in the vicinity of the project location. The locations are illustrated in Figure 3. The first noise measurement type consisted of continuous long-term ambient noise level measurements and the second type of noise measurement was short-term and included traffic counts and aircraft flyover monitoring. The purpose of the short-term noise measurements and corresponding traffic counts were to calibrate a traffic noise prediction model. The noise measurements were conducted between December 16, 2013 and December 18, 2013.

4.1 Noise Measurement Procedures

Long-Term Noise Measurements

Continuous, hourly, statistical sound levels were recorded for approximately 48 hours at each location. The measurements were taken using a Larson-Davis Laboratories, Model 820, Type-1 Sound Level Meter together with a Larson-Davis, Model 2560 Type-1 Microphone. Calibration was checked before and after the measurements with a Larson-Davis Model CAL200 calibrator. Both the sound level meter and the calibrator have been certified by the manufacturer within the recommended calibration period. The microphone was mounted on a tripod, approximately 6 feet above grade. A windscreen covered the microphone during the entire measurement period. The sound level meter was secured in a weather resistant case.

Short-Term Noise Measurements

An approximate 30-minute equivalent sound level, L_{eq}, was measured at each location. Vehicular traffic counts and traffic mix were documented during the measurement period. In addition to the short term traffic noise measurement, spot measurements were conducted on-site during aircraft flyover events. The noise measurement was taken using a Larson-Davis Laboratories, Model 831, Type-1 Sound Level Meter together with a Larson-Davis, Model 377B20 Type-1 Microphone. Calibration was checked before and after the measurements with a Larson-Davis Model CAL200 calibrator. Both the sound level meter and the calibrator have been certified by the manufacturer within the recommended calibration period. The microphone and sound level meter were mounted on a tripod, approximately 5 feet above grade. A windscreen covered the microphone during the entire measurement period.

4.2 Noise Measurement Locations

Long-Term Noise Measurements

Location L1: On the project site, approximately 160 feet west of Fort Barrette Road. The dominant noise source was vehicular traffic and secondary noise sources include aircraft flyovers, birds, and wind.

Location L2: On the southwest corner of the project site, approximately 5 feet east of Kunehi Street. The dominant noise source was vehicular traffic and secondary noise sources include aircraft flyovers, birds, wind, and noises typical of a residential neighborhood.

Short-Term Noise Measurement Locations

Location S1: Positioned adjacent to Fort Barrette Road, approximately 140 feet west of the edge-of-pavement.

Location S2: Positioned adjacent to Kapolei Parkway, approximately 50 feet north of the edge-of-pavement.

4.3 Long-Term Noise Measurement Results

The ambient sound levels on site are relatively dynamic and depend significantly on the vehicular traffic patterns of the surrounding roadways. Thus, higher ambient noise levels are apparent during peak traffic hours but drop off at night. The measured equivalent sound levels, L_{eq}, in A-weighted decibels (dBA) are graphically presented in Figures 4 and 5 for locations L1 and L2, respectively. Noise measurement results are also summarized in Table 3.

4.4 Short-Term Noise Measurement Results

Several aircraft flyover events were observed during the measurement period. Typical aircraft included wide and narrow body jet airliners as well as propeller planes. All observed aircraft were on a descent to Honolulu International Airport. The peak sound level observed during flyover events ranged from 65 dBA to 70 dBA. Military aircraft (F16) were also observed (but not measured) and were subjectively louder than the commercial aircraft.

4.5 Project Vicinity

Existing residential developments immediately south and west of the project site include D.R.Horton's La Hiki and Pulewa at Mehana. Vehicular noise from Fort Barrette Road and Kapolei Parkway dominate the ambient environment in the vicinity of these roadways. Across Fort Barrette Road is the new Kapolei High School which will experience an acoustical environment similar to the project site with vehicular traffic and occasional aircraft flyovers being dominant noise sources.

4.6 Kalaeloa Airport and Honolulu International Airport Noise Contours

The project is approximately one mile north of the Kalaeloa Airport and 8 miles west of Honolulu International Airport. Therefore, the project site was assessed for aircraft noise using airport noise contour maps. The Kalaeloa Master Plan [Reference 9, 10] includes year 2020 projections of airport operations and noise contour maps for airport alternates. Also included in the airport noise contour maps is the effect of the Honolulu International Airport (HIA) operations [Reference 6]. A complete description of the Kalaeloa Airport alternatives can be found in the Kalaeloa Master Plan. The Kapolei II Elementary School project site is outside of the L_{dn} 55 noise contours for both airports when considered individually. Noise contours for the Kalaeloa Airport including HIA show that the school site is sited directly on the L_{dn} 55 contour line.

5.0 POTENTIAL NOISE IMPACTS

5.1 Project Construction Noise

Development of project areas will involve excavation, grading, and other typical construction activities during construction. The various construction phases of the project will generate significant amounts of noise. Depending on when construction occurs, construction of the school facilities may impact existing adjacent properties, such as the La Hiki and Pulewa at Mehana residential development to the west and south of the project site. The exterior grounds of Kapolei High School will also experience elevated ambient sound levels during construction. The actual noise levels produced during construction will be a function of the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 6. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction.

5.2 Project Generated Stationary Mechanical Noise and Compliance with State of Hawaii Community Noise Control Rule

The project design will incorporate stationary mechanical equipment that is typical of a school facility. Expected mechanical equipment may include air handling equipment, condensing units, refrigeration units, etc. Noise from this mechanical equipment and other equipment must meet the State noise rules, which stipulate maximum permissible noise limits at the property line. The noise limits are 60 dBA during the day and 50 dBA during the night, as shown in Figure 1. However, the HDOH takes into consideration background noise levels when assessing noise infractions. Mitigation of mechanical noise to meet the HDOH noise rules should be incorporated into the project design.

5.3 Compliance with FHWA/HDOT Noise Limits

A vehicular traffic noise analysis was completed using the DataKustik CadnaA (version 4.0) software program [Reference 11] for the existing conditions, future year 2018 projections with the “No Build” and “Build” conditions. The traffic noise analysis was based on the peak hour traffic volumes provided by the Traffic Consultant [Reference 12]. Intersection geometric configurations and future speed limits were also provided by the traffic consultant.

Vehicular traffic noise level contours were calculated throughout the project site. The short-term noise measurement and corresponding traffic counts were used to validate the software at noise measurement locations L1, L2, S1 and S2. The results of the traffic noise analysis for the existing and future year projections are summarized in Table 5 and shown graphically in Figures 7 to 13.

5.3.1 Vehicular Traffic Noise Impacts on the Project

Based on the current site plans, the covered play court is approximately 180 feet away from Fort Barrette Road and the Commons building is approximately 100 feet from Kunehi Street. Traffic noise levels at these buildings are currently well below the FHWA maximum noise limit of 67 dBA. The traffic volume projections indicate a minimal increase in traffic volume on Fort Barrette Road and a significant increase in traffic volume for Kunehi Street. However, due to the low speed limit, traffic noise levels from these roadways are not expected to significantly increase over current levels.

Although the FHWA criteria is not a regulatory requirement for this project, as it has no authority to enforce land use, its noise limit criteria is recommended by the FHWA to be used as a guideline for consideration of land use and the impact of traffic noise.

5.3.2 Vehicular Traffic Noise Impacts on the Surrounding Community

Existing residences located adjacent to Kunehi Street currently experience traffic noise levels below the FHWA maximum noise limit of 67 dBA. The proposed project is expected to approximately double the traffic volumes in the future. In addition, school buses are expected to be a new source of noise during the morning and afternoon pickup/drop off times. However, due to the low speed limit, traffic noise levels along Kunehi Street are not expected to significantly increase over current levels.

Traffic volume increases on Fort Barrette Road and Kapolei Parkway are not significant, therefore, traffic noise at the nearby residential neighborhoods and Kapolei High School is not expected to increase by a significant amount.

5.4 Compliance with FAA and HDOT Airports Division Guidelines

The Kapolei II Elementary School project site is on the 55 L_{dn} noise contours of the combined Noise Exposure Map for Honolulu International Airport and Kalaeloa Airport. Therefore, the project will not be impacted by aircraft noise.

As evidenced by the short term noise measurements, aircraft flyover events may still be audible at the project site. Ambient noise levels increase by up to 10 dB during a flyover event. Students and faculty may have to use a raised voice in order to communicate effectively when outdoors during a flyover event.

5.5 Compliance with HDOE EDSPECS and ANSI Noise Guidelines

The HDOE EDSPECS requires that air conditioning be installed for schools exposed to an exterior noise level of L_{10} 65dBA. Based on the ambient noise measurement data, the school site will not experience an L_{10} in excess of this requirement.

Kapolei II Elementary School is currently sited such that the school buildings are at least 100 feet from the nearest roadway. Based on the ambient noise measurement data, the daily L_{dn} will be less than 65 dBA so conventional construction methods will be acceptable for the exterior shell of the school buildings.

The building shell construction will be as follows:

Roof:	Single ply top roof membrane, 3” minimum rigid tapered insulation, 3” concrete topping varies, 2” leg of precast double tee (24” deep stems). ~STC 52, OITC 47 (or greater)
Exterior Glazing:	1” Insulated Laminated. ~STC 36, OITC 29
Exterior Wall:	8” Precast Concrete, 2.5” Stud Pony Wall, 5/8” Gypsum Board. ~STC 65, OITC 57

The above building shell construction is adequate to achieve the ANSI recommended 35 dBA inside of all classrooms for the predicted traffic noise.

6.0 NOISE MITIGATION

6.1 Mitigation of Construction Noise

In cases where construction noise exceeds, or is expected to exceed the State’s "maximum permissible" property line noise levels [Reference 1], a permit must be obtained from the HDOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

In order for the HDOH to issue a construction noise permit, the Contractor must submit a noise permit application to the HDOH, which describes the construction activities for the project. Prior to issuing the noise permit, the HDOH may require action by the Contractor to incorporate noise mitigation into the construction plan. The HDOH may also require the Contractor to conduct noise monitoring or community meetings inviting the neighboring residents and business owners to discuss construction noise. The Contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. However, the HDOH may require additional noise mitigation, such as temporary noise barriers, or time of day usage limits for certain kinds of construction activities.

Specific permit restrictions for construction activities [Reference 1] are:

> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels ... before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday."

> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels... before 9:00 a.m. and after 6:00 p.m. on Saturday."
>
> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays."

The use of hoe rams and jack hammers 25 lbs. or larger, high pressure sprayers, chain saws, and pile drivers are restricted to 9:00 a.m. to 5:30 p.m., Monday through Friday. In addition, construction equipment and on-site vehicles or devices whose operations involve the exhausting of gas or air, excluding pile hammers and pneumatic hand tools weighing less than 15 pounds, must be equipped with mufflers [Reference 1].

The HDOH noise permit does not limit the noise level generated at the construction site, but rather the times at which noisy construction can take place. Therefore, noise mitigation for construction activities should be addressed using project management, such that the time restrictions within the HDOH permit are followed.

6.2 FHWA Traffic Noise Mitigation

Vehicular traffic noise levels are not expected to increase by a significant amount in the future at the school site or in the surrounding areas. Therefore, noise mitigation to attenuate vehicular traffic noise is not necessary.

6.3 Mitigation of Aircraft Noise

Noise mitigation to attenuate aircraft noise is not necessary as the project site is on the L_{dn} 55 dBA noise contour.

6.4 Board of Education/ANSI Noise Mitigation

The proposed exterior construction of the school buildings is sufficient to minimize audible noises from vehicular traffic and aircraft flyovers to the interior of the buildings. No additional mitigation will be required.

REFERENCES

1. Chapter 46, *Community Noise Control*, Department of Health, State of Hawaii, Administrative Rules, Title 11, September 23, 1996.

2. *Department of Transportation, Federal Highway Administration Procedures for Abatement of Highway Traffic Noise*, Title 23, CFR, Chapter 1, Subchapter J, Part 772, 38 FR 15953, June 19, 1973; Revised at 75 FR 32820, July 13, 2010.

3. *Highway Traffic Noise: Analysis and Abatement Guidance*, U.S. Department of Transportation, Federal Highways Administration, December 2011.

4. *Noise Analysis and Abatement Policy*, Department of Transportation, Highways Division, State of Hawaii, June 1977.

5. *FAA Regulations on Airport Noise Compatibility Planning Programs*, Code of Federal Regulations, Title 14, Chapter 1, Subchapter 1, Part 150; Issued by 49 FR 49269, December 18, 1984; corrected by 50 FR 5063, February 6, 1985; amended by 53 FR 8723, March 16, 1988; corrected by 53 FR 9726, March 24, 1988.

6. *Honolulu International Airport Master Plan Update and Noise Compatibility Program*, State of Hawaii Department of Transportation, Airports Division, Vol. 2, December 1989.

7. *Educational Specifications (EDSPECS) for Elementary Schools*, Department of Education, January 2008.

8. *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*, American National Standard Institute, ANSI Standard S12.60, 2002

9. *Kalaeloa Airport Master Plan*, State of Hawaii Department of Transportation, Airports Division, November 1998.

10. *Kalaeloa Airport Development Plan Improvements*, State of Hawaii Department of Transportation, Airports Division, June 2010.

11. *DataKustik CadnaA software program*, Version 4.0; DataKustik GmbH, 2010.

12. *Traffic Impact Report for the Kapolei II Elementary School*, Wilson Okamoto Corporation, January 2014

TABLE 1:
FAR Part 150 Recommendations for Land Use Compatibility in Yearly Day-Night Average Sound Levels

TYPE OF LAND USE	Yearly Day-Night Average Sound Level (L_{dn})					
	< 65	**65-70**	**70-75**	**75-80**	**80-85**	**> 85**
RESIDENTIAL:						
Residential (except mobile homes & transient lodgings)	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE:						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE:						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale/Retail:(bldg. Mater., hardware, & farm equip.)	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade – general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
RECREATIONAL USE:						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Note: Numbers in parentheses refer to the following notes.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(4) Measures to achieve NLR 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require a NLR of 25.

(7) Residential buildings require a NLR of 30.

(8) Residential buildings are not permitted.

Abbreviations:

Y(Yes) = Land Use and related structures compatible w/o restrictions.

N(No) = Land Use and related structures are not compatible and should be prohibited.

NLR = Noise Level Reduction (outdoor-to-indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land use and related structures general compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

Regulatory Note.

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Source: FAR Part 150, Appedix A, Table 1. "Land Use Compatibility with Yearly Day-Night Average Sound Levels."

TABLE 2:
State Department of Transportation Airports Division Recommendations for Local Land Use Compatibility in Yearly Day-Night Average Sound Levels (Ldn)

TYPE OF LAND USE	Yearly Day-Night Average Sound Level (L_{dn})					
	< 60	60-65	65-70	70-75	75-80	80-85
RESIDENTIAL:						
Low density residential, resorts, & hotels (w/ outdoor fac)	Y(a)	N(b)	N	N	N	N
Low density apartment w/ moderate outdoor use	Y	N(b)	N	N	N	N
High density apartment with limited outdoor use	Y	N(b)	N(b)	N	N	N
Transient lodgings (w/limited outdoor use)	Y	N(b)	N(b)	N	N	N
PUBLIC USE:						
Schools, day care centers, libraries, and churches	Y	N(c)	N(c)	N(c)	N	N
Hospitals, nursing homes, clinics, and health facilities	Y	Y(d)	Y(d)	Y(d)	N	N
Indoor auditoriums, and concert halls	Y(c)	Y(c)	N	N	N	N
Government services and offices serving the public	Y	Y	Y(d)	Y(d)	N	N
Transportation and parking	Y	Y	Y(d)	Y(d)	Y(d)	Y(d)
COMMERCIAL USE:						
Offices - government, business and professional	Y	Y	Y(d)	Y(d)	N	N
Wholesale/Retail: bldg. Mater., hardware, & heavy equip.	Y	Y	Y(d)	Y(d)	Y(d)	Y(d)
Airport businesses - car rental, ticketing, lei stands, etc.	Y	Y	Y(d)	Y(d)	N	N
Retail trade, restaurants, shp. Centers, financial inst., etc	Y	Y	Y(d)	Y(d)	N	N
Power plants, sweage treatment plants, & base yards	Y	Y	Y(d)	Y(d)	Y(d)	N
Studios w/o outdoor sets, broadcasting & Production fac	Y(c)	Y(c)	N	N	N	N
MANUFACTURING AND PRODUCTION:						
Manufacturing, general	Y	Y	Y(d)	Y(d)	Y(d)	N
Photographic and optical	Y	Y	Y(d)	Y(d)	N	N
Agriculture (except livestock) and forestry	Y	Y(e)	Y(e)	Y(e)	Y(e)	Y(e)
Livestock farming and breeding	Y	Y(e)	Y(e)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL USE:						
Outdoor sports arenas and spectator sports	Y	Y(f)	Y(f)	N	N	N
Outdoor music shells, amphitheaters	Y(f)	N	N	N	N	N
Nature exhibits and zoos, neighborhood parks	Y	Y	Y	N	N	N
Amusements, beach parks, active playgrounds, etc	Y	Y	Y	Y	N	N
Public golf courses, riding stables, cemeteries, gardens, etc	Y	Y	N	N	N	N
Professional/resort sports facil., media event facil., etc	Y(f)	N	N	N	N	N
Extensive natural wildlife and recreation areas	Y(f)	N	N	N	N	N

Note: Letters in parentheses refer to the following notes.

(a) A noise level of 60 L_{dn} does not eliminate all risks of adverse noise impacts from aircraft noise. However, the 60 L_{dn} planning level has been selected by the State Airports Division as an appropriate compromise between the minimal risk of level of 55 L_{dn} and the significant risk level of 65 L_{dn}.

(b) Where the community determines that these uses should be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45 L_{dn} or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure plus air conditioning may be required to provide additional outdoor-to-indoor NLR, but will not eliminate outdoor noise problems.

(c) Because the L_{dn} noise descriptor system represents a 24-hour average of individual aircraft noise events, each of which can be unique in respect to amplitude, duration, and tonal content, the NLR requirements should be evaluated for the specific land use, interior acoustical requirements, and properties of the aircraft noise events. NLR requirements should not be based solely upon the exterior L_{dn} exposure level.

(d) Measures to achieve required NLR must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(e) Residential buildings require NLR. Residential buildings should not be located where exterior noise is greater than 65 L_{dn}.

(f) Impact of amplitude, duration, frequency, and tonal content of aircraft noise events should be evaluated.

Abbreviations:

Y(Yes) = Land Use and related structures compatible without restrictions.
N(No) = Land Use and related structures are not compatible and should be prohibited.

Source: Airports Division, Department of Transportation, State of Hawaii

TABLE 3:
Long Term Noise Measurement Results

	AM L_{eq}	PM L_{eq}	L_{dn} (Calculated)
L1	53 - 63 dBA	47 - 57 dBA	61 dBA
L2	56 - 67 dBA	46 - 64 dBA	66 dBA

TABLE 4:
Vehicular Traffic Noise Analysis Constraints

Noise Prediction Location	Nearest Roadway	Distance to Edge-of-Pavement (ft)	Total Lanes	Speed Limit (mph)
A - KES Building G	Fort Barrette Road	180	3	30
B - KES Building C	Kunehi Street	100	2	30
C - La Hiki Neighborhood	Kunehi Street	30	2	25
D - Leihano Senior Living	Fort Barrette Road	430	3	25
E - Kapolei High School	Kapolei Parkway	180	5	30

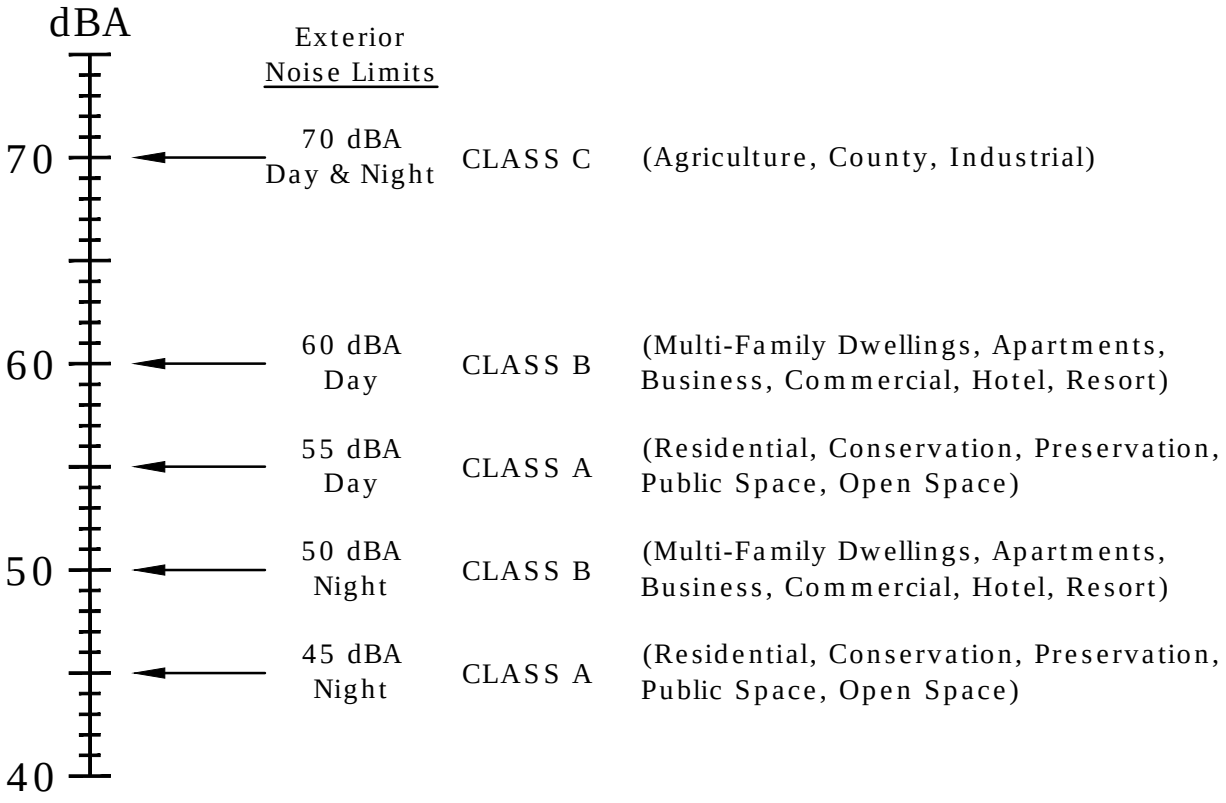
TABLE 5:
Predicted Traffic Noise Levels With and Without the Project and Resulting Increases Due to the Project

Noise levels shown in the table are based on peak-hour traffic volumes, and are expressed in A-weighted decibels (dBA). FHWA Noise Abatement Criteria is shown in Figure 2. Sound level increases greater than 3 dB are considered significant.

Row ID	Traffic Analysis Conditions	Location A		Location B		Location C		Location D		Location E	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
A	Existing (Calculated)	57.4	56.0	52.3	52.4	59.2	59.3	55.7	54.2	58.9	57.5
B	Future Without Project (2018)	58.0	56.7	52.8	52.9	59.7	59.8	56.6	55.4	59.3	57.9
C	Future With Project (2018)	58.1	56.8	55.6	54.1	62.4	60.9	56.9	55.6	59.3	57.9
B-A	Future Increase Without Project (2018)	0.6	0.7	0.5	0.5	0.5	0.5	0.9	1.2	0.4	0.4
C-A	Future Increase With Project (2018)	0.7	0.8	3.3	1.7	3.2	1.6	1.2	1.4	0.4	0.4
C-B	**Future Increase Due to Project**	**0.1**	**0.1**	**2.8**	**1.2**	**2.7**	**1.1**	**0.3**	**0.2**	**0.0**	**0.0**

HAWAII DEPARTMENT OF HEALTH MAXIMUM PERMISSIBLE SOUND LEVELS FOR EXTERIOR MECHANICAL EQUIPMENT IN VARIOUS ZONING DISTRICTS

Zoning District	Day Hours (7 AM to 10 PM)	Night Hours (10 PM to 7 AM)
CLASS A Residential, Conservation, Preservation, Public Space, Open Space	55 dBA (Exterior)	45 dBA (Exterior)
CLASS B Multi-Family Dwellings, Apartments, Business, Commercial, Hotel, Resort	60 dBA (Exterior)	50 dBA (Exterior)
CLASS C Agriculture, Country, Industrial	70 dBA (Exterior)	70 dBA (Exterior)



D. L. ADAMS ASSOCIATES
acoustics | performing arts | technology

PROJECT: Kapolei II Elementary School		
PROJECT NO: 13-45A	DATE: January 2014	FIGURE: 1

FEDERAL HIGHWAY ADMINISTRATION NOISE ABATEMENT CRITERIA FOR HIGHWAY NOISE

ACTIVITY CATEGORY	ACTIVITY CATEGORY DESCRIPTION	HOURLY EQUIVALENT SOUND LEVEL L_{eq}
A	LANDS ON WHICH SERENITY AND QUIET ARE OF EXTRAORDINARY SIGNIFICANCE AND SERVE AN IMPORTANT PUBLIC NEED AND WHERE THE PRESERVATION OF THOSE QUALITIES IS ESSENTIAL IF THE AREA IS TO CONTINUE TO SERVE ITS INTENDED PURPOSE.	57 dBA (EXTERIOR)
B	RESIDENTIAL	67 dBA (EXTERIOR)
C	ACTIVE SPORT AREAS, AMPHITHEATERS, AUDITORIUMS, CAMPGROUNDS, CEMETERIES, DAY CARE CENTERS, HOSPITALS, LIBRARIES, MEDICAL FACILITIES, PARKS, PICNIC AREAS, PLACES OF WORSHIP, PLAYGROUNDS, PUBLIC MEETING ROOMS, PUBLIC OR NONPROFIT INSTITUTIONAL STRUCTURES, RADIO STUDIOS, RECORDING STUDIOS, RECREATION AREAS, SECTION 4(F) SITES, SCHOOLS, TELEVISION STUDIOS, TRAILS, AND TRAIL CROSSINGS	67 dBA (EXTERIOR)
D	AUDITORIUMS, DAY CARE CENTERS, HOSPITALS, LIBRARIES, MEDICAL FACILITIES, PLACES OF WORSHIP, PUBLIC MEETING ROOMS, PUBLIC OR NONPROFIT INSTITUTIONAL STRUCTURES, RADIO STUDIOS, RECORDING STUDIOS, SCHOOLS, AND TELEVISION STUDIOS .	52 dBA (INTERIOR)
E	HOTELS, MOTELS, OFFICES, RESTAURANTS/BARS, AND OTHER DEVELOPED LANDS, PROPERTIES OR ACTIVITIES NOT INCLUDED IN A-D OR F.	72 dBA (EXTERIOR)
F	AGRICULTURE, AIRPORTS, BUS YARDS, EMERGENCY SERVICES, INDUSTRIAL, LOGGING, MAINTENANCE FACILITIES, MANUFACTURING, MINING, RAIL YARDS, RETAIL FACILITIES, SHIPYARDS, UTILITIES (WATER RESOURCES, WATER TREATMENT, ELECTRICAL), AND WAREHOUSING	N/A
G	UNDEVELOPED LANDS THAT ARE NOT PREMITTED	N/A

Project Site and Noise Measurement Locations

Legend

- Short Term Noise Measurement Location
- Long Term Noise Measurement Location
- Property Line

L1 160 feet west of Fort Barrett Rd.

L2 5 feet east of Kunehi St.

S1 140 feet west of Fort Barrett Rd.

S2 50 feet north of Kapolei Pkwy

(all distances measured from the edge of pavement)

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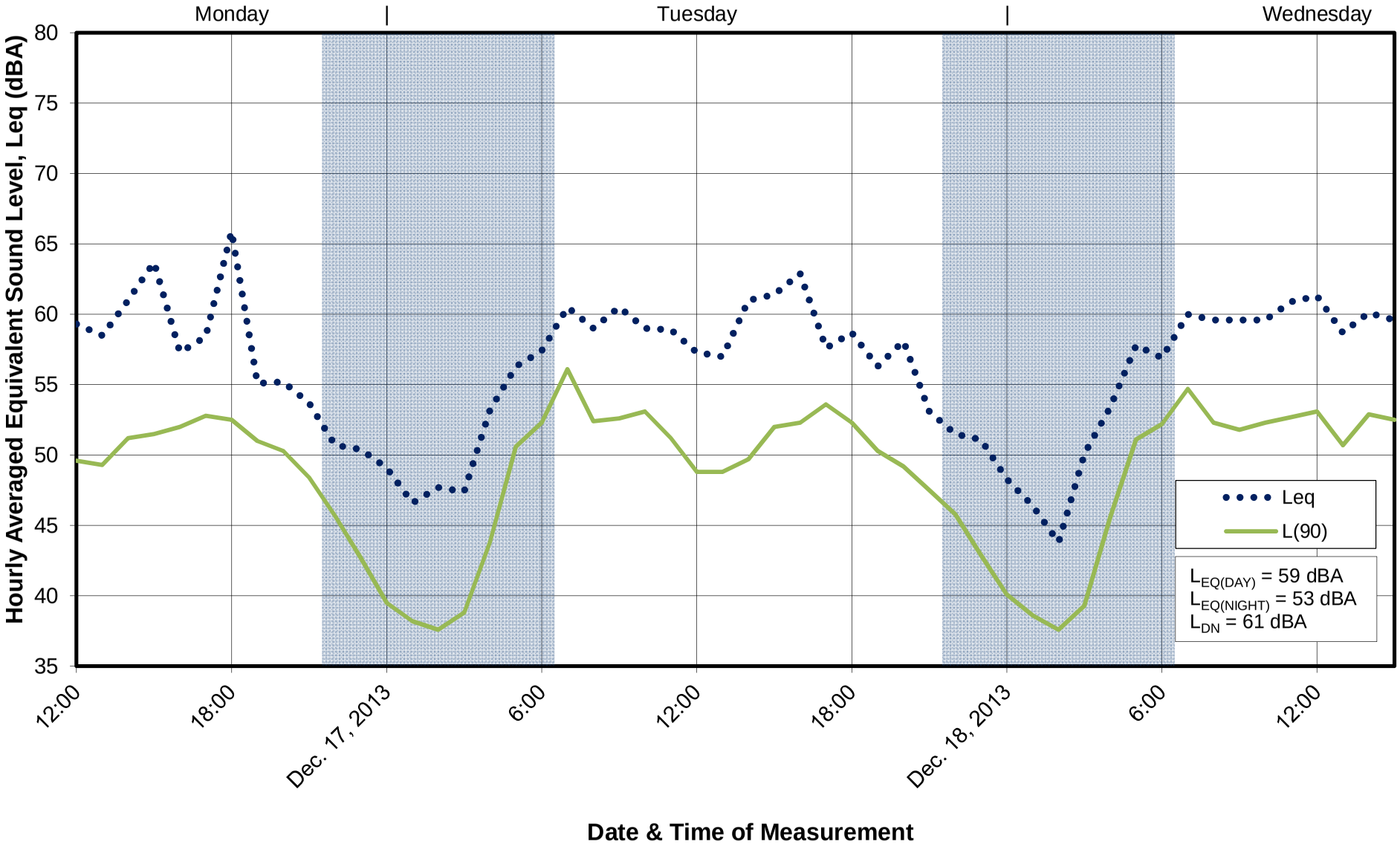
Kapolei II Elementary School

PROJECT NO:	DATE:	FIGURE:
13-45A	January 2014	3

Graph of Long Term Noise Measurements - Location 1



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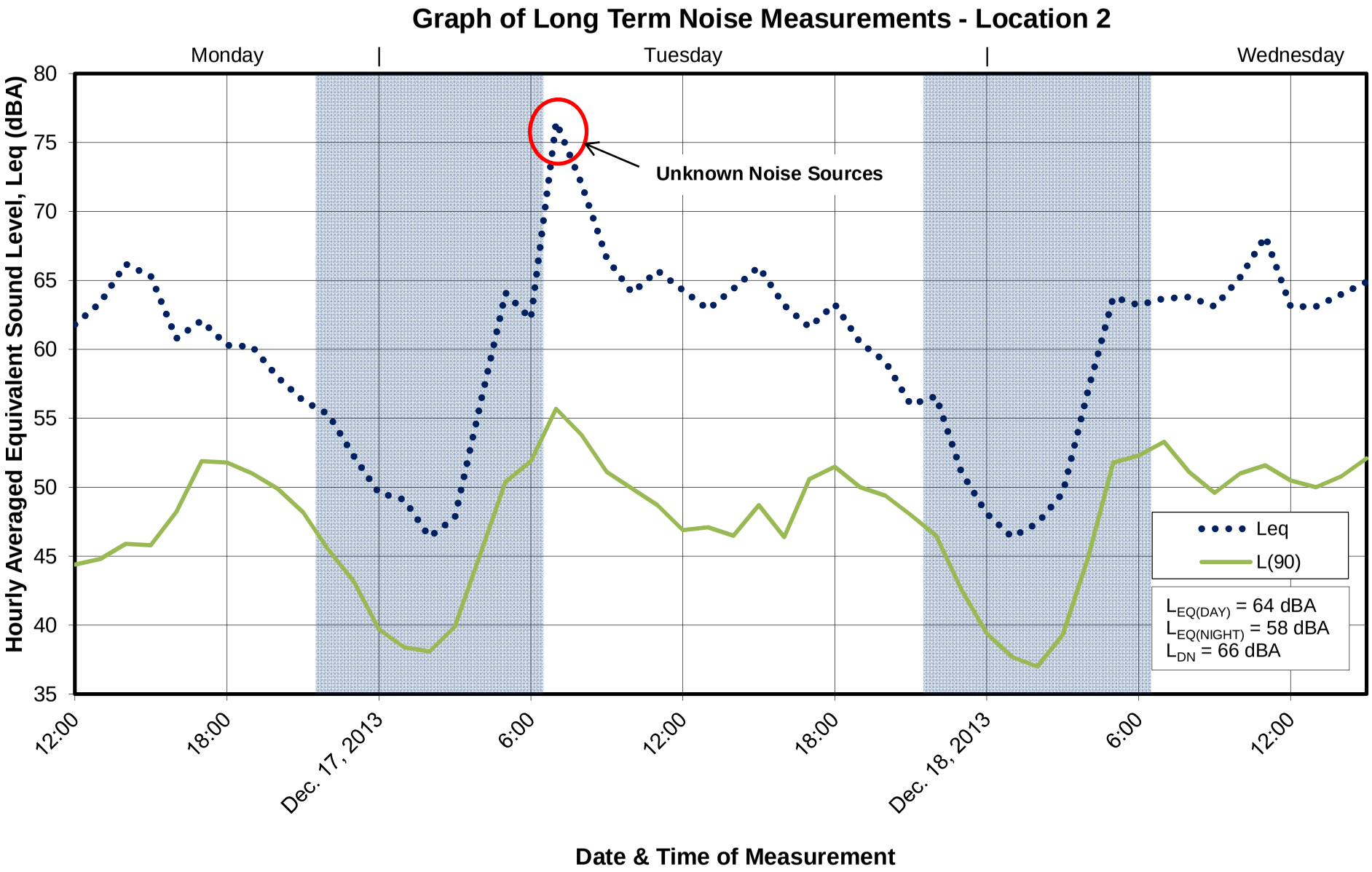
PROJECT:		
Kapolei II Elementary School		
PROJECT NO: 13-45A	DATE: January 2014	FIGURE: 4



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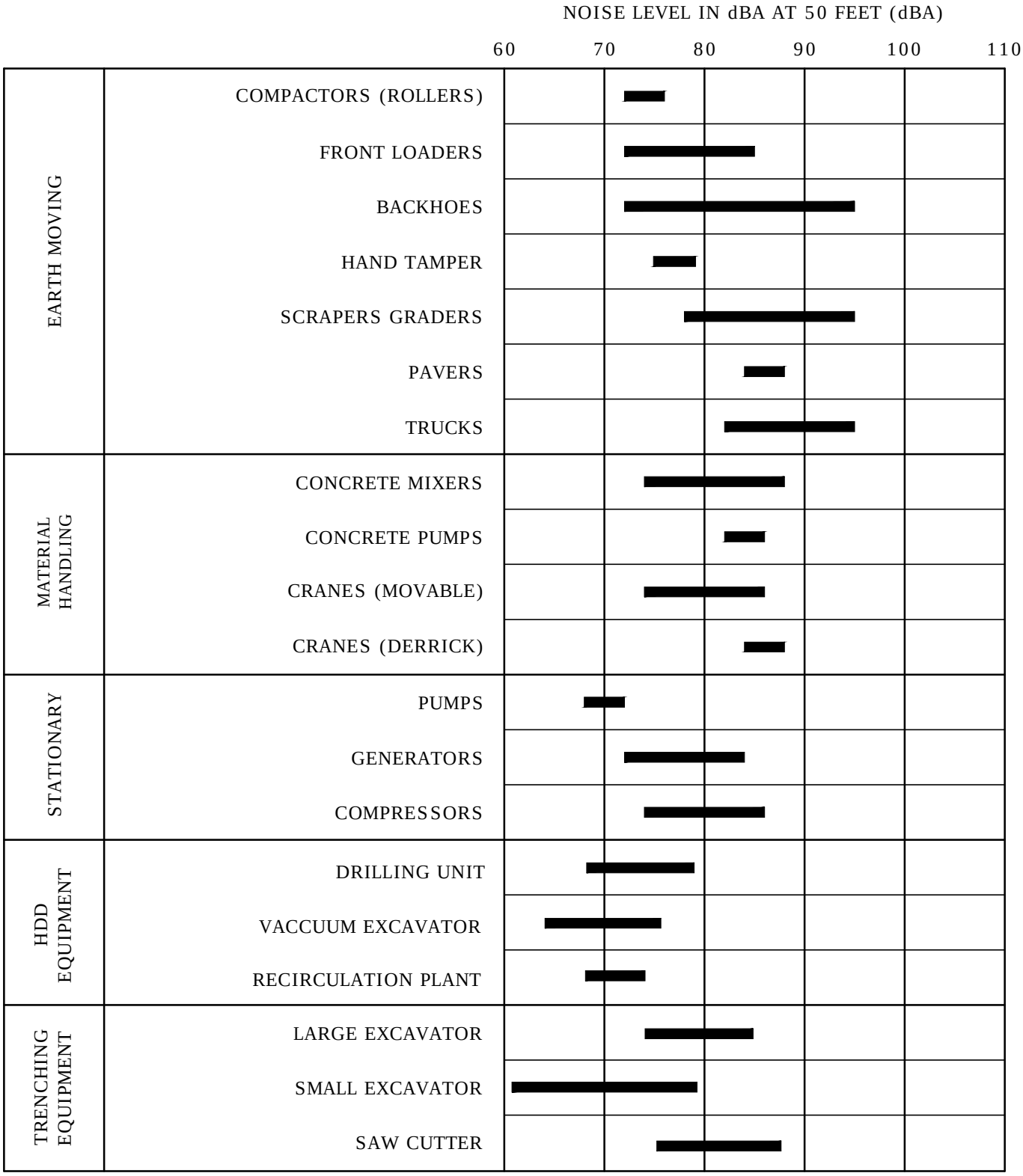
	PROJECT NO: 13-45A	DATE: January 2014	FIGURE: 5

TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT



NOTE: BASED ON LIMITED AVAILABLE DATA SAMPLES

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PROJECT NO: 13-45A	DATE: January 2014	FIGURE: 6

Project Site and Predicted Traffic Noise Level Locations

Legend

Predicted Traffic Noise Level Location

Property Line

- **A** KES Building G
- **B** KES Building C
- **C** La Kiki Neighborhood
- **D** Leihano Senior Living
- **E** Kapolei High School

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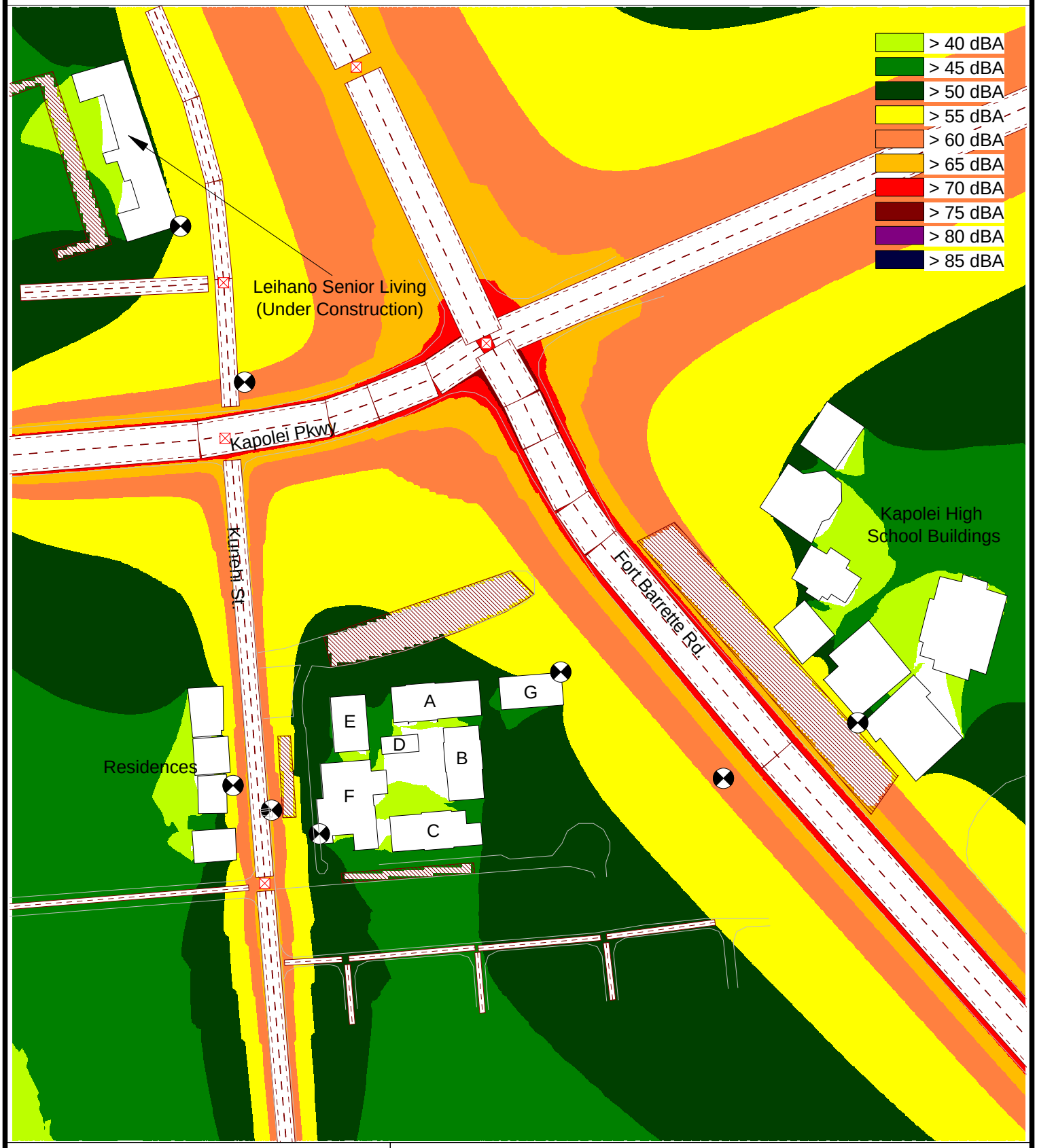
Kapolei II Elementary School

PROJECT NO:	DATE:	FIGURE:
13-45A	January 2013	7

EXISTING (2013) - SOUND LEVEL CONTOURS DUE TO AM VEHICULAR TRAFFIC



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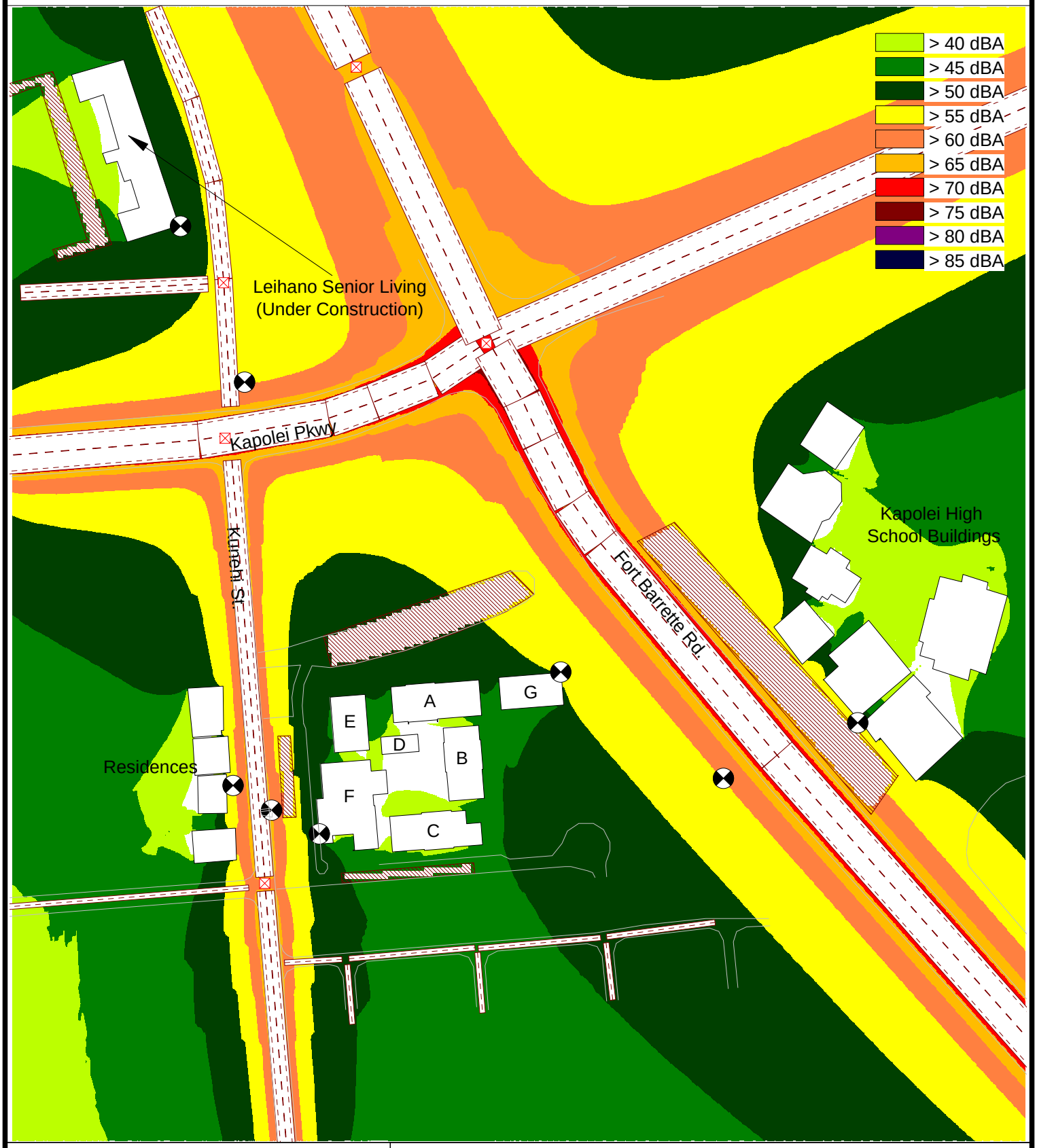
PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	8

EXISTING (2013) - SOUND LEVEL CONTOURS DUE TO PM VEHICULAR TRAFFIC



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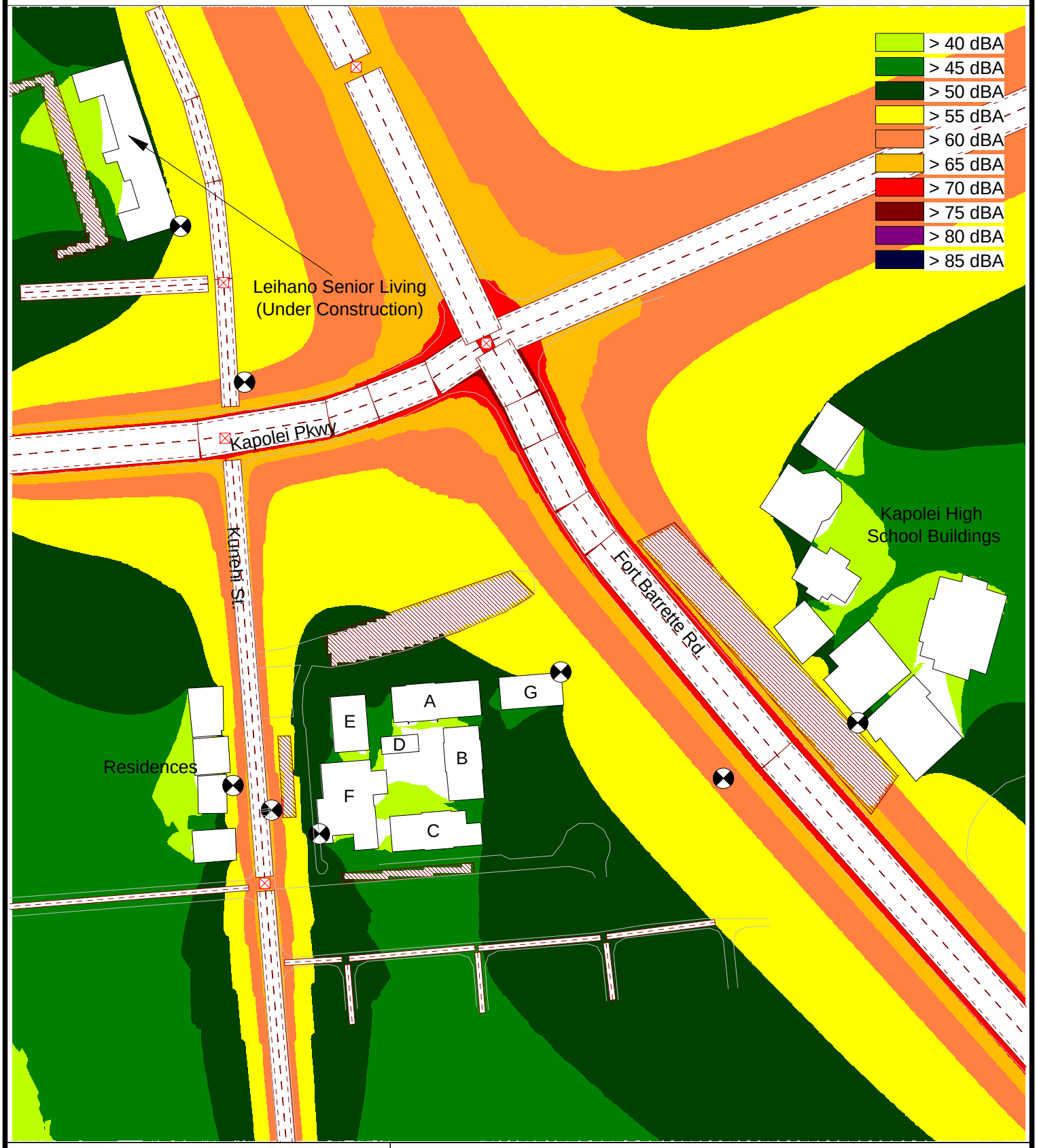
PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	9

FUTURE (2018) W/OUT PROJECT - SOUND LEVEL CONTOURS DUE TO AM VEHICULAR TRAFFIC



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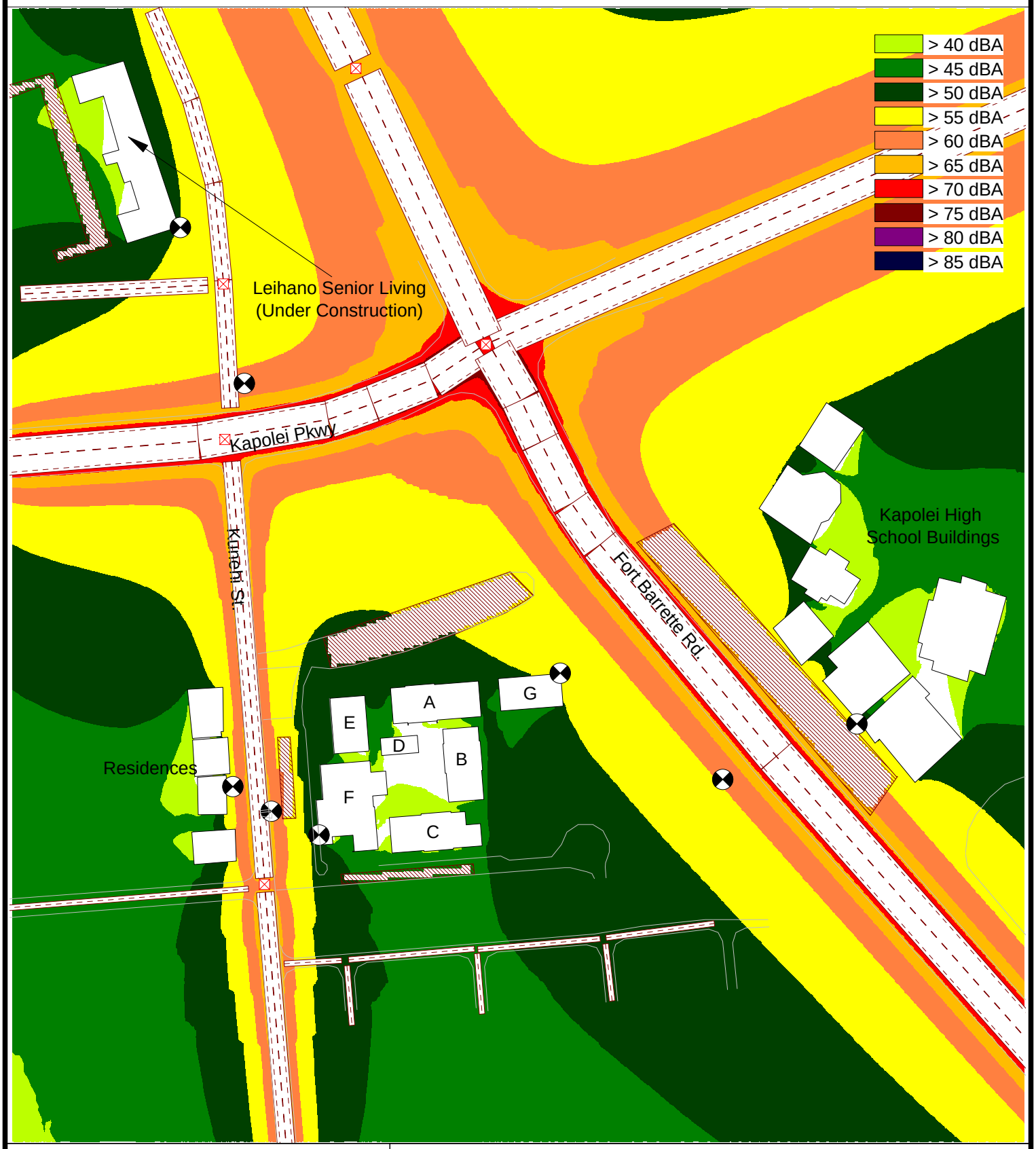
PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	10

FUTURE (2018) W/OUT PROJECT - SOUND LEVEL CONTOURS DUE TO PM VEHICULAR TRAFFIC



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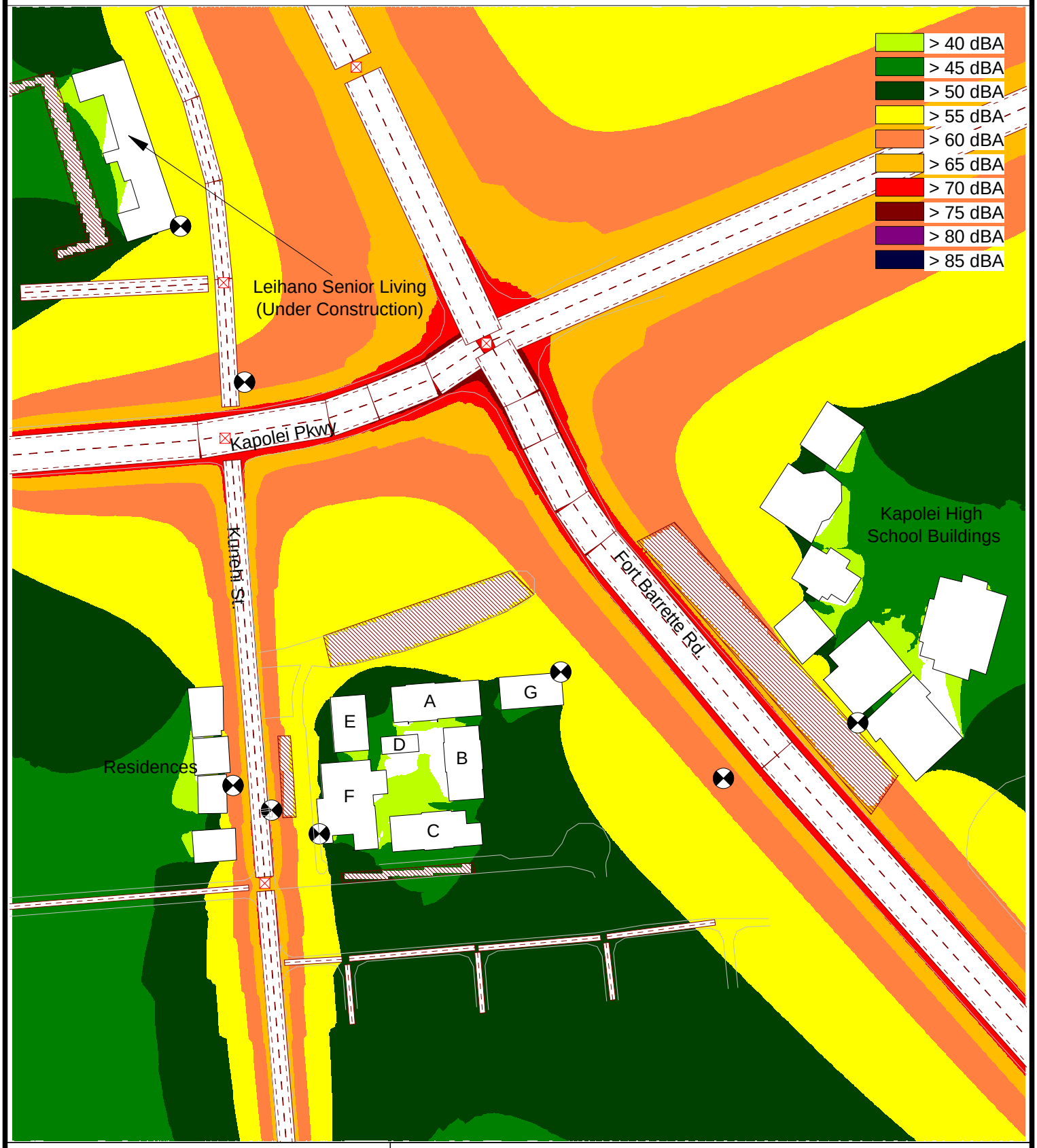
PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	11

FUTURE (2018) WITH PROJECT - SOUND LEVEL CONTOURS DUE TO AM VEHICULAR TRAFFIC



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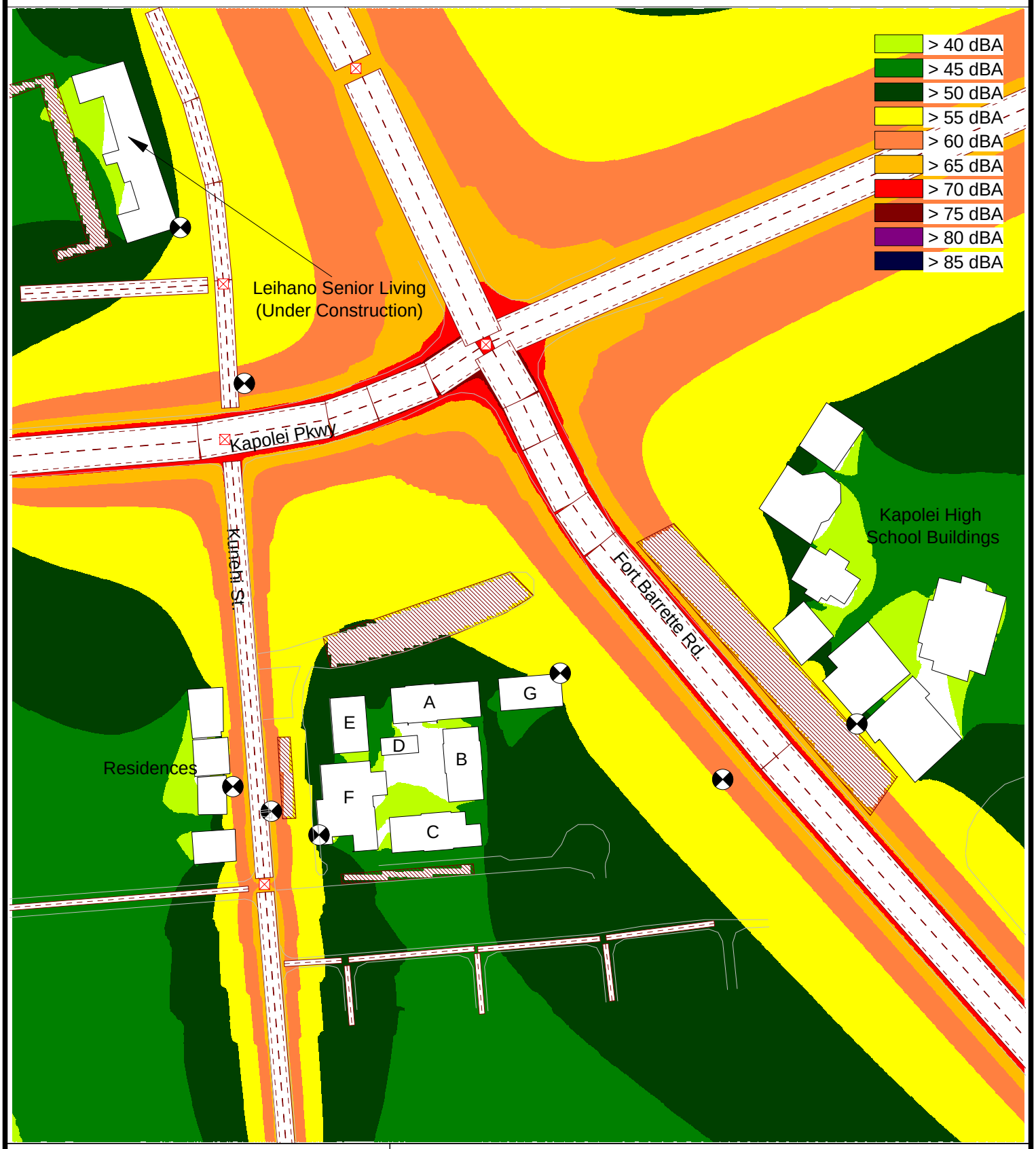
PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	12

FUTURE (2018) WITH PROJECT - SOUND LEVEL CONTOURS DUE TO PM VEHICULAR TRAFFIC



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PROJECT:		
Kapolei II ES		
PROJECT NO.	DATE:	FIGURE:
13-45A	January 2014	13

APPENDIX A

Acoustic Terminology

Acoustic Terminology

Sound Pressure Level

Sound, or noise, is the term given to variations in air pressure that are capable of being detected by the human ear. Small fluctuations in atmospheric pressure (sound pressure) constitute the physical property measured with a sound pressure level meter. Because the human ear can detect variations in atmospheric pressure over such a large range of magnitudes, sound pressure is expressed on a logarithmic scale in units called decibels (dB). Noise is defined as Aunwanted@ sound.

Technically, sound pressure level (SPL) is defined as:

$$SPL = 20 \log (P/P_{ref}) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and P_{ref} is the reference pressure, 20 µPa, which is approximately the lowest sound pressure that can be detected by the human ear. For example:

If P = 20 µPa, then SPL = 0 dB
If P = 200 µPa, then SPL = 20 dB
If P = 2000 µPa, then SPL = 40 dB

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound sources, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined sound level of 53 dB, not 100 dB. Two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 6 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level

Studies have shown conclusively that at equal sound pressure levels, people are generally more sensitive to certain higher frequency sounds (such as made by speech, horns, and whistles) than most lower frequency sounds (such as made by motors and engines)[1] at the same level. To address this preferential response to frequency, the A-weighted scale was developed. The A-weighted scale adjusts the sound level in each frequency band in much the same manner that the

[1] D.W. Robinson and R.S. Dadson, AA Re-Determination of the Equal-Loudness Relations for Pure Tones,@ *British Journal of Applied Physics*, vol. 7, pp. 166 - 181, 1956. (Adopted by the International Standards Organization as Recommendation R-226.

human auditory system does. Thus the A-weighted sound level (read as "dBA") becomes a single number that defines the level of a sound and has some correlation with the sensitivity of the human ear to that sound. Different sounds with the same A-weighted sound level are perceived as being equally loud. The A-weighted noise level is commonly used today in environmental noise analysis and in noise regulations. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

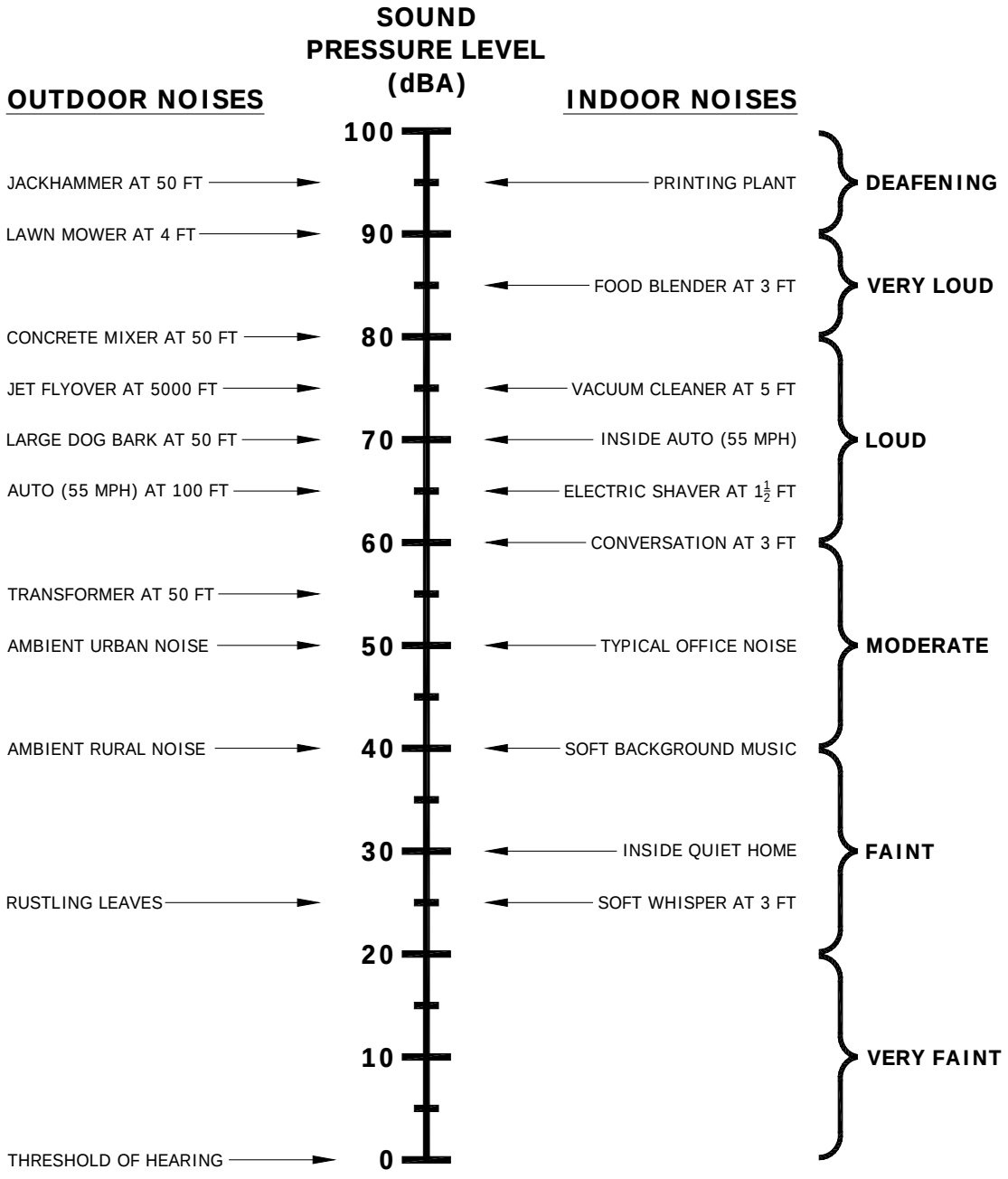

Figure A-1. Common Outdoor/Indoor Sound Levels

Equivalent Sound Level

The Equivalent Sound Level (L_{eq}) is a type of average which represents the steady level that, integrated over a time period, would produce the same energy as the actual signal. The actual *instantaneous* noise levels typically fluctuate above and below the measured L_{eq} during the measurement period. The A-weighted L_{eq} is a common index for measuring environmental noise. A graphical description of the equivalent sound level is shown in Figure A-2.

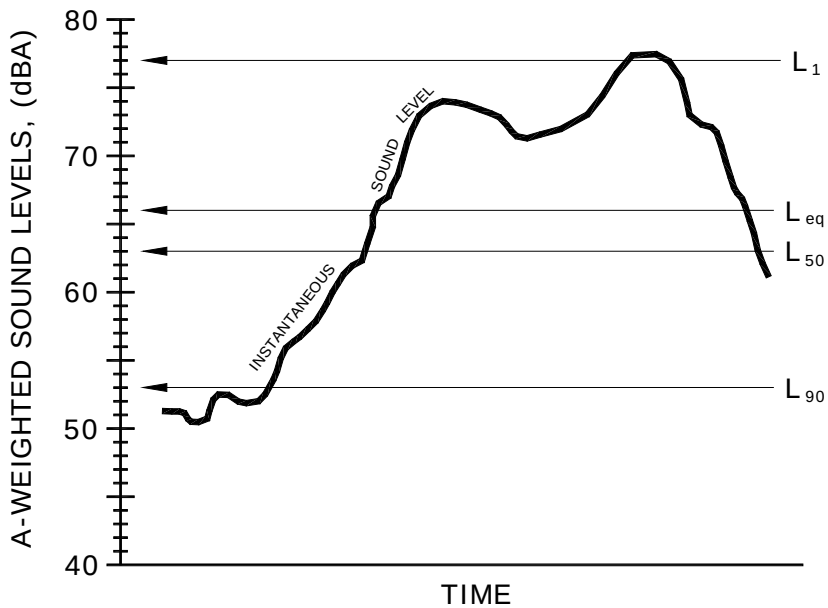

Figure A-2. Example Graph of Equivalent and Statistical Sound Levels

Statistical Sound Level

The sound levels of long-term noise producing activities such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels has been developed. It is known as the Exceedence Level, L_n. The L_n represents the sound level that is exceeded for n% of the measurement time period. For example, L_{10} = 60 dBA indicates that for the duration of the measurement period, the sound level exceeded 60 dBA 10% of the time. Typically, in noise regulations and standards, the specified time period is one hour. Commonly used Exceedence Levels include L_{01}, L_{10}, L_{50}, and L_{90}, which are widely used to assess community and environmental noise. A graphical description of the equivalent sound level is shown in Figure A-2.

Day-Night Equivalent Sound Level

The Day-Night Equivalent Sound Level, L_{dn}, is the Equivalent Sound Level, L_{eq}, measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 p.m. and 7 a.m. to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The L_{dn} is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations.

Sound Exposure Level

The sound exposure level, SEL, is the total noise energy produced from a single noise event. The sound exposure level is used to describe the amount of noise from discrete moving sources such as an individual aircraft flyover or a single train passing by. The sound exposure level is the integration of all the acoustic energy contained within the event.

APPENDIX B

Photographs at Project Site

Location L1
Located 160 feet west of Fort Barrette Rd.

Location L2
Located 5 feet east of Kunehi St.