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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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RICK BLANGIARDI
MAYOR

DAWN TAKEUCHI APUNA
DIRECTOR DESIGNATE

December 12, 2022

2022/GEN-11(AB)

The Honorable Tommy Waters
Chair and Presiding Officer
and Members
Honolulu City Council
530 South King Street, Room 202
Honolulu, Hawaii 96813

Dear Chair Waters and Councilmembers:

SUBJECT:	Request for Exemptions from Development Regulations Pursuant to Chapter 201H-38, Hawaii Revised Statutes (HRS)
Project:	Keawalau Affordable Housing Community Project
Landowner:	Bernice Pauahi Bishop Estate
Applicant:	Highridge Costa Development Company
Agent:	Munekiyo Hiraga (Yukino Uchiyama, AICP)
Location:	Hikimoe Street at Waipahu Depot Street and Kahuailani Street – Waipahu
Tax Map Keys:	9-4-016: 046 and 9-4-014: 005, 014, 058 through 067, and 075

The Highridge Costa Development Company is requesting exemptions from the City and County of Honolulu regulations and fees to develop the Keawalau Affordable Housing Community Project pursuant to Chapter 201H-38, HRS. The purpose of these regulations is to encourage the development of affordable housing.

Enclosed for your review and action are the Report, Draft Resolution, and a copy of the Plans and Specifications. The enclosed Draft Resolution is to grant exemptions from certain statutes, ordinances, and rules relating to planning, zoning, and permit fees to allow development of the Project.

The Applicant undertook an outreach effort involving elected officials, neighborhood boards, and other community groups, which began in 2020. Height, impacts to views of the Waipahu Sugar Mill Smokestack, and traffic were concerns raised during the community outreach effort. According to the Applicant, the community

outreach resulted in modifications to the Project that address these community comments. Other than these concerns, the community views appear to have been generally supportive of the affordable housing Project. The issues of height, views, and traffic are discussed in the attached Report.

Pursuant to Section 201H-38, HRS, the City Council has 45 days to act on the matter from the date the Department of Planning and Permitting submits the request to the City Council. If the City Council does not act on the request within 45 days, the exemptions will be automatically approved.

Should you have any questions, please contact me at (808) 768-8000.

Very truly yours,

Dawn Takeuchi Apuna
Director Designate

Enclosure: DPP Report and Recommendation
Draft Resolution
Plans and Specifications

APPROVED:

Michael D. Formby
Managing Director

DEPARTMENT OF PLANNING AND PERMITTING
OF THE CITY AND COUNTY OF HONOLULU

STATE OF HAWAII

IN THE MATTER OF THE APPLICATION OF KEAWALAU AFFORDABLE HOUSING COMMUNITY PROJECT CHAPTER 201H, HAWAII REVISED STATUTES (HRS) EXEMPTIONS FOR AN AFFORDABLE HOUSING PROJECT	FILE NO. 2022/GEN-11(AB)

I. APPLICATION

A. BASIC INFORMATION:

PROJECT:	Keawalau Affordable Housing Community
LANDOWNER:	Bernice Pauahi Bishop Estate
APPLICANT:	Highridge Costa Development Company (Monte Heaton)
AGENT:	Munekiyo Hiraga (Yukino Uchiyama, AICP)
LOCATION:	Hikimoe Street at Waipahu Depot Street, Kahuailani Street – Waipahu (Exhibit A)
TAX MAP KEYS:	9-4-016: 046 and 9-4-014: 005, 014, 058 through 067, and 075
LAND AREA:	Approximately 3.84 acres
STATE LAND USE:	Urban District
DEVELOPMENT PLAN AREA:	Central Oahu Sustainable Communities Plan
ZONING:	BMX-3 Community Business Mixed Use
EXISTING USE:	Various commercial, retail, office, and personal services.
SURROUNDING LAND USE:	Single-family dwellings, various commercial uses including retail, office, service station, eating, and personal service uses and the Waipahu Transit Center.

B. Background: Starting in 2020, the Applicant began a community outreach program that involved meetings with elected representatives, business operators, and Neighborhood Boards, hosting town hall meetings, and participating in public discussions with the media. The Applicant summarized the outreach efforts in Section 15 of the application.

The Project was deemed eligible for exemptions under Chapter 201H-38, HRS, on August 23, 2021. The Applicant was required to obtain approval of a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (FEMA) prior to determination of compliance with Chapter 343, HRS. On July 25, 2022, FEMA approved the LOMR with an effective date of December 6, 2022. Exhibit B demonstrates the revised floodway. The Department of Planning and Permitting (DPP) subsequently confirmed compliance with Chapter 343, HRS, on August 11, 2022.

C. Proposal: The Applicant is proposing to develop a mixed-use Project consisting of 537 multi-family housing units, ground floor commercial spaces with about 42,372 square feet (sq. ft.) of floor area, and related infrastructure improvements in close proximity to the future Waipahu Transit Center. The Project consists of three phases: the Mauka Block (Phase 1), which includes 133 senior housing units in a mid-rise building; and the Makai Block (Phases 2 and 3), which includes two residential towers including 234 and 170 units, respectively. The ground floor of both the Mauka and Makai Blocks are to be developed with various supportive commercial uses, residential lobbies, outdoor gathering areas, landscaped areas, bicycle parking, and vehicular parking and loading. The existing office building on the Makai Block will be retained. See Exhibits C through V.

D. Affordability Requirements: Of the 537 units, 531 units (99 percent) will be reserved below rates accessible to "very low-income households" (60 percent Area Median Income [AMI] or lower), for a period of 60 years, which exceeds the minimum eligibility requirements for 201H projects pursuant to the DPP Rules related to the 201H Housing Program. The table below details the number and affordability of the dwelling units by phase and in total:

AFFORDABLE UNIT MATRIX		
Restricted at Percent of AMI	**Number of Units**	**Percent of Total Units**
Mauka Block Phase 1		
30 Percent of AMI	14	3
60 Percent of AMI	117	22
Manager's Units	2	0.4
Makai Block Phase 2		
30 Percent AMI	24	4
60 Percent AMI	208	39
Manager's Units	2	0.4
Makai Block Phase 3		
30 Percent of AMI	17	3
60 Percent of AMI	151	28

Restricted at Percent of AMI	Number of Units	Percent of Total Units
Manager's Units	2	0.4
TOTAL AFFORDABLE UNITS	**531**	**99**
Total 30 Percent of AMI	**55**	**10**
Total 60 Percent of AMI	**476**	**89**
Total Manager Units	**6**	**1**
TOTAL NUMBER OF UNITS	**537**	**100**

II. FINDINGS OF FACT

On the basis of the evidence presented, the Director has found:

A. Description of Site and Surrounding Uses: The Project Site in Waipahu is comprised of the subject 14 parcels, as shown in Exhibit A (Site). The Site is divided by Hikimoe Street into two distinct areas, referred to as the Mauka and Makai Blocks. The total area for the Site is about 3.84 acres, with the Mauka Block being 50,781 sq. ft., and the Makai Block being 119,183 sq. ft.

The Site is currently developed with paved parking and maneuvering areas, commercial buildings, an office building, and subsurface utilities and related infrastructure. Other than the office building at the corner of Farrington Highway and Waipahu Depot Street on the Makai Block, the site will be completely redeveloped. The office building will be retained.

The Site is bounded by Waipahu Depot Street to the west, Farrington Highway to the south, commercial buildings and single-family dwellings to the east and north east, and commercial uses to the north and northwest. The Site is bisected by Hikimoe Street. The Site is located in the vicinity of the Waipahu Transit Center and the Waipahu Sugar Mill Smokestack. The Waipahu Depot Street frontage is affected by a five-foot (ft.) road widening setback and 30-ft. property line radius at the intersection with Hikimoe Street.

B. Chapter 343, HRS: The DPP determined the Project qualified for an exemption from the environmental document preparation requirements of Chapter 343, HRS, pursuant to Hawaii Administrative Rules Section 11-200.1-15(c)(10). The DPP issued an exemption letter on August 11, 2022, which was published in the September 8, 2022, edition of *The Environmental Notice*.

C. Flood Hazard Area and Sea Level Rise (SLR): The lot is in Flood Zones AE, D, and X, after the approval of the LOMR by FEMA. See Exhibit B. Flood Zone AE is a special flood hazard area, where development is subject to Chapter 21A, Revised Ordinances of Honolulu (ROH). Data from the Hawaii SLR Viewer estimates that no portion of the Project area will be impacted by 3.2 ft. of SLR.

D. Community and Agency Comments: Height, impacts to views of the Waipahu Sugar Mill Smokestack, and traffic were concerns raised during the community outreach effort, which began in 2020. Otherwise, views expressed were generally supportive of the affordable housing Project.

The 201H application was routed by the DPP to various public agencies for review and comment. No public agency objected to the Project. The following agencies provided a response to the DPP: Board of Water Supply (BWS), Honolulu Fire Department (HFD), the Department of Transportation Services (DTS), and the Hawaii Department of Transportation.

Applicable comments are incorporated into the Analysis section of this report.

III. REQUESTED EXEMPTIONS AND ANALYSIS

A. Chapter 201H, HRS Requirements and Exemptions: The Project has demonstrated compliance with the City's 201H Program qualifying requirements. The requested fee exemptions are summarized in the following sections.

1. Plan Review, Permit, and Utility Fees: The following table summarizes the requested fee exemptions and other adjustments sought for the Project and the approximate related values:

Item	ROH Section	*Estimated Total Fees and Requested Exemptions	Recommendation
Plan Review and Permit Fees			
Stormwater Quality Review Fee: Erosion Control and Sediment Plan Review Fee	18A-1.6 and DPP Rules: Water Quality	$500	$500
Grading, Grubbing, Stockpiling	18A-2.4	$3,000	$3,000
Building Permit Plan Review	18-6.1	$25,000	$25,000
Building Permit Fees	18-6.2	$944,188	$944,188
HFD Plan Review Fee	20-1.1(3) 1.12.8	$12,500	$12,500

Item	ROH Section	*Estimated Total Fees and Requested Exemptions	Recommendation
Park Dedication	22-7	$2,369,540 (34,370 sq. ft. shortfall)	$2,369,540
Conditional Use Permit (CUP) for a Joint Development Agreement Fee	21-5.380 and 21-5.380A	$1,200 (two permits)	$1,200
Special District Permit, Major	21-9.100-11, Table 21-9.8	$2,400	$2,400
Subdivision Fee	22-1.1	$600	$600
Utility Fees			
Wastewater System Facility Charge	43-10.1, 43-10.2, and 43-10.3	$1,843,217.60	$1,843,217.60
Private Storm Drain Connection License	43-11.12	$400	$400
BWS Water System Facility and Installation Charge	Section 1-102 and 2-202(2) and (3) (BWS Rules and Regulations)	$1,176,106	Defer; BWS will determine eligibility at time of Building Permit
Taxes			
Real Property Tax	8-10.36	Not estimated	Deny; Process per Ordinances 18-1 and 20-11
Real Property Tax Holiday	8-10.37	Not estimated	Deny; process per Ordinances 18-1 and 20-11
Estimated Totals		**$6,378,651.60**	**$5,202,545.60**

* The requested fee values are only estimates and may be further adjusted upon the submission of building permits and certification of the Project's affordable units.

Granting the above recommendations will not adversely affect public health and safety and will help reduce the cost of producing affordable housing. Therefore, unless otherwise noted below, we do not object to the requested exemptions. Apart from the requests identified in the table above, no other

fee exemptions or deferrals were requested that are under the City Council's purview. For example, Hawaiian Electric Company fees were not included in this application.

In order to determine compliance with BWS safety standards, tariffs, or rates and fees, the DPP forwarded the application to the BWS for review. The BWS may exempt water system facility charges and new meter costs for up to 500 dwelling units per year. To qualify, the dwelling units must be certified as either affordable dwelling units by the appropriate City agency, and the certification provided when the building permit application is submitted for review and approval. The BWS specified that the exemptions for the affordable housing units will have to be verified and approved during the review of building permits. The BWS also stated that the Applicant will be required to pay water system facilities charges for resource development, transmission, and daily storage for non-qualifying units. As such the DPP recommends deferral of this request, allowing the BWS to make this determination during a future review.

The requested property tax exemption and property tax holiday do not need to be accommodated by the City Council's 201H Resolution approval for this Project because they are more appropriately addressed through the ordinary process provided by Ordinances 18-1 and 20-11, related to affordable housing incentives.

A similar statement could be made about the request for park dedication; however, the six manager's units would still be subject to park dedication. The site will be providing a variety of recreational areas to all residents, and public open spaces that may qualify for park dedication. These provisions far exceed the requirement for the six manager's units; therefore, in the interest of efficient permitting, the DPP recommends waiving the park dedication requirement entirely so as to not burden the Project with an additional application and review.

The Applicant requests to waive the wastewater system facility charge for the affordable housing units. The Department of Environmental Services (ENV) did not provide a comment on the request. Previously ENV has supported such requests so long as they are limited to the affordable housing units only. The DPP has no objections to waiving this charge.

The estimated value of the exemptions supported by DPP is about $5,202,545.60.

2. Chapter 21, ROH: The following table shows the Project's compliance with development standards of the Land use Ordinance (LUO) and summarizes the Applicant's requested exemptions:

LUO Standards	LUO Provisions	Project	Recommendation
Minimum Lot Area	5,000 sq. ft.	Complies	N/A
Maximum Density (Floor Area Ratio [FAR])	3.5 FAR with Major Special District Permit	Request 3.5 FAR (approximate) without Special District Permit	Approve
Yards	Front yard: 5 ft. minimum, 15 ft. maximum	Complies, although may encroach after road widening setback	Approve
Height	60 ft.	70 ft. for Mauka Block; 191 ft. for Makai Block	Approve
Height Setback	Any portion over 40 ft., must provide one-foot side and rear setbacks for each 10 ft. of additional height.	2-ft. encroachment for Mauka Block; 15-ft. encroachment for Makai Block	Approve
Transitional Height Setback	The Residential District height setback is applicable at the buildable area boundary line of the adjoining side.	8-ft. encroachment for Mauka Block	Approve
Joint Development	CUP required	Exemption from Joint Development CUP	Approve
Transit Oriented Development (TOD) Special District Permit	Projects over one acre or 3.5 FAR require a Special District Permit	No Special District Permit	Approve
Building Orientation and Entrances	Building façade should be parallel to the property line and each establishment should have a separate entrance.	Some façade will not be parallel to the property line or have establishment entrances.	Approve
Building transparency	60% of the building façade area must have openings; blank walls cannot exceed 25 ft.	Does not comply along Farrington Highway and Kahuailani St.	Approve
Parking setbacks	At-grade parking must be setback 40 ft. from property line	Parking encroaches along Farrington Highway and Kahuailani St.	Approve
Vehicular access	Vehicular access should be from a secondary street	Vehicular access will be provided via Farrington Highway and Hikimoe St.	Approve
Loading access location	Service areas and loading spaces must be located at the side or rear of the site	Makai Block building will have service areas and/or loading spaces off Farrington Highway.	Approve

LUO Standards	LUO Provisions	Project	Recommendation
Loading Requirements and Dimensions	Three loading spaces: 35- x 12-ft. Six loading spaces: 19- x 8.2-ft.	Two loading spaces: 35- x 12-ft. Four loading spaces: 19- x 8.2-ft.	Approve

a. BMX-3 Business Mixed Use District Standards: The Applicant requests exemptions from LUO standards related to height, height setbacks, transitional height setbacks, and density to allow design flexibility in support of providing more affordable housing units. The additional flexibility also allows for greater distance between the two tower buildings, creating better opportunities to preserve views of the Waipahu Sugar Mill Smokestack.

It appears that after the road widening and corner rounding setbacks are accounted for, the Project may encroach into the required yard along Waipahu Depot Street and at the corner of Waipahu Depot and Hikimoe Streets. The DPP supports this conceptual encroachment so long as adequate facilities are provided for pedestrian access and circulation, as determined by a pedestrian assessment report. This is discussed in more detail below in the section about access, transportation, and circulation.

The Applicant did not request an exemption from the required landscaping in the required yard because required yards can be improved with pedestrian-oriented features in the Transit Oriented Development (TOD) Special District. Because the Major Special District Permit requirement is likely to be waived and because future road widening and corner rounding may affect the required yard treatment, we conducted a review of the proposed yard treatments and found the yard treatments, like landscaping and pedestrian improvements, to be broadly compliant with the TOD Special District Standards. However, the building may encroach into the required yard after road widening, so we recommend that a waiver to yard requirements be approved for that purpose.

b. Joint Development: The Mauka and Makai Blocks will each be developed as a single zoning lot despite being made up of multiple lots. Pursuant to LUO Section 21-5.380(d), one CUP would be required for the Mauka Block, and another for the Makai Block. The Applicant is requesting an exemption from the CUP requirement and fees. This exemption would help to expedite the development of affordable housing. The DPP finds this to be an acceptable streamlining option under the 201H resolution.

We recommend that the Mauka and Makai Blocks be treated as individual zoning lots for the purposes of this Project.

c. Off-street Loading: LUO Section 21-6.110, Table 21-6.5, requires 10 loading spaces for the Project. The Applicant is proposing a total of six loading spaces to be dispersed throughout the Mauka and Makai Blocks. Pursuant to LUO Section 21-6.130, when more than one loading space is required, the minimum horizontal dimensions for one-third of the required spaces are 35 ft. in length and 12 ft. in width, with a minimum vertical clearance of 14 ft. The Applicant is not requesting to modify this ratio, and the TOD Special District allows for a reduction in the number of loading spaces in order to accommodate better design at the ground floor. Therefore, the DPP recommends approval of this request to reduce the total number of loading spaces.

d. TOD Special District General Requirements and Development Standards: As summarized in the table above, the Applicant is seeking to waive or modify a variety of TOD Special District standards, including those related to setback improvements for pedestrian access, building orientation, building entrances, building transparency, parking access and location, and loading access and location. However, when considering the specific circumstances of the site and the proposal, the Project will generally support the TOD objectives of the Special District and the requested waivers would likely be supportable through a Major Special District Permit. Therefore, the DPP recommends approval of these requests.

Summary of LUO Exemptions: The LUO exemption requests are directly related to the provisions of affordable housing on site. The height and maximum density exemptions will allow the Applicant to provide more affordable housing units and an appropriate design considering the location and size of the site. Potential impacts to the surrounding area relating to the Project will be mitigated through the ordinary review of future permits, preparation and implementation of traffic engineering studies, or the application of specific conditions discussed below. Waiving the above requirements will contribute to a development that generally conforms to the City's plans and policies to promote affordable housing, and will support the objectives of the TOD Special District. The requested exemptions allow for a more efficient use of land to meet the housing needs of an underserved population by increasing the development potential for the site through the requested exemptions while still being broadly compliant with the goals and objectives of the TOD Special District. Therefore, the DPP supports the requests, as summarized above and generally shown in the Exhibits.

B. Oahu General Plan (GP), Central Oahu Sustainable Communities Plan (COSCP), and the Waipahu Neighborhood TOD Plan:

The Project is generally consistent with the GP. In particular, the Project supports objectives and policies related to increasing the availability of affordable housing, encouraging affordable housing designed for elderly people in locations convenient to critical services and public transit, encouraging higher-density housing near rail areas, and more generally providing decent, reasonably priced housing in safe and attractive neighborhoods.

The Project is within the community growth boundary of the COSCP in an area designated as Regional Town Center on the Urban Land Use Map. It is generally consistent with the COSCP policies relating to provision of affordable housing, community, retail, and other mixed uses near the Waipahu Transit Center Station. However, the proposed residential towers on the Makai Block are three times higher than the 60-ft. height limit allowed within a quarter-mile of the rail station. This conflicts with the COSCP's urban design goal to "maintain the visual dominance of sugar mill site, particularly the smokestack," which is about 1,000 ft. from the Makai Block. However, the COSCP also allows for urban design flexibility "as appropriate for redevelopment in the TOD Special Districts around the Honolulu Rail Transit Stations." The location of this site lends itself to higher densities, and the provision of affordable housing at the levels and lengths proposed supports exercising this design flexibility. The additional height also supports a more slender tower design, and additional space between towers, which mitigated impacts on views of the smokestack.

As previously stated, the Project broadly follows the principles of the Waipahu Neighborhood TOD Plan, with the exception of height. Both towers were reduced in height in response to community concerns and the Project meets the community goal of not exceeding the overall height of the Waipahu Sugar Mill Smokestack. Furthermore, the Applicant analyzed impacts to views in the view study, which can be found in Section 11-A of the application materials. The view study included graphics and views from several vantage points. See Exhibits X, Y, and Z. Considering the number of affordable housing units being proposed, the level and length of affordability, and the effort taken to respect the Waipahu Sugar Mill Smokestack and mitigate impacts on the views, the DPP supports the proposal and recommends conditional approval.

C. Health, Safety, and Infrastructure: The requested exemptions are not expected to impact the Project's ability to satisfy the basic requirements for health and safety of the residents or the public. The adequacy of the individual infrastructure systems or services are as follows:

1. Water: In a letter dated October 18, 2022, the BWS indicated that the existing water system is adequate to accommodate the proposed development. The BWS noted that the determination is based on current data, and that a final decision on the availability of water will be confirmed during the building permit approval process. Construction drawings should

be submitted to the BWS and the construction schedule should be coordinated to minimize impact to the water system. These are standard requirements, so no related condition of approval is proposed.

2. Wastewater: Sewer Connection Application (SCA) No. 2021/SCA-0794 was approved for 106 new dwellings and various other uses for the Mauka Block on June 18, 2021, with the expiration date of June 18, 2023. SCA No. 2021/SCA-0795 was approved for 458 new dwellings units and various other uses for the Makai Block on June 18, 2021, with the expiration date of June 18, 2023. The approval of the SCAs indicate that there is sufficient capacity for the Project as envisioned at that time. New SCAs will be required to accommodate changes in the number of units and the amount of floor area dedicated to other commercial uses on the site. The ENV did not object to the wastewater system facility charge exemption for the affordable dwellings.

3. Fire: HFD approved the request to exempt the Project from review fees. Building and construction permits will be reviewed for compliance with the appropriate codes by the HFD during the review of building permits.

4. Public Parks and Recreation Facilities: The Applicant is requesting an exemption from the park dedication requirement in order to expedite the permit process. The proposed development is not expected to have negative impacts on any of the public parks or recreational facilities nearby, which include Waipahu District Park, Hans L'Orange Neighborhood Park, Waipahu Central Garden Park, and the Pearl Harbor Historic bicycle trail. The Project proposes numerous recreation amenities for the residents, which should satisfy their recreational needs. In total, the Project includes about 30,000 sq. ft. of public open space, and 24,700 sq. ft. of semi-public residential amenity open space and other areas that may qualify for park dedication. These new amenities, coupled with the existing recreational resources nearby, will provide sufficient opportunities for recreation and enjoyment of open space. Therefore, the DPP supports the request to exempt the Project from park dedication review and fees.

5. Solid Waste: Solid waste collection will be accommodated on-site by a private collection agency. This will be confirmed during the review of building and construction permits.

6. Drainage: New developments must comply with the Water Quality Rules. According to the application, the Project is expected to include landscaped areas that will increase pervious surfaces when compared to the existing conditions, resulting in a decrease in total runoff. Therefore, no adverse impacts to drainage are anticipated. This will be confirmed during the review of construction and building permits.

7. Access, Transportation, and Circulation: The Project is accessed by Farrington Highway, Hikimoe Street, Waipahu Depot Street, and Kahuailani Street. A road widening setback and corner rounding impact the Makai Block along Waipahu Depot Street.

In August 2022, a Traffic Impact Report (TIR) was completed by Wilson Okamoto Corporation. The TIR concluded that traffic operations are generally expected to remain similar to the existing conditions, subject to implementation of recommendations contained in the Report. These recommendations should be required as conditions of approval.

Additionally, in order to ensure that there are no impacts during construction and after occupancy of the Project, the DPP recommends the following be submitted for review and approval:

a. A timeline or phasing of the anticipated dates to obtain major building permit(s) for demolition and/or construction work, including the projected date of occupancy.

b. A construction management plan (CMP).

c. A traffic management plan (TMP) that includes traffic demand management (TDM) strategies to minimize the amount of vehicular trips.

d. Construction plans for all work within or affecting public streets and traffic control plans during construction, as required.

e. A pedestrian assessment report to determine appropriate sidewalk widths needed to accommodate increased pedestrian activity around the Project site. This should be done prior to final design so wider sidewalks, if needed, can be incorporated into the Project.

f. A TIR approximately one year after the issuance of the certificate of occupancy to validate the traffic projections, distribution, and assignment contained in the latest accepted TIR. If additional traffic mitigation measures or modifications are necessary to support related traffic impacts directly attributable to this development, the applicant will be required to implement these measures. If the findings of the post TIR is inconclusive, a follow up study may be required within a year of this prior study, as necessary.

Lastly, the Makai Block of the Project is subject to the road widening and turning radius setbacks along Waipahu Depot Street. These setbacks should be improved as necessary to allow for two mauka-bound lanes, a bike lane, or other improvements that are necessary to accommodate the

additional traffic and improved pedestrian, bicycle, or transit circulation anticipated in the area. The Applicant should be required to coordinate with the DPP and DTS as their plans progress, and should be required to implement any required improvements.

With the above as conditions of approval, the DPP does not anticipate adverse impacts to the surrounding transportation and circulation networks.

8. Grading, Grubbing, and Trenching: The proposed redevelopment will require grading prior to construction. Erosion control measures and best management practices will be implemented to limit pollutant discharge to offsite areas. Required permits will be reviewed by the DPP at the appropriate time for compliance with the relevant regulations.

9. Flood Hazards: With the adoption of the updated FEMA flood maps, the Project will involve development within the AE Flood zones, which includes areas with a one percent chance of annual flooding. The Project is designed to avoid flood hazards by elevating ground floors above the base flood elevation. The Applicant is not seeking to waive any requirements associated with building in this area, and the Project appears to comply with Chapter 21A, ROH, related to flood hazards. The DPP does not expect any unmitigated health or safety hazards associated with this development. Compliance with the applicable standards will be confirmed during the review of construction and building permits.

To ensure efficient implementation and monitoring of the Project, the DPP recommends that the Applicant execute a 201H agreement with the City to ensure ongoing compliance with any Council approved Resolution and the 201H Program. This should be a condition of approval.

Furthermore, the City Council typically recommends a 24-month time limit to start construction for 201H Projects. Based on their funding strategy and anticipated schedule, the Applicant is asking that this timeline be established at four years, instead of two. As we have seen, due to the complexity of financing and permitting, projects of this scale and affordability level are difficult to accomplish in a 24-month time period. In order to avoid unnecessary processing of future extension requests, the DPP recommends the City Council set the time limit at 48 months to obtain development permits.

IV. CONCLUSION

The Applicant has submitted all required documentation. The Project is consistent with the provisions of Section 201H-38, HRS.

A. The Project provides affordable housing units.

B. The Project will meet the minimum requirements for health and safety.

C. The Project is in compliance with safety standards, tariffs, rates, and fees approved by the Public Utilities Commission for public utilities or the BWS.

The proposed affordable rental housing Project satisfies the eligibility criteria specified in the HRS Chapter 201H and the City's application requirements.

V. RECOMMENDATION

A. Proposed Exemptions: Pursuant to the above, the Director of the DPP recommends approval of the requested exemptions from statutes, ordinances, and rules relating to zoning for development and improvement of land, and the construction of units thereon as listed in the Draft Resolution, generally shown in the enclosed Exhibits C through W, and as summarized in the following:

1. Application Fees:

   a. Exemption from Section 18A-1.6(d), ROH, and the DPP Rules Related to Water Quality, to allow an exemption from payment of storm water quality review fees for the erosion control and sediment plan, estimated at $500.

   b. Exemption from Section 18A-2.4, ROH, to allow an exemption from payment of grading, stockpiling, and grubbing permit fees, estimated at $3,000.

   c. Exemption from Section 18A-6.1, ROH, to allow an exemption of payment of building permit plan review fees, estimated at $25,000.

   d. Exemption from Section 18-6.2, ROH, to allow an exemption from the payment of building permit fees, estimated at $944,188.

   e. Exemption from Sections 21-5.380 and 21-5.380A, ROH, to allow an exemption of the payment of CUP fees for two joint development agreements, estimated at $1,200.

   f. Exemption from Section 21-9.100-11, Table 21-9.8, ROH, to allow an exemption from the payment of special district permit fees for projects over one acre along key streets in the TOD Special District, estimated at $2,400.

   g. Exemption from Section 22-1.1, ROH, to allow an exemption from payment of subdivision permit fees, estimated at $600.

2. Infrastructure and Public Work Fees and Charges:

   a. Exemption from Sections 43-10.1, 43-10.2, and 43-10.3, ROH, to allow an exemption of payment of wastewater system facility charges, estimated at $1,843,217.60.

   b. Exemption from Section 43-11.12, ROH, to allow an exemption from private storm drain connection license fee, estimated at $400.

3. Fire Department Review Fees: Exemption from Section 20-1.1(3) 1.12.8, ROH, to allow exemption from HFD plan review fees, estimated at $12,500.

4. BWS Rules and Regulations: Deferral from Sections 1-102 and 2-202 of the BWS regulations to allow a deferral of payment of water system facility and installation of water service fees estimated at $1,176,106; provided all BWS requirements are satisfied.

5. LUO:

   a. Exemption from LUO Subsections 21-3.120-2(b) and (c), relating to heights, height setbacks, yards, and transitional height setbacks as generally shown in the enclosed exhibits.

   b. Exemption from LUO Section 21-5.380, relating to joint development requirements. The Mauka and Makai blocks will be treated as individual zoning lots for development purposes.

   c. Exemption from LUO Section 21-6.100, relating to off-street loading to allow six instead of nine loading spaces, as shown in the exhibits.

   d. Exemption from LUO Section 21-9.100-8(a) and (c), relating to TOD Special District requirements for density, yards, building orientation and entrances, transparency, parking setbacks, access and location, and loading access and location, as shown in the exhibits.

   e. Exemption from LUO Sections 21-9.100-9 and 21-9.100-11, relating to the requirements for TOD Special District Permits.

6. Park Dedication Ordinance Requirements: Exemption from Section 22-7, ROH, to allow an exemption from park dedication ordinance requirements and payment of an equivalent in-lieu fee, estimated at $2,369,540 or 34,370 sq. ft. of park dedication area.

B. Conditions of Approval: Pursuant to the above, the Director of the DPP recommends the following conditions:

1. Except as modified herein, development must be in general conformance with the approved Project, as described herein and shown on plans and drawings labeled as Exhibits C through W. Minor changes may be approved by the Director. Major modifications to the site plan will require approval by the City Council.

2. Encroachments into the required yard are only permitted if made necessary by the improvements to the road widening setback and corner rounding area, and if sufficient pedestrian circulation facilities are provided as determined by a pedestrian circulation plan.

3. Prior to the approval of any construction or building permits, the Applicant must submit for review and approval of the following:

   a. A timeline or phasing of the anticipated dates to obtain major building permit(s) for demolition and/or construction work, including the projected date of occupancy, should be submitted to the DPP. The timeline should identify when the CMP and the TMP will be submitted for review and approval as well as when the TIR was submitted.

   b. A CMP that identifies the type, frequency, and routing of heavy trucks and construction related vehicles. Every effort should be made to minimize impacts from these vehicles and related construction activities. The CMP should identify and limit vehicular activity related to construction to provide mitigation measures related to traffic and potential neighborhood impacts. Preliminary or conceptual traffic control plans should also be included in the CMP. The Applicant must document the condition of roadways prior to the start of construction activities and provide remedial measures, as necessary, such as restriping, road resurfacing and/or reconstruction if the condition of the roadways has deteriorated as a result of the related construction activities.

   c. A TMP that includes TDM strategies to minimize the number of vehicular trips. TDM strategies could include carpooling and ride sharing programs, transit, bicycle, and pedestrian incentives and other similar TDM measures. A pedestrian circulation plan should also be included to provide accessibility and connectivity to the surrounding public sidewalks. A post TMP will be required approximately one year after the issuance of the certificate of occupancy to validate the relative effectiveness of the various TDM strategies identified in the initial report.

d. Construction plans for all work within or affecting public streets. Traffic control plans during construction should also be submitted, as required.

e. A pedestrian assessment report to determine appropriate sidewalk widths needed to accommodate increased pedestrian activity around the Project site.

4. The Applicant must submit a TIR approximately one year after the issuance of the certificate of occupancy to validate the traffic projections, distribution, and assignment contained in the latest accepted TIR. If additional traffic mitigation measures or modifications are necessary to support related traffic impacts directly attributable to this development, the applicant will be required to implement these measures. If the findings of the post TIR is inconclusive, a follow up study may be required within a year of this prior study, as necessary.

5. The Applicant must improve and incorporate the road widening setback and corner rounding into construction and building permit plans in coordination with the DPP and DTS.

201H Agreement: To ensure the efficient implementation and monitoring of the Project, the Director of the DPP further recommends that the City Council require the Applicant to execute a 201H agreement to ensure compliance with the requirements of HRS, Chapter 201H, this Resolution, and the proposal as described in this Report, prior to the issuance of building permits.

C. Project Commencement: The Resolution should be considered null and void provided development permits for the Project are obtained no later than 48 months after the approval date of the Resolution.

Dated at Honolulu, Hawaii, this 12th day of December 2022.

Department of Planning and Permitting
City and County of Honolulu
State of Hawaii

By _____
Dawn Takeuchi Apuna
Director Designate

Enclosures

Exhibit A

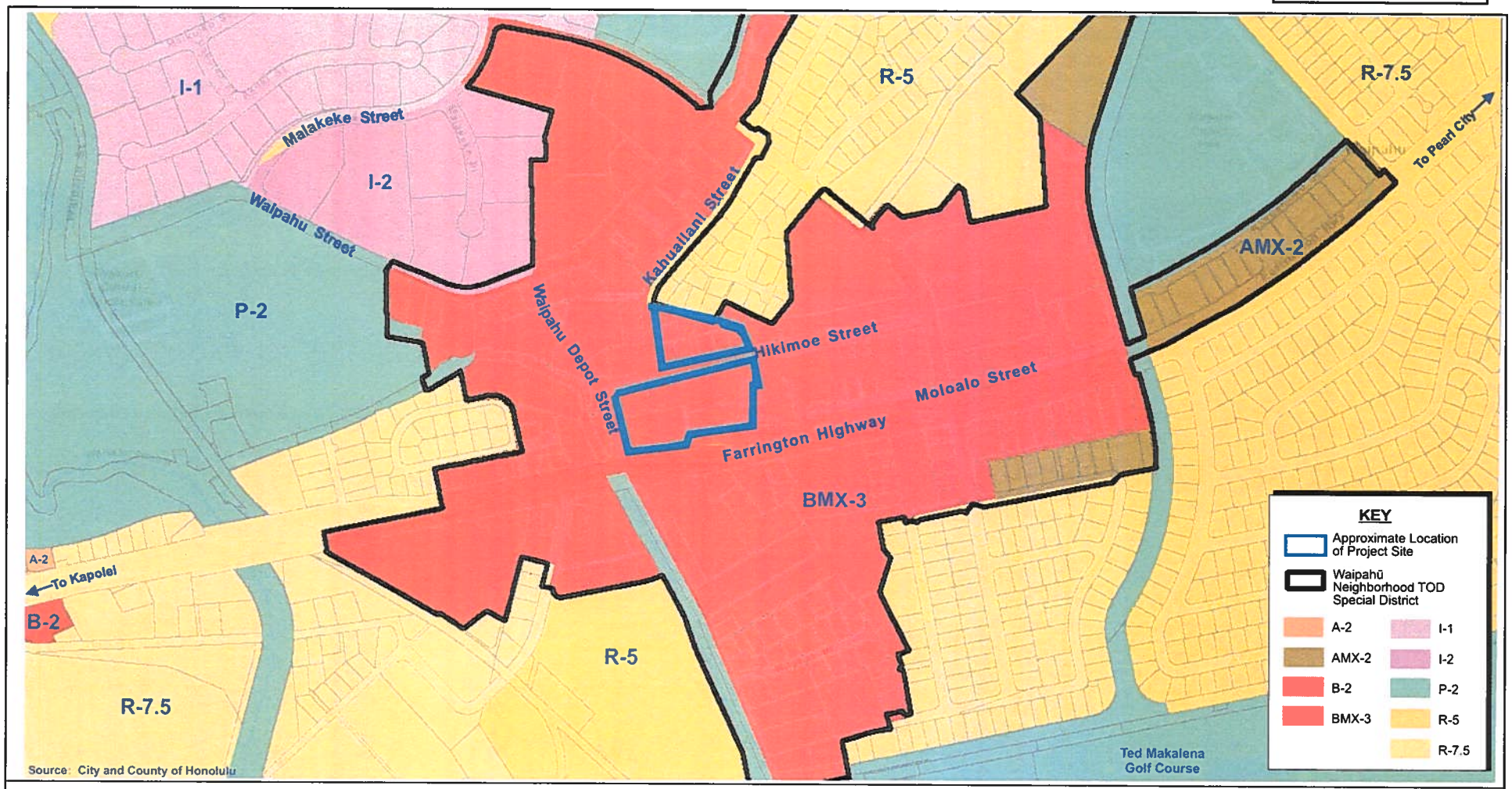


Figure 6

Keawalau Affordable Housing Community Project

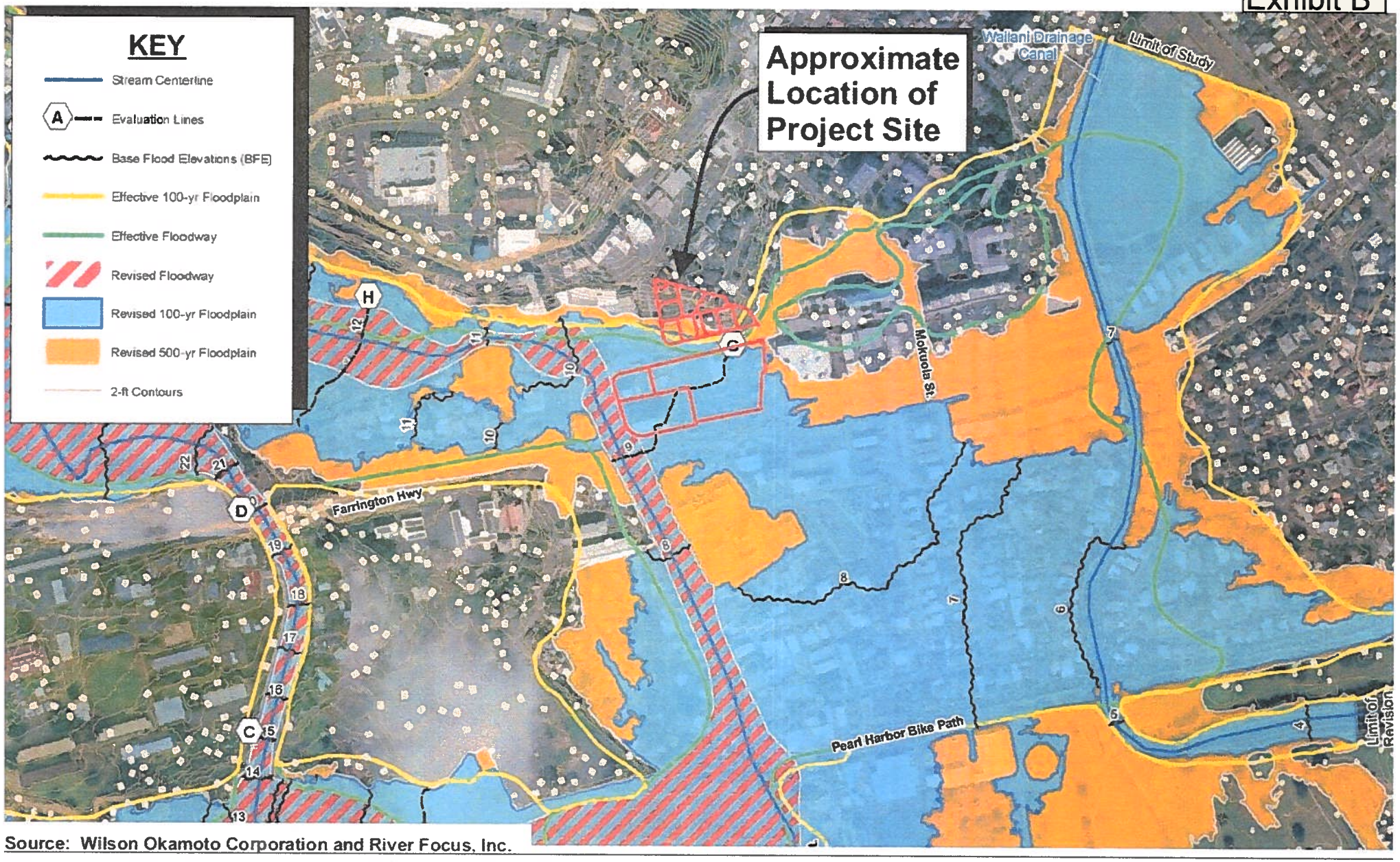
Zoning and Special District Map

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

REF-120

Exhibit B



Source: Wilson Okamoto Corporation and River Focus, Inc.

Figure 7

Waipahu Transit-Oriented Community Development Project

NOT TO SCALE

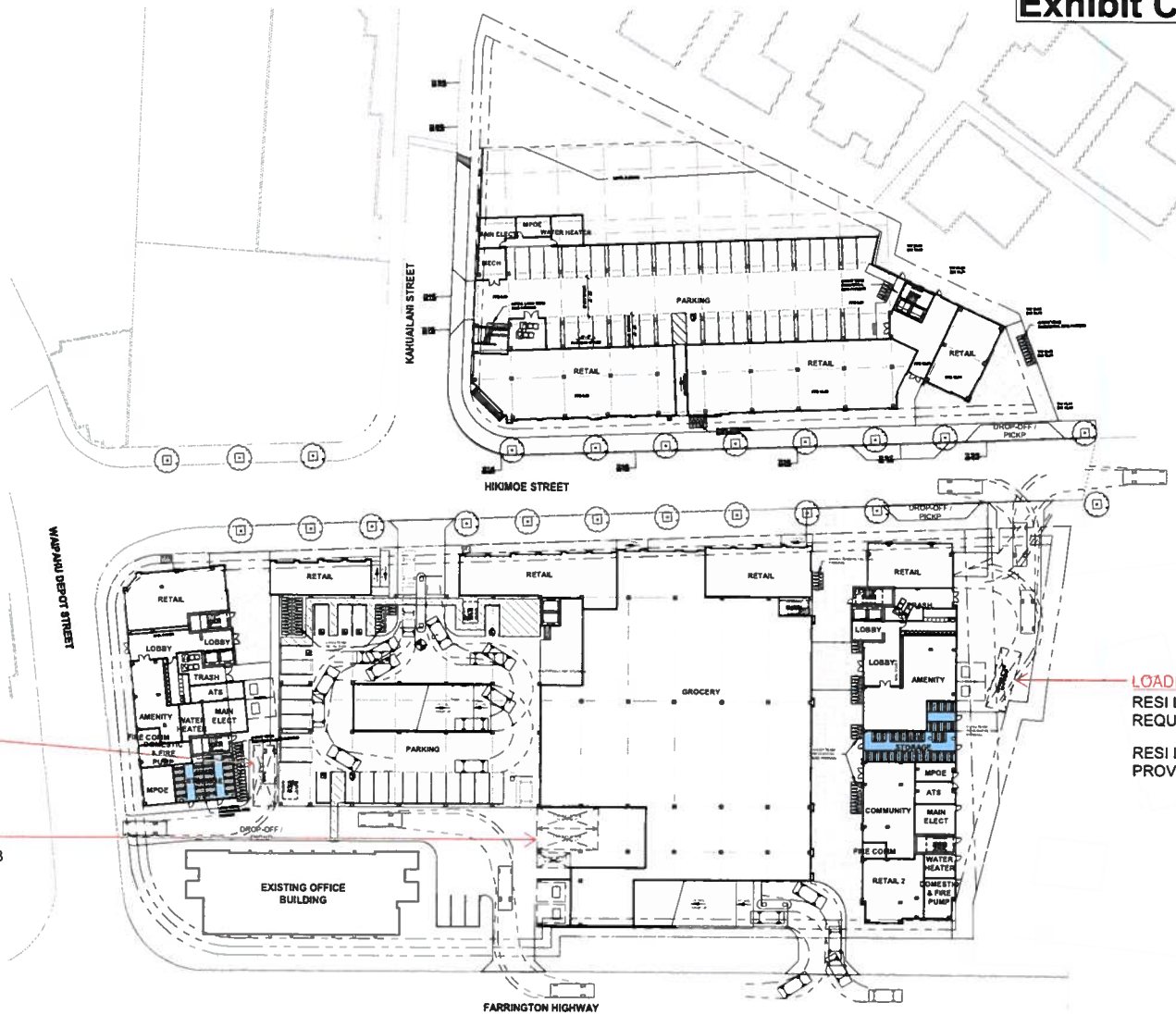
GROUND FLOOR PLAN

Keawalau at Waipahū

Exhibit C

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:



LOADING ZONE
RESI LOADING REQUIRED = 2
RESI LOADING PROVIDED = 1

RETAIL/GROCERY LOADING
LOADING REQUIRED FOR RETAIL = 3
LOADING SPACES PROVIDED = 3

LOADING ZONE
RESI LOADING REQUIRED = 2

RESI LOADING PROVIDED = 1

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LEVEL 2

Keawalau at Waipahū

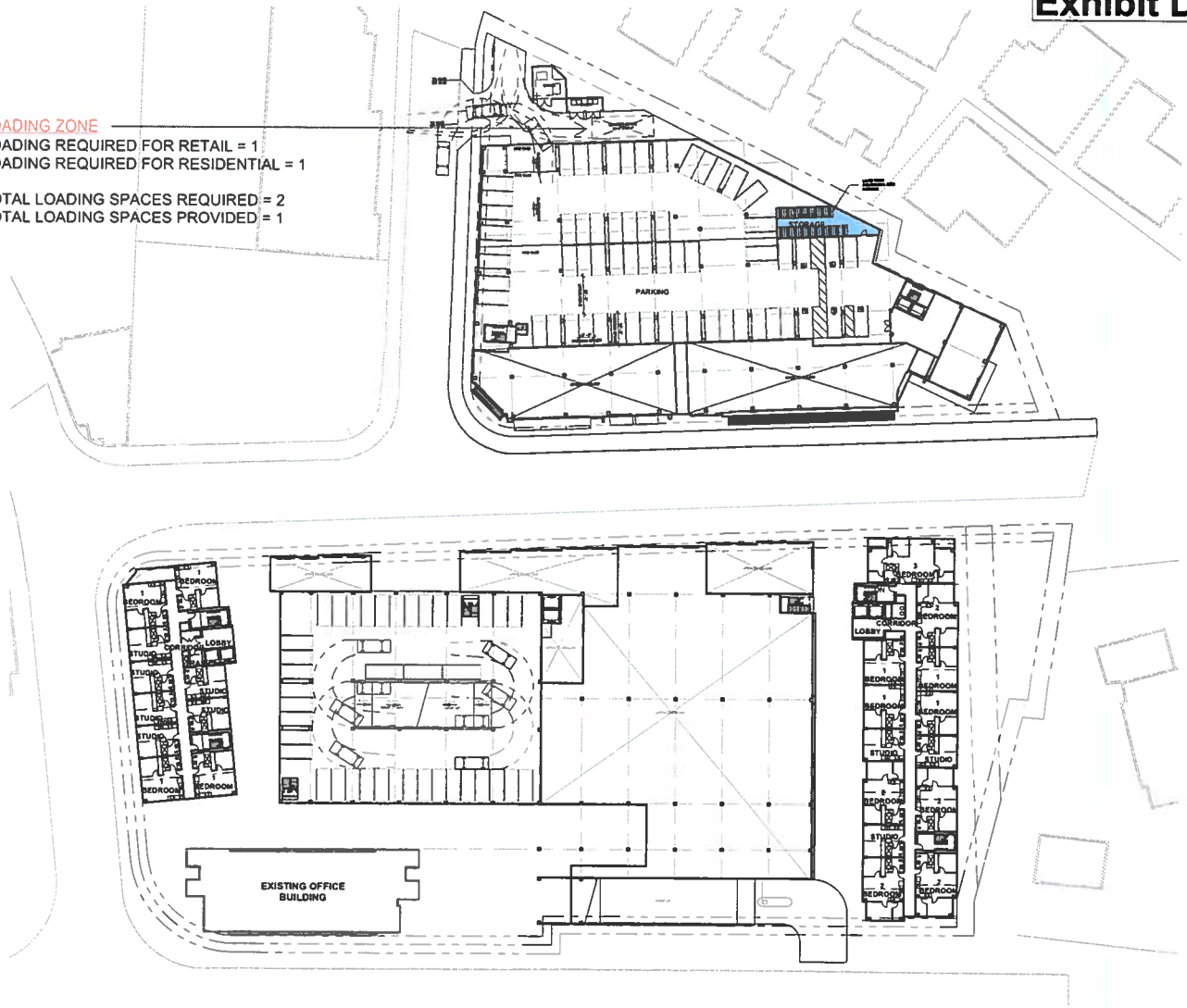
Exhibit D

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:

LOADING ZONE
LOADING REQUIRED FOR RETAIL = 1
LOADING REQUIRED FOR RESIDENTIAL = 1

TOTAL LOADING SPACES REQUIRED = 2
TOTAL LOADING SPACES PROVIDED = 1



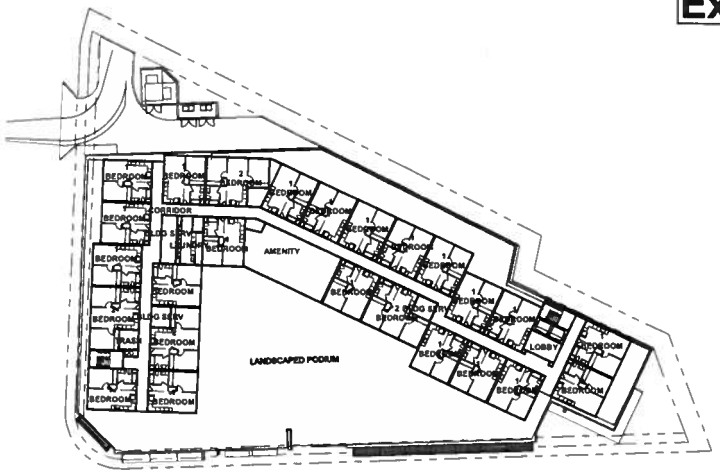
Kamehameha Schools
Highridge Costa
PBR HAWAII & ASSOCIATES INC.
SVA

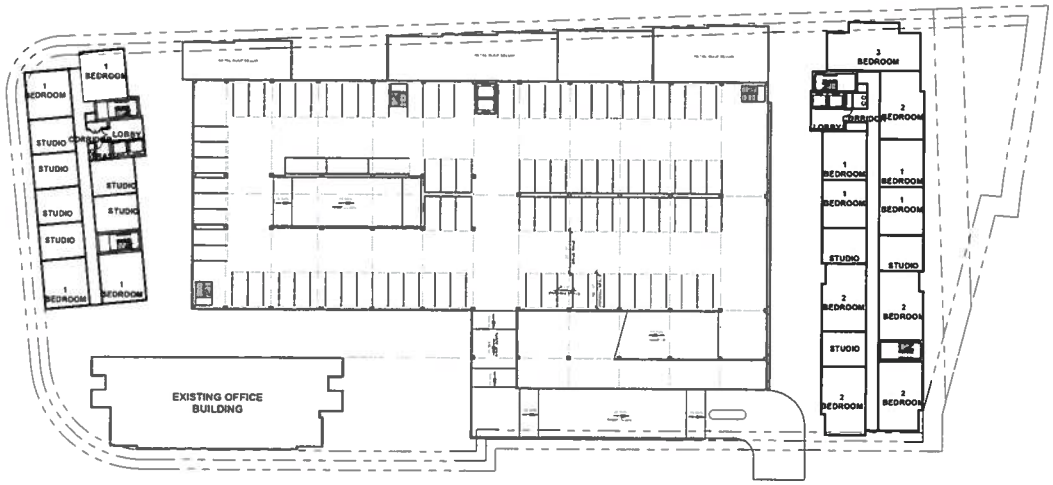
LEVEL 3

Keawalau at Waipahū

Exhibit E

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



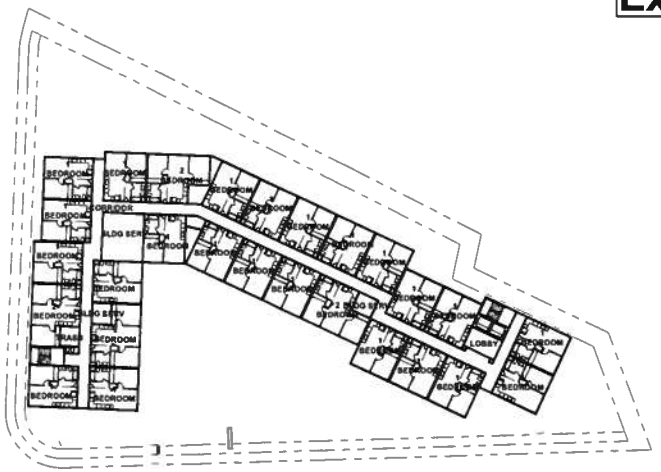


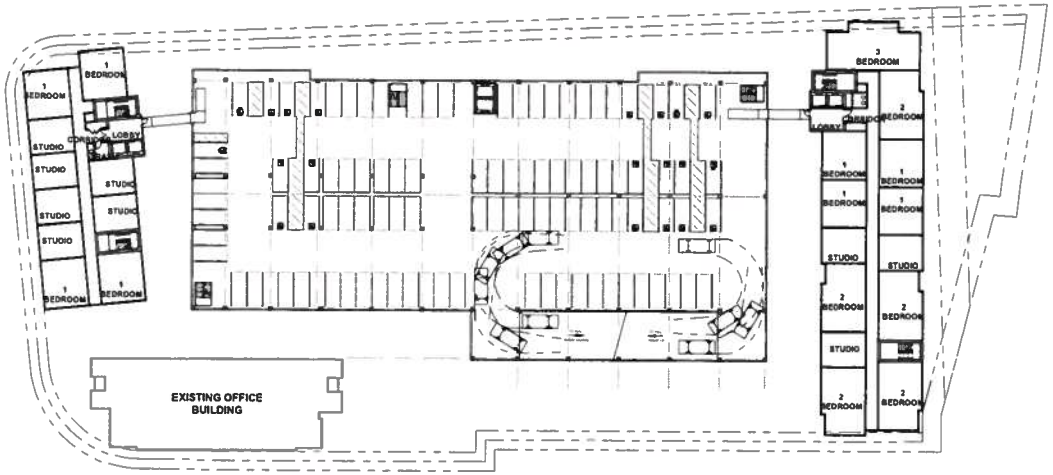
LEVEL 4

Keawalau at Waipahū

Exhibit F

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



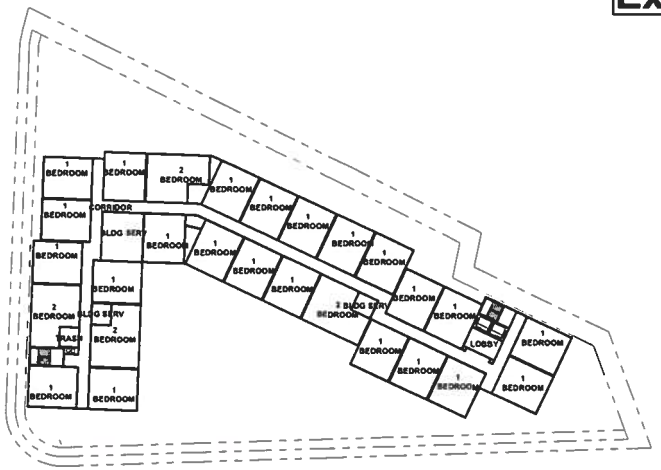


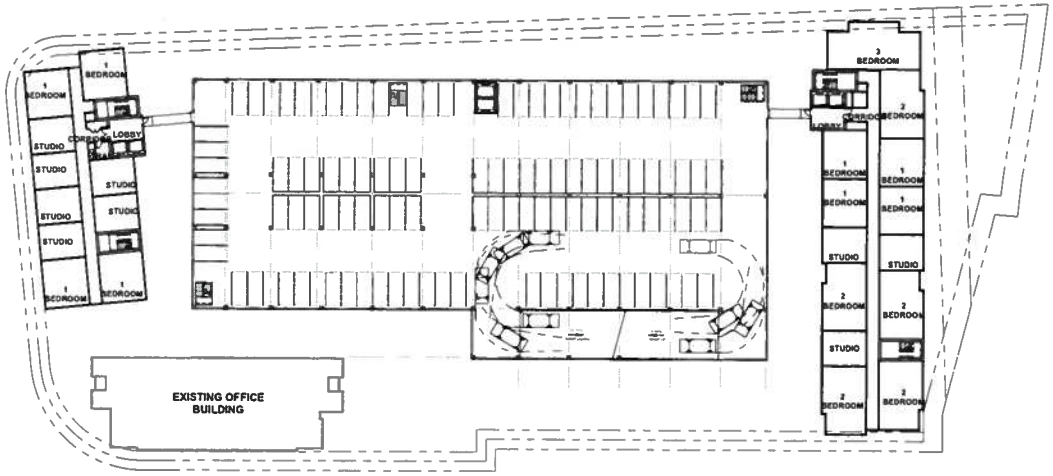
LEVEL 5

Keawalau at Waipahū

Exhibit G

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE





Kamehameha Schools

Highridge Costa

PBR HAWAII

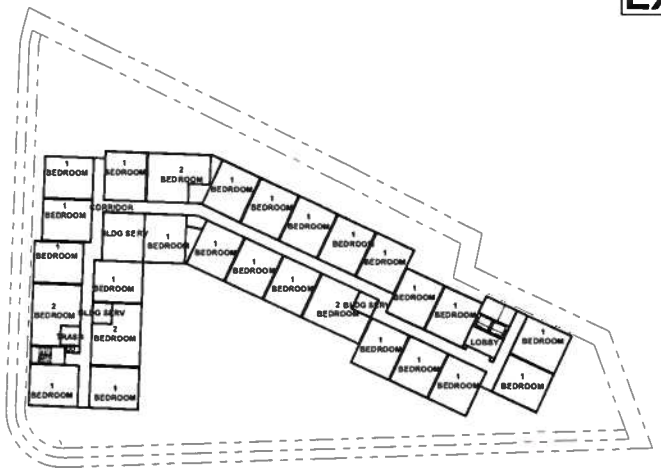
SVA

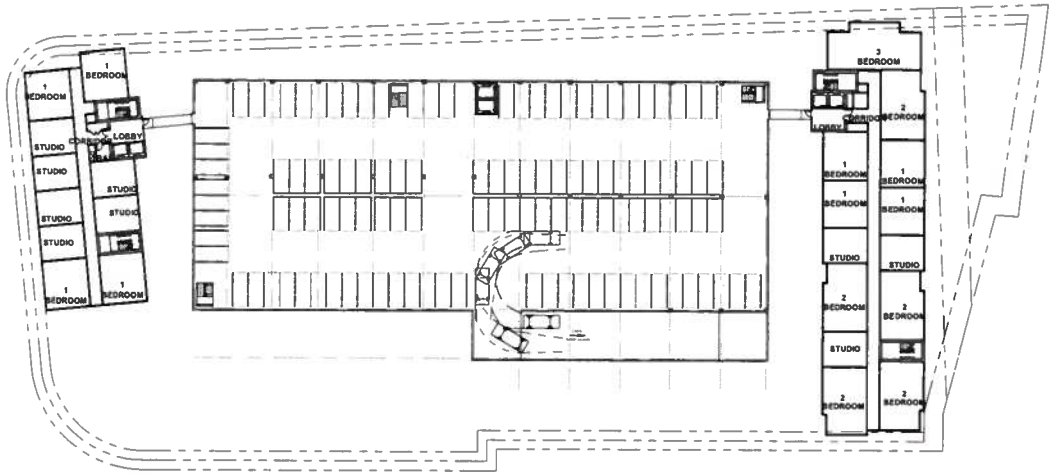
LEVEL 6

Keawalau at Waipahū

Exhibit H

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE





Kamehameha Schools

Highridge Costa

PBR HAWAII & ASSOCIATES INC.

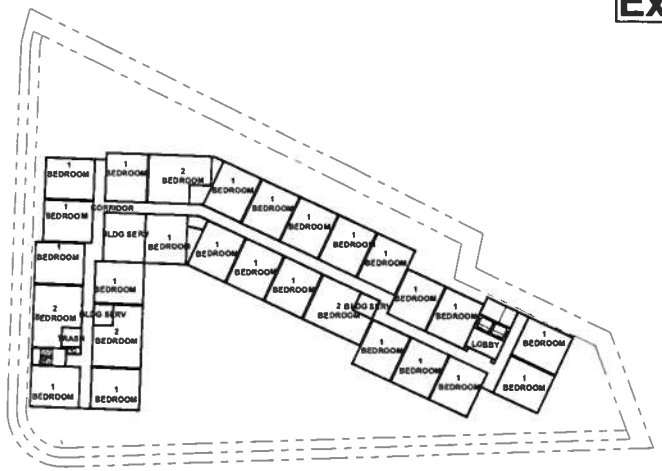
SVA

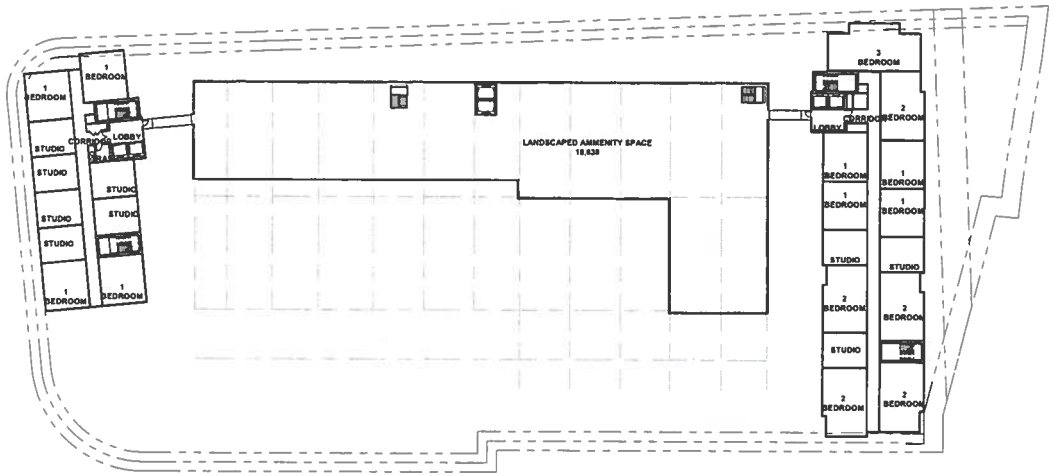
LEVEL 7

Keawalau at Waipahū

Exhibit I

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



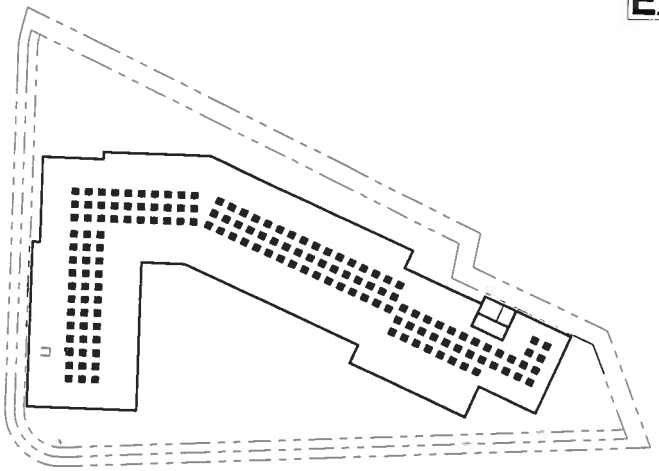


LEVEL 8-18/19

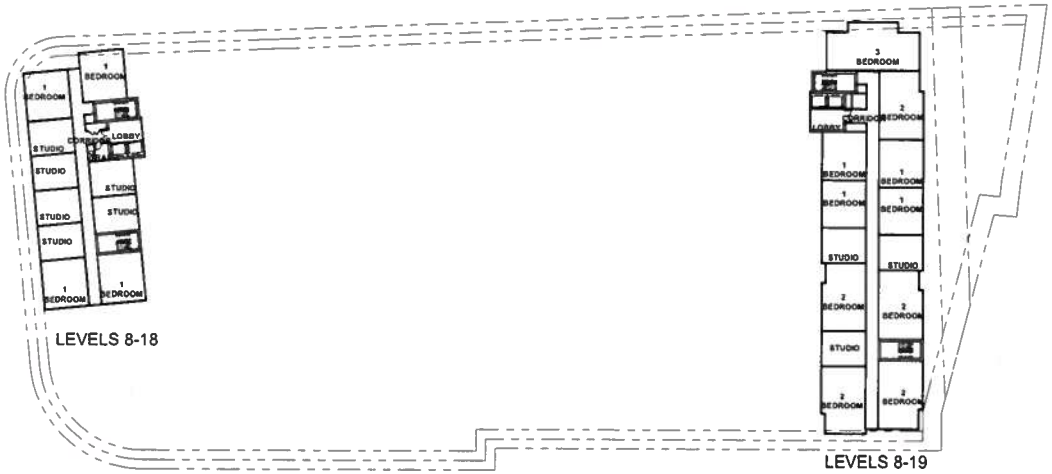
Keawalau at Waipahū

Exhibit J

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



LEVEL ROOF



LEVELS 8-18

LEVELS 8-19

SITE PHASING + DATA

Keawalau at Waipahū

Exhibit K

PARKING

Parking structure will be allocated between phases 2 and 3 at a later date.

PHASE 3

Total Retail = 3,685 sf
Total Resi Count = 170
Total stories = 18
Total Residential stories = 17

West Tower Mix
- 6 studios
- 4 one bed

10 units per level

PHASE 1

Total Retail = 9,796 sf
Total Resi Count = 133

Low Rise Seniors Mix:
- 24 one bed
- 3 two bed

27 units per level

PHASE 2

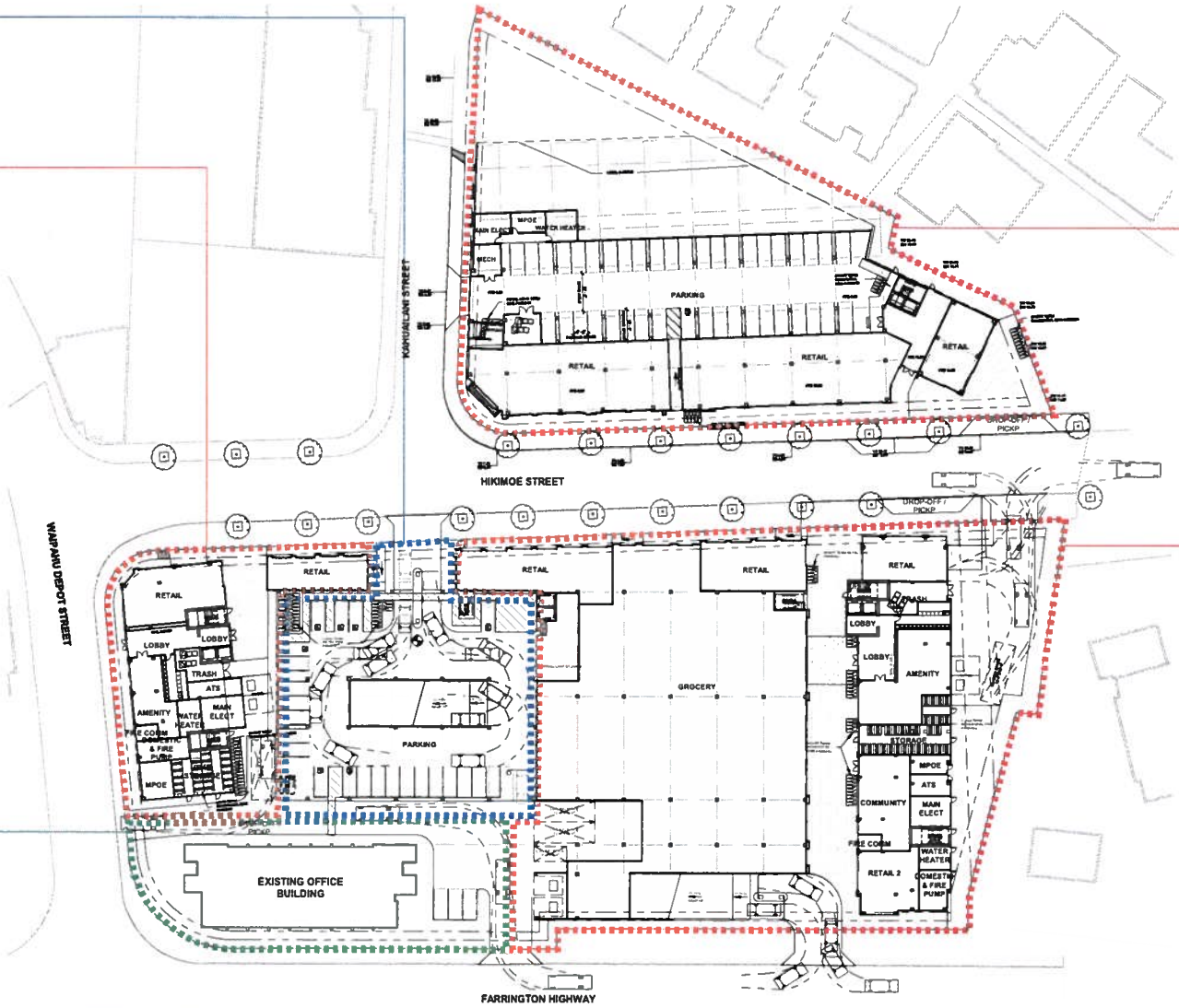
Total Retail = 5,539 sf
Grocery Store = 23,352 sf
Total Resi Count = 234
Total stories = 19
Total Residential stories = 18

West Tower Mix
- 3 studios
- 4 one bed
- 5 two bed
- 1 three bed

13 units per level

OWNER RETAINED AREA

Existing building to be retained by KS and not included in the development.



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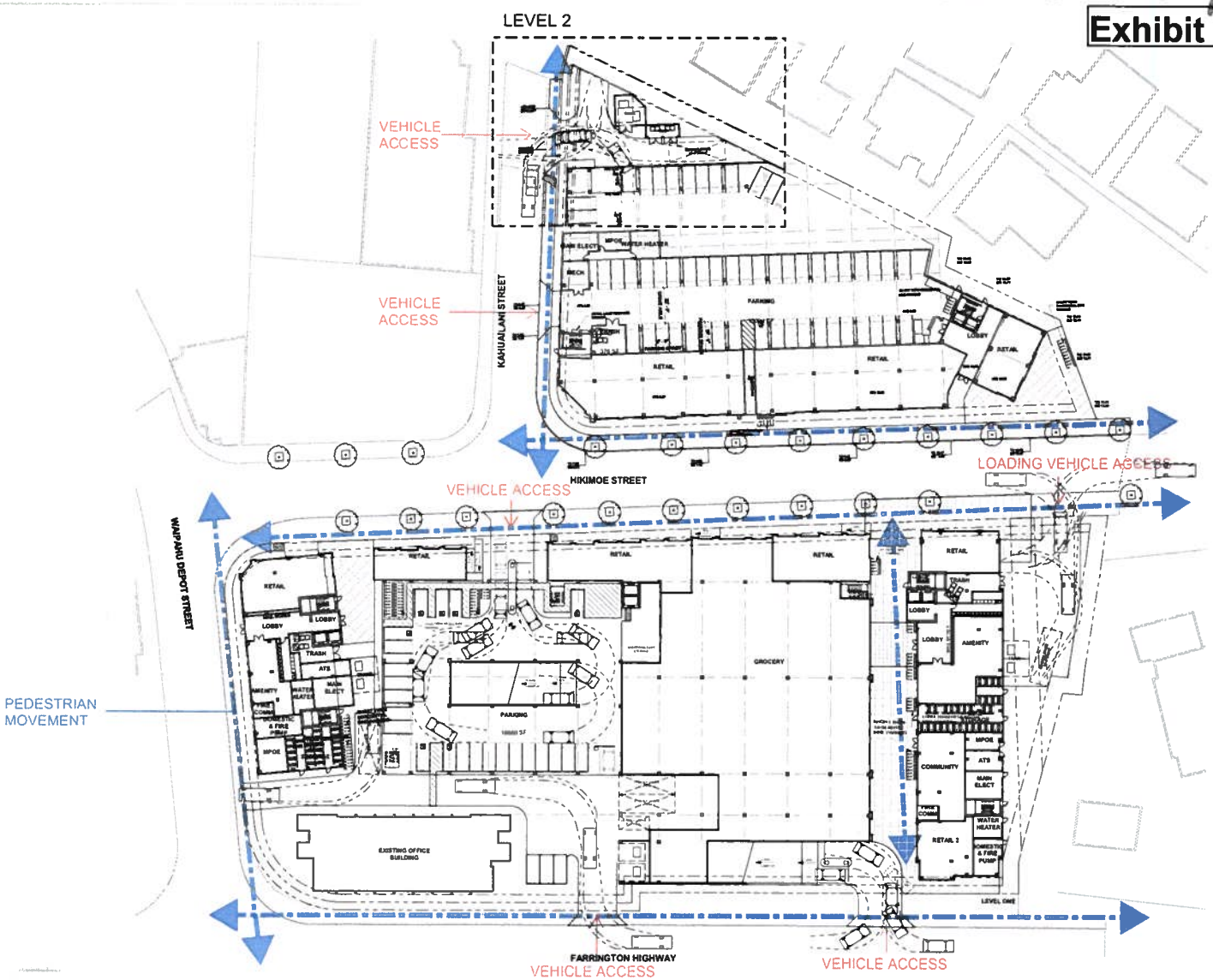
GROUND FLOOR PLAN - CIRCULATION

Keawalau at Waipahū

Exhibit L

NOTE:
*REFER TO LANDSCAPE CONCEPT PACKAGE FOR FURTHER DETAIL ON OPEN SPACE DESIGNATION



#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAII

PARKING SUMMARY

Keawalau at Waipahū

Exhibit M

Phase 1

Residential	Unit Area	No Units	Total Area				Parking Required
1 - Bdrm	595	118	70,210				Per Table 21-6.1
2 - Bdrm	779	15	11,685				
Residential Area		133	81,895	1	per	1,000	82
Retail			9,796	1	per	500	20
						Total	102
Total parking required in transit-oriented development special district (See Note 1)							**0**
						Parking Provided	103

Bicycle Parking		Units				Required	Provided
	133	Short Term	1	per	10	14	14
		Long Term	1	per	2	67	67
	9,796	S.F. Commercial Uses					
		Short Term	1	per	2,000	5	5
		Long Term	1	per	12,000	1	1

Phase 2

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	54	24,300				Per Table 21-6.1
1 - Bdrm	590	72	42,480				
2 - Bdrm	830	90	74,700				
3 - Bdrm	1,160	18	20,880				
		234	162,360	1	per	1,000	163
Retail			27,146	1	per	500	55
Office			29,550	1	per	500	60
						Total	278
Total parking required in transit-oriented development special district (See Note 1)							**0**
						Parking Provided	353

Bicycle Parking Provided		Units				Required	Provided
	234	Short Term	1	per	10	24	24
		Long Term	1	per	2	117	117
	56,696	S.F. Commercial Uses					
		Short Term	1	per	2,000	29	29
		Long Term	1	per	12,000	5	5

Phase 3

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	102	45,900				Per Table 21-6.1
1 - Bdrm	590	68	40,120				
		170	86,020	1	per	1,000	87
Retail			5,814	1	per	500	12
						Total	99
Total parking required in transit-oriented development special district (See Note 1)							**0**
						Parking Provided	107

Bicycle Parking Provided		Units				Required	Provided
	170	Short Term	1	per	10	17	17
		Long Term	1	per	2	85	85
	5,814	S.F. Commercial Uses					
		Short Term	1	per	2,000	3	3
		Long Term	1	per	12,000	1	1

Note 1

Sec. 21-6.20 (a) no off-street parking is required in any zoning district within one-half mile of an existing or future Honolulu rail transit station, as identified in the accepted environmental impact statement, or in the transit-oriented development special districts.

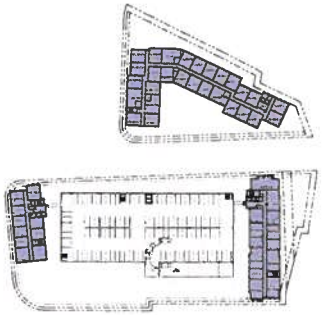
Loading Spaces

Phase 1	Residential	20 - 150 (1 Required)	133	Units	1
Phase 1	Retail	2,000 - 10,000 (1 Required)	9,796	S.F.	1
				Total Loading Spaces Required	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 1					
Phase 2	Residential	151 - 300 (2 Required)	234	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 2 residential					
Phase 3	Residential	151 - 300 (2 Required)	170	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 3 residential					
Phase 2 & 3	Retail	20,000 - 40,000 (3 Required)	32,960	S.F.	3
				3 Loading spaces provided	
Existing	Office	20,00 - 50,000 (1 Required)	29,550	S.F.	1
0 Loading space provided, exemption to reduce number of loading spaces to 0 for existing office building					

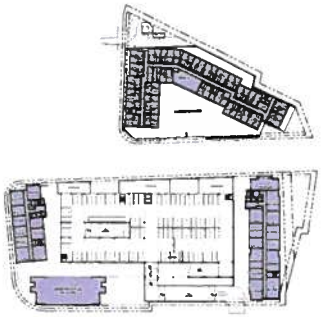
FAR DIAGRAM & CALCULATION

Keawalau at Waipahū

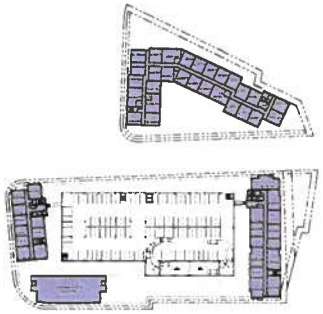
Exhibit N



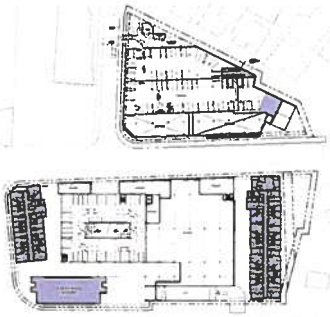
LEVEL 6 (typ upper)



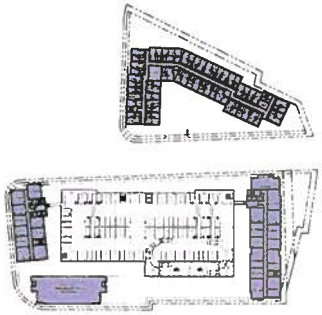
LEVEL 3



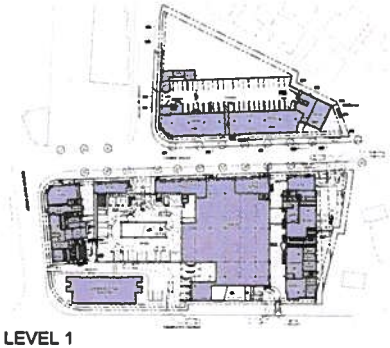
LEVEL 5



LEVEL 2



LEVEL 4



LEVEL 1

Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

FLOOR AREA RATIO (FAR)

PHASE 1 (SENIOR)

Lot Area	50,925
FAR	2.41

		GFA
Level	7	21,182 SF
Level	6	21,182 SF
Level	5	21,182 SF
Level	4	21,182 SF
Level	3	21,182 SF
Level	2	2,490 SF
Level	1	14,123 SF
Total		122,523 SF

PHASE 2, 3 & EXISTING OFFICE TOWER

Lot Area	119,090 SF
FAR	3.44

GROSS FLOOR AREA	
Phase 2	247,665 SF
Phase 3	132,172 SF
Office	29,550 SF
TOTAL	409,387 SF

		GFA (Phase 2)
Level	19	11,518 SF
Level	18	11,518 SF
Level	17	11,518 SF
Level	16	11,518 SF
Level	15	11,518 SF
Level	14	11,518 SF
Level	13	11,518 SF
Level	12	11,518 SF
Level	11	11,518 SF
Level	10	11,518 SF
Level	9	11,518 SF
Level	8	11,518 SF
Level	7	11,518 SF
Level	6	11,518 SF
Level	5	11,518 SF
Level	4	11,518 SF
Level	3	11,518 SF
Level	2	11,518 SF
Level	1	40,341 SF
Total		247,665 SF

		GFA (Phase 3)
Level		
Level	18	7,252 SF
Level	17	7,252 SF
Level	16	7,252 SF
Level	15	7,252 SF
Level	14	7,252 SF
Level	13	7,252 SF
Level	12	7,252 SF
Level	11	7,252 SF
Level	10	7,252 SF
Level	9	7,252 SF
Level	8	7,252 SF
Level	7	7,252 SF
Level	6	7,252 SF
Level	5	7,252 SF
Level	4	7,252 SF
Level	3	7,252 SF
Level	2	7,252 SF
Level	1	8,888 SF
Total		132,172 SF

		GFA (Phase 2+3)
Level	19	11,518 SF
Level	18	18,770 SF
Level	17	18,770 SF
Level	16	18,770 SF
Level	15	18,770 SF
Level	14	18,770 SF
Level	13	18,770 SF
Level	12	18,770 SF
Level	11	18,770 SF
Level	10	18,770 SF
Level	9	18,770 SF
Level	8	18,770 SF
Level	7	18,770 SF
Level	6	18,770 SF
Level	5	18,770 SF
Level	4	18,770 SF
Level	3	18,770 SF
Level	2	18,770 SF
Level	1	49,229 SF
Total		379,837 SF

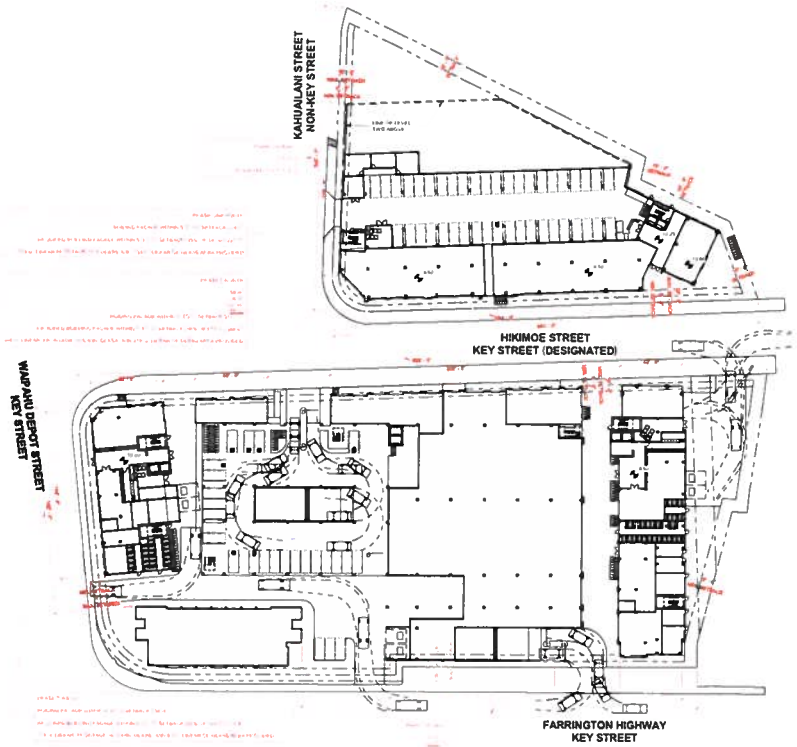
OPEN SPACE DIAGRAM & CALCULATION

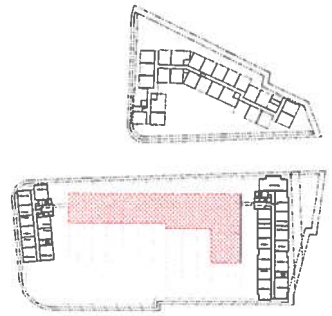
Keawalau at Waipahū

PUBLIC OPEN SPACE

Exhibit O

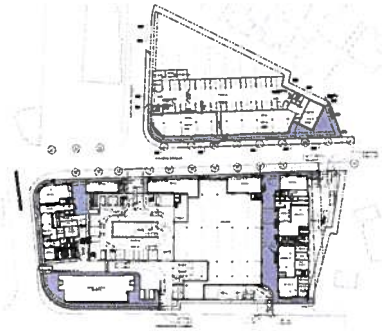
SEMI-PUBLIC OPEN SPACE
(RESIDENTIAL AMENITIES)





LEVEL 6

LEVEL 3



LEVEL 1

PHASE 1 (SENIOR)

Open Space	Level 1	6,658 sf	(Public)
	Level 3	10,200 sf	(Semi-Public)
	TOTAL	16,858 sf	
		33.2 %	

PHASE 2, 3 & EXISTING OFFICE TOWER

Open Space	Level 1	23,663 sf	(Public)
	Level 6	18,841 sf	(Semi-Public)
		42,504 sf	
		35.7 %	

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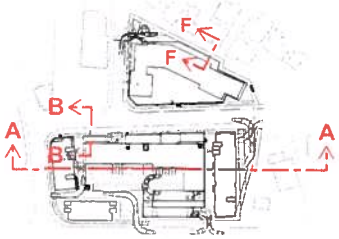
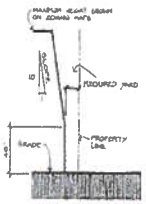
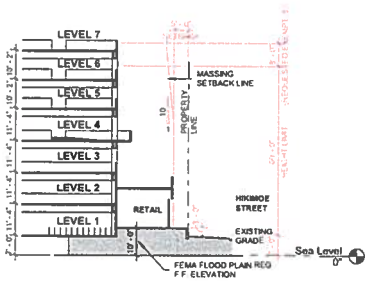
SITE SECTION

Keawalau at Waipahū

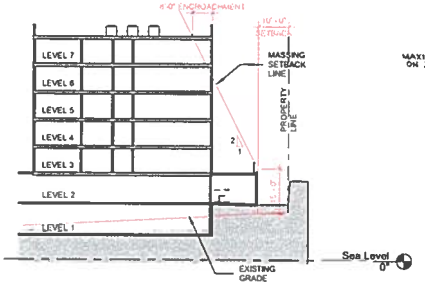
Exhibit P



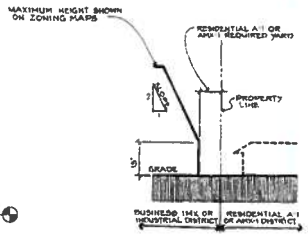


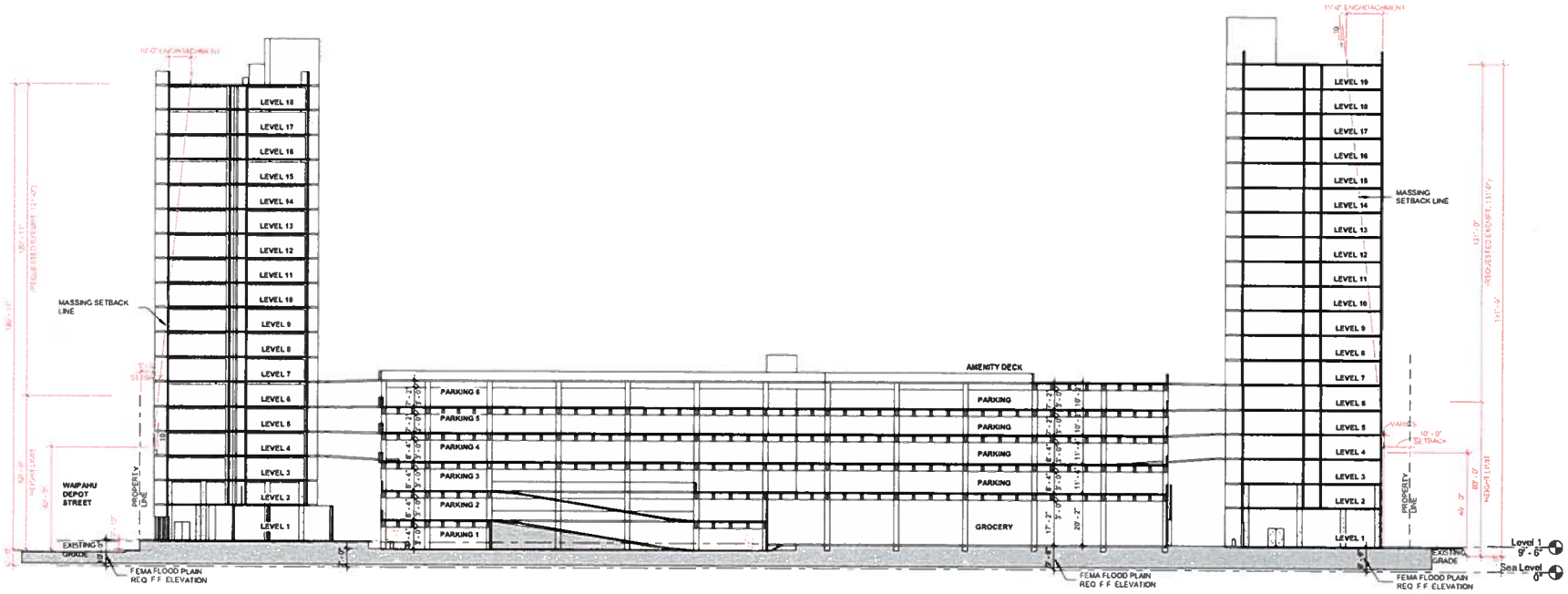


SECTION B-B



SECTION F-F





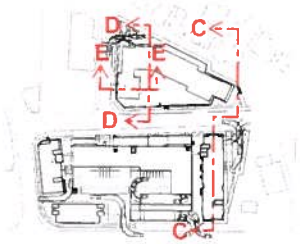
SECTION A-A

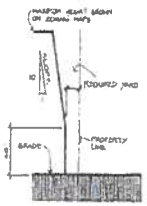
Kamehameha Schools · Highridge Costa · Pacific Hawaii · SVA

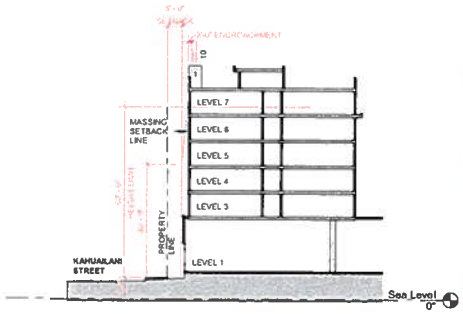
SITE SECTION

Keawalau at Waipahū

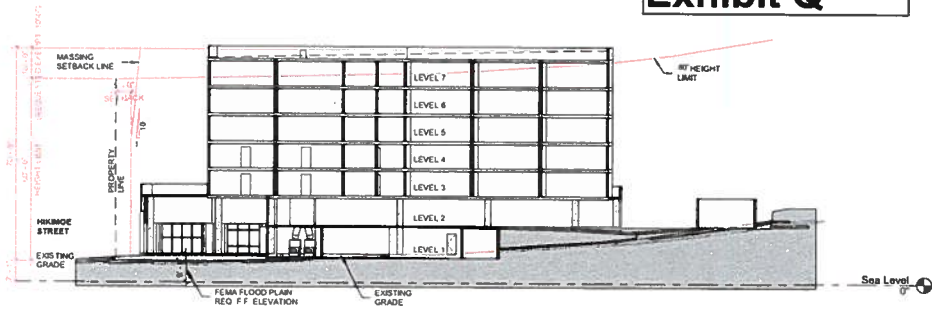
Exhibit Q



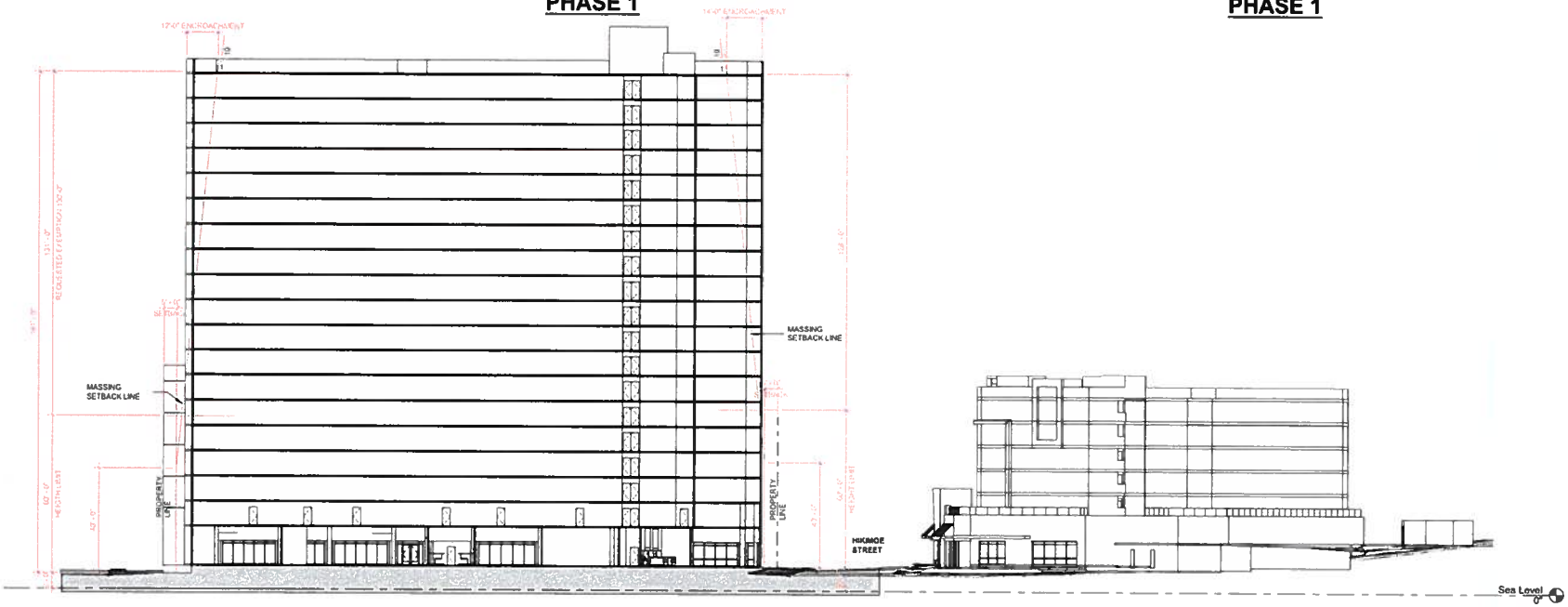




SECTION E-E
PHASE 1



SECTION D-D
PHASE 1



SECTION C-C
PHASE 2

SOUTH ELEVATION-MAUKA SITE

Keawalau at Waipahū

Exhibit R

360' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS SEC 21-7 40g 1 5 SQ F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE 360' x 1 5 = 540 SQ F

4 TENANTS + BUILDING SIGNAGE = 8 SIGNAGE OF MAX. 67.5 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 45 SQ.F

LEGEND

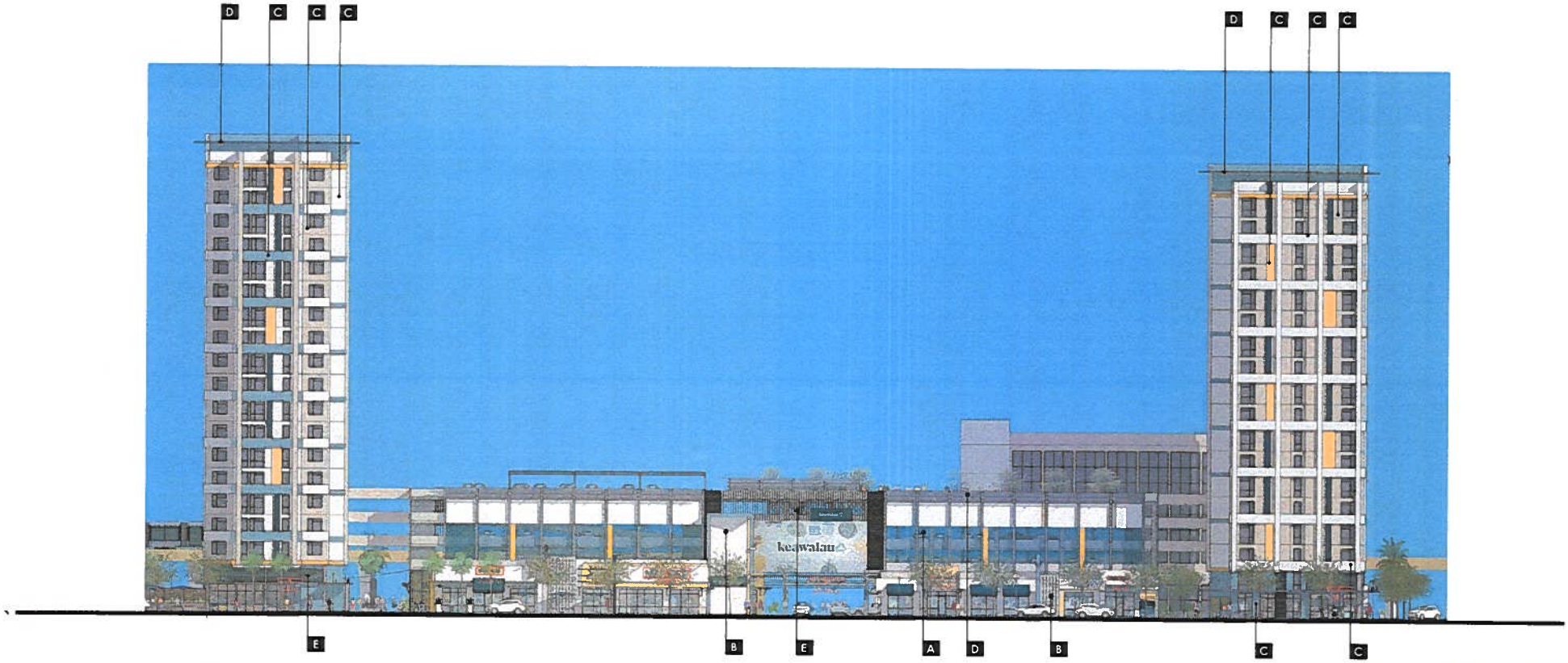
- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools | Highridge Costa | Pulte Homes | SVA

NORTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit S



425.2' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ.F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 425.2' x 1.5 = 637 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 53 SQ.F

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

Highridge Costa

PBR HAWAII & ASSOCIATES, INC.

SVA

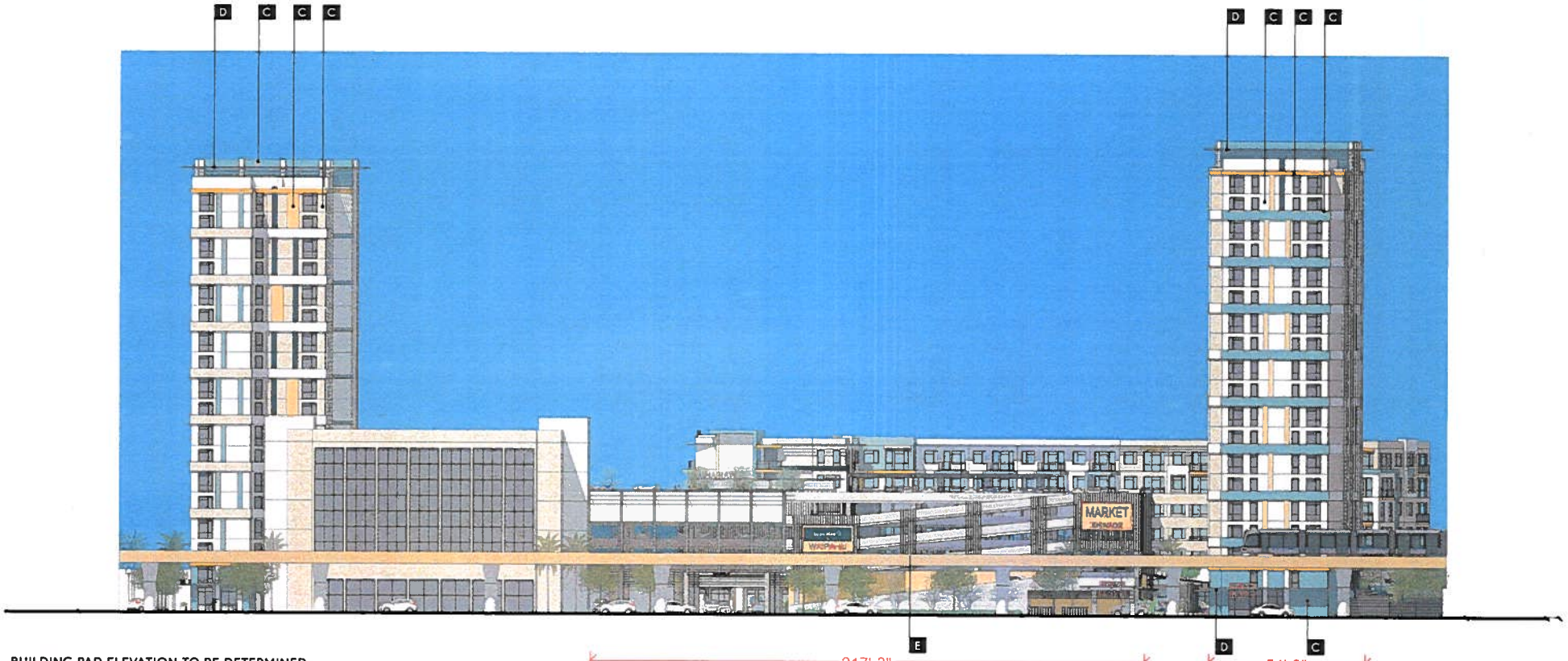
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAII

SOUTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit T



BUILDING PAD ELEVATION TO BE DETERMINED.
6.62' LOWEST ADJACENT GRADE FOR REFERENCE

217'-3"

54'-9"

272' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS SEC. 21-7.40g: 1.5 SQ.F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE , 272' x 1.5 = 408 SQ.F

2 TENANTS + BUILDING SIGNAGE = 4 SIGNAGE OF MAX. 102 SQ.F

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

Highridge Costa

#2019.40117 SEPTEMBER 16, 2022

EAST ELEVATION

Keawalau at Waipahū

Exhibit U

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

#2019 40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAII

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

WEST ELEVATION

Keawalau at Waipahū

Exhibit V

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

Highridge Costa

PBR HAWAII

SVA

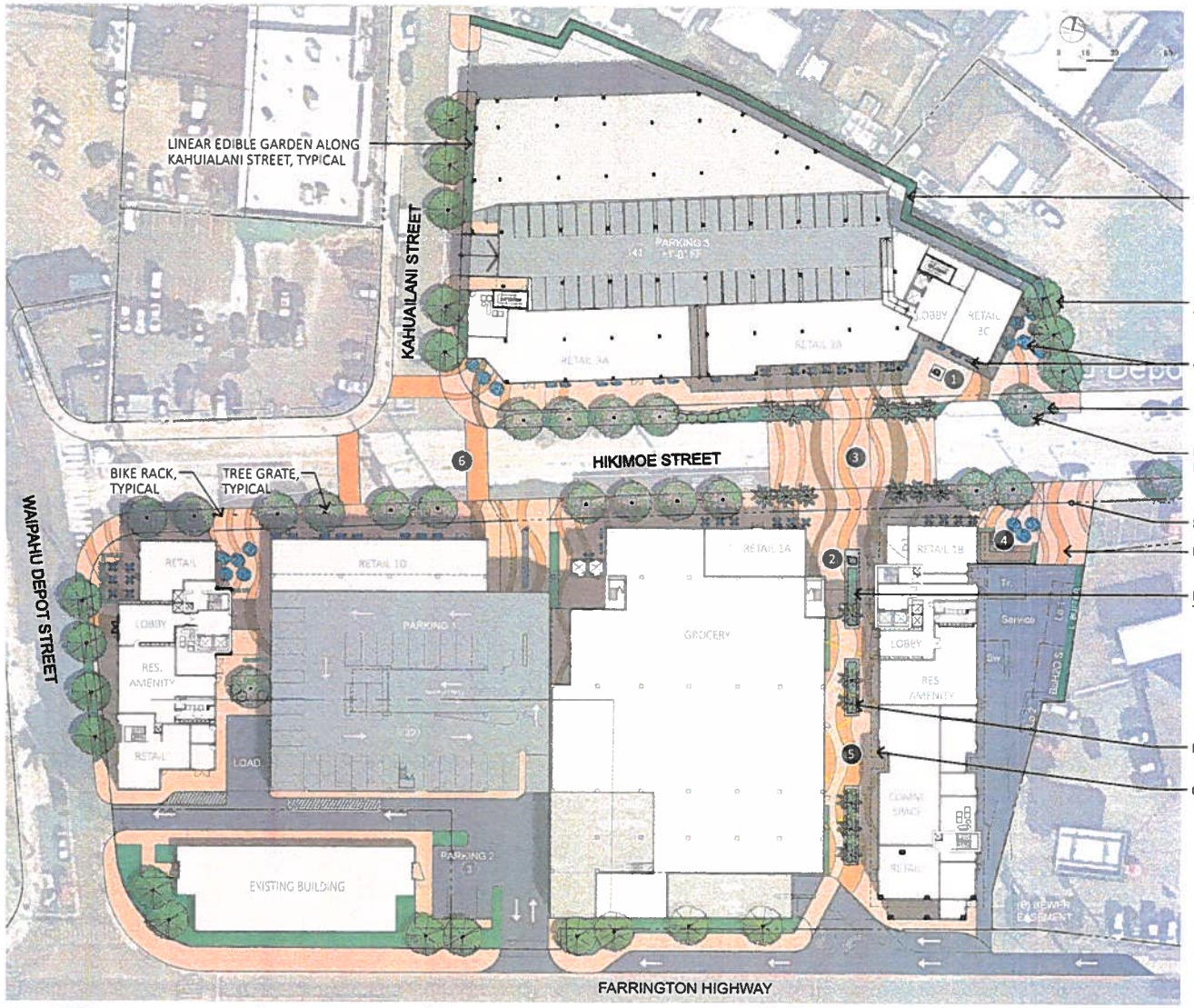
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

CONCEPTUAL GROUND LEVEL LANDSCAPE PLAN

Keawalau at Waipahū

Exhibit W



SCREENING PLANTS, TYPICAL

NATIVE OR POLYNESIAN-INTRODUCED TREES, TYPICAL

OUTDOOR SEATING, TYPICAL

IN-GROUND PLANTERS WITH NATIVE PLANTS, TYPICAL

FLOWERING TREE TO MATCH EXISTING HIKIMOE STREET TREES, TYPICAL

PROPERTY LINE, TYPICAL

DECORATIVE CONCRETE PAVING, TYPICAL

BIOFILTRATION PLANTERS WITH SEATWALLS, TYPICAL

NATIVE PALM, TYPICAL

OUTDOOR STRING LIGHTS BETWEEN BUILDINGS

LEGEND

1. SCULPTURE (KANE)
2. SCULPTURE (KANALOA)
3. RAISED MID-BLOCK CROSSING
4. CORNER "STAGE" SEATING DECK
5. OUTDOOR EXTENSION OF COMMUNITY SPACE
6. ENHANCED CROSSWALKS AT T-INTERSECTION

Exhibit X

Keawalau at Waipahū

VIEW FROM SOUTHEAST LOOKING TOWARDS SITE

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

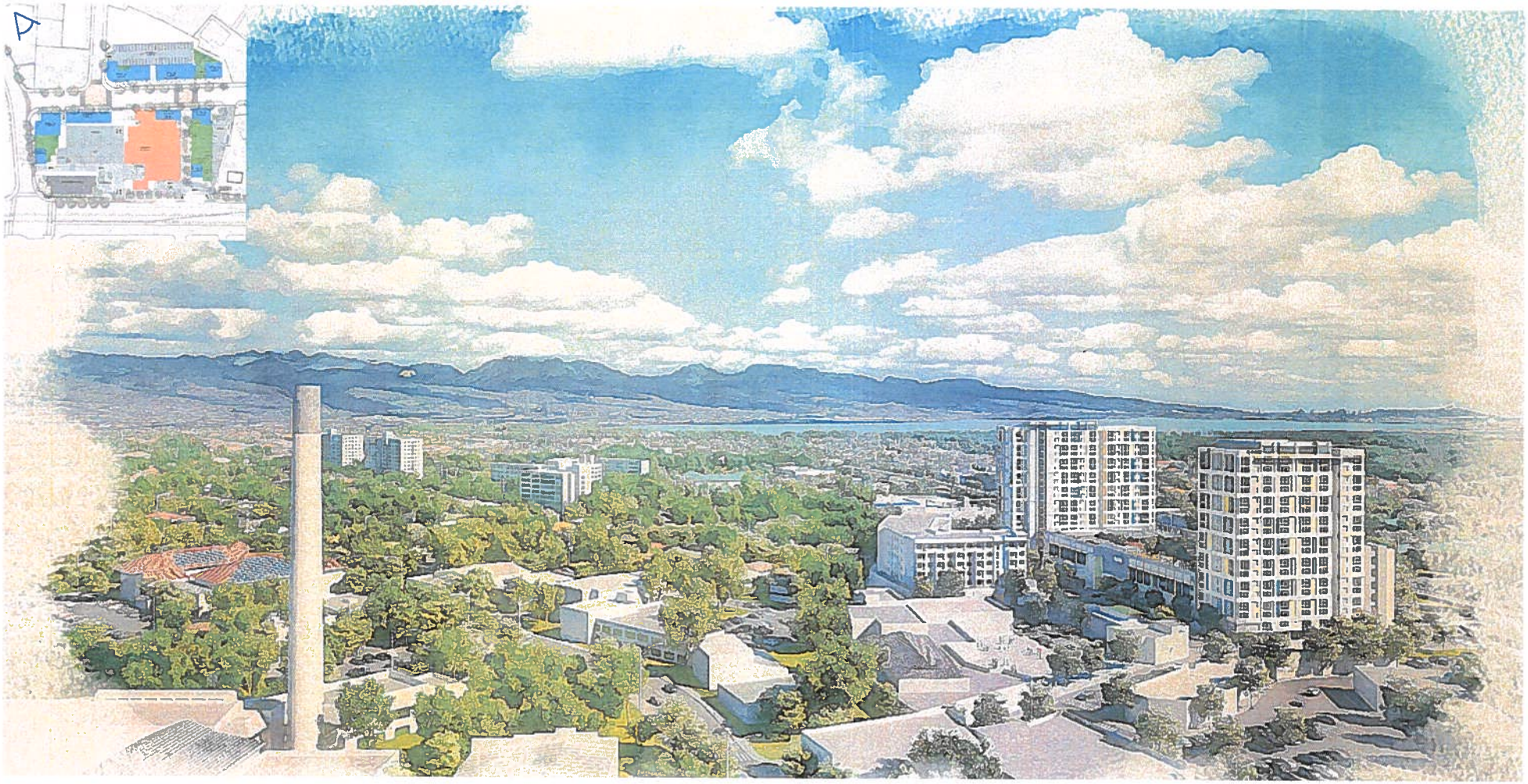
Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-219

Exhibit Y

Keawalau at Waipahū

VIEW FROM NORTHEAST LOOKING DOWN SITE



PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-220

Exhibit Z

Keawalau at Waipahū

VIEW FROM SOUTHHEAST AT MAKAI SITE

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

CITY COUNCIL

CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAI'I

No. _____

RESOLUTION

AUTHORIZING EXEMPTIONS FROM CERTAIN REQUIREMENTS RELATING TO THE KEAWALAU AFFORDABLE HOUSING COMMUNITY PROJECT IN WAIPAHU.

WHEREAS, the Highridge Costa Development Company (the "Applicant") proposes to develop an affordable housing Project on approximately 3.84 acres of land zoned BMX-3 Community Business Mixed Use District located on Hikimoe Street at the intersections with Waipahu Depot Street and Kahuailani Street in Waipahu, Oahu, and identified as Tax Map Keys 9-4-016: 046 and 9-4-014: 005, 014, 058 through 067, and 075, (the "Project"); and

WHEREAS, as proposed, the Project consists of a new mixed-use development consisting of 537 multi-family dwellings, ground floor commercial spaces, and related site and infrastructure improvements; and

WHEREAS, as proposed, the Project will consist of 531 affordable dwelling units for rent to households earning 60 percent and below of the area median income ("AMI") for Honolulu (476 units will be affordable to households earning 60 percent of the AMI and 55 units will be affordable to households earning 30 percent of the AMI); and

WHEREAS, the Project is eligible to receive consideration under the City's rules implementing Section 201H-38 of the Hawaii Revised Statutes ("HRS"), which require that at least 20 percent of a project's total units must be available to households earning 80 percent and below of the AMI, and at least 31 percent of the project's total units must be available to households earning between 81 percent and 120 percent of the AMI, or lower AMI; and

WHEREAS, the City Council ("Council") is empowered and authorized to approve the Project which may include exemptions from statutes, ordinances, charter provisions, and rules of any government agency relating to planning, zoning, construction standards for subdivision, development and improvement of land, and the construction of units thereon pursuant to HRS Sections 46-15.1 and 201H-38, and

WHEREAS, the Council has reviewed the preliminary plans and specifications for the Project, dated September 2022, and updated September 16, 2022 prepared by Munekiyo Hiraga, PBR Hawaii, and SVA Architects (the "Plans and Specifications"), and submitted to the Council by the Department of Planning and Permitting ("DPP") on _____, 2022 by Departmental Communication_____; and

WHEREAS, the Project is consistent with the housing and community development goals and objectives of the City; and

RESOLUTION

WHEREAS, the granting of the exemptions is necessary for the timely and successful implementation of the Project; and

WHEREAS, the Project does not contravene any safety standards, tariffs, or rates, and fees approved by the Public Utilities Commission or the Board of Water Supply ("BWS"); and

WHEREAS, the exemptions authorized herein meet the intent of HRS Chapter 201H, and minimum requirements of health and safety; now, therefore,

BE IT RESOLVED by the Council of the City and County of Honolulu that it approves the Project, which approval includes exemptions from certain requirements for the Project as set forth in the Plans and Specifications for the Project, as follows:

Application Fees:

1. Exemption from § 18A-1.6, Revised Ordinances of Honolulu 2021 ("ROH"), and the DPP Rules Related to Storm Water Quality, to allow an exemption from payment of storm water quality review fees for the erosion control and sediment plan, estimated at $500.

2. Exemption from ROH § 18A-2.4, to allow an exemption from payment of grading and grubbing permit fees, estimated at $3,000.

3. Exemption from ROH § 18-6.1, to allow an exemption of payment of building permit plan review fees, estimated at $25,000.

4. Exemption from ROH § 18-6.2, to allow an exemption from the payment of building permit fees, estimated at $944,188.

5. Exemption from ROH § 21-5.380 and § 21-5.380A, to allow an exemption of the payment of CUP fees for two joint development agreements, estimated at $1,200.

6. Exemption from ROH § 21-9.100-11, Table 21-9.8, to allow an exemption from the payment of special district permit fees for projects over one acre along key streets in the Transit Oriented Development ("TOD") Special District, estimated at $2,400.

7. Exemption from ROH § 22-1.1, to allow an exemption from the payment of subdivision filing fees estimated at $600.

Infrastructure and Public Works Fees and Charges:

8. Deferral from ROH § 43-10.1, § 43-10.2, and § 43-10.3, to allow the deferral of payment of wastewater system facility charges, estimated at $1,843,217.60.

9. Exemption from ROH § 43-11.12, to allow an exemption from the private storm drain connection license fee, estimated at $400.

Fire Department Review Fees:

10. Exemption from ROH § 20-1.1(3) 1.12.8, to allow exemption from Honolulu Fire Department plan review fees, estimated at $12,500.

BWS Rules and Regulations:

11. Deferral from Sections 1-102 and 2-202 of the BWS Rules and Regulations to allow a deferral of payment of water system facility and installation of water service fees estimated at $1,176,106 until the installation of the water meter; provided that all BWS requirements are satisfied. The actual fees to be exempted will be determined by the BWS during review of the building permit applications.

ROH Chapter 21: Land Use Ordinance ("LUO"):

12. Exemption from LUO § 21-3.120-2(b) and § 21-3.120-2(c), relating to heights, height setbacks, and transitional height setbacks as generally shown in the enclosed exhibits.

13. Exemption from LUO § 21-5.380, relating to joint development requirements. The Mauka and Makai blocks will be treated as individual zoning lots for development purposes.

14. Exemption from LUO § 21-6.100, relating to off-street loading to allow six instead of nine loading spaces, as shown in the exhibits.

15. Exemption from LUO § 21-9.100-8(a) and § 21-9.100-8(c), relating to TOD Special District requirements for density, yards, building orientation and entrances, transparency, parking setbacks, access and location, and loading access and location, as shown in the exhibits.

16. Exemption from LUO § 21-9.100-9 and § 21-9.100-11, relating to the requirements for TOD Special District Permits.

Park Dedication Ordinance:

17. Exemption from ROH § 22-7, to allow an exemption from park dedication ordinance requirements and payment of an equivalent in-lieu fee, estimated at $2,369,540 or 34,370 sq. ft. of park dedication area.

BE IT FURTHER RESOLVED that the Project is approved subject to the following conditions:

A. Except as modified herein, development must be in general conformance with the approved Project, as described herein and shown on plans and drawings labeled as Exhibits A through Z, attached hereto and made a part hereof. Minor changes may be approved by the Director. Major modifications to the site plan will require approval by the Council.

B. Encroachments into the required yard are only permitted if made necessary by the improvements to the road widening setback and corner rounding area, and if sufficient pedestrian circulation facilities are provided as determined by a pedestrian circulation plan.

C. Prior to the issuance of any building permit for the Project, the Applicant shall submit to the DPP for its review and approval:

1. A timeline or phasing of the anticipated dates to obtain major building permit(s) for demolition and/or construction work, including the projected date of occupancy. The timeline should identify when the Construction Management Plan (CMP) and the Traffic Management Plan (TMP) will be submitted for review and approval as well as when the Traffic Impact Report (TIR) was submitted.

2. A CMP that identifies the type, frequency, and routing of heavy trucks and construction related vehicles. Every effort should be made to minimize impacts from these vehicles and related construction activities. The CMP should identify and limit vehicular activity related to construction to providing mitigation measures related to traffic and potential neighborhood impacts. Preliminary or conceptual traffic control plans should also be included in the CMP. The Applicant must document the condition of roadways prior to the start of construction activities and provide remedial

measures, as necessary, such as restriping, road resurfacing and/or reconstruction if the condition of the roadways has deteriorated as a result of the related construction activities.

3. A TMP that includes Traffic Demand Management (TDM) strategies to minimize the number of vehicular trips. TDM strategies could include carpooling and ride sharing programs, transit, bicycle, and pedestrian incentives and other similar TDM measures. A pedestrian circulation plan should also be included to provide accessibility and connectivity to the surrounding public sidewalks. A post TMP will be required approximately one year after the issuance of the certificate of occupancy to validate the relative effectiveness of the various TDM strategies identified in the initial report.

4. Construction plans for all work within or affecting public streets. Traffic control plans during construction should also be submitted, as required.

5. A pedestrian assessment report to determine appropriate sidewalk widths needed to accommodate increased pedestrian activity around the Project site.

D. The Applicant must submit a TIR approximately one year after the issuance of the certificate of occupancy to validate the traffic projections, distribution, and assignment contained in the latest accepted TIR. If additional traffic mitigation measures or modifications are necessary to support related traffic impacts directly attributable to this development, the applicant will be required to implement these measures. If the findings of the post TIR is inconclusive, a follow up study may be required within a year of this prior study, as necessary.

E. The Applicant must improve and incorporate the road widening setback and corner rounding into construction and building permit plans in coordination with the DPP and Department of Transportation Services.

F. Prior to the issuance of any building permit for the Project, the Applicant shall execute a 201H Agreement with the DPP Director that includes terms, conditions, and provisions to facilitate the efficient development and monitoring of the Project, and to ensure the Projects compliance with the requirements of HRS Chapter 201H and this resolution.

BE IT FURTHER RESOLVED that references to specific statutes, ordinances, or regulations include respective successor statutes, ordinances, or regulations; and

RESOLUTION

BE IT FURTHER RESOLVED that the exemptions granted for this Project are not transferable to any other real property; and

BE IT FURTHER RESOLVED that this resolution is null and void unless development permits are obtained no later than 48 months after the approval date of this resolution; and

BE IT FURTHER RESOLVED that the final plans and specifications for the Project constitute the zoning, building, and construction standards for the Project and are approved if those plans and specifications do not substantially deviate from the Plans submitted to the Council; provided that minor modifications to the design character or specifications of the building or landscaping, may be approved by the DPP, if such modifications are consistent with the prevailing neighborhood character; and

BE IT FURTHER RESOLVED that no action may be prosecuted or maintained against the City and County of Honolulu, its officials or employees, on account of actions taken by them in reviewing or approving the preliminary plans and specifications or in granting these exemptions listed herein; and

BE IT FURTHER RESOLVED that the DPP Director is authorized to execute and record the 201H Agreement referenced in Condition F, pursuant to the terms, conditions, and provisions approved as to form and legality by the Corporation Counsel as being necessary, advisable, or desirable for the purpose of carrying out this resolution; and

BE IT FURTHER RESOLVED that the Director of the DPP is hereby authorized to execute any incidental or related documents to carry out the transactions, above described, as long as said documents do not increase either directly or indirectly the financial obligations of the City; and

CITY COUNCIL

CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAI'I

No. _____

RESOLUTION

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Director of Planning and Permitting; Monte Heaton, Highridge Costa Development Company, 330 West Victoria Street, Gardena, California 90248; and Yukino Uchiyama, Munekiyo Hiraga, 735 Bishop Street, Suite 412, Honolulu, Hawaii 96813.

INTRODUCED BY:

_____

_____

_____

_____

_____

_____

DATE OF INTRODUCTION: _____

_____

_____ _____

Honolulu, Hawai'i Councilmembers

Exhibit A

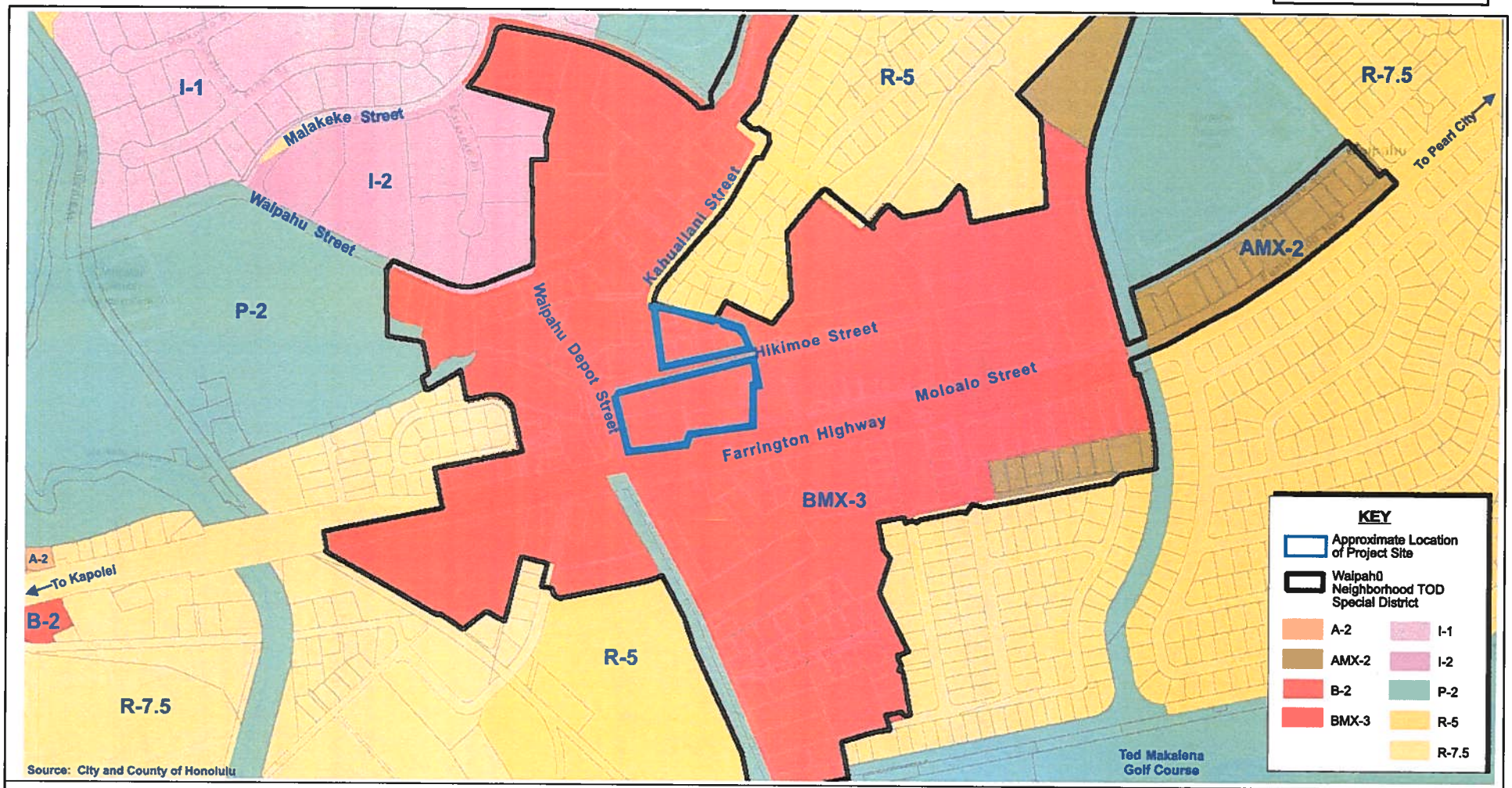


Figure 6

Keawalau Affordable Housing Community Project

Zoning and Special District Map

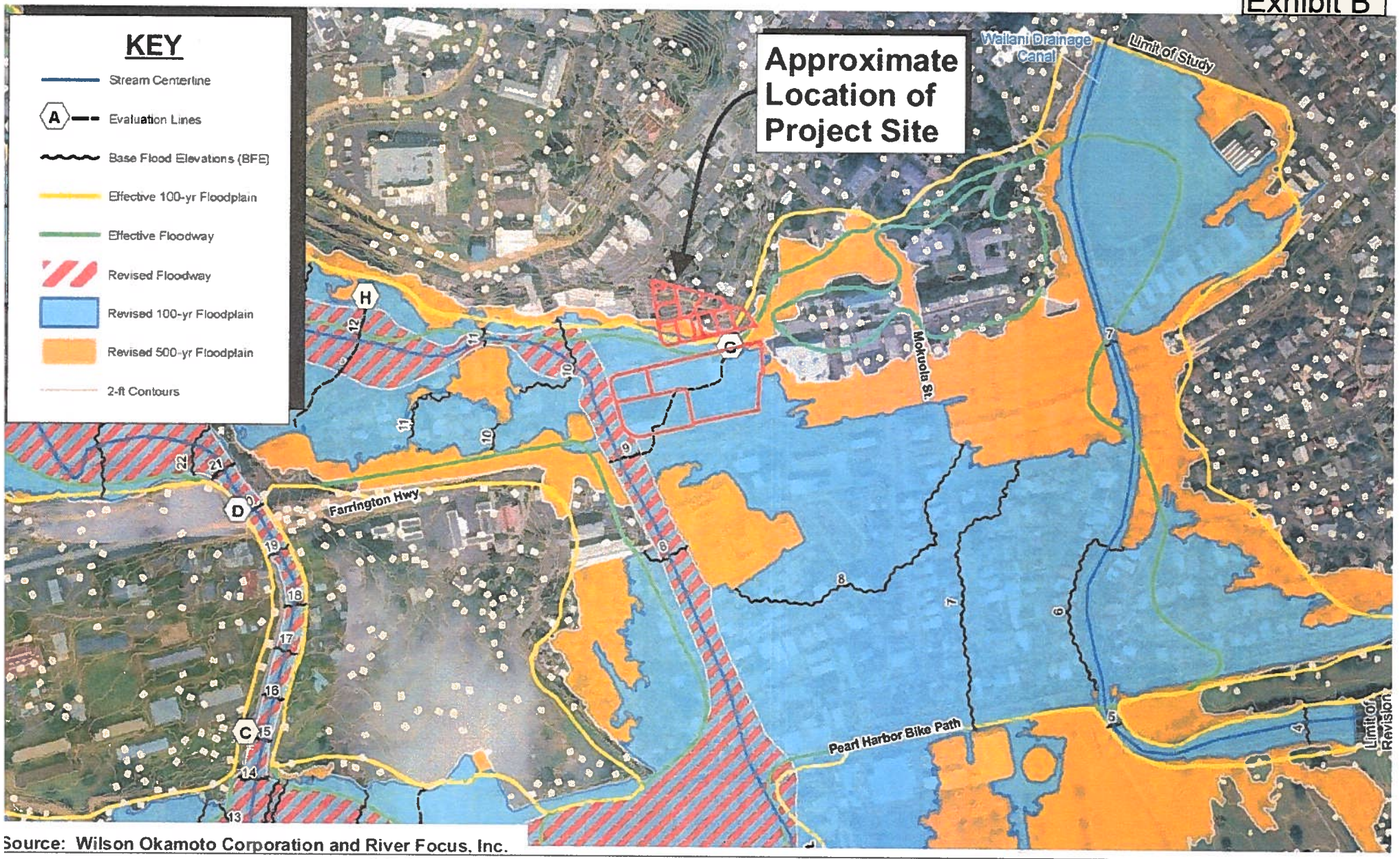
0 0.05 0.1 0.2 MILE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

REF-120

Exhibit B



Source: Wilson Okamoto Corporation and River Focus, Inc.

Figure 7

Waipahu Transit-Oriented Community Development Project

NOT TO SCALE

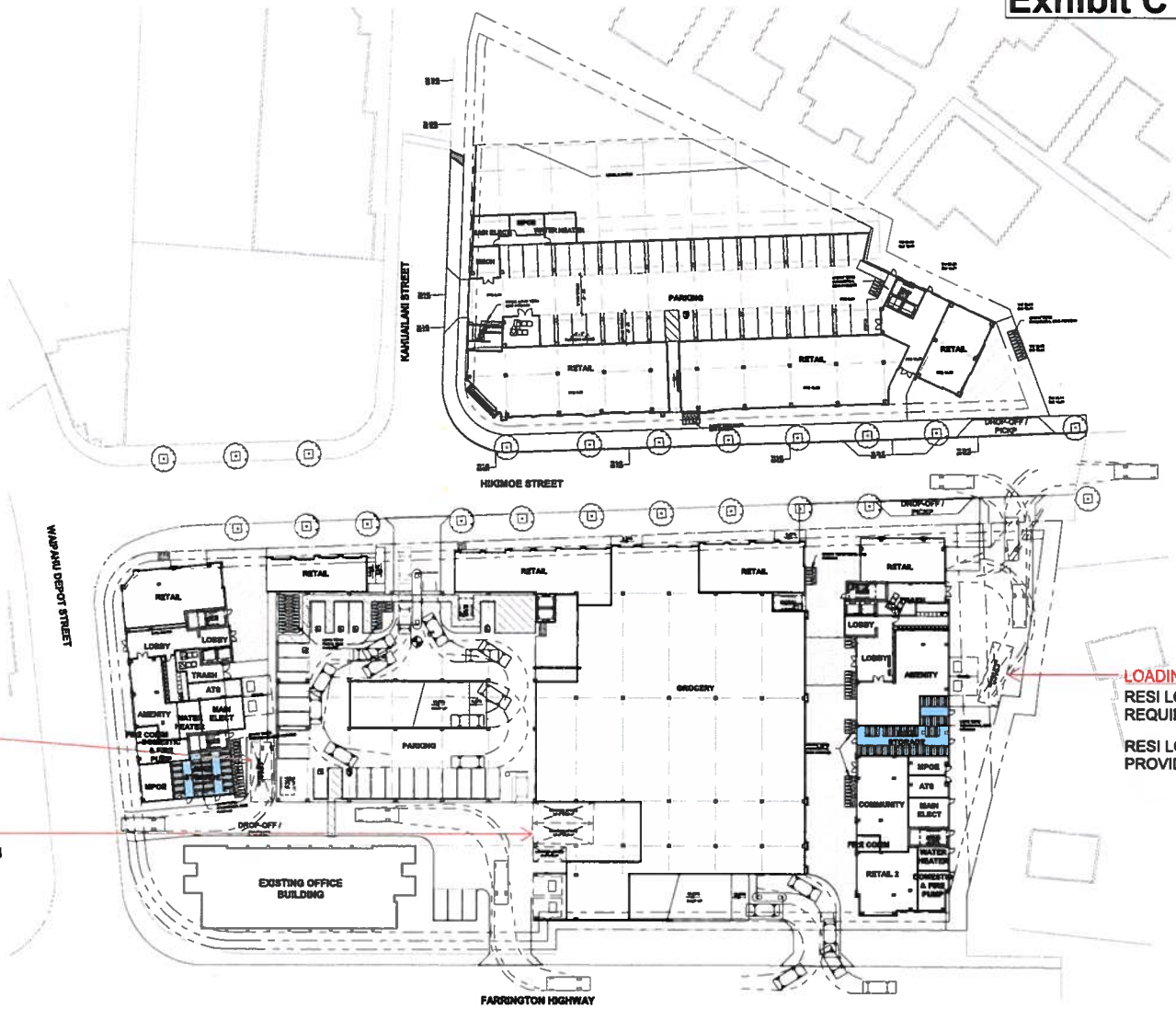
GROUND FLOOR PLAN

Keawalau at Waipahū

Exhibit C

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:



Kamehameha Schools · Highridge Costa · PRE HAWAII · SVA

LEVEL 2

Keawalau at Waipahū

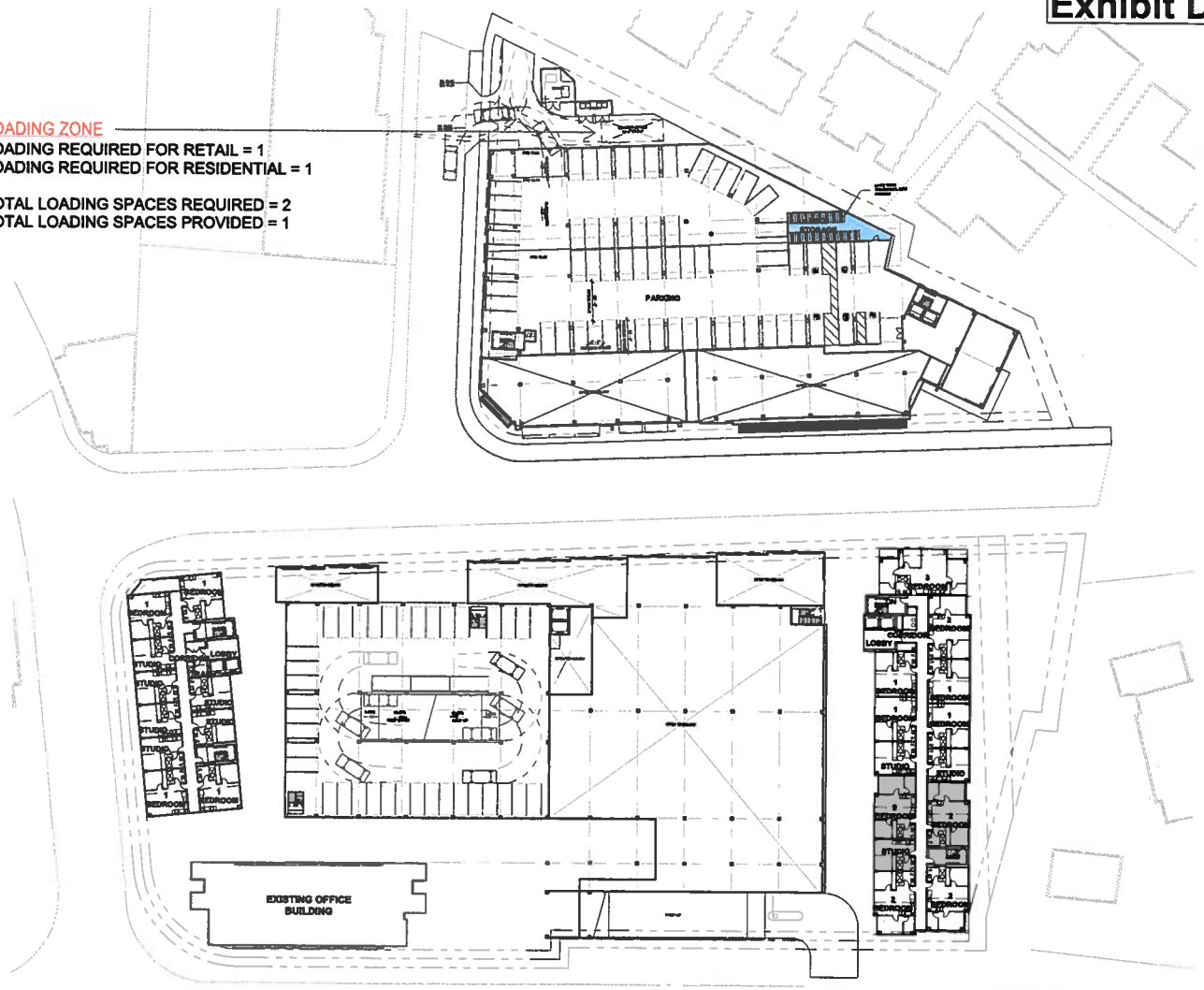
Exhibit D

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:

LOADING ZONE
LOADING REQUIRED FOR RETAIL = 1
LOADING REQUIRED FOR RESIDENTIAL = 1

TOTAL LOADING SPACES REQUIRED = 2
TOTAL LOADING SPACES PROVIDED = 1



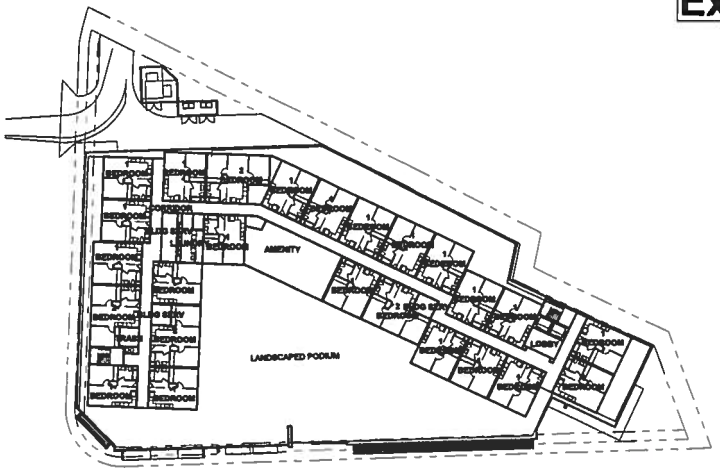
Kamehameha Schools
Highridge Costa
PULI LAWAI
SVA

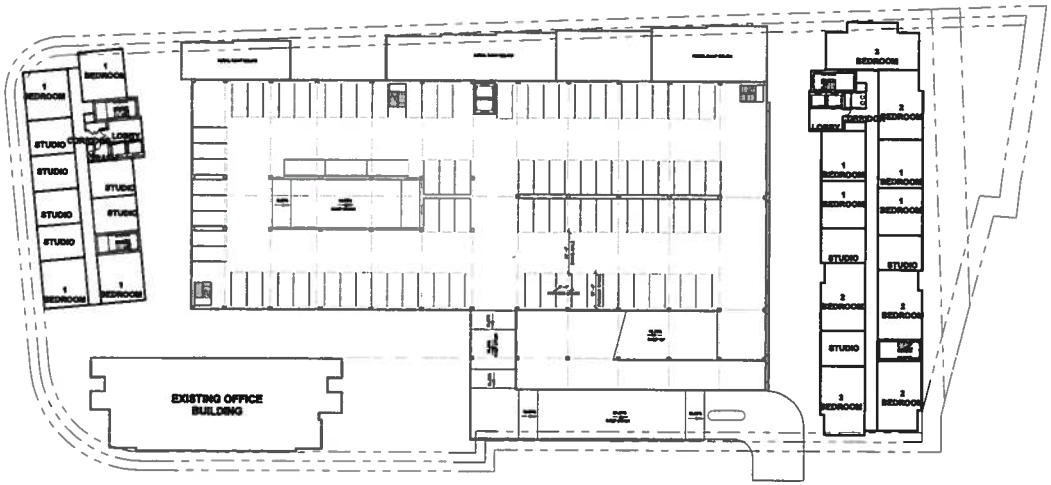
LEVEL 3

Keawalau at Waipahū

Exhibit E

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



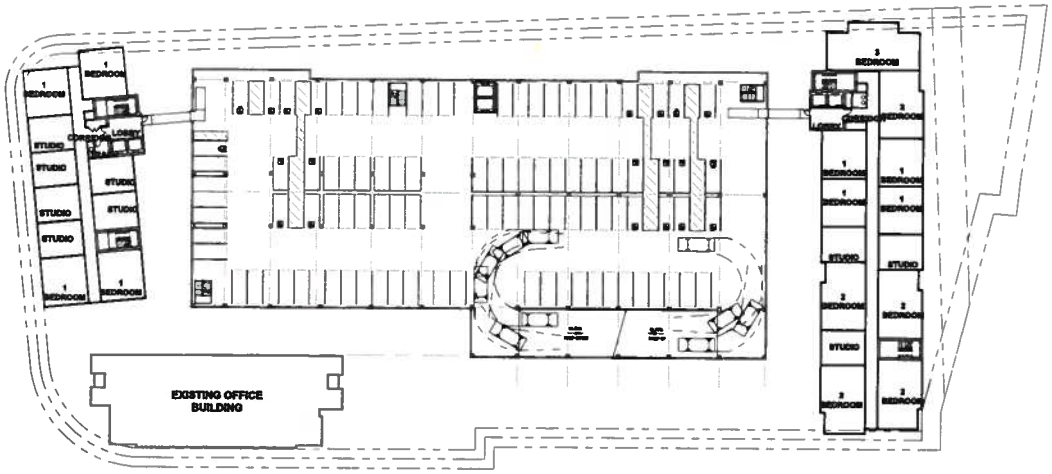


LEVEL 4

Keawalau at Waipahū

Exhibit F

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

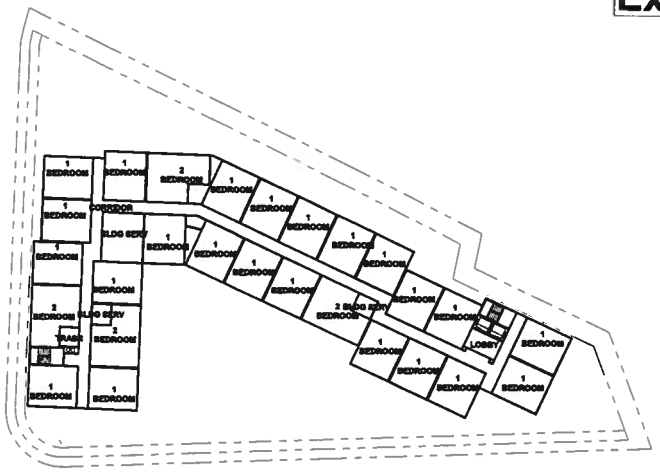


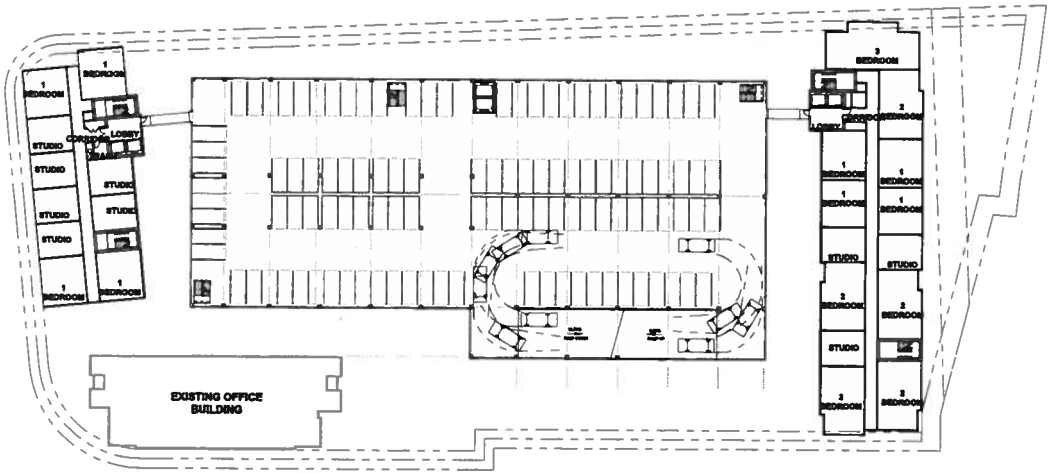
LEVEL 5

Keawalau at Waipahū

Exhibit G

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



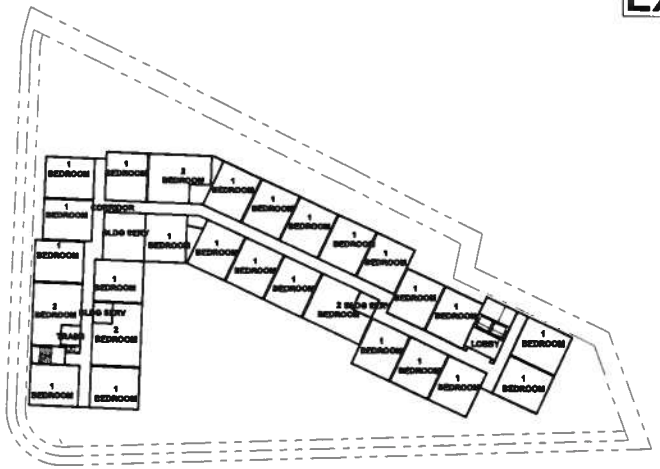


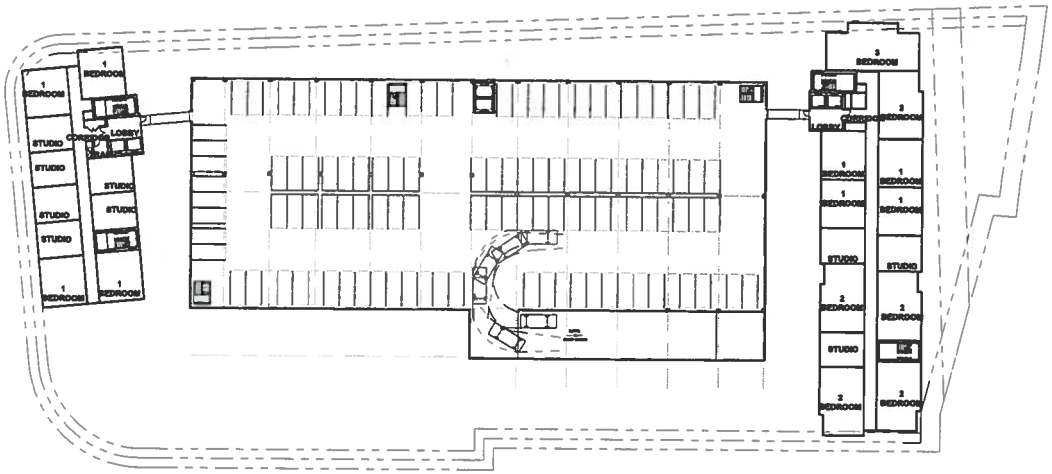
LEVEL 6

Keawalau at Waipahū

Exhibit H

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



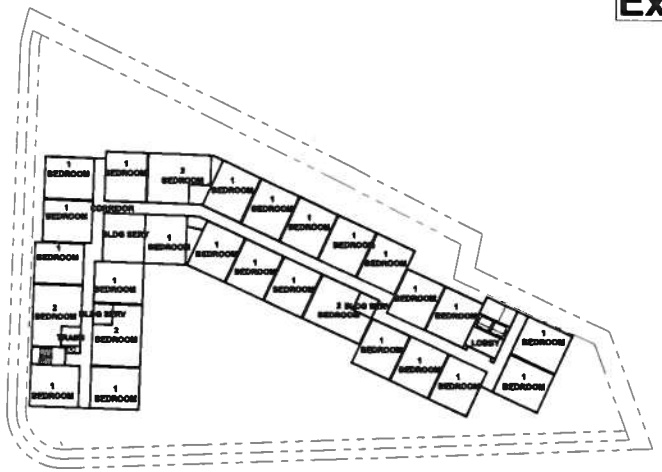


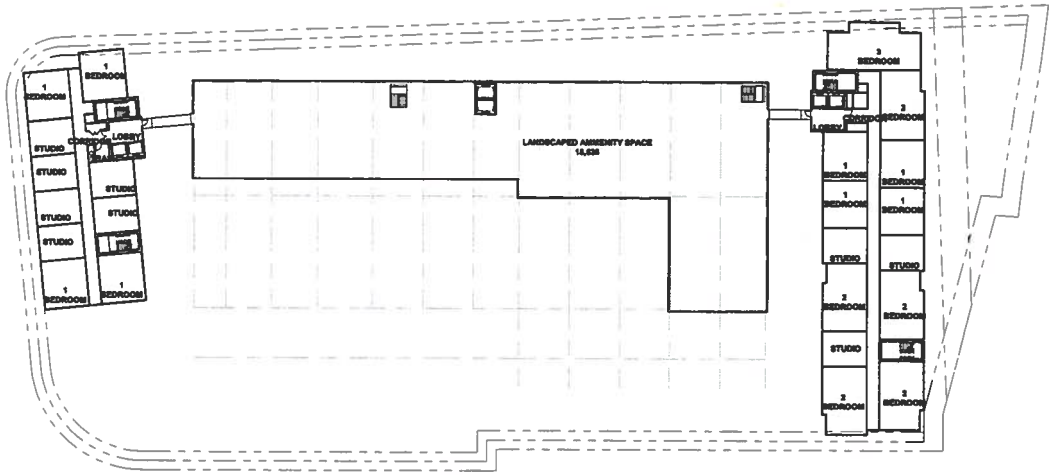
LEVEL 7

Keawalau at Waipahū

Exhibit I

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



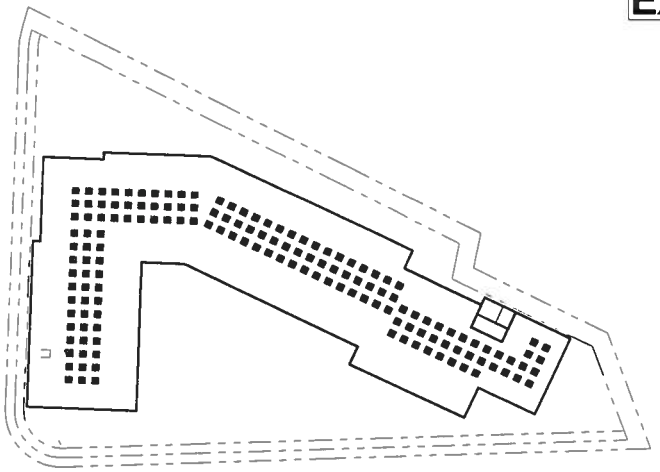


LEVEL 8-18/19

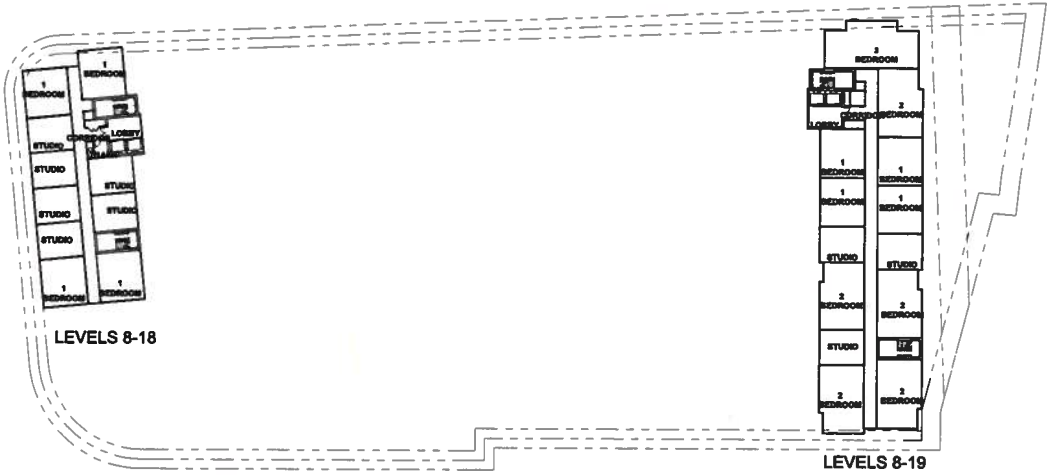
Keawalau at Waipahū

Exhibit J

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



LEVEL ROOF



LEVELS 8-18

LEVELS 8-19

SITE PHASING + DATA

Keawalau at Waipahū

Exhibit K

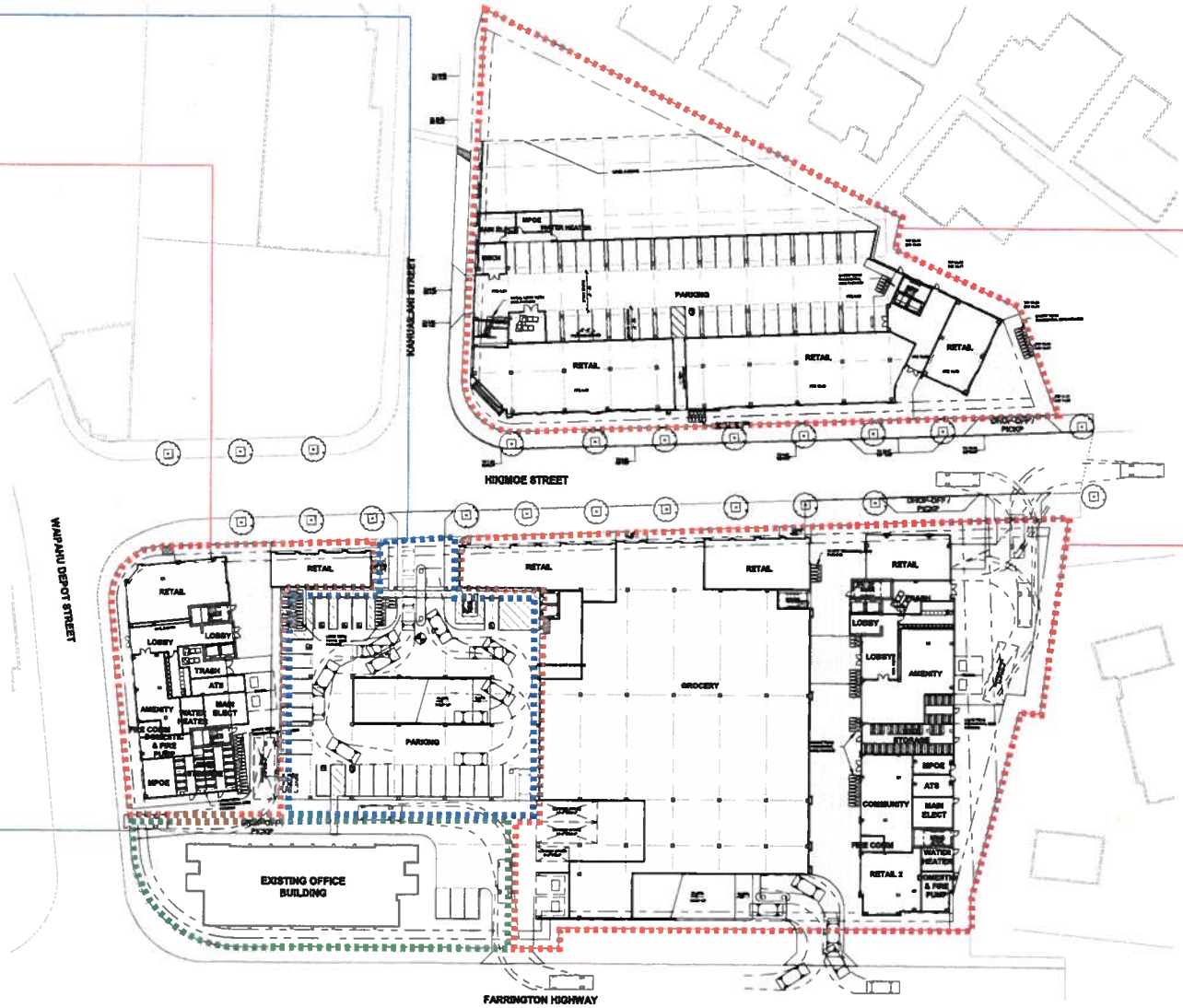
PARKING

Parking structure will be allocated between phases 2 and 3 at a later date.

PHASE 3

Total Retail = 3,685 sf
Total Resi Count = 170
Total stories = 18
Total Residential stories = 17

West Tower Mix
6 studios
4 one bed
10 units per level



PHASE 1

Total Retail = 9,796 sf
Total Resi Count = 133

Low Rise Seniors Mix:
24 one bed
3 two bed
27 units per level

PHASE 2

Total Retail = 5,539 sf
Grocery Store = 23,352 sf
Total Resi Count = 234
Total stories = 19
Total Residential stories = 18

West Tower Mix
3 studios
4 one bed
5 two bed
1 three bed
13 units per level

OWNER RETAINED AREA

Existing building to be retained by KS and not included in the development.

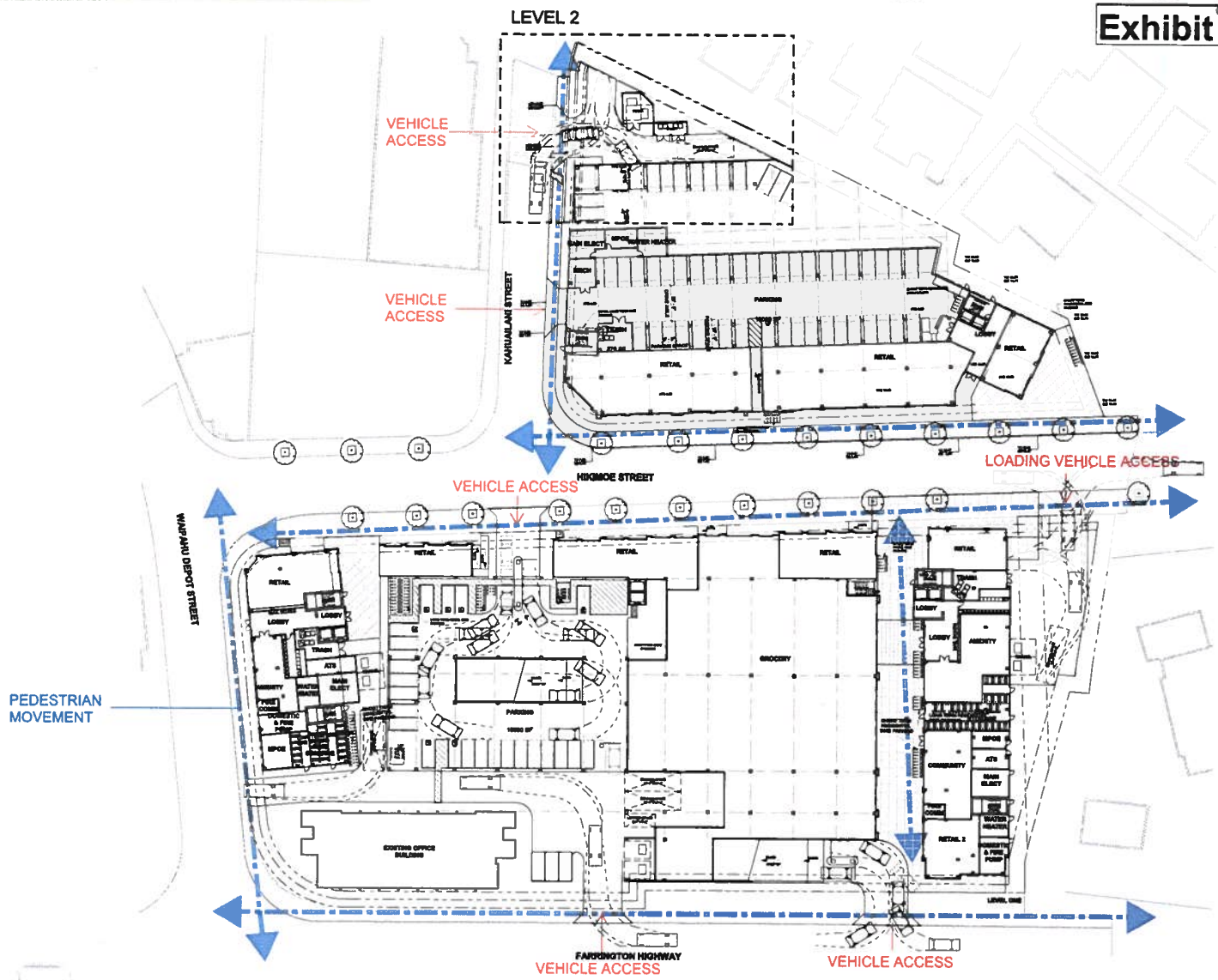
Kamehameha Schools | Highridge Costa | PBR HAWAII | SV

GROUND FLOOR PLAN - CIRCULATION

Keawalau at Waipahū

Exhibit L

NOTE:
*REFER TO LANDSCAPE CONCEPT PACKAGE FOR FURTHER DETAIL ON OPEN SPACE DESIGNATION



Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

PARKING SUMMARY

Keawalau at Waipahū

Exhibit M

Phase 1

Residential	Unit Area	No Units	Total Area				Parking Required
1 - Bdrm	595	118	70,210				Per Table 21-6.1
2 - Bdrm	779	15	11,685				
Residential Area		133	81,895	1	per	1,000	82
Retail			9,796	1	per	500	20
						Total	102
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	103

Bicycle Parking		Units				Required	Provided
	133	Units					
		Short Term	1	per	10	14	14
		Long Term	1	per	2	67	67
	9,796	S.F. Commercial Uses					
		Short Term	1	per	2,000	5	5
		Long Term	1	per	12,000	1	1

Phase 2

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	54	24,300				Per Table 21-6.1
1 - Bdrm	590	72	42,480				
2 - Bdrm	830	90	74,700				
3 - Bdrm	1,160	18	20,880				
		234	162,360	1	per	1,000	163
Retail			27,146	1	per	500	55
Office			29,550	1	per	500	60
						Total	278
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	353

Bicycle Parking Provided		Units				Required	Provided
	234	Units					
		Short Term	1	per	10	24	24
		Long Term	1	per	2	117	117
	56,696	S.F. Commercial Uses					
		Short Term	1	per	2,000	29	29
		Long Term	1	per	12,000	5	5

Phase 3

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	102	45,900				Per Table 21-6.1
1 - Bdrm	590	68	40,120				
		170	86,020	1	per	1,000	87
Retail			5,814	1	per	500	12
						Total	99
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	107

Bicycle Parking Provided		Units				Required	Provided
	170	Units					
		Short Term	1	per	10	17	17
		Long Term	1	per	2	85	85
	5,814	S.F. Commercial Uses					
		Short Term	1	per	2,000	3	3
		Long Term	1	per	12,000	1	1

Note 1
Sec. 21-6.20 (a) no off-street parking is required in any zoning district within one-half mile of an existing or future Honolulu rail transit station, as identified in the accepted environmental impact statement, or in the transit-oriented development special districts.

Loading Spaces

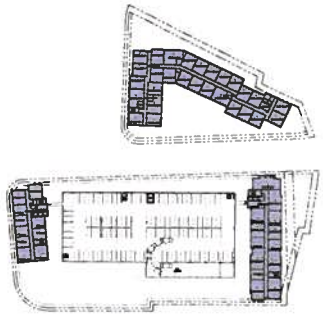
Phase 1	Residential	20 - 150 (1 Required)	133	Units	1
Phase 1	Retail	2,000 - 10,000 (1 Required)	9,796	S.F.	1
				Total Loading Spaces Required	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 1					
Phase 2	Residential	151 - 300 (2 Required)	234	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 2 residential					
Phase 3	Residential	151 - 300 (2 Required)	170	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 3 residential					
Phase 2 & 3	Retail	20,000 - 40,000 (3 Required)	32,960	S.F.	3
				3 Loading spaces provided	
Existing	Office	20,00 - 50,000 (1 Required)	29,550	S.F.	1
0 Loading space provided, exemption to reduce number of loading spaces to 0 for existing office building					

FAR DIAGRAM & CALCULATION

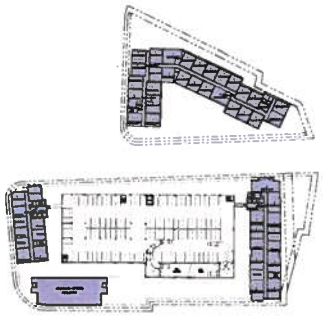
Keawalau at Waipahū

Exhibit N

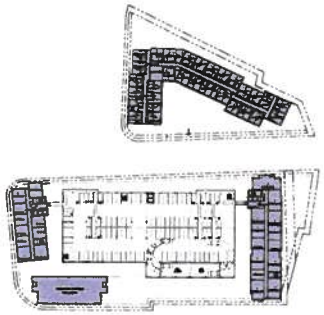
FLOOR AREA RATIO (FAR)



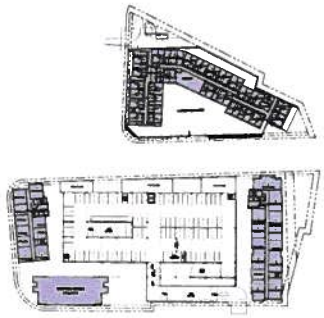
LEVEL 6 (typ upper)



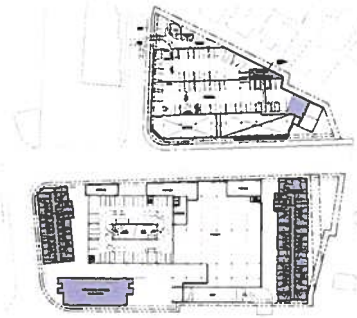
LEVEL 5



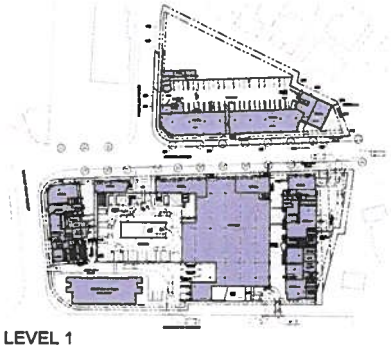
LEVEL 4



LEVEL 3



LEVEL 2



LEVEL 1

PHASE 1 (SENIOR)

Lot Area	50,925
FAR	2.41

		GFA
Level	7	21,182 SF
Level	6	21,182 SF
Level	5	21,182 SF
Level	4	21,182 SF
Level	3	21,182 SF
Level	2	2,490 SF
Level	1	14,123 SF
Total		122,523 SF

PHASE 2, 3 & EXISTING OFFICE TOWER

Lot Area	119,090 SF
FAR	3.44

GROSS FLOOR AREA	
Phase 2	247,665 SF
Phase 3	132,172 SF
Office	29,550 SF
TOTAL	409,387 SF

		GFA (Phase 2)
Level	19	11,518 SF
Level	18	11,518 SF
Level	17	11,518 SF
Level	16	11,518 SF
Level	15	11,518 SF
Level	14	11,518 SF
Level	13	11,518 SF
Level	12	11,518 SF
Level	11	11,518 SF
Level	10	11,518 SF
Level	9	11,518 SF
Level	8	11,518 SF
Level	7	11,518 SF
Level	6	11,518 SF
Level	5	11,518 SF
Level	4	11,518 SF
Level	3	11,518 SF
Level	2	11,518 SF
Level	1	40,341 SF
Total		247,665 SF

		GFA (Phase 3)
Level		
Level	18	7,252 SF
Level	17	7,252 SF
Level	16	7,252 SF
Level	15	7,252 SF
Level	14	7,252 SF
Level	13	7,252 SF
Level	12	7,252 SF
Level	11	7,252 SF
Level	10	7,252 SF
Level	9	7,252 SF
Level	8	7,252 SF
Level	7	7,252 SF
Level	6	7,252 SF
Level	5	7,252 SF
Level	4	7,252 SF
Level	3	7,252 SF
Level	2	7,252 SF
Level	1	8,888 SF
Total		132,172 SF

		GFA (Phase 2+3)
Level	19	11,518 SF
Level	18	18,770 SF
Level	17	18,770 SF
Level	16	18,770 SF
Level	15	18,770 SF
Level	14	18,770 SF
Level	13	18,770 SF
Level	12	18,770 SF
Level	11	18,770 SF
Level	10	18,770 SF
Level	9	18,770 SF
Level	8	18,770 SF
Level	7	18,770 SF
Level	6	18,770 SF
Level	5	18,770 SF
Level	4	18,770 SF
Level	3	18,770 SF
Level	2	18,770 SF
Level	1	49,229 SF
Total		379,837 SF

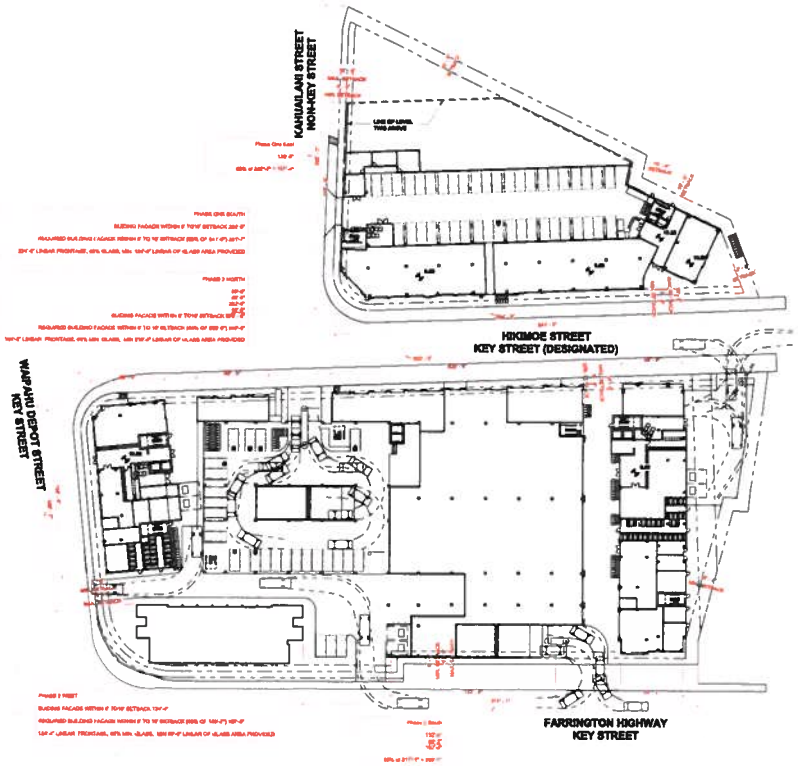
OPEN SPACE DIAGRAM & CALCULATION

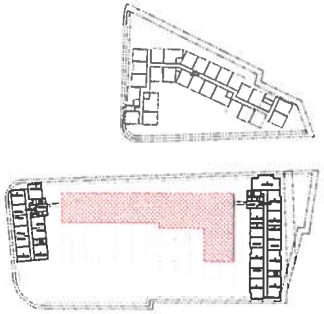
Keawalau at Waipahū

PUBLIC OPEN SPACE

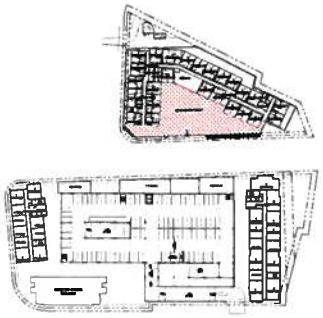
Exhibit O

SEMI-PUBLIC OPEN SPACE
(RESIDENTIAL AMENITIES)

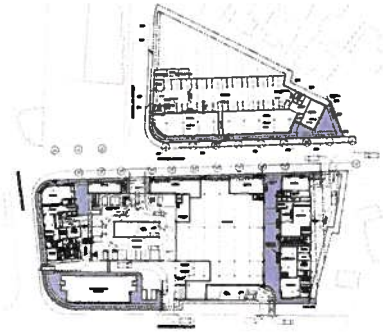




LEVEL 6



LEVEL 3



LEVEL 1

PHASE 1 (SENIOR)

Open Space	Level 1	6,658 sf	(Public)
	Level 3	10,200 sf	(Semi-Public)
	TOTAL	16,858 sf	
		33.2 %	

PHASE 2, 3 & EXISTING OFFICE TOWER

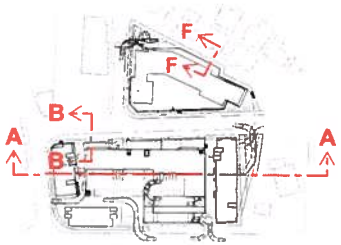
Open Space	Level 1	23,663 sf	(Public)
	Level 6	18,841 sf	(Semi-Public)
		42,504 sf	
		35.7 %	

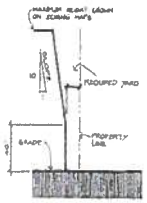
Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

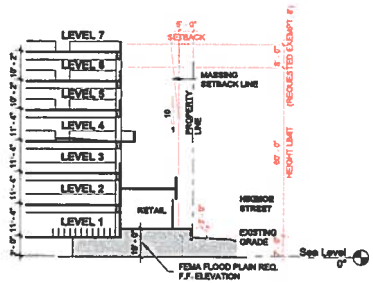
SITE SECTION

Keawalau at Waipahū

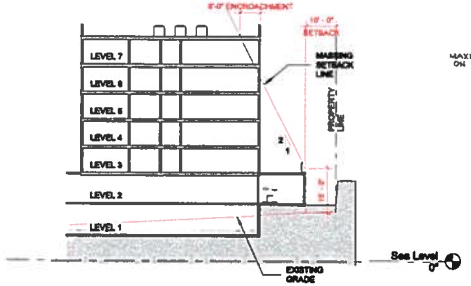
Exhibit P



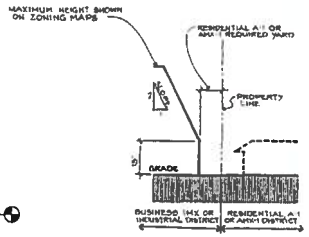


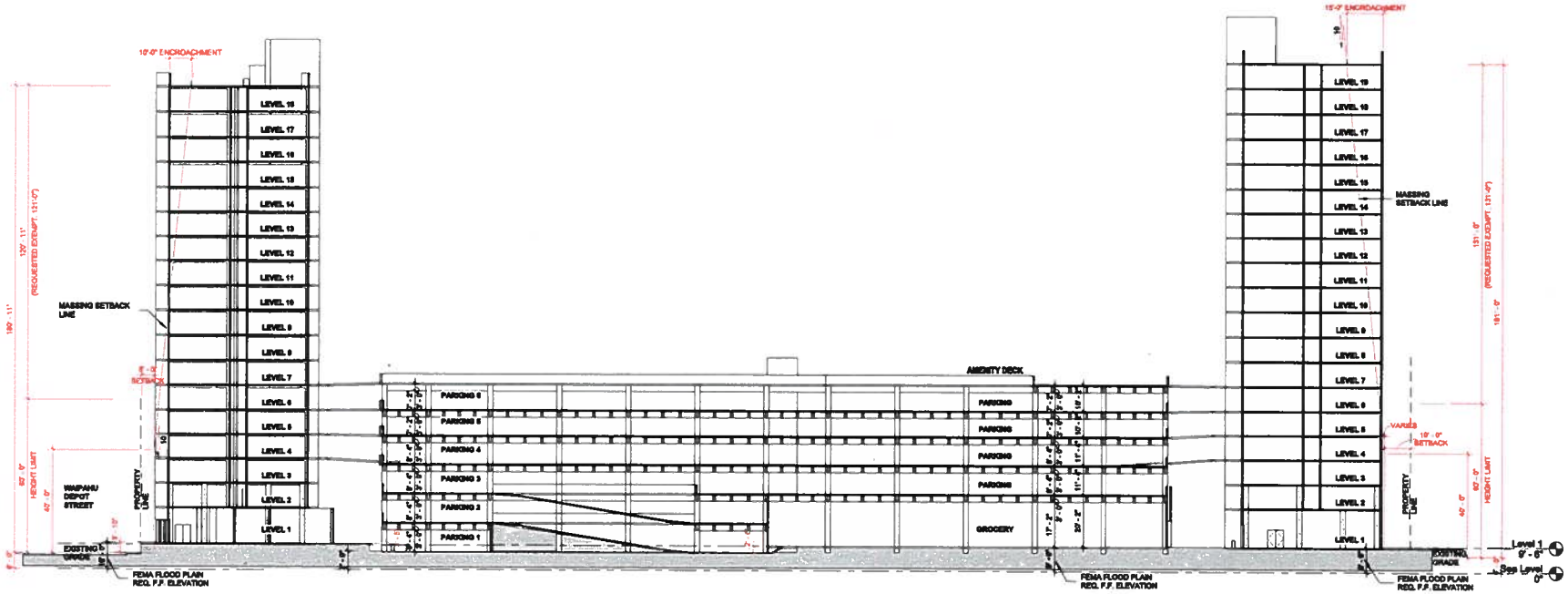


SECTION B-B



SECTION F-F





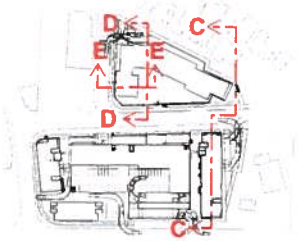
SECTION A-A

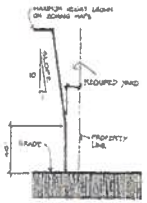
Kamehameha Schools · Highridge Costa · PBR HAWAII & ASSOCIATES INC. · SVA

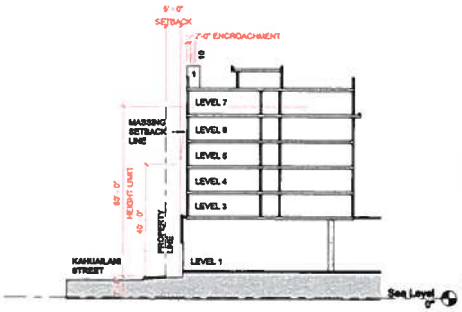
SITE SECTION

Keawalau at Waipahū

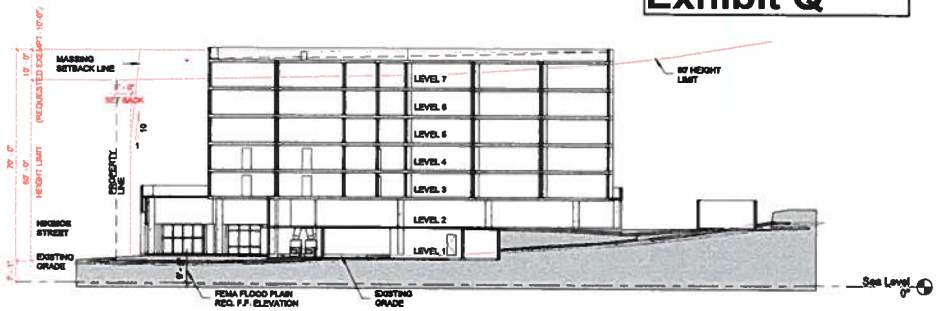
Exhibit Q



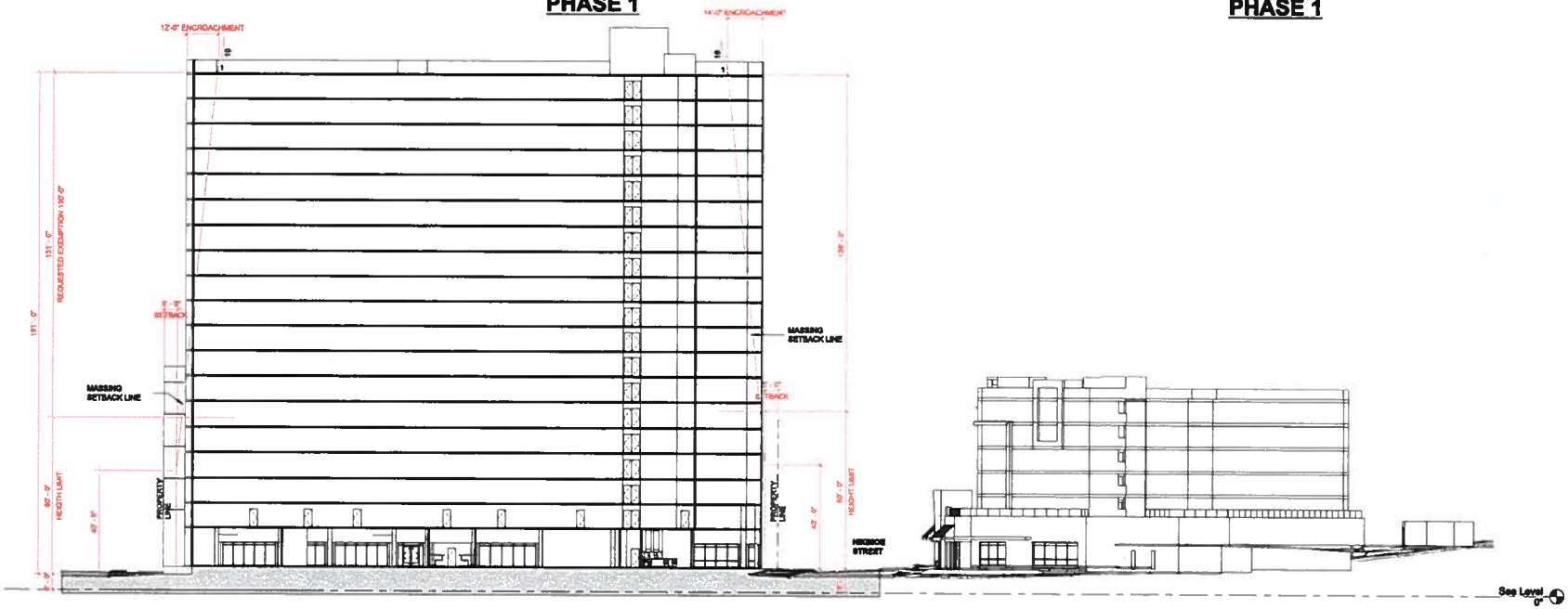




SECTION E-E
PHASE 1



SECTION D-D
PHASE 1



SECTION C-C
PHASE 2

Kamehameha Schools | Highridge Costa | The Hawaii Laborers | SVA

SOUTH ELEVATION-MAUKA SITE

Keawalau at Waipahū

Exhibit R

360' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 360' x 1.5 = 540 SQ.F

4 TENANTS + BUILDING SIGNAGE = 8 SIGNAGE OF MAX. 67.5 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 45 SQ.F

B B C D F C C

LEGEND

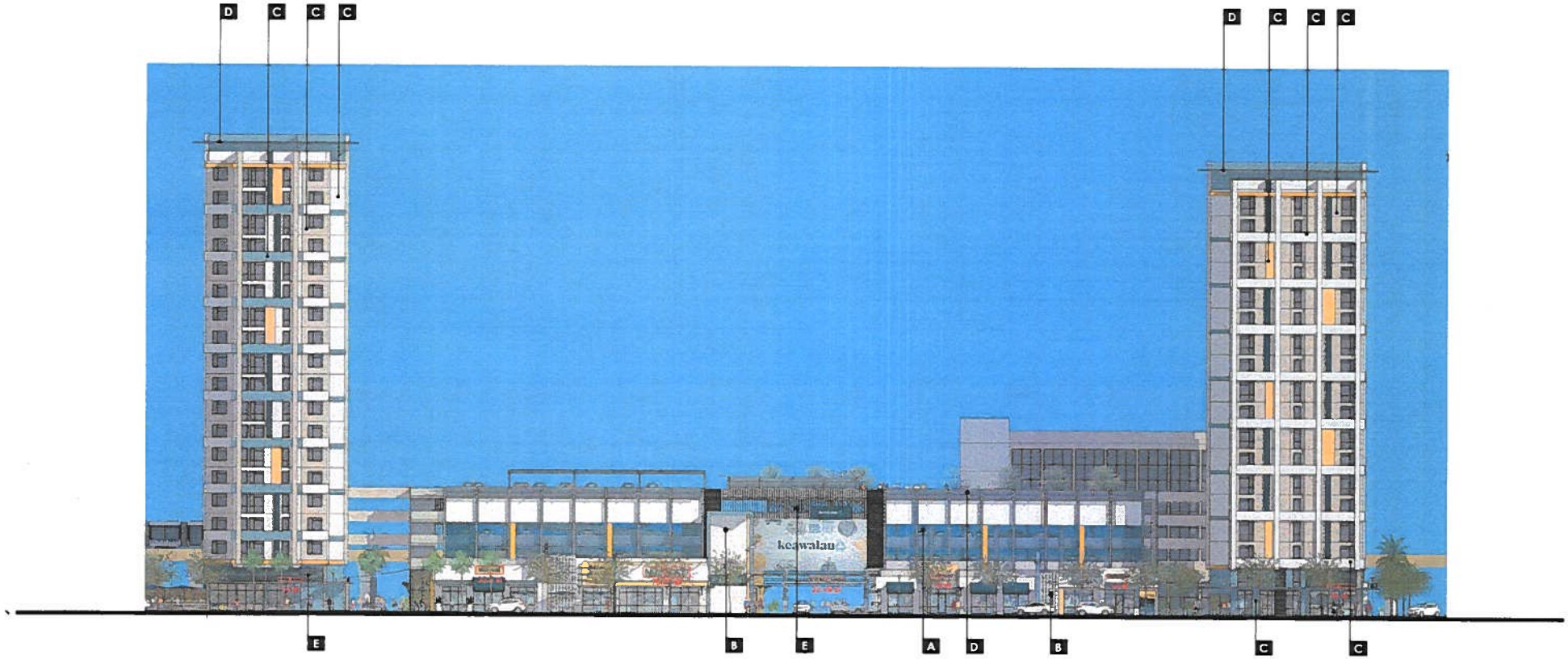
- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools · Highridge Costa · PBR HAWAII & ASSOCIATES INC · SVA

NORTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit S



425.2' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ.F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 425.2' x 1.5 = 637 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 53 SQ.F

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools · Highridge Costa · SVA

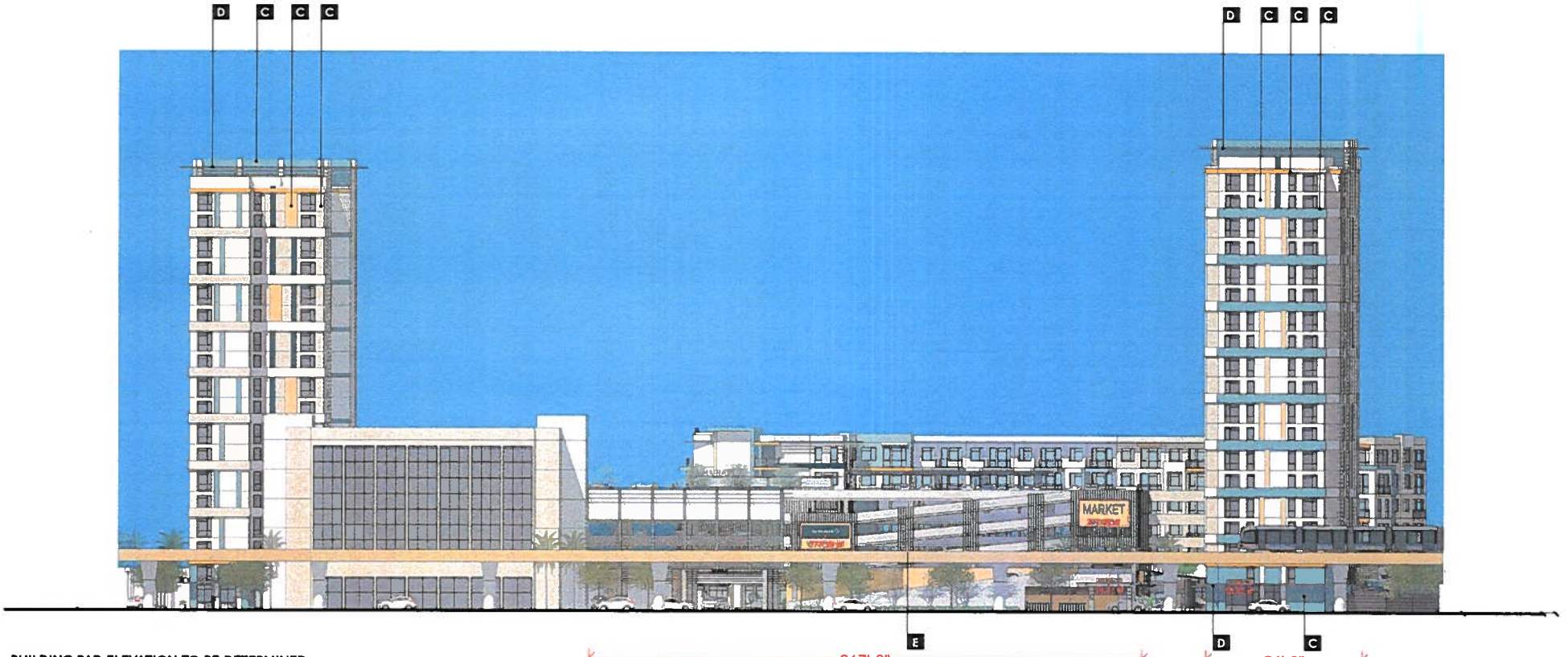
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

SOUTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit T



BUILDING PAD ELEVATION TO BE DETERMINED.
6.62' LOWEST ADJACENT GRADE FOR REFERENCE

217'-3" | 54'-9"

272' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ.F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 272' x 1.5 = 408 SQ.F

2 TENANTS + BUILDING SIGNAGE = 4 SIGNAGE OF MAX. 102 SQ.F

LEGEND

- **A** PERFORATED METAL SCREEN
- **B** ACCENT PANEL
- **C** EXTERIOR CEMENT PLASTER
- **D** METAL CANOPY
- **E** METAL LOUVER
- **F** METAL MESH RAILING

Kamehameha Schools · Highridge Costa · PBR HAWAII & ASSOCIATES, INC. · SVA

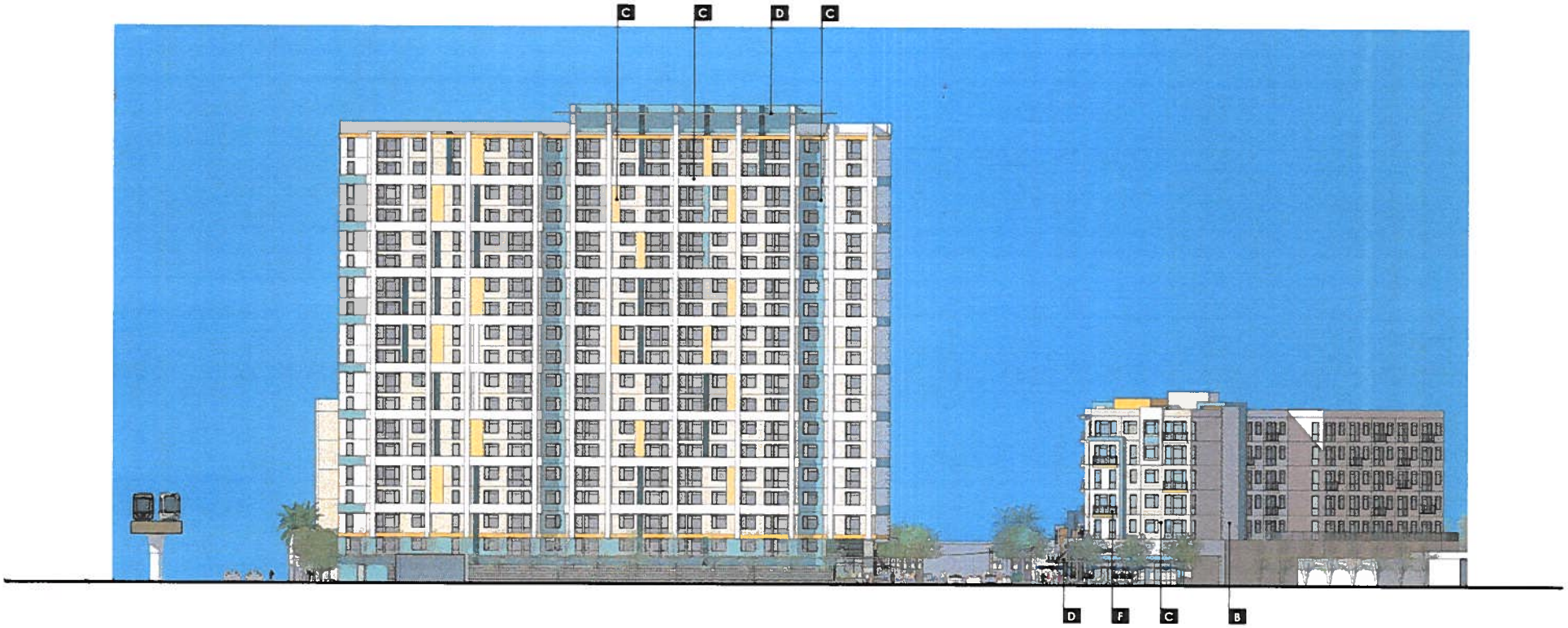
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

EAST ELEVATION

Keawalau at Waipahū

Exhibit U



LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

Highridge Costa

PBR HAWAII

SVA

#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

WEST ELEVATION

Keawalau at Waipahū

Exhibit V

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

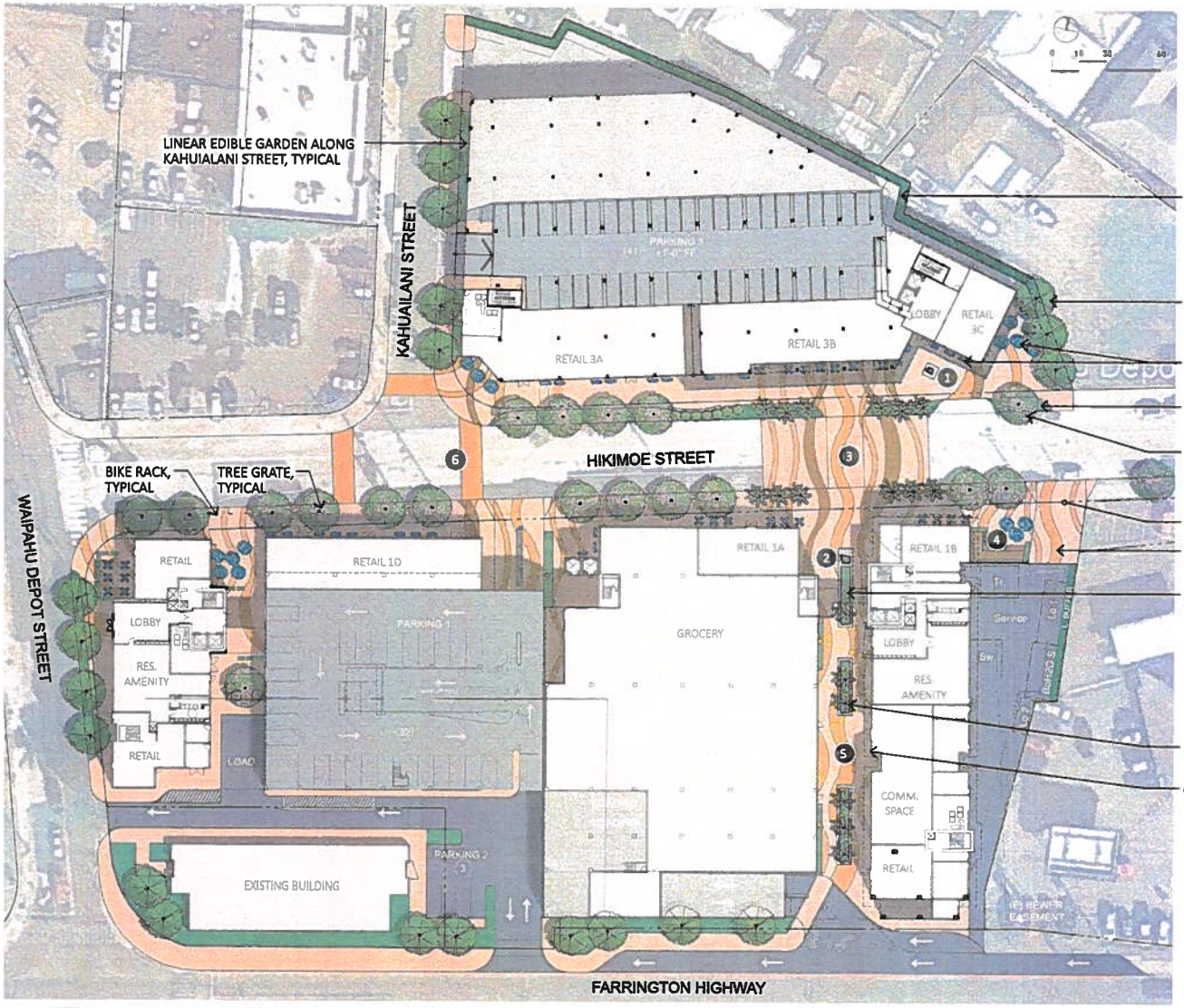
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

CONCEPTUAL GROUND LEVEL LANDSCAPE PLAN

Keawalau at Waipahū

Exhibit W



SCREENING PLANTS, TYPICAL

NATIVE OR POLYNESIAN-INTRODUCED TREES, TYPICAL

OUTDOOR SEATING, TYPICAL

IN-GROUND PLANTERS WITH NATIVE PLANTS, TYPICAL

FLOWERING TREE TO MATCH EXISTING HIKIMOE STREET TREES, TYPICAL

PROPERTY LINE, TYPICAL

DECORATIVE CONCRETE PAVING, TYPICAL

BIOFILTRATION PLANTERS WITH SEATWALLS, TYPICAL

NATIVE PALM, TYPICAL

OUTDOOR STRING LIGHTS BETWEEN BUILDINGS

LEGEND

1. SCULPTURE (KANE)
2. SCULPTURE (KANALOA)
3. RAISED MID-BLOCK CROSSING
4. CORNER "STAGE" SEATING DECK
5. OUTDOOR EXTENSION OF COMMUNITY SPACE
6. ENHANCED CROSSWALKS AT T-INTERSECTION

Exhibit X

Keawalau at Waipahū

VIEW FROM SOUTHEAST LOOKING TOWARDS SITE

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

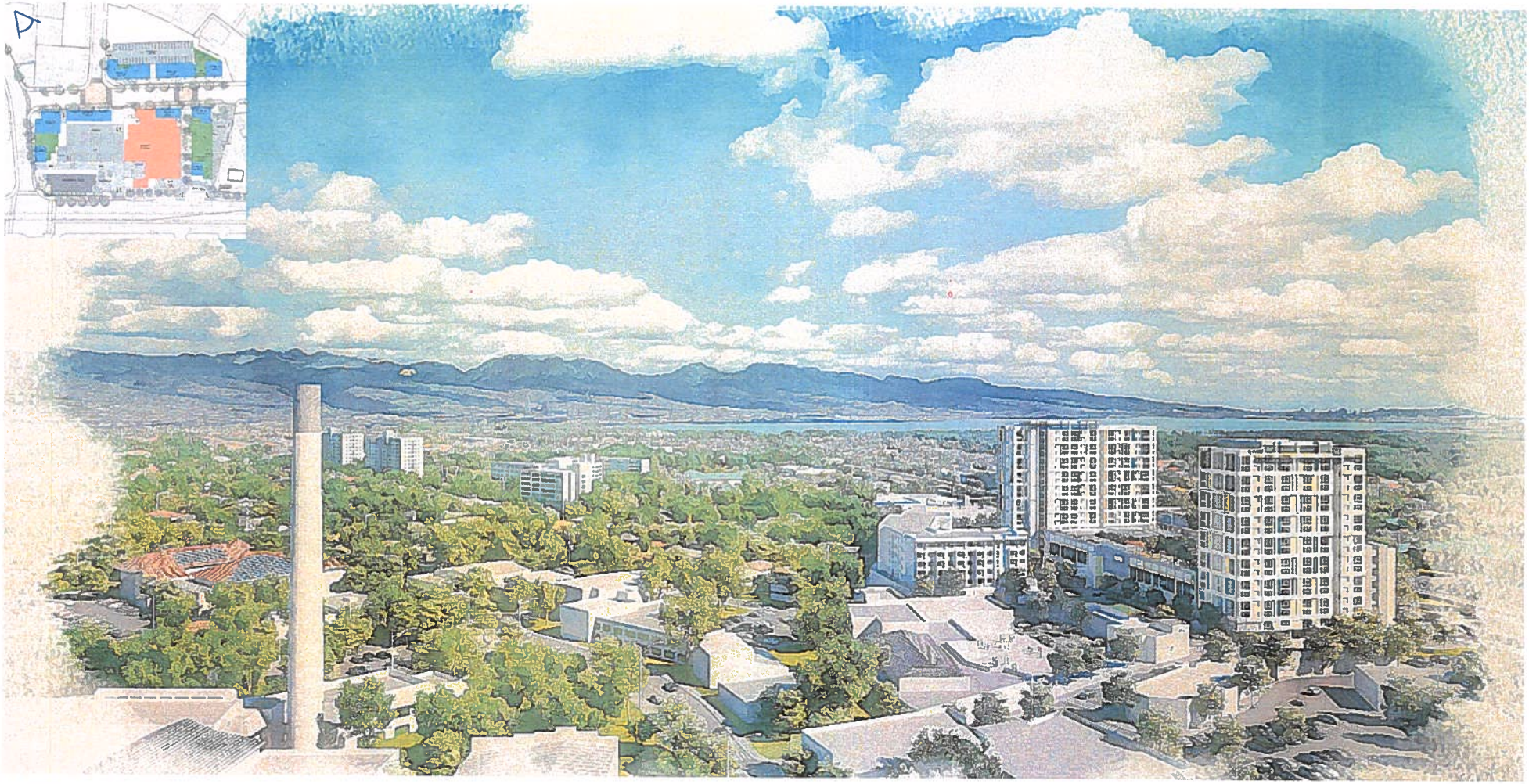
Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-219

Exhibit Y

Keawalau at Waipahū

VIEW FROM NORTHEAST LOOKING DOWN SITE



PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-220

Exhibit Z

Keawalau at Waipahū

VIEW FROM SOUTHHEAST AT MAKAI SITE

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

Application for Affordable Housing Development Pursuant to Section 201H-38, Hawai‘i Revised Statutes

KEAWALAU AFFORDABLE HOUSING COMMUNITY PROJECT AT WAIPAHŪ, O‘AHU, HAWAI‘I

Prepared for:
Highridge Costa Development Company

September 2022
(REVISED)

August 2022
Copyright © 2022
by Munekiyo Hiraga

MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

REF-1

Application for Affordable Housing Development Pursuant to Section 201H-38, Hawai‘i Revised Statutes

KEAWALAU AFFORDABLE HOUSING COMMUNITY PROJECT AT WAIPAHŪ, O‘AHU, HAWAI‘I

Prepared for:
Highridge Costa Development Company

September 2022
(REVISED)

August 2022
Copyright © 2022
by Munekiyo Hiraga

MUNEKIYO HIRAGA

REF-2

Application for Affordable Housing Development Pursuant to Section 201H-38, Hawai'i Revised Statutes
for
KEAWALAU AFFORDABLE HOUSING COMMUNITY PROJECT
AT
WAIPAHŪ, O'AHU, HAWAI'I

INDEX

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2. Determination of Eligibility Submittal
3. Project Narrative
4. Requested Exemptions Pursuant to Chapter 201H-38, HRS
5. Letter Confirming Sewer Capacity
6. Letter Confirming Water Availability
7. Letter Confirming Availability of Electricity
8. Project Development Schedule
9. Project Management Plan
10. Vicinity Maps and Land Use Map
11. Preliminary Project Plans

11A. View Analysis

12. Project Budget and Financing
13. Developer Experience
14. Rental Rates and Estimated Monthly Utility Costs
15. Community Outreach Summary

REF-3

16. **Traffic Impact Analysis Report**

17. **Preliminary Civil Engineering Report**

18. **Archaeological Inventory Survey**

19. **Geotechnical Report**

K:\DATA\Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\(1) Revised 201H Application\Revised 201H Application.doc

REF-4

201H APPLICATION CHECKLIST

REF-5

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING AND PERMITTING (DPP)

201H Program Application Instructions

This document is intended to assist in preparing a complete application.

Attach a cover letter to the application. Number responses to each application item and each page. A table of contents and list of attachments is highly recommended. Check to ensure the application is complete and all attachments are included before submitting. If you have any questions about completing the application, contact the DPP.

1. Submit a completed Land Use Permits Division Master Application Form. **See Section 1.**

2. Resubmit the materials provided for the Determination of Eligibility. Provide a statement confirming that the information submitted either remains correct or identify how it has changed and why. **See Section 2.**

3. Provide a project narrative that includes: **See Section 3.**

   a. The State Land Use Classification and City and County Zoning District for the site.

   b. How the project is consistent with the goals and policies of the Sustainable Communities or Development Plan in which the project is geographically located. Reference the applicable goals and objectives from the Plan, as appropriate.

   c. Describe the current and historic site conditions. Describe the degree to which existing structures, if any, will be renovated or demolished.

   d. Indicate the flood zone designation for the site from the Federal Emergency Management Agency current Flood Insurance Rate Map(s). Indicate whether the property is in a tsunami evacuation zone. Identify the mitigating measures that will be taken to ensure the safety of residents, as applicable.

   e. Indicate whether the proposed project will relocate any tenants, and if so, the assistance that will be provided. Provide a relocation plan, if necessary.

   f. Describe each proposed building; the type of construction being proposed; the dwelling unit mix including the types of units by bedroom size, the total number of each type of unit and floor area for each type; the square feet attributable to common areas in the buildings; the square feet of non-residential spaces on the site, if any; project amenities; and, proximity to services and employment.

   g. Identify the number of resident, guest, and handicapped parking spaces, bicycle stalls, loading stalls, and how the site will be accessed by vehicles, pedestrians, and people on bicycles.

   h. Describe the existing water, sewer, drainage, roads, and electrical improvements and what additional improvements and other permits and/or approvals are needed to accommodate the project. Explain the status of those permits and/or approvals.

REF-6

i. Describe the topography and soils and what mitigation is needed, if any, to accommodate new structures, access, and stormwater management.

4. List the proposed exemptions and reference the applicable ordinance sections; their approximate dollar value, as applicable; the degree to which they deviate from development standards of the underlying City and County zoning, as applicable; and justification for each exemption sought. **See Section 4.**

5. Submit a letter from DPP's Wastewater Branch confirming the capacity to connect to the municipal sewer system or from the DOH documenting approval for an alternative treatment system. **See Section 5.**

6. Submit a letter confirming availability of water from the Board of Water Supply, or describe how water will otherwise be made available. **See Section 6.**

7. Submit a letter from the local electricity provider confirming the availability of electricity. **See Section 7.**

8. Provide the project development schedule. **See Section 8.**

9. Provide a project management plan, including a sales and/or rental plan that ensures affordability to the target population. **See Section 9.**

10. Submit a vicinity map and land use map from the appropriate Development or Sustainable Communities Plan. **See Section 10.**

11. Submit two sets of fully dimensioned drawings and/or plans drawn to scale and prepared by a licensed professional. For document imaging purposes, one set of drawings shall be a maximum size of 11" x 17" and the second should not exceed 24" x 36". DPP staff may request additional copies after acceptance of the application. The plans shall include: **See Section 11.**

    a. Property lines, lot areas, all existing and proposed easements with dimensions, and the purpose of easements.

    b. Location of all existing and proposed improvements. Indicate if existing structures are to remain, be altered, or be removed.

    c. The dimensions of proposed and existing buildings, and all setbacks from property lines.

    d. Existing contours at vertical intervals of 5 feet where the slope is greater than 10 percent, and not more than 2 feet where the slope is less than 10 percent. Proposed grading must be shown with contours and spot elevations.

    e. Preliminary floor plans and floor area calculations, showing all dimensions used in calculating proposed floor area and building area. Indicate the elements used in the calculation and include the tabulation of total proposed floor area and total allowable floor area.

REF-7

f. Exterior building elevations and sections with dimensions and existing/proposed finish grades, including all building heights and envelopes measured from these grades. Provide the dimensions between structures.

g. Open space plans and area calculations, showing all dimensions and elements used in calculating these areas, including the total proposed and total required open space. (If bonus areas are used, provide calculations and indicate the applicable areas on the plans.) The open space plan should also specify 1) areas devoted to public, semi-public, and private open space, including parks, plazas, and playgrounds; 2) an integrated circulation system indicating proposed movement of vehicles, goods, pedestrians, and bicyclists within the project area and adjacent areas, including streets and driveways, sidewalks and pedestrian ways, bicycle lanes, bicycle tracks, and multi-use paths.

h. Off-street parking and loading plans and calculations with dimensions of all stalls, aisles, driveways and setbacks from property lines and proposed structures, showing the total number of proposed parking and loading stalls.

i. Preliminary landscaping and screening plans, with enough specificity such that compliance with the requirements of the Land Use Ordinance can be determined.

12. Provide a breakdown of the development costs for the project. Indicate the total dollar amount in the form of cash (or equivalents), land, or "in kind" contributions that your organization will directly contribute to the project. "In kind" contributions may include, but are not limited to, donated construction materials or professional services (i.e., pro bono work by architects, engineers, attorneys, etc.). If land is part of your equity contribution, provide an estimate of the land value and how that number was derived i.e., if the land value is from an appraisal, include a copy of the appraisal. If your organization is not contributing any cash, land, or "in kind" goods and services to the project, please provide an explanation.

    a. Identify the sources of all financing. **See Section 12.**

    b. Specify whether any operating subsidies have been awarded or are being contemplated.

13. Describe the Applicant's experience developing or managing affordable housing. **See Section 13.**

14. If the affordable housing units are for rent, provide proposed rental rates and provide an estimate of monthly utility costs. **See Section 14.**

15. Document efforts associated with community outreach and comments received. **See Section 15.**

16. Provide a traffic impact assessment or study, if required by DPP's Traffic Review Branch. **See Section 16.**

17. Provide the status of the Land Use Commission application, as necessary, and any correspondence that documents that status. **Not Applicable.**

18. Provide a draft development agreement (optional, may also be submitted after the City Council votes on the Project). **This will be submitted after the City Council votes on the project.**

Last revised 12/6/2019

REF-8

MASTER APPLICATION FORM

1

REF-9

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING & PERMITTING
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

LAND USE PERMITS DIVISION MASTER APPLICATION FORM

Additional data, drawings/plans, and fee requirements are listed on a separate sheet titled "Application Instructions." ***PLEASE ASK FOR THESE INSTRUCTIONS.***

All specified materials described in the "Instructions for Filing" and required fees must accompany this form; incomplete applications will delay processing. You are encouraged to consult with Zoning Division staff in completing the application. Please call the appropriate phone number given in the "Instructions for Filing."

Please print legibly or type the required information.

SUBMITTED FEE: $ Not Applicable

PERMIT/APPROVAL REQUESTED (Check one or more as appropriate):

Cluster:
- ☐ Agricultural
- ☐ Country
- ☐ Housing

Conditional Use Permit:
☐ Minor ☐ Major

☐ Existing Use: _____
(Indicate Type of Use)

Environmental Document:
- ☐ Environmental Impact Statement
- ☐ Environmental Assessment
- ☐ Supplemental

☐ Minor Shoreline Structure

☐ Modify Approved Permit: _____
(Indicate Reference File No.)

☐ Plan Review Use

Planned Development:
- ☐ Housing
- ☐ Commercial (WSD Only)
- ☐ Resort (WSD Only)
- ☐ Interim Planned Development (IPD-T)

☐ Shoreline Setback Variance

Special District Permit:
☐ Minor ☐ Major
_____
(Indicate District)

☐ Downtown Height >350 Feet

Special Management Area Use Permit:
☐ Minor ☐ Major

☐ Temporary Use Approval

☐ Variance from LUO Section(s): _____

☐ Waiver from LUO Section(s): _____

☐ Zoning Adjustment, LUO Section(s): _____

☑ HRS Section 201H-38 Project

TAX MAP KEY(S): (1)9-4-013:046 and (1)9-4-014:005, 014(por.), 058, 059, 060, 061, 062, 063, 064, 065, 066, 067, and 075
LOT AREA: Approximately 3.84 acres
ZONING DISTRICT(S): BMX3, Community Business Mixed Use **STATE LAND USE DISTRICT:** Urban
STREET ADDRESS/LOCATION OF PROPERTY: Hikimoe Street, Waipahū, Hawai'i 96797

RECORDED FEE OWNER:
Name (& title, if any) Bishop Estate
Mailing Address 567 South King Street
Honolulu, Hawai'i 96813
Phone Number (808) 534-8702
Signature _____

PRESENT USE(S) OF PROPERTY/BUILDING:
A shopping center, other commercial buildings, parking lot and other related improvements.

PROJECT NAME (if any): Keawalau Affordable Housing Community Project

APPLICANT: Attn: Monte Heaton
Name Highridge Costa Development Company
Mailing Address 330 W. Victoria Street
Gardena, California 90248
Phone Number (424)258-2910
Signature _____

AUTHORIZED AGENT/CONTACT PERSON:
Name Yukino Uchiyama, AICP, Munekiyo Hiraga
Mailing Address 735 Bishop Street, Suite 412
Honolulu, Hawai'i 96813
Phone Number (808)983-1233
E-mail planning@munekiyohiraga.com
Signature Yukino Uchiyama

REQUEST/PROPOSAL (Briefly describe the nature of the request, proposed activity or project): Highridge Costa Development Company (Applicant) is proposing to develop a mixed-use project consisting of 537 multi-family affordable rental housing units, ground floor commercial space, and related infrastructure improvements, which will be located in close proximity of the future Waipahū Transit Center in Waipahū, O'ahu, Hawai'i. The residential component will consist of 100 percent affordable rental units, including units limited to seniors and families earning 30 percent or less and 60 percent or less of AMI. The Applicant seeks an affordable housing project approval from the City Council pursuant to Chapter 201H-38, HRS to allow greater design flexibility and cost savings for the project.

POSSE JOB NO. _____

DETERMINATION OF ELIGIBILITY SUBMITTAL

2

REF-11

2. DETERMINATION OF ELIGIBILITY SUBMITTAL

On behalf of Kamehameha Schools (KS) and Highridge Costa Development Company (HC), a Determination of Eligibility was submitted to the Department of Planning and Permitting (DPP) on July 30, 2021. See **Attachment "2-A"**. The DPP provided a letter dated August 23, 2021, confirming that the subject project is eligible for processing of affordable housing exemptions by the City and County of Honolulu under Chapter 201H, Hawai'i Revised Statutes (HRS), subject to compliance with Chapter 343, HRS. See **Attachment "2-B"**. The letter also noted that the Applicant has prepared a Letter of Map Revision (LOMR), which has been reviewed by DPP and submitted to the Federal Emergency Management Agency (FEMA) for approval, and should the LOMR workmap be accepted and implemented, the subject project would not need a variance for siting in an environmentally sensitive area, and would, therefore, be eligible for exemption from the requirements of Chapter 343, HRS. On July 25, 2022, FEMA approved the LOMR with an effective date of December 6, 2022. Subsequently, the FEMA approval and request for an EA Exemption determination were submitted to DPP on August 1, 2022. See **Attachment "2-C"**. DPP provided an EA Exemption determination by letter dated August 11, 2022. See **Attachment "2-D"**.

It is noted that the Determination of Eligibility was submitted under the project name "Waipahū Transit-Oriented Community Development Project" and the project has recently been renamed to "Keawalau Affordable Housing Community".

We hereby confirm that the information provided for the Determination of Eligibility remains correct, with the exception of reduction in unit count and commercial square footage, as noted below. It is also noted that the target income group for the residential units has been expanded to include households earning 30 percent or less of Area Median Income (AMI). The proposed changes are summarized below.

	Affordable Multi-Family Residential Units	**Commercial Floor Area**
Previously Proposed	570 units (for 60 percent or less AMI)	47,580 square feet (sq. ft.)
Currently Proposed	537 units (for 30 percent or less and 60 percent or less AMI)	42,372 sq. ft.

ATTACHMENT 2-A.

DETERMINATION OF ELIGIBILTY SUBMITTAL

REF-13

MUNEKIYO HIRAGA
Planning Project Management Sustainable Solutions

Michael T. Munekiyo
CHAIRMAN
Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy
VICE PRESIDENT
Tessa Munekiyo Ng
VICE PRESIDENT

July 30, 2021

Dean Uchida, Director
Attention: Katia Balassiano
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

SUBJECT: Determination of Eligibility for Proposed Waipahu Transit-Oriented Community Development Project at Waipahu, O'ahu, Hawai'i

Dear Mr. Uchida:

Kamehameha Schools (KS) and Highridge Costa Development Company (HC) are proposing to develop the Proposed Waipahu Transit-Oriented Community Development Project. The project is a mixed-use project consisting of 570 multi-family affordable rental housing units, approximately 47,560 square feet (sq.ft.) of retail space, and related infrastructure improvements, and will be located in the close proximity of the future Pouhala Transit Center Station in Waipahu, O'ahu, Hawai'i. The retail portion of the project will be owned by KS, but will be developed by HC on KS's behalf. HC will own and develop the affordable housing units.

The residential component will consist of 100 percent affordable rental units, including units limited to seniors earning 60 percent or less of Area Median Income (AMI) and units limited to households and families earning 60 percent or less of AMI. HC, as the developer of the affordable housing portion of the project, proposes to seek an affordable housing project approval from the Council of the City and County of Honolulu pursuant to Chapter 201H, Hawai'i Revised Statutes (HRS) to allow greater design flexibility and cost savings for the project.

We are writing to you today to request determination on the subject project's eligibility for the Department of Planning and Permitting's Chapter 201H program. This package includes the following information for your review and consideration:

I. 201H Determination of Eligibility Form

Maui: 305 High Street, Suite 104 • Wailuku, Hawaii 96793 • Tel: 808.244.2015 • Fax: 808.244.8729
Oahu: 735 Bishop Street, Suite 321 • Honolulu, Hawaii 96813 • Tel: 808.983.1233
www.munekiyohiraga.com

II. Written Project Information
1. Project Description
2. Flood Conditions and Letter of Map Revision (LOMR) Application
3. Chapter 343, HRS Environmental Review Compliance
4. Community Outreach Summary

III. Exhibits
Exhibit A. Letter of Authorization
Exhibit B. Landownership Documentation
Exhibit C. Letter of Map Revision Application

We very much appreciate your assistance with this respect. If additional information or clarification is needed, please feel free to contact me at (808) 983-1233.

Very truly yours,

Yukino Uchiyama

Yukino Uchiyama, AICP
Senior Associate

YU:lh
Attachments
Cc: Mohannad Mohanna, Highridge Costa Development Company (via email: moe.mohanna@housingpartners.com)
Duff Janus, Kamehameha Schools (via email: jojanus@ksbe.edu)
K:\DATA\Highridge\Waipahu AH\Applications\Waipahu AH Eligibility Determination letter.doc

REF-14

I. 201H DETERMINATION OF ELIGIBILITY FORM

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING AND PERMITTING (DPP)

201H Program Determination of Eligibility Form

Applicant Name and Contact Information	Highridge Costa Development Company Attn: Monte Heaton 330 W. Victoria Street, Gardena, CA 90248 Phone: (424)258-2910 Email: monte.heaton@housingpartners.com
Project Name, Address, and Tax Map Key	Waipahu Transit-Oriented Community Development Project Address: Hikimoe Street/Waipahu Depot Street, Waipahu, Hawai'i TMKs: (1)9-4-013:046 and (1)9-4-014:005, 014 (por.), 058, 059, 060, 061, 062, 063, 064, 065, 066, and 067. The project also includes a cul-de-sac road stub (TMK (1)9-4-014 (por.)).

1. Housing Affordability

i. Target Households and Affordable Units

Affordable Units		
Restricted at % of AMI*	Number of units	Percent of total units
60.00% of AMI	570 units	100.00%
0.00% of AMI	____ units	0.00%
0.00% of AMI	____ units	0.00%
Special Housing Needs**	____ units	0.00%
Total Affordable Units	570 **units**	
Market Rate Units	0 units	0.00%
Total Number of Units	570 **units**	0.00%

*AMI = Area Median Income per current HUD standards

** Describe the Special Housing Need of the tenants below, if applicable

Not applicable.

ii. Length of Affordability Commitment

Length of affordability restrictions: 60.0 Years

REF-15

2. **Site Control Status**

☐	Own site - fee simple	
☐	Executed ground lease	Expires on:
☐	Option to purchase	Expires on:
☐	Option to lease	Expires on:
☒	Other	Describe: The landowner, Kamehameha Schools (KS), and the Applicant are in the process of negotiating a lease option agreement for the subject parcels. See Exhibit "A" and Exhibit "B".
		Expires on:

Submit evidence of site control for the project, e.g., deed, lease, agreement of sale, option agreement, or comparable document.

3. **Environmental Disclosure**

The project must comply with Chapter 343, HRS. If an Environmental Assessment (EA) or Environmental Impact Statement (EIS) has been published or will be published, identify the date of publication in the Office of Environmental Quality Control (OEQC) bulletin. Identify the accepting agency. Submit a copy of the most recent (a) EA with FONSI, (b) EIS, or (c) exemption determination.

Accepting Agency:	Department of Planning and Permitting	
Check if applicable		**Date of publication or estimated completion date.**
☐	No EA or EIS is required	(specify reason)
☐	EA status and finding	
☐	EIS status	
☐	NEPA compliance status	

See Section II-3, Chapter 343, HRS Environmental Review Compliance

II. WRITTEN PROJECT INFORMATION

1. PROJECT DESCRIPTION

a. *Project Location*

The project site is located in Waipahu, O'ahu, Hawai'i and comprised of parcels identified as TMK (1)9-4-013:046 and (1)9-4-014:005, 014(por.), 058, 059, 060, 061, 062, 063, 064, 065, 066, and 067. The project will also include a cul-de-sac road stub which is a portion of the public right-of-way identified as TMK (1)9-4-014. See **Figure 1** and **Figure 2**. The City and County entered into a Purchase and Sale Agreement for the cul-de-sac road stub with Bishop Estate, beneficiaries of which are Kamehameha Schools (KS), on June 25, 2021 and the transaction is planned to close on August 24, 2021. See **Exhibit "A"** and **Exhibit "B"**.

The total area for the project site is approximately 3.84 acres. The project site is bounded by Waipahu Depot Street to the west, Farrington Highway to the south, and various commercial buildings and single-family residential neighborhood to the east and the north. It is noted that the existing building located along southern boundary of TMK (1)9-4-014:014 will remain as is and that portion of the parcel will be subdivided into a smaller lot that will not be part of the project.

b. *Preliminary Project Plan*

Highridge Costa Development Company (hereinafter referred to as "Applicant") was selected by KS as the developer of the proposed Waipahu Transit-Oriented Community Development Project. The proposed mixed-use Waipahu Transit-Oriented project consists of 570 multi-family affordable rental housing units, approximately 47,560 square feet (sq.ft.) of retail space, and related infrastructure improvements, and will be located in the close proximity of the future Pouhala Transit Center Station. The retail portion of the project will be owned by KS, but will be developed by the Applicant on KS's behalf. The Applicant will own and develop the affordable housing units.

Three (3) residential buildings will be built as part of the project, of which, one (1) of the buildings located on the mauka side of Hikimoe Street will be limited to seniors earning 60 percent or less of Area Median Income (AMI), and two (2) other buildings located on the makai side of Hikimoe Street will be for families/households earning 60 percent or less of AMI. The retail spaces will be located on the ground floor. See **Figure 3** and **Figure 4**. The breakdown of the housing unit types are summarized in **Table 1**.

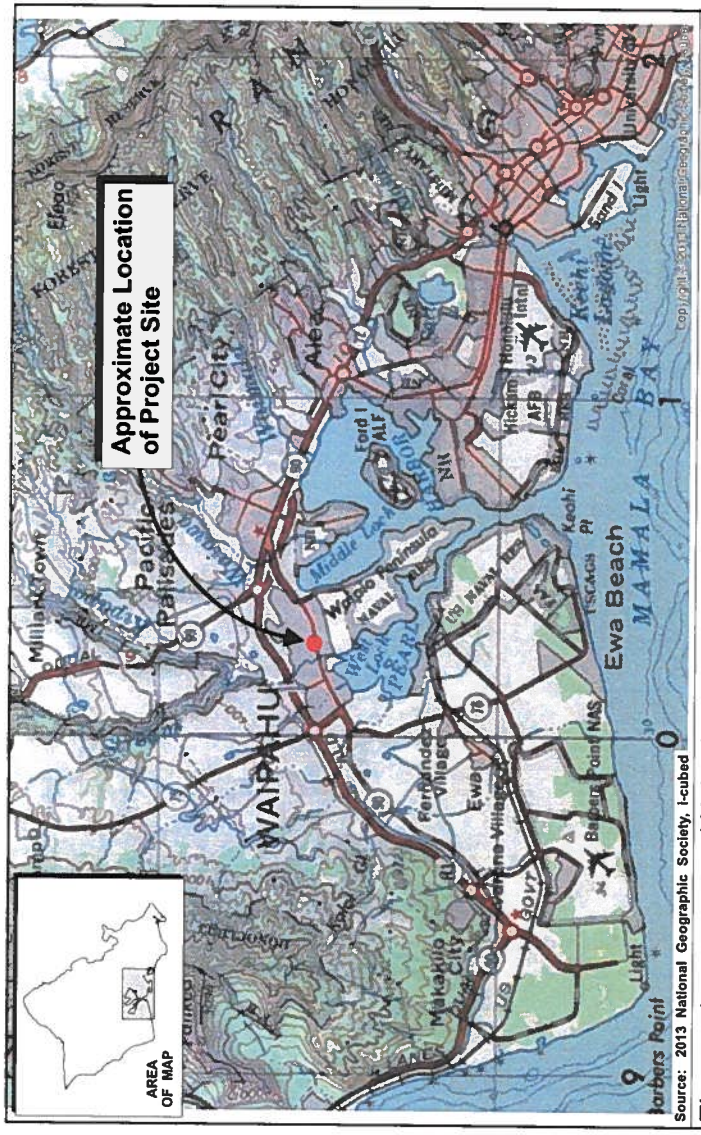


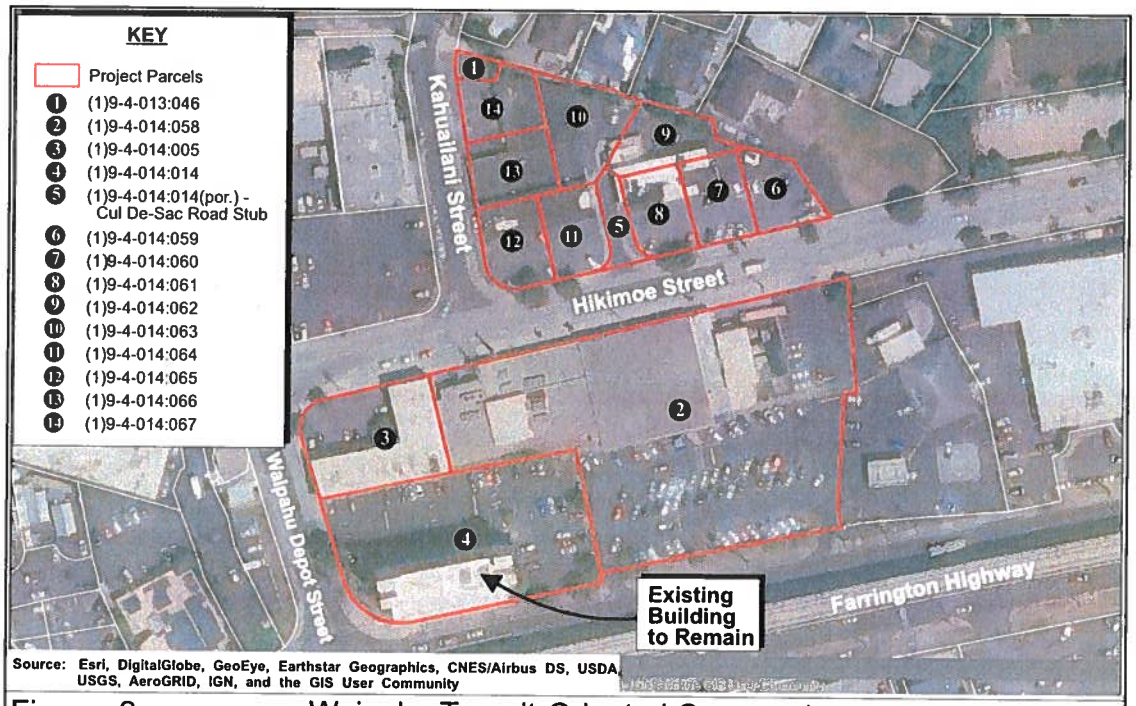
Figure 1
Waipahu Transit-Oriented Community Development Project
Regional Location Map

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge/Waipahu Art Applications/Figures/Regional Location Map

REF-17



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 2

Waipahu Transit-Oriented Community Development Project

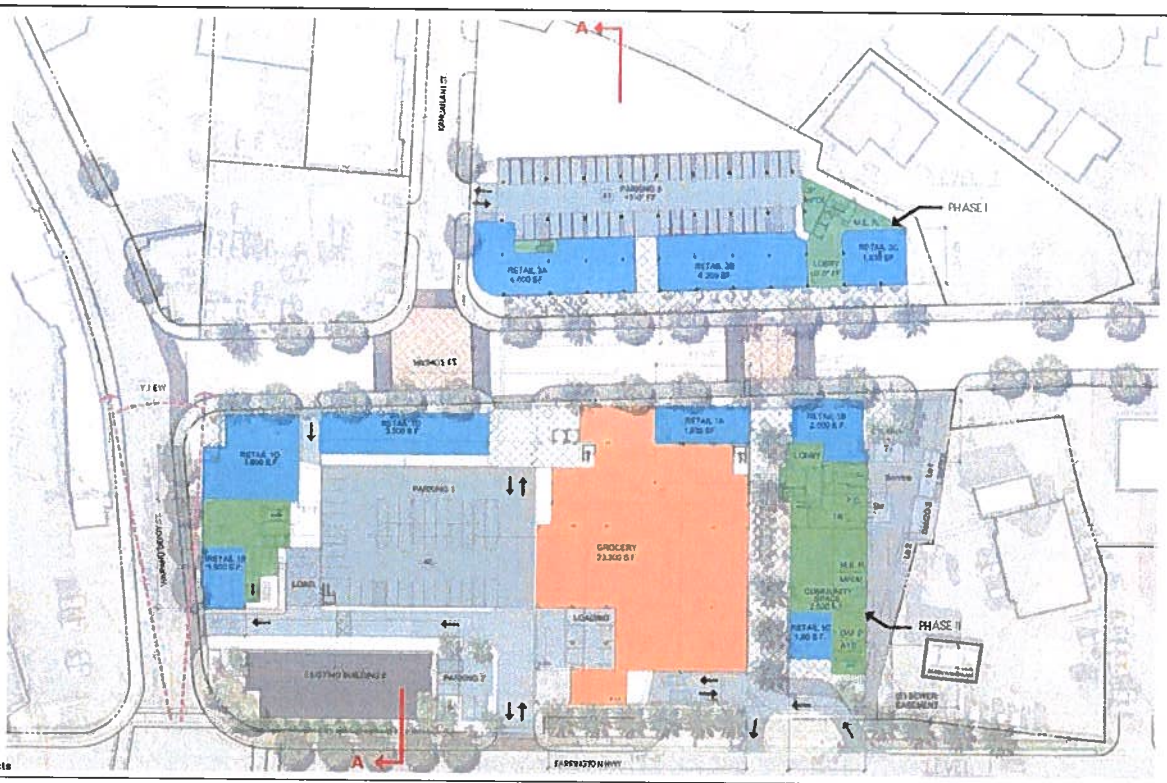
Project Location Map

0 27.5 55 110 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH\Applications\Figures\Project Location Map



Source: SVA Architects

Figure 3

Waipahu Transit-Oriented Community Development Project

Ground Level Plan

NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

REF-18

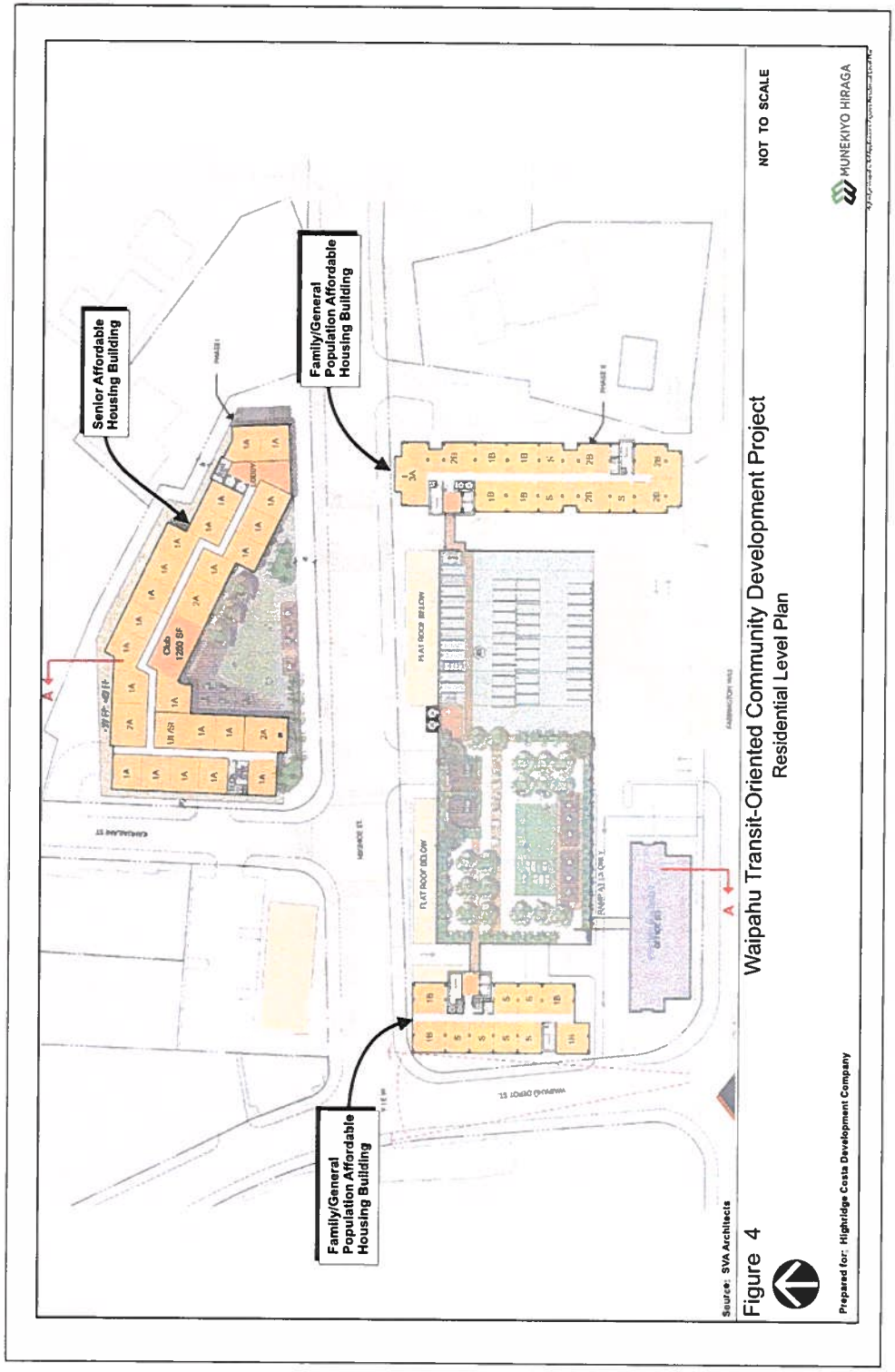


Table 1. Proposed Affordable Housing Units

Unit Type	No. of Units
Senior Affordable Housing Units	
1-bedroom	118 units
2-bedroom	15 units
Subtotal	**133 units**
Family/General Population Affordable Housing Units	
Studio	171 units
1-bedroom	152 units
2-bedroom	95 units
3-bedroom	19 units
Subtotal	**437 units**
Total	**570 units**

c. *Land Use Designations and Entitlement Requirements*

The project site is designated "Urban" by the State Land Use Commission, "BMX-3, Community Business Mixed Use" by the City and County of Honolulu, Land Use Ordinance (LUO), and located within the City and County of Honolulu's Transit-Oriented Development Special District. The project is located outside of the Special Management Area (SMA).

As a 100 percent affordable housing project, the Applicant proposes to seek an affordable housing project approval from the Council of the City and County of Honolulu pursuant to Chapter 201H, Hawai'i Revised Statutes (HRS). The 201H application process would allow the Applicant to amend or waive certain conditions relating to planning, zoning, construction standards for subdivisions, development, and improvement of land, and the construction of dwelling units thereon.

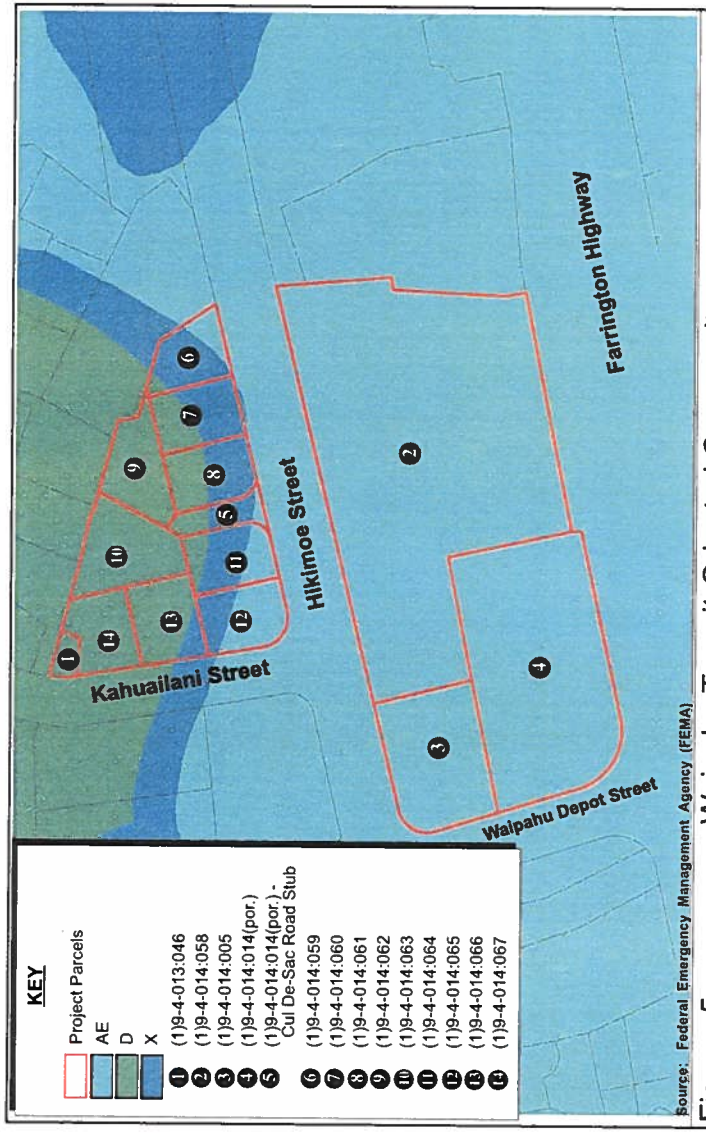
The proposed project will be funded, in part, by the State of Hawai'i's Rental Housing Revolving Fund (RHRF). In addition, offsite infrastructure improvements (i.e. driveways construction) are anticipated to be required for the proposed project, which will affect public right-of-way lands.

The use of State funds and potential off-site improvements affecting public rightof-way lands trigger compliance with environmental review requirements pursuant to Chapter 343, HRS. A detailed discussion related to the Chapter 343, HRS compliance is included below in **Section 3**.

d. *Flood and Tsunami Hazard*

The Flood Insurance Rate Map in the project vicinity designates the project site as being located within Zones "AE", "D", and "X". See **Figure 5**. Specifically, the Federal Emergency Management Agency (FEMA) describes that Flood Zone "AE" presents a 1 percent annual chance of flooding and Flood Zone "X" to be areas of

REF-19



minimal flood hazard. Flood Zone "D" is used for areas where there are possible but undetermined flood hazards. It is noted that a portion of the project site within Zone "AE" is located within the floodway designated by FEMA. Due to the age of the study that was used to determine the floodway designation, KS has submitted a Letter of Map Revision (LOMR) application to the Department of Planning and Permitting (DPP) to propose an amendment to the existing floodway limits. A summary of the LOMR application is further discussed in **Section 2**.

According to the National Oceanic and Atmospheric Administration (NOAA) Tsunami Evacuation Maps, the subject property is located beyond the limits of dangerous wave action and evacuation boundaries.

e. ***Infrastructure***

The project site is located in the existing service limits of the City and County of Honolulu's water and wastewater systems, as well as the service limits of the private electrical, telephone, and cable television (CATV) services including Hawaiian Electric, Hawaiian Telcom, and Spectrum. The Applicant is in the process of initiating consultation with the Board of Water Supply, Department of Environmental Services, and the private service providers to understand the existing capacity of the infrastructure systems and if any improvements are required.

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REF-20

2. FLOOD CONDITIONS AND LETTER OF MAP REVISION (LOMR) APPLICATION

a. *Existing Flood Conditions*

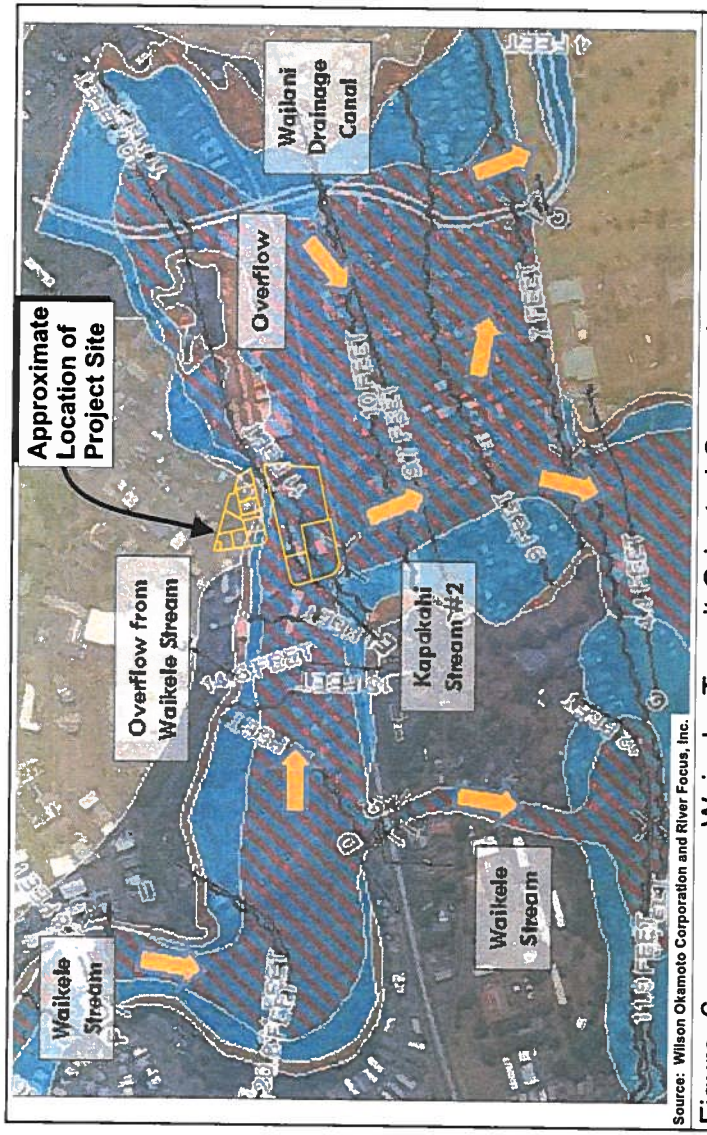
The project site is located within the floodway designated by the Federal Emergency Management Agency (FEMA). The Flood Insurance Rate Map (FIRM) in the project vicinity designates the project site as being located within Zones "AE", "X", and "D". Refer to **Figure 5**.

Historically, flood problems from Waikele Stream, located approximately 1,500 feet west of the project site, were severe in Waipahu Town. The City and County of Honolulu constructed a trapezoidal concrete channel in 1939, parallel to an existing earthen channel, to divert the stream and alleviate the flood conditions. The lower portion of Waikele Stream has been extended by siltation in the Pearl Harbor West Loch and a dense mangrove cover that has expanded over the years. Thus, the outlet of the stream is now well beyond the old railroad bridge where the earthen channel ends.

The flooding conditions are complex in Waipahu Town. During large flood events, overflow from Waikele Stream enters Kapakahi Stream (referred to as Kapakahi Stream #2 by FEMA). This flow intermingles with overflow from the Wailani Drainage Canal, along with local runoff. See **Figure 6**. The peak flows for Waikele Stream, Kapakahi Stream #2, and Wailani Drainage Canal in the effective FEMA Flood Insurance Study (2014) are listed in **Table 2**.

Table 2. Peak Flows from FEMA Flood Insurance Study

Flooding Source and Drainage Area			Peak Discharge (cfs)		
Source/Location	Drainage Area (sq.mi.)	10-Year	50-Year	100-Year	500-Year
Waikele Stream					
At Pacific Ocean	45.790	10,620	21,000	26,400	41,400
Downstream of H-1 Freeway	44.910	10,450	20,700	26,000	40,800
Kapakahi Stream #2					
Downstream limit of Study	0.329	---	---	12,712	---
Upstream limit of Study	0.109	---	---	11,971	---
Wailani Drainage Canal					
Downstream limit of Study	1.570	---	---	2,681	---
Upstream limit of Study	1.140	---	---	2,200	---



Source: Wilson Okamoto Corporation and River Focus, Inc.

Figure 6

Waipahu Transit-Oriented Community Development Project

FEMA Existing Condition Floodplain/Floodway Map with Flow Patterns Added

NOT TO SCALE

MUNEKIYO HIRAGA

Prepared for: Highridge Costa Development Company

Highridge/Waipahu AH Application/Figures/FEMA Existing Condition Floodplain/Floodway Map with Flow Patterns Added

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b. *Proposed Floodway Revision*

Although the dynamics of the complex flooding conditions in Waipahu Town are two-dimensional (2-D) in nature, the effective FEMA modeling uses a series of one-dimensional (1-D) models. The effective FEMA study for Waikele Stream and the town of Waipahu was completed in 1985 and consists of 1-D HEC-2 hydraulic models for the various study reaches. The U.S. Corps of Engineers' HEC-2 program is an old program that was replaced by HEC-RAS (River Analysis System) nearly 25 years ago.

A Letter of Map Revision (LOMR) application was submitted to the City and County of Honolulu, Department of Planning and Permitting (DPP) in January 2021 by Kamehameha Schools. As a technical supporting document, Wilson Okamoto Corporation and River Focus Inc. prepared the Waipahu Town Flood Study dated January 2021. See **Exhibit "C"**. This report provides updated flood analyses using newer methodologies and data sets, as follows:

- Updated hydrologic modeling using HEC-HMS (Hydrologic Modeling System), Version 4.5 (HEC, 2020)
- Newer, more detailed topographic data—NOAA LiDAR data for the overbanks and topographic/bathymetric data collected by field survey.
- Improved hydraulic analysis—Detailed 2-D hydraulic modeling performed using HECRAS (River Analysis System), Version 5.0.7 (HEC, 2016) that reflects the complex flood conditions in Waipahu.

Based on the updated flood analyses, the certified floodplain workmap and revised/annotated FIRM panels were prepared and included in the LOMR application. Refer to **Exhibit "C"**. The certified floodplain workmap indicates that the proposed project site is located largely outside of the revised floodway proposed by the LOMR application. See **Figure 7**.

The LOMR application is currently under review by FEMA.

c. *Future Flood Conditions*

University of Hawai'i Coastal Geology Group and Tetra Tech, Inc. developed the passive flooding model in 2017, which provides an initial assessment of low-lying areas susceptible to flooding by sea level rise. Passive flooding includes areas that are hydrologically connected to the ocean (marine flooding) and low-lying areas that are not hydrologically connected to the ocean (groundwater). The passive flooding map under the 3.2-foot Sea Level Rise scenario is shown in **Figure 8**.

The project site is located outside of the area susceptible to passive flooding from the 3.2-foot sea level rise.

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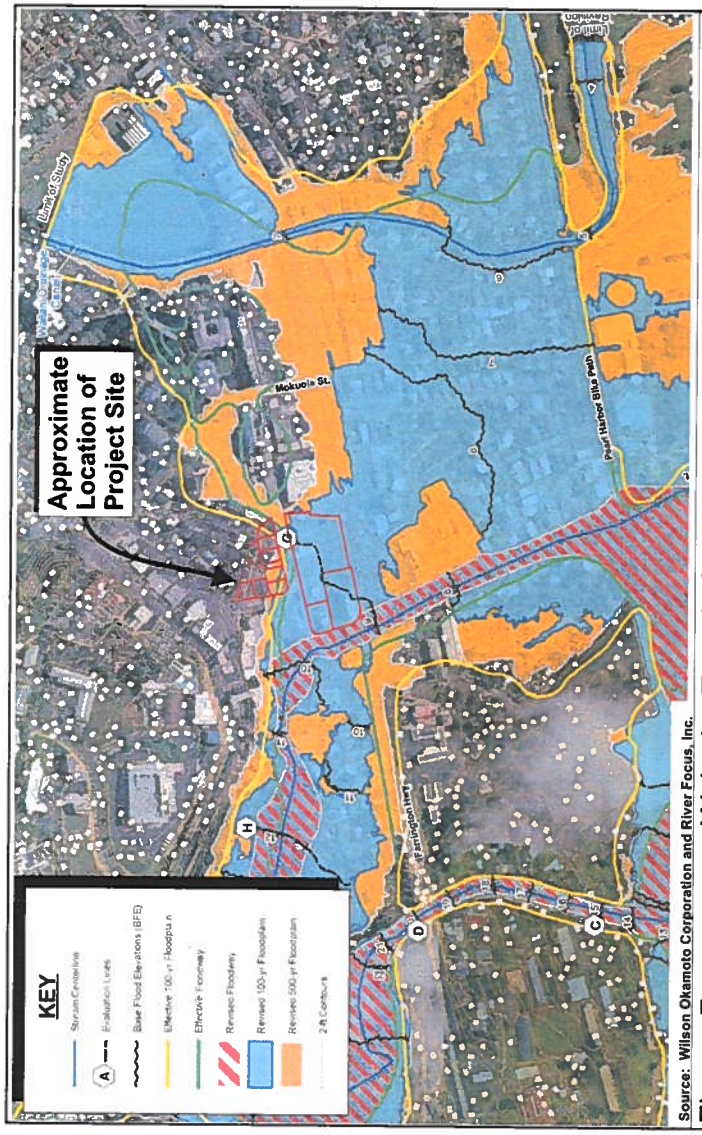

Figure 7
Waipahu Transit-Oriented Community Development Project
Certified Floodplain Workmap

Prepared for: Highridge Costa Development Company

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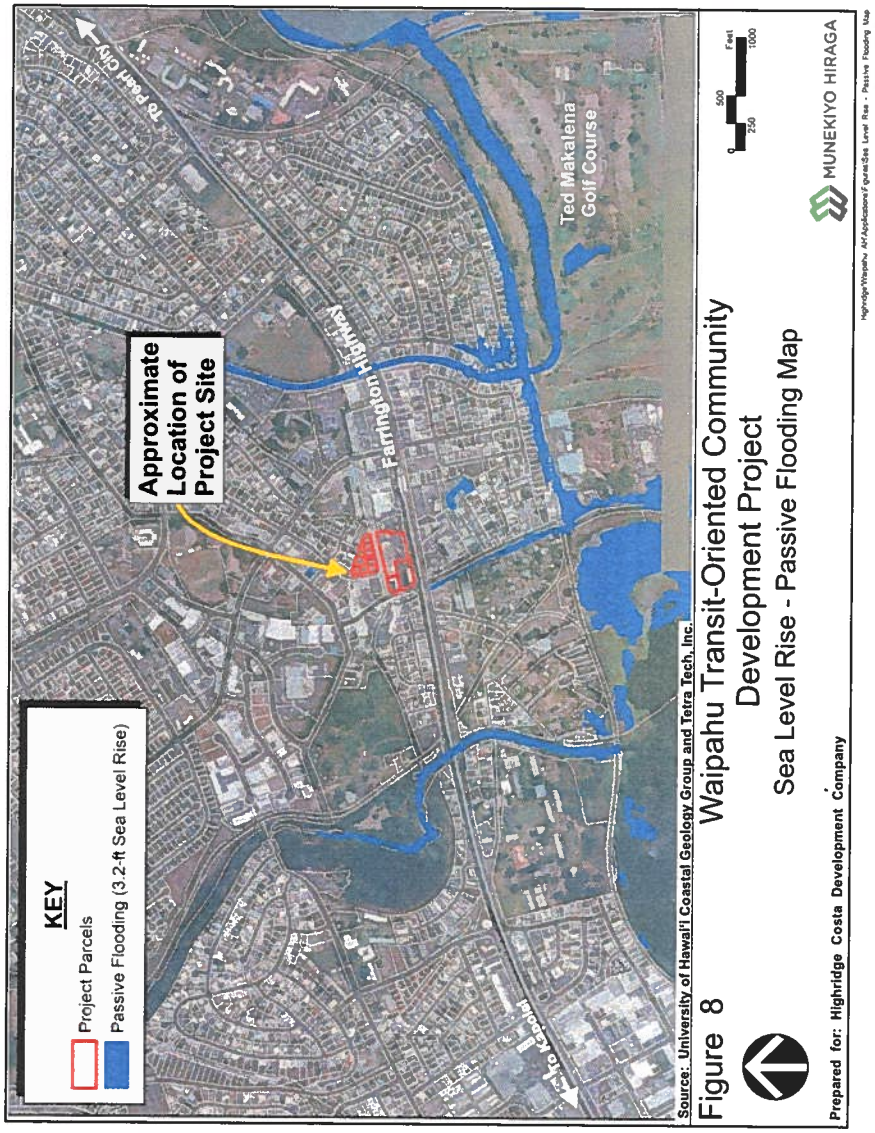

Source: University of Hawai'i Coastal Geology Group and Tetra Tech, Inc.

Figure 8 Waipahu Transit-Oriented Community Development Project Sea Level Rise - Passive Flooding Map

Prepared for: Highridge Costa Development Company

Highridge/Waipahu AH Applications/Figures/Sea Level Rise - Passive Flooding Map

3. CHAPTER 343, HRS ENVIRONMENTAL REVIEW COMPLIANCE

a. *Chapter 343, HRS Environmental Review Triggers*

The proposed project will be funded, in part, by the State of Hawai'i's Rental Housing Revolving Fund (RHRF). In addition, offsite infrastructure improvements (i.e. driveways construction) are anticipated to be required for the proposed project, which will affect public right-of-way lands.

The use of State funds and potential offsite improvements affecting public right-of-way lands trigger compliance with environmental review requirements pursuant to Chapter 343, Hawai'i Revised Statutes (HRS). Chapter 343, HRS compliance can be achieved through preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS), or issuance of an EA exemption determination.

b. *Chapter 343, HRS EA Exemption Eligibility*

Chapter 11-200.1-15(c)(10), Hawai'i Administrative Rules (HAR) establishes that affordable housing projects may be eligible for an EA exemption if it meets four (4) criteria. The project's eligibility for an EA exemption based on the four (4) criteria is analyzed as follows:

Chapter 11-200.1-15(c)(10) New construction of affordable housing, where affordable housing is defined by the controlling law applicable for the state or county proposing agency or approving agency, that meets the following:

(A) Has the use of state or county lands or funds or is within Waikiki as the sole triggers for compliance with chapter 343, HRS;

Response: Applicable. As noted previously, the project's triggers for complice with Chapter 343, HRS are the use of State funds and the potential use of State/County lands.

(B) As proposed conforms with the existing state urban land use classification;

Response: Applicable. The project site is designated as "Urban" by the State Land Use Commission.

(C) As proposed is consistent with the existing county zoning classification that allows housing; and

Response: Applicable. The project site is designated as "BMX-3, Community Business Mixed Use" by the City and County of Honolulu, Land Use Ordinance (LUO). According to Section 21-3.120(a), LUO, the purpose

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of the business mixed use districts is to recognize that certain areas of the city have historically been mixtures of commercial and residential uses, occurring vertically and horizontally and to encourage the continuance and strengthening of this pattern. The proposed project is consistent is the intent of business mixed use districts as commercial and residential uses will be vertically mixed within the project.

Specifically, within BMX-3 zoning district, multi-family dwellings are a permitted use subject to standards in Article 5, Chapter 21, LUO (Specific Use Development Standards), which states:

> *Sec. 21-5.210 Dwellings, multifamily. In the BMX-3 zoning district, where multifamily dwellings are integrated with other uses, pedestrian access to the dwellings must be physically, mechanically, or technologically independent from other uses and must be designed to enhance privacy for residents and their guests.*

The Applicant will comply with this standard and pedestrian access to the multi-family dwellings will be physically, mechanically, and technologically independent from other commercial uses.

(D) As proposed does not require variances for shoreline setbacks or siting in an environmentally sensitive area, as stated in section 11-200 .1-13 (b) (11).

Response: Applicable. The project will not require variances for shoreline setbacks or for siting in an environmentally sensitive area. The project site is located within the effective floodway designated by the Federal Emergency Management Agency (FEMA) and designated as Flood Zones "AE", "X", and "D". Refer to **Figure 5**. As discussed in **Section 2**, the Applicant is currently proposing a floodway revision via a Letter of Map Revisions (LOMR) application. The rationale of the proposed floodway revision is summarized in Section 2 and detailed in **Exhibit "A"**. With the proposed floodway revision, the proposed structures would be largely located outside of the floodway. Refer to **Figure 7**.

The Applicant will comply with applicable development standards and obtain any flood-related permits, as may be required.

c. ***Request***

Based on the information presented above, we respectfully request the Department of Planning and Permitting (DPP)'s consideration and determination of the proposed Waipahu Transit-Oriented Community Development Project's eligibility for an EA exemption.

4. COMMUNITY OUTREACH SUMMARY

Kamehameha Schools (KS) and Highridge Costa Developing Company (Applicant), have initiated community outreach efforts for the proposed project. **Table 3** below summarizes the community outreach efforts that have been done to date.

Table 3. Community Outreach Summary

Date	Stakeholder	Summary
11/2/2020	Brandon Elefante, Councilmember, District 8	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember mentioned the community might be concerned about the height, but that concern may be offset by the desire for affordable housing.
11/5/2020	Henry Aquino, House Representative, District 38	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Representative expressed concern over traffic that may be generated by the project.
11/23/2020	Clarence Nishihara, Senator, District 17	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
12/8/2020	Heidi Tsuneyoshi, Councilmember, District 2	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember commented that the look should blend with the existing community and the project should be respectful to the local people.
12/14/2020	Tommy Waters, Council Chair, District 4	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Council Chair commented that the community would like to see Waipahu as a destination and was supportive of affordable housing at or below 60% AMI.
12/21/2020	Augie Tulba, Councilmember, District 9	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember was supportive of revitalization of Waipahu.
12/21/2020	Andrea Tupola, Councilmember, District 1	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember noted there are opportunites for food systems, urban farming, and clean energy for the project.
12/21/2020	Harrison Rue, Community Building and TOD Administrator, DPP	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. Mr. Rue mentioned that added parking and affordable units could offset community concerns of height.

12/21/2020	Kathy Sokugawa, Former Acting Director, DPP	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The former Acting Director commented that it is a thoughtful design that is true to Waipahu, but suggested more diversity in income levels. She also wanted the project team to be careful with adding green space to renderings.
1/15/2021	Carol Fukunaga, Councilmember, District 6	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/21/2021	Radiant Cordero, Councilmember, District 7	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/4/2021	Evelyn Ahlo, Executive Director, Hawaii Plantation Village	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/23/2021	Donnie Juan (Executive Director) & Boardmembers, Filipino Chamber of Commerce	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/9/2021	Chris Borden, Times Supermarket	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/20/2021	Denise Iseri-Matsubara, Executive Director, Hawaii Housing Finance & Development Corporation (HHFDC)	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/28/2021	Esther Kiaaina, Council Vice-Chair, District 3	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
12/9/2020	Roy Takumi, Representative, District 35	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/25/2021	Cory Chun, Waipahu Neighborhood Board Chair	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Chair expressed concern over older residents having problems with project height. The Chair also noted the area would benefit from the proposed improvements.
4/13/2021	Waipahu Neighborhood Board	The Applicant met with the Waipahu Neighborhood Board in person and provided an explanation of the project layout through a presentation. Board Members voiced their support of affordable housing but noted worries about the proposed height of the project.
4/22/2021	Town Hall Meeting	The Applicant conducted an online town hall meeting via Microsoft Teams open to all community members. A total of 58 attendees registered for the meeting. The Applicant provided an explanation of the project layout through a presentation and also provided time for a question and answer session. The community largely voiced their support for affordable housing but there were a few worries about the proposed height of the project.

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III. EXHIBITS

EXHIBIT A.

Letter of Authorization

REF-26

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KAMEHAMEHA SCHOOLS®

July 2, 2021

Dean Uchida, Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

SUBJECT: Waipahu Transit-Oriented Community Development Project at Waipahu, O'ahu, Hawai'i

Dear Mr. Uchida:

Kamehameha Schools ("**KS**") hereby authorizes Highridge Costa Development Company, LLC ("**Highridge**"), as applicant, and its consultant, Munekiyo Hiraga, to prepare, file and process a Request for Determination of Eligibility for the 201H Affordable Housing Program for the Waipahu Transit-Oriented Community Development Project ("**Project**") which is proposed to be developed on the Property (described below) by Highridge. KS and Highridge are in the process of negotiating leases of applicable portions of the Property to Highridge. We understand Highridge will notify you if the parties reach final agreement on any lease(s).

Highridge proposes to develop the Project on land identified by tax map key numbers (1) 9-4-013-046, (1) 9-4-014-005, -014 (por.), -058, -059, -060, -061, -062, -063, -064, -065, -066, and -067, and on a cul-de-sac stub portion of Hikimoe Street identified by tax map key number (1) 9-4-014 (por.) (collectively, the "**Property**"). KS owns all of the Property except for the Hikimoe Street stub.

As to the Hikimoe Street stub (more particularly identified as Lot 24-B, being approximately 2,404 square feet, as shown on Subdivision Map approved by the Department of Planning and Permitting, City and County of Honolulu on May 15, 2020, DPP File No. 2020/SUB-68), KS has entered into a contract to purchase said parcel from the City and County of Honolulu. A copy of the Purchase and Sale Agreement dated June 25, 2021 is enclosed. KS' purchase of the Hikimoe Street stub is anticipated to close on or about August 24, 2021.

Please note that this letter shall not be construed as a representation or warranty by KS as to any matters set forth in the Request for Determination of Eligibility for the 201H Affordable Housing Program or any other materials, correspondence, or information submitted to or discussed with you by any party in connection with the proposed Project.

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This letter has been executed by or on behalf of the Trustees of the Estate of Bernice Pauahi Bishop in their fiduciary capacities as said Trustees, and not in their individual capacities. No personal liability or obligation under this letter shall be imposed or assessed against said Trustees in their individual capacities.

Should you have any questions, or require additional information, please do not hesitate to contact Duff Janus at (808) 541-5378.

Sincerely,

DocuSigned by
Walter Thoemmes
39D6BA5A2AB7452

Walter Thoemmes
Managing Director, Commercial Real Estate

cc: Mohannad Mohanna, Highridge Costa Development Company
Yukino Uchiyama, Munekiyo Hiraga

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PURCHASE AND SALE AGREEMENT

THIS PURCHASE AND SALE AGREEMENT (this "*Agreement*") dated as of June 25, 2021 (the "*Effective Date*"), is made by and between **LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, MICAH A. KANE, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop**, whose business and post office address is 567 South King Street, Suite 200, Honolulu, Hawai'i 96813 (collectively, the "*Buyer*"), and the **CITY AND COUNTY OF HONOLULU**, a municipal corporation of the State of Hawai'i, by and through its Department of Land Management, whose address is 558 South King Street, Honolulu, Hawai'i 96813 (the "*Seller*").

RECITALS

1. Seller is the fee simple owner of Lot 24-B, being approximately 2,404 square feet, as shown on Subdivision Map approved by the Department of Planning and Permitting, City and County of Honolulu ("*DPP*") on May 15, 2020, DPP File No. 2020/SUB-68 (the "*Property*"). The Property is formerly a portion of Lot 24, area 36,788 square feet, more or less, as shown on Map 6, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawai'i with Land Court Application No. 779 (amended) of the Trustees under the Will and of the Estate of Bernice Pauahi Bishop, deceased, which Lot 24 was described in Certificate of Title 78,207, and deregistered from the Land Court System pursuant to Hawaii Revised Statutes Section 501-261.5 by Document No. A-76480488.

2. Buyer is the fee simple owner of those certain parcels of land located in Waikele, District of Ewa, City and County of Honolulu, State of Hawai'i, which parcels are in the vicinity of the Property and identified by Tax Map Key Nos. (1) 9-4-014-059, -060, -061, -062, -063, -064, -065, -066, -067 and (1) 9-4-013-046 (collectively, the "*KS Parcels*"). Buyer desires to redevelop the KS Parcels and the Property into a mixed-use affordable housing development.

3. Seller has agreed to sell, and Buyer has agreed to purchase, the Property for the consideration and on the terms set forth in this Agreement.

AGREEMENT

NOW, THEREFORE, Buyer and Seller hereby agree as follows:

1. **DEFINITIONS**. The following terms shall have the following definitions in this Agreement:

(a) "*Bureau*": The Bureau of Conveyances of the State of Hawai'i.

(b) "*Closing*" or "*Closing Date*": The date when the Deed is recorded in the Bureau, as more particularly described in Section 13.

(c) "*Deposit*": The sum of One Thousand and No/100 Dollars ($1,000.00) to be deposited with Escrow Agent by Buyer as more particularly described in Section 4.

(d) "*Deed*": The quitclaim deed which is to be used by Seller to convey the Property to Buyer, which deed shall be in substantially the form attached hereto and made a part hereof as Exhibit "B".

(e) "*Escrow Agent*": Title Guaranty Escrow Services, Inc.

(f) "*Event of Default*": Any of the events of default described in Section 15(a).

(g) "*Purchase Price*": The sum of Forty-Seven Thousand Five Hundred and No/100 Dollars ($47,500.00).

(h) "*Subdivision Map*": The subdivision map prepared by Wilfred Y.K. Chin, Land Surveyor, with Controlpoint Surveying, Inc., dated March 3, 2020 and approved by DPP on May 15, 2020, DPP File No. 2020/SUB-68. The Subdivision Map is attached hereto as Exhibit "A".

(i) "*Title Company*": Title Guaranty of Hawaii, LLC., 235 Queen Street, Honolulu, Hawai'i 96813, Attention Barbara Paulo.:

(j) "*Title Policy*": a title insurance policy for the Property in the face amount of the Purchase Price (or such other amount as agreed to by Buyer) insuring title to the Property in Buyer, in form and content acceptable to Buyer, subject only to the Permitted Exceptions.

(k) "*Title Report*": The preliminary title report for the Property to be issued by the Title Company.

2. **CONVEYANCE OF THE PROPERTY**. Subject to the terms, covenants and conditions set forth in this Agreement, Seller hereby agrees to sell to Buyer, and Buyer hereby agrees to purchase from Seller, the Property, together with the improvements, fixtures, appurtenant easements, and other appurtenant real property interests, on the Closing Date and at the Purchase Price (the "*Transaction*").

3. **ESCROW**. An executed copy of this Agreement shall be delivered to Escrow Agent by Buyer within five (5) business days of the Effective Date, and the parties hereby instruct Escrow Agent to act in accordance with the terms of this Agreement. Buyer and Seller shall execute such further escrow instructions as may be required by Escrow Agent to consummate the Transaction, provided that if there is any inconsistency between such escrow instructions and this Agreement, this Agreement shall control.

4. **DEPOSIT**. Buyer shall make the Deposit with Escrow Agent within five (5) business days following the Effective Date. No interest shall accrue on the Deposit. The Deposit shall be applied to the Purchase Price at Closing.

5. **PROPERTY CONDITION**. Except as provided in the Deed, Buyer and Seller each understand and acknowledge that the Property is being conveyed, and Buyer agrees to accept the Property in "AS IS, WHERE IS" condition, and "WITH ALL FAULTS AND DEFECTS," with no representations or warranties by Seller and no performance of any obligations by Seller after Closing, except as otherwise provided in this Agreement.

6. **TITLE MATTERS**. Within ten (10) days of the Effective Date, Buyer shall cause the Title Company to prepare the Title Report and deliver the same to the parties for their review. Buyer shall have until the fourteenth (14th) business day after Buyer receives the Title Report to examine title to the Property as shown in the Title Report and to furnish Seller with a written statement of Buyer's title exceptions. Seller shall respond in writing to such statement within ten (10) calendar days of Buyer's

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written statement with a statement as to whether Seller will cure or cause to be cured all title exceptions not approved by Buyer. Seller's failure to deliver Seller's response to Buyer within such time period shall be deemed to constitute Seller's election to satisfy or cure all of the matters set forth in Buyer's title objection notice. Buyer shall have thirty (30) days after receipt of Seller's response to Buyer's title objection notice to either (a) deliver written notice to Seller approving Seller's response (or Seller's deemed response), in which case Seller shall, prior to Closing, remove, cure or cause the Title Company to insure over to the reasonable satisfaction of Buyer, as applicable, the matters set forth in Seller's response in the manner set forth therein, if applicable, and the matters set forth in Buyer's title objection notice which are not addressed in Seller's response shall, in addition to the encumbrances and exceptions noted in the Title Report not disapproved by Buyer, be deemed to constitute the "**Permitted Exceptions**", or (b) terminate this Agreement, whereupon the Deposit shall be refunded to Buyer. Notwithstanding the foregoing, Seller shall be obligated to pay or cause to be removed as an exception from the Title Report any mortgage, security deed, monetary judgment, security interest, mechanics' lien, delinquent tax or assessment or similar encumbrance of a monetary nature at or before Closing. Buyer may elect to consummate the transaction hereby contemplated despite the existence of uncured defects, but such actions shall not constitute a waiver of Buyer's rights under this Agreement, all of which shall survive Closing. Buyer shall have the right to approve or disapprove additional title exceptions until Closing as to title matters not referred to in the Title Report which are first discovered by or disclosed to Buyer after receipt of the Title Report, but except as set forth herein Seller shall have no obligation to cure any such matters. All title exceptions which Buyer does not approve of in writing shall be deemed disapproved.

7. [INTENTIONALLY OMITTED].

8. **SELLER'S REPRESENTATIONS**. Seller makes the following representations and warranties to Buyer, which representations and warranties are true and correct as of the Effective Date and will be true as of the date of Closing:

(a) Seller is a political subdivision of the State of Hawai'i.

(b) Seller has all requisite capacity, power and authority to enter into this Agreement, and to consummate the Transaction in accordance with the terms hereof.

(c) All documents to be executed by Seller pursuant to this Agreement are, and at Closing will be: (i) duly authorized, executed and delivered by Seller; (ii) legal, valid and binding obligations of Seller; and (iii) not in violation of the terms of any agreement or undertaking to which Seller is a party or by which Seller is bound or otherwise subject.

9. **BUYER'S REPRESENTATIONS**. Buyer makes the following representations and warranties to Seller, which representations and warranties are true and correct as of the Effective Date and will be true as of the date of Closing:

(a) Buyer has all requisite capacity, power and authority to enter into this Agreement and consummate the Transaction in accordance with the terms hereof.

(b) All documents to be executed by Buyer pursuant to this Agreement are, and at Closing will be: (i) duly authorized, executed and delivered by Buyer; (ii) legal, valid and binding obligations of Buyer; and (iii) not in violation of the terms of any agreement or undertaking to which Buyer is a party or by which Seller is bound or otherwise subject.

10. **CLOSING OBLIGATIONS**.

(a) **Seller's Closing Obligations**. At least three (3) business days prior to the Closing Date, Seller shall:

(i) Deliver or cause to be delivered to Escrow Agent the following: (i) two (2) original counterparts of the Deed and all other documents necessary to consummate the Transaction, executed and notarized by Seller; (ii) a conveyance tax certificate executed by Seller (if required by the Bureau or Escrow Agent); (iii) Seller's closing costs and prorations as provided herein; and (iv) customary title affidavits as may be required by Escrow Agent to issue the Title Policy at Closing; and

(ii) Perform and satisfy, or cause to be performed and satisfied, all other obligations and conditions on the part of Seller to be performed or satisfied as of the Closing Date under this Agreement.

(b) **Buyer's Closing Obligations**. At least three (3) business days prior to the Closing Date, Buyer shall:

(i) Deliver or cause to be delivered to Escrow Agent (i) two (2) original counterparts of the Deed and all other documents necessary to consummate the Transaction, executed and notarized by Buyer; and (ii) a conveyance tax certificate executed by Buyer;

(ii) Deposit with Escrow Agent sufficient funds to cover the Purchase Price and Buyer's prorations and closing costs described herein;

(iii) Execute and acknowledge all documents necessary to consummate the Transaction; and

(iv) Perform and satisfy, or cause to be performed and satisfied, all other obligations and conditions on the part of Buyer to be performed or satisfied as of the Closing Date under this Agreement.

11. **CONDITIONS PRECEDENT TO CLOSING**.

(a) **Seller's Conditions Precedent**. Seller's obligation to close hereunder shall be subject to satisfaction of the following conditions (collectively, "***Seller's Conditions Precedent***"), any of which may be waived in whole or in part by Seller, in writing, at or prior to Closing:

(i) Buyer shall not be in default in the performance of any material covenant to be performed by Buyer under this Agreement; and

(ii) All representations and warranties made in this Agreement by Buyer shall be true and correct in all material respects as of the Effective Date and of the Closing Date.

(b) **Buyer's Conditions Precedent**. Buyer's obligation to close hereunder shall be subject to satisfaction of the following conditions (collectively, "***Buyer's Conditions Precedent***"), any of which may be waived in whole or in part by Buyer, in writing, at or prior to Closing:

(i) Seller shall not be in default in the performance of any material covenant to be performed by Seller under this Agreement;

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(ii) All representations and warranties made in this Agreement by Seller shall be true and correct in all material respects as of the Effective Date and of the Closing Date;

(iii) The Title Company shall have irrevocably and unconditionally committed to issue to Buyer, effective as of the Closing Date, the Title Policy; and

(iv) The status and condition of the Property shall not have changed in any materially adverse manner following the Effective Date.

(c) **Failure of Conditions Precedent**. In the event that any of Seller's Conditions Precedent or Buyer's Conditions Precedent are not satisfied on or before the Closing Date, either party may (a) terminate this Agreement, whereupon the Deposit shall be refunded to Buyer, or (b) proceed with Closing as scheduled.

12. **CLOSING COSTS; PRORATIONS**. Expenses in connection with the Transaction contemplated by this Agreement shall be paid as follows:

(a) **Seller's Costs**. Seller shall pay for Seller's attorney's fees.

(b) **Buyer's Costs**. Buyer shall pay for the following: (i) All notary fees; (ii) all recording and filing fees; (iii) all of Escrow Agent's fees; (iv) all of the premium for the Title Policy; (v) the conveyance tax due on the conveyance of the Property to Buyer; (vi) any extended coverage title insurance or special endorsements that Buyer elects to obtain; and (vii) Buyer's attorney's fees.

(c) **Prorations**. Real property taxes (for the fiscal tax year in which the Closing shall occur and subsequent fiscal tax years not yet due and payable), assessments, and utilities, if any, shall be prorated between Seller and Buyer as of the Closing Date.

13. **CLOSING**.

(a) **Closing Date**. The Closing Date shall be on a business day mutually selected by Buyer and Seller, but in no event later than sixty (60) days after the Effective Date (or, if such date is not a business day on which the Bureau is open for recording documents, then the next business day on which the Bureau is open for recording documents).

(b) **Closing Transaction**. Upon each party's performance of all of its respective closing obligations specified in this Agreement on or prior to the Closing Date for the Transaction, and notification of Escrow Agent of such performance by both parties, and upon Escrow Agent's receipt of the documents and funds required herein, Escrow Agent shall cause all recordable documents, including the Deed, to be recorded in the Bureau. Escrow Agent shall further arrange for or cause certified copies of any recordable documents, including the Deed, together with fully executed copies of all other Closing documents to be released to Buyer, within five (5) business days of the Closing. Risk of loss and responsibility for insurance coverage for the Property shall pass to Buyer as of the time and date of the Closing.

14. **POST-CLOSING OBLIGATIONS AND COVENANTS**. Provided that the Closing occurs, Seller and Buyer agree as follows with respect to the period following the Closing:

(a) **Consolidation**. Within a reasonable time after Closing, Buyer shall, at its sole cost and expense, prepare and submit the application to consolidate the Property with the KS Parcels. Buyer

shall use commercially reasonable efforts to obtain approval for such consolidation from DPP, in accordance with Chapter 22 of the Revised Ordinances of Honolulu.

(b) **Existing Sewer Line**. There is an existing 6-inch sewer line within the Property. Within a reasonable time after Closing, Buyer shall cause a clean out or manhole at the boundary line of the Property and Hikimoe Street to be installed at no cost to Seller as may be needed in connection with Buyer's contemplated redevelopment project.

(c) **Board of Water Supply**. After Closing, Buyer shall reasonably cooperate with the Board of Water Supply ("***BWS***"), as needed, to decommission BWS' existing water pipeline and four meters with the Property and to make alternative arrangements with BWS for water lines and meters in connection with Buyer's contemplated redevelopment project. Seller shall not be responsible for any expenses in connection therewith.

(d) **Survival**. The provisions of this Section 14 shall survive Closing.

15. **DEFAULT AND REMEDIES**.

(a) **Events of Default**. The following shall constitute "***Events of Default***" under this Agreement:

(i) Seller or Buyer shall fail to pay or deposit with Escrow Agent any sum of money when due under this Agreement and such failure shall not be cured within five (5) business days of the specified due date;

(ii) Seller or Buyer shall fail to observe or perform any other term or provision to be observed or performed by such party under this Agreement, and such failure is not cured or otherwise remedied within five (5) business days after receipt of notice of such failure or default is provided to the defaulting party;

(iii) Seller shall have created or permitted the creation of any title exceptions or encumbrances, such as easements or liens, to encumber the Property after the Effective Date without Buyer's prior written approval.

(b) **Remedies**.

(i) **Seller's Remedies; Liquidated Damages**. Subject to all of the conditions set forth in this Agreement, if Buyer fails to purchase the Property on the Closing Date in accordance with the terms of this Agreement as a result of an Event of Default by Buyer, and no Event of Default by Seller then exists, then Seller shall have the right to receive the Deposit from Escrow Agent as liquidated damages as Seller's sole and exclusive remedy in full settlement of any claim for damages at law, in equity, or otherwise. Seller and Buyer acknowledge the difficulty of determining actual damages in the event of a default by Buyer, that it is impossible to more precisely estimate Seller's damages upon such a default, that the return or retention of the Deposit is not intended as a penalty but as full liquidated damages and that such amount constitutes a good faith estimate of Seller's potential damages arising from a material default. Seller hereby waives any right of specific performance against Buyer, except as otherwise provided in this Agreement.

(ii) **Buyer's Remedies**. Subject to all of the conditions set forth in this Agreement, in the event that this Agreement is not consummated by the Closing Date due to an Event of Default by Seller, and no Event of Default by Buyer then exists, then Buyer shall be entitled to pursue all

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remedies available at law or equity, including but not limited to the termination of this Agreement, a refund of the Deposit, and specific performance of this Agreement. No remedy herein reserved to Buyer is intended to be exclusive of any other remedy, but each and every remedy shall be cumulative and shall be in addition to any other remedy given hereunder or now or hereafter existing at law or in equity.

(iii) **Remedies For Post-Closing Events of Default**. If any Event of Default shall occur with respect to either party after the Closing Date, and no Event of Default by the other party hereto then exists, then the non-defaulting party shall have all legal and equitable remedies available to the non-defaulting party due to the default, including specific performance. No remedy herein reserved to the non-defaulting party is intended to be exclusive of any other remedy, but each and every remedy shall be cumulative and shall be in addition to any other remedy given hereunder or now or hereafter existing at law or in equity.

16. **MISCELLANEOUS**.

(a) **Entire Agreement**. This Agreement is the sole agreement between the parties related to the Transaction and the Property. Any and all prior oral or written representations, correspondence, letters of intent and agreements are merged into and superseded by this Agreement and shall be of no force or effect. Any modifications of this Agreement shall be in writing and signed by the parties hereto.

(b) **Severability**. If any provision of this Agreement or its application to any party or circumstances shall be determined by any court of competent jurisdiction to be invalid and unenforceable to any extent, the remainder of this Agreement or the application of such provision to such person or circumstances, other than those as to which it is so determined invalid or unenforceable, shall not be affected thereby, and each provision hereof shall be valid and shall be enforced to the fullest extent permitted by law.

(c) **Applicable Law; Waiver of Trial by Jury**. This Agreement shall be construed and enforced in accordance with the laws of the State of Hawai'i. Any legal action hereunder shall be filed in the Hawai'i judicial system only, and Seller and Buyer hereby unconditionally submit themselves to the jurisdiction of the courts of the State of Hawai'i and the United States District Court for the District of Hawai'i. Seller and Buyer each hereby voluntarily and knowingly waives and relinquishes its right to a trial by jury in any action, proceeding or counterclaim brought by either against the other as to any matter whatsoever arising out of or in any way connected with this Agreement.

(d) **Attorneys' Fees**. Either party hereto shall be entitled to recover from the defaulting party all costs and expenses, including reasonable attorney's fees, incurred by the prevailing party in enforcing any of the terms and provisions of this Agreement, in remedying any breach by the other party, collecting any sum due hereunder or in connection with any litigation commenced by or against either party to which the other, without any fault on its part, shall be made a party.

(e) **Assignment**. Seller may not directly or indirectly assign or transfer any of Seller's rights, obligations and interests under this Agreement, to any person or entity without the prior written consent of Buyer, which consent may be withheld in Buyer's sole and absolute discretion. Buyer may not directly or indirectly assign or transfer any of Buyer's rights, obligations and interests under this Agreement, to any person or entity without the prior written consent of Seller, which consent may be withheld in Seller's sole and absolute discretion.

(f) **Successors Bound**. This Agreement shall be binding upon and inure to the benefit of Buyer and Seller and their respective heirs, personal representatives, successors, successors-in-trust, and permitted assigns.

(g) **Captions; Interpretation**. The captions in this Agreement are inserted only as a matter of convenience and for reference and in no way define, limit or describe the scope of this Agreement or the scope or content of any of its provisions. Whenever the context may require, words used in this Agreement shall include the corresponding feminine, masculine, or neuter forms, and the singular shall include the plural and vice versa. Unless the context expressly indicates otherwise, all references to "Section" are to sections of this Agreement.

(h) **Time of Essence**. Time is of the essence with respect to the performance of the obligations of Seller and Buyer under this Agreement. Unless otherwise specified herein, the due date for the receipt of any notice or sum of money shall be 4:00 P.M., Hawai'i Standard Time, of each respective day.

(i) **Notices**. All notices, requests, demands or documents which are required or permitted to be given or served hereunder shall be in writing and shall be sufficiently made or given only when sent by electronic mail to the e-mail address of the respective party set forth below, with a hard copy to follow as confirmation of receipt:

TO BUYER at:

Kamehameha Schools
Commercial Real Estate Division
567 South King Street
Honolulu, Hawai'i 96813
Attn: Marcy Fleming
Email: maflemin@ksbe.edu

with a copy to:

Kamehameha Schools Endowment Division
Real Estate Legal Division
Kawaiaha'o Plaza
567 S. King Street, Suite 310
Honolulu, Hawai'i 96813
Attention: Malia S. L. Day, Esq.
Email: maday@ksbe.edu

TO SELLER at:

Department of Land Management
City and County of Honolulu
558 South King Street
Honolulu, Hawai'i 96813
Attention: Scott K. Hayashi, Director
Email: scott.hayashi@honolulu.gov

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with a copy to:

Department of Corporation Counsel
City and County of Honolulu
567 South King Street,
Honolulu, Hawai'i 96813
Attention: Marilyn Ushijima
Email: mushijima@honolulu.gov

TO ESCROW AGENT at:

Title Guaranty Escrow Services, Inc.
235 Queen Street
Honolulu, Hawai'i 96813
Attention: Barbara Paulo
Email: bpaulo@tghawaii.com

Such addresses may be changed from time to time by the addressee by serving notice as heretofore provided. Service of such notice or demand shall be deemed complete upon electronic confirmation of receipt by the sending party's computer if sent by electronic transmission. Any notices may be sent on behalf of either party by such party's counsel.

(j) **Interpretation of Agreement**. The parties acknowledge that they have been given the opportunity to be represented and advised by legal counsel of their own choice in the negotiation and legal effects of this Agreement. The parties moreover agree that no party shall be deemed to be the drafter of this Agreement and, further, that if this Agreement is ever construed by a court of law, such court shall not construe this Agreement or any provision thereof against either party as the drafter of this Agreement.

(k) **Parties**. The term "Buyer", whenever used in this Agreement, shall include Buyer and its successors in trust and assigns. The term "Seller", whenever used in this Agreement, shall include Seller and its successors and permitted assigns.

(l) **Counterparts; Electronic Signatures and Delivery**. This Agreement may be executed and delivered in any number of counterparts, each of which shall be deemed to be an original, but all of which shall constitute one and the same instrument. The parties hereto agree that this Agreement may be executed (whether by original ("wet-ink") signature or an electronic signature (including through e-sign services providers such as DocuSign)) and the signature pages transmitted by facsimile, electronic image scan transmission (such as emailing a "pdf" file), or other electronic transmission. The delivery of such signature pages via facsimile, electronic image scan transmission, or other electronic transmission shall constitute effective execution and delivery hereof. If so executed and delivered by one or both parties hereto, the effectiveness of this Agreement shall not be affected by the non-delivery of any manually-signed signature page.

(m) **Limitation of Liability**. This Agreement has been executed by or on behalf of the Trustees of the Estate of Bernice Pauahi Bishop in their fiduciary capacities as said Trustees and not in an individual (or personal) capacity. No personal liability or obligation under this Agreement shall be imposed or assessed against said Trustees in their individual capacities.

(n) **Recordation**. Buyer and Seller agree not to record this Agreement or any memorandum hereof.

(o) **Waiver**. No waiver of any breach of any agreement or provision contained herein shall be deemed a waiver of any preceding or succeeding breach of any other agreement or provision herein contained. No extension of time for the performance of any obligation or act shall be deemed an extension of time for the performance of any other obligation or act.

(p) **No Third Party Beneficiary**. This Agreement is solely for the benefit of Buyer and Seller. No other person or entity is entitled to the benefit or may enforce any of the provisions of this Agreement, except where expressly provided herein to the contrary.

[Signatures on following page]

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IN WITNESS WHEREOF, Buyer and Seller have executed this Agreement effective as of the Effective Date.

Approved as to Content:

Scott K. Hayashi, Director
Department of Land Management

Approved as to Form and Legality:

Marilyn Ushijima
Deputy Corporation Counsel

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i

By: Rick Blangiardi
Name: Rick Blangiardi
Title: Mayor

By: Andrew T. Kawano, Director
Department of Budget and Fiscal Services

"Seller"

Approved as to Content, Authority, and Compliance with KS Policy:

/s/ Marcy E. Fleming
Manager/Director

/s/ Timothy Slottow
Executive Vice President

Approved as to Form:

/s/ Malia S. L. Day
Legal Group

/s/ John Love
Retained Counsel

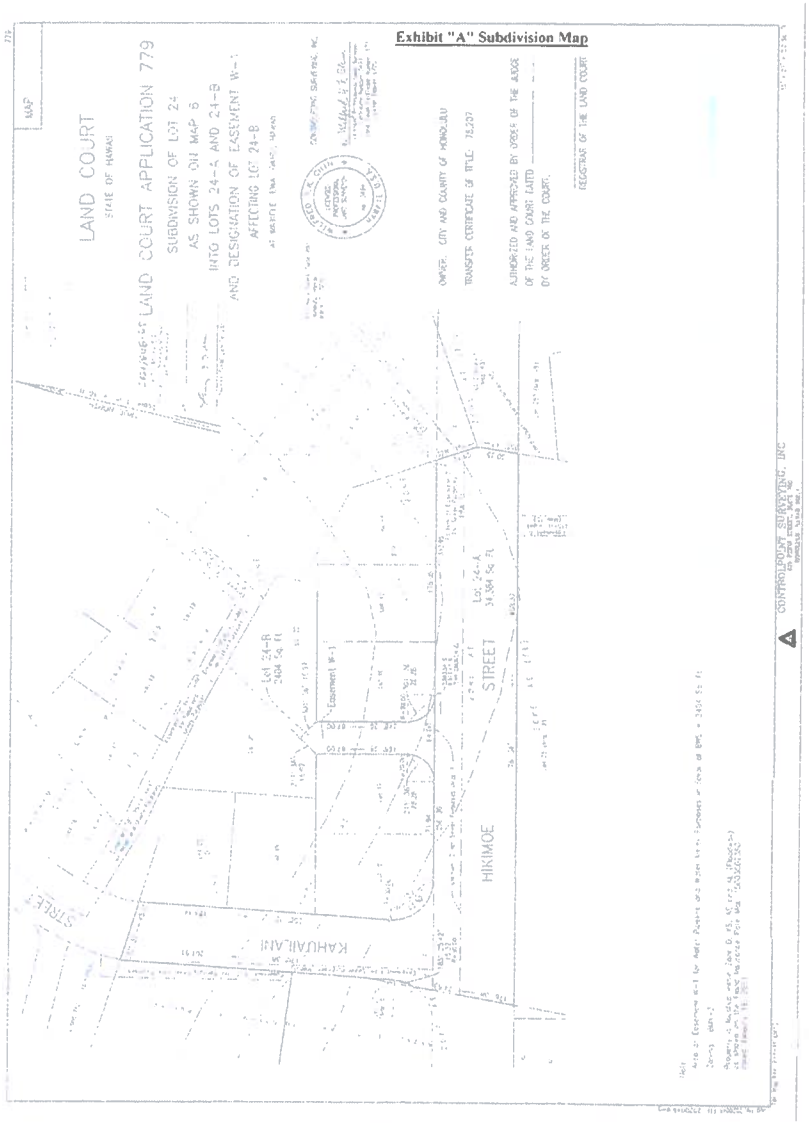
TRUSTEES OF THE ESTATE OF BERNICE PAUAHI BISHOP, AS AFORESAID

By
Name: JOHN T. KOMEIJI, General Counsel and Vice President
Their Attorney-in-Fact

By
Name: SHERYL L. NICHOLSON, Assistant General Counsel
Their Attorney-in-Fact

"Buyer"

Exhibit "A" Subdivision Map



REF-33

Exhibit "B"
Form of Deed

Return by Mail ☐ Pickup ☐ To:

Kamehameha Schools
Attn: Real Estate Legal Division
P.O. Box 3466
Honolulu, Hawai'i 96801

Document contains _____ pages

Tax Map Key No.: (1) 9-4-014 (por.)

QUITCLAIM DEED

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i, whose address is Honolulu Hale, 530 South King Street, Honolulu, Hawai'i 96813, hereinafter called the "***Grantor***", in consideration of the sum of Ten Dollars ($10.00) and other valuable consideration to Grantor paid, the receipt of which is hereby acknowledged, does hereby remise, release and forever quitclaim unto **LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, MICAH A. KANE, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop,** whose business and post office address is 567 South King Street, Suite 200, Honolulu, Hawai'i 96813, hereinafter called the "***Grantee***", as such Trustees, as Grantee's successors in trust and assigns, all of the Grantor's estate, right, title and interest in and to:

ALL of the land and premises (the "***Property***") more fully described in Exhibit "A" attached hereto and made a part hereof;

AND the reversions, remainders, rents, issues and profits thereof, together with all buildings, improvements, tenements, rights, easements, privileges and appurtenances to the same belonging or appertaining or held and enjoyed therewith, and all of the estate, right, title and interest of the Grantor, both at law and in equity, therein and thereto;

TO HAVE AND TO HOLD the same unto the Grantee, as aforesaid, forever.

The terms "Grantor" and "Grantee" as and when used herein or any pronouns used in place thereof, shall mean and include the masculine, feminine and neuter, the singular and plural number, individuals,

trustees, partnerships, companies or corporations, and their and each of their respective heirs, devisees, personal representatives, successors, successors-in-trust and assigns, according to the context thereof.

This document may be executed in as many counterparts as may be deemed necessary or convenient, and by the parties on separate counterparts, each of which, when so executed, shall be deemed an original, but all such counterparts shall constitute one and the same instrument. The parties agree that the person or company recording or arranging for the recordation of this document is authorized to complete any blanks contained in this document with the applicable number of pages, dates, and recordation information, whether before or after this document has been notarized by a notary public, and in no event shall completion of any such blanks be deemed an alteration of this document by means of the insertion of new content.

Said Trustees are accepting this deed and title to the Property as Trustees of the Estate of Bernice Pauahi Bishop in their fiduciary capacities as said Trustees and not in an individual (or personal) capacity. No personal liability or obligation hereunder shall be imposed or assessed against said Trustees in their individual capacities.

[The remainder of this page is intentionally left blank. Signature page(s) follow(s).]

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IN WITNESS WHEREOF, the Grantor and Grantee have executed this instrument this _____ day of _____, 20___.

Approved as to Content:

_____
Scott K. Hayashi, Director
Department of Land Management

Approved as to Form and Legality:

_____
Marilyn Ushijima
Deputy Corporation Counsel

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i

By: _____
Name: Rick Blangiardi
Title: Mayor

"GRANTOR"

Approved as to Content, Authority, and Compliance with KS Policy:

_____
Manager/Director

_____
Director/Vice President

Approved as to Form:

_____
Legal Group

_____
Retained Counsel

TRUSTEES OF THE ESTATE OF BERNICE PAUAHI BISHOP, AS AFORESAID

By _____
Name: _____
Their Attorney-in-Fact

By _____
Name: _____
Their Attorney-in-Fact

"GRANTEE"

GRANTOR
STATE OF HAWAII)
CITY AND COUNTY OF HONOLULU) SS.
FIRST JUDICIAL CIRCUIT)

On _____, 2021, before me personally appeared **RICK BLANGIARDI**, to me personally known, who being by me duly sworn (or affirmed), did say that such person is the Mayor of the City and County of Honolulu, a municipal corporation of the State of Hawaii, and that the seal affixed to said instrument is the corporate seal of said municipal corporation, and that the foregoing instrument was signed and sealed in behalf of said municipal corporation by authority of its City Council, and such person acknowledged the foregoing instrument to be the free act and deed of said municipal corporation.

Document Description: Quitclaim Deed
Doc. Date: _____ No. Page: ____

_____
Notary Signature Date

_____
Name (printed)

Notary Public, State of Hawaii

My commission expires: _____

REF-35

GRANTEE
STATE OF HAWAI'I)
) SS.
CITY AND COUNTY OF HONOLULU)

On _____ before me appeared _____ and _____, to me personally known, who being by me duly sworn, did say that they are two of the attorneys-in-fact for LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, MICAH A. KANE, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop, duly appointed under Limited Power of Attorney effective as of March 10, 2020, as amended by that certain Amendment to Limited Power of Attorney and Ratification effective as of May 18, 2020, recorded in the Bureau of Conveyances of the State of Hawai'i as Document No. A-73740550 and A-74430363, respectively, and in the Office of the Assistant Registrar of the Land Court of the State of Hawai'i as Document No. T-11026199 and T-11095123, respectively; and that the foregoing instrument was executed in the name and on behalf of LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, MICAH A. KANE, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop, by such persons in their capacities as attorneys-in-fact; and they acknowledged the instrument to be the free act and deed of the Trustees of the Estate of Bernice Pauahi Bishop, as aforesaid.

Signature: _____
Name: _____
Notary Public, State of Hawai'i

My commission expires: _____

(Official Stamp or Seal)

NOTARY CERTIFICATION STATEMENT

Document Identification or Description: Quitclaim Deed

Doc. Date: _____ or ☒ Undated at time of notarization.

No. of Pages: ____ Jurisdiction: First Circuit
(in which notarial act is performed)

_____
Signature of Notary Date of Notarization and Certification Statement

_____ (Official Stamp or Seal)
Printed Name of Notary

EXHIBIT A

All of that certain parcel of land situate at Waikele, Ewa, City and County of Honolulu, State of Hawai'i, being a portion of the land(s) described in deregistered Certificate of Title No. 78,207 recorded in the Bureau of Conveyances of the State of Hawai'i as Document No. A-76480487, being Lot 24-B, approximately 2,404 square feet, as shown on the Subdivision Map approved by the Department of Planning and Permitting of the City and County of Honolulu on May 15, 2020, File No. DPP 2020/SUB-68, and thus bounded and described:

LOT 24-B

Being a portion of Hikimoe Street, to be abandoned, same being also a portion of Lot 24 (Map 6) of Land Court Application 779

Situate at Waikele, Ewa, Oahu, Hawaii

Beginning at the Southeast corner of this parcel of land, being also the Southwest corner of Lot 16 (Map 6) of Land Court Application 779, the coordinates of said point of beginning referred Government Survey Triangulation Station "EWA CHURCH" being 2,603.54 feet South, and 8,611.47 feet West, and running by azimuths measured clockwise from true South:

1. 76° 36' — 64.00 feet along the remainder of Hikimoe Street along remainder of Lot 24 (Map 6) of Land Court Application 779;

2. Thence along Lot 17 (Map 6) of Land Court Application 779, on a curve to the left with a radius of 20.00 feet, the chord azimuth and distance being: 211° 36' 28.28 feet;

3. 136° 16' — 67.00 feet along same;

4. 211° 36' — 16.97 feet along Lot 21 (Map 6) of Land Court Application 779;

5. 301° 36' — 16.97 feet along Lot 22 (Map 6) of Land Court Application 779;

6. 346° 36' — 67.00 feet along Lot 16 (Map 6) of Land Court Application 779;

7. Thence along same, on a curve to the left with a radius of 20.00 feet, the chord azimuth and distance being: 301° 36' 28.28 feet to the point of beginning and containing an area of 2404 square feet.

Subject, However to Easement W-1 for water pipeline and water meter purposes in favor of The Board of Water Supply.

WILFRED Y.K. CHIN
LICENSED PROFESSIONAL LAND SURVEYOR
No. 3499
HAWAII, U.S.A.

August 05, 2020
Honolulu, Hawaii

Wilfred Y. K. Chin
Wilfred Y. K. Chin
Licensed Professional Land Surveyor
Certificate Number 3499-LS
License Expires 4/30/22

Being a portion of the land conveyed to Grantor by Deed dated October 11, 1959, recorded in the Office of the Assistant Registrar of the Land Court of the State of Hawai'i as Document No. 248750
[Note: Exhibit shall be updated, as necessary, to reflect the Title Report to be prepared by the Title Company.]

REF-36

EXHIBIT B.

Landownership Documentation

City & County of Honolulu
Department of Planning & Permitting (DPP)

Property Information

undefined

Wednesday, July 21, 2021 | 2:42:06 PM

General Information

TMK:	94013046:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$48,200.00
Land Exempt:	$0.00
Acres:	0
Square Feet	1,072
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu
High School:	WAIPAHU
Near Transit Route:	Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D
Tsunami Evacuation Zone:	No

more public safety info >>

Page Tools: PRINT | BOOKMARK | EMAIL | STREET/BIRD'S EYE

More Info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

Information shown on these maps are derived from public records that are constantly undergoing change and do not replace a site survey, and is not warranted for content or accuracy.

2010 Assessed Values as of October 1, 2009.

Department of Planning & Permitting
650 S. King St, Ste 6, Honolulu, HI 96813
gis@honolulu.gov
Property Info Page FAQ

REF-37

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94-241 WAIPAHU DEPOT ST

Wednesday, July 21, 2021 | 2:40:13 PM

General Information

TMK:	94014005:0000
Building Value:	$1,062,500.00
Building Exemption:	$0.00
Land Value:	$949,000.00
Land Exempt:	$0.00
Acres:	0
Square Feet	12,360
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Waipahu District Park show route
show all addresses >>

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1009
Population (block):	0

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:	Yes	
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AEF
Tsunami Evacuation Zone:	No

more public safety info >>

Page Tools: PRINT | BOOKMARK | EMAIL | STREET/BIRD'S EYE

More Info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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2010 Assessed Values as of October 1, 2009.

Department of Planning & Permitting
650 S. King St, Ste 8, Honolulu, HI 96813
gis@honolulu.gov
Property Info Page FAQ

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94-750 FARRINGTON HWY

Wednesday, July 21, 2021 | 2:43:11 PM

General Information

TMK:	94014014:0000
Building Value:	$5,519,900.00
Building Exemption:	$0.00
Land Value:	$2,300,700.00
Land Exempt:	$0.00
Acres:	0
Square Feet	33,172
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Waipahu District Park show route
show all addresses >>

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1009
Population (block):	0

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:	Yes	
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AEF
Tsunami Evacuation Zone:	No

more public safety info >>

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REF-38

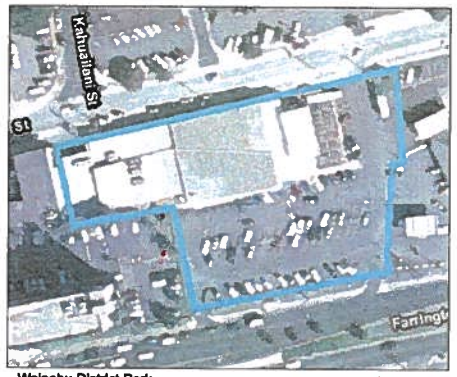
City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94-766 FARRINGTON HWY

Wednesday, July 21, 2021 | 2:44:09 PM

General Information

TMK:	94014058:0000
Building Value:	$1,086,700.00
Building Exemption:	$0.00
Land Value:	$4,086,600.00
Land Exempt:	$0.00
Acres:	0
Square Feet	73,581
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower



Nearest Park: Waipahu District Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1009
Population (block):	0

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AEF
Tsunami Evacuation Zone:	No

more public safety info >>

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Property Information

94-750 HIKIMOE ST

Wednesday, July 21, 2021 | 2:44:54 PM

General Information

TMK:	94014059:0000
Building Value:	$110,300.00
Building Exemption:	$0.00
Land Value:	$227,400.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,054
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Waipahu District Park show route

show all addresses >>

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AE / D / XS
Tsunami Evacuation Zone:	No

more public safety info >>

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Property Info Page FAQ

REF-39

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94-750 HIKIMOE ST

Wednesday, July 21, 2021 | 2:47:31 PM

General Information

TMK:	94014060:0000
Building Value:	$460,000.00
Building Exemption:	$0.00
Land Value:	$227,100.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,046
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D / XS
Tsunami Evacuation Zone:	No

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City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94 750 HIKIMOE ST

Wednesday, July 21, 2021 | 2:48:42 PM

General Information

TMK:	94014061:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$227,100.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,047
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AE / D / XS
Tsunami Evacuation Zone:	No

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REF-40

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

undefined

Wednesday, July 21, 2021 | 2:49:20 PM

General Information

TMK:	94014062:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$238,200.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,294
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu
High School:	WAIPAHU
Near Transit Route:	Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D
Tsunami Evacuation Zone:	No

more public safety info >>

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More info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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Property Info Page FAQ

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94 855 KAHUAILANI ST

Wednesday, July 21, 2021 | 2:56:00 PM

General Information

TMK:	94014063:0000
Building Value:	$973,800.00
Building Exemption:	$0.00
Land Value:	$291,700.00
Land Exempt:	$0.00
Acres:	0
Square Feet	6,483
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:	Yes	
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D
Tsunami Evacuation Zone:	No

more public safety info >>

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More info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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Property Info Page FAQ

REF-41

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94-748 HIKIMOE ST

Thursday, July 22, 2021 | 9:04:16 AM

General Information

TMK:	94014064:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$227,100.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,047
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	C/O THE YOUNG GROUP INC	98-572 ALOALII STREET	AIEA HI 96701-2711

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AE / D / XS
Tsunami Evacuation Zone:	No

more public safety info >>

Page Tools: PRINT | BOOKMARK | EMAIL | STREET/BIRD'S EYE

More Info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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gis@honolulu.gov
Property Info Page FAQ

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94 748 HIKIMOE ST

Wednesday, July 21, 2021 | 2:57:06 PM

General Information

TMK:	94014065:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$232,800.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,173
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

show all addresses >>

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	C/O THE YOUNG GROUP INC	98-572 ALOALII STREET	AIEA HI 96701-2711

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	AE / AEF / D / XS
Tsunami Evacuation Zone:	No

more public safety info >>

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More Info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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REF-42

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94 855 KAHUAILANI ST

Wednesday, July 21, 2021 | 2:58:34 PM

General Information

TMK:	94014066:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$237,200.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,270
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D / XS
Tsunami Evacuation Zone:	No

more public safety info >>

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Property Info Page FAQ

City & County of Honolulu
Department of Planning & Permitting (DPP)
Property Information

94 855 KAHUAILANI ST

Wednesday, July 21, 2021 | 2:59:03 PM

General Information

TMK:	94014067:0000
Building Value:	$0.00
Building Exemption:	$0.00
Land Value:	$226,500.00
Land Exempt:	$0.00
Acres:	0
Square Feet	5,033
Property Tax Class:	Commercial
City:	Waipahu
Zip Code:	96797
Realtor Neighborhood:	Waipahu-Lower

Nearest Park: Hans L'orange Neighborhood Park show route

Tax Bill Owner Information

Name	Type	Address	Address 2	City State Zip
B P BISHOP TRUST ESTATE	Fee Owner	PO BOX 3466		HONOLULU HI 96801

2010 Census Information

Tract Number:	008702
Block Number:	1006
Population (block):	222

Voting Information

City Council Member:	Brandon Elefante
Polling Place:	Waipahu Civic Ctr
Address:	94-275 Mokuola St
Neighborhood Board:	Waipahu

School and Transit Information

Elementary School:	Waipahu	show route
High School:	WAIPAHU	show route
Near Transit Route:		Yes
Near Bus Routes:	432, 433, 40, 42, 43, 434, 81, A, E, W1	

Zoning and Flood Information

Zoning (LUO) Designation:	BMX-3
Ohana Zoning Designation:	Ineligible
FEMA Flood Designation:	D
Tsunami Evacuation Zone:	No

more public safety info >>

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More Info: ZONE INFO | BUILDING PERMITS | PROPERTY TAX

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REF-43

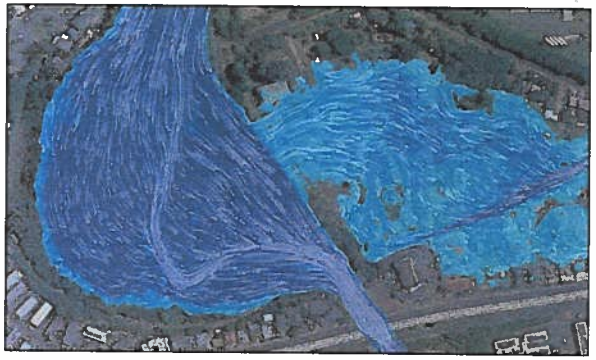
EXHIBIT C.

Waipahu Town Flood Study

FEMA Letter of Map Revision (LOMR)

Waipahu Town Flood Study – Existing Conditions

City and County of Honolulu, Hawaii



January 2021

LOMR Report

Prepared for:

Kamehameha Schools

Prepared by:

RIVER FOCUS WATER RESOURCE CONSULTANTS

WILSON OKAMOTO CORPORATION

REF-44

Waipahu Town Flood Study – Existing Conditions

City and County of Honolulu, Hawaii

Study Report

January 2021

Prepared for

Kamehameha Schools

Prepared by

Wilson Okamoto Corporation
www.wilsonokamoto.com

River Focus, Inc.
www.riverfocus.com

A. Jake Gusman, P.E.
Project Manager, River Focus

This work was prepared by me or under my supervision.

April 30, 2022

Signature *Expiration Date*

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REF-45

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Exhibits

Exhibit A. MT-2 Forms
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Exhibit C. Revised (Annotated) FIRM Panels
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1 INTRODUCTION

This FEMA Letter of Map Revision (LOMR) report describes the hydrologic modeling, hydraulic analysis, and floodplain mapping for Waikele Stream, Kapakahi Stream #2, and Wailani Drainage Canal. The study area is in the town of Waipahu, located in the City and County of Honolulu, Hawaii. A location map showing the LOMR study area is provided in Figure 1-1. The purpose of this LOMR is to update the effective FEMA floodplain and floodway mapping based on improved data and modeling methods.

Figure 1-1. General Study Area – Waipahu Town

1.1 Background

The Waikele Stream watershed is the largest on Oahu. In the early 20th century, flooding problems from Waikele Stream were severe enough for the City and County of Honolulu to divert the stream away from Waipahu town. A trapezoidal concrete channel was completed in 1939 from just upstream (mauka) of Farrington Highway to just upstream of the old railroad bridge. An earthen channel lies downstream (makai) of the concrete channel.

REF-46

The lower portion of Waikele Stream has been extended by siltation in the Pearl Harbor West Loch and a dense mangrove cover that has expanded over the years. Thus, the outlet of the stream is now well beyond the old railroad bridge where the earthen channel ends.

1.2 Complex Flooding Conditions

Flooding conditions are complex in the town of Waipahu (Figure 1-2). During large flood events, overflow from Waikele Stream enters Kapakahi Stream (referred to as Kapakahi Stream #2 by FEMA). This flow intermingles with overflow from the Wailani Drainage Canal, along with local runoff. The dynamics of these complex flooding conditions are two-dimensional (2-D) in nature. However, the effective FEMA modeling uses a series of 1-D models.

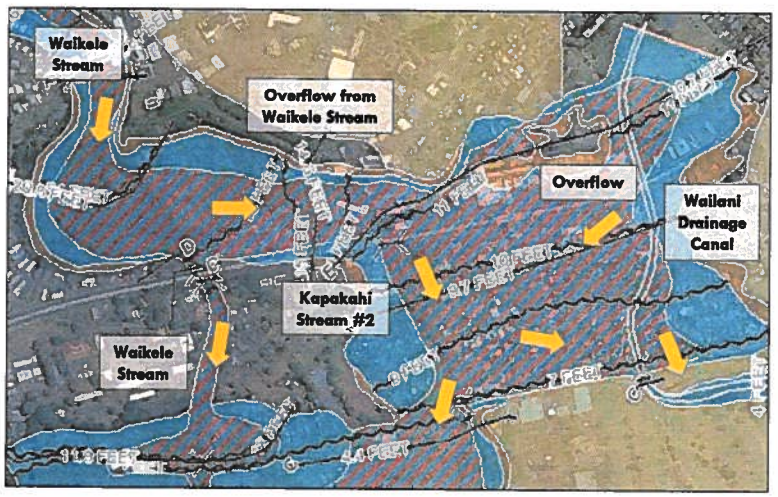

Figure 1-2. FEMA Existing Condition Floodplain/Floodway Map with Flow Patterns Added

The peak flows for Waikele Stream, Kapakahi Stream #2, and Wailani Drainage Canal in the effective FEMA Flood Insurance Study (2014) are listed in Table 1-1.

Table 1-1. Peak Flows from FEMA Flood Insurance Study

Flooding Source and Drainage Area		Peak Discharge (cfs)			
Source/Location	Drainage Area (sq. mi.)	10-Year	50-Year	100-Year	500-Year
Waikele Stream					
At Pacific Ocean	45.790	10,620	21,000	26,400	41,400
Downstream of H-1 Freeway	44.910	10,450	20,700	26,000	40,800
Kapakahi Stream #2					
Downstream limit of Study	0.329	–	–	12,712	–
Upstream limit of Study	0.109	–	–	11,971	–
Wailani Drainage canal					
Downstream limit of Study	1.570	–	–	2,681	–
Upstream limit of Study	1.140	–	–	2,200	–

1.3 Effective FEMA Study and LOMR

Effective FEMA Study

The effective FEMA study for Waikele Stream and the town of Waipahu was completed in 1985 and consists of one-dimensional (1-D) HEC-2 hydraulic models for the various study reaches. The U.S. Corps of Engineers' HEC-2 program is an old DOS-based program that was replaced by HEC-RAS (River Analysis System) nearly 25 years ago.

Current LOMR Application

The current LOMR application is based on the following improvements:

- Updated hydrologic modeling using HEC-HMS (Hydrologic Modeling System), Version 4.5 (HEC, 2020).
- Newer, more detailed topographic data—NOAA LIDAR data for the overbanks and topographic/bathymetric data collected by field survey.
- Improved hydraulic analysis—Detailed 2-D hydraulic modeling performed using HEC-RAS (River Analysis System), Version 5.0.7 (HEC, 2016) that reflects the complex flood conditions in Waipahu.

The FEMA MT-2 LOMR application forms are provided in Exhibit A. The certified floodplain workmap and revised/annotated FIRM (Flood Insurance Rate Map) panels are provided in Exhibit B and Exhibit C, respectively.

REF-47

2 HYDROLOGY

The Waikele Stream watershed was modeled using the U.S. Army Corps of Engineers' HEC-HMS (Hydrologic Modeling System) software. This section describes the hydrologic modeling completed for the LOMR application, including watershed data, HEC-HMS parameter development, and model results.

2.1 Watershed Data

The Waikele Stream watershed, a basin of 45.3 square miles, is the largest on the island of Oahu. It is located on the leeward side of the Koolau Range, the remnants of an ancient highly eroded shield volcano that comprises the eastern half of Oahu.

Topographic Data

The available topographic datasets used for modeling the Waikele Stream watershed include 2013 LiDAR data obtained from the National Oceanic and Atmospheric Administration (NOAA) and 2017 LiDAR/bathymetry data obtained from U.S. Geological Survey (USGS). Orthometric heights were converted to local mean sea level (LMSL) based on City/County of Honolulu benchmark data. ArcGIS was used to create a Digital Elevation Model (DEM) for the watershed (Figure 2-1). The horizontal datum/projection used for this study is NAD 1983, State Plane Hawaii Zone 3, FIPS 5103, Feet. All elevations are referenced to LMSL (i.e., local tidal datum).

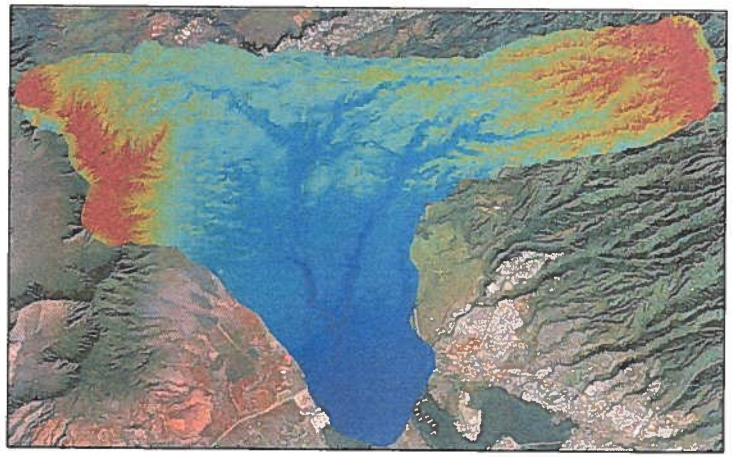

Figure 2-1. Waikele Stream Watershed – Digital Elevation Model (DEM)

Subbasin Delineation

The Waikele Stream watershed was subdivided into smaller subbasins for the hydrologic modeling effort, as shown in Figure 2-2. ArcGIS Version 10.8.1 was used to complete the subbasin delineation and stream network creation. The HEC-HMS schematic is shown in Figure 2-5.

Figure 2-2. Waikele Stream Watershed – HEC-HMS Subbasins

Soils Data

Soils data were obtained from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database. The SSURGO database contains information about soils as collected by the National Cooperative Soil Survey over the past century. For HEC-HMS model development, the Hydrologic Soil Group layer was extracted from the SSURGO dataset and clipped to the watershed extents (Figure 2-3).

NRCS methodology divides soils into four hydrologic soil groups, as defined below:

- A – High infiltration rate, low runoff potential
- B – Moderate infiltration rate, moderately low runoff potential
- C – Low infiltration rate, moderately high runoff potential
- D – Very low infiltration rate, high runoff potential

The Waipahu watershed includes A, B, C, and D type soils.

REF-48

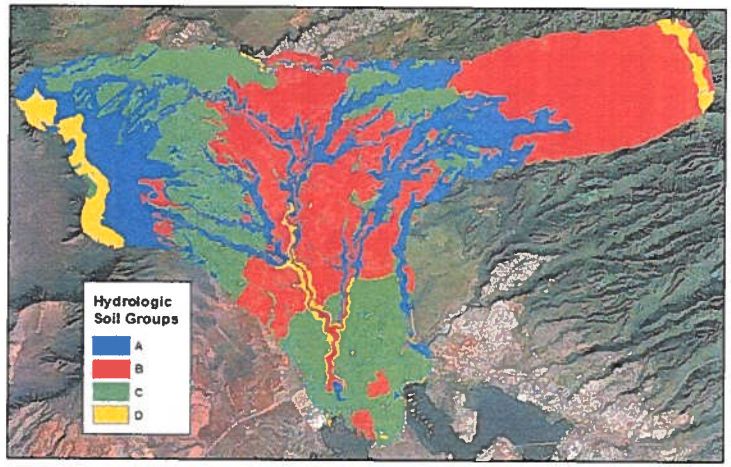

Figure 2-3. Waikele Stream Watershed – Hydrologic Soil Groups

Land Cover/Land Use Data

Land cover and land use data for the subbasins were obtained from the 2011 NOAA Land Cover database. Figure 2-4 shows the land use/vegetation coverage for the watershed. The most dominant land use/vegetation type in the upper subbasins is evergreen forest and scrub/shrub on the western and eastern sides of the watershed (higher elevation area). There are developed/open spaces, grassland, and cultivated land in the center area. The lower watershed consists of predominantly urban/suburban development.

Precipitation Data

Precipitation depths for the 10-, 50-, 100-, and 500-year, 24-hour duration events were obtained from the NOAA Atlas 14 precipitation-frequency estimates for Hawaii (*http://hdsc.nws.noaa.gov/hdsc/pfds/*). Gridded data were used to determine precipitation-frequency values for each recurrence interval within each subbasin.

Mean annual precipitation for the watershed is approximately 71.5 inches. Precipitation depths for the model subbasins ranged from 3.47 to 6.53 inches for the 100-year, 24-hour event.

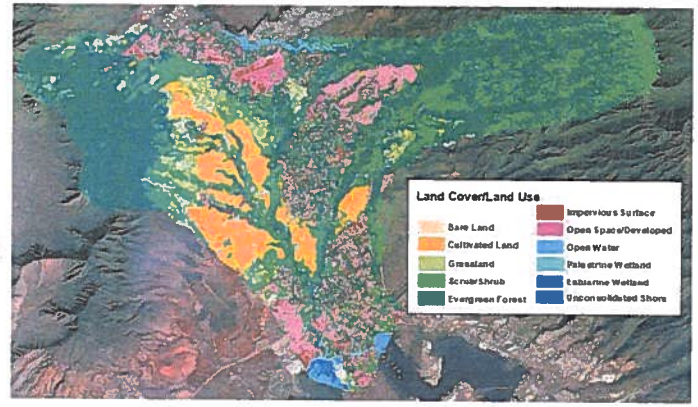

Figure 2-4. Waikele Stream Watershed – Land Cover/Land Use

2.2 HEC-HMS Modeling

River Focus used the U.S. Army Corps of Engineers' HEC-HMS (Hydrologic Modeling System), Version 4.5 (HEC, 2019) to perform hydrologic modeling of the watershed.

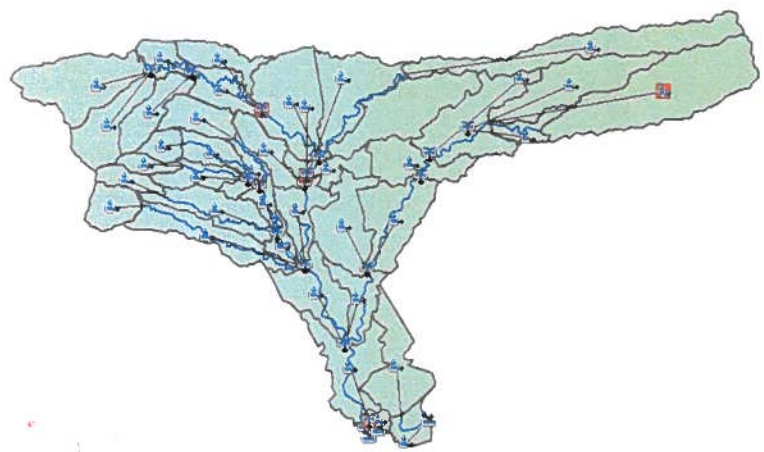

Figure 2-5. HEC-HMS Schematic (Subbasins, Routing Reaches, and USGS Gages)

REF-49

NRCS Methodology

The NRCS Curve Number method (also known as the SCS method) was used for estimating precipitation losses from the watershed. Combining the land cover type and hydrologic soil groups found within each subbasin, an area-weighted NRCS curve number (CN) was assigned to estimate precipitation loss rates from the watershed. This process was automated using ArcGIS, then values were manually entered into HEC-HMS. CN values for land use and vegetation types found within the watershed are listed in Table 2-1 for each of the Hydrologic Soil Groups.

Table 2-1. Land Use/Vegetation Type, Hydrologic Soil Group, and CN Values

Land Use Code	Land Use/Cover Classification	Hydrologic Soil Group			
		A	B	C	D
2	Residential and Commercial	70	82	89	96
5	Developed Open Space	49	69	79	84
6	Cultivated Land	67	78	85	89
8	Grassland	39	61	74	80
10	Evergreen Forest	30	55	70	77
12	Scrub/Shrub	30	48	65	73
13	Palustrine Forested Wetland	78	78	78	78
14	Palustrine Scrub/Shrub Wetland	78	78	78	78
15	Palustrine Emergent Wetland	78	78	78	78
16	Estuarine Forested Wetland	87	89	90	91
17	Estuarine Scrub/Shrub Wetland	92	93	94	95
18	Estuarine Emergent Wetland	98	98	98	98
20	Bare Land	77	86	91	94
21	Open Water	98	98	98	98

Source: NRCS (1986)

The hydrologic soil group data (Figure 2-3) was combined with the land use/vegetation data (Figure 2-4) and the corresponding CN values (Table 2-1) yielding the area-weighted subbasin CN values shown in Table 2-2.

Transform and Basin Lag

The SCS Unit Hydrograph method was selected as the rainfall-runoff transformation method in the HEC-HMS model. The calculation of basin lag was based on the U.S. Army Corps of Engineers relationship ("Corps Lag") in which lag is defined as the amount of time from the start of the rainfall to the peak of the runoff hydrograph:

$$\text{Corps Lag (hours)} = 24 * \bar{n} * ((L * L_c)/s^{0.5})^{0.38}$$

Where:

$\bar{n}$ = the average of the Manning's *n* values of the watercourse and its tributaries
L = length of the longest watercourse (miles)
L_c = length along the longest watercourse to basin centroid (miles)
s = overall slope of drainage area between headwaters and collection point (ft per mile)

Table 2-2. Subbasin Curve Number (CN) Values

HMS Subbasin	Area (sq. mi.)	Average CN	HMS Subbasin	Area (sq. mi.)	Average CN
Ekahanui_S01	0.792	35	Kapakahi_S01	0.151	88
Ekahanui_S02	1.513	59	Waikakalaua_S01	2.955	52
Huliwai_S01	0.457	37	Waikakalaua_S02	1.918	59
Huliwai_S02	1.353	68	WaikakalauaTrib_S01	2.243	73
Manuwaiahu_S01	0.902	78	Waikele_S01	2.261	50
Kipapa_S01	4.105	52	Waikele_S02	1.348	37
Kipapa_S02	0.493	33	Waikele_S03	0.538	67
Kipapa_S03	2.155	44	Waikele_S04	0.973	47
Kipapa_S04	1.204	61	Waikele_S05	0.871	60
Kipapa_S05	1.834	59	Waikele_S06	0.782	81
Kipapa_S06	0.881	69	Waikele_S07	2.355	63
KipapaTrib1_S01	2.079	48	Waikele_S08	0.775	64
KipapaTrib2_S01	1.674	73	Waikele_S09	0.819	66
Poliwai_S01N	0.435	61	Waikele_S10	1.009	66
Poliwai_S01S	0.358	32	Waikele_S11	1.485	73
Poliwai_S02N	0.662	72	Waikele_S12	1.664	78
Poliwai_S02S	0.685	65	Waikele_S13	0.042	83
Poliwai_S03	0.5	69	Wailani_S01	1.626	83
Poliwai_S04	0.36	59	Wailani_S02	0.506	83
Poliwai_S05	0.336	54			

Source: NRCS (1986); subbasin values computed using ArcGIS

ArcGIS was used to estimate lag parameters, including the length of the longest flow path, length to basin centroid, and basin slope. These parameters and the computed lag for each of the subbasins are shown in Table 2-3.

Routing Reaches

The Muskingum-Cunge routing method with the trapezoidal and triangular channel shape options was used in HEC-HMS. Reach and channel parameters are summarized in Table 2-4. Trapezoidal/Triangular channel dimensions were estimated from representative cross sections taken along the Waikele Stream watershed terrain using RAS Mapper within HEC-RAS. Manning's *n* values were estimated based on field reconnaissance photos, standard engineering references (Chow, 1959), and USDA Forest Service study of high-gradient streams (Yochum et al., 2014) for upper watershed streams.

REF-50

Table 2-3. Summary of Basin Lag Parameters

HMS Subbasin	Average *n*	Longest Flow path (mile)	Centroidal Flow Path (mile)	Basin Slope (feet/mile)	Computed Lag (hours)
Ekahanui_S01	0.05	1.54	0.82	1202.21	0.34
Ekahanui_S02	0.075	5.09	2.72	308.77	1.64
Huliwai_S01	0.05	1.95	0.99	891.77	0.42
Huliwai_S02	0.075	3.87	1.88	127.37	1.52
Kapakahi_S01	0.015	0.68	0.47	626.69	0.07
Kipapa_S01	0.05	8.68	5.12	233.16	1.80
Kipapa_S02	0.05	2.29	1.07	348.45	0.55
Kipapa_S03	0.05	4.84	2.15	154.53	1.12
Kipapa_S04	0.03	1.56	0.80	210.32	0.28
Kipapa_S05	0.03	2.56	1.53	247.07	0.42
Kipapa_S06	0.075	3.17	1.50	149.75	1.26
KipapaTrib_S01	0.05	6.91	3.62	214.60	1.47
KipapaTrib2_S01	0.015	1.97	1.04	264.15	0.16
Manuwaiahu_S01	0.075	2.13	0.96	298.08	0.80
Poliwai_S01N	0.05	1.29	0.60	943.75	0.30
Poliwai_S01S	0.05	1.82	1.10	854.76	0.43
Poliwai_S02N	0.075	2.80	1.42	157.45	1.16
Poliwai_S02S	0.075	3.00	1.62	341.29	1.08
Poliwai_S03	0.075	1.94	0.55	95.11	0.78
Poliwai_S04	0.075	2.07	0.85	122.47	0.90
Poliwai_S05	0.075	1.52	0.80	223.87	0.69
Waikakalaua_S01	0.05	13.88	8.67	140.79	2.89
Waikakalaua_S02	0.035	3.67	1.88	124.70	0.70
WaikakalauaTrib_S01	0.015	4.07	2.37	52.40	0.40
Waikele_S01	0.05	4.16	1.78	377.17	0.83
Waikele_S02	0.05	3.76	2.09	485.43	0.81
Waikele_S03	0.025	2.33	1.00	79.70	0.36
Waikele_S04	0.05	2.91	1.34	520.60	0.61
Waikele_S05	0.04	2.71	1.67	79.36	0.74
Waikele_S06	0.015	3.01	1.36	78.03	0.27
Waikele_S07	0.035	4.46	2.13	81.65	0.86
Waikele_S08	0.025	1.70	0.60	136.91	0.24
Waikele_S09	0.075	2.67	1.38	136.63	1.16
Waikele_S10	0.065	3.08	1.63	133.18	1.14
Waikele_S11	0.075	3.67	1.71	154.87	1.39
Waikele_S12	0.025	4.03	1.57	130.39	0.48
Waikele_S13	0.02	0.70	0.40	109.12	0.12
Wailani_S01	0.02	3.11	1.19	132.51	0.31
Wailani_S02	0.015	0.90	0.42	139.79	0.10

Source: Corps lag equation; values computed using ArcGIS

Table 2-4. Summary of Routing Reach and Channel Parameters

HMS Name	Length (ft)	Slope (ft/ft)	Shape	Width (ft)	Side Slope (xH:1V)	Manning's *n*
Ekahanui_R01	21771	0.043	Trapezoid	10	0.63	0.055
Huliwai_R01	14579	0.037	Triangle	3	0.45	0.06
Kipapa_R01	10722	0.017	Trapezoid	25	1.14	0.045
Kipapa_R02	13506	0.015	Trapezoid	7.5	0.2	0.045
Kipapa_R03	3958	0.012	Trapezoid	13	1.083	0.045
Kipapa_R04	8988	0.012	Triangle	6	0.5	0.05
Kipapa_R05	7319	0.018	Triangle	6	0.5	0.06
Manuwaiahu_R01	7703	0.020	Trapezoid	10	0.26	0.055
Poliwai_R01	6264	0.037	Trapezoid	28	0.7	0.05
Poliwai_R02	7398	0.018	Trapezoid	10	0.325	0.05
Poliwai_R03	1401	0.018	Trapezoid	12.5	0.3	0.05
Poliwai_R04N	10102	0.025	Triangle	3	0.383	0.055
Poliwai_R04S	8309	0.035	Triangle	5	0.0425	0.06
Waikakalaua_R01	1360	0.016	Triangle	5	1	0.05
Waikakalaua_R02	16667	0.018	Trapezoid	17	0.96	0.04
Waikele_R01	1759	0.019	Trapezoid	43	0.98	0.035
Waikele_R02	11020	0.008	Trapezoid	35	0.95	0.04
Waikele_R03	11233	0.020	Trapezoid	10	0.314	0.045
Waikele_R04	11473	0.016	Trapezoid	40	0.32	0.05
Waikele_R05	4644	0.013	Trapezoid	12	1	0.05
Waikele_R06	10875	0.017	Triangle	5	1.8	0.045
Waikele_R07	14336	0.010	Triangle	2	0.28	0.045
Waikele_R08	8822	0.011	Triangle	4	0.3	0.06
Wailani_R01	4808	0.002	Trapezoid	80	0.12	0.035

Source: Values computed using HEC-RAS and ArcGIS

Flood-Frequency Analysis

USGS streamgages located within the Waikele Stream watershed were used to complete a flood-frequency analysis for use in HEC-HMS model calibration. There are four USGS streamgages within the watershed, active or historic, and each has more than 50 years of data. The gage characteristics are summarized in Table 2-5. The locations of all four USGS streamgages are shown in Figure 2-6.

REF-51

Table 2-5. Available USGS Streamgage Data in Waikele Stream watershed

USGS Gage #	Streamgage Location	Drainage Area (mi²)	Years of Record
16212700	Waikakalaua Str nr Wahiawa, Oahu, HI	6.93	54
16212800	Kipapa Str nr Wahiawa, Oahu, HI	4.25	52
16212601	Waikele Str at Wheeler Field, Oahu, HI	6.72	61
16213000	Waikele Str at Waipahu, Oahu, HI	45.14	67

Source: USGS Surface Water for USA (http://nwis.waterdata.usgs.gov/)

River Focus performed a statistical analysis of annual peak flows using the U.S. Army Corps of Engineers' HEC-SSP (Statistical Software Package) software (HEC, 2019). The HEC-SSP analysis was based on Bulletin 17C (USGS Book 4, Hydrologic Analysis and Interpretation, Version 1.1, 2019).

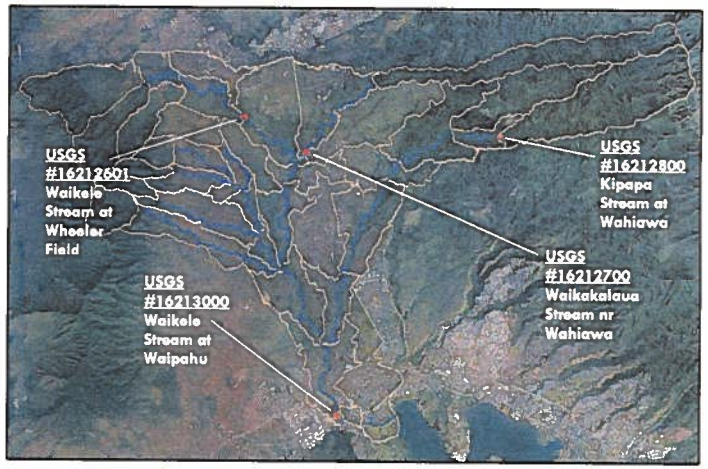

Figure 2-6. USGS Streamgages location in Waikele Stream Watershed

The USGS streamgage on Waikele Stream at Waipahu is located within the LOMR revision area. The gage has a long 67-year period of record (1951 through 2018).

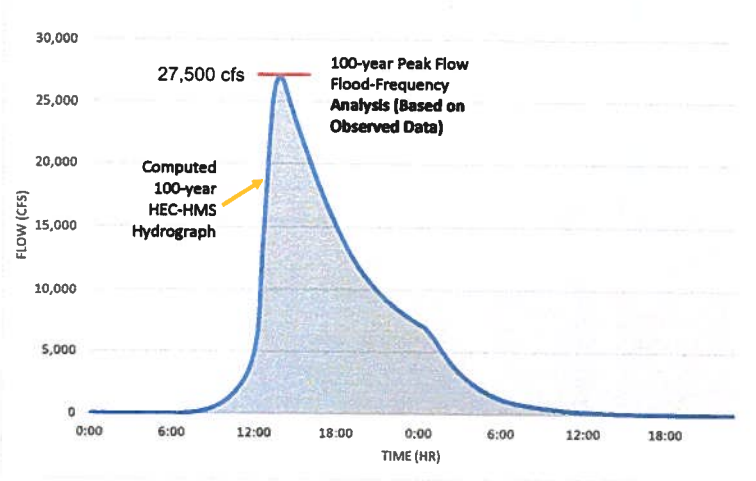

Figure 2-7. HEC-HMS Model Calibration based on Flood-Frequency Analysis at the USGS Streamgage (Waikele Stream at Waipahu)

2.3 HEC-HMS Results

HEC-HMS peak discharges for each of the model subbasins are summarized in Table 2-6. Computed values were rounded based on standard USGS rounding rules—all flows from 100 cfs through 10,000 cfs are rounded to the nearest 10 cfs.

The computed 100-year Waikele Stream peak flow from the HEC-HMS hydrology model was calibrated to fit the 100-year flood-frequency analysis peak flow at USGS streamgage #16213000 (Figure 2-7) while maintaining a reasonable level of consistency with the initial model parameterization. A comparison of the computed flood-frequency analysis and HEC-HMS model peak discharges for Waikele Stream is provided in Table 2-7.

REF-52

Table 2-6. HEC-HMS Subbasins – Computed Peak Discharges

HMS Subbasin	Area (square. mile)	HEC-HMS 100-year Peak Discharge (cfs)	HMS Subbasin	Area (square. mile)	HEC-HMS 100-year Peak Discharge (cfs)
Ekahanui_S01	0.792	292	Manuwaiahu_S01	0.902	1388
Ekahanui_S02	1.513	968	Kapakahi_S01	0.151	671
Huliwai_S01	0.457	160	Waikele_S01	2.261	1300
Huliwai_S02	1.353	1140	Waikele_S02	1.348	363
Kipapa_S01_Gage	4.105	4358	Waikele_S03	0.538	718
Kipapa_S02	0.493	384	Waikele_S04	0.973	561
Kipapa_S03	2.155	958	Waikele_S05	0.871	604
Kipapa_S04	1.204	2195	Waikele_S06	0.782	1885
Kipapa_S05	1.835	2347	Waikele_S07	2.355	2595
Kipapa_S06	0.881	771	Waikele_S08	0.775	1517
KipapaTrib1_S01	2.079	1446	Waikele_S09	0.819	798
KipapaTrib2_S01	1.674	4781	Waikele_S10	1.009	767
Poliwai_S01S	0.358	486	Waikele_S11	1.485	1344
Poliwai_S01N	0.435	150	Waikele_S12	1.664	2233
Poliwai_S02S	0.685	744	Waikele_S13	0.042	125
Poliwai_S02N	0.662	667	Waikele_03_Gage	6.773	3415
Poliwai_S03	0.500	661	Waikele_08_Gage	44.774	27,528
Poliwai_S04	0.360	345	Wailani_S01	1.626	3042
Poliwai_S05	0.336	315	Wailani_S02	0.506	1457
Waikakalaua_S01	2.955	1540	Waikele_Outlet	44.816	27,545
Waikakalaua_S02	1.918	2161	Wailani Outlet	2.133	3468
WaikakalauaTrib_S01	2.243	3310	Kapakahi_Outlet	0.151	671
Waikakalaua_01_Gage	7.116	5562			

Table 2-7. Peak Flow Comparison

Source	100-Year Peak Discharge (cfs)
USGS Streamgage 16213000: Flood-Frequency Analysis (67 years)	27,500
HEC-HMS Hydrologic Model (calibrated)	27,500

3 HYDRAULIC MODELING

Two-dimensional hydraulic modeling was performed using HEC-RAS (River Analysis System), Version 5.0.7 (HEC, 2016). This section describes the HEC-RAS model development and results.

3.1 Hydraulic Model Data/Parameters

2-D Model Area

The 2-D model mesh was defined with an average grid cell spacing of 20 feet (Figure 3-1).

Figure 3-1. HEC-RAS 2-D Model Area

The HEC-RAS 2-D Diffusion Wave solver was used because it provided results that closely matched observed flood elevations (flood elevations computed using the 2-D Full Momentum solver yielded results that poorly matched observed values).

Hydraulic Structures

Hydraulic structures (bridges, culverts, and weirs) were incorporated into the 2-D model domain. The culvert groups near Kapakahi Shopping Center, Farrington Highway, Pearl Harbor Bike Path crossings, and the Golf Course Crossing at Wailani Drainage Canal were modeled as 2-D area connections. Table 3-1 lists the relevant crossings and how they are modeled in HEC-RAS. Available as-built plans and data are provided in Exhibit D.

REF-53

The Farrington Highway bridges over Waikele Stream and the concrete weir downstream of USGS Streamgage #16213000 were modeled directly in the terrain (Figure 3-2). The bridge low-chord elevations are higher than the highest computed flood elevation. Field photos showing the crossings are provided in Figure 3-4 through Figure 3-12. It should be noted that a number of these crossings were modeled as lidded cross sections in the effective HEC-2 hydraulic models. In the current LOMR, these crossings are modeled with additional detail.

Table 3-1. Hydraulic Structures within the 2-D Model Area

Flooding Source	Crossing Location/Description	HEC-RAS Modeling
Waikele Stream	Concrete Weir Downstream of USGS Gage	Modeled Directly in Terrain
	Farrington Highway (deck is high above WSE)	
	Old Railroad Crossing	Modeled as 2D Area Connections
Kapakahi Stream #2	Shopping Center Culvert	
	Farrington Highway	
	Pearl Harbor Bike Path Crossing	
Wailani Drainage Canal	Farrington Highway	
	Pearl Harbor Bike Path Crossing	
	Golf Course Crossing	

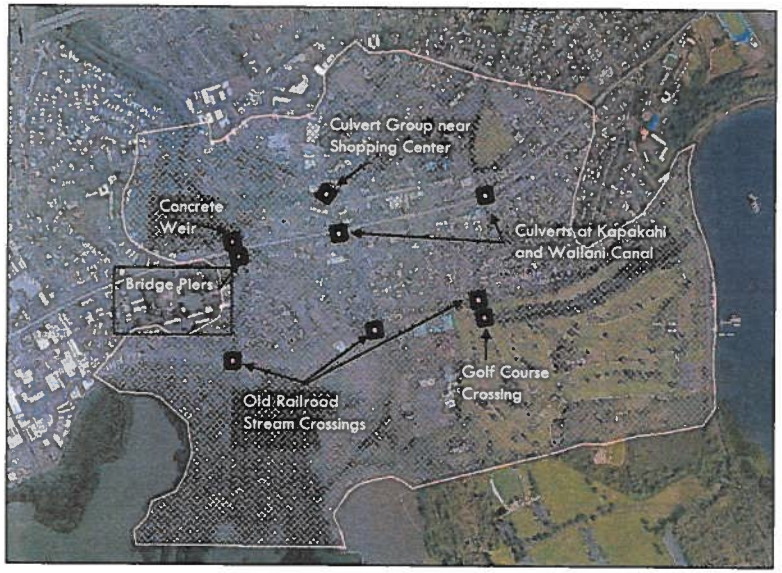

Figure 3-2. Hydraulic Structures within the 2-D Model Area

REF-54

Figure 3-3. Damaged Railroad Crossing on Waikele Stream

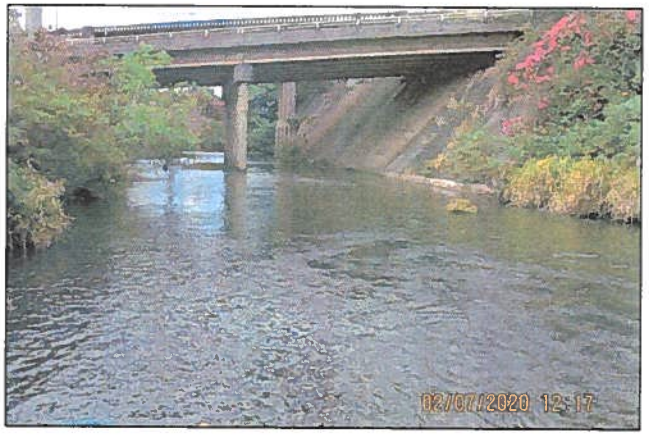

Figure 3-4. Farrington Highway Bridge (Outbound) over Waikele Stream

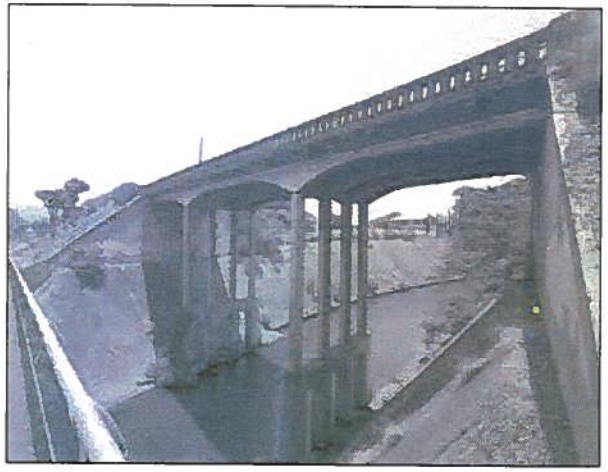

Figure 3-5. Farrington Highway Bridge (Inbound) over Waikele Stream (NPS, 2012)

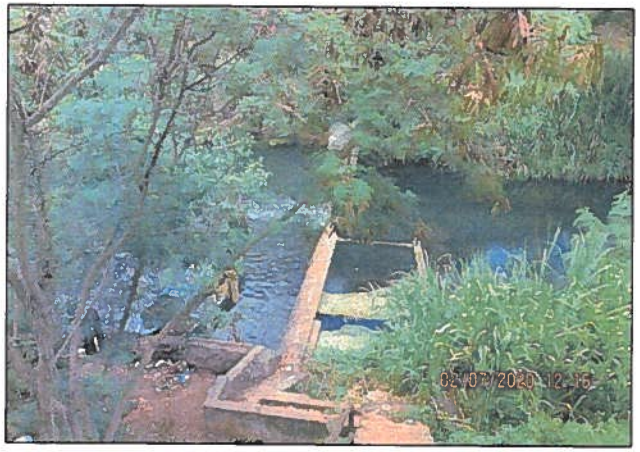

Figure 3-6. Concrete Weir at Downstream of USGS Gage on Waikele Stream

REF-55

Figure 3-7. Kapakahi Stream #2 – Damaged Old Railroad Crossing

Figure 3-8. Kapakahi Stream #2 – Farrington Highway Culvert

Figure 3-9. Kapakahi Stream #2 – Shopping Center Culvert

Figure 3-10. Wailani Drainage Canal – Golf Course Crossing

REF-56

Figure 3-11. Wailani Drainage Canal – Damaged Railroad Crossing

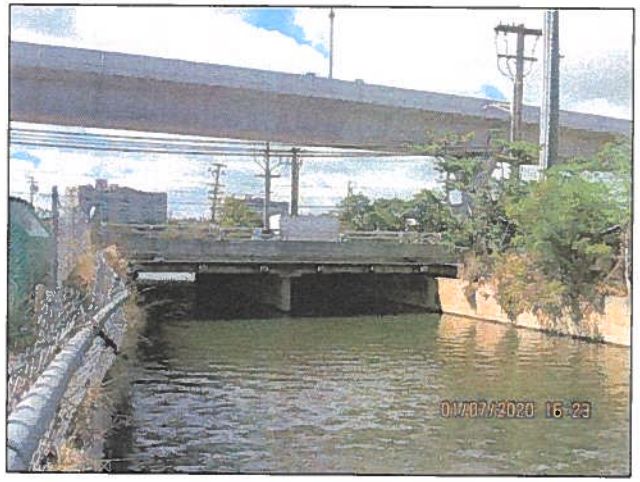

Figure 3-12. Wailani Drainage Canal – Farrington Highway

Topographic and Bathymetric Data

The 2-D hydraulic model terrain was developed with 2013 NOAA LIDAR, survey data provided by Control Point Surveying, and effective FEMA model cross sections. ArcGIS was used to combine the topographic data sources to create a DEM for the 2-D model area.

The ground/bathymetric survey was performed in July 2020. The projection/coordinate system used for this study is NAD 1983, State Plane Hawaii Zone 3, FIPS 5103 (Feet), and the vertical datum is LMSL (Local Mean Sea Level).

Boundary Conditions

The 2-D model grid includes two downstream stage hydrograph boundary conditions: (1) at the Waikele and Kapakahi Stream confluence with Pearl Harbor, and (2) at the Wailani Drainage Canal confluence with Pearl Harbor. Both boundary conditions were set to a Water Surface Elevation (WSE) of 1.9 feet to be consistent with the effective FEMA hydraulic models.

Two upstream boundary conditions were included with inflow hydrographs from the HEC-HMS model, as described in Section 2 above. The upstream boundary conditions correspond to Waikele Stream and the Wailani Drainage canal.

Three local flow boundaries were set within the 2-D model mesh with inflow hydrographs from the HEC-HMS mode. These inflow locations correspond to local runoff locations. The three local flow boundaries are located on Waikele and Kapakahi Streams and Wailani Drainage Canal (Figure 3-13).

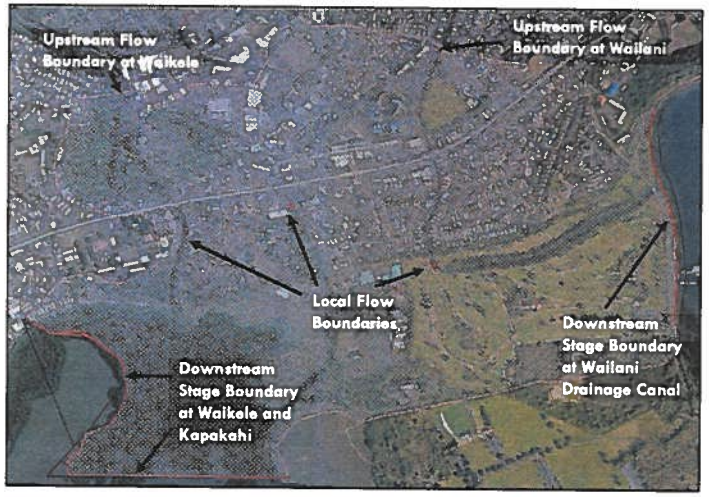

Figure 3-13. HEC-RAS Model Boundary Conditions

REF-57

Manning's Roughness

The channel and overbank roughness (Manning's *n*) values used in the hydraulic simulations are summarized in Table 3-2 and Table 3-3. The selected *n* values were based on field observations, standard engineering references (e.g., Chow, 1959), and engineering judgment. Overbank values are also illustrated in Figure 3-14.

Table 3-2. Manning's Roughness Values in Reaches/Channel

Reaches/ Channel	Area Description	Manning's *n* Value
Kapakahi Stream	Lower Segment	0.04 - 0.05
	Middle Segment	0.060
	Upper Segment	0.045
	Upper Segment near Shopping Center	0.035
Waikele Stream	Earthen Channel, Concrete Channel with Some Trees	0.035
	Stream Channel	0.045
Wailani Drainage Canal	Side Canals, earthen with vegetation	0.045
	Lower Segment, earthen	0.035
	Middle Segment, concrete	0.015
	Upper Segment, denser vegetation	0.060

Table 3-3. Manning's Roughness Values in Overbank Areas

Overbank Area Description	Manning's *n* Value
Paved Surfaces	0.020
Grasslands or Grass Field	0.030
Waikele Stream Overbank - Less Dense	0.060
Taro Field - Dense Vegetation	0.075
Dense Brush, Grass, and Some Trees	0.080
Waikele Stream Overbank - Dense	0.100
Mangrove	0.150
Buildings	0.500

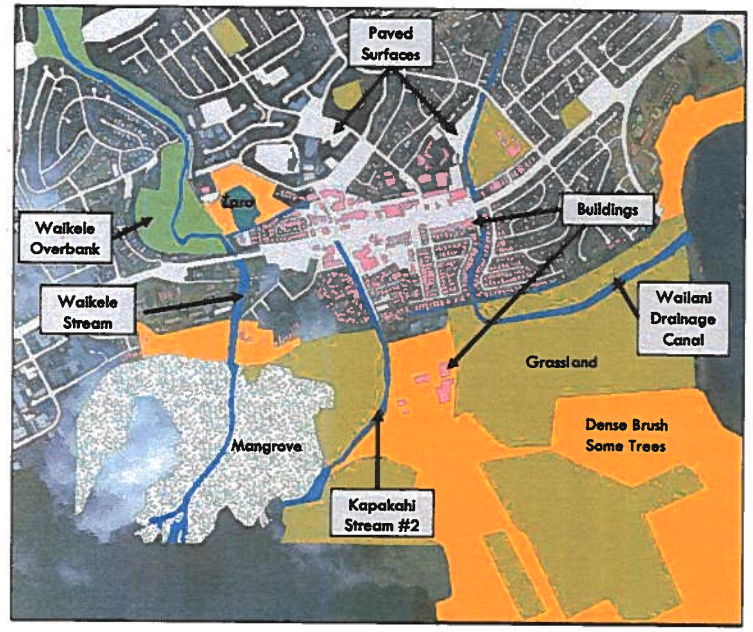

Figure 3-14. Manning's *n* for the Study Area

3.2 Hydraulic Model Calibration

The 2-D hydraulic model was calibrated based on two observed events at the USGS stream gage #16213000: Waikele Stream at Waipahu:

- Flood of record – December 2008
  - Peak Flow: 22,600 cubic feet per second (cfs)
  - Gage Elevation: 20.2 ft (MSL)
- High flow – October 2005
  - Peak Flow: 12,000 cubic feet per second (cfs)
  - Gage Elevation: 14.6 ft (MSL)

Figure 3-15 compares the rating curve from the HEC-RAS 2-D model, which shows computed flood elevations vs. discharge, with the observed events (2005 and 2008). The computed water surface elevations closely match the observed values, showing that the model is well-calibrated.

REF-58

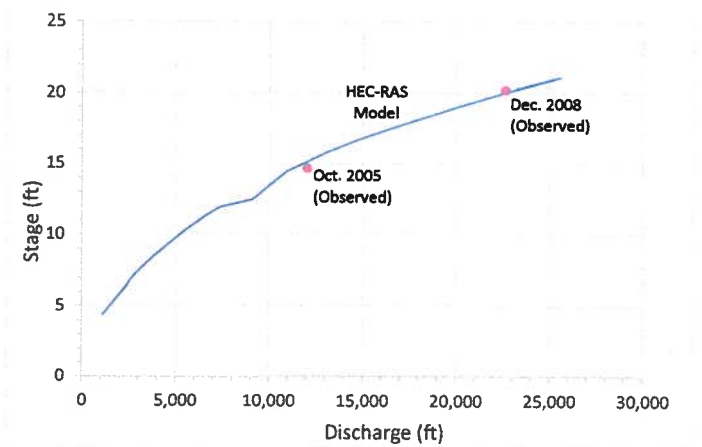

Figure 3-15: 2-D HEC-RAS Model Rating Curve Compared with Observed Events at USGS #16213000

In addition, the HEC-RAS modeled floodplain at the December 2008 peak flow (see Figure 3-16) matched the general floodplain limits seen by Hawaii's Plantation Village staff, who witnessed the flooding first-hand during the December 2008 event. Together with the observed gage data, this anecdotal evidence helps validate the hydraulic model and its computed flood elevations and extents.

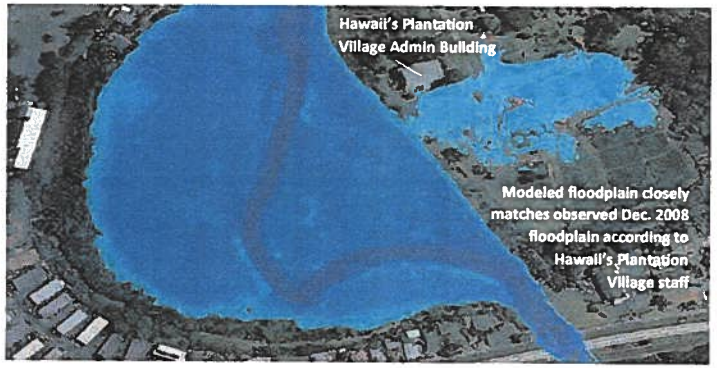

Figure 3-16. HEC-RAS Modeled Floodplain – December 2008 Flood

3.3 Stream Stability

As illustrated in Figure 3-16, during major flood events, flow begins to leave the Waikele Stream floodplain, heading toward Waipahu town along the Kapakahi Stream #2 alignment. Note that the 2008 flood, which is the flood of record, did not appear to cause significant erosion or tree removal within the Waikele Stream floodplain or at the overflow location. Waikele Stream channel has been relatively stable over the past several decades (or even longer), as shown in Figure 3-18.

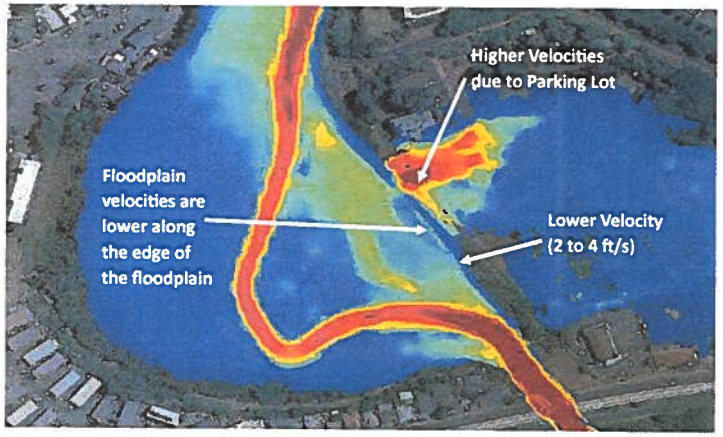

Figure 3-17. Floodplain Velocities – 100-year Flood Event

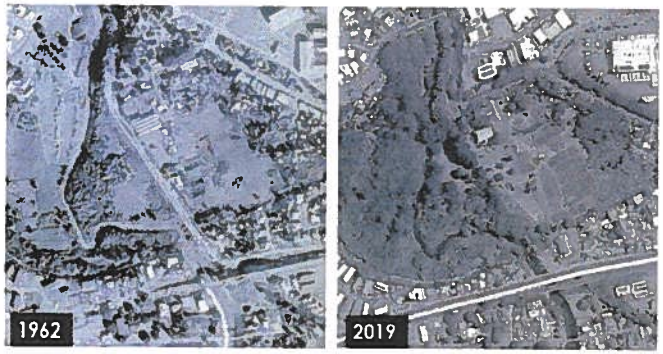

Figure 3-18. Stability of Waikele Stream Channel

REF-59

The rating curves for USGS gage #16213000 on Waikele Stream have changed very little over time; the channel cross section is stable and is not eroding. In addition, a concrete weir is located just downstream of USGS streamgage—this weir helps stabilize the flow and the stream channel (Figure 3-20).

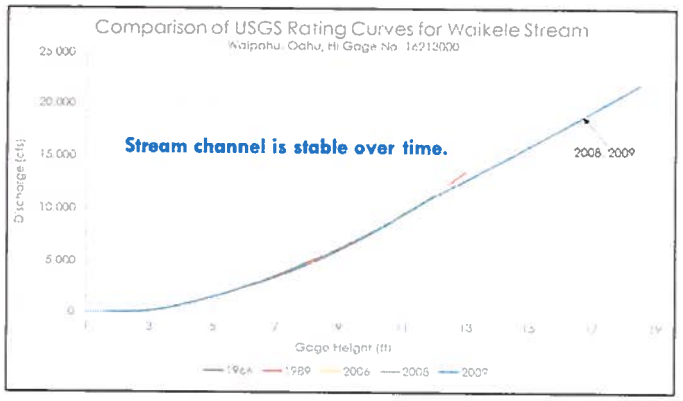

Figure 3-19. Waikele Stream Channel USGS Rating Curve

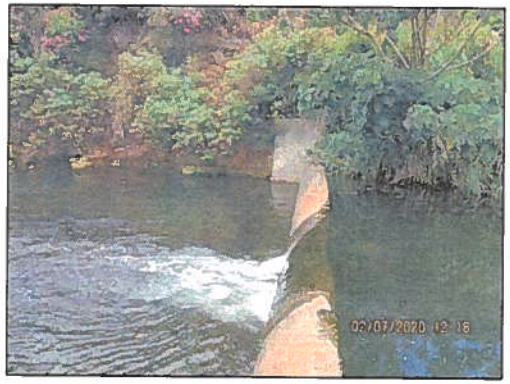

Figure 3-20. Concrete Weir at the Waikele Stream Channel - Downstream of USGS Gage

3.4 Model Results and Mapping

Model Output

The HEC-RAS 2-D unsteady flow model was run with the 10%, 2%, 1%, and 0.2% annual chance exceedance (10-, 50-, 100-, and 500-year) flood events.

Model Tie-ins

The computed 1% annual chance water surface elevations at the upstream end of the Waikele Stream revision reach were compared with those from FIS flood profiles to confirm the upstream tie-in is within 0.5 feet. Because the entire length of Kapakahi Stream #2 is being revised, and Wailani Drainage Canal is being revised to the upstream limit of study, no upstream tie-ins are required for these two flooding sources.

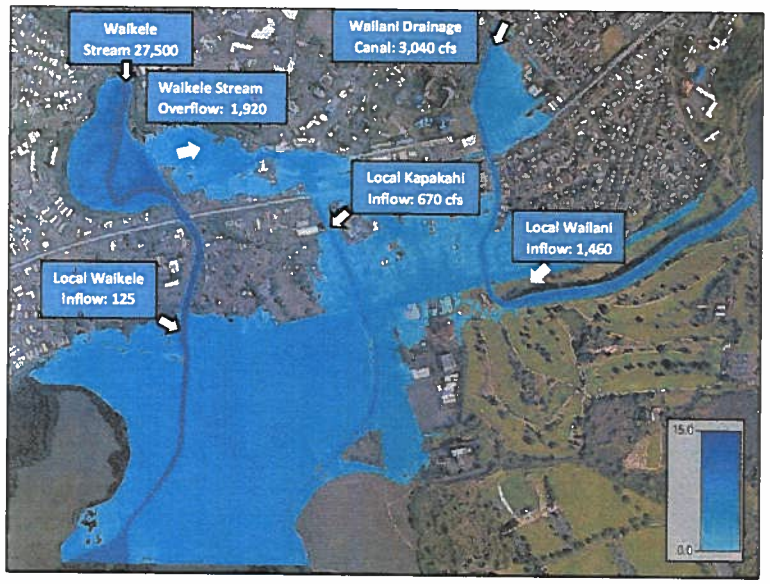

Figure 3-21. 100-Year Flood Depths with HEC-RAS Model Flows (cfs)

REF-60

Floodplain Mapping

Floodplains were developed for the 1% and 0.2% annual chance exceedance (100- year and 500-year) flood events. A certified floodplain workmap is provided as Exhibit B. This workmap also shows the effective FEMA 1% annual chance exceedance floodplain and regulatory floodway for comparison. Revised annotated FIRM Panels are provided as Exhibit C.

3.5 Proposed Floodway Revision

Floodway Development

The final draft version of FEMA's Floodway Analysis and Mapping Guidance Document 79 (November 2020) was used for the 2-D floodway analysis and proposed floodway revision (FEMA, 2020). The proposed floodway revision is shown in Exhibits B and C. The 2-D floodway evaluation lines, which are required by the new 2-D floodway methodology, were developed generally near the lettered cross sections from the FEMA effective mapping.

Note that Wailani Drainage Canal does not have a floodway in the effective FEMA Flood Insurance Study. The effective floodway shown in the vicinity of Wailani Drainage Canal is from the Waikele Stream overflow along Kapakahi Stream #2.

The effective floodway was used as the starting point to avoid expanding the floodway within any urbanized area. Per the FEMA guidance document, Depth times Velocity (D x V) values for the base (100-year) flood were used as the initial encroachment screening approach for the revised floodway (see Figure 3-22).

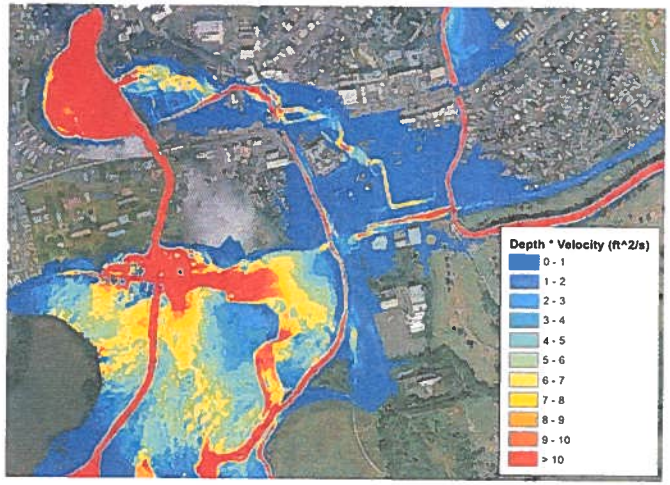

Figure 3-22. Depth times Velocity Plot (100-year)

Per the FEMA 2-D floodway methodology, the terrain was manually modified within the HEC-RAS 2-D model by raising terrain elevations at the tested floodway fringe to confine all flow within the encroached floodway.

Once the proposed floodway limits were developed, the surcharge was checked in two ways:

1. Floodway elevations were compared to non-encroached floodplain elevations along the designated evaluation lines. A conveyance-weighted average surcharge value was computed for each evaluation line. As shown in Table 3-4, these surcharge values were confirmed to be less than 1 ft. Evaluation line locations are shown in Exhibit B.
2. Floodway elevations were compared to computed non-encroached floodplain elevations in GIS to compute surcharge values throughout the study area (see Figure 3-23).

Table 3-4. Floodway Evaluation Lines

Evaluation Line	Average Surcharge (ft)	Average Surcharge Less than 1 ft
A	0.318	Yes
B	0.321	Yes
C	0.123	Yes
D	0.146	Yes
E	0.181	Yes
F	0.625	Yes
G	0.804	Yes
H	0.459	Yes
I	0.286	Yes
Additional Line	0.991	Yes

All surcharge values were between 0 and 1 ft, with two exceptions—one slightly over 1 ft near Farrington Highway and Kapakahi Stream #2 and one negative surcharge location on Waikele Stream. For the area near Farrington Highway, the higher surcharge is within Kapakahi Stream #2 and no structures are affected. An additional evaluation line was drawn across the area per FEMA guidelines, and the average surcharge was shown to be less than 1 ft (see Table 3-4).

Revised Floodway

Due to less computed overflow from Waikele Stream, the proposed floodway in Waipahu is significantly smaller than the effective floodway. There are some areas where the floodway is wider, primarily due to more detailed topographic data and the updated hydraulic analysis. Much of the area where the floodway has increased is in the Pouhala Marsh reserve, which is not subject to future development. However, no structures have been added to the proposed floodway.

REF-61

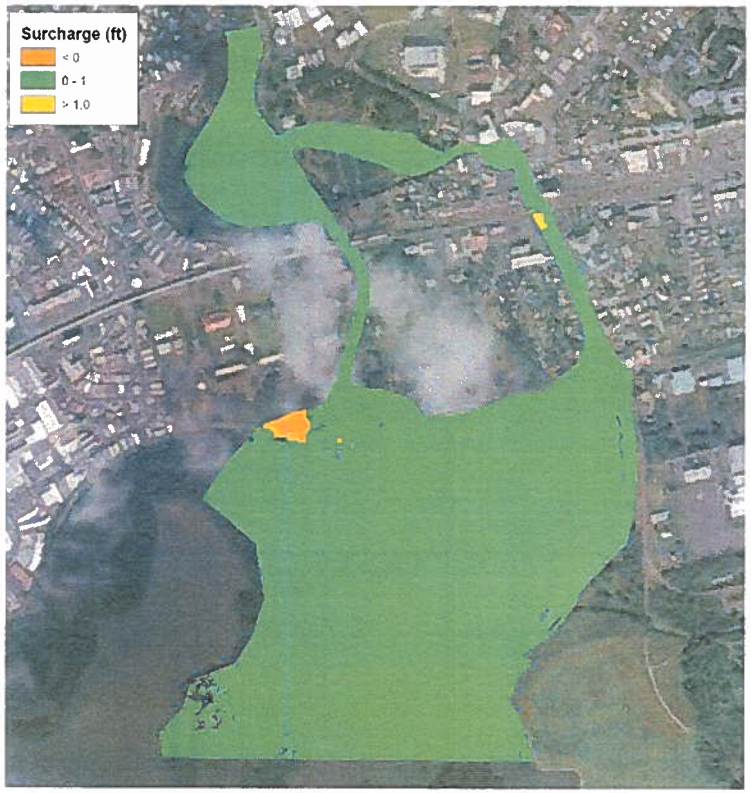

Figure 3-23. Floodway Surcharge – Waikele Stream and Kapakahi Stream #2

4 REFERENCES

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Yochum, S., F. Comiti, E. Wohl, G. David, L. Mao (2014). *Photographic Guidance for Selecting Flow Resistance Coefficients in High-Gradient Channels.* USDA Forest Service Rocky Mountain Research Station. General Technical Report RMRS-GTR-323, July 2014.

REF-62

5 ACKNOWLEDGMENTS

This study was performed by River Focus, Inc., for Kamehameha Schools in association with Wilson Okamoto Corporation (WOC). The WOC team included Kevin Goto, P.E. (Civil Engineer), Cara Itai, and Eric Bisch.

The River Focus study team included Jake Gusman, P.E. (River Focus Project Manager), Darren Bertrand, CFM (Senior Hydrologist), Grant Brady (Hydraulic Engineer), Rumana Arifin, Ph.D. (Senior Water Resources Engineer), and Mikell Warms (Hydraulic Engineer).

EXHIBIT A

FEMA MT-2 Forms

(LOMR Application Forms)

REF-63

LOMC Application

Application ID: R3697925590975 **Revision**

Revision Review

Project Type

Project Type: LOMR

Payment Total

Fee: $0.00 (LOMR Based Solely on Submission of More Detailed Data)

Project Name/Identifier

Project Name/Identifier: Waipahu Existing Conditions

Community Information

State, District or Territory:	HI
County:	Honolulu County
Community Name:	HONOLULU , CITY AND COUNTY* OF
Map Panel Number - Effective Date:	15003C0238G - 01/19/2011
CID:	150001

State, District or Territory:	HI
County:	Honolulu County
Community Name:	HONOLULU , CITY AND COUNTY* OF
Other Map Panel Number - Effective Date:	15003C0236G - 01/19/2011
CID:	150001

Flooding

Flooding Source: Waikele Stream
Types of Flooding: Riverine

Flooding Source: Kapakahi Stream #2
Types of Flooding: Riverine

Flooding Source: Wailani Drainage Canal
Types of Flooding: Riverine

Basis for Request

The basis for this revision request is: Hydraulic Analysis , Hydrologic Analysis , Improved Methodology/Data , New Topographic Data , Regulatory Floodway Revision

Zone Designation

FEMA Zone designations affected: AE , X

Revision Structures

The area of revision encompasses the following structures: No Project

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Last Name:	Siu-Li
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Community Name:	HONOLULU , CITY AND COUNTY* OF
Address 1:	Department of Planning and Permitting

REF-64

Address 2:	650 South King Street 8th Floor
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ZIP Code:	96813
E-mail Address:	msiuli@honolulu.gov
Phone:	808-768-8098

As the CEO or designee responsible for the floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For conditional LOMR request, the applicant has documented Endangered Species Act (ESA) compliance to DHS/FEMA prior to DHS/FEMA's review of the Conditional LOMR application. For LOMR request, I acknowledge that compliance with sections 9 and 10 of the ESA has been achieved independently of DHS/FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44 CFR 65.2(c), and that we have available upon request by DHS/FEMA, all analyses and documentation used to make this determination.

Community Official Signature: _____

Date: _____

Certification by Registered Professional Engineer and/or Land Surveyor

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms instruction. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

First Name:	A. Jake
Last Name:	Gusman
License Number:	10801-C
Expiration Date:	April 30, 2022
Company Name:	River Focus
E-mail Address:	jgusman@riverfocus.com
Telephone Number:	(619) 457-3119
Fax Number:	N/A
Certifier's Signature:	
Date:	01/19/2021

ANDREAS JAKE GUSMAN
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U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Waikele Stream

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
At Pacific Ocean	45.79	26,400	Varies (2D Model)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model → Specify Model: HEC-HMS 4.6
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation.

REF-65

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	West Loch, Pearl Harbor	RS 0	1.9	1.9
Upstream Limit*	133 ft d/s of Waipahu Street	RS 5296	27.0	27.0

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS Version 5.0.7 2D Model

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: WaikeleMauka/Makai	Plan Name: p01	File Name: WaikeleMauka/Makai	Plan Name:	LMSL
Corrected Effective Model*	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Existing or Pre-Project Conditions Model	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A certified topographic work map must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: LiDAR, Topo-Bathymetry, and Ground Survey Data

Source: NOAA (LiDAR), USGS (Topo-Bathymetry), Survey Data

Date: NOAA LiDAR 2013, USGS Topo 2017, Survey 2020

Accuracy: NOAA: 4.8 cm vertical accuracy

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☒ Yes ☐ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☒ Yes ☐ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

REF-66

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C. § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Kapakahi Stream #2

Note: Fill out one form for each flooding source studied.

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
Downstream limit of study	0.33	12,712	Varies (2D Model)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model → Specify Model: HEC-HMS 4.6
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	West Loch, Pearl Harbor	RS 0	1.9	1.9
Upstream Limit*	Start of Waikele Str. overflow	n/a (2D model)	n/a	23.0

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS Version 5.0.7 2D Model

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: KapakahiStream#2	Plan Name: p01	File Name: KapakahiStream#2	Plan Name:	LMSL
Corrected Effective Model*	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Existing or Pre-Project Conditions Model	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: LiDAR, Topo-Bathymetry, and Ground Survey Data

Source: NOAA (LiDAR), USGS (Topo-Bathymetry), Survey Data Date: NOAA LiDAR 2013, USGS Topo 2017, Survey 2020

Accuracy: NOAA: 4.8 cm vertical accuracy

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

REF-67

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☒ Yes ☐ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☒ Yes ☐ No
   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

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AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Wailani Drainage Canal

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

   ☐ Not revised (skip to section B) ☐ No existing analysis ☒ Improved data
   ☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
Downstream limit of study	1.57	2,681	Vanes (2D Model)

3. Methodology for New Hydrologic Analysis (check all that apply)

   ☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model → Specify Model: HEC-HMS 4.6
   ☐ Regional Regression Equations ☐ Other (please attach description)

   Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

   If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

   Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

   If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation.

REF-68

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	900 ft u/s of Lettered XS B		3.48	3.66
Upstream Limit*	Limit of Effective Detailed Study		N/A	7.93

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS Version 5.0.7 2D Model

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: WailaniDrainCanal	Plan Name: p01	File Name: n/a	Plan Name: n/a	LMSL
Corrected Effective Model*	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Existing or Pre-Project Conditions Model	File Name: Waipahu LOMR	Plan Name: p01, p03, p04, p05	File Name: Waipahu LOMR	Plan Name: p02	LMSL
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A certified topographic work map must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: LiDAR, Topo-Bathymetry, and Ground Survey Data

Source: NOAA (LiDAR), USGS (Topo-Bathymetry), Survey Data

Date: NOAA LiDAR 2013, USGS Topo 2017, Survey 2020

Accuracy: NOAA: 4.8 cm vertical accuracy

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☒ Yes ☐ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☒ Yes ☐ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

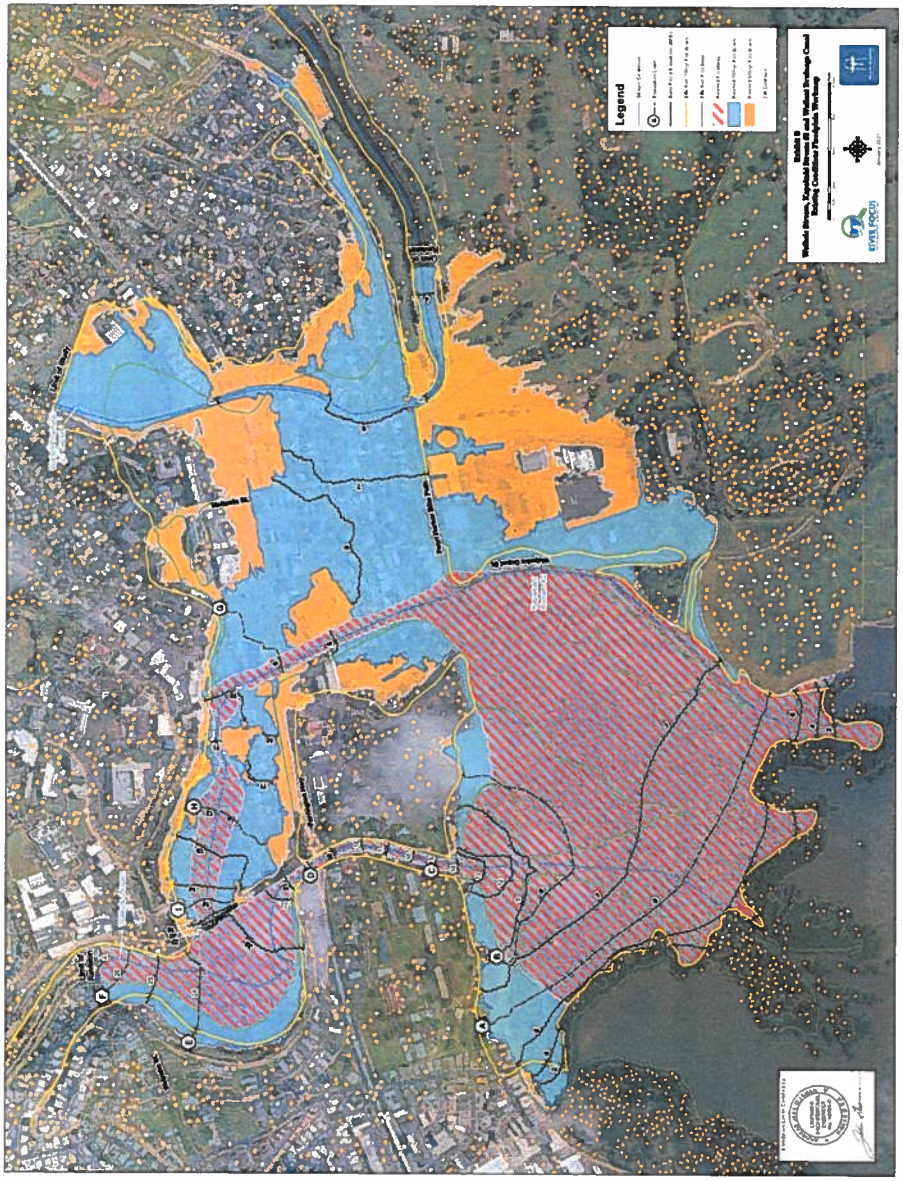
For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

REF-69

EXHIBIT B

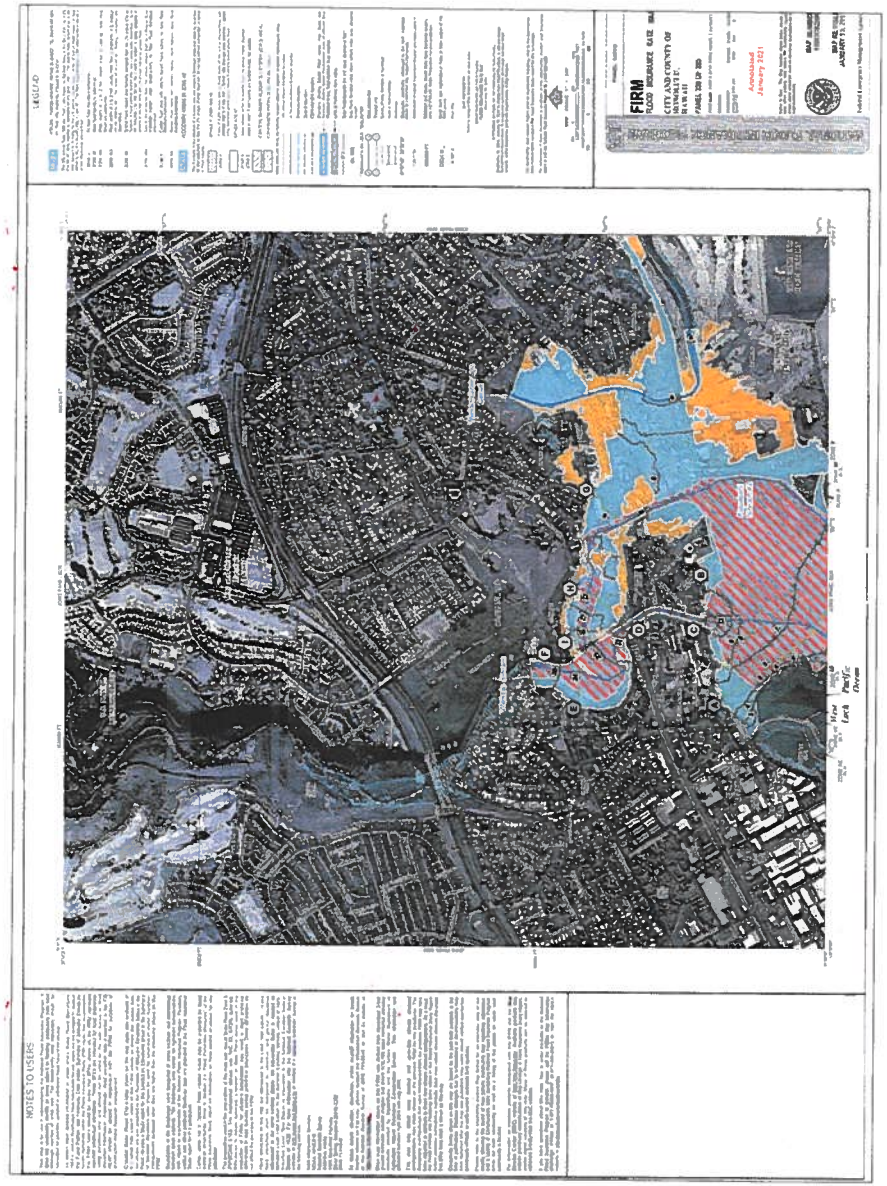
Certified Floodplain Workmap



REF-70

EXHIBIT C

Revised (Annotated) FIRM Panels



REF-71

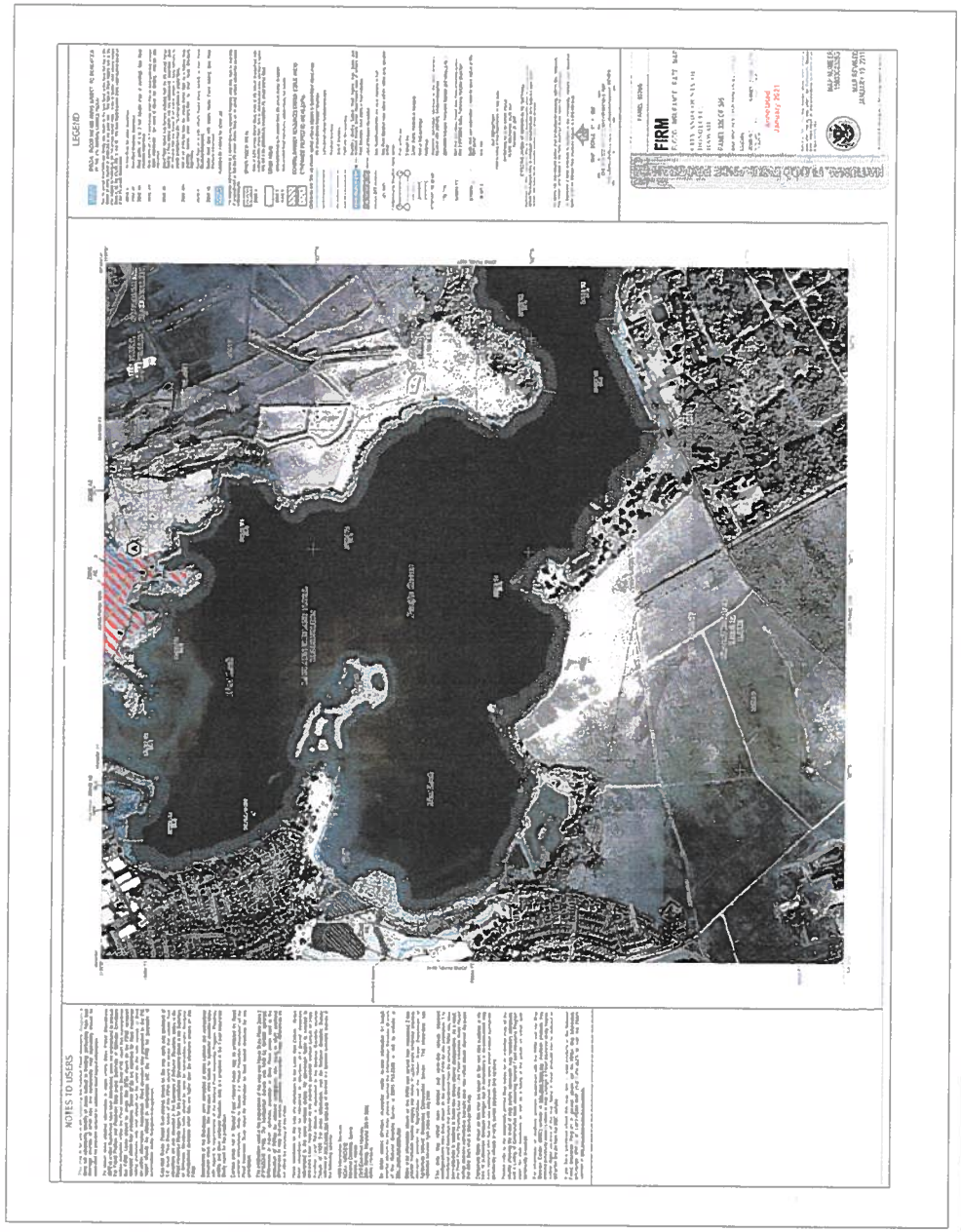
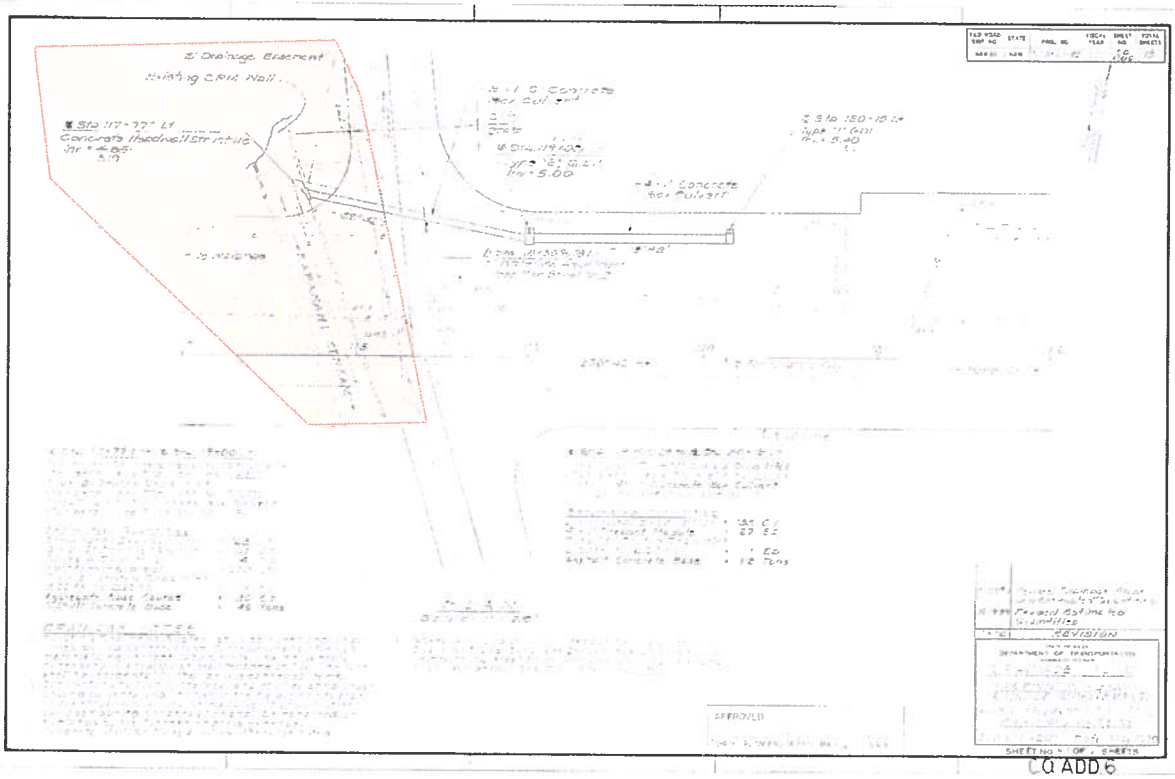


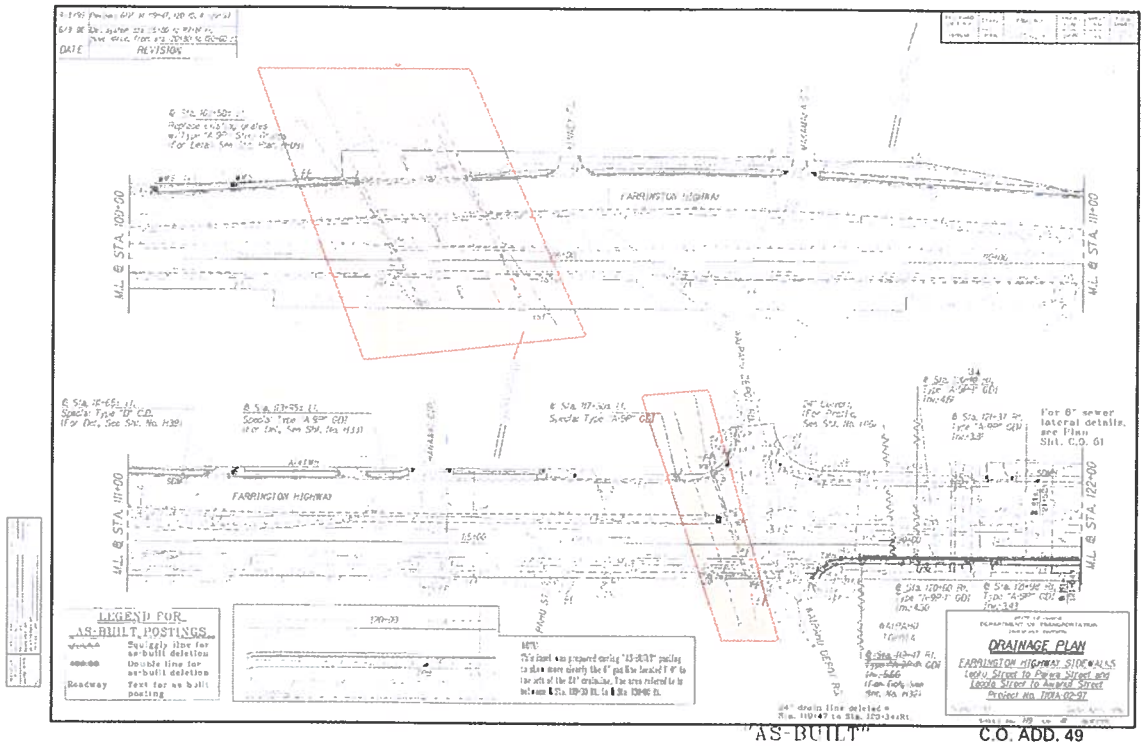
EXHIBIT D

As-Built Structure Plans

REF-72



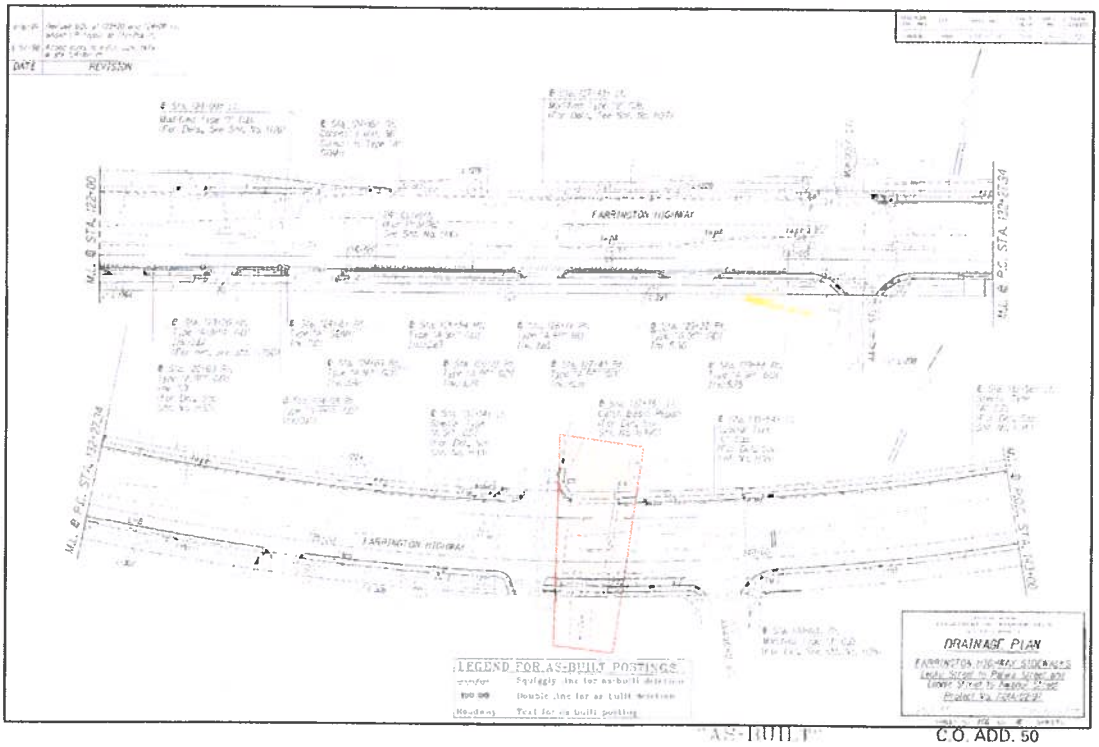
C.O. ADD 6



"AS-BUILT"

C.O. ADD. 49

REF-73



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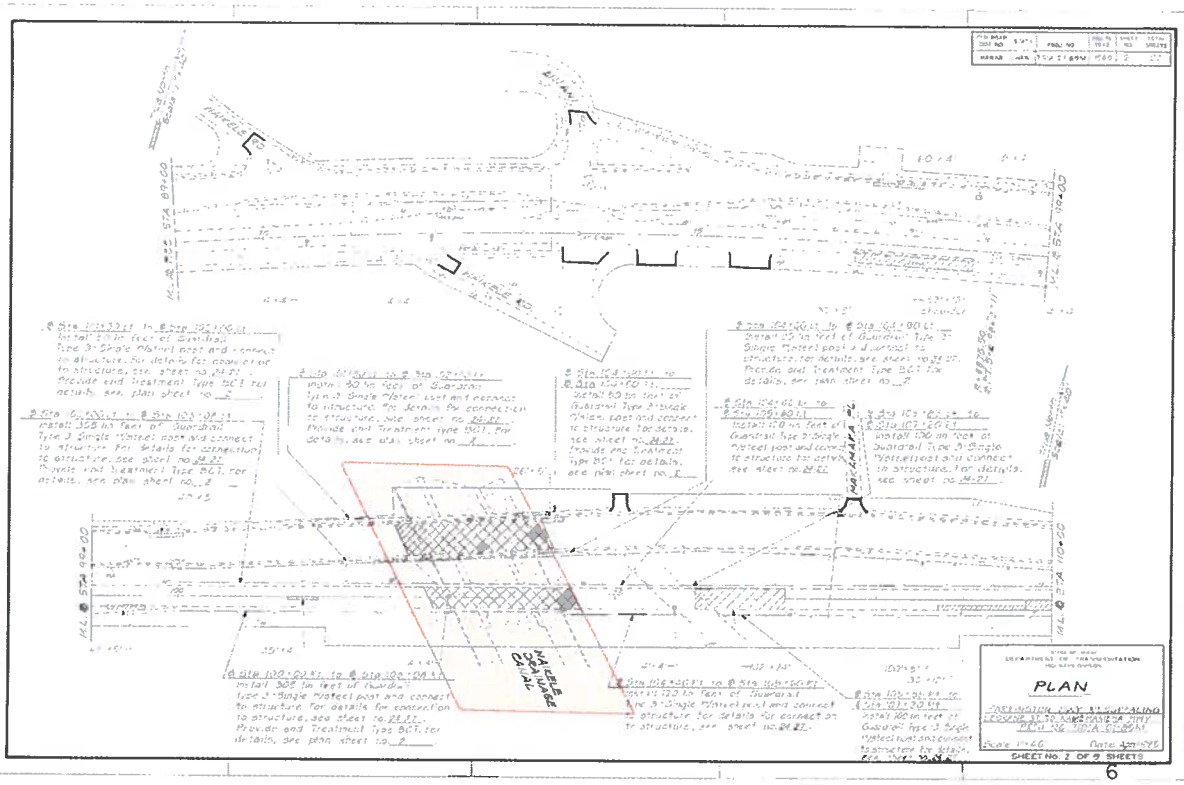
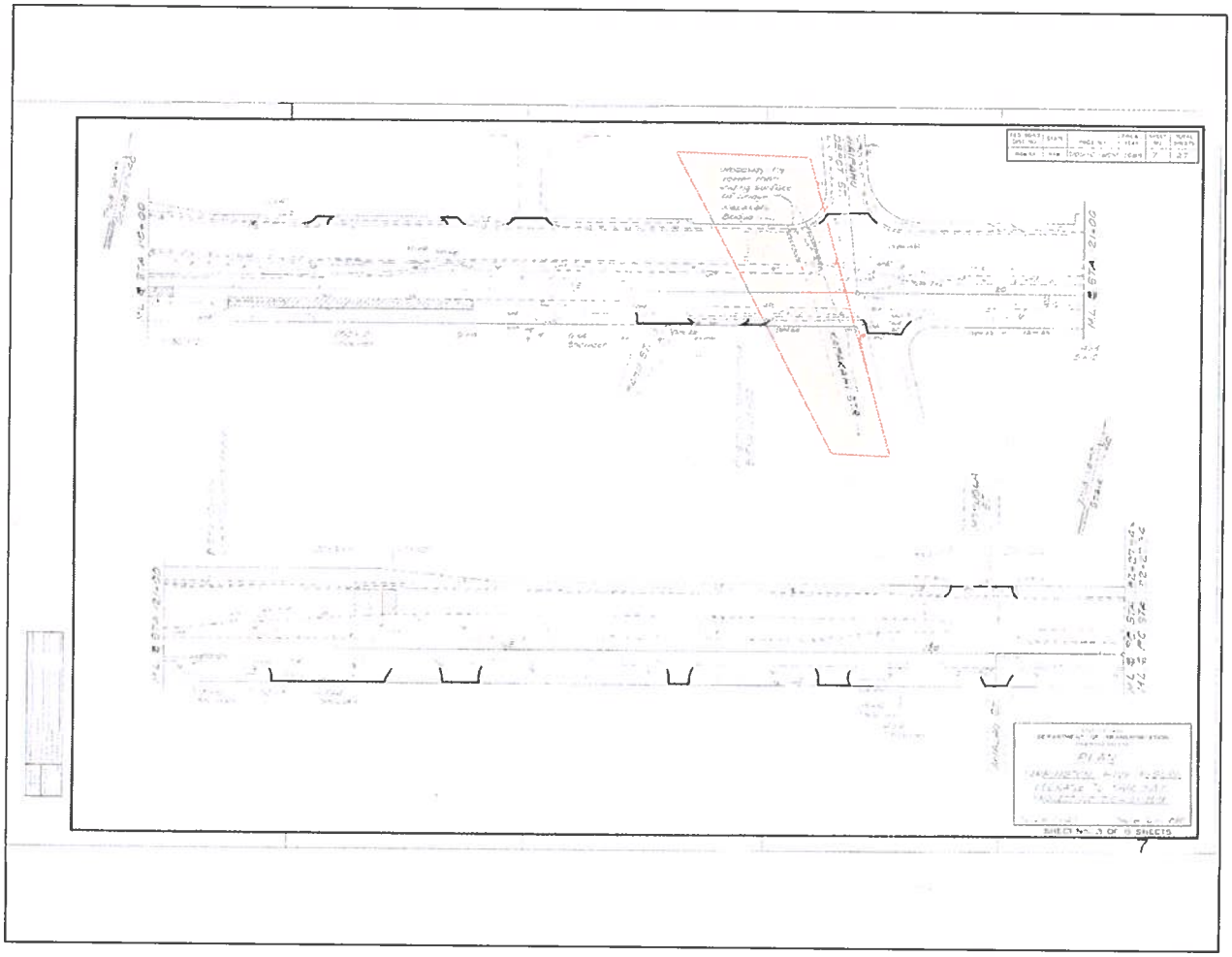
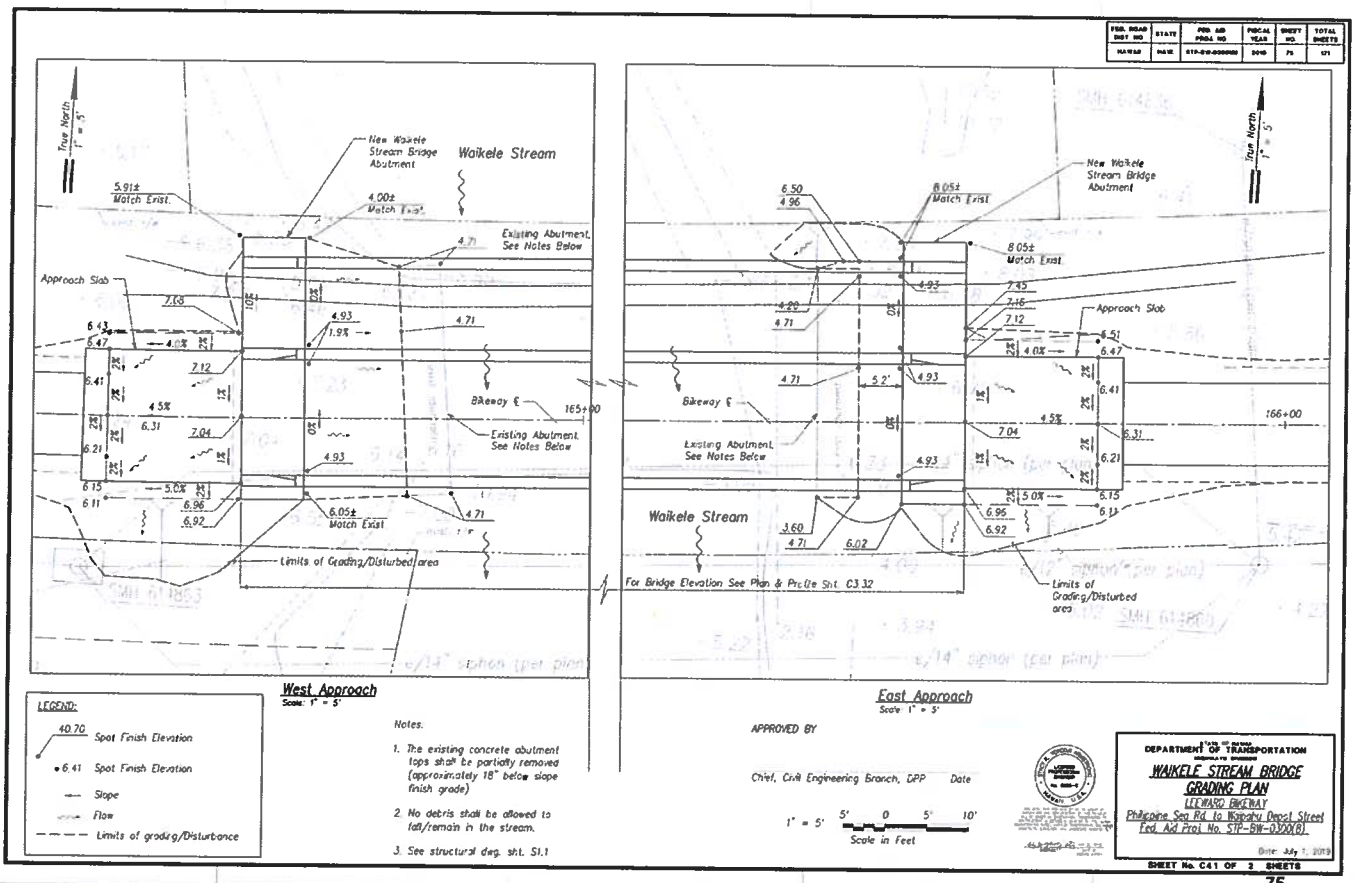


6

REF-74





West Approach
Scale: 1" = 5'

East Approach
Scale 1" = 5'

LEGEND:

- 40.70 Spot Finish Elevation
- 6.41 Spot Finish Elevation
- Slope
- Flow
- Limits of grading/Disturbance

Notes:

1. The existing concrete abutment tops shall be partially removed (approximately 18" below slope finish grade)
2. No debris shall be allowed to fall/remain in the stream.
3. See structural dwg. sht. S1.1

APPROVED BY

Chief, Civil Engineering Branch, DPP Date

1" = 5' 5' 0 5' 10'
Scale in Feet

DEPARTMENT OF TRANSPORTATION

WAIKELE STREAM BRIDGE GRADING PLAN

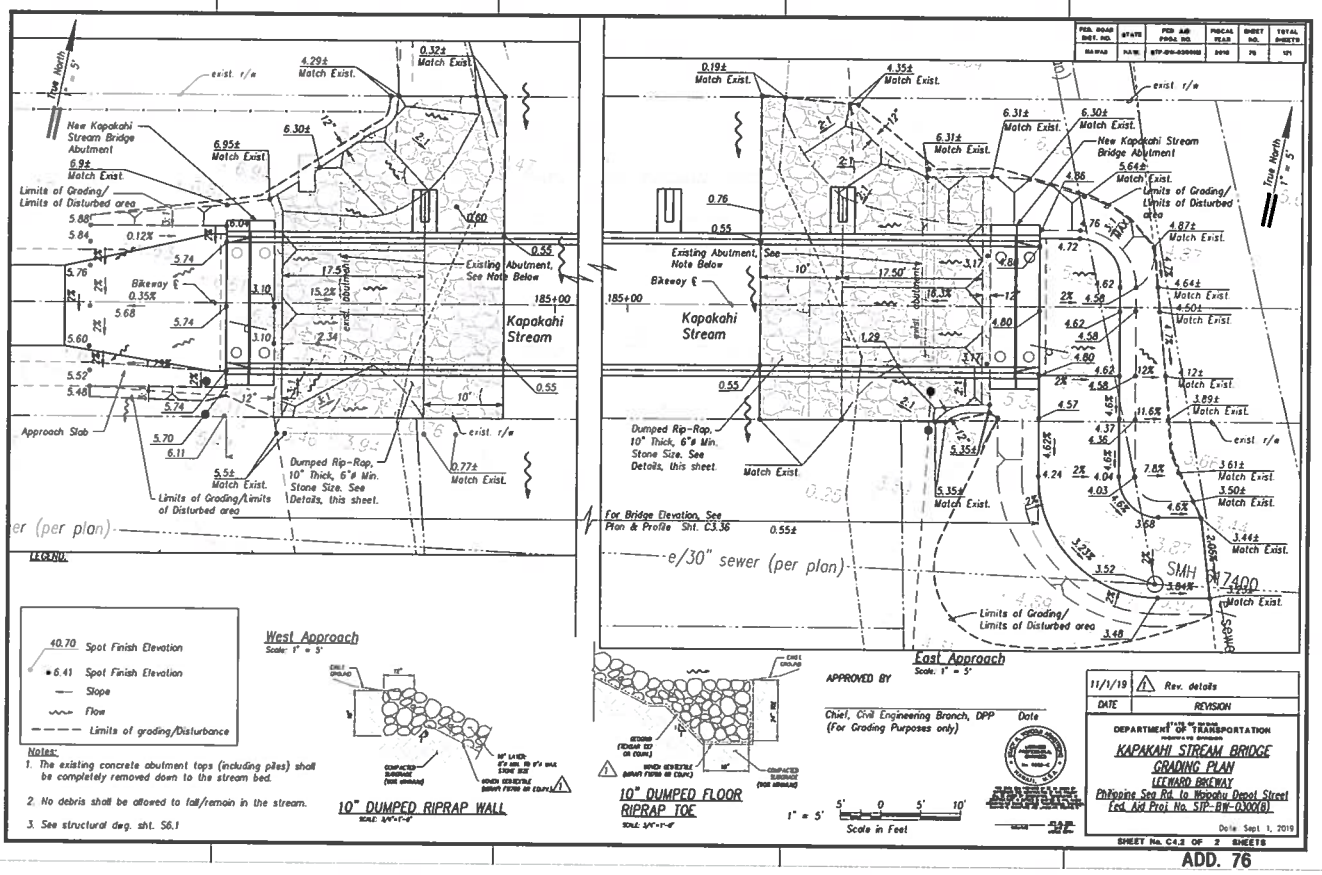
LEEWARD BIKEWAY

Philipine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-BW-0300(8)

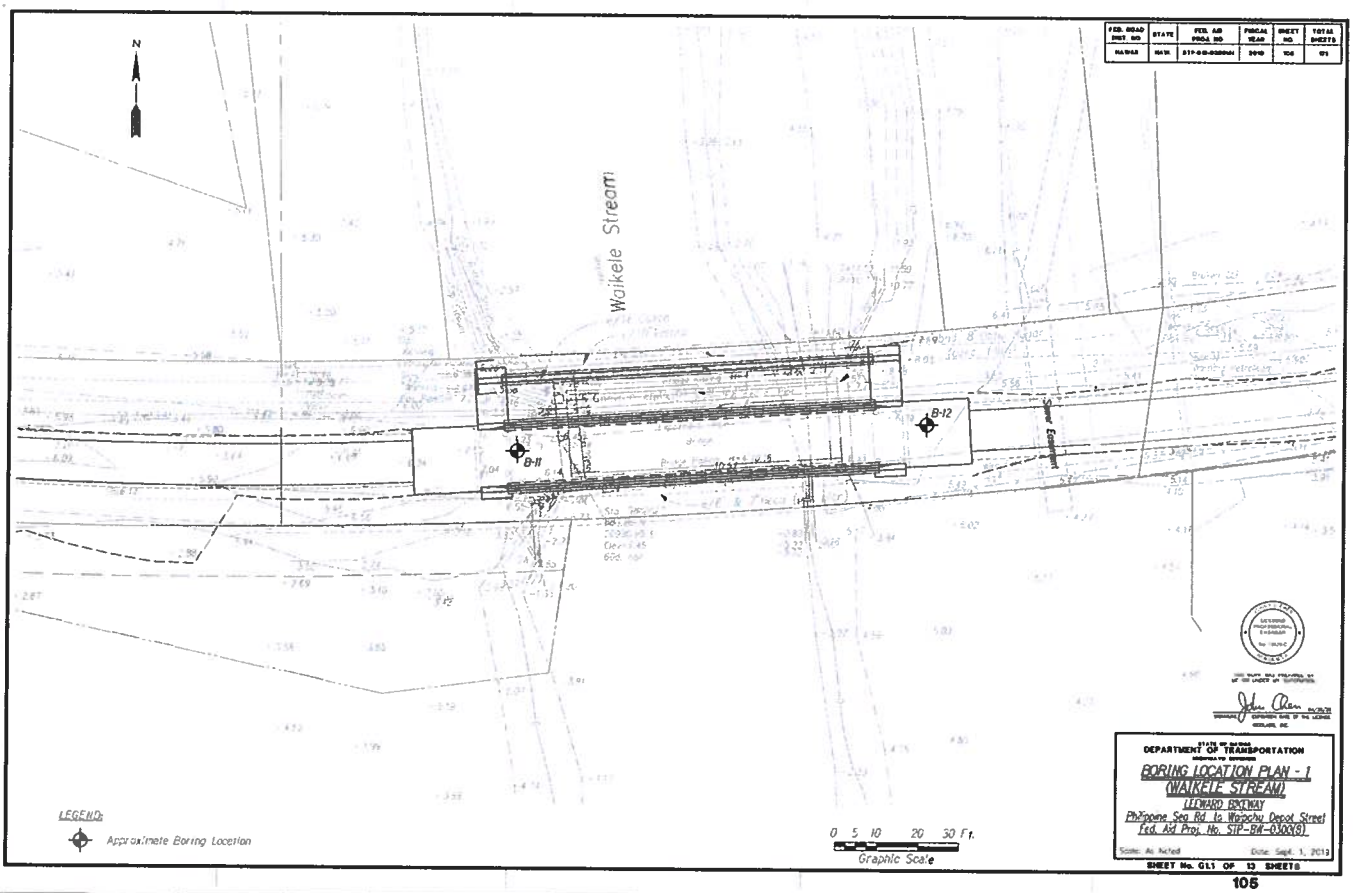
Date: July 1, 2013

SHEET No. C41 OF 2 SHEETS

REF-75



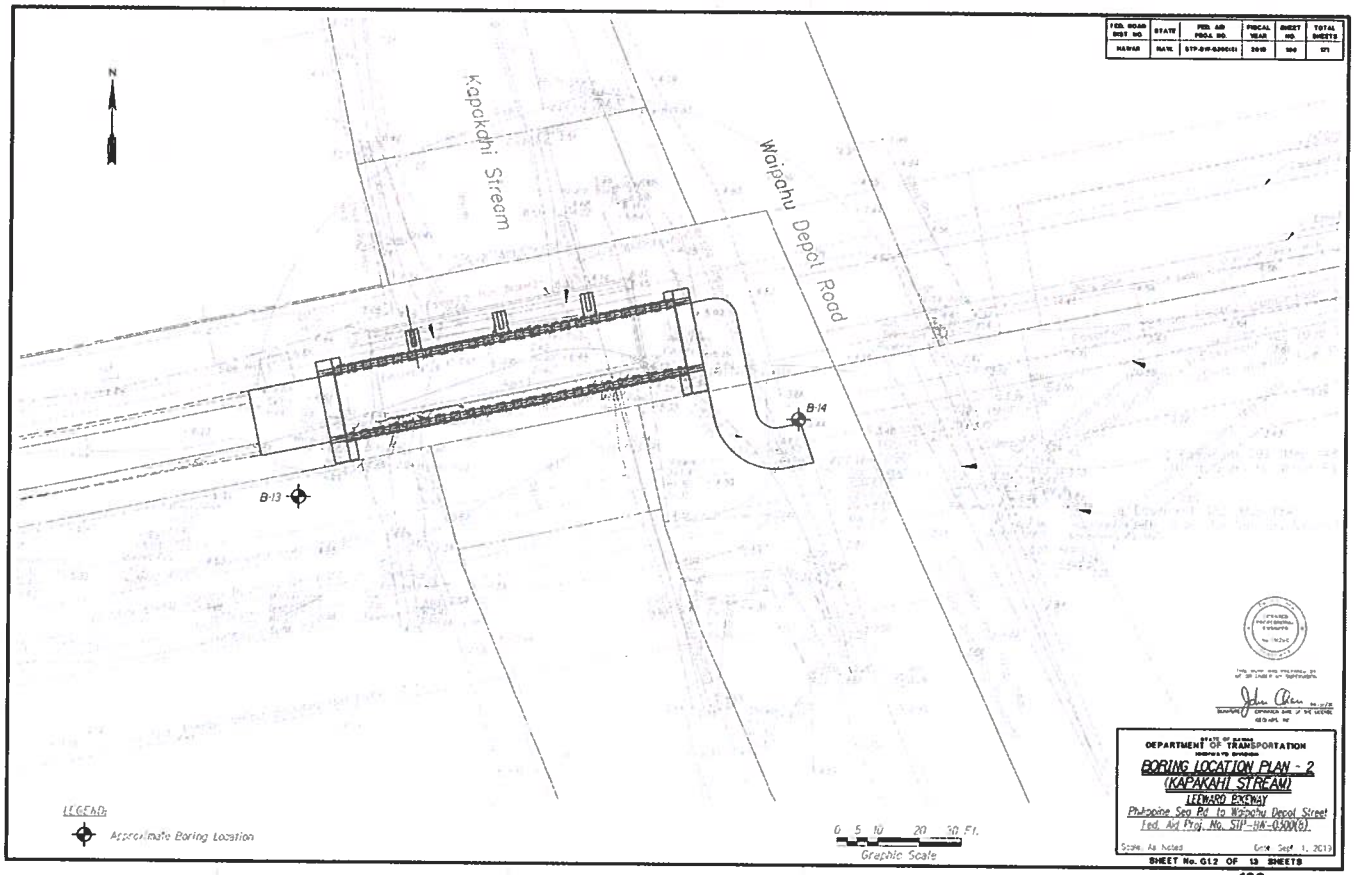
ADD. 76



105

REF-76

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(6)	2013	106	171



DEPARTMENT OF TRANSPORTATION

BORING LOCATION PLAN - 2
(KAPAKAHI STREAM)

LEEWARD EXPWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-HA-0300(6)

Scale: As Noted Date: Sept. 1, 2013

SHEET No. G1.2 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(6)	2013	107	171

GEOLABS, INC.
Geotechnical Engineering

Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS (MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE)	GRAVELS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (MORE THAN 12% FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE)	CLEAN SANDS (LESS THAN 5% FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (MORE THAN 12% FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS (50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT 50 OR MORE)		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, MUCK, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND

- (2-INCH) O.D. STANDARD PENETRATION TEST
- (3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE
- SHELBY TUBE SAMPLE
- CORE SAMPLE
- WATER LEVEL OBSERVED IN BORING
- CONSOL CONSOLIDATION
- LL LIQUID LIMIT (NP=NON-PLASTIC)
- PI PLASTICITY INDEX (NP=NON-PLASTIC)
- TV TORVANE SHEAR (tsf)
- PEN POCKET PENETROMETER (tsf)
- UC UNCONFINED COMPRESSION (psi)
- UU UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (tsf)

Plate A-0.1

GEOLABS, INC.
Geotechnical Engineering

Soil Classification Log Key
(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR SOIL (< #200 <50%)

- PRIMARY constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e. GRAVEL, SAND).
- SECONDARY constituents are composed of a percentage less than the primary constituent. If the soil mass consists of 12 percent or more fines content, a cohesive constituent is used (SILTY or CLAYEY); otherwise, a granular constituent is used (GRAVELLY or SANDY) provided that the secondary constituent consists of 20 percent or more of the soil mass. Secondary constituents are capitalized and bold (i.e. SANDY GRAVEL, CLAYEY SAND) and precede the primary constituent.
- accessory descriptions composed of the following:
  with some >12%
  with a little 5 - 12%
  with traces of <5%
  accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e. SILTY GRAVEL with a little sand)

COHESIVE SOIL (< #200 50%)

- PRIMARY constituents are based on plasticity. Primary constituents are capitalized and bold (i.e. CLAY, SILT).
- SECONDARY constituents are composed of a percentage less than the primary constituent, but more than 20 percent of the soil mass. Secondary constituents are capitalized and bold (i.e. SANDY CLAY, SILTY CLAY, CLAYEY SILT) and precede the primary constituent.
- accessory descriptions composed of the following:
  with some >12%
  with a little 5 - 12%
  with traces of <5%
  accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e. SILTY CLAY with some sand)

EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 15% Fines. Described as SILTY GRAVEL with some sand

RELATIVE DENSITY / CONSISTENCY

Granular Soils			Cohesive Soils			
N-Value (Blows/Foot) SPT	N-Value (Blows/Foot) MCS	Relative Density	N-Value (Blows/Foot) SPT	N-Value (Blows/Foot) MCS	PP Readings (tsf)	Consistency
0 - 4	0 - 7	Very Loose	0 - 2	0 - 4		Very Soft
4 - 10	7 - 18	Loose	2 - 4	4 - 7	< 0.5	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	0.5 - 1.0	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	1.0 - 2.0	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	2.0 - 4.0	Very Stiff
			> 30	> 55	> 4.0	Hard

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

GRAIN SIZE DEFINITION

Description	Sieve Number and / or Size
Boulders	> 12 inches (305-mm)
Cobbles	3 to 12 inches (75-mm to 305-mm)
Gravel	3-inch to #4 (75-mm to 4.75-mm)
Coarse Gravel	3-inch to 3/4-inch (75-mm to 19-mm)
Fine Gravel	3/4 inch to #4 (19-mm to 4.75-mm)
Sand	#4 to #200 (4.75-mm to 0.075-mm)
Coarse Sand	#4 to #10 (4.75-mm to 2-mm)
Medium Sand	#10 to #40 (2-mm to 0.425-mm)
Fine Sand	#40 to #200 (0.425-mm to 0.075-mm)

ABBREVIATIONS

WOH	Weight of Hammer
WOR	Weight of Drill Rods
SPT	Standard Penetration Test Split Spoon Sampler
MCS	Modified California Sampler
PP	Pocket Penetrometer

*Soil descriptions are based on ASTM D2488-99a, Visual-Manual Procedure with the above modifications by Geolabs, Inc. to the Unified Soil Classification System (USCS)

Plate A-0.2

DEPARTMENT OF TRANSPORTATION

BORING LOG LEGENDS

LEEWARD EXPWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-HA-0300(6)

Scale: As Noted Date: Sept. 1, 2013

SHEET No. G2.1 OF 13 SHEETS

REF-77

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(4)	2013	102	171

GEOLABS, INC.
Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

BASALT	FINGER CORAL
BOULDERS	LIMESTONE
BRECCIA	SANDSTONE
CLINKER	SILTSTONE
COBBLES	TUFF
CORAL	VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock.

Massive	Greater than 24 inches apart
Slightly Fractured	12 to 24 inches apart
Moderately Fractured	6 to 12 inches apart
Closely Fractured	3 to 6 inches apart
Severely Fractured	Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock.

Unweathered	Rock shows no signs of discoloration or loss of strength
Slightly Weathered	Slight discoloration extends from open fractures
Moderately Weathered	Discoloration throughout and material is penetrable through but able to break by hand
Highly Weathered	Most minerals decomposed with some discontinuities present in relicual and mass. Can be crumbled by hand
Extremely Weathered	Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved

HARDNESS

The following terms describe the resistance to penetration or excavation.

Very Hard	Specimen breaks with difficulty after several "pinging" hammer blows. Example: Dense, fine grain volcanic rock
Hard	Specimen breaks with some difficulty after several hammer blows. Example: Very coarse, angular, coarse-grained rock
Medium Hard	Specimen can be scratched by pick hammer blow. Cannot be scraped or peeled by knife. SPT may penetrate by ~25 blows per inch with bouncing. Example: Porous rock such as clinker, cinder, and coral reef
Soft	Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot. Example: Weathered rock, chalk, like limestone
Very Soft	Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure. Example: Saprolite

Plate
A-0.3

GEOTECHNICAL NOTES

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Leeward Bikeway, Philippine Sea Road to Waipahu Depot Street, Waipahu, Oahu, Hawaii" dated September 20, 2018 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.
2. For boring locations, see Sheet G1.0 and G1.2.
3. The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
4. The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.
5. The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND & NOTES

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted Date: Sept. 1, 2013

SHEET No. G2.2 OF 13 SHEETS

108

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(4)	2013	103	171

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 11

Approximate Ground Surface Elevation (feet): 7 ±

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Sample Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	14	77	33		30				MH	Brown with white mottling CLAYEY SILT with sand, medium stiff, damp (fill)
	9		11		6				GP-GM	Whitish tan with white mottling SILTY GRAVEL (CORALLINE) with sand, loose, dry (fill)
	34		11		16		5			grades to saturated
									CL	Dark brownish gray with white mottling SANDY CLAY with silt and shells, very soft (lagoonal deposit)
	46		83		2		10			
CONSOL	114	42	50		3		15			
	88		83		1/18"		20			
									SC	Dark grayish brown CLAYEY SAND with some gravel, very loose (marsh deposit)
	60	65	78		2		25			
	57		83		2		30			
									CL	Brown with multi-color mottling SANDY CLAY with silt and some gravel, very stiff (alluvium)
							35			

Date Started	December 5, 2008
Date Completed	December 9, 2008
Logged By:	Y. Chiba
Total Depth:	151 feet
Work Order:	0008-00

Water Level:	4.5 ft. 12/5/08 1000 HRS
Drill Rig:	CME-55
Drilling Method:	4" Auger & PQ Coring
Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 11

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Sample Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
LL=49 PI=22	40		83		18	3.5				
							40			
TXUU	44	77	78		23	2.5				
							45			
	45		83		7	2.0				
							50		GP	Brown with multi-color mottling COBBLES AND BOULDERS (BASALTIC) with sand, dense (alluvium)
			88	0	11/3"					
							55			
			75	0	8"/0"					
							60			
			50	0						
							65			
			88	0	15/3"					
							70			

Date Started	December 5, 2008
Date Completed	December 9, 2008
Logged By:	Y. Chiba
Total Depth:	151 feet
Work Order:	0008-00

Water Level:	4.5 ft. 12/5/08 1000 HRS
Drill Rig:	CME-55
Drilling Method:	4" Auger & PQ Coring
Driving Energy:	140 lb. wt., 30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted Date: Sept. 1, 2013

SHEET No. G2.3 OF 13 SHEETS

109

REF-78

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	STP-0H-0300(6)	2010	110	171

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 11

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
		100	0							Grayish brown with multi-color mottling vesicular BASALT, closely to severely fractured, highly weathered, medium hard
							75			grades to closely fractured, highly to moderately weathered
		100	27							
							80			
		100	67							
							85			
		75	50							
							90			
		100	67							
							95			
		90	47							
							100			
		75	67							grades to scoriaceous
							105			

Date Started	December 5, 2008	Water Level	4.5 ft. 12/5/08 1000 HRS
Date Completed	December 9, 2008		
Logged By	Y. Chiba	Drill Rig	CME 55
Total Depth	151 feet	Drilling Method	4" Auger & PQ Coring
Work Order	6008-00	Driving Energy	140 lb. wt.,30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 11

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
		100	83							
							110			
		100	92							grades to moderately weathered, very hard
							115			grades to moderately fractured
		100	93							
							120			grades to grayish red
		100	90							
							125			
		100	100							
							130			grades to moderately fractured
		100	83							grades to gray, slightly fractured, slightly weathered, very hard
							135			(6 foot artesian head encountered)
		100	97							grades with red mottling
							140			

Date Started	December 5, 2008	Water Level	4.5 ft. 12/5/08 1000 HRS
Date Completed	December 9, 2008		
Logged By	Y. Chiba	Drill Rig	CME 55
Total Depth	151 feet	Drilling Method	4" Auger & PQ Coring
Work Order	6008-00	Driving Energy	140 lb. wt.,30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. 02.4 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	STP-0H-0300(6)	2010	111	171

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 11

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
		100	97							
							145			grades to grayish red
		100	100							
							150			(6 foot artesian head encountered)
										Boring terminated at 151 feet
							155			* Elevations estimated from Topographic Survey Map transmitted by R. M. Towill Corporation on January 6, 2009
							160			
							165			
							170			
							175			

Date Started	December 5, 2008	Water Level	4.5 ft. 12/5/08 1000 HRS
Date Completed	December 9, 2008		
Logged By	Y. Chiba	Drill Rig	CME 55
Total Depth	151 feet	Drilling Method	4" Auger & PQ Coring
Work Order	6008-00	Driving Energy	140 lb. wt.,30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 12

Approximate Ground Surface Elevation (feet), 7 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	12	104	39		21				CL	Brown with white mottling SANDY CLAY with some gravel, very stiff, damp (fill)
	24		33		8		5		SM	Whitish tan with light brown mottling SILTY SAND (CORALLINE) with gravel, medium dense, moist (fill)
									CL	Dark grayish brown with white mottling SILTY CLAY with shells, very soft (lagoonal deposit)
	48	74	39		4		10			
							15			
	42		67		2					
									MH	Dark grayish brown CLAYEY SILT with fine sand and some shells, very soft (lagoonal deposit)
							20			
CONSOL	91	46	78		2					
							25			
LL=96 PI=48		104		100	1/18"					
									CH	Brown with multi-color mottling SILTY CLAY with some fine sand, very stiff (alluvium)
							30			
TXUU	42	61	78		14	3.0				
							35			

Date Started	December 1, 2008	Water Level	7.1 ft. 12/1/2008 1230 HRS
Date Completed	December 4, 2008		
Logged By	Y. Chiba	Drill Rig	CME-55
Total Depth	126 feet	Drilling Method	4" Auger & PQ Coring
Work Order	6008-00	Driving Energy	140 lb. wt.,30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. 02.5 OF 13 SHEETS

REF-79

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-BW-0300(6)	2010	112	171

GEOLABS, INC. Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 12

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
LL=56 PI=33	42		83		4	2.5			CH	grades with some gravel
							40			
TXUU	47	74	22		19	3.0			ML	Brown SANDY SILT with some gravel, medium dense (alluvium)
							45			
	45		83		7	3.0				
							50			
	16		83		7					
							55		GP	Brown with multi-color mottling GRAVELLY COBBLES AND BOULDERS (BASALTIC) with clayey silt, dense (alluvium)
			60	0	8/0"					
							60			
			100	0						
							65			
			50	0						
							70			

Date Started: December 1, 2008
Date Completed: December 4, 2008
Logged By: Y. Chiba
Total Depth: 126 feet
Work Order: 6008-00

Water Level: 7.1 ft. 12/1/2008 1234 HRS
Drill Rig: CME-55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

GEOLABS, INC. Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 12

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			100	50					GP	Brownish orange with multi-color mottling scoriaceous BASALT, closely fractured, highly weathered, medium hard
							75			
			83	70						(3 foot artesian head encountered)
							80			
			100	67						grades to vesicular, moderately fractured, moderately weathered, very hard
							85			
			100	67						grades to orangish brown with multi-color mottling scoriaceous, closely fractured, moderately to highly weathered, hard
							90			grades to light gray vesicular, closely to severely fractured, moderately weathered
			100	50						
							95			
			100	60						
							100			
			100	75						
							105			

Date Started: December 1, 2008
Date Completed: December 4, 2008
Logged By: Y. Chiba
Total Depth: 126 feet
Work Order: 6008-00

Water Level: 7.1 ft. 12/1/2008 1234 HRS
Drill Rig: CME-55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-BW-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. G2.6 OF 13 SHEETS

112

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-BW-0300(6)	2010	113	171

GEOLABS, INC. Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 12

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			100	70						grades to scoriaceous to dense, moderately to highly weathered
							110			
			100	82						grades to closely fractured
							115			
			100	67						
							120			
			87	80						grades to very hard
							125			grades to grayish red
										Boring terminated at 126 feet
							130			
							135			
							140			

Date Started: December 1, 2008
Date Completed: December 4, 2008
Logged By: Y. Chiba
Total Depth: 126 feet
Work Order: 6008-00

Water Level: 7.1 ft. 12/1/2008 1234 HRS
Drill Rig: CME-55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

GEOLABS, INC. Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 13

Approximate Ground Surface Elevation (feet): 5.5 ±

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
LL=57 PI=25	37	83			9	1.5			MH	Dark reddish brown CLAYEY SILT, medium stiff, damp
	62				Wt. of Rods	<0.5	5		MH	Dark grayish brown CLAYEY SILT with fine sand and some shells, very soft, wet (marsh deposit)
							10		CH	Dark grayish brown CLAY with shells, very soft (alluvium)
LL=62 PI=32	51				Wt. of Rods					
							15			
	35	80			10				SW	Dark grayish brown GRAVELLY SAND with some cobbles and organic matter, medium dense (alluvium)
									MH	Dark grayish brown CLAYEY SILT with some organic matter and shells, very soft (marsh deposit)
							20			
LL=90 PI=45 TV=0.05	81				Wt. of Rods					
							25			
LL=82 PI=42 CONSOL	75	59			Wt. of Rods					
							30			
	78				Wt. of Rods					
							35			

Date Started: January 26, 2009
Date Completed: January 27, 2009
Logged By: Y. Chiba
Total Depth: 116.5 feet
Work Order: 6008-00

Water Level: 5.7 ft. 01/26/2009 1127 HRS
Drill Rig: CME-76
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-BW-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. G2.7 OF 13 SHEETS

113

REF-80

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	PROJECT YEAR	SHEET NO.	TOTAL SHEETS
9	HAWAII	STP-BW-0300(6)	2010	115	121

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 13

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Product Pen. (in)	Depth (feet)	Sample Graphic	USCS	Description
									SC	Reddish brown with multi-color mottling SILTY SAND (BASALTIC) with gravel, medium dense (clinker)
		50	17							
							110			Tannish gray with multi-color mottling vesicular BASALT, closely to severely fractured, highly to moderately weathered, hard
		83	10							
							115			
										Boring terminated at 116.5 feet
							120			
							125			
							130			
							135			
							140			

Date Started: January 26, 2009
Date Completed: January 27, 2009
Logged By: Y. Chiba
Total Depth: 116.5 feet
Work Order: 8008-00

Water Level: 5.7 ft 01/26/2009 1122 HRS
Drill Rig: CME-75
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb wt 30 in drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 14

Approximate Ground Surface Elevation (feet) 3.5 ±

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Product Pen. (in)	Depth (feet)	Sample Graphic	USCS	Description
									GM	Light brown with gray mottling SILTY GRAVEL (BASALTIC) with sand, dense, dry (fill)
	9	103	78	37	2.5				CL	Reddish brown with multi-color mottling SANDY CLAY with gravel and sand, medium stiff, damp (fill)
	26		33	9	2.0					grades with some cobbles, wet at 3 feet
LL=46 PI=21	32	86	78	17	1.5		5			
										grades with silt, very soft
	31		28	7	<0.5		10			
									GP	Dark gray GRAVEL (BASALTIC) with sand and clay, loose (fill)
	11		67	10			15			
									MH	Dark brownish gray SANDY CLAY with silt and some shells, very soft (marsh deposit)
	64		6	2			20			
	71	57	78	5			25			
LL=74 PI=37	72		100	2			30			
							35			

Date Started: November 21, 2008
Date Completed: December 1, 2008
Logged By: Y. Chiba
Total Depth: 153.5 feet
Work Order: 8008-00

Water Level: 10.5 ft 11/24/08 1330 HRS
Drill Rig: CME-55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb wt 30 in drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-BW-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. 0.2.9 OF 13 SHEETS

115

REF-81

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	PROJECT YEAR	SHEET NO.	TOTAL SHEETS
9	HAWAII	STP-BW-0300(6)	2010	114	121

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 13

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Product Pen. (in)	Depth (feet)	Sample Graphic	USCS	Description
							70			
							75			
							80			
							85			
							90			
							95			
							100			
							105			
							110			
							115			
							120			
							125			
							130			
							135			
							140			

Date Started: January 26, 2009
Date Completed: January 27, 2009
Logged By: Y. Chiba
Total Depth: 116.5 feet
Work Order: 8008-00

Water Level: 5.7 ft 01/26/2009 1122 HRS
Drill Rig: CME-75
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb wt 30 in drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 13

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Product Pen. (in)	Depth (feet)	Sample Graphic	USCS	Description
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			
							80			
							85			
							90			
							95			
							100			
							105			
							110			
							115			
							120			
							125			
							130			
							135			
							140			

Date Started: January 26, 2009
Date Completed: January 27, 2009
Logged By: Y. Chiba
Total Depth: 116.5 feet
Work Order: 8008-00

Water Level: 5.7 ft 01/26/2009 1122 HRS
Drill Rig: CME-75
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb wt 30 in drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring 13

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Product Pen. (in)	Depth (feet)	Sample Graphic	USCS	Description
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			
							80			
							85			
							90			
							95			
							100			
							105			
							110			
							115			
							120			
							125			
							130			
							135			
							140			

Date Started: January 26, 2009
Date Completed: January 27, 2009
Logged By: Y. Chiba
Total Depth: 116.5 feet
Work Order: 8008-00

Water Level: 5.7 ft 01/26/2009 1122 HRS
Drill Rig: CME-75
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb wt 30 in drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-BW-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. 0.2.9 OF 13 SHEETS

114

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(4)	2013	116	171

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring **14**

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
CONSOL	77	55	67	1/18"					MH	
	73		100	1/18"			40			
	76	53			3		45			
LL=76 PI=41	69		100		1		50			
CONSOL	72	55	83		2		55			
	72		100	1/18"			60			
									CL	Dark brownish gray SANDY CLAY with some gravel, soft (alluvium)
TXUU	58	61	78		7	1.0	65			
							70			

Date Started: November 24, 2008
Date Completed: December 1, 2008
Logged By: Y. Chiba
Total Depth: 150.5 feet
Work Order: F008-00

Water Level: 10.5 ft. 11/24/08 1335 HRS
Drill Rig: CME 55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring **14**

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	53		50		2				CL	
									MH	Brown with multi-color mottling SANDY CLAY with some gravel and organic matter, medium stiff (alluvium)
TXUU	48	73	83		9	1.5	75			
	47		50		4	1.5	80			
LL=63 PI=30	53		100		8	2.0	85			grades to very stiff
TXUU	54	73	78		12	3.0	90			
	48		83		7	3.0	95			(3 foot artesian head encountered)
			100	14					GP	Gray with multi-color mottling COBBLES AND BOULDERS (BASALTIC) with gravel, dense (alluvium)
			50	0	8/0"		100			
							105			

Date Started: November 24, 2008
Date Completed: December 1, 2008
Logged By: Y. Chiba
Total Depth: 150.5 feet
Work Order: F008-00

Water Level: 10.5 ft. 11/24/08 1335 HRS
Drill Rig: CME 55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

SHEET No. G2.10 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0H-0300(4)	2013	117	171

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring **14**

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
UC=9997		100	87							Gray vesicular BASALT, slightly fractured, slightly weathered, very hard
							110			grades to dense, slightly fractured, slightly weathered, very hard
UC=17912		100	100							
		100	100				115			
		100	75				120			grades to gray with red mottling vesicular, closely to moderately fractured, moderately weathered, hard
		10	0				125			
									GP	Gray with multi-color mottling SANDY GRAVEL (BASALTIC) with cobbles, medium dense (clinker)
		100	50				130			Reddish brown with black mottling scoriaceous BASALT, closely fractured, moderately to highly weathered, medium hard to hard
		100	100				135			grades to light gray dense, slightly fractured, moderately to slightly weathered, very hard grades to slightly fractured, moderately weathered hard at 136.5 feet
							140			

Date Started: November 24, 2008
Date Completed: December 1, 2008
Logged By: Y. Chiba
Total Depth: 150.5 feet
Work Order: F008-00

Water Level: 10.5 ft. 11/24/08 1335 HRS
Drill Rig: CME 55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LEEWARD BIKEWAY
PHILIPPINE SEA ROAD TO WAIPAHU DEPOT STREET
WAIPAHU, OAHU, HAWAII

Log of Boring **14**

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (Blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			100	87						(3 foot artesian head encountered)
							145			grades to closely fractured
			100	83						
							150			Boring terminated at 150.5 feet
							155			
							160			
							165			
							170			
							175			

Date Started: November 24, 2008
Date Completed: December 1, 2008
Logged By: Y. Chiba
Total Depth: 150.5 feet
Work Order: F008-00

Water Level: 10.5 ft. 11/24/08 1335 HRS
Drill Rig: CME 55
Drilling Method: 4" Auger & PQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

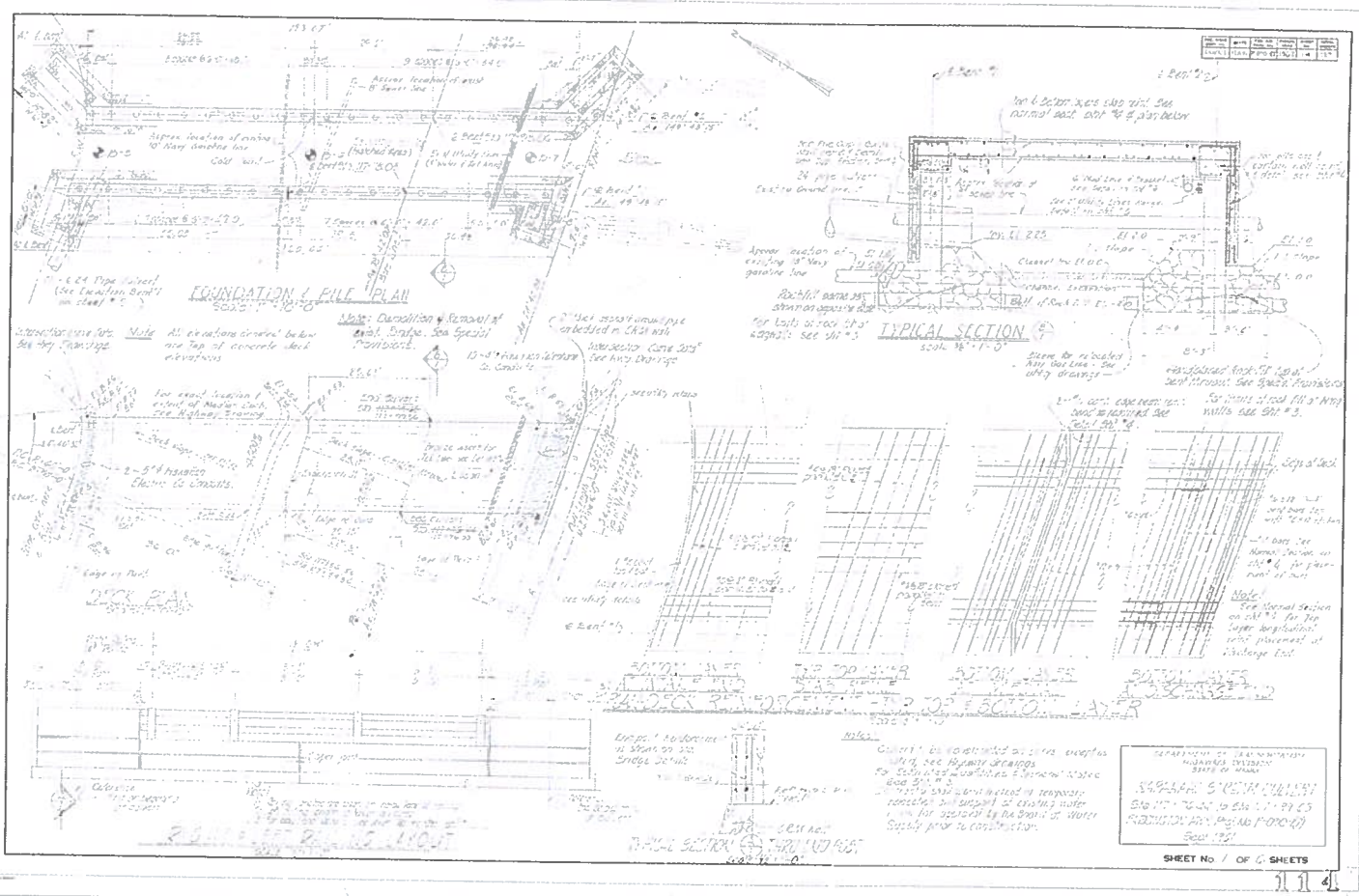
BORING LOGS

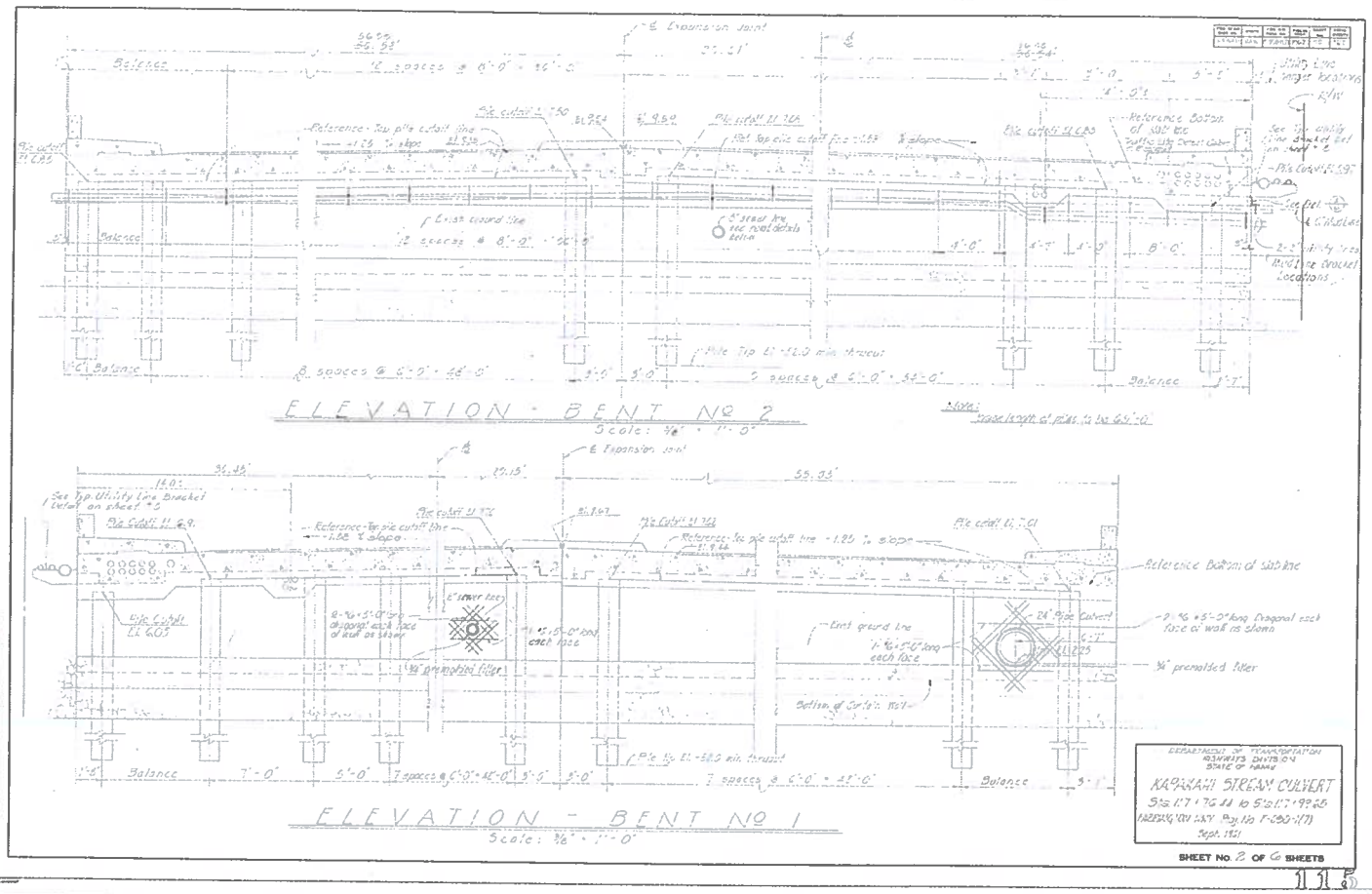
LEEWARD BIKEWAY
Philippine Sea Rd. to Waipahu Depot Street
Fed. Aid Proj. No. STP-0H-0300(6)

Scale: As Noted — Date: Sept. 1, 2010

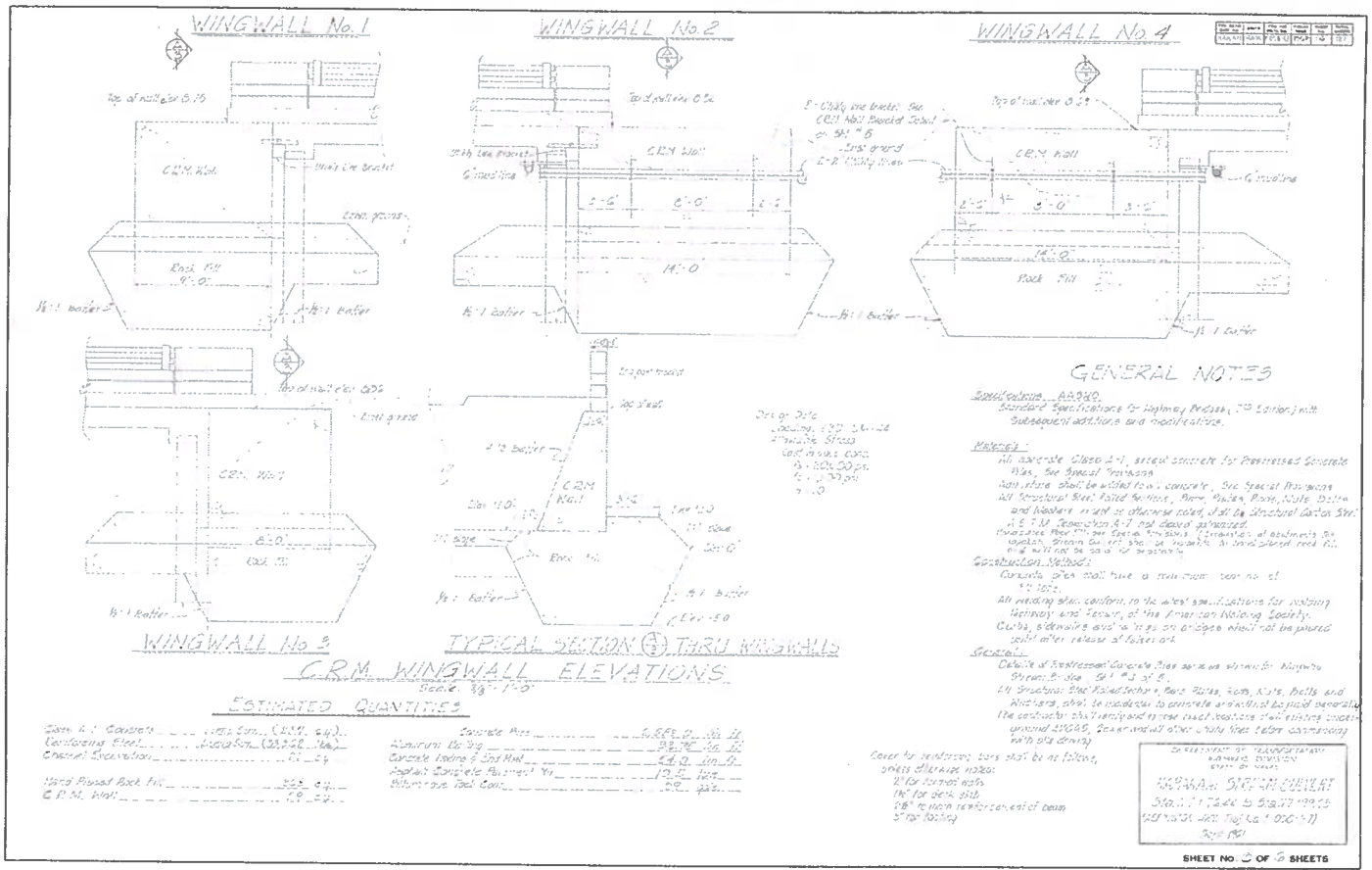
SHEET No. G2.11 OF 13 SHEETS

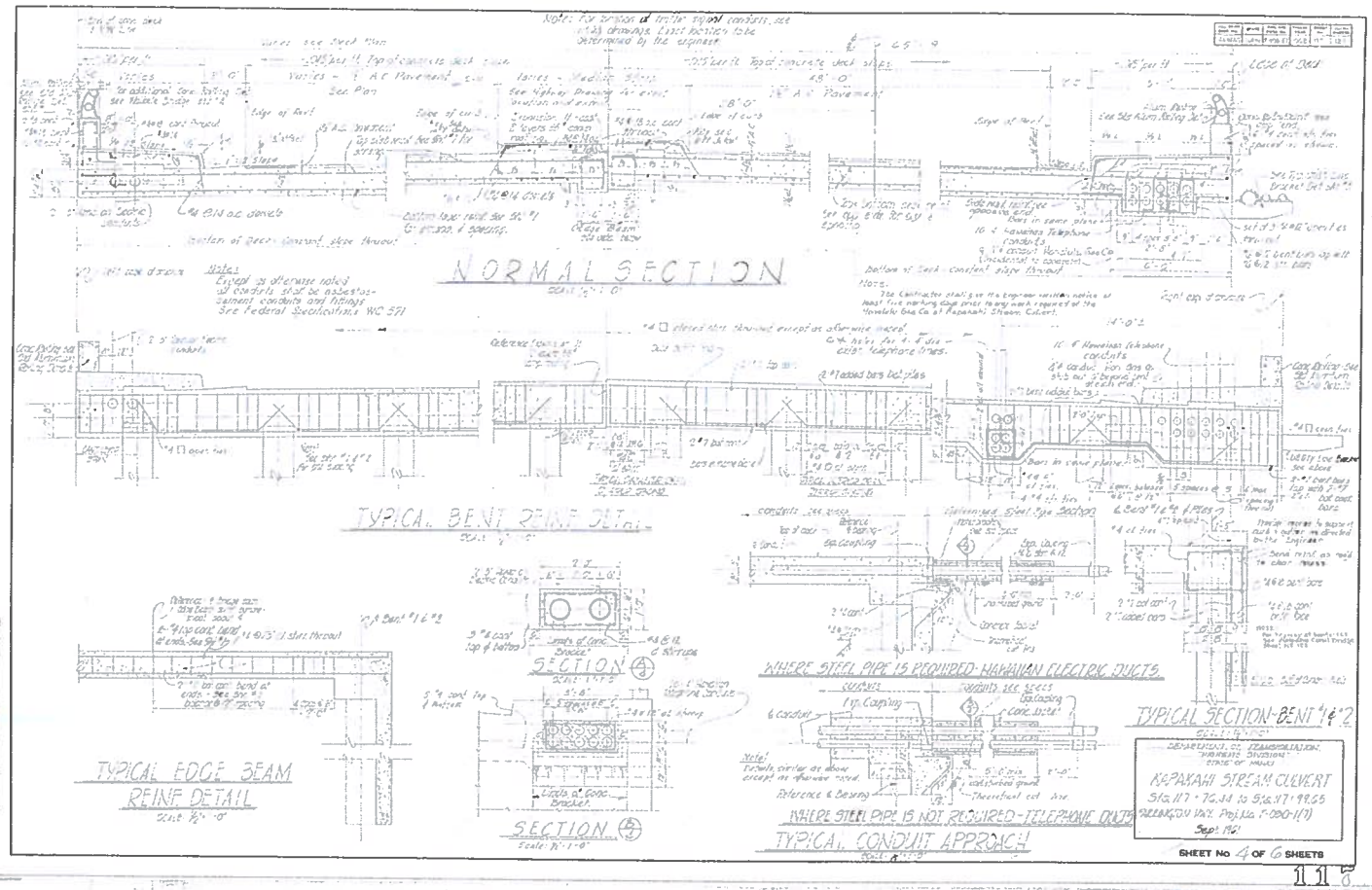
REF-82


FOUNDATION & PILE PLAN
TYPICAL SECTION
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII
KAPAHAHI STREAM CULVERT
SHEET No. 1 OF 6 SHEETS

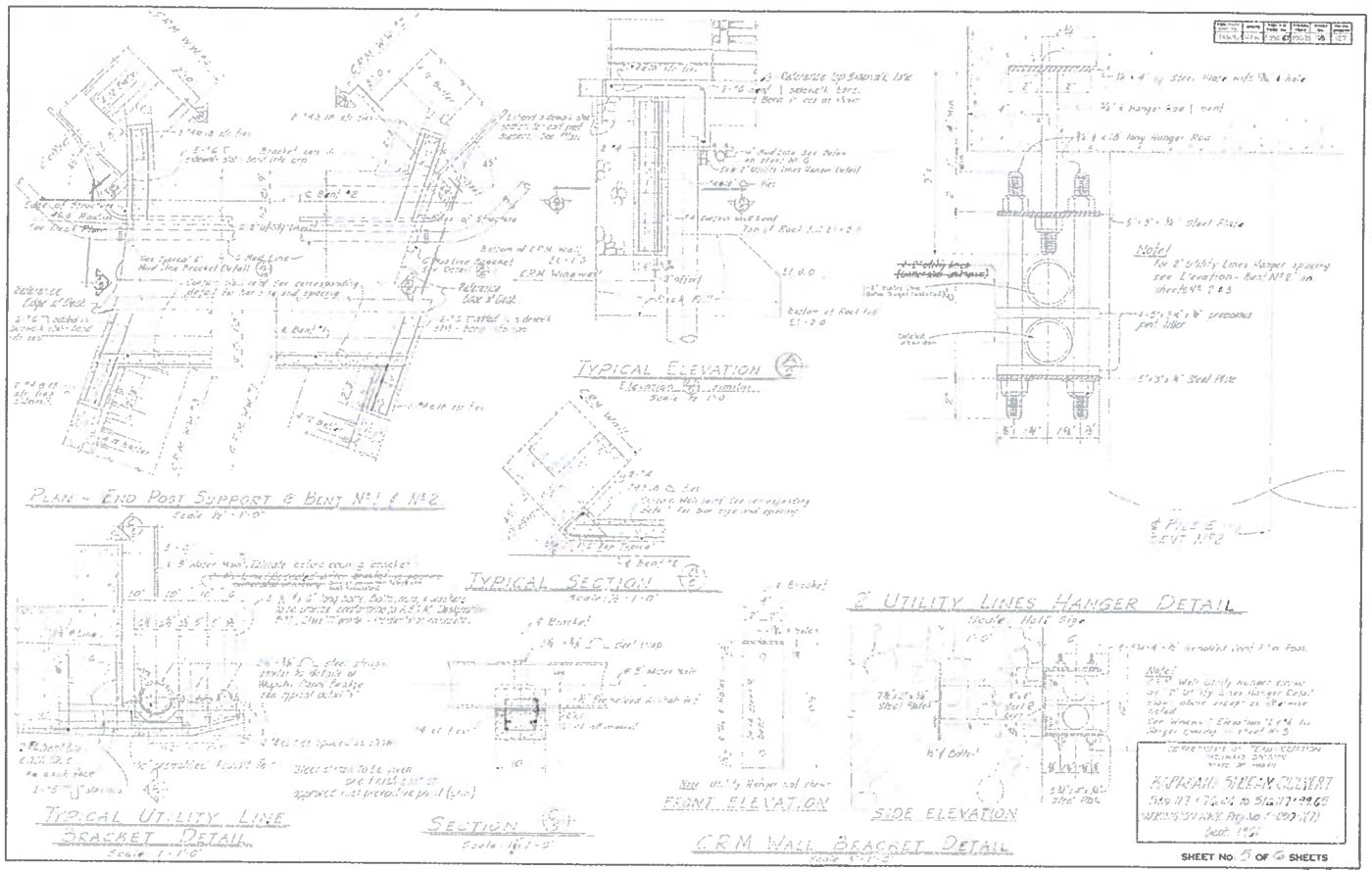

ELEVATION - BENT No 2
Scale: 3/8" = 1'-0"
ELEVATION - BENT No 1
Scale: 3/8" = 1'-0"
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII
KAPAHAHI STREAM CULVERT
SHEET No. 2 OF 6 SHEETS

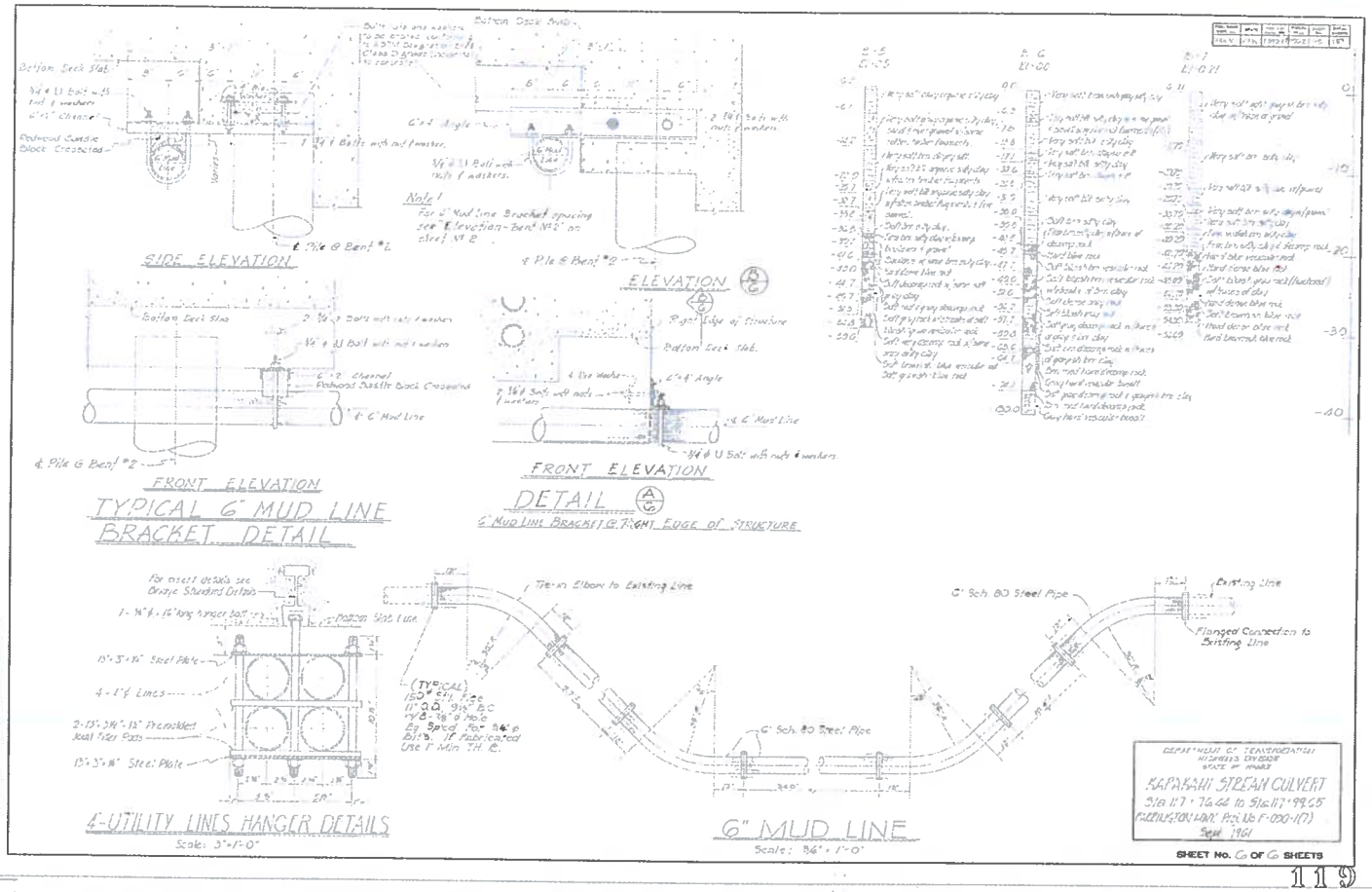
REF-03

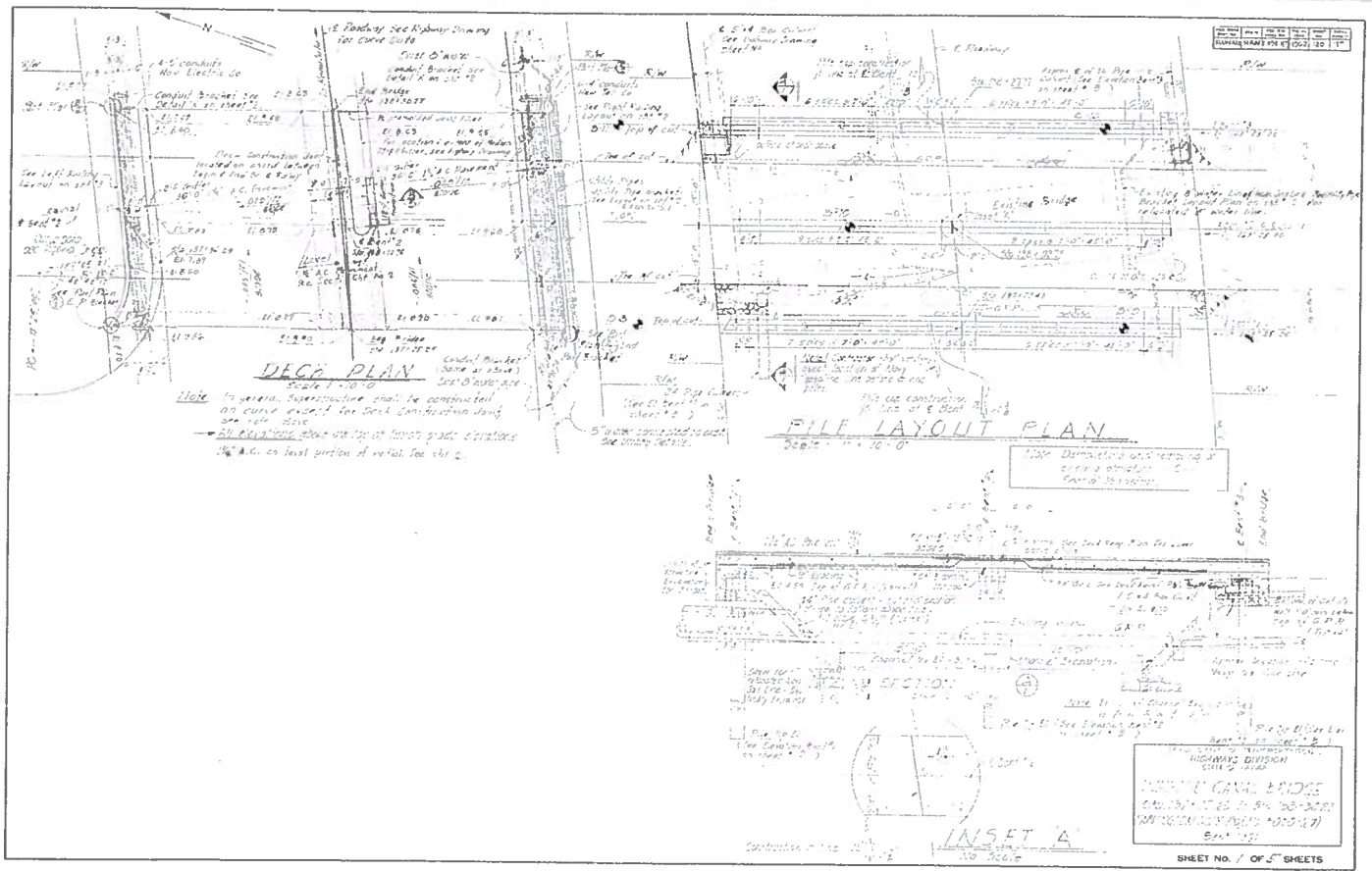

WINGWALL No. 1
WINGWALL No. 2
WINGWALL No. 4
C.R.M. Wall
Rock Fill
Batter
Ground line
WINGWALL No. 3
TYPICAL SECTION ③ THRU WINGWALLS
C.R.M. WINGWALL ELEVATIONS
ESTIMATED QUANTITIES
GENERAL NOTES
Specifications: AASHTO
Standard Specifications for Highway Bridges, 13th Edition, with Subsequent additions and modifications.
Materials:
Construction Methods:
Concrete pipe shall have a minimum wall thickness of 5" thick.
All welding shall conform to the latest specifications for welding Railroad and Secondary of the American Welding Society.
Curbs, sidewalks and railings on bridges shall not be poured until after release of falsework.
Structures:
Details of Prestressed Concrete Pipe serve as shown for Highway Stream Culvert
All Structural Steel Rolled Sections, Bent Plates, Rods, Nuts, Bolts and Washers, shall be incidental to concrete and shall be paid generally the contractor shall verify and review each location shall existing underground utilities, power and all other utility lines before commencing with site density
Cover for reinforcing bars shall be as follows, unless otherwise noted:
2" for formed walls
1½" for deck slab
2½" to main reinforcement of beam
3" for footing
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII
KAPAKAHI STREAM CULVERT
Sta. 117+76.44 to Sta. 117+99.55
GREENTOW INV. Proj. No. F-080-1(7)
Sept. 1961
SHEET NO. 3 OF 6 SHEETS

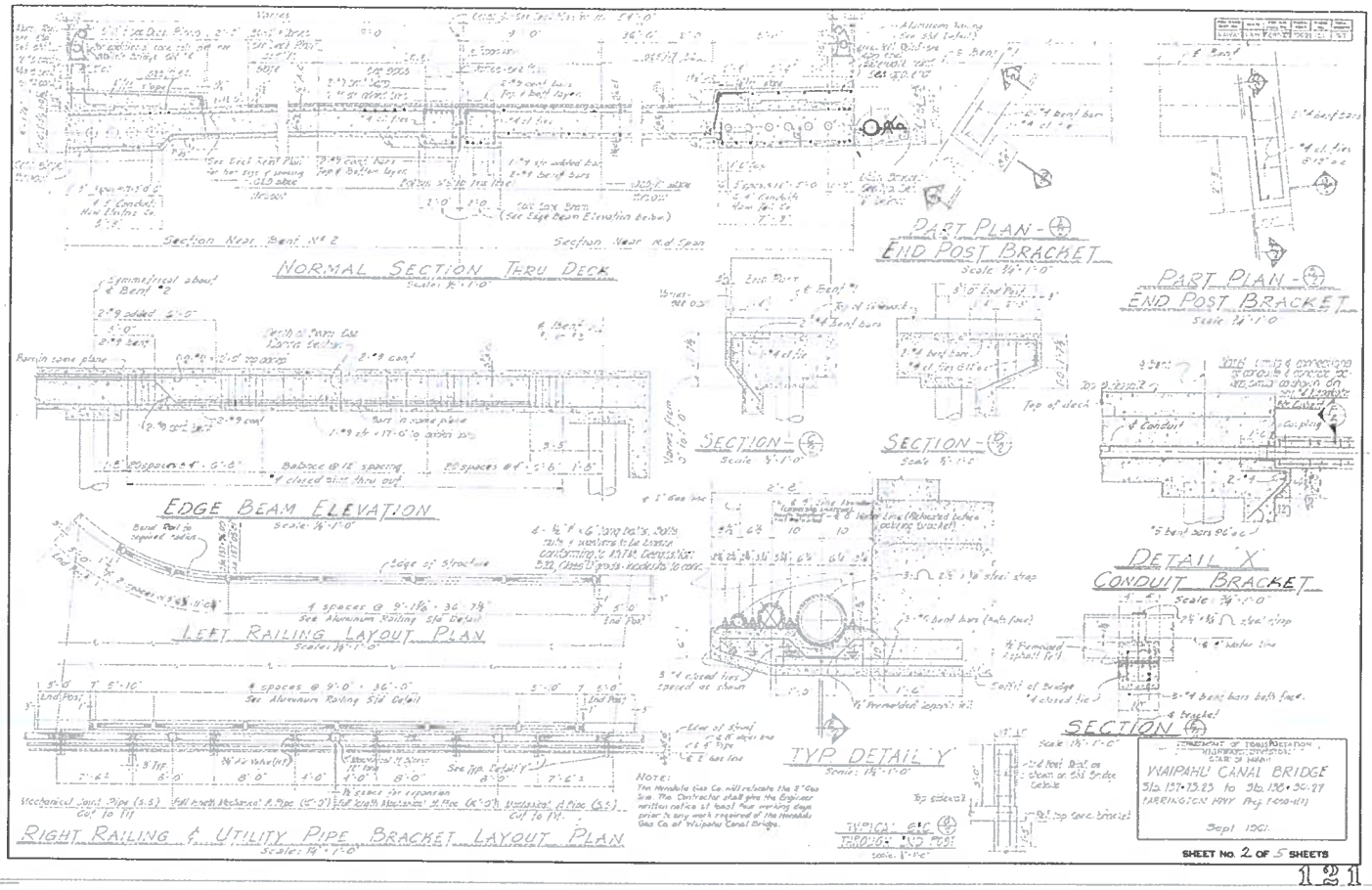

NORMAL SECTION
TYPICAL BENT REINF DETAIL
TYPICAL EDGE BEAM REINF DETAIL
SECTION ④
SECTION ⑤
WHERE STEEL PIPE IS REQUIRED-HAWAIIAN ELECTRIC DUCTS
WHERE STEEL PIPE IS NOT REQUIRED-TELEPHONE DUCTS
TYPICAL CONDUIT APPROACH
TYPICAL SECTION-BENT #1 & #2
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII
KAPAKAHI STREAM CULVERT
Sta. 117+76.44 to Sta. 117+99.55
GREENTOW INV. Proj. No. F-080-1(7)
Sept. 1961
SHEET No. 4 OF 6 SHEETS

REF-84

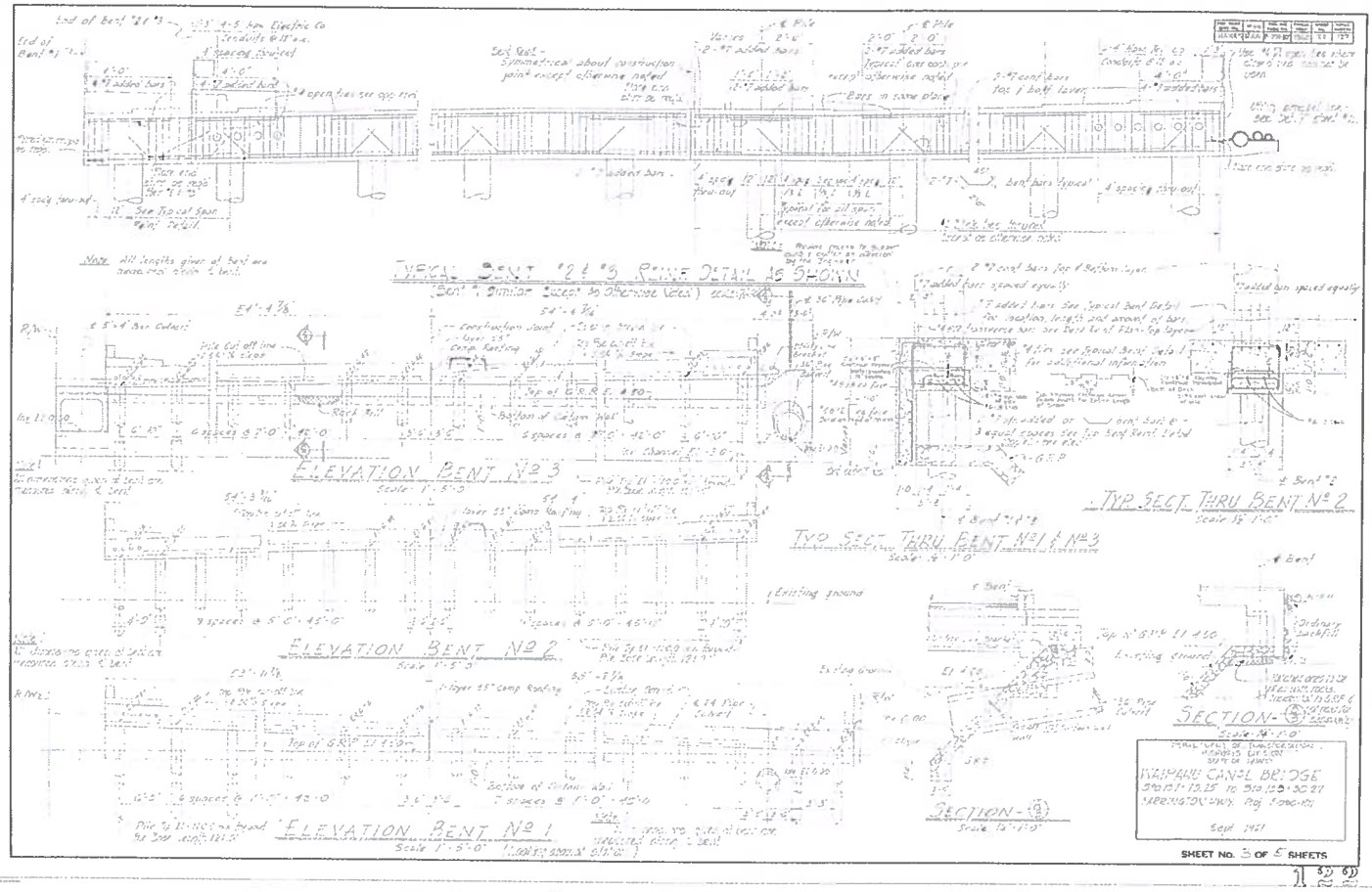

PLAN - END POST SUPPORT @ BENT Nº1 & Nº2
TYPICAL ELEVATION
TYPICAL SECTION
2" UTILITY LINES HANGER DETAIL
TYPICAL UTILITY LINE BRACKET DETAIL
SECTION
FRONT ELEVATION
SIDE ELEVATION
CRM WALL BRACKET DETAIL
KAPAKAHI STREAM CULVERT
SHEET No. 5 OF 6 SHEETS

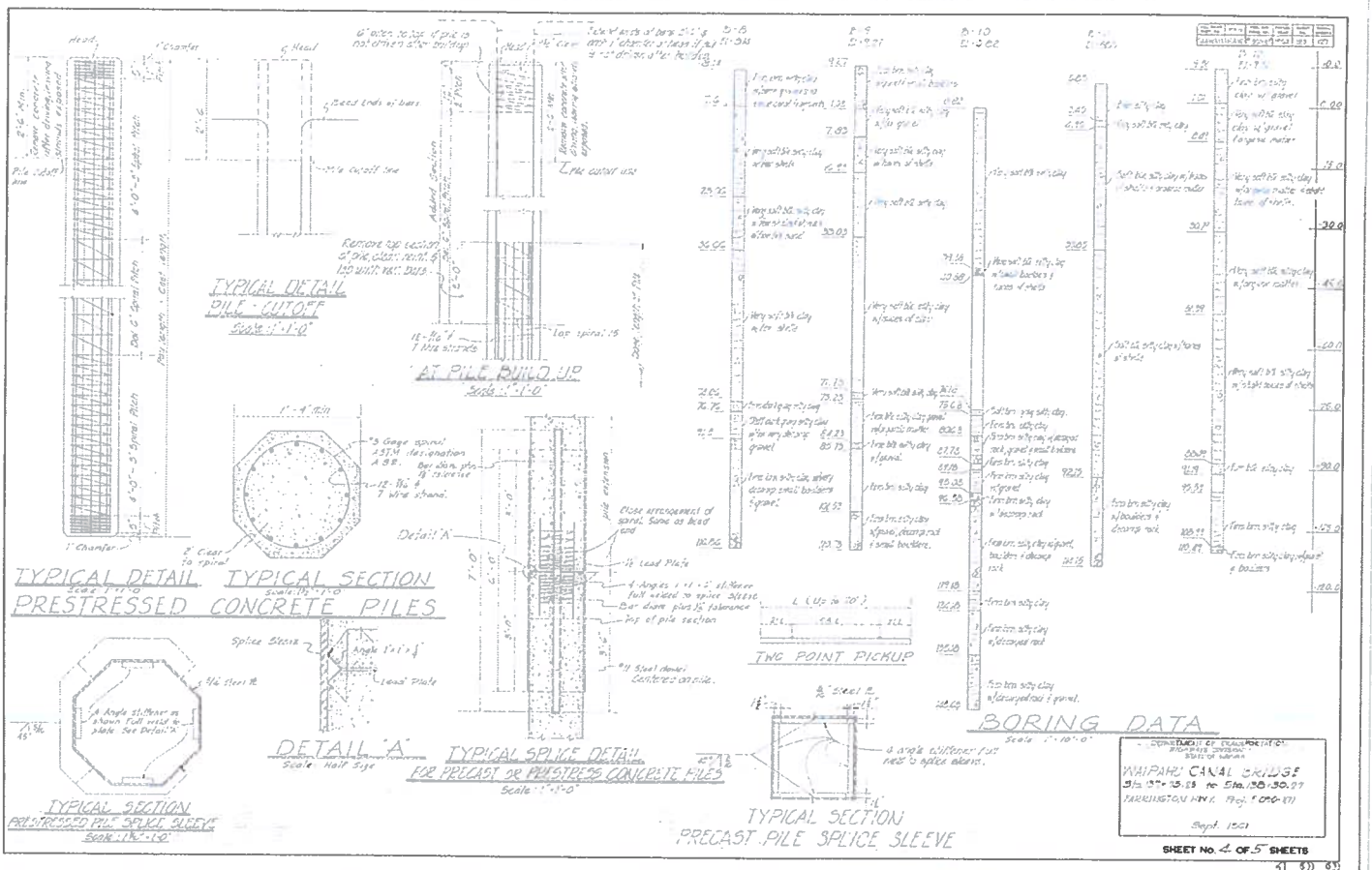

SIDE ELEVATION
FRONT ELEVATION
TYPICAL 6" MUD LINE BRACKET DETAIL
ELEVATION
FRONT ELEVATION
DETAIL
6" MUD LINE BRACKET @ RIGHT EDGE OF STRUCTURE
4-UTILITY LINES HANGER DETAILS
6" MUD LINE
KAPAKAHI STREAM CULVERT
SHEET No. 6 OF 6 SHEETS


DECK PLAN
Scale 1" = 10'-0"
PILE LAYOUT PLAN
Scale 1" = 10'-0"
SECTION
INSET A
HIGHWAYS DIVISION
STATE OF HAWAII
WAIPAHU CANAL BRIDGE
SHEET No. 1 OF 5 SHEETS


NORMAL SECTION THRU DECK
Scale: 1/4" = 1'-0"
PART PLAN - END POST BRACKET
Scale 1/4" = 1'-0"
PART PLAN - END POST BRACKET
Scale 1/4" = 1'-0"
SECTION
Scale 1/4" = 1'-0"
SECTION
Scale 1/4" = 1'-0"
EDGE BEAM ELEVATION
Scale: 1/4" = 1'-0"
DETAIL "X"
CONDUIT BRACKET
Scale: 1/4" = 1'-0"
LEFT RAILING LAYOUT PLAN
Scale: 1/4" = 1'-0"
TYP DETAIL "Y"
Scale: 1/4" = 1'-0"
SECTION
Scale: 1/4" = 1'-0"
RIGHT RAILING & UTILITY PIPE BRACKET LAYOUT PLAN
Scale: 1/4" = 1'-0"
TYPICAL END PIER
Scale: 1/4" = 1'-0"
NOTE:
The Honolulu Gas Co. will relocate the 2" Gas Line. The Contractor shall give the Engineer written notice at least two working days prior to any work required of the Honolulu Gas Co. at Waipahu Canal Bridge.
DEPARTMENT OF PUBLIC WORKS
HIGHWAYS DIVISION
STATE OF HAWAII
WAIPAHU CANAL BRIDGE
Sta. 137+73.25 to Sta. 138+30.97
FARRINGTON HWY. Proj. F-050-4(1)
Sept 1961
SHEET No. 2 OF 5 SHEETS

REF-86


TYPICAL BENT #2 & #3 REINF. DETAIL AS SHOWN
ELEVATION BENT #3
TYP. SECT. THRU BENT #2
TYP. SECT. THRU BENT #1 & #3
ELEVATION BENT #2
SECTION-
ELEVATION BENT #1
WAIPAHU CANAL BRIDGE
SHEET NO. 3 OF 5 SHEETS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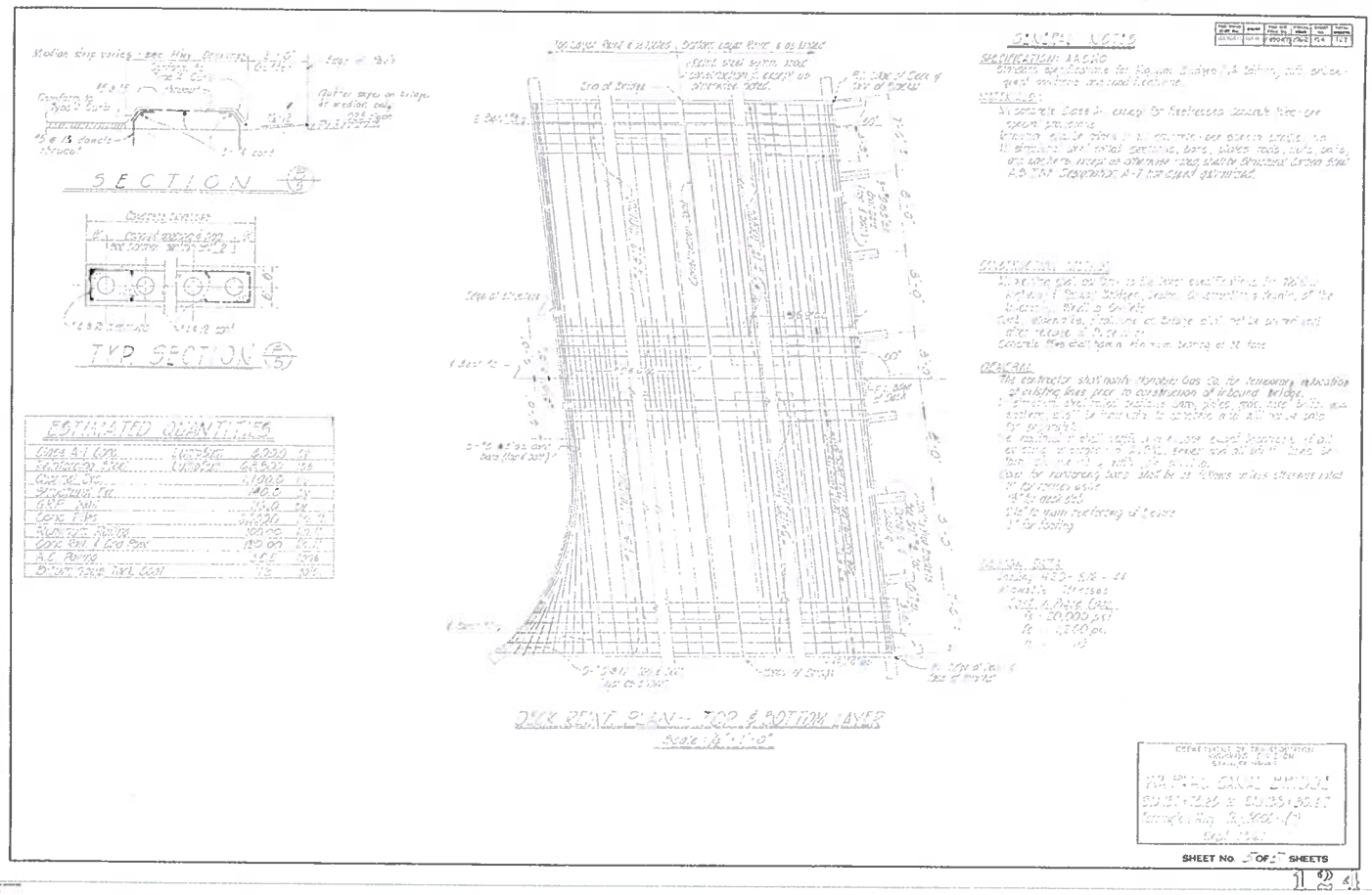
AT PILE BUILD UP
TYPICAL DETAIL
PRESTRESSED CONCRETE PILES
TYPICAL SECTION
DETAIL "A"
TYPICAL SPLICE DETAIL
FOR PRECAST OR PRESTRESS CONCRETE PILES
TWO POINT PICKUP
BORING DATA
TYPICAL SECTION
PRESTRESSED PILE SPLICE SLEEVE
TYPICAL SECTION
PRECAST PILE SPLICE SLEEVE
WAIPAHU CANAL BRIDGE
SHEET NO. 4 OF 5 SHEETS

REF-07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TYP SECTION
ESTIMATED QUANTITIES
DECK PLAN-- TOP & BOTTOM LAYER
GENERAL NOTES
SPECIFICATION: AASHTO
GENERAL:
SHEET NO. OF SHEETS

REF-88

ATTACHMENT 2-B.

NOTICE OF ELIGIBILITY LETTER FROM DEPARTMENT OF PLANNING AND PERMITTING DATED AUGUST 23, 2021

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.honolulupdp.org • CITY WEB SITE: www.honolulu.gov

RICK BLANGIARDI
MAYOR

DEAN UCHIDA
DIRECTOR

DAWN TAKEUCHI APUNA
DEPUTY DIRECTOR

EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

2021/ELOG-1523(AB)

NOTICE OF ELIGIBILITY
CHAPTER 201H, HAWAII REVISED STATUTES (HRS), EXEMPTIONS and
CHAPTER 343, HRS, COMPLIANCE DETERMINATION

File No.:	2021/ELOG-1523
Owner:	Bishop Estate/Kamehameha Schools
Applicant:	Highridge Costa Development Company, LLC
Agent:	Munekiyo Hiraga
Location:	Various addresses along Farrington Highway, Waipahu Depot Road, Hikimoe Street, and Kahuaikani Street - Waipahu
Tax Map Keys:	9-4-013: 046, 9-4-014: 005, 014, 046, and 058 though 067
Received:	August 6, 2021
Request:	Determination of eligibility for affordable housing exemptions pursuant to Chapter 201H, HRS, from various planning, zoning, construction and/or development standards for an Affordable Housing Project, and determination of compliance with Chapter 343, HRS

The above application has been reviewed and determined to be eligible for processing of affordable housing exemptions by the City and County of Honolulu (City) under Chapter 201H, HRS, subject to compliance with Chapter 343, HRS, as discussed below.

201H, HRS, Eligibility: Pursuant to the City's 201H Housing Program Administrative Rules (201H Rules), eligible projects must contain at least 30 dwelling units, of which at least 51 percent will be affordable to low- and moderate-income households. More specifically, at least 20 percent of the units must be set aside for households earning annual incomes less than 80 percent of the area median income (AMI), and 31 percent of the total number of units must be set aside for households earning between 81 percent and 120 percent of the AMI, or lower. The affordable units must remain affordable for a period not less than 30 years. The proposed Project involves about 570 affordable units, 100 percent of which will be set aside for households earning no more than 60 percent of the AMI, for a period of 60 years. Therefore, the Project complies with this eligibility requirement of the 201H Rules.

The 201H Rules stipulate that the City may allow portions of land to be dedicated to commercial, industrial, or other uses, provided they are integral to the Project and are

primarily for the benefit of the residents of the Project. During the processing of the 201H application, the City must consider whether the proposed uses conform with the objectives and policies of the Sustainable Communities or Development Plans, provide employment opportunities to the residents of the Project, provide necessary and convenient amenities and services to the residents of the Project, and whether the Project mitigates adverse impacts on the proposed residential units and adjacent land uses. The Project is in the BMX-3 Community Business District and is within the Transit-Oriented Development (TOD) Special District of Waipahu.

The Applicant is deemed eligible if they are licensed or otherwise authorized to do business within the State, have reasonable amount of experience in the type of work proposed, and have obtained site control of the Project site. The Applicant, Highridge Costa Development Company, LLC, has obtained a letter of authorization from the landowner, and is in the process of negotiating a lease option agreement. Highridge Costa Development, LLC as experience in Hawaii, including a two-phase Project in Makakilo, and has extensive experience developing affordable housing across the nation. Considering this, the Applicant is eligible to submit the application for review under the 201H Rules.

Lastly, the Agent has supplied all of the necessary information for the Department of Planning and Permitting (DPP) to make a determination of eligibility, pursuant to Section 20-25-8 of the 201H Rules, with the exception of (d), which requires the confirmation of compliance with Chapter 343, HRS. Therefore, subject to confirmation of compliance with Chapter 343, HRS, as discussed below, the Project is eligible for further processing under the 201H, HRS, program by the City.

Chapter 343, HRS, Determination. The Project proposes to use State or County lands or funds for the Project, and is therefore subject to the requirements of Chapter 343, HRS. Section 11-200.1-15 of the Hawaii Administrative Rules (HAR) provides a list of general types of actions that are eligible for exemption from the preparation of an environmental assessment. This list includes Projects involving new construction of affordable housing that meet the following:

(A) The use of State/County lands or funds, or development within Waikiki are the sole triggers for compliance with Chapter 343, HRS;

(B) It conforms to the existing State urban land use classification;

(C) It is consistent with the existing county zoning classification that allows housing; and

(D) It does not require variance for shoreline setbacks or siting in an environmentally sensitive area, as stated in Section 11-200.1-13(b)(11)

REF-90

The Project satisfies requirements A, B, and C above to be considered for the exemption. However, at the time of this letter, the Project is in the AEF Flood Hazard District, and would require a flood variance for siting in an environmentally sensitive area, which precludes the Project from being exempted from Chapter 343, HRS, pursuant to subsection (D). The Applicant has prepared a Letter of Map Revision (LOMR), which has been reviewed by the DPP and submitted to the Federal Emergency Management Agency (FEMA) for approval. The submitted materials include the "workmap" submitted to FEMA, which shows most, if not all, of the site in the AE Flood Hazard District. Should the LOMR workmap be accepted and implemented, the Project would not need a variance for siting in an environmentally sensitive area, and would therefore be eligible for exemption from the requirements of Chapter 343, HRS. Because a final decision on this matter is pending, it is premature for the DPP to make this determination related to Chapter 343, HRS.

Therefore, the determination of eligibility for review under the 201H Rules is subject to the submittal of either a completed and accepted final environmental document prepared pursuant to Chapter 343, HRS, or an approved map revision by FEMA and the DPP along with a formal determination that the Project is exempt pursuant to Section 11-200-13, HAR. If the revised map is accepted and implemented, the DPP will again consider the exemption request, and may be able to consult with other involved agencies to determine if the exemption is appropriate. Prior to accepting an application for review under the DPP Rules, the Applicant must supply the necessary materials for the DPP to determine compliance with Chapter 343, HRS.

After our initial review of this proposal to determine eligibility, we recommend that in addition to the materials described in the 201H application instructions the following be included in your application submittal:

1. A detailed discussion regarding the timing of the Project's phases.

2. A discussion of how the Project complies with the recommendations of the Waipahu TOD Plan, the Central Oahu Sustainable Communities Plan, and the Oahu General Plan.

3. An analysis, including any visual analysis prepared, of the impact the Project might have on recognized public views.

4. A comprehensive list of all exemptions and fee waivers (including approximate dollar value) being requested, including a justification for each requested exemption detailing the purpose, need, and potential impacts of granting the exemption. Please note that the site is in the TOD Special District, so the standards of the Special District may also need to be included if the proposal is seeking exemptions from these standards.

5. A comprehensive list and explanation of the other permits and/or approvals that the Project will require and text explaining the status of those permits.

Should you have any questions, please contact Alex Beatty, of our staff, at 768-8032 and refer to the above file number.

for Dean Uchida
Director

Date: August 23, 2021

Note: If you have appointed an agent to represent you, all future correspondence will be with the agent. If you should change agents, please notify the Department of Planning and Permitting immediately.

REF-91

ATTACHMENT 2-C.

CHAPTER 343, HRS EA EXEMPTION REQUEST LETTER AND FEMA APPROVAL SUBMITTED TO DPP

MUNEKIYO HIRAGA
Planning · Project Management · Sustainable Solutions

Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT
Michael T. Munekiyo AICP
SENIOR ADVISOR

August 1, 2022

Dean Uchida, Director
Attention: Alexander Beatty
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

SUBJECT Proposed Keawalau Affordable Housing Community (Waipahū Transit-Oriented Community Development) Project at Waipahū, O'ahu, Hawai'i

Dear Mr. Uchida:

We are writing today in regards to the Keawalau Affordable Housing Community, previously referred to as the Waipahū Transit-Oriented Community Development. On behalf of Kamehameha Schools (KS) and Highridge Costa Development Company (HC), we previously submitted materials for a 201H Determination of Eligibility to the Department of Planning and Permitting (DPP) on July 30, 2021. The DPP provided a letter dated August 23, 2021, confirming that the subject project is eligible for processing of affordable housing exemptions by the City and County of Honolulu under Chapter 201H, Hawai'i Revised Statutes (HRS), pending compliance with Chapter 343, HRS. See **Attachment "A"**. The letter also noted that the Applicant has prepared a Letter of Map Revision (LOMR), which has been reviewed by DPP and submitted to the Federal Emergency Management Agency (FEMA) for approval, and should the LOMR workmap be accepted and implemented, the subject project would not need a variance for siting in an environmentally sensitive area, and would, therefore, be eligible for exemption from the requirements of Chapter 343, HRS.

On July 25, 2022, FEMA approved the LOMR with an effective date of December 6, 2022. The project's engineer, Wilson Okamoto Corporation, understands that the approved LOMR can be utilized for building permit purposes as of July 25, 2022. See **Attachment "B"** and **Figure 1**. We are writing to you today to respectfully request a determination that the project is exempt from the requirements of Chapter 343, HRS. The following information is provided in support of this request.

Maui: 305 High Street, Suite 104 • Wailuku, Hawaii 96793 • Tel: 808.244.2015 • Fax: 808.244.8729
Oahu: 735 Bishop Street, Suite 412 • Honolulu, Hawaii 96813 • Tel: 808.983.1233
www.munekiyohiraga.com

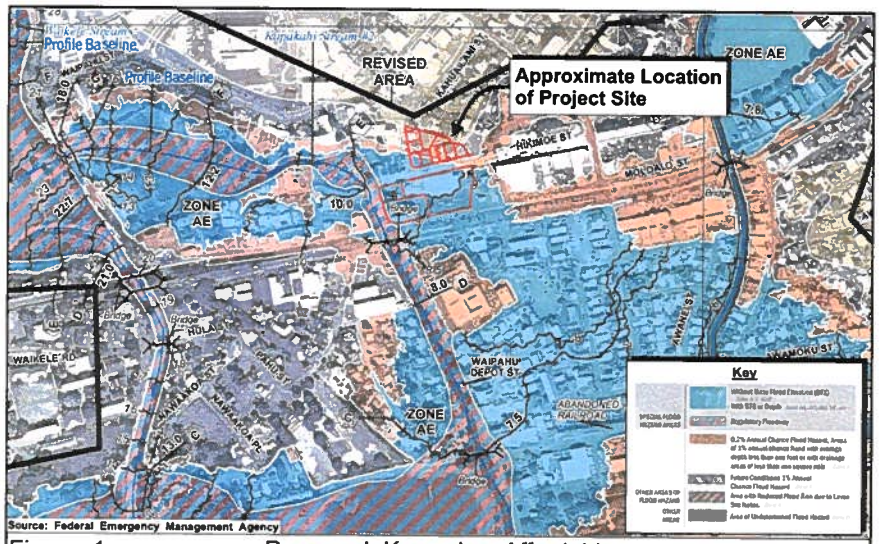


Figure 1 Proposed Keawalau Affordable Housing Community
Approved FEMA Flood Insurance Rate Map

NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

REF-93

a. *Chapter 343, HRS Environmental Review Triggers*

The proposed project will be funded, in part, by the State of Hawai'i's Rental Housing Revolving Fund (RHRF). In addition, offsite infrastructure improvements (i.e. driveways construction) are anticipated to be required for the proposed project, which will affect public right-of-way lands.

The use of State funds and potential offsite improvements affecting public right-of-way lands trigger compliance with environmental review requirements pursuant to Chapter 343, HRS. Chapter 343, HRS compliance can be achieved through preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS), or issuance of an EA exemption determination.

b. *Chapter 343, HRS EA Exemption Eligibility*

Chapter 11-200.1-15(c)(10), Hawai'i Administrative Rules (HAR) establishes that affordable housing projects may be eligible for an EA exemption if it meets four (4) criteria. The project's eligibility for an EA exemption based on the four (4) criteria is analyzed as follows:

Chapter 11-200.1-15(c)(10) New construction of affordable housing, where affordable housing is defined by the controlling law applicable for the state or county proposing agency or approving agency, that meets the following:

> *(A) Has the use of state or county lands or funds or is within Waikiki as the sole triggers for compliance with chapter 343, HRS;*
>
> **Response:** Applicable. As noted previously, the project's triggers for complice with Chapter 343, HRS are the use of State funds and the potential use of State/County lands.
>
> *(B) As proposed conforms with the existing state urban land use classification;*
>
> **Response:** Applicable. The project site is designated as "Urban" by the State Land Use Commission.
>
> *(C) As proposed is consistent with the existing county zoning classification that allows housing; and*
>
> **Response:** Applicable. The project site is designated as "BMX-3, Community Business Mixed Use" by the City and County of Honolulu, Land Use Ordinance (LUO). According to Section 21-3.120(a), LUO, the purpose

of the business mixed use districts is to recognize that certain areas of the city have historically been mixtures of commercial and residential uses, occurring vertically and horizontally and to encourage the continuance and strengthening of this pattern. The proposed project is consistent is the intent of business mixed use districts as commercial and residential uses will be vertically mixed within the project.

Specifically, within BMX-3 zoning district, multi-family dwellings are a permitted use subject to standards in Article 5, Chapter 21, LUO (Specific Use Development Standards), which states:

> *Sec. 21-5.210 Dwellings, multifamily. In the BMX-3 zoning district, where multifamily dwellings are integrated with other uses, pedestrian access to the dwellings must be physically, mechanically, or technologically independent from other uses and must be designed to enhance privacy for residents and their guests.*

The Applicant will comply with this standard and pedestrian access to the multi-family dwellings will be physically, mechanically, and technologically Independent from other commercial uses.

(D) As proposed does not require variances for shoreline setbacks or siting in an environmentally sensitive area, as stated in section 11-200 .1-13 (b) (11).

Response: Applicable. The project will not require variances for shoreline setbacks or for siting in an environmentally sensitive area. The project site is designated as Flood Zones "AE", "X", and "D". The project site was previously located within the effective floodway designated by the FEMA, however, due to the age of the study that was used to determine the floodway designation, the Applicant proposed a floodway revision via a LOMR application. FEMA approved the LOMR application on July 25, 2022 with an effective date of December 6, 2022. Refer to **Attachment "B"** and **Figure 1**. With the approved floodway revision, the proposed structures will be located outside of the floodway. The Applicant will comply with applicable development standards and obtain any flood-related permits, as may be required. Therefore, the project does not need a variance for siting in an environmentally sensitive area.

c. ***Request***

Based on the information presented above, we respectfully request the Department of Planning and Permitting (DPP)'s consideration and determination of the proposed Keawalau Affordable Housing Community Project's eligibility for an EA exemption.

Should you have any questions, please do not hesitate to contact me at (808)983-1233.

Very truly yours,

Yukino Uchiyama

Yukino Uchiyama, AICP
Senior Associate

cc. Mohannad Mohanna, Highridge Costa Development Company (via email: moe.mohanna@housingpartners.com)
Serge Krivatsy, Kamehameha Schools (via email: sekrivat@ksbe.edu)
Ren Seguritan, Kamehamehan Schools (via email: auseguri@ksbe.edu)
K:\DATA\Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Request Letter 2022\(Draft) Waipahu AH EA Exemption Req letter.docx

YU:ab
Enclosures

Attachment A.

Notice of Eligibility Letter From Department of Planning and Permitting Dated August 23, 2021

REF-95

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

RICK BLANGIARD
MAYOR

DEAN UCHIDA
DIRECTOR

DAWN TAKEUCHI APUNA
DEPUTY DIRECTOR

EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

2021/ELOG-1523(AB)

NOTICE OF ELIGIBILITY
CHAPTER 201H, HAWAII REVISED STATUTES (HRS), EXEMPTIONS and
CHAPTER 343, HRS, COMPLIANCE DETERMINATION

File No.:	2021/ELOG-1523
Owner:	Bishop Estate/Kamehameha Schools
Applicant:	Highridge Costa Development Company, LLC
Agent:	Munekiyo Hiraga
Location:	Various addresses along Farrington Highway, Waipahu Depot Road, Hikimoe Street, and Kahuaikani Street - Waipahu
Tax Map Keys:	9-4-013: 046, 9-4-014: 005, 014, 046, and 058 though 067
Received:	August 6, 2021
Request:	Determination of eligibility for affordable housing exemptions pursuant to Chapter 201H, HRS, from various planning, zoning, construction and/or development standards for an Affordable Housing Project, and determination of compliance with Chapter 343, HRS

The above application has been reviewed and determined to be eligible for processing of affordable housing exemptions by the City and County of Honolulu (City) under Chapter 201H, HRS, subject to compliance with Chapter 343, HRS, as discussed below.

201H, HRS, Eligibility: Pursuant to the City's 201H Housing Program Administrative Rules (201H Rules), eligible projects must contain at least 30 dwelling units, of which at least 51 percent will be affordable to low- and moderate-income households. More specifically, at least 20 percent of the units must be set aside for households earning annual incomes less than 80 percent of the area median income (AMI), and 31 percent of the total number of units must be set aside for households earning between 81 percent and 120 percent of the AMI, or lower. The affordable units must remain affordable for a period not less than 30 years. The proposed Project involves about 570 affordable units, 100 percent of which will be set aside for households earning no more than 60 percent of the AMI, for a period of 60 years. Therefore, the Project complies with this eligibility requirement of the 201H Rules.

The 201H Rules stipulate that the City may allow portions of land to be dedicated to commercial, industrial, or other uses, provided they are integral to the Project and are

primarily for the benefit of the residents of the Project. During the processing of the 201H application, the City must consider whether the proposed uses conform with the objectives and policies of the Sustainable Communities or Development Plans, provide employment opportunities to the residents of the Project, provide necessary and convenient amenities and services to the residents of the Project, and whether the Project mitigates adverse impacts on the proposed residential units and adjacent land uses. The Project is in the BMX-3 Community Business District and is within the Transit-Oriented Development (TOD) Special District of Waipahu.

The Applicant is deemed eligible if they are licensed or otherwise authorized to do business within the State, have reasonable amount of experience in the type of work proposed, and have obtained site control of the Project site. The Applicant, Highridge Costa Development Company, LLC, has obtained a letter of authorization from the landowner, and is in the process of negotiating a lease option agreement. Highridge Costa Development, LLC as experience in Hawaii, including a two-phase Project in Makakilo, and has extensive experience developing affordable housing across the nation. Considering this, the Applicant is eligible to submit the application for review under the 201H Rules.

Lastly, the Agent has supplied all of the necessary information for the Department pf Planning and Permitting (DPP) to make a determination of eligibility, pursuant to Section 20-25-8 of the 201H Rules, with the exception of (d), which requires the confirmation of compliance with Chapter 343, HRS. Therefore, subject to confirmation of compliance with Chapter 343, HRS, as discussed below, the Project is eligible for further processing under the 201H, HRS, program by the City.

Chapter 343, HRS, Determination: The Project proposes to use State or County lands or funds for the Project, and is therefore subject to the requirements of Chapter 343, HRS. Section 11-200.1-15 of the Hawaii Administrative Rules (HAR) provides a list of general types of actions that are eligible for exemption from the preparation of an environmental assessment. This list includes Projects involving new construction of affordable housing that meet the following:

(A) The use of State/County lands or funds, or development within Waikiki are the sole triggers for compliance with Chapter 343, HRS;

(B) It conforms to the existing State urban land use classification;

(C) It is consistent with the existing county zoning classification that allows housing; and

(D) It does not require variance for shoreline setbacks or siting in an environmentally sensitive area, as stated in Section 11-200.1-13(b)(11).

REF-96

The Project satisfies requirements A, B, and C above to be considered for the exemption. However, at the time of this letter, the Project is in the AEF Flood Hazard District, and would require a flood variance for siting in an environmentally sensitive area, which precludes the Project from being exempted from Chapter 343, HRS, pursuant to subsection (D). The Applicant has prepared a Letter of Map Revision (LOMR), which has been reviewed by the DPP and submitted to the Federal Emergency Management Agency (FEMA) for approval. The submitted materials include the "workmap" submitted to FEMA, which shows most, if not all, of the site in the AE Flood Hazard District. Should the LOMR workmap be accepted and implemented, the Project would not need a variance for siting in an environmentally sensitive area, and would therefore be eligible for exemption from the requirements of Chapter 343, HRS. Because a final decision on this matter is pending, it is premature for the DPP to make this determination related to Chapter 343, HRS.

Therefore, the determination of eligibility for review under the 201H Rules is subject to the submittal of either a completed and accepted final environmental document prepared pursuant to Chapter 343, HRS, or an approved map revision by FEMA and the DPP along with a formal determination that the Project is exempt pursuant to Section 11-200-13, HAR. If the revised map is accepted and implemented, the DPP will again consider the exemption request, and may be able to consult with other involved agencies to determine if the exemption is appropriate. Prior to accepting an application for review under the DPP Rules, the Applicant must supply the necessary materials for the DPP to determine compliance with Chapter 343, HRS.

After our initial review of this proposal to determine eligibility, we recommend that in addition to the materials described in the 201H application instructions the following be included in your application submittal:

1. A detailed discussion regarding the timing of the Project's phases.

2. A discussion of how the Project complies with the recommendations of the Waipahu TOD Plan, the Central Oahu Sustainable Communities Plan, and the Oahu General Plan.

3. An analysis, including any visual analysis prepared, of the impact the Project might have on recognized public views.

4. A comprehensive list of all exemptions and fee waivers (including approximate dollar value) being requested, including a justification for each requested exemption detailing the purpose, need, and potential impacts of granting the exemption. Please note that the site is in the TOD Special District, so the standards of the Special District may also need to be included if the proposal is seeking exemptions from these standards.

5. A comprehensive list and explanation of the other permits and/or approvals that the Project will require and text explaining the status of those permits.

Should you have any questions, please contact Alex Beatty, of our staff, at 768-8032 and refer to the above file number.

for Dean Uchida
Director

Date: August 23, 2021

Note: If you have appointed an agent to represent you, all future correspondence will be with the agent. If you should change agents, please notify the Department of Planning and Permitting immediately.

REF-97

Attachment B.

FEMA Approval

Federal Emergency Management Agency

Washington, D.C. 20472

July 25, 2022

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Rick Blangiardi
Mayor, City and County of Honolulu
530 South King Street, Room 300
Honolulu, HI 96813

IN REPLY REFER TO:
Case No.: 21-09-0747P
Community Name: City and County of Honolulu, HI
Community No.: 150001
Effective Date of
This Revision: **December 6, 2022**

Dear Mayor Blangiardi:

The Flood Insurance Study Report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7211, or the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Mario Siu-Li, CFM
Floodplain Manager
City and County of Honolulu

Jake Gusman, P.E., D.WRE
President
River Focus, Inc.

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City and County of Honolulu Honolulu County Hawaii	NO PROJECT	FLOODWAY 2D HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 150001		
IDENTIFIER	Waipahu Existing Conditions	APPROXIMATE LATITUDE & LONGITUDE: 21.385, -158.013 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES

TYPE: FIRM* NO.: 15003C0238G DATE: January 19, 2011
TYPE: FIRM NO.: 15003C0239G DATE: January 19, 2011
TYPE: FIRM NO.: 15003C0328G DATE: January 19, 2011

ANNOTATED STUDY ENCLOSURES

DATE OF EFFECTIVE FLOOD INSURANCE STUDY: November 5, 2014
PROFILE(S): 42P, 43P, 43P(a), 110P, 111P, 1113P AND 113P(a)
SUMMARY OF DISCHARGES TABLE: 3
FLOODWAY DATA TABLE: 8

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) & REVISED REACH(ES) See Page 2 for Additional Flooding Sources

Waikele Stream - From approximately 3,220 feet downstream of Farrington Highway to approximately 20 feet downstream of Waipahu Street.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Waikele Stream	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone AE	Zone AE	YES	YES
	Zone D	Zone AE	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

OTHER FLOODING SOURCES AFFECTED BY THIS REVISION

FLOODING SOURCE(S) & REVISED REACH(ES)

Waikele Stream - From approximately 3,220 feet downstream of Farrington Highway to approximately 20 feet downstream of Waipahu Street.
Kapakahi Stream #2 - From approximately 4,430 feet downstream to approximately 2,570 feet upstream of Farrington Highway.
Wailani Drainage Canal - From approximately 2,670 feet downstream to approximately 1,220 feet upstream of Farrington Highway.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Waikele Stream	Zone X (shaded)	Zone X (shaded)	YES	YES
Kapakahi Stream #2	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	Zone D	Zone AE	NONE	YES
	Zone AE	Zone AE	YES	YES
Wailani Drainage Canal	BFEs	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	Zone D	Zone AE	NONE	YES
	Zone AE	Zone AE	YES	YES

* BFEs - Base Flood Elevations

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

21-09-0747P 102-I-A-C

REF-99

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Kathryn Lipiecki
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7211

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

21-09-0747P 102-I-A-C

REF-100

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp

LOCAL NEWSPAPER
Name: *Honolulu Star-Advertiser*
Dates: August 1, 2022 and August 8, 2022

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

21-09-0747P 102-I-A-C

Table 3: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent	4-Percent	2-Percent	1-Percent	0.2-Percent
KAELEPULU STREAM						
Downstream limit of study	0.176	—[1]	—[1]	—[1]	1,404	—[1]
Upstream limit of study	0.128	—[1]	—[1]	—[1]	1,120	—[1]
KAHALUU STREAM						
Upstream of confluence of Ahuimanu Stream	1.36	1,220	—[1]	2,630	3,530	6,550
At Melekula Road	1.01	980	—[1]	2,110	2,830	5,220
KALAEOKAHIPA STREAM						
At Kamehameha Highway	1.15	410	—[1]	1,380	4,500	—[1]
KALAUAO STREAM						
At Pacific Ocean	2.65	1,860	—[1]	2,990	3,540	4,960
Downstream of H-1 Freeway	2.53	1,780	—[1]	2,870	3,400	4,760
KALIHI STREAM						
Downstream limit of study	5.18	—[1]	—[1]	—[1]	16,880	—[1]
Upstream limit of study	2.61	—[1]	—[1]	—[1]	10,683	—[1]
KALOI GULCH						
Downstream limit of study	5.805	—[1]	—[1]	—[1]	2,425	—[1]
Upstream limit of study	5.223	—[1]	—[1]	—[1]	2,359	—[1]
KAMANAIKI STREAM						
Downstream limit of study	0.85	—[1]	—[1]	—[1]	4,944	—[1]
Upstream limit of study	0.64	—[1]	—[1]	—[1]	4,069	—[1]
KAPAKAHI STREAM #2						
Downstream limit of study	0.329	—[1]	—[1]	—[1]	2,590[2]	—[1]
At Divergence from Waikele Stream	0.151	—[1]	—[1]	—[1]	1,920[3]	—[1]
KAUPUNI STREAM						
Just Upstream of confluence with East Makaha Stream	5.31	1,959	3,178	4,333	5,714	9,846
At Plantation Road	8.75	2,435	4,040	5,587	7,453	13,137

[1]Not computed
[2]Includes overflow from Waikele Stream and split flow from Wailani Drainage Canal
[3]Includes overflow from Waikele Stream

REVISED DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

REF-101

Table 3: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent	4-Percent	2-Percent	1-Percent	0.2-Percent
WAIKAKALAUA STREAM						
Downstream limit of study	4.580	—[1]	—[1]	—[1]	5,591	—[1]
Upstream limit of study	4.184	—[1]	—[1]	—[1]	5,486	—[1]
WAIKELE STREAM						
At Pacific Ocean	45.14	10,858	—[1]	21,975	27,528	41,852
Downstream of H-1 Freeway	44.91	10,450	—[1]	20,700	26,000	40,800
WAILANI DRAINAGE CANAL						
Downstream of Golf Cart Bridge	2.13	—[1]	—[1]	—[1]	3,468	—[1]
Upstream limit of study	1.60	—[1]	—[1]	—[1]	3,042	—[1]
WAILELE STREAM (LEFT/RIGHT OVERBANK)						
Downstream limit of study	1.323	—[1]	—[1]	—[1]	2,601	—[1]
Upstream limit of study	1.090	—[1]	—[1]	—[1]	2,257	—[1]
WAILELE STREAM						
0.8 miles upstream of Cane Haul Road	1.21	1,753	2,476	3,084	3,736	5,479
WAIMALU STREAM						
1,200 feet downstream of Moanalua Road	6.11	3,958	5,755	7,300	9,018	13,637
At confluence with East Loch	8.29	4,398	6,525	8,382	10,466	16,162
WAIMANALO: STREAM A						
Just upstream of confluence with Waimanalo Stream B	0.38	736	1,053	1,323	1,620	2,431
At confluence with Waimanalo Stream	1.34	1,887	2,663	3,314	4,011	5,871
WAOLANI STREAM						
At confluence with Nuuanu Stream	1.81	2,180	—[1]	3,650	4,400	6,450
Near St. Francis Hospital	1.34	1,680	—[1]	2,810	3,400	4,980

[1]Not computed

REVISED DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (LOCAL TIDAL DATUM)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Waikele Stream								
A[2]	396	2,398[3]	10,497[3]	1.8[3]	6.0[3]	6.0[3]	6.3[3]	0.3[3]
B[2]	1,005	3,061[3]	14,337[3]	1.9[3]	7.4[3]	7.4[3]	7.7[3]	0.3[3]
C[2]	1,796	469[3]	2,789[3]	6.4[3]	13.0[3]	13.0[3]	13.6[3]	0.6[3]
D[2]	3,380	105[3]	1,583[3]	13.3[3]	21.0[3]	21.0[3]	21.2[3]	0.2[3]
E[2]	3,742	823[3]	6,854[3]	4.2[3]	22.7[3]	22.7[3]	22.9[3]	0.2[3]
F[2]	5,112	213[3]	2,705[3]	8.1[3]	25.0[3]	25.0[3]	25.4[3]	0.4[3]
G	5,605	294	2,426	10.8	32.8	32.8	33.5	0.7
H	6,419	196	4,361	6.0	36.6	36.6	37.5	0.9
I	7,149	112	2,543	10.2	38.6	38.6	39.4	0.8
J	7,629	437	7,376	3.5	40.7	40.7	41.5	0.8
Honouliuli Stream								
A	305	1,770	5,146	1.6	6.1	6.1	6.9	0.8
B	850	1,104	4,070	2.0	6.5	6.5	7.3	0.8
C	1,470	661	1,844	4.3	11.7	11.7	12.5	0.8
D	1,921	430	2,213	3.6	13.1	13.1	13.6	0.5
E	2,621	600	4,390	1.8	14.5	14.5	14.5	0.0
F	3,991	305	842	9.3	21.0	21.0	21.5	0.5
G	4,651	241	1,060	7.4	27.6	27.6	28.6	1.0
H	5,151	370	1,631	4.8	32.7	32.7	33.6	0.9
I	6,774	340	1,343	5.8	64.0	64.0	64.3	0.3
J	7,164	122	803	9.6	64.7	64.7	65.2	0.5
K	7,374	75	514	15.1	68.9	68.9	69.6	0.7
L	7,558	48	572	13.5	75.2	75.2	75.2	0.0

[1]Feet above confluence with West Loch, Pearl Harbor

[2]Floodway computed by 2D Model at this location

[3]Values reported are based on averages calculated across evaluation lines. Refer to model result grids for modeled variability in elevation and surcharge across the floodway

REVISED DATA

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

WAIKELE STREAM – HONOULIULI STREAM

REF-102

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (LOCAL TIDAL DATUM)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Makaha Stream and West Makaha Stream								
A	0[1]	894	--[3]	--[3]	13.4	13.4	13.8	0.4
B	340[1]	1,092	5,201	2.0	14.2	14.2	15.2	1.0
C	1,215[1]	1,717	1,538	6.7	22.6	22.6	23.3	0.7
D	2,140[1]	570	1,229	7.9	42.1	42.1	42.7	0.6
E	2,890[1]	655	1,009	9.7	57.7	57.7	58.4	0.7
F	3,711[1]	442	1,081	9.2	82.8	82.8	83.3	0.5
G	4,791[1]	286	922	10.0	119.2	119.2	119.7	0.5
H	5,261[1]	138	754	12.0	138.8	138.8	138.9	0.1
I	6,211[1]	162	695	12.3	167.2	167.2	167.3	0.1
J	7,611[1]	203	753	11.4	216.8	216.8	216.8	0.0
K	8,241[1]	330	988	7.7	237.2	237.2	237.8	0.6
Kapakahi Stream #2								
A*	1,330[2]	2,396[7]	10,497[7]	1.8[7]	6.0[4,7]	6.0[4,7]	6.3[7]	0.3[7]
B*	2,860[2]	3,061[7]	14,337[7]	1.9[7]	7.4[7]	7.4[7]	7.7[7]	0.3[7]
C*	4,050[2]	535[7]	1,361[7]	1.5[7]	7.5[7]	7.5[7]	7.8[7]	0.3[7]
D*	4,986[2]	118[7]	416[7]	4.1[7]	8.0[7]	8.0[7]	9.0[7]	1.0[7]
E*	5,732[2]	258[7]	996[7]	2.3[7]	10.0[7]	10.0[7]	10.6[7]	0.6[7]
F*	6,672[2]	285[7]	820[7]	2.2[7]	12.2[7]	12.2[7]	12.3[7]	0.1[7]
G*	7,460[2]	115[7]	140[7]	12.7[7]	18.0[7]	18.0[7]	18.1[7]	0.1[7]

[1] Feet above Farrington Highway
[2] Feet above West Loch, Pearl Harbor
[3] Not calculated
[4] Elevation computed without consideration of tidal effects from West Loch, Pearl Harbor
[7] Floodway computed by 2D Model at this location
[8] Values reported are based on averages calculated across evaluation lines. Refer to model result grids for modeled variability in elevation and surcharge across the floodway

REVISED DATA

TABLE 8

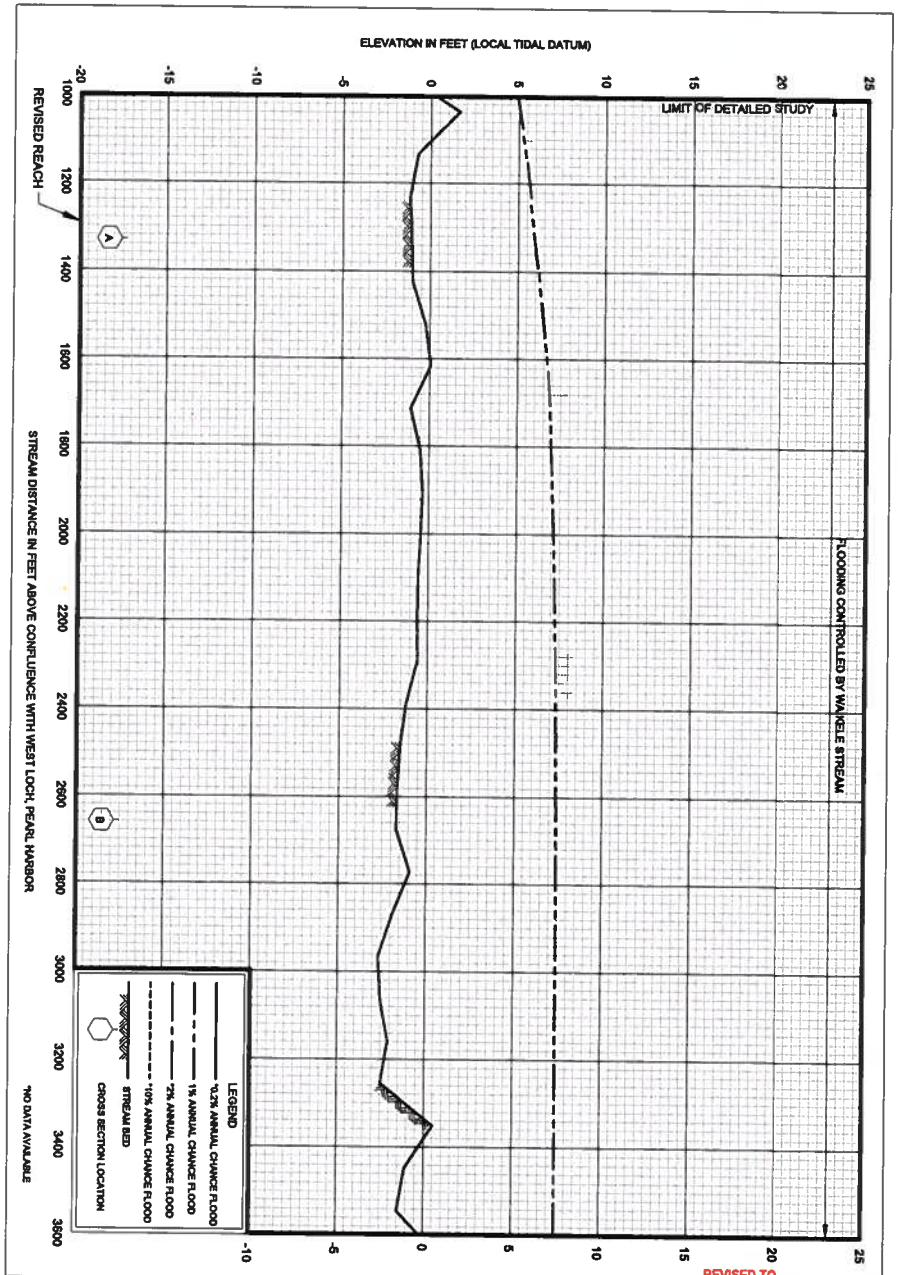
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

FLOODWAY DATA

REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022

MAKAHA STREAM AND WEST MAKAHA STREAM - KAPAKAHI STREAM #2



42P

FEDERAL EMERGENCY MANAGEMENT AGENCY

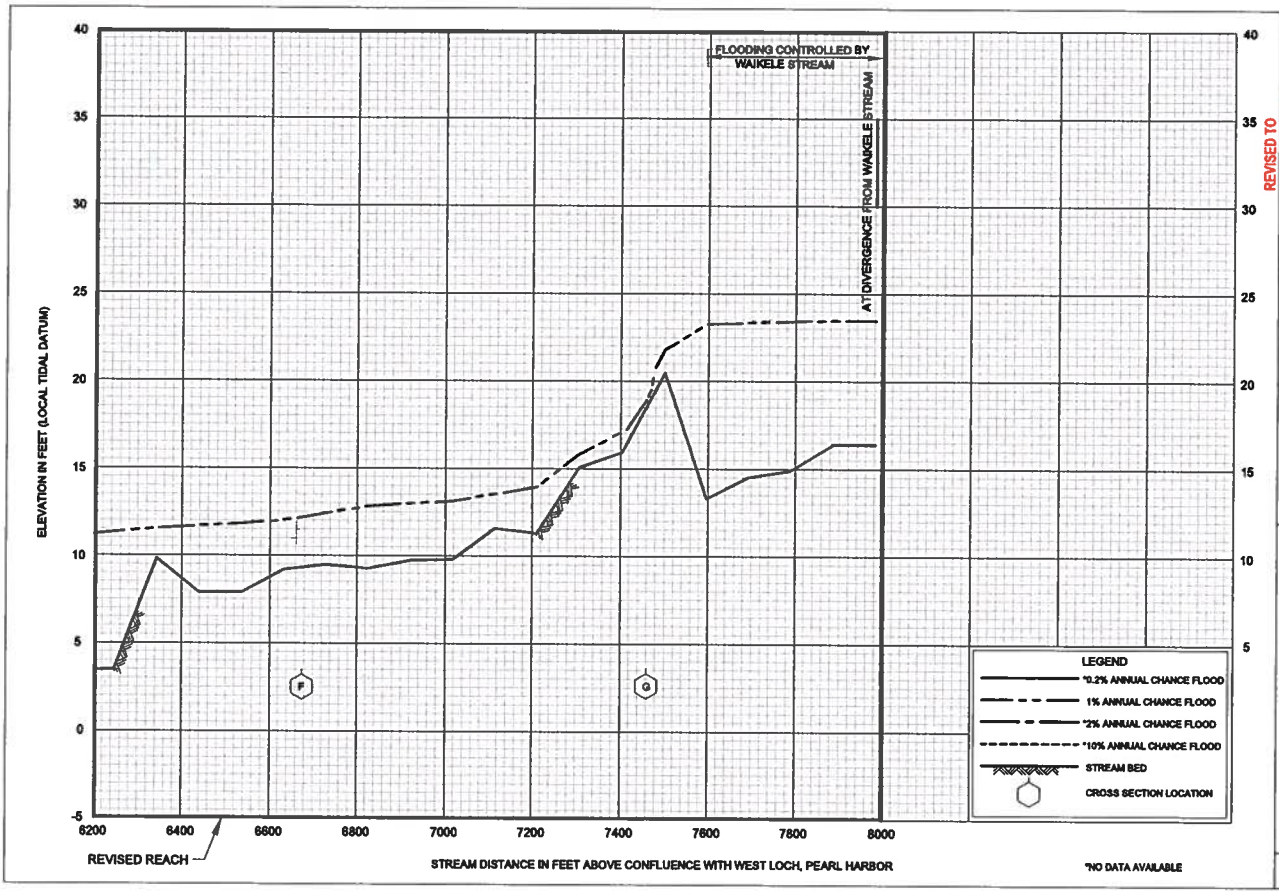
CITY AND COUNTY OF HONOLULU, HI

FLOOD PROFILES

REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022

KAPAKAHI STREAM #2

REF-103



REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

FLOOD PROFILES

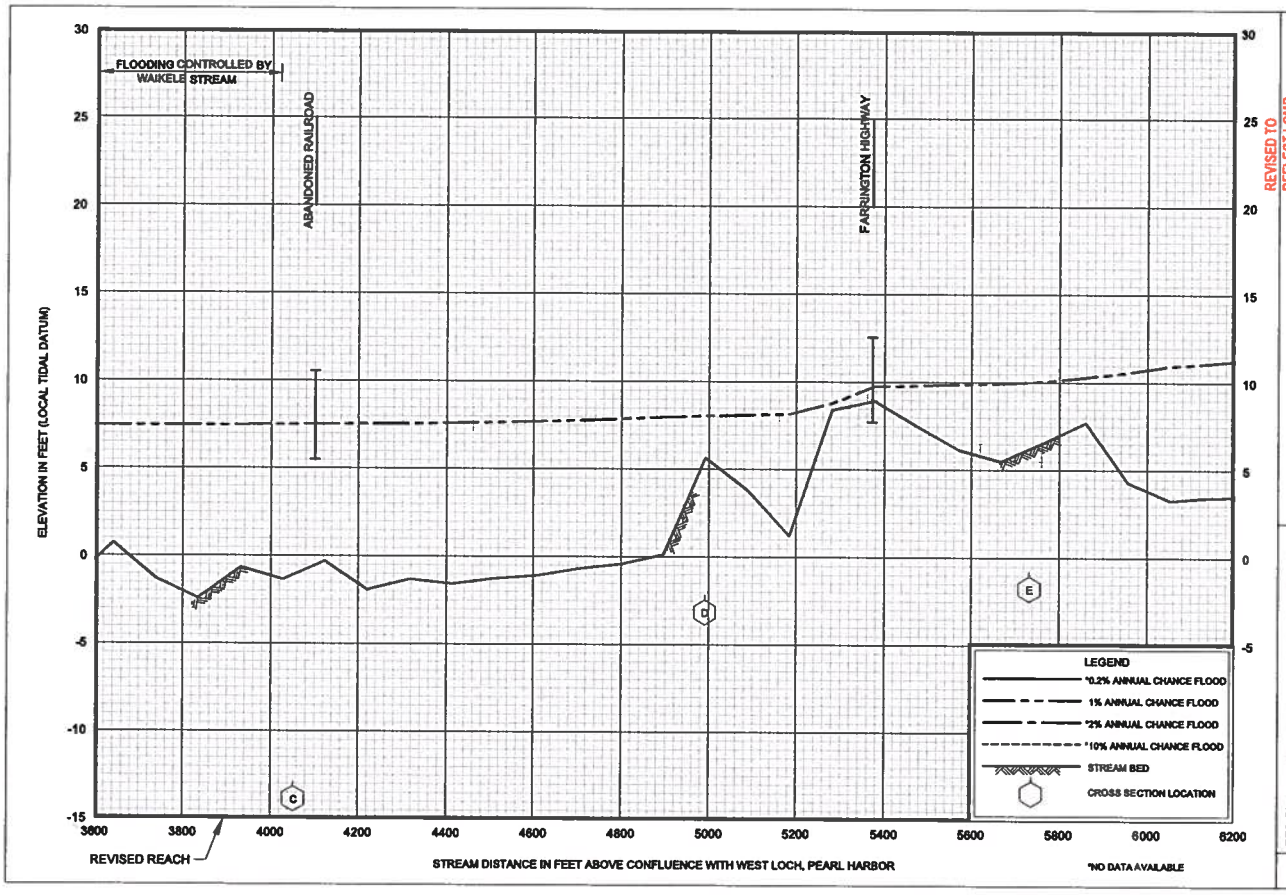
KAPAKAHI STREAM #2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

43P(a)

REF-104



REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

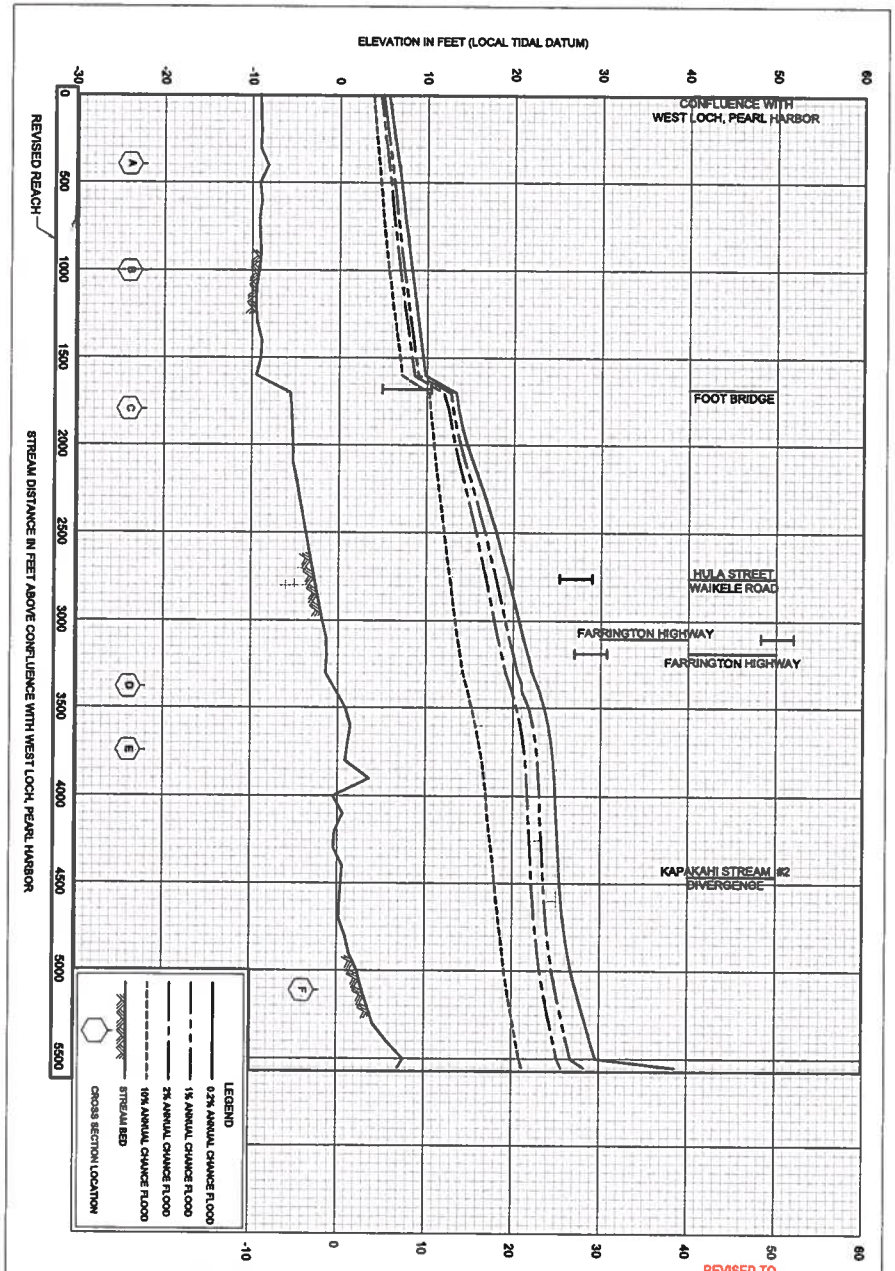
FLOOD PROFILES

KAPAKAHI STREAM #2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

43P



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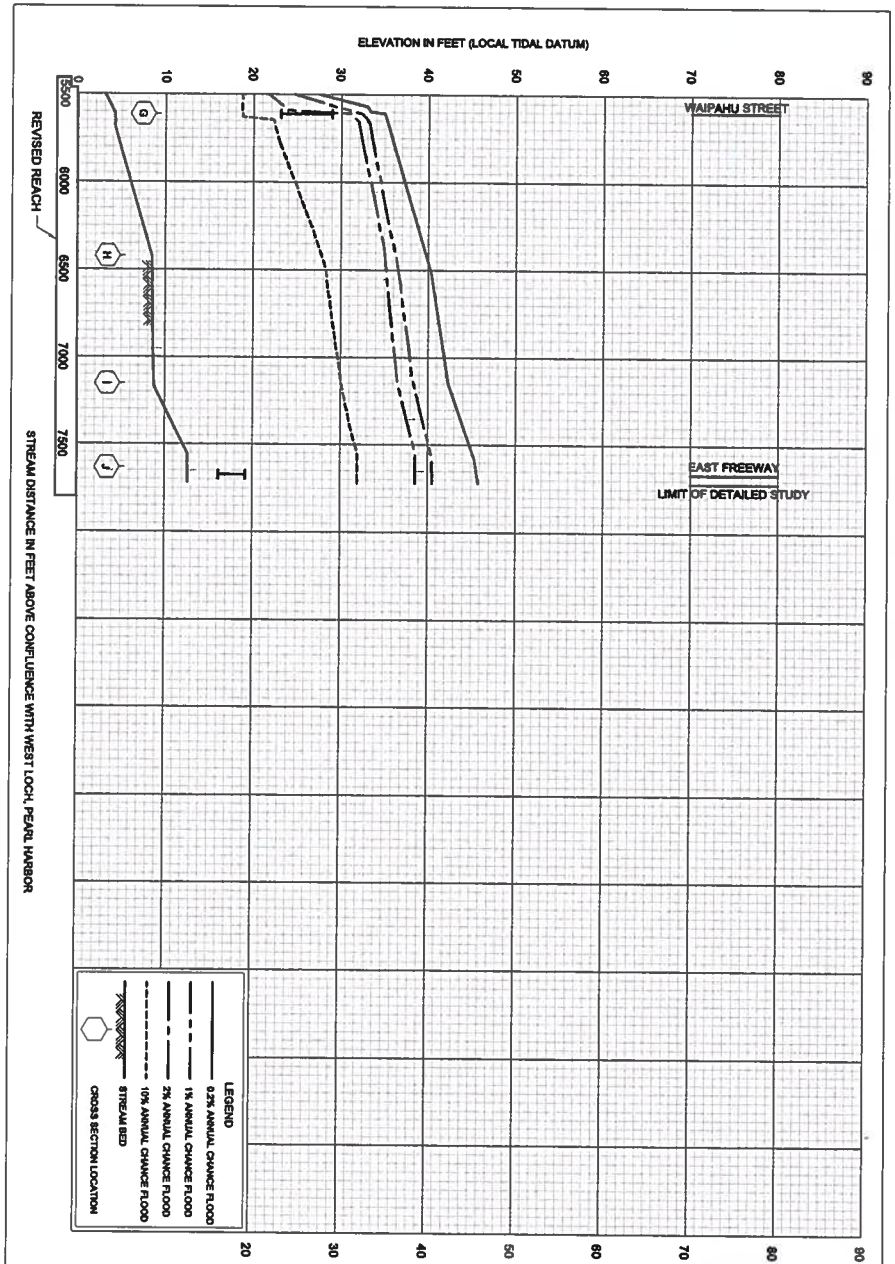
REFLECT LOMR
EFFECTIVE: December 6, 2022

FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI

FLOOD PROFILES

WAIKELE STREAM

110P



REVISED TO
REFLECT LOMR
EFFECTIVE: December 6, 2022

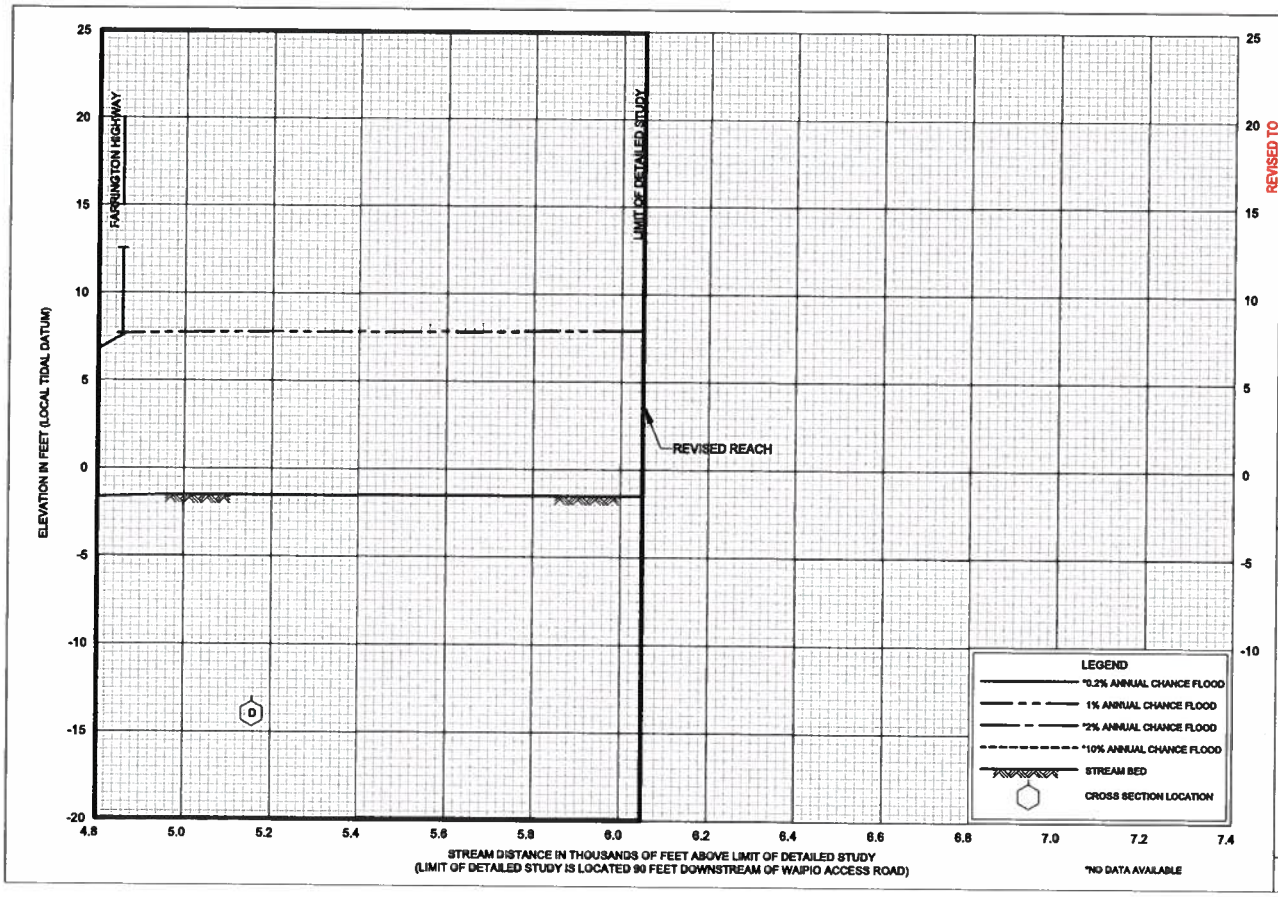
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI

FLOOD PROFILES

WAIKELE STREAM

111P

REF-105



REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

FLOOD PROFILES

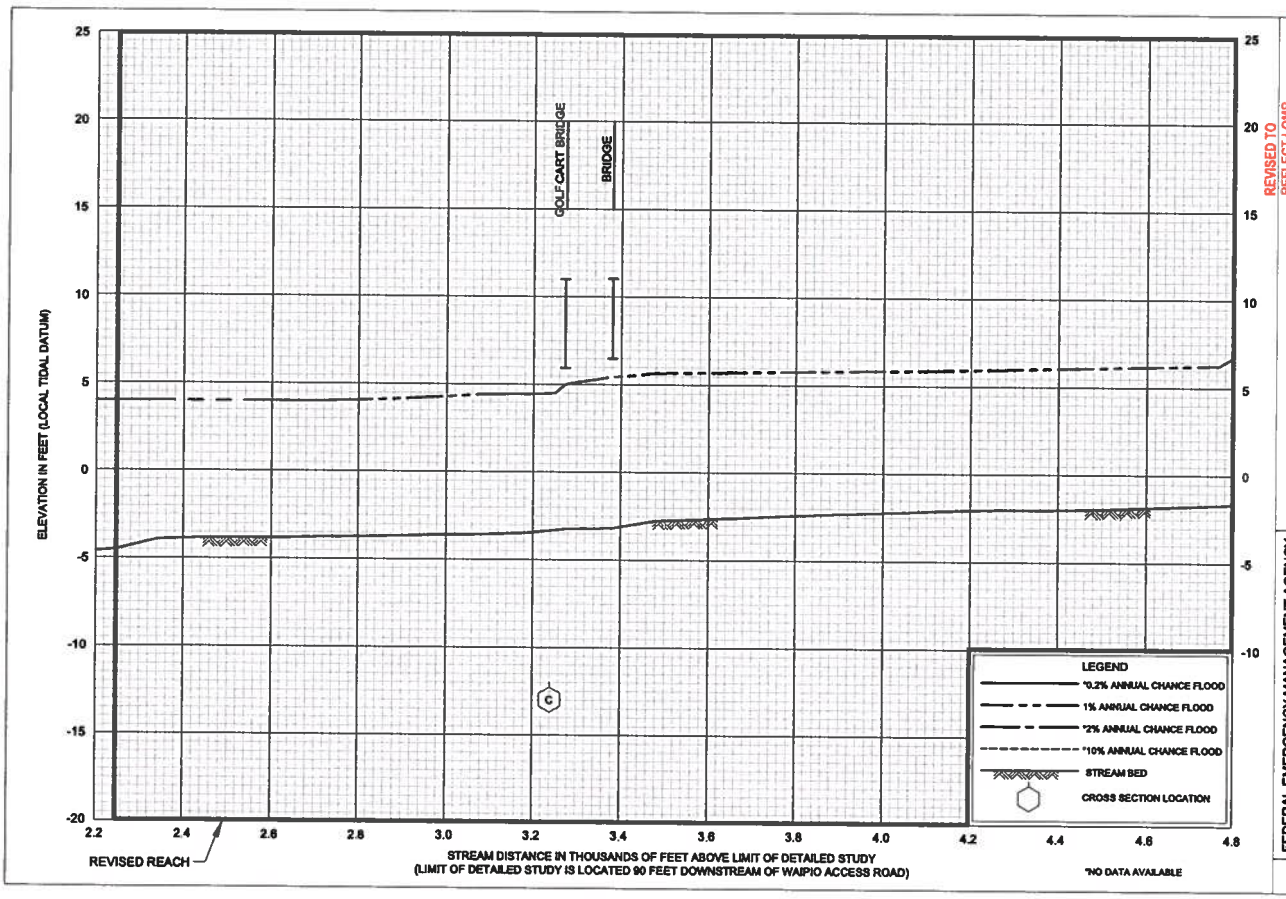
WAILANI DRAINAGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

113P(a)

REF-106



REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

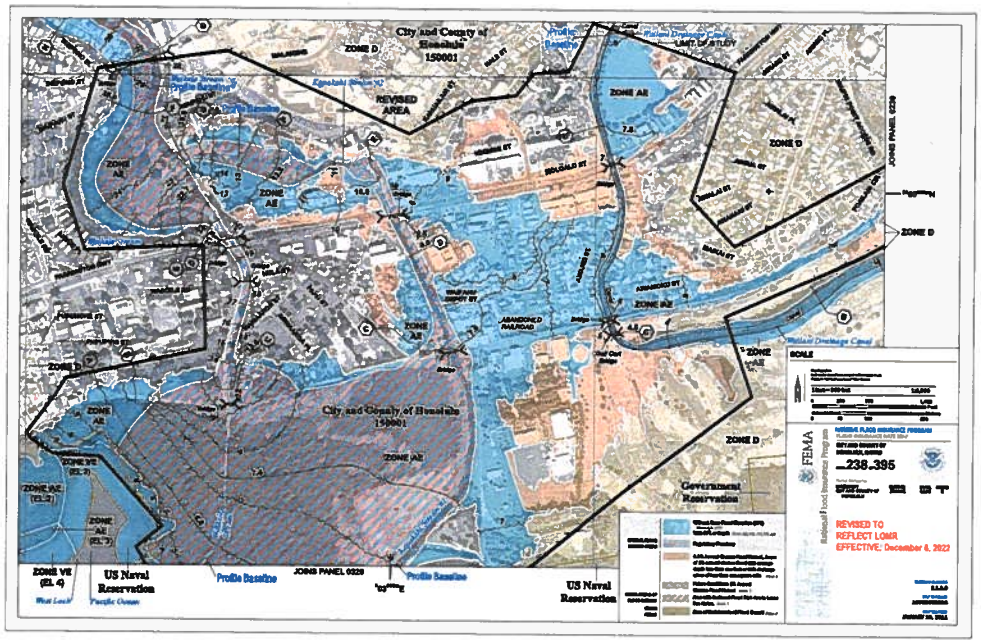
FLOOD PROFILES

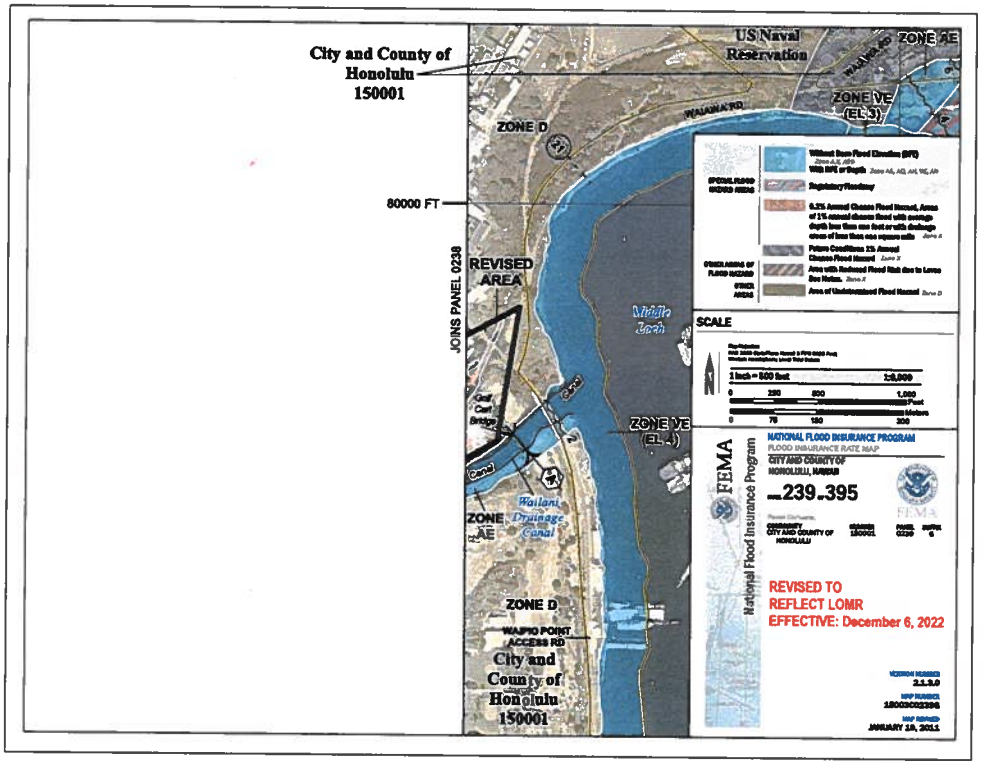
WAILANI DRAINAGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

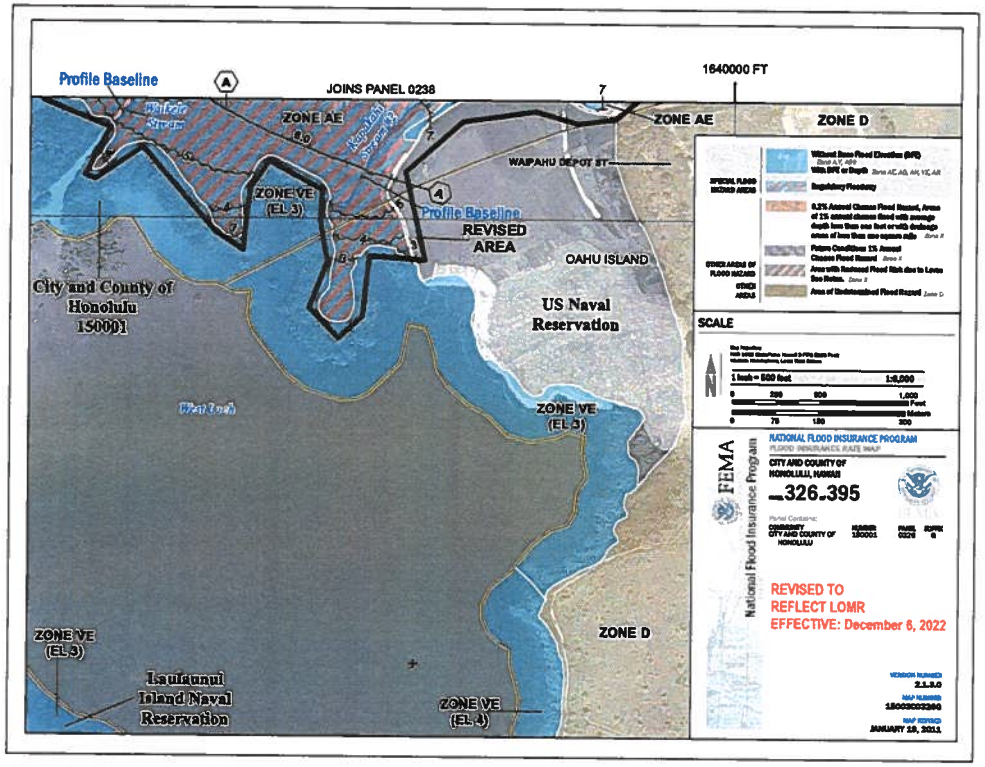
CITY AND COUNTY OF HONOLULU, HI

113P


City and County of Honolulu 150001
REVISED AREA
ZONE D
ZONE AE
ZONE VE (EL 4)
US Naval Reservation
Profile Baseline
JOINS PANEL 0229
Government Reservation
SCALE
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
CITY AND COUNTY OF HONOLULU, HAWAII
...238.395
REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022


City and County of Honolulu 150001
80000 FT
JOINS PANEL 0238
REVISED AREA
US Naval Reservation
ZONE AE
ZONE VE (EL 3)
ZONE D
ZONE VE (EL 4)
Middle Loch
Wailani Drainage Canal
WAIPIO POINT ACCESS RD
City and County of Honolulu 150001
SCALE
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
CITY AND COUNTY OF HONOLULU, HAWAII
...239.395
REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022
MAP REVISED
JANUARY 19, 2011

REF-107


Profile Baseline
A
JOINS PANEL 0238
7
1640000 FT
ZONE AE
ZONE D
ZONE AE
WAIPAHU DEPOT ST
ZONE VE
(EL 3)
4
Profile Baseline
REVISED
AREA
OAHU ISLAND
City and County of
Honolulu
150001
US Naval
Reservation
ZONE VE
(EL 3)
ZONE VE
(EL 3)
ZONE D
Ianiqunui
Island Naval
Reservation
ZONE VE
(EL 4)
SPECIAL FLOOD HAZARD AREAS
OTHER AREAS OF FLOOD HAZARD
OTHER AREAS
SCALE
N
1 inch = 500 feet
1:6,000
0
250
500
1,000
Feet
0
75
150
300
Meters
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
CITY AND COUNTY OF
HONOLULU, HAWAII
326 395
Panel Contains:
COMMUNITY
CITY AND COUNTY OF HONOLULU
NUMBER
150001
PANEL
0326
SUFFIX
G
REVISED TO
REFLECT LOMR
EFFECTIVE: December 6, 2022
VERSION NUMBER
2.1.3.0
MAP NUMBER
15003C0326G
MAP REVISED
JANUARY 19, 2011

REF-108

ATTACHMENT 2-D.

CHAPTER 343, HRS EA EXEMPTION DETERMINATION

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
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RICK BLANGIARDI
MAYOR

DEAN UCHIDA
DIRECTOR

DAWN TAKEUCHI APUNA
DEPUTY DIRECTOR

August 11, 2022 2022/ELOG-1592 (MAK)

Ms. Yukino Uchiyama
Munekiyo Hiraga
735 Bishop Street, Suite 412
Honolulu, Hawaii 96813

Dear Ms. Uchiyama:

SUBJECT: Environmental Assessment Determination
Keawalau Affordable Housing Community
Various addresses along Farrington Highway, Waipahu Depot Road, Hikimoe Street, and Kahuaikani Street - Waipahu
Tax Map Keys 9-4-013: 046, 9-4-014: 005, 014, 046, and 058 through 067

This is in response to your letter, received August 2, 2022, requesting a Department of Planning and Permitting (DPP) determination that the subject Project can be exempted from Chapter 343, Hawaii Revised Statutes (HRS), the Environmental Impact Statement Law. The Hawaii Administrative Rules (HAR) Section 11-200.1 enumerates an exemption for affordable housing projects if the Project meets certain criteria. We find that the subject Project meets the necessary criteria to be exempted from Chapter 343, HRS, as detailed below.

Pursuant to Section 11-200.1-15(10), HAR, new construction of affordable housing is an exempt action provided that it complies with applicable affordable housing regulations of the State or County and it meets the following criteria:

- The use of State or County lands or funds or development within Waikiki are the sole triggers for compliance with Chapter 343, HRS;
- It conforms to the existing State Land Use Urban classification;
- It is consistent with the existing county zoning classification that allows housing; and

- It does not require variances for shoreline setbacks or siting in an environmentally sensitive area, as stated in HAR Section 11-200.1-13(b)(11).

Based on the information provided, the only Chapter 343, HRS, trigger is the use of State funds. Our records show the site is within the State Land Use Urban classification and is within the BMX-3 Community Business Mixed-Use District, which allows for housing. Additionally, we understand that the Applicant's Letter of Map Revision application, which proposed a floodway revision, was approved by the Federal Emergency Management Agency on July 25, 2022, with an effective date of December 6, 2022. With the approved floodway revision, the proposed structures will be located outside of the floodway. Given this and that the proposed Project is not located along the shoreline, the Project does not need variances for shoreline setbacks or siting in an environmentally sensitive area. Therefore, we find that it meets all the necessary requirements to be considered an exempt action for purposes of Chapter 343, HRS.

Should you have any questions, please contact Michael Kat, of our Zoning Regulations and Permits Branch, at (808) 768-8013 or via email at michael.kat@honolulu.gov and refer to the above file number.

for Dean Uchida
Director

Date: August 11, 2022

Note: If you have appointed an agent to represent you, all future correspondence will be with the agent. If you should change agents, please notify the Department of Planning and Permitting immediately.

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PROJECT NARRATIVE 3

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3. PROJECT NARRATIVE

PREFACE

Project Location

The project site is located in Waipahū, O'ahu, Hawai'i and comprised of parcels identified as TMK (1)9-4-013:046 and (1)9-4-014:005, 014(por.), 058, 059, 060, 061, 062, 063, 064, 065, 066, 067, and 075. The project site is divided by Hikimoe Street into two (2) blocks (hereinafter referred to as "Mauka Block" and "Makai Block"). See **Figure 1** and **Figure 2**. It is noted that TMK (1)9-4-014:075 was previously a portion of the public right-of-way owned by the City and County of Honolulu and was recently purchased by Bishop Estate, beneficiaries of which are Kamehameha Schools (KS). The transaction closed in August 2021.

The total area for the project site is approximately 3.84 acres. The project site is bounded by Waipahū Depot Street to the west, Farrington Highway to the south, and various commercial buildings and single-family residential neighborhood to the east and the north. The project site is located in close proximity, approximately 300 feet west, of the future Waipahū Transit Center Rail Station. The project site currently consists of a completely urbanized environment with paved roads, commercial buildings, and subsurface utilities and related infrastructure. The existing buildings will be demolished for construction of the proposed project, except for a building located along the southern boundary of TMK (1)9-4-014:014 (Sonido Building) which will remain as is and will not be part of the project.

Proposed Action

Highridge Costa Development Company (hereinafter referred to as "Applicant") was selected by Kamehameha Schools (KS) as the developer of the proposed Keawalau Affordable Housing Community Project. The proposed project consists of 537 multi-family affordable rental housing units, approximately 42,372 square feet (sq. ft.) of commercial space, and related infrastructure improvements, and will be located in the close proximity of the future Waipahū Transit Center Rail Station. The commercial portion of the project will be owned by KS, but will be developed by the Applicant on KS's behalf. The Applicant will own and develop the affordable housing units.

The project will be developed in three (3) phases. Phase 1 of the project involves development of the Mauka Block. The Mauka Block will include a mixed-use building, containing retail and restaurant uses and parking on the ground floor and 2nd floor, and senior multi-family affordable housing units for seniors on the 3rd through 7th floors. Phase 2 of the project involves development of the eastern portion of Makai Block. Phase 2 will include a 19-story mixed-use building with retail, restaurant, and grocery uses, parking, and residential amenities (such as lobby and community space) on the ground floor, and multi-family affordable housing units for families and individuals on the 2nd through the 19th floors ("East Tower"). Phase 3 involves development of the western portion of Makai Block. Phase 3 includes a mixed-use 18-story building which includes

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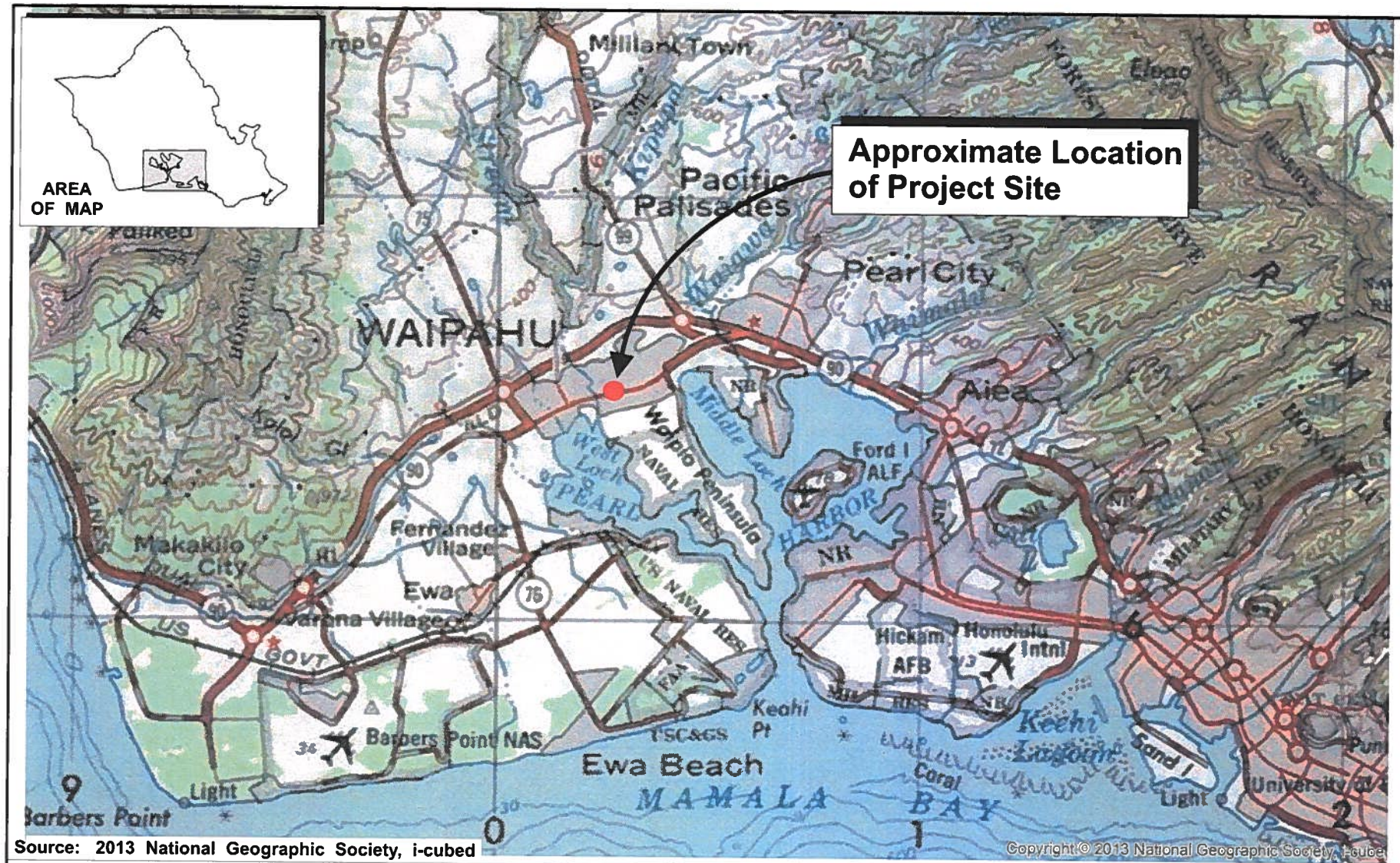

Source: 2013 National Geographic Society, i-cubed

Figure 1

Keawalau Affordable Housing Community Project

Regional Location Map

0 275 550 1100 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH2423\Applications\Figures\Regional Location Map

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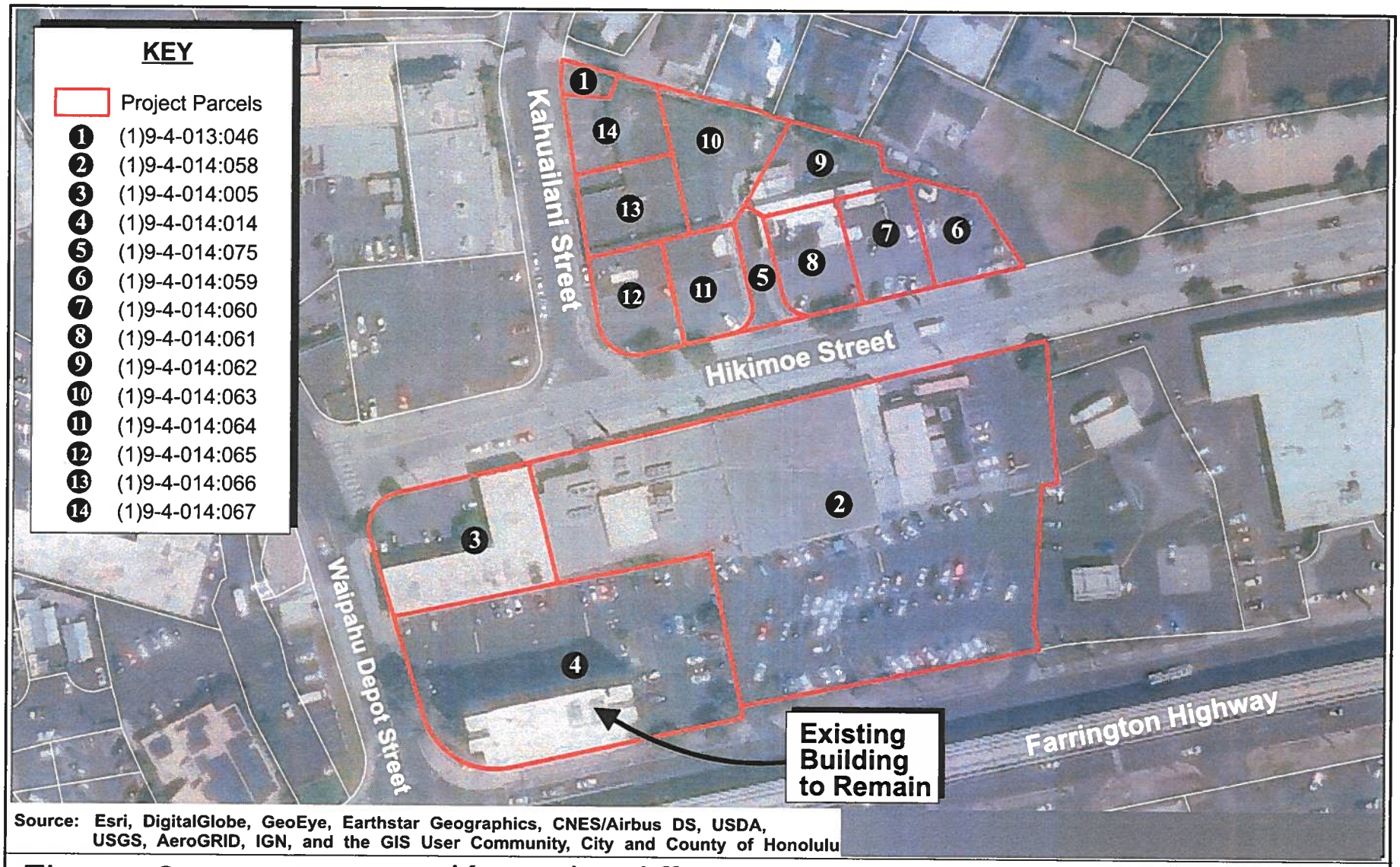

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, City and County of Honolulu

Figure 2

Keawalau Affordable Housing Community Project

Project Location Map

0 27.5 55 110 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu_AH2423\Applications\Figures\Project Location Map

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retail and restaurant uses, parking, and residential amenities on the ground floor and multi-family affordable housing units for families and individuals on the 2nd through the 18th floors ("West Tower"). A mix of affordable housing units will be offered to seniors (for Mauka Block) and families/individuals (for Makai Block East and West Towers) earning 30 percent or less of Area Median Income (AMI) and 60 percent or less of AMI. See **Figure 3** and **Figure 4**. The details of the proposed development are summarized in **Table 1**.

Table 1. Proposed Development Program

Phase 1: Mauka Block		
Senior Living Mid-Rise Housing (5 residential stories)	1-Bedroom	118 units
	2-Bedroom	15 units
	Subtotal	**133 units**
Commercial (ground floor)	Retail/Restaurant	9,796 sq. ft
	Subtotal	**9,796 sq. ft.**

Phase 2: Makai Block East Tower		
Multi-Family High-Rise Housing (18 residential stories)	Studio	54 units
	1-Bedroom	72 units
	2-Bedroom	90 units
	3-Bedroom	18 units
	Subtotal	**234 units**
Commercial (ground floor)	Retail/Restaurant	5,539 sq. ft
	Grocery	23,352 sq. ft
	Subtotal	**28,891 sq. ft.**

Phase 3: Makai Block West Tower		
Multi-Family High-Rise Housing (17 residential stories)	Studio	102 units
	1-Bedroom	68 units
	Subtotal	**170 units**
Commercial (ground floor)	Retail/Restaurant	3,685 sq. ft
	Subtotal	**3,685 sq. ft.**

The total square footage for commercial spaces is 42,372 sq. ft. which is anticipated to consist of a mix of retail, restaurant, and grocery. An exact commercial breakdown will be determined at the time of leasing based on market conditions.

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PARKING

Parking structure will be allocated between phases 2 and 3 at a later date

PHASE 3

Total Retail = 3,685 sf
Total Resi Count = 170
Total stories = 18
Total Residential stories = 17

West Tower Mix
6 studios
4 one bed
10 units per level

OWNER RETAINED AREA

Existing building to be retained by KS and not included in the development

* Retail spaces are anticipated to consist of a mix of retail and restaurant uses

Note: Designs are preliminary and subject to change

MASTER SITE AREA (Phases 1+2+3)
156,432 sf

JOINT DEVELOPMENT AREA (Phases 2+3)
105,651 sf

PHASE 1

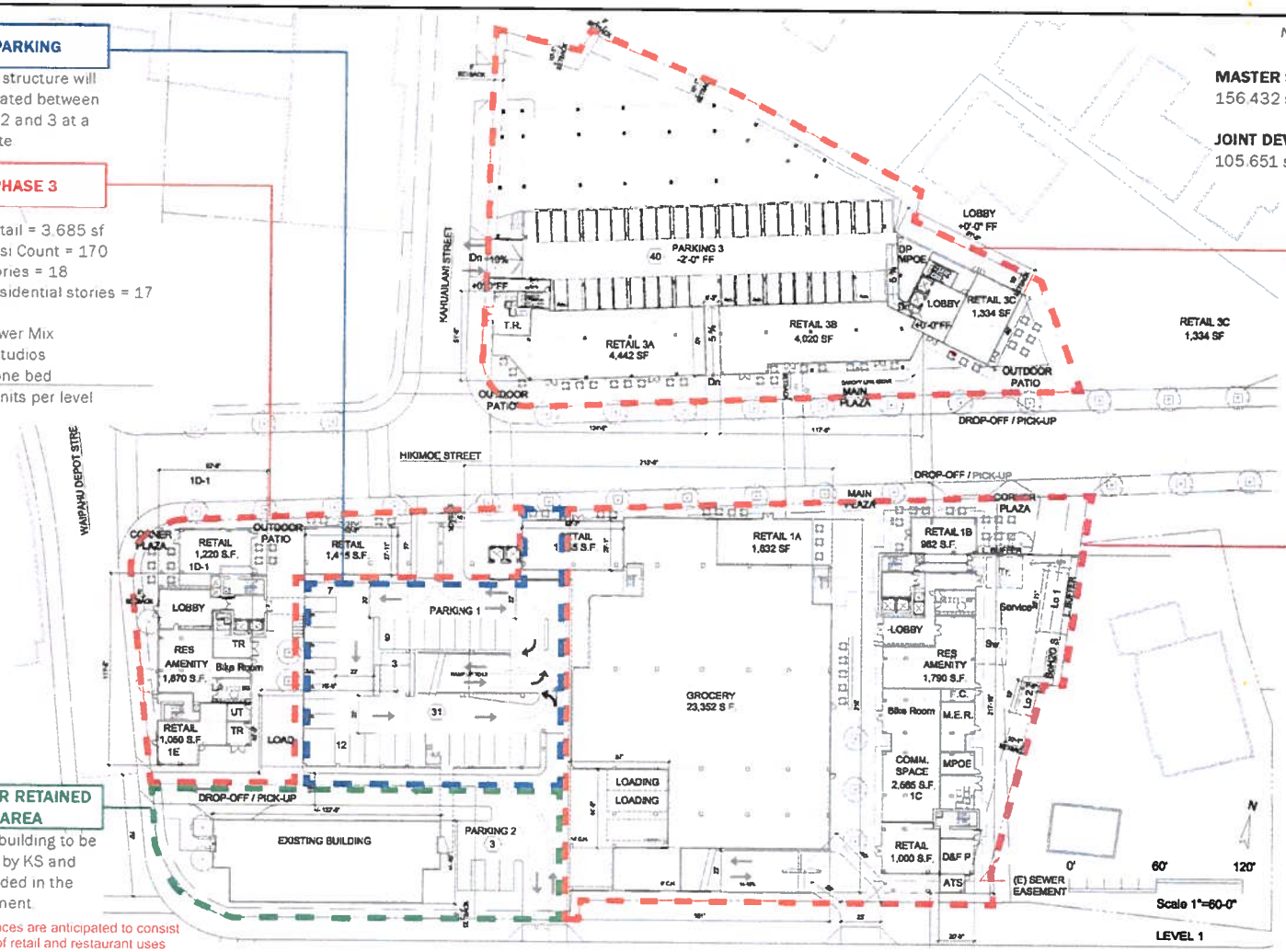
Total Retail = 9,796 sf
Total Resi Count = 133

Low Rise Seniors Mix
24 one bed
3 two bed
27 units per level

PHASE 2

Total Retail = 5,539 sf
Grocery Store = 23,352 sf
Total Resi Count = 234
Total stories = 19
Total Residential stories = 18

West Tower Mix
3 studios
4 one bed
5 two bed
1 three bed
13 units per level



Source: SVA Architects

* Retail spaces are anticipated to consist of a mix of retail and restaurant uses.

Figure 3

Keawalu Affordable Housing Community Project

Ground Level Plan

NOT TO SCALE

Prepared for: Highridge Costa Development Company

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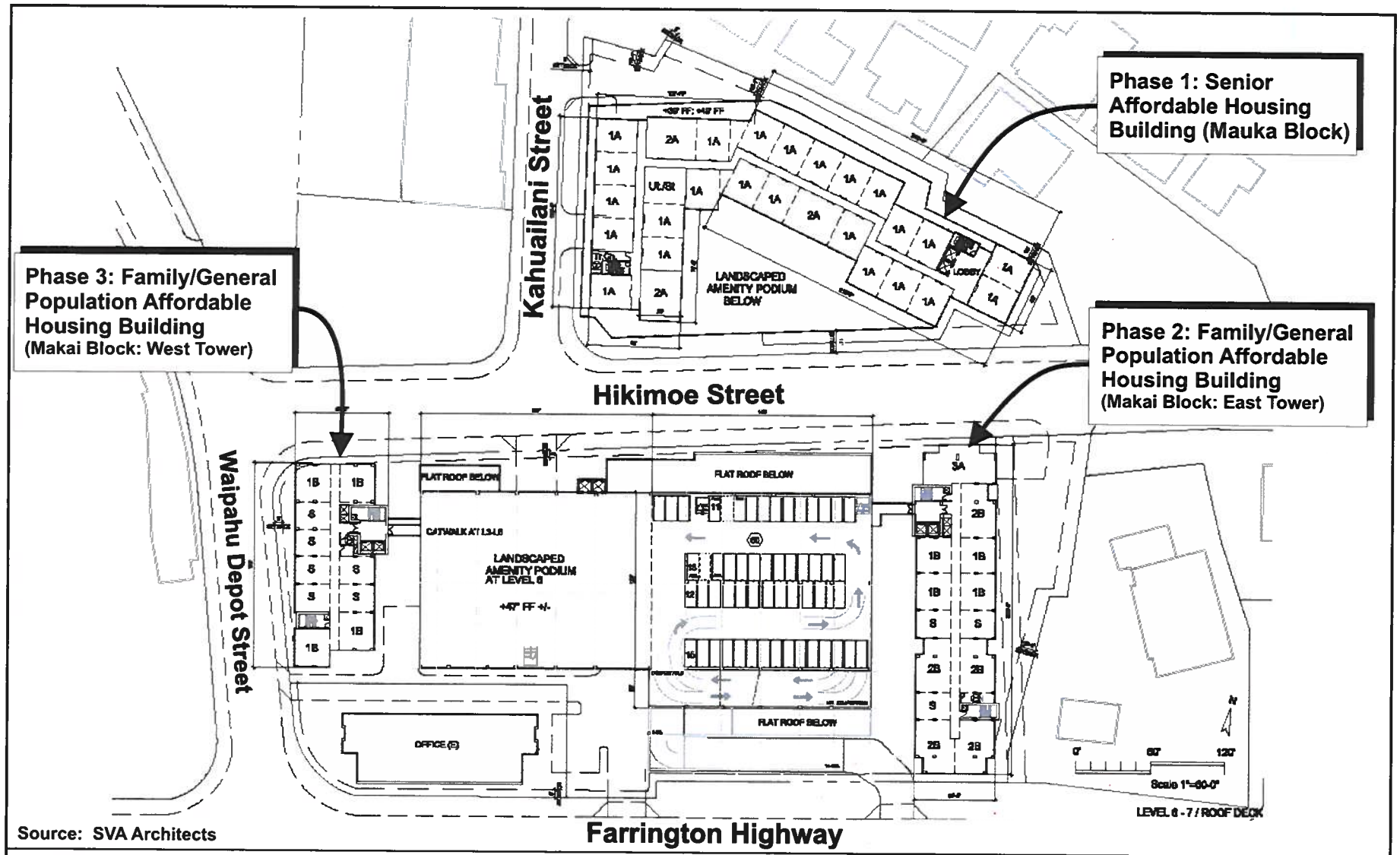
REF-116



Source: SVA Architects

Figure 4

Proposed Keawalau Affordable Housing Community
Residential Level Plan

NOT TO SCALE

Prepared for: Highridge Costa Development Company

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Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Figures\ResidentLevelPlan

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PROJECT NARRATIVE RESPONSES

a. The State Land Use Classification and City and County Zoning District for the site.

The project site is designated "Urban" by the State Land Use Commission, "BMX-3, Community Business Mixed Use" by the City and County of Honolulu, Land Use Ordinance (LUO), and located within the City and County of Honolulu's Transit Oriented Development (TOD) Special District (Waipahū Neighborhood TOD). Residential and retail uses are allowed by the land use designations for the project site. See **Figure 5** and **Figure 6**. The project is located outside of the Special Management Area (SMA).

b. How the project is consistent with the goals and policies of the Sustainable Communities or Development Plan in which the project is geographically located. Reference the applicable goals and objective from the Plan, as appropriate.

The O'ahu General Plan

The O'ahu General Plan sets for the City's objectives and broad policies for the long-range development of the island. It contains statements of the general social, economic, environmental, and design objectives to be achieved for the general welfare and prosperity of the people of O'ahu and the most desirable population distribution and regional development pattern. The most recent version of the O'ahu General Plan was adopted by the City Council on December 1, 2021 and signed by the Mayor on January 14, 2022.

The policies and objectives of the O'ahu General Plan were developed and organized into 11 key focus areas reflecting the needs of the people and the functions of the governments. Of the 11 key focus areas of the General Plan, the proposed Keawalau Affordable Housing Community Project supports the objectives and policies within six (6) focus areas of the plan. They are Population, Balanced Economy, Natural Environment and Resource Stewardship, Housing and Communities, Physical Development and Urban Design, Public Safety and Community Resilience, as further detailed below.

(1) Population

Objective A:

To plan for anticipated population in a manner that acknowledges the limits of O'ahu's natural resources, protects the environment, and minimizes social, cultural, and economic disruptions.

Policy 3:

Seek a balanced pace of physical development in harmony with the City's environmental, social, cultural, and economic goals by effecting and enforcing City regulations.

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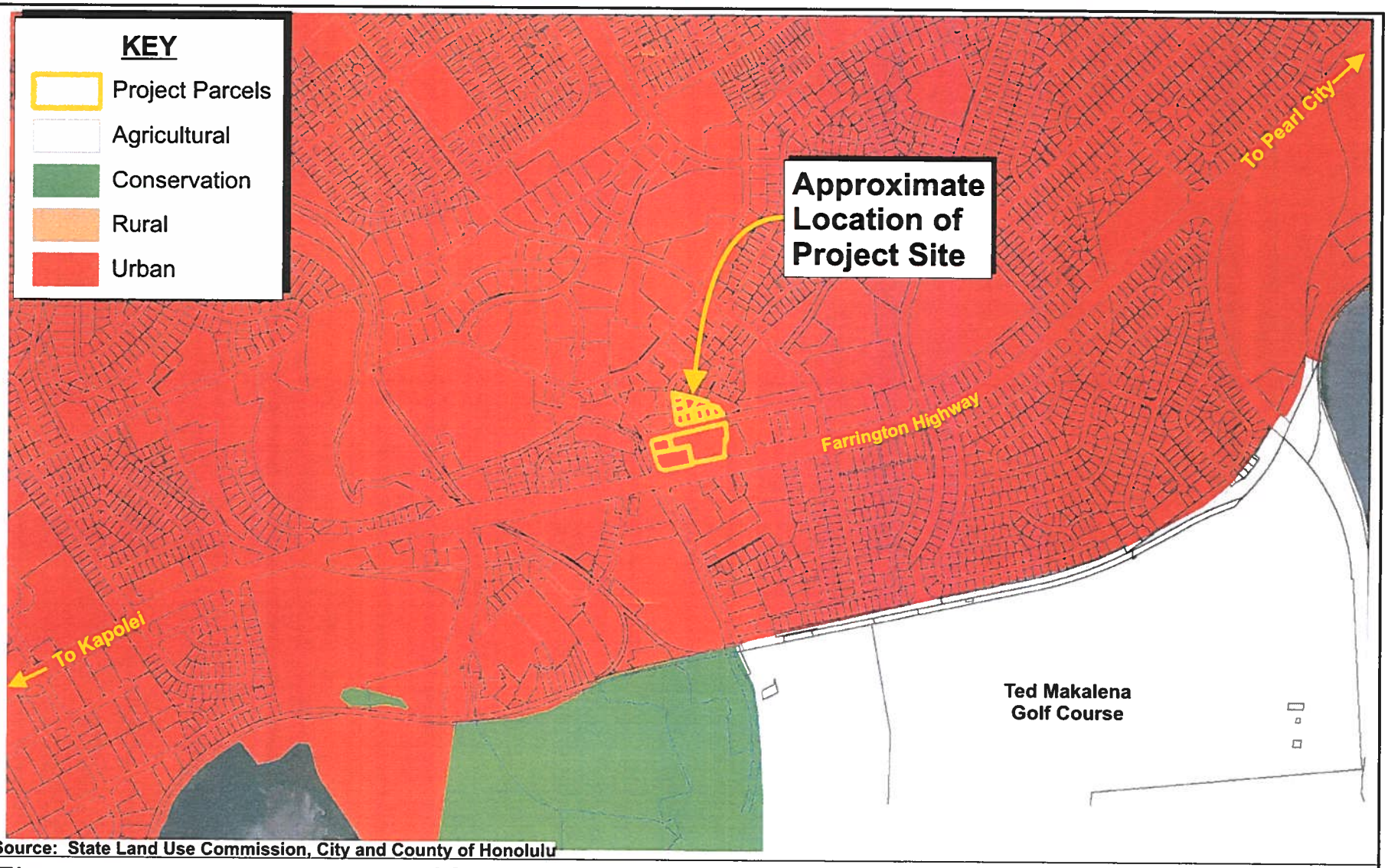

Source: State Land Use Commission, City and County of Honolulu

Figure 5

Keawalau Affordable Housing Community Project

State Land Use District Map

0 250 500 1000 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

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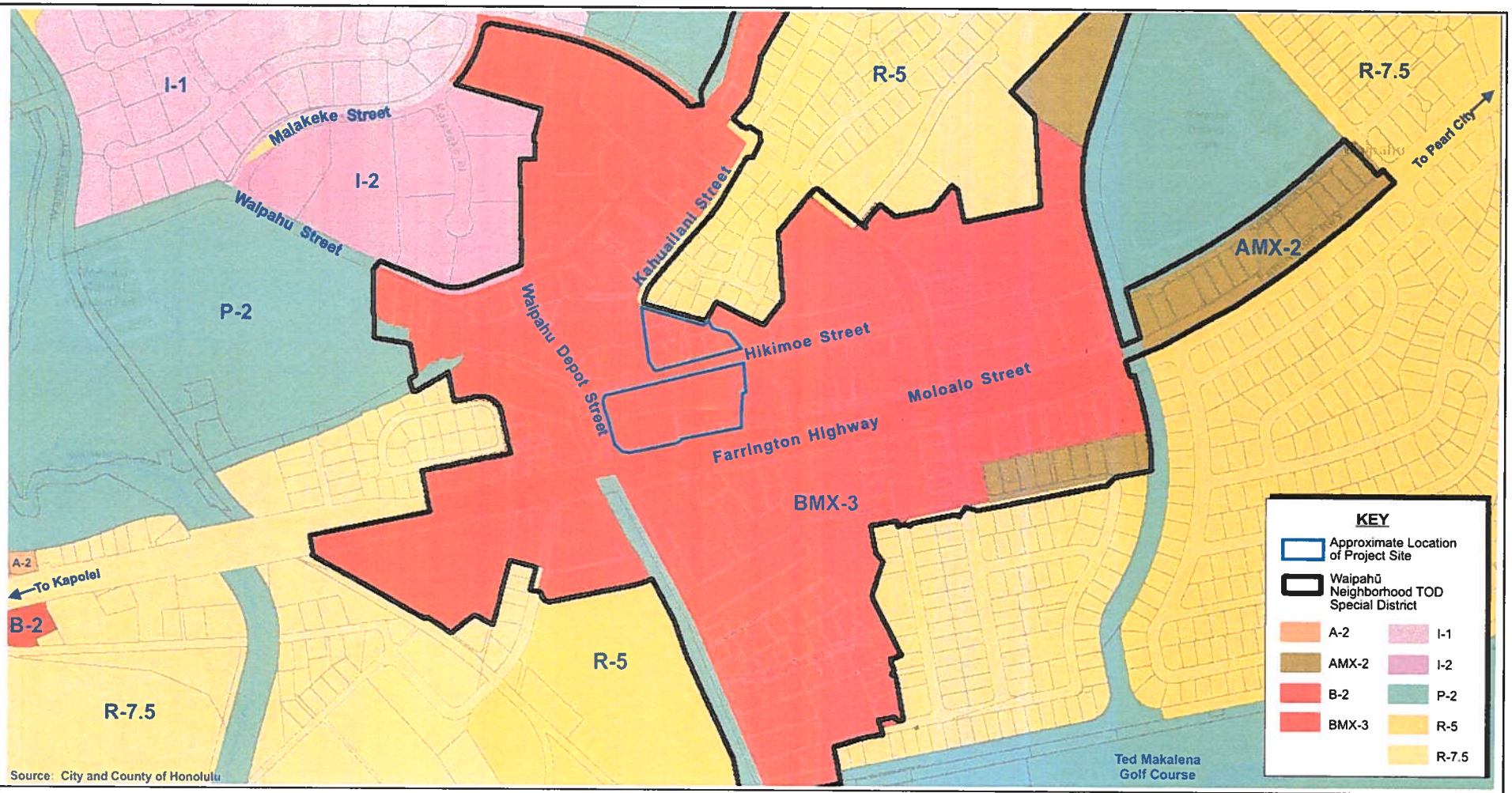

Figure 6

Keawalau Affordable Housing Community Project

Zoning and Special District Map

0 0.05 0.1 0.2 MILE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

REF-120

Response: The proposed project will provide 537 multi-family affordable rental housing units for seniors and families earning 30 percent and 60 percent or less of AMI, which will support local families and seniors on O'ahu who are struggling with high housing costs and support the anticipated population growth on the island. The Applicant has prepared a Preliminary Engineering Report (PER), Geotechnical Report, Traffic Impact Analysis Report (TIAR), and Archaeological Inventory Survey (AIS) and has consulted with the State Historic Preservation Division (SHPD) to identify and mitigate potential environmental, traffic, and archaeological impacts. See **Sections 16 through 19** of this 201H application submittal package.

Objective B:

To establish a pattern of population distribution that will allow the people of O'ahu to live, work and play in harmony.

Policy 2:

Encourage development within the secondary urban center at Kapolei and the 'Ewa and Central O'ahu urban-fringe areas to relieve developmental pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.

Response: The proposed project is a mixed-use transit-oriented development which will provide places to live, work, and play in generally the same area. The project is located in an existing urbanized area in Central O'ahu and is intended to help meet affordable housing needs in the region.

(2) Balanced Economy

Objective A:

To promote diversified economic opportunities that enable all the people of O'ahu to attain meaningful employment and a decent standard of living.

Policy 2:

Encourage the viability of businesses and industries, including support for small businesses, which contribute to the economic and social well-being of O'ahu residents.

Response: The proposed project will include 537 multi-family affordable housing units and ground floor commercial uses, which are anticipated to include small businesses. As such, the proposed

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project will promote diversified economic opportunities for O'ahu residents.

(3) **Natural Environment and Resource Stewardship**

Objective A:

To protect and preserve the natural environment.

Policy 4:

Require development projects to give due consideration to natural features and hazards such as slope, inland and coastal erosion, flood hazards, water-recharge areas, and existing vegetation, as well as to plan for coastal hazards that threaten life and property.

Policy 6:

Design and maintain surface drainage and flood-control systems in a manner which will help preserve natural and cultural resources.

Response: As noted previously, the Applicant has prepared a PER, Geotechnical Report and AIS and has consulted with the SHPD to identify and mitigate potential environmental and archaeological impacts. Appropriate drainage improvements and stormwater treatment will be in place as required by the City and County of Honolulu. The project site is located within Zones "AE", "D", and "X" by the Flood Insurance Rate Map (FIRM). See **Figure 7**. A Letter of Map Revision (LOMR) was submitted to the Federal Emergency Management Agency (FEMA) to revise the FIRM based on more accurate data of existing conditions, specifically, the floodway designation within Zone AE. On July 25, 2022, FEMA approved the LOMR with an effective date of December 6, 2022 and removed the project site from the floodway designation and lowered the base flood elevations within Zone AE. The proposed project will comply with the development standards for Zone AE, which require the first floor of the building and any life safety components within Zone AE to be constructed above the base flood elevation.

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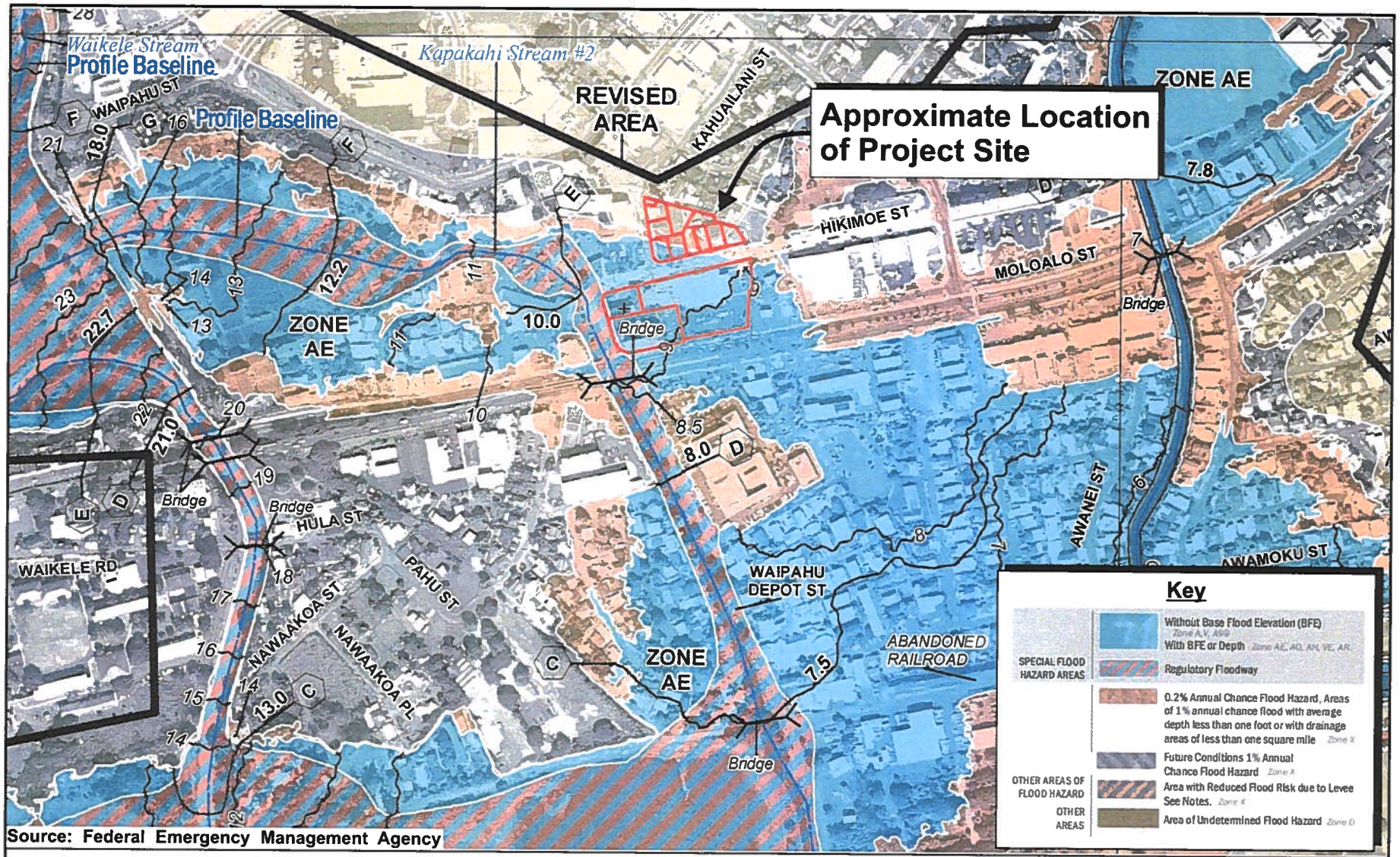

Source: Federal Emergency Management Agency

Figure 7

Proposed Keawalau Affordable Housing Community

Approved FEMA Flood Insurance Rate Map

NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Figures\FEMA FIRM.201H

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(4) **Housing and Communities**

Objective A:

To ensure a balanced mix of housing opportunities and choices for all residents at prices they can afford.

Policy 1:

Support programs, policies, and strategies that will provide decent and affordable homes for local residents, especially those in the lowest income brackets.

Policy 5:

Make full use of government programs that provide assistance for low- and moderate-income renters and homebuyers.

Policy 7:

Provide financial and other incentives to encourage the private sector to build homes for low- and moderate-income residents.

Policy 9:

Encourage the replacement of low- and moderate-income housing in areas which are being redeveloped at higher densities.

Policy 12:

Promote higher-density, mixed-use development where appropriate, including rail transit-oriented development, to increase the supply of affordable and market housing in convenient proximity to jobs, schools, shops, and public transit.

Policy 13:

Encourage the production and maintenance of affordable rental housing.

Policy 14:

Encourage the provision of affordable housing designed for the elderly and people with disabilities in locations convenient to critical services and to public transit.

Response: The proposed project is applying for affordable housing development approval pursuant to Section 201H-38, Hawai'i Revised Statutes (HRS), which would help expedite the delivery of affordable housing and advance the affordability objectives of the

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project by providing cost saving. The proposed project is a high-density, transit-oriented mixed-use affordable housing for families and seniors earning 30 percent/60 percent of AMI or less, and as such, supports Objective A and related policies listed above.

Objective B:

To minimize speculation in land and housing.

Policy 5:

Ensure that owners of housing properties, including government-subsidized housing, maintain housing affordability over the long term.

Response: The proposed project will ensure the affordability of the project for at least 61 years.

Objective C:

To provide residents with a choice of living environments that are reasonably close to employment, schools, recreation, and commercial centers, and that are adequately served by transportation networks and public utilities.

Policy 1:

Ensure that residential developments offer affordable housing to people of different income levels and to families of various sizes to alleviate the existing condition of overcrowding.

Policy 3:

Encourage the co-location of residential development and employment centers with commercial, educational, social, and recreational amenities in the development of desirable communities.

Policy 5:

Support mixed-use development and higher-density redevelopment in areas surrounding rail transit stations.

Response: The proposed transit-oriented mixed-use development project offers 537 multi-family affordable housing units to meet demand and alleviate the overcrowded housing conditions, and includes ground floor retail, restaurant, and grocery uses to support various aspects of residents' life styles.

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(5) **Physical Development and Urban Design**

Objective A:

To coordinate changes in the physical environment of O'ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

Policy 4:

Facilitate and encourage compact, higher-density development in urban areas designated for such uses.

Policy 5:

Encourage the establishment of mixed-use town centers that are compatible with the physical and social character of their community.

Policy 6:

Facilitate transit-oriented development in rail transit station areas to create live/work/play multi-modal communities that reduce travel and traffic congestion.

Response: The proposed project site is identified as an ideal location for transit-oriented, mixed-use development in the close proximity to the future Waipahū Transit Center Rail Station in the Central O'ahu Sustainable Community Plan and Waipahū Neighborhood TOD plan, as further discussed below. The proposed project will create a new transit-oriented mixed-use community that will provide places to live, play, and work and help reduce automobile trips and traffic congestion.

(6) **Public Safety and Community Resilience**

Objective B:

To protect residents and visitors and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.

Policy 2:

Require all developments in areas subject to floods and tsunamis, and coastal erosion to be located and constructed in a manner that will not create any health or safety hazards or cause harm to natural and public resources.

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Response: As noted previously, the Applicant has prepared a PER and Geotechnical Report to identify and mitigate potential environmental and traffic impacts. The project site is located within Special Flood Hazard Zone AE (without floodway designation). Refer to **Figure 7**. To protect the public from potential flood hazards, the proposed project will comply with the development standards for Zone AE, which require the first floor of the building and any life safety components to be constructed above the base flood elevation. The proposed project is located outside of the Tsunami Evaluation Zone and over 4,000 feet inland of the nearest coastal area, and as such, unsafe conditions from tsunamis and coastal erosion are not anticipated. See **Figure 8**. The project site is outside of the projected 3.2-foot Sea Level Rise Exposure Area, which includes areas vulnerable to passive flooding. See **Figure 9**.

The Central O'ahu Sustainable Community Plan

The Central O'ahu SCP's vision statement and policies sustain Central O'ahu's character, lifestyle, and economic opportunities by focusing future residential development on master planned suburban communities within a Community Growth Boundary and on redevelopment around two (2) transit centers in Waipahū, one of which is the Waipahū Transit Center Rail Station Area which encompasses the project area for the proposed Keawalau Affordable Housing Community Project.

The Central O'ahu SCP designates the project site as Regional Town Center on the Urban Land Use Map. See **Figure 10.** The Regional Town Center is the core of an urban fringe town which serves as a center for shopping, civic activity, and municipal services for its region. The proposed project is consistent with the following policies of the Central O'ahu SCP:

3.6 Waipahū Town

3.6.1 General Policies

- *Develop Waipahū as a harmonious blend of the old and new.*
  - *Provide opportunities for economic revitalization which generate jobs and attract people to Waipahū while minimizing adverse impacts to existing small businesses.*
  - *Approve new land uses if they are compatible with existing uses and provide for community needs.*
  - *Develop so there is a mixture of old style plantation buildings with more contemporary buildings.*
  - *Create streets that are landscaped and pedestrian- and*

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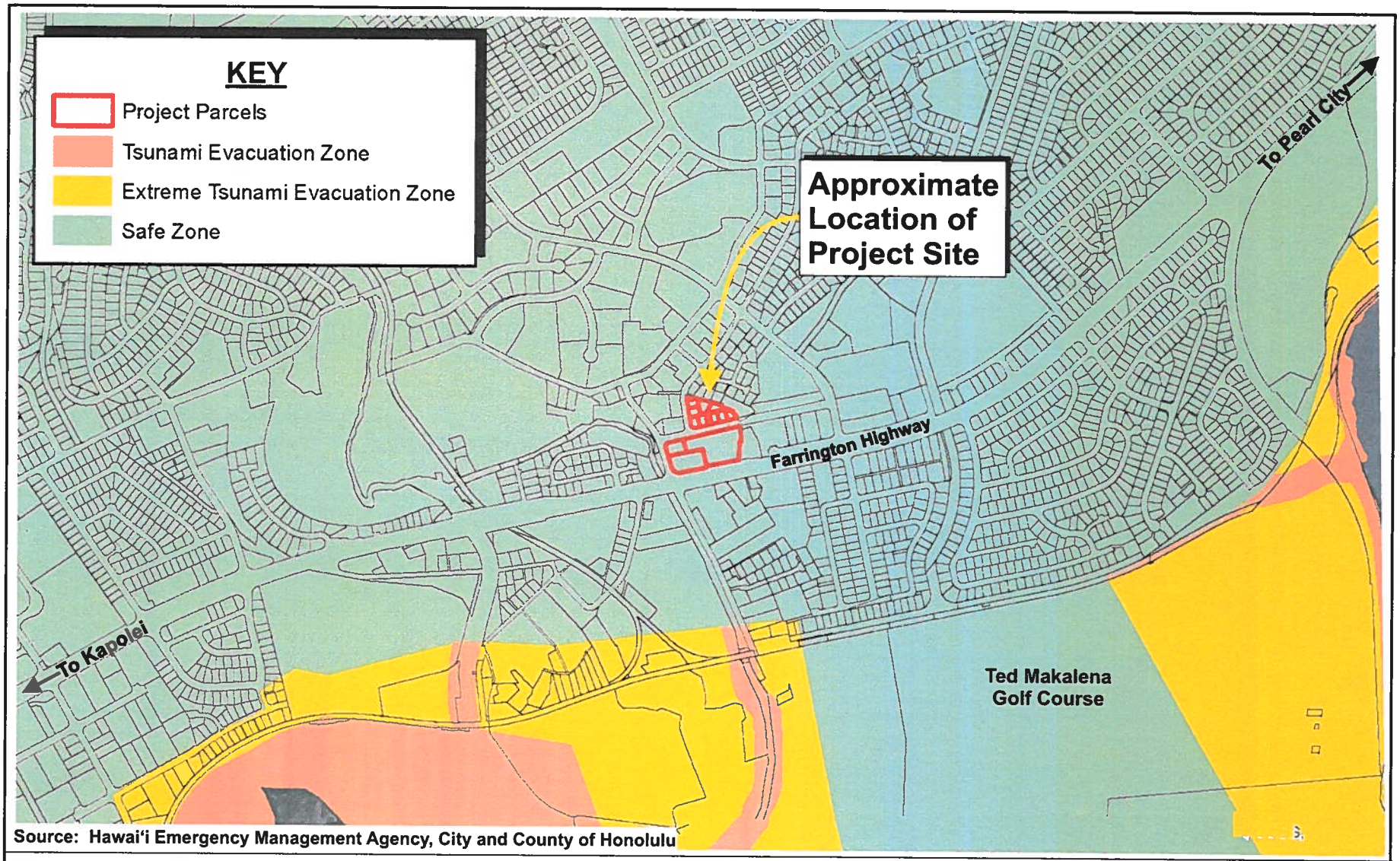

Source: Hawai'i Emergency Management Agency, City and County of Honolulu

Figure 8

Keawalau Affordable Housing Community Project

Tsunami Evacuation Zone Map

0 250 500 1000 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu_AH\Applications2423\Figures\Tsunami

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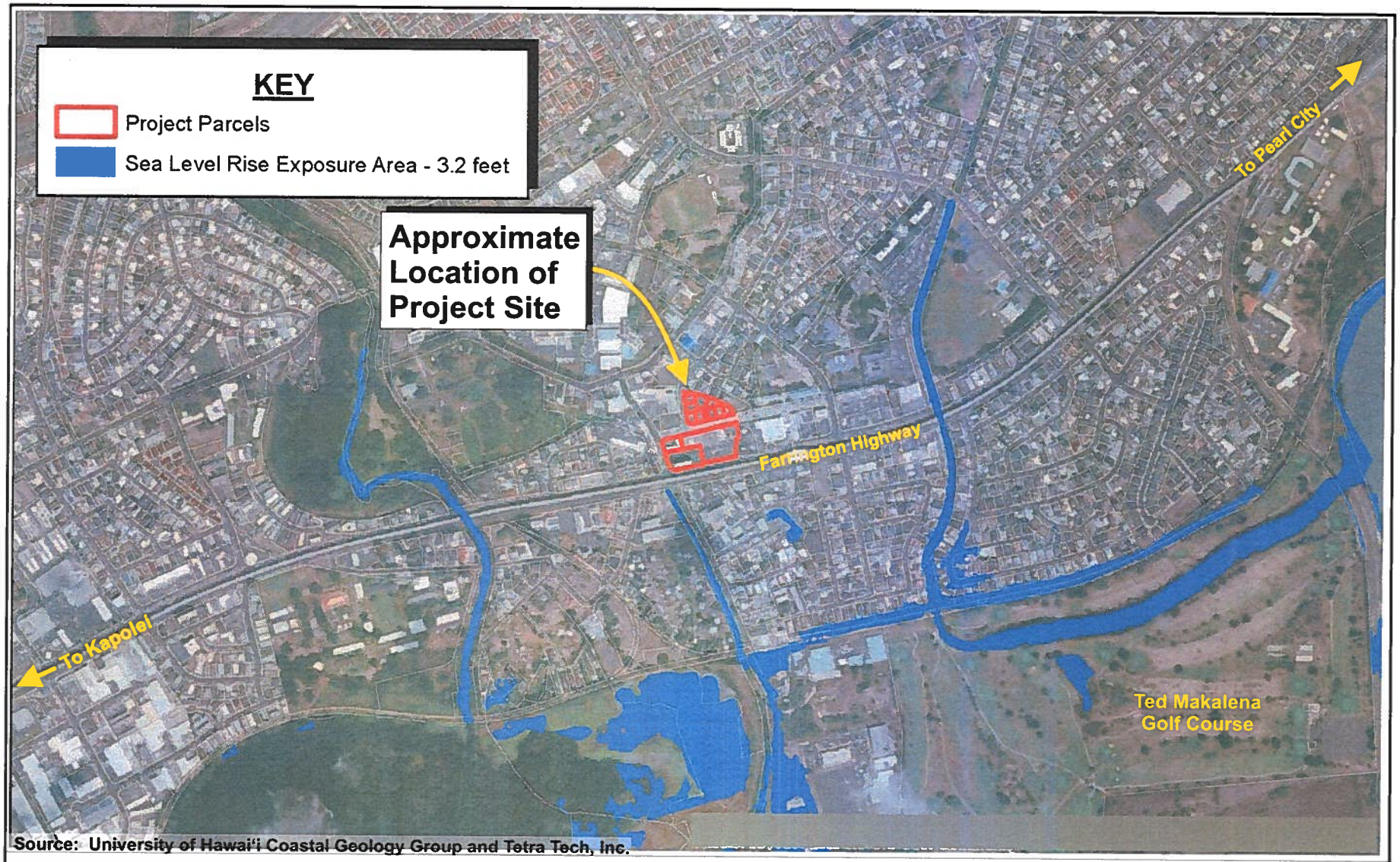

Source: University of Hawai'i Coastal Geology Group and Tetra Tech, Inc.

Figure 9

Keawalau Affordable Housing Community Project

Sea Level Rise Exposure Area Map

0 250 500 1000 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH\Applications2423\Figures\SLR EXP

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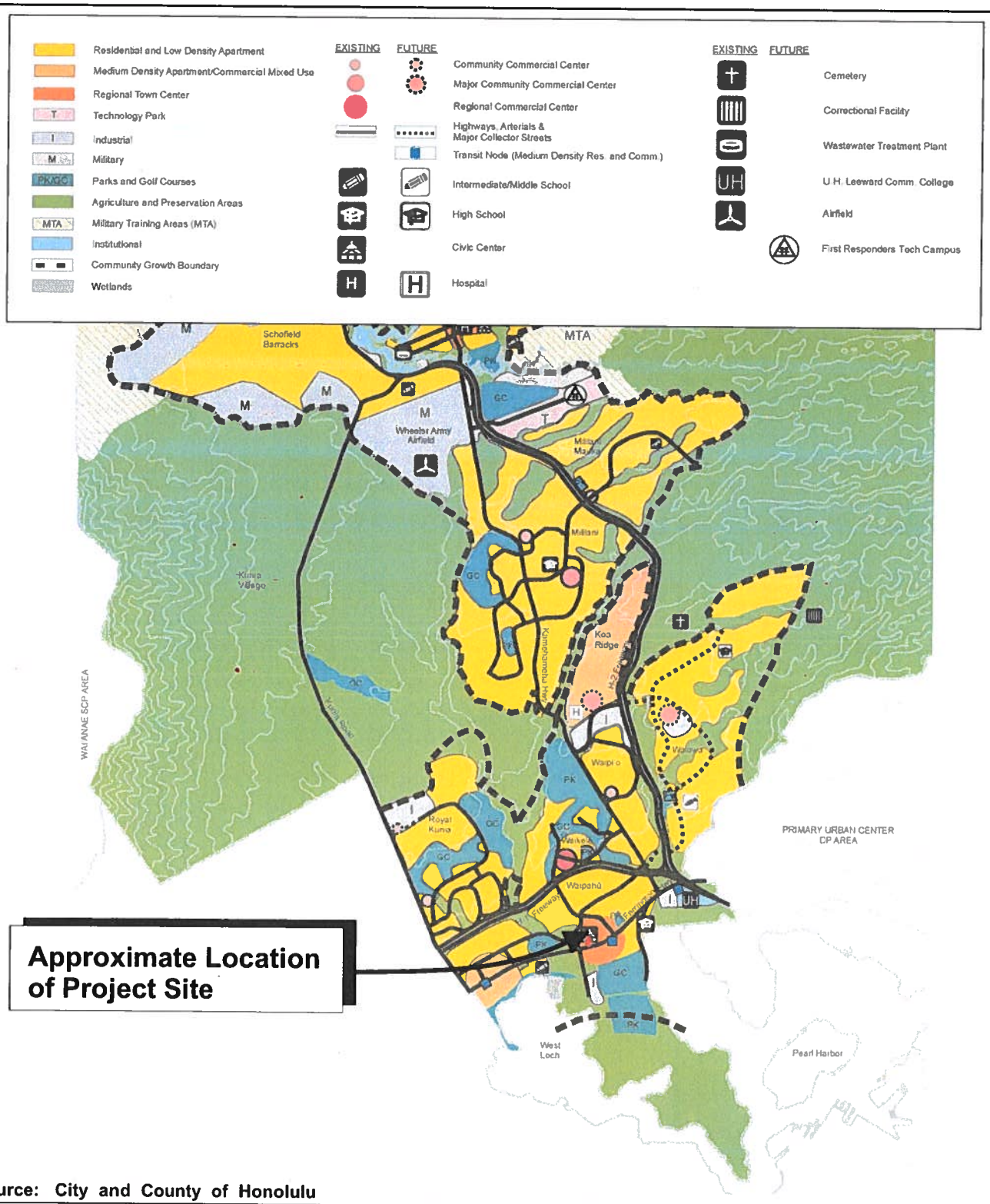

Source: City and County of Honolulu

Figure 10 Keawalau Affordable Housing Community Project

Central O'ahu Sustainable Communities Plan Urban Land Use Map

NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Figures\Urban Land

REF-130

bike-friendly.

- *Integrate the economic development of Waipahū with social, cultural, and recreational enhancements.*
  - *Revitalize Waipahū Town for the betterment of the business community and to provide gainful employment serving the immediate community and the region.*
  - *Make the economic development and revitalization of Waipahū, particularly within the town core area (also known as the Old Town Anchor area), central to implementing the community's desired land use plan.*
- *Create a Waipahū that is a vibrant community where the country atmosphere is preserved, where business prospers, and where diverse people can come together to live, work, shop, and play.*
- *Around the (2) two Waipahū stations on the Honolulu Rail Transit system, encourage transit-oriented development that:*
  - *Reflects Waipahū's unique character,*
  - *Maintains the quantity of affordable housing while offering housing for a wider range of households,*
  - *Creates more walkable, healthier, prosperous neighborhoods with safe pedestrian and bicycling environments that put pedestrians first, and*
  - *Offers gathering places for all generations.*

Response: The proposed project is a transit-oriented mixed-use project located in the close proximity to the future Waipahū Transit Center Rail Station. The proposed project, which includes ground floor commercial space, will generate jobs and attract people to Waipahū. The proposed affordable housing units will be offered to both seniors and families earning 30 percent and 60 percent or less of AMI. The proposed project will create a walkable community and create gathering spaces as part of residential amenities.

3.9 Existing and Planned Residential Communities

3.9.1 General Policies

- ***Higher Density Housing along the Waipahū-Kapolei Rail Transit Corridor** – To promote use of mass transit, develop higher density residential use along a major rail transit corridor linking Waipahū with Kapolei in the west and with Primary Urban Center communities to the east.*
  - *Develop Medium Density Apartment and Commercial mixed uses at Transit-Oriented Development (TOD) areas around the three Honolulu Rail Transit stations.*

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- *Develop areas along the rapid transit corridor at housing densities of 25 units per acre, and encourage greater densities within the TOD areas.*

- ***Affordable Housing** – Require that housing affordable to low and low-moderate income households be provided in new residential developments. In particular, provide affordable rental housing for students, families, seniors, and those with special needs.*

Response: The proposed project is a transit-oriented mixed-use affordable housing project located in Waipahū, which aligns with the policies outlined in Section 3.9 of the Central O'ahu SCP. It is noted that the project will be developed with housing densities of approximately 138 units per acre, which aligns with the above noted policy which encourages higher densities within the TOD areas.

3.10 Planned Commercial Retail Centers

3.10.1 General Policies

- *Emphasize pedestrian and transit access to and within the centers.*
- *Permit multi-family residential use above the first floor, and include it wherever possible in commercial centers.*

Response: The proposed project will include commercial spaces on the first floor with multi-family affordable housing units in above floors in Waipahū, one of the commercial centers in Central O'ahu. The proposed project will create pedestrian linkages for a walkable community in close proximity to the transit station.

4.2 Water Allocation and System Development

4.2.1 General Policies

Adequacy of Water Supply

- *Before zoning approval is given for new residential or commercial development in Central O'ahu, the Board of Water Supply should:*
  - *Report if adequate potable and nonpotable water is available; and*
  - *If adequate potable and nonpotable water is not available, recommend conditions that should be included as part of the zone change approval in order to assure adequacy*

Response: The Applicant has consulted with the Board of Water Supply (BWS). BWS provided a letter dated May 26, 2022 stating that the existing water system is presently adequate to accommodate the proposed development, and final determination of availability will be made

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during the building permit process. A letter from the BWS is included in **Section 6** of this 201H application submittal package.

4.3 Wastewater Treatment

4.3.1 General Policies

- *Require all new developments in Central O'ahu to be connected to a regional or municipal sewer service system.*

Response: The Applicant's engineer submitted Sewer Connection Applications to the Department of Environmental Services (DES), and the DES issued approvals on June 18, 2021. The approvals from the DES is included in **Section 5** of this 201H application submittal package.

4.6 Drainage Systems

4.6.1 General Policies

- *Design drainage systems to emphasize flood control, minimization of nonpoint source pollution, and the retention and/or detention of storm water on-site and in appropriate open space and wetland areas.*

Response: According to the PER for the project, the proposed project is expected to include landscaped areas that will increase pervious surfaces compared to that of the existing conditions, which will subsequently decrease the total runoff rate accordingly. As such, retention of stormwater for quantity control is not anticipated to be required. The project is anticipated to utilize a stormwater treatment device in accordance with the City and County of Honolulu's rules related to water quality and will be connected to the existing catch basins at Hikimoe Street and Farrington Highway by storm drainage lateral connections to follow the existing drainage patterns of the site. The project site will be graded to provide positive drainage directed away from the buildings. Refer to **Section 17**.

Waipahū Neighborhood TOD Plan

The Waipahū Neighborhood Transit Oriented Development (TOD) Plan was prepared and adopted by the City Council on February 20, 2014 via Resolution 14-47, CD1. The Plan focuses on the areas around two (2) proposed rail transit stations, at the intersections of Farrington Highway/Leoku Street and Farrington Highway/Mokuola Street, referred to as the West Loch Station and Waipahū Transit Center Rail Station, respectively. It is the community's vision to "Celebrate Waipahū" by fostering neighborhood improvements and future urban development adjacent to those stations.

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The project site is located within 1/4 mile of the Farrington/Mokuola Station Area (Waipahū Transit Center Rail Station). The proposed project is consistent with the following plan principles and Farrington/Mokuola Station Area (Waipahū Transit Center Rail Station) Plan:

Plan Principles

A. Celebrate Waipahū

- *Principles were developed through community process*
- *"Celebrating Waipahu" recognizes the neighborhood's potential*

Response: The proposed project is guided by the Waipahu Neighborhood TOD Plan and project design themes are inspired by Waipahu's unique character.

B. Maintain the Local Character of the Place

- *The Old Town is the recognized as the historic heart of Waipahu*

Response: The Applicant recognizes that with a few exceptions, the Old Town area is generally low-rise in character. The design of the proposed project has been carefully considered with these factors in mind. The proposed development will not exceed the height (inclusive of differences in grade) of the historic sugar mill smokestack, a recognized landmark for the area. After careful consideration of the design, the development team concluded that it would be infeasible to create an attractive project with the 60-ft.height restriction while meeting the goal of the development to provide substantial affordable housing and transformative commercial development to the Waipahū Community. A single 60-ft. building across the entire Makai Block would have had a more detrimental impact on views, been generally unattractive, and yield a fraction of the affordable units provided by the project as proposed.

With this said, the Applicant understands that some members of the community have an unfavorable view of heights greater than 60 ft. After consultation with the community, the project has been reduced by two (2) stories from 20 stories to 18 stories on the Phase 3 Makai Block West Tower and one (1) story from 20 stories to 19 stories on the Phase II Makai Block East Tower. To further ensure the proposed community will fit well into the surrounding area, substantial effort has been put into the ground level experience for locals and residents alike. The proposed buildings have been set back substantially from the sidewalk, with seating areas and local

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art accenting to create a village-like feel. The View Analysis included with this 201H Application illustrates the intent of these areas to create a new and revitalized downtown Waipahū. See **Section 11A**.

C. ***Enhance the "Green Network"***

- *Emphasize network of green spaces, linking existing larger parks with new neighborhood open spaces.*

Response: The proposed project incorporates landscaped plazas and communal gathering spaces throughout the mixed-income community. These plazas and public spaces are connected by pedestrian accesses throughout.

D. ***Create a Safe, Pedestrian-First Environment***

- *Provide safe, convenient and attractive pedestrian and attractive pedestrian environment*
- *Development in the station areas should be oriented to the pedestrian*
- *New streets and pathways will help to connect homes with transit, jobs, retail and services*

Response: The proposed project will involve sidewalk and landscape improvements along Hikimoe Street and Farrington Highway which will contribute to a safe and pedestrian friendly environment for the community and improve the pedestrian connectivity between the proposed mixed-use affordable housing project and the future Waipahū Transit Center Rail Station, located approximately 300 feet east of the proposed project.

E. ***Provide Mixed-Income Housing***

- *Mixture of housing choices and price ranges*
- *Maintain the quantity of affordable housing*
- *Many residents near transit may reduce the number of cars they would normally own, resulting in overall household savings*

Response: The proposed project will consist of 537 multi-family affordable rental housing units which will be available for seniors and families earning 30 percent or less and 60 percent or less of AMI. The proposed project will contribute 537 units to the affordable housing inventory in Waipahū and will maintain its affordability for 61 years. In addition, due to its close proximity to the future Waipahū Transit

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Center Rail Station, residents of the proposed project may choose not to own private vehicles, resulting in overall household savings.

F. ***Inter-Modal Transportation Network***

- *Station areas currently have limited connectivity to surrounding neighborhoods*
- *New streets, paths and trails should be developed*

Response: The proposed project will involve sidewalk and landscape improvements along Hikimoe Street and Farrington Highway which will contribute to a safe and pedestrian friendly environment for the community and improve the pedestrian connectivity between the proposed mixed-use affordable housing project and the future Waipahū Transit Center Rail Station.

G. ***Create a Mixed-Use Village-Like Setting in the Core Areas***

- *Active, village-like character in station areas*
- *Many older neighborhoods in Honolulu are good example of mixed-use villages*

Response: The proposed project will enhance the mixed-use character of the area, providing a mix of residential units with commercial space.

Farrington/Mokuola Station Area Plan

A. ***Overall Structure***

- *Infill housing, retail and mixed-use development*

Response: The proposed project site is previously developed with various commercial uses. The proposed project is located in an ideal location for an infill housing, retail, and mixed-use development in the close proximity to the future Waipahū Transit Center Rail Station.

B. ***Connectivity and Circulation***

- *Usable, attractive transportation options*
- *Transit will provide a viable alternative to the private automobile*
- *Pedestrian village character and fined-grained neighborhood*
- *Parking structures may be developed by private property owners to help support overall neighborhood parking needs*

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Response: The proposed project is located in close proximity to the future Waipahū Transit Center Rail Station, offering transit options for residents and users of the proposed mixed-use community, which is anticipated to reduce the overall private automobile trips in the region. As noted previously, sidewalk and landscape improvements will be implemented as part of the project to improve the pedestrian environment of the community. The parking available for the commercial uses, located on the ground floor, is anticipated to help alleviate the overall neighborhood parking needs.

C. *Parks and Open Space*

- *An Open space network can provide a green corridor for non-motorized movement within the community*

Response: The proposed project incorporates landscaped plazas and communal gathering spaces throughout the mixed-income community. These plazas and public spaces are connected by pedestrian accesses throughout.

D. *Land Use and Urban Form*

By 2030:

- *Residential: net increase of approximately 1,520 units*
- *Commercial/industrial: existing inventory to be replaced with new buildings and the amount of space to remain unchanged at approximately 971,000 square feet*
- *Approximately 70 percent of newly developed space will be for residential uses, and 30 percent will be for commercial/industrial uses*

Response: The proposed mixed-use transit-oriented project will contribute 537 affordable residential units, representing a significant contribution for the net increase in residential units noted in the Plan, and approximately 42,372 sq. ft. commercial uses to the Farrington/Mokuloa Station Area, replacing approximately 60,000 sq. ft. of the existing commercial uses on the property.

D.1. *Housing*

- *New housing will help support neighborhood services*
- *Medium-and higher-density housing opportunities exist both mauka and makai of Farrington Highway*

Response: The proposed 537 affordable housing units will help support neighborhood services. The proposed

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project offers high-density affordable housing and is located mauka side of Farrington Highway.

D.2. ***<u>Mixed-Use</u>***

- *Mixed-use buildings will help to create vibrant, urban neighborhoods*
- *Residential mixed-use areas should help to strengthen the historic core along Waipahū Street and Waipahū Depot Road*

<u>Response</u>: As noted previously, the proposed project will include 537 multi-family affordable housing units and ground floor commercial uses to help create a vibrant, urban neighborhood. The proposed project is located along Waipahū Depot Street to help strengthen the historic core along Waipahū Depot Street.

D.3. ***<u>Retail</u>***

- *Retail areas should be located along Farrington Highway*
- *Retail areas should contain a mix of complementary uses and services*

<u>Response</u>: The Makai block of the proposed project is located between Hikimoe Street and Farrington Highway and includes ground floor retail and grocery use, both of which will complement each other's uses and services.

c. Describe the current and historic site conditions. Describe the degree to which existing structures, if any, will be renovated or demolished.

(1) <u>Existing Site Condition</u>

Current environmental conditions consist of a completely urbanized environment with paved roads, commercial buildings, and subsurface utilities and related infrastructure. Currently leased businesses within the Mauka Block include a laundromat, drug store, medical clinic, salon, and restaurants, while currently leased businesses within the Makai Block include a supermarket, health center, pharmacy, remittance center, and radiology clinic. Most of the project area is surfaced with either asphalt (exterior parking) or concrete (building foundations).

Small, narrow strips of landscaped grass supporting ornamental trees are dispersed throughout the project area.

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As noted previously, the existing building (Sonido Building) located along the southern boundary of TMK (1)9-4-014:014 will remain as is and will not be part of the project. The rest of the existing structures within the project area will be demolished to develop the proposed project.

A summary of the proposed treatment of existing improvements at the site is shown in **Table 2.**

Table 2. Existing Land Use Program

Mauka Block Existing Programming		
Retail	11,830 sq. ft.	Demolish
Restaurant	2,340 sq. ft.	Demolish
General Office	2,200 sq. ft.	Demolish
Medical Office	3,050 sq. ft.	Demolish

Makai Block Existing Programming			
Market		30,089 sq. ft.	Demolish
Depot Center	General Office	4,824 sq. ft.	Demolish
	Medical Office	5,942 sq. ft.	Demolish
Sonido Building	General Office	6,148 sq. ft.	Remain
	Medical Office	13,913 sq. ft.	Remain

(2) Historic Site Condition

Kleinfelder, Inc. prepared an Archaeological Inventory Survey (AIS) in May 2022. See **Section 18**. This AIS has been submitted to the SHPD in accordance with Section 6E-42, HRS for review and approval. The preparation of the AIS involved literature review and field survey. A summary of the literature review is provided below.

The project area is situated within ahupua'a of Waikele, which means "muddy water", likely referring to the murky or cloudy appearance of the Waikele Stream during pre-Contact times. Traditional Hawaiian land use centered on agricultural production, coastal exploitation of marine resources, and the collection of wild plants and animals.

Agricultural intensification accounted for a wide variety of cultivated plants, the most prolific being taro (***Colocasia esculenta***) and sweet potato (***Ipomoea batatas***). Other important cultigens included arrowroot (***Tacca leontopetaloides***), sugar cane (***Saccharum officinarum***), ti (***Cordyline terminalis***), banana (***Musa paradisiacal***), and coconut (***Cocos nucifera***).

The region was also notable for its resource-rich coastal environment and exploitation of marine resources centered on fishing, aquaculture, and the collection of limu (seaweed) and marine invertebrates. Upland areas of the project

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region also provided a wide range of natural resources, including the collection of wild plants for subsistence as well as medicinal and ceremonial purposes. These areas were also noted for the collection of bird feathers, especially from the ʻōʻō (***Moho nobilis***), ʻiʻiwi (***Vestiaria coccinea***), and ʻapapane (***Himatione sanguinea***), which provided colorful feathers for chiefly ornaments. Ornately decorated goods with feathers, including ʻahu ʻula (feathered capes), mahiole (helmets), and akua hulu manu (feathered gods), were a direct measure of a chief's power and influence.

Profound transformations in land and resource ownership occurring in Hawaiʻi in the 1800s ultimately benefited the nascent sugar cane industry and bolstered its position in the local economy. The modern town of Waipahū developed around the sugar plantation. The Oahu Sugar Company provided housing to the laborers who worked the plantation, many of whom were from the Philippines, Japan, and China. After 97 years in business, the Oahu Sugar Company eventually succumbed to the increased operational costs as well as competition from emerging foreign markets, and the company shut down in 1994.

The AIS also notes that the growth and prosperity of the sugar cane industry led to increased demands for large agricultural labor forces. Chinese plantation workers began to convert former taro lands in the project region for the cultivation of rice. Following numerous successful rice harvests, the Royal Hawaiian Agricultural Society and the Hawaiian government began to promote rice cultivation as a potential commercial industry. However, by the 1920, rice production had steadily declined in Hawaiʻi due to immigration restrictions and an expanding rice market in California.

World War II military activities had a significant impact in the Waipahū area and a variety of military facilities was constructed in the area. Following World War II, Waipahū and the direct project area gradually expanded into the commercial and residential hub that it is today. A series of maps produced by the U.S. Geological Survey and the Army Corps of Engineers from 1927 to 1978 illustrate this transition from a small, rural plantation town to the current urbanized environment. In 1927, for example, the current project area was largely undeveloped, and the town center was located around the sugar mill. Only minor changes are evident by 1943, including the construction of Farrington Highway. By 1954, commercial and residential development appears along Waipahū Depot Road south of Farrington Highway, but the current project area still appears undeveloped. By 1968, however, extensive urban growth was underway, and the project area was clearly developed.

A field survey for the AIS was conducted over a period of nine (9) days between April 23 and May 4, 2020 and included the excavation of twenty-five 5-meter-long

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backhoe trenches. The field survey resulted in the recordation of one (1) previously recorded historic property, designated State Inventory of Historic Places Site (HPSI) No. 50-80-09-7751, a subsurface agricultural layer associated with pre-Contact to Historic Period wetland cultivation of taro and rice. Site 50-80-09-7751 was previously recorded by Hammatt (2010) and Sroat et al. (2016) during archaeological investigations for the Waipahū Transit Station approximately 200 meters southeast of the current study area.

Site 50-80-09-7751 was encountered in 15 of the 25 test trenches excavated during the current study. It was encountered beneath thick layers of imported fill material associated with the 1960s urban growth of Waipahū and the1950s land reclamations by the U.S. military. Site 50-80-09-7751 presented as a distinct stratigraphic layer (Stratum II) consisting of deep, naturally deposited wetland alluvial sediments situated close to or at the water table and containing dispersed charcoal flecks and historic debris. Site 50-80-09-7751 has produced and is likely to continue to produce important information regarding pre-Contact to Historic Period agricultural use of Waipahū. It is, therefore, assessed significant historic property under Hawai'i Administrative Rules (HAR)13-284-6 Criterion (d). Per HAR 13-284-6, Criterion (d) is defined as follows:

> ***Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history***

All parts of the study area have the potential to receive some degree of ground disturbance that may affect Site 50-80-09-7751. Given that the site is anticipated to encompass nearly the entire study area, and proposed redevelopment has the potential to disturb all parts of the study area at significant depths, the AIS concluded that the effect determination is ***"effect, with agreed upon mitigation measures."*** Recommended mitigation for Site 50-80-09-7751 is archaeological monitoring during all ground disturbing activities below one (1) meter (three (3) feet) in depth to ensure an adequate and reasonable opportunity to collect data regarding pre-Contact up to Historic Period agricultural activity in Waipahū. Upon concurrence by SHPD, an archaeological monitoring plan will be prepared for the proposed project.

With implementation of archaeological monitoring, no significant adverse impacts to the archaeological and cultural resources in the project area are anticipated.

d. Indicate the flood zone designation for the site from the Federal Emergency Management Agency current Flood Insurance Rate Map(s). Indicate whether the property is in a tsunami evacuation zone. Identify the mitigating measures that will be taken to ensure the safety of residents, as applicable.

The Flood Insurance Rate Map in the project vicinity designates the project site as being located within Zones "AE", "D", and "X". Refer to **Figure 7**. Specifically, the FEMA

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describes that Flood Zone "AE" presents a one (1) percent annual chance of flooding and Flood Zone "X" to be areas of minimal flood hazard. Flood Zone "D" is used for areas where there are possible but undetermined flood hazards.

It is noted that a portion of the project site within Zone "AE" was previously located within the floodway designated by FEMA. Due to the age of the study that was used to determine the floodway designation, KS submitted a LOMR application to the DPP in January 2021 to propose an amendment to the existing floodway limits. The LOMR application was forwarded to FEMA for review, and approved on July 25, 2022 with an effective date of December 6, 2022. Based on the certified floodplain workmap and revised FIRM panels, the proposed project area is now located outside of the revised floodway and no buildings will be located within the floodway. To protect the public from potential flood hazards, the proposed project will comply with the development and standards for Zone AE, which require the first floor of the building and any life safety components to be constructed above the base flood elevation. Refer to **Figure 7**.

According to the National Oceanic and Atmospheric Administration (NOAA) Tsunami Evacuation Maps, the subject property is located beyond the limits of dangerous wave action and evacuation boundaries. Refer to **Figure 8**.

University of Hawai'i Coastal Geology Group and Tetra Tech, Inc. developed the sea level rise exposure model in 2017, which provides an initial assessment of low-lying areas susceptible to sea level rise, including passive flooding. Passive flooding includes areas that are hydrologically connected to the ocean (marine flooding) and low-lying areas that are not hydrologically connected to the ocean (groundwater). The project site is located outside of the area susceptible to the 3.2-foot Sea Level Rise Exposure Area. Refer to **Figure 9**.

e. Indicate whether the proposed project will relocate any tenants, and if so, the assistance that will be provided. Provide a relocation plan, if necessary.

KS, the landowner, cares for every tenant and the success of their businesses. KS remains committed to maintaining open dialogue with the tenants throughout the planning and redevelopment process of the Keawalau Affordable Housing Community Project.

f. Describe each proposed building; the type of construction being proposed; the dwelling unit mix including the types of units by bedroom size, the total number of each type of unit and floor area for each type; the square feet attributable to common areas in the buildings; the square feet of non-residential spaces on the site, if any; project amenities; and, proximity to services and employment.

The project will be a new construction and will be developed in three (3) phases. Phase 1 of the project involves development of Mauka Block. The Mauka Block will be a seven 7-story mixed-use building, containing retail and restaurant uses and parking on the ground floor and 2nd floor, and senior multi-family affordable housing units for seniors on the 3rd

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through 7th floors. Phase 2 of the project involves development of the eastern portion of Makai Block. Phase 2 will be a 19-story mixed-use building with retail, restaurant, and grocery uses, parking and residential amenities (such as lobby and community space) on the ground floor, and multi-family affordable housing units for families and individuals on the 2nd through the 19th floors ("East Tower"). Phase 3 involves development of the western portion of Makai Block. Phase 3 is a mixed-use 18-story building which includes retail and restaurant uses, parking, and residential amenities on the ground floor and multi-family affordable housing units for families and individuals on the 2nd floor through the 18th floor ("West Tower"). These buildings will be fire-resistive with reinforced concrete and protected steel. Refer to **Figure 3** and **Figure 4**. The details of each of the buildings are provided in **Table 3**.

The proposed project is a mixed-use development, containing various commercial services and a grocery store, located in the close proximity to the future Wāipahu Transit Center Rail Station. The project site is located in the commercial center of Wāipahū and there are numerous restaurants, retail stores, grocery stores, and industrial uses located in the vicinity of the project site. Other amenities in the region includes neighborhood parks, including Wāipahū District Park, Wāipahū Cultural Garden Park, and Hans L'Orange Neighborhood Park, and schools, including St. Joseph Parish School and Wāipahū Intermediate School.

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Table 3. Summary of Keawalau Affordable Housing Community Project

Residential Unit Mix					
		AMI (units)			
Unit Type	Unit Area	30%	60%	MGR*	Total (units)
Phase 1: Mauka Block Building (For Seniors)					
1 Bed/1 Bath	630 sq. ft.	12	106	0	118
2 Bed/2 Bath	946 sq. ft.	2	11	2	15
				Subtotal:	**133 units**
Phase 2: Makai Block East Tower (For Families & Individuals)					
Studio	450 sq. ft.	5	49	0	54
1 Bed/1 Bath	590 sq. ft.	8	64	0	72
2 Bed/2 Bath	830 sq. ft.	9	79	2	90
3 Bed/2 Bath	1,160 sq. ft.	2	16	0	18
				Subtotal:	**234 units**
Phase 3: Makai Block West Tower (For Families & Individuals)					
Studio	450 sq. ft.	10	92	0	102
1 Bed/1 Bath	590 sq. ft.	7	59	2	68
				Subtotal:	**170 units**
				TOTAL:	**537 units**
*Residential units for property managers					

Other Uses		
Phase 1: Mauka Block Building (For Seniors)		
Residential Common Area	Type of Amenities	Lobby, Common Space, and Rooftop Deck
	Common Area sq. ft.	11,097 sq. ft.
Commercial Use	Retail/Restaurant	9,796 sq. ft.
Phase 2: Makai Block East Tower (For Families & Individuals)		
Residential Common Area	Type of Amenities	Lobby, Common Space, and Rooftop Deck
	Common Area sq. ft.	14,168 sq. ft.
Commercial Use	Retail/Restaurant	5,539 sq. ft.
	Grocery	23,352 sq. ft.
Phase 3: Makai Block West Tower (For Families & Individuals)		
Residential Common Area	Type of Amenities	Lobby, Common Space, and Rooftop Deck
	Common Area sq. ft.	9,239 sq. ft.
Commercial Use	Retail/Restaurant	3,685 sq. ft.

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g. Identify the number of residents, guest, and handicapped parking spaces, bicycle stalls, loading stalls, and how the site will be accessed by vehicles, pedestrians, and people on bicycles.

A summary of the parking spaces proposed for the project is provided in **Table 4** below. It is noted that pursuant to Section 21-6.20(a), LUO, no off-street parking is required in any zoning district within one-half mile of an existing or future Honolulu rail station, including the future Waipahū Transit Center Rail Station. Nonetheless, resident and commercial parking spaces are provided for the project, as indicated in **Table 4**. A detailed parking calculation is provided in **Section 11**. Pedestrian access to the Mauka Block (both retail and the lobby of the residential units) will be via Hikimoe Street. The driveway to the parking lot of the Mauka Block will be via Kahuailani Street. Pedestrian and vehicle access to the Makai Block building will be from Farrington Highway, Hikimoe Street, and Waipahū Depot Street. It is noted that the driveway for the Makai Block off Waipahū Depot Street is expected to be a one-way (exit only) driveway. Refer to **Figure 3**.

Table 4. Parking Summary

Phase 1: Mauka Block (For Seniors)		
Resident/Commercial Parking		103 stalls (including 9 handicap stalls)
Loading Stalls		1 stall
Resident Bicycle Parking	Short Term	14 stalls
	Long Term	67 stalls
Commercial Bicycle Parking	Short Term	5 stalls
	Long Term	1 stall

Phase 2: Makai Block East Tower (For Families & Individuals)		
Resident/Commercial Parking		353 stalls (including 18 handicap stalls)
Loading Stalls		3 stalls
Resident Bicycle Parking	Short Term	24 stalls
	Long Term	117 stalls
Commercial Bicycle Parking	Short Term	29 stalls
	Long Term	5 stalls

Phase 3: Makai Block West Tower (For Families & Individuals)		
Resident/Commercial Parking		107 stalls (including 10 handicap stalls)
Loading Stalls		2 stalls
Resident Bicycle Parking	Short Term	17 stalls
	Long Term	85 stalls
Commercial Bicycle Parking	Short Term	3 stalls
	Long Term	1 stall

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h. Describe the existing water, sewer, drainage, roads, and electrical improvements and what additional improvements and other permits and/or approvals are needed to accommodate the project. Explain the status of those permits and/or approvals.

A PER was prepared for the proposed project by Wilson Okamoto Corporation. Refer to **Section 17**. The various utility agency correspondence contained within the PER and in this 201H application were based on a marginally different commercial area breakdown as the breakdown changed since the time of the correspondence. An exact commercial breakdown will be determined at the time of leasing based on market conditions. The PER notes that any minor deviations to the commercial breakdown, including those in the utility agency correspondence, will not affect the results of the analysis.

Similarly, the TIAR prepared for the project by Wilson Okamoto Corporation notes that minor deviations from the assumed commercial area breakdown assessed in the report are not expected to significantly change or alter the results of the traffic analysis. Refer to **Section 16**.

(1) <u>Wastewater</u>

The existing businesses at the project site are serviced by the City and County of Honolulu, DES Wastewater Branch (WWB).

According to the project's PER, the Mauka Block is anticipated to reuse the 6-inch lateral connection to the existing 15-inch main within Hikimoe Street. The Makai Block will require several lateral connections in the form of a reused 6-inch lateral to the same 15-inch main in Hikimoe Street for the supermarket, a new 12-inch lateral to the existing 24-inch main in Waipahū Depot Street for one of the high-rise buildings and another 12-inch lateral to the existing 36-inch main in Farrington Highway for the other high-rise building. Refer to **Section 17**.

The WWB approved a Sewer Connection Application confirming system capacity on June 18, 2021. See **Section 5** of the 201H application package.

(2) <u>Water</u>

The existing businesses at the project site are serviced by the City and County of Honolulu, BWS.

It is anticipated that separate residential owners' associations will manage the Mauka Block and Makai Block, respectively. Therefore, separate domestic and commercial water meters will be necessary for each block. Based on other similar projects, it is estimated that the Mauka Block will require a 3-inch domestic compound meter, 6-inch fire protection detector check meter, and 1-inch commercial meter within Hikimoe Street, while the Makai Block will require a 4-inch domestic compound meter, 6-inch fire protection detector check meter and 2-

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inch commercial meter for each of the two (2) towers. An estimated 2-inch commercial meter is also anticipated for the grocery store. Reduced pressure backflow preventers are required by BWS for the domestic and commercial meters to protect the BWS system from contamination.

In consultation with the BWS, water conservation measures are required for the proposed development. There are no known non-potable water sources in the vicinity of the project, therefore, utilization of rain catchment drought tolerant plants, xeriscape landscaping, and efficient irrigation systems, such as a drip system and moisture will be considered. Any irrigation should be done during non-peak hours of the day to minimize total demand in conjunction with the domestic water usage. Refer to **Section 17**.

A Water Availability Request Letter was sent to BWS on April 13, 2022. BWS responded by letter dated May 26, 2022 confirming that the existing water system is presently adequate to accommodate the proposed development and final determination of availability will be made during the building permit process. Refer to **Section 6** of the 201H application package.

(3) **Drainage**

The proposed project will include landscaped areas that will increase pervious surfaces compared to that of the existing conditions, which will subsequently decrease the total runoff rate accordingly. As such, retention of storm water for quantity control is not anticipated to be required. The City and County of Honolulu requires storm water treatment and as such, manufactured treatment devices are anticipated to be utilized.

Storm drainage lateral connections will be made to the existing catch basins at Hikimoe Street and Farrington Highway to follow the existing drainage patterns of the site. The sites shall be graded to provide positive drainage directed away from the buildings. Refer to **Section 17**.

(4) **Gas line system**

According to Hawaii Gas, there is a two (2)-inch gas main within Hikomoe Street from Waipahu Depot Street to Kahuailani Street that can support the proposed development. A new gas line can be linked from Farrington Highway if the gas loads are higher than expected. Email correspondence was sent to Hawaii Gas on April 15, 2022 requesting confirmation of gas systems in the area that can support the proposed project. Hawaii Gas confirmed system adequacy on April 18, 2022. Refer to **Section 17.**

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(5) Electrical

All existing joint use poles are located within rights-of-way or utility easements. A request for information letter, to verify the available capacity of Hawaiian Electric Company's (HECO) existing facilities, was sent to HECO on April 18, 2022. HECO responded to the letter on July 6, 2022 stating that the existing distribution circuits along Farrington Highway, Waipahu Depot Street, and Hikimoe Street could potentially serve the redevelopment project.

HECO has preliminarily indicated that the existing 12 kilovolt (kV) circuit along Farrington Highway should have sufficient capacity to meet the anticipated demands for the Makai Parcel. However, HECO will require additional information regarding the anticipated locations of the various commercial and residential developments within the parcel before confirming the adequacy of the existing circuits in the project area. A detailed evaluation of circuit capacity will be performed when service requests for each facility are submitted to HECO during the design phase.

Because the existing poleline along Hikimoe Street is at the end of the existing 12 kV circuit, portions of this 12 kV circuit will likely need to be upgraded to support the Mauka Block as well as any services extended from this poleline to the Makai Block. As noted above, HECO will require additional information regarding the anticipated locations of the various commercial and residential developments within the block before confirming the adequacy of the existing circuit and the extent of any upgrades to HECO's distribution system. Similarly, a detailed evaluation of circuit capacity will be performed when service requests for each facility are submitted to HECO during the design phase.

HECO service to the portion of the Makai Block with direct access to Waipahu Depot Road could be extended from the existing poleline along Waipahu Depot Road. The 12 kV conductors on the Waipahu Depot Road poleline are larger than the conductors on the Hikimoe Street poleline. Therefore, it is expected that the Waipahu Depot Road conductors may have greater capacity to support additional demand loads.

Costs for offsite upgrades of HECO facilities are typically borne by HECO when there are existing circuits in the project area. This is the case for the Mauka and Makai Blocks as there are various existing circuits along the roadways adjacent to the project sites.

It is also anticipated that new HECO pad mounted transformers will be utilized to support the project loads associated with the various buildings/facilities proposed for the development. HECO may also require pad-mounted primary switches for the transformers. Locations of the transformers and primary switches will be

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determined by the onsite electrical engineer as the site development plans are refined. New underground infrastructure, consisting of ductlines, manholes and/or handholes, will be extended from HECO's existing 12 kV overhead circuits along Farrington Highway or Hikimoe Street to support HECO service to each of the transformers and primary switches on the site.

The PER does not address undergrounding or relocation of the existing HECO overhead circuit systems along Farrington Highway and Hikimoe Streets at this time. Significant coordination and discussion with HECO will be required to identify infrastructure requirements and HECO design and construction costs associated with such undergrounding work. For planning purposes, it is likely that HECO will require separate ductline and manhole systems for 46 kV sub-transmission and 12 kV distribution circuits along Farrington Highway. Although HECO will perform the actual removal of the overhead circuits and installation of underground conductors, the cost for undergrounding of existing overhead HECO circuits will be charged to the customer.

The Applicant will continue to coordinate with HECO to identify the detailed electrical work requirements to support the proposed development. Refer to **Section 17**.

(6) <u>Roadway</u>

The project site is bounded by Waipahū Depot Street to the west, Farrington Highway to the south, and various commercial buildings and single-family residential neighborhoods to the east and the north. Access to the Mauka Block is expected to be provided via a driveway off Kahuailani Street while access to the Makai Block is expected to be provided via driveways off Farrington Highway, Hikimoe Street, and Waipahū Depot Street. It is noted that the driveway for the Makai Block off Waipahū Depot Street is expected to be a one-way (exit only) driveway.

A TIAR was conducted by Wilson Okamoto Corporation for the project. Refer to **Section 16**. The TIAR analyzed the existing traffic conditions, and the project traffic conditions with the proposed project fully developed. The TIAR also analyzed anticipated impacts to pedestrian facilities, bike facilities, and transit facilities. The TIAR provided the following recommendations for the project:

a) Provide sufficient sight distance for motorists to safely enter and exit the project driveways.

b) Provide adequate onsite loading and off-loading service areas and prohibit offsite loading operations.

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

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

e) Consider restricting traffic movements at the driveway off Waipahū Depot Street to right-turn-out movements only due to the proximity of that intersection to Farrington Highway.

f) Align the project driveway for the Makai Block off Hikimoe Street with the intersection with Kahuailani Street to minimize conflicts between turning vehicles and queues at these locations. The dimensions shall be determined during the design phases and coordinated with the appropriate design review/approval agencies for acceptance.

g) If access at the entrances to the parking garages are controlled, provide sufficient storage for entering vehicles at the parking area access controls (i.e. automatic gate, etc.) to ensure that queues do not extend onto the adjacent roadways. The layout and dimensions shall be determined during the design phase.

h) Provide sufficient turning radii along the internal connections, particularly within the Makai block, to accommodate all anticipated vehicle types for the proposed uses.

i) Verify adequate sight distances at the internal intersections within the project site to ensure motorists and pedestrians are aware of the presence of one another at these locations.

j) Provide adequate pedestrian connections between the onsite uses and offsite facilities. All pedestrian connections should be made accessible in conformance with the American with Disabilities Act (ADA). In addition, incorporate Complete Streets principles along the roadways adjacent to the project site to increase the attractiveness of the overall pedestrian environment. These may include provision of wider sidewalks and the addition of canopy trees and other landscaping treatments.

k) Coordinate with the City and County of Honolulu to get their concurrence on the proposed midblock crosswalk locations shown on the project site plan along Hikimoe Street and Kahuailani Street. If the proposed crosswalks are to be included, assess if additional crossing treatments are necessary to facilitate pedestrian crossings given the anticipated increase in pedestrian activity in the vicinity.

l) Incorporate bicycle facilities within the project boundaries including designated and secured bicycle parking to encourage the use of alternate modes of transportation. In addition, provide adequate connections to and from the bike parking areas to ensure convenient and safe pedestrian and

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bicyclist access, as well as connections to the planned bicycle facilities along the roadways adjacent to the project site.

m) Coordinate with the City and County of Honolulu Department of Transportation Services (DTS) and the State of Hawai'i Department of Transportation (DOT) during the design phase to assist with the development of bicycle facilities proposed by the City and State bike plans in the vicinity of the project including the bike lanes planned along Hikimoe Street and Waipahū Depot Street.

n) Prepare a Construction Management Plan (CMP) that includes the anticipated construction schedule and phasing, as well as traffic circulation, traffic control and parking during the construction period.

o) Prepare a Transportation Management Plan (TMP) which includes traffic circulation, parking, loading, and Traffic Demand Management (TDM) strategies to further minimize the impact of the development on the surrounding roadway network. It should be noted that given the density of conflict points and layout of parking within the Makai block, parking management strategies may be necessary to minimize onsite conflicts and queuing.

Based on these recommendations, the Applicant will prepare detailed CMP and TMP for the project, and will continue to consult with the State DOT and the City DTS. Refer to **Section 16**.

i. Describe the topography and soils and what mitigation is needed, if any, to accommodate new structures, access, and stormwater management.

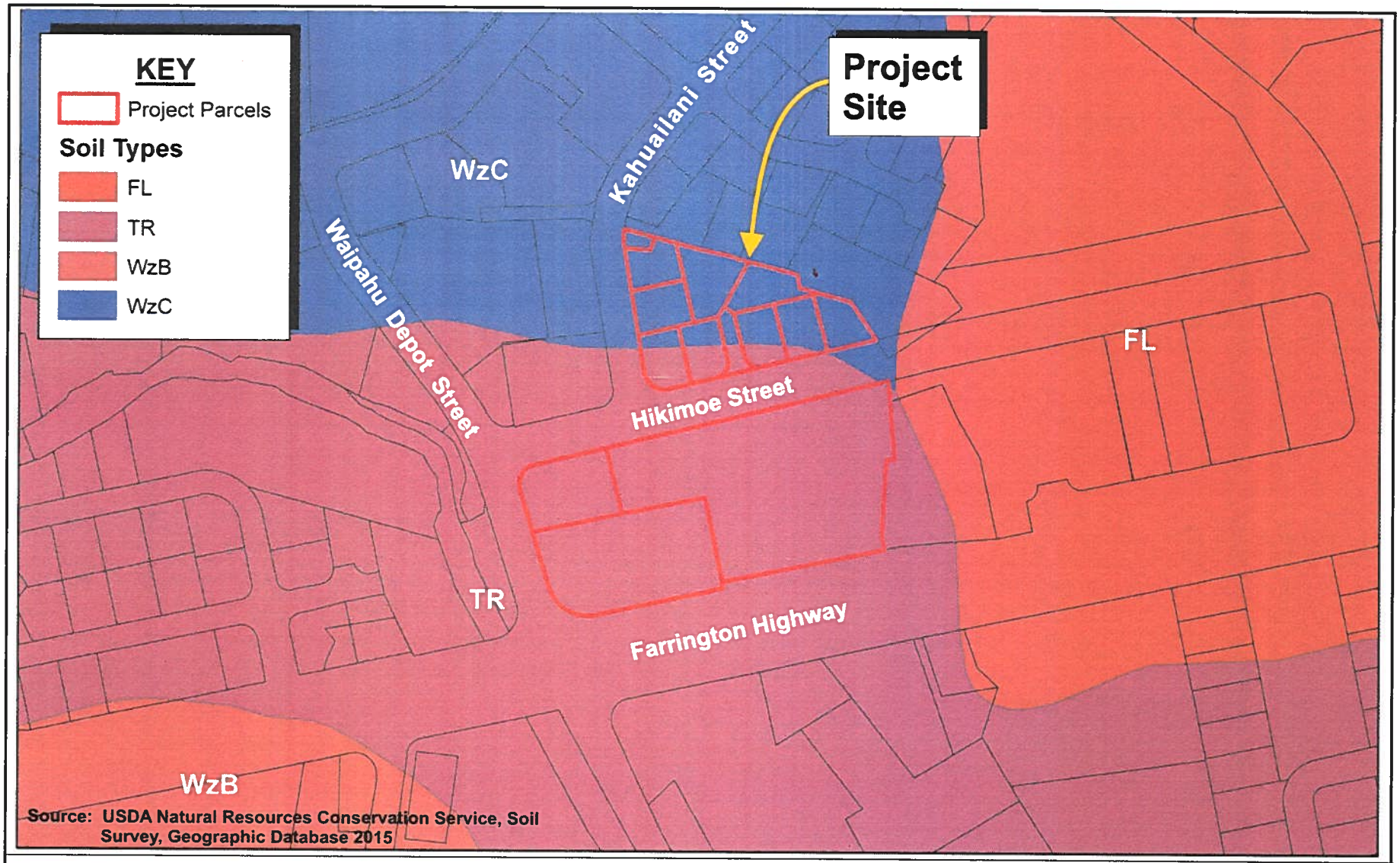
The project site slopes from mauka (north) to makai (south). The soil underlying of approximately two thirds of the project site is Typic Endoaquepts (TR). The remaining northerneastern portion of the project site consist of Waipahū Silty Clay, 6 to 12 percent slopes (WzC). See **Figure 11**.

TR, previously defined as Tropaquepts, are poorly drained soils that are periodically flooded by irrigation in order to grow crops that thrive in water and occur as nearly level flood plains on O'ahu and Maui. TR are used for production of taro, rice, and watercress on flooded paddies (United States Department of Agriculture (USDA), 1972).

WzC is characterized by medium runoff and moderate erosion hazard. Included in mapping were small gravelly areas where the slope is as much as 20 percent, and small areas of clay where the slope is 12 to 15 percent. This soil is used for sugar cane and homesites (USDA, 1972).

According to the Geotechnical Report prepared for the project, the project site is underlain by surface fills and a relatively thick layer of very soft compressible recent alluvium and marsh deposits overlying older alluvium and basalt formation at greater depths. Based on available subsurface information in the area, it appears the very soft compressible recent

REF-151



Source: USDA Natural Resources Conservation Service, Soil Survey, Geographic Database 2015

Figure 11

Keawalau Affordable Housing Community Project

Soil Classification Map

0 50 100 200 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH\Applications2423\Figures\SOIL

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alluvium and marsh deposits extend to depths up to 54 feet at the Mauka Block and up to 94 feet on the Makai Block. Based on the subsurface conditions at the project site and the relatively heavy building loads for the proposed structures, the Geotechnical Report recommends that new building structures be supported on a deep foundation system consisting of augered cast-in-place (ACIP) piles, octagonal prestressed precast concrete piles, or drilled shafts. Drilled shafts may be the desired foundation system to support the proposed structures as higher allowable compressive loads are achievable compared to the ACIP piles or octagonal prestressed precast concrete pile systems. Refer to **Section 19**.

To control runoff, sedimentation, and erosion, a comprehensive program of Best Management Practices (BMPs) will be implemented during construction. After construction, the proposed project will include landscaped areas that will increase pervious surfaces compared to that of the existing conditions, which will subsequently decrease the total runoff rate accordingly. As such, retention of stormwater for quantity control is not anticipated to be required.

As noted previously, the City requires stormwater treatment and, as such, manufactured treatment devices are anticipated to be utilized. Storm drainage lateral connections will be made to the existing catch basins at Hikimoe Street and Farrington Highway to follow the existing drainage patterns of the site. The sites shall be graded to provide positive drainage directed away from the buildings.

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SUPPLEMENTAL INFORMATION

a. View Analysis

A View Analysis is included herein as **Section 11A.**

The Applicant recognizes that with a few exceptions, the Old Town area is generally low-rise in character. The design of the proposed project has been carefully considered with these factors in mind. The proposed development will not exceed the height (inclusive of differences in grade) of the historic sugar mill smokestack, a recognized landmark for the area. After careful consideration of the design, the development team concluded that it would be infeasible to create an attractive project with the 60-ft. height restriction while meeting the goal of the development to provide substantial affordable housing and transformative retail to the Waipahū Community. A single 60-ft. building across the entire Makai Block would have had a more detrimental impact on views, been generally unattractive, and yield a fraction of the affordable units provided by the project as proposed.

With this said, the Applicant understands that some members of the community have an unfavorable view of heights greater than 60 ft. After consultation with the community, the project has been reduced by two (2) stories from 20 stories to 18 stories on the Phase 3 Makai Block West Tower and one (1) story from 20 stories to 19 stories on the Phase 2 Makai Block East Tower. To further ensure the proposed community will fit well into the surrounding area, substantial effort has been put into the ground level experience for locals and residents alike. The proposed buildings have been set back substantially from the sidewalk, with seating areas and local art accenting to create a village-like feel. The View Analysis included with this 201H Application (Section 11A) illustrates the intent of these areas to create a new and revitalized downtown Waipahū.

b. List of Permits Required for Project

The following permits and approvals may be required prior to the implementation of the project:

State of Hawai'i

1. Chapter 11-46, Community Noise Control, as applicable
2. Chapter 11-60.1-33, Fugitive Dust
3. National Pollutant Discharge Elimination System (NPDES) Permit, as applicable
4. Chapter 343, HRS Environmental Assessment Exemption
5. Chapter 6E, HRS State Historic Preservation Division (SHPD) Review

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6. Permit to Perform Work Upon State Highways, as applicable

7. Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways, as applicable

City and County of Honolulu

1. Construction permits (i.e. building and grading permits)

2. Affordable Housing Approval Pursuant to Section 201H-38, HRS (City Council approval)

REF-155

REQUESTED EXEMPTIONS PURSUANT TO CHAPTER 201H-38, HRS

4

4. REQUESTED EXEMPTIONS PURSUANT TO SECTION 201H-38, HRS

As a 100 percent affordable housing project, Highridge Costa Development Company (Applicant) is seeking an affordable housing project approval from the City Council pursuant to Chapter 201H-38, Hawai'i Revised Statutes (HRS). Applicant requests exemptions from certain conditions relating to planning, zoning, construction standards for subdivisions, development, and improvement of land, and the construction of dwelling units thereon. The specific exemptions requested are presented in the table below.

201H-38 Exemption Request

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
1	Need for TOD Special District Permit Major	Section 21-9.20-2(a)	An exemption to permit the project to proceed without obtaining a TOD Special District Permit Major.	The exemption would expedite the delivery of affordable workforce housing. The project's consistency with the TOD Special District Design Guidelines will be analyzed as part of the 201H application (refer to Section 9).	$2,400 (application fee)
2	Need for Planned Development-Transit (PD-T) Permit for Additional FAR	Section 21-9.100-8(a)(1)(A)	The project proposes a Floor Area Ratio (FAR) up to 4.0. An exemption is sought to exceed FAR of 3.5 without obtaining a PD-T permit.	Increasing the floor area ratio allows for the provision of more affordable housing units and the exemption from needing to obtain a PD-T permit expedites the delivery of affordable housing.	$15,000 (application fee)
3	TOD Special District Height Standards	Section 21-9.100-8 (a)(1)(D) and Zoning Map No. 8 (Waipahu Ordinance 17-56)	Exemptions from the height limit of 60 feet specified in the Zoning Map to allow the project to exceed the height limit by 10 feet for Phase 1 (Mauka Block), 131 feet for Phase 2 (Makai Block East Tower), 121 feet for Phase 3 (Makai Block West Tower), and 8 feet for the Makai Block parking structure with the residential amenity deck on top.	The 60-foot height limit would significantly limit the number of affordable housing units that could be provided. A single 60-foot building across the entire Makai Block of the project would have a more detrimental impact on views, be generally unattractive, and yield a fraction of the affordable units.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
4	Setback Improvements	Section 21-9.100-8 (a)(3)(E)(i)	An exemption from the requirement to provide pedestrian access to the setback area for the Farrington Highway side of the Makai Block building.	The Farrington Highway side of the building is a garage ramp to the upper levels of the parking structure. The setback area will be improved with landscaping, but pedestrian access will be provided within the Farrington Highway right-of-way, which is wider in the area of the parking garage.	Not Applicable
5	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(A)	Exemptions are sought for the Hikimoe Street and Farrington Highway sides of the buildings to allow that the building facades be not predominantly oriented to and parallel with the street, property line or adjacent public spaces.	The residential towers' orientation predominantly to and parallel with these streets would block the views from the surrounding residential neighborhoods and views to the smokestack. The orientation of the first level is parallel with these streets and primary entrances are provided on the street frontage, as required.	Not Applicable
6	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(B)	An exemption to allow the Farrington Highway frontage not to have separate entrances to each establishment.	No businesses are located along the front façade of the ground floor of the Makai Block building along Farrington Highway. The primary entrance to the grocery store will be via Hikimoe Street and the secondary entrance will be from inside of the garage on the ground floor.	Not Applicable
7	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(C)	An exemption to allow the Farrington Highway frontage not to have entrances every 50 feet.	No businesses are located along the front façade of the ground floor of the Makai Block building along Farrington Highway. The primary entrance to the grocery store will be via Hikimoe Street and the secondary entrance will be from inside of the garage on the ground floor.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
8	Building transparency, blank wall limits and required openings for ground floor facades	Section 21-9.100-8 (a)(5)(A)	Exemptions are sought for the Farrington Highway side of the Makai Block building and the Kahuailani Street side of the Mauka Block building from the requirements to contain windows, doors, or other openings for at least 60 percent of the building façade area and blank walls cannot extend for more than 25 feet in a continuous horizontal plane.	These facades are a garage ramp (for Farrington Highway) and a garage entrance (for Kahuailani Street) and no windows or doors are located on the building elevations. With the garage ramping on the Farrington Highway side of the Makai Block building, blank walls will need to extend for more than 25 feet in a continuous horizontal plane without an opening on the ground floor of the building. With the steep topography of Kahuailani Street, ground floor retail or residential spaces are not feasible. The building elevations along Farrington Highway and Kahuailani Street will be provided with architectural detail and the area will be enhanced with landscaping.	Not Applicable
9	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(1)	Exemptions are sought for the Kahuailani Street side of the Mauka Block building and the Farrington Highway side of the Makai Block building to allow the ground floor of the parking structure to be is located within 40 feet of the property lines.	Hikimoe Street is designated as the front property line and no at-grade parking or ground floor parking will be located within 40 feet of the Hikimoe Street property line, as required. In the event that Farrington Highway and/or Kahuailani Street are considered the front property line, exemptions requested to allow the ground floor of the parking structure to be located within 40 feet of the Kahuailani Street and/or Farrington Highway property lines.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
10	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(2)	An exemption is sought to allow the Makai Block building to have service areas and loading spaces off of Farrington Highway at the side of the building towards the front.	Hikimoe Street is designated as the front property line for the Makai Block building and service areas and loading spaces will be located on the side and rear of the lot, as required. In the event Farrington Highway is considered the front property line, an exemption is requested to allow service areas and loading spaces off of Farrington Highway, on the interior of the site.	Not Applicable
11	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(3)	An exemption is requested from the requirement that vehicular access must be provided from a secondary street wherever possible to allow the vehicle entrances to the Makai Block building to be via Hikimoe Street and Farrington Highway.	Providing a vehicular access to the Makai Block building via Waipahū Depot Street is not feasible as it is too close to the Farrington Highway/Waipahū Depot Street intersection and would not meet driveway and intersection spacing requirements.	Not Applicable
12	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(4)	Exemptions from the requirement for the ground floor of parking structures on all streets to be designated and used for active ground floor activities within 40 feet of the front property line is sought for Farrington Highway and Kahuailani Street.	The exemptions are being requested for Kahuailani Street due to the steep topography of the street and Farrington Highway due to the lot configuration impacted by the existing office building fronting Farrington Highway and limited frontage for site access.	Not Applicable
13	Off-Street Loading Requirements	Section 21-6.110	Exemptions from off-street loading requirements to allow 6 loading stalls in total instead of 10 stalls in total.	The exemption would provide adequate loading stalls for residents, retail, and office uses while providing flexibility in site planning and to accommodate affordable housing development. The loading zones for residents, retail and office uses may be shared. Times will be coordinated to avoid conflicts.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
14	Park Dedication	Section 22-7.3	An exemption from park dedication requirements for affordable dwelling units.	The proposed project is an urban infill project and there are existing parks in the vicinity, including Waipahu District Park, Hans L'Orange Neighborhood Park, and Waipahu Cultural Garden Park. In addition, various onsite open spaces for residents and the community will also be provided.	Not Estimated
15	Plan Review Fee	Section 18-6.1	Exemptions from building permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$25,000
16	Building Permit Fee	Section 18-6.2	Exemptions from building permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$944,188
17	Public Works/Infrastructure Fees	Section 14-14.4	An exemption from grading and grubbing permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$3,000
18	Erosion and Sediment Control Plan Review Fee	Section 14-13.6 (d)	An exemption from payment of Erosion and Sediment Control Plan Review Fee.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$500
19	Wastewater System Facilities Charge	Sections 14-10.1, 14-10.2, and 14-10.3	An exemption from payment of wastewater system facilities charge.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$2,707,267
20	Fee Related to Connection to City-Owned Separate Storm Sewer System	Section 14-12.12 (f)	An exemption from payment of private drain connection license fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$400
21	Water System Facility and Installation of Water Service Fees	BWS Rules and Regulations Sections 1-102 and 2-202(2) & (3)	An exemption from payment of water system facility and installation of water service fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$1,176,106

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
22	Fire Department Plan Review Fees	Section 20-1.1	An exemption from payment of Honolulu Fire Department plan review fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$12,500
23	Real Property Tax	Section 8-10.36	Exemptions from payment of real property tax for affordable rental housing units during the period in which the rental units are subject to an affordable housing agreement.	The exemption will provide cost savings and will advance the affordability objectives of the project.	Not Estimated
24	Real Property Tax Holiday	Section 8-10.37	For projects that contain affordable housing units, real property taxes would be kept at the current assessment (tax holiday) during the construction period for up to three (3) years or until construction is completed.	The exemption will provide cost savings and will advance the affordability objectives of the project.	Not Estimated

LETTER CONFIRMING SEWER CAPACITY

5

REF-163

DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
Phone: (808) 768-8209 • Fax: (808) 768-4210

RECEIVED
JUN 24 2021
WILSON OKAMOTO CORPORATION

SEWER CONNECTION APPLICATION

APPLICATION NO.: **2021/SCA-0794** STATUS: **Approved**
DATE RECEIVED: **05/28/2021** IWDP APP. NO.:
PROJECT NAME: **2021/SCA-0794 Waipahu Redevelopment Phase 1 - Mauka Parcel**

$522,664.00
Estimated Wastewater System Facility Charge*

LOCATION:

Zone	Section	Plat	Parcel		
9	4	013	046	1,072 Sq. Ft.	
9	4	014	059	94-750 HIKIMOE ST Waipahu 96797	5,054 Sq. Ft.
9	4	014	060	94-750 HIKIMOE ST Waipahu 96797	5,046 Sq. Ft.
9	4	014	061	94-750 HIKIMOE ST Waipahu 96797	5,047 Sq. Ft.
9	4	014	062	5,294 Sq. Ft.	
9	4	014	063	94-855 KAHUAILANI ST Waipahu 9(	6,483 Sq. Ft.
9	4	014	064	94-748 HIKIMOE ST Waipahu 96797	5,047 Sq. Ft.
9	4	014	065	94-748 HIKIMOE ST Waipahu 96797	5,173 Sq. Ft.
9	4	014	066	94-855 KAHUAILANI ST Waipahu 9(	5,270 Sq. Ft.
9	4	014	067	94-855 KAHUAILANI ST Waipahu 9(	5,033 Sq. Ft.

SPECIFIC LOCATION: **Hikimoe Street**

APPLICANT: **Goto, Kevin, P.E., LEED, AP**
Wilson Okamoto Corporation
1907 South Beretania Street 400
Honolulu, HI 96826

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **Existing**

OTHER USES: **Restaurant: 4,778 sf (2,151 seats/day)**
Retail: 5,352 sf

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS	EXISTING UNITS	UNITS TO BE DEMOLISHED
No. of New Units: **106**	No. of Existing Units: **0**	No. of Units to be Demolished: **0**
Studios:	Studios:	Studios:
1-Bedroom: **94**	1-Bedroom:	1-Bedroom:
2-Bedroom: **12**	2-Bedroom:	2-Bedroom:
3-Bedroom:	3-Bedroom:	3-Bedroom:
4-Bedroom:	4-Bedroom:	4-Bedroom:

ExternalID: **092970204-001** JobId: **92970204**

REF-164

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
Phone: (808) 768-8209 • Fax: (808) 768-4210

SEWER CONNECTION APPLICATION

4-Bedroom:	4-Bedroom:	4-Bedroom:
5-Bedroom:	5-Bedroom:	5-Bedroom:
6-Bedroom:	6-Bedroom:	6-Bedroom:

REMARKS

APPROVAL DATE: **06/18/2021**

EXPIRATION DATE: **06/18/2023**

Valid 2-years after approval date. Construction plans shall be completed and approved within this 2-year period. Construction shall commence within 1-year after approval of plans.
** Applicable WSFC shall be collected at the prevailing rate in accordance with ROH 1990, Chapter 14, Sections 14-10.3, 14-10.4, 14-10.5 and Appendix 14-D.*

REVIEWED BY: ***Jing Meng***

Site Development Division, Wastewater Branch

DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET * HONOLULU, HAWAII 96813
Phone: (808) 768-8209 * Fax: (808) 768-4210

RECE
JUN 7 - 2021
WILSON OKAMOTO CORPORATION

SEWER CONNECTION APPLICATION

APPLICATION NO.: **2021/SCA-0795** STATUS: **Approved**
DATE RECEIVED: **05/28/2021** IWDP APP. NO.:
PROJECT NAME: **2021/SCA-0795 Waipahu Redevelopment Phase 2 - Makai Parcel**

$2,184,603.20
Estimated Wastewater System Facility Charge*

LOCATION:

Zone	Section	Plat	Parcel		
9	4	014	005	94-239 WAIPAHU DEPOT ST Waipa	12,360 Sq. Ft.
9	4	014	014	94-730 FARRINGTON HWY Waipah	33,172 Sq. Ft.
9	4	014	058	94-766 FARRINGTON HWY Waipah	73,581 Sq. Ft.

SPECIFIC LOCATION: **Hikimoe Street**

APPLICANT: **Kevin Goto**
1907 South Beretania Street 400
Honolulu, HI 96826

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **Existing**

OTHER USES: **Restaurant: 17,008 sf (7,654 seats/day)**
Retail: 9,172 sf
Office: 27,500 sf (184 employees)
Supermarket: 20,000 sf

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS		EXISTING UNITS		UNITS TO BE DEMOLISHED	
No. of New Units:	458	No. of Existing Units:	0	No. of Units to be Demolished:	0
Studios:	180	Studios:		Studios:	
1-Bedroom:	150	1-Bedroom:		1-Bedroom:	
2-Bedroom:	100	2-Bedroom:		2-Bedroom:	
3-Bedroom:	20	3-Bedroom:		3-Bedroom:	
4-Bedroom:		4-Bedroom:		4-Bedroom:	
5-Bedroom:		5-Bedroom:		5-Bedroom:	
6-Bedroom:		6-Bedroom:		6-Bedroom:	

REMARKS

APPROVAL DATE: **06/18/2021**

EXPIRATION DATE: 06/13/2023

Valid 2-years after approval date. Construction plans shall be completed and approved within this 2-year period. Construction shall commence within 1-year after approval of plans.
** Applicable WSFC shall be collected at the prevailing rate in accordance with ROH 1990, Chapter 14, Sections 14-10.3, 14-10.4, 14-10.5 and Appendix 14-D*

REVIEWED BY: *Jing Meng*

Site Development Division, Wastewater Branch

Email ID: 09297 1625-001 Job ID: 92971625

Initial Print Date: Friday June 18, 2021 3:55 pm

REF-166

LETTER CONFIRMING WATER AVAILABILITY

6

REF-167

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

May 26, 2022

RICK BLANGIARDI, MAYOR

BRYAN P. ANDAYA, Chair
KAPUA SPROAT, Vice Chair
RAY C. SOON
MAX J. SWORD
NA'ALEHU ANTHONY

JADE T. BUTAY, Ex-Officio
DAWN B. SZEWCZYK, P.E., Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

Mr. Kevin Goto
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Goto:

Subject: Your Letter Dated April 17, 2022 Requesting Water Availability and Fire Flow Pressure Data on the Proposed Waipahu Redevelopment Along Hikimoe Street
Tax Map Key: 9-4-013: 046; 9-4-014: 005, 014, 058 to 067

Thank you for your letter regarding the proposed Waipahu redevelopment that consist of 534 units of residential development and approximately 68,178 square feet of commercial and retail spaces.

The existing water system is presently adequate to accommodate the proposed redevelopment. However, please be advised that this information is based upon current data, and therefore, the Board of Water Supply (BWS) reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges (WSFC) for resource development, transmission, and daily storage.

Proposed mixed use developments are required to install separate domestic water meters and laterals serving the residential and non-residential spaces.

Water conservation measures are required for all proposed developments. These measures include utilization of nonpotable water for irrigation, using rain catchment, drought tolerant plants, xeriscape landscaping, efficient irrigation systems, such as a drip system and moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets.

The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

The construction drawings should be submitted for our approval, and the construction schedule should be coordinated to minimize impact to the water system.

REF-168

The BWS has suspended fire flow tests on fire hydrants as a water conservation measure. However, you may use the following calculated flow data:

Fire Hydrant Number	Location	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)
L00325	Waipahu Depot Street	90	60	2,000
L00674	Hikimoe Street	88	76	2,000
L00675	Hikimoe Street	88	73	2,000
L00676	Kahuailani Street	86	72	2,000
L04002	Hikimoe Street	88	73	2,000

The data are based on the existing water system, and the static pressure represents the theoretical pressure at the point of calculation with the reservoir full and no demands on the water system. The static pressure is not indicative of the actual pressure in the field. Therefore, to determine the flows that are available to the site, you will have to determine the actual field pressure by taking on-site pressure readings at various times of the day and correlating that field data with the above hydraulic design data.

The map showing the location of the fire hydrants is attached.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

BWS may waive the WSFC and new meter cost for qualified on-site affordable or homeless dwelling units, up to 500 dwellings units per year, on a first come first served basis. The waivers will be granted when the building permit is submitted for approval. To qualify, the dwelling units must be certified as either affordable or homeless dwelling units by the appropriate agency of the City and County of Honolulu and the certification must be provided when the building permit application is submitted for BWS review and approval. For non-qualifying units, the applicant will be required to pay our WSFC for resource development, transmission and daily storage. For more information, please contact Service Engineering of our Customer Care Division at (808) 748-5460.

If you have any questions, please contact Joyce Lin, Project Review Branch of our Water Resources Division at (808) 748-5442.

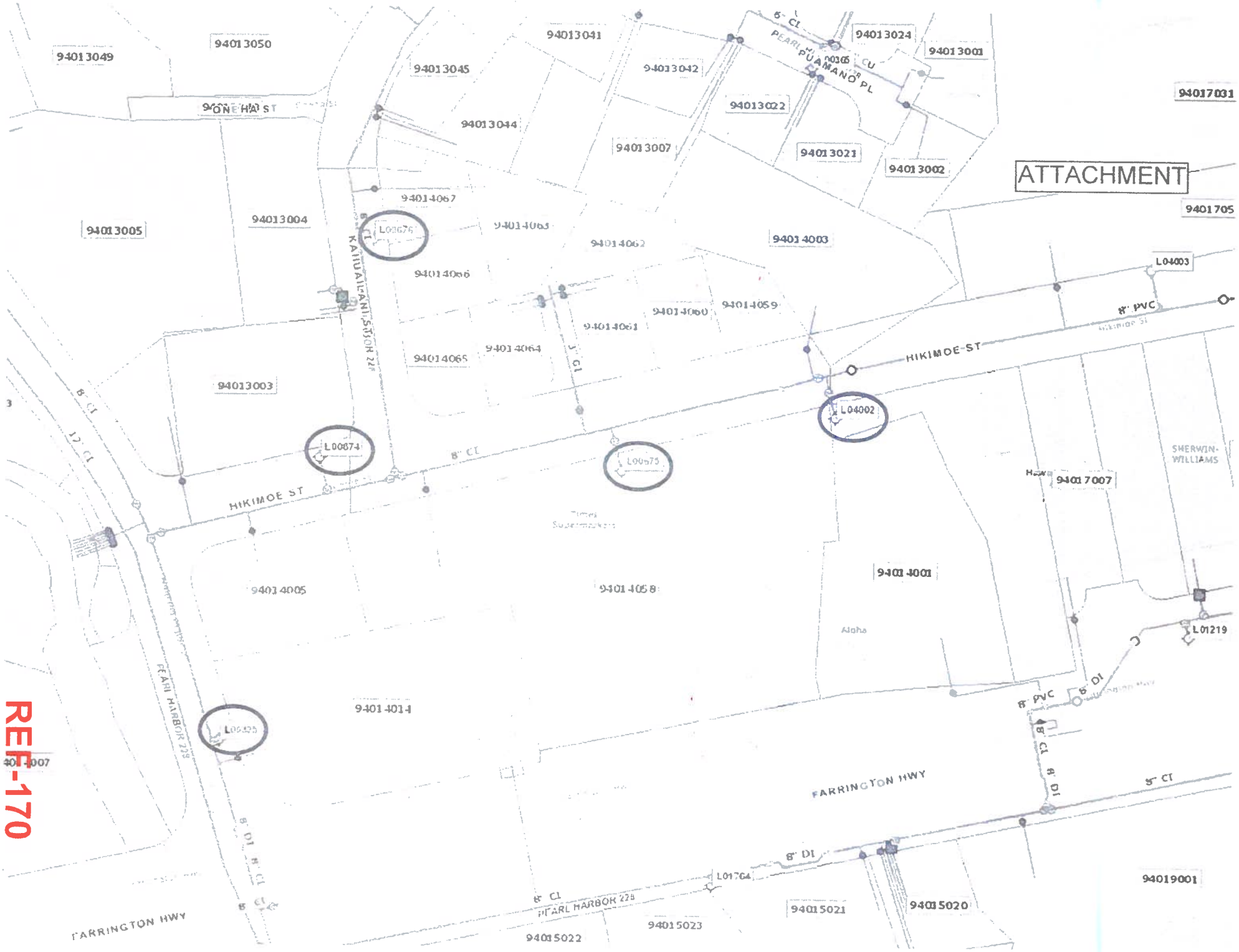
Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachment

cc: Customer Care - Service Engineering
R. Chun
WR-22-70

REF-169


ATTACHMENT
94013049
94013050
94013045
94013041
94013042
94013024
94013001
94013022
94013044
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94013021
94013002
94017031
94013005
94013004
94014067
94014063
94014062
94014003
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94014060
94014059
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94014064
94013003
94014005
94014058
94014001
94014014
94017007
94015021
94015020
94015022
94015023
94019001
L00676
L00674
L00675
L00425
L04002
L04003
L01219
L01704
HIKIMOE ST
HIKIMOE-ST
FARRINGTON HWY
PEARL HARBOR 228
KAHUALANI-STION 228
PUAMANO PL
SHERWIN-WILLIAMS
8" PVC
8" CI
5" CI
8" DI
5" DI

REF-170

LETTER CONFIRMING AVAILABILITY OF ELECTRICITY

7

REF-171

July 6, 2022

Mr. Monte Heaton
Highridge Costa Development Company
330 W Victoria St.
Gardena, CA 90248

Dear Mr. Heaton:

Re: Keawalau Affordable Housing Community
Waipahu, Hawaii
TMK: 9-4-013:046, 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067

This is in response to your request for a "Will Serve" letter for the above project location.

We have existing distribution circuits along Farrington Highway, Waipahu Depot Street and Hikimoe Street that could potentially be used to serve your future project. Please keep in mind that these circuits may need to be upgraded depending on the size of this **project's load. At this time, we do not have sufficient information and detailed plans to** make this determination.

We request that you keep us informed on the status of your project. As soon as you have detailed plans, please create a Service Request with us, and be sure to allow sufficient time for us to work on the project.

Please let us know if we can be of assistance in any other way. Should you have any questions, please call me at 543-7590.

Sincerely,

Shimono, Eric

Digitally signed by Shimono, Eric
Date: 2022.07.06 07:11:55 -10'00'

Eric Shimono
Supervisor
Transmission and Distribution Engineering Department
Engineering Division

PROJECT DEVELOPMENT SCHEDULE

8

REF-173

8. PROJECT DEVELOPMENT SCHEDULE

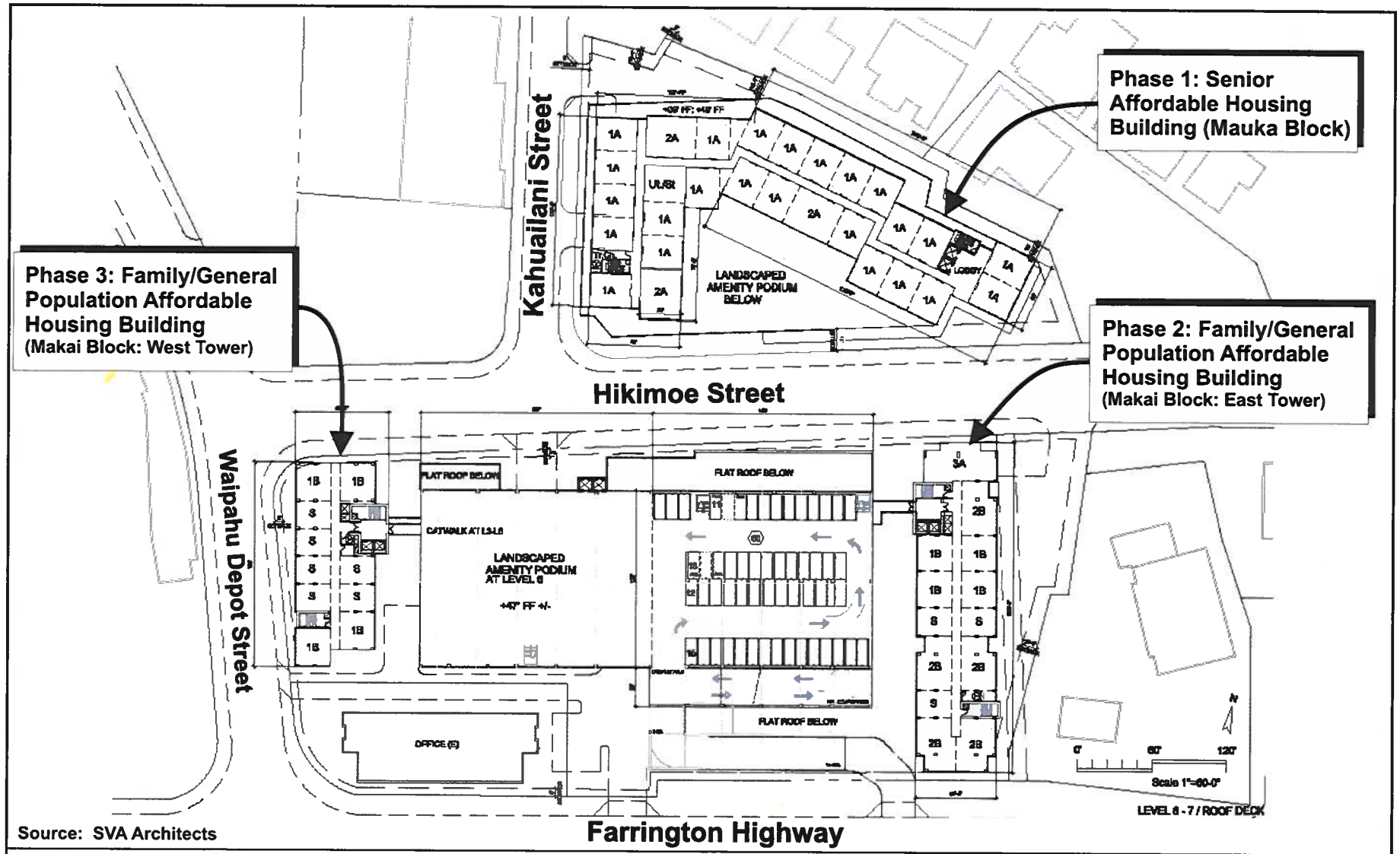
The project will be developed in three (3) phases. See attached phasing plan. Construction will commence on a phase-by-phase basis when all approvals are granted from the pertinent State of Hawai'i or City and County of Honolulu agencies. The entitlement process includes the 201H application and processing. The financing phase includes a joint financing application submitted to Hawai'i Housing Finance & Development Corporation (HHFDC). The design development/permitting phase includes building permits submitted and processed with the City and County of Honolulu, Department of Planning and Permitting (DPP). The construction phase includes groundbreaking to completion of the project. The proposed development timeframe is shown in the table below:

Development Timeframe

Phase 1		
Process	**Dates**	**Duration**
Entitlement	Q1 2022 – Q1 2023	12 Months
Financing	Q1 2023 - Q3 2023	9 Months
Design Development/Permitting	Q3 2023 - Q3 2024	12 Months
Construction	Q4 2024 - Q3 2026	18 Months

Phase 2		
Process	**Dates**	**Duration**
Entitlement	Q1 2022 – Q1 2023	12 Months
Financing	Q1 2024 - Q3 2024	9 Months
Design Development/Permitting	Q3 2024 - Q3 2025	12 Months
Construction	Q4 2025 - Q4 2027	24 Months

Phase 3		
Process	**Dates**	**Duration**
Entitlement	Q1 2022 – Q1 2023	12 Months
Financing	Q1 2024 - Q3 2024	9 Months
Design Development/Permitting	Q3 2024 - Q3 2025	12 Months
Construction	Q4 2025 - Q4 2027	24 Months



Source: SVA Architects

Proposed Keawalau Affordable Housing Community
Residential Level Plan

NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Figures\ResidentLevelPlan

REF-175

PROJECT MANAGEMENT PLAN

9

REF-176

9. PROJECT MANAGEMENT PLAN

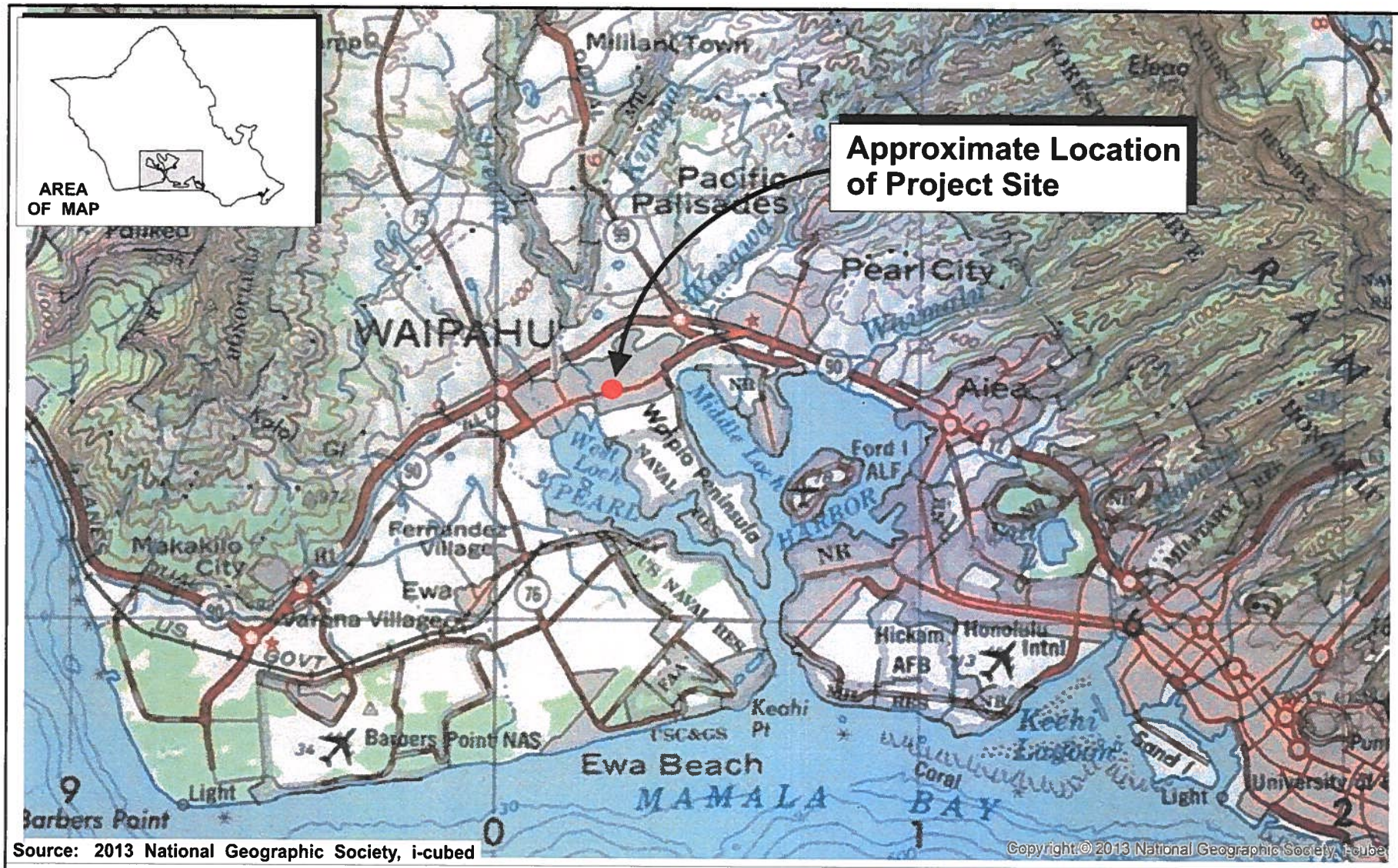
Of the total of 537 affordable housing units, 156 units are studios, 258 units are one-bedrooms, 105 units are two-bedrooms, and 18 units are 3-bedrooms. 55 units will be income-restricted at 30% of the area median income (AMI), 476 units will be restricted at 60% of AMI, and six (6) units will be for the onsite property management. A detailed summary of unit types by phase can be found in **Section 3**, **Table 3**.

As the project is planned to be phased, the Applicant will submit three (3) consolidated applications to Hawai'i Housing Finance & Development Corporation (HHFDC) for 4 percent Low Income Housing Tax Credits (LIHTC), Hula Mae Tax Exempt Bonds, and Rental Housing Revolving Fund financing. In order to score competitively in these applications, the Applicant will commit to a 61-year affordability period, during which these affordability levels will be enforced by a recorded restrictive covenant on the property.

VICINITY MAPS AND LAND USE MAP

10

REF-178



Source: 2013 National Geographic Society, i-cubed

Keawalau Affordable Housing Community Project

Regional Location Map

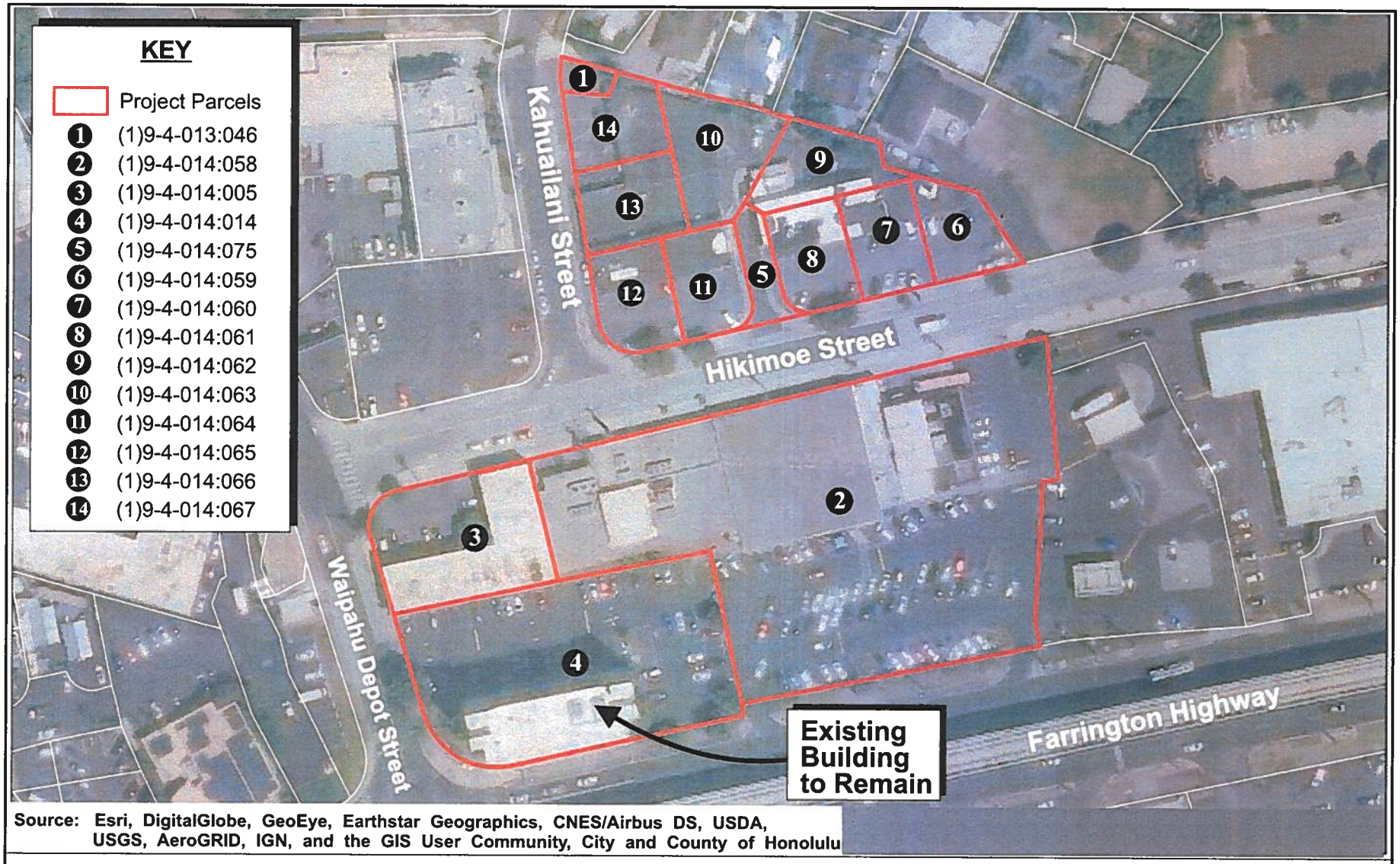
0 275 550 1100 Feet

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH2423\Applications\Figures\Regional Location Map

REF-179



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, City and County of Honolulu

Keawalau Affordable Housing Community Project

Project Location Map

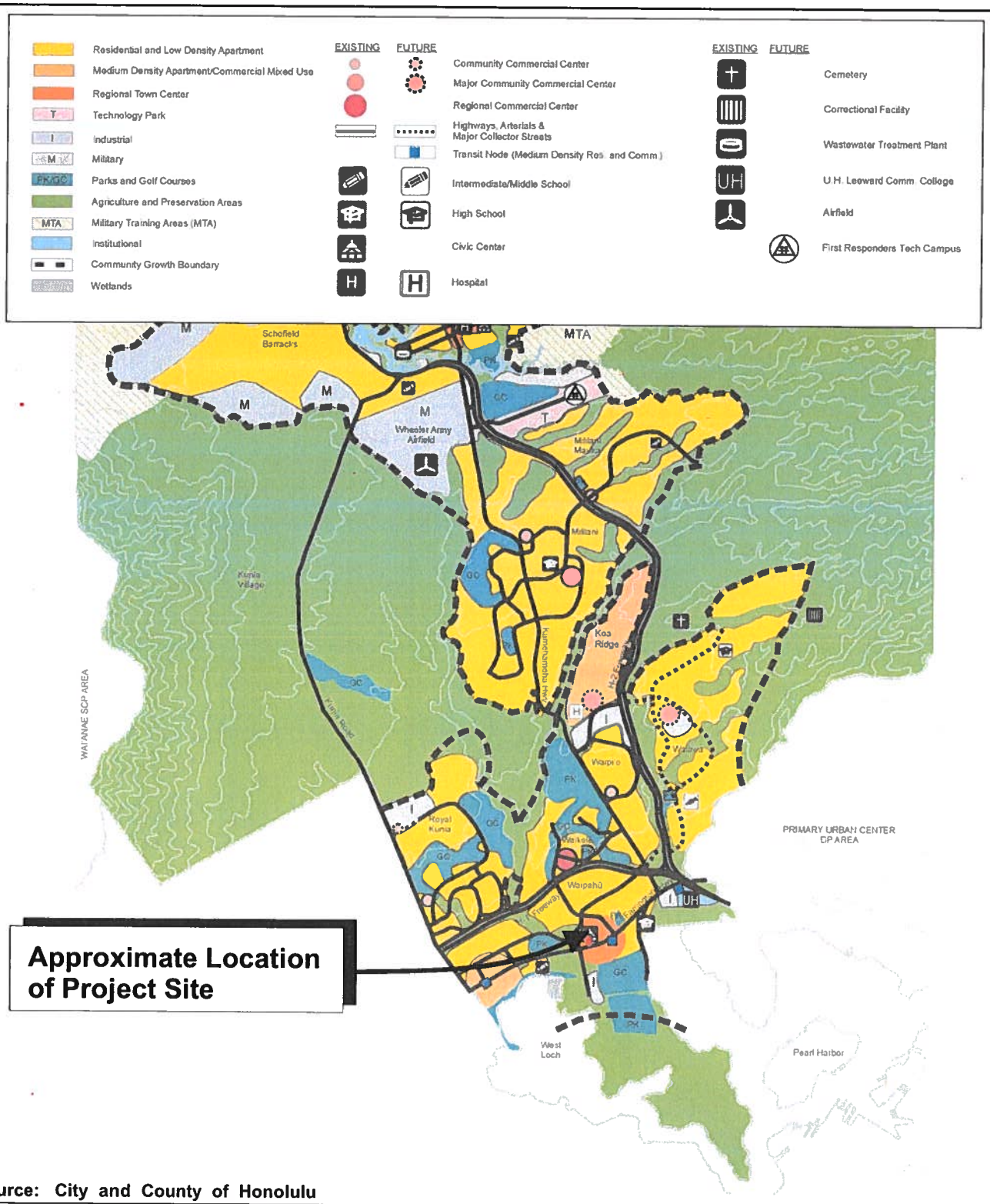
0 55 Feet
27.5 110

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu_AH2423\Applications\Figures\Project Location Map

REF-180



Source: City and County of Honolulu

Keawalau Affordable Housing Community Project

Central O'ahu Sustainable Communities Plan Urban Land Use Map

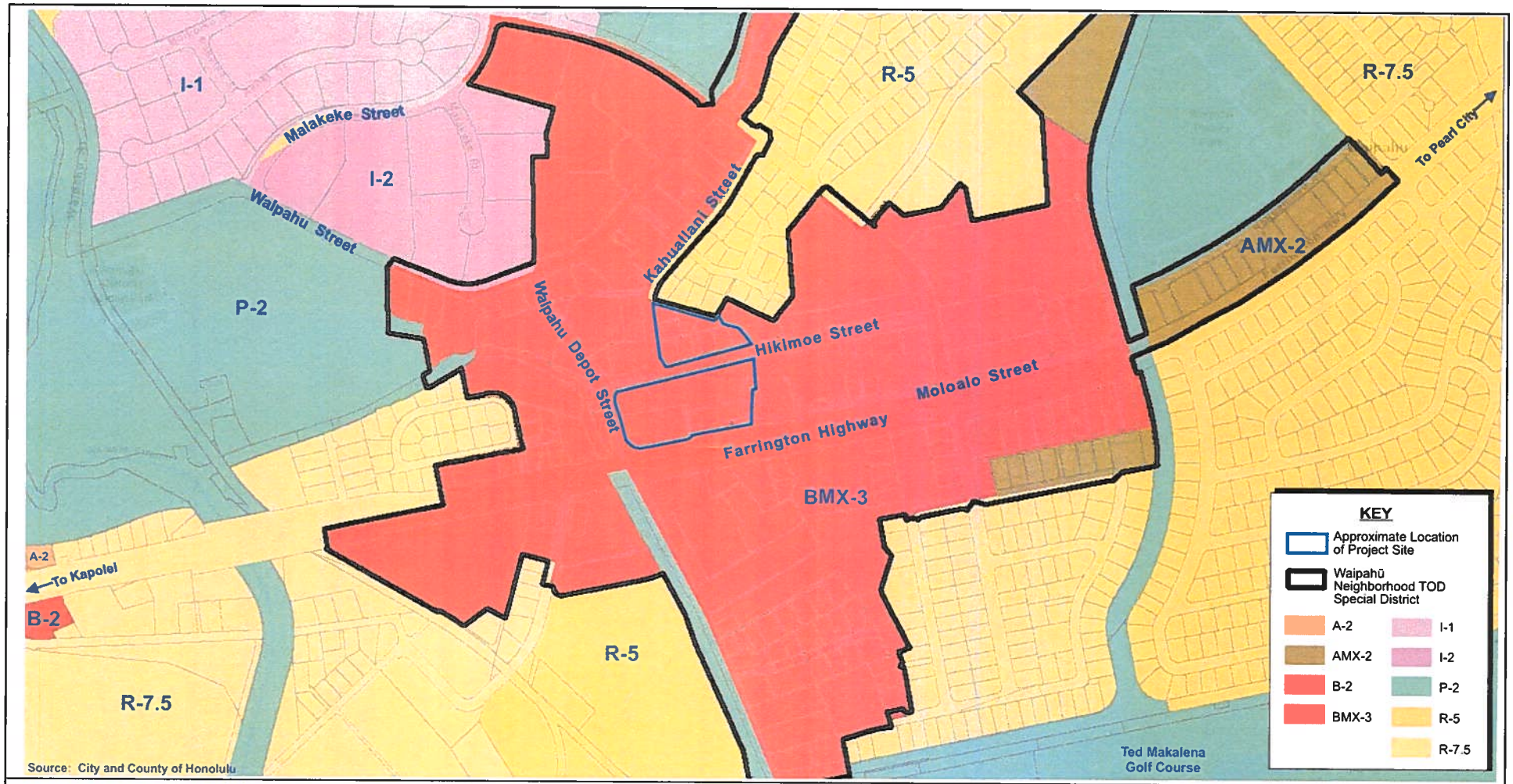
NOT TO SCALE

Prepared for: Highridge Costa Development Company

MUNEKIYO HIRAGA

Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\Figures\Urban Land

REF-181



Keawalau Affordable Housing Community Project

Zoning and Special District Map

Prepared for: Highridge Costa Development Company

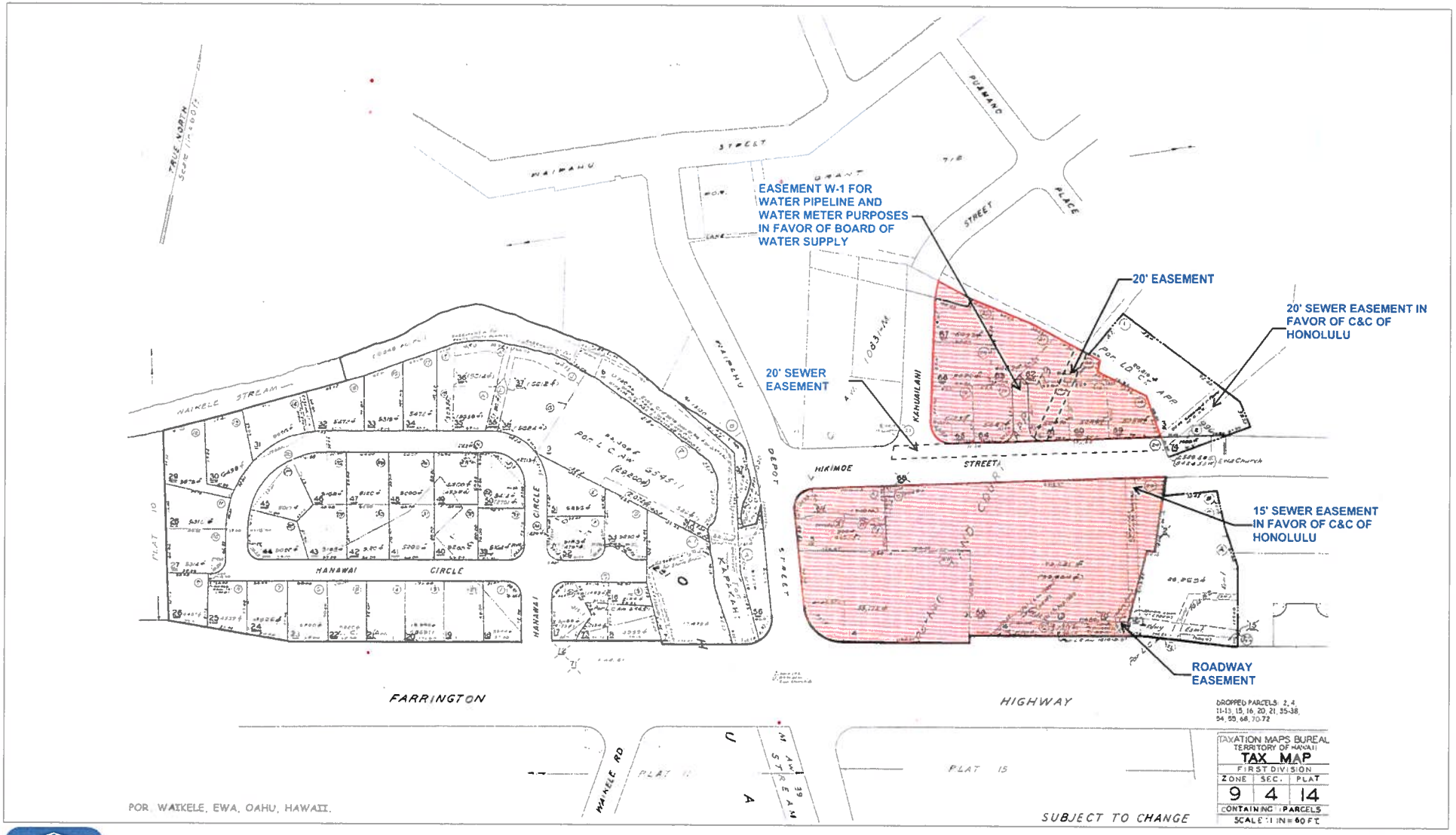
MUNEKIYO HIRAGA

REF-182

PRELIMINARY PROJECT PLANS

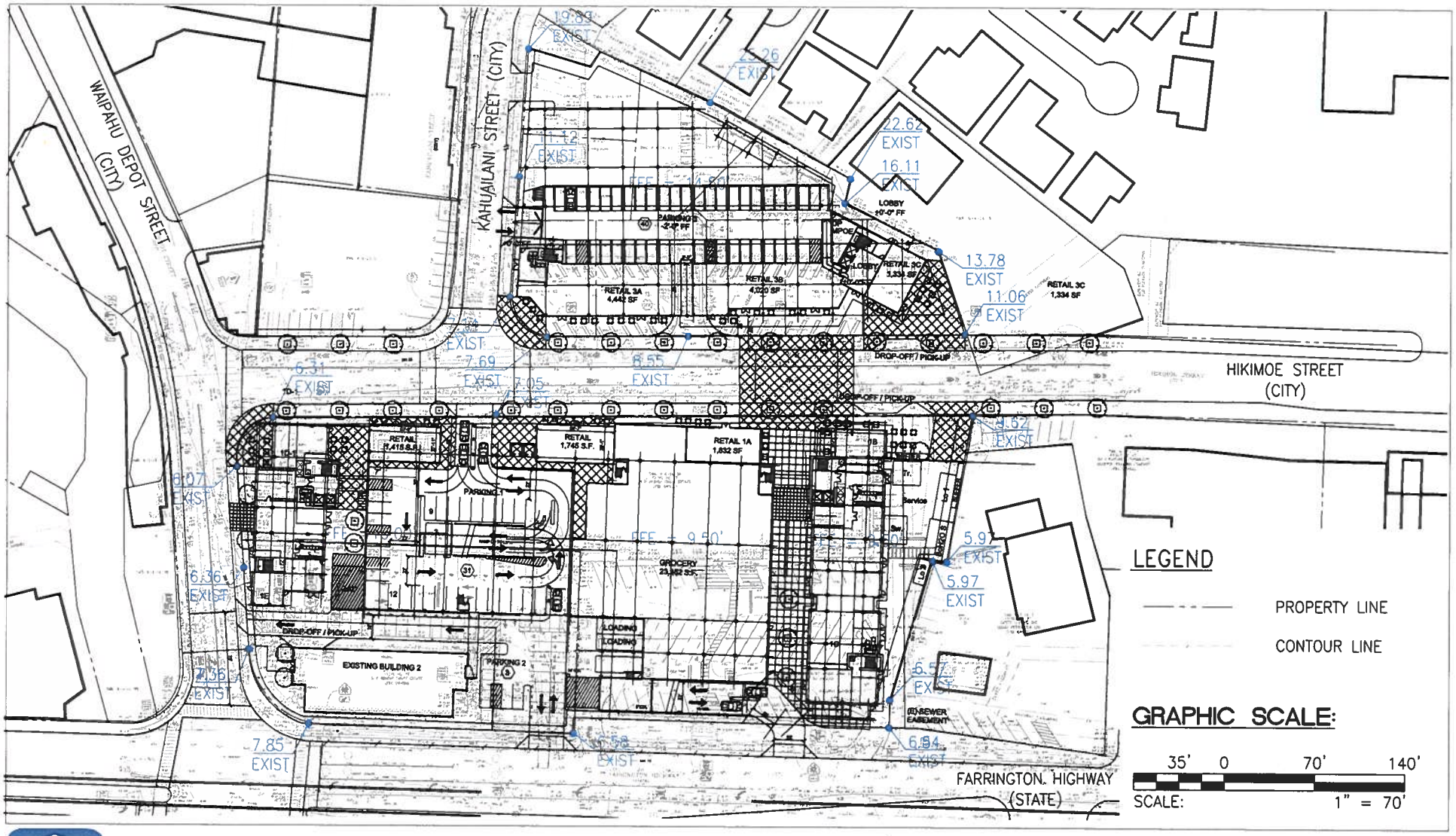
11

REF-183



WILSON OKAMOTO CORPORATION

TAX MAP KEY



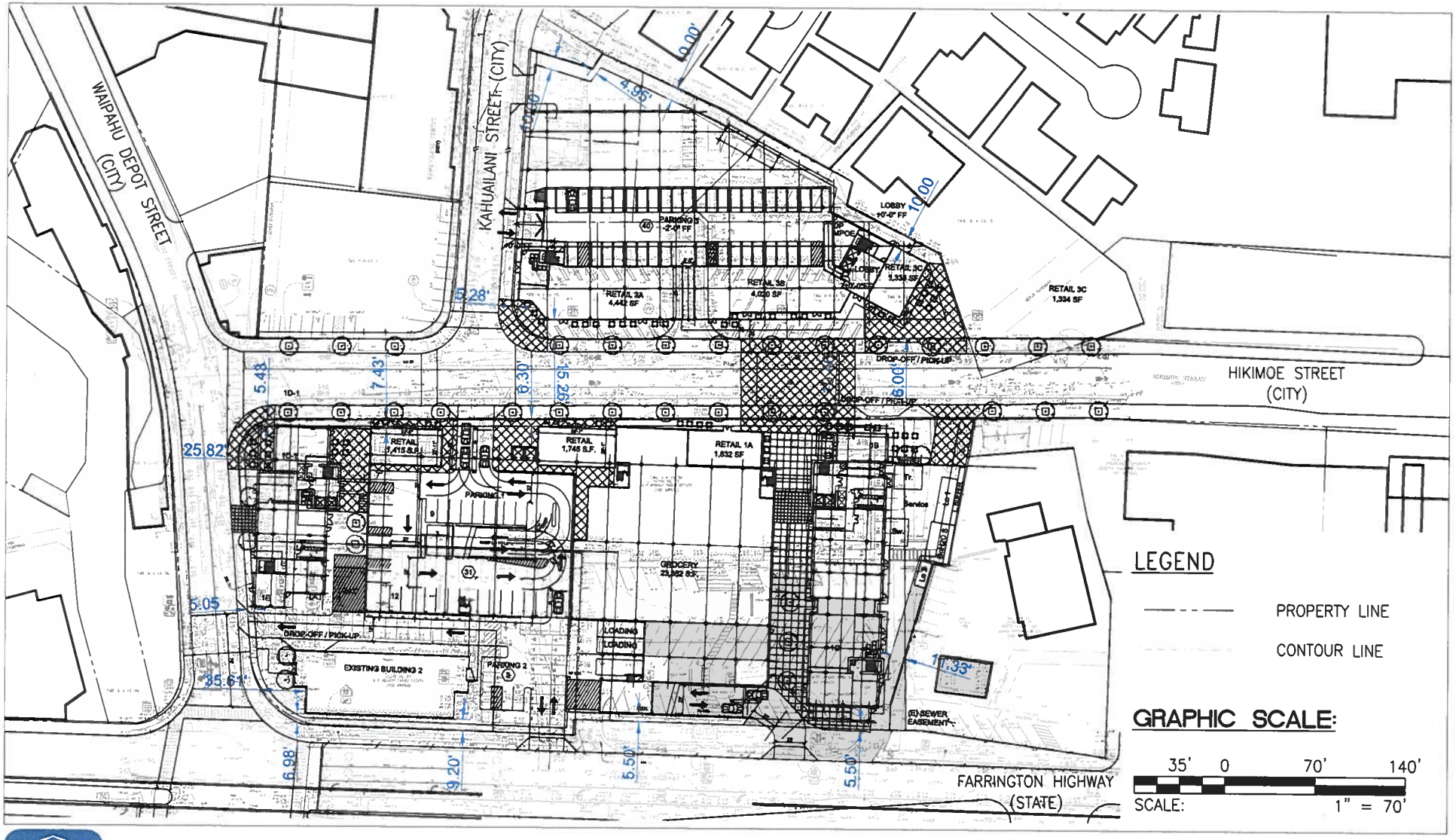
WILSON OKAMOTO CORPORATION

SITE GRADING PLAN

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAI'I

WILSON OKAMOTO CORPORATION

EXISTING IMPROVEMENTS



WILSON OKAMOTO CORPORATION

PROPOSED IMPROVEMENTS

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAI'I

REF-187

Keawalau Affordable Housing Community

NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

AUGUST 10, 2022

Kamehameha Schools

Celebrating 25 Years Highridge Costa
Creating a Blueprint for a Better Nation Since 1994
1994-2019

PBR HAWAII & ASSOCIATES, INC.

SVA

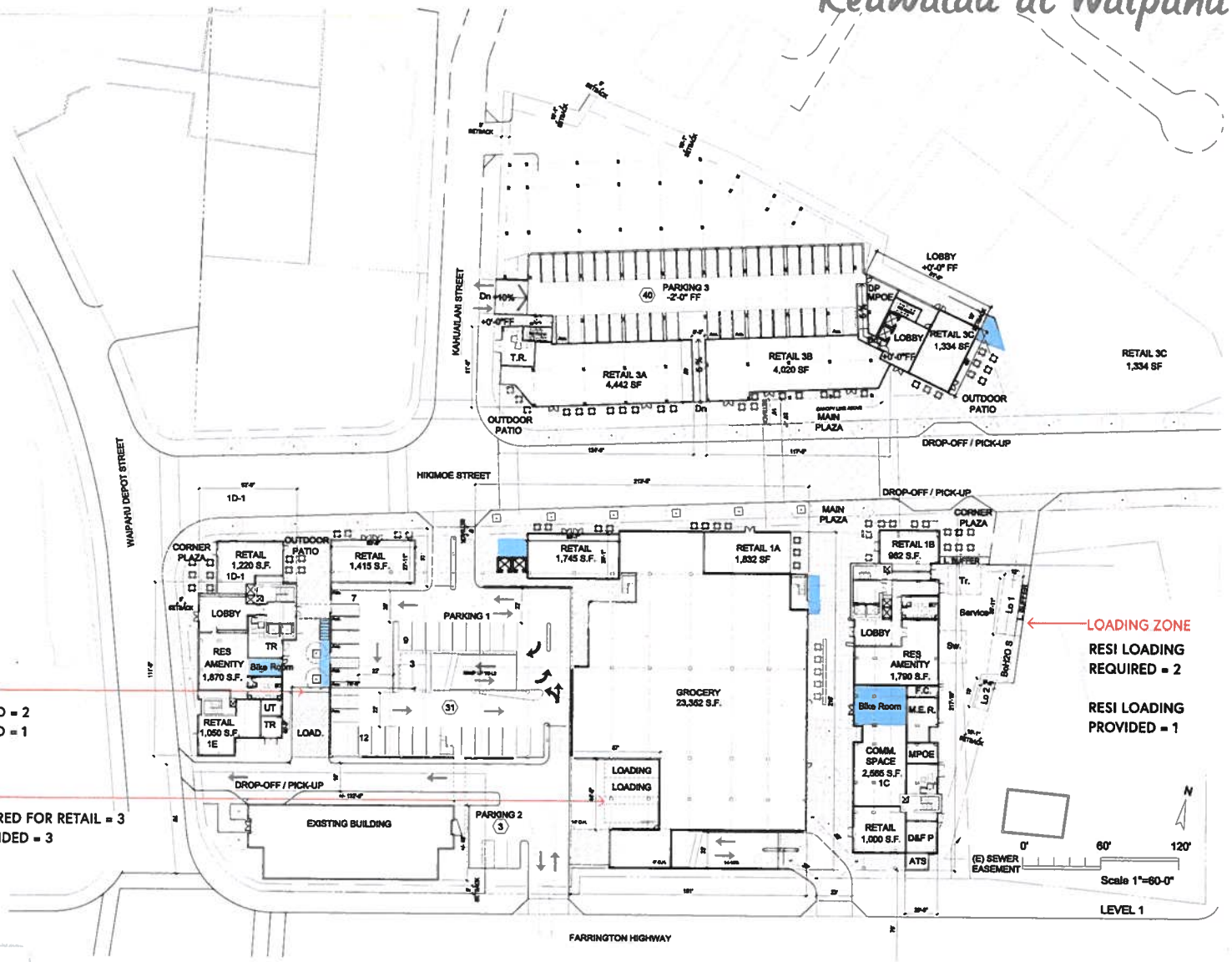
REF-188

GROUND FLOOR PLAN

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:



Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

LEVEL 2

Keawalau at Waipahū

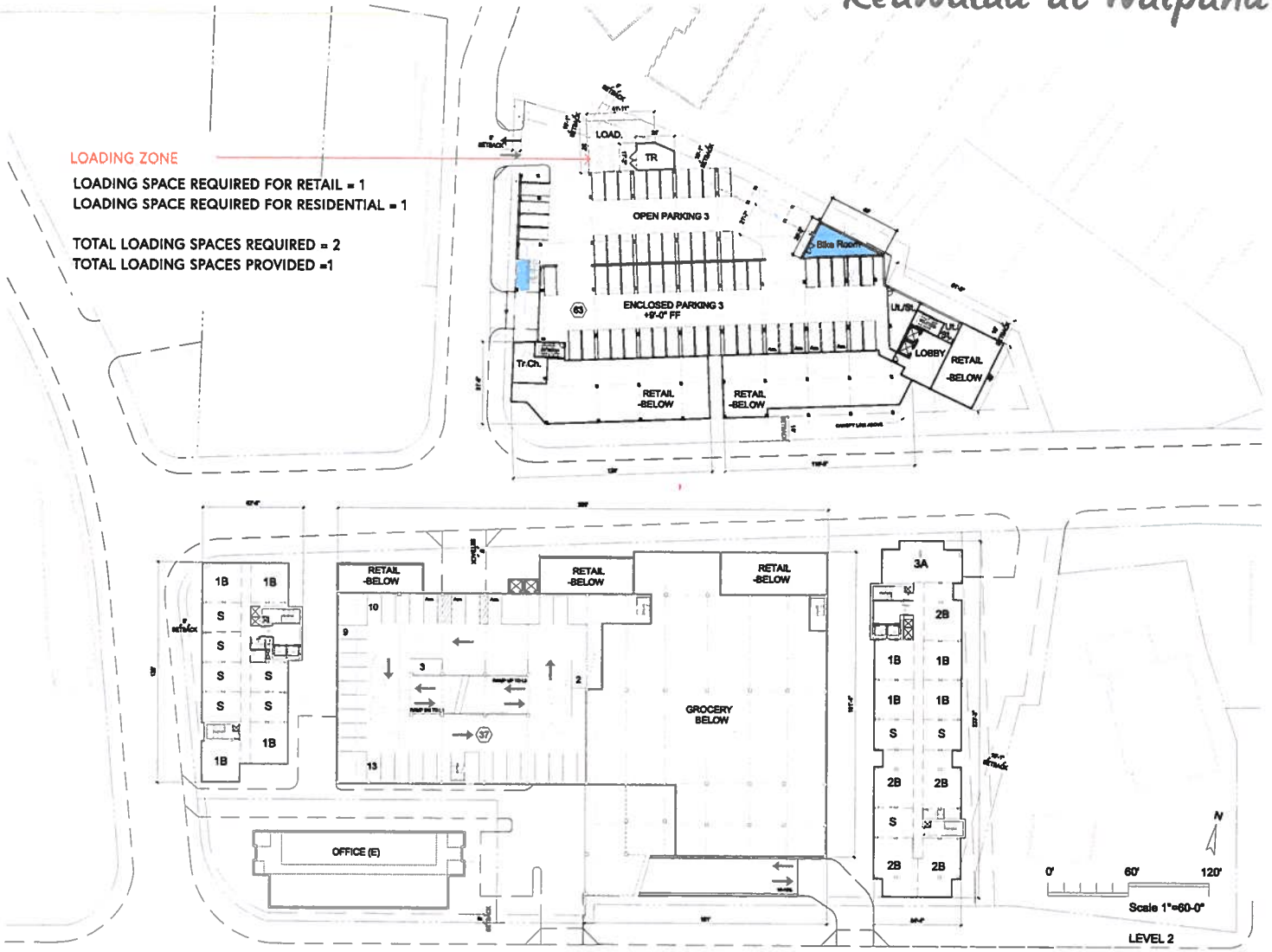
NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:

LOADING ZONE

LOADING SPACE REQUIRED FOR RETAIL = 1
LOADING SPACE REQUIRED FOR RESIDENTIAL = 1

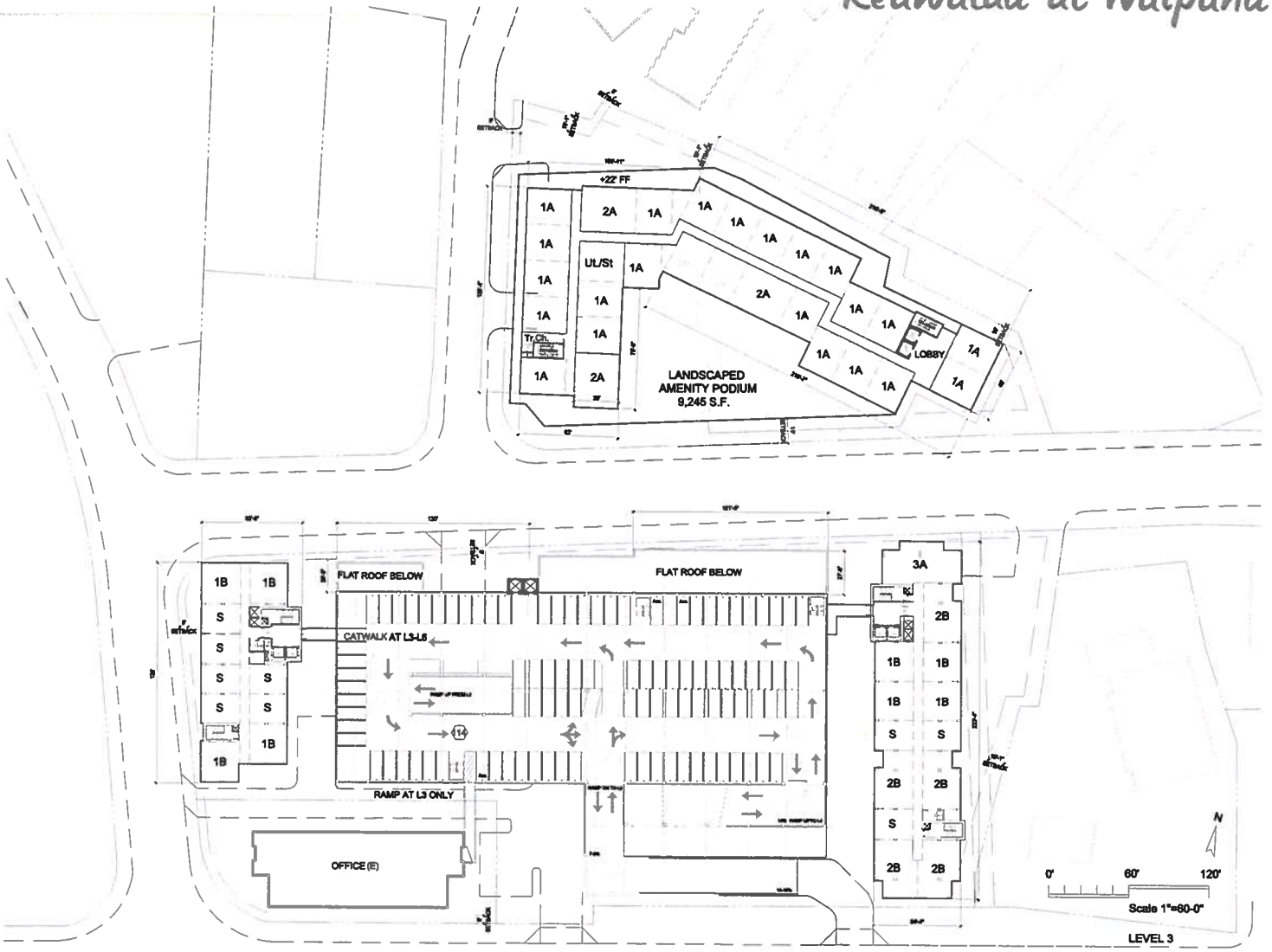
TOTAL LOADING SPACES REQUIRED = 2
TOTAL LOADING SPACES PROVIDED =1



LEVEL 3

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

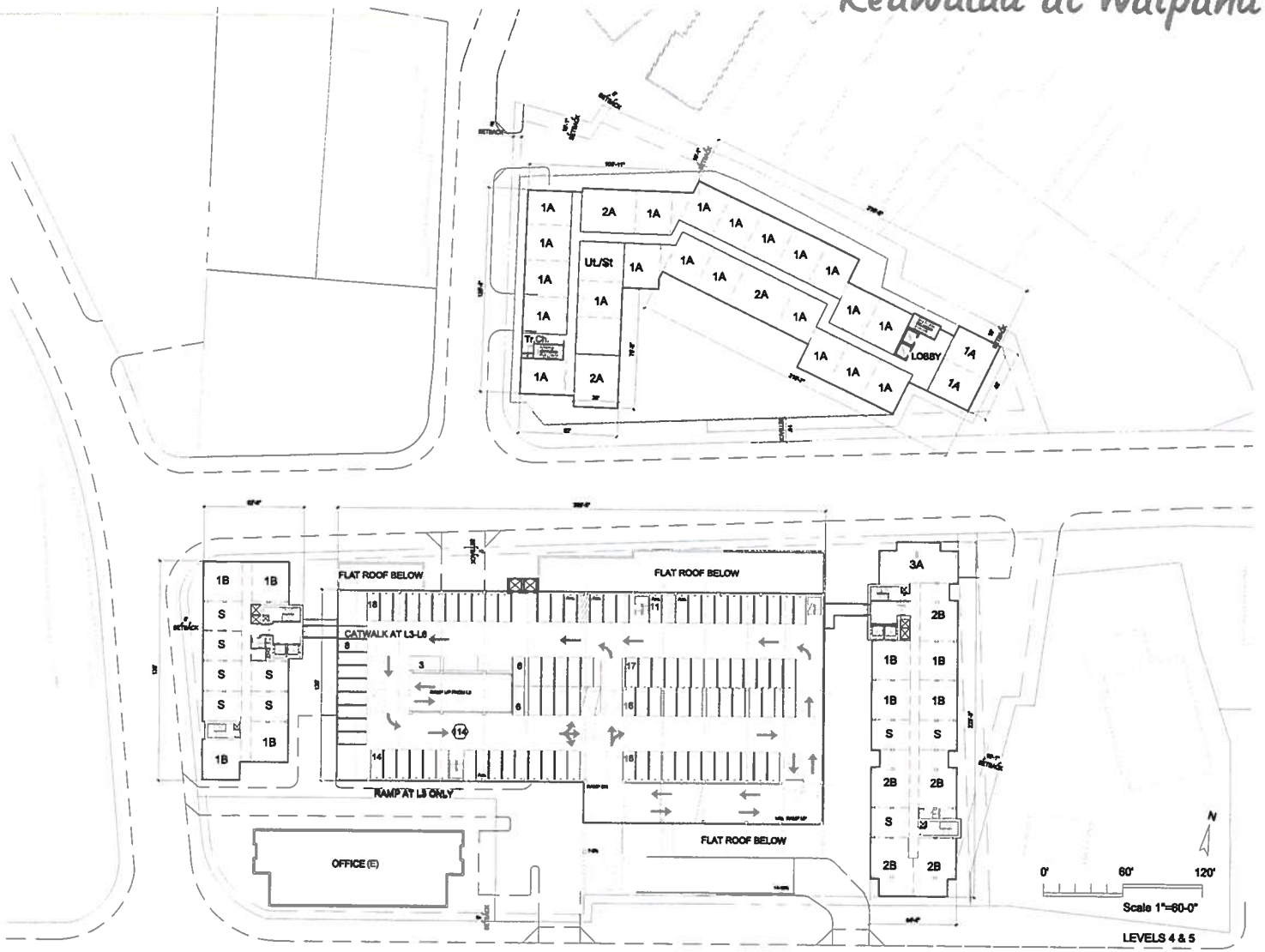


Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

LEVEL 4 & 5

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



Kamehameha Schools

Highridge Costa

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON AVE, HONOLULU, HAWAII

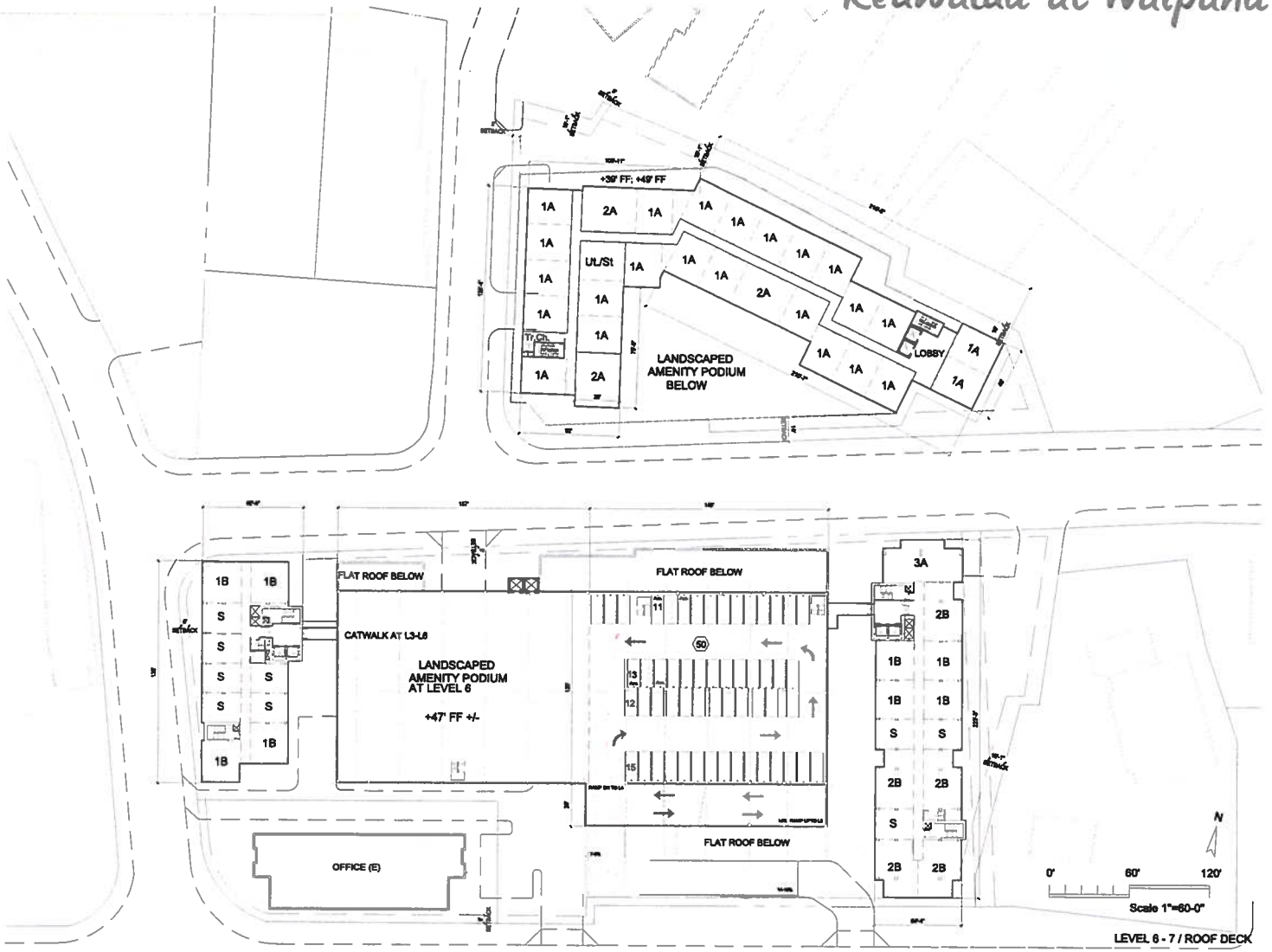
#2019.40117 AUGUST 10, 2022

REF-192

LEVEL 6 & 7

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

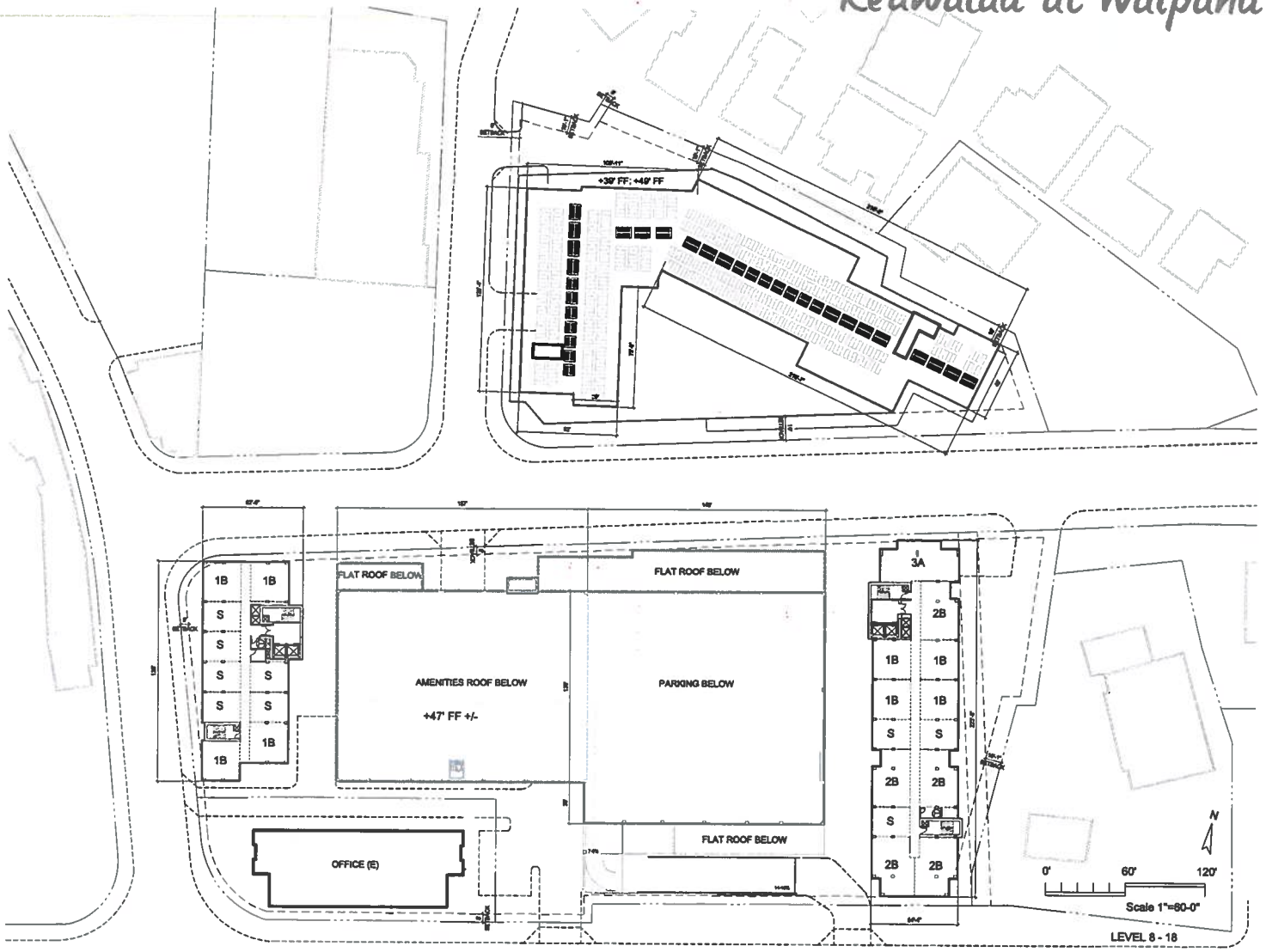


Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

LEVEL 8-18

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

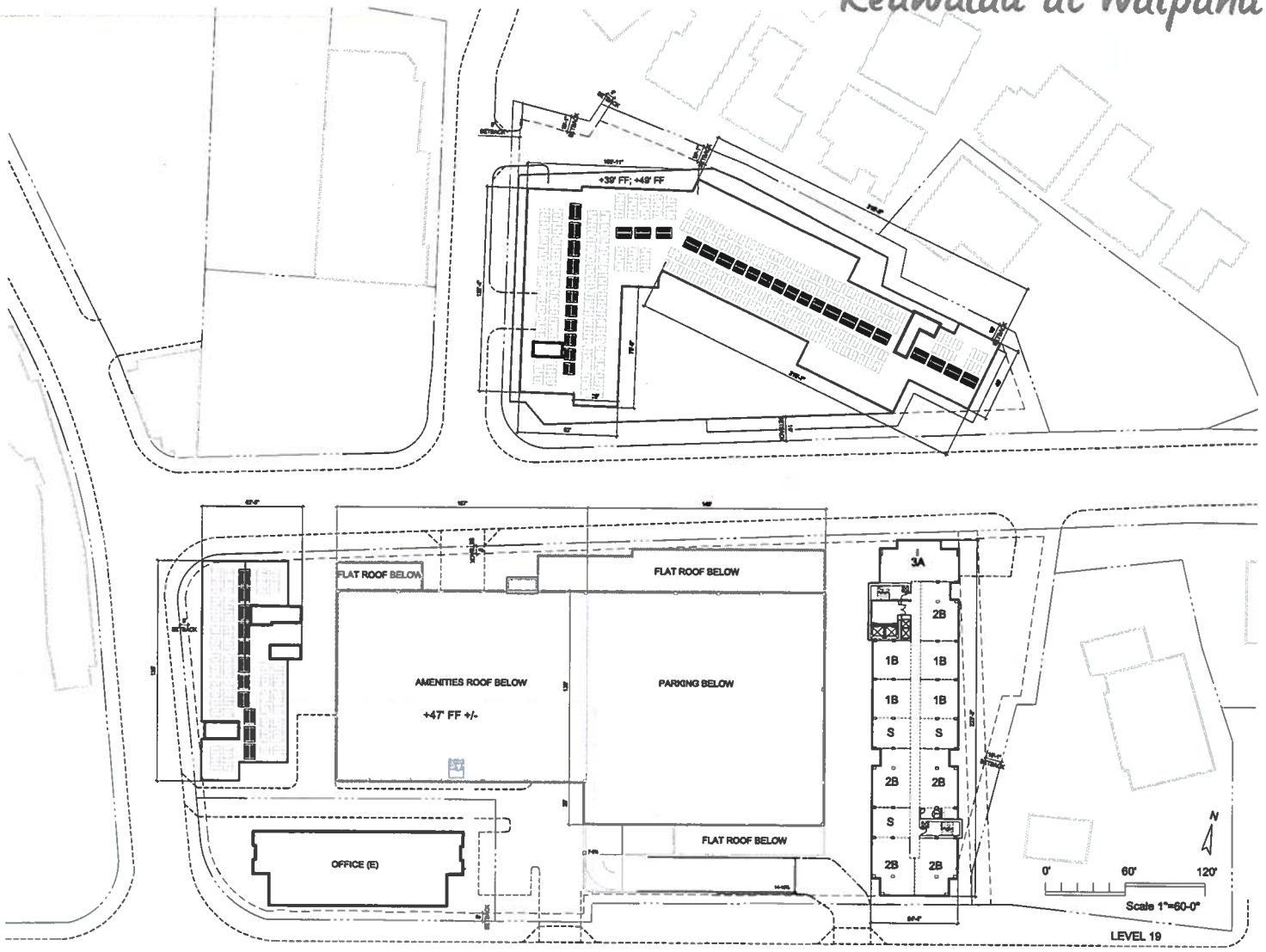


Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

LEVEL 19

Keawalau at Waipahū

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

SITE PHASING + DATA

Keawalau at Waipahū

Note: Designs are preliminary and subject to change

MASTER SITE AREA (Phases 1+2+3)
156,432 sf

JOINT DEVELOPMENT AREA (Phases 2+3)
105,651 sf

PARKING

Parking structure will be allocated between phases 2 and 3 at a later date.

PHASE 3

Total Retail = 3,685 sf
Total Resi Count = 170
Total stories = 18
Total Residential stories = 17

West Tower Mix
- 6 studios
- 4 one bed

10 units per level

PHASE 1

Total Retail = 9,796 sf
Total Resi Count = 133

Low Rise Seniors Mix:
- 24 one bed
- 3 two bed

27 units per level

PHASE 2

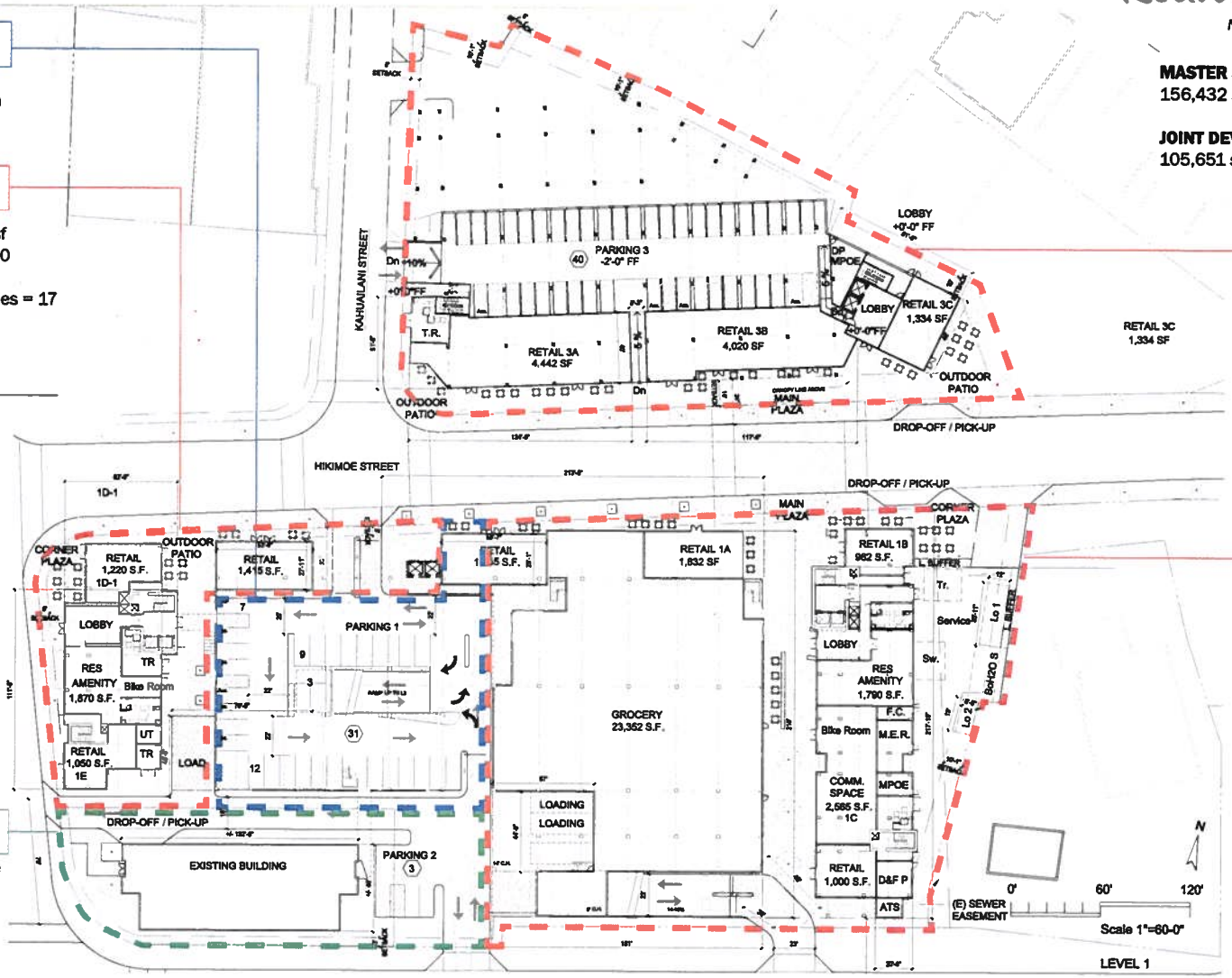
Total Retail = 5,539 sf
Grocery Store = 23,352 sf
Total Resi Count = 234
Total stories = 19
Total Residential stories = 18

West Tower Mix
- 3 studios
- 4 one bed
- 5 two bed
- 1 three bed

13 units per level

OWNER RETAINED AREA

Existing building to be retained by KS and not included in the development.



REF-196

PARKING SUMMARY

Keawalau at Waipahū

Phase 1

Residential	Unit Area	No Units	Total Area				Parking Required
1 - Bdrm	595	118	70,210				Per Table 21-6.1
2 - Bdrm	779	15	11,685				
Residential Area		133	81,895	1	per	1,000	82
Retail			9,796	1	per	500	20
						Total	102
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	103

Bicycle Parking		Units				Required	Provided
		Short Term	1	per	10	14	14
		Long Term	1	per	2	67	67
	9,796	S.F. Commercial Uses					
		Short Term	1	per	2,000	5	5
		Long Term	1	per	12,000	1	1

Phase 2

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	54	24,300				Per Table 21-6.1
1 - Bdrm	590	72	42,480				
2 - Bdrm	830	90	74,700				
3 - Bdrm	1,160	18	20,880				
		234	162,360	1	per	1,000	163
Retail			27,146	1	per	500	55
Office			29,550	1	per	500	60
						Total	278
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	353

Bicycle Parking Provided		Units				Required	Provided
		Short Term	1	per	10	24	24
		Long Term	1	per	2	117	117
	56,696	S.F. Commercial Uses					
		Short Term	1	per	2,000	29	29
		Long Term	1	per	12,000	5	5

Phase 3

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	102	45,900				Per Table 21-6.1
1 - Bdrm	590	68	40,120				
		170	86,020	1	per	1,000	87
Retail			5,814	1	per	500	12
						Total	99
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	107

Bicycle Parking Provided		Units				Required	Provided
		Short Term	1	per	10	17	17
		Long Term	1	per	2	85	85
	5,814	S.F. Commercial Uses					
		Short Term	1	per	2,000	3	3
		Long Term	1	per	12,000	1	1

Note 1

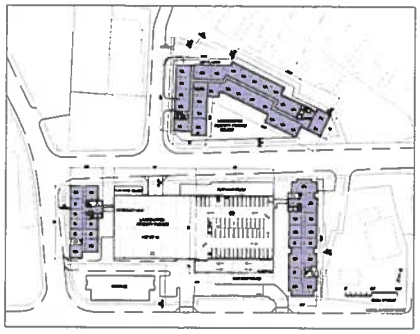
Sec. 21-6.20 (a) no off-street parking is required in any zoning district within one-half mile of an existing or future Honolulu rail transit station, as identified in the accepted environmental impact statement, or in the transit-oriented development special districts.

Loading Spaces

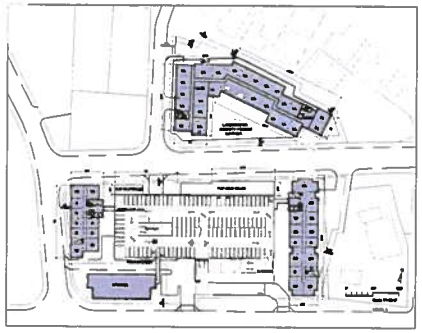
Phase 1	Residential	20 - 150 (1 Required)	133	Units	1
Phase 1	Retail	2,000 - 10,000 (1 Required)	9,796	S.F.	1
				Total Loading Spaces Required	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 1					
Phase 2	Residential	151 - 300 (2 Required)	234	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 2 residential					
Phase 3	Residential	151 - 300 (2 Required)	170	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 3 residential					
Phase 2 & 3	Retail	20,000 - 40,000 (3 Required)	32,960	S.F.	3
				3 Loading spaces provided	
Existing	Office	20,00 - 50,000 (1 Required)	29,550	S.F.	1
0 Loading space provided, exemption to reduce number of loading spaces to 0 for existing office building					

FAR DIAGRAM & CALCULATION

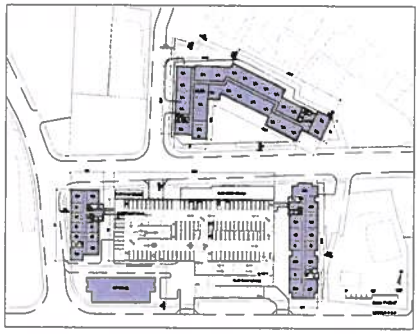
Keawalau at Waipahū



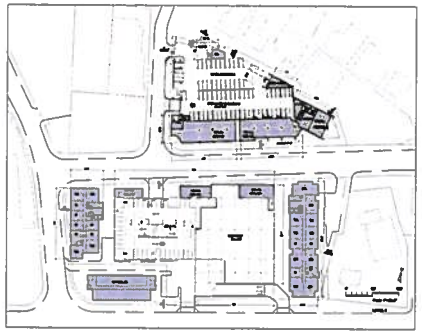
LEVEL 6 (typ upper)



LEVEL 3



LEVEL 5



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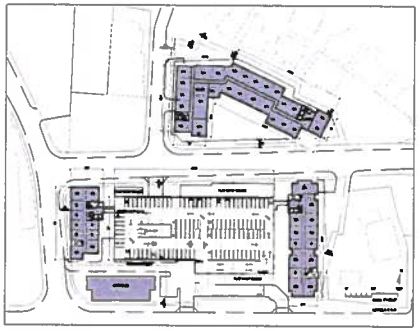

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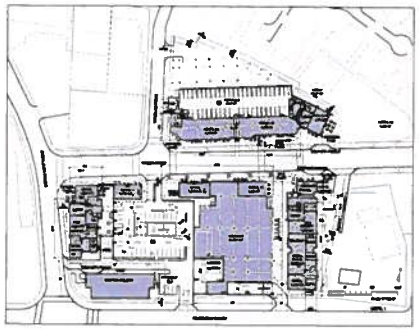

LEVEL 1

FLOOR AREA RATIO (FAR)

PHASE 1 (SENIOR)

Lot Area	50,781 sf
FAR	2.69

		GFA
Level	7	22,301 sf
Level	6	22,301 sf
Level	5	22,301 sf
Level	4	22,301 sf
Level	3	22,301 sf
Level	2	12,733 sf
Level	1	12,176 sf
		136,414 sf

PHASE 2, 3 & EXISTING OFFICE TOWER

Lot Area	119,183 sf
FAR	3.32

GFA	Phase 2	230,155 sf
	Phase 3	135,936
	Office =	29,550 sf
	TOTAL	395,641 sf

		GFA (Phase 2)
Level	19	10,416 sf
Level	18	10,416 sf
Level	17	10,416 sf
Level	16	10,416 sf
Level	15	10,416 sf
Level	14	10,416 sf
Level	13	10,416 sf
Level	12	10,416 sf
Level	11	10,416 sf
Level	10	10,416 sf
Level	9	10,416 sf
Level	8	10,416 sf
Level	7	10,416 sf
Level	6	10,416 sf
Level	5	10,416 sf
Level	4	10,416 sf
Level	3	10,416 sf
Level	2	14,933 sf
Level	1	38,150 sf
		230,155 sf

		GFA (Phase 3)
Level	18	7,407 sf
Level	17	7,407 sf
Level	16	7,407 sf
Level	15	7,407 sf
Level	14	7,407 sf
Level	13	7,407 sf
Level	12	7,407 sf
Level	11	7,407 sf
Level	10	7,407 sf
Level	9	7,407 sf
Level	8	7,407 sf
Level	7	7,407 sf
Level	6	7,407 sf
Level	5	7,407 sf
Level	4	7,407 sf
Level	3	7,407 sf
Level	2	8,651 sf
Level	1	8,773 sf
		135,936 sf

		GFA (Phase 2+3)
Level	19	10,416 sf
Level	18	17,823 sf
Level	17	17,823 sf
Level	16	17,823 sf
Level	15	17,823 sf
Level	14	17,823 sf
Level	13	17,823 sf
Level	12	17,823 sf
Level	11	17,823 sf
Level	10	17,823 sf
Level	9	17,823 sf
Level	8	17,823 sf
Level	7	17,823 sf
Level	6	17,823 sf
Level	5	17,823 sf
Level	4	17,823 sf
Level	3	17,823 sf
Level	2	23,584 sf
Level	1	46,923 sf
		366,091 sf

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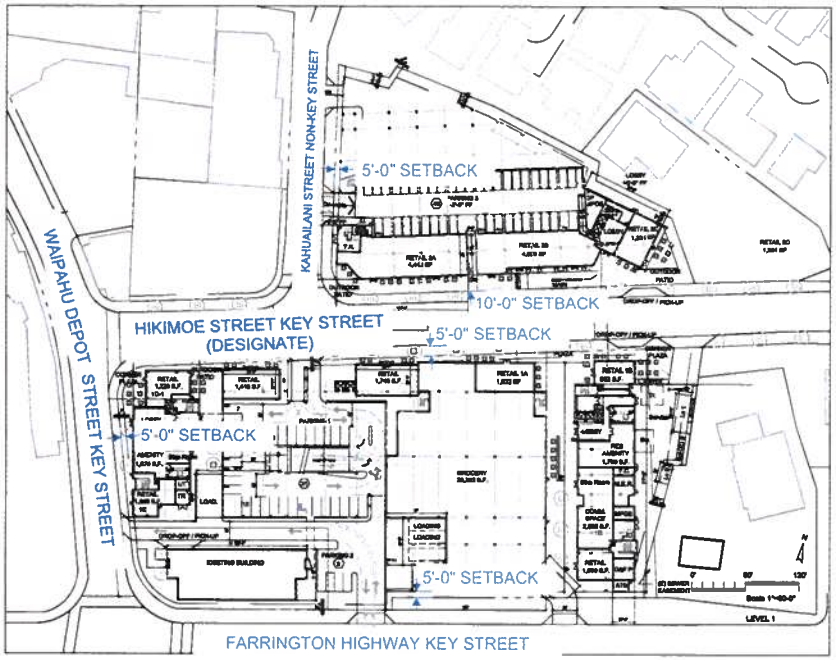
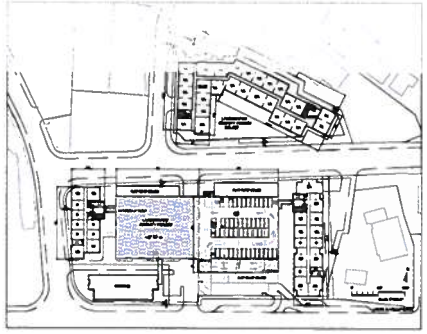
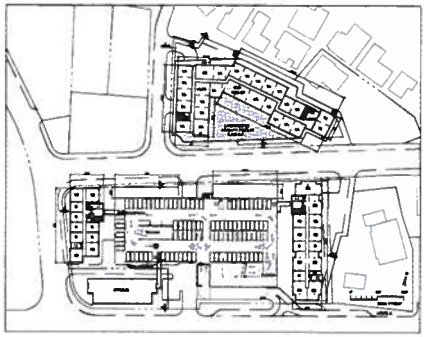
OPEN SPACE DIAGRAM & CALCULATION

Keawalau at Waipahū

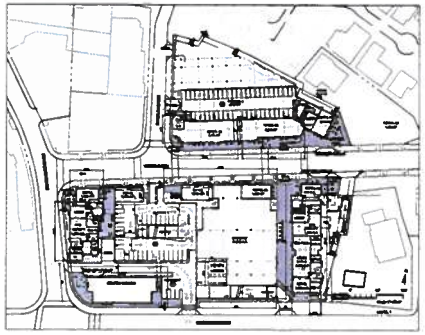




LEVEL 6



LEVEL 3



LEVEL 1

PUBLIC OPEN SPACE

SEMI-PUBLIC OPEN SPACE (RESIDENTIAL AMENITIES)

PHASE 1 (SENIOR)

Open Space	Level 1	6,658 sf	(Public)
	Level 3	10,200 sf	(Semi-Public)
	TOTAL	16,858 sf	
		33.2 %	

PHASE 2, 3 & EXISTING OFFICE TOWER

Open Space	Level 1	23,663 sf	(Public)
	Level 6	18,841 sf	(Semi-Public)
		42,504 sf	
		35.7 %	

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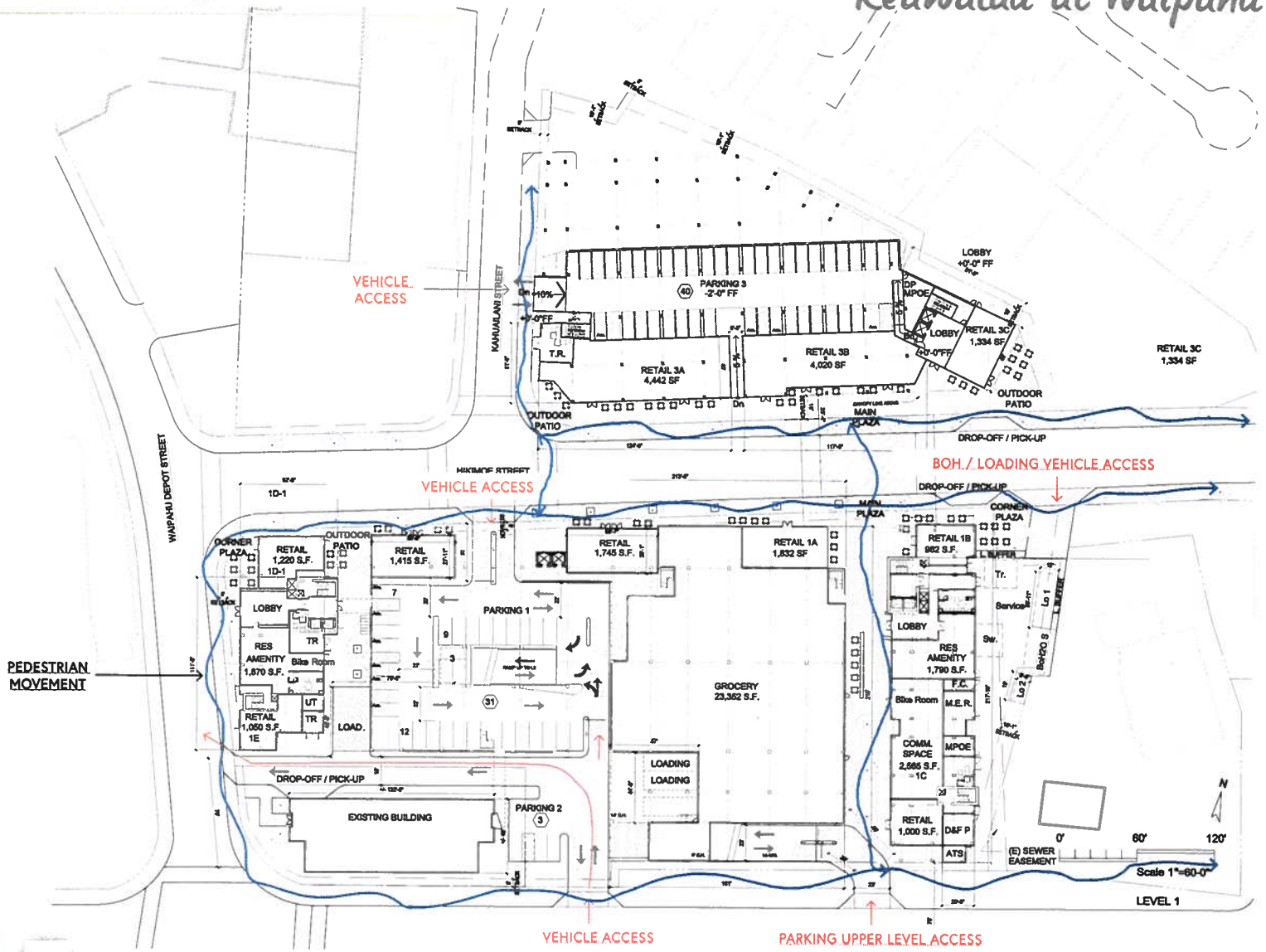
GROUND FLOOR PLAN - CIRCULATION

Keawalau at Waipahū

NOTE:
*REFER TO LANDSCAPE CONCEPT PACKAGE FOR FURTHER DETAIL ON OPEN SPACE DESIGNATION



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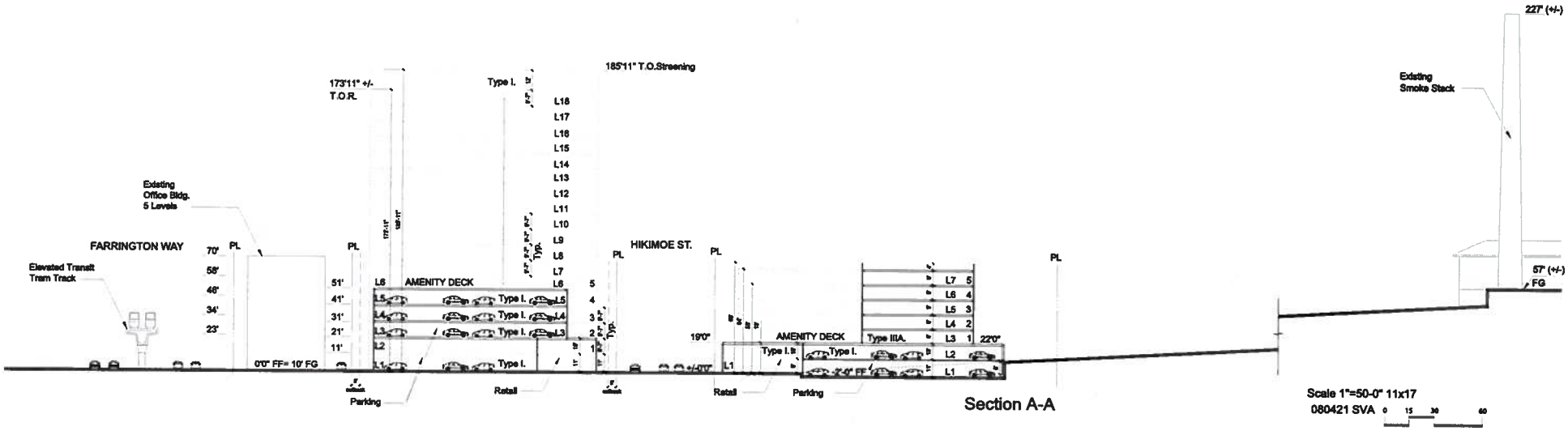
#2019.40117 AUGUST 10, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON AVE, WAIPAHU

REF-200

SITE SECTION

Keawalau at Waipahū



Kamehameha Schools

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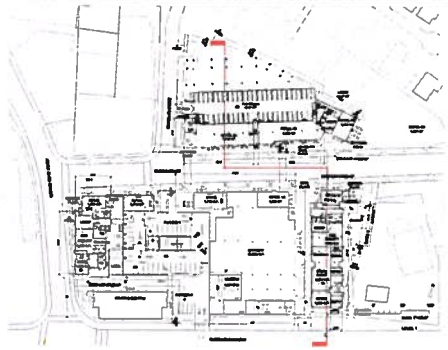
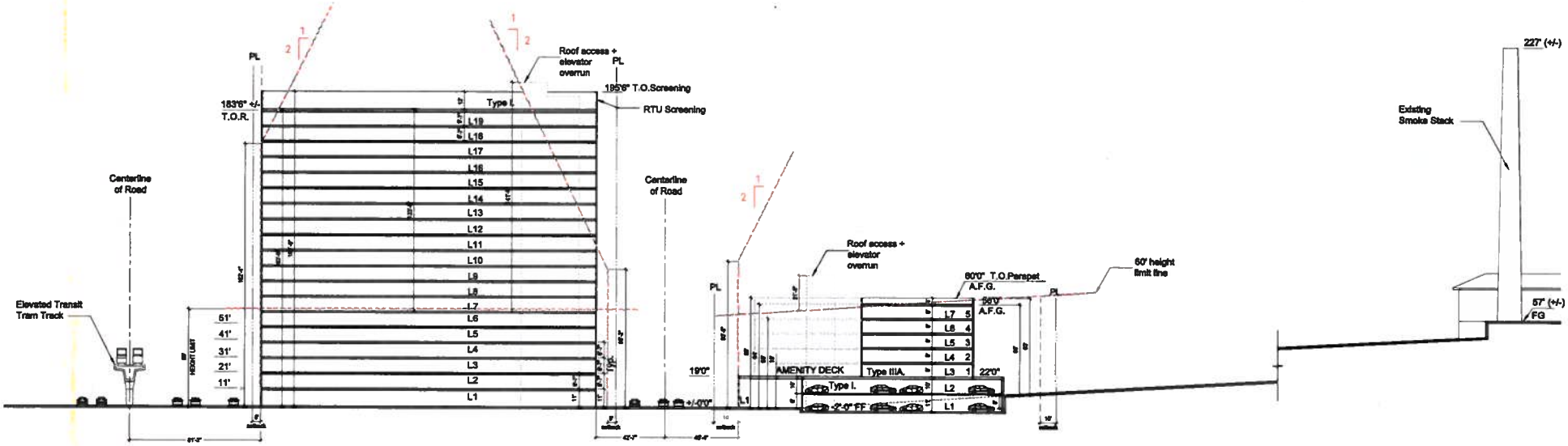
SITE SECTION + SETBACK DIAGRAM

Keawalau at Waipahū





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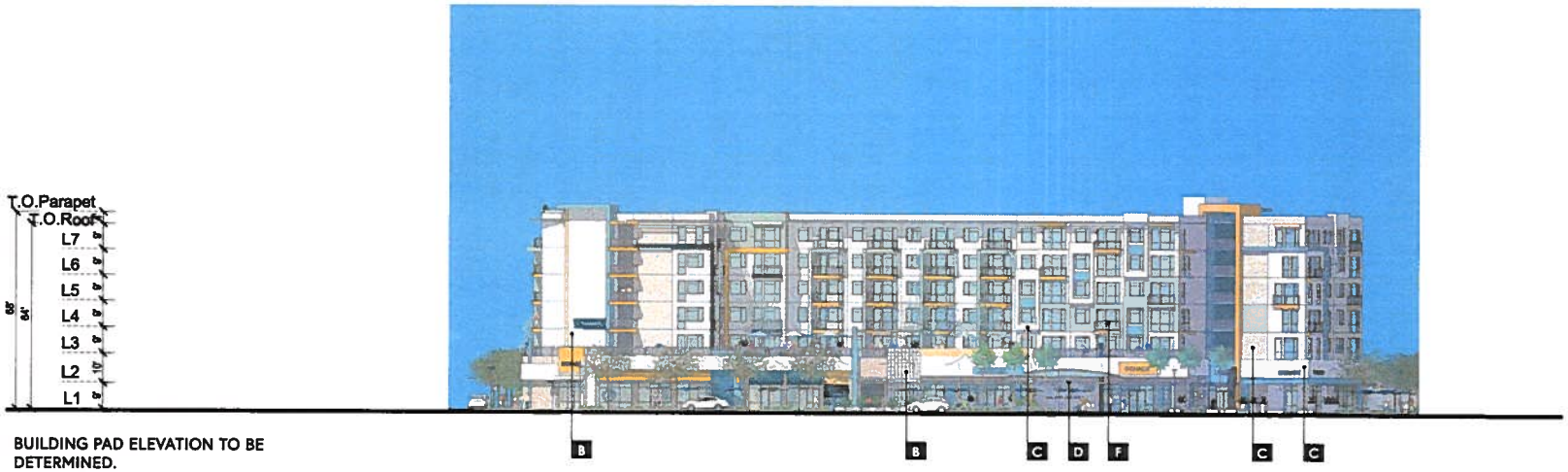
SOUTH ELEVATION-MAUKA SITE

Keawalau at Waipahū

283'-0" LINEAR FRONTAGE WITHIN 20' OF PROPERTY LINE
170'-0" LINER GLASS
60%
(60% MIN. REQUIRED)

230'-0" BUILDING FACADE WITHIN 10' SETBACK
67%
(65% MIN REQUIRED)

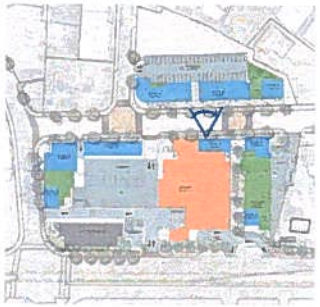
343'-2" PROPERTY LINE DIM



BUILDING PAD ELEVATION TO BE DETERMINED.
7.06' LOWEST ADJACENT GRADE FOR REFERENCE

LEGEND

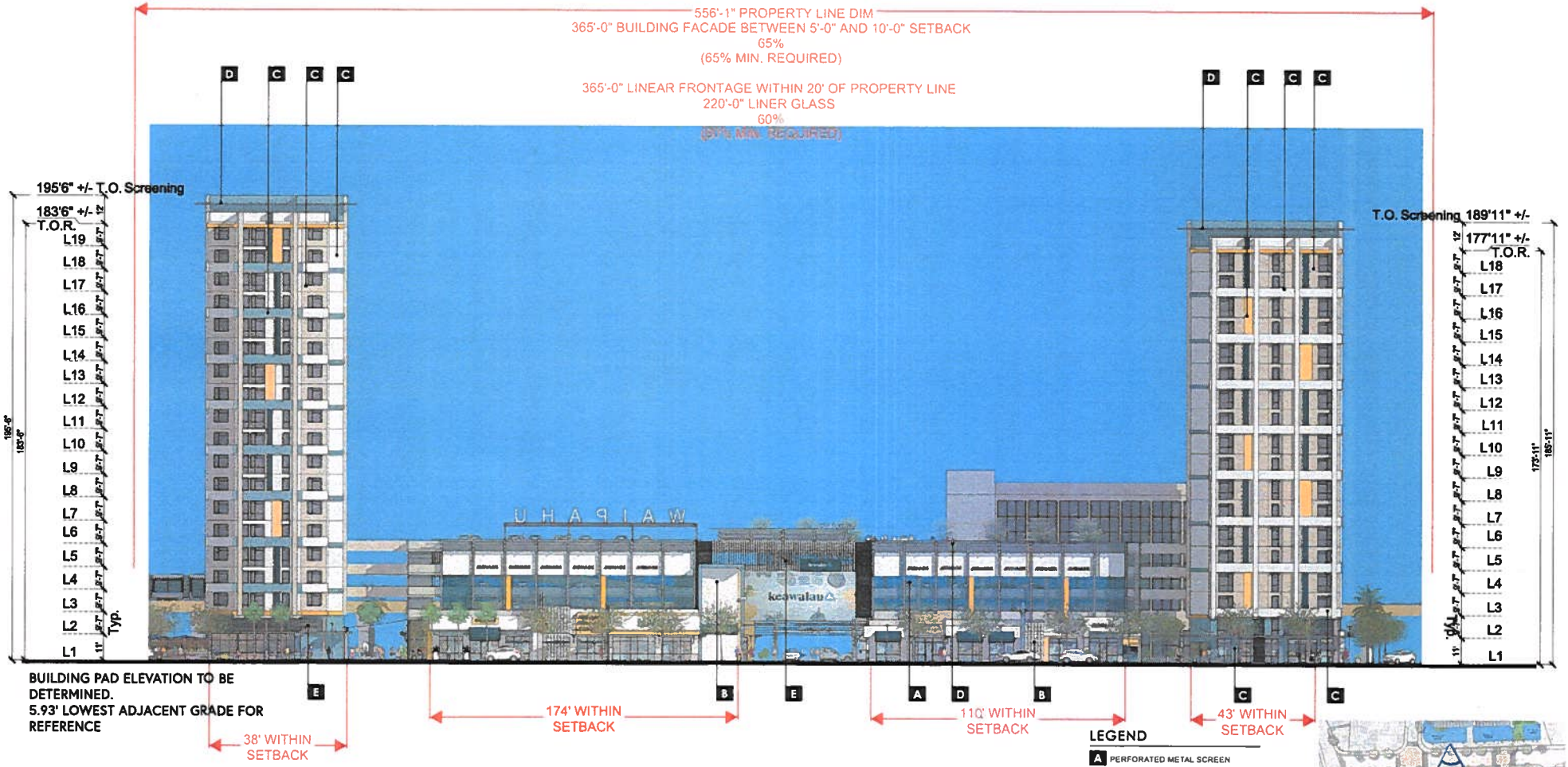
- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING



Kamehameha Schools | Highridge Costa | PBR HAWAII | SVA

NORTH ELEVATION-MAKAI SITE

Keawalau at Waipahū



Kamehameha Schools

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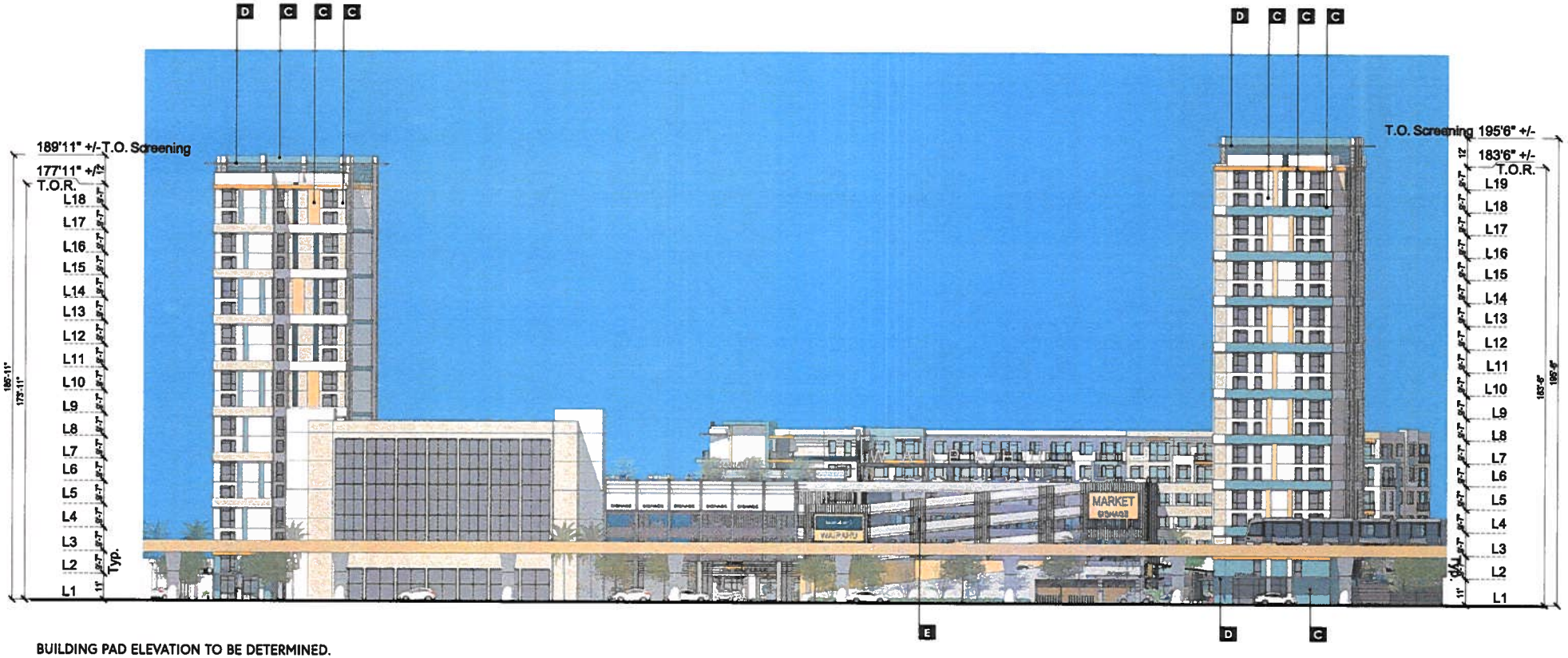
#2019.40117 AUGUST 10, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON AVE, HONOLULU, HAWAI'I

REF-204

SOUTH ELEVATION-MAKAI SITE, DESIGN OPTIONS COMPARISON

Keawalau at Waipahū



BUILDING PAD ELEVATION TO BE DETERMINED.
6.62' LOWEST ADJACENT GRADE FOR REFERENCE

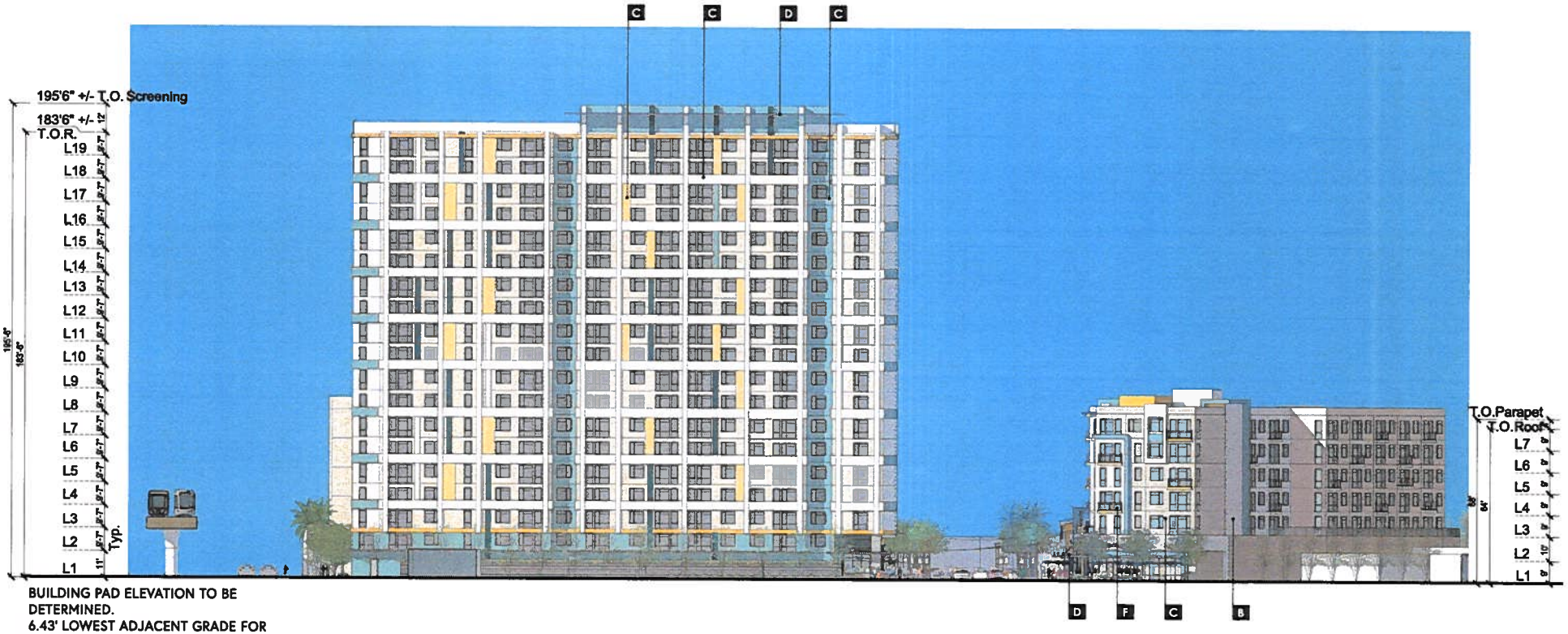
LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

#2019.40117 AUGUST 10, 2022

EAST ELEVATION, DESIGN OPTIONS COMPARISON

Keawalau at Waipahū



BUILDING PAD ELEVATION TO BE DETERMINED.
6.43' LOWEST ADJACENT GRADE FOR REFERENCE

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

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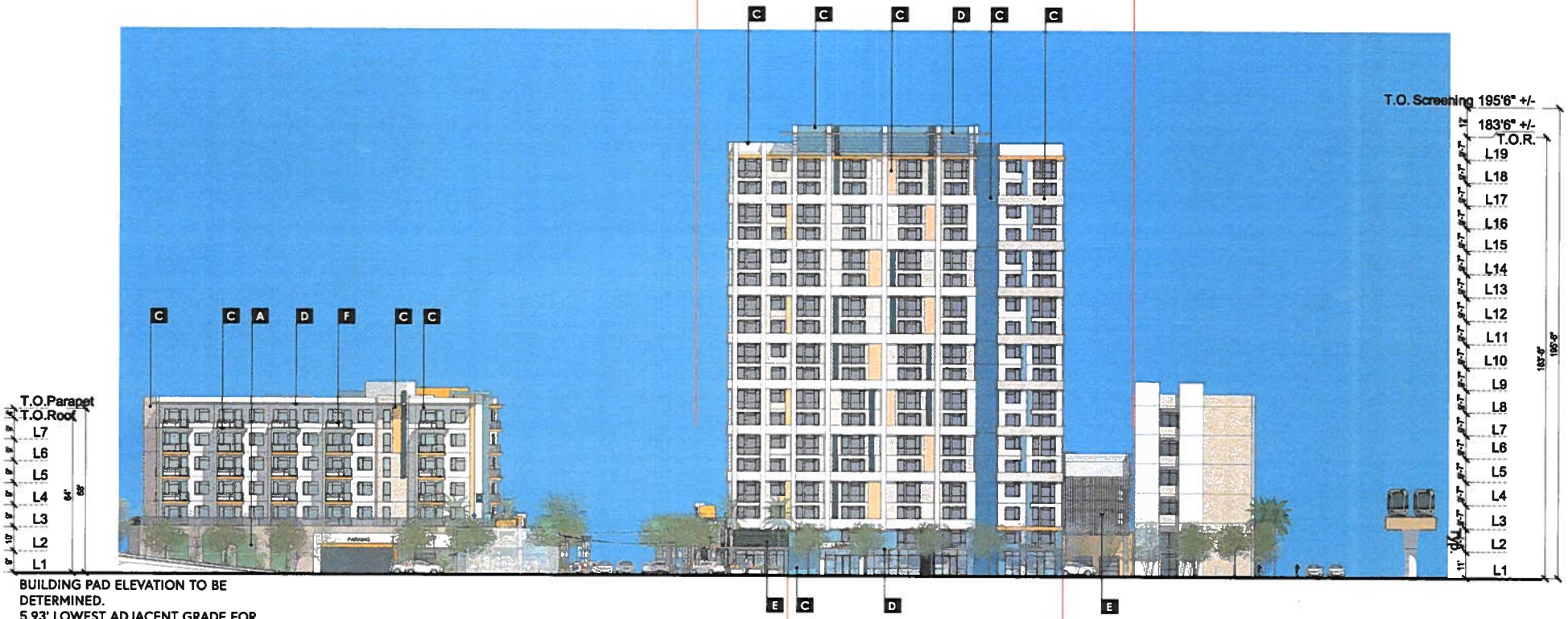
WEST ELEVATION, DESIGN OPTIONS COMPARISON

Keawalau at Waipahū

173'-6" PROPERTY LINE TO FACE OF EXITING BUILDING
112'-0" BUILDING FACADE BETWEEN 5'-0" AND 10'-0" SETBACK
65%
(65% MIN. REQUIRED)

112'-0" LINEAR FRONTAGE WITHIN 20' OF PROPERTY LINE
68'-0" LINER GLASS
60%
(60% MIN. REQUIRED)



BUILDING PAD ELEVATION TO BE DETERMINED.
5.93' LOWEST ADJACENT GRADE FOR REFERENCE

112' WITHIN SETBACK

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

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#2019.40117 AUGUST 10, 2022

REF-207

Mahalo!

Kamehameha Schools

Highridge Costa

PBR HAWAII & ASSOCIATES, INC.

SVA

Waipahū Transit-Oriented Community

LANDSCAPE CONCEPTS

SEPTEMBER 20, 2021

Kamehameha Schools

Highridge Costa

SVA

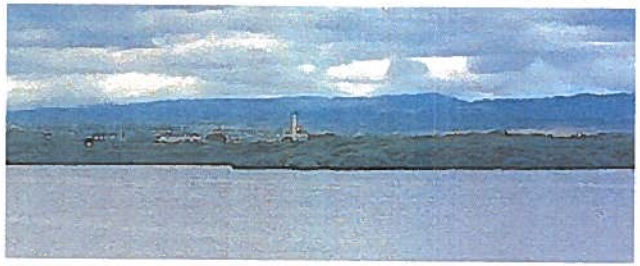
PBR HAWAII ASSOCIATES, INC.

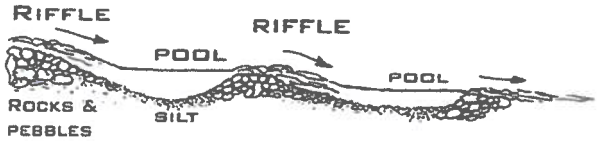
REF-209

LANDSCAPE MOOLELO

Keawalau at Waipahū

- EWA MOKU (CONTEXT)
- FROM MAUKA TO KEAWALAU
- *CHANNELS, PASSAGE*
- *FLOW —PAUSE— MOVEMENT*
- *ABUNDANCE*



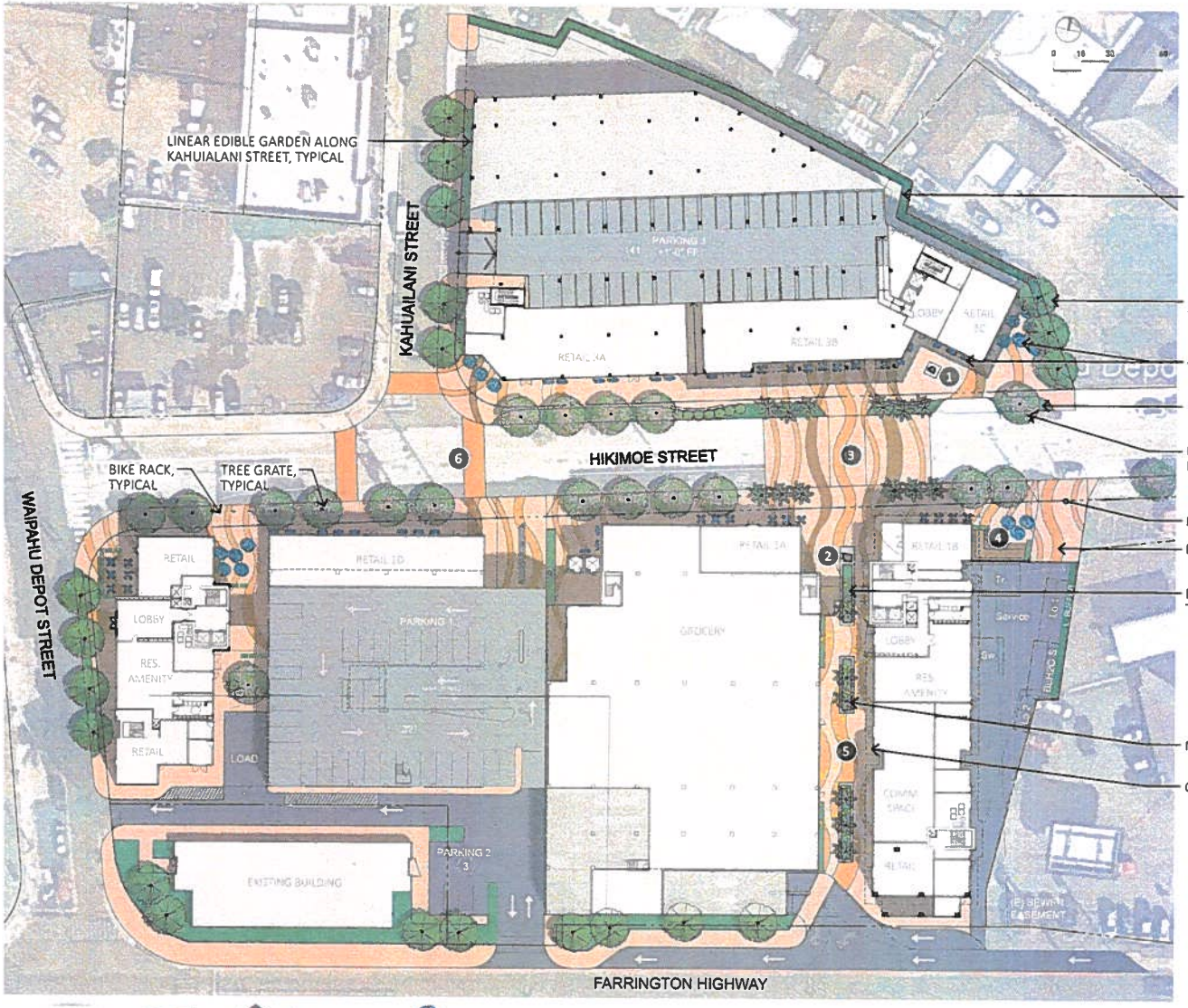



"EKAHI" HIGHWAY INN MURAL BY 808 URBAN

REF-210

CONCEPTUAL GROUND LEVEL LANDSCAPE PLAN

Keawalau at Waipahū



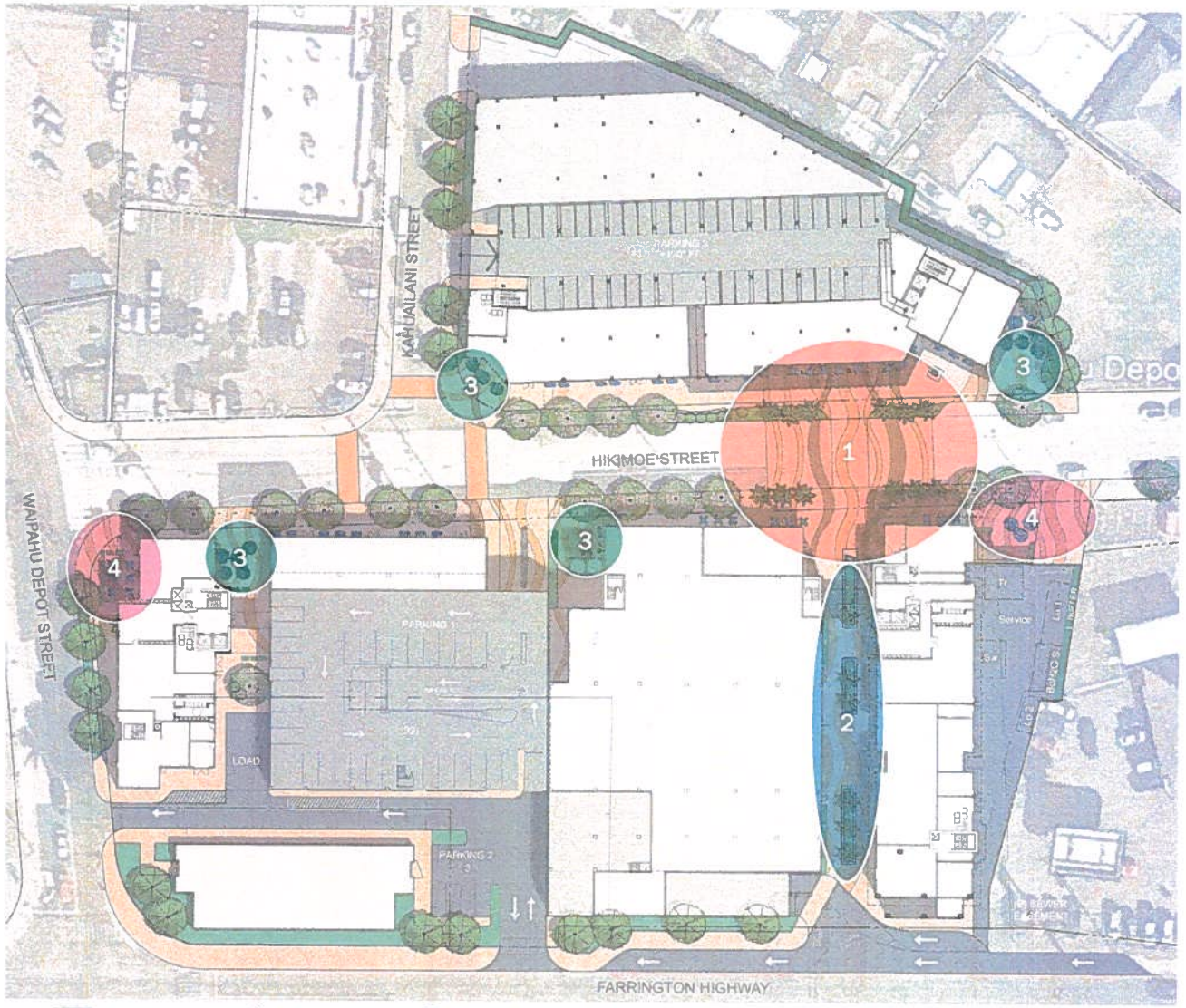
LEGEND

1. SCULPTURE (KANE)
2. SCULPTURE (KANALOA)
3. RAISED MID-BLOCK CROSSING
4. CORNER "STAGE" SEATING DECK
5. OUTDOOR EXTENSION OF COMMUNITY SPACE
6. ENHANCED CROSSWALKS AT T-INTERSECTION

REF-211

LANDSCAPE SPACES DIAGRAMS

Keawalau at Waipahū



1 - THE ENERGY OF THE DEVELOPMENT
The main plaza located in the East welcomes visitors. On special event days, the street can be closed, and this space becomes a large gathering area. The paving spills out to the street which also helps slow down traffic and give priority to the pedestrian experience.

2 - KAHAWAI
A naturally quiet and shaded area, The Respite will incorporate water and green elements. This is where one will find peace and quietness away from the energy of the street and the sun. An intimate space for residents and visitors alike.

3 - LEISURELY PATIOS
Small intimate spaces that become an extension of the interior.

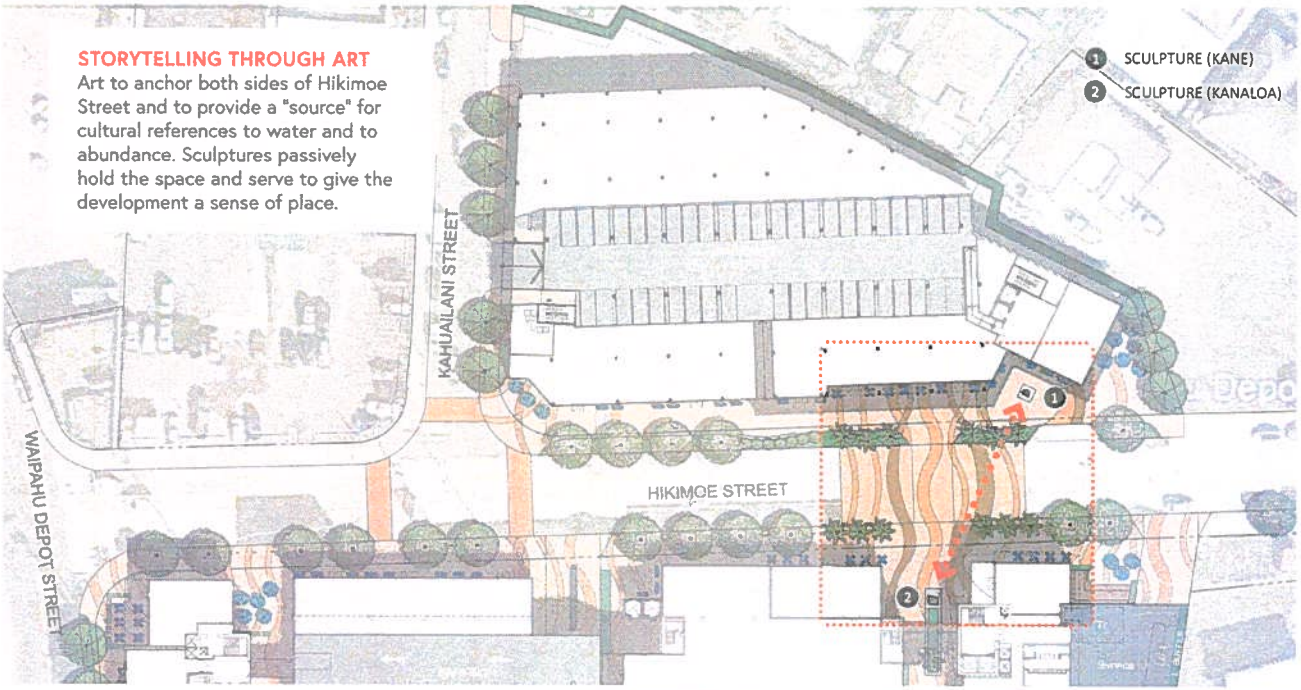
4 - CORNER PLAZA
Provides a connection/entryway to the existing developments.

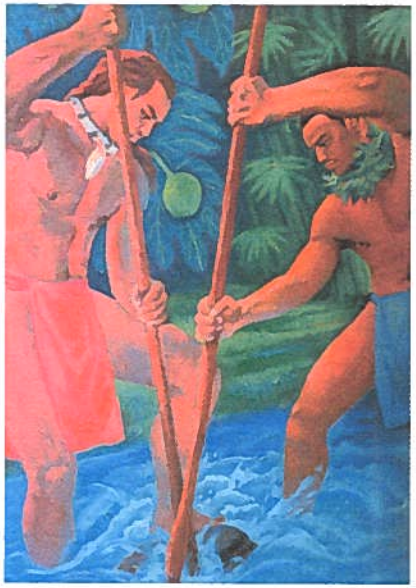
REF-212

INSPIRATIONAL ART

Keawalau at Waipahū

STORYTELLING THROUGH ART
Art to anchor both sides of Hikimoe Street and to provide a "source" for cultural references to water and to abundance. Sculptures passively hold the space and serve to give the development a sense of place.





KANE & KANALOA BRINGING FORTH FRESHWATER
(PAINTING BY D. POOLOA TOLENTINO)

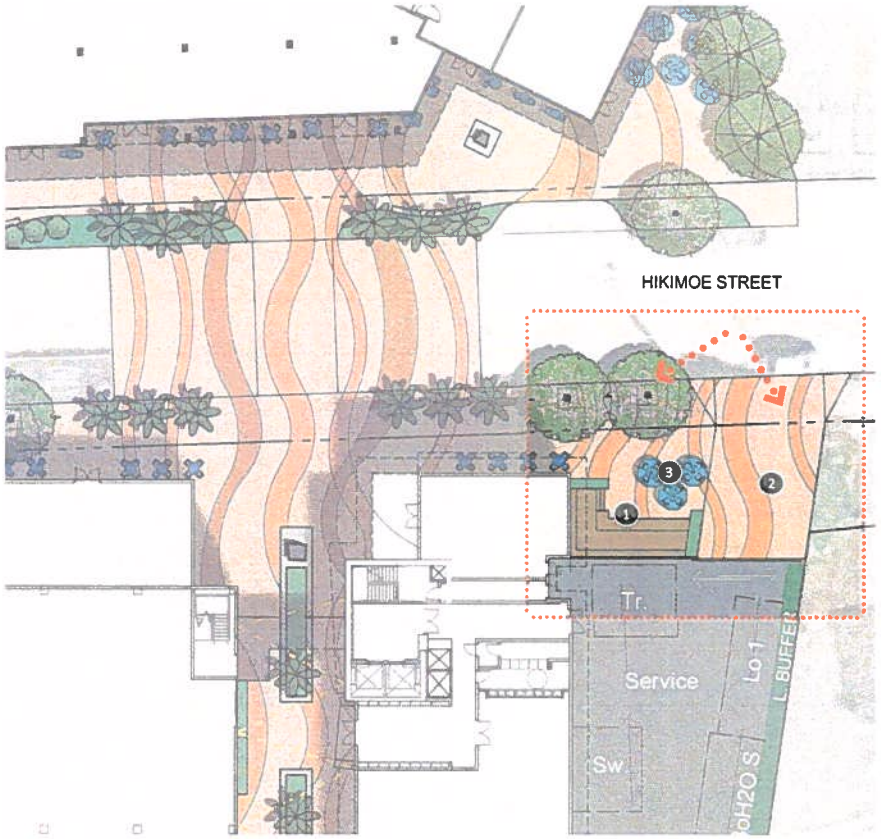
REF-213

CORNERL PLAZA

A WELCOMING SPACE

A platform seating area allows for passive use or active programming such as live music. Shaded for a large part of the day in the building's shadow, this corner plaza would be a great place to meet a friend, people-watch, or grind that poke bowl.

1. CORNER "STAGE" SEATING DECK
2. DECORATIVE CONCRETE PAVING
3. MOVEABLE OUTDOOR SEATING
4. BIO-FILTRATION PLANTERS
5. OUTDOOR STRING LIGHTS



CONCEPTUAL STREETSCAPE STUDY

PLATFORM SEATING AREA ALLOWS FOR SMALL PERFORMANCES

MOVEABLE OUTDOOR SEATING

REF-214

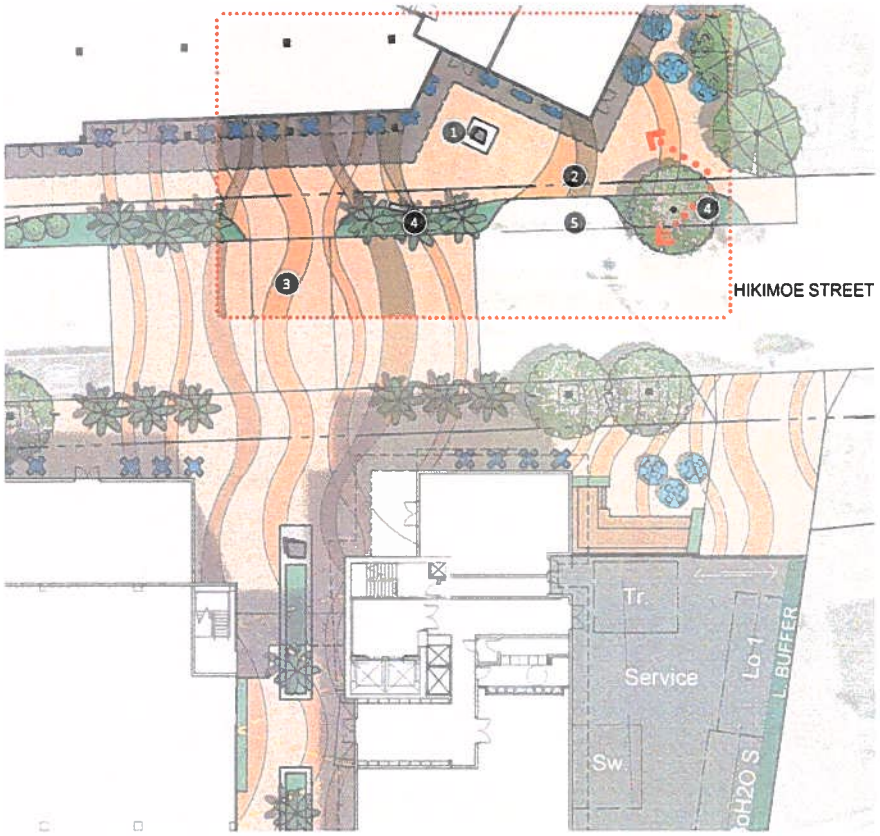
MAUKA - KANE PLAZA

Keawalau at Waipahū

LOW-IMPACT DEVELOPMENT STRATEGIES

In-ground planters create safer walking environments by buffering pedestrians from between vehicular traffic and help reduce stormwater runoff that goes into our oceans. Street trees help reduce traffic speeds, provides shade, and helps reduce urban air temperatures.

1. SCULPTURE (KANE)
2. DECORATIVE CONCRETE PAVING
3. RAISED MID-BLOCK CROSSING
4. IN-GROUND PLANTERS
5. DROP-OFF ZONE

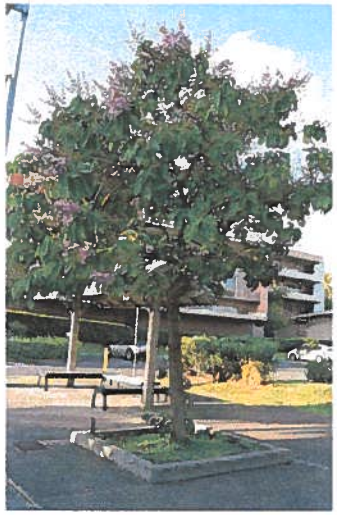


CONCEPTUAL STREETSCAPE STUDY

NATIVE LOULU PALMS TO HIGHLIGHT CROSSING

CALAMANSI OR KUMQUAT FOR SCREENING

SURFACE RUNOFF FLOW INTO IN-GROUND PLANTERS; NATIVE PLANTS SUCH AS CAREX, AKIA, ETC.



CONTINUATION OF HIKIMOE STREET TREES

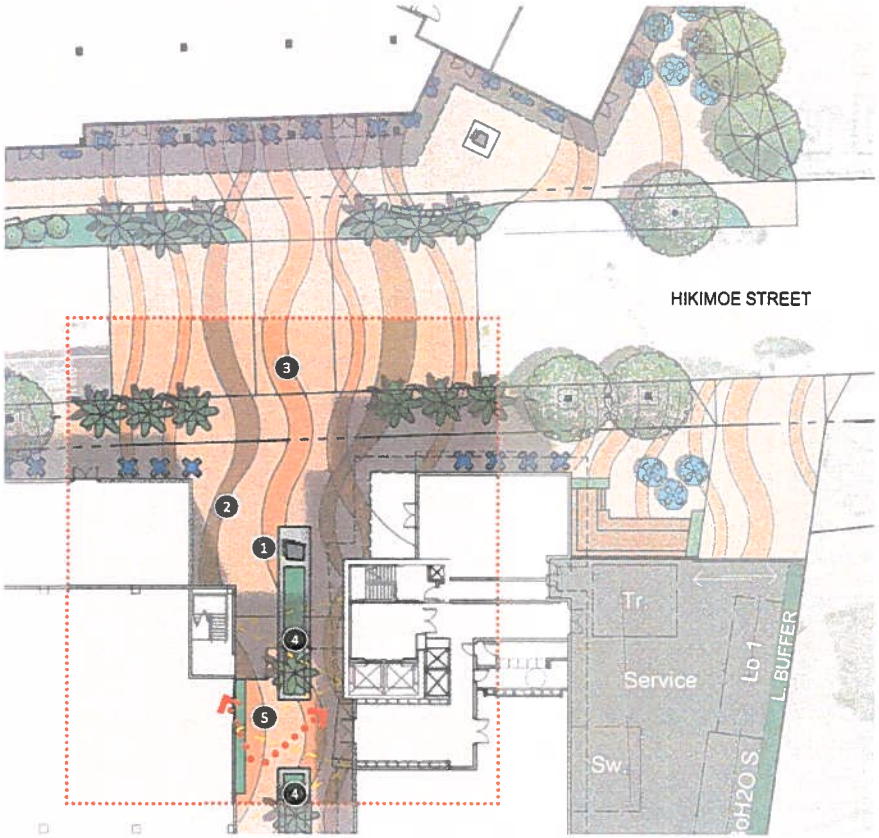
REF-215

MAKAI - KANALOA PLAZA

Keawalau at Waipahū

LOW-IMPACT DEVELOPMENT STRATEGIES
Bio-filtration planters along the corridor filter stormwater to increase water quality downstream. They also reduce stress on the city's existing infrastructure by temporarily holding stormwater during peak rain events. Planter walls double as seating for those who want a quieter place to talk story.

1. SCULPTURE (KANALOA)
2. DECORATIVE CONCRETE PAVING
3. RAISED MID-BLOCK CROSSING
4. BIO-FILTRATION PLANTERS
5. OUTDOOR STRING LIGHTS




CONCEPTUAL STREETSCAPE STUDY


OUTDOOR STRING LIGHTS FOR AMBIANCE

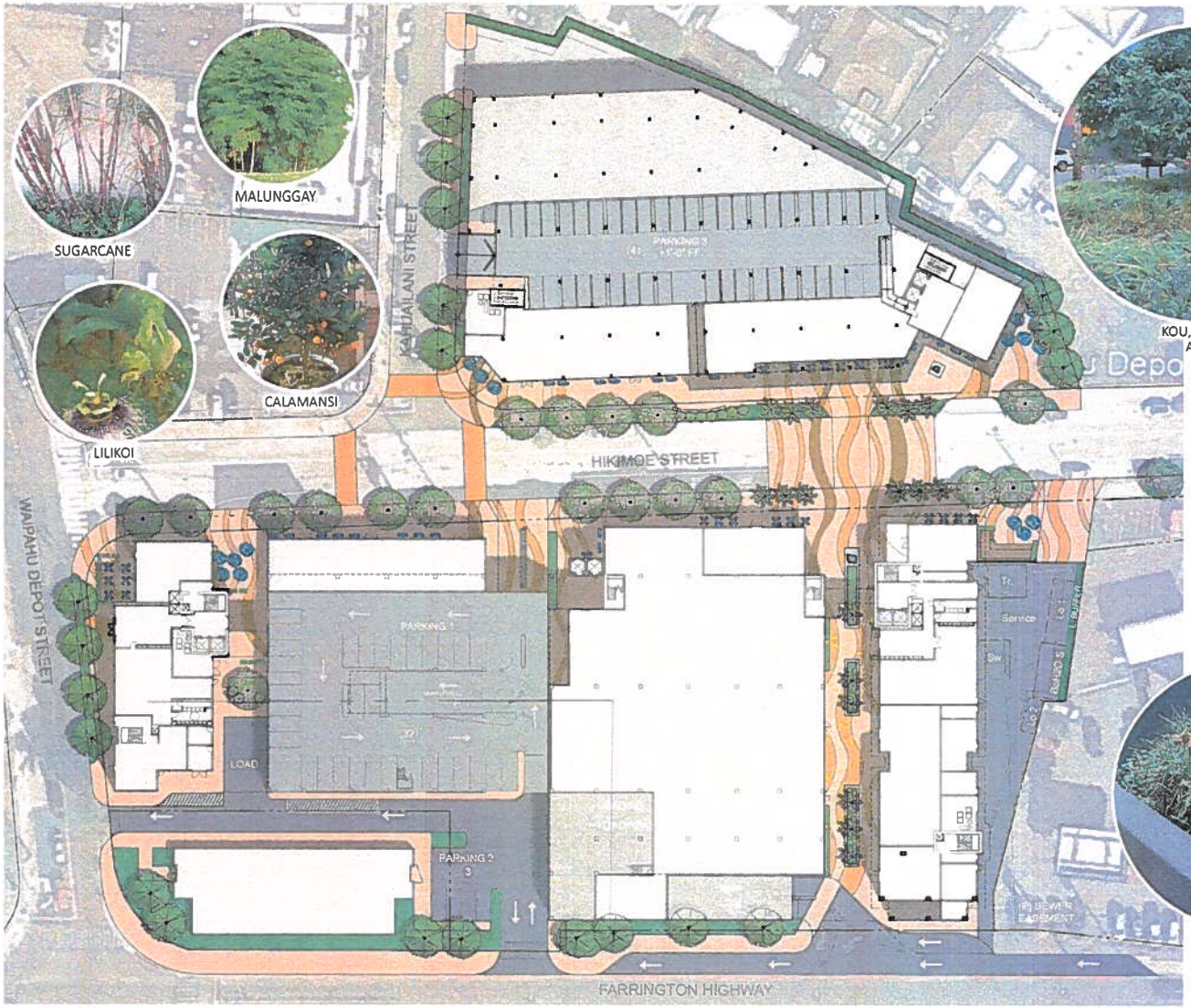

SHADE-TOLERANT ACCENT PLANTS


SEATWALLS AROUND BIO-FILTRATION PLANTER, NATIVE PLANTS SUCH AS AHU AWA, CAREX, ETC.


NATIVE LOULU PALMS FOR SENSE OF SCALE

PLANT REFERENCE IMAGES

Keawalau at Waipahū



SUGARCANE

MALUNGGAY

LILIKOI

CALAMANSI


KOU, CAREX, AKIA


NAU


ALAHEE, ULEI (SCREENING)


LOULU


GIANT CREPE MYRTLE


KALO


AHUAWA, CAREX, POHINAHINA


OHAI, KUPUKUPU


APE, LAUAE FERN

REF-217

VIEW
ANALYSIS

11A

REF-218

VIEW FROM SOUTHEAST LOOKING TOWARDS SITE

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools

Highridge Costa

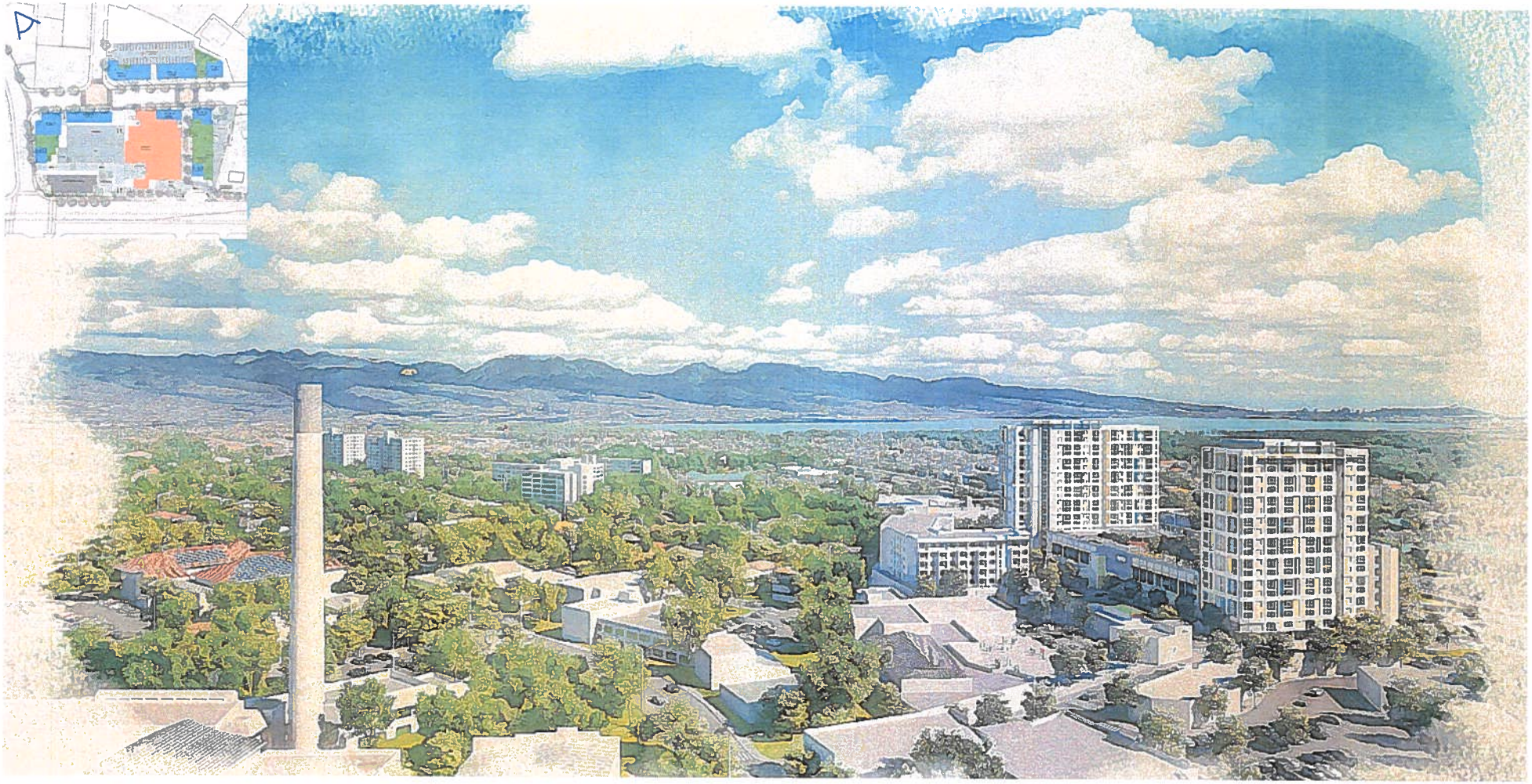
PBR HAWAII

SVA

REF-219

VIEW FROM NORTHEAST LOOKING DOWN SITE

Keawalau at Waipahū



PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-220

VIEW FROM SOUTHWEST LOOKING DOWN SITE

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-221

VIEW FROM EAST LOOKING DOWN HIKIMOE ST.

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · SVA

REF-222

VIEW FROM EAST LOOKING AT MAUKA SITE

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools

Highridge Costa

REF-223

VIEW FROM NORTH, FROM KAHUAILANI ST.

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-224

VIEW FROM WEST LOOKING DOWN HIKIMOE ST.

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-225

VIEW FROM EAST LOOKING DOWN HIKIMOE ST.

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools

Highridge Costa

PBR HAWAII

SVA

REF-226

ELEVATED VIEW AT MAUKA SITE

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · FBE HAWAII · SVA

REF-227

VIEW FROM SOUTHHEAST AT MAKAI SITE

Keawalau at Waipahū

PROPOSED DESIGN RENDERINGS ARE CONCEPTUAL AND SUBJECT TO CHANGE

Kamehameha Schools · Highridge Costa · PBR HAWAII · SVA

REF-228

PROJECT BUDGET AND FINANCING

12

REF-229

12. PROJECT BUDGET AND FINANCING

The budget and sources of funds for each of the development phases are included in this section as follows;

- **Attachment 12-A**. Phase 1 Budget and Funding Sources
- **Attachment 12-B**. Phase 2 Budget and Funding Sources
- **Attachment 12-C**. Phase 3 Budget and Funding Sources

In addition, projected tax credits to be sold to generate tax credit equity for each phase are provided below. It is noted that these numbers are the total amounts and not annual.

Phase 1:

Federal:	$28,231,602
State:	$14,115,801

Phase 2:

Federal:	$56,755,622
State:	$28,37,811

Phase 3:

Federal:	$42,530,457
State:	$21,265,228

Attachment 12-A.

Phase 1
Budget and Funding Sources

Waipahu North 07-Jun-22

DEVELOPMENT COSTS / SOURCES AND USES

Senior/ New Construction / 7 Story / 4% Tax Credits

SOURCES OF FUNDS

CONSTRUCTION

CONSTRUCTION LOAN	$30,748,963
COMMERCIAL CONST. LOAN	$4,041,870
HCDC PREDEVELOPMENT FUNDING	0
COSTS PAID AT PERM CLOSING	5,430,480
EQUITY	8,488,277
KS EQUITY	2,182,430
RHRF LOAN	12,190,000
TOTAL SOURCES	**$63,082,020**

PERMANENT

TAX CREDIT EQUITY (LIMITED PARTNER)	$32,180,808
PERMANENT FINANCING	11,721,124
DEVELOPER NOTE	765,788
AHP	0
BRIDGE LOAN PAYDOWN	0
KS EQUITY	6,224,300
RHRF LOAN	12,190,000
TOTAL SOURCES	**$63,082,020**

USES OF FUNDS

DEVELOPMENT COST BREAKDOWN

ACQUISITION & PRE DEVELOPMENT

LEASE INCENTIVE PAYMENT	$0	
LIIF LOAN INTEREST AND FEES	$0	
CLOSING AND TITLE	0	
LEGAL/BROKER	0	
ARCHITECTURE / ENGINEERING / FEASIBILITY	3,016,000	
PRE DEV. FIN. AND CARRY	0	
SUBTOTAL		$3,016,000

CONSTRUCTION

FEES AND PERMITS	$1,590,000	
RESIDENTIAL ONSITE/OFFSITE	750,000	
RESIDENTIAL BASE CONSTRUCTION	36,831,040	
RESIDENTIAL EXTERIOR COMMON AREA	150,000	
MODELS, REC. BUILDING, AND FURNISHINGS	250,000	
INDIRECT / ONSITE SUPERVISION	2,060,058	
DEVELOPER OVERHEAD & FEE	6,000,000	
BRIDGE LOAN FEES & INTEREST	35,374	
CREDIT ENHANCEMENT FEES	0	
RESIDENTIAL CONSTR. INTEREST	1,362,551	
ORIGINATION FEE	272,834	
COMMERCIAL CONSTRUCTION	3,924,869	
COMM. CONSTR. LOAN FEES,TAXES, & MISC	1,197,246	
COMM. CONSTR. PERIOD INTEREST	587,606	
COMMERCIAL LEASING COST	101,047	
CONST FEES/APPRAISAL/TAXES/TITLE	837,500	
CONSTRUCTION CONTINGENCY	1,852,218	
SOFT COSTS/CONTINGENCY	300,000	
SUBTOTAL		$58,102,342

LEASE UP AND SALES

OPERATING RESERVE	350,480	
MARKETING/LEASING/LEGAL	450,000	
LEASE UP PERIOD INTEREST & CARRY	846,105	
PERMANENT FINANCING COSTS	80,000	
SYNDICATION EXPENSE	0	
TCAC APPLICATION/MONITOR. FEES	237,092	
SUBTOTAL		$1,963,678
TOTAL USES		**$63,082,020**
TOTAL USES ROUNDED		**$63,082,000**

REF-232

Attachment 12-B.

Phase 2

Budget and Funding Sources

Waipahu Mixed-Use East Tower 07-Jun-22

DEVELOPMENT COSTS / SOURCES AND USES

Family/ New Construction / 19 Story / 4% Tax Credits

SOURCES OF FUNDS

CONSTRUCTION

CONSTRUCTION LOAN	$73,327,491
COMMERCIAL CONST. LOAN	$5,271,588
HCDC PREDEVELOPMENT FUNDING	0
COSTS PAID AT PERM CLOSING	6,005,208
EQUITY	17,950,122
KS EQUITY	2,922,131
RHRF LOAN	22,100,000
TOTAL SOURCES	**$127,576,540**

PERMANENT

TAX CREDIT EQUITY (LIMITED PARTNER)	$64,694,939
PERMANENT FINANCING	32,355,496
DEVELOPER NOTE	232,386
AHP	0
BRIDGE LOAN PAYDOWN	0
KS EQUITY	8,193,719
RHRF LOAN	22,100,000
TOTAL SOURCES	**$127,576,540**

USES OF FUNDS

DEVELOPMENT COST BREAKDOWN

ACQUISITION & PRE DEVELOPMENT

LEASE INCENTIVE PAYMENT	$3,500,000	
LIIF LOAN INTEREST AND FEES	$0	
CLOSING AND TITLE	0	
LEGAL/BROKER	0	
ARCHITECTURE / ENGINEERING / FEASIBILITY	3,516,000	
PRE DEV. FIN. AND CARRY	0	
SUBTOTAL		$7,016,000

CONSTRUCTION

FEES AND PERMITS	$3,900,000	
RESIDENTIAL ONSITE/OFFSITE	750,000	
RESIDENTIAL BASE CONSTRUCTION	81,781,369	
RESIDENTIAL EXTERIOR COMMON AREA	150,000	
MODELS, REC. BUILDING, AND FURNISHINGS	250,000	
INDIRECT / ONSITE SUPERVISION	4,557,298	
DEVELOPER OVERHEAD & FEE	6,000,000	
BRIDGE LOAN FEES & INTEREST	36,580	
CREDIT ENHANCEMENT FEES	0	
RESIDENTIAL CONSTR. INTEREST	3,283,158	
ORIGINATION FEE	763,477	
COMMERCIAL CONSTRUCTION	5,443,588	
COMM. CONSTR. LOAN FEES,TAXES, & MISC	1,197,246	
COMM. CONSTR. PERIOD INTEREST	952,578	
COMMERCIAL LEASING COST	164,737	
CONST FEES/APPRAISAL/TAXES/TITLE	837,500	
CONSTRUCTION CONTINGENCY	4,058,114	
SOFT COSTS/CONTINGENCY	300,000	
SUBTOTAL		$114,425,646

LEASE UP AND SALES

OPERATING RESERVE	925,208	
MARKETING/LEASING/LEGAL	450,000	
LEASE UP PERIOD INTEREST & CARRY	4,146,065	
PERMANENT FINANCING COSTS	80,000	
SYNDICATION EXPENSE	0	
TCAC APPLICATION/MONITOR. FEES	533,621	
SUBTOTAL		$6,134,894
TOTAL USES		**$127,576,540**
TOTAL USES ROUNDED		**$127,577,000**

REF-234

Attachment 12-C.

Phase 3

Budget and Funding Sources

Waipahu Mixed-Use West Tower 07-Jun-22

DEVELOPMENT COSTS / SOURCES AND USES

Family/ New Construction / 18 Story / 4% Tax Credits

SOURCES OF FUNDS

CONSTRUCTION

CONSTRUCTION LOAN	$50,244,060
COMMERCIAL CONST. LOAN	$8,995,615
HCDC PREDEVELOPMENT FUNDING	0
COSTS PAID AT PERM CLOSING	5,717,672
EQUITY	13,244,528
KS EQUITY	4,553,591
RHRF LOAN	19,000,000
TOTAL SOURCES	**$101,755,465**

PERMANENT

TAX CREDIT EQUITY (LIMITED PARTNER)	$48,479,872
PERMANENT FINANCING	20,165,141
DEVELOPER NOTE	561,246
AHP	0
BRIDGE LOAN PAYDOWN	0
KS EQUITY	13,549,206
RHRF LOAN	19,000,000
TOTAL SOURCES	**$101,755,465**

USES OF FUNDS

DEVELOPMENT COST BREAKDOWN

ACQUISITION & PRE DEVELOPMENT

LEASE INCENTIVE PAYMENT	$2,500,000	
LIIF LOAN INTEREST AND FEES	$0	
CLOSING AND TITLE	0	
LEGAL/BROKER	0	
ARCHITECTURE / ENGINEERING / FEASIBILITY	3,516,000	
PRE DEV. FIN. AND CARRY	0	
SUBTOTAL		$6,016,000

CONSTRUCTION

FEES AND PERMITS	$3,000,000	
RESIDENTIAL ONSITE/OFFSITE	175,000	
RESIDENTIAL BASE CONSTRUCTION	59,427,056	
RESIDENTIAL EXTERIOR COMMON AREA	150,000	
MODELS, REC. BUILDING, AND FURNISHINGS	250,000	
INDIRECT / ONSITE SUPERVISION	3,315,392	
DEVELOPER OVERHEAD & FEE	6,000,000	
BRIDGE LOAN FEES & INTEREST	33,665	
CREDIT ENHANCEMENT FEES	0	
RESIDENTIAL CONSTR. INTEREST	2,248,996	
ORIGINATION FEE	502,441	
COMMERCIAL CONSTRUCTION	9,738,222	
COMM. CONSTR. LOAN FEES,TAXES, & MISC	1,197,246	
COMM. CONSTR. PERIOD INTEREST	1,446,273	
COMMERCIAL LEASING COST	295,908	
CONST FEES/APPRAISAL/TAXES/TITLE	837,500	
CONSTRUCTION CONTINGENCY	2,932,346	
SOFT COSTS/CONTINGENCY	300,000	
SUBTOTAL		$91,850,045

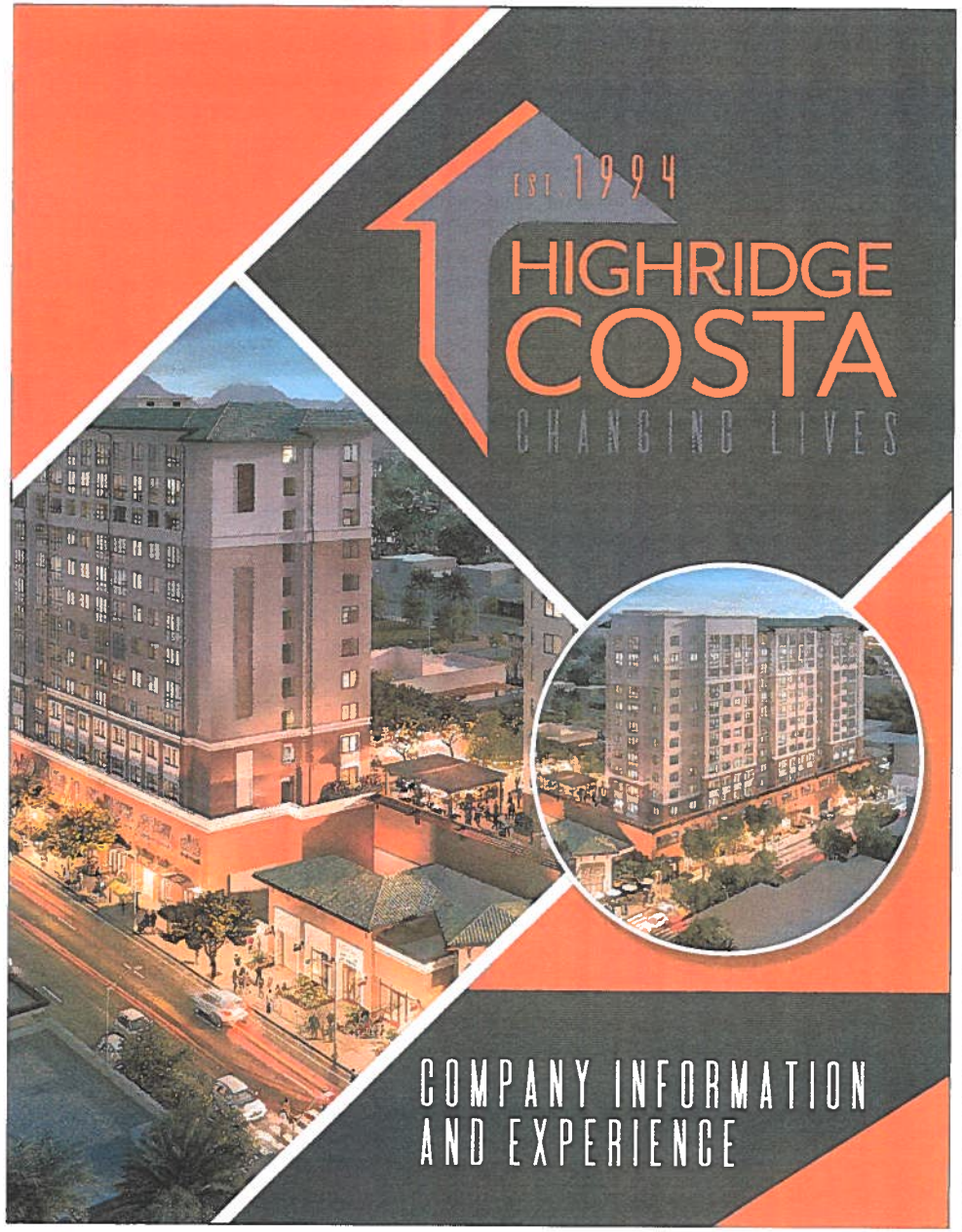
LEASE UP AND SALES

OPERATING RESERVE	637,672	
MARKETING/LEASING/LEGAL	450,000	
LEASE UP PERIOD INTEREST & CARRY	2,332,144	
PERMANENT FINANCING COSTS	80,000	
SYNDICATION EXPENSE	0	
TCAC APPLICATION/MONITOR. FEES	389,604	
SUBTOTAL		$3,889,420
TOTAL USES		**$101,755,465**
TOTAL USES ROUNDED		**$101,755,000**

REF-236

DEVELOPER EXPERIENCE 13

REF-237



HIGHRIDGE COSTA

Highridge Costa is among America's leading developers, asset managers, financiers, owners and operators of affordable multifamily workforce and senior apartment communities. The company was formed in 1994 and currently operates through a venture created in 2010 between Michael Costa (President, CEO, and founder) of Highridge Costa, and Highridge Partners, a diverse, privately held investment company that has acquired, developed, and/or financed assets totaling more than $7 billion.

Highridge Costa has been involved in the development of over 30,000 affordable housing units in some 300 communities throughout the U.S. and Puerto Rico since 1994. Each community was developed using Low-income Housing Tax Credits. As one of the nation's most knowledgeable developers and asset managers in the highly specialized housing tax credit industry, the firm has extensive experience not only with federal Section 42 Low-income Housing Tax Credits, but also tax-exempt mortgage-backed revenue bonds and various other state and local housing finance programs and grants supporting affordable housing.

Highridge Costa is steadfast in its "long-term minded" focus on the design, development and financing of low - to - moderate income apartments for families and seniors that blend seamlessly within market-rate neighborhoods. Attractive, smart, high-density, multi-dwelling living communities are an affordable choice for working Americans, many of whom are priced out of "for sale" and market rate apartment opportunities.

REF-238

CHANGING LIVES

MISSION STATEMENT

To apply a long-term business approach to enhancing the lives of lower income family and senior households through the development, preservation, ownership and operation of quality new and repositioned affordable housing.

VALUES

Integrity in our people and in our actions. We will do what we say we are going to do. Trust in our relationships. Our investors, lenders, partners and tenants will trust we will do the right thing for the right reasons. A fun and collegial work environment. We will motivate each other to maintain a balanced focus on family, faith, health and work while creating an exceptional employee experience. An entrepreneurial spirit. We will always value new ideas and techniques which assist in new ways to finance and develop affordable housing. Adaptability and flexibility. We will value the ability to quickly adapt to change, allowing us to continue to be a leader in affordable housing industry. Outstanding performance from our people. We will reward outstanding performance from our employees.

HIGHRIDGE COSTA
CHANGING LIVES

At Highridge Costa, we are committed to creating high quality affordable housing through building living communities that meet both individual and city growth planning needs.

NATIONAL LEADER IN DEVELOPMENT, FINANCING, AND OPERATION OF AFFORDABLE HOUSING

Nationally recognized leader in the development of affordable housing and the syndication of low income housing tax credits, Highridge Costa has established 54 single-investor upper-tier investment Funds, raising in excess of $3 billion in tax credit equity since 1994.

The Highridge Costa Companies' affordable housing business model uses low-income housing tax credits combined with public and private financing to finance the development of its communities.

To successfully receive tax credit allocations in a highly competitive environment, Highridge Costa becomes intimately familiar with various state Qualified Allocation Plans to assure the highest possible scoring for proposed projects which leads to an allocation of tax credits. Once the allocation is received, Highridge Costa then presents the credits to several long-standing investor relationships for evaluation and sale of the credits.

The partnership created between Highridge Costa and a tax credit investor, becomes a 15-year venture to develop, own and operate the community. Following the initial 15-year venture, Highridge Costa, in most cases, purchases the investors interest in order to maintain affordability and properly care for the community for many years following its initial 15 years.

REF-239

A WIDE VARIETY OF ON-SITE FEATURES AND AMENITIES

Highridge Costa seamlessly integrates health and wellness through on-site programs that support resident lifestyles while incorporating the latest in sustainable strategies and technology to reduce residents' utility costs, including LEED Gold and Universal Design principles.

Affordable apartment communities built by the company are designed for workforce families and seniors on fixed incomes and include a wide variety of on site features and amenities. Many prestigious national and local industry honors have been achieved by Highridge Costa, including "Pillars of the Industry" awards from the National Association. of Home Builders for the nation's best affordable housing community on three separate occasions.

DEVELOPMENT EXPERIENCE

Highridge Costa is among America's leading developers, financiers, owners and operators of affordable workforce and senior apartment communities. Created in 1994, Highridge Costa is a joint venture between Michael Costa, and the principals of Highridge Partners, Inc., a diversified privately held investment company with assets totaling $7 billion. With a focus on the design, development and financing of affordable family and senior apartments, the organization has extensive expertise in the utilization of federal Section 42 Low Income Housing Tax Credits (both 4% and 9%), Tax Exempt Mortgage-Backed Revenue Bonds, HUD, and Fannie Mae affordable housing grants as well as a variety of state and local housing programs. Highridge Costa strives to deliver an attractive product that complements and enhances the surrounding community.

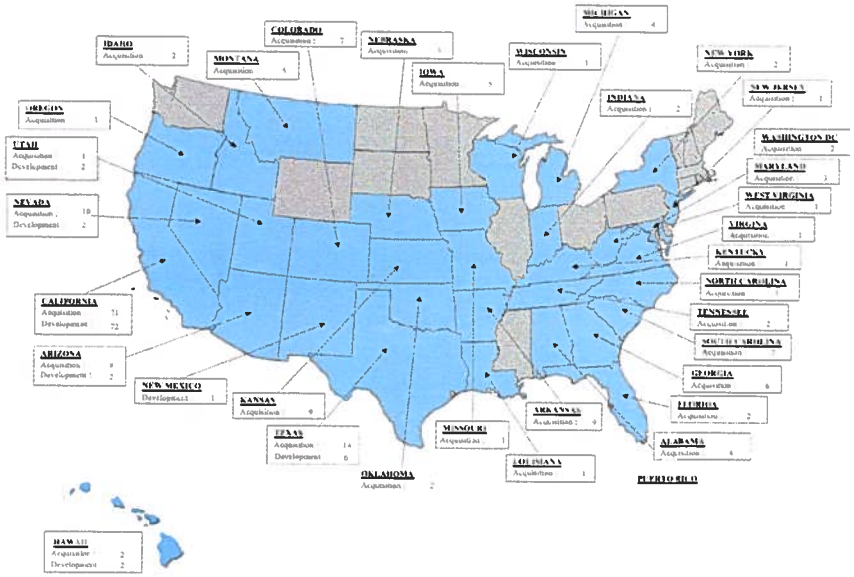
With over 30,000 units across 300 apartment communities developed and invested in, Highridge Costa brings tremendous development experience to the table and has formed strong relationships with institutional lenders and public-sector agencies alike. With an emphasis on continuity, the organization has retained its key leadership staff since inception and has a proven record of managing projects from early design through completion and beyond.

The firm brings unparalleled financial strength to the table, along with a depth of construction experience and an understanding of all aspects of the development process few other builders can match. The company's success in the rental housing industry is due in large part to its recognition of the fact that no two developments or communities are exactly alike and that an emphasis on flexibility, resourcefulness, and transparency is the best way to ensure that all stakeholders needs are met.

In addition to its extensive experience in the development, acquisition, and entitlement of real estate, Highridge Costa has its own construction department that oversees all properties under construction. The construction department interfaces with its General Contractors on a regular basis and conducts monthly site visits to its construction sites. Once a project is completed, Highridge Costa utilizes its best-in-class asset management department to ensure the long term financial viability, maintenance, and quality of each community. As both multifamily and senior housing specialists, Highridge Costa has built a solid reputation for creativity as well as results.

REF-240

GEOGRAPHIC DISPERSION



AWARDS

2021

BEST PLACES TO WORK IN MULTI-FAMILY
BEST PLACES TO WORK IN MULTI-FAMILY FOR WOMEN

2018

CCH AFFORDABLE HOUSING HALL OF FAME INDUCTEE

2017

AHF AFFORDABLE HOUSING HALL OF FAME INDUCTEE

2015

NAHB 50+ HOUSING AWARDS

Perris Station Senior Apartments, Perris, CA
Winner - Gold
Best 50+ Affordable Rental Community
Best 50+ Independant Living Community
Best 50+ Mixed use Community

NAHB BEST IN GREEN AWARDS

Finalist - Multifamily Category

2014

PILLARS OF THE INDUSTRY AWARDS / NAHB MULTIFAMILY

Best Creative Financing of an Affordable Housing Community - Winner
Best Rental Apartment Community - Non-Garden, Five Stories or Less - Finalist
Best Affordable Apartment Community - Finalist
Best Example of Green Building Concepts - Finalist

2013

SAGE AWARDS

"On the Boards" Project of the Year

2011

PCBC - GOLD NUGGET AWARDS

Best Age Qualified Housing - Award of Merit

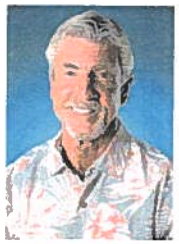
PILLARS OF THE INDUSTRY AWARDS / NAHB MULTIFAMILY

Multifamily Development Firm of the Year - Finalist
Highridge Costa Housing Partners, LLC

REF-241

MICHAEL A. COSTA

PRESIDENT | CEO, HIGHRIDGE COSTA



Mr. Costa is responsible for overseeing all activities at Highridge Costa, which specializes in the development, ownership, financing, construction, repositioning, and asset management of affordable housing for families and seniors throughout the U.S.

These housing communities are all developed utilizing low-income housing tax credits, as well as other types of public and private financing. Mr. Costa is considered an industry expert in tax exempt bond financing and other affordable financing programs as well as tax credit-based asset management, including the myriad of compliance issues associated with owning and managing bond financed and tax credit properties.

Over the past 29 years, Mr. Costa and his team have been responsible for developing and growing a portfolio of more than 30,000 affordable housing units in 300 communities throughout the U.S. and Puerto Rico. Throughout a career spanning nearly three decades, Mr. Costa has supervised the development and financing of nearly 45,000 units of multi-family affordable and market-rate housing.

Highridge costa was founded by Mr. Costa in 1994 originally as a subsidiary of KB Home, in 2011 the company was recapitalized through a joint venture between Mr. Costa and Highridge Partners, a diversified, privately held investment firm.

In recognition of his contributions to the industry, in 2018 Mr. Costa was inducted into both the Affordable Housing Hall of Fame (AHF), a national recognition, and the California Housing Hall of Fame (CHC). He was named the Freddie Mac Multi-family Builder of the year in 2000 and the 1999 Builder of the Year by Multi-family Executive Magazine. An executive member of the California Housing Consortium and the California Council of Affordable Housing, which are statewide nonprofit organizations focused on the production of affordable housing in California.

Mr. Costa holds a Bachelor of Science degree in Engineering from California Polytechnic State University at San Luis Obispo, and also holds a general contractor's license from the State of California.

MOHANNAD H. MOHANNA

PRESIDENT, HIGHRIDGE COSTA DEVELOPMENT

Mr. Mohanna is Principal and President of Highridge Costa Development Company, LLC ("HCDC"), the development arm of Highridge Costa. His responsibilities included overseeing land acquisition, planning, entitlements, construction, financing, lease-up activities, property management and asset rehabilitation.

Mr. Mohanna joined the firm in 1995. A real estate veteran with over 30 years of real estate development experience both nationally and internationally, his knowledge spans the entire spectrum of the real estate development industry from land acquisition, entitlement and construction through sales/lease-up and asset management.

Mr. Mohanna received his Bachelor's and Master's degrees in Economics from the American University in Cairo, Egypt.

ROBERT W. TETRAULT

CFO | COO, HIGHRIDGE COSTA

Mr. Tetrault is responsible for all accounting and financial reporting activities, as well as risk management and quarterly business plan preparation.

Mr. Tetrault joined Highridge Costa in 1999. Previously, he was Vice President, Controller and Chief Accounting Officer with ARV Assisted Living, Inc, and also served as an Audit Manager at Arthur Andersen, LLP.

Mr. Tetrault earned his Bachelor of Science degree in Business Administration, with an emphasis in accounting, from California State University, Long Beach. He is a Certified Public Accountant in the State of California.

BRIAN C. SUESS

SENIOR VICE PRESIDENT, CAPITAL MARKETS, HIGHRIDGE COSTA

Mr. Suess directs all aspects of the syndication of tax credits, including investor relationship management, financial modeling, project due diligence, and the negotiation of partnership agreements

Mr. Suess joined Highridge Costa in 2002, and was subsequently promoted to Senior Financial Analyst, Manager of Tax Credit Resale and then Vice President. Previously, he served as a Staff Accountant with Novogradac & Company LLP.

Mr. Suess earned his Bachelor's of Arts degree in Business Economics with an emphasis in accounting from the University of California, Santa Barbara.

MONTE J. HEATON

PROJECT MANAGER, HIGHRIDGE COSTA

Mr. Heaton is responsible for the management of new development in the State of Hawaii as well as financial underwriting and modeling for new projects.

Mr. Heaton brings over seven years of experience in the affordable housing space, with expertise in the states of California, Hawaii, and Texas. His responsibilities include acquisition, entitlement, closing of construction and permanent financing, construction, and lease-up. He has extensive experience with HHFDC's 201-H, Rental Housing Revolving Fund, Hula Mae Multi-Family, and Low-Income Housing Tax Credit Programs as well as the processes required to acquire, entitle, and permit affordable multifamily developments in the state.

Mr. Heaton received Bachelor's degrees in economics and philosophy from University of California Santa Barbara in 2012.

Kulana Hale at Kapolei

Kulana Hale at Kapolei is a 154 unit mixed-use community that consists of 22 studio units, 110 one-bedroom units, and 22 two-bedroom units. The project is an eleven-story residential building with two stories of podium parking situated on approximately .94 acres. The development also includes approximately 7,400 square feet of retail space. Hale Moena Kupuna is the first of two phases totaling 297 residential units and a third phase of retail development to be located on a 3.04 acre parcel.

Outdoor community amenities for Kulana Hale at Kapolei include a large adjoining outdoor recreation deck atop the parking structure. The indoor community amenities include electronically controlled access to lobby and common areas, gated-controlled access parking garage, indoor recreation center, community room with computer lab, laundry room, Wi-Fi in lobby and throughout the common area, mail room and package receiving, and on-site management. Each unit has Energy Star appliances, ceiling fans, garbage disposals, walk-in closets (select units), and dishwashers.

Hale Moena under construction - December, 2019

The project is designed to LEED Platinum standards. Kulana Hale at Kapolei features energy efficiency in design and operations, including on-site energy generation systems, Energy Star appliances, high efficiency interior/exterior lighting systems, and water efficient plumbing fixtures. A climate-appropriate landscape palette will be chosen along with high efficiency irrigation and controls. Recycled water will be used to meet all irrigation needs.

Kulana Hale at Kapolei received a reservation of 4% Low-income Housing Tax Credits in the annual amount of $2,409,351 and $1,204,675 in annual State Credits. The total development cost of the project is $64,669,099. Sources leveraged were as follows:

Tax credit equity (Limited Partner) - $28,943,735
Perm loan (Citibank) – $23,850,000
Developer note - $1,190,983
Rental Housing Revolving Housing -
$10,684,322 Total = $64,669,099

Occupancy, History, and Unique Challenges of the Project:

Kulana Hale at Kapolei was completed March of 2020 and suffered no noteworthy challenges during the construction period. The project's lease-up period began during the start of the Covid-19 pandemic, which caused leasing to be slower than projected. Although over 500 people were on the interest list for the 154 units, we found that seniors 55+ were more reluctant to relocate at the beginning of the pandemic. The project achieved full occupancy in August of 2021 and is now stabilized and operating without issue. The lead developer has been overseeing all aspects of the project since initial due diligence of the site.

Development Timeline:

HHFDC Bond Approval	12/11/2014
LIHTC Reservation	12/19/2014
Building Permit	06/26/2018
Site Acquisition	08/10/2018
Financing Closing	08/10/2018
Certificate of Occupancy	03/11/2020

Kapolei Mixed-Use Development Phase II

Kapolei Mixed-Use Development Phase II is a 143 unit mixed-use community that consists of 13 studio units, 43 one-bedroom units, 76 two-bedroom units, and 11 three-bedroom units. The project is an eleven-story residential building with two stories of podium parking situated on approximately 1.04 acres. The development also includes approximately 2,300 square feet of retail space. Kapolei Mixed-Use Development Phase II is the second of two phases totaling 297 residential units and a third phase of retail development located on a 3.04 acre parcel.

Outdoor community amenities for Kapolei Mixed-Use Development Phase II include a large adjoining outdoor recreation deck atop the parking structure. The indoor community amenities include electronically controlled access to lobby and common areas, gated-controlled access parking garage, indoor recreation center, community room with computer lab, laundry room, Wi-Fi in lobby and throughout the common area, mail room and package receiving, and on-site management. Each unit has Energy Star appliances, ceiling fans, garbage disposals, walk-in closets (select units), and dishwashers.

The project is designed to LEED equivalent standards. Kapolei Mixed-Use Development Phase II features energy efficiency in design and operations, including on-site energy generation systems, Energy Star appliances, high efficiency interior/exterior lighting systems, and water efficient plumbing fixtures.

Kapolei Mixed-Use Development Phase II received a reservation of 4% Low-income Housing Tax Credits in the total amount of $27,352,800 and $13,676,400 in total State Credits. The total development cost of the project is $71,994,325. Sources leveraged were as follows:

Tax credit equity (Limited Partner) - $32,864,341
Perm loan (Citibank) – $21,166,512
Rental Housing Revolving Fund - $17,963,472
Total = $71,994,325

Occupancy, History, and Unique Challenges of the Project:

Kapolei Mixed-Use Development Phase II was completed March of 2021 and suffered no noteworthy challenges during the construction period. The project's lease-up period lasted around 10 months, achieving over 97% occupancy December of 2021. The project is operating without issue. The lead developer has been overseeing all aspects of the project since initial due diligence of the site.

Development Timeline:

HHFDC Bond Approval	09/14/2017
LIHTC Reservation	09/19/2017
Site Acquisition	08/10/2018
Building Permit	07/05/2019
Financing Closing	08/01/2019
Certificate of Occupancy	03/05/2021

Kokua

Kokua is an age-restricted (55+) 224-unit, 20-story Low Income Housing Tax Credit ("LIHTC") development located in the heart of downtown Honolulu at 1192 Alakea Street. The project will include a ground floor lobby, 5-story parking garage, and a 6th-floor podium level. Fourteen of the twenty stories will have residential units, with 222 studio units and 2 manager's units (a one-bedroom and a two-bedroom). The podium level has a landscaped podium deck, a common laundry room, lanai space, office space, and manager/resident services unit. The open space podium deck will have an outdoor area with shaded seating and garden planting areas that provide community and comfort. Floors 6-20 contain the 224 residential units that range from approximately 260 square feet to 330 square feet. The studio units contain a small kitchen with a sink and electric cooking range; and a bathroom with sink, toilet, and shower.

The development will offer the studio units restricted to senior households earning at or below 30 and 60 percent of Area Median Income (AMI). Of the 222 total affordable units, 12 will be restricted at 30 percent AMI and 210 will be restricted at 60 AMI. Additionally, the Project will meet the most current Americans with Disabilities Act (ADA) and HUD standards. 5%, or twelve, of the units will be fully accessible. The accessible residential units will be designed per the most current ADA requirements in order to comfortably accommodate persons using walkers, canes, wheelchairs, or scooters. Accessible unit bathrooms are provided with a toilet with grab bars along the adjacent wall and an accessible counter and sink.

Kokua received a reservation of 4% Low-income Housing Tax Credits in the total amount of $31,359,540 and $15,679,770 in total State Credits. The total development cost of the project is $91,748,691. Sources leveraged were as follows:

Tax credit equity (Limited Partner) - $35,372,647
Perm loan (Citibank) – $18,796,426
Developer note - $1,726,807
Rental Housing Revolving Fund - $35,852,811
Total = $91,748,691

Occupancy, History, and Unique Challenges of the Project:

Kokua is currently under construction and has had no delays. The lead developer has been overseeing all aspects of the project since initial due diligence of the site.

Development Timeline:

HHFDC Bond Approval	**01/10/2019**
LIHTC Reservation	**01/10/2019**
Building Permit	**08/09/2021**
Site Acquisition	**09/01/2021**
Financing Closing	**09/01/2021**

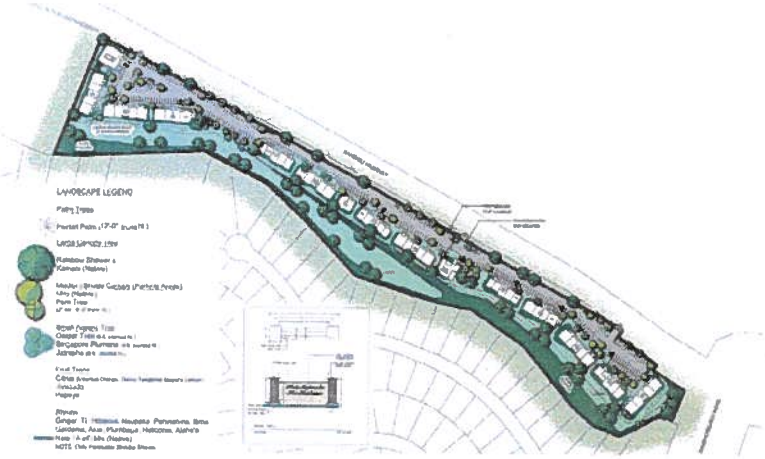
Liloa Hale

Liloa Hale is comprised of approximately 3.61 acres of land located in Kīhei, Maui, Hawai'i. The project site is bounded by the existing Hope Chapel church to the north, Pi'ilani Highway to the west, Hale Mahaolu Ehiku, an elderly affordable housing development, to the south, and Liloa Drive to the east.

The project will consist of a single three-story building containing 117 apartment units and related improvements. Of the 117 units, 101 units will be one-bedroom units (approximately 650 sq. ft.) of which, five units will be the Americans with Disabilities Act (ADA) Standards compliant, while the remaining 16 units will be two-bedroom units (approximately 900 sq.ft.) of which, one unit will be ADA compliant. Amenities at the property will include a community gathering space for residents of the complex, a mail room, a property manager's living unit, office space for onsite staff, approximately 143 on-grade parking stalls and two (2) loading stalls. Related improvements include grading, construction of driveways, utility connections, landscaping, and drainage improvements including catch basins, subsurface drainage system, and onsite retention basin. Highridge Costa has partnered with Hale Mahaolu, a private non-profit corporation and co-developer for the project, to operate the new facility.

Liloa Hale has received all discretionary approvals including Special Management Area (SMA) Use Permit and Chapter 2.97 of the Maui County Code, a similar process to the 201H by which developers of 100 percent residential workforce housing projects may seek fast track development of their projects by applying for County exemptions from fees, zoning, and other code requirements. As such, the project is considered to be fully entitled. The project currently has a tax credit application submitted to HHFDC. The lead developer has been overseeing all aspects of the project since initial due diligence of the site.

Hale Mahaolu Ke Kahua



Hale Mahaolu Ke Kahua is a planned 120-unit, two-story garden style affordable family community located in Waiehu, Maui. The currently vacant site is approximately 11.476 acres adjacent to Kahekili Highway and Waiehu Beach Road. In addition to offering affordable homes in and around the community where the residents live and work, the project's amenities will include a clubhouse, manager's office, fitness room, computer room, playground, and 3,000 square foot community center reserved primarily for programs targeted at the resident population. Additionally, there will be a 3,500 square foot building for local non-profit, Maui Economic Opportunity, Inc. (MEO), to run their programs out of. The project will provide 250 residential parking stalls, 35 parking stalls for MEO, and 2 loading stalls.

The 120 affordable units will be comprised of two 8-unit buildings, ten 10-unit buildings, and one 4-unit building. 30 units will be one-bedroom, one-bath apartments, 58 will be two-bedroom, two-bath apartments and 32 will be three-bedroom, two-bath apartments. All units will be set aside for individuals and families earning 60% or less of area median income.

Hale Mahaolu Ke Kahua is currently in the entitlement process. The lead developer has been overseeing all aspects of the project since initial due diligence of the site.

RENTAL RATES AND ESTIMATED MONTHLY UTILITY COSTS

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14. RENTAL RATES AND ESTIMATED MONTHLY UTILITY COSTS

The table below shows the rental rates and estimated monthly utility costs. The utility costs are estimated based on the 2022 utility allowance schedule, and tenants will be responsible for electricity costs only.

Rental/Utility Rates and Estimated Monthly Utility Costs

Unit Type	30% AMI Rent	60% AMI Rent	Utility Allowance - Phase I	Utility Allowance - Phase II and III
Studio	$686	$1,372	$108	$92
1-Bedroom	$735	$1,470	$128	$109
2-Bedroom	$882	$1,764	$179	$152
3-Bedroom	$1,018	$ 2,037	$ 231	$197

COMMUNITY OUTREACH SUMMARY

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COMMUNITY OUTREACH SUMMARY

Kamehameha Schools (KS) and Highridge Costa Developing Company (Applicant), have initiated community outreach efforts for the proposed project. The table below summarizes the community outreach efforts that have been done to date.

Community Outreach Summary

Date	Stakeholder	Summary
11/2/2020	Brandon Elefante, Councilmember, District 8	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember mentioned the community might be concerned about the height, but that concern may be offset by the desire for affordable housing.
11/5/2020	Henry Aquino, House Representative, District 38	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Representative expressed concern over traffic that may be generated by the project.
11/23/2020	Clarence Nishihara, Senator, District 17	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
12/8/2020	Heidi Tsuneyoshi, Councilmember, District 2	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember commented that the look should blend with the existing community and the project should be respectful to the local people.
12/14/2020	Tommy Waters, Council Chair, District 4	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Council Chair commented that the community would like to see Waipahu as a destination and was supportive of affordable housing at or below 60% AMI.
12/21/2020	Augie Tulba, Councilmember, District 9	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember was supportive of revitalization of Waipahu.
12/21/2020	Andrea Tupola, Councilmember, District 1	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Councilmember noted there are opportunities for food systems, urban farming, and clean energy for the project.
12/21/2020	Harrison Rue, Community Building and TOD Administrator, DPP	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. Mr. Rue mentioned that added parking and affordable units could offset community concerns of height.
12/21/2020	Kathy Sokugawa, Former Acting Director, DPP	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The former Acting Director commented that it is a thoughtful design that is true to Waipahu, but suggested more diversity in income levels. She also wanted the project team to be careful with adding green space to renderings.

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Date	Stakeholder	Summary
1/15/2021	Carol Fukunaga, Councilmember, District 6	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/21/2021	Radiant Cordero, Councilmember, District 7	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/4/2021	Evelyn Ahlo, Executive Director, Hawaii Plantation Village	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/23/2021	Donnie Juan (Executive Director) & Boardmembers, Filipino Chamber of Commerce	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/9/2021	Chris Borden, Times Supermarket	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/20/2021	Denise Iseri-Matsubara, Executive Director, Hawaii Housing Finance & Development Corporation (HHFDC)	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
1/28/2021	Esther Kiaaina, Council Vice-Chair, District 3	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
12/9/2020	Roy Takumi, Representative, District 35	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. No comment was provided at this time.
2/25/2021	Cory Chun, Waipahu Neighborhood Board Chair	The Applicant provided an explanation of the project layout through a presentation and gave request for comment. The Chair expressed concern over older residents having problems with project height. The Chair also noted the area would benefit from the proposed improvements.
4/13/2021	Waipahu Neighborhood Board	The Applicant met with the Waipahu Neighborhood Board in person and provided an explanation of the project layout through a presentation. Board Members voiced their support of affordable housing but noted worries about the proposed height of the project.
4/22/2021	Town Hall Meeting	The Applicant conducted an online town hall meeting via Microsoft Teams open to all community members. A total of 58 attendees registered for the meeting. The Applicant provided an explanation of the project layout through a presentation and also provided time for a question and answer session. The community largely voiced their support for affordable housing but there were a few worries about the proposed height of the project.
10/17/2021	Clarence Nishihara, Senator, District 17	The Applicant provided an update on project status including a project site plan with reduced tower height and three (3) different design rendering options.

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Date	Stakeholder	Summary
10/25/2021	Henry Aquino, House Representative, District 38	The Applicant provided an update on project status including a project site plan with reduced tower height and three (3) different design rendering options.
11/4/2021	Town Hall Meeting	The Applicant presented a project site plan with reduced tower height and three (3) different design rendering options for audience to view and provide comments.
3/24/2022	Waipahu Neighborhood Board	The Applicant presented a project site plan with reduced tower height and three (3) different design rendering options for audience to view and provide comments. Some members expressed concern about the height and some members expressed concerns for small businesses in the area.
4/28/2022	Waipahu Neighborhood Board	A follow-up reporting/meeting with the Board.
5/4/22	Hawaii Public Radio	The Applicant discussed the project details with the host of The Conversation, Catherine Cruz.

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TRAFFIC IMPACT ANALYSIS REPORT

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REF-255

Traffic Impact Report

Keawalau Affordable Housing Community

Prepared for:
Highridge Costa Development
Company, LLC

Prepared by:
Wilson Okamoto Corporation

September 2022 (Revised)

TRAFFIC IMPACT REPORT

FOR

KEAWALAU AFFORDABLE HOUSING COMMUNITY

Prepared for:

Highridge Costa Development Company, LLC
330 West Victoria Street
Gardena, CA 90248-3527

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #10550-02

September 2022 (revised)

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the development of the Keawalau Affordable Housing Community in Waipahu on the island of Oahu. The proposed project entails the redevelopment of several parcels on the north and south sides of Hikimoe Street (referred to as Phases 1 and 2, respectively) to include a new mixed-use community with residential, office, and commercial uses.

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. Superimposition of 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 project site for the Keawalau Affordable Housing Community development is located adjacent to Hikimoe Street on the island of Oahu (see Figure 1). The project site includes thirteen parcels contained within two blocks of land bisected by Hikimoe Street. Phase 1 (also referred to as the "Mauka block") consists of parcels north of Hikimoe Street that are further identified as TMKs 9-4-013:046, and 9-4-014:059,060, 061, 062, 063, 064, 066, and 067 with access provided via a driveway off Kahuailani Street. Phase 2 (also referred to as the "Makai block") consists of parcels between Farrington Highway and Hikimoe Street that are further

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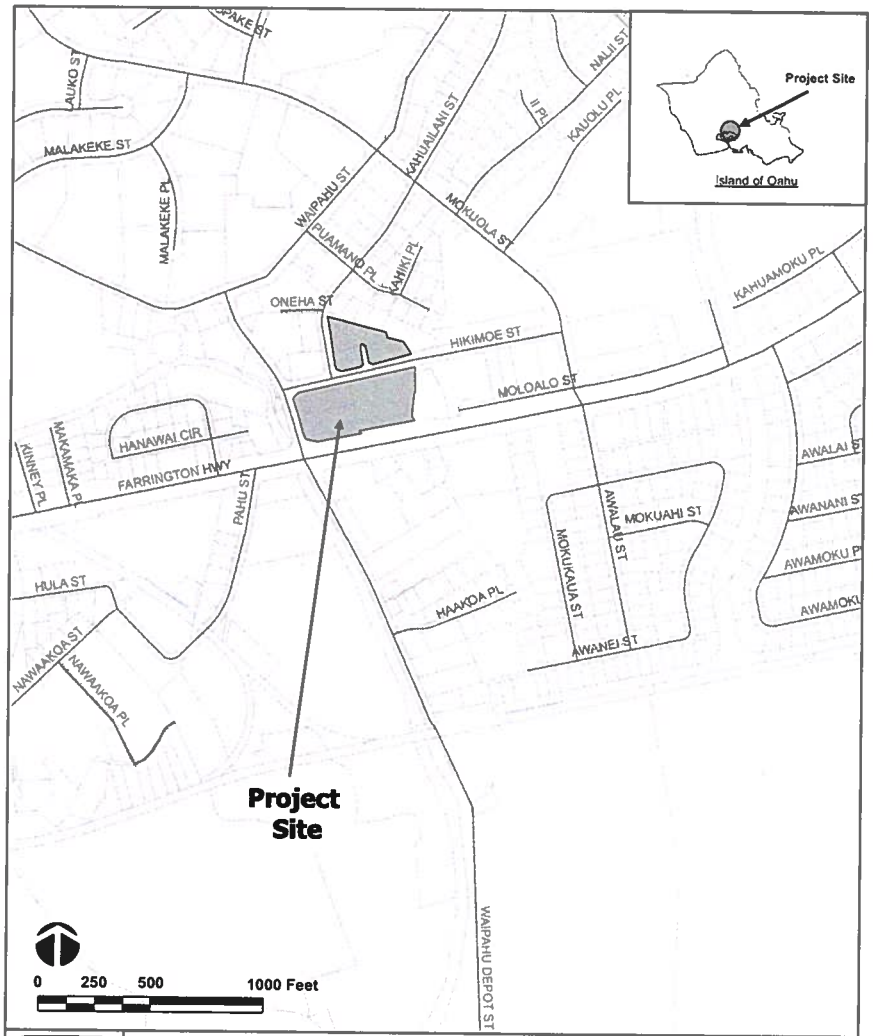

WILSON OKAMOTO CORPORATION	KEAWALAU AFFORDABLE HOUSING COMMUNITY	FIGURE 1
	LOCATION MAP AND VICINITY MAP	

identified as TMKs 9-4-014: 005, 014, and 058. Access to the Makai block will be provided via driveways off Farrington Highway, Hikimoe Street, and Waipahu Depot Street.

B. Project Characteristics

The existing project site currently houses a variety of office, restaurant, and commercial/retail uses. The following are the existing uses by block with some of the office uses within the Makai block expected to remain:

- Mauka Block
  - Retail (11,830 square feet (sf))
  - Restaurant (2,340 sf)
  - General Office (2,200 sf)
  - Medical Office (3,050 sf)
- Makai Block
  - Supermarket (30,089 sf)
  - General Office (10,972 sf total with 6,148 sf to remain)
  - Medical Office (19,855 sf total with 13,913 sf to remain)

The proposed project entails the redevelopment of the existing site to include the following new uses:

- Mauka Block
  - Senior Housing (133 units)
  - Retail (5,018 sf)
  - Restaurant (4,778 sf)
- Makai Block
  - Multifamily Residential (404 units)
  - Retail (2,767 sf)
  - Restaurant (6,457 sf)
  - Supermarket (23,352 sf)

Access to the Mauka Block is expected to be provided via a driveway off Kahuailani Street while access to the Makai Block is expected to be provided via driveways off Farrington Highway, Hikimoe Street, and Waipahu Depot Street. It should be noted that the driveway for the Makai Block off Waipahu Depot Street is expected to be a one-way (exit only) driveway. At this time, the proposed project is expected to be completed by the Year 2027. However, it should be noted that the project is being

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processed under Section 201H-38, HRS and given the application process being undertaken for this project, the funding schedule and subsequent completion of the project may change. Figure 2 shows the project site plan.

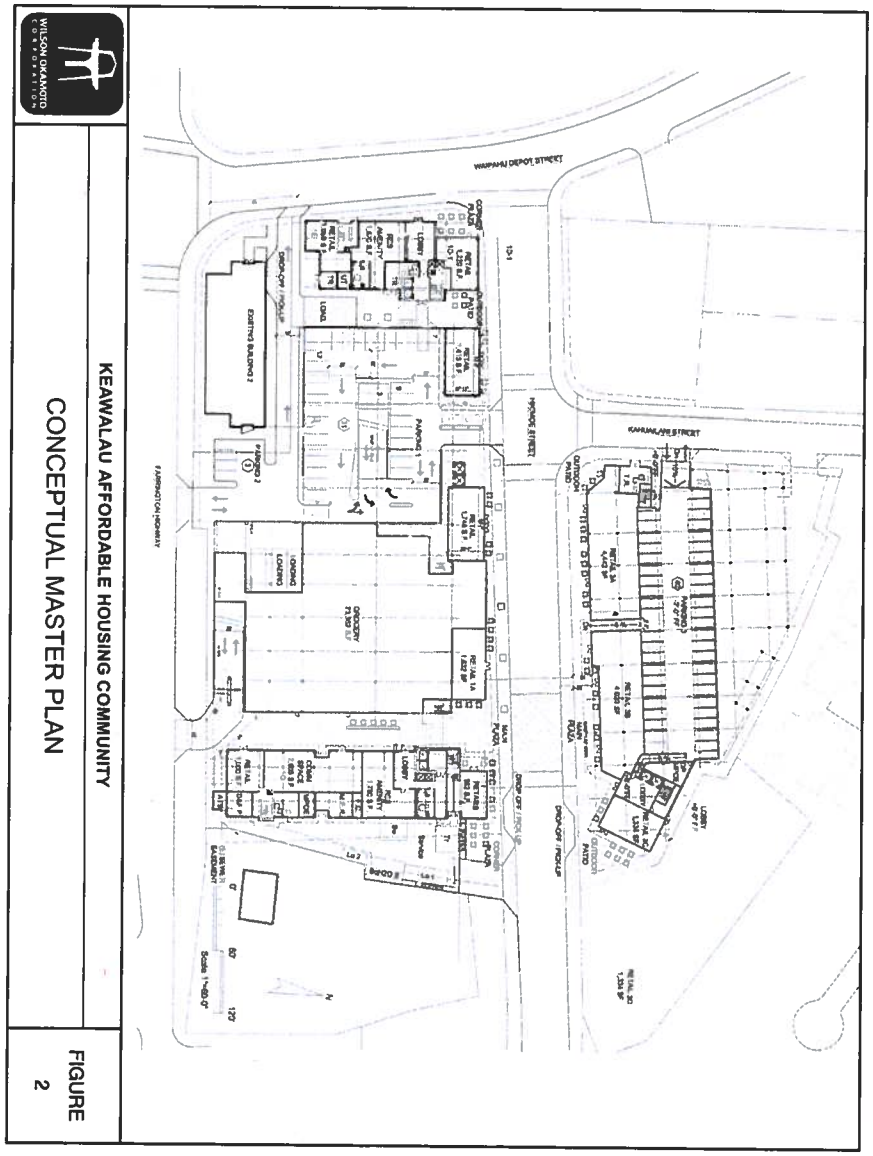
III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

Adjacent to the project site, Farrington Highway is a predominantly four-lane, two-way divided roadway generally oriented in the east-west direction that serves as a major thoroughfare along the Leeward region. Near the southwest corner of the project site, Farrington Highway intersects Waipahu Depot Street. At this signalized intersection, both approaches of Farrington Highway have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Waipahu Depot Street is a predominantly two-lane, two-way City and County of Honolulu roadway generally oriented in the north-south direction. At the intersection with the highway, both approaches of the roadway have a shared left-turn and through lane, and an exclusive right-turn lane.

East of the intersection with Waipahu Depot Street, Farrington Highway intersects Mokuola Street and Awalau Street. At this signalized intersection, both approaches of Farrington Highway have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Mokuola Street and Awalau Street are predominantly two-lane, two-way City and County of Honolulu roadways generally oriented in the north-south direction. At the intersection with Farrington Highway, the Mokuola Street and Awalau Street approaches have one lane that serves all traffic movements.

North of the intersection with Farrington Highway, Mokuola Street intersects Hikimoe Street. At this signalized intersection, the northbound approach of Mokuola Street has one lane that serves left-turn and through traffic movements while the southbound approach has one lane that serves through and right-turn traffic movements. Hikimoe Street is a predominantly two-lane, two-way City and County of Honolulu roadway generally oriented in the east-west direction that also functions as a major transit hub for the Leeward region. At the intersection with Mokuola Street, the Hikimoe Street approach has exclusive turning lanes.



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KEAWALAU AFFORDABLE HOUSING COMMUNITY

CONCEPTUAL MASTER PLAN

FIGURE 2

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West of the intersection with Mokuola Street, Hikimoe Street intersects Waipahu Depot Street. At this unsignalized intersection, Hikimoe Street has one stop-controlled westbound lane that serves left-turn and right-turn traffic movements. The Waipahu Depot Street approaches of this intersection both have one lane that serves the allowed traffic movements.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted in April 2022 and consisted of manual turning movement count surveys during the morning peak hours between 6:30 AM and 8:30 AM, and the afternoon peak hours between 3:30 PM and 5:30 PM at the following intersections:

- Farrington Highway and Waipahu Depot Street
- Farrington Highway and Mokuola Street
- Hikimoe Street, Mokuola Street, and Awalau Street
- Hikimoe Street and Waipahu Depot Road

The survey time periods were selected based on historical traffic data in the vicinity collected by the State of Hawaii Department of Transportation. 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, 2016, 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 lane configurations and peak period traffic volumes. The AM peak hour of traffic generally occurs between 7:00 AM and 8:00 AM while the PM peak hour of traffic generally occurs between 4:00 PM and 5:00 PM. Although the peak hours of traffic generally occur around the same periods at each of the study intersection, the absolute commuter peak hour time periods for each intersection may differ slightly. The analysis is based on these absolute commuter peak hour time periods to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Farrington Highway and Waipahu Depot Street

At the intersection with Waipahu Depot Street, Farrington Highway carries 1,435 vehicles eastbound and 1,015 vehicles westbound during the AM peak hour of traffic. The overall traffic volume is less during the PM peak hour of traffic with 949 vehicles traveling eastbound and 1,270 vehicles traveling westbound. The eastbound approach of the highway operates at LOS "B" during both peak hours while the westbound approach operates at LOS "C" during both peak hours. Traffic queues periodically formed on the Farrington Highway approaches of the intersection with the most significant queues occurring during the AM peak period. Average queues of 10-

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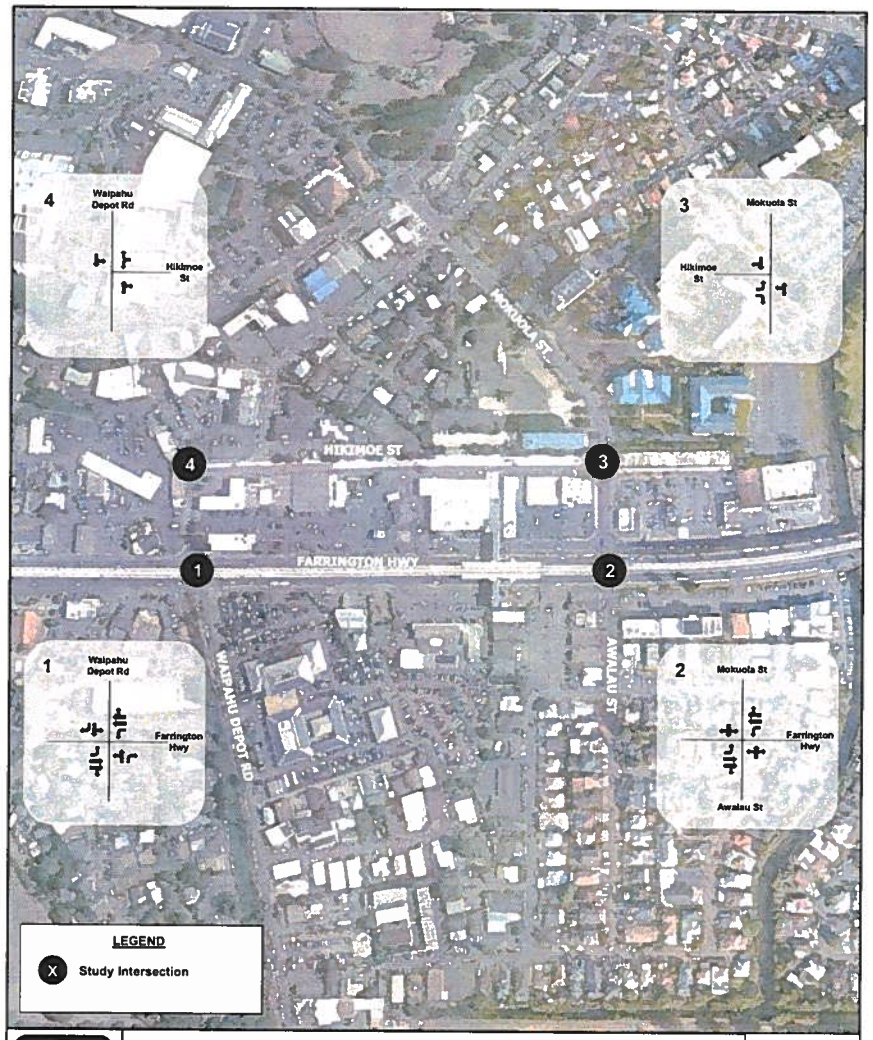
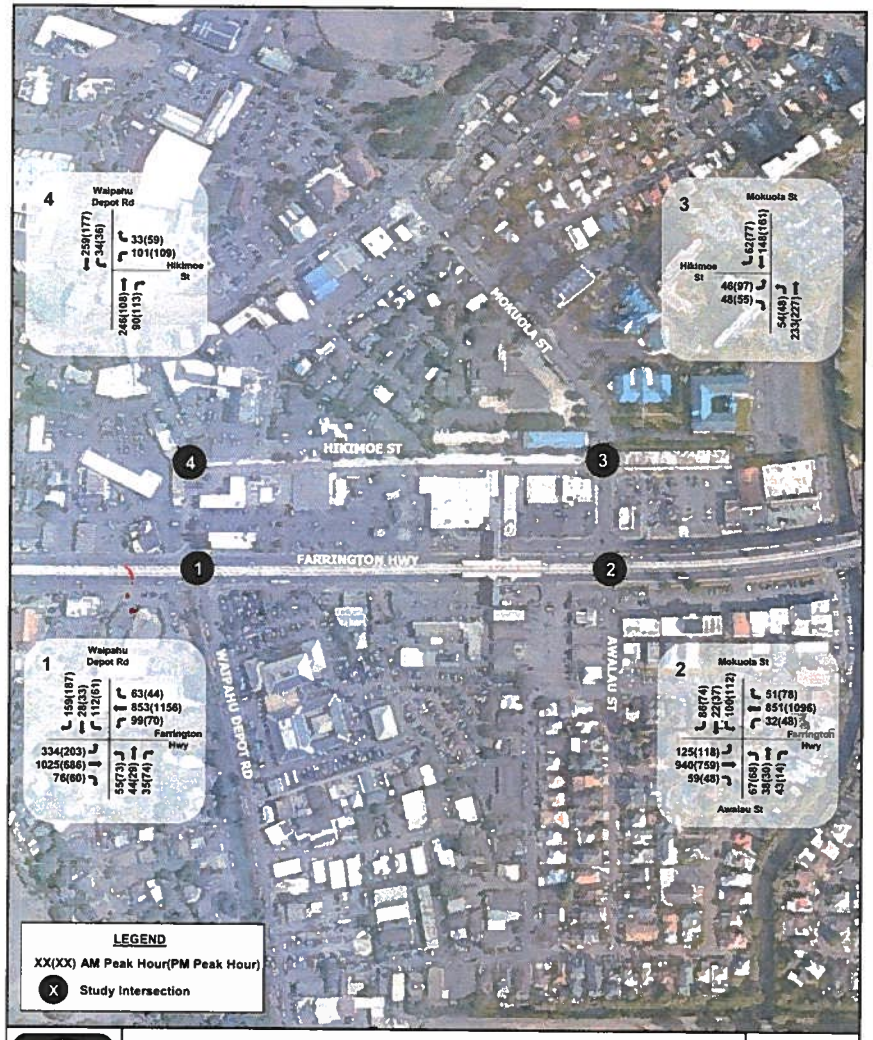


KEAWALAU AFFORDABLE HOUSING COMMUNITY

EXISTING LANE CONFIGURATIONS

FIGURE 3



KEAWALAU AFFORDABLE HOUSING COMMUNITY

EXISTING PEAK HOURS OF TRAFFIC

FIGURE 4

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12 vehicles were observed on the eastbound approach during this peak period, while average queues of 4-6 vehicles were observed on the westbound approach during the same peak period. These queues were observed clearing the intersection after each traffic signal cycle change.

The Waipahu Depot Street approaches of the intersection carry 134 vehicles northbound and 299 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volume is approximately the same with 176 vehicles traveling northbound and 281 vehicles traveling southbound. The Waipahu Depot Street approaches **of the intersection operate at LOS "C" during** both peak hours of traffic. Traffic queues occasionally formed on the Waipahu Depot Street approaches of the intersection with the most significant queues occurring on the southbound approach. Average queues of 4-5 vehicles were observed on this approach during both peak periods. These queues were observed clearing the intersection after each traffic signal cycle change.

Crosswalks are provided across all approaches of the intersection. During the AM peak hour, 28 pedestrians and 25 pedestrians were observed crossing the highway on the west and east sides of the intersection, respectively, while 16 pedestrians and 24 pedestrians were observed crossing Waipahu Depot Street on the south and north sides of the intersection, respectively. During the PM peak hour, 10 pedestrians were observed crossing the highway on the west and east sides of the intersection while 16 pedestrians were observed crossing Waipahu Depot Street on the south and north sides of the intersection.

c. Farrington Highway, Mokuola Street, and Awalau Street

At the intersection with Mokuola Street and Awalau Street, Farrington Highway carries 1,124 vehicles eastbound and 939 vehicles westbound during the AM peak hour of traffic. The overall traffic

volume is approximately the same during the PM peak hour of traffic with 925 vehicles traveling eastbound and 1,222 vehicles traveling westbound. The eastbound approach of the highway operates at LOS **"B" during** both peak hours of traffic while the westbound approach operates at **LOS "B" and LOS "C"** during the AM and PM peak hours, respectively. Traffic queues occasionally formed on the Farrington Highway approaches of the intersection. During the AM peak period, average queues of 8-10 vehicles were observed on the eastbound approach while average queues of 6-8 vehicles were observed on the westbound approach. During the PM peak period, average queues of 4-6 vehicles were observed on the eastbound approach with average queues of 5-7 vehicles observed on the westbound approach. These queues were observed clearing the intersection after each traffic signal cycle change.

The Mokuola Street approach of the intersection carries 208 vehicles and 233 vehicles southbound during the AM and PM peak hours of traffic, respectively. The Awalau Street approach of the intersection carries 148 vehicles and 112 vehicles northbound during the AM and PM peak hours of traffic, respectively. Both approaches **of the intersection operate at LOS "B" and LOS "C" during** the AM and PM peak hours of traffic, respectively. Traffic queues periodically formed on the side street approaches with the most significant queues observed on the Mokuola Street approach. Average queues of 6-8 vehicles were observed during both peak periods on the southbound approach with these queues occasionally extending to the upstream intersection with Hikimoe Street. These queues were observed clearing the intersection after each traffic signal cycle change.

Crosswalks are provided at the intersection across the westbound approach of Farrington Highway and across the Mokuola Street and Awalau Street approaches of the intersection. During the AM peak hour, 37 pedestrians were observed crossing the highway on

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the east side of the intersection while 9 pedestrians and 15 pedestrians were observed crossing on the south and north sides of the intersection, respectively. During the PM peak hour, 37 pedestrians were observed crossing the highway on the east side of the intersection while 14 pedestrians were observed crossing the north side of the intersection.

d. Hikimoe Street and Mokuola Street

At the intersection with Mokuola Street, Hikimoe Street carries 94 vehicles and 152 vehicles eastbound during the AM and PM peak hours of traffic, respectively. This approach operates at LOS "A" during both peak hours of traffic. Minimal traffic queues were observed on the Hikimoe Street approach of the intersection with average queues of 1-2 vehicles observed during both peak periods.

The Mokuola Street approaches of the intersection carry 287 vehicles northbound and 210 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, the overall traffic volumes is approximately the same with 275 vehicles traveling northbound and 238 vehicles traveling southbound. The Mokuola Street approaches of the intersection operate at LOS "A" during both peak periods. As previously discussed, queues from the downstream intersection with Farrington Highway occasionally extended to this intersection, with average queues of 1-2 vehicles during both peak periods.

Crosswalks are provided across the eastbound and southbound approaches of the intersection. During the AM peak period, 12 pedestrians and 34 pedestrians were observed crossing on the west and north sides of the intersection. During the PM peak period, 6 pedestrians and 28 pedestrians were observed crossing on the west and north sides of the intersection, respectively.

e. Hikimoe Street and Waipahu Depot Street

At the intersection with Waipahu Depot Street, Hikimoe Street carries 134 vehicles and 168 vehicles westbound during the AM and

PM peak hours of traffic, respectively. This approach operates at LOS "B" during both peak hours of traffic. Minimal traffic queues were observed on the westbound approach with average queues of 1-2 vehicles observed during both peak periods.

The Waipahu Depot Street approaches of the intersection carry 336 vehicles northbound and 293 vehicles southbound during the AM peak hour of traffic. During the PM peak hour, traffic volumes are less with 221 vehicles traveling northbound and 213 vehicles traveling southbound. The critical movement on the Waipahu Depot Street approaches is the southbound approach which operates at LOS "A" during both peak periods.

A crosswalk is provided across the Hikimoe Street approach of the intersection. During the AM peak period, 42 pedestrians were observed crossing on the east side of the intersection. During the PM peak period, 10 pedestrians were observed crossing on the east side of the intersection.

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, 10th Edition," 2017. The ITE trip generation rates are developed empirically by correlating vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit or 1,000 sf of development. The trip generation methodology also includes provisions for multimodal trips. Multimodal trips are trips made using non-motorized modes of travel such as those made via transit, as well as walking and biking. As such, a portion of the trips associated with the proposed uses of the project were adjusted to account for the influence of multimodal trips. In addition, the ITE Trip Generation also includes provisions for the internal capture of trips. Internal

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capture of trips account for trips that visit more than destination within the same area without adding additional vehicular trips to the external roadways. As such, the trip generation characteristics for the proposed project were adjusted to account for the influence of the aforementioned factors. Tables 1 to 3 summarize the existing, projected, and adjusted net trip generation characteristics related to the proposed project applied to the AM and PM peak hours of traffic. It should be noted that the trip generation calculations do not include existing uses that are expected to remain. In addition, the traffic analysis is based on a total square footage for commercial spaces of approximately 40,000 sf, which is anticipated to consist of a mix of retail, restaurant, and grocery. While the exact breakdown of retail and restaurant square footage may change slightly based on market conditions at the time of leasing, the following breakdown is used for analysis purposes. Minor deviation from this breakdown is not expected to not change the results of the analysis.

Table 1: Existing Peak Hour Trip Generation

MAUKA BLOCK		
RETAIL (SHOPPING CENTER)		
INDEPENDENT VARIABLE: 1,000 sf of development = 11.83		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	7
	EXIT	4
	TOTAL	11
PM PEAK	ENTER	22
	EXIT	23
	TOTAL	45
RESTAURANT (HIGH-TURN OVER SIT-DOWN)		
INDEPENDENT VARIABLE: 1,000 sf of development = 2.34		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	10
	TOTAL	23
PM PEAK	ENTER	14
	EXIT	9
	TOTAL	23

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

MAUKA BLOCK		
GENERAL OFFICE		
INDEPENDENT VARIABLE: 1,000 sf of development = 2.2		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	2
	EXIT	1
	TOTAL	3
PM PEAK	ENTER	0
	EXIT	3
	TOTAL	3
MEDICAL OFFICE (MEDICAL-DENTAL OFFICE)		
INDEPENDENT VARIABLE: 1,000 sf of development = 3.05		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	4
	TOTAL	17
PM PEAK	ENTER	6
	EXIT	15
	TOTAL	21
TOTAL MAUKA BLOCK		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	29
	EXIT	16
	TOTAL	45
PM PEAK	ENTER	39
	EXIT	43
	TOTAL	82
MAKAI BLOCK		
SUPERMARKET		
INDEPENDENT VARIABLE: 1,000 sf of development = 30.089		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	69
	EXIT	46
	TOTAL	115
PM PEAK	ENTER	142
	EXIT	136
	TOTAL	278

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

MAKAI BLOCK		
GENERAL OFFICE		
INDEPENDENT VARIABLE: 1,000 sf of development = 4.824		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	5
	EXIT	1
	TOTAL	6
PM PEAK	ENTER	1
	EXIT	5
	TOTAL	6
MEDICAL OFFICE (MEDICAL-DENTAL OFFICE)		
INDEPENDENT VARIABLE: 1,000 sf of development = 5.942		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	4
	TOTAL	17
PM PEAK	ENTER	6
	EXIT	15
	TOTAL	21
MAKAI BLOCK TOTAL		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	87
	EXIT	51
	TOTAL	138
PM PEAK	ENTER	149
	EXIT	156
	TOTAL	305

Table 2: Projected Peak Hour Trip Generation

MAUKA BLOCK		
SENIOR HOUSING (SENIOR ADULT HOUSING-ATTACHED)		
INDEPENDENT VARIABLE: dwelling units = 133		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	9
	EXIT	18
	TOTAL	27
PM PEAK	ENTER	19
	EXIT	16
	TOTAL	35

Table 2: Projected Peak Hour Trip Generation (Cont'd)

MAUKA BLOCK		
RETAIL (SHOPPING CENTER)		
INDEPENDENT VARIABLE: 1,000 sf of development = 5.018		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	3
	EXIT	2
	TOTAL	5
PM PEAK	ENTER	9
	EXIT	10
	TOTAL	19
RESTAURANT (HIGH TURNOVER SIT-DOWN)		
INDEPENDENT VARIABLE: 1,000 sf of development = 4.778		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	26
	EXIT	21
	TOTAL	47
PM PEAK	ENTER	29
	EXIT	18
	TOTAL	47
MAUKA BLOCK TOTAL		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	38
	EXIT	41
	TOTAL	79
PM PEAK	ENTER	57
	EXIT	44
	TOTAL	101
MAKAI BLOCK		
MULTI-FAMILY RESIDENTIAL (MID RISE)		
INDEPENDENT VARIABLE: dwelling units = 404		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	38
	EXIT	107
	TOTAL	145
PM PEAK	ENTER	108
	EXIT	70
	TOTAL	178

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Table 2: Projected Peak Hour Trip Generation (Cont'd)

MAKAI BLOCK		
RETAIL (SHOPPING CENTER)		
INDEPENDENT VARIABLE: 1,000 sf of development = 2.767		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	2
	EXIT	1
	TOTAL	3
PM PEAK	ENTER	5
	EXIT	6
	TOTAL	11
RESTAURANT (HIGH TURNOVER SIT-DOWN)		
INDEPENDENT VARIABLE: 1,000 sf of development = 6.457		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	35
	EXIT	29
	TOTAL	64
PM PEAK	ENTER	39
	EXIT	24
	TOTAL	63
SUPERMARKET		
INDEPENDENT VARIABLE: 1,000 sf of development = 23.352		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	54
	EXIT	35
	TOTAL	89
PM PEAK	ENTER	110
	EXIT	106
	TOTAL	216
MAKAI BLOCK TOTAL		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	129
	EXIT	172
	TOTAL	301
PM PEAK	ENTER	262
	EXIT	206
	TOTAL	468

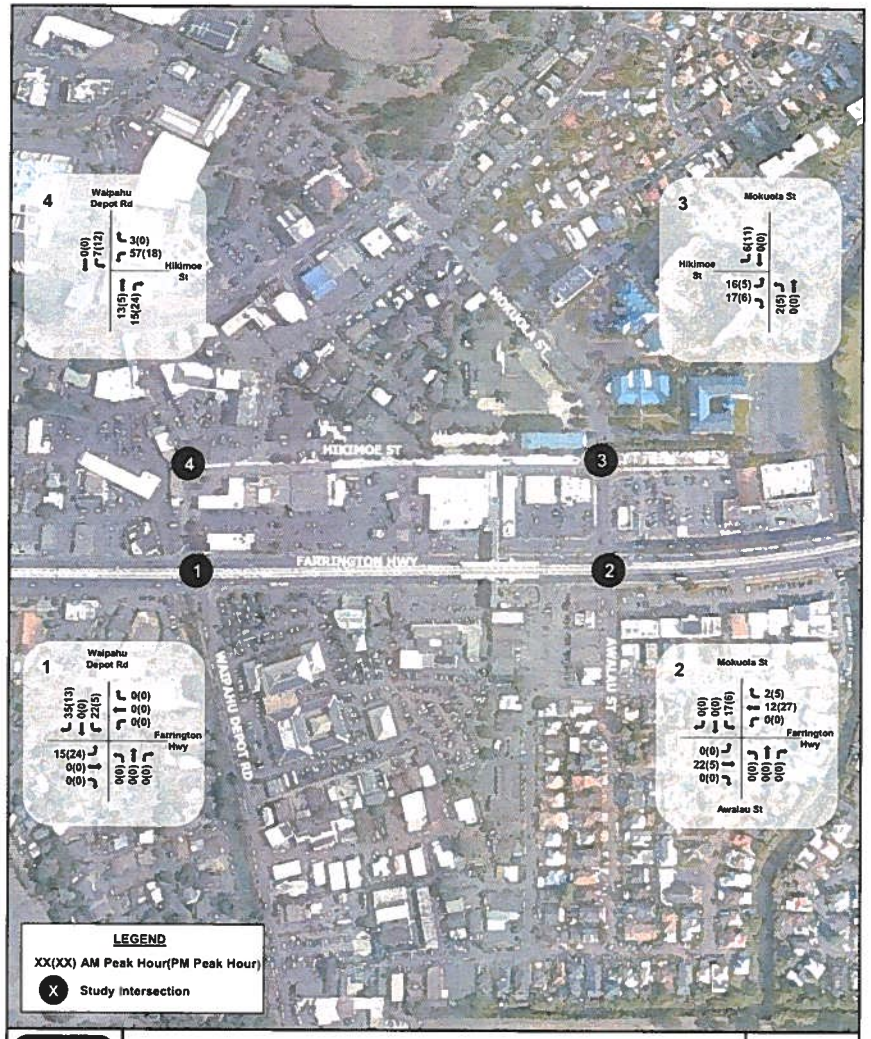
Table 3: Adjusted Net Peak Trip Generation

MAUKA BLOCK		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	6
	EXIT	18
	TOTAL	24
PM PEAK	ENTER	11
	EXIT	1
	TOTAL	12
MAKAI BLOCK		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	36
	EXIT	88
	TOTAL	124
PM PEAK	ENTER	68
	EXIT	33
	TOTAL	101

2. Trip Distribution

Figure 5 shows the distribution of site-generated traffic during the AM and PM peak periods. Access to the Mauka Block will be provided via a driveway off Kahuailani Street while access to the Makai Block will be provided via driveways off Hikimoe Street, Waipahu Depot Street, and Farrington Highway. The directional distribution of trips was based on the relative distribution between the roadways in the vicinity. As such, 15% of trips were assumed to be traveling to/from the north via Waipahu Depot Street, 15% of trips were assumed to be traveling to/from the north via Mokuola Street, and 75% of trips were assumed to be traveling to/from Farrington Highway. In addition, the directional distribution of trips along Farrington Highway was assumed to remain similar to existing conditions. The site-generated trips were distributed to the project driveways and at the study intersections based upon their assumed origin/destination, convenience of the available routes, and allowed turning movements at the project driveways.

REF-267



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KEAWALAU AFFORDABLE HOUSING COMMUNITY

DISTRIBUTION OF SITE-GENERATED VEHICLES

FIGURE 5

B. Through Traffic Forecasting Methodology

The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at survey stations in the vicinity of the project site. Although historical data indicates relatively stable traffic volumes in the project vicinity, a 0.5% growth rate per year was conservatively assumed along Farrington Highway. Using Year 2022 as the Base Year, a growth rate factor of 1.025 was applied to the existing through traffic demands along that roadway to achieve the projected Year 2027 traffic volumes.

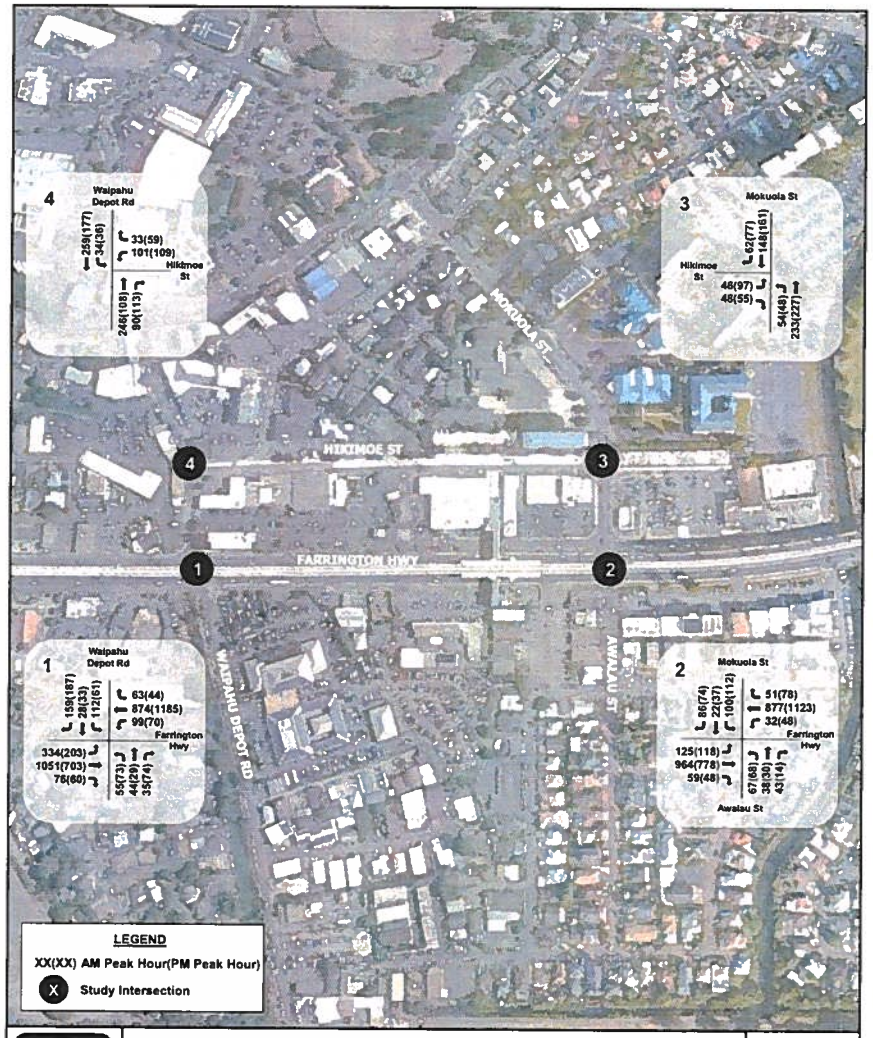
C. Other Considerations

The City and County of Honolulu is currently developing a fixed guideway transit system that will extend from Kapolei to central Honolulu area to provide an alternative mode of travel and increase east-west mobility on Oahu's most heavily congested corridor. The recently constructed Pouhala Rail Transit Station is located just east of the project site with access to the rail station from the project site facilitated via existing pedestrian facilities located along Hikimoe Street. Although construction is still on-going for the remaining segments of the project, the first phase of the rail system which extends between Kapolei and the Halawa Rail Station (Aloha Stadium) is expected to be partially operational under with project conditions. However, given the already high transit mode share in the vicinity, the additional influence of the rail system was not incorporated into projected conditions for a conservative analysis of vehicular traffic operations.

D. Total Traffic Volumes Without Project

The projected Year 2027 AM and PM peak period traffic volumes and operating conditions without the development of the Keawalau Affordable Housing Community are shown in Figure 6 and summarized in Table 4. The analysis incorporates ambient growth of traffic. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.

REF-268



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YEAR 2027 PEAK HOURS OF TRAFFIC WITHOUT PROJECT

FIGURE 6

Table 4: Existing and Projected Year 2027 (Without Project) LOS Traffic Operating Conditions

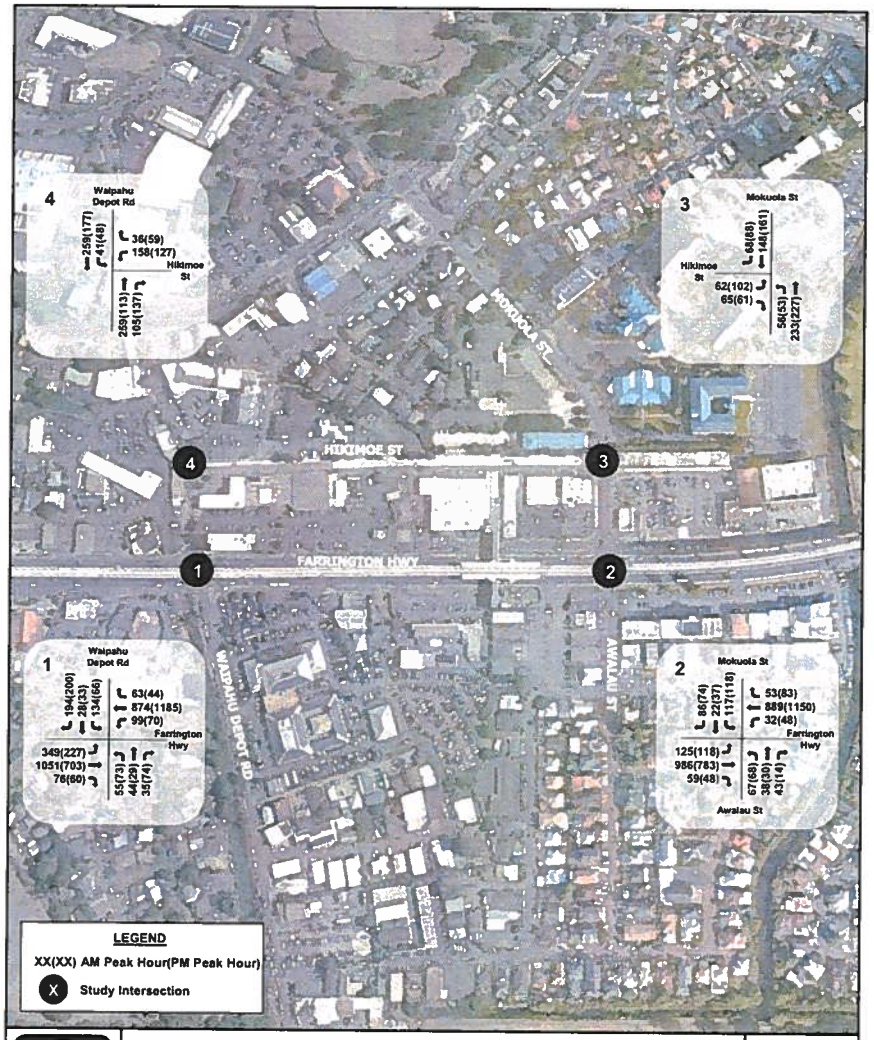
Intersection	Approach/ Critical Movement	AM		PM	
		Exist	Year 2027 w/out Proj	Exist	Year 2027 w/out Proj
Farrington Hwy/ Waipahu Depot St	Eastbound	B	B	B	B
	Westbound	C	C	C	C
	Northbound	C	C	C	C
	Southbound	C	C	C	C
Farrington Hwy/ Mokuola St/ Awalau St	Eastbound	B	B	B	B
	Westbound	B	B	C	C
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Hikimoe St/ Mokuola St	Eastbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Hikimoe St/ Waipahu Depot St	Westbound	B	B	B	B
	Southbound	A	A	A	A

Under Year 2027 without project conditions, traffic operations are expected to remain similar to existing conditions. Traffic operations at the study intersections along Farrington Highway are expected to continue operating at LOS "C" or better during both peak hours of traffic. Similarly, those at the study intersections along Hikimoe Street are expected to continue operation at LOS "B" or better during both peak hours of traffic.

E. Total Traffic Volumes With Project

Figure 7 shows the Year 2027 cumulative AM and PM peak hour traffic conditions resulting from the Keawalau Affordable Housing Community development. The cumulative volumes consist of site-generated traffic superimposed over Year 2027 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

REF-269



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KEAWALAU AFFORDABLE HOUSING COMMUNITY

YEAR 2027 PEAK HOURS OF TRAFFIC WITH PROJECT

FIGURE 7

V. TRAFFIC IMPACT ANALYSIS

The Year 2027 cumulative AM and PM peak hour traffic conditions with the Keawalau Affordable Housing Community development are summarized in Table 5. The existing and projected Year 2027 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 5: Existing and Projected Year 2027 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM			PM		
		Exist	Year 2027		Exist	Year 2027	
			w/out Proj	w/ Proj		w/out Proj	w/ Proj
Farrington Hwy/ Waipahu Depot St	Eastbound	B	B	C	B	B	B
	Westbound	C	C	C	C	C	C
	Northbound	C	C	C	C	C	C
	Southbound	C	C	C	C	C	C
Farrington Hwy/ Mokuola St/ Awalau St	Eastbound	B	B	B	B	B	B
	Westbound	B	B	B	C	C	C
	Northbound	B	B	B	C	C	C
	Southbound	B	B	B	C	C	C
Hikimoe St/ Mokuola St	Eastbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A
Hikimoe St/ Waipahu Depot St	Westbound	B	B	B	B	B	B
	Southbound	A	A	A	A	A	A

Under Year 2027 with project conditions, traffic operations in the vicinity are generally expected to remain similar to without project conditions even with the addition of site-generated vehicles along the surrounding roadways. Many of the proposed commercial and office uses are similar to the existing uses and are expected to be compatible with the new residential uses included in the development plan. Traffic operations at the intersection of Farrington Highway with Waipahu Depot Street are expected to continue operating at LOS "C" or better during both peak hours of traffic while those at the intersection with Mokuola Street and Awalau Street are expected to continue operating at LOS "B" during the AM peak hour and LOS "C" or better during the PM peak hour. Along Hikimoe Street,

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traffic operations at the intersection with Mokuola Street are expected to continue operating at LOS "A" during both peak hours of traffic while those at the intersection with Waipahu Depot Street are expected to continue operating at LOS "B" or better during both peak hours.

VI. MULTIMODAL FACILITIES

A. Pedestrian Facilities

1. Existing Conditions

Pedestrian facilities in the vicinity are generally comprised of sidewalks, marked crosswalks, and curb ramps providing access to nearby transit stops and other destinations in the surrounding area. Along the project frontage on Hikimoe Street and Waipahu Depot Street, continuous improved sidewalks are provided with street lighting along both sides of the roadway. Although improved pedestrian facilities are provided along these roadways, the overall attractiveness of the provided pedestrian facilities are influenced by the generally limited presence of trees, landscaping or other enhanced pedestrian treatments. In addition, the adjacent uses utilize Hikimoe Street for loading and service operations.

Along Farrington Highway, improved sidewalks are also provided along both sides of the roadway with overhead street lighting for pedestrian comfort during the evening hours. However, the overall pedestrian environment is influenced by the high volume of vehicular traffic and overall lack of landscaping treatment or trees that provide intermittent shade. In addition, pedestrian connectivity is also limited. Due to the high volume of traffic along Farrington Highway, the intersections are widely spaced with long street blocks that provide limited crossing opportunities for pedestrians. The distance between Mokuola Street and Awalau Street is approximately 1,200 feet.

2. With Project Conditions

The proposed project is generally expected to maintain the existing pedestrian facilities in the vicinity, with pedestrian connections planned to facilitate access between on-and off-site uses including to the nearby transit facilities. A landscaped pedestrian corridor is also planned within the Mauka

block of the project site near the east edge of the project site to provide an alternate north-south connection between Farrington Highway and Hikimoe Street. In conjunction with these improvements, consideration should also be given to providing enhanced pedestrian treatments along the project frontage on Hikimoe Street, Waipahu Depot Street, and Farrington Highway to increase the attractiveness of the project vicinity, promote pedestrian activity, and enhance the overall pedestrian environment. These may include trees that provide intermittent shade and other landscaping treatments.

B. Bicycle Facilities

1. Methodology

Bicycle Level of Traffic Stress (LTS) is a metric developed by the Mineta Transportation Institute used to classify a roadway segment or intersection. The LTS ranking system is based on the amount of traffic stress imposed on cyclists based on variables such as street width, prevailing vehicle speed, and average daily traffic volumes. The Level of Traffic Stress ranges from 1 to 4 and can be assessed for a given segment or intersection via six tables provided by the Mineta Transportation Institute. The general descriptions of the LTS levels are as follows:

- LTS 1: Characterized by strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
- LTS 2: Except in low speed/low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. There is a physical separation from higher speed and multilane traffic. Crossings are easy for an adult to navigate. This refers to a level of traffic stress that most adults can tolerate, particularly those sometimes classified as interested but concerned.
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. Refers to a level of traffic stress acceptable to those classified as enthused and confident.
- LTS 4: Involves interaction with higher speed traffic or close proximity to high-speed traffic. Refers to a level of stress acceptable only to those classified as strong and fearless.

It should be noted that current LTS methodology assumes no traffic stress is imposed on cyclists at signalized intersections. Guidance provided by

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the Mineta Transportation Institute includes categorizing signalized intersections as a LTS 2.

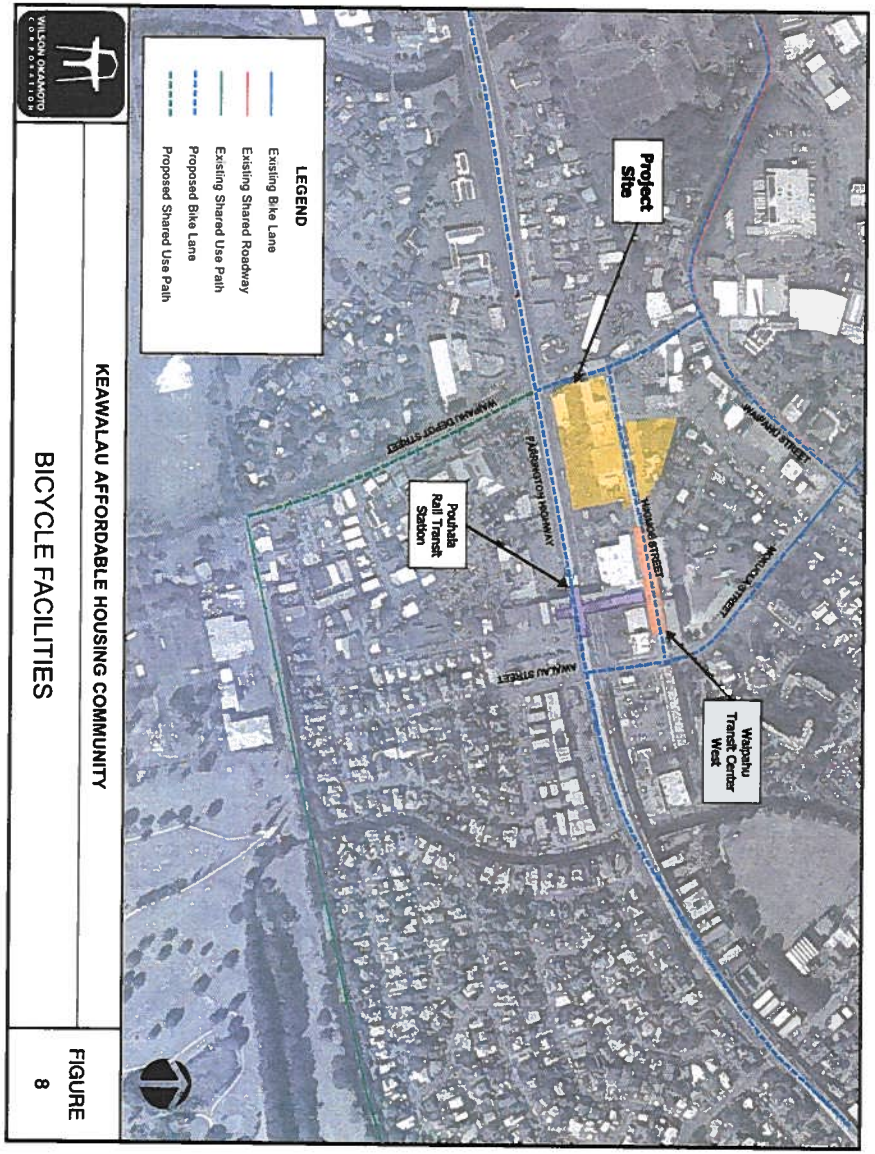
2. Existing Conditions and Bicycle Level of Traffic Stress

There are currently a limited number of designated bicycle facilities in the vicinity of the project with the exception of a shared-use path referred to as the Pearl Harbor Bike Path to the south off Waipahu Depot Street and a small segment of Mokuola Street that includes bike lanes north of the project site (see Figure 8). However, connectivity between these bicycle facilities and project site are limited with bicyclists required to share the travel way with vehicular traffic to access the designated facilities. The lack of designated bike facilities could dissuade the use of this mode in the vicinity of the project. As such, the roadways in the vicinity of the proposed project were assessed to determine the level of stress (LTS) imposed upon bicyclists based upon the prevailing speed and geometric characteristics of the roadway.

With the exception of a small segment of Mokuola Street, the roadways in the vicinity of the project are rated at LTS 3 or higher. Farrington Highway is rated at LTS 4, representing the highest level of traffic stress, while the remaining roadways, Mokuola Street, Awalau Street, Hikimoe Street, and Waipahu Depot Street are rated at LTS 3. The high LTS along these roadways are primarily due to the lack of dedicated facilities in the vicinity, thereby requiring bicyclists to utilize the travel way and interact with vehicular traffic. As such, the conditions along the roadways in the vicinity of the project are better suited for more experienced bicyclists. Figure 9 depicts the existing LTS along the roadways in the vicinity of the project.

3. With Project Conditions

The proposed project is expected to incorporate bike amenities within the project site to encourage the use of this alternative mode of transportation. In addition, the City and County of Honolulu also has future plans to provide the dedicated bicycle facilities in the project vicinity (see Figure 8). As **indicated in the 2019 Update of the "Oahu Bike Plan" published by the City** and County of Honolulu DTS, these improvements include:



KEAWALAU AFFORDABLE HOUSING COMMUNITY

BICYCLE FACILITIES

FIGURE 8

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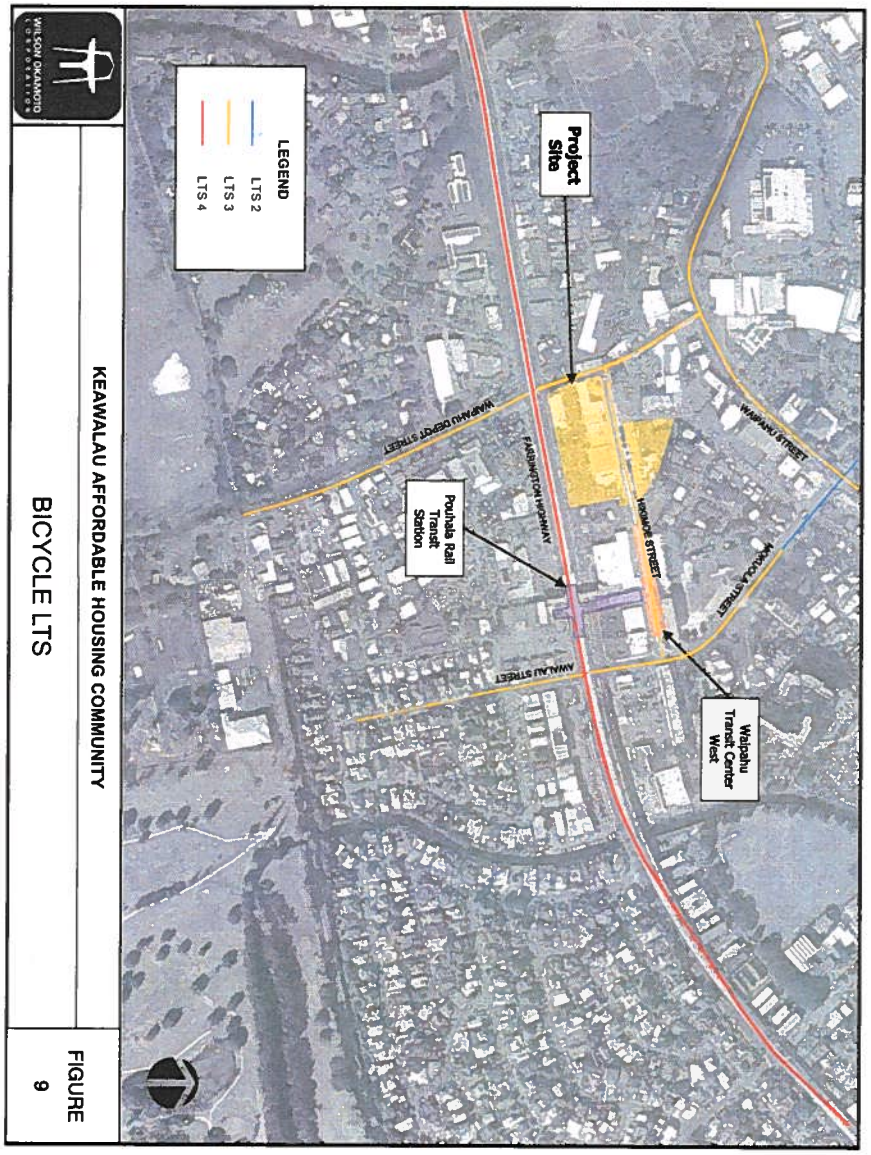
REF-272



KEAWALAU AFFORDABLE HOUSING COMMUNITY

BICYCLE LTS

FIGURE 9

- Extension of the bike lanes along Mokuola Street to Farrington Highway
- Bike lanes along Waipahu Depot Street between Waipahu Street and Farrington Highway
- Bike lanes along Farrington Highway between Fort Weaver Road and Kahualii Street
- Improvement of the existing bike route on Waipahu Street to include bike lanes between Kunia Road and Kamehameha Highway
- A shared-use path along Waipahu Depot Street between Farrington Highway and the Pearl Harbor Bike Path

The addition of these facilities is expected to provide connectivity to existing bicycle facilities north and south of the project site, but the timelines for these improvements are not known at this time.

C. Transit Facilities

1. Methodology

Transit Capacity and Quality of Service is a metric used to measure transit availability, comfort, and convenience from both the passenger and transit service provider's points of view. The framework for this metric is outlined in the Transit Cooperative Research Program (TCRP) Report 165: Transit Capacity and Quality of Service Manual (TCQSM), 3rd Edition published in 2013 which provides research-based guidance on public transit capacity and quality of service. The quality of service concepts and methods contained in the TCQSM address real-world transit operations, comprehensive planning, and design needs. The research for and development of the TCQSM has also directly supported the development of the Multimodal Level of Service (LOS) analysis methodologies introduced in the Highway Capacity Manual (HCM) 2010 and subsequently refined in HCM 6. Multimodal LOS analyzes a roadway corridor comprised of street segments which are defined as a length of street between intersections where traffic may have to stop due to traffic control. Transit LOS can be directly compared to other transportation modes with LOS "A" representing the best quality of service and the letter "F" used to represent the worst quality of service. The assessment evaluates the quality of transit operations incorporating factors that bear all aspect of a transit trip including the pedestrian environment along

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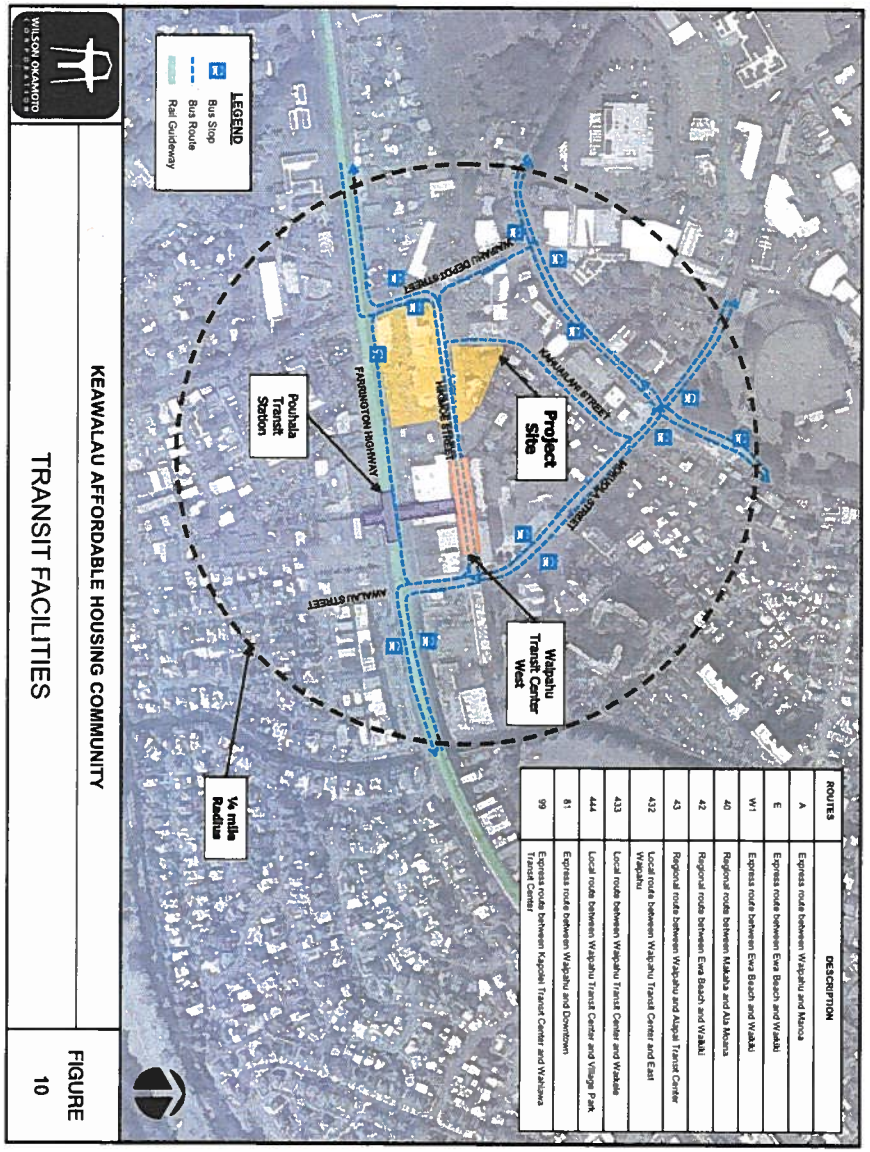
the street, service frequency and reliability, and the availability of transit amenities at those stop locations.

2. Existing Conditions and Transit LOS

Transit service in the project vicinity is provided by "TheBus" which is operated by the Oahu Transit Services (OTS) for the City and County of Honolulu Department of Transportation Services. There are a number of transit resources within close proximity to the project site, including the Waipahu Transit Center West adjacent to the project site (see Figure 10). Based on the Transit Capacity and Quality of Service Manual (TCQSM), a quarter mile represents the maximum distance that people will walk to a transit stop which is equivalent to approximately 5 minutes of walking time. To verify the existing quality of service for the transit facilities in the project vicinity, an assessment of the facilities located within a quarter-mile radius of the project site was conducted based on the methodology outlined by the TCQSM. The assessment indicates that transit service along the roadways in the vicinity of the project **operates at LOS "C" or** better since it is served by a number of local and regional routes, as well express routes. As such, service is relatively frequent with most of the routes with headways of 30 minutes or less. In addition, a number of the nearby transit stops include amenities like benches and shelters with access to the bus stops facilitated via improved pedestrian facilities along the adjacent roadways. LOS calculations are included in Appendix F.

3. With Project Conditions

Transit service in the vicinity of the project under with project conditions is generally expected to improve from existing conditions. As previously discussed, the City and County of Honolulu is currently constructing a fixed guideway rail system that will extend from East Kapolei to Honolulu thereby providing an alternate mode of travel through the area with the nearest rail station located immediately east of the project site at the recently constructed Pouhala Rail Station. This station will include a kiss-and-ride, bicycle amenities, and a connection to the adjacent Waipahu Transit



ROUTES	DESCRIPTION
A	Express route between Waipahu and Manoa
E	Express route between Ewa Beach and Waikiki
W1	Express route between Ewa Beach and Waikiki
40	Regional route between Makakilo and Ala Moana
42	Regional route between Ewa Beach and Waikiki
43	Regional route between Waipahu and Alapai Transit Center
432	Local route between Waipahu Transit Center and East Waipahu
433	Local route between Waipahu Transit Center and Waikele
444	Local route between Waipahu Transit Center and Village Park
81	Express route between Waipahu and Downtown
99	Express route between Kapolei Transit Center and Wahiawa Transit Center

KEAWALAU AFFORDABLE HOUSING COMMUNITY

TRANSIT FACILITIES

FIGURE 10

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Center West. The first phase of the rail system which extends between Kapolei and the Halawa Rail Station (Aloha Stadium) is expected to be partially operational under with project conditions, but as previously discussed, the additional influence of the rail system was not incorporated into projected conditions for a conservative analysis since there is already a high transit mode share in the vicinity.

VII. 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. Provide sufficient sight distance for motorists to safely enter and exit the 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. Consider restricting traffic movements at the driveway off Waipahu Depot Street to right-turn-out movements only due to the proximity of that intersection to Farrington Highway.

6. As shown in the project site plan, align the project driveway for the Makai Block off Hikimoe Street with the intersection with Kahuailani Street to minimize conflicts between turning vehicles and queues at these locations. The dimensions shall be determined during the design phases and coordinated with the appropriate design review/approval agencies for acceptance.

7. If access at the entrances to the parking garages are controlled, provide sufficient storage for entering vehicles at the parking area access controls (i.e. automatic gate, etc.) to ensure that queues do not extend onto the adjacent roadways. The layout and dimensions shall be determined during the design phase.

8. Provide sufficient turning radii along the internal connections, particularly within the Makai block, to accommodate all anticipated vehicle types for the proposed uses.

9. Verify adequate sight distances at the internal intersections within the project site to ensure motorists and pedestrians are aware of the presence of one another at these locations.

10. Provide adequate pedestrian connections between the on-site uses and off-site facilities. All pedestrian connections should be made accessible in conformance with the American with Disabilities Act (ADA). In addition, incorporate Complete Streets principles along the roadways adjacent to the project site to increase the attractiveness of the overall pedestrian environment. These may include provision of wider sidewalks and the addition of canopy trees and other landscaping treatments.

11. Coordinate with the City and County of Honolulu to get their concurrence on the proposed midblock crosswalk locations shown on the project site plan along Hikimoe Street and Kahuailani Street. If the proposed crosswalks are to be included, assess if additional crossing treatments are necessary to facilitate pedestrian crossings given the anticipated increase in pedestrian activity in the vicinity.

12. Incorporate bicycle facilities within the project boundaries including designated and secured bicycle parking to encourage the use of alternate modes of transportation. In addition, provide adequate connections to and from the bike parking areas to ensure convenient and safe pedestrian and bicyclist access, as well as connections to the planned bicycle facilities along the roadways adjacent to the project site.

13. Coordinate with the City and County of Honolulu Department of Transportation Services and the State of Hawaii Department of Transportation during the design phase to assist with the development of bicycle facilities proposed by the City and State bike plans in the vicinity of the project including the bike lanes planned along Hikimoe Street and Waipahu Depot Street.

14. Prepare a Construction Management Plan (CMP) that includes the anticipated construction schedule and phasing, as well as traffic circulation, traffic control and parking during the construction period.

15. Prepare a Transportation Management Plan (TMP) which includes traffic circulation, parking, loading, and traffic demand management (TDM) strategies to further minimize the impact of the development on the surrounding roadway network. It should be noted that given the density of conflict points and layout of parking within the Makai block, parking management strategies may be necessary to minimize on-site conflicts and queuing.

VIII. CONCLUSION

The proposed project entails redevelopment of several parcels north and south of Hikimoe Street to include a new mixed-use development with commercial, residential, and office uses. Access to the north parcels (Mauka block) is expected to be provided via

REF-275

driveways off Kahuailani Street while access to the south parcels (Makai block) is expected to be provided via driveways off Farrington Highway, Hikimoe Street, and Waipahu Depot Street. The entire project is expected to be completed by Year 2027. With the implementation of the aforementioned recommendations, traffic operations are generally expected to remain similar to without project conditions. Many of the proposed commercial and office uses are expected to be similar to the existing uses and are anticipated to be compatible with the new residential uses included in the development plan. Although traffic operations are generally expected to remain similar to without project conditions, the development of multimodal facilities and coordination with the City and State agencies with regards to their bicycle plans in the vicinity of the project is recommended to encourage the use alternative modes of transportation. In addition, a Transportation Management Plan that includes parking management strategies, as well as traffic circulation, loading, and travel demand management strategies should also be prepared in conjunction with the development to further minimize the impact of the proposed project on the surrounding roadway network.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

REF-276

REF-277

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counted By:RV, JB
Counters:TU-0650, TU-0654
Weather: CLEAR

File Name : FarWai AM-U-Turns ONLY
Site Code : 00000003
Start Date : 4/28/2022
Page No : 1

Groups Printed- Unshifted

	Farrington Hwy Westbound		Farrington Hwy Eastbound		
Start Time	U-Turn	App. Total	Left	App. Total	Int. Total
06:30 AM	3	3	9	9	12
06:45 AM	3	3	6	6	9
Total	6	6	15	15	21
07:00 AM	6	6	15	15	21
07:15 AM	5	5	41	41	46
07:30 AM	12	12	24	24	36
07:45 AM	6	6	20	20	26
Total	29	29	100	100	129
08:00 AM	4	4	12	12	16
08:15 AM	5	5	0	0	5
Grand Total	44	44	127	127	171
Apprch %	100		100		
Total %	25.7	25.7	74.3	74.3	

	Farrington Hwy Westbound		Farrington Hwy Eastbound		
Start Time	U-Turn	App. Total	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:00 AM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 07:00 AM					
07:00 AM	6	6	15	15	21
07:15 AM	5	5	41	41	46
07:30 AM	12	12	24	24	36
07:45 AM	6	6	20	20	26
Total Volume	29	29	100	100	129
% App. Total	100		100		
PHF	.604	.604	.610	.610	.701

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counted By: RV, JB
Counters: TU-0654, TU-0650
Weather: CLEAR

File Name : FarWai AM1
Site Code : 00000003
Start Date : 4/28/2022
Page No : 1

Groups Printed- Unshifted

	Waipahu Depot St Southbound					Farrington Hwy Westbound					Waipahu Depot St Northbound					Farrington Hwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	36	15	14	4	69	8	139	21	0	168	5	4	4	4	17	12	309	26	2	349	603
06:45 AM	31	12	17	10	70	15	136	22	12	185	7	2	7	6	22	17	263	35	9	324	601
Total	67	27	31	14	139	23	275	43	12	353	12	6	11	10	39	29	572	61	11	673	1204
07:00 AM	27	6	22	4	59	9	188	16	4	217	9	10	8	1	28	12	281	47	6	346	650
07:15 AM	44	9	34	4	91	16	190	17	12	235	7	10	20	8	45	26	272	58	6	362	733
07:30 AM	48	7	24	11	90	16	222	15	6	259	6	12	19	6	43	23	236	69	12	340	732
07:45 AM	40	6	32	5	83	22	253	22	3	300	13	12	8	1	34	15	236	60	4	315	732
Total	159	28	112	24	323	63	853	70	25	1011	35	44	55	16	150	76	1025	234	28	1363	2847
08:00 AM	40	11	16	5	72	23	183	23	3	232	8	6	16	3	33	25	151	36	5	217	554
08:15 AM	41	8	24	4	77	20	182	22	4	228	0	0	0	0	0	0	0	0	0	0	305
Grand Total	307	74	183	47	611	129	1493	158	44	1824	55	56	82	29	222	130	1748	331	44	2253	4910
Apprch %	50.2	12.1	30	7.7		7.1	81.9	8.7	2.4		24.8	25.2	36.9	13.1		5.8	77.6	14.7	2		
Total %	6.3	1.5	3.7	1	12.4	2.6	30.4	3.2	0.9	37.1	1.1	1.1	1.7	0.6	4.5	2.6	35.6	6.7	0.9	45.9	

	Waipahu Depot St Southbound				Farrington Hwy Westbound				Waipahu Depot St Northbound				Farrington Hwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	27	6	22	55	9	188	16	213	9	10	8	27	12	281	47	340	635
07:15 AM	44	9	34	87	16	190	17	223	7	10	20	37	26	272	58	356	703
07:30 AM	48	7	24	79	16	222	15	253	6	12	19	37	23	236	69	328	697
07:45 AM	40	6	32	78	22	253	22	297	13	12	8	33	15	236	60	311	719
Total Volume	159	28	112	299	63	853	70	986	35	44	55	134	76	1025	234	1335	2754
% App. Total	53.2	9.4	37.5		6.4	86.5	7.1		26.1	32.8	41		5.7	76.8	17.5		
PHF	.828	.778	.824	.859	.716	.843	.795	.830	.673	.917	.688	.905	.731	.912	.848	.938	.958

REF-278

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counted By:RV, GC
Counters:TU-0650,TU-0654
Weather:

File Name : FarWai PM-U-Turns ONLY
Site Code : 00000003
Start Date : 4/28/2022
Page No : 1

Groups Printed- Unshifted

	Farrington Hwy Westbound		Farrington Hwy Eastbound		
Start Time	Left	App. Total	U-Turn	App. Total	Int. Total
03:30 PM	10	10	18	18	28
03:45 PM	12	12	16	16	28
Total	22	22	34	34	56
04:00 PM	8	8	12	12	20
04:15 PM	9	9	24	24	33
04:30 PM	9	9	24	24	33
04:45 PM	7	7	14	14	21
Total	33	33	74	74	107
05:00 PM	7	7	15	15	22
05:15 PM	8	8	30	30	38
Grand Total	70	70	153	153	223
Apprch %	100		100		
Total %	31.4	31.4	68.6	68.6	

	Farrington Hwy Westbound		Farrington Hwy Eastbound		
Start Time	Left	App. Total	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 03:45 PM					
03:45 PM	12	12	16	16	28
04:00 PM	8	8	12	12	20
04:15 PM	9	9	24	24	33
04:30 PM	9	9	24	24	33
Total Volume	38	38	76	76	114
% App. Total	100		100		
PHF	.792	.792	.792	.792	.864

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counted By:RV, GC
Counters: TU-0650, TU-0654
Weather: CLEAR

File Name : FarWai PM1
Site Code : 00000003
Start Date : 4/28/2022
Page No : 1

Groups Printed- Unshifted

	Waipahu Depot St Southbound					Farrington Hwy Westbound					Waipahu Depot St Northbound					Farrington Hwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	45	5	9	5	64	13	304	11	2	330	39	12	30	0	81	13	174	31	2	220	695
03:45 PM	55	9	17	5	86	4	296	10	6	316	14	8	18	4	44	13	156	28	3	200	646
Total	100	14	26	10	150	17	600	21	8	646	53	20	48	4	125	26	330	59	5	420	1341
04:00 PM	39	8	14	5	66	20	276	5	2	303	28	4	21	2	55	19	153	45	4	221	645
04:15 PM	44	7	11	3	65	10	268	9	2	289	15	7	17	5	44	14	189	24	2	229	627
04:30 PM	49	9	19	3	80	10	316	8	0	334	17	10	17	5	49	14	188	30	1	233	696
04:45 PM	55	5	12	3	75	14	281	5	1	301	11	6	13	2	32	14	156	33	3	206	614
Total	187	29	56	14	286	54	1141	27	5	1227	71	27	68	14	180	61	686	132	10	889	2582
05:00 PM	50	6	25	2	83	7	295	13	2	317	23	6	15	4	48	14	166	20	3	203	651
05:15 PM	53	5	19	3	80	11	288	9	2	310	10	7	14	5	36	8	146	31	1	186	612
Grand Total	390	54	126	29	599	89	2324	70	17	2500	157	60	145	27	389	109	1328	242	19	1698	5186
Apprch %	65.1	9	21	4.8		3.6	93	2.8	0.7		40.4	15.4	37.3	6.9		6.4	78.2	14.3	1.1		
Total %	7.5	1	2.4	0.6	11.6	1.7	44.8	1.3	0.3	48.2	3	1.2	2.8	0.5	7.5	2.1	25.6	4.7	0.4	32.7	

	Waipahu Depot St Southbound				Farrington Hwy Westbound				Waipahu Depot St Northbound				Farrington Hwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	55	9	17	81	4	296	10	310	14	8	18	40	13	156	28	197	628
04:00 PM	39	8	14	61	20	276	5	301	28	4	21	53	19	153	45	217	632
04:15 PM	44	7	11	62	10	268	9	287	15	7	17	39	14	189	24	227	615
04:30 PM	49	9	19	77	10	316	8	334	17	10	17	44	14	188	30	232	687
Total Volume	187	33	61	281	44	1156	32	1232	74	29	73	176	60	686	127	873	2562
% App. Total	66.5	11.7	21.7		3.6	93.8	2.6		42	16.5	41.5		6.9	78.6	14.5		
PHF	.850	.917	.803	.867	.550	.915	.800	.922	.661	.725	.869	.830	.789	.907	.706	.941	.932

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:GH/JT
Counters:TU-0652/TU-2050
Weather:Clear/Sunny

File Name : FarMok PM
Site Code : 00000004
Start Date : 4/28/2022
Page No : 1

REF-279

Groups Printed- Unshifted

	Mokuola St Southbound					Farrington Hwy Westbound					Mokuola St Northbound					Farrington Hwy 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
03:30 PM	21	5	32	5	63	12	289	17	16	334	11	6	5	0	22	40	201	6	0	247	666
03:45 PM	26	12	26	2	66	13	282	19	10	324	12	3	0	0	15	37	154	6	0	197	602
Total	47	17	58	7	129	25	571	36	26	658	23	9	5	0	37	77	355	12	0	444	1268
04:00 PM	25	8	24	4	61	8	258	16	13	295	20	10	0	0	30	23	203	8	0	234	620
04:15 PM	28	10	21	5	64	8	242	10	6	266	9	3	7	0	19	32	195	13	0	240	589
04:30 PM	28	9	19	3	59	22	296	25	11	354	23	6	3	0	32	32	191	14	0	237	682
04:45 PM	27	13	17	2	59	7	282	17	10	316	13	10	1	0	24	29	173	10	0	212	611
Total	108	40	81	14	243	45	1078	68	40	1231	65	29	11	0	105	116	762	45	0	923	2502
05:00 PM	29	5	17	4	55	11	276	26	10	323	23	11	3	0	37	25	200	11	0	236	651
05:15 PM	0	0	0	0	0	9	254	19	10	292	18	6	4	0	28	0	0	0	0	0	320
Grand Total	184	62	156	25	427	90	2179	149	86	2504	129	55	23	0	207	218	1317	68	0	1603	4741
Apprch %	43.1	14.5	36.5	5.9		3.6	87	6	3.4		62.3	26.6	11.1	0		13.6	82.2	4.2	0		
Total %	3.9	1.3	3.3	0.5	9	1.9	46	3.1	1.8	52.8	2.7	1.2	0.5	0	4.4	4.6	27.8	1.4	0	33.8	

	Mokuola St Southbound				Farrington Hwy Westbound				Mokuola St Northbound				Farrington Hwy 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 03:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	28	10	21	59	8	242	10	260	9	3	7	19	32	195	13	240	578
04:30 PM	28	9	19	56	22	296	25	343	23	6	3	32	32	191	14	237	668
04:45 PM	27	13	17	57	7	282	17	306	13	10	1	24	29	173	10	212	599
05:00 PM	29	5	17	51	11	276	26	313	23	11	3	37	25	200	11	236	637
Total Volume	112	37	74	223	48	1096	78	1222	68	30	14	112	118	759	48	925	2482
% App. Total	50.2	16.6	33.2		3.9	89.7	6.4		60.7	26.8	12.5		12.8	82.1	5.2		
PHF	.966	.712	.881	.945	.545	.926	.750	.891	.739	.682	.500	.757	.922	.949	.857	.964	.929

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:BE/GH
Counters:TU-0652/TU-2050
Weather:Clear/Sunny

File Name : FarMok AM
Site Code : 00000004
Start Date : 4/28/2022
Page No : 1

Groups Printed- Unshifted

	Mokuola St Southbound					Farrington Hwy Westbound					Awalau St Northbound					Farrington Hwy 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
06:30 AM	14	4	5	1	24	5	144	3	10	162	11	6	13	6	36	22	326	7	0	355	577
06:45 AM	18	7	15	4	44	4	161	9	6	180	7	6	10	5	28	19	260	15	0	294	546
Total	32	11	20	5	68	9	305	12	16	342	18	12	23	11	64	41	586	22	0	649	1123
07:00 AM	23	4	18	2	45	5	176	12	12	205	13	9	18	4	44	21	283	15	0	319	613
07:15 AM	30	3	23	2	58	8	203	15	10	236	15	15	12	4	46	41	256	12	0	309	649
07:30 AM	29	7	21	7	64	8	221	13	7	249	23	11	6	0	40	34	234	15	0	283	636
07:45 AM	18	8	26	4	56	11	256	11	8	286	16	3	7	1	27	29	167	17	0	213	582
Total	100	22	88	15	223	32	856	51	37	976	67	38	43	9	157	125	940	59	0	1124	2480
08:00 AM	17	4	15	3	39	6	183	19	8	216	16	7	5	3	31	28	164	15	0	207	493
08:15 AM	25	13	19	2	59	0	0	1	0	1	0	0	0	0	0	24	119	10	0	153	213
Grand Total	174	50	140	25	389	47	1344	83	61	1535	101	57	71	23	252	218	1809	106	0	2133	4309
Apprch %	44.7	12.9	36	6.4		3.1	87.6	5.4	4		40.1	22.6	28.2	9.1		10.2	84.8	5	0		
Total %	4	1.2	3.2	0.6	9	1.1	31.2	1.9	1.4	35.6	2.3	1.3	1.6	0.5	5.8	5.1	42	2.5	0	49.5	

	Mokuola St Southbound				Farrington Hwy Westbound				Awalau St Northbound				Farrington Hwy 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 06:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	23	4	16	43	5	176	12	193	13	9	18	40	21	283	15	319	595
07:15 AM	30	3	23	56	8	203	15	226	15	15	12	42	41	256	12	309	633
07:30 AM	29	7	21	57	8	221	13	242	23	11	6	40	34	234	15	283	622
07:45 AM	18	8	26	52	11	256	11	278	16	3	7	26	29	167	17	213	569
Total Volume	100	22	86	208	32	856	51	939	67	38	43	148	125	940	59	1124	2419
% App. Total	48.1	10.6	41.3		3.4	91.2	5.4		45.3	25.7	29.1		11.1	83.6	5.2		
PHF	.833	.688	.827	.912	.727	.836	.850	.844	.728	.633	.597	.881	.762	.830	.868	.881	.955

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:GC/RV
Counters:TU-0652/TU-2050
Weather:Clear/Sunny

File Name : HikMok PM
Site Code : 00000002
Start Date : 4/27/2022
Page No : 1

Groups Printed- Unshifted

	Mokuola St Southbound					Mokuola St Northbound			Hikimoe St Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:30 PM	0	31	25	7	63	16	64	80	19	0	15	2	36	179
03:45 PM	0	47	20	10	77	11	64	75	21	0	14	4	39	191
Total	0	78	45	17	140	27	128	155	40	0	29	6	75	370
04:00 PM	0	36	22	5	63	11	46	57	25	0	16	1	42	162
04:15 PM	0	34	16	5	55	10	41	51	24	0	13	0	37	143
04:30 PM	0	44	19	8	71	16	76	92	27	0	12	1	40	203
04:45 PM	0	37	30	12	79	11	56	67	14	0	13	3	30	176
Total	0	151	87	30	268	48	219	267	90	0	54	5	149	684
05:00 PM	0	34	18	5	57	17	55	72	26	0	18	1	45	174
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	263	150	52	465	92	402	494	156	0	101	12	269	1228
Apprch %	0	56.6	32.3	11.2		18.6	81.4		58	0	37.5	4.5		
Total %	0	21.4	12.2	4.2	37.9	7.5	32.7	40.2	12.7	0	8.2	1	21.9	

	Mokuola St Southbound				Mokuola St Northbound			Hikimoe St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:00 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 03:45 PM												
03:45 PM	0	47	20	67	11	64	75	21	0	14	35	177
04:00 PM	0	36	22	58	11	46	57	25	0	16	41	158
04:15 PM	0	34	16	50	10	41	51	24	0	13	37	138
04:30 PM	0	44	19	63	16	76	92	27	0	12	39	194
Total Volume	0	161	77	238	48	227	275	97	0	55	152	665
% App. Total	0	67.6	32.4		17.5	82.5		63.8	0	36.2		
PHF	.000	.856	.875	.888	.750	.747	.747	.898	.000	.859	.927	.857

REF-280

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:GC/RV
Counters:TU-0652/TU-2050
Weather:Clear/Sunny

File Name : HikMok AM
Site Code : 00000002
Start Date : 4/27/2022
Page No : 1

Groups Printed- Unshifted

	Mokuola St Southbound					Mokuola St Northbound			Hikimoe St Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	1	26	6	3	36	4	30	34	11	0	8	0	19	89
06:45 AM	0	27	14	3	44	7	34	41	9	0	8	4	21	106
Total	1	53	20	6	80	11	64	75	20	0	16	4	40	195
07:00 AM	0	34	13	3	50	8	46	54	11	0	8	1	20	124
07:15 AM	0	46	17	5	68	10	67	77	8	0	14	6	28	173
07:30 AM	0	34	17	9	60	15	66	81	10	0	12	3	25	166
07:45 AM	0	42	14	9	65	14	51	65	14	0	12	3	29	159
Total	0	156	61	26	243	47	230	277	43	0	46	13	102	622
08:00 AM	0	26	14	11	51	15	49	64	14	0	10	0	24	139
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	235	95	43	374	73	343	416	77	0	72	17	166	956
Apprch %	0.3	62.8	25.4	11.5		17.5	82.5		46.4	0	43.4	10.2		
Total %	0.1	24.6	9.9	4.5	39.1	7.6	35.9	43.5	8.1	0	7.5	1.8	17.4	

	Mokuola St Southbound				Mokuola St Northbound			Hikimoe St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:00 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:15 AM												
07:15 AM	0	46	17	63	10	67	77	8	0	14	22	162
07:30 AM	0	34	17	51	15	66	81	10	0	12	22	154
07:45 AM	0	42	14	56	14	51	65	14	0	12	26	147
08:00 AM	0	26	14	40	15	49	64	14	0	10	24	128
Total Volume	0	148	62	210	54	233	287	46	0	48	94	591
% App. Total	0	70.5	29.5		18.8	81.2		48.9	0	51.1		
PHF	.000	.804	.912	.833	.900	.869	.886	.821	.000	.857	.904	.912

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:GH
Counters:TU-0650
Weather:Clear/Sunny

File Name : HikWai PM
Site Code : 00000001
Start Date : 4/27/2022
Page No : 1

Groups Printed- Unshifted

	Waipahu Depot Rd Southbound			Hikimoe St Westbound				Waipahu Depot Rd Northbound			
Start Time	Left	Thru	App. Total	Left	Right	Peds	App. Total	Thru	Right	App. Total	Int. Total
03:30 PM	9	59	68	35	16	3	54	28	26	54	176
03:45 PM	10	35	45	21	14	3	38	33	35	68	151
Total	19	94	113	56	30	6	92	61	61	122	327
04:00 PM	9	39	48	31	18	3	52	17	23	40	140
04:15 PM	8	44	52	22	11	1	34	30	29	59	145
04:30 PM	14	48	62	28	10	2	40	28	16	44	146
04:45 PM	14	30	44	29	20	1	50	23	17	40	134
Total	45	161	206	110	59	7	176	98	85	183	565
05:00 PM	13	42	55	26	14	11	51	17	25	42	148
05:15 PM	7	41	48	22	9	4	35	31	28	59	142
Grand Total	84	338	422	214	112	28	354	207	199	406	1182
Apprch %	19.9	80.1		60.5	31.6	7.9		51	49		
Total %	7.1	28.6	35.7	18.1	9.5	2.4	29.9	17.5	16.8	34.3	

	Waipahu Depot Rd Southbound			Hikimoe St Westbound			Waipahu Depot Rd Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:30 PM										
03:30 PM	9	59	68	35	16	51	28	26	54	173
03:45 PM	10	35	45	21	14	35	33	35	68	148
04:00 PM	9	39	48	31	18	49	17	23	40	137
04:15 PM	8	44	52	22	11	33	30	29	59	144
Total Volume	36	177	213	109	59	168	108	113	221	602
% App. Total	16.9	83.1		64.9	35.1		48.9	51.1		
PHF	.900	.750	.783	.779	.819	.824	.818	.807	.813	.870

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted By:GH
Counters:TU-0650
Weather:Clear/Sunny

File Name : HikWai AM
Site Code : 00000001
Start Date : 4/27/2022
Page No : 1

Groups Printed- Unshifted

	Waipahu Depot Rd Southbound			Hikimoe St Westbound				Waipahu Depot Rd Northbound			
Start Time	Left	Thru	App. Total	Left	Right	Peds	App. Total	Thru	Right	App. Total	Int. Total
06:30 AM	6	55	61	11	8	0	19	33	11	44	124
06:45 AM	4	71	75	16	8	2	26	46	23	69	170
Total	10	126	136	27	16	2	45	79	34	113	294
07:00 AM	6	63	69	22	9	8	39	59	19	78	186
07:15 AM	12	62	74	25	1	16	42	64	28	92	208
07:30 AM	7	75	82	26	9	10	45	74	22	96	223
07:45 AM	9	59	68	28	14	8	50	49	21	70	188
Total	34	259	293	101	33	42	176	246	90	336	805
08:00 AM	12	35	47	16	10	5	31	44	20	64	142
08:15 AM	8	47	55	9	13	11	33	26	21	47	135
Grand Total	64	467	531	153	72	60	285	395	165	560	1376
Apprch %	12.1	87.9		53.7	25.3	21.1		70.5	29.5		
Total %	4.7	33.9	38.6	11.1	5.2	4.4	20.7	28.7	12	40.7	

	Waipahu Depot Rd Southbound			Hikimoe St Westbound			Waipahu Depot Rd Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	6	63	69	22	9	31	59	19	78	178
07:15 AM	12	62	74	25	1	26	64	28	92	192
07:30 AM	7	75	82	26	9	35	74	22	96	213
07:45 AM	9	59	68	28	14	42	49	21	70	180
Total Volume	34	259	293	101	33	134	246	90	336	763
% App. Total	11.6	88.4		75.4	24.6		73.2	26.8		
PHF	.708	.863	.893	.902	.589	.798	.831	.804	.875	.896

REF-281

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR AUTOMOBILES AT SIGNALIZED INTERSECTIONS

LOS A describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual ***cycle failures*** (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most Cycles fail to clear the queue.

A lane group can incur a delay less than 80s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicated that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80s/veh represents failure from a delay perspective).

"Highway Capacity Manual," Transportation Research Board, 2016.

REF-282

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE (LOS) CRITERIA FOR AUTOMOBILES AT A TWO-WAY STOP CONTROLLED (TWSC) INTERSECTIONS

LOS for a TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using criteria shown below. Major-street through vehicles are assumed to experience zero delay. LOS F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay.

The following lists the LOS criteria for a TWSC intersection:

LOS A describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0.

LOS B describes operations with a control delay between 10s/veh and 15s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS C describes operations with a control delay between 15s/veh and 25s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS D describes operations with a control delay between 25s/veh and 35s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS E describes operations with a control delay between 35s/veh and 50s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS F describes operations with a control exceeding 50s/veh and a volume-to-capacity ratio no greater than 1.0 or when the volume-to-capacity ratio exceeds 1.0, regardless of the measurement of the control delay.

"Highway Capacity Manual," Transportation Research Board, 2016.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

REF-283

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	334	1025	76	99	853	63	55	44	35	112	28	159
Future Volume (veh/h)	334	1025	76	99	853	63	55	44	35	112	28	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	1068	79	103	889	66	57	46	0	117	29	166
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	404	1686	125	135	1179	88	174	121		319	70	362
Arrive On Green	0.23	0.50	0.50	0.08	0.35	0.35	0.23	0.23	0.00	0.23	0.23	0.23
Sat Flow, veh/h	1781	3350	248	1781	3347	248	444	524	1585	1023	304	1564
Grp Volume(v), veh/h	348	566	581	103	472	483	103	0	0	146	0	166
Grp Sat Flow(s),veh/h/ln	1781	1777	1821	1781	1777	1819	968	0	1585	1327	0	1564
Q Serve(g_s), s	14.8	18.4	18.4	4.5	18.5	18.5	3.1	0.0	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s	14.8	18.4	18.4	4.5	18.5	18.5	11.0	0.0	0.0	7.9	0.0	7.2
Prop In Lane	1.00		0.14	1.00		0.14	0.55		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	404	894	916	135	626	641	295	0		389	0	362
V/C Ratio(X)	0.86	0.63	0.63	0.77	0.75	0.75	0.35	0.00		0.38	0.00	0.46
Avail Cap(c_a), veh/h	1240	2339	2398	451	1552	1589	701	0		800	0	812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.4	14.3	14.3	35.8	22.6	22.6	27.9	0.0	0.0	26.3	0.0	26.1
Incr Delay (d2), s/veh	5.5	0.7	0.7	8.7	1.9	1.8	0.7	0.0	0.0	0.6	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	6.7	6.8	2.2	7.5	7.6	1.8	0.0	0.0	2.4	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	15.1	15.0	44.5	24.4	24.4	28.6	0.0	0.0	26.9	0.0	27.0
LnGrp LOS	C	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1495			1058			103	A		312	
Approach Delay, s/veh		19.7			26.4			28.6			26.9	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	44.8		23.3	22.9	32.8		23.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	104.0		41.0	55.0	69.0		41.0				
Max Q Clear Time (g_c+I1), s	6.5	20.4		9.9	16.8	20.5		13.0				
Green Ext Time (p_c), s	0.2	10.0		1.5	1.1	7.3		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			23.1									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	686	60	70	1156	44	73	29	74	61	33	187
Future Volume (veh/h)	203	686	60	70	1156	44	73	29	74	61	33	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	216	730	64	74	1230	47	78	31	0	65	35	199
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	263	1825	160	97	1603	61	222	77		270	131	335
Arrive On Green	0.15	0.55	0.55	0.05	0.46	0.46	0.21	0.21	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1781	3301	289	1781	3487	133	694	358	1585	929	612	1563
Grp Volume(v), veh/h	216	393	401	74	626	651	109	0	0	100	0	199
Grp Sat Flow(s),veh/h/ln	1781	1777	1813	1781	1777	1844	1052	0	1585	1540	0	1563
Q Serve(g_s), s	9.9	10.7	10.7	3.4	24.7	24.8	5.3	0.0	0.0	0.0	0.0	9.6
Cycle Q Clear(g_c), s	9.9	10.7	10.7	3.4	24.7	24.8	9.7	0.0	0.0	4.4	0.0	9.6
Prop In Lane	1.00		0.16	1.00		0.07	0.72		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	263	983	1003	97	817	848	299	0		401	0	335
V/C Ratio(X)	0.82	0.40	0.40	0.77	0.77	0.77	0.36	0.00		0.25	0.00	0.59
Avail Cap(c_a), veh/h	783	2302	2349	360	1879	1950	618	0		776	0	724
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.8	10.8	10.8	39.3	19.0	19.0	30.6	0.0	0.0	27.6	0.0	29.7
Incr Delay (d2), s/veh	6.3	0.3	0.3	11.8	1.5	1.5	0.7	0.0	0.0	0.3	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	3.8	3.9	1.8	9.6	9.9	2.0	0.0	0.0	1.7	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	11.1	11.1	51.1	20.5	20.5	31.4	0.0	0.0	27.9	0.0	31.4
LnGrp LOS	D	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1010			1351			109	A		299	
Approach Delay, s/veh		17.5			22.2			31.4			30.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	51.5		23.0	17.4	43.7		23.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	109.0		39.0	37.0	89.0		39.0				
Max Q Clear Time (g_c+I1), s	5.4	12.7		11.6	11.9	26.8		11.7				
Green Ext Time (p_c), s	0.1	5.7		1.3	0.6	11.9		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			21.7									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

REF-284

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	940	59	32	856	51	67	38	43	100	22	86
Future Volume (veh/h)	125	940	59	32	856	51	67	38	43	100	22	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	979	61	33	892	53	70	40	45	104	23	90
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	1486	93	62	1278	76	256	147	131	265	74	181
Arrive On Green	0.10	0.44	0.44	0.03	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	3397	212	1781	3404	202	598	505	451	622	255	622
Grp Volume(v), veh/h	130	512	528	33	466	479	155	0	0	217	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1832	1781	1777	1829	1555	0	0	1499	0	0
Q Serve(g_s), s	4.5	14.4	14.4	1.2	14.0	14.0	0.0	0.0	0.0	2.5	0.0	0.0
Cycle Q Clear(g_c), s	4.5	14.4	14.4	1.2	14.0	14.0	4.4	0.0	0.0	6.9	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.11	0.45		0.29	0.48		0.41
Lane Grp Cap(c), veh/h	172	777	801	62	667	687	535	0	0	520	0	0
V/C Ratio(X)	0.75	0.66	0.66	0.53	0.70	0.70	0.29	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	816	2751	2836	310	2245	2312	1394	0	0	1362	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.9	14.1	14.1	30.0	16.7	16.7	17.5	0.0	0.0	18.2	0.0	0.0
Incr Delay (d2), s/veh	6.6	1.0	0.9	6.9	1.3	1.3	0.3	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	5.1	5.3	0.6	5.4	5.5	1.7	0.0	0.0	2.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	15.0	15.0	37.0	18.1	18.0	17.8	0.0	0.0	18.8	0.0	0.0
LnGrp LOS	C	B	B	D	B	B	B	A	A	B	A	A
Approach Vol, veh/h		1170			978			155			217	
Approach Delay, s/veh		17.2			18.7			17.8			18.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	32.7		23.4	11.1	28.8		23.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	98.0		56.0	29.0	80.0		56.0				
Max Q Clear Time (g_c+I1), s	3.2	16.4		8.9	6.5	16.0		6.4				
Green Ext Time (p_c), s	0.0	8.5		1.6	0.3	7.7		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			17.9									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	759	48	48	1096	78	68	30	14	112	37	74
Future Volume (veh/h)	118	759	48	48	1096	78	68	30	14	112	37	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	0.97		0.96	0.96		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	816	52	52	1178	84	73	32	15	120	40	80
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	164	1753	112	76	1570	112	269	112	44	242	87	131
Arrive On Green	0.09	0.52	0.52	0.04	0.47	0.47	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1781	3392	216	1781	3360	239	772	437	173	684	339	512
Grp Volume(v), veh/h	127	427	441	52	622	840	120	0	0	240	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1831	1781	1777	1823	1382	0	0	1535	0	0
Q Serve(g_s), s	5.7	12.4	12.4	2.3	23.3	23.4	0.0	0.0	0.0	5.0	0.0	0.0
Cycle Q Clear(g_c), s	5.7	12.4	12.4	2.3	23.3	23.4	5.5	0.0	0.0	10.5	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.13	0.61		0.12	0.50		0.33
Lane Grp Cap(c), veh/h	164	918	946	76	830	852	425	0	0	459	0	0
V/C Ratio(X)	0.77	0.47	0.47	0.69	0.75	0.75	0.28	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	549	2212	2280	285	1949	2000	945	0	0	999	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.0	12.5	12.5	38.3	17.7	17.7	24.4	0.0	0.0	26.2	0.0	0.0
Incr Delay (d2), s/veh	7.6	0.4	0.4	10.5	1.4	1.4	0.4	0.0	0.0	0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.5	4.6	1.2	9.1	9.3	1.9	0.0	0.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	12.8	12.8	48.8	19.1	19.1	24.7	0.0	0.0	27.1	0.0	0.0
LnGrp LOS	D	B	B	D	B	B	C	A	A	C	A	A
Approach Vol, veh/h		995			1314			120			240	
Approach Delay, s/veh		16.8			20.3			24.7			27.1	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	46.9		25.8	12.5	42.9		25.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	13.0	101.0		51.0	25.0	89.0		51.0				
Max Q Clear Time (g_c+I1), s	4.3	14.4		12.5	7.7	25.4		7.5				
Green Ext Time (p_c), s	0.0	6.4		1.8	0.3	12.5		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			19.8									
HCM 6th LOS			B									

REF-285

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

06/04/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	46	48	54	233	148	62
Future Volume (veh/h)	46	48	54	233	148	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	0.99			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	51	53	59	256	163	68
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	199	177	302	533	433	181
Arrive On Green	0.11	0.11	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	1585	202	1539	1250	521
Grp Volume(v), veh/h	51	53	315	0	0	231
Grp Sat Flow(s),veh/h/ln	1781	1585	1742	0	0	1771
Q Serve(g_s), s	0.5	0.6	0.2	0.0	0.0	1.8
Cycle Q Clear(g_c), s	0.5	0.6	2.5	0.0	0.0	1.8
Prop In Lane	1.00	1.00	0.19			0.29
Lane Grp Cap(c), veh/h	199	177	835	0	0	613
V/C Ratio(X)	0.26	0.30	0.38	0.00	0.00	0.38
Avail Cap(c_a), veh/h	2316	2061	5327	0	0	5374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.5	7.5	4.7	0.0	0.0	4.5
Incr Delay (d2), s/veh	0.7	0.9	0.3	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.3	0.0	0.0	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.2	8.5	5.0	0.0	0.0	4.9
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	104			315	231	
Approach Delay, s/veh	8.3			5.0	4.9	
Approach LOS	A			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		11.4		7.1		11.4
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		56.0		24.0		56.0
Max Q Clear Time (g_c+I1), s		4.5		2.6		3.8
Green Ext Time (p_c), s		2.3		0.3		1.6
Intersection Summary						
HCM 6th Ctrl Delay			5.5			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

06/04/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	55	48	227	161	77
Future Volume (veh/h)	97	55	48	227	161	77
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	113	64	56	264	187	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	279	248	275	534	408	196
Arrive On Green	0.16	0.16	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	1585	183	1557	1189	572
Grp Volume(v), veh/h	113	64	320	0	0	277
Grp Sat Flow(s),veh/h/ln	1781	1585	1741	0	0	1761
Q Serve(g_s), s	1.1	0.7	0.2	0.0	0.0	2.4
Cycle Q Clear(g_c), s	1.1	0.7	2.7	0.0	0.0	2.4
Prop In Lane	1.00	1.00	0.17			0.32
Lane Grp Cap(c), veh/h	279	248	809	0	0	604
V/C Ratio(X)	0.41	0.26	0.40	0.00	0.00	0.46
Avail Cap(c_a), veh/h	2675	2380	4404	0	0	4408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	7.4	5.2	0.0	0.0	5.1
Incr Delay (d2), s/veh	0.9	0.5	0.3	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.5	0.0	0.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.5	7.9	5.5	0.0	0.0	5.7
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	177			320	277	
Approach Delay, s/veh	8.3			5.5	5.7	
Approach LOS	A			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		11.9		8.1		11.9
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		50.0		30.0		50.0
Max Q Clear Time (g_c+I1), s		4.7		3.1		4.4
Green Ext Time (p_c), s		2.4		0.5		2.0
Intersection Summary						
HCM 6th Ctrl Delay			6.2			
HCM 6th LOS			A			

REF-286

Intersection						
Int Delay, s/veh	3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	101	33	246	90	34	259
Future Vol, veh/h	101	33	246	90	34	259
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	112	37	273	100	38	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	707	343	0	0	383	0
Stage 1	333	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	3.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	491	771	-	-	1310	-
Stage 1	726	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	464	756	-	-	1298	-
Mov Cap-2 Maneuver	464	-	-	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	513	1298	-
HCM Lane V/C Ratio	-	-	0.29	0.029	-
HCM Control Delay (s)	-	-	14.9	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

Intersection						
Int Delay, s/veh	3.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	59	108	113	36	177
Future Vol, veh/h	109	59	108	113	36	177
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	68	124	130	41	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	494	209	0	0	264	0
Stage 1	199	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	2.5	2.3	-	-	2.218	-
Pot Cap-1 Maneuver	811	1236	-	-	1300	-
Stage 1	1209	-	-	-	-	-
Stage 2	1110	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	766	1213	-	-	1288	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	1197	-	-	-	-	-
Stage 2	1060	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	880	1288	-
HCM Lane V/C Ratio	-	-	0.219	0.032	-
HCM Control Delay (s)	-	-	10.2	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

REF-287

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2027 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	334	1051	76	99	874	63	55	44	35	112	28	159
Future Volume (veh/h)	334	1051	76	99	874	63	55	44	35	112	28	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	1095	79	103	910	66	57	46	0	117	29	166
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	1705	123	134	1198	87	171	120		315	70	362
Arrive On Green	0.23	0.51	0.51	0.08	0.36	0.36	0.23	0.23	0.00	0.23	0.23	0.23
Sat Flow, veh/h	1781	3357	242	1781	3354	243	441	517	1585	1018	302	1564
Grp Volume(v), veh/h	348	579	595	103	482	494	103	0	0	146	0	166
Grp Sat Flow(s),veh/h/ln	1781	1777	1822	1781	1777	1820	959	0	1585	1320	0	1564
Q Serve(g_s), s	15.2	19.2	19.3	4.6	19.3	19.3	3.2	0.0	0.0	0.0	0.0	7.4
Cycle Q Clear(g_c), s	15.2	19.2	19.3	4.6	19.3	19.3	11.4	0.0	0.0	8.1	0.0	7.4
Prop In Lane	1.00		0.13	1.00		0.13	0.55		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	402	902	925	134	635	650	291	0		385	0	362
V/C Ratio(X)	0.86	0.64	0.64	0.77	0.76	0.76	0.35	0.00		0.38	0.00	0.46
Avail Cap(c_a), veh/h	1212	2287	2345	441	1517	1554	681	0		780	0	794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	14.5	14.5	36.7	22.9	22.9	28.7	0.0	0.0	26.9	0.0	26.7
Incr Delay (d2), s/veh	5.7	0.8	0.8	8.8	1.9	1.9	0.7	0.0	0.0	0.6	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	7.0	7.2	2.3	7.8	8.0	1.9	0.0	0.0	2.5	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	15.3	15.3	45.4	24.8	24.8	29.4	0.0	0.0	27.5	0.0	27.6
LnGrp LOS	D	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1522			1079			103	A		312	
Approach Delay, s/veh		20.0			26.7			29.4			27.6	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	48.0		23.7	23.3	33.9		23.7
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	20.0	104.0		41.0	55.0	69.0		41.0
Max Q Clear Time (g_c+I1), s	6.6	21.3		10.1	17.2	21.3		13.4
Green Ext Time (p_c), s	0.2	10.4		1.5	1.1	7.5		0.6

Intersection Summary			
HCM 6th Ctrl Delay			23.5
HCM 6th LOS			C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

REF-288

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	703	60	70	1185	44	73	29	74	61	33	187
Future Volume (veh/h)	203	703	60	70	1185	44	73	29	74	61	33	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	216	748	64	74	1261	47	78	31	0	65	35	199
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	1853	158	97	1632	61	218	75		266	129	332
Arrive On Green	0.15	0.56	0.56	0.05	0.47	0.47	0.21	0.21	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1781	3308	283	1781	3491	130	690	355	1585	928	609	1563
Grp Volume(v), veh/h	216	402	410	74	641	667	109	0	0	100	0	199
Grp Sat Flow(s),veh/h/ln	1781	1777	1815	1781	1777	1844	1045	0	1585	1537	0	1563
Q Serve(g_s), s	10.2	11.1	11.1	3.6	26.1	26.1	5.5	0.0	0.0	0.0	0.0	10.0
Cycle Q Clear(g_c), s	10.2	11.1	11.1	3.6	26.1	26.1	10.0	0.0	0.0	4.5	0.0	10.0
Prop In Lane	1.00		0.16	1.00		0.07	0.72		1.00	0.65		1.00
Lane Grp Cap(c), veh/h	262	995	1016	97	831	862	293	0		395	0	332
V/C Ratio(X)	0.83	0.40	0.40	0.77	0.77	0.77	0.37	0.00		0.25	0.00	0.60
Avail Cap(c_a), veh/h	760	2234	2281	349	1824	1893	597	0		753	0	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.9	10.8	10.8	40.5	19.2	19.2	31.8	0.0	0.0	28.6	0.0	30.8
Incr Delay (d2), s/veh	6.5	0.3	0.3	11.8	1.6	1.5	0.8	0.0	0.0	0.3	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.0	4.0	1.8	10.1	10.5	2.1	0.0	0.0	1.8	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	11.1	11.1	52.3	20.8	20.8	32.6	0.0	0.0	28.9	0.0	32.5
LnGrp LOS	D	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1028			1382			109	A		299	
Approach Delay, s/veh		17.7			22.5			32.6			31.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	53.6		23.4	17.7	45.5		23.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	109.0		39.0	37.0	89.0		39.0				
Max Q Clear Time (g_c+I1), s	5.6	13.1		12.0	12.2	28.1		12.0				
Green Ext Time (p_c), s	0.1	5.9		1.3	0.6	12.4		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			22.0									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	964	59	32	877	51	67	38	43	100	22	86
Future Volume (veh/h)	125	964	59	32	877	51	67	38	43	100	22	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	1004	61	33	914	53	70	40	45	104	23	90
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	1510	92	62	1302	75	254	145	130	263	73	180
Arrive On Green	0.10	0.44	0.44	0.03	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	3403	207	1781	3410	198	598	503	450	623	254	622
Grp Volume(v), veh/h	130	524	541	33	476	491	155	0	0	217	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1833	1781	1777	1830	1551	0	0	1500	0	0
Q Serve(g_s), s	4.6	15.0	15.0	1.2	14.6	14.6	0.0	0.0	0.0	2.5	0.0	0.0
Cycle Q Clear(g_c), s	4.6	15.0	15.0	1.2	14.6	14.6	4.5	0.0	0.0	7.0	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.11	0.45		0.29	0.48		0.41
Lane Grp Cap(c), veh/h	172	788	813	62	678	699	529	0	0	516	0	0
V/C Ratio(X)	0.76	0.66	0.66	0.54	0.70	0.70	0.29	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	802	2703	2789	304	2207	2273	1369	0	0	1339	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.4	14.1	14.1	30.6	16.8	16.8	17.9	0.0	0.0	18.7	0.0	0.0
Incr Delay (d2), s/veh	6.6	1.0	0.9	7.0	1.3	1.3	0.3	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	5.3	5.5	0.6	5.6	5.7	1.8	0.0	0.0	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	15.1	15.1	37.6	18.2	18.1	18.2	0.0	0.0	19.2	0.0	0.0
LnGrp LOS	C	B	B	D	B	B	B	A	A	B	A	A
Approach Vol, veh/h		1195			1000			155			217	
Approach Delay, s/veh		17.3			18.8			18.2			19.2	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	33.6		23.6	11.2	29.6		23.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	98.0		56.0	29.0	80.0		56.0				
Max Q Clear Time (g_c+I1), s	3.2	17.0		9.0	6.6	16.6		6.5				
Green Ext Time (p_c), s	0.0	8.8		1.6	0.3	8.0		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

REF-289

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

06/04/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	778	48	48	1123	78	68	30	14	112	37	74
Future Volume (veh/h)	118	778	48	48	1123	78	68	30	14	112	37	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	0.97		0.96	0.96		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	837	52	52	1208	84	73	32	15	120	40	80
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1784	111	75	1600	111	264	110	43	238	86	130
Arrive On Green	0.09	0.52	0.52	0.04	0.48	0.48	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1781	3398	211	1781	3367	234	769	434	172	686	338	512
Grp Volume(v), veh/h	127	438	451	52	637	655	120	0	0	240	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1832	1781	1777	1824	1376	0	0	1537	0	0
Q Serve(g_s), s	5.8	12.9	12.9	2.4	24.4	24.5	0.0	0.0	0.0	5.0	0.0	0.0
Cycle Q Clear(g_c), s	5.8	12.9	12.9	2.4	24.4	24.5	5.8	0.0	0.0	10.8	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.13	0.61		0.12	0.50		0.33
Lane Grp Cap(c), veh/h	163	933	962	75	844	867	417	0	0	453	0	0
V/C Ratio(X)	0.78	0.47	0.47	0.69	0.75	0.76	0.29	0.00	0.00	0.53	0.00	0.00
Avail Cap(c_a), veh/h	513	2197	2266	235	1920	1971	919	0	0	974	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	37.0	12.5	12.5	39.4	17.9	17.9	25.3	0.0	0.0	27.1	0.0	0.0
Incr Delay (d2), s/veh	7.7	0.4	0.4	11.0	1.4	1.4	0.4	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.7	4.8	1.3	9.5	9.8	2.0	0.0	0.0	4.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.7	12.8	12.8	50.3	19.3	19.3	25.6	0.0	0.0	28.0	0.0	0.0
LnGrp LOS	D	B	B	D	B	B	C	A	A	C	A	A
Approach Vol, veh/h		1016			1344			120			240	
Approach Delay, s/veh		16.8			20.5			25.6			28.0	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	48.7		26.1	12.6	44.6		26.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	103.0		51.0	24.0	90.0		51.0				
Max Q Clear Time (g_c+I1), s	4.4	14.9		12.8	7.8	26.5		7.8				
Green Ext Time (p_c), s	0.0	6.7		1.8	0.3	13.1		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			20.0									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

06/04/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	46	48	54	233	148	62
Future Volume (veh/h)	46	48	54	233	148	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	0.99			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	51	53	59	256	163	68
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	199	177	302	533	433	181
Arrive On Green	0.11	0.11	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	1585	202	1539	1250	521
Grp Volume(v), veh/h	51	53	315	0	0	231
Grp Sat Flow(s),veh/h/ln	1781	1585	1742	0	0	1771
Q Serve(g_s), s	0.5	0.6	0.2	0.0	0.0	1.8
Cycle Q Clear(g_c), s	0.5	0.6	2.5	0.0	0.0	1.8
Prop In Lane	1.00	1.00	0.19			0.29
Lane Grp Cap(c), veh/h	199	177	835	0	0	613
V/C Ratio(X)	0.26	0.30	0.38	0.00	0.00	0.38
Avail Cap(c_a), veh/h	2316	2061	5327	0	0	5374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.5	7.5	4.7	0.0	0.0	4.5
Incr Delay (d2), s/veh	0.7	0.9	0.3	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.3	0.0	0.0	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.2	8.5	5.0	0.0	0.0	4.9
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	104			315	231	
Approach Delay, s/veh	8.3			5.0	4.9	
Approach LOS	A			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		11.4		7.1		11.4
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		56.0		24.0		56.0
Max Q Clear Time (g_c+I1), s		4.5		2.6		3.8
Green Ext Time (p_c), s		2.3		0.3		1.6
Intersection Summary						
HCM 6th Ctrl Delay			5.5			
HCM 6th LOS			A			

REF-290

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

06/04/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	55	48	227	161	77
Future Volume (veh/h)	97	55	48	227	161	77
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	113	64	56	264	187	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	279	248	275	534	408	196
Arrive On Green	0.16	0.16	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	1585	183	1557	1189	572
Grp Volume(v), veh/h	113	64	320	0	0	277
Grp Sat Flow(s),veh/h/ln	1781	1585	1741	0	0	1761
Q Serve(g_s), s	1.1	0.7	0.2	0.0	0.0	2.4
Cycle Q Clear(g_c), s	1.1	0.7	2.7	0.0	0.0	2.4
Prop In Lane	1.00	1.00	0.17			0.32
Lane Grp Cap(c), veh/h	279	248	809	0	0	604
V/C Ratio(X)	0.41	0.26	0.40	0.00	0.00	0.46
Avail Cap(c_a), veh/h	2675	2380	4404	0	0	4408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	7.4	5.2	0.0	0.0	5.1
Incr Delay (d2), s/veh	0.9	0.5	0.3	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.5	0.0	0.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.5	7.9	5.5	0.0	0.0	5.7
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	177			320	277	
Approach Delay, s/veh	8.3			5.5	5.7	
Approach LOS	A			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		11.9		8.1		11.9
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		50.0		30.0		50.0
Max Q Clear Time (g_c+I1), s		4.7		3.1		4.4
Green Ext Time (p_c), s		2.4		0.5		2.0

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

HCM 6th TWSC
3: Waipahu Depot St & Hikimoe St

06/04/2022

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	101	33	246	90	34	259
Future Vol, veh/h	101	33	246	90	34	259
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	112	37	273	100	38	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	707	343	0	0	383	0
Stage 1	333	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	2.5	2.3	-	-	2.218	-
Pot Cap-1 Maneuver	631	1062	-	-	1175	-
Stage 1	1074	-	-	-	-	-
Stage 2	1035	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	594	1042	-	-	1164	-
Mov Cap-2 Maneuver	594	-	-	-	-	-
Stage 1	1063	-	-	-	-	-
Stage 2	985	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	664	1164	-
HCM Lane V/C Ratio	-	-	0.224	0.032	-
HCM Control Delay (s)	-	-	12	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

REF-291

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	59	108	113	36	177
Future Vol, veh/h	109	59	108	113	36	177
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	68	124	130	41	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	494	209	0	0	264	0
Stage 1	199	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	2.5	2.3	-	-	2.218	-
Pot Cap-1 Maneuver	811	1238	-	-	1300	-
Stage 1	1209	-	-	-	-	-
Stage 2	1110	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	766	1213	-	-	1288	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	1197	-	-	-	-	-
Stage 2	1060	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	880	1288	-
HCM Lane V/C Ratio	-	-	0.219	0.032	-
HCM Control Delay (s)	-	-	10.2	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2027 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

REF-292

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

08/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	349	1051	76	99	874	63	55	44	35	134	28	194
Future Volume (veh/h)	349	1051	76	99	874	63	55	44	35	134	28	194
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	1095	79	103	910	66	57	46	0	140	29	202
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	414	1704	123	133	1173	85	157	110		324	60	388
Arrive On Green	0.23	0.51	0.51	0.07	0.35	0.35	0.25	0.25	0.00	0.25	0.25	0.25
Sat Flow, veh/h	1781	3357	242	1781	3353	243	377	442	1585	1006	244	1566
Grp Volume(v), veh/h	364	579	595	103	482	494	103	0	0	169	0	202
Grp Sat Flow(s),veh/h/ln	1781	1777	1822	1781	1777	1820	819	0	1585	1250	0	1566
Q Serve(g_s), s	17.4	21.0	21.1	5.0	21.4	21.4	3.9	0.0	0.0	0.0	0.0	9.8
Cycle Q Clear(g_c), s	17.4	21.0	21.1	5.0	21.4	21.4	15.0	0.0	0.0	11.1	0.0	9.8
Prop In Lane	1.00		0.13	1.00		0.13	0.55		1.00	0.83		1.00
Lane Grp Cap(c), veh/h	414	902	925	133	621	637	266	0		384	0	388
V/C Ratio(X)	0.88	0.64	0.64	0.77	0.78	0.78	0.39	0.00		0.44	0.00	0.52
Avail Cap(c_a), veh/h	1110	2114	2168	363	1369	1402	581	0		707	0	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.7	15.9	15.9	40.1	25.6	25.6	31.7	0.0	0.0	29.0	0.0	28.7
Incr Delay (d2), s/veh	6.1	0.8	0.8	9.2	2.1	2.1	0.9	0.0	0.0	0.8	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	7.9	8.1	2.5	8.9	9.1	2.1	0.0	0.0	3.2	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	16.7	16.6	49.3	27.7	27.7	32.6	0.0	0.0	29.8	0.0	29.8
LnGrp LOS	D	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1538			1079			103	A		371	
Approach Delay, s/veh		21.9			29.8			32.6			29.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.6	49.8		26.9	25.5	35.9		26.9
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	105.0		42.0	55.0	68.0		42.0
Max Q Clear Time (g_c+I1), s	7.0	23.1		13.1	19.4	23.4		17.0
Green Ext Time (p_c), s	0.2	10.4		1.8	1.1	7.5		0.6

Intersection Summary			
HCM 6th Ctrl Delay			25.9
HCM 6th LOS			C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
4: Waipahu Depot St & Farrington Hwy

08/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	227	703	60	70	1185	44	73	29	74	66	33	200
Future Volume (veh/h)	227	703	60	70	1185	44	73	29	74	66	33	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	241	748	64	74	1261	47	78	31	0	70	35	213
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	1876	160	96	1609	60	212	74		270	123	337
Arrive On Green	0.16	0.57	0.57	0.05	0.46	0.46	0.22	0.22	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1781	3309	283	1781	3491	130	871	341	1585	950	569	1563
Grp Volume(v), veh/h	241	402	410	74	641	667	109	0	0	105	0	213
Grp Sat Flow(s),veh/h/ln	1781	1777	1815	1781	1777	1844	1012	0	1585	1519	0	1563
Q Serve(g_s), s	12.1	11.6	11.6	3.8	28.0	28.1	6.0	0.0	0.0	0.0	0.0	11.4
Cycle Q Clear(g_c), s	12.1	11.6	11.6	3.8	28.0	28.1	11.2	0.0	0.0	5.2	0.0	11.4
Prop In Lane	1.00		0.16	1.00		0.07	0.72		1.00	0.67		1.00
Lane Grp Cap(c), veh/h	285	1007	1029	96	819	850	286	0		393	0	337
V/C Ratio(X)	0.84	0.40	0.40	0.77	0.78	0.78	0.38	0.00		0.27	0.00	0.63
Avail Cap(c_a), veh/h	755	2144	2190	290	1681	1744	549	0		705	0	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.5	11.1	11.1	42.9	20.9	20.9	33.8	0.0	0.0	30.2	0.0	32.7
Incr Delay (d2), s/veh	6.8	0.3	0.3	12.0	1.7	1.6	0.8	0.0	0.0	0.4	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	4.2	4.3	1.9	11.1	11.5	2.3	0.0	0.0	2.0	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	11.4	11.4	54.9	22.6	22.6	34.7	0.0	0.0	30.6	0.0	34.7
LnGrp LOS	D	B	B	D	C	C	C	A		C	A	C
Approach Vol, veh/h		1053			1382			109	A		318	
Approach Delay, s/veh		18.9			24.3			34.7			33.3	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	57.2		24.9	19.7	47.4		24.9
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	15.0	111.0		39.0	39.0	87.0		39.0
Max Q Clear Time (g_c+I1), s	5.8	13.6		13.4	14.1	30.1		13.2
Green Ext Time (p_c), s	0.1	5.9		1.4	0.7	12.3		0.7

Intersection Summary			
HCM 6th Ctrl Delay			23.7
HCM 6th LOS			C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

REF-293

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

08/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	986	59	32	889	53	67	38	43	117	22	86
Future Volume (veh/h)	125	986	59	32	889	53	67	38	43	117	22	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	1027	61	33	926	55	70	40	45	122	23	90
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	1525	91	61	1312	78	251	144	129	282	68	165
Arrive On Green	0.10	0.45	0.45	0.03	0.39	0.39	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	3408	202	1781	3404	202	593	499	447	688	234	573
Grp Volume(v), veh/h	130	535	553	33	483	498	155	0	0	235	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1834	1781	1777	1830	1540	0	0	1495	0	0
Q Serve(g_s), s	4.6	15.5	15.5	1.2	15.0	15.0	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	4.6	15.5	15.5	1.2	15.0	15.0	4.7	0.0	0.0	7.9	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.11	0.45		0.29	0.52		0.38
Lane Grp Cap(c), veh/h	172	795	821	61	685	705	524	0	0	515	0	0
V/C Ratio(X)	0.76	0.67	0.67	0.54	0.71	0.71	0.30	0.00	0.00	0.46	0.00	0.00
Avail Cap(c_a), veh/h	765	2588	2671	300	2125	2188	1416	0	0	1381	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.7	14.3	14.3	31.0	16.9	16.9	18.2	0.0	0.0	19.2	0.0	0.0
Incr Delay (d2), s/veh	6.7	1.0	1.0	7.1	1.3	1.3	0.3	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	5.5	5.7	0.6	5.7	5.9	1.8	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	15.3	15.2	38.1	18.3	18.2	18.5	0.0	0.0	19.8	0.0	0.0
LnGrp LOS	D	B	B	D	B	B	B	A	A	B	A	A
Approach Vol, veh/h		1218			1014			155			235	
Approach Delay, s/veh		17.4			18.9			18.5			19.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	34.2		23.8	11.3	30.1		23.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	95.0		59.0	28.0	78.0		59.0				
Max Q Clear Time (g_c+I1), s	3.2	17.5		9.9	6.6	17.0		6.7				
Green Ext Time (p_c), s	0.0	9.1		1.8	0.3	8.2		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			18.3									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary
1: Awalau St/Mokuola St & Farrington Hwy

08/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	783	48	48	1150	83	68	30	14	118	37	74
Future Volume (veh/h)	118	783	48	48	1150	83	68	30	14	118	37	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	0.97		0.96	0.96		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	127	842	52	52	1237	89	73	32	15	127	40	80
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1817	112	74	1627	117	258	107	43	241	81	123
Arrive On Green	0.09	0.53	0.53	0.04	0.48	0.48	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1781	3399	210	1781	3358	241	764	430	171	710	323	495
Grp Volume(v), veh/h	127	440	454	52	653	673	120	0	0	247	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1833	1781	1777	1823	1364	0	0	1528	0	0
Q Serve(g_s), s	6.0	13.2	13.2	2.5	25.7	25.9	0.0	0.0	0.0	5.7	0.0	0.0
Cycle Q Clear(g_c), s	6.0	13.2	13.2	2.5	25.7	25.9	6.1	0.0	0.0	11.8	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.13	0.61		0.12	0.51		0.32
Lane Grp Cap(c), veh/h	163	950	979	74	861	883	408	0	0	445	0	0
V/C Ratio(X)	0.78	0.46	0.46	0.71	0.76	0.76	0.29	0.00	0.00	0.56	0.00	0.00
Avail Cap(c_a), veh/h	498	2131	2198	228	1862	1911	888	0	0	942	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	38.2	12.4	12.4	40.6	18.1	18.1	26.3	0.0	0.0	28.4	0.0	0.0
Incr Delay (d2), s/veh	7.8	0.4	0.3	11.6	1.4	1.4	0.4	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.8	4.9	1.3	10.1	10.4	2.0	0.0	0.0	4.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	12.7	12.7	52.3	19.5	19.5	26.7	0.0	0.0	29.5	0.0	0.0
LnGrp LOS	D	B	B	D	B	B	C	A	A	C	A	A
Approach Vol, veh/h		1021			1378			120			247	
Approach Delay, s/veh		16.9			20.7			26.7			29.5	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	50.9		26.4	12.9	46.6		26.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	103.0		51.0	24.0	90.0		51.0				
Max Q Clear Time (g_c+I1), s	4.5	15.2		13.8	8.0	27.9		8.1				
Green Ext Time (p_c), s	0.0	6.7		1.8	0.3	13.7		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			20.3									
HCM 6th LOS			C									

REF-294

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

08/29/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	65	56	233	148	68
Future Volume (veh/h)	62	65	56	233	148	68
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	0.99			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	71	62	256	163	75
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	243	216	296	525	416	192
Arrive On Green	0.14	0.14	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	1585	211	1523	1208	556
Grp Volume(v), veh/h	68	71	318	0	0	238
Grp Sat Flow(s),veh/h/ln	1781	1585	1734	0	0	1765
Q Serve(g_s), s	0.7	0.8	0.3	0.0	0.0	2.0
Cycle Q Clear(g_c), s	0.7	0.8	2.6	0.0	0.0	2.0
Prop In Lane	1.00	1.00	0.19			0.32
Lane Grp Cap(c), veh/h	243	216	821	0	0	608
V/C Ratio(X)	0.28	0.33	0.39	0.00	0.00	0.39
Avail Cap(c_a), veh/h	2405	2140	4906	0	0	4948
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.5	7.5	5.0	0.0	0.0	4.8
Incr Delay (d2), s/veh	0.6	0.9	0.3	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	0.4	0.0	0.0	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.1	8.4	5.3	0.0	0.0	5.2
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	139			318	238	
Approach Delay, s/veh	8.3			5.3	5.2	
Approach LOS	A			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		11.6		7.6		11.6
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		54.0		26.0		54.0
Max Q Clear Time (g_c+I1), s		4.6		2.8		4.0
Green Ext Time (p_c), s		2.4		0.4		1.7
Intersection Summary						
HCM 6th Ctrl Delay			5.8			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary
2: Mokuola St & Hikimoe St

08/29/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	61	53	227	161	88
Future Volume (veh/h)	102	61	53	227	161	88
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	119	71	62	264	187	102
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	288	256	279	529	396	216
Arrive On Green	0.16	0.16	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1781	1585	198	1515	1134	619
Grp Volume(v), veh/h	119	71	326	0	0	289
Grp Sat Flow(s),veh/h/ln	1781	1585	1713	0	0	1753
Q Serve(g_s), s	1.2	0.8	0.3	0.0	0.0	2.6
Cycle Q Clear(g_c), s	1.2	0.8	2.9	0.0	0.0	2.6
Prop In Lane	1.00	1.00	0.19			0.35
Lane Grp Cap(c), veh/h	288	256	808	0	0	612
V/C Ratio(X)	0.41	0.28	0.40	0.00	0.00	0.47
Avail Cap(c_a), veh/h	2440	2171	4416	0	0	4458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.7	7.5	5.2	0.0	0.0	5.2
Incr Delay (d2), s/veh	1.0	0.6	0.3	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.5	0.0	0.0	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.7	8.1	5.6	0.0	0.0	5.7
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	190			326	289	
Approach Delay, s/veh	8.4			5.6	5.7	
Approach LOS	A			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		12.1		8.3		12.1
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		52.0		28.0		52.0
Max Q Clear Time (g_c+I1), s		4.9		3.2		4.6
Green Ext Time (p_c), s		2.5		0.6		2.1
Intersection Summary						
HCM 6th Ctrl Delay			6.3			
HCM 6th LOS			A			

REF-295

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	158	36	259	105	41	259
Future Vol, veh/h	158	36	259	105	41	259
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	176	40	288	117	46	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	747	367	0	0	415	0
Stage 1	357	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.5	-	-	-	-	-
Follow-up Hdwy	2.5	2.3	-	-	2.218	-
Pot Cap-1 Maneuver	602	1033	-	-	1144	-
Stage 1	1051	-	-	-	-	-
Stage 2	1010	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	562	1013	-	-	1133	-
Mov Cap-2 Maneuver	562	-	-	-	-	-
Stage 1	1040	-	-	-	-	-
Stage 2	952	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	613	1133	-
HCM Lane V/C Ratio	-	-	0.352	0.04	-
HCM Control Delay (s)	-	-	14	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1	-

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	127	59	113	137	48	177
Future Vol, veh/h	127	59	113	137	48	177
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	68	130	157	55	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	542	229	0	0	297	0
Stage 1	219	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Critical Hdwy	5.4	5.2	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	2.5	2.3	-	-	2.218	-
Pot Cap-1 Maneuver	766	1209	-	-	1264	-
Stage 1	1188	-	-	-	-	-
Stage 2	1083	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	713	1186	-	-	1252	-
Mov Cap-2 Maneuver	713	-	-	-	-	-
Stage 1	1176	-	-	-	-	-
Stage 2	1019	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	816	1252	-
HCM Lane V/C Ratio	-	-	0.262	0.044	-
HCM Control Delay (s)	-	-	11	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

REF-296

REF-297

Multimodal Transit LOS Calculation

		Hikimoe Street EB	Hikimoe St WB	Mokuola St NB	Mokuola St SB	Farrington Hwy EB	Farrington Hwy WB	Waipahu St EB	Waipahu St WB	Waipahu Depot NB	Waipahu Depot SB
Inputs		1	2	3	4	5	6	7	8	9	10
	TRANSIT OPERATIONS INFORMATION										
	Number of local buses on street segment per hour (bus/h)	14	13	3	3	9	9	2	2	6	6
	Number of express buses stopping in segment per hour (bus/h)	4	4	1	1	3	3	1	1	2	2
t_{ew}	Average excess wait time (min)	4.4	6.8	2.7	3.1	3.6	3.1	2.2	1.0	3.6	4.2
L_v	Average passenger load factor (p/seat)	0.4	0.4	0.7	0.7	0.5	0.3	0.5	0.3	0.4	0.5
S	Average transit travel speed (mi/h)	18.0	8.0	8.1	15.8	13.0	12.5	9.3	15.3	19.7	8.0
L_p	Average passenger trip length (mi)	5.0	4.9	4.2	2.5	3.9	2.8	8.9	6.6	3.8	4.7
	Is the segment in the CBD of a metro area of 5 million or more?	No	No	No	No	No	No	No	No	No	No
	TRANSIT AMENITY DATA										
P_{sh}	Percent stops in segment with a shelter	100%	100%	50%	0%	100%	66%	0%	0%	0%	0%
P_{bn}	Percent stops in segment with a bench	100%	100%	50%	50%	100%	100%	50%	66%	0%	0%
	PEDESTRIAN ENVIRONMENT DATA										
W_s	Sidewalk width (ft) (Enter 0 if no sidewalk)	7.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
W_{buf}	Buffer width from sidewalk to street (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Does a continuous barrier exist between the street and sidewalk?	No	No	No	No	Yes	No	No	No	No	No
	Is the street divided?	No	No	No	No	Yes	Yes	No	No	No	No
	Are parking spaces striped?	No	No	No	No	No	No	No	No	No	No
P_{pk}	Proportion of on-street parking occupied	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
W_{bl}	Bicycle lane width (ft)	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0
W_{sh}	Shoulder/parking lane width (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W_{vl}	Outside travel lane (closest to sidewalk) width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
v_{ol}	Outside lane demand flow rate at midsegment (veh/h)	200	200	300	300	600	600	500	500	400	400
S_{ol}	Average vehicle running speed, including intersection delay (mi/h)	15.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Calculations											
f	Transit frequency (bus/h)	18	17	4	4	12	12	3	3	8	8
f_h	Headway factor	3.69	3.68	2.80	2.80	3.55	3.55	2.48	2.48	3.34	3.34
f_{ld}	Passenger load weighting factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
T_{ea}	Perceived amenity time rate (min/mi)	0.3	0.3	0.2	0.0	0.4	0.4	0.0	0.0	0.0	0.0
T_{ew}	Excess wait time rate due to late arrivals (min/mi)	0.9	1.4	0.6	1.2	0.9	1.1	0.2	0.1	0.9	0.9
T_{pt}	Perceived travel time rate (min/mi)	4.8	10.0	8.5	6.2	6.1	8.6	7.0	4.2	4.9	11.8
T_{bt}	Base travel time rate (min/mi)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
I_{tt}	Perceived travel time factor	0.91	0.71	0.75	0.84	0.85	0.82	0.80	0.58	0.92	0.67
I_{wr}	Transit walk-ride score	3.44	2.80	2.10	2.35	3.00	2.91	2.00	2.43	3.07	2.24
f_v	Motorized vehicle speed adjustment factor	0.09	0.09	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
f_c	Motorized vehicle volume adjustment factor	0.46	0.46	0.68	0.68	1.37	1.37	1.14	1.14	0.91	0.91
W_{sa}	Adjusted available sidewalk width (ft)	7.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
f_{sw}	Sidewalk width coefficient	3.90	3.90	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
f_b	Buffer area coefficient	1.00	1.00	1.00	1.00	5.37	1.00	1.00	1.00	1.00	1.00
W_t	Total width of outside lane, bike lane, and parking lane/shoulder (ft)	12.0	12.0	17.0	17.0	12.0	12.0	12.0	12.0	12.0	12.0
W_v	Effective total width as a function of traffic volume (ft)	12.0	12.0	17.0	17.0	12.0	12.0	12.0	12.0	12.0	12.0
W_l	Effective width of combined bike lane and shoulder (ft)	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{cs}	Cross-section adjustment factor	-4.51	-4.51	-4.59	-4.59	-4.35	-4.35	-4.35	-4.35	-4.35	-4.35
I_p	Pedestrian environment score	2.09	2.09	2.39	2.39	3.31	3.31	3.09	3.09	2.86	2.86
	Pedestrian LOS	B	B	B	B	C	C	C	C	C	C
I_t	Transit LOS score	1.15	2.41	3.22	2.84	1.99	2.13	3.47	2.81	1.81	3.07
Output											
	Transit LOS	A	B	C	C	A	B	C	C	A	C

APPENDIX F

TRANSIT LOS CALCULATIONS

PRELIMINARY CIVIL ENGINEERING REPORT

17

REF-298

Civil Engineering
PRELIMINARY ENGINEERING REPORT
for
Keawalau Affordable Housing Community

Waipahu, Oahu, Hawai`i
TMK: 9-4-13: 046, 9-4-14: 005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066, & 067

Prepared For:

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August 2022

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REF-299

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- Hawaiian Telcom Request for Information Letter dated April 18, 2022
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Appendix I – Concept Architectural Rendering

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REF-300

1 EXECUTIVE SUMMARY

Project Description: The proposed development site in Waipahu, Oahu, Hawaii is located in a mauka property (Mauka Block) consisting of TMK 9-4-013: 046, 9-4-014: 059, 060, 061, 062, 063, 064, 065, 066 and 067, and a makai property (Makai Block) consisting of TMK 9-4-014: 005, 014, and 058. Currently leased businesses within the Mauka Block include a laundromat, drug store, medical clinic, water station, dental clinic, salon and restaurants, while within the Makai Block currently leased businesses include a supermarket, health center, pharmacy, remittance center and radiology clinic. Highridge Costa Development Company, LLC is proposing to redevelop the properties in phases per each Block by demolishing the existing buildings, except the existing Sonido-Alquero building in the Makai Block, toward constructing a senior living low-rise building, two multi-family high-rise buildings, ground level retail and restaurant space, and a supermarket.

Sanitary Sewer System: City and County of Honolulu (CCH) Wastewater Branch (WWB) approved a Sewer Connection Application confirming system capacity on June 18, 2021.

It is anticipated that the Mauka Block will reuse the 6" lateral connection to the existing 15" main within Hikimoe Street, while the Makai Block will require several lateral connections in the form of a reused 6" lateral to the same 15" main in Hikimoe Street for the supermarket, a new 12" lateral to the existing 24" main in Waipahu Depot Street for one of the high-rise buildings and another 12" lateral to the existing 36" main in Farrington Highway for the other high-rise building.

Water System: A Water Availability Request Letter was sent to Board of Water Supply (BWS) on April 13, 2022 to confirm system adequacy to support the development. BWS responded to the letter on May 26, 2022 stating that the existing water system is presently adequate to accommodate the proposed development and final determination of availability will be made during the building permit process. It is anticipated that separate residential owner's associations will manage the Mauka Block and Makai Block, respectively; therefore, separate domestic and commercial water meters will be necessary for each.

The response letter from BWS indicated water conservation measures are required for the proposed development. There are no known non-potable water sources in the vicinity of the project, therefore, utilization of rain catchment drought tolerant plants, xeriscape landscaping, and efficient irrigation systems, such as a drip system and moisture should be considered. Any irrigation should be done during non-peak hours of the day to minimize total demand in conjunction with the domestic water usage.

The proposed residential buildings will be required to have an automatic fire sprinkler system to meet CCH code in addition to meeting Honolulu Fire Department (HFD) criteria. The existing fire hydrants and roadways around the site are expected to fulfill the HFD criteria.

Storm Water System and Flood Risk: The proposed development is expected to include landscaped areas that will increase pervious surfaces compared to that of the existing conditions, which will subsequently decrease the total runoff rate accordingly. Retention of storm water for quantity control is not anticipated, however, storm water treatment will be required by CCH.

Storm drainage lateral connections should be made to the existing catch basins at Hikimoe Street and Farrington Highway to follow the existing drainage patterns of the site. The sites shall be graded to provide positive drainage directed away from the buildings.

A Flood Insurance Rate Map (FIRM) Letter of Map Revision (LOMR) application was submitted to the Federal Emergency Management Agency (FEMA) in the year 2021 by Wilson Okamoto Corporation and River Focus to revise the FIRM based on more accurate data of existing conditions. The LOMR was issued by FEMA on July 25, 2022 with an effective date of December 6, 2022. According to the annotated FIRM panels provided by the issued LOMR, the development sites continue to be in the AE zone floodplain although no longer in the floodway. The base flood elevations through the development sites range from +9.00' MSL to +10.00' MSL. Redevelopment in an AE zone without a floodway requires the project to construct the first floor of the building and any life safety components above the base flood elevation, but it does not involve a no-rise requirement.

Gas Line System: An email correspondence was sent to Hawaii Gas on April 15, 2022 to confirm system adequacy to support the development. Hawaii Gas responded on April 18, 2022 confirming that there is a 2" gas main within Hikimoe Street from Waipahu Depot Street to Kahuailani Street that can support the proposed redevelopment.

Electrical Utility System: A Request for Information Letters were sent to Hawaiian Electric Company (HECo) on April 18, 2022 to confirm system adequacy to support the development. HECo responded to the letter on July 6, 2022 stating that the existing distribution circuits along Farrington Highway, Waipahu Deport Street, and Hikimoe Street could potentially serve the redevelopment project.

It is anticipated that new underground infrastructure, consisting of ductlines, manholes and/or handholes, will be extended from HECo's existing 12 kV overhead circuits along Farrington Highway or Hikimoe Street to support HECo service to each of the transformers and primary switches on the site. Also, HECo will require separate ductline and manhole systems for 46 kV sub-transmission and 12 kV distribution circuits along Farrington Highway.

Telecommunication Utility System: A Request for Information Letters were sent to Hawaiian Telcom (HT) and Spectrum on April 18, 2022 to confirm system adequacy to support the development.

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It is anticipated that new underground infrastructure, consisting of ductlines, manholes and/or handholes, will be extended from the existing overhead HT and OTWC polelines along Farrington Highway or Hikimoe Street to support telecommunications services to the development. The service points of connection to the HT and OTWC polelines will be confirmed as the site development plans for the properties are further refined and the types of telecommunications services desired by the various customers are identified.

2 PROJECT DESCRIPTION

2.1 Existing Conditions

The proposed development site is located within thirteen (13) total parcels in Waipahu, Oahu, Hawaii. A 1.12 acre Mauka Block consisting of TMK 9-4-013: 046, and TMK 9-4-014: 059, 060, 061, 062, 063, 064, 065, 066 and 067 is bounded by TMK 9-4-13: 007, 043 and 044 to the north, TMK 9-14-13: 003 to the east, Hikimoe Street to the south, and Kahuailani Street to the west. A 2.71 acre Makai Block consisting of TMK 9-4-014: 005, 014, and 058 is bounded by Hikimoe Street to the north, TMK 9-4-14:001 and 9-4-17: 007 to the east, Farrington Highway to the south, and Waipahu Depot Street to the west. See Project Location and Vicinity Map Figure 1, and Tax Map Key Figure 2.

The Blocks are zoned as BMX-3 Community Business Mixed Use. Currently leased businesses within the Mauka Block include a laundromat, drug store, medical clinic, water station, dental clinic, salon and restaurants, while within the Makai Block currently leased business include a supermarket, health center, pharmacy, remittance center and radiology clinic.

The existing program summary of each phase is as follows:

Phase 1: Mauka Block Existing Programming

Retail	11,830 sf	to demolish
Restaurant	2,340 sf	to demolish
General Office	2,200 sf	to demolish
Medical Office	3,050 sf	to demolish

Phase 2: Makai Block Existing Programming

Market		30,089 sf	to demolish
Depot Center	General Office	4,824 sf	to demolish
	Medical Office	5,942 sf	to demolish
Sonido Building	General Office	6,148 sf	to remain
	Medical Office	13,913 sf	to remain
	Common Space	9,489 sf	to remain

2.2 Proposed Conditions

Highridge Costa Development Company, LLC is proposing to redevelop the properties in phases per each Block that will provide a senior living low-rise building, two multi-family high-rise buildings, ground level retail and restaurant space, and a supermarket. It is intended that all existing buildings will be removed as part of the redevelopment except for the existing Sonido-Alquero Building located at the corner of Waipahu Depot Street and Farrington Highway in a parcel within the Makai Block identified as TMK 9-4-14: 014.

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The proposed program summary of each phase is as follows:

Phase 1: Mauka Block Proposed Programming

Senior Living Low-Rise	1-Bedroom	118 units
	2-Bedroom	15 units
Retail		5,018 sf
Restaurant		4,778 sf

Phase 2: Makai Block Proposed Programming

Multi-Family High-Rise	Studio	156 units
	1-Bedroom	140 units
	2-Bedroom	90 units
	3-Bedroom	18 units
Retail		2,767 sf
Restaurant		6,457 sf
Market		23,352 sf
Sonido Building (to remain)	General Office	6,148 sf
	Medical Office	13,913 sf
	Common Space	9,489 sf

The total square footage for commercial spaces is 42,372 sf, which is anticipated to consist of retail, restaurant, and grocery. An assumed breakdown of these commercial uses is included in the tables above for analysis purposes. The various utility agency correspondence contained within this report were based on a marginally different commercial breakdown as the breakdown changed since the time of the correspondence. An exact commercial breakdown will be determined at the time of leasing based on market conditions. Any minor deviations to the commercial breakdown, including those in the utility agency correspondence, will not affect the results of the analysis.

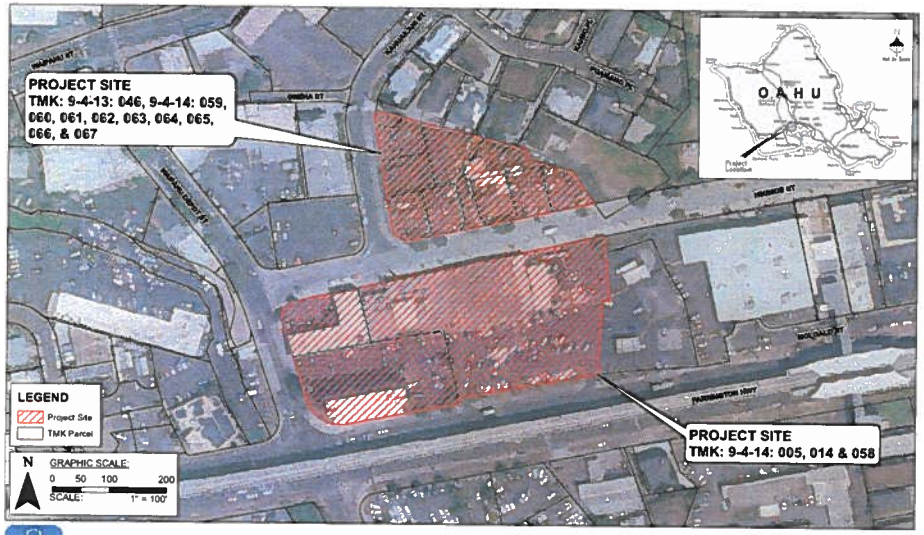

FIGURE 1
PROJECT LOCATION AND VICINITY MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

REF-303

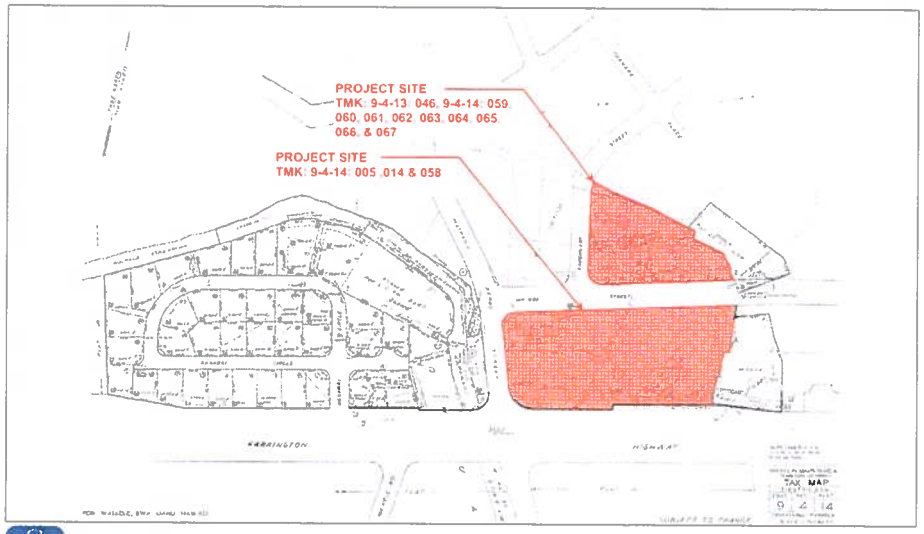

FIGURE 2
TAX MAP KEY
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

3 SANITARY SEWER SYSTEM

3.1 Background

Sanitary sewer service for the project will be provided through the municipal sewer system of the City Sewer and County of Honolulu (CCH). Review of the sanitary sewer system is based on information available through the CCH Geographic Information System (GIS) database, as-built plans, and consultation with the CCH Department of Planning and Permitting Wastewater Branch (WWB).

The estimated wastewater flow is based on CCH Wastewater Design Standards dated July 2017, and assumed average daily sanitary sewer flow rates that were previously agreed upon by WWB for similar developments in the past.

3.2 Existing Conditions

Maps obtained from CCH indicate that there is: an 8" vitrified clay, 15" vitrified clay and 36" reinforced concrete mains within Hikimoe Street; a 6" vitrified clay, 36" reinforced concrete mains within Kahuailani Street; a 24" reinforced concrete main within Waipahu Depot Street; and a 15" vitrified clay, 16" polyvinyl chloride, and 36" reinforced concrete mains within Farrington Highway. The 36" reinforced concrete mains on Hikimoe Street and Farrington Highway connect through the Makai Block within a 15' sewer easement in favor of the City and County of Honolulu along the Diamond Head boundary of TMK 9-4-14:058. There are various 6" laterals to the mains in all surrounding roads. See Existing Sewer Utilities Map Figure 3.

3.3 Proposed Conditions

Sewer connection applications were sent to CCH WWB on May 25, 2021 for each of the Mauka Block and the Makai Block. WWB approved the application confirming system capacity on June 28, 2021 with an expiration date of June 28, 2023 subject to approval of construction plans for the necessary sewer connections by that date. The approved applications were based on previous larger proposed programming information that was later superseded by the programming listed in this report. Since the previous programming exceeded that of the current proposed programming, then the approved applications still verify capacity to support the project. New applications will need to be re-processed with WWB if construction plans for the necessary sewer connections supporting the proposed project are not approved by June 18, 2023.

Estimated wastewater system facility charges of $522,664.00 for the Mauka Block and $2,184,603.20 for the Makai Block were listed on the approved applications based on the superseded programming. It is expected that the wastewater facility charges for the current programming will be similar. The final wastewater system facility charge may vary depending on the final programming and date when the building permit is submitted. See the original sewer connection applications in Appendix B.

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The estimated wastewater generated by the current proposed programming is as follows:

Phase	Average Flow (gallons per day)	Peak Flow (gallons per day)
Mauka Block	31,046.83	167,131.45
Makai Block	86,344.92	368,525.38
TOTAL	117,391.75	535,656.83

See Appendix B Sewer System Calculations

3.4 Recommendation

It is anticipated that the Mauka Block will reuse the 6" lateral connection to the existing 15" main within Hikimoe Street, while the Makai Block will require several lateral connections in the form of a reused 6" lateral to the same 15" main in Hikimoe Street for the supermarket, a new 12" lateral to the existing 24" main in Waipahu Depot Street for one of the high-rise buildings and another 12" lateral to the existing 36" main in Farrington Highway for the other high-rise building. The 36" main and 15' wide easement in favor of CCH passing through the Makai Block will remain. On other projects, CCH has required that 50' of vertical clearance be kept over the easement, no trees or site structures be placed on the easement, no parking can be placed over any manholes, a paved access must be provided to any manholes, and the easement must be kept accessible at all times.

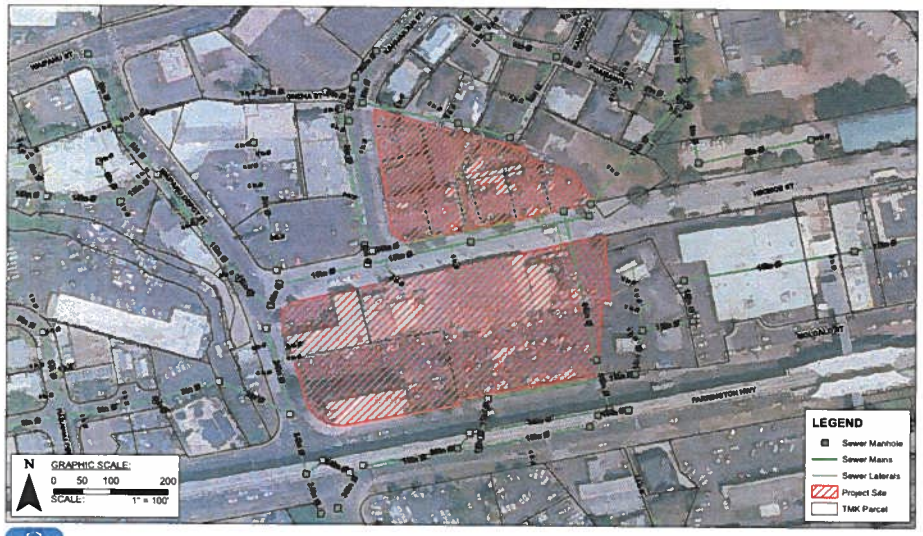

FIGURE 3
EXISTING SEWER UTILITIES MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAII

REF-305

4 WATER SYSTEM

4.1 Background

Water for the project, including domestic, fire protection, and irrigation will be provided through the municipal water system of the Board of Water Supply (BWS). Review of the water service system is based on information available through BWS record drawings and facility maps, and consultation with BWS.

4.2 Existing Conditions

Maps obtained from BWS indicate that there is: an 8" water main within Kahuailani Street; an 8" water main within Hikimoe Street; 3", 8" and 12" water mains within Waipahu Depot Street; and an 8" water main within Farrington Highway. Five (5) fire hydrants are located within 100' from the project site along Kahuailani Street, Hikimoe Street, and Waipahu Depot Street. See Water Systems Facilities Map Figure 4.

Existing water meters around the project site include:

Mauka Block:

Kahuailani Street
- 4" meter serving TMK: 9-4-014: 063
  - M/N: 13040260
  - P/ID: 6866112711

Hikimoe Street
- 3" meter serving TMK: 9-4-014: 064
  - M/N: 94031568
  - P/ID: 6131442673
- 3" meter serving TMK: 9-4-014: 064
  - M/N: 17032003
  - P/ID: 6327101370
- 3" meter serving TMK: 9-4-014: 061
  - M/N: 02319329
  - P/ID: 9692483842
- 3" meter serving TMK: 9-4-014: 061
  - M/N: 02319331
  - P/ID: 0022192688

Makai Block:

Hikimoe Street
- 6" meter serving TMK: 9-4-014: 005
  - M/N: 10060047
  - P/ID: 5357355366
- 6" meter serving TMK: 9-4-014: 058
  - M/N: 11060090
  - P/ID: 7946038882

4.3 Proposed Conditions

4.3.1 Domestic Water System

A Water Availability Request Letter was sent to Board of Water Supply (BWS) on April 13, 2022 to confirm system adequacy to support the development. BWS responded to the letter on May 26, 2022 stating the existing water system is

presently adequate to accommodate the proposed development and final determination of availability will be made during the building permit process. It is anticipated that separate residential owner's associations will manage the Mauka Block and Makai Block, respectively; therefore, separate domestic and commercial water meters will be necessary for each.

The estimated water demand for the proposed programming is as follows:

Phase	Average Flow (gallons per day)	Peak Flow (gallons per day)
Mauka Block	40,246	120,737
Makai Block	124,825	374,475
TOTAL	165,071	495,212

See Appendix C Water System Calculations.

Based on the BWS Revision to the schedule of rates and charges for the furnishing of water and water service amended by the Resolution No. 719, 2001, effective July 1, 2007, the water system facilities charge for the new proposed programming is estimated to be $301,456.07 for Mauka Block and $875,915.57 for Makai Block, respectively.

4.3.2 Irrigation System

The response letter from BWS indicated water conservation measures are required for the proposed development. These measures include utilization of non-potable water for irrigation using rain catchment, drought tolerant plants, xeriscape landscaping, and efficient irrigation systems, such as a drip system and moisture sensors. There are no known non-potable water sources in the vicinity of the project.

4.3.3 Fire Protection System

The proposed project will be required to have an automatic fire sprinkler system to meet CCH code in addition to meeting the following Honolulu Fire Department (HFD) criteria:

1. All portions of the building must be within 450' from a fire access road.
2. At least one external door must be within 50' of the fire access road.
3. The closest portion of the building is within 400' from a fire hydrant.

4.4 Recommendations

4.4.1 Domestic Water System

It is anticipated that separate residential owner's associations will manage the Mauka Block and Makai Block, respectively; therefore, separate domestic and commercial water meters will be necessary for each. Based on other similar projects, it is estimated that the Mauka Block will require a 3" domestic compound meter, 6"

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fire protection detector check meter, and 1" commercial meter within Hikimoe Street, while the Makai Block will require a 4" domestic compound meter, 6" fire protection detector check meter and 2" commercial meter for each of the two towers. An estimated 2" commercial meter is also anticipated for the market. Reduced pressure backflow preventers are required by BWS for the domestic and commercial meters to protect the BWS system from contamination.

4.4.2 Irrigation System

There are no existing recycled water mains in the area; therefore, utilization of rain catchment drought tolerant plants, xeriscape landscaping, and efficient irrigation systems, such as a drip system and moisture should be considered. Any irrigation should be done during non-peak hours of the day to minimize total demand in conjunction with the domestic water usage.

4.4.3 Fire Protection System

The existing fire hydrants and roadways around the site are expected to fulfill the HFD criteria.

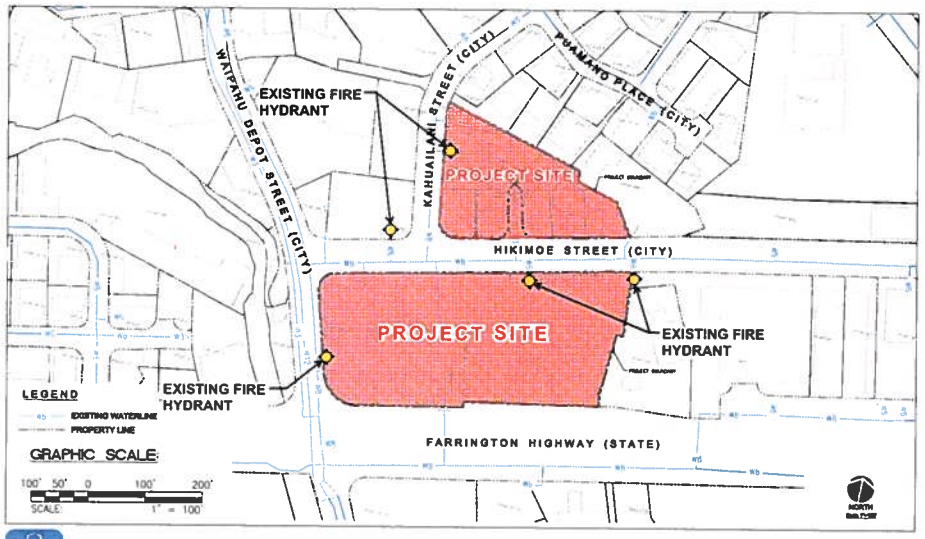

FIGURE 4
WATER SYSTEMS FACILITIES MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

REF-307

5 STORM DRAINAGE SYSTEM AND FLOOD RISK

5.1 Background

Review of the storm drainage system and flood risk is based on as-built plans, maps available through the CCH GIS database, the Federeal Emergency Management Agency (FEMA) Flood Insurance Rate Maps database and a Letter of Map Revision (LORM) that was submitted to FEMA in 2021.

The estimated storm water runoff is based on the CCH Rules Relating to Storm Drainage Standards, dated January 2000.

5.2 Existing Conditions

The project site slopes from Mauka to Makai with a drainage pattern that conveys stormwater runoff via overland flow and underground storm drain pipe systems toward the Kapakahi Stream, located west of the project site along Waipahu Depot Street. Site elevations range from +7.50' mean sea level (MSL) to +28.00' MSL in the Mauka Block and +6.00' MSL to +9.00' MSL in the Makai Block.

Maps obtained from CCH GIS indicate there are existing catch basins at the corner of Hikimoe and Kahuailani Streets that capture and convey stormwater runoff from the Mauka Block and other adjacent properties to the Kapakahi Stream via an 18" reinforced concrete pipe system within Hikimoe Street. Stormwater runoff generated by the Makai Block and other adjacent properties are captured and conveyed to the Kapakahi Stream via catch basins, drain inlets, and 4'x1' and 3'x1.5' concrete box culverts within Farrington Highway. There are no known lateral connections with runoff sheet flowing off the sites into the streets before draining into the catch basins. Each site is nearly entirely composed of impervious surfaces in the form of buildings and pavement. See Existing Storm Drainage Utilities Map Figure 5.

According to the original FIRM dated January 19, 2011, community-panel number 15003C0238G, portions of the project site are located in Zone D, Zone AE and Zone X. Zone AE are flood hazard areas in which the base flood elevation (BFE) has been determined for a 100-year flood. Zone X areas are determined to be outside of the 0.2% annual chance floodplain. Zone D are areas of irresolute flood hazards. The development sites are within a floodway in special flood hazard zone AE that have base flood elevations ranging from +11.00' MSL to +13.00' MSL. In accordance with the FEMA FIRM requirements, areas within a floodway must be kept free of encroachment so that a 100-year flood can be carried without substantial increases in flood heights. Redevelopments in floodways are not allowed to increase the base flood elevations as a result of fill.

A Letter of Map Revision (LOMR) application was submitted to the Federal Emergency Management Agency (FEMA) in the year 2021 by Wilson Okamoto Corporation and River Focus to revise the FIRM based on more accurate data of existing conditions, most notably a mound along Waikele Stream in Hawaii's Plantation Village. The mound

through Hawaii's Plantation Village contains the majority of flood water in Waikele Stream. The LOMR was issued by FEMA on July 25, 2022 with an effective date of December 6, 2022. According to the annotated FIRM panels provided by the issued LOMR, the development sites continue to be in the AE zone floodplain although no longer in the floodway. The base flood elevations through the development sites range from +9.00' MSL to +10.00' MSL. Redevelopment in an AE zone without a floodway requires the project to construct the first floor of the building and any life safety components above the base flood elevation, but it does not involve a no-rise requirement. See Appendix E for the original FIRM, LOMR, and revised annotated FIRM.

5.3 Proposed Conditions

The proposed development is expected to include landscaped areas that will increase pervious surfaces compared to that of the existing conditions, which will subsequently decrease the total runoff rate accordingly. Retention of storm water for quantity control is not anticipated. A comparison of the estimated existing and proposed calculated runoff rates are as follows:

Comparison between the existing and proposed flow rate is shown below.

	Existing Condition	Proposed Condition
Flow rate Q_{10} (cfs)	20.49	17.01

See Appendix D Storm Drainage Calculations.

Storm water treatment is required by CCH. The City and County of Honolulu Rules Related to Water Quality amended July 14, 2017 state that post construction runoff is to be treated by low impact development means prior to discharge into the CCH system. A hierarchy of treatment methods is described that first requires implementation of infiltration types of best management practices measures, before flow through measures are considered, and then finally mechanical measures are considered.

5.4 Recommendation

Storm drainage lateral connections should be made to the existing catch basins at the Hikimoe Street and Farrington Highway to follow the existing drainage patterns of the site. The sites shall be graded to provide positive drainage directed away from the buildings. Retention of runoff is not anticipated to be required, however, the runoff must be treated to meet CCH permitting requirements. Based on similar projects, manufactured treatment devices may be used for treatment such as the Old Castle Perk Filter or Hydro International Jellyfish. These devices are vault structures in the ground that pass storm water through filter cartridges. The filter cartridges require maintenance and replacement depending on the frequency of rain events.

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FIGURE 5
EXISTING STORM DRAINAGE UTILITIES MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

6 GAS LINE SYSTEM

6.1 Background

An email correspondence was sent to Hawaii Gas on April 15, 2022 requesting confirmation of gas systems in the area that can support the proposed project. Hawaii Gas confirmed system adequacy on April 18, 2022.

6.2 Existing Conditions

According to Hawaii Gas, there is a 2" gas main within Hikimoe Street from Waipahu Depot Street to Kahuailani Street that can support the proposed redevelopment. A new gas line can be linked from Farrington Highway if the gas loads are higher than expected. See Appendix F for correspondence with Hawaii Gas.

REF-309

7 ELECTRICAL SYSTEM

7.1 Background

The scope of work for the electrical utility systems involves the off-site commercial electrical utility systems and potential modifications required to support the proposed Development. Electrical utility systems include but are not limited to electrical (power) and telecommunications (telephone, cable television and internet).

Electrical (power) service to customers in the project area is provided by the Hawaiian Electric Company (HECo) and distributed overhead on joint use utility poles.

7.2 Existing Condition

Electrical (power) service to customers in the project area is provided by the Hawaiian Electric Company (HECo) and distributed overhead on joint use utility poles. All existing joint use poles are located within road right-of-ways or utility easements. A request for information letter, to verify the available capacity of HECo's existing facilities, was sent to HECo on April 18, 2022.

HECo overhead facilities run parallel to the Makai Parcel, along Farrington Highway, and consists of sub-transmission (46 kV), distribution (12 kV) and secondary (120/240 volt) lines. Pole mounted transformers are utilized to step the 12 kV distribution voltage down to utilization voltages. The joint use poles also support the overhead secondary circuits which distribute the power from the pole mounted transformers. Many customers are served from these pole mounted transformers. For larger customers (which include the Sonido-Alquero Building), a primary 12 kV feeder is extended underground to their property for use with a HECo pad-mounted transformer.

HECo customers with frontages along Hikimoe Street are served from the overhead joint use pole line which runs along Hikimoe Street and Kahuailani Street. This poleline consists of 12 kV and secondary lines. The 12 kV distribution circuit along the Hikimoe Street pole line is a different circuit from the 12 kV circuit along Farrington Highway. Pole mounted transformers are utilized to step the 12 kV distribution voltage down to utilization voltages. The joint use poles support overhead or underground secondary circuits which distribute the power from the pole mounted transformers to various customers. The 12 kV circuit along Hikimoe Street extends from the poleline along Kahuailani Street and "deadends" along Hikimoe Street, at both the Ewa and Diamond Head ends of the Makai Parcel.

A third joint utility poleline runs along Waipahu Depot Road and also consists of 12 kV and secondary lines. Pole mounted transformers are utilized to step the 12 kV distribution voltage down to utilization voltages. The joint use poles support overhead or underground secondary circuits which distribute the power from the pole mounted transformers to various customers. This pole line is used to provide

secondary service to the two-story office building at the corner of Hikimoe Street and Waipahu Road and "deadends" in the area fronting the building.

There is an underground HECo primary ductline consisting of 2-5 inch conduits which extends from a 4' x 6' HECo handhole, located on the makai side of Hikimoe Street and stubs out in the sidewalk on the mauka side of Hikimoe Street. These conduits were installed in 2019, in anticipation of future development of the mauka property.

7.3 Proposed Conditions

HECo has preliminarily indicated that the existing 12 kV circuit along Farrington Highway should have sufficient capacity to meet the anticipated demands for the Makai Parcel. However, HECo will require additional information regarding the anticipated locations of the various commercial and residential developments within the parcel before confirming the adequacy of the existing circuits in the project area. A detailed evaluation of circuit capacity will be performed when service requests for each facility are submitted to HECo during the design phase.

Because the poleline along Hikimoe Street is at the end of the existing 12 kV circuit, portions of this 12 kV circuit will likely need to be upgraded to support the Mauka Parcels as well as any services extended from this poleline to the Makai Parcel. Again, HECo will require additional information regarding the anticipated locations of the various commercial and residential developments within the parcels before confirming the adequacy of the existing circuit and the extent of any upgrades to HECo's distribution system. Similarly, a detailed evaluation of circuit capacity will be performed when service requests for each facility are submitted to HECo during the design phase.

HECo service to the portion of the Makai Parcel with direct access to Waipahu Depot Road could be extended from the existing poleline along Waipahu Depot Road. The 12 kV conductors on the Waipahu Depot Road poleline are larger than the conductors on the Hikimoe Street poleline. Therefore, it is expected that the Waipahu Depot Road conductors may have greater capacity to support additional demand loads.

HECo provided a "Will Serve" letter dated July 6, 2022 which identifies the existing HECo distribution circuits in project area which can potentially be used to serve the development.

Costs for off-site upgrades of HECo facilities are typically borne by HECo when there are existing circuits in the project area. This is the case for the mauka and makai pproperties as there are various existing circuits along the roadways adjacent to the project sites.

For purposes of this report, assume that new HECo pad mounted transformers will be utilized to support the project loads associated with the various buildings/facilities

REF-310

proposed for the development. HECo may also require pad-mounted primary switches for the transformers. Locations of the transformers and primary switches will be determined by the on-site electrical engineer as the site development plans are refined. New underground infrastructure, consisting of ductlines, manholes and/or handholes, will be extended from HECo's existing 12 kV overhead circuits along Farrington Highway or Hikimoe Street to support HECo service to each of the transformers and primary switches on the site.

The PER does not address undergrounding or relocation of the existing HECo overhead circuits systems along Farrington Highway and Hikimoe Streets at this time. Significant coordination and discussion with HECo will be required to identify infrastructure requirements and HECo design and construction costs associated with such undergrounding work. For planning purposes, it is likely that HECo will require separate ductline and manhole systems for 46 kV sub-transmission and 12 kV distribution circuits along Farrington Highway. Although HECo will perform the actual removal of the overhead circuits and installation of underground conductors, the cost for undergrounding of existing overhead HECo circuits will be charged to the customer.

8 TELECOMMUNICATION SYSTEM

8.1 Background

The scope of work for the telecommunications utility systems involves the off-site commercial electrical utility systems and potential modifications required to support the development.

Telephone, cable television and related telecommunications services are provided to customers in the project area by Hawaiian Telcom (HT) and Spectrum. Customers have the option to contract with HT, Spectrum, or both for their telecommunications services. Both HT and Spectrum are capable of providing voice, internet and other telecommunications services to their customers.

8.2 Existing Conditions

Telephone, cable television and related telecommunications services are provided to customers in the project area by Hawaiian Telcom (HT) and Spectrum. Customers have the option to contract with HT, Spectrum, or both for their telecommunications services. Both HT and Spectrum are capable of providing voice, internet and other telecommunications services to their customers.

The existing Hawaiian Telcom and Spectrum telecommunications cables are generally run overhead and follow the path of the HECo electrical lines along Farrington Highway, Hikimoe Street and Kahuailani Street. HT and Spectrum also have smaller distribution cables on the opposite side of Farrington Highway. Requests for information letters, to verify the available capacity of HT's and Spectrum's existing distribution systems, were sent to each utility on April 18, 2022.

Hawaiian Telcom's overhead distribution system consists of a combination of fiber optic and copper cables along the Farrington Highway joint pole line. The polelines along Hikimoe and Kahuailani Streets carry Hawaiian Telcom copper cables only. There is an underground HT ductline consisting of 2-4 inch conduits which extend from a 3' x 5' HT handhole, located on the makai side of Hikimoe Street and stubs out in the sidewalk on the mauka side of Hikimoe Street. These conduits were installed in 2019, in anticipation of future development of the mauka property.

Spectrum's overhead distribution system consists of trunk fiber optic and coaxial cables along the Farrington Highway joint pole line. The polelines along Hikimoe and Kahuailani Streets carry Spectrum coaxial cable only. There is an underground Spectrum ductline consisting of 1-4 inch conduit which extends from a 2' x 6' Spectrum handhole, located on the makai side of Hikimoe Street and stubs out in the sidewalk on the mauka side of Hikimoe Street. This conduit was installed in 2019, in anticipation of future development of the mauka property.

The existing customers on the within the project area have a combination of overhead and underground services from HT and Spectrum.

REF-311

8.3 Proposed Conditions

Hawaiian Telcom has confirmed that their existing copper and fiber optic facilities adjacent to the parcels have sufficient capacity to support the development.

Spectrum has confirmed that their existing coaxial and fiber optic plant facilities fronting the development do not have adequate capacity to support the development. Spectrum would plan to extend their existing fiber optic plant to the project area, along Farrington Highway, via the existing joint utility poles. The fiber extension may then need to be routed via new underground infrastructure along Waipahu Depot Road and extended to the properties along Hikimoe and Kahuailani Streets via existing joint utility poles. Spectrum's fiber extension is tentatively planned to be a 96-strand single mode cable.

New underground infrastructure, consisting of ductlines, manholes and/or handholes, will be extended from the existing overhead HT and OTWC polelines along Farrington Highway or Hikimoe Street to support telecommunications services to the development. The service points of connection to the HT and OTWC polelines will be confirmed as the site development plans for the properties are further refined and the types of telecommunications services desired by the various customers are identified.

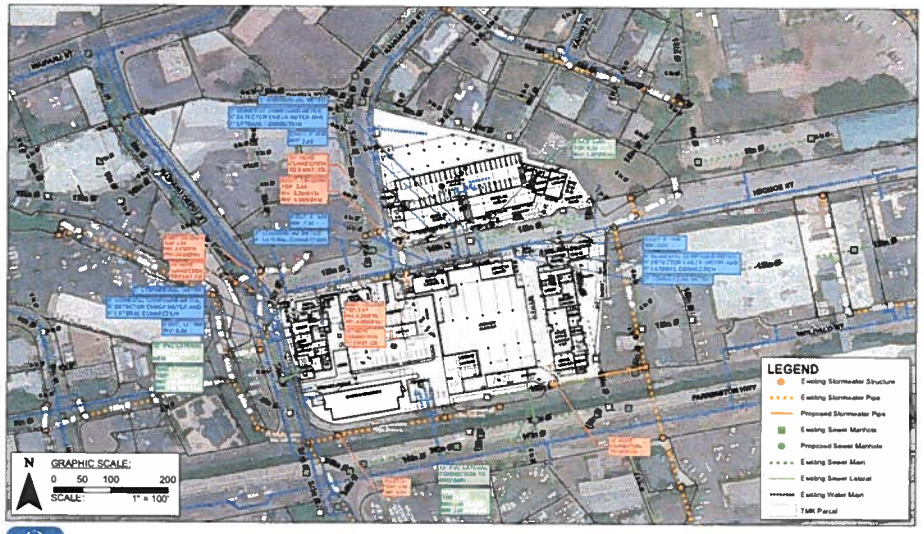
The PER does not address undergrounding of the existing HT and Spectrum cables along Farrington Highway and Hikimoe Streets at this time. Significant coordination and discussion with HT and Spectrum will be required to identify infrastructure requirements and utility company design and construction costs associated with such undergrounding work. Although HT and Spectrum will perform the actual removal of the overhead cables and installation of underground cables, the cost for undergrounding of existing overhead HT and Spectrum cables will likely be charged to the customer.

Appendix A

Plan Maps

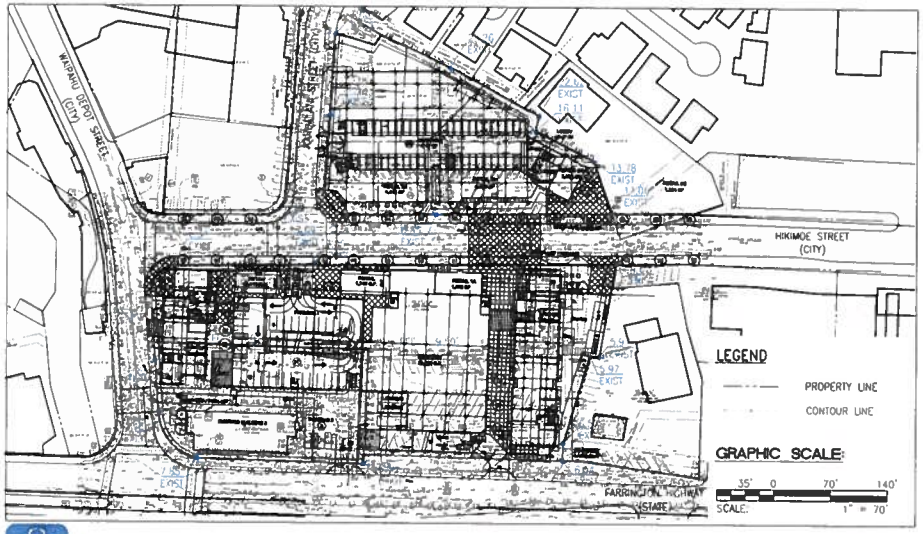
- Concept Utility Plan Map
- Site Grading Plan

REF-312



CONCEPT UTILITY PLAN MAP

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII



SITE GRADING PLAN

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

REF-313

Appendix B

Sewer System Information

- Mauka Block Sewer Application submitted May 25, 2021
- Makai Block Sewer Application submitted May 25, 2021

WILSON OKAMOTO
CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10550-01
May 25, 2021

City and County of Honolulu
Department of Planning and Permitting
Wastewater Branch
650 South King Street, 1st Floor
Honolulu, HI 96813

Attention: Ms. Tessa Ching

Subject: Waipahu Redevelopment Mauka Parcel – Sewer Connection Application

Dear Ms. Ching:

We are submitting a Sewer Connection Application Form for the Waipahu Redevelopment Mauka Parcel project located at TMK: 9-4-014: 059 to 067 and 9-4-013: 046. See the enclosed Site Development Division Master Application Form, Sewer Table, Project Vicinity and Location Map, and Tax Map Key.

The development will include the following programming:

- Existing programming:
  - General Office – 2,200 sf (Demolish)
  - Medical Office – 3,050 sf (Demolish)
  - Restaurant – 2,340 sf (Demolish)
  - Retail – 11,830 sf (Demolish)
- Proposed programming:
  - Residential – 106 units – 1" water meter
  - Restaurant – 4,778 sf – 1" water meter
  - Retail – 5,352 sf – 1" water meter

Changes were made to the original plans for the Waipahu Redevelopment Project, therefore, this is an updated application that reflects the changes that were made. Originally, the project was to be done in a single phase, however, it will now be done in two phases. Phase 1 (Mauka Parcel) will consist of TMK 9-014:059 to 067 and 9-4-013:046. Phase 2 (Makai Parcel) will consist of TMK 9-014: 005, 014 & 058.

Feel free to call or email me at kgoto@wilsonokamoto.com should you have any questions or require additional information.

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

10550-01
Letter to Tessa Ching
Page 2
May 25, 2021

Sincerely,

Kevin Goto, PE, LEED AP
Project Manager

Enclosures: Site Development Division Master Application Form
Sewer Table
Project Vicinity and Location Map
Tax Map Key

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING & PERMITTING
650 South King Street, Honolulu, Hawaii 96813

SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM

All required documents and fees must accompany this application form. Please visit www.honoluludpp.org for applicable procedures and fees under the menu heading Application & Forms, Site Engineering and Subdivision Permits. Electronic submittal of permit applications and other permit-related documents constitutes agreement by the applicant or authorized representative to transact business electronically with this department, in accordance with HRS Chapter 489E.

I. PERMIT / VARIANCE / APPROVAL

Check one or more as appropriate:

- ☐ Grading
- ☐ Grubbing
- ☐ Stockpiling
- ☐ Trenching
- ☑ Sewer Connection
- ☐ Flood Hazard Variance
- ☐ Flood Determination
- ☐ Floodway Permit
- ☐ Flood Map Revision
- ☐ Subdivision, Easement Consolidation
- ☐ Park Dedication
- ☐ Lot Determination
- ☐ Ag. Site Development

Complete Sections I, II, III and all other sections as possible

II. LOT AND LAND USE INFORMATION

TAX MAP KEY(S): 9-4-014: 059 to 067 and 9-4-013: 046 — Lot Area: 48,519/1.11 sq.ft./ac.

Zoning District: BMX-3 — Development Plan Designation: Central Oahu — State Land Use District: Urban

Street Address/Location of Property: Hikimoe Street, Honolulu, HI 94750

Present Use of Property/Building: Commercial

Project Name (if any): Waipahu Redevelopment Mauka Parcel

Request/Proposal (describe the nature of the request, proposed activity or project): The project proposes 106 residential units, 4,778 sf restaurant space, and 5,352 sf retail space.

III. APPLICANT INFORMATION

	Owner/Developer	Engineer/Architect	Contractor (or Agent for Subdivision apps only)
Name (& title)	Monte Heaton	Kevin Goto	
Mailing Address	330 W. Victoria Street, Gardena, California 90248-3527 (City State Zip)	1907 S. Beretania Street, Suite 400, Honolulu, HI 96826 (City State Zip)	(City State Zip)
Phone Number(s)	(424) 295-2255	(808) 946-2277	
Email Address		kgoto@wilsonokamoto.com	

APPLICANT: Kevin Goto (Print NAME of applicant) — Project Manager (Print TITLE of applicant) — Signature of applicant

IV. FOR GRADING/GRUBBING/STOCKPILING INFORMATION ONLY

Estimated Dates: Start: ____ Completion: ____ Borrow Material: ____

Area of work (sf or acres): ____ Borrow Site: ____

Disturbed area (sf or acres): ____ Disposal Material: ____

Estimated Quantity (cy): Cut: ____ Fill: ____ Disposal Site: ____

V. DESIGNATED ESCP COORDINATOR OR CWPPP

Check One:

- ☐ Erosion and sediment Control Plan (ESCP) Coordinator
- ☐ Certified Water Pollution Plan Preparer (CWPPP)

Contact Information of ESCP Coordinator/ CWPPP :

Mailing address: ____

Phone Number: ____ Email Address: ____

AUTHORIZATION CLEARANCE

This statement of authorization is used in reference to the information provided for in sections I, II, III and V above.

I/We, ____ (Print NAME and TITLE of person giving authority), hereby authorize ____ (Print NAME of person receiving authority) to act in my/our behalf in obtaining/closing the Grading/Grubbing/Stockpiling/Trenching permit for the project and designate ESCP coordinator or CWPPP ____ (Print NAME of ESCP Coordinator/CWPPP).

Signature of Owner/Developer giving authority — Date — ESCP Coordinator / CWPPP Signature — Date

FOR DIVISION USE ONLY:

Date of Application: ____ Received By: ____ Application No.: ____

Grading Permit No.: ____

Trenching Permit No.: ____

SEE REVERSE FOR APPLICATIONS FOR TRENCHING AND SEWER CONNECTION

rev. 08/16/2017

REF-315

SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM

(REVERSE SIDE)

VI. FOR TRENCHING INFORMATION ONLY

Work to be performed for: _____ Work to be done: ☐ Service Connection ☐ Repair ☐ Borings

Estimated Dates: Start: _____ Completion: _____ Other: _____

Estimated Value of work: $ _____ Dimensions: _____ ft/in (length) _____ ft/in (width) _____ ft/in (depth)

in the city right - of - way

AGENCY CLEARANCES	SIGNATURE	DATE	ADDRESS	PHONE NO.
DPP, Wastewater Branch			650 So. King St., FMB, 1st Flr.	768-8210
DTS, Traffic Signal			650 So. King St., FMB, 2nd Flr.	768-8388
DDC, Street Lightning			650 So. King St., FMB, 9th Flr.	768-8431
BWS, Customer Care			630 So. Beretania St., 1st Flr.	748-5460
Hawaiian Electric, Construction Installation			820 Ward Avenue, 4th Flr.	543-5654
Hawaiian Telcom, Excavation			**1177 Bishop St.,Security Entrance Adams Lane**	**546-7746**
Gasco., Inc., Maps & Records			515 Kamakee St., 1st Flr.	594-5575
Oceanic Cablevision, Engineering & Constr.			200 Akamainui St.	625-8443
DFM, Division of Road Maintenance (if trenching 250 lineal feet or more)			99-999 Iwaena Street, #214	484-7695

DPP: Dept. of Planning and Permitting DTS: Dept. of Transportation Services DDC: Dept. of Design and Construction BWS: Board of Water Supply DFM: Dept. of Facility Maintenance

Note to agencies providing clearances: Signature on this form may be reproduced (scanned and emailed) and submitted electronically for permitting purposes in accordance with HRS Chapter 489E. Original wet Signatures may be retained by the applicant(s).

Note to the applicants receiving clearances: The utilities listed above may not represent all underground utilities located within City rights-of-ways, nor do there utility clearances relieve the permittee from complying with all other aplicable codes, rules, regulations, and/or permit procedures including, but not limited to, additional clearances and requirements for other utilities (i.e. irrigation, data transmission, etc.) located within City rights-of-ways. Pursuant to ROH 1990, Section 14-17.6, the permittee shall indemnify and save harmless the city for any injuries or damages to any person or property received or sustained by any person as a consequence of any act or acts of the permitee on work done under the trenching permit.

VII. FOR SEWER CONNECTION INFORMATION ONLY

To receive a response via e-mail provide email address below and check box here ☑

☑ Residential: No. of Proposed Units 106 (Provide breakdown below) kgoto@wilsonokamoto.com

_____ Studios 94 1 Bedroom 12 2 Bedrooms _____ 3 Bedrooms _____ 4 Bedrooms _____ Other

☑ Non-Residential: (See attached sewer table for required category and quantity and provide any additional information in the remarks)

CATEGORY(IES)	QUANTITY(IES)	NEW WATER METER SIZE(S)
Restaurant (seats per day)	2,151	1"
Retail (sf)	5,352	1"

Date of Connection: _____ (approximate) Connection Work Desired: ☐ Use Existing Lateral ☐ Other

Dimensions: _____ ft. (length) _____ in. (size) _____ ft. (depth)

Existing Structures/Dwellings on Property: (Provide breakdown below)

TYPE (i.e. Singel Family)	QUANTITY(IES)	REMAIN	DEMOLISH
* Refer to Sewer Connection Application Letter for breakdown			

Remarks: (Provide any additional information on the lines provided) *To receive a response via e-mail,provide email address below and check box here* ☑

kgoto@wilsonokamoto.com

FOR DIVISION USE ONLY:

Date of Application: _____ Received By: _____ Application No.: _____

rev. 06.16.17

SEWER TABLE

This table is used for required category and quantity for non-residential connections. (See sect. V1 "Sewer Connection Information Only" of the Site Development Master Application form).

TAX MAP KEY(S) 9-4-014: 059 to 067 and 9-4-013: 046

CATEGORY	UNITS	QUANTITY	CATEGORY	UNITS	QUANTITY
Animal Clinic	Employees		Meat Processing	gpd*	
Aquarium	Employees		Medical Clinic	Employees	
Auto Repair	Employees		Military	gpd*	
Bakery	Employees		Milk Processing	gpd*	
Banks	Employees		Mortuaries	Employees	
Bowling Alley	Employees		Motel	Rooms	
Car Dealership	Employees		Museum	Employees	
Car Wash	Employees		Newspaper Agencies	Employees	
Caterers	Employees		Noodle Factory	Employees	
Church	Employees		Nursery	Employees	
Commercial (Misc.)	Sq. Ft. of Floor Space		Nursing, Convalescent Home	Employees and Beds	
Commercial Kennel	Employees		Office Building	Employees	
Convent	Sisters		Park w/ comfort station only	Employees	
Day Care, Pre-School	Children		Parking Structure	Employees	
Delicatessen	Employees		Personal Services	Employees	
Dental Clinic	Employees		Photo Finishers	Employees	
Dentist's Office	Employees		Photo Processing	Employees	
District Park	Employees		Pineapple Processing	gpd*	
Doctor's Office	Employees		Police Station	Employees	
Dormitory	Rooms		Potato Chip Manufacturing	gpd*	
Drinking Establishment	Employees		Poultry Processing	gpd*	
Dry Cleaning	gpd *		Prison	Prisoners	
Elementary School	Students		Private Clubs	Employees	
Eye Glass Manufacturing	Employees		Residential Care Home	Employees and Beds	
Fast Foods	Employees		Resort Condo	Rooms	
Fire Station	Employees		Restaurant	Seats per day	2,151
Florist	Employees		Retail	Sq. Ft. of Retail Floor Space	5,352
General Industry (Misc.)	Sq. Ft. of Floor Space		Rooming House	Rooms	
Golf Course w/Clubhouse	Employees		Schools (other)	Students	
Government Offices	Employees		Service Station	Employees	
Grocery Store	Employees		Shopping Center	Sq. Ft. of Retail Floor Space	
Half-way House	Employees and Beds		Soy Bean Factory	gpd*	
Health Spa	Employees		Sports Arena	gpd*	
High Schools	Students		Stadium	gpd*	
Hospital	Beds		Sugar Processing	gpd*	
Hostel	Rooms		Supermarket	Employees	
Hotel	Rooms		Theater	Seats per day	
Hotel Development	Acres		Tofu Factory	gpd*	
Intermediate Schools	Students		Warehouse	Employees	
Jewelry Manufacturing	Employees		YMCA (Lodging)	Rooms	
Laundromats	Machines		Zoo	Employees	
Library	Employees				

*gpd = gallons per day

FOR DIVISION USE ONLY:

Date of Application: _____ Received By: _____ Application No.: _____

REF-316

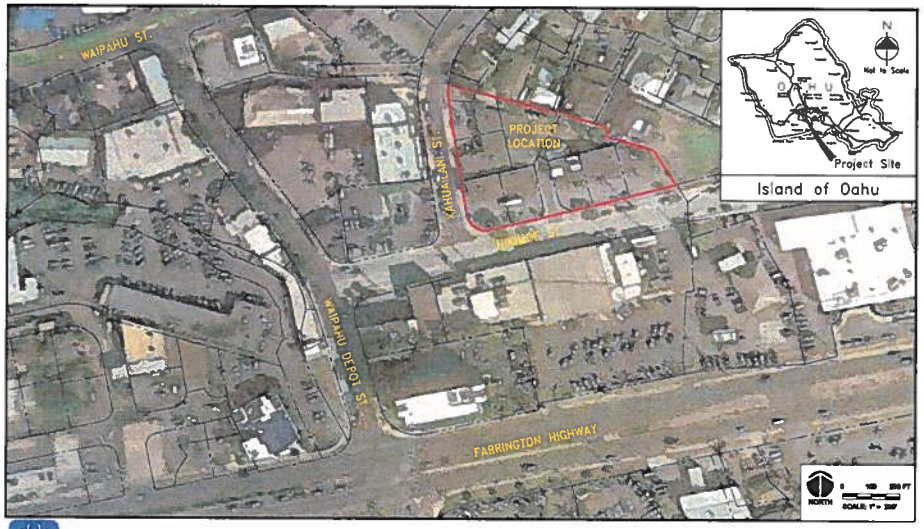


FIGURE 1
PROJECT VICINITY AND LOCATION MAP

KEAWALAU AFFORDABLE HOUSING COMMUNITY / HONOLULU, OAHU, HAWAII

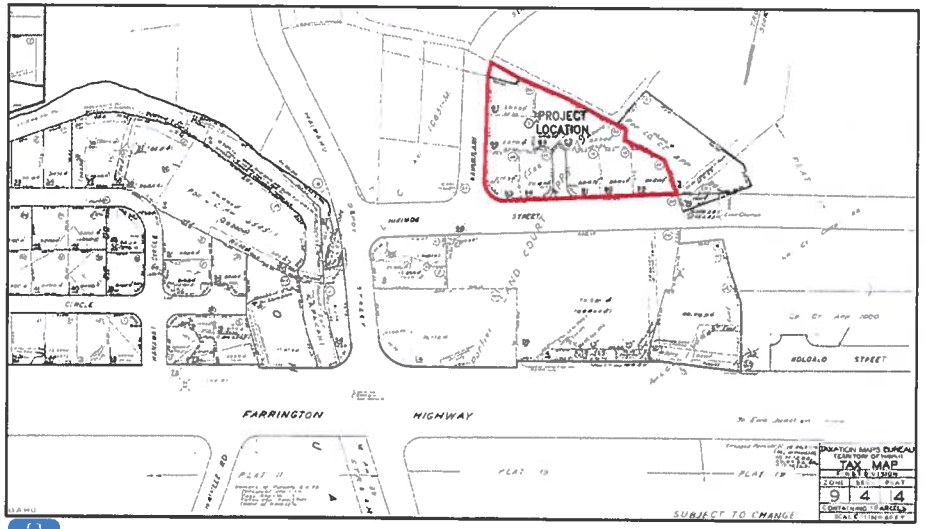


FIGURE 2
TAX MAP KEY

KEAWALAU AFFORDABLE HOUSING COMMUNITY / HONOLULU, OAHU, HAWAII

REF-317

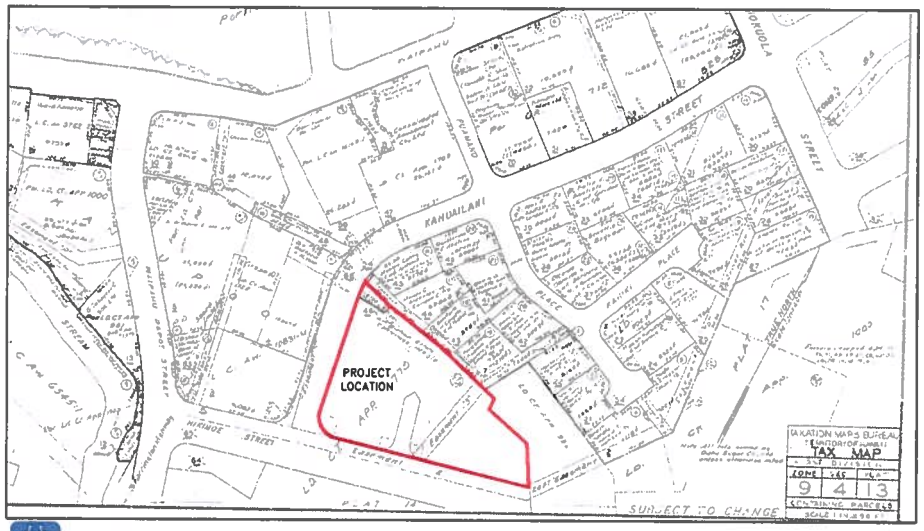


FIGURE 3
TAX MAP KEY

KEAWALAU AFFORDABLE HOUSING COMMUNITY / HONOLULU, OAHU, HAWAII

WILSON OKAMOTO CORPORATION
INNOVATORS • PLANNERS • ENGINEERS

10550-01
May 25, 2021

City and County of Honolulu
Department of Planning and Permitting
Wastewater Branch
650 South King Street, 1st Floor
Honolulu, HI 96813

Attention: Ms. Tessa Ching

Subject: Waipahu Redevelopment Makai Parcel – Sewer Connection Application

Dear Ms. Ching:

We are submitting a Sewer Connection Application Form for the Waipahu Redevelopment Makai Parcel project located at TMK: 9-4-014: 005, 014, & 058. See the enclosed Site Development Division Master Application Form, Sewer Table, Project Vicinity and Location Map, and Tax Map Key.

The development will include the following programming:

- Existing programming:
  - Market – 30,089 sf (Demolish)
  - General Office (Depot Center) – 4,824 sf (Demolish)
  - Medical Office (Depot Center) – 5,942 sf (Demolish)
  - General Office (Sonido Building) – 6,148 sf (To Remain)
  - Medical Office (Sonido Building) – 13,913 sf (To Remain)
- Proposed programming:
  - Residential – 458 units
  - Restaurant – 17,008 sf – 1" water meter
  - Retail – 9,172 sf – 1" water meter
  - Office – 27,500 sf – 1" water meter
  - Market – 20,000 sf – 1" water meter

Changes were made to the original plans for the Waipahu Redevelopment Project, therefore, this is an updated application that reflects the changes that were made. Originally, the project was to be done in a single phase, however, it will now be done in two phases. Phase 1 (Mauka Parcel) will consist of TMK 9-014:059 to 067 and 9-4-013:046. Phase 2 (Makai Parcel) will consist of TMK 9-014: 005, 014 & 058.

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

10550-01
Letter to Tessa Ching
Page 2
May 25, 2021

Feel free to call or email me at kgoto@wilsonokamoto.com should you have any questions or require additional information.

Sincerely,

Kevin Goto, PE, LEED AP
Project Manager

Enclosures: Site Development Division Master Application Form
Sewer Table
Project Vicinity and Location Map
Tax Map Key

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING & PERMITTING
650 South King Street, Honolulu, Hawaii 96813

SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM

All required documents and fees must accompany this application form. Please visit www.honoluludpp.org for applicable procedures and fees under the menu heading Application & Forms, Site Engineering and Subdivision Permits. Electronic submittal of permit applications and other permit-related documents constitutes agreement by the applicant or authorized representative to transact business electronically with this department, in accordance with HRS Chapter 489E.

I. PERMIT | **VARIANCE** | **APPROVAL**

Check one or more as appropriate:

- ☐ Grading
- ☐ Grubbing
- ☐ Stockpiling
- ☐ Trenching
- ☑ Sewer Connection
- ☐ Flood Hazard Variance
- ☐ Flood Determination
- ☐ Floodway Permit
- ☐ Flood Map Revision
- ☐ Subdivision, Easement Consolidation
- ☐ Park Dedication
- ☐ Lot Determination
- ☐ Ag. Site Development

Complete Sections I, II, III and all other sections as possible

II. LOT AND LAND USE INFORMATION

TAX MAP KEY(S) 9-4-014: 005, 014, and 058 — Lot Area: 119,113/2.73 sq.ft/ac.

Zoning District: BMX-3 — Development Plan Designation: Central Oahu — State Land Use District: Urban

Street Address/Location of Property: Hikimoe Street, Honolulu, HI 94750

Present Use of Property/Building: Commercial

Project Name (if any): Waipahu Redevelopment Makai Parcel

Request/Proposal (describe the nature of the request, proposed activity or project): The project proposes 458 residential units, 17,008 sf restaurant space, 9,172 sf retail space, 27,500 sf Office space, and 20,000 sf Market space.

III. APPLICANT INFORMATION

	Owner/Developer	Engineer/Architect	Contractor (or Agent for Subdivision appe only)
Name (& title)	Monte Heaton	Kevin Goto	
Mailing Address	330 W. Victoria Street, Gardena, California 90248-3527 (City State Zip)	1907 S. Beretania Street, Suite 400, Honolulu, HI 96826 (City State Zip)	(City State Zip)
Phone Number(s)	(424) 295-2255	(808) 946-2277	
Email Address		kgoto@wilsonokamoto.com	

APPLICANT — Kevin Goto (Print NAME of applicant) — Project Manager (Print TITLE of applicant) — Signature of applicant

IV. FOR GRADING/GRUBBING/STOCKPILING INFORMATION ONLY

Estimated Dates: Start: _____ Completion: _____ Borrow Material: _____

Area of work (sf or acres): _____ Borrow Site: _____

Disturbed area (sf or acres): _____ Disposal Material: _____

Estimated Quantity (cy): Cut: _____ Fill: _____ Disposal Site: _____

V. DESIGNATED ESCP COORDINATOR OR CWPPP

Check One:

- ☐ Erosion and sediment Control Plan (ESCP) Coordinator
- ☐ Certified Water Pollution Plan Preparer (CWPPP)

Contact Information of ESCP Coordinator/ CWPPP :

Mailing address: _____

Phone Number: _____ Email Address: _____

AUTHORIZATION CLEARANCE

This statement of authorization is used in reference to the information provided for in sections I, II, III and V above.

I/We, _____ (Print NAME and TITLE of person giving authority), hereby authorize _____ (Print NAME of person receiving authority) to act in my/our behalf in obtaining/closing the Grading/Grubbing/Stockpiling/Trenching permit for the project and designate ESCP coordinator or CWPPP _____ (Print NAME of ESCP Coordinator/CWPPP).

Signature of Owner/Developer giving authority — Date — ESCP Coordinator / CWPPP Signature — Date

FOR DIVISION USE ONLY:

Date of Application: _____ Received By: _____ Application No.: _____

Grading Permit No.: _____

Trenching Permit No.: _____

SEE REVERSE FOR APPLICATIONS FOR TRENCHING AND SEWER CONNECTION

rev. 08/16/2017

REF-319

SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM

(REVERSE SIDE)

VI. FOR TRENCHING INFORMATION ONLY

Work to be performed for: _____ Work to be done: ☐ Service Connection ☐ Repair ☐ Borings

Estimated Dates: Start: _____ Completion: _____ Other: _____

Estimated Value of work: $ _____ Dimensions: _____ ft/in (length) _____ ft/in (width) _____ ft/in (depth)

In the city right - of - way

AGENCY CLEARANCES	SIGNATURE	DATE	ADDRESS	PHONE NO.
DPP, Wastewater Branch			650 So. King St., FMB, 1st Flr.	768-8210
DTS, Traffic Signal			650 So. King St., FMB, 2nd Flr.	768-8388
DDC, Street Lightning			650 So. King St., FMB, 9th Flr.	768-8431
BWS, Customer Care			630 So. Beretania St., 1st Flr.	748-5460
Hawaiian Electric, Construction Installation			820 Ward Avenue, 4th Flr.	543-5654
Hawaiian Telcom, Excavation			1177 Bishop St.,Security Entrance Adams Lane	546-7746
Gasco., Inc., Maps & Records			515 Kamakee St., 1st Flr.	594-5575
Oceanic Cablevision, Engineering & Constr.			200 Akamainui St.	625-8443
DFM, Division of Road Maintenance (if trenching 250 lineal feet or more)			99-999 Iwaena Street, #214	484-7695

DPP: Dept. of Planning and Permitting DTS: Dept. of Transportation Services DDC: Dept. of Design and Construction BWS: Board of Water Supply DFM: Dept. of Facility Maintenance

Note to agencies providing clearances: Signature on this form may be reproduced (scanned and emailed) and submitted electronically for permitting purposes in accordance with HRS Chapter 489E. Original wet Signatures may be retained by the applicant(s).

Note to the applicants receiving clearances: The utilities listed above may not represent all underground utilities located within City rights-of-ways, nor do there utility clearances relieve the permittee from complying with all other aplicable codes, rules, regulations, and/or permit procedures including, but not limited to, additional clearances and requirements for other utilities (i.e. irrigation, data transmission, etc.) located within City rights-of-ways. Pursuant to ROH 1990, Section 14-17.6, the permittee shall indemnify and save harmless the city for any injuries or damages to any person or property received or sustained by any person as a consequence of any act or acts of the permitee on work done under the trenching permit.

VII. FOR SEWER CONNECTION INFORMATION ONLY

To receive a response via e-mail,provide email address below and check box here. ☑

☑ Residential: No. of Proposed Units 458 (Provide breakdown below) kgoto@wilsonokamoto.com

180 Studios 158 1 Bedroom 100 2 Bedrooms 20 3 Bedrooms _____ 4 Bedrooms _____ Other

☑ Non-Residential: (See attached sewer table for required category and quantity and provide any additional information in the remarks)

CATEGORY(IES)	QUANTITY(IES)	NEW WATER METER SIZE(S)
* Refer to Sewer Connection Application Letter for Breakdown		

Date of Connection: _____ (approximate)

Connection Work Desired: ☐ Use Existing Lateral ☐ Other

Dimensions: _____ ft. (length) _____ in. (size) _____ ft. (depth)

Existing Structures/Dwellings on Property: (Provide breakdown below)

TYPE (i.e. Singel Family)	QUANTITY(IES)	REMAIN	DEMOLISH
* Refer to Sewer Connection Application Letter for Breakdown			

Remarks: (Provide any additional information on the lines provided)

To receive a response via e-mail,provide email address below and check box here. ☑

kgoto@wilsonokamoto.com

FOR DIVISION USE ONLY:

Date of Application: _____ Received By: _____ Application No.: _____

rev. 08/16/17

SEWER TABLE

This table is used for required category and quantity for non-residential connections. (See sect. V1 "Sewer Connection Information Only" of the Site Development Master Application form).

TAX MAP KEY(S) 9-4-014: 005, 014, 058

CATEGORY	UNITS	QUANTITY	CATEGORY	UNITS	QUANTITY
Animal Clinic	Employees		Meat Processing	gpd*	
Aquarium	Employees		Medical Clinic	Employees	
Auto Repair	Employees		Military	gpd*	
Bakery	Employees		Milk Processing	gpd*	
Banks	Employees		Mortuaries	Employees	
Bowling Alley	Employees		Motel	Rooms	
Car Dealership	Employees		Museum	Employees	
Car Wash	Employees		Newspaper Agencies	Employees	
Caterers	Employees		Noodle Factory	Employees	
Church	Employees		Nursery	Employees	
Commercial (Misc.)	Sq. Ft. of Floor Space		Nursing, Convalescent Home	Employees and Beds	
Commercial Kennel	Employees		Office Building	Employees	184
Convent	Sisters		Park w/ comfort station only	Employees	
Day Care, Pre-School	Children		Parking Structure	Employees	
Delicatessen	Employees		Personal Services	Employees	
Dental Clinic	Employees		Photo Finishers	Employees	
Dentist's Office	Employees		Photo Processing	Employees	
District Park	Employees		Pineapple Processing	gpd*	
Doctor's Office	Employees		Police Station	Employees	
Dormitory	Rooms		Potato Chip Manufacturing	gpd*	
Drinking Establishment	Employees		Poultry Processing	gpd*	
Dry Cleaning	gpd *		Prison	Prisoners	
Elementary School	Students		Private Clubs	Employees	
Eye Glass Manufacturing	Employees		Residential Care Home	Employees and Beds	
Fast Foods	Employees		Resort Condo	Rooms	
Fire Station	Employees		Restaurant	Seats per day	7,654
Florist	Employees		Retail	Sq. Ft. of Retail Floor Space	9,172
General Industry (Misc.)	Sq. Ft. of Floor Space		Rooming House	Rooms	
Golf Course w/Clubhouse	Employees		Schools (other)	Students	
Government Offices	Employees		Service Station	Employees	
Grocery Store	Employees		Shopping Center	Sq. Ft. of Retail Floor Space	
Half-way House	Employees and Beds		Soy Bean Factory	gpd*	
Health Spa	Employees		Sports Arena	gpd*	
High Schools	Students		Stadium	gpd*	
Hospital	Beds		Sugar Processing	gpd*	
Hostel	Rooms		Supermarket	Employees	X
Hotel	Rooms		Theater	Seats per day	
Hotel Development	Acres		Tofu Factory	gpd*	
Intermediate Schools	Students		Warehouse	Employees	
Jewelry Manufacturing	Employees		YMCA (Lodging)	Rooms	
Laundromats	Machines		Zoo	Employees	
Library	Employees				

*gpd = gallons per day

FOR DIVISION USE ONLY:

Date of Application: _____ Received By: _____ Application No.: _____

REF-320

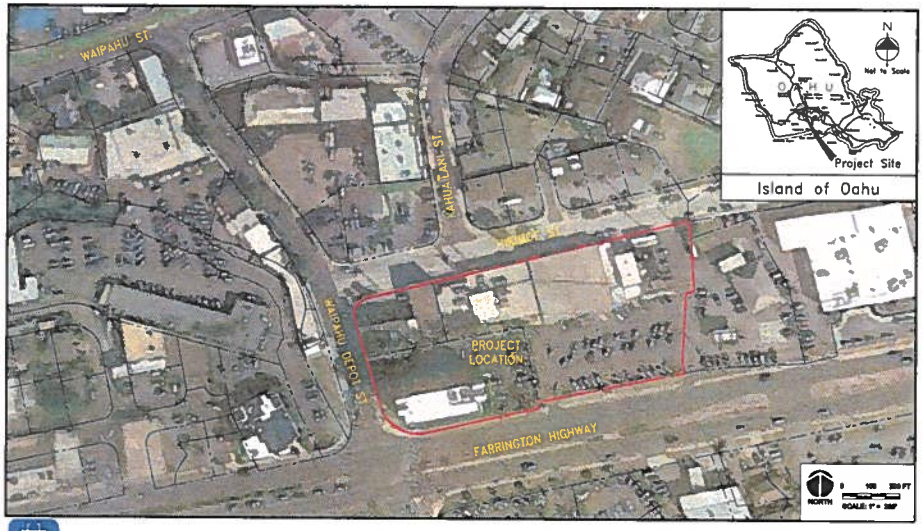


FIGURE 1
PROJECT VICINITY AND LOCATION MAP

KEAWALAU AFFORDABLE HOUSING COMMUNITY / HONOLULU, OAHU, HAWAII

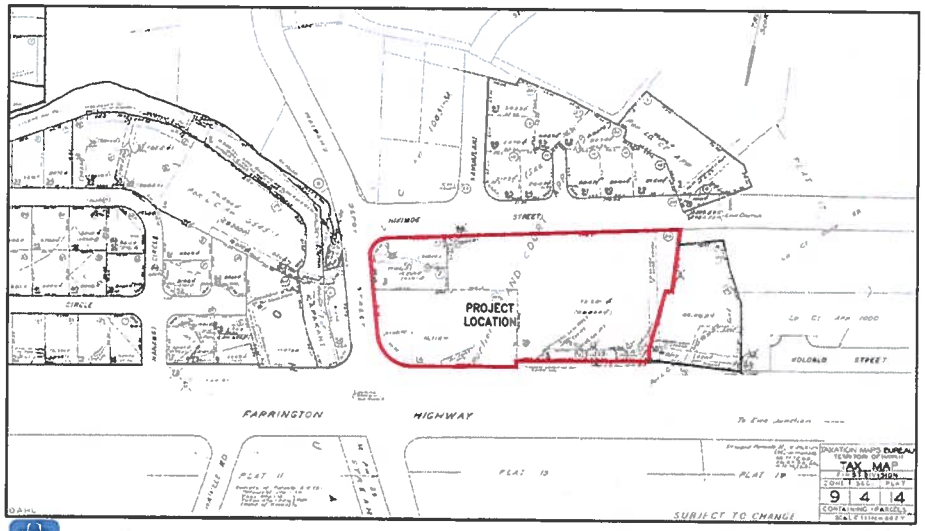


FIGURE 2
TAX MAP KEY

KEAWALAU AFFORDABLE HOUSING COMMUNITY / HONOLULU, OAHU, HAWAII

REF-321

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET * HONOLULU, HAWAII 96813
Phone (808) 768-8209 * Fax (808) 768-4210

RECEIVED JUN 24 2021 WILSON OKAMOTO CORPORATION

SEWER CONNECTION APPLICATION

APPLICATION NO. **2021/SCA-0794** STATUS: **Approved**
DATE RECEIVED: **05/28/2021** IWDP APP. NO.:
PROJECT NAME: **2021/SCA-0794 Waipahu Redevelopment Phase 1 - Mauka Parcel**

$522,664.00
Estimated Wastewater System Facility Charge*

LOCATION

Zone	Section	Plat	Parcel		
9	4	013	046	1,072 Sq. Ft.	
9	4	014	059	94-750 HIKIMOE ST Waipahu 96797	5,054 Sq. Ft.
9	4	014	060	94-750 HIKIMOE ST Waipahu 96797	5,046 Sq. Ft.
9	4	014	061	94-750 HIKIMOE ST Waipahu 96797	5,047 Sq. Ft.
9	4	014	062	5,294 Sq. Ft.	
9	4	014	063	94-855 KAHUAILANI ST Waipahu 9(	6,483 Sq. Ft.
9	4	014	064	94-748 HIKIMOE ST Waipahu 96797	5,047 Sq. Ft.
9	4	014	065	94-748 HIKIMOE ST Waipahu 96797	5,173 Sq. Ft.
9	4	014	066	94-855 KAHUAILANI ST Waipahu 9(	5,270 Sq. Ft.
9	4	014	067	94-855 KAHUAILANI ST Waipahu 9(	5,033 Sq. Ft.

SPECIFIC LOCATION: **Hikimoe Street**

APPLICANT: **Goto, Kevin, P.E., LEED, AP**
Wilson Okamoto Corporation
1907 South Beretania Street 400
Honolulu, HI 96826

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **Existing**
OTHER USES: **Restaurant: 4,778 sf (2,151 seats/day)**
Retail: 5,352 sf
NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS	EXISTING UNITS	UNITS TO BE DEMOLISHED
No. of New Units: **106**	No. of Existing Units: **0**	No. of Units to be Demolished: **0**
Studios:	Studios:	Studios:
1-Bedroom: **94**	1-Bedroom:	1-Bedroom:
2-Bedroom: **12**	2-Bedroom:	2-Bedroom:
3-Bedroom:	3-Bedroom:	3-Bedroom:
4-Bedroom:	4-Bedroom:	4-Bedroom:
5-Bedroom:	5-Bedroom:	5-Bedroom:
6-Bedroom:	6-Bedroom:	6-Bedroom:

ExternalID: **092970204-001** JobId: **92970204**

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET * HONOLULU, HAWAII 96813
Phone (808) 768-8209 * Fax (808) 768-4210

SEWER CONNECTION APPLICATION

REMARKS

APPROVAL DATE: **06/18/2021**

EXPIRATION DATE: **06/18/2023**

Valid 2-years after approval date. Construction plans shall be completed and approved within this 2-year period. Construction shall commence within 1-year after approval of plans
** Applicable WSFC shall be collected at the prevailing rate in accordance with ROH 1990, Chapter 14, Sections 14-10.3, 14-10.4, 14-10.5 and Appendix 14-D*

REVIEWED BY: ***Jing Meng***

Site Development Branch, Wastewater Branch

ExternalID: **092970204-001** JobId: **92970204**

REF-322

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET * HONOLULU, HAWAII 96813
Phone: (808) 768-8209 * Fax: (808) 768-4210

SEWER CONNECTION APPLICATION

APPLICATION NO.: **2021/SCA-0795** STATUS: **Approved**
DATE RECEIVED: **05/28/2021** IWDP APP. NO.:
PROJECT NAME: **2021/SCA-0795 Waipahu Redevelopment Phase 2 - Makai Parcel**

$2,184,603.20
Estimated Wastewater System Facility Charge*

LOCATION:

Zone	Section	Plat	Parcel		
9	4	014	005	94-239 WAIPAHU DEPOT ST Waipa	12,360 Sq. Ft.
9	4	014	014	94-730 FARRINGTON HWY Waipahı	33,172 Sq. Ft.
9	4	014	058	94-766 FARRINGTON HWY Waipahı	73,581 Sq. Ft.

SPECIFIC LOCATION: **Hikimoe Street**

APPLICANT: **Kevin Goto**
1907 South Beretania Street 400
Honolulu, HI 96826

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **Existing**

OTHER USES: **Restaurant: 17,008 sf (7,654 seats/day)**
Retail: 9,172 sf
Office: 27,500 sf (184 employees)
Supermarket: 20,000 sf

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS		EXISTING UNITS		UNITS TO BE DEMOLISHED	
No. of New Units	458	No. of Existing Units:	0	No. of Units to be Demolished:	0
Studios:	180	Studios:		Studios:	
1-Bedroom:	150	1-Bedroom:		1-Bedroom:	
2-Bedroom:	100	2-Bedroom:		2-Bedroom:	
3-Bedroom:	20	3-Bedroom:		3-Bedroom:	
4-Bedroom:		4-Bedroom:		4-Bedroom:	
5-Bedroom:		5-Bedroom:		5-Bedroom:	
6-Bedroom:		6-Bedroom:		6-Bedroom:	

REMARKS

APPROVAL DATE: **06/18/2021**
EXPIRATION DATE: 06/18/2023

Valid 2-years after approval date. Construction plans shall be completed and approved within this 2-year period. Construction shall commence within 1-year after approval of plans.
** Applicable WSFC shall be collected at the prevailing rate in accordance with ROH 1990, Chapter 14, Sections 14-10.3, 14-10.4, 14-10.5 and Appendix 14-D.*

REVIEWED BY: *Jing Meng*
Site Development Division, Wastewater Branch

FormatID: 092971625-001 JobId: 92971625
Initial Print Date: Friday June 18, 2021 3:55 pm

APPENDIX B
KEAWALAU AFFORDABLE HOUSING COMMUNITY PROGRAMMING AND PROJECTED WASTEWATER FLOW SUMMARY

Phase	Property Description	Residential Units by Bedroom Count				Retail (sq.ft.)	Restaurant (sq.ft.)	Office (sq.ft.)	Market (sq.ft.)	Wastewater Flow Summary per Current Design Standards	
		Studio	1BR	2BR	3BR					Average Daily Flow (mgd)	Design Peak Flow (mgd)
Phase 1	Makaa Block		118	15		5,918	4,778			0.0310	0.1871
Phase 2	Makai Block	156	140	90	18	2,767	6,457	28,061	23,352	0.0863	0.3685
	TOTAL	156	258	105	18	7,785	11,235	28,061	23,352	0.1174	0.5357

REF-323

APPENDIX B
Table 1
BASE SANITARY FLOW CALCULATIONS

Phase	Property Description	Retail			Restaurant			Office			Market			Senior Living Low-Rise / Mixed-Family High-Rise						Base Sanitary Flow (gpd)	Base Sanitary Flow (mgd)
		Area (sf)	Capita	Flow Rate (gpd)	Area (sf)	Capita (seatings)	Flow Rate (gpd)	Area (sf)	Capita	Flow Rate (gpd)	Area (sf)	Capita	Flow Rate (gpd)	Studio (units)	1-Bedroom (units)	2-Bedroom (units)	3-Bedroom (units)	Capita	Flow Rate (gpd)		
Phase 1	Mauka Block	5,918	33	825	4,728	2,150	10,751								118	15		278	19,440	31,047	0.0310
Phase 2	Makai Block	2,767	18	461	6,457	2,936	14,528	20,000	134	2,344	23,352	156	3,892	156	140	90	18	916	64,140	86,345	0.0863
	Total	7,685	52	1,296	11,235	5,086	25,279	20,000	134	2,344	23,352	156	3,892	156	258	105	18	1,194	83,580	117,392	0.1174

Assumptions

Retail Capita =	0.00577	capita/sf (1 person / 150 sf)	Retail Flow =	25	gal/capita/day
Restaurant Capita =	0.45	seatings/sf (9 seatings / 20 sf)	Restaurant Flow =	5	gal/capita/day
Studio Capita =	2.0	capita/unit	Market Flow =	25	gal/capita/day
1-Bedroom Capita =	2.0	capita/unit	Office Flow =	25	gal/capita/day
2-Bedroom Capita =	2.8	capita/unit	SLL/MF HR Flow =	70	gal/capita/day
3-Bedroom Capita =	4.0	capita/unit			

APPENDIX B
Table 2
DESIGN FLOW CALCULATIONS

Phase	Property Description	Area (acres)	Capita	Base Sanitary Flow (mgd)	Flow Factor	Peak Base Sanitary Flow (mgd)	Groundwater Infiltration (mgd)	Avg. Dry Weather Flow (mgd)	Peak Dry Weather Flow (mgd)	Wet Weather PI (mgd)	Design Flow (mgd)
Phase 1	Mauka Block	1.12	2,442	0.031	2.50	0.078	0.006	0.117	0.184	0.003	0.187
Phase 2	Makai Block	2.71	4,120	0.086	2.50	0.216	0.145	0.231	0.362	0.008	0.370
	Total	3.83	6,561	0.117	2.50	0.293	0.151	0.348	0.524	0.011	0.536

REF-324

Appendix C

Water System Information

- Water Availability Request Letter submitted April 13, 2022
- BWS Response Letter dated May 26, 2022
- Water Demand Calculations

WILSON OKAMOTO CORPORATION
INNOVATORS · PLANNERS · ENGINEERS

10550-03
April 13, 2022

City and County of Honolulu
Board of Water Supply
Customer Care Operating Unit
630 South Beretania Street
Honolulu, HI 96813

Attention: Mr. Robert Chun

Subject: Waipahu Redevelopment – BWS Water System Adequacy

Dear Mr. Chun:

We are requesting Board of Water Supply assistance to determine adequacy of the existing source, storage, and water distribution systems in Waipahu to support a redevelopment project located at TMK: 9-4-13: 046 and 9-4-14: 005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066, and 067.

The redevelopment involves a 1.12 acre mauka parcel and a 2.73 makai parcel on either side of Hikimoe Street. It is proposed to provide over 500 multi-family residential units and over 56,000 square feet of commercial spaces, including a supermarket.

Existing programming:

Mauka (TMK: 9-4-13: 046, 9-4-14: 059, 060, 061, 062, 063, 064, 065, 066, & 067)

- 2,200 sf General Office (to demolish)
- 3,050 sf Medical Office (to demolish)
- 2,340 sf Restaurant (to demolish)
- 11,830 sf Retail (to demolish)

Makai (TMK: 9-4-14: 005, 014, & 058)

- 30,089 sf Market (to demolish)
- 4,824 sf General Office – Depot Center (to demolish)
- 5,942 sf Medical Office – Depot Center (to demolish)
- 6,148 sf General Office – Sonido Building (to remain)
- 13,913 sf Medical Office – Sonido Building (to remain)

1907 S. Beretania Street, Suite 400 • Honolulu, Hawaii • 96826 • (808) 946-2277

Proposed programming:

Mauka (TMK: 9-4-13: 046, 9-4-14: 059, 060, 061, 062, 063, 064, 065, 066, & 067)

- 118 1-Bedroom units
- 15 2-Bedroom units
- 5,924 sf Restaurant
- 2,538 sf Retail

Makai (TMK: 9-4-14: 005, 014, & 058)

- 156 Studio units
- 140 1-Bedroom units
- 90 2-Bedroom units
- 18 3-Bedroom units
- 4,770 sf Restaurant
- 2,044 sf Retail
- 23,352 sf Market
- 29,550 sf Existing Office (to remain)

In addition to your review of the existing water system, we are requesting Board of Water Supply flow information, pressure information, record drawings, and facility maps related to the property. Any existing facility information that can be provided will be used in the project planning and design process to minimize potential conflicts during construction.

Feel free to call or email me at kgoto@wilsonokamoto.com should you have any questions or require additional information.

Sincerely,

Kevin Goto, PE, LEED AP
Project Manager

Enclosures: Project Vicinity and Location Map
Tax Map Key

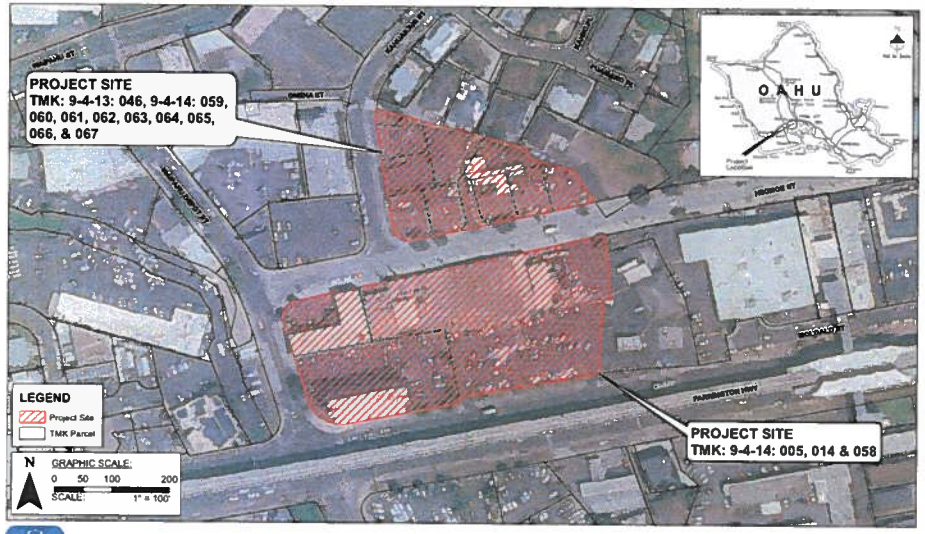


FIGURE 1
PROJECT LOCATION AND VICINITY MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

REF-326

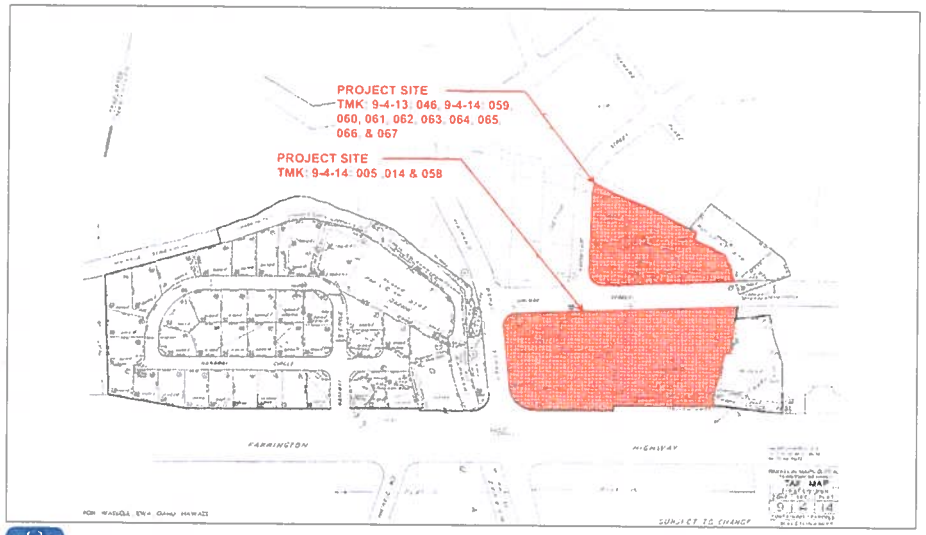


FIGURE 2
TAX MAP KEY
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

May 26, 2022

RICK BLANGIARDI, MAYOR

BRYAN P. ANDAYA, Chair
KAPUA SPROAT, Vice Chair
RAY C. SOON
MAX J. SWORD
NA'ALEHU ANTHONY

JADE T. BUTAY, Ex-Officio
DAWN B. SZEWCZYK, P.E., Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

Mr. Kevin Goto
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Goto:

Subject: Your Letter Dated April 17, 2022 Requesting Water Availability and Fire Flow Pressure Data on the Proposed Waipahu Redevelopment Along Hikimoe Street
Tax Map Key: 9-4-013: 046; 9-4-014: 005, 014, 058 to 067

Thank you for your letter regarding the proposed Waipahu redevelopment that consist of 534 units of residential development and approximately 68,178 square feet of commercial and retail spaces.

The existing water system is presently adequate to accommodate the proposed redevelopment. However, please be advised that this information is based upon current data, and therefore, the Board of Water Supply (BWS) reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges (WSFC) for resource development, transmission, and daily storage.

Proposed mixed use developments are required to install separate domestic water meters and laterals serving the residential and non-residential spaces.

Water conservation measures are required for all proposed developments. These measures include utilization of nonpotable water for irrigation, using rain catchment, drought tolerant plants, xeriscape landscaping, efficient irrigation systems, such as a drip system and moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets.

The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

The construction drawings should be submitted for our approval, and the construction schedule should be coordinated to minimize impact to the water system.

REF-327

Mr. Kevin Goto
May 26, 2022
Page 2

The BWS has suspended fire flow tests on fire hydrants as a water conservation measure. However, you may use the following calculated flow data:

Fire Hydrant Number	Location	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)
L00325	Waipahu Depot Street	90	60	2,000
L00674	Hikimoe Street	88	76	2,000
L00675	Hikimoe Street	88	73	2,000
L00676	Kahuailani Street	86	72	2,000
L04002	Hikimoe Street	88	73	2,000

The data are based on the existing water system, and the static pressure represents the theoretical pressure at the point of calculation with the reservoir full and no demands on the water system. The static pressure is not indicative of the actual pressure in the field. Therefore, to determine the flows that are available to the site, you will have to determine the actual field pressure by taking on-site pressure readings at various times of the day and correlating that field data with the above hydraulic design data.

The map showing the location of the fire hydrants is attached.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

BWS may waive the WSFC and new meter cost for qualified on-site affordable or homeless dwelling units, up to 500 dwellings units per year, on a first come first served basis. The waivers will be granted when the building permit is submitted for approval. To qualify, the dwelling units must be certified as either affordable or homeless dwelling units by the appropriate agency of the City and County of Honolulu and the certification must be provided when the building permit application is submitted for BWS review and approval. For non-qualifying units, the applicant will be required to pay our WSFC for resource development, transmission and daily storage. For more information, please contact Service Engineering of our Customer Care Division at (808) 748-5460.

If you have any questions, please contact Joyce Lin, Project Review Branch of our Water Resources Division at (808) 748-5442.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Attachment

cc: Customer Care - Service Engineering
R. Chun
WR-22-70

REF-328

APPENDIX C
Water System Calculation

Mauka Block Proposed Programming						
	Quantity		Rate		Total (gal per day)	Total (gal per minute)
Retail	0.12	acres	3,000	gallon/acre/day	346	0.2400
Residential	133	units	300	gallons/unit/day	39,900	27.71
Restaurant	0.11	acres	3,000	gallon/acre/day	329	0.23
Average Daily Water Demand for Current Mauka Proposed Programming =					**40,246**	**27.95**
Peak Flow = 3 x Average Daily demand =					**120,737**	**83.84**

Makai Block Proposed Programming						
	Quantity		Rate		Total (gal per day)	Total (gal per minute)
Retail	0.06	acres	3,000	gallon/acre/day	191	0.1323
Residential	404	units	300	gallons/unit/day	121,200	84.17
Office	0.46	acres	3,000	gallon/acre/day	1,382	0.96
Restaurant	0.15	acres	3,000	gallon/acre/day	445	0.31
Market	0.54	acres	3,000	gallon/acre/day	1,608	1.12
Average Daily Water Demand for Current Makai Proposed Programming =					**124,825**	**86.68**
Peak Flow = 3 x Average Daily demand =					**374,475**	**260.05**

Total Average Daily Water Demand for Current Proposed Programming =	**165,071**	**114.63**
Total Peak Flow = 3 x Average Daily demand =	**495,212**	**343.90**

NOTE:
Water meters were sized based on similar projects in the nearby area.

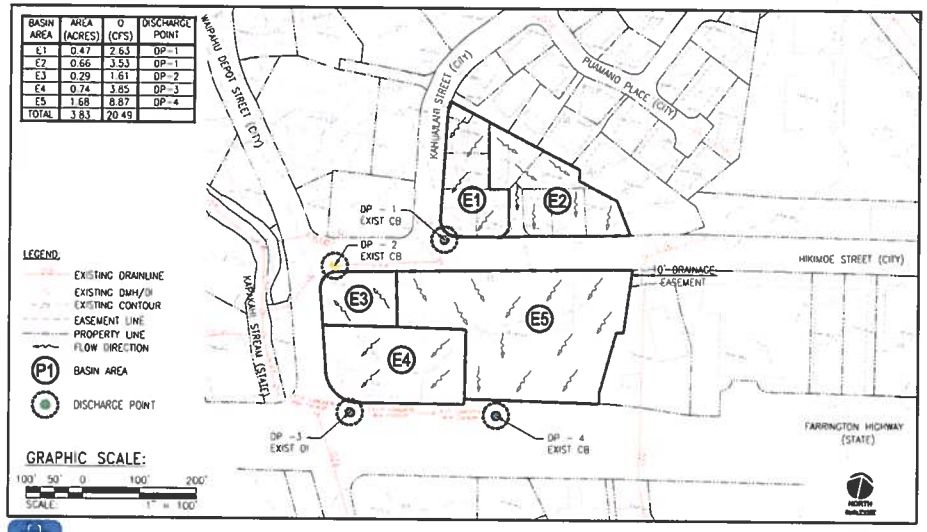
Appendix D

Storm Drainage System

- Existing Drainage Condition Figure
- Proposed Drainage Condition Figure
- Existing and Proposed Drainage Condition Table

REF-329

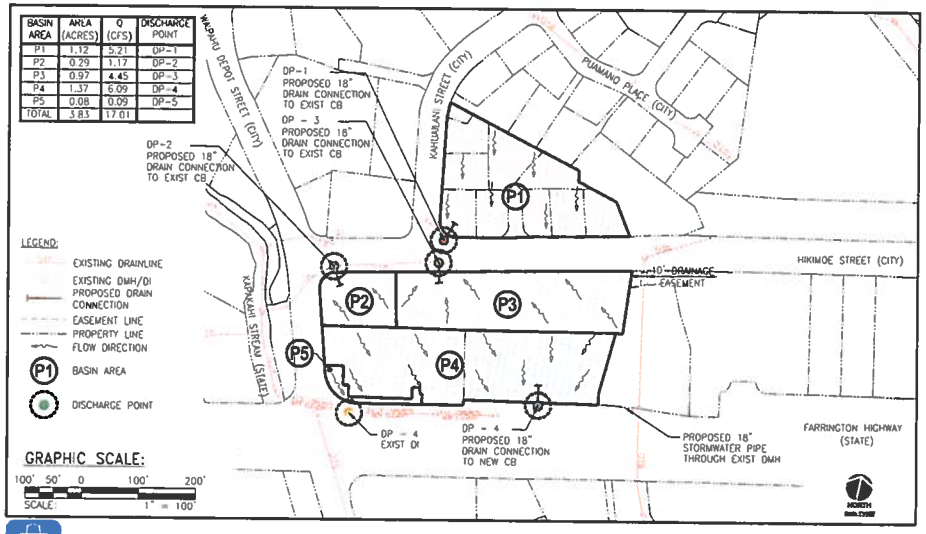
BASIN AREA	AREA (ACRES)	Q (CFS)	DISCHARGE POINT
E1	0.47	2.63	DP-1
E2	0.66	3.53	DP-1
E3	0.29	1.61	DP-2
E4	0.74	3.85	DP-3
E5	1.68	8.87	DP-4
TOTAL	3.83	20.49	



EXISTING DRAINAGE CONDITION

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAII

BASIN AREA	AREA (ACRES)	Q (CFS)	DISCHARGE POINT
P1	1.12	5.21	DP-1
P2	0.29	1.17	DP-2
P3	0.97	4.45	DP-3
P4	1.37	6.09	DP-4
P5	0.08	0.09	DP-5
TOTAL	3.83	17.01	



PROPOSED DRAINAGE CONDITION

KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAII

REF-330

APPENDIX D
HYDROLOGY FLOW CALCULATIONS

Table 1 - Existing Drainage Condition

Basin Area	Ground Cover Type	Drainage Area (acres)	Total Area (acres)	C	Weighted C	Length (ft)	Slope	T_c (min.)	Correction Factor	I (in/hr)	I' (in/hr)	Q (cfs)	V (cf)	Discharge Point
E1	Impervious	0.47	0.47	0.90	0.90	245	2.45%	6.00	2.65	2.35	6.23	2.63	4734	DP-1
E2	Impervious	0.68	0.68	0.90	0.90	330	1.36%	6.75	2.55	2.35	5.99	3.53	6354	DP-1
E3	Impervious	0.29	0.29	0.90	0.90	155	1.29%	6.00	2.65	2.35	6.23	1.61	2898	DP-2
E4	Impervious	0.74	0.74	0.90	0.90	250	0.40%	7.40	2.47	2.35	5.80	3.85	6930	DP-3
E5	Impervious	1.68	1.68	0.90	0.90	225	0.36%	7.20	2.50	2.35	5.88	8.87	15966	DP-4
Total			3.83									20.49	36882	

Note: Calculations based on a 10 year 1 hour design storm event

Table 2 - Proposed Drainage Condition

Basin Area	Ground Cover Type	Drainage Area (acres)	Total Area (acres)	C	Weighted C	Length (ft)	Slope	T_c (min.)	Correction Factor	I (in/hr)	I' (in/hr)	Q (cfs)	V (cf)	Discharge Point
P1	Impervious	0.98	1.12	0.90	0.82	330	1.36%	7.65	2.40	2.35	5.64	5.21	9378	DP-1
	Pervious	0.15		0.30										
P2	Impervious	0.19	0.29	0.90	0.69	155	1.29%	6.90	2.52	2.35	5.92	1.17	2106	DP-2
	Pervious	0.10		0.30										
P3	Impervious	0.82	0.97	0.90	0.81	350	1.46%	7.63	2.41	2.35	5.66	4.45	8010	DP-3
	Pervious	0.15		0.30										
P4	Impervious	1.24	1.37	0.90	0.84	405	0.20%	9.90	2.25	2.35	5.29	6.09	10962	DP-4
	Pervious	0.13		0.30										
P5	Impervious	0.00	0.08	0.90	0.30	135	0.11%	18.50	1.70	2.35	4.00	0.09	162	DP-5
	Pervious	0.08		0.30										
Total			3.83									17.01	30618	

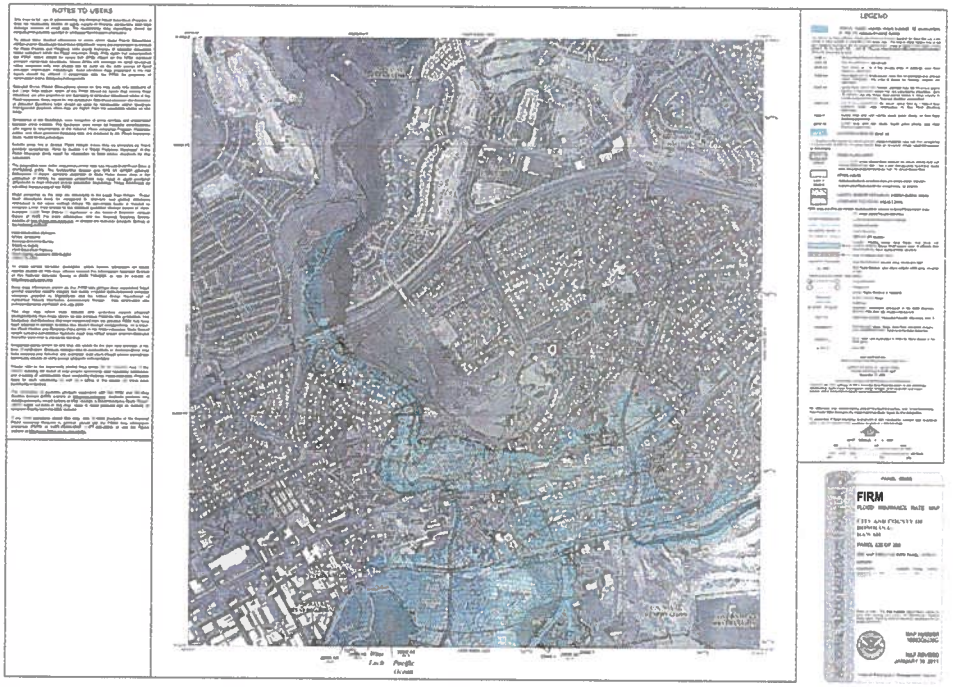
Notes: Calculations based on a 10 year 1 hour design storm event

Appendix E

Flood Risk

- Flood Insurance Rate Map dated January 19, 2011
- Letter of Map Revision issued July 25, 2022 effective December 6, 2022
- Revised Flood Insurance Rate Map effective December 6, 2022

REF-331



Federal Emergency Management Agency

Washington, D.C. 20472

July 25, 2022

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Rick Blangiardi
Mayor, City and County of Honolulu
530 South King Street, Room 300
Honolulu, HI 96813

IN REPLY REFER TO:
Case No.: 21-09-0747P
Community Name: City and County of Honolulu, HI
Community No.: 150001
Effective Date of
This Revision: **December 6, 2022**

Dear Mayor Blangiardi:

The Flood Insurance Study Report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7211, or the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Mario Siu-Li, CFM
Floodplain Manager
City and County of Honolulu

Jake Gusman, P.E., D.WRE
President
River Focus, Inc.

REF-332

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City and County of Honolulu Honolulu County Hawaii	NO PROJECT	FLOODWAY 2D HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 150001		
IDENTIFIER	Waipahu Existing Conditions	APPROXIMATE LATITUDE & LONGITUDE: 21.385, -158.013 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES

TYPE: FIRM* NO.: 15003C0238G DATE: January 19, 2011
TYPE: FIRM NO.: 15003C0239G DATE: January 19, 2011
TYPE: FIRM NO.: 15003C0326G DATE: January 19, 2011

ANNOTATED STUDY ENCLOSURES

DATE OF EFFECTIVE FLOOD INSURANCE STUDY: November 5, 2014
PROFILE(S): 42P, 43P, 43P(a), 110P, 111P, 111P AND 113P(a)
SUMMARY OF DISCHARGES TABLE: 3
FLOODWAY DATA TABLE: 8

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) & REVISED REACH(ES) See Page 2 for Additional Flooding Sources

Waikele Stream - From approximately 3,220 feet downstream of Farrington Highway to approximately 20 feet downstream of Waipahu Street.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Waikele Stream	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone AE	Zone AE	YES	YES
	Zone D	Zone AE	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

OTHER FLOODING SOURCES AFFECTED BY THIS REVISION

FLOODING SOURCE(S) & REVISED REACH(ES)

Waikele Stream - From approximately 3,220 feet downstream of Farrington Highway to approximately 20 feet downstream of Waipahu Street.
Kapakahi Stream #2 - From approximately 4,430 feet downstream to approximately 2,570 feet upstream of Farrington Highway.
Wailani Drainage Canal - From approximately 2,670 feet downstream to approximately 1,220 feet upstream of Farrington Highway.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Waikele Stream	Zone X (shaded)	Zone X (shaded)	YES	YES
Kapakahi Stream #2	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	Zone D	Zone AE	NONE	YES
	Zone AE	Zone AE	YES	YES
Wailani Drainage Canal	BFEs	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	Zone D	Zone AE	NONE	YES
	Zone AE	Zone AE	YES	YES

* BFEs - Base Flood Elevations

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

REF-333

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Kathryn Lipiecki
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7211

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

21-09-0747P 102-I-A-C

REF-334

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp

LOCAL NEWSPAPER
Name: *Honolulu Star-Advertiser*
Dates: August 1, 2022 and August 8, 2022

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

21-09-0747P 102-I-A-C

Table 3: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent	4-Percent	2-Percent	1-Percent	0.2-Percent
KAELEPULU STREAM						
Downstream limit of study	0.176	—[1]	—[1]	—[1]	1,404	—[1]
Upstream limit of study	0.128	—[1]	—[1]	—[1]	1,120	—[1]
KAHALUU STREAM						
Upstream of confluence of Ahuimanu Stream	1.36	1,220	—[1]	2,630	3,530	6,550
At Melekula Road	1.01	980	—[1]	2,110	2,830	5,220
KALAEOKAHIPA STREAM						
At Kamehameha Highway	1.15	410	—[1]	1,380	4,500	—[1]
KALAUAO STREAM						
At Pacific Ocean	2.65	1,860	—[1]	2,990	3,540	4,960
Downstream of H-1 Freeway	2.53	1,780	—[1]	2,870	3,400	4,760
KALIHI STREAM						
Downstream limit of study	5.18	—[1]	—[1]	—[1]	16,880	—[1]
Upstream limit of study	2.61	—[1]	—[1]	—[1]	10,683	—[1]
KALOI GULCH						
Downstream limit of study	5.805	—[1]	—[1]	—[1]	2,425	—[1]
Upstream limit of study	5.223	—[1]	—[1]	—[1]	2,359	—[1]
KAMANAIKI STREAM						
Downstream limit of study	0.85	—[1]	—[1]	—[1]	4,944	—[1]
Upstream limit of study	0.64	—[1]	—[1]	—[1]	4,069	—[1]
KAPAKAHI STREAM #2						
Downstream limit of study	0.329	—[1]	—[1]	—[1]	2,590[2]	—[1]
At Divergence from Waikele Stream	0.151	—[1]	—[1]	—[1]	1,920[3]	—[1]
KAUPUNI STREAM						
Just Upstream of confluence with East Makaha Stream	5.31	1,959	3,178	4,333	5,714	9,846
At Plantation Road	8.75	2,435	4,040	5,587	7,453	13,137

[1]Not computed
[2]Includes overflow from Waikele Stream and split flow from Wailani Drainage Canal
[3]Includes overflow from Waikele Stream

REVISED DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

REF-335

Table 3: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10-Percent	4-Percent	2-Percent	1-Percent	0.2-Percent
WAIKAKALAUA STREAM						
Downstream limit of study	4.580	—[1]	—[1]	—[1]	5,591	—[1]
Upstream limit of study	4.184	—[1]	—[1]	—[1]	5,486	—[1]
WAIKELE STREAM						
At Pacific Ocean	45.14	10,858	—[1]	21,975	27,528	41,852
Downstream of H-1 Freeway	44.91	10,450	—[1]	20,700	26,000	40,800
WAILANI DRAINAGE CANAL						
Downstream of Golf Cart Bridge	2.13	—[1]	—[1]	—[1]	3,468	—[1]
Upstream limit of study	1.60	—[1]	—[1]	—[1]	3,042	—[1]
WAILELE STREAM (LEFT/RIGHT OVERBANK)						
Downstream limit of study	1.323	—[1]	—[1]	—[1]	2,601	—[1]
Upstream limit of study	1.090	—[1]	—[1]	—[1]	2,257	—[1]
WAILELE STREAM						
0.8 miles upstream of Cane Haul Road	1.21	1,753	2,476	3,084	3,736	5,479
WAIMALU STREAM						
1,200 feet downstream of Moanalua Road	6.11	3,958	5,755	7,300	9,018	13,637
At confluence with East Loch	8.29	4,398	6,525	8,382	10,466	16,162
WAIMANALO: STREAM A						
Just upstream of confluence with Waimanalo Stream B	0.38	736	1,053	1,323	1,620	2,431
At confluence with Waimanalo Stream	1.34	1,887	2,663	3,314	4,011	5,871
WAOLANI STREAM						
At confluence with Nuuanu Stream	1.81	2,180	—[1]	3,650	4,400	6,450
Near St. Francis Hospital	1.34	1,680	—[1]	2,810	3,400	4,980

[1]Not computed

REVISED DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (LOCAL TIDAL DATUM)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Waikele Stream								
A[2]	398	2,396[3]	10,497[3]	1.8[3]	6.0[3]	6.0[3]	6.3[3]	0.3[3]
B[2]	1,006	3,061[3]	14,337[3]	1.9[3]	7.4[3]	7.4[3]	7.7[3]	0.3[3]
C[2]	1,796	486[3]	2,785[3]	6.4[3]	13.0[3]	13.0[3]	13.6[3]	0.6[3]
D[2]	3,380	105[3]	1,588[3]	13.3[3]	21.0[3]	21.0[3]	21.2[3]	0.2[3]
E[2]	3,742	823[3]	6,864[3]	4.2[3]	22.7[3]	22.7[3]	22.9[3]	0.2[3]
F[2]	5,112	213[3]	2,705[3]	8.1[3]	25.0[3]	25.0[3]	25.4[3]	0.4[3]
G	5,605	284	2,428	10.8	32.8	32.8	33.5	0.7
H	6,419	198	4,361	6.0	36.6	36.6	37.5	0.9
I	7,149	112	2,543	10.2	38.6	38.6	39.4	0.8
J	7,629	437	7,378	3.5	40.7	40.7	41.5	0.8
Honouliuli Stream								
A	305	1,770	5,146	1.6	6.1	6.1	6.9	0.8
B	850	1,104	4,070	2.0	6.5	6.5	7.3	0.8
C	1,470	661	1,844	4.3	11.7	11.7	12.5	0.8
D	1,921	430	2,213	3.6	13.1	13.1	13.6	0.5
E	2,621	600	4,390	1.8	14.5	14.5	14.5	0.0
F	3,991	305	842	9.3	21.0	21.0	21.5	0.5
G	4,651	241	1,060	7.4	27.6	27.6	28.6	1.0
H	5,151	370	1,631	4.8	32.7	32.7	33.6	0.9
I	6,774	340	1,343	5.8	64.0	64.0	64.3	0.3
J	7,164	122	803	9.6	64.7	64.7	65.2	0.5
K	7,374	75	514	15.1	68.9	68.9	69.6	0.7
L	7,558	48	572	13.5	75.2	75.2	75.2	0.0

[1]Feet above confluence with West Loch, Pearl Harbor

[2]Floodway computed by 2D Model at this location

[3]Values reported are based on averages calculated across evaluation lines. Refer to model result grids for modeled variability in elevation and surcharge across the floodway

REVISED DATA

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

WAIKELE STREAM – HONOULIULI STREAM

REF-336

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (LOCAL TIDAL DATUM)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Makaha Stream and West Makaha Stream								
A	0[1]	894	–[3]	–[3]	13.4	13.4	13.8	0.4
B	340[1]	1,092	5,201	2.0	14.2	14.2	15.2	1.0
C	1,215[1]	1,717	1,538	6.7	22.6	22.6	23.3	0.7
D	2,140[1]	570	1,229	7.9	42.1	42.1	42.7	0.6
E	2,690[1]	655	1,009	9.7	57.7	57.7	58.4	0.7
F	3,711[1]	442	1,061	9.2	82.8	82.8	83.3	0.5
G	4,791[1]	286	922	10.0	119.2	119.2	119.7	0.5
H	5,361[1]	138	784	12.0	138.8	138.8	138.9	0.1
I	6,211[1]	162	695	12.3	167.2	167.2	167.3	0.1
J	7,611[1]	203	753	11.4	216.8	216.8	216.8	0.0
K	8,241[1]	330	968	7.7	237.2	237.2	237.8	0.6
Kapakahi Stream #2								
A[6]	1,330[2]	2,396[7]	10,487[7]	1.8[7]	6.0[6,7]	6.0[6,7]	6.3[7]	0.3[7]
B[6]	2,680[2]	3,061[7]	14,337[7]	1.9[7]	7.4[7]	7.4[7]	7.7[7]	0.3[7]
C[6]	4,050[2]	535[7]	1,361[7]	1.5[7]	7.5[7]	7.5[7]	7.8[7]	0.3[7]
D[6]	4,986[2]	118[7]	418[7]	4.1[7]	8.0[7]	8.0[7]	9.0[7]	1.0[7]
E[6]	5,732[2]	258[7]	998[7]	2.3[7]	10.0[7]	10.0[7]	10.6[7]	0.6[7]
F[6]	6,672[2]	285[7]	820[7]	2.2[7]	12.2[7]	12.2[7]	12.3[7]	0.1[7]
G	7,460[2]	115[7]	140[7]	12.7[7]	18.0	18.0[7]	18.1[7]	0.1[7]

[1]Feet above Farrington Highway
[2]Feet above West Loch, Pearl Harbor
[3]Not calculated
[4]~~Elevation computed without consideration of tidal effects~~
[5]Elevation computed without consideration of tidal effects from West Loch, Pearl Harbor
[6]Floodway computed by 2D Model at this location
[7]Values reported are based on averages calculated across evaluation lines. Refer to model result grids for modeled variability in elevation and surcharge across the floodway

REVISED DATA

TABLE 8

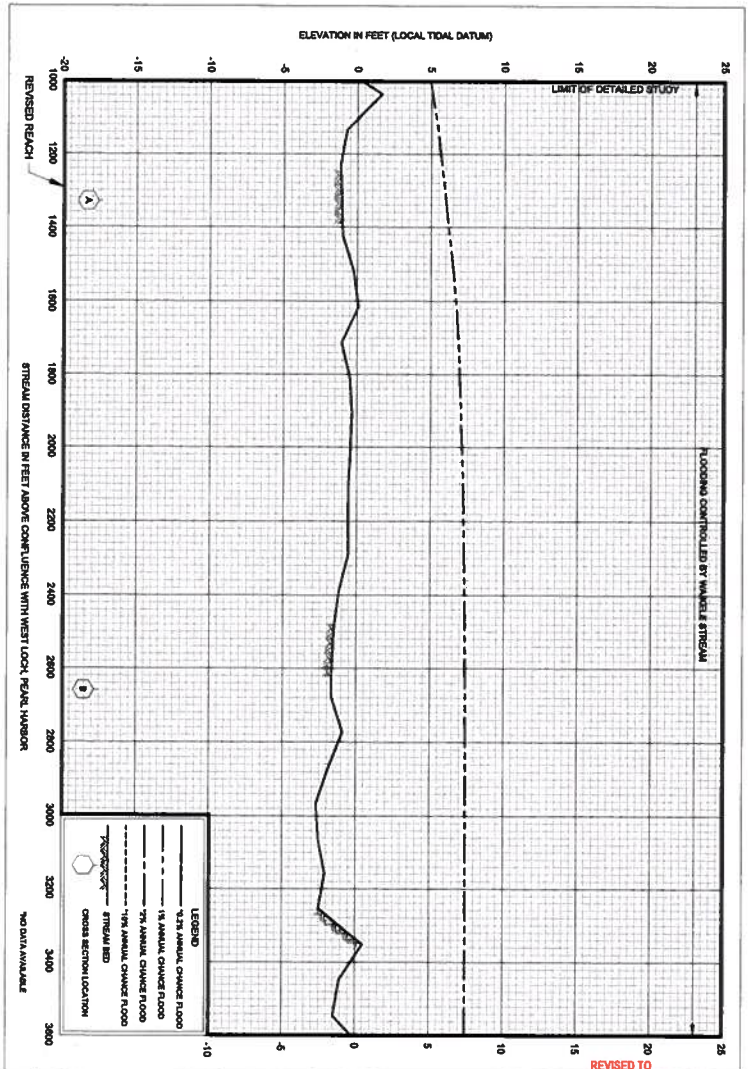
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF HONOLULU, HI

FLOODWAY DATA

REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022

MAKAHA STREAM AND WEST MAKAHA STREAM - KAPAKAHI STREAM #2



42P

FEDERAL EMERGENCY MANAGEMENT AGENCY

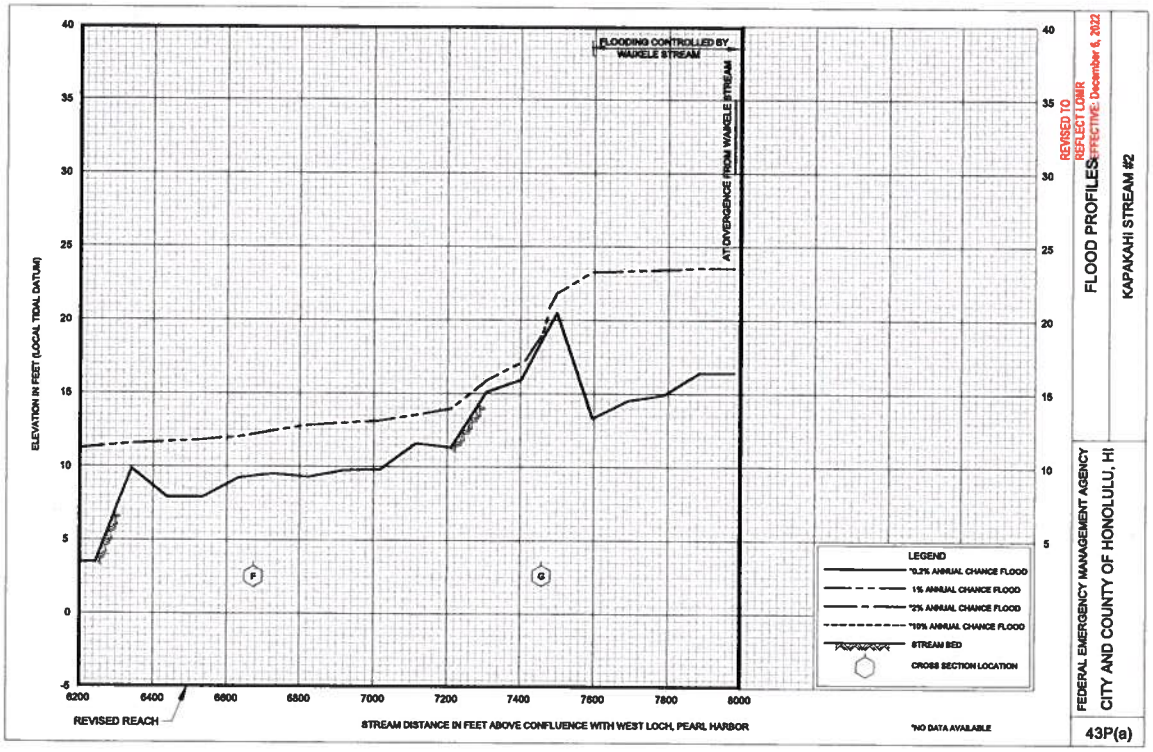
CITY AND COUNTY OF HONOLULU, HI

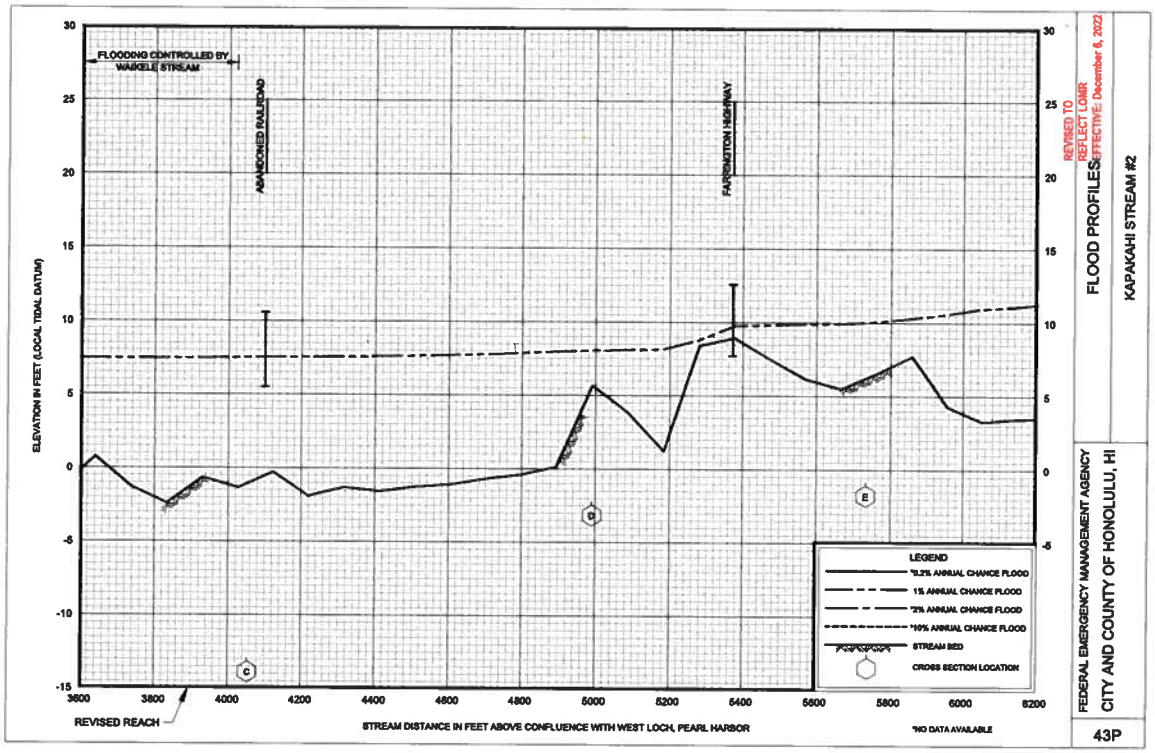
FLOOD PROFILES

REVISED TO REFLECT LOMR
EFFECTIVE: December 6, 2022

KAPAKAHI STREAM #2

REF-337


FLOODING CONTROLLED BY WAIKELE STREAM
AT DIVERGENCE FROM WAIKELE STREAM
ELEVATION IN FEET (LOCAL TIDAL DATUM)
REVISED REACH
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WEST LOCH, PEARL HARBOR
*NO DATA AVAILABLE
LEGEND
*0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
*10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022
FLOOD PROFILES
KAPAKAHI STREAM #2
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI
43P(a)


FLOODING CONTROLLED BY WAIKELE STREAM
ABANDONED RAILROAD
FARRINGTON HIGHWAY
ELEVATION IN FEET (LOCAL TIDAL DATUM)
REVISED REACH
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WEST LOCH, PEARL HARBOR
*NO DATA AVAILABLE
LEGEND
*0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
*10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022
FLOOD PROFILES
KAPAKAHI STREAM #2
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI
43P

REF-338

FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI

FLOOD PROFILES

WAIKELE STREAM

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

110P

FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI

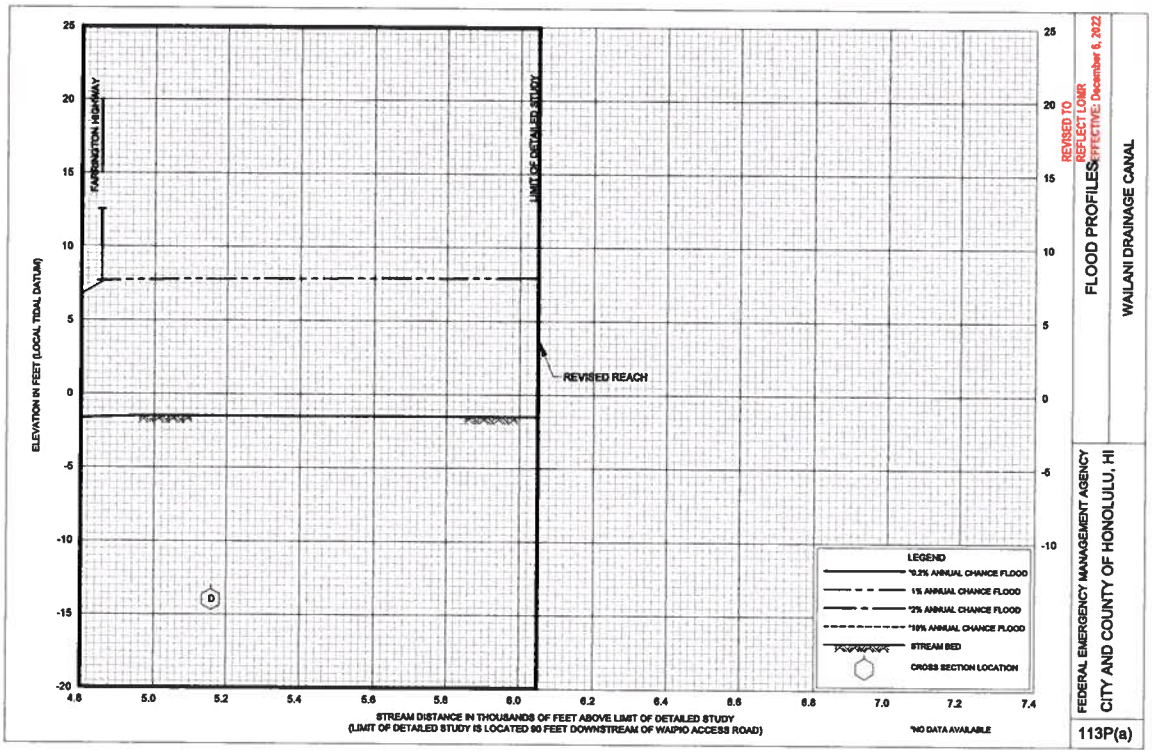
FLOOD PROFILES

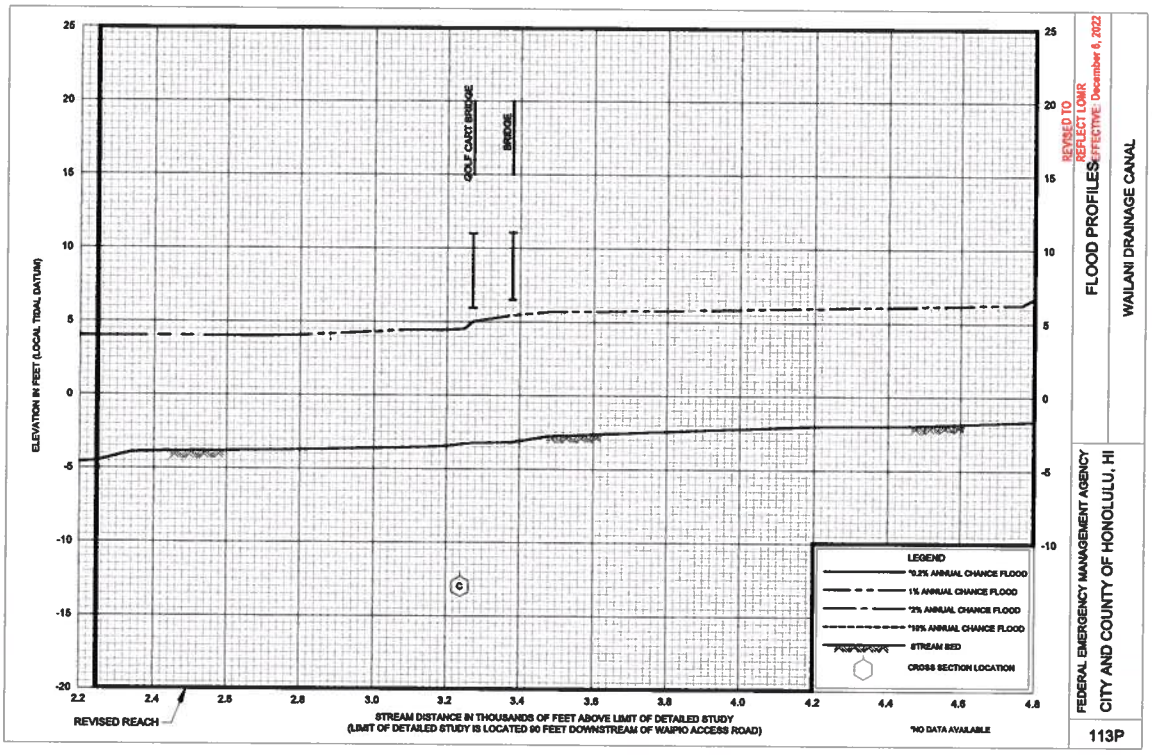
WAIKELE STREAM

REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

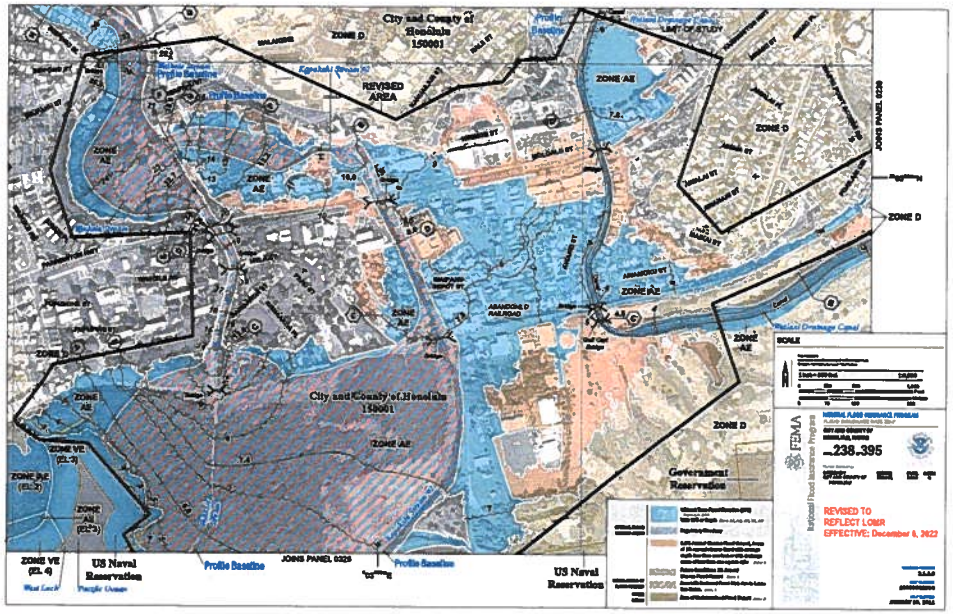
111P

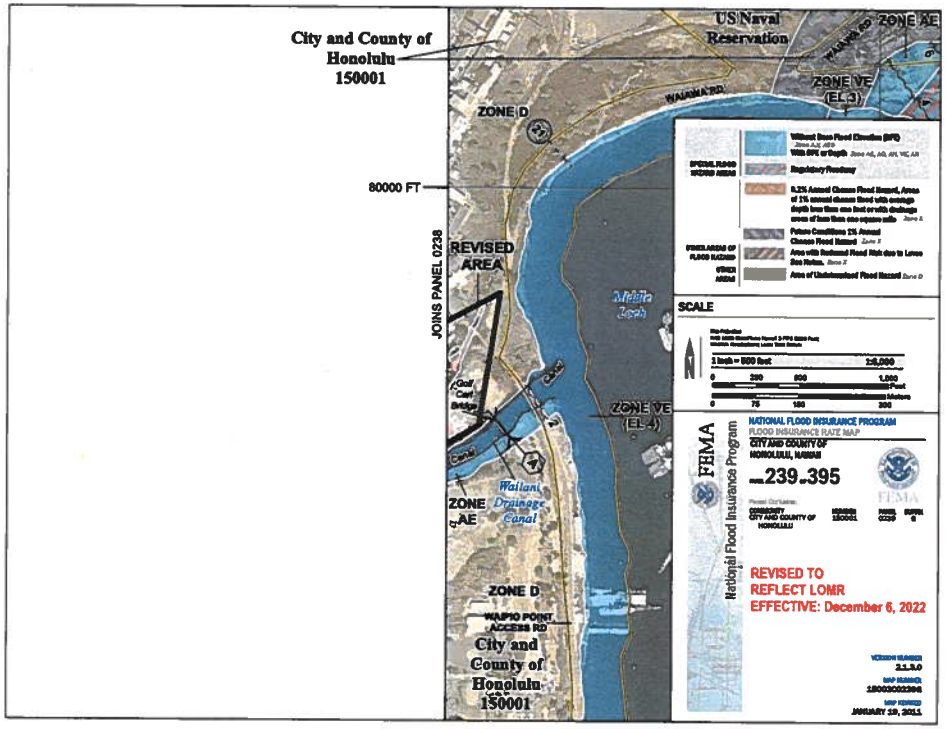
REF-339


FARRINGTON HIGHWAY
LIMIT OF DETAILED STUDY
REVISED REACH
D
ELEVATION IN FEET (LOCAL TIDAL DATUM)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE LIMIT OF DETAILED STUDY
(LIMIT OF DETAILED STUDY IS LOCATED 90 FEET DOWNSTREAM OF WAIPIO ACCESS ROAD)
LEGEND
*0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
*10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
*NO DATA AVAILABLE
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022
FLOOD PROFILES
WAILANI DRAINAGE CANAL
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI
113P(a)


GOLF CART BRIDGE
BRIDGE
C
REVISED REACH
ELEVATION IN FEET (LOCAL TIDAL DATUM)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE LIMIT OF DETAILED STUDY
(LIMIT OF DETAILED STUDY IS LOCATED 90 FEET DOWNSTREAM OF WAIPIO ACCESS ROAD)
LEGEND
*0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
*10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
*NO DATA AVAILABLE
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022
FLOOD PROFILES
WAILANI DRAINAGE CANAL
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY AND COUNTY OF HONOLULU, HI
113P

REF-340


City and County of Honolulu 150001
ZONE D
REVISED AREA
ZONE AE
ZONE VE (EL 4)
US Naval Reservation
Profile Baseline
JOINS PANEL 0238
Government Reservation
SCALE
FEMA
National Flood Insurance Program
...238..395
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022


City and County of Honolulu 150001
US Naval Reservation
ZONE AE
ZONE VE (EL 4)
ZONE D
80000 FT
JOINS PANEL 0238
REVISED AREA
Mililani Beach
Golf Cart Bridge
Waiani Drainage Canal
WAIPIO POINT ACCESS RD
City and County of Honolulu 150001
SCALE
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
CITY AND COUNTY OF HONOLULU, HAWAII
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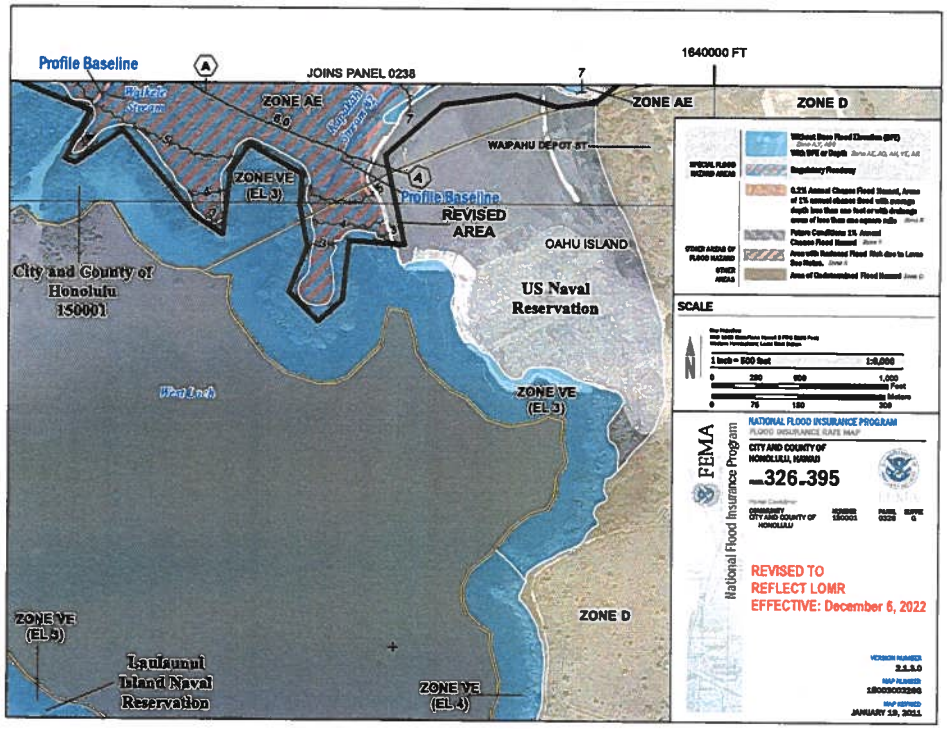
REVISED TO REFLECT LOMR EFFECTIVE: December 6, 2022

REF-341



Public Notice | **Public Notice**

DEPARTMENT OF HOMELAND SECURITY

FEDERAL EMERGENCY MANAGEMENT AGENCY

Proposed Flood Hazard Determinations for the City and County of Honolulu, Hawaii, and Case No. 21-09-0747P. The Department of Homeland Security's Federal Emergency Management Agency (FEMA) solicits technical information or comments on proposed flood hazard determinations for the Flood Insurance Rate Map (FIRM), and where applicable, the Flood Insurance Study (FIS) report for your community. These flood hazard determinations may include the addition or modification of Base Flood Elevations, base flood depths, Special Flood Hazard Area boundaries or zone designations, or the regulatory floodway. The FIRM and, if applicable, the FIS report have been revised to reflect these flood hazard determinations through issuance of a Letter of Map Revision (LOMR), in accordance with Title 44, Part 65 of the Code of Federal Regulations. These determinations are the basis for the floodplain management measures that your community is required to adopt or show evidence of having in effect to qualify or remain qualified for participation in the National Flood Insurance Program. For more information on the proposed flood hazard determinations and information on the statutory 90-day period provided for appeals, please visit FEMA's website at https://www.floodmaps.fema.gov/fhm/BFE_Status/bfe_main.asp, or call the FEMA Mapping and Insurance eXchange (FMIX) toll free at 1-877-FEMA MA (1-877-336-2627).

(SA12380723 8/1, 8/8/22)

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REF-342

Appendix F

Gas Line System

- Gas Availability Coordination Letter

From: Yamamoto, Keith
To: Kevin Goto
Cc: Cara Itai; Eric Bisch
Subject: RE: Waipahu Redevelopment - Hawaii Gas
Date: Tuesday, April 19, 2022 3:16:55 AM
Attachments: image002.png
image003.png

Kevin,

We installed a 2" main on Hikimoe St from Waipahu Depot St to Kahuailani St for this project. If the gas loads are higher than expected, we can also run a new line from Farrington Hwy.

Please let me know if you have any questions.

Thanks,
Keith

From: Kevin Goto <kgoto@wilsonokamoto.com>
Sent: Friday, April 15, 2022 3:39 PM
To: Yamamoto, Keith <kkyamamo@hawaiigas.com>
Cc: Cara Itai <CItai@wilsonokamoto.com>; Eric Bisch <ebisch@wilsonokamoto.com>
Subject: [EXTERNAL EMAIL] Waipahu Redevelopment - Hawaii Gas

Keith:

We are working on a project that will redevelop two sites on either side of Hikimoe Street in Waipahu per the attached.

I think we asked about this before about five years ago, but we wanted to double check again now whether there are Hawaii Gas facilities that can support the proposed programming:

Proposed programming

Mauka (TMK: 9-4-13: 046, 9-4-14: 059, 060, 061, 062, 063, 064, 065, 066, & 067)

- 118 1-Bedroom units
- 15 2-Bedroom units
- 5,924 sf Restaurant
- 2,538 sf Retail

Makai (TMK: 9-4-14: 005, 014, & 058)

- 156 Studio units
- 140 1-Bedroom units
- 90 2-Bedroom units
- 18 3-Bedroom units
- 4,770 sf Restaurant
- 2,044 sf Retail
- 23,352 sf Market
- 29,550 sf Existing Office (to remain)

Thanks again for your help.

Kevin Goto, PE, LEED AP
Civil Engineer
WILSON OKAMOTO CORPORATION 75
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
T (808) 392-6538
W http://www.wilsonokamoto.com

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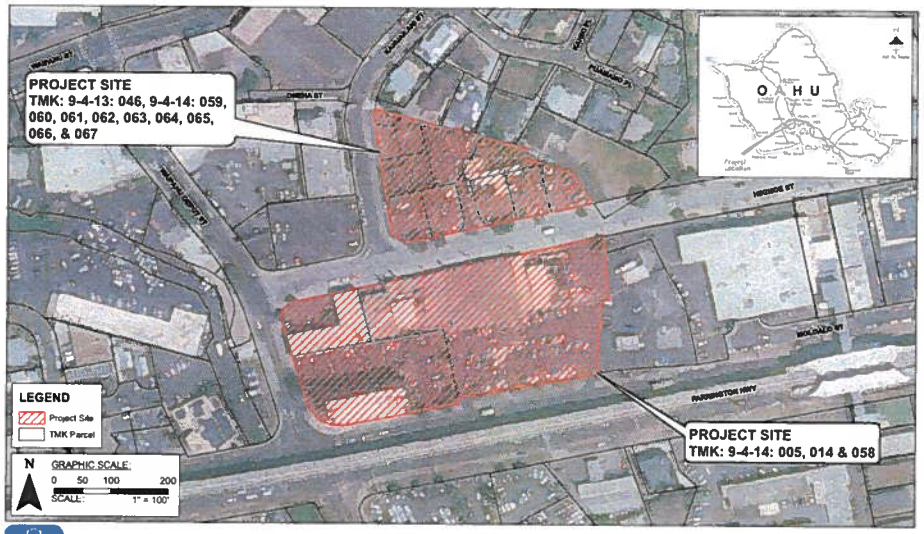


FIGURE 1
PROJECT LOCATION AND VICINITY MAP
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

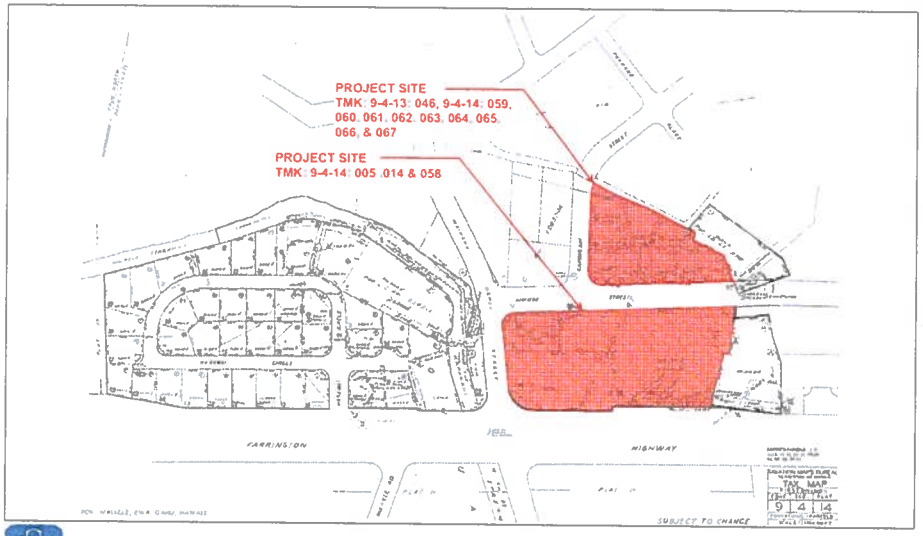


FIGURE 2
TAX MAP KEY
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, O'AHU, HAWAII

REF-344

Appendix G

Electrical Utility System

- Hawaiian Electric Company Will-Serve Letter dated July 6, 2022
- Hawaiian Electric Company Email Correspondence dated May 3, 2022
- Hawaiian Electric Company Request for Information Letter dated April 18, 2022
- Hawaiian Electric Company Email Correspondence dated March 27, 2017
- Hawaiian Electric Company Request for Information Letter dated March 21, 2017
- Conceptual Electrical (Power) Utility Plan

July 6, 2022

Mr. Monte Heaton
Highridge Costa Development Company
330 W Victoria St.
Gardena, CA 90248

Dear Mr. Heaton:

Re: Keawalau Affordable Housing Community
Waipahu, Hawaii
TMK: 9-4-013:046, 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067

This is in response to your request for a "Will Serve" letter for the above project location.

We have existing distribution circuits along Farrington Highway, Waipahu Depot Street and Hikimoe Street that could potentially be used to serve your future project. Please keep in mind that these circuits may need to be upgraded depending on the size of this **project's load. At this time, we do not have sufficient information and detailed plans to** make this determination.

We request that you keep us informed on the status of your project. As soon as you have detailed plans, please create a Service Request with us, and be sure to allow sufficient time for us to work on the project.

Please let us know if we can be of assistance in any other way. Should you have any questions, please call me at 543-7590.

Sincerely,

Shimono, Eric

Digitally signed by Shimono, Eric
Date: 2022.07.06 07:11:55 -10'00'

Eric Shimono
Supervisor
Transmission and Distribution Engineering Department
Engineering Division

REF-345

Michele Adolpho

From: Shimono, Eric <eric.shimono@hawaiianelectric.com>
Sent: Monday, June 6, 2022 5:11 AM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Hi Michele,

Nothing has changed from what was previously provided.

Thanks

Eric

From: Michele Adolpho <MAdolpho@ecshawaii.com>
Sent: Friday, June 03, 2022 7:18 AM
To: Shimono, Eric <eric.shimono@hawaiianelectric.com>
Subject: FW: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

[This email is coming from an EXTERNAL source. Please use caution when opening attachments or links in suspicious email.]

Hi Eric,

Following up on the request for information below and attached. Do you think you can provide input (or confirm that nothing has changed since 2017) in the next week?

Thanks,
Michele

From: Michele Adolpho
Sent: Tuesday, May 3, 2022 2:56 PM
To: Shimono, Eric <eric.shimono@hawaiianelectric.com>
Subject: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Hi Eric,

This project is similar to the request for information on HECO facilities related to redevelopment of a couple of properties along Waipahu Depot Road/Farrington Highway/Hikimoe Street back in 2017. Attached is some of our correspondence.

A new developer is looking to repurpose the sites and we have been asked to again contact the utilities for input on capacity/existing facilities in the area. Attached is information on the new development program and planning load estimates.

Can you advise if anything has changed since 2017?

Thanks,
Michele

CONFIDENTIALITY NOTICE: This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, copying, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender immediately by reply e-mail and destroy the original message and all copies.

Consulting
Electrical
Engineers

ECS, Inc.

April 18, 2022

Mr. Eric Shimono
Hawaiian Electric
Customer Installations
820 Ward Avenue
Honolulu, Hawaii 96814

Project: Waipahu Redevelopment
(ECS No. 030.044)

Subject: HECo Infrastructure and Facility Planning

Dear Mr. Shimono:

The subject project involves preliminary planning for redevelopment of properties located at TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The redevelopment will involve a 1.12 acre parcel, mauka of Hikimoe Street (Mauka Parcel) and a 2.73 acre parcel between Hikimoe Street and Farrington Highway (Makai Parcel). The development is anticipated to consist of a combination of residential and commercial buildings with the following proposed uses:

- Mauka Parcel
  - 118 – 1 Bedroom Units
  - 15 – 2 Bedroom Units
  - Restaurant – 5,930 SF
  - Retail – 2,540 SF
- Maiak Parcel
  - 156 – Studio Units
  - 140 – 1 Bedroom Units
  - 90 – 2 Bedroom Units
  - 18 – 3 Bedroom Units
  - Restaurant – 4,770 SF
  - Retail – 2,000 SF
  - Market/Grocery – 23,400 SF
  - Existing Office to Remain – 29,550 SF

We are requesting HECo assistance to confirm existing HECo facilities serving the project area and to identify required upgrades to HECo facilities in support of the development.

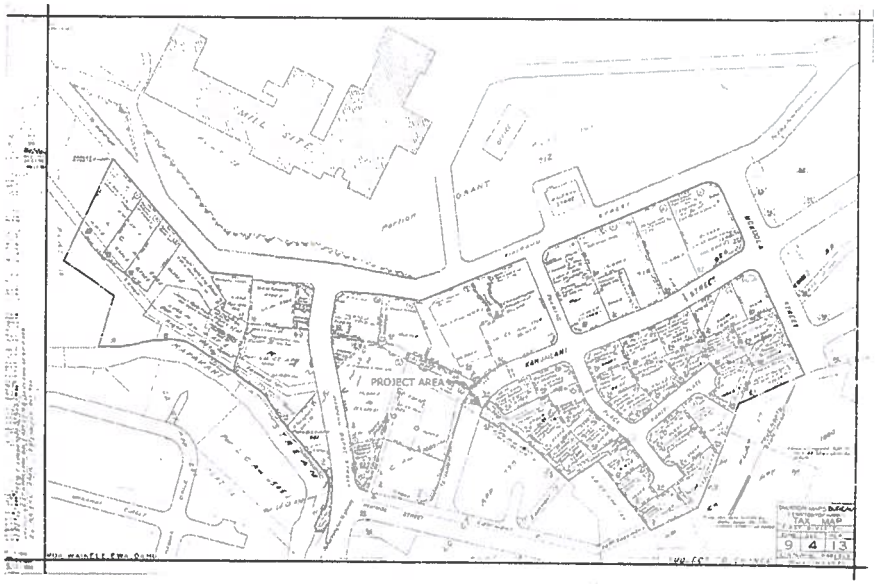
Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

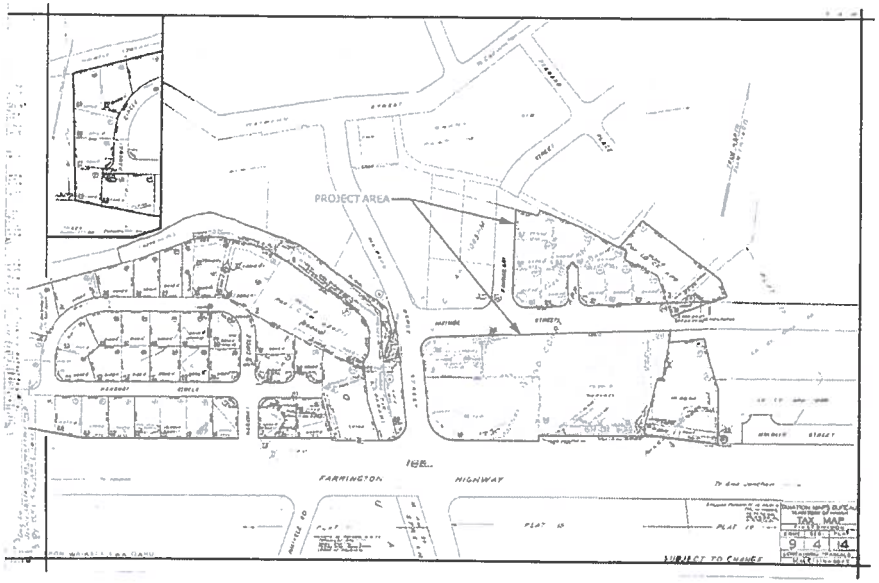
Regards,

Michele Adolpho, P.E.
Project Engineer

Enclosures

REF-347


PROJECT AREA
KAMAILANI
GRANT
TAX MAP
9 4 13


PROJECT AREA
FARMINGTON
HIGHWAY
SUBJECT TO CHANGE
TAX MAP
9 4 14

REF-348

Waipahu Redevelopment (Waipahu Depot Road/Farrington Highway)
PLANNING LOAD ESTIMATE

4/18/2022

MAUKA PARCEL		KVA	TOTAL KVA
Living Units (133 Units)	133	8	1,064
Restaurant (5,930 SF)	5,930	0.015	89
Retail (2,540)	2,540	0.012	30
	TOTAL		1,183

MAUKA PARCEL			
Living Units (404)	404	8	3,232
Restaurant (4,770 SF)	4,770	0.015	72
Retail (2,000 SF)	2000	0.01	20
Market/Grocery (23,400 SF)	23,400	0.015	351
Existing Office Bldg (29,550 SF)	29,550	0.012	355
	TOTAL		4,029

Michele Adolpho

From: Shimono, Eric <eric.shimono@hawaiianelectric.com>
Sent: Tuesday, April 18, 2017 2:01 PM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Hi Michele,

For most cases, the cost for any off-site upgrades will be borne by HECO if there are existing circuits surrounding the property. This would be the case for the Waipahu property since there are various circuits along the project site. Additionally, if there wasn't any circuits in the area, then the customer may be subject to a line extension cost per Rule 13. Please note that any undergrounding or relocation of existing overhead lines will be charged to the customer.

Thanks

Eric

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Friday, April 14, 2017 6:48 AM
To: Shimono, Eric
Cc: Kevin Goto (kgoto@wilsonokamoto.com); John Labausa (JLabausa@wilsonokamoto.com)
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Eric,

Is there any way to confirm (or obtain general guidelines) whether any necessary off-site system upgrades will be at Kamehameha Schools' cost? The intent of this planning exercise is to provide information to help Kamehameha better understand any costs associated with redevelopment of the properties.

Thanks,
Michele

From: Shimono, Eric [mailto:eric.shimono@hawaiianelectric.com]
Sent: Thursday, April 13, 2017 8:31 PM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Michele,

Any system upgrades will be evaluated at the time a service request is initiated. Please note that required circuit upgrades outside of the property will be done to ensure adequate power is available. Please be sure to submit a service request to allow HECO to plan for any system upgrades.

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Thursday, April 13, 2017 5:51 PM
To: Shimono, Eric
Cc: Kevin Goto (kgoto@wilsonokamoto.com)
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Eric,

Michele Adolpho

From: Shimono, Eric <eric.shimono@hawaiianelectric.com>
Sent: Monday, April 03, 2017 9:12 AM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Michele,

Please see comments in red.

Thanks

Erdc

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Tuesday, March 28, 2017 12:30 PM
To: Shimono, Eric
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Eric,

There are planners working on possible layouts of the various developments on the properties. Right now, I can't tell you what will be placed where. If there are utility capacity concerns for certain areas, the layouts might be based on the desire to minimize the need to upgrade utility company facilities. In the meantime, can you provide information on the following:

- It appears that the overhead distribution system along Farrington Highway consists of 12 kV and 46 kV. Please confirm. (yes, 12kv and 46kv overhead)
- Are HECo facilities in the area all overhead? Any underground distribution/sub transmission facilities? (HECO facilities within the proposed project scope are overhead)
- Can you identify the existing circuits (circuit number/substation) on the Farrintgon Highway poleline? (not able to provide – proprietary information)
- For the parcel at the corner of Hikimoe and Waipahu Depot Road, I'm guessing the service would need to come off Hikimoe or Waipahu Depot Road. Would that be the circuit from Kahuailani Street? (depending on the load size. Waipahu Depot Road has larger overhead conductors)
- Is the Kahuailani Street circuit the same circuit as the Farrington Highway circuit? (no)
- Any idea what the Kahuailani circuit upgrade would involve? Would the upgrade need to be all the way back to the substation? (depending on the load, upgrade may need to go back to only Mokuola Street)

Thanks,
Michele

From: Shimono, Eric [mailto:eric.shimono@hawaiianelectric.com]
Sent: Monday, March 27, 2017 11:03 AM
To: Michele Adolpho
Subject: FW: Waipahu Redevelopment for Kamehameha Schools

Hi Michele,

Do you know the locations of the various commercial and residential projects within the development? For the parcel fronting Farrington Hwy, the service will most likely come from the existing circuit on Farrington Hwy. This circuit should be adequate to meet the demand depending on what loads are within this parcel. Regarding the other two parcels, they are currently fed from Kahuailani Street and is at the tail end of the circuit. This overhead primary will most likely have to be upgraded.

Thanks

Eric

REF-350

Consulting
Electrical
Engineers

ECS, Inc.

March 21, 2017

Mr. Erik Kusunoki
Hawaiian Electric
Customer Installations Department
820 Ward Avenue
Honolulu, Hawaii 96814

Project: Kamehameha Schools Waipahu Redevelopment
(ECS No. 030.030)

Subject: HECo Infrastructure and Facility Planning

Dear Mr. Kusunoki:

The subject project involves master planning for redevelopment of Kamehameha Schools' properties in the Waipahu Transit Oriented Development zone identified as TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The master plan redevelopment will consist of a combination of residential and commercial buildings with the following proposed uses:

- 250 Unit Residential Rental Apartments (electric appliances and air conditioning)
  - 75 – 1 Bedroom Units
  - 150 – 2 Bedroom Units
  - 25 – 3 Bedroom Units

- Commercial Areas (180,000 SF total gross floor area)
  - Existing Sonido Building – 29,495 SF
  - Grocery Market – 30,000 SF
  - Retail – 35,000 SF
  - Office – 10,000 SF
  - Day Care – 6,000 SF
  - Outdoor Play – 5,000 SF
  - Financial – 8,505 SF
  - Restaurant – 56,000 SF

We are requesting HECo assistance to confirm existing HECo facilities serving the project area and to identify required upgrades to HECo facilities in support of the development.

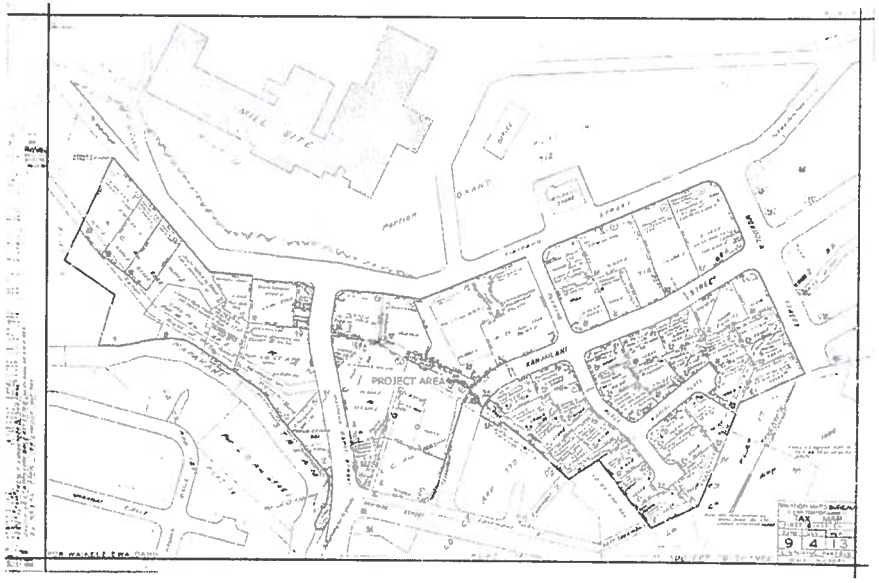
Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

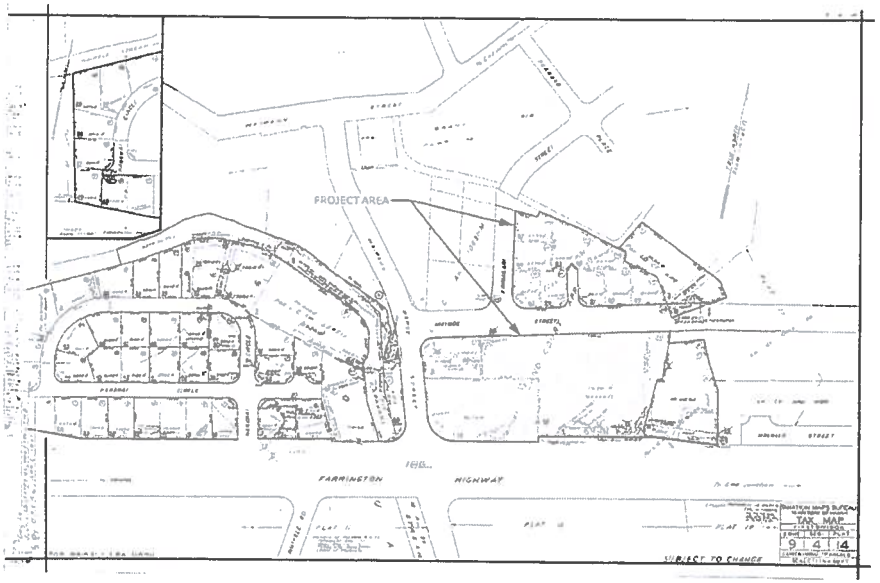
Regards,

Michele Adolpho, P.E.
Project Engineer

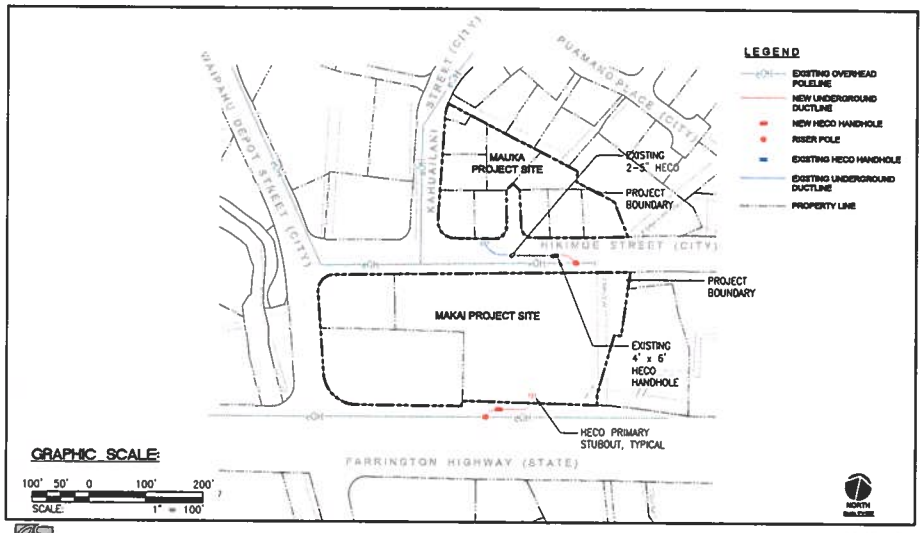
Enclosures

REF-351


PROJECT AREA
TAX MAP
9 4 13


PROJECT AREA
FARRINGTON HIGHWAY
TAX MAP
9 4 14
SUBJECT TO CHANGE

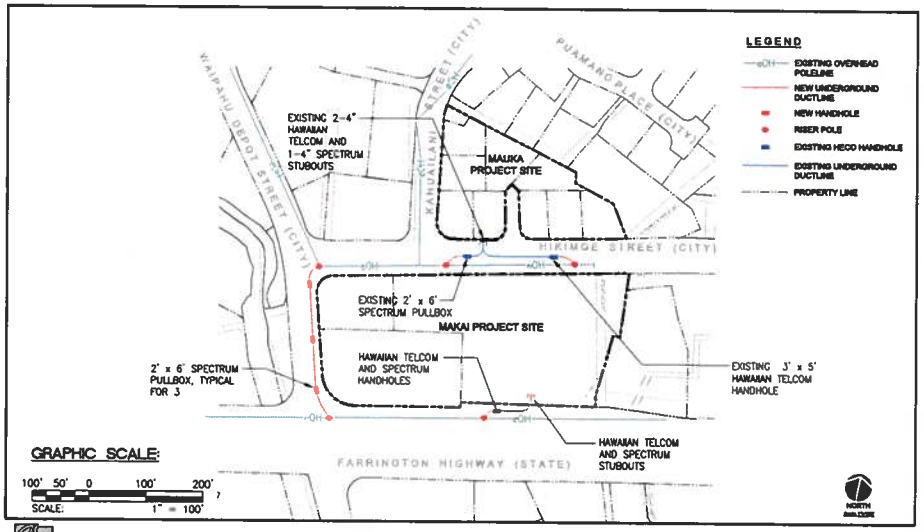
REF-352



ECS, INC.

FIGURE E-1
CONCEPTUAL ELECTRICAL (POWER) UTILITY PLAN

WAIPAHU REDEVELOPMENT / WAIPAHU, OAHU, HAWAII



ECS, INC.

FIGURE E-2
CONCEPTUAL TELECOMMUNICATIONS UTILITY PLAN

WAIPAHU REDEVELOPMENT / WAIPAHU, OAHU, HAWAII

REF-353

Appendix H

Telecommunication Utility System

- Hawaiian Telcom Company Email Correspondence dated May 10, 2022
- Hawaiian Telcom Request for Information Letter dated April 18, 2022
- Hawaiian Telcom Response Letter dated April 13, 2017
- Hawaiian Telcom Request for Information Letter dated March 21, 2017
- Hawaiian Telcom Company Email Correspondence dated April 21, 2017
- Spectrum Email Correspondence dated April 18, 2022
- Spectrum Request for Information Letter dated April 18, 2022
- Spectrum Email Correspondence dated March 22, 2017
- Spectrum Request for Information Letter dated March 21, 2017
- Conceptual Telecommunications Utility Plan

Michele Adolpho

From: Nicole Roberts <Nicole.Roberts@hawaiiantel.com>
Sent: Tuesday, May 31, 2022 2:08 PM
To: Michele Adolpho
Cc: HT-Plan Reviews
Subject: RE: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Hi Michele,

Nothing should have changed since 2017.

HT can still serve the areas, using whatever connection points may have been communicated at the time. If connection points are needed, let us know.

Depending on the plans for each lot, we may consider asking for a small equipment pad (with easement) for FDH placement. However, an FDH may be located in the MDF room, it just depends on the layout (number of buildings, number of units per building).

Thanks,

Nicole Lajousky
Strategic Fiber Network Engineer
Hawaiian Telcom
O: (808) 546-4858
C: (808) 799-8680
Nicole.Roberts@HawaiianTel.com

Hawaii's Technology Leader Hawaiian Telcom

From: HT-Plan Reviews <HT-PlanReviews@hawaiiantel.com>
Sent: Tuesday, May 10, 2022 6:27 PM
To: Michele Adolpho <MAdolpho@ecshawaii.com>; Nicole Roberts <Nicole.Roberts@hawaiiantel.com>
Cc: HT-Plan Reviews <HT-PlanReviews@hawaiiantel.com>; Jonathan Delahoyde <Jonathan.Delahoyde@hawaiiantel.com>
Subject: RE: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Aloha Michele,

Thank you for your email. This has been assigned for review. Thanks for providing the past correspondence with Garrett. Please, let us know if there is any updates or if you folks have any further questions. Thank you!

Greg Kawachi
Specialist – Structure Engineer
O: 808.546.7666
C: 808.779.8324

Hawaii's Technology Leader Hawaiian Telcom

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REF-354

From: Michele Adolpho <MAdolpho@ecshawaii.com>
Sent: Tuesday, May 10, 2022 6:09 PM
To: HT-Plan Reviews <HT-PlanReviews@hawaiiantel.com>
Cc: Greg Kawachi <Greg.Kawachi@hawaiiantel.com>
Subject: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Hi Greg,

HT had provided input related to redevelopment of a couple of properties along Waipahu Depot Road/Farrington Highway/Hikimoe Street back in 2017. Attached is some of our correspondence.

A new developer is looking to repurpose the sites and we have been asked to again contact the utilities for input on capacity/existing facilities in the area. Attached is information on the new development program that was previously sent.

Can you advise if anything has changed since 2017?

Thanks,
Michele

Michele Adolpho, P.E.
ECS, Inc.
615 Piikoi Street, Suite 207
Honolulu, Hawaii 96814
(808) 591-8181 Fax: (808) 591-9098

Consulting Electrical Engineers
ECS, Inc.

April 18, 2022

Mr. Greg Kawachi
Hawaiian Telcom
1177 Bishop Street
Honolulu, Hawaii 96813

Project: Waipahu Redevelopment
(ECS No. 030.044)

Subject: Hawaiian Telcom Infrastructure and Facility Planning

Dear Mr. Kawachi:

The subject project involves preliminary planning for redevelopment of properties located at TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The redevelopment will involve a 1.12 acre parcel, mauka of Hikimoe Street (Mauka Parcel) and a 2.73 acre parcel between Hikimoe Street and Farrington Highway (Makai Parcel). The development is anticipated to consist of a combination of residential and commercial buildings with the following proposed uses:

- Mauka Parcel
  - 118 – 1 Bedroom Units
  - 15 – 2 Bedroom Units
  - Restaurant – 5,930 SF
  - Retail – 2,540 SF
- Maiak Parcel
  - 156 – Studio Units
  - 140 – 1 Bedroom Units
  - 90 – 2 Bedroom Units
  - 18 – 3 Bedroom Units
  - Restaurant – 4,770 SF
  - Retail – 2,000 SF
  - Market/Grocery – 23,400 SF
  - Existing Office to Remain – 29,550 SF

REF-355

We are requesting Hawaiian Telcom assistance to confirm existing Hawaiian Telcom facilities serving the project area and to identify required upgrades to Hawaiian Telcom facilities in support of the development.

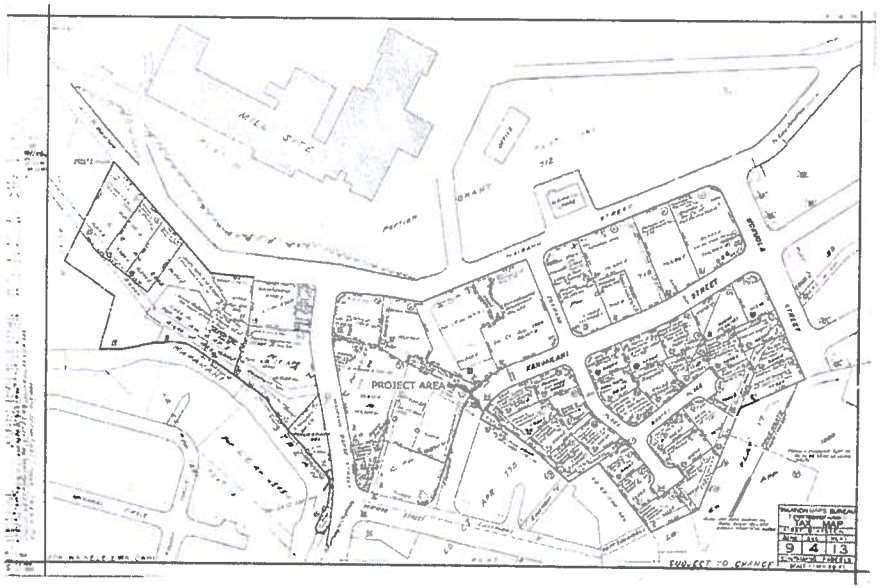
Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

Regards,

Michele Adolpho, P.E.
Project Engineer

Enclosures

615 Piikoi Street, Suite 207 • Honolulu, Hawaii 96814 • Phone: (808) 591-8181 • Fax: (808) 591-9098



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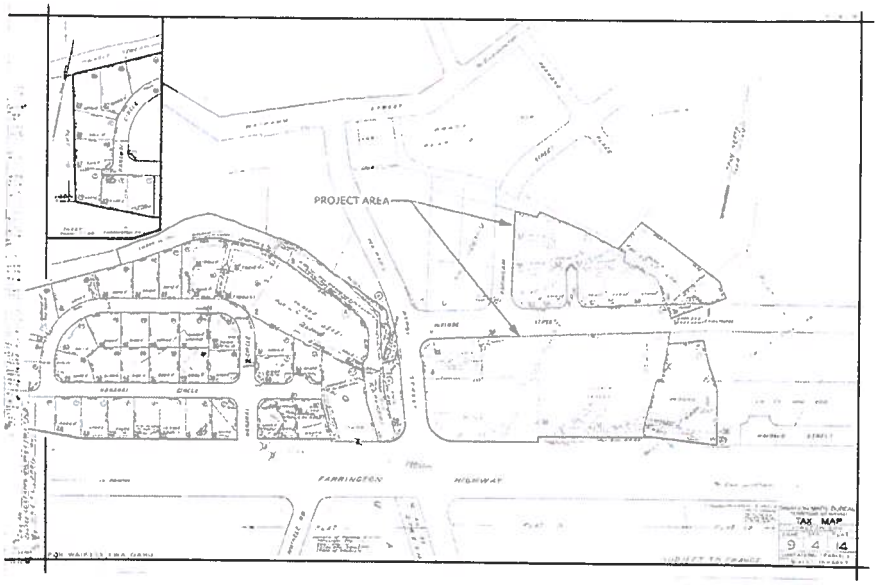


Hawaiian Telcom

April 13, 2017

ECS, Inc.
615 Piikoi Street, Suite 207
Honolulu, Hawaii 96814

Attention: Michele Adopho, P.E.

Subject: Hawaiian Telcom Infrastructure and Facility Planning

Dear Michele:

Thank you for consulting with us on the preparation for the redevelopment of Kamehamcha Schools' properties in the Waipahu Transit Oriented Development zone identified as TMK: 9-4-13:046 and TMK: 9-4-14:005, 014, 058-067. Hawaiian Telcom has existing aerial and underground facilities adjacent to and serving the affected parcels. We do not anticipate requiring any upgrades to our existing facilities in order to support this development.

Should you have any questions, please call Garret Hayashi at 546-5438.

Sincerely,

Cassandra Yamamoto
Senior Manager – Network Development

cc: File (Waipahu C.O.)

Always on.℠

PO Box 2200, Honolulu, HI 96841 hawaiiantel.com

REF-357

Consulting
Electrical
Engineers

ECS, Inc.

RECEIVED
MAR 24 2017

March 21, 2017

Mr. Jon Uyehara
Hawaiian Telcom
Outside Plant Engineering
P. O. Box 2200
Honolulu, Hawaii 96841

Project: Kamehameha Schools Waipahu Redevelopment
(ECS No. 030.030)

Subject: Hawaiian Telcom Infrastructure and Facility Planning

Dear Mr. Uyehara:

The subject project involves master planning for redevelopment of Kamehameha Schools' properties in the Waipahu Transit Oriented Development zone identified as TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The master plan redevelopment will consist of a combination of residential and commercial buildings with the following proposed uses:

- 250 Unit Residential Rental Apartments (electric appliances and air conditioning)
  - 75 – 1 Bedroom Units
  - 150 – 2 Bedroom Units
  - 25 – 3 Bedroom Units
- Commercial Areas (180,000 SF total gross floor area)
  - Existing Sonido Building – 29,495 SF
  - Grocery Market – 30,000 SF
  - Retail – 35,000 SF
  - Office – 10,000 SF
  - Day Care – 6,000 SF
  - Outdoor Play – 5,000 SF
  - Financial – 8,505 SF
  - Restaurant – 56,000 SF

We are requesting Hawaiian Telcom assistance to confirm existing Hawaiian Telcom facilities serving the project area and to identify required upgrades to Hawaiian Telcom facilities in support of the development.

Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

Regards,

Michele Adolpho, P.E.
Project Engineer

Enclosures

REF-358

Michele Adolpho

From: Garret Hayashi <Garret.Hayashi@hawaiiantel.com>
Sent: Monday, April 24, 2017 7:50 AM
To: Michele Adolpho; Gina Uyema
Cc: Garret Hayashi; Cassandra Yamamoto
Subject: RE: Waipahu Redevelopment for Kamehameha Schools
Attachments: HT response to ECS letter.pdf

Hi Michele,

Please see the attached soft copy of the response that was sent to you regarding this project.

- Yes, HT has copper and fiber facilities along Farrington Hwy
- Yes, HT facilities along Hikimoe and Kahuailani Streets are overhead and copper only.
- Yes, HT would plan to extend fiber to support new residential units.
- HT has an existing manhole on Waipahu Depot Road adjacent to the project. That would likely be the service point.

Please let me know if you have any other questions.

Thanks,
Garret

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Saturday, April 22, 2017 10:41 AM
To: Gina Uyema <Regina.Uyema@hawaiiantel.com>; Garret Hayashi <Garret.Hayashi@hawaiiantel.com>
Subject: RE: Waipahu Recevelopment for Kamehameha Schools

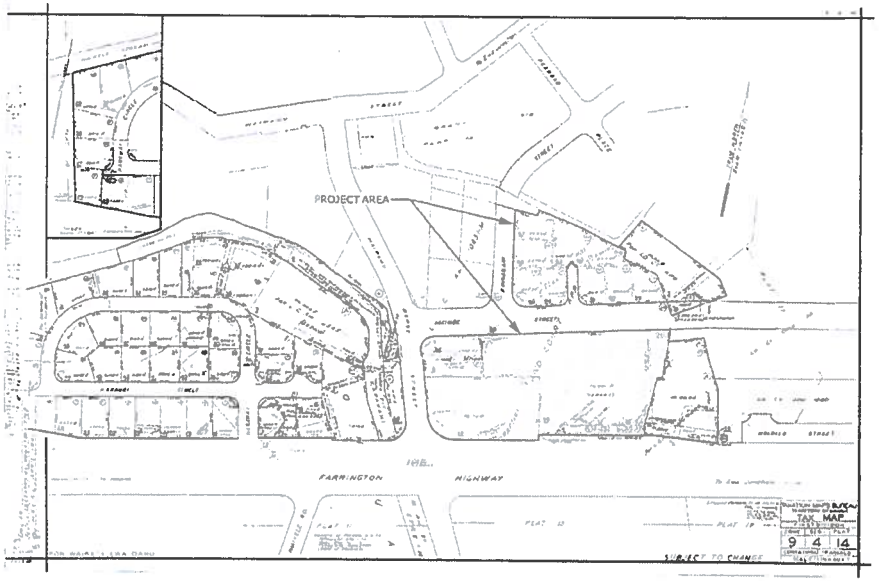
Thanks Gina.

Garret – I'll give you a call next week to confirm general information on existing facilities. What I'm hoping to obtain information on is:

- Does HT have copper and fiber facilities along Farrington Highway?
- I'm assuming that HT's facilities along Hikimoe and Kahuailani Streets are all overhead. Copper only?
- If there is a residential development on the mauka parcels (mauka of Hikimoe), would HT plan to extend fiber to support the residential units?
- Would you anticipate the need to serve the development from HT's underground facilities? Hoping to get an idea of the extent of any service infrastructure, particularly if we need to cross Farrington Highway.

Thanks,
Michele

From: Gina Uyema [mailto:Regina.Uyema@hawaiiantel.com]
Sent: Friday, April 21, 2017 6:56 AM
To: Michele Adolpho
Subject: RE: Waipahu Recevelopment for Kamehameha Schools



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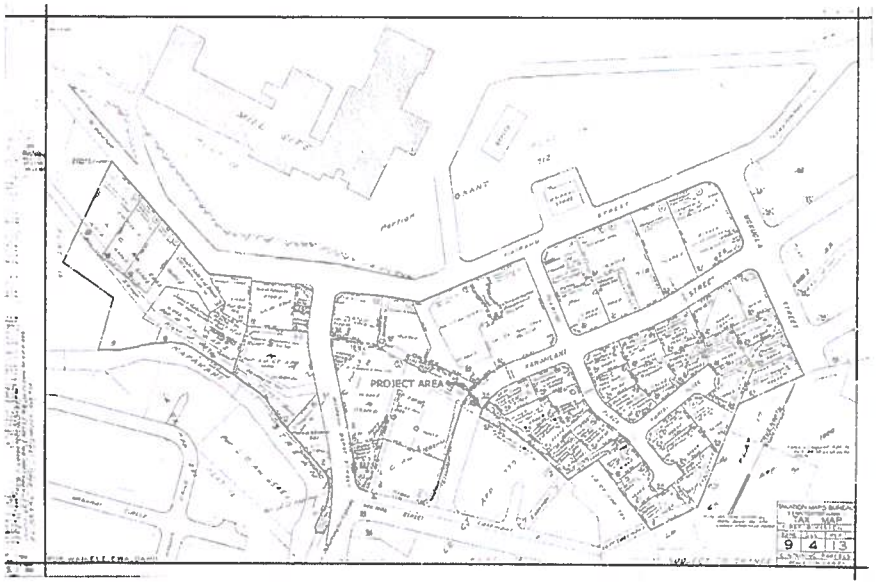


Michele Adolpho

From: Keck, Kevin <Kevin.Keck@charter.com>
Sent: Monday, May 16, 2022 1:59 PM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

Hello Michele,

I have reviewed the project area and what was communicated previously. Our plant in the area is the same as in the 2017 review, so suggestions the engineer provided before still stand.

Let me know if you have any further questions...

Thanks,
Kevin

From: Michele Adolpho <MAdolpho@ecshawaii.com>
Sent: Monday, April 18, 2022 9:16 AM
To: Kaai, Allyson K <Allyson.Kaai@charter.com>
Subject: [EXTERNAL] Waipahu Redevelopment - Waipahu Depot Road/Farrington Highway

CAUTION: The e-mail below is from an external source. Please exercise caution before opening attachments, clicking links, or following guidance.

Hi Allyson,

Spectrum (OTWC at the time) had provided input related to redevelopment of a couple of properties along Waipahu Depot Road/Farrington Highway/Hikimoe Street back in 2017. Attached is some of our correspondence.

A new developer is looking to repurpose the sites and we have been asked to again contact the utilities for input on capacity/existing facilities in the area. Attached is information on the new development program.

Can you advise if anything has changed since 2017?

Thanks,
Michele

Michele Adolpho, P.E.
ECS, Inc.
615 Piikoi Street, Suite 207
Honolulu, Hawaii 96814
(808) 591-8181 Fax: (808) 591-9098

REF-360

Consulting
Electrical
Engineers

ECS, Inc.

April 18, 2022

Ms. Allyson Kaai
Spectrum
200 Akamainui Street
Mililani, Hawaii 96789

Project: Waipahu Redevelopment
(ECS No. 030.044)

Subject: Spectrum Infrastructure and Facility Planning

Dear Ms. Kaai:

The subject project involves preliminary planning for redevelopment of properties located at TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The redevelopment will involve a 1.12 acre parcel, mauka of Hikimoe Street (Mauka Parcel) and a 2.73 acre parcel between Hikimoe Street and Farrington Highway (Makai Parcel). The development is anticipated to consist of a combination of residential and commercial buildings with the following proposed uses:

- Mauka Parcel
  - 118 – 1 Bedroom Units
  - 15 – 2 Bedroom Units
  - Restaurant – 5,930 SF
  - Retail – 2,540 SF
- Maiak Parcel
  - 156 – Studio Units
  - 140 – 1 Bedroom Units
  - 90 – 2 Bedroom Units
  - 18 – 3 Bedroom Units
  - Restaurant – 4,770 SF
  - Retail – 2,000 SF
  - Market/Grocery – 23,400 SF
  - Existing Office to Remain – 29,550 SF

We are requesting Spectrum assistance to confirm existing Spectrum facilities serving the project area and to identify required upgrades to Spectrum facilities in support of the development.

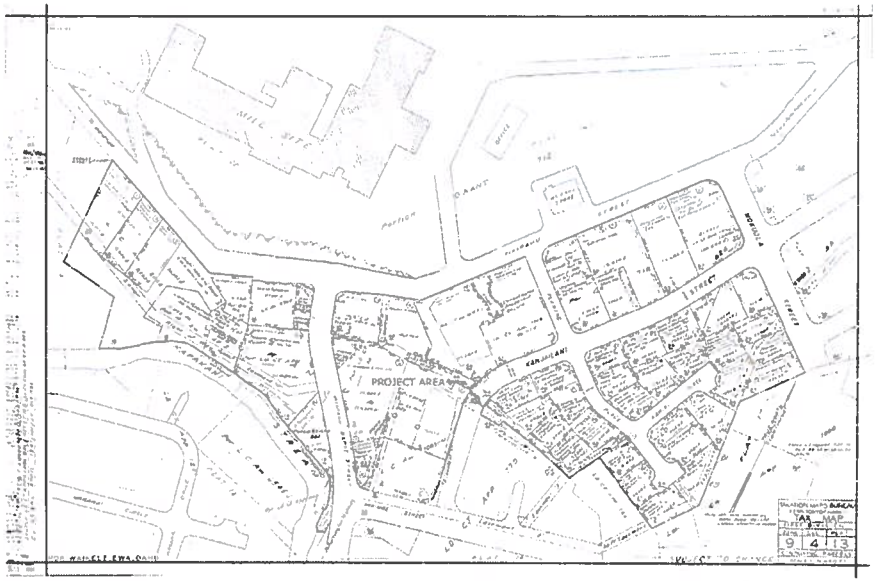
Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

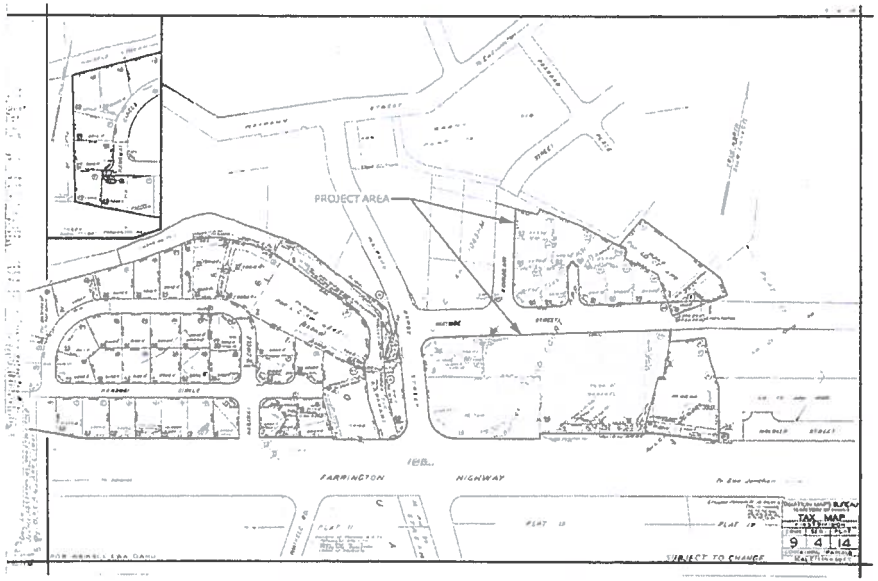
Regards,

Michele Adolpho, P.E.
Project Engineer

Enclosures

REF-361


PROJECT AREA
TAX MAP
9 4 13
SUBJECT TO CHANGE


PROJECT AREA
FARRINGTON HIGHWAY
TAX MAP
9 4 14
SUBJECT TO CHANGE

REF-362

Michele Adolpho

From: Nguyen, Tuan <Tuan.Nguyen1@charter.com>
Sent: Wednesday, April 05, 2017 8:22 AM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Michele,

Plan for 2-4"C and 2'x6' PB

Thanks,
Tuan Nguyen

Spectrum

OSP Engineering | 200 Akamainui Street | Mililani, HI 96789
PH # 808-625-8378 | tuan.nguyen1@charter.com

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Wednesday, April 05, 2017 7:38 AM
To: Nguyen, Tuan <Tuan.Nguyen1@charter.com>
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Tuan,

For the portion of new underground infrastructure, between Farrington Highway and Hikimoe Street, would 1-4"C and 2' x 6' pullboxes be adequate or should we plan for 2-4"C?

Thanks,
Michele

From: Nguyen, Tuan [mailto:Tuan.Nguyen1@charter.com]
Sent: Wednesday, March 29, 2017 1:18 PM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Michele,
Please see response in RED below.

Tuan Nguyen

Charter
COMMUNICATIONS

OSP Engineering | 200 Akamainui Street | Mililani, HI 96789
PH # 808-625-8378 | tuan.nguyen1@charter.com

Michele Adolpho

From: Nguyen, Tuan <Tuan.Nguyen1@charter.com>
Sent: Wednesday, March 29, 2017 1:18 PM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Michele,
Please see response in RED below.

Tuan Nguyen

Charter
COMMUNICATIONS

OSP Engineering | 200 Akamainui Street | Mililani, HI 96789
PH # 808-625-8378 | tuan.nguyen1@charter.com

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Tuesday, March 28, 2017 12:55 PM
To: Nguyen, Tuan <Tuan.Nguyen1@charter.com>
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Hi Tuan,

Thanks for the input. Can you provide clarification on the following?

- Is there currently coax only on the joint pole line? We have trunk fiber and coax facilities on joint pole line on Farrington Hwy, and coax only on side streets.
- I'm assuming all of Oceanic's existing plant facilities in the area are overhead and there are no underground facilities. Please confirm. The only underground infrastructure is front of the new Waipahu Rail Station.
- Will the fiber extension be used to serve both telecommunications and TV services to the development? Yes.
- Where will the 2,500 ft of fiber extension originate (approximate location)? The POC is located east of the project sites on Farrington Hwy near Arby's.
- Do you have an idea on the size of fiber cable you would need to extend to the project area? 96 strands
- Would you be able to provide a rough estimate of the cost for the fiber extension? Cost is approx. $25,000.

Thanks,
Michele

From: Nguyen, Tuan [mailto:Tuan.Nguyen1@charter.com]
Sent: Tuesday, March 28, 2017 11:58 AM
To: Michele Adolpho
Subject: RE: Waipahu Redevelopment for Kamehameha Schools

Hi Michele,

Attached is the Oceanic existing facilities in the general area of the proposed project. Oceanic's existing coaxial plant will not be able to support this project, we will need to extend 2,500 ft of our fiber plant to the project area along

REF-363

Farrington Hwy via joint utility poles. In order to service the parcel outline by Hikimoe St and Kahuailani St, we will need the proposed underground infrastructure route from Farrington Hwy to Hikimoe St as indicated in magenta line on the attached drawing.

Oceanic does not have any planned future projects in the project area. Any questions please give me a call or email me.

Tuan Nguyen

From: Kaai, Allyson K
Sent: Wednesday, March 22, 2017 12:34 PM
To: Nguyen, Tuan <Tuan.Nguyen1@charter.com>
Subject: FW: Waipahu Redevelopment for Kamehameha Schools

Forwarding to you for review and comment. Thanks.

From: Michele Adolpho [mailto:MAdolpho@ecshawaii.com]
Sent: Wednesday, March 22, 2017 12:12 PM
To: Kaai, Allyson K <Allyson.Kaai@charter.com>
Subject: Waipahu Redevelopment for Kamehameha Schools

Allyson,

Attached is an advance copy of a letter that was mailed to you today regarding this project. This is a request for information regarding planning for redevelopment of the Kamehameha School's properties in Waipahu. Would appreciate if you could let me know who would be the OTWC/Charter point of contact to obtain preliminary planning information.

We are preparing a preliminary engineering report for Kamehameha Schools and will need to identify the existing facilities serving the affected properties as well as any upgrades needed to support the proposed development. The report needs to be completed by the end of April.

Thanks,
Michele

Michele Adolpho, P.E.
ECS, Inc.
615 Piikoi Street, Suite 207
Honolulu, HI 96814
Phone: (808) 591-8181
Fax: (808) 591-9098

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The contents of this e-mail message and any attachments are intended solely for the addressee(s) and may contain confidential and/or legally privileged information. If you are not the intended recipient of this message or if this message has been addressed to you in error, please immediately alert the sender by reply e-mail and then delete this message and any attachments. If you are not the intended recipient, you are notified that any use, dissemination, distribution, copying, or storage of this message or any attachment is strictly prohibited.
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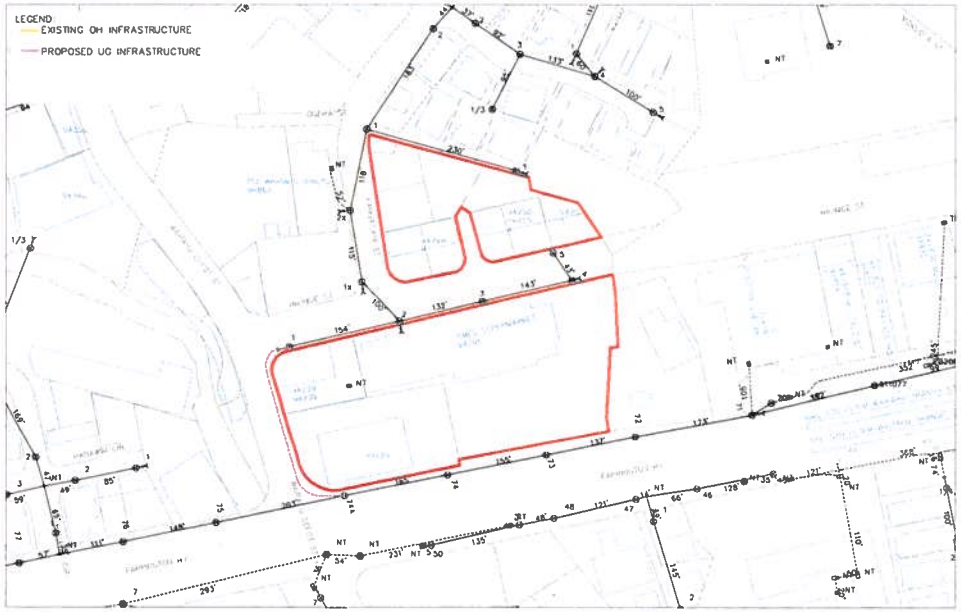


Consulting Electrical Engineers

ECS, Inc.

March 21, 2017

Ms. Allyson Kaai
Oceanic Time Warner Cable (Charter Communications)
Outside Plant Engineering
200 Akamainui Street
Mililani, Hawaii 96789

Project: Kamehameha Schools Waipahu Redevelopment (ECS No. 030.030)

Subject: Oceanic Cable Infrastructure and Facility Planning

Dear Ms. Kaai:

The subject project involves master planning for redevelopment of Kamehameha Schools' properties in the Waipahu Transit Oriented Development zone identified as TMK: 9-4-013:046 and TMKs: 9-4-14:005, 014, 058, 059, 060, 061, 062, 063, 064, 065, 066 and 067. A copy of project location maps are attached for your reference.

The master plan redevelopment will consist of a combination of residential and commercial buildings with the following proposed uses:

- 250 Unit Residential Rental Apartments (electric appliances and air conditioning)
  - 75 – 1 Bedroom Units
  - 150 – 2 Bedroom Units
  - 25 – 3 Bedroom Units
- Commercial Areas (180,000 SF total gross floor area)
  - Existing Sonido Building – 29,495 SF
  - Grocery Market – 30,000 SF
  - Retail – 35,000 SF
  - Office – 10,000 SF
  - Day Care – 6,000 SF
  - Outdoor Play – 5,000 SF
  - Financial – 8,505 SF
  - Restaurant – 56,000 SF

615 Piikoi Street, Suite 207 • Honolulu, Hawaii 96814 • Phone: (808) 591-8181 • Fax: (808) 591-9098

REF-365

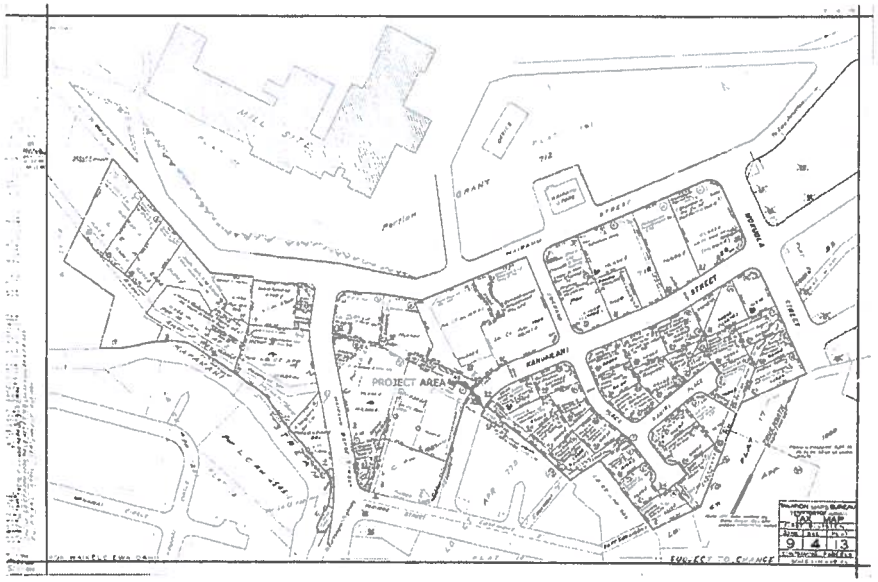
We are requesting OTWC assistance to confirm existing OTWC facilities serving the project area and to identify required upgrades to OTWC facilities in support of the development.

Feel free to call or email me at madolpho@ecshawaii.com should you have questions or require additional information.

Regards,

Michele Adolpho, P.E.
Project Engineer

Enclosures



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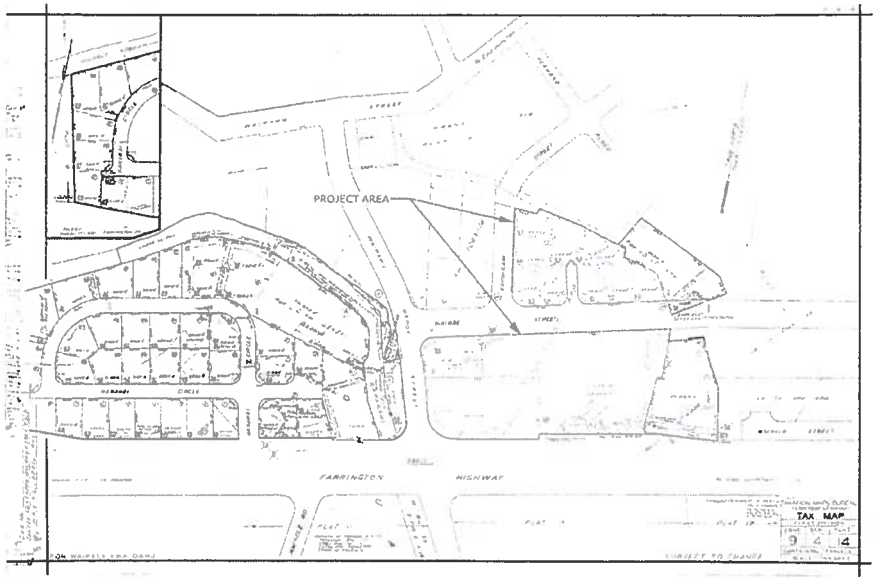
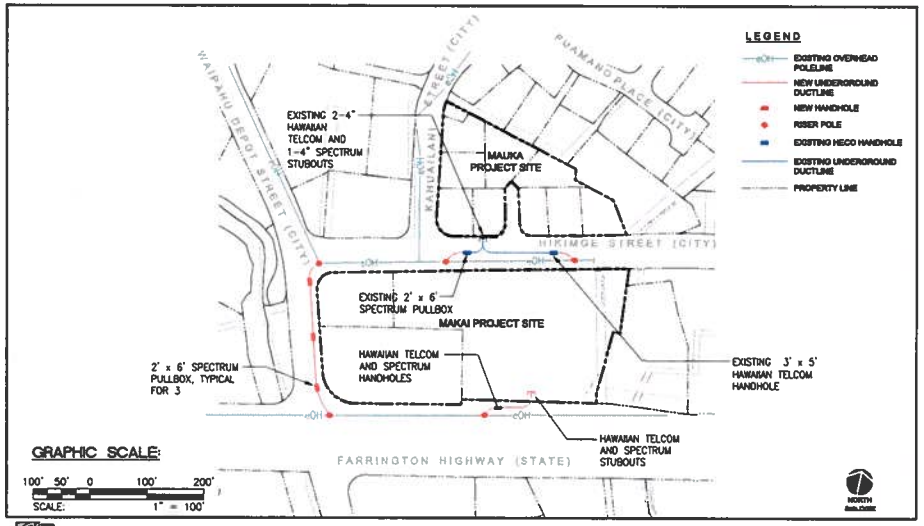




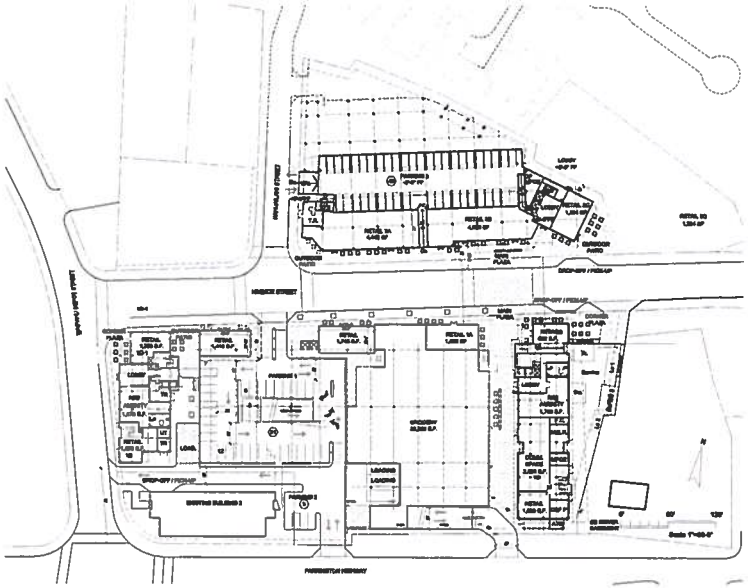
ECS, INC.

FIGURE E-2
CONCEPTUAL TELECOMMUNICATIONS UTILITY PLAN
KEAWALAU AFFORDABLE HOUSING COMMUNITY / WAIPAHU, OAHU, HAWAII

REF-367

Appendix I

Concept Architectural Rendering



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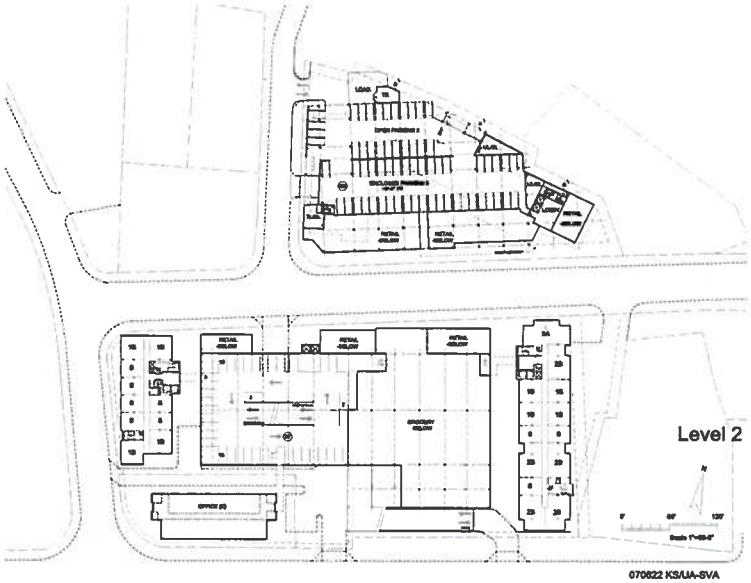


Appendix I

Lot 24-B Acquisition

- Hikimoe Street Lot 24-B Deed dated August 24, 2021

REF-369

417

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
August 24, 2021 8:01 AM
Doc No(s) A - 79060109

/s/ LESLIE T KOBATA
REGISTRAR

Pkg 11848997 KI

Conveyance Tax $47 50

LAND COURT SYSTEM | REGULAR SYSTEM

Return by Mail ☐ Pickup ☐ To:

Kamehameha Schools
Attn: Real Estate Legal Division
P.O. Box 3466
Honolulu, Hawai'i 96801

TG: 202126898 A RS

TGE: 1322109679
BARBARA PAULO

Document contains 7 pages

Tax Map Key No.: (1) 9-4-014 (por.)

QUITCLAIM DEED

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i, whose address is Honolulu Hale, 530 South King Street, Honolulu, Hawai'i 96813, hereinafter called the "***Grantor***", in consideration of the sum of Ten Dollars ($10.00) and other valuable consideration to Grantor paid, the receipt of which is hereby acknowledged, does hereby remise, release and forever quitclaim unto **LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop**, whose business and post office address is 567 South King Street, Suite 200, Honolulu, Hawai'i 96813, hereinafter called the "***Grantee***", as such Trustees, as Grantee's successors in trust and assigns, all of the Grantor's estate, right, title and interest in and to:

ALL of the land and premises (the "***Property***") more fully described in Exhibit "A" attached hereto and made a part hereof;

AND the reversions, remainders, rents, issues and profits thereof, together with all buildings, improvements, tenements, rights, easements, privileges and appurtenances to the same belonging or appertaining or held and enjoyed therewith, and all of the estate, right, title and interest of the Grantor, both at law and in equity, therein and thereto;

TO HAVE AND TO HOLD the same unto the Grantee, as aforesaid, forever.

The terms "Grantor" and "Grantee" as and when used herein or any pronouns used in place thereof, shall mean and include the masculine, feminine and neuter, the singular and plural number, individuals, trustees, partnerships, companies or corporations, and their and each of their respective heirs, devisees, personal representatives, successors, successors-in-trust and assigns, according to the context thereof.

This document may be executed in as many counterparts as may be deemed necessary or convenient, and by the parties on separate counterparts, each of which, when so executed, shall be deemed an original, but all such counterparts shall constitute one and the same instrument. The parties agree that the person or company recording or arranging for the recordation of this document is authorized to complete any blanks contained in this document with the applicable number of pages, dates, and recordation information, whether before or after this document has been notarized by a notary public, and in no event shall completion of any such blanks be deemed an alteration of this document by means of the insertion of new content.

Said Trustees are accepting this deed and title to the Property as Trustees of the Estate of Bernice Pauahi Bishop in their fiduciary capacities as said Trustees and not in an individual (or personal) capacity. No personal liability or obligation hereunder shall be imposed or assessed against said Trustees in their individual capacities.

[The remainder of this page is intentionally left blank. Signature page(s) follow(s).]

REF-370

IN WITNESS WHEREOF, the Grantor and Grantee have executed this instrument this 24th day of August, 2021.

Approved as to Content:

Scott K. Hayashi, Director
Department of Land Management

Approved as to Form and Legality:

Marilyn Ushijima
Deputy Corporation Counsel

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i

By: Rick Blangiardi
Name: Rick Blangiardi
Title: Mayor

"GRANTOR"

Approved as to Content, Authority, and Compliance with KS Policy:

/s/ Marcy Fleming
Manager/Director

Director/VP/Executive Vice President

Approved as to Form:

/s/ Malia Day
Legal Group

/s/ John Love
Retained Counsel

TRUSTEES OF THE ESTATE OF BERNICE PAUAHI BISHOP, AS AFORESAID

By
Name:
Their Attorney-in-Fact

By
Name:
Their Attorney-in-Fact

"GRANTEE"

IN WITNESS WHEREOF, the Grantor and Grantee have executed this instrument this _____ day of _____, 2021.

Approved as to Content:

Scott K. Hayashi, Director
Department of Land Management

Approved as to Form and Legality:

Marilyn Ushijima
Deputy Corporation Counsel

CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawai'i

By:
Name: Rick Blangiardi
Title: Mayor

"GRANTOR"

Approved as to Content, Authority, and Compliance with KS Policy:

/s/ Marcy Fleming
Manager/Director

Director/VP/Executive Vice President

Approved as to Form:

/s/ Malia Day
Legal Group

/s/ John Love
Retained Counsel

TRUSTEES OF THE ESTATE OF BERNICE PAUAHI BISHOP, AS AFORESAID

By
Name: SHERYL L. NICHOLSON, Assistant General Counsel
Their Attorney-in-Fact

By
Name: PAULA W. CHONG, Senior Counsel
Their Attorney-in-Fact

"GRANTEE"

REF-371

GRANTOR
STATE OF HAWAII)
CITY AND COUNTY OF HONOLULU) SS.
FIRST JUDICIAL CIRCUIT)

On august 16, 2021, before me personally appeared **RICK BLANGIARDI**, to me personally known, who being by me duly sworn (or affirmed), did say that such person is the Mayor of the City and County of Honolulu, a municipal corporation of the State of Hawaii, and that the seal affixed to said instrument is the corporate seal of said municipal corporation, and that the foregoing instrument was signed and sealed in behalf of said municipal corporation by authority of its City Council, and such person acknowledged the foregoing instrument to be the free act and deed of said municipal corporation.

Document Description: Quitclaim Deed
Doc. Date: undated at time of notarization No. Page: 6

8/16/2021
Notary Signature Date

J.L.M. Kuwabara
Name (printed)

Notary Public, State of Hawaii

My commission expires: 1/22/2024

J.L.M. KUWABARA NOTARY 80-62 PUBLIC STATE OF HAWAII

GRANTEE
STATE OF HAWAI'I)
) SS.
CITY AND COUNTY OF HONOLULU)

On AUG - 5 2021 before me appeared SHERYL L. NICHOLSON, Assistant General Counsel and PAULA W. CHONG, Senior Counsel, to me personally known, who being by me duly sworn, did say that they are two of the attorneys-in-fact for LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop, duly appointed under Limited Power of Attorney effective as of July 1, 2021, recorded in the Bureau of Conveyances of the State of Hawai'i as Document No. A-78520458, and in the Office of the Assistant Registrar of the Land Court of the State of Hawai'i as Document No. T-11504191; and that the foregoing instrument was executed in the name and on behalf of LANCE KEAWE WILHELM, ROBERT K. W. H. NOBRIGA, ELLIOT K. MILLS, and CRYSTAL KAUILANI ROSE, as Trustees of the Estate of Bernice Pauahi Bishop, by such persons in their capacities as attorneys-in-fact; and they acknowledged the instrument to be the free act and deed of the Trustees of the Estate of Bernice Pauahi Bishop, as aforesaid.

Signature: Emily Davids
Name: Emily Davids
Notary Public, State of Hawai'i

L.S.

My commission expires: 11/15/23

(Official Stamp or Seal)

NOTARY CERTIFICATION STATEMENT

Document Identification or Description: Quitclaim Deed

Doc. Date: — or ☒ Undated at time of notarization.

No. of Pages: 5 w/o exhibits Jurisdiction: First Circuit (in which notarial act is performed)

Emily Davids AUG - 5 2021
Signature of Notary Date of Notarization and Certification Statement

L.S.

Emily Davids
Printed Name of Notary

(Official Stamp or Seal)

Date of notary commission expiration: 11/15/23

REF-372

EXHIBIT A

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Mahele Award 39 to Kauliokamoa, and Royal Patent Number 4370, Land Commission Award Number 7260, Apana 2 to B. Namakeha), being LOT 24-B, containing an area of 2,404 square feet, more or less, situate, lying and being at Waikele, District of Ewa, City and County of Honolulu, State of Hawaii, as referenced on Subdivision map dated March 3, 2020, approved by the City and County of Honolulu on May 15, 2020, 2020/SUB-68.

BEING A PORTION OF THE PREMISES ACQUIRED BY DEED

GRANTOR : FRANK ELBERT MIDKIFF, EDWIN PUAHUALANI MURRAY, WILLSON CARR MOORE, ATHERTON RICHARDS and RICHARD LYMAN, JR., Trustees under the Will and of the Estate of Bernice Pauahi Bishop, Deceased

GRANTEE : THE CITY AND COUNTY OF HONOLULU, a municipal corporation of the State of Hawaii

DATED : October 11, 1959
FILED : Land Court Document No. 245750

SUBJECT, HOWEVER, TO:

1. Mineral and water rights of any nature.

2. DESIGNATION OF EASEMENT W-1

PURPOSE : water pipeline and water meter
REFERENCED : on Subdivision map dated March 3, 2020, approved by the City and County of Honolulu on May 15, 2020, 2020/SUB-68

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
Phone: (808) 768-8000 • Fax: (808) 768-4950

KIRK CALDWELL
MAYOR

KATHY K. SOKUGAWA
ACTING DIRECTOR
TIMOTHY F. T. HIU
DEPUTY DIRECTOR
EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

File Number	:	2020/SUB-68
Project	:	SUB / Waipahu - Hikimoe St. / Tax Map Key: 9-4-014
Location	:	
Tax Map Key	:	9-4-014:061 (various)
Owner	:	City and County of Honolulu, Department of Land Management
Surveyor	:	ControlPoint Surveying, Inc.
Agent	:	ControlPoint Surveying, Inc.

Description of the Proposal: Subdivision of Lot 24 as shown on Map 6 of Land Court Application 779, into two roadway lots: Lot 24-A of 34,384 square feet and Lot 24-B of 2,404 square feet, and the designation of Easement W-1 (for water pipeline and meter purposes in favor of the Board of Water Supply) affecting Lot 24-B.

Based on an April 17, 2020 memo from the Department of Land Management, Lot 24-B is to be sold to Kamehameha Schools, the fee owner of the adjacent lots.

Approval was granted to the proposal.

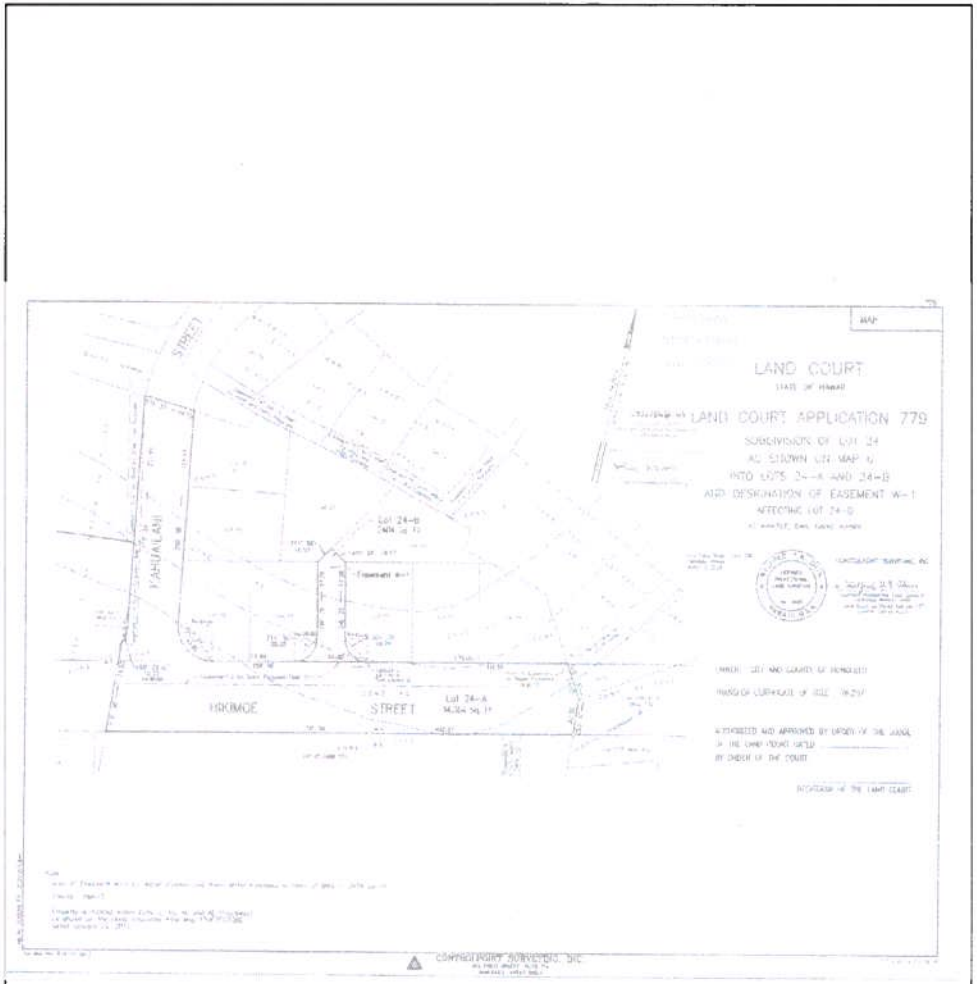
Copies of the final survey map with the stamp of approval are enclosed.

THIS COPY IS NOTIFICATION OF THE ACTION TAKEN AND THE DATE IT WAS SIGNED.

SIGNATURE	TITLE	DATE
	for *ACTING DIRECTOR*	*May 15, 2020*

This action does not constitute approval of any other required permits, such as building or sign permits. Should you have any questions, please call the Subdivision Branch at 768-8100 or 768-8101.

REF-373


MAP
LAND COURT
STATE OF HAWAII
LAND COURT APPLICATION 779
SUBDIVISION OF LOT 24
AS SHOWN ON MAP 6
INTO LOTS 24-A AND 24-B
AND DESIGNATION OF EASEMENT W-1
AFFECTING LOT 24-B
Lot 24-B
Lot 24-A
HIKIMOE
STREET
COMPASS POINT SURVEYORS, INC

REF-374

ARCHAEOLOGICAL INVENTORY SURVEY

18

REF-375

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Bright People. Right Solutions.

DRAFT—ARCHAEOLOGICAL INVENTORY SURVEY FOR KAMEHAMEHA SCHOOLS WAIPAHU REDEVELOPMENT PROJECT, WAIKELE AHUPUA'A, 'EWA DISTRICT, ISLAND OF O'AHU, HAWAI'I

TMK PARCELS (1) 9-4-013:046 AND (1) 9-4-014:005, 014, AND 058–067

HAWAI'I SHPD PERMIT NO. 22-32
KLEINFELDER PROJECT # 20230167.001A

MAY 3, 2022

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ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.

KLEINFELDER
Bright People. Right Solutions.

A Report Prepared for:

Kamehameha Schools
567 South King Street, Suite 200
Honolulu, Hawai'i 96813

DRAFT—ARCHAEOLOGICAL INVENTORY SURVEY
FOR KAMEHAMEHA SCHOOLS WAIPAHU REDEVELOPMENT PROJECT,
WAIKELE AHUPUA'A, 'EWA DISTRICT,
ISLAND OF O'AHU, HAWAI'I
TMK PARCELS (1) 9-4-013:046 AND (1) 9-4-014:005, 014, AND 058–067

Prepared by:
Cacilie Craft, MA, RPA
and
David Byerly, BA

KLEINFELDER, INC.
1221 Kapi'olani Blvd, Suite 201
Honolulu, HI 96814
Phone: 808.262.1387

May 3,2022
Hawai'i SHPD Permit No. 22-32
Kleinfelder Project No: 20230167.001A

REF-376

MANAGEMENT SUMMARY

At the request of the landowner, Kamehameha Schools, Kleinfelder, Inc. (formerly Garcia and Associates) conducted an archaeological inventory survey for the Waipahu Redevelopment Project in Waikele Ahupua'a, 'Ewa District, Island of O'ahu, Hawai'i, TMKs (1) 9-4-013:046 and (1) 9-4-014:005, 014, and 058–067. Excavation of 25 test trenches resulted in the recordation of one previously recorded historic property, designated State Inventory of Historic Places Site 50-80-09-7751, a subsurface agricultural layer associated with pre-Contact to Historic Period wetland cultivation of taro and rice. Site 50-80-09-7751 was previously recorded by Hammatt (2010) and Sroat et al. (2016) during archaeological investigations for the Waipahu Transit Station approximately 200 meters southeast of the current study area.

Site 50-80-09-7751 was encountered in 15 of the 25 test trenches excavated during the current study. It was encountered beneath thick layers of imported fill material associated with ca. 1960s urban growth of Waipahu and ca. 1950s land reclamations by the U.S. military. Site 50-80-09-7751 presented as a distinct stratigraphic layer (Stratum II) consisting of deep, naturally deposited wetland alluvial sediments situated close to or at the water table and containing dispersed charcoal flecks and historic debris.

Site 50-80-09-7751 has produced and is likely to continue to produce important information regarding pre-Contact to Historic Period agricultural use of Waipahu. It is therefore a significant historic property under Hawaii Administrative Rules 13-284-6 Criterion (d).

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1 INTRODUCTION

At the request of Kamehameha Schools (the landowner), Kleinfelder, Inc. (formerly Garcia and Associates) conducted an archaeological inventory survey (AIS) for the Waipahu Redevelopment Project in Waikele Ahupua'a, 'Ewa District, Island of O'ahu, Hawai'i, Tax Map Keys (TMK)s (1) 9-4-013:046 and (1) 9-4-014:005, 014, and 058–067 (Figures 1 and 2). Archaeological investigations were conducted in advance of proposed redevelopment of the project parcels as part of Kamehameha School's ongoing implementation of Hawaii Revised Statutes (HRS) §6E-42 consultation effort. Current redevelopment plans for the project area are focused on potential demolition of existing structures (except for the Sonido Building) and construction of a mixed-use commercial complex consisting of commercial, residential, and retail space (Figure 3). The primary objectives of the AIS were therefore to identify, document, and assess significance for all extant historic properties, including subsurface cultural deposits, within the project area.

Cacilie Craft, MA, RPA, served as the Principal Investigator for archaeological investigations. Ms. Craft meets the professional qualifications outlined in Hawai'i Administrative Rules §13-281-3 and is permitted to conduct archaeological investigations under State Historic Preservation Division (SHPD) Permit No. 18-34. Ms. Craft also meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology. AIS fieldwork was conducted over a period of 9 days between 23 April and 4 May 2018 by Ms. Craft and Kleinfelder's Field Archaeologist, David Byerly, BA.

1.1 PROJECT AREA DESCRIPTION

The project area is comprised of 13 urban parcels, totaling 1.6 hectares (3.9 acres), situated on the north side of Farrington Highway in Waipahu. The makai portion of the project area consists of three parcels, TMKs (1) 9-4-014:005, 014, and 058, and is bounded by Farrington Highway to the south, Waipahu Depot Road to the west, Hikimoe Street to the north, and a gas station to the east. These lots are occupied by commercial buildings dating to the last several decades, including the Times Supermarket and the Sonido Building. The mauka portion of the project area consists of the remaining 10 parcels, TMKs (1) 9-4-014:059–067 and (1) 9-4-013:046, and is bounded by Hikimoe Street to the south, Kahuailani Street to the west, and residential lots to the north and east. This portion of the project area is occupied by small businesses housed in two-story commercial buildings which have existed on the parcel since the late-1960s and 1970s.

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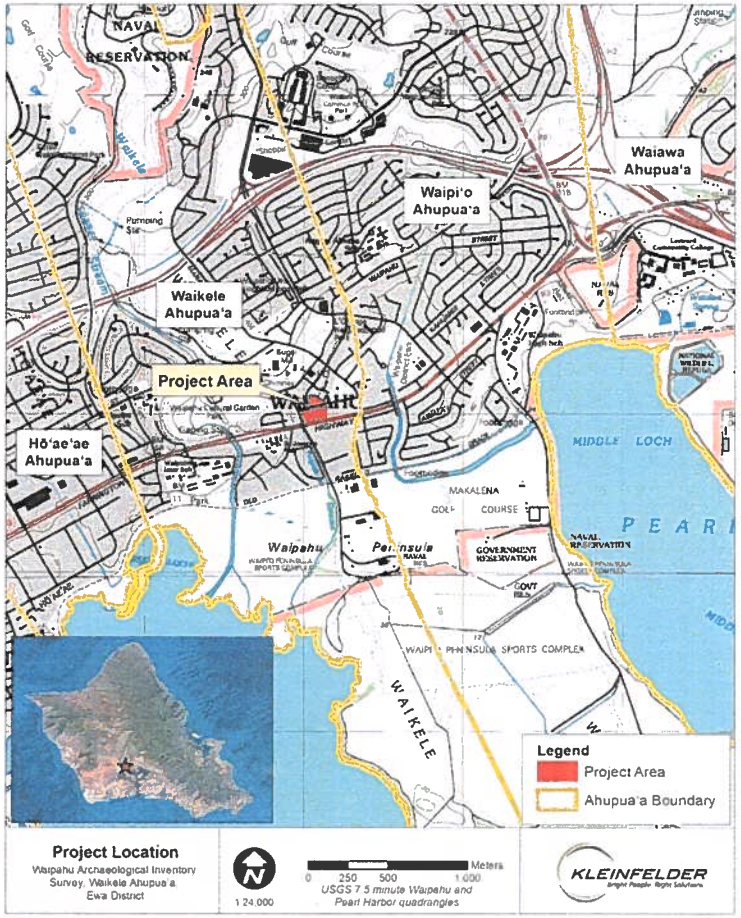

Figure 1. Project location on 2008 USGS Waipahu and Pearl Harbor quadrangles.

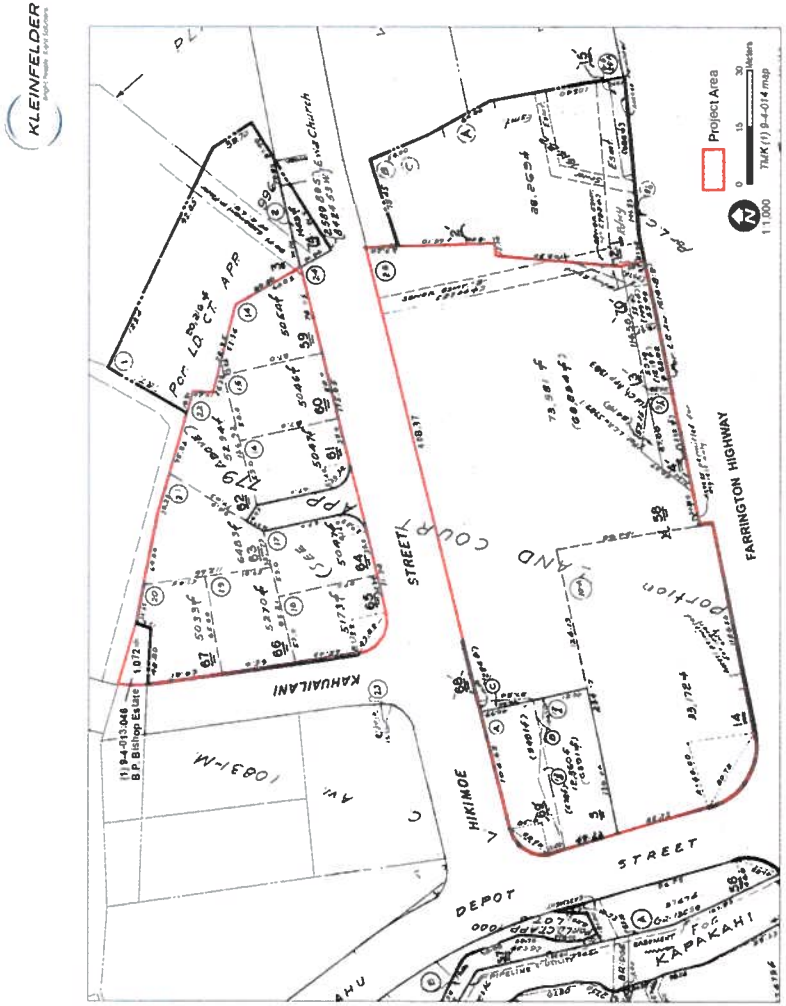

Figure 2. Project location on TMK (1) 9-4-014 map.

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Figure 3. Ground level plan for Waipahu Redevelopment Project.

1.2 DESCRIPTION OF PARCEL DEVELOPMENT

Proposed new construction includes the almost complete redevelopment (except for the Sonido Building) of the Waipahu Redevelopment Project parcel. Many existing structures will be demolished, and new buildings are anticipated to be constructed per the ground level plan shown in Figure 3.

In an April 12, 2022, email communication from a Civil Engineer for the project, Kevin Goto of Wilson Okamoto Corporation provided a summary of the proposed construction and approximated depths of ground disturbance for the project:

> The mixed-use project in Waipahu involves two development sites with one on the mauka side of Hikimoe Street and the other on the makai side of Hikimoe Street. A low-rise senior living building with a parking garage and ground floor commercial space is proposed for the mauka parcel, while two high-rise multi-family buildings with a shared parking garage and ground floor commercial space, including a market, are proposed for the makai parcel.
>
> It is anticipated that the high-rise buildings will have deep foundation systems consisting of drilled shafts ranging from 36 to 60 inches in diameter extending 65 to 140 feet into the ground. Ground level pavement is anticipated to be about 15 inches in thickness. There will be various approximate trench depths for the different utilities: sanitary sewer – 9-feet along Hikimoe Street, 13 feet along Waipahu Depot Street, and 14 feet along Farrington Highway; domestic water – 6.5 feet along Hikimoe Street and 10 feet along Waipahu Depot Street; storm drainage – 5.5 feet along Hikimo Street, Waipahu Depot Street, and Farrington Highway; and electrical/telecommunication – 4 feet along Hikimoe Street and Farrington Highway.

REF-380

2 METHODS

Archaeological investigations involved four primary tasks, listed below and discussed in the following sections:

- Preparation of research objectives based on archival research, previous archaeological investigations, and the environmental context of the study area.
- Field investigations to determine the presence or absence of historic properties in the project area.
- Post-field laboratory processing and analysis.
- Synthesis of archaeological results and evaluation of historic properties for significance per §13-284-6.

2.1 RESEARCH OBJECTIVES

Historical accounts indicate that the large floodplain in the southern portion of Waikele Ahupua'a supported an extensive network of cultivated wetlands, pasture lands, house lots, and fishponds. LCA documentation indicates that the direct project area supported at least seven lo'i and one auwai at the time of the Māhele. Two house lots, one koele (a land unit farmed for the chief), and one kula (pasture land) are also noted. By the late-1800s, Chinese immigrants arrived in large numbers to work the burgeoning sugar plantations. Chinese plantation workers leased the former taro lands and repurposed them for rice cultivation. Agricultural pondfields and the surrounding wetlands were later filled in by the U.S. military during World War II. After the war, commercial and residential development supplanted what was left of the former cultivated wetland.

Previous archaeological investigations conducted in the immediate vicinity of the study area recorded remnant wetland sediments and associated evidence of wetland taro and rice cultivation (Hammatt 2010; Sroat et al. 2016). This subsurface agricultural layer was designated Site 50-80-09-7751. The proximity of this site to the current project area combined with the archival research and LCA documentation summarized above indicated a high probability for encountering the site during the current AIS. Research objectives thus focused first on recording the presence and extent of the site within the current project boundaries, and next, on assessing the nature of the deposit. The latter consisted of analyzing historical, archaeological, and palynological evidence to substantiate agricultural use of the wetland within the study area and to assess the age of agricultural activity.

Assessing the age of agricultural activity presented certain challenges (McElroy 2012; Acabado 2009). Churned pondfield sediments often contain dispersed charcoal, which is not suitable for radiometric dating (McElroy 2012; Rieth and Athens 2013). Constructed wall elements and primary feature contexts associated with irrigated pondfields were also not encountered in the project area, further limiting

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potential dating approaches (McElroy 2012; Acabado 2009). Research objectives therefore considered other temporal indicators per McElroy's (2012:144–151) approach for wetland agricultural systems, which include the presence of historic artifacts, charcoal from recently-introduced taxa, and historic maps and photographs.

2.2 FIELD METHODS

Fieldwork was conducted over a period of nine days between 23 April and 4 May and included the excavation of 25, 5-meter-long backhoe trenches per Kamehameha Schools' original trenching plan to provide even and extensive coverage across the project area. Trenches were excavated by a miniature tracked excavator and were terminated at the water table or 50 centimeters into naturally occurring saprolite. One sidewall of each trench was stratigraphically profiled and photographed. Soil and sediment descriptions followed U.S. Soil Conservation Service standards and the Munsell color notation system.

Archaeological sites and materials were recorded with the aim of collecting metric and descriptive data relevant to determining age, nature, cultural affiliation, integrity, and depositional history of the resources in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeological Documentation* and HAR §13-276. Archaeological sampling was conducted to assist in the characterization of archaeological materials and deposits. Bulk sediment samples were volumetrically controlled two-liter samples, discussed in more detail in Section 2.3.1. Historical materials were photographically sampled in the field and in field logs for post-field analysis.

Given the limitations of conducting subsurface investigations in an urban environment, minimum site boundaries for any cultural deposits encountered during test trenching were first delineated empirically by their presence or absence in the sidewall of test trenches. If the deposit was present throughout the aerial extent of the trenching plan, it was assumed to extend beyond the boundary of the current study area (into surrounding TMK parcels). This is unavoidably an approximation but does account for the likely broad extent of cultural deposits while not encroaching on untested adjacent parcels. As such, previously reported cultural deposits on adjacent parcels were assumed to cover their entire parcel unless site boundaries were empirically tested and identified. For parcels that adjoin the current study area and contain broadly extended cultural deposits, the previously documented deposits were interpreted as continuous, and part of the same overall deposit.

2.3 LABORATORY METHODS

All cultural material recovered during fieldwork was processed and analyzed in Kleinfelder's Honolulu laboratory. Transportation of samples from the field to the laboratory included proper labeling, minimization of handling, isolation of specific samples in appropriate storage containers, and ensuring an adequately arid environment for any radiocarbon and sediment samples.

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2.3.1 Bulk Sediment Samples

Ten 2-liter bulk sediment samples were collected from buried wetland agricultural sediments encountered throughout the study area. Prior to wet screening, sediment samples were examined for the presence of ferruginous mottling, rhizoconcretions, and charcoal. One liter of each sample was then collected for flotation analysis. The material was poured into a sieve and submerged into a container of water. The sieve was agitated in the water, allowing larger grained material (heavy faction) to sink while lighter organic material (light faction) floated to the surface. These particles were then gathered with a fine mesh and allowed to dry. The remaining heavy faction was wet screened through 1/16-inch wire mesh. Once dry, the samples were inspected for artifacts, charcoal, and midden contents, which were then sorted, counted, weighed, and tabulated. The remaining one liter of each bulk sediment sample was placed on reserve for later palynological sampling (see below).

2.3.2 Palynological Analysis

Three, 30-gram bulk sediment subsamples collected from three different trenches representing the maximum areal extent of the site were submitted to BGP Consulting, LLC for palynological analysis (see Appendix B for methodology). The results of palynological analysis will be used to help characterize vegetation and the presence of cultivars in the study area at the time of cultural deposition.

2.3.3 Archaeobotanical Analysis

One charcoal sample was submitted to the International Archaeological Research Institute, Inc. (IARII) Wood Identification Laboratory for taxonomic identification (see Appendix C for methodology). The objective of the analysis is to identify recently or historically introduced plant taxa in Stratum II, a subsurface agricultural layer.

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3 BACKGROUND

The background information presented below establishes the environmental, historical, and archaeological setting of the study area. This information provides a contextual framework within which cultural resources identified during the archaeological inventory survey can be interpreted and evaluated for significance.

3.1 ENVIRONMENTAL CONTEXT

The project area is situated about 2 meters above sea level on the large Pearl Harbor coastal plain on the south coast of the island of O'ahu. The island of O'ahu was formed by two shield volcanoes, Ko'olau Range along the east side of the island and the Wai'anae Range on the west (MacDonald et al. 1983:420). After the Wai'anae volcano became dormant, lava flows from the Ko'olau volcano formed the Schofield Plateau. Eventually the plateau was bounded by a broad coastal plain formed by detritus sediments from the deeply eroded stream valleys and aeolian coastal dune sands (Armstrong 1983:34). The lower Waikele coastal plain, which contains the project area, was created from the deposition of alluvium weathered from the erosion of the Schofield Plateau to the north. This coastal plain contains numerous wetlands used for traditional subsistence practices.

Waikele Stream lies about 300 meters west of the project area. It is fed by two tributary streams that cut across the Schofield Plateau. The Wai'eli Stream originates from the Waianae mountain range in the west, and the Waikakalaua Stream flows from the Ko'olau mountain range in the east. Both streams converge with the Waikele Stream in transporting alluvial material to the Pearl Harbor floodplain.

The project region has a moderate and coastal climate with daily temperatures between approximately 15.7 and 25.6 degrees Celsius in January, and 20 and 30.6 degrees Celsius in July. Mean annual rainfall in the project area, as measured from the Waipahu Station, averages 59.4 centimeters with 74 percent of the precipitation occurring between the months of October and March (Giambelluca et al. 2013).

Current environmental conditions consist of a completely urbanized environment with paved roads, commercial buildings, and subsurface utilities and related infrastructure. Most of the project area is surfaced with either asphalt (exterior parking) or concrete (building foundations). Small, narrow strips of landscaped grass supporting ornamental trees are dispersed throughout the project area. The area is, overall, relatively flat with a gradual south-facing slope from mauka to makai.

3.1.1 Project Area Soils

Three soil classes have been identified in the project area vicinity (USDA 1999): 1) Typic Endoaquepts, mapped in the makai project area in the vicinity of Times Supermarket and the Sonido Building; 2)

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Waipahu Silty Clay, 6 to 12 percent slopes, mapped in the mauka portion of the project area; and 3) Fill Land, Mixed, mapped north of the gas station in the eastern section of the project area (Figure 4).

Typic Endoaquepts, previously defined as Tropaquepts by Foote et al. (1972) for poorly drained sediment periodically flooded by irrigation for wetland cultivation (e.g., taro, rice, watercress), are wet, dominantly gray Inceptisols that feature endosaturation (USDA 1999:449–500). Ground water commonly fluctuates from near the soil surface to a depth of 50 centimeters. These soils formed in late-Pleistocene or Holocene deposits at sea level.

Waipahu Silty Clay (WcZ) soils are Torrertic Haplustolls, which are a sub-family group of soils within the Order of Mollisols. They consist of deep, well drained soils that formed in old alluvium weathered from basic igneous rock. Haplustolls formed mainly in late-Pleistocene or Holocene deposits.

Fill Land, mixed is a type of anthropic soil extensively influenced by human activities. It commonly occurs adjacent to the ocean near Pearl Harbor and in Honolulu and consists of areas filled with material dredged from the ocean or nearby areas, garbage, and various other sources (Foote et al. 1972).

3.2 CULTURAL CONTEXT

The study area is situated within the ahupua'a of Waikele, which literally means "muddy water," likely referring to the murky or cloudy appearance of the Waikele Stream during pre-Contact times (Pukui et al. 1974:223). Traditional and early historical accounts indicate extensive traditional and historic utilization of the project region, particularly along the coast. The following cultural historical context provides an overview of this history as it relates to the current study area.

3.2.1 Traditional Land Use

Traditional Hawaiian land use centered on agricultural production, coastal exploitation of marine resources, and the collection of wild plants and animals (Kirch 1985:2–3). Agricultural intensification accounted for a wide variety of cultivated plants, the most prolific being taro (*Colocasia esculenta*) and sweet potato (*Ipomoea batatas*). Taro was grown prolifically across the islands but particularly in irrigated pond fields along river valleys, whereas sweet potato was primarily grown in dryer, leeward areas, or those areas not typically conducive to wetland taro farming. In addition to taro and sweet potato, other important cultigens included arrowroot (*Tacca leontopetaloides*), sugarcane (*Saccharum officinarum*), ti (*Cordyline terminalis*), banana (*Musa paradisiacal*), and coconut (*Cocos nucifera*).

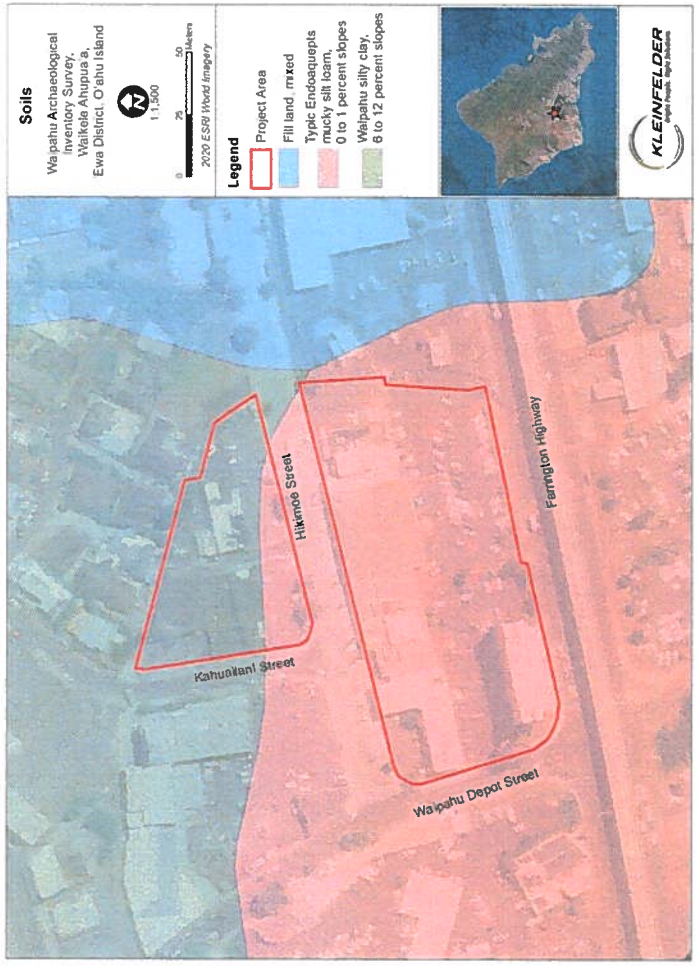

Figure 4. Soils within project area.

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The general project region provided ample natural resources for early Hawaiians, from the fertile 'Ewa floodplain surrounding Pearl Harbor to the abundance of nearby coastal resources to the upland reaches of resource exploitation mauka of the harbor. Handy and Handy (1991:469) describe this resource-rich setting and the types of cultivation that took place there:

> The ['Ewa] lowlands, bisected by ample streams, were ideal terrain for the cultivation of irrigated taro. The hinterland consisted of deep valleys running far back into the Ko'olau range. Between the valleys were ridges, with steep sides, but a very gradual increase of altitude. The lower parts of the valley sides were excellent for the culture of yams and bananas. Farther inland grew the 'awa for which the area was famous. The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the wao, or upland jungle than was the case on the windward coast. Yet the wao here was more extensive, giving greater opportunity to forage for wild food in famine times.

Handy (1940:82) further describes the types of cultivation that occurred in the lower floodplain within the Waikele Ahupua'a near the current study area:

> In the flatland, where the Kamehameha Highway crosses the lower valley of Waikele Stream, there are the remains of terraces on both sides of the road, now planted to bananas, beans, cane, and small gardens. For at least 2 miles upstream there were small terraces.

Early observations from English sailor Archibald Campbell provide further insight into traditional cultivation in the Pearl Harbor area. Campbell, who was shipwrecked at sea, spent time in the Hawaiian Islands to recuperate from the incident. During his stay, King Kamehameha I granted him 60 acres in Waimano Ahupua'a. In 1809 he described the extensive cultivation taking place on the fertile 'Ewa Plain:

> In the month of November the King was pleased to grant me about sixty acres of land, situated upon the Wymummee [Pearl River], or Pearl-water, an inlet of sea about twelve miles to the west of Hanaroora [Honolulu]. I immediately removed thither; and it being Macaheite time [Makahiki], during which canoes were tabooed, I was carried on men's shoulders. We passed by footpath winding through an extensive and fertile plain, the whole of which is in the highest state of cultivation. Every stream was carefully embanked, to supply water for taro beds. Where there was no water, the land was under crops of yams and sweet potatoes. The roads and numerous houses are shaded by cocoa-nut trees, and the sides of the mountains are covered with wood to a great height. We halted two or three times, and were treated by the natives with the utmost hospitality. My farm, called Wymannoo [Waimano], was upon the east side of the river, four or five miles from its mouth. Fifteen people with their families resided upon it, who cultivated the ground. [Campbell 1967:103–104]

'Ewa was also notable for its resource-rich coastal environment and the early exploitation history of these resources. According to Handy and Handy (1991:469) again:

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> The salient feature of 'Ewa, and perhaps its most notable difference, is its spacious coastal plain, surrounding the deep bays ("lochs") of Pearl Harbor, which are actually the drowned seaward valleys of the 'Ewa's main streams, Waikele and Waipo...These bays offered the most favorable locality in all of the Hawaiian Islands for the building of fishponds and fish traps into which deep-sea fish came on the inflow of tidal waters.

Exploitation of 'Ewa's marine resources centered on fishing, aquaculture, and the collection of limu (seaweed) and marine invertebrates. Hawaiian fishpond construction was a unique and advanced innovation that was developed to trap and raise fish such as mullet (*Mugil cephalis*) and milkfish (*Chanos chanos*). Fishpond construction was a labor-intensive investment, but the productive yield guaranteed a steady supply of fish. Fishponds were thus heavily utilized along the resource-rich coasts of ahupua'a surrounding Pearl Harbor. A 1913 map illustrates at least six fishponds in Waikele Ahupua'a, including Apoka'a, Pouhala, Ulumoku, and Miki fishponds and the government fisheries of Ulumoku-Auiloe and Pouhala (Figure 5). These ponds were stocked with various kinds of fish, but especially mullet, because these inland waters were the summer home of the mullet of Oahu. There were traps in which deep sea fish, especially akule, were caught. One trap was named Ka-pa-akule (the akule enclosure) (Handy and Handy 1991:470).

Ahupua'a bordering Pearl Harbor were also noted for the abundance of shellfish, the most important of which was the pipi (*Pinctada radiata*), also known as the Hawaiian pearl oyster, which was highly regarded as a valued food source and was eaten raw (Handy and Handy 1991:470). They were also used to furnish shanks for bonito hooks. Native historian Samuel Kamakau describes the pipi as:

> ...the oyster that came in from deep water to the mussel beds near shore, from the channel entrance of Pu'uloa to the rocks along the edges of the fishponds. They grew right on the nahawele mussels and thus was obtained. Not six months after the hau branches were set up, the pipi were found in abundance-enough for all 'Ewa-and fat with flesh. Within the oyster was a jewel (daimana) called a pearl (momi), beautiful as the eyeball of a fish, white and shining: white as the cuttlefish, and shining with the colors of the rainbow-reds and yellows and blues, and some pinkish white, ranging in size from small to large. They were of great bargaining value (he waiwai kumuku'ai nui) in ancient days, but were just "rubbish" ('opala) in 'Ewa. [Kamakau 1991:83]

Sereno Edwards Bishop (1901:87), a Hawai'i born Presbyterian minister also noted the abundance of the pipi during her childhood in the 1830s and its eventual decline by the turn of the century from environmental degradation:

> The lochs or lagoons of Pearl River were not then as shoal now. The subsequent occupation of the uplands by cattle denuded the country of herbage, and cause vast quantities of earth to be washed down by storms into the lagoons shoaling the water for a long distance seaward. No doubt the area of deepwater and anchorage has

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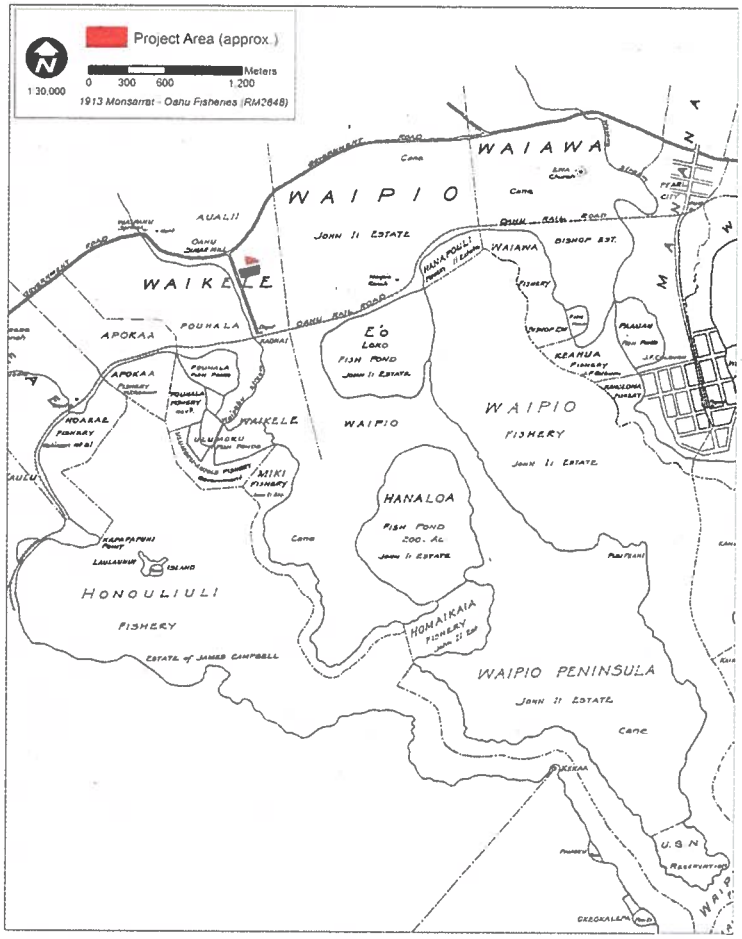

Figure 5. Portion of 1913 Oahu Fisheries map (RM2848; Monsarrat, surveyor).

> greatly diminished. In the thirties, the small oyster was quite abundant, and common on our table. Small pearls were frequently found in them. No doubt the copious inflow of fresh water favored their presence. I think they have become almost entirely extinct, drowned out by the mud.

In addition to the coastal lowlands and off-shore environment, the mauka or upland areas of the project region also provided a wide range of natural resources. Upland exploitation included the collection of wild plants for subsistence as well as medicinal and ceremonial purposes. These areas were also noted for the collection of bird feathers, especially from the 'ō'ō (Moho nobilis), 'i'iwi (Vestiaria coccinea), and 'apapane (Himatione sanguinea), which provided colorful feathers for chiefly ornaments. Ornately decorated goods with feathers, including 'ahu 'ula (feathered capes), mahiole (helmets), and akua hulu manu (feathered gods), were a direct measure of a chief's power and influence (Valeri 1985:246).

Handy and Handy (1991:470) further describe the rich resources that were gathered in the uplands of 'Ewa:

> In the interior was the same avifauna, including the birds whose feathers were prized for feather capes, helmets, and lei making. In fact this, with its spacious wao inland, was the region where these birds were most numerous. There were more extensive areas also where wauke and māmaki, which supplied bast for making tapa, grew in abundance. In fact, 'Ewa was famous for its māmaki. There was, too, much olonā grown in the interior, and wild bananas and yams flourished.

3.2.2 Historic Land Tenure

The 1848 Māhele eliminated the traditional Hawaiian land tenure system in favor of the western concept of fee-simple land ownership, which would have far reaching consequences on Hawai'i's cultural landscape. All land in the Kingdom of Hawai'i was placed into one of three categories: Crown Lands, Government Lands, and Konohiki Lands. During the Māhele, Hawaiian chiefs and konohiki were required to present land claims to the governmental Land Commission in the hopes of receiving a Land Commission Award (LCA) title for the land quit-claimed to them by Kamehameha III. Until an award was issued, the land title remained with the government. Award of an LCA gave complete title to the subject lands, although the government still had a right to commutation. A commutation could be settled by a cash payment or by a land exchange of equal value. If successful, a Royal Patent was then issued by the minister of the interior. A Royal Patent quitclaimed the government's interest in the land and served as proof that the government's right to commutation no longer existed.

The "Second Great Māhele" or Kuleana Act of 1850 bolstered private land ownership even further by permitting maka'āina, or commoners, to own land as well as, significantly, foreign-born individuals. The Act's restrictions, however, made it difficult to receive a land award, which discouraged Hawaiians who did not actively cultivate land. The Act of August 10, 1854 later dissolved the Land Commission but stated

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that "a Land Commission Award shall furnish as good and sufficient a ground upon which to maintain an action for trespass, ejectment, and other real action, against any person or persons, whatsoever, as if the claimant, his heirs or assigns, had received a Royal Patent for the same" (Chinen 1958:14). An LCA recipient was thus still protected if they had not obtained a Royal Patent (Chinen 1958:13–14).

Overall, the Māhele and subsequent land ownership regulations mark a key shift in Hawaiian land use history and usher in a drastic transformation from a redistributive economy to a market-based system. This facilitated the rapid decline of native land tenure and led to the buying up of land by wealthy foreign investors.

3.2.2.1 LCA Claims within the Project Area

During the Māhele, 199 LCA claims were made within the Waikele Ahupua'a, 73 of which were successfully awarded. LCA information indicates that land use was diverse in Waikele and included house lots, trails, agricultural fields, pasture lands, and fishponds. Four LCA claims are documented within the specific project area (Table 1). These indicate that it was primarily used for habitation and wetland agriculture. LCA claims reference two house lots and at least seven lo'i fields, one koele (a land unit farmed for the chief), one kula (pasture land), and one auwai (irrigation ditch).

Table 1. LCA Claims within Project Area

LCA NO.	CLAIMANT	'ILI	CLAIM AWARDED
0039	David Kauliokamoa	Kapakahi	No description.
1614-B:2	Hookaamomi	Ahualii, Mikiokai	Four lo'i, 1 house lot, and a wall or fence.
5989-1	Paulua	Kapakahi	Three lo'i, 1 house lot, 1 koele, 1 auwai, and a wall.
10831-M	Puniwai	Kanupoo	No description.

3.2.3 Plantation Era

Profound transformations in land and resource ownership occurring in Hawai'i in the 1800s ultimately benefited the nascent sugarcane industry and bolstered its position in the local economy. The establishment of western-style land ownership during the Māhele, and significantly, the right of foreign-born individuals to own land, paved the way for the sugar industry by attracting outside investors who could now own land and develop a variety of large-scale business opportunities in the islands, including within the 'Ewa District.

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Early sugarcane production on the dry 'Ewa Plain, however, was plagued by issues related to water and its transport to agricultural fields. The development of artesian wells and the construction of the Oahu Railway and Land Company's (OR&L) railroad in the late 1800s, solved many of these problems. B.F. Dillingham organized the OR&L in 1889 and established a narrow gauge (36-inch) railroad track that extended from Honolulu Harbor to Aiea. By 1890, the railway extended through Waikele to the sugarcane fields of James Campbell and the Ewa Plantation Company. In 1894, Dillingham composed a prospectus detailing the commercial expansion of sugarcane into the 'Ewa lands, which included Waikele. This prospectus led to the incorporation of the Oahu Sugar Company (OSC) in 1897.

The Oahu Sugar Company, situated on the slopes of the Waianae and Ko'olau mountains east of Honolulu, leased 10,000 acres of land from the Ii, Bishop, Robinson, and Campbell estates. The first sugar crop was harvested in 1899, which stimulated the need for a sugar mill. The sugar mill was constructed in the town of Waipahu and just up slope from the current study area (Figure 6). Water acquisition continued to plague the company, however, since the area was mostly arid and covered with lantana and guava. The lowlands, including Waipio Peninsula, were irrigated by water from the Pearl Harbor aquifer, but pumping water to the mauka fields (at 550 ft elevation) from this aquifer proved too costly and resulted in the search for an alternative water source. Jorgen Jorgensen, an engineer, was hired by the company in 1905 to explore the feasibility of procuring water from the windward side of the Ko'olau mountains. The designs for the resulting Waiahole Ditch were engineered and in 1913 construction of the irrigation network began. The Waiahole Water Co., Ltd., a subsidiary of the OSC, labored for the next four years to excavate a 2.76-mile-long tunnel through the Ko'olau mountains. The tunnel was finally completed in 1916. The Waiahole Ditch irrigation system delivered approximately 27 million gallons per day to the 'Ewa fields of the Oahu Sugar Company (Wilcox 1996).

The modern town of Waipahu, and the current study area, developed around the sugar plantation, and the OSC plantation lifestyle was central to the socio-cultural dynamic of the town. The Oahu Sugar Company provided housing to the laborers who worked the plantation, many of whom were from the Philippines, Japan, and China. The company also ran a plantation store where employees could buy produce and retail goods at lower costs. By the 1920s, the company was providing clubhouses, athletic fields, playgrounds, as well as a hospital that offered healthcare to the families who worked for the sugar company. Population estimates by 1925 range between 9,500 to 10,000 people.

After 97 years in business, the Oahu Sugar Company eventually succumbed to the increased operational costs of growing and processing sugarcane as well as competition from emerging foreign markets. The company shut down and liquated its assets in 1994.

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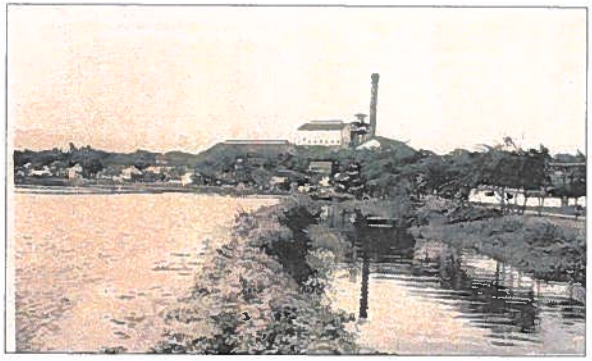

Figure 6. Oahu Sugar Company mill at Waipahu (from the Kamehameha Schools Archive).

3.2.3.1 Rice Cultivation

The growth and prosperity of the sugarcane industry led to increased demands for large agricultural labor forces. Immigrant workers from China, contracted to work on sugar plantations, started to arrive in Hawai'i in 1852. Chinese plantation workers began to convert former taro lands in the project region for the cultivation of rice (Figure 7). Following numerous successful rice harvests, the Royal Hawaiian Agricultural Society and the Hawaiian government began to promote rice cultivation as a potential commercial industry (Coulter and Chun 1937:9). With emerging export markets for rice developing in California, along with the domestic need for rice, Hawaiians were readily encouraged to convert their lo'i into rice pondfields. A missionary station report in 1862 noted:

> Foreigners too have begun the culture of rice in this district extensively and it was hoped their example would stimulate the natives to cultivate their own lands, but most of them choose to hire themselves to the foreigners at low wages and put their lands in the hands of foreigners for a few dollars rather than cultivate or improve it themselves. [Mission Station Report 1862:1, cited in Devaney et al. 1982:49]

Chinese laborers typically received relatively low wages and little room for advancement, so instead of extending their labor contract with sugar plantations, many began to acquire their own leases for suitable farm land to cultivate rice (Nordyke and Lee 1989:201). This small domestic market run by Chinese rice farmers eventually developed into a large-scale industry that exported rice to California. By 1892, 333 acres of rice were being cultivated in Waikele and Waipio (Coulter and Chun 1937:21). Josephine E. Tilden provides the following account of the rice fields in the ahupua'a of 'Aiea, which neighbors Waikele Ahupua'a:

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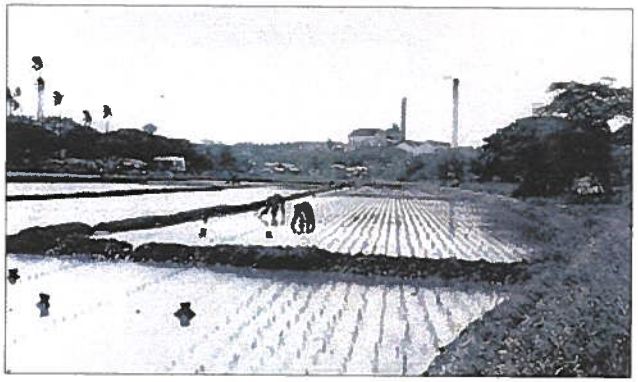

Figure 7. Tung Wo Wai plantation workers below the Oahu Sugar Company mill (photograph from the Bishop Museum archives).

> For a distance of eight miles the road shirts the shore and then turns landwards or mauka through the rice and sugar plantations. Ewa Mill, Waipahu, Pearl City...Like all rice fields in Hawaii, this one is worked entirely by chinamen, they alone being able to endure the conditions of location and climate necessary for the cultivation of this cereal. On one side of the railroad track was the broad, muddy inland lake or bay of saltwater, Pearl Harbor; on the other side were terraced plots or fields, flooded to a depth of several inches with water and separated by narrowed raised earthen ridges on which the careful Chinaman doubtless succeeded in walking, but which many times proved treacherous to our unsteady feet. A rice plantation, laid out as it generally is on the low flats at the foot of a valley, where mountain streams empty into the sea, is ideal collecting ground for certain algae. [Tilden 1904:134]

By the 1920s, however, rice production had steadily declined in Hawai'i. Several key factors contributed to this, including immigration restrictions that limited the number of Chinese laborers coming into Hawai'i, an expanding rice market in California which had been a major export market for Hawai'i, and the introduction and spread of the rice borer insect which devastated rice yields.

3.2.4 Military Land Use and Modern Development

U.S. military involvement in the Pearl Harbor area began with the Hawaiian government granting exclusive rights to the United States to enter Pearl Harbor and establish a coaling and maintenance station for U.S. ships in 1887. When the United States annexed Hawai'i in 1901, it began acquiring land to develop Pearl Harbor into a major naval base. By 1909, the entire Waipio Peninsula was appropriated by the government for military use.

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World War II military activities had a significant impact in the Waipahu area. An ammunition depot was constructed in the upland portion of Waipahu, and the OR&L railway was used to transport large quantities of ammunition through the area. Most notable, however, were the large land reclamation projects that took place on the Waipio Peninsula, directly south of the project area, for the construction of a naval reservation. The large fishponds of Loko 'Eo, Loko Hanaloa and the surrounding wetlands were all filled in during this time.

Following World War II, Waipahu and the direct project area gradually expanded into the commercial and residential hub that it is today. A series of maps produced by the U.S. Geological Survey and the Army Corps of Engineers from 1927 to 1978 illustrate this transition from a small, rural plantation town to the current urbanized environment. In 1927, for example, the current project area was largely undeveloped, and the town center was located around the sugar mill (Figure 8). Only minor changes are evident by 1943, including the construction of Farrington Highway (Figure 9). By 1954, the Loko, 'Eo, and Hanaloa fishponds on Waipio Peninsula are clearly filled in. Commercial and residential development appears along Waipahu Depot Road south of Farrington Highway, but the current project still appears undeveloped (Figure 10). By 1968, however, extensive urban growth is underway, and the project area is clearly developed (Figure 11). Two historic photographs from a similar vantage point on Waipahu Depot Road highlight the contrast between the rural plantation town and the modern urban center. The first photograph, circa 1910, shows an unpaved Waipahu Depot Road and wooden structures below the sugar mill in the background (Figure 12). By the 1960s, Waipahu Depot Road is paved with overhead electrical lines, and the wooden buildings that once lined the unpaved road have been replaced with concrete structures (Figure 13).

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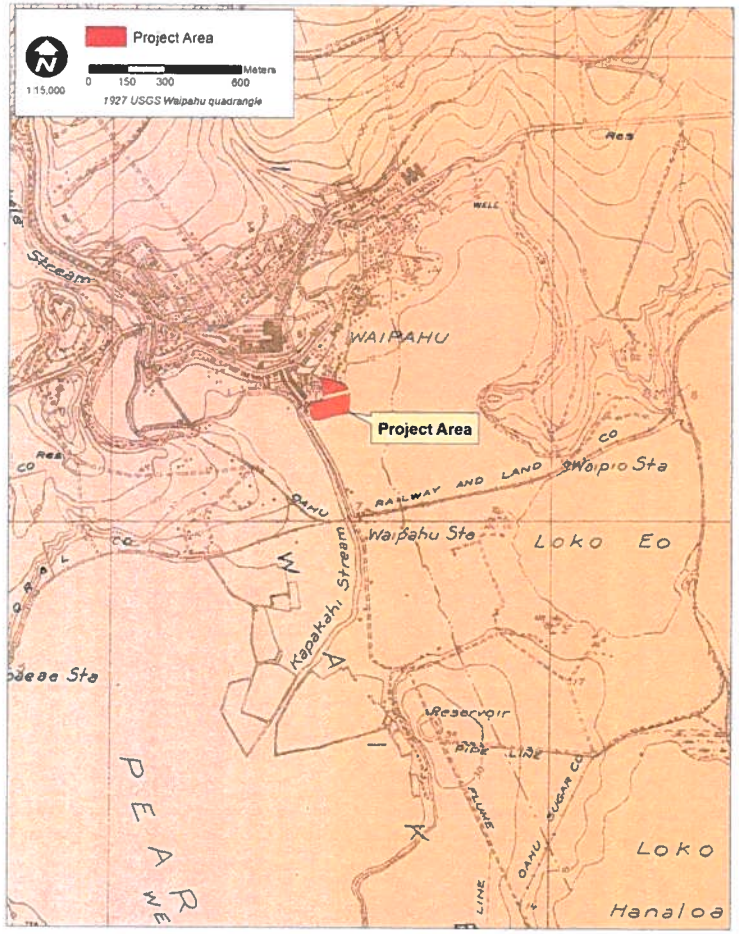

Figure 8. Portion of 1927 USGS Waipahu quadrangle map.

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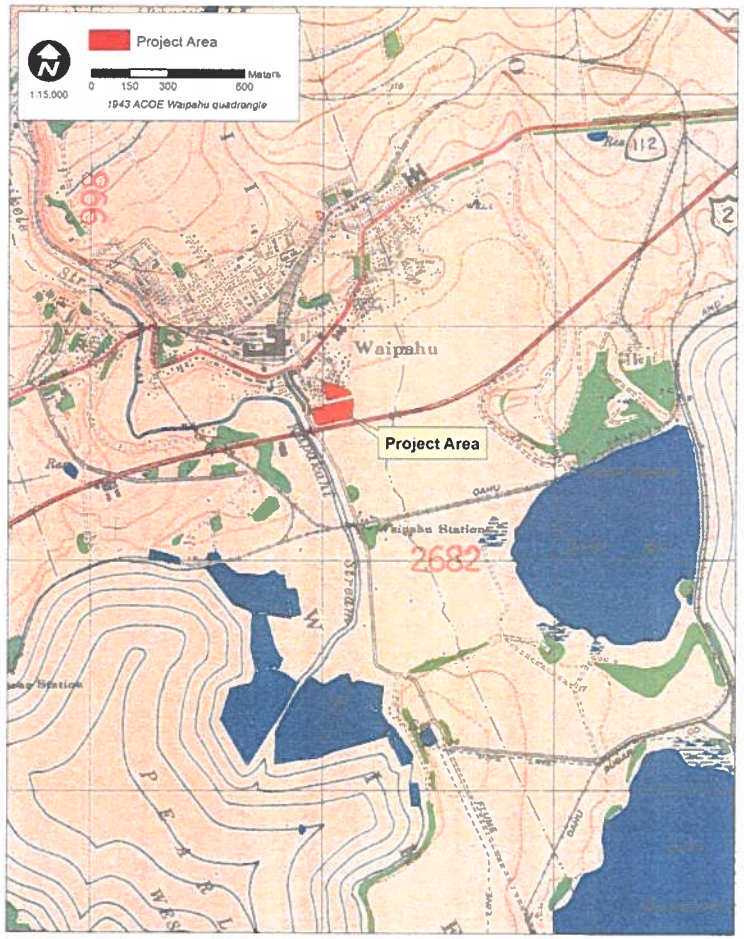

Figure 9. Portion of 1943 Army Corps of Engineers Waipahu quadrangle map.

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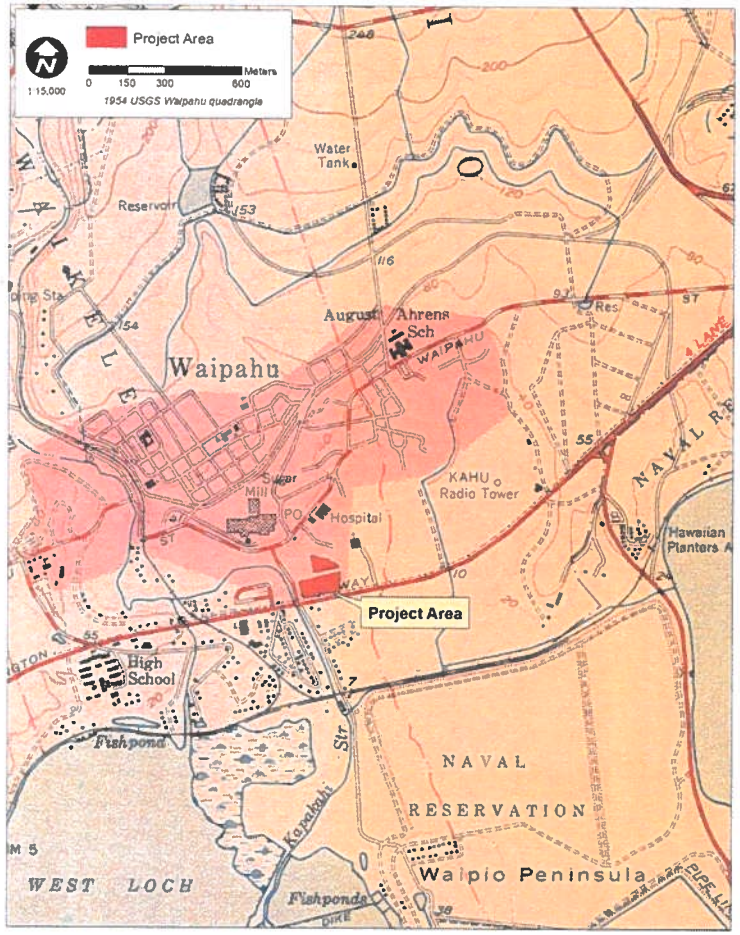

Figure 10. Portion of 1954 USGS Waipahu quadrangle map.

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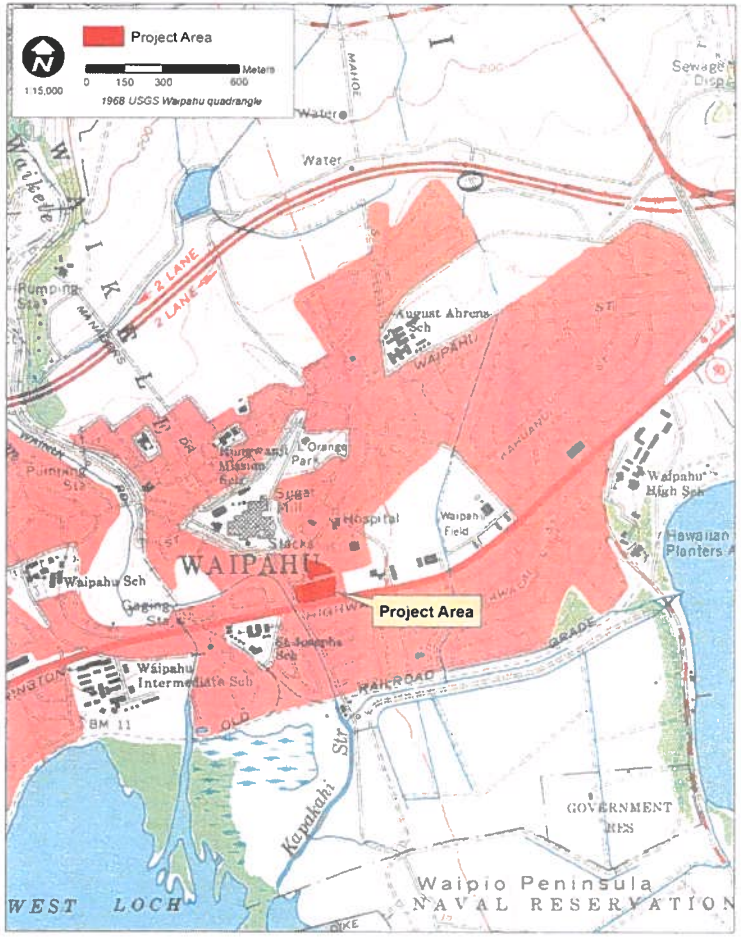

Figure 11. Portion of 1968 USGS Waipahu quadrangle map.

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Figure 12. Waipahu Depot Road, c. 1910.

Figure 13. Waipahu Depot Road, c. 1960s.

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3.3 ARCHAEOLOGICAL CONTEXT

The project area is a commercially constructed landscape in the urban center of Waipahu. Its initial development largely preceded the implementation of federal and state historic preservation laws and regulations. The intensity of archaeological investigation in the area is thus relatively low when compared to other, more recently developed areas on the island. Nonetheless, 12 studies have been conducted in the project area vicinity within the last few decades (Figure 14; Table 2). Many of these recent studies have been driven by the planning and development of the Honolulu Rail Transit Project, for which a transit station is situated directly east and southeast of the current study area (Hammatt 2010; Sroat et al. 2016). Results for previous archaeological investigations are discussed below. Six of the 12 investigations documented the absence of cultural and archaeological resources and are thus presented in Table 2 only.

3.3.1 Previous Archaeological Studies

Cleghorn (1999) conducted a reconnaissance survey for the proposed installation of a 20-inch irrigation line at the Waipio Peninsula Soccer Park about 600 meters south of the current project area (see Figure 14). The survey consisted of a 100-foot wide survey corridor extending from Kapahaki Stream to Waipahu Depot Road. The survey re-recorded a portion of the previously documented Oahu Railway and Land Company railroad right-of-way (SIHP 50-80-12-9714; Goodman and Cleghorn 1998). The portion of the railway within the survey area had been determined ineligible for listing in the National Register of Historic Places due to the absence of the original rail tracks.

Ostroff et al. (2001) recorded the inadvertent discovery of human remains during the construction of a new storm drain at the Filipino Community Center in Waikele about 200 meters north of the current study area (see Figure 14). The human remains were determined to be Native Hawaiian in a traditional burial context. The burial was designated SIHP 50-80-09-5882.

Whitman et al. (2007) conducted an archaeological literature review and field inspection of 9.2 acres for the proposed roadway upgrades along Waipahu Depot Road just south of the current project area (see Figure 14). Field inspection resulted in an additional re-recording of a portion of the previously documented Oahu Railway and Land Company railroad right-of-way (SIHP 50-80-12-9714; Goodman and Cleghorn 1998; Cleghorn 1999).

Tulchin et al. (2009) conducted an inventory survey for sewer installation for the proposed Koa Ridge Makai Development Project (see Figure 14). One historic property was recorded during the survey at the northern tip of the project area, north of the current study area. The historic property consisted of a Plantation Era water control box and an irrigation ditch (SIHP 50-80-09-6969) that extended further north beyond the extent of the survey area.

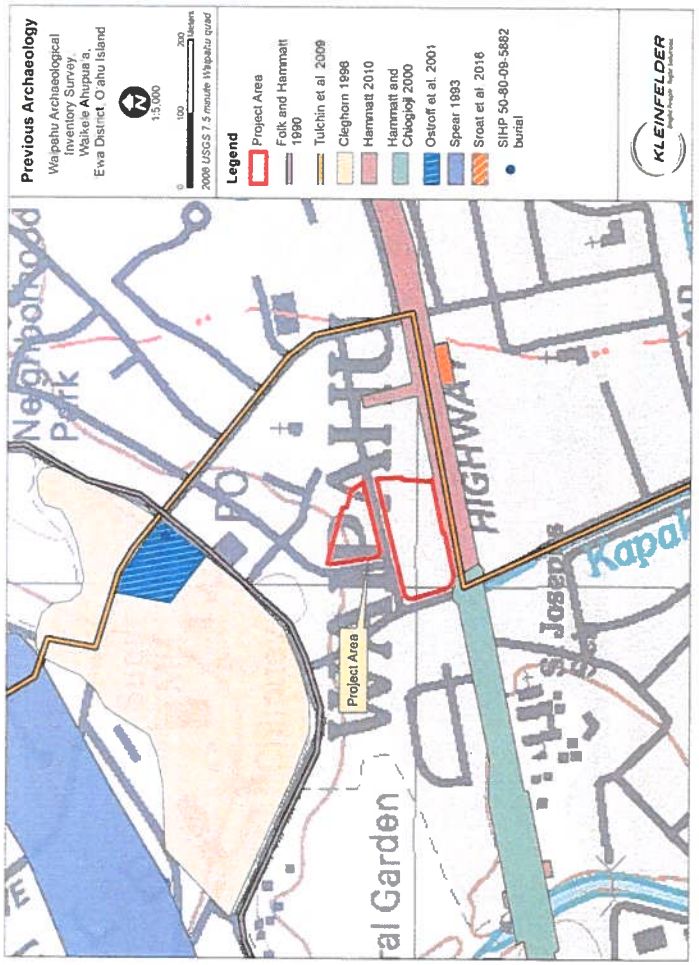

Figure 14. Previous archaeological investigations conducted in the project area vicinity.

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Table 2. Previous Archaeological Investigations Conducted in the Project Area Vicinity

REFERENCE	INVESTIGATION TYPE	RESULTS
Folk and Hammatt 1990	Reconnaissance survey and archival research	No findings.
Spear 1993	Reconnaissance survey	No findings.
Spear 1994	Reconnaissance survey	No findings.
Cleghorn 1996	Inventory survey	No findings.
Cleghorn 1999	Reconnaissance survey	Previously recorded portion historic railway, SIHP 50-80-12-9714.
Hammatt and Chiogioji 2000	Archaeological assessment	No findings.
Ostroff et al. 2001	Inadvertent discovery of human remains	Traditional Hawaiian burial (SIHP 50-80-09-5882).
Rasmussen and Tomonari-Tuggle 2006	Archaeological monitoring	No findings.
Whitman et al. 2007	Literature review and field inspection	Previously recorded portion of historic railway, SIHP 50-80-12-9714.
Tulchin et al. 2009	Inventory survey	Historic irrigation ditch and water control box, SIHP 50-80-09-6959.
Hammatt 2010	Inventory survey	Subsurface cultural deposit (lo'i sediments), SIHP 50-80-09-7751.
Sroat et al. 2016	Data recovery	Subsurface cultural deposit (lo'i sediments), SIHP 50-80-09-7751.

3.3.2 Previous Recordation of Site 50-80-09-7751

The closest previously recorded site to the current project area is Site 50-80-09-7751. This site was encountered during archaeological investigations conducted prior to the construction of a transit station for the Honolulu Rail Transit Project by Hammatt (2010) and Sroat et al. (2016) directly southeast of the current study area.

Hammatt (2010) conducted an inventory survey at seven proposed transit stations for the Honolulu Rapid Transit Project, one of which is situated directly southeast of the current study area (Figure 14). Fifty-

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seven test trenches and 35 test pits were placed across the project area, which exposed buried agricultural sediments indicative of taro cultivation (SIHP 50-80-09-7751). Archival research and LCA information corroborated the historical presence of lo'i in the area. Two bulk sediment samples consisting of dispersed charcoal and charcoal flecks were submitted to Beta Analytic Inc. for radiocarbon dating. One sample (Beta-267036) produced a date range of AD 990–1170 (calibrated 2-sigma, 95% probability). The second sample (Beta-267037) yielded a date range of AD 1010–1190 (calibrated 2-sigma, 95% probability), indicating human activity in the general region.

Following the survey and recordation of SIHP 50-80-09-7751, Sroat et al. (2016) conducted data recovery excavations of the cultural deposit recorded by Hammatt (2010). Two, 1- by 10-meter test excavations were placed over the deposit. Sampling consisted of 10 bulk sediment samples, three column samples, and two core samples. Post-field processing included archaeobotanical, radiometric, and palynological analysis of the samples. Archaeobotanical analysis of seven charcoal samples identified native and Polynesian-introduced species. Native species included hau (*Hibiscus tiliaceus*), 'āheahea (*Chenopodium aohuense*), 'ōhi'a lehua (*Metrosideros polymorpha*), 'akoko (*Chamaesyce* sp.), 'ahakea (*Bobea sandwicensis*), 'aiea (*Nothocestrum latifolium*), 'a'ali'i (*Dodonaea viscosa*), alahe'e (*Canthium odoratum*), 'ūlei (*Osteomeles anthyllidifolia*), and lama (*Diospyros sandwicensis*). Polynesian-introduced species consisted of kukui (cf. *Aleurites moluccana*) and ko'oko'olau (*Bidens* sp.). Three charcoal samples were submitted to Beta Analytic Inc., for radiocarbon dating using the accelerator mass spectrometry (AMS) method. The first sample consisted of charcoal from a kukui nut shell that produced date ranges of AD 1498–1504 (0.8% probability), AD 1513–1601 (54.3% probability), AD 1616–1666 (38.2% probability), and AD 1784–1795 (2.1% probability). The second sample consisted of charcoal from 'āheahea and yielded two possible date ranges of AD 1679–1765 (32.6% probability) and AD 1800–1940 (62.8% probability). The final sample consisted of charcoal from the native shrub 'a'ali'i which yielded a single date range of AD 1412–1468 (95.4% probability). Ten bulk sediment samples were submitted for palynological and micro charcoal analysis. Of these 10 samples, five contained sufficient identifiable pollen which yielded 13 different pollen types including niu (*Cocos nucifera*), pine (Pinus), Sedge (Cyperaceae), Sunflower (Asteraceae), Spurge (Euphorbiaceae), Pea (Fabaceae), Hibiscus (Malvaceae), and grasses (Poaceae).

3.3.3 Summary of Previous Archaeological Investigations

Previous archaeological investigations document a lack of surficial historic properties in the immediate vicinity of the study area, as is clearly reflected in the current standing of the built landscape which comprises commercial centers, paved roads, and related infrastructure. Portions of an Oahu Railway and Land Company railroad right-of-way and minimal traces of sugar plantation infrastructure (except for structural remnants of the nearby OSC mill) appear to be the only surface elements encountered in the vicinity (Cleghorn 1999; Whitman et al. 2007; and Tulchin et al. 2009).

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Although commercial development and associated landscape modification has likely disturbed subsurface cultural deposition, intact subsurface cultural deposits interpreted to be buried lo'i sediments (SIHP 50-80-09-7751) are documented in the immediate project vicinity (Hammatt 2010; Sroat et al. 2016). Historical records support the assumption that portions of the project area were utilized for taro cultivation at the time of the Māhele and later for rice cultivation by Chinese sugar plantation workers. This lasted up to the U.S. Military's acquisition of the area during World War II and subsequent land reclamation efforts.

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4 FIELD RESULTS

The project area is comprised of a built, urban environment with paved roads, commercial buildings, and related infrastructure so no surficial historic properties were encountered. Archaeological fieldwork included the excavation of 25, 5-meter-long test trenches spaced evenly across the project area per the proposed testing strategy approved by SHPD with some reorientation of trenches to account for underground utilities and other obstacles (Figure 15). All trenches exposed extensive imported fill, typically descending over one meter below the modern asphalt parking surface. The water table fluctuated with the time of day and per each trench location but was typically encountered at 1.7 meters below the surface.

Fifteen out of the 25 trenches exposed a wet black (10YR 2/1) clay below the modern fill events (see Figure 15). This is interpreted as a subsurface cultural layer utilized for wetland agriculture and associated with Site 50-80-09-7751, previously documented by Hammatt (2010) and Sroat et al. (2016). Within the current study area, however, this deposit appears to be heavily impacted by 20th century activities indicated by inclusions of historic bottle glass, metal nails, charcoal, and in one instance, small pieces of thin plastic sheeting (see Section 6.0).

Two trenches were terminated early: Trenches 12 and 16 (see Figure 15). Trench 16 was terminated early due to the presence of a possible electrical conduit. Trench 12 was terminated at about 0.90 meters below the surface due to a large concrete slab that extended throughout the length of the trench, indicating perhaps a buried tank capped by concrete. Possibly related, a strong petroleum smell and oil slick was detected near the base (ca. 1.55 meters below the surface) of nearby Trench 15.

Stratigraphic profiles, technical descriptions, and photographs for all 25 trenches are presented in Appendix A. Section 4.1 below presents an overview of stratigraphy observed in the project area as well as a depositional context for Site 50-80-09-7751.

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Figure 15. Test trench placement and results of fieldwork.

4.1 PROJECT AREA STRATIGRAPHY

The project area's overall stratigraphic sequence consists of three primary strata (Table 3), which showed little variation throughout the project area. Stratum I consists of multiple layers of imported fill sediments mechanically deposited over natural wetland alluvium (Stratum II) (Figure 16 and Figure 17). Naturally occurring saprolite (Stratum III) was encountered only once, in Trench 1 (Figure 18), located upslope in the northern, mauka portion of the study area.

The upper portions of Stratum I consist of mechanically introduced sediments associated with urban development of Waipahu in the late-1960s and 1970s. These include the current asphalt parking lot extant throughout the project area and its associated basalt gravel base course, which varies in thickness and quality. In the makai portion of the project area, particularly in front of Times Supermarket, these layers are underlain by limestone gravel (see Figure 16), the pre-construction grade deposited prior to building construction. Underlying this fill material across the study area are layers of terrigenous silty clay, likely deposited during initial land reclamation events in the 1940s and 1950s (see Figure 16 and Figure 17). These layers were deposited no earlier than the beginning of World War II when the military started to expand Pearl Harbor and reclaim land in the surrounding floodplain.

Stratum II underlies Stratum I and consists of deep, naturally deposited alluvial sediments situated close to or at the water table (see Figure 17). The upper boundary of the deposit ranges in depth from 120 to 150 centimeters below surface. The sediments are comprised of black (10YR 2/1) silty clay to clay with abundant dispersed charcoal flecks and organic material. Historic material such as broken glass, ceramic sherds, miscellaneous metals and nails, and plastic sheeting was also observed within the layer. Stratum II represents the original wetland environment and historical land surface that was present in the area prior to large-scale land modification in the 20th century. Historical documentation for the project area indicates that this deposit supported lo'i fields that were later repurposed for rice cultivation. Historical material observed during fieldwork supports the assumption that it was used at least historically.

Stratum III underlies Stratum II and consists of naturally occurring saprolite (see Figure 18). This culturally sterile silty clay/weathered basalt is a brown (10YR 4/3) sediment with yellowish brown (10YR 5/8) striations. It is dry and compact with fine to course granular structure and no roots. This is the native sediment and was only encountered once within the project area in Trench 1.

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Table 3. Overview of Project Area Stratigraphy

STRATUM	DEPTH RANGE (CMBS)	DESCRIPTION	INTERPRETATION
I	0–185	Mechanically introduced sediments.	Modern surfacing and fill material associated with ca. 1960s urban growth and ca. 1950s land reclamations.
II	65–220	Naturally deposited alluvium.	Agricultural sediments associated with Site 50-80-09-7751.
III	100–120	Naturally occurring saprolite	Culturally sterile sediments.

Figure 16. Example of project area stratigraphy (Stratums I and II), Trench 21 south wall.

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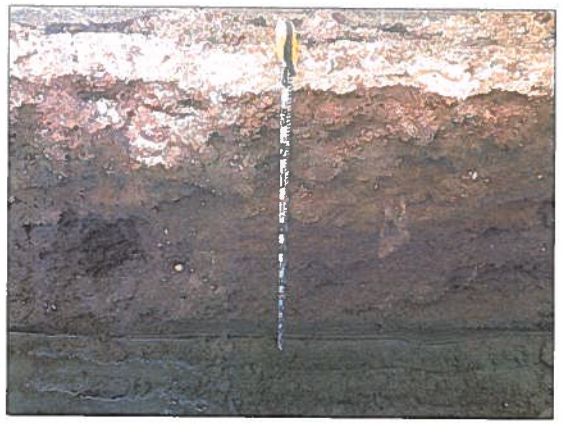

Figure 17. Stratum II (Site 7751) underlying imported fill sediments, Trench 24 west wall.

Figure 18. Naturally occurring saprolite (Stratum III) underlying imported fill sediments, Trench 1 north wall.

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5 LABORATORY RESULTS

Laboratory work included processing and analyzing 10 2-liter bulk sediment samples, of which, three subsamples were submitted for palynological analysis, and one charcoal sample was submitted for archaeobotanical analysis.

5.1 BULK SEDIMENT ANALYSIS

Ten bulk sediment samples were collected from buried wetland agricultural sediments or Stratum II, designated as Site 50-80-09-7751. The bulk sediment samples were collected from above the waterline and between 145 to 190 centimeters below surface.

Preliminary analysis of the samples focused on recording the presence or absence of ferruginous mottling and rhizoconcretion development, previously noted within Site 50-80-09-7751 by Hammatt (2010) and Sroat et al. (2016). Hammatt (2010) and Sroat et al. (2016) encountered extensive evidence of ferruginous mottling and rhizoconcretions and noted its association with Hawaii pondfield soils (Allen et al. 1987; Kirch 1977; Schilt 1980). These phenomena, however, appear to be widely absent within the current study area (Figure 19). A few faint occurrences of ferruginous mottling were observed in bulk sediment samples collected from Trenches 24 and 25 (Figure 20), while minimal rhizoconcretions were observed in bulk sediment samples collected from Trenches 10 and 24 (Figure 21).

Although these phenomena were extensively noted in previous investigations, it is important to recognize that the presence of ferruginous mottling and rhizoconcretions is simply indicative of vegetation growth within a wetland environment. In permanently waterlogged environmental conditions (e.g., wetlands), ferruginous rhizoconcretions or hollow root casts develop that consist primarily of Fe-oxyhydroxides (Bridge and Demicco 2008:72). These hollow root casts are the result of concretions that form due to the oxidation of iron compounds present within the sediment. The plant's absorption of water facilitates the release of oxygen and results in oxidation (Stieglitz and Van Horn 1982:14). When the root dies or decays, its interior may be filled with illuviated clay or crystalline cement such as calcite, forming a hollow root cast. Anthropogenic cultigens such as taro and rice are not mutually exclusive to this process. Additional evidence, such as historical records and LCA documentation, is therefore necessary to support the determination of specific land use.

Following preliminary analysis, bulk sediment samples were subjected to flotation and wet screening. This yielded light fractions containing varying amounts of charcoal (present in all samples but present in increased volumes in Trenches 9 and 10), a high concentration of grasses from Trenches 9 and 24, and a non-charred intact kukui nut from Trench 16 (Table 4). Kukui nut shells are commonly found in Hawaii pondfield soils, as they were sometimes used in mulch (Handy and Handy 1972:229). This inclusion may

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also have originated from a kukui forest that was once present in the vicinity (Handy and Handy 1972:229). Heavy fraction yielded small fragments of marine shell (Trenches 2 and 9) and broken bottle glass (Trenches 2, 9, and 25) (Table 4). One small volcanic glass flake was observed in the sample from Trench 2 and is likely a manuport item to the area. While the flake possesses ripple lines on the ventral surface, the flake lacks a striking platform and a definitive bulb from percussion reduction.

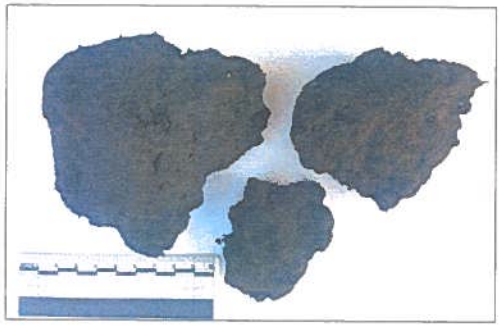

Figure 19. Representative bulk sediment sample (from Trench 21). Note absence of ferruginous mottling.

Figure 20. Faint ferruginous mottling observed in bulk sediment sample from Trench 24.

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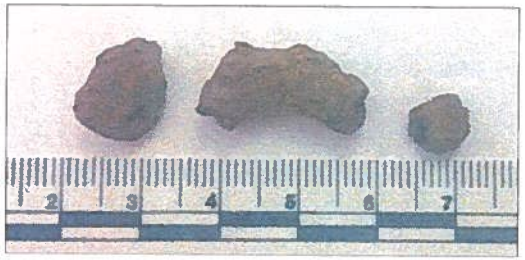

Figure 21. Root casts collected from Trench 24 bulk sediment sample.

Table 4. Material Collected from Bulk Sediment Analysis

BULK SAMPLE NO.	SUBSAMPLE NO.	PROVENIENCE (TRENCH NO.)	SAMPLE TYPE	MATERIAL**	COUNT	WEIGHT (G)
1	1A	2	Light fraction	Charcoal	-	0.1
	1B		Heavy fraction	Glass	3	0.8
	1C		Heavy fraction	Unidentified marine shell	41	2.7
	1D		Heavy fraction	Volcanic glass	1	0.1
2	2A	4	Light fraction	Charcoal	-	0.2
3	3A	9	Light fraction	Charcoal	-	0.7
	3B		Heavy fraction	Glass	2	1.0
	3C		Heavy fraction	Unidentified marine shell	3	0.2
4	4A	10	Light fraction	Charcoal	-	0.1
	4B		Heavy fraction	Charcoal	-	0.3
	4C		Heavy fraction	Ferruginous root structures	-	2.7
5	5A	13	Light fraction	Charcoal	-	0.2
6	6A	16	Light fraction	Non-charred Kukui nut	1	5.7
	6B		Light fraction	Charcoal	-	0.1
	6C		Heavy fraction	Charcoal	-	< 0.1

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Table 4. (cont.)

BULK SAMPLE NO.	SUBSAMPLE NO.	PROVENIENCE (TRENCH NO.)	SAMPLE TYPE	MATERIAL**	COUNT	WEIGHT (G)
7	7A	20	Light fraction	Charcoal	-	0.1
	7B		Heavy fraction	Charcoal	-	0.2
8	8A	21	Light fraction	Charcoal*	-	0.1
	8B		Heavy fraction	Charcoal	-	0.3
9	9A	24	Light fraction	Charcoal	-	0.2
	9B		Light fraction	Grasses	-	0.6
	9C		Heavy fraction	Charcoal	-	0.1
	9D		Heavy fraction	Ferruginous root structures	-	1.7
10	10A	25	Light fraction	Charcoal	-	0.2
	10B		Heavy fraction	Charcoal	-	0.5
	10C		Heavy fraction	Glass	1	2.5

* Charcoal sample identified as 'āweoweo (*Chenopodium oahuense*).
** See Table 5 for specific pollen grain name.

5.2 PALYNOLOGICAL ANALYSIS

Three, 30-gram bulk sediment subsamples collected from Stratum II were submitted to BGP Consulting, LLC for palynological analysis (Appendix B). The three samples were collected from three different trenches (Trenches 2, 10, and 21) to represent the maximum areal extent of the project area. The objective of palynological analysis was to attempt the characterization of vegetation and the presence of cultivars in the study area at the time of deposition.

Samples from Trenches 2 and 21 contained enough pollen for 200-grain counts, while the Trench 10 sample contained only enough pollen for a 100-grain count. Fourteen pollen and spore types were identified (Table 5), with grass pollen dominant and low-spine Asteraceae, Cheno-Ams, Cyperaceae, and monolete pores subdominant. These diverse results represent both wetland and drier shrub-grassland environments. However, pollen grains in two (Trenches 2 and 10) out of the three samples were found to be severely degraded (which is not uncommon) and thus may not accurately reflect the original environmental landscape. The sample from Trench 21, on the other hand, had an extremely high pollen concentration coupled with a much lower percentage of degraded pollen grains; thus resulting in a likely more accurate reflection of the original environment in which the sample was deposited.

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Table 5. Palynological Analysis Results

					Percent															
							Trees		Herbs and Shrubs										Spores	
Sample	Trench	Depth (m)	Concentration (grains per gram)	Types per sample	Degraded	Unknown	*Cocos nucifera*	*Myrsine*	Asteraceae, low spine	Cheno-Am	Cyperaceae	Euphorbiaceae	Fabaceae	Liliaceae	*Nama*	Poaceae	Poaceae, large	Rubiaceae	Trilete spore	Monolete spore
1	10	1.4	4,633	10	27.0	2.0	2.0	-	5.0	22.0	2.0	-	2.0	1.0	3.0	28.0	3.0	-	-	3.0
2	21	1.6	208,500	10	17.5	-	-	-	4.5	7.5	16.0	4.0	0.5	1.5	-	36.0	4.0	-	1.5	7.0
3	2	1.9	41,700	13	27.5	1.5	1.0	0.5	2.5	4.0	6.5	1.0	0.5	-	0.5	31.5	3.5	1.0	4.5	14.0

The sample from Trench 21 yielded a relatively high percentage of sedge pollen indicating the presence of a wetland or a pondfield containing aquatic vegetation and surrounded by grasses. Large grass pollen grains were also present, indicating the presence and possible cultivation of rice or sugarcane. However, the percentage of large grass pollen grains was relatively low compared to the results of previous investigations of Site 50-80-09-7751 (Sroat et al. 2016). According to the current results analysis (Appendix B), this low relative percentage may indicate that rice cultivation did not occur in the current study area. It may also simply indicate that this sample represents a point in time when rice cultivation did not occur or had already ceased. It is certainly plausible that this sample location, situated along Waipahu Depot Road, which for a time was the center of the Oahu Sugar Plantation village, was not being farmed during the time represented by the sample. Traditional agriculture and later rice farming may have been abandoned in this area as houses and businesses associated with the plantation village expanded to accommodate the influx of immigrant laborers.

Palynological results from the Trench 21 sample corroborate historical documentation that the area was a wetland or pondfield at the time of deposition. Agricultural use of the wetland, however, is not clearly indicated by the palynological sample results. This may be due to the sampling strategy where aerial coverage was prioritized by collecting single samples across the project area rather than multiple samples from various depths within a single exposure, which can also produce limited data potential. The time of deposition represented by the single sample may thus indicate the cessation of rice cultivation at the sample location.

5.3 ARCHAEOBOTANICAL ANALYSIS

One charcoal sample from Trench 21 was submitted to the International Archaeological Research Institute, Inc. (IARII) Wood Identification Laboratory for taxonomic identification (Appendix C). The objective of the analysis was to consider other temporal indicators for Stratum II, the subsurface agricultural layer, by assessing the presence of recently or historically introduced plant taxa.

Due to the small fragmentary nature of the charcoal sample selected (and all samples collected from Layer II during fieldwork), only one reliable wood identification could be made: wood from the native shrub, ʻāweoweo (*Chenopodium oahuense*). ʻĀweoweo is an endemic species of partially woody lightly scented shrubs to small trees that typically grow 0.6 to 2.4 meters in height. They range from occasional-to-common in dry habitats, including coastal, dry forest, and subalpine (Wagner et al. 1999:538). The shrub is known to be very hardy and well adapted to low rainfall and drought conditions. The soft wood of the ʻaweoweo was not likely heavily utilized by the ancient Hawaiians; however, the leaves and young shoots were apparently cooked and eaten, especially during times of drought when more preferable food sources

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were scarce (Krauss 1993:16; Malo 1951:23). ʻĀweoweo was also mixed with other ingredients and used medicinally to treat ʻea (thrush) and pāʻaoʻao (general ailments) (Hawaiian Ethnobotany Online Database).

No recently introduced plant taxa were identified in the deposit to help assess historical use of the wetland; though, it should be noted again that the diminutive quality of the samples largely precluded a more thorough consideration of temporal archaeobotanical indicators.

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6 SITE 50-80-09-7751 DESCRIPTION AND DISCUSSION

Subsurface testing resulted in the identification of one previously recorded historic property, Site 50-80-09-7751, a subsurface cultural layer associated with pre-Contact to Historic Period wetland taro and rice cultivation. Site 50-80-09-7751 was previously recorded by Hammatt (2010) and Sroat et al. (2016) during archaeological investigations for the Waipahu Transit Station approximately 200 meters southeast of the current study area. Previous recordation described the site as a distinct stratigraphic layer consisting of black (10YR 2/1) clay with noticeable and well-dispersed charcoal flecks and reddish-orange mottles. The stratigraphic layer was interpreted as the preserved remnant of a former loʻi. This interpretation was based largely on historical accounts and LCA documentation, which show abundant loʻi in the area from as early as the mid-1800s. Hammatt (2010) and Sroat et al. (2016) propose that taro cultivation was likely occurring even earlier than historical documents indicate and that Site 50-80-09-7751 is thus also associated with pre-Contact wetland cultivation.

Hammatt (2010) radiocarbon dated bulk sediment samples collected from Site 50-80-09-7751, which yielded relatively early pre-Contact date ranges of AD 990–1170 (95%) and 1010–1190 AD (95%). These early dates are questionable, however, as they date the accumulation of organic material in the sediment which may or may not be related to pre-Contact agricultural activity. Sroat et al. (2016) radiocarbon dated short-lived plant taxa collected from dispersed charcoal within the Site 50-80-09-7751 sediment. These included ʻaʻaliʻi, which yielded a date range of AD 1412–1468 (95.4% probability), ʻāheahea, which yielded a date range of AD 1679–1765 (32.6% probability) and 1800–1940 (62.8% probability), and a kukui nut shell, which yielded four date ranges consisting of AD 1498–1504 (0.8% probability), AD 1513–1601 (54.3% probability), AD 1616–1666 (38.2% probability), and AD 1784–1795 (2.1% probability). These date ranges indicate that human activity was occurring in the general region over a span of 500 years, but do not necessarily date direct agricultural use of the wetland.

Sroat et al.'s (2016) archaeobotanical analysis of seven charcoal samples identified native and Polynesian-introduced species within Site 50-80-09-7751 sediment. Native species included hau (*Hibiscus tiliaceus*), ʻāheahea (*Chenopodium oahuense*), ʻōhiʻa lehua (*Metrosideros polymorpha*), ʻakoko (*Chamaesyce* sp.), ʻahakea (*Bobea sandwicensis*), ʻaiea (*Nothocestrum latifolium*), ʻaʻaliʻi (*Dodonaea viscosa*), alaheʻe (*Canthium odoratum*), ʻūlei (*Osteomeles anthyllidifolia*), and iama (*Diospyros sandwicensis*). Polynesian-introduced species consisted of kukui (cf. *Aleurites moluccana*) and koʻokoʻolau (*Bidens* sp.). Ten bulk sediment samples were also submitted for palynological and micro charcoal analysis. Of these ten samples, five contained sufficient identifiable pollen which yielded 13 different pollen types including niu (*Cocos nucifera*), pine (Pinus), Sedge (Cyperaceae), Sunflower (Asteraceae), Spurge (Euphorbiaceae), Pea (Fabaceae), Hibiscus (Malvaceae), and grasses (Poaceae).

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Site 50-80-09-7751 was encountered in 15 of 25 test trenches excavated during the current study. It was recorded near the base of excavations under thick layers of imported fill material associated with ca. 1960s urban growth and ca. 1950s land reclamations. Site 50-80-09-7751 presented as a distinct stratigraphic layer (Stratum II) consisting of deep, naturally deposited wetland alluvial sediments situated close to or at the water table. The sediments are comprised of black (10YR 2/1) silty clay to clay with abundant dispersed charcoal flecks and organic material. Historic material, including broken glass, ceramic sherds, miscellaneous metal and nails, and plastic sheeting was also observed within the sediment matrix of four test trenches. Construction debris and other modern material was found in fill material above Site 7751 in nine trenches.

Stratum II represents the original wetland environment and historical land surface that was present in the area prior to large-scale land modification in the 20th century. The presence of the agricultural layer within the current study area agrees with LCA (1614-B:2 and 5989-1) documentation and later historical records, which indicate that the project area was utilized for lo'i and later the widespread cultivation of rice since at least the mid-1800s.

While historical documentation substantiates agricultural use of the wetland for lo'i and later rice cultivation at Site 50-80-09-7751, the current study aimed to further characterize the vegetation and presence of cultivars through palynological analysis. The palynological analysis identified an abundance of sedge pollen indicating the presence of a wetland environment or possibly a pondfield harboring aquatic vegetation. The relatively low percentage of large grass pollen grains suggest that agriculture did not occur at the sample location at the time of deposition. These results may reflect the cessation of wetland agriculture within the study area, or at least at the sample loci.

Historical material observed during fieldwork corroborates Historic Period use or disturbance of the wetland deposit from at least the early-1900s. This material consisted of miscellaneous refuse, including sherds of glass and ceramic, metal fragments, nails, concrete, and plastic. Additionally, three nearly intact glass bottles associated with early-1900s activity in the area were located in Trench 11. They include a small square-shaped, clear-colored extract bottle manufactured by J.A. Folger & Company, a clear-colored Oahu Soda Works company bottle, and an aqua-colored Primo Beer bottle manufactured by the Honolulu Brewing Company. Each of the glass bottles possess diagnostic characteristics associated with automatic bottling. This type of machine manufacturing indicates that a production date could not be prior to the early-1900s. Diagnostic features include vertical side mold seams which extended to the highest point of the bottle finish as well as a suction scar on the base (e.g., Oahu Soda Works and Primo bottles), indicative of bottles produced by an Owens Automatic Bottling Machine. The Primo Beer bottle features the firmest manufacturing date range: the Honolulu Brewing and Malting Company Ltd. was established in 1900 with a brewery located on Queen Street between Punchbowl and South Streets (Schmitt 1997:146). The

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company produced Primo Beer in tall, aqua-colored bottles from 1901 up until Prohibition in 1918. After the repeal of Prohibition in 1933, Primo Beer was produced in short, brown bottles (still in use today) by the newly established Hawaii Brewing Corporation.

The current study considers additional temporal indicators to reinforce the age assessment for agricultural activity at Site 50-80-09-7751 per McElroy's (2012:144–151) approach for wetland agricultural systems. Archaeobotanical analysis was conducted to identify the presence of charcoal from recently introduced plant taxa, but due to the small fragmentary nature of the charcoal samples collected, only one species was identified, the native 'āweoweo (Chenopodium oahuense), an endemic species of partially woody lightly scented shrubs. No recently introduced species were identified.

The current boundary of the site is defined by the parcel limits of its observation (Figure 22). Its occurrence during the present AIS was recorded in 15 of 25 test trenches with relatively even exposure throughout the project area, with one exception, the northern-mauka extent of the study area where an increase in land elevation did not support the low-lying wetland. The total site area within the current project parcel includes all makai TMKs (1) 9-4-014:005, 014, and 058 and mauka TMKs (1) 9-4-014:059–067 and (1) 9-4-013:046, up to the northern parking lots. The total area encompassed by this boundary is 3.9 acres. It extends 150 meters east-west and 135 meters north-south. The site boundary is clearly inconclusive. Future archaeological investigations would be warranted in the same vicinity in order to gain a more definitive understanding of the site's (50-80-09-7751) areal extent.

6.1 SIGNIFICANCE ASSESSMENT

According to HAR §13-284-6, to be considered 'significant' "a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association, and shall meet one or more of the following criteria:

1. Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
2. Criterion "b". Be associated with the lives of persons significant in our past;
3. Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or that possess high artistic value;
4. Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; or
5. Criterion "e". Have important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts—these associations being important to the group's history and cultural identity."

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Figure 22. Proposed expansion of SIHP 50-80-09-7751 boundary.

This study agrees with Hammatt's (2010) previous significance assessment in that Site 50-80-9-7751 is a significant historic property under Criterion "d" (Table 6). It has produced and may continue producing significant information regarding pre-Contact up to Historic Period agricultural use of Waipahu. The potential of future data collection from the site is particularly relevant because questions remain, especially regarding its areal extent, and the nature of its use over time.

However, the site has been heavily impacted by 20th century development. The upper boundary of the stratigraphic layer has been truncated by 20th century land reclamation and construction events while historical sugarcane and rice farming have contributed to additional mixing of cultural deposits within an already turbated wetland environment. This mixing is evidenced by a disturbed matrix of various historical to modern debris as well as a combination of pollen from cultigens that span the pre-Contact to historic periods. These activities have damaged the site's integrity of setting, materials, and association while retaining its integrity of location. Further investigation may help determine whether the site retains integrity of design and workmanship (e.g., by assessing intact portions of constructed wall elements, and other cultural materials, if found to be present).

Table 6. Significance Assessment Results

SITE NUMBER	SITE TYPE	SITE FUNCTION	HISTORIC CONTEXT	SIGNIFICANCE CRITERIA	RECOMMENDED MITIGATION
50-80-09-7751	Subsurface cultural layer	Agriculture	Historic Period taro and rice cultivation	d	Archaeological Monitoring

REF-401

7 CONCLUSIONS AND RECOMMENDATIONS

At the request of the landowner, Kamehameha Schools, Kleinfelder, Inc. (formerly Garcia and Associates) conducted an archaeological inventory survey for the Waipahu Redevelopment Project in Waikele Ahupua'a, 'Ewa District, Island of O'ahu, Hawai'i, TMKs (1) 9-4-013:046 and (1) 9-4-014:005, 014, and 058–067. Excavation of 25 test trenches resulted in the recordation of one previously recorded historic property, designated Site 50-80-09-7751, a subsurface agricultural layer associated with pre-Contact to Historic Period wetland cultivation of taro and rice. Site 50-80-09-7751 was previously recorded by Hammatt (2010) and Sroat et al. (2016) during archaeological investigations for the Waipahu Transit Station approximately 200 meters southeast of the current study area.

Site 50-80-09-7751 was encountered in 15 of the 25 test trenches excavated during the current study. It was encountered beneath thick layers of imported fill material associated with ca. 1960s urban growth of Waipahu and ca. 1950s land reclamations by the U.S. military. Site 50-80-09-7751 presented as a distinct stratigraphic layer (Stratum II) consisting of deep, naturally deposited wetland alluvial sediments situated close to or at the water table and containing dispersed charcoal flecks and historical debris.

Site 50-80-09-7751 has produced and may continue to produce important information regarding pre-Contact to Historic Period agricultural use of Waipahu. It is therefore considered a significant historic property under Hawaii Administrative Rules 13-284-6 Criterion (d).

7.1 EFFECT DETERMINATION AND RECOMMENDED MITIGATION MEASURES

Proposed redevelopment at TMKs (1) 9-4-013:046 and (1) 9-4-014:005, 014, and 058–067 will include the potential demolition of existing structures (except for the Sonido Building) and construction of a mixed-use commercial complex consisting of commercial, residential, and retail spaces. This would necessitate a large amount of associated ground intrusive work such as utilities installation and modification. All parts of the study area have the potential to receive some degree of ground disturbance that may affect Site 50-80-09-7751, the upper boundary of which ranges in depth from 120 to 150 centimeters below surface. Given that the site is anticipated to encompass nearly the entire study area, and proposed redevelopment has the potential to disturb all parts of the study area at significant depths, the effect determination is "effect, with agreed upon mitigation measures."

Recommended mitigation for Site 50-80-09-7751 is archaeological monitoring during all ground disturbing activities below 1 meter (3 feet) in depth to ensure an adequate and reasonable opportunity to collect data regarding pre-Contact up to Historic Period agricultural activity in Waipahu. Future research should consider the research challenges of churned pondfield sediments. It is recommended that bulk sediment samples not be used for dating pondfield soils; such efforts should instead target constructed wall

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elements, primary feature contexts, and archaeobotanical analysis to identify recently or historically introduced plant taxa as a relative dating tool. Palynological analysis should also consider the research limitations of mixed pondfield sediments; this level of analysis is not recommended for future investigation within the project area.

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APPENDIX A:
TRENCH PROFILES, PHOTOS, AND DESCRIPTIONS

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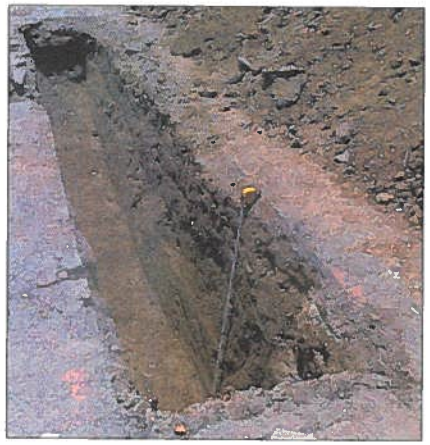

Figure 1. Trench 1, overview.

Figure 2 Trench 1, view to north.

REF-405

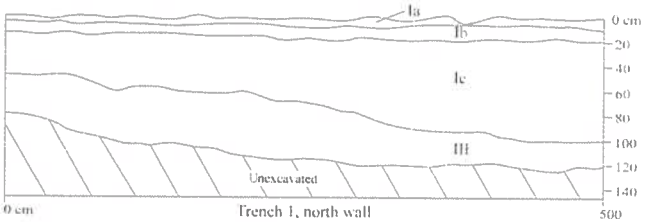

Figure 3. Trench 1 profile.

Table 1. Trench 1 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–8	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	8–15	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	15–100	10YR 3/2 (very dark grayish brown); terrigenous silty clay; dry; compact; fine granular structure; no roots; contains construction debris; smooth, abrupt lower boundary.	Fill material.
III	100–120	10YR 4/3 (brown) with 10YR 5/8 (yellowish brown) striations; silty clay/weathered basalt (saprolite); dry; compact; fine to course granular structure; 50% course material; no roots.	Native saprolite.

Figure 4. Trench 2, overview.

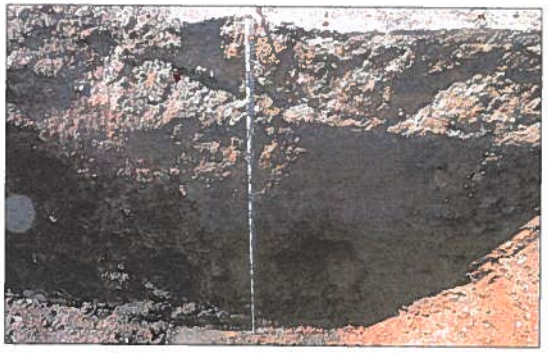

Figure 5. Trench 2, view to north.

REF-406

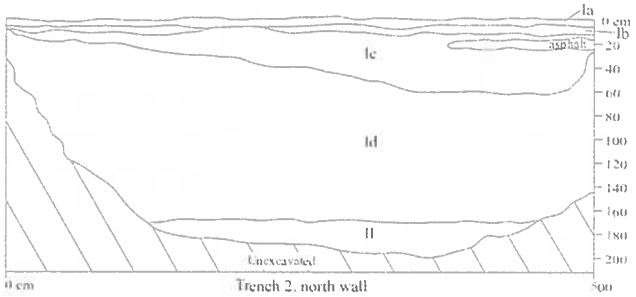

Figure 6. Trench 2 profile.

Table 2. Trench 2 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–8	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	8–15	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	15–60	7.5YR 3/2 (dark brown); terrigenous silty clay; dry; compact; fine granular structure; no roots; contains construction debris; smooth, abrupt lower boundary.	Fill material.
Id	60–170	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; fine granular structure; moist; few roots; smooth, abrupt lower boundary.	Fill material.
II	170–200	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks, organic material, glass, and decomposing lumber.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 7. Trench 3, overview.

Figure 8. Trench 3, view to south.

REF-407

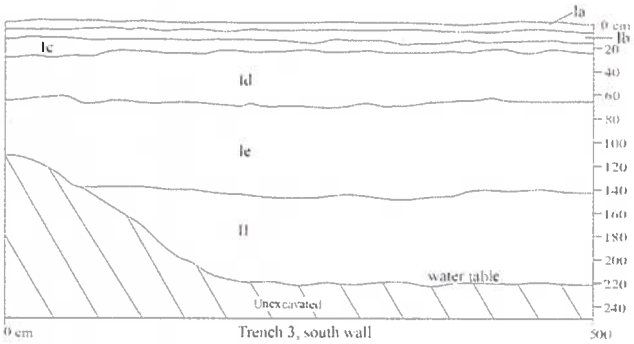

Figure 9. Trench 3 profile.

Table 3. Trench 3 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–8	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	0–14	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	14–30	7.5YR 3/3 (brown); terrigenous silty clay loam; fine granular structure; moist; few roots; 5% pebbles/course material; smooth, abrupt lower boundary.	Fill material.
Id	30–68	2.5YR 2.5/3 (dark reddish brown); terrigenous silty clay; fine granular structure; moist; few roots; smooth, abrupt lower boundary.	Fill material.
Ie	68–143	2.5YR 3/3 (brown) terrigenous silty clay; fine granular structure; moist; 5% basalt pebbles and cobbles; no roots; wavy, abrupt lower boundary.	Fill material.
II	143–220	10YR 2/1 (black); silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 10. Trench 4, overview.

Figure 11. Trench 4, view to south.

REF-408

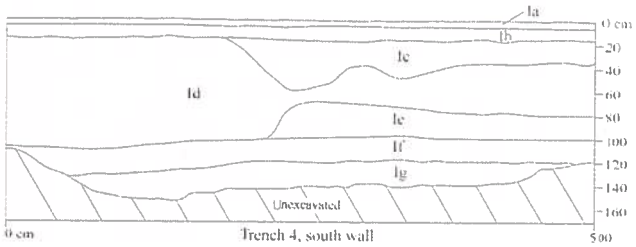

Figure 12. Trench 4 profile.

Table 4. Trench 4 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–7	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	7–16	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; abrupt lower boundary.	Base course associated with asphalt surface.
Ic	16–58	7.5YR 2.5/3 (very dark brown); terrigenous silty clay; moist; fine granular structure; no roots; small basalt boulders; contains construction debris/metal; smooth, abrupt lower boundary.	Fill material.
Id	40–80	2.5YR 2.5/3 (dark reddish brown); terrigenous silty clay; moist; fine granular structure; no roots; small basalt boulders; smooth, abrupt lower boundary.	Fill material.
Ie	16–150	7.5YR 3/3 (dark brown); terrigenous silty clay loam; fine granular structure; moist; few roots; smooth, abrupt lower boundary.	Fill material.
If	80–120	10YR 2/1 (black); silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material; smooth, abrupt lower boundary.	Pushed or redeposit of agricultural sediments associated with Site 50-80-09-7751.
Ig	120–140	2.5YR 2.5/2 (very dusky red); terrigenous silty clay with 25% basalt pebbles to cobbles; wet; fine granular structure; plastic; no roots.	Fill material.

Figure 13. Trench 5, overview.

Figure 14. Trench 5, view to east.

REF-409

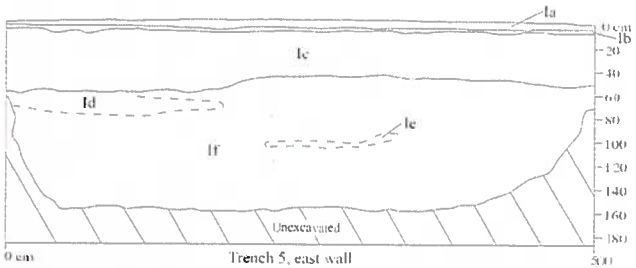

Figure 15. Trench 5 profile.

Table 5. Trench 5 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–12	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	12–60	7.5YR 3/2 (dark brown); terrigenous silty clay; dry; compact; fine granular structure; no roots; contains 20% limestone cobbles and basalt pebbles; observed broken glass; wavy, abrupt lower boundary.	Fill material.
Id	60–80	5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; fine granular structure; contains degraded sheet metal; smooth, abrupt lower boundary.	Fill material.
Ie	100–105	10YR 2/1 (black); silty clay; 80% medium to course basalt pebbles; moist; fine granular structure; no charcoal observed; smooth, abrupt lower boundary.	Fill material.
If	60–160	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots.	Fill material.

Figure 16. Trench 6, overview.

Figure 17. Trench 6, view to south.

REF-410

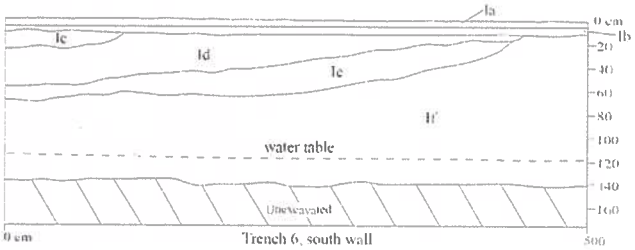

Figure 18. Trench 6 profile.

Table 6. Trench 6 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–12	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	12–26	10YR 7/4 (very pale brown) to 10YR 3/6 (dark yellowish brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	12–60	7.5YR 2.5/3 (very dark brown); terrigenous silty clay; moist; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	14–70	7.5YR 4/6 (strong brown); terrigenous silty clay; moist; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
If	12–140	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots.	Fill material.

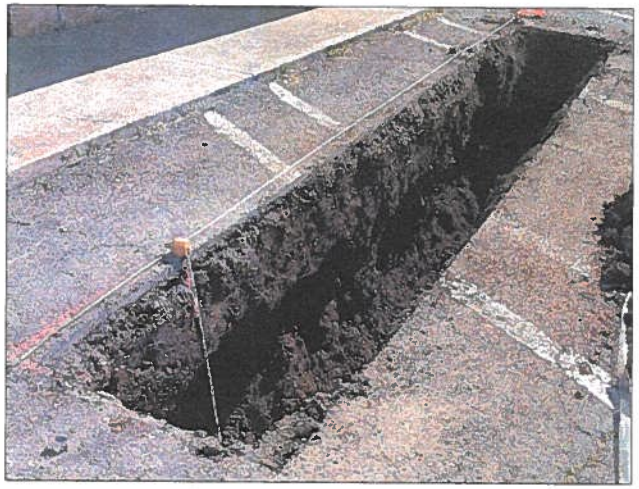

Figure 19. Trench 7, overview.

Figure 20. Trench 7, view to south.

REF-411

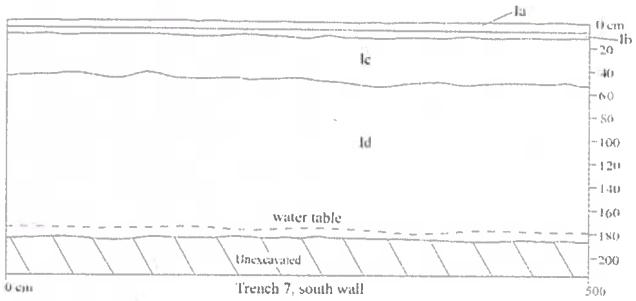

Figure 21. Trench 7 profile.

Table 7. Trench 7 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–4	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	4–12	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	12–50	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth abrupt lower boundary.	Fill material.
Id	50–183	2.5YR 3/2 (dusky red); terrigenous silty clay; dry to moist; compact; upper 50 cm 30% course gravel and small cobbles; no roots.	Fill material.

Figure 22. Trench 8, overview.

Figure 23. Trench 8, view to west.

REF-412

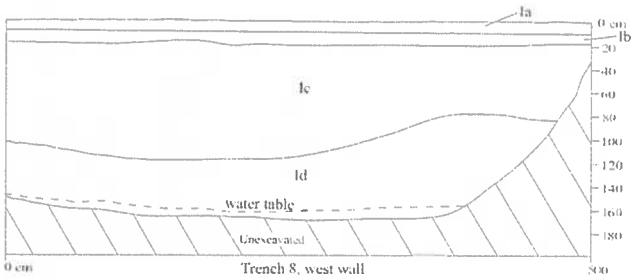

Figure 24. Trench 8 profile.

Table 8. Trench 8 Description

Layer	Depth (cmbs)	Technical	Interpretation
Ia	0–4	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	4–12	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	12–125	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Id	82–160	2.5YR 3/2 (dusky red); terrigenous silty clay; dry to moist; compact; no roots.	Fill material.

Figure 25. Trench 9, overview.

Figure 26. Trench 9, view to north.

REF-413

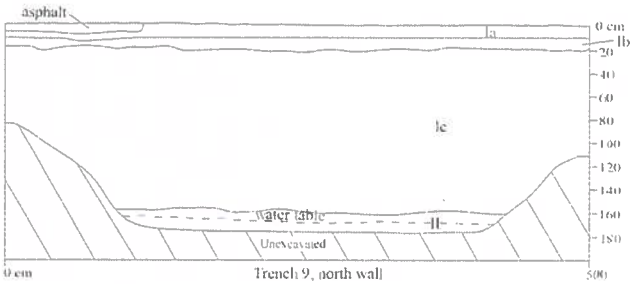

Figure 27. Trench 9 profile.

Table 9. Trench 9 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–7	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	7–20	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ic	20–170	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 40% pebbles to small basalt cobbles; no roots; smooth, abrupt lower boundary.	Fill material.
II	170–180	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks, organic material, and broken glass.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 28. Trench 10, overview.

Figure 29. Trench 10, view to east.

REF-414

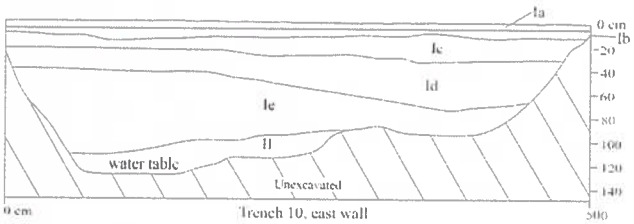

Figure 30. Trench 10 profile.

Table 10. Trench 10 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–25	5YR 3/2 (dark reddish brown); terrigenous silty clay with basalt gravel; dry; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Id	25–40	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	40–90	2.5YR 3/2 (dusky red); terrigenous silty clay loam; moist; compact; no roots; fine granular structure; 30% basalt pebbles; contains metal nails and broken glass; smooth, abrupt lower boundary.	Fill material.
II	90–140	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

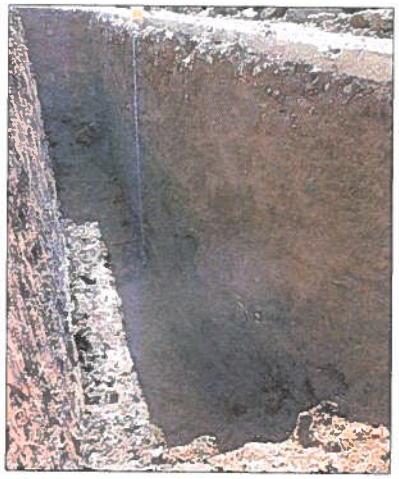

Figure 31. Trench 11, overview.

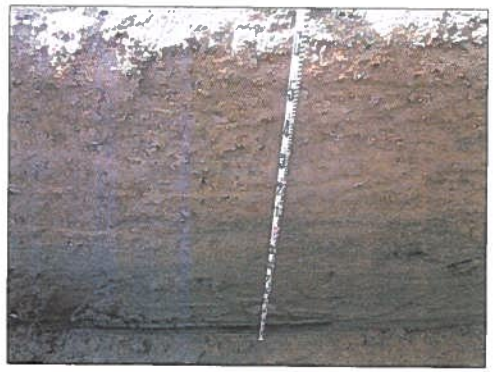

Figure 32. Trench 11, view to south.

REF-415

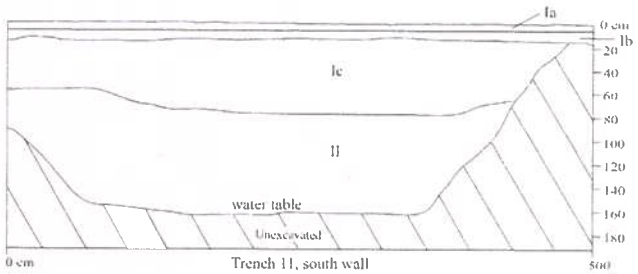

Figure 33. Trench 11 profile.

Table 11. Trench 11 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–5	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	5–12	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	12–80	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; wavy, clear lower boundary.	Fill material.
II	80–165	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks, organic material, broken glass, ceramic, metal pipe, and decomposing wood. Three intact ABM bottles were also observed including a clear-colored bottle manufactured by J.A. Folger & Company, a clear-colored Oahu Soda Works company bottle, and an aqua-colored Primo Beer bottle manufactured by the Honolulu Brewing Company.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 34. Trench 12, overview.

Figure 35. Trench 12, view to south.

REF-416

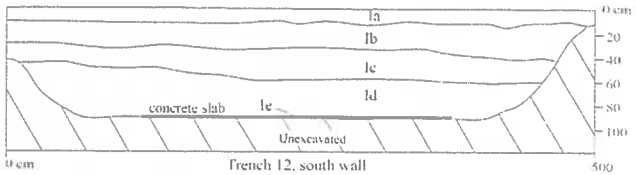

Figure 36. Trench 12 profile.

Table 12. Trench 12 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–10	10YR 4/1 (dark gray); asphalt; two separate layers paved over each other.	Modern surfacing.
Ib	10–30	10YR 3/1 (very dark gray); silty gravel; moist; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ic	30–60	10YR 3/1 (very dark gray); gravel; 80% course material; no roots; smooth, abrupt lower boundary.	Fill material.
Id	60–90	5YR 3/2 (dark reddish brown); terrigenous silty clay with basalt gravel; moist; fine granular structure; no roots; 50% basalt gravel; contains construction debris; smooth, abrupt lower boundary.	Fill material.
Ie	90+	7.5YR 7/1 (light gray); concrete.	Utility cap.

Figure 37. Trench 13, overview.

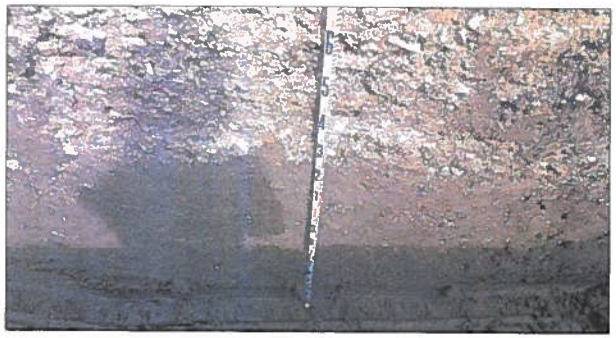

Figure 38. Trench 13, view to northwest.

REF-417

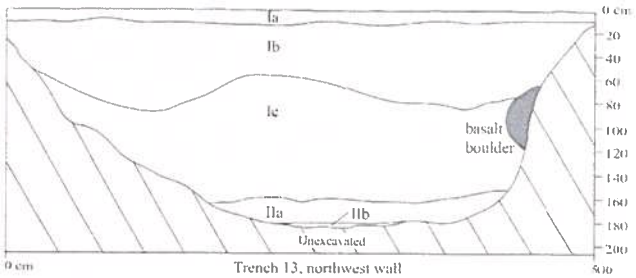

Figure 39. Trench 13 profile.

Table 13. Trench 13 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–10	10YR 4/1 (dark gray); asphalt; two separate layers paved over each other.	Modern surfacing.
Ib	10–80	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	80–165	5YR 3/1 (very dark gray); silty clay; moist; no roots; 10% basalt gravel; contains construction debris; smooth, clear lower boundary.	Fill material.
IIa	165–185	10YR 2/2 (very dark brown) silty clay to clay; very moist; fine to very fine granular structure; plastic; no roots; smooth, clear lower boundary.	Natural wetland sediments.
IIb	186	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 40. Trench 14, overview.

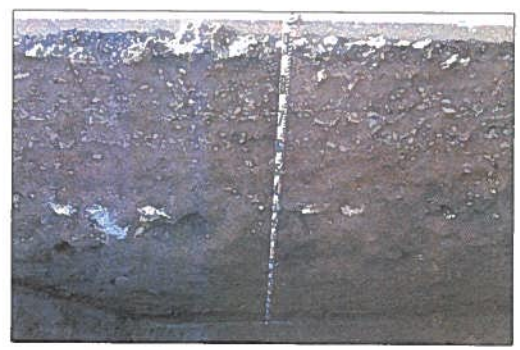

Figure 41. Trench 14, view to south.

REF-418

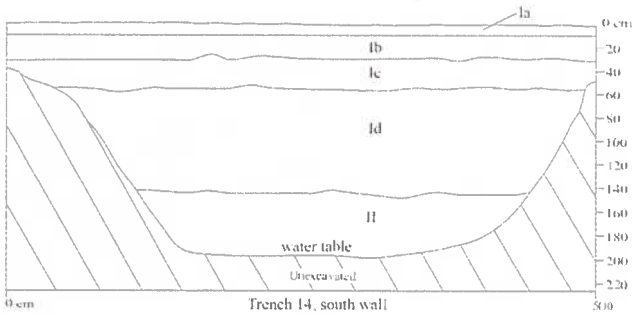

Figure 42. Trench 14 profile.

Table 14. Trench 14 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–10	10YR 4/1 (dark gray); asphalt; two separate layers paved over each other.	Modern surfacing.
Ib	10–30	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	30–55	5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Id	55–148	10YR 3/1 (very dark gray); silty clay; moist; very fine granular structure; 30% basalt gravel; contains construction debris; smooth, clear lower boundary.	Fill material.
II	148–190	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 43. Trench 15, overview.

Figure 44. Trench 15, view to east.

REF-419

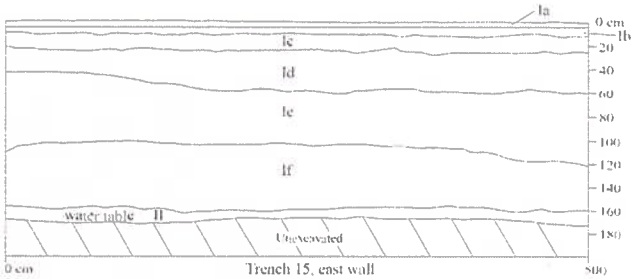

Figure 45. Trench 15 profile.

Table 15. Trench 15 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–25	7.5YR 3/1 (very dark gray); course gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Fill material.
Id	25–60	7.5YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; over 50% basalt gravel; no roots; smooth, clear lower boundary.	Fill material.
Ie	60–105	10YR 3/1 (very dark gray); silty clay; moist; very fine granular structure; no roots; over 50% basalt gravel; no roots; smooth, clear lower boundary.	Fill material.
If	105–155	10YR 3/1 (very dark gray); silty clay; moist; very fine granular structure; contains construction debris; smooth, abrupt lower boundary.	Fill material.
II	155–170	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flocks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 46. Trench 16, overview.

Figure 47. Trench 16, view to east.

REF-420

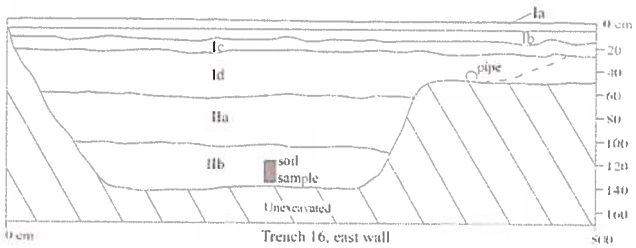

Figure 48. Trench 16 profile.

Table 16. Trench 16 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–7	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	7–15	2.5YR 3/3 (dark reddish brown); silty gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Fill material.
Ic	15–25	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Fill material.
Id	25–65	7.5YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 5% basalt cobbles; no roots; smooth, clear lower boundary.	Fill material.
IIa	65–115	10YR 3/1 (very dark gray); silty clay; moist; very fine granular structure; plastic; contains disperse charcoal flecks, organic material, broken glass, and wood; gradual, diffuse lower boundary.	Agricultural sediments associated with Site 50-80-09-7751.
IIb	115–145	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks, organic material, and isolated noncharred *kukui* shell.	Agricultural sediments associated with Site 50-80-09-7751.

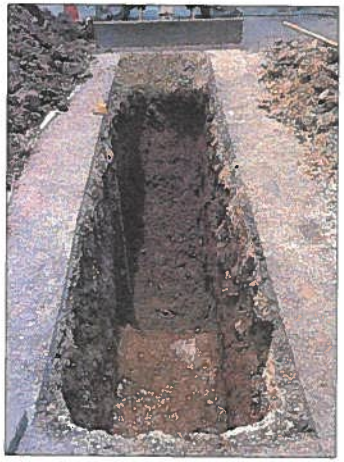

Figure 49. Trench 17, overview.

Figure 50. Trench 17, view to north.

REF-421

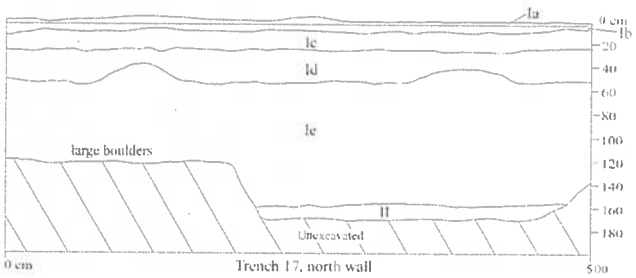

Figure 51. Trench 17 profile.

Table 17. Trench 17 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–4	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	4–8	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	8–28	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	28–63	7.5YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 30% basalt cobbles; no roots; wavy, clear lower boundary.	Fill material.
Ie	63–150	2.5YR 3/3 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
II	150–160	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

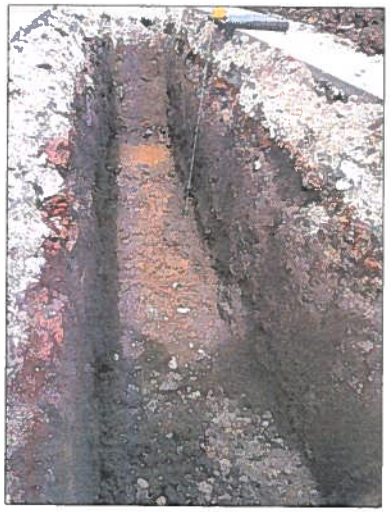

Figure 52. Trench 18, overview.

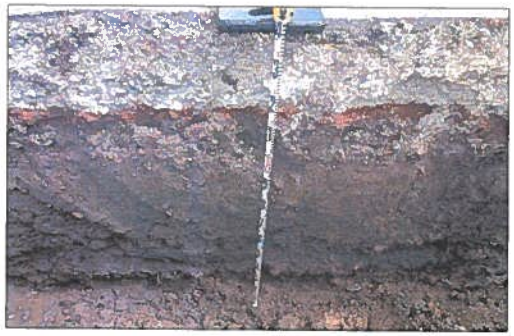

Figure 53. Trench 18, view to south.

REF-422

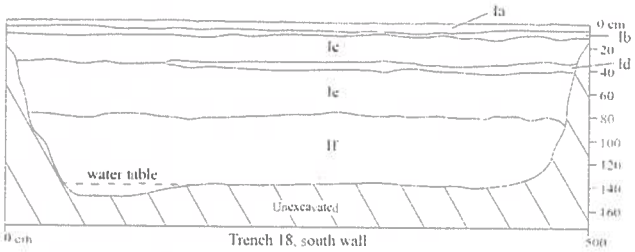

Figure 54. Trench 18 profile.

Table 18. Trench 18 Description

Layer	Depth Range (cmbs)	Technical Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–35	5YR 7/1 (light gray); coralline pebbly sand mixed with terrigenous sediment; dry; fines to medium granular structure, loose; unconsolidated; smooth, abrupt lower boundary.	Fill material.
Id	35–40	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	40–80	10YR 2/2 (very dark brown); clay loam; moist; fine granular structure; no roots; 15% limestone and basalt pebbles; smooth, abrupt lower boundary.	Fill material.
If	80–140	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 30% limestone and basalt pebbles; no roots; smooth, abrupt lower boundary.	Fill material.

Figure 55. Trench 19, overview.

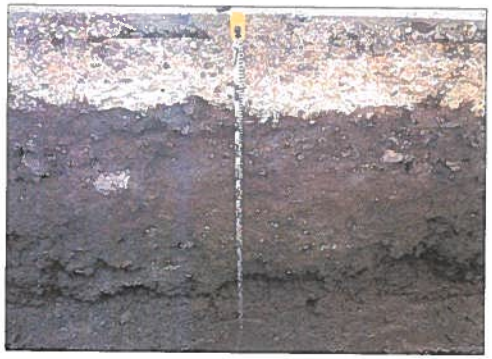

Figure 56. Trench 19, view to north.

REF-423

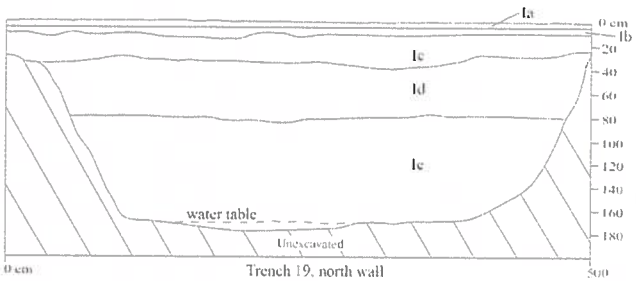

Figure 57. Trench 19 profile.

Table 19. Trench 19 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–30	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	30–80	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; over 50% gravel; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	88–170	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 30% basalt gravel; no roots.	Fill material.

Figure 58. Trench 20, overview.

Figure 59. Trench 20, view to north.

REF-424

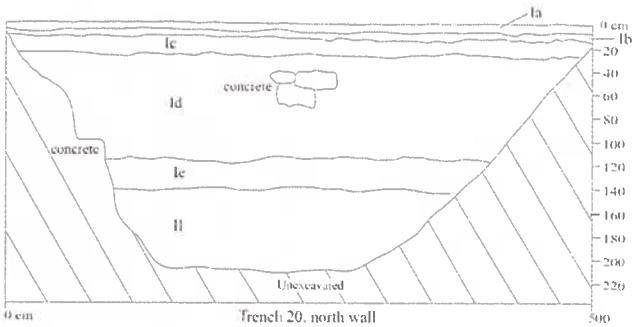

Figure 60. Trench 20 profile.

Table 20. Trench 20 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–25	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	25–115	2.5YR 2.5/3 (dark reddish brown); terrigenous silty clay; fine granular structure; moist; 30% limestone gravel; contains construction debris; smooth, abrupt lower boundary.	Fill material.
Ie	115–140	10YR 5/8 (yellowish brown) to 7.5YR 2.5/3 (very dark brown) mixed terrigenous and coralline silty clay loam; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
II	140–210	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

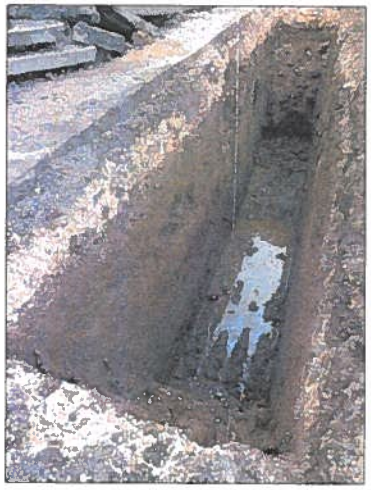

Figure 61. Trench 21, overview.

Figure 62. Trench 21, view to south.

REF-425

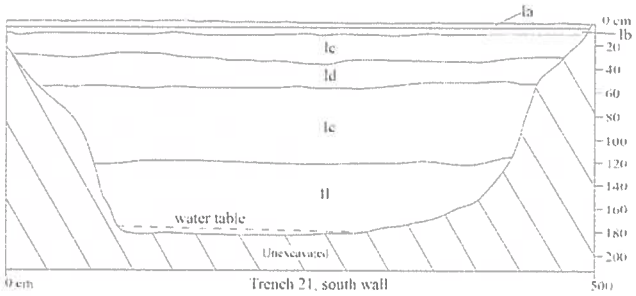

Figure 63. Trench 21 profile.

Table 21. Trench 21 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–30	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	30–55	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; wavy, clear lower boundary.	Fill material.
Ie	55–120	7.5YR 2.5/2 (very dark brown); terrigenous silty clay; moist; compact; fine granular structure; high organic content; smooth, abrupt lower boundary.	Fill material.
II	120–180	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 64. Trench 22, overview.

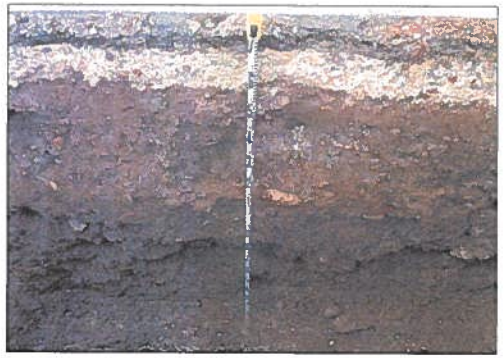

Figure 65. Trench 22, view to south.

REF-426

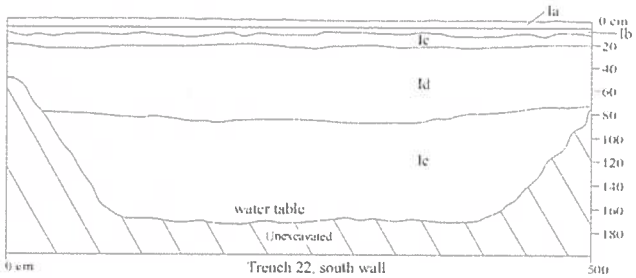

Figure 66. Trench 22 profile.

Table 22. Trench 22 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–20	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	20–85	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; over 50% gravel; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	85–170	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; 30% basalt gravel; no roots.	Fill material.

Figure 67. Trench 23, overview.

Figure 68. Trench 23, view to west.

REF-427

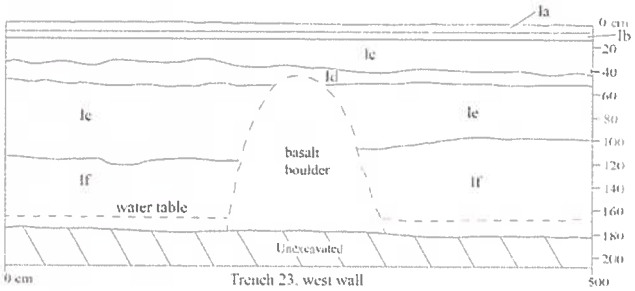

Figure 69. Trench 23 profile.

Table 23. Trench 23 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–11	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	11–30	10YR 6/ (light brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	30–48	10YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	48–110	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; 10% basalt gravel; no roots; smooth, abrupt lower boundary.	Fill material.
If	110–185	7.5YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; 20% basalt gravel; contains broken glass and glass bottles; smooth, abrupt lower boundary.	Fill material.

Figure 70. Trench 24, overview.

Figure 71. Trench 24, view to west.

REF-428

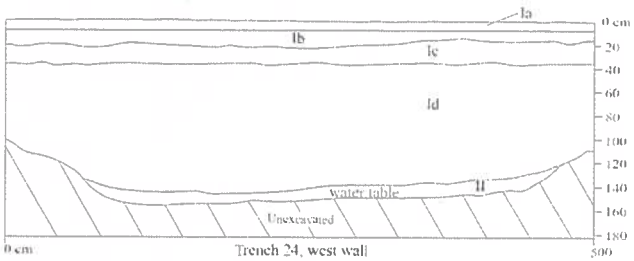

Figure 72. Trench 24 profile.

Table 24. Trench 24 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–20	10YR 7/4 (very pale brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Ic	20–35	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Id	35–137	7.5YR 3/2 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; 30% basalt pebbles; contains construction debris; smooth, abrupt lower boundary.	Fill material.
II	137–150	10YR 2/1 (black) silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

Figure 73. Trench 25, overview.

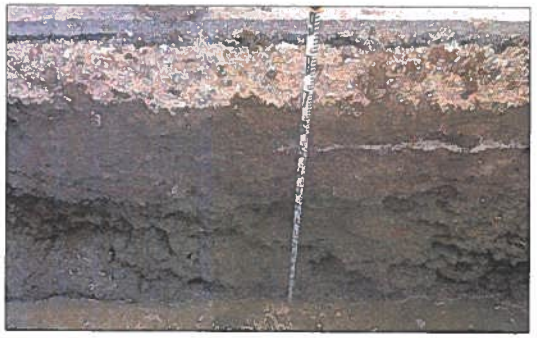

Figure 74. Trench 25, view to west.

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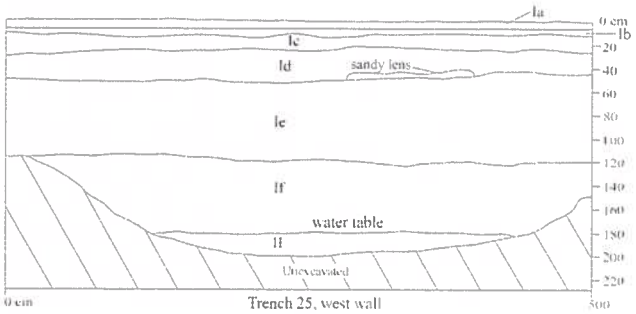

Figure 75. Trench 25 profile.

Table 25. Trench 25 Description

Layer	Depth (cmbs)	Description	Interpretation
Ia	0–6	10YR 4/1 (dark gray); asphalt.	Modern surfacing.
Ib	6–10	10YR 4/1 (dark gray); angular basaltic gravel; loose; dry; unconsolidated; smooth, abrupt lower boundary.	Base course associated with asphalt surface.
Ic	10–25	10YR 6/ (light brown); coralline pebbles; dry; loose; medium to course granular structure; unconsolidated; no roots; smooth, abrupt lower boundary.	Fill material.
Id	25–50	10YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; smooth, abrupt lower boundary.	Fill material.
Ie	50–120	2.5YR 3/4 (dark reddish brown); terrigenous silty clay; moist; compact; fine granular structure; 10% basalt gravel; no roots; smooth, abrupt lower boundary.	Fill material.
If	120–180	7.5YR 3/3 (dark brown); terrigenous silty clay; moist; compact; fine granular structure; no roots; 20% basalt gravel; contains broken glass and glass bottles; smooth, abrupt lower boundary.	Fill material.
II	180–200	2.5YR 1 (black); silty clay to clay; very moist; fine to very fine granular structure; plastic; contains disperse charcoal flecks and organic material.	Agricultural sediments associated with Site 50-80-09-7751.

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APPENDIX B: PALYNOLOGICAL ANALYSIS

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Pollen Analysis of the Waipahu AIS Project

By Bruce G. Phillips
BGP Consulting LLC

In advance of construction of the Kamehameha Schools Waipahu Redevelopment project, **Waikele Ahupua'a, 'Ewa District, Island of O'ahu**, Garcia and Associates (GANDA) investigated an extended portion of SIHP #50-80-09-7751, a suspected ***lo'i*** pondfield. Subsequent to these efforts, three soil samples from three trenches were selected for pollen analysis, with the goal of characterizing vegetation communities at the time of deposition and identifying cultivars grown at the site. All samples were from the basal sedimentary layer (Layer II), black muck presumed to represent past agricultural activities at the site.

The project area is situated on low-lying coastal flats, between 0.5 and 1.3 miles inland of the West and Middle Lochs of Pearl Harbor, respectively. Elevation ranges approximately 10 to 20 feet above mean sea level. Annual rainfall averages 24 to 31 inches (Giambelluca et al. 1986). Subsoil in the northern parcel (***mauka*** of Himikoe Street) is Waipahu silty clay, deep, well drained soils that formed in old alluvium weathered from basic igneous rock, typically found on dissected terraces. This suggests an ancient landform is buried by more recent deposits in the area. Although used mainly for urban development, sugar cane was grown in some areas. Soils in the southern, ***makai*** parcel are Typic Endoaquepts mucky silt loam, poorly drained soils on coastal plains and other low-lying settings, and often waterlogged. Such soils are used for farming taro, rice, and watercress on flooded paddies.

Prior to urban development, natural vegetation along the coastline would have primarily been characterized as Coastal Dry communities, having elevations less than 50 feet and rainfall less 47 inches per year (Gagne and Cuddihy 1990). Local edaphic conditions determine the makeup of various herblands, grasslands, shrublands, forests, and mixed communities. In turn, these communities can be further differentiated based on dominant species, such as ***'Aki 'aki*** Grassland dominated by ***Sporobolus virginicus***. Many areas once covered with extensive grasslands are now dominated by alien species, such as ***kiawe*** (***Prosopis pallida***) forests.

Coastal Wet communities occur on all of the main islands. Native examples, however, were much disturbed by the early Hawaiians, as nutrient-rich floodplains, marshes, and lowland riparian areas were turned into fishponds and irrigated farmlands (***lo'i***) for the cultivation of ***kalo*** (***Colocasia esculenta***). The presence of extensive ***lo'i*** pondfields in and around the project area during historic times suggests that wetlands were once widespread. Common natural constituents would have included members of the sedge family (Cyperaceae) and grass family (Poaceae).

In prehistory, Waikele Stream ran immediately east of the project area, where it ran through an **extensive marshland before entering the West Loch of Pearl Harbor (O'Hare et al. 2011:9). The** wetlands were ideal for traditional Hawaiian ***kalo*** farming in ***lo'i*** pondfields in pre-contact and early contact times. With the arrival of Europeans, sandalwood forests were harvested, grazing animals were introduced, and grasslands encroached on the upland surrounding the project area.

In the latter half of the 19th Century, Chinese and other foreign laborers were brought to the islands to support the growing sugar industry. To suite their tastes, many pondfields were leased and turned to ***laiki*** cultivation in the 1880s. By the early decades of the 20th Century, ***laiki*** farming was on the decline. During this time, sugarcane became a major crop on suitable terrain beyond the wetlands. By the 1950s, much of the area was urbanized.

Methods

Sediment samples were sent to the Palynology Laboratory, Texas A&M University, College Station, for pollen extractions. Sample bag contents were mixed thoroughly, and 10 gram subsamples were taken. Approximately 20,850 grains of ***Lycopodium*** were added to estimate pollen concentration. Samples were then treated with 10 percent hydrochloric acid to reduce carbonates, followed by a swirl-and-decant step (Mehringer 1967):136–137) to reduce the heavier matrix fraction (greater than 180 µm). Silicates were reduced by a hydrofluoric acid treatment of approximately 20 hours. Heavy liquid flotation in zinc bromide (with a specific gravity of 1.9) was followed by acetolysis to further reduce organics. The remaining residues were washed with water and alcohol, stained with saffranin, and suspended in glycerol.

At BGP Consulting LLC offices, extracts were mounted and examined at a viewing power of 400X on an Olympus BHTU compound microscope. Standard counts of 100 to 200 pollen grains and spores were conducted. Identifications were aided by BGP Consulting LLC reference material and by keys (Selling 1946, 1947; Moore, et al. 1991). Each fossil pollen grain was identified to the generic level when possible. If a grain could not be differentiated from similar genera, it was identified only to the family level. Pollen grains that were broken, corroded, or degraded beyond recognition were assigned to the **"degraded"** category. Percentages of types were calculated for each sample. Pollen concentrations were calculated with the following formula:

$$\text{Concentration (grains/gram)} = \frac{\text{pollen grains counted}}{\text{tracers counted}} \times \frac{\text{tracer concentration}}{\text{sample weight}}$$

Results

Two samples had pollen sufficient for 200-grain counts; only a 100-grain count was possible for the third sample. Overall, 14 types of pollen and spores were identified (Table 1). Grass pollen was dominant; low-spine Asteraceae, Cheno-Ams, Cyperaceae, and monolete pores were subdominant (Tables 2 and 3). The small sample set was diverse, reflecting both drier shrub-grassland and wetlands. The abundance of regular-sized grass pollen grains potentially represented plant succession on landscapes cleared for agriculture or habitation and then abandoned (Gagne and Cuddihy 1990). ***Nui*** (coconut) was the only Polynesian introduction. No unequivocal historical introductions were found. It is possible that relatively low proportions of large grass pollen grains represented ***laiki*** (rice) and/or ***ko*** (sugarcane) farming in the area, or the

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collection of ***pili*** grass (***Heteropogon contortus***). In practice, ***laiki***, ***ko***, and ***pili*** grass have common traits under light microscopy and cannot be distinguished (Moore et al. 1990); SEM is required.

Samples 1 and 3 were severely degraded, having 27 percent or more degraded grains. Furthermore, Sample 1 had a very low total pollen concentration, also indicating deterioration. This suggests that the data of these two samples may not be accurate reflections of the original assemblages. In contrast, Sample 2 had an extremely high pollen concentration and lower percentage of degraded grains; this sample probably reflects the original environment in which it was deposited.

Given the similarities of stratigraphic location and sedimentary character, why pollen assemblages differ so widely is uncertain. While degraded pollen assemblages are not uncommon in archaeological contexts (Hall 1981; Holloway 1981), many factors cause pollen deterioration, and the process is not well understood. Chief among chemical agents is the cycle of wetting and drying (Holloway 1989). It is possible that pollen in sediments at or near the water table have suffered deterioration due to fluctuations in groundwater level, caused by climatic (e.g., rainfall) and/or oceanic (e.g., sea levels) factors, or possibly even tides. Also affecting the number and distribution of pollen types is the amount of sporopollenin in grains of different plants. Sporopollenin is a highly resistant organic compound that allows pollen to be preserved in sediments and other settings. Sedge pollen, however, does not have unusually low amounts of sporopollenin than most other pollen types (Moore, et al. 1991) and is expected to be proportionately represented, reflecting past environments. Soil chemistry can also affect pollen preservation. Soil pH is known to cause pollen deterioration, alkali soils are more corrosive. More degraded Samples 1 and 3 were on the west side of the project area, while better preserved Sample 2 was to the east. It is possible that geologic (or other) conditions caused dissolved constituents in subsurface water flow to be more alkaline than to the east, causing greater deterioration in the area.

Taken at face value, data from Sample 1 reflected dry, shrub-grassland dominated by ***aweoweo*** and grasses. The sample may have represented a fallow period or an abandoned field. In Sample 2, the high percentage of sedge pollen indicated the presence of a wetland, possibly a pondfield harboring aquatic vegetation and surrounding grasses. The moderate proportion of sedge pollen in Sample 3 suggested wetlands at or near the sample location, and a very low percentage of ***aweoweo*** pollen indicated surrounding terrain was not exceptionally dry; depositional environment was not clearly indicated. Although high percentages of spores in Sample 3 suggested mesic conditions, ferns typically grow further upslope. It is possible that edaphic conditions (such as local drainage) caused spores originating in higher terrain to be trapped at the sample location.

Recently, Cultural Surveys **Hawai'i** (CSH) conducted investigations at the future Waipahu Transit Center Station, immediately adjacent to the current project area (Sroat, et al., 2016). Pollen analysis of ten samples found severe deterioration (Phillips 2016). Only five of the samples had sufficient pollen for analysis. Data from these samples contained an environmental record of the area and showed the initial development of irrigated pondfields. A shift from marshlands to possible ***laiki*** farming is evidenced by a decrease in sedge pollen and increase in

grass pollen, particularly the large grain type, in two sample columns. While ***kalo*** pollen was not found in the analysis, ferrogenous root casts clearly indicated the cultivation of ***kalo*** in the pondfield. That absence of ***kalo*** pollen does not necessarily mean the crop was not grown in field. This is due primarily to the ecology of ***kalo***, but also the nature of ***kalo*** farming (Onwueme 1999). First, ***kalo*** rarely blooms and sets seed naturally. Some varieties have never been known to flower. Furthermore, like other members of the Araceae (arum family), ***kalo*** produces relatively small quantities of pollen when in bloom. Second, ***kalo*** is harvested at a time when the edible corm has its highest nutritional content and is most viable for propagation. This occurs before flowering. In contrast, grasses produce pollen in abundance. ***Laiki*** grains (rice) are the goal of cultivation and the plants go through an entire life cycle before harvest, potentially depositing large amounts of pollen in the surrounding sediments. Given the history of the location and suitability of the environment, it is likely that the large grass pollen grains represented ***laiki*** farming in the area. It is possible that some of the large grass pollen grains blew in from ***ko*** fields surrounding the site.

The CSH and current pollen studies differ in several ways. First, the CSH sample set included multiple samples from the suspected agricultural layer, collected at various depths within in Layer II. This allowed a diachronic evaluation of vegetation and landscape change. Within the GANDA sample set, single samples from separate exposures across the project area represented **"snapshots" of time during deposition** of the layer. Because the CSH data reflected a changing environment, despite the homogeneity of the agricultural horizon, it is possible that the individual sample points of the current investigation actually represent different times during deposition of Layer II. Second, the CSH samples were all dominated by sedge pollen, clearly indicating a wetland environment. The GANDA assemblage primarily reflected drier grasslands. The exception was Sample 2, which had a relatively high percentage of sedge pollen. This sample at the eastern edge of the project area was closest to the CSH project area. It is possible that the location was once part of the same wetland investigated by CSH, or at least was heavily affected by nearby wetlands. Finally, although large grass pollen grains (likely representing ***laiki*** or ***ko***) consistently appeared in the GANDA samples, percentages were well below most of those found in the previous investigation. This indicated that ***laiki*** cultivation may not have occurred in the area. Multiple samples from various depths within a single exposure may reveal a different story.

Summary

Three samples from three trenches were analyzed. Of these, two samples had enough pollen for 200-grain counts, while the third was sufficient for only a 100-grain count. The two samples from the western project area had high percentages of degraded grains and relatively low pollen concentrations. In contrast, the sample from the eastern project area was well preserved. The differences may be due to edaphic conditions.

Grass pollen dominated all samples, reflecting relatively dry conditions. It is possible that the sample locations and surrounding terrain were not being farmed during the time represented by the samples. The exception was Sample 2, which had a high percentage of sedge pollen, suggesting wetlands at or near the sample location. Low percentages of large grass pollen grains, however, suggested that ***laiki*** farming was not conducting in the area.

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APPENDIX C:
ARCHAEOBOTANICAL ANALYSIS

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IARII INTERNATIONAL ARCHAEOLOGICAL RESEARCH INSTITUTE, INC.
ARCHAEOBOTANICAL SERVICES

ANALYSIS OF CHARCOAL SAMPLES FROM PROJECT 2404, WAIPAHU AIS, O'AHU ISLAND

Jennifer Huebert, IARII

METHODS

The freshly fractured transverse, tangential, and radial facets of selected charcoal fragments were examined with an epi-illuminated microscope at magnifications of 50–500X. Taxonomic identifications were made by comparing observed anatomical characteristics with those of woods in the IARII reference collection. Vouchers associated with this collection have been verified and archived at the Department of Botany, University of Hawai'i at Mānoa. Other published references, including books, journal articles, technical documents, and wood atlases, were also consulted.

RESULTS

Note: * = preferred short-lived material for RC dating

	WIDL No.	Taxon	Plant Part & State of Preservation	Weight (g)	Comment
Sample 1, Bag B10, TU2 Builders trench A					
*	1816-1	*Chenopodium oahuense ('āweoweo)*	wood charcoal	0.08	

This sample contains very small fragments of charcoal. The larger fragments were examined. Some of the smaller pieces were fractured, but reliable identifications could not be made for this material. The wood of a native shrub, *'āweoweo*, was the only material identified. A systematic review of the identified taxon is presented at the end of this report.

Chenopodium is a good choice for dating, as it is a shrub with a maximal lifespan approximately a decade. For other considerations regarding the selection of material for radiocarbon dating in Pacific Island contexts, please see (Allen and Huebert 2014, Athens and Rieth 2013). Copies of both papers are available upon request.

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Please note the following:

- Fragments under 4 mm are often challenging to identify, and results will be biased towards woods with very distinctive anatomy.
- It is best to choose one fragment for radiocarbon dating to eliminate the chance of dating more than one event (Ashmore 1999; also see Higham and Petchey 2000:Table 4).

TAXA REVIEW

AMARANTHACEAE (Amaranth family)

Chenopodium oahuense (Meyen) Aellen (*'Āheahea, 'āweoweo*)

This endemic species is usually a shrub in the coastal lowlands but may become arborescent at higher elevations (Hillebrand 1981:380). Its known distribution in the main Hawaiian Islands includes coastal, dry forest, and subalpine shrubland from sea level to 2,520 m elevation (Wagner et al. 1990:538). The soft wood was probably not much used by the ancient Hawaiians, but the leaves were cooked and eaten (Hillebrand 1981:380; Malo 1951:23).

DESCRIPTIONS OF WOOD ANATOMY

Chenopodium oahuense

Vessels in radial rows and clusters, 20-35 µm diameter or smaller and intergraded with tracheids; thick-walled fibers; axial parenchyma surrounding vessels, and unlignified parenchyma in regular tangential bands; cross-section forms overall net-like pattern at low magnification; rays of almost exclusively upright cells

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GEOTECHNICAL REPORT 19

REF-436

GEOLABS, INC.
Geotechnical Engineering and Drilling Services

April 13, 2022
W.O. 7607-30

Mr. Monte Heaton
Highridge Costa Development Company
330 W. Victoria Street
Gardena, CA 90248

GEOTECHNICAL ENGINEERING CONSULTATION SERVICES
DUE DILIGENCE STUDY
WAIPAHU TRANSIT ORIENTED COMMUNITIES DEVELOPMENT
TMKs: 9-4-14: 5, 14, 58 THRU 67; 9-14-13: 46
WAIPAHU, OAHU, HAWAII

Dear **Mr. Heaton:**

This letter report presents the findings from our review of the subsurface conditions in the project vicinity in support of the due diligence study for the proposed commercial/residential development in the Waipahu area on the Island of Oahu, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

This letter report summarizes our findings and preliminary geotechnical recommendations based on our desktop study of available subsurface information, literature research, and past project experience at the project site only. These preliminary geotechnical recommendations are intended to inform the client regarding the potential geotechnical risks involved and the geotechnical considerations that may need to be addressed for the development of the two parcels comprising the planned low-rise and high-rise commercial/residential project. The findings and preliminary recommendations presented herein are subject to the limitations noted at the end of this letter report.

EXECUTIVE SUMMARY

Based on our reconnaissance of the parcels involved and a review of the available subsurface information, the following geotechnical considerations are addressed for the development of the low-rise and high-rise commercial/residential project planned. Generally, the geotechnical considerations for the development of the project include, but are not limited to, the following items:

1. Liquefaction Potential
2. Seismic Design Considerations
3. Foundation Considerations
4. Building Floor Slabs
5. Pavement Design

In general, geotechnical recommendations contained in the Geotechnical Engineering Report entitled "Geotechnical Engineering Exploration, Waipahu Redevelopment, TMKs: 9-4-14: 5, 14, 58 thru 67; 9-14-13: 46, Waipahu, Oahu, Hawaii," dated September 7, 2018, prepared by our office are generally applicable to this proposed Waipahu Transit Oriented Communities Development project. However, it should be noted that updates to the Seismic Design Considerations and Drilled Shaft Foundations sections of the report will be required when more information on the proposed project becomes available.

Our experience in the area suggests that the project site is underlain by surface fills and a relatively thick layer of very soft compressible recent alluvium and marsh deposits overlying older alluvium and basalt formation at greater depths. Based on available subsurface information in the area, it appears the very soft compressible recent alluvium and marsh deposits extend to depths up to 54 feet at the Mauka Parcel (north of Hikimoe Street) and up to 94 feet on the Makai Parcel (south of Hikimoe Street).

Based on the subsurface conditions at the project site and the relatively heavy building loads for the proposed low-rise and high-rise structures, we believe new building structures planned for the commercial/residential development may be supported on a deep foundation system consisting of augered cast-in-place (ACIP) piles, octagonal prestressed precast concrete piles, or drilled shafts. We believe that drilled shafts may be the desired foundation system to support the proposed structures as higher allowable compressive loads are achievable compared to the ACIP piles or octagonal prestressed precast concrete pile systems.

Based on the subsurface conditions encountered in the previously drilled borings and the anticipated structural load demands on the new building foundations, we recommend supporting the new building structures on a deep foundation system consisting of cast-in-place concrete drilled shafts. We recommend considering drilled shafts with diameters of 36, 48, and 60 inches to support the new buildings. Additional drilled shaft diameters may be evaluated upon completion of the building layout and actual structural load requirements. In general, it would be ideal to support each building column by one single drilled shaft. In order to achieve the design load resistances imposed on the drilled shaft foundations, the drilled shafts would need to extend to about 75 and 140 feet below the bottom of the foundation cap elevations (assumed at about 5 feet below the existing ground surface for ease of reference) for the Mauka and Makai Parcels, respectively. The allowable compressive load capacities of the drilled shaft foundations would range from about 700, 1,000 and 1,500 kips for the 36, 48, and 60-inch diameter drilled shafts, respectively.

Due to the anticipated long-term ground settlements at the project site, settlement of the very soft to soft soils will result in downdrag loading of the drilled shaft foundations. Therefore, the recommended allowable compressive load capacities of the drilled shaft foundations have been reduced by the estimated downdrag loads in the foundation analyses. To reduce the magnitude of the downdrag loading, the use of a permanent steel casing should be considered for installation to depths where the very soft to soft soil deposits are encountered.

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Due to the potential for consolidation of ground settlements at the project site due to the addition of structural loads, we recommend structurally supporting the ground floor slabs of the proposed structures on drilled shaft foundations to reduce the impact of the ground settlements on the ground floor slabs.

The text of this report should be referred to for detailed discussion and a generalized geotechnical evaluation of the site with respect to the proposed project.

PROJECT CONSIDERATIONS

The project site is located along Farrington Highway and Hikimoe Street (designated as TMKs: 9-4-14: 5, 14, 58 thru 67 and 9-14-13: 46) in the Waipahu area on the Island of Oahu, Hawaii. The parcels have a combined land area of approximately 167,632 square feet. The parcels located north of Hikimoe Street are designated as the Mauka Parcel, while the parcels located south of Hikimoe Street are designated as the Makai Parcel. The approximate limits of the project site are shown on the Site Plan, Plate 2.

Previously, it was desired to develop the project site into several five to six-story low-rise commercial and residential buildings constructed of reinforced concrete and metal framing. Based on the information provided, we understand the original development concept has changed, and currently, the development will consist of the following:

1. A 21-story high-rise central tower structure consists of 20 residential levels, five parking levels, and one retail/amenity level.

2. Two 21-story high-rises west and east tower structures consist of 20 residential levels and one retail/amenity level.

3. A six-story low-rise senior housing structure consists of four residential levels and two parking levels. One of the parking levels will be below the existing ground surface.

We anticipate that the new structures will consist of reinforced concrete and metal framing. In addition, we understand the existing six-story Sonido Retail Building will remain as part of the proposed development. Further details of the planned development were not available at the time this due diligence report was prepared.

We understand a due diligence study to evaluate the geotechnical considerations for the commercial/residential development at the parcels is desired. The scope of our due diligence study consisted of a desktop study of available subsurface information, literature research, and a review of the site conditions based on our experience only. Based on our project experience in the area, the primary geotechnical considerations for the project development include the following items.

1. Liquefaction Potential
2. Seismic Design Considerations
3. Foundation Considerations
4. Building Floor Slabs
5. Pavement Design

PURPOSE AND SCOPE

The purpose of our geotechnical engineering services is to obtain an overview of the subsurface conditions at the project site and provide a generalized evaluation of the site with respect to probable subsurface conditions and key geotechnical considerations for the site development. To accomplish this, our geotechnical consultation services consisted of the following tasks and work efforts:

1. Site reconnaissance of the project site by our senior engineer and principal engineer.

2. Review of Conceptual Master Plans for the project.

3. Background research and review of available in-house information for the subsurface conditions in the project vicinity.

4. Analyses of the available subsurface information to formulate preliminary geotechnical recommendations in support of the due diligence study for planning and preliminary design.

5. Preparation of this letter report summarizing our work on the project and presenting our findings and preliminary geotechnical recommendations in support of the due diligence study.

6. Coordination of our overall work on the project by our senior engineer.

7. Quality assurance of our work and client/design team consultation by our principal engineer.

8. Miscellaneous work efforts such as word processing and clerical support.

REGIONAL GEOLOGY

The Island of Oahu was built by the extrusion of basaltic lava from the Waianae and Koolau Shield Volcanoes. The older Waianae Volcano is estimated to be middle to late Pliocene in age, and the Koolau Volcano is estimated to be late Pliocene to early Pleistocene in age. As volcanic activity at the Waianae Volcano ceased, lava flows from the Koolau Volcano banked against its eroded eastern slope forming the Schofield Plateau.

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The Koolau Volcanic Shield was built during the late Pliocene Epoch and early Pleistocene Epoch by the extrusion of successive thinly bedded lava flows. The main shield-building stage ceased approximately 2.5 million years ago. Evidence from historic drilled wells indicates that the Island of Oahu has subsided by as much as 1,200 feet since the cessation of the early volcanic activity (Macdonald and Abbott, 1970). During the period of island subsidence, coral-algal reefs began to grow along the southern coast of Oahu forming embayments protected by barrier reefs. A series of lagoons formed behind the barrier reefs, and both terrigenous and marine sediments accumulated in the lagoons (Macdonald and Abbott, 1970).

During the Pleistocene Epoch (Ice Age), many sea level changes occurred as a result of widespread glaciation in the continental areas of the world. As the great continental glaciers accumulated, the level of the oceans fell because there was less water available to fill the oceanic basins. Conversely, as the glaciers receded (melted), global sea levels rose because the volume of water increased. The land mass comprising the Island of Oahu remained essentially stable during these water level changes, and the fluctuations were eustatic in nature. These glacio-eustatic fluctuations resulted in stands of the sea that were both higher and lower relative to the present sea level on the Island of Oahu.

The higher sea level stands caused landform changes, including the accumulation of deltas and alluvial fans composed of terrigenous sediments in the heads of the old bays, the accumulation of reef deposits at correspondingly higher elevations, and the deposition of lagoonal and/or marine sediments in the quiet lagoonal waters protected by barrier reefs. The concurrent growth of reefs and the accumulation of lagoonal sediments also resulted in the deposition of coral-algal limestone and marl materials within the predominantly lagoonal sedimentary unit.

The lower sea level stands caused streams to carve drainages into the coastal plain platforms composed of sedimentary and coral reef deposits. In addition, subaerial exposure of the calcareous sediments caused the consolidation of the soft deltaic materials and lagoonal deposits and the induration of calcareous reef materials. Furthermore, renewed subaerial erosion acting at the upper elevations of the volcanic shield caused the downstream deposition of terrigenous alluvial sediments under relatively higher energy conditions.

During periods of no significant sea level changes, continued meandering stream action extended the alluvial deltas and fans seaward and deposited alluvial materials overlying the marine-lagoonal sediments.

Development projects around the Waipahu Parcels site have resulted in alterations to the natural terrain, including the placement of earth fills, which may be of poor quality in terms of supporting large structural loads.

SUBSURFACE CONDITIONS

We previously explored the subsurface conditions at the project site by drilling and sampling a total of 11 borings. Subsurface conditions at the Mauka Parcel were explored by drilling and sampling five borings, designated as Boring Nos. 1 through 4, and 101, extending to depths of about 81 to 106 feet below the existing ground surface. Subsurface conditions at the Makai Parcel were explored by drilling and sampling six borings, designated as Boring Nos. 5 through 9, and 102, to depths ranging from about 20 to 151 feet below the existing ground surface. The approximate boring locations are shown on the Site Plan, Plate 2. Results of the borings are contained in the Geotechnical Engineering Report entitled "Geotechnical Engineering Exploration, Waipahu Redevelopment, TMKs: 9-4-14: 5, 14, 58 thru 67; 9-14-13: 46, Waipahu, Oahu, Hawaii," dated September 7, 2018.

Based on the available subsurface information obtained from the above-referenced report, the subsurface at the Mauka Parcel site generally was underlain by a pavement structure consisting of about 1.5 to 3 inches of asphaltic concrete overlying base material and fill consisting of medium dense silty gravel, and medium stiff to very stiff sandy silt and clayey silt extending to depths of approximately 6.2 to 9 feet below the existing pavement surface. The surface fill was generally underlain by recent alluvium and marsh deposits consisting of very soft to soft sandy silt, clayey silt, and silty clay to depths of approximately 18 to 51 feet below the existing ground surface. Below the recent alluvium and marsh deposits, older alluvium and residual soils consisting of medium to very stiff clayey silts and silty clays were encountered to depths of about 39 to 54 feet below the existing ground surface. The older alluvium and residual soils were underlain by medium to very hard and highly to a slightly weathered basalt rock formation with isolated interbedded zones of clinker extending to the maximum depths explored in our borings.

The Makai Parcel site generally was underlain by a pavement structure consisting of about 1.5 to 3 inches of asphaltic concrete overlying base material and fill consisting of medium to very dense silty sand, silty gravel, and cobbles and boulders, and medium to very stiff sandy silt and clayey silt extending to depths of approximately 1.5 to 9 feet below the existing pavement surface. The surface fill was generally underlain by recent alluvium and marsh deposits consisting of very soft to soft sandy silt and clayey silt and very loose to loose silty sand to depths of approximately 59 to 94 feet below the existing ground surface. Below the recent alluvium and marsh deposits, older alluvium consisting of medium to very dense cobbles and boulders was encountered at depths of 68.5 to 120 feet below the existing ground surface. The older alluvium was underlain by medium hard to hard and highly to slightly weathered basalt rock formation extending to the maximum depths explored in our borings.

Groundwater in the borings at depths of about 2.8 to 9.0 feet below the existing ground surface. Groundwater levels can fluctuate depending on tidal fluctuations, storm surge conditions, seasonal precipitation, groundwater withdrawal and/or injection, and other factors. It should be noted that artesian groundwater conditions were encountered at the Mauka and

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Makai Parcels within the older alluvial and basalt rock formation layers with elevation head pressures up to about 1.5 to 10 feet above the existing ground surface, corresponding to an approximate ground surface elevation of +15 to +20 feet MSL. Artesian groundwater conditions may result in some difficulty when installing a deep foundation with an open excavation at depths within the older alluvium as water will flow above the ground surface and will need to be contained to a static condition during deep foundation excavation and installation.

DISCUSSIONS AND RECOMMENDATIONS

Based on our review of the available information, we believe the proposed commercial/residential development project generally is feasible from a geotechnical engineering point-of-view. However, it should be noted that due to the relatively thick deposit of soft compressible recent alluvial deposits and artesian groundwater conditions at the project site, higher than normal foundation and superstructure costs associated with the proposed development should be anticipated. In addition, several geotechnical considerations may have the potential for some adverse impacts on the design and construction of the proposed project. Based on our experience and a review of the available information for this site, the geotechnical considerations include, but are not limited to, the following. These items are discussed further in the following subsections.

1. Liquefaction Potential
2. Seismic Design Considerations
3. Foundation Considerations
4. Building Floor Slabs
5. Pavement Design

Liquefaction Potential

The current code adopted by the City and County of Honolulu for the design of building structures is the International Building Code (IBC), 2012 Edition. Based on the IBC 2012, the project site may be subjected to seismic activity and should be evaluated for potential soil liquefaction.

Soil liquefaction is a condition where saturated cohesionless soils located near the ground surface undergo a substantial loss of strength due to the build-up of excess pore water pressures resulting from cyclic stress applications induced by earthquakes. In this process, when the loose saturated sand deposit is subjected to vibration (such as during an earthquake), the soil tends to densify and decrease in volume, causing an increase in pore water pressure. If drainage is unable to occur rapidly enough to dissipate the build-up of pore water pressure, the effective stress (internal strength) of the soil is reduced. Under sustained vibrations, the pore water pressure build-up could equal the overburden pressure, essentially reducing the soil shear strength to zero and causing it to behave as a viscous fluid. During liquefaction, the soil

acquires sufficient mobility to permit both horizontal and vertical movements, and if not confined, will result in significant deformations.

Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands and loose silts with little cohesion. The major factors affecting the liquefaction characteristics of a soil deposit are as follows:

FACTORS	LIQUEFACTION SUSCEPTIBILITY
Grain Size Distribution	Fine and uniform sands and silts are more susceptible to liquefaction than coarse or well-graded sands.
Initial Relative Density	Loose sands and silts are most susceptible to liquefaction. Liquefaction potential is inversely proportional to relative density.
Magnitude and Duration of Vibration	Liquefaction potential is directly proportional to the magnitude and duration of the earthquake.

As indicated above, the site is underlain by marsh and recent alluvium consisting of very soft to soft sandy silts, clayey silts, and silty clays. Based on the cohesive materials encountered in the borings, we do not consider the phenomenon of soil liquefaction to be a design consideration.

Seismic Design Considerations

Based on the subsurface materials encountered and our engineering analyses, the project site is underlain by thick, soft soil layers meeting one of the following conditions.

- Peats of highly organic clays (H>10 feet of peat or highly organic clay where H=thickness of soil);
- Very high plasticity clays (H>25 feet with PI>75); or
- Very thick soft/medium stiff clays (H>120 feet).

Therefore, the project site would need to be classified as Site Class F based on ASCE Standard ASCE/SEI 7-10 (Table No. 20.3-1) referenced by the International Building Code, 2012 edition, and a site-specific ground motion study in accordance with ASCE 7-10 Chapter 21 will need to be performed to determine the appropriate values for seismic design considerations.

It should be noted that a site-specific ground motion study was previously performed for the project and is presented in the Geotechnical Engineering Report entitled "Geotechnical

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Engineering Exploration, Waipahu Redevelopment, TMKs: 9-4-14: 5, 14, 58 thru 67; 9-14-13: 46, Waipahu, Oahu, Hawaii," dated September 7, 2018. However, at the time the above-referenced report was prepared, the code adopted by the City and County of Honolulu for the design of building structures was the International Building Code (IBC), 2006 edition, which references ASCE 7-05. The current adopted code is the International Building Code, 2012 edition, which references ASCE 7-10. Due to the code change, a new site-specific ground motion study will need to be performed in accordance with ASCE 7-10, Chapter 21.

Foundation Considerations

We understand details of the proposed structures have not been determined at the time this letter report was prepared. However, we envision that the site will be developed into several six-story low-rise commercial and 21-story high-rise residential buildings constructed of reinforced concrete and metal framing. As mentioned above, both the Mauka and Makai sites are underlain by a relatively thick deposit of soft compressible recent alluvial soil and marsh deposits. Based on the thick deposit of soft compressible recent alluvial and marsh deposits below a relatively thin crust and the anticipated relatively heavy building loads, we believe the use of a shallow foundation system would not be feasible for the low-rise or high-rise buildings. Therefore, it is our opinion that a deep foundation system should be considered for the support of the new buildings planned.

Since the project site is in the urban area of Waipahu, we envision there may be concerns regarding excess noise and vibrations generated during the typical pile driving operations. Augered cast-in-place (ACIP) piles may be considered although contractors may experience difficulty in advancing the ACIP piles through the dense cobbles and boulders and basalt rock formation encountered within the estimated foundation depths. Therefore, we believe the use of drilled shafts may be desired for support of the proposed structures. Considering the subsurface conditions, drilled shafts are not limited by depth as they can advance to greater depths within the older alluvium and basalt formation resulting in higher allowable compressive load capacities than those obtained by the use of ACIP piles or driven pile foundations.

We envision the new structures may be supported on 36, 48, or 60-inch diameter cast-in-place concrete drilled shafts. It should be noted that the proposed building structures were not finalized at the time this letter report was prepared; therefore, actual structural loading was not yet available. Additional drilled shaft diameters and/or capacities other than those provided herein may be evaluated upon completion of the building layout and actual structural load requirements. Once the actual structural loading is made available, our office should be contacted for further evaluation.

The cast-in-place concrete drilled shafts would derive vertical support primarily from friction between the concrete shaft and the older alluvium and basalt rock formation. In general, the end-bearing component of the drilled shafts has been discounted in our analysis

due to difficulties associated with obtaining a clean bottom during construction in the relatively deep drilled shafts.

It is anticipated that each column would be supported on a single drilled shaft designed to support the structural loads of the columns. Where required, drilled shafts installed in groups should have a minimum center-to-center spacing of 3 times the shaft diameter to avoid the reduction in vertical load capacity due to group action and to facilitate drilling of the shaft holes. Our recommendations pertaining to the drilled shaft capacities and estimated lengths are presented in the following table.

COMPRESSIVE LOAD CAPACITIES OF DRILLED SHAFT FOUNDATIONS

Location	Allowable Compressive Load Capacity Per Drilled Shaft (kips)	Drilled Shaft Diameter (inches)	Drilled Shaft Length (feet)		Downdrag Load (kips)	
			Without Permanent Casing	With Permanent Casing	Without Permanent Casing	With Permanent Casing
Mauka Parcel	700	36	70	65	210	40
	1,000	48			280	55
	1,200	60			350	70
	1,500	60	75	70	350	70
Makai Parcel	700	36	135	125	380	75
	1,000	48			510	100
	1,200	60			640	125
	1,500	60	140	130	640	125

NOTE: The estimated drilled shaft lengths shown are based on an assumed bottom of cap elevation at 5 feet below the existing ground surface.

The allowable compressive load capacities for the drilled shafts presented above are for supporting dead-plus-live loads. The compressive load capacities may be increased by up to one-third (⅓) when considering transient loads, such as wind or seismic forces. A factor of safety of 2.0 was used in arriving at the allowable compressive load capacities provided in the table above.

It should be noted that the drilled shaft foundations will be subjected to downdrag loading. As mentioned above, the project site is underlain by relatively thick deposits of very soft to soft compressible marsh deposits and recent alluvial soils that are under-consolidated. When the soft soil deposits move downward relative to the stationary drilled shaft, the

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downward movement will result in negative skin friction forces, generally known as downdrag forces, acting on the drilled shaft. The magnitude of the downdrag force depends on the drilled shaft perimeter, the thickness of the compressible layer, and compressibility/relative density of the soft soil deposits. Due to the anticipated long-term ground settlements at the project site, settlement of the very soft to soft soils will result in downdrag loading of the drilled shaft foundations. Therefore, the allowable compressive load capacities of the drilled shaft foundations recommended have been reduced by the estimated downdrag loads in the foundation analyses.

To reduce the magnitude of the downdrag loading, the use of the permanent steel casing should be considered for installation to depths where the soft to very soft soil deposits are encountered. If used, the permanent steel casing should extend through the very soft to soft compressible marsh deposit and recent alluvial soils to approximate elevations of -35 and -76 feet Mean Sea Level (MSL) for the Mauka and Makai Parcels, respectively. Estimated drilled shaft downdrag loads with and without permanent casing are presented in the compressive load capacities of drilled shaft foundations table above.

An advantage of utilizing drilled shaft foundations at the proposed project site is the ability to advance through dense cobbles and boulders and into the underlying basalt formation, which will result in the ability to achieve higher allowable compressive load capacities over the ACIP pile and driven pile foundation systems. It should be noted that the drilled shafts are typically slower to construct than the other foundation types presented herein. The use of temporary steel casing and/or drilling fluids (polymer slurry) through the soft compressible recent alluvial soils will be required as these soils will likely not stay open following drilling. In addition, artesian groundwater conditions are anticipated when excavating in the older alluvial soils and basalt rock formation and will result in water flowing above the ground surface. The artesian water will need to be contained through casing extensions or other acceptable methods.

Building Floor Slabs

As mentioned above, the project site is underlain by relatively thick deposits of very soft to soft compressible marsh deposits and recent alluvial soils that are under-consolidated. In general, ground settlements are anticipated when substantial new fills or structural loads are placed over a soil profile of thick, very soft to soft recent alluvium or marsh deposits. In general, the existing ground settlements are primarily the result of the following two processes:

- Compression of the compacted fill material under its own weight; and
- Consolidation and/or compression of the underlying in-situ soils induced by fills and structural loading.

Due to the potential for consolidation of ground settlements at the project site due to the addition of structural loads, we recommend structurally supporting the ground floor slabs of the proposed structures on drilled shaft foundations to reduce the impact of the ground settlements on the ground floor slabs.

Because the ground floor slabs will be structurally supported, the underlying slab subgrade below the ground floor slab would serve only as a form for placement of the concrete slab. To provide a stable subgrade to serve as a form for the reinforced concrete floor slab, we recommend scarifying the subgrade soil to a depth of about 8 inches, moisture conditioning to above the optimum moisture content, and recompacting to at least 95 percent relative compaction (per ASTM D1557).

For the under slab support, we recommend placing a minimum 4-inch-thick layer of cushion fill consisting of open-graded gravel (ASTM C33, No. 67 gradation) below the slabs. The open-graded gravel cushion fill would serve as a capillary moisture break. To reduce the potential for excessive future moisture infiltration through the slab and subsequent damage to floor coverings, an impervious moisture barrier should be provided on top of the open-graded gravel cushion fill layer.

Pavement Design

We anticipated that flexible pavements would be used for the new entry driveways and parking areas planned. In general, we anticipate that the vehicle loading for the proposed driveways and parking areas would primarily consist of passenger vehicles with some light trucks and occasional heavy trucks only. Therefore, we have assumed generally light traffic loading conditions for pavement design purposes. We have assumed that the pavement subgrade soils will be similar to the fill materials generally encountered during our field exploration. On this basis, we recommend using the following pavement designs for this project

Flexible Pavement Section (Standard Pavement for Parking Areas)

2.0-Inch Asphaltic Concrete
6.0-Inch Aggregate Base Course (95 Percent Relative Compaction)
6.0-Inch Aggregate Subbase Course (95 Percent Relative Compaction)
14.0-Inch Total Pavement Thickness on Moist Compacted Subgrade

Flexible Pavement Section (Entryway and Loading Zones)

3.0-Inch Asphaltic Concrete
6.0-Inch Aggregate Base Course (95 Percent Relative Compaction)
6.0-Inch Aggregate Subbase Course (95 Percent Relative Compaction)
15.0-Inch Total Pavement Thickness on Moist Compacted Subgrade

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Rigid Pavement Section

6.0-Inch Portland Cement Concrete
6.0-Inch Aggregate Subbase Course (95 Percent Relative Compaction)
12.0-Inch Total Pavement Thickness on Moist Compacted Subgrade

The subgrade soils under the pavement areas should be scarified to a minimum depth of 8 inches, moisture-conditioned to above the optimum moisture, and compacted to at least 95 percent relative compaction. California Bearing Ratio (CBR) tests and/or field observations should be performed on the actual subgrade soils during construction to confirm that the above design sections are adequate. The aggregate base and subbase courses should consist of crushed basaltic aggregates compacted to a minimum of 95 percent relative compaction.

In general, paved areas should be sloped, and drainage gradients should be maintained to carry surface water off the pavements. Surface water ponding should not be allowed on the site during or after construction. Where concrete curbs are used to isolate landscaping in or adjacent to the pavement areas, we recommend that the curbs extend a minimum of 2 inches into the subgrade soil to reduce the potential for migration of excessive landscape water into the pavement section.

LIMITATIONS

The findings and discussions submitted herein are based, in part, upon our desktop study of available subsurface information, literature research, and past project experience in the vicinity of the Waipahu area. Variations of the subsurface conditions between and beyond the field borings may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented herein.

Additional design-level geotechnical engineering analyses should be conducted to confirm and/or modify the preliminary geotechnical recommendations provided herein when structural loading information becomes available. Our services on this project were performed in accordance with generally accepted standards of geotechnical engineering practice; no warranty is expressed or implied.

This letter report has been prepared solely for the purpose of assisting Highridge Costa Development Company in the planning and evaluation of the project only. Therefore, this letter report may not contain sufficient data, or the proper information, to serve as the basis for detailed design and preparation of construction drawings. A design-level geotechnical study will need to be conducted for the detailed project design.

CLOSURE

We appreciate the opportunity to provide professional services to you on this project. If you have questions or need additional information, please contact our office.

Respectfully submitted,

GEOLABS, INC.

By _____
Gerald Y. Seki, P.E.
Vice President

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

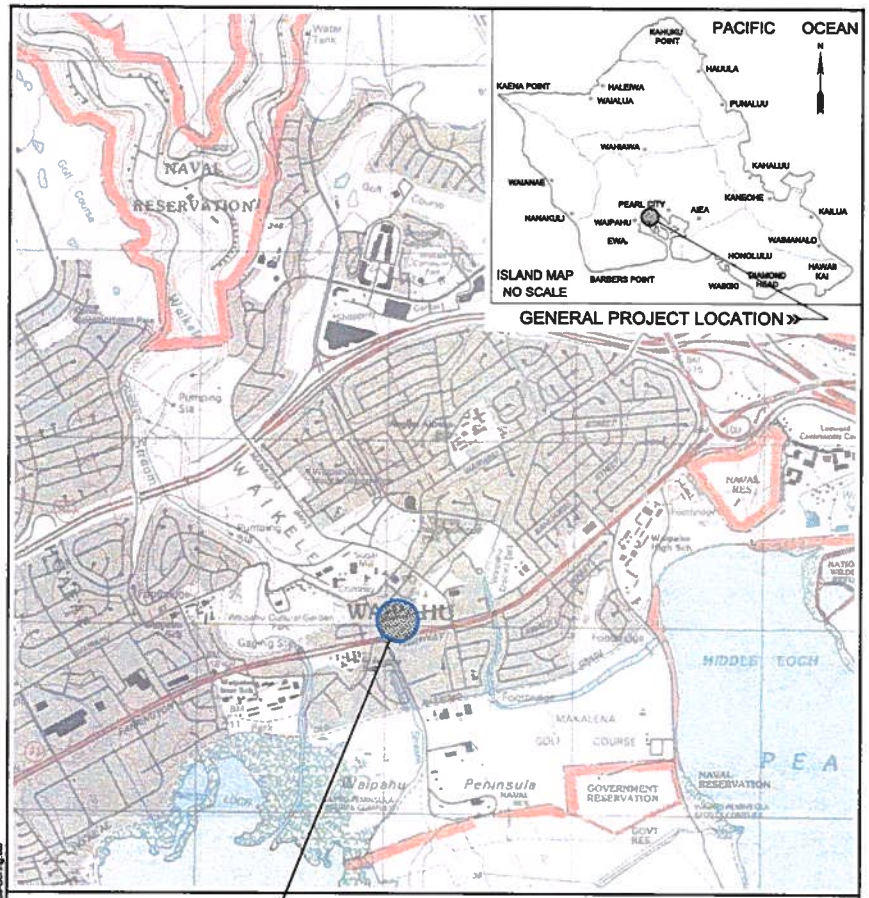
SIGNATURE _____ EXPIRATION DATE OF THE LICENSE 4-30-24

GS:JS:cj

Attachments: Project Location Map, Plate 1
Site Plan, Plate 2

h:\7600_Series\7607-30.js1.doc

REF-443



2000 1000 0 2000 FT.

GRAPHIC SCALE

N

REFERENCE: MAP CREATED WITH TOPO® ©2010 NATIONAL GEOGRAPHIC; ©2007 TELE ATLAS, REL. 1/2007.

CAD User: HENRY File Last Updated: June 22, 2018 4:12:33pm Plot Date: April 07, 2022 - 12:03:17pm
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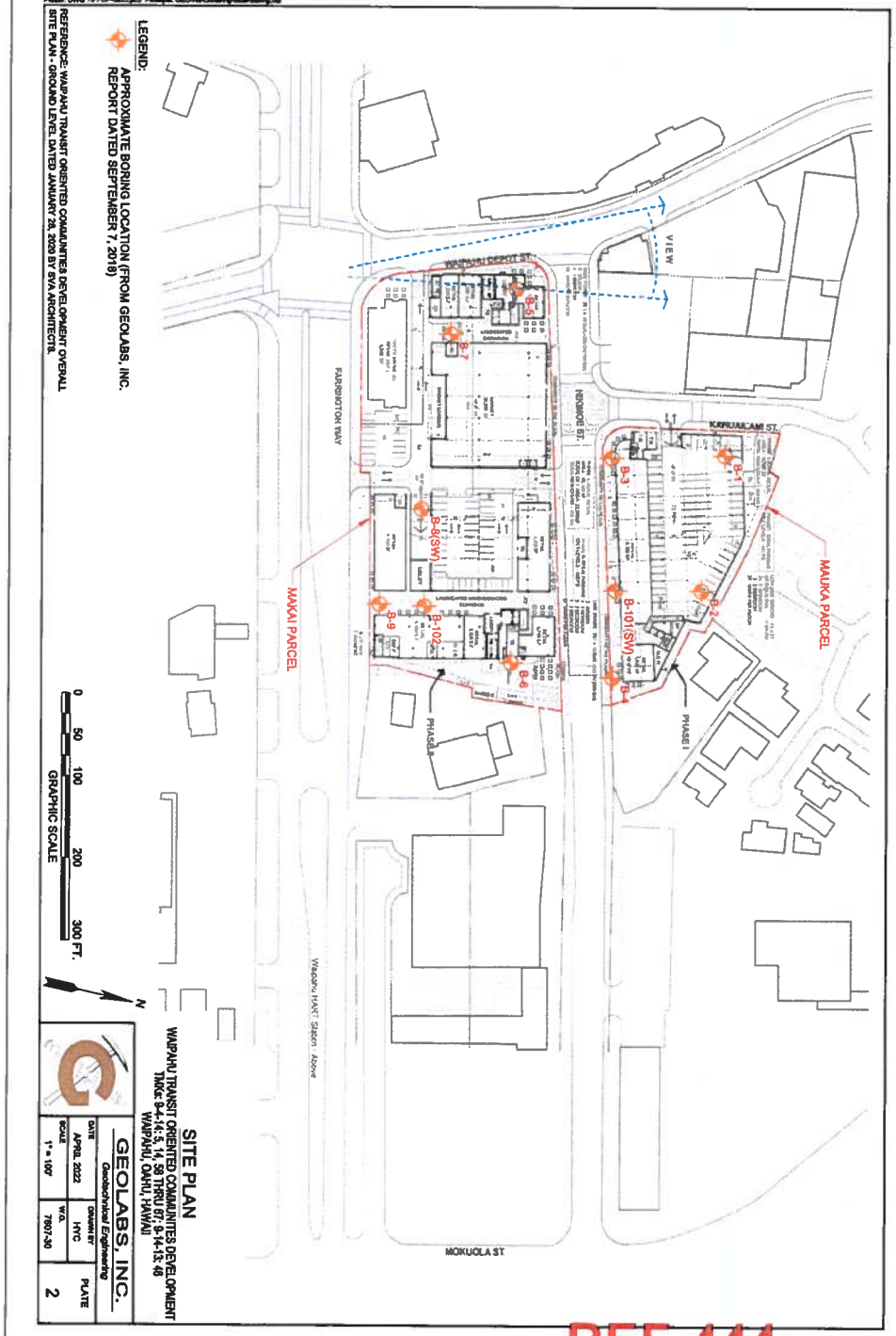
Plotter: DWG to PDF.pc3 Paper: ISO-A0 (841.00mm x 1189.00mm)

PROJECT LOCATION MAP

WAIPAHU TRANSIT ORIENTED COMMUNITES DEVELOPMENT
TMKs: 9-4-14: 5, 14, 58 THRU 67; 9-14-13: 46
WAIPAHU, OAHU, HAWAII

GEOLABS, INC. Geotechnical Engineering		
DATE APRIL 2022	DRAWN BY KHN / HYC	PLATE 1
SCALE 1" = 2,000'	W.O. 7607-30	



LEGEND:

APPROXIMATE BORING LOCATION (FROM GEOLABS, INC. REPORT DATED SEPTEMBER 7, 2018)

REFERENCE: WAIPAHU TRANSIT ORIENTED COMMUNITIES DEVELOPMENT OVERALL SITE PLAN - GROUND LEVEL DATED JANUARY 28, 2020 BY SYA ARCHITECTS.

0 50 100 200 300 FT.

GRAPHIC SCALE

N

SITE PLAN

WAIPAHU TRANSIT ORIENTED COMMUNITES DEVELOPMENT
TMKs: 9-4-14: 5, 14, 58 THRU 67; 9-14-13: 46
WAIPAHU, OAHU, HAWAII

GEOLABS, INC. Geotechnical Engineering		
DATE APRIL 2022	DRAWN BY HYC	PLATE 2
SCALE 1" = 100'	W.O. 7607-30	

CAD User: HENRY File Last Updated: April 07, 2022 6:59:39pm Plot Date: April 07, 2022 - 6:59:11pm
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REF-444

MUNEKIYO HIRAGA

Planning Project Management Sustainable Solutions

REF-445

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Karlynn K. Fukuda
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VICE PRESIDENT
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VICE PRESIDENT

Michael T. Munekiyo AICP
SENIOR ADVISOR

September 16, 2022

Dawn Takeuchi Apuna, Acting Director
Attention: Alex Beatty
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

SUBJECT: Keawalau Affordable Housing Community Project in Waipahū, O'ahu, Hawai'i

Dear Ms. Takeuchi Apuna:

Thank you for the Acceptance Notice dated September 2, 2022 for the 201H application for the proposed Keawalau Affordable Housing Community Project. We appreciate the Department of Planning and Permitting's (DPP) review and acceptance of the application and provide the following responses to your request for additional information:

Comment No. 1:

Corrected drawings that show the height setback for BMX-3 Community Business Mixed Use District as being measured from the required yard, up to a height of 40 feet, then up and in at a rate of 1-foot in per 10 feet of height [See Figure 21-3.3 of the Land Use Ordinance (LUO). Please note on the plans the maximum encroachment for both mauka and makai lots. It appears that the drawings provided use the old street centerline height setback.

Response: An updated drawing set, addressing Comment No.1, is provided herein as **Attachment "A"**. The exemption requests regarding the BMX-3 District Height Setback and Transitional Height Setback requirements have also been added to the requested exemption list. See **Attachment "B"**.

Comment No. 2

Clarification of the proposed Floor Area Ratio (FAR), including any open space bonuses, and the requested waiver or exemption being sought. The chart provided indicates that you are seeking a FAR of 4.0; however, the plans indicate that the mauka site will have a FAR of about 2.7, and the makai site will have a FAR of about 3.2.

> **Response:** The exemption request regarding additional Floor Area Ratio (FAR) has been updated to be consistent with the drawings. The revised exemption request seeks to allow the maximum FAR of 3.5 without obtaining a Special District Permit Major. Refer to **Attachment "B".**

Comment No. 3.

Clarification of any waivers related to signs. The chart provided does not indicate any waivers are sought; however, the plans submitted show more signs, more sign area, and higher signs than would be permitted under the Land Use Ordinance.

> **Response:** The proposed project will comply with Article 7, Sign Regulations of the Land Use Ordinance.

Comment No. 4

A brief discussion of the construction schedule if financing is not awarded in 2023 for this Project. Particularly, when would construction start for each phase of the Project if financing is not awarded in 2023? The City Council typically requires construction to begin within two years of the approved 201H Resolution. If there is a possibility that construction may not start within two years, we would encourage you to specify a reasonable timeframe so that we may recommend an alternative to the Council to avoid unnecessary extension requests.

> **Response:** The project's financing application processes with the Hawai'i Housing and Development Corporation (HHFDC) are anticipated to be reviewed from the 1st through 3rd Quarters of 2023 for Phase 1 (Mauka Block) and from the 1st through 3rd Quarters of 2024 for Phase 2 and Phase 3 (Makai Block). The HHFDC financing application is a competitive process and the proposed project is not guaranteed to be awarded as planned. If financing is not granted, the Applicant will re-submit for financing in the following year. Based on the foregoing, the Applicant respectfully requests the DPP to recommend a four (4)-year timeframe for initiation of construction after the 201H Resolution is approved by the Council.

Comment No. 5.

Information about the affordability of the six managers units. In parts of the document, the Project is called "100 percent affordable," but it does not appear that the managers units are assigned an affordability rate (AMI) or period of affordability (years). If these units are not expected to be affordable, the table should be updated to reduce all fee waiver calculations accordingly. ***See No. 7 below.***

> **Response:** A total of six (6) managers' units is proposed as part of the proposed project. They are non-revenue units intended to allow for onsite management that better serves residents' needs and will remain in place for 60 years. However, as these units are not Area Median Income (AMI) restricted, they have been removed from the fee waiver calculations. Refer to **Attachment "B"**.

Comment No.6

Information about loading operations for the mauka site. It does not appear that the loading area has a dimensioned loading space, so it is not clear if a loading space can operate at the identified location without encroaching into the required yard or the travel lane.

> **Response:** The project plans have been updated to show dimensions of the proposed loading space in the Mauka Block. Refer to **Attachment "A"**.

Comment No. 7.

Updated details for each requested fee waiver after reviewing Resolution No. 20-262, FD1, which details the City Council's policies regarding fee waivers. Fee waivers for any units that are not affordable, and fee waivers for commercial uses, are typically not supported by the City Council, per the Resolution.

> **Response:** The fee waiver requests have been updated to reflect the waivers for the affordable housing units only. Refer to **Attachment "B"**.

Comment No. 8

Information about the 20-foot-wide easement impacting Parcels 61 and 62, and the Roadway Easement impacting Parcel 58. If these are access easements in favor of others, they should be removed from the lot area when calculating the FAR.

Response: The 20-foot-wide easement affecting Parcels 60 through 62 (referred to as "Easement 3") was created in 1923 in favor of the City and County of Honolulu for a perpetual right to lay and maintain a sewer pipe through and over and across a strip of land 20 feet wide, recorded in Liber 722 on Pages 59 through 63. The easement is described and shown on Land Court App 799 Map 0001. See **Attachment "C".** When easements are designated in this fashion, they may be subsequently be cancelled by a subdivision action.

In 1959, what was then known as Lot 11 (the Mauka Block of the proposed project) was subdivided into nine (9) separate lots and Easement 3 was cancelled. Land Court Map No. 6 was approved by DPP and then recorded with the Land Court. See **Attachment "D"**. The description of the map on the right hand side indicates that Easement 3 was cancelled. The surveyor added this easement to the survey in error. The easement does not appear on title, nor the TMK map. The survey map has been included herein as **Attachment "E".**

The roadway easement impacting Parcel 58 is associated with an existing driveway to the adjacent parcel. The Applicant will be working with the neighboring landowner to cancel and remove the easement from title. As such, no impacts to the FAR calculation are anticipated.

Comment No. 9

A detailed discussion of the current and final zoning lots for the mauka and makai phases of the Project. If a Joint Development is being considered to consolidate multiple adjacent zoning lots into one zoning lot for development purposes, you may seek a waiver from permit requirements of the Conditional Use Permit. If a consolidation through subdivision action is being considered, you may seek a waiver from the subdivision fee.

Response: We appreciate your comment and have added a waiver request from the Conditional Use Permit requirements related to Joint Development. Refer to **Attachment "B".**

Should you have any questions, please do not hesitate to contact me at (808) 983-1233.

Very truly yours,

Yukino Uchiyama

Yukino Uchiyama, AICP
Senior Associate

YU:de
Enclosure
cc: Moe Mohanna, Highridge Costa Development Company
Monte Heaton, Highridge Costa Development Company
Bill Koster, SVA Architects
K:\DATA\Highridge\Waipahu AH PERMITTING 2423\Applications\201H Application\(2) DPP Response Letter\(Final) 201H DPP Response Ltr.docx

ATTACHMENT A.
UPDATED DRAWINGS

Keawalau Affordable Housing Community

NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

SEPTEMBER 16, 2022

Kamehameha Schools

Celebrating 25 Years Highridge Costa
Creating a Blueprint for a Better Nation Since 1994
1994-2019

PBR HAWAII & ASSOCIATES, INC.

SVA

2019.40117 SEPTEMBER 16, 2022

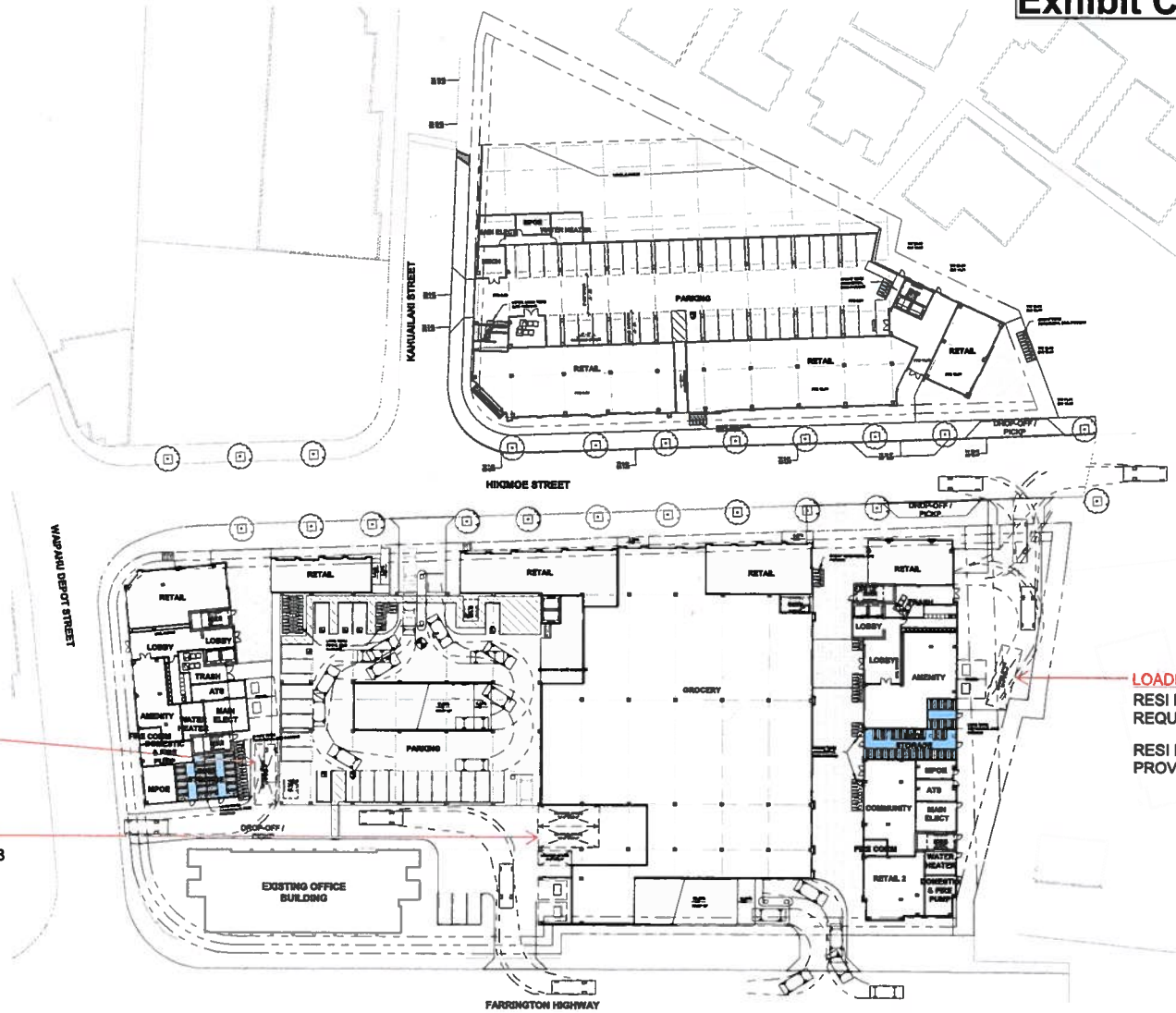
GROUND FLOOR PLAN

Keawalau at Waipahū

Exhibit C

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:



LOADING ZONE
RESI LOADING REQUIRED = 2
RESI LOADING PROVIDED = 1

RETAIL/GROCERY LOADING
LOADING REQUIRED FOR RETAIL = 3
LOADING SPACES PROVIDED = 3

LOADING ZONE
RESI LOADING REQUIRED = 2

RESI LOADING PROVIDED = 1

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LEVEL 2

Keawalau at Waipahū

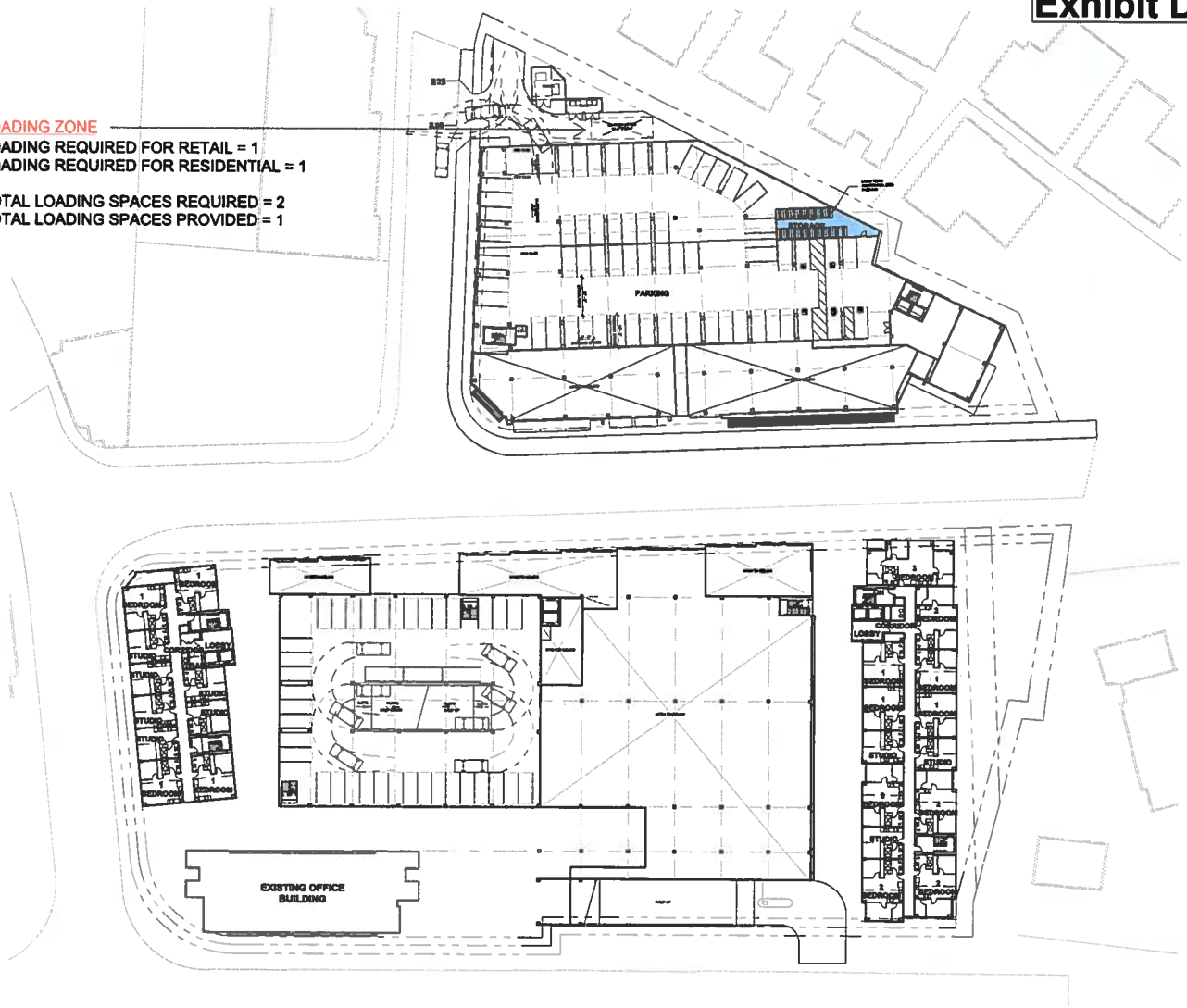
Exhibit D

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE

BICYCLE PARKING:

LOADING ZONE
LOADING REQUIRED FOR RETAIL = 1
LOADING REQUIRED FOR RESIDENTIAL = 1

TOTAL LOADING SPACES REQUIRED = 2
TOTAL LOADING SPACES PROVIDED = 1



Kamehameha Schools

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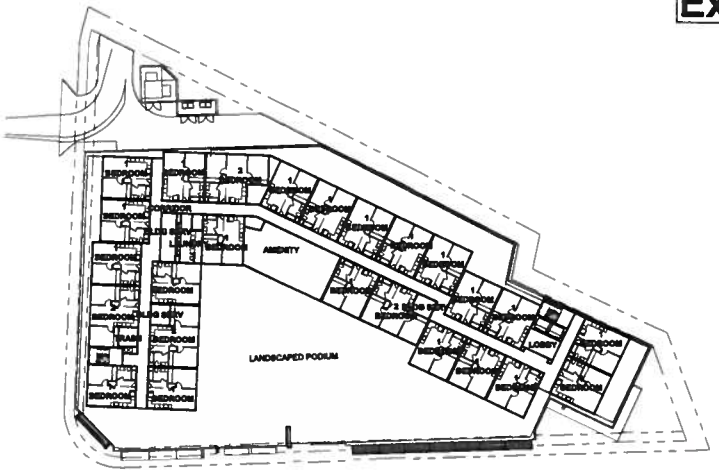
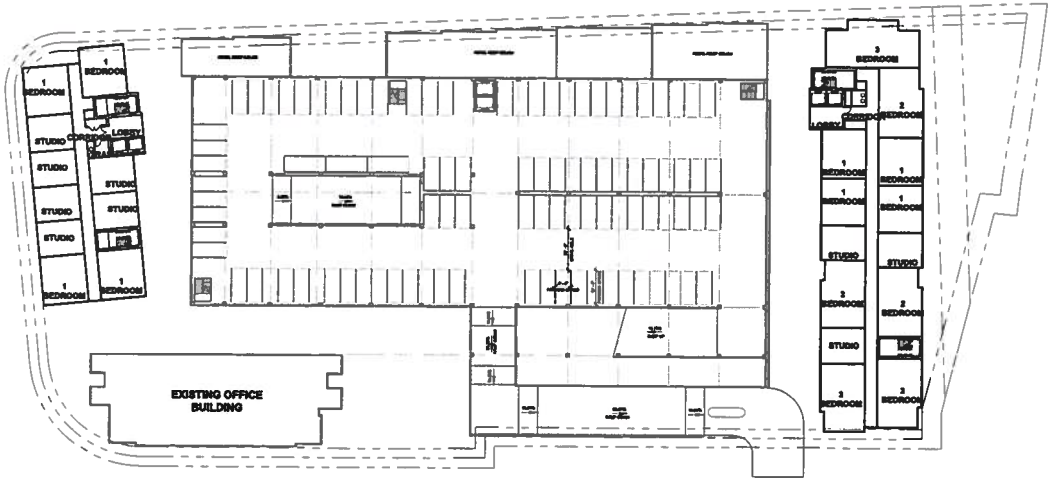
LEVEL 3

Keawalau at Waipahū

Exhibit E

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE





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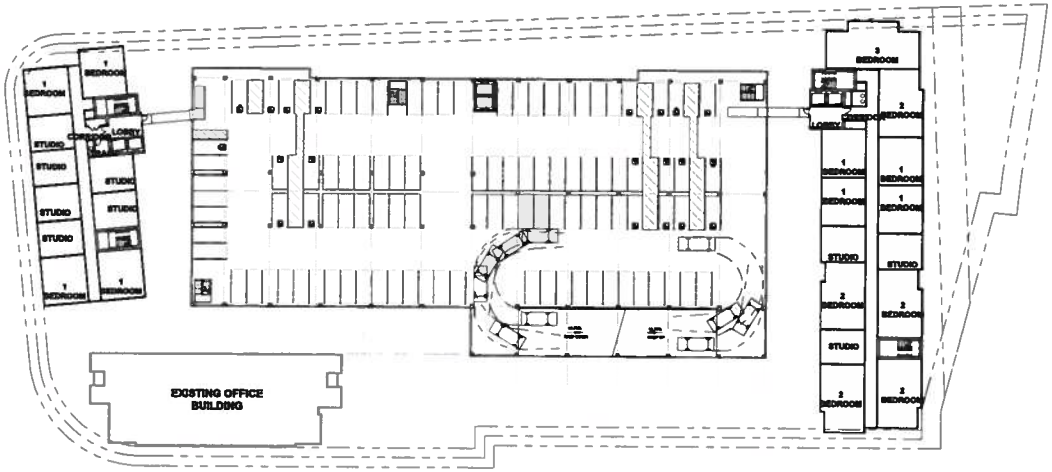
LEVEL 4

Keawalau at Waipahū

Exhibit F

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



Kamehameha Schools

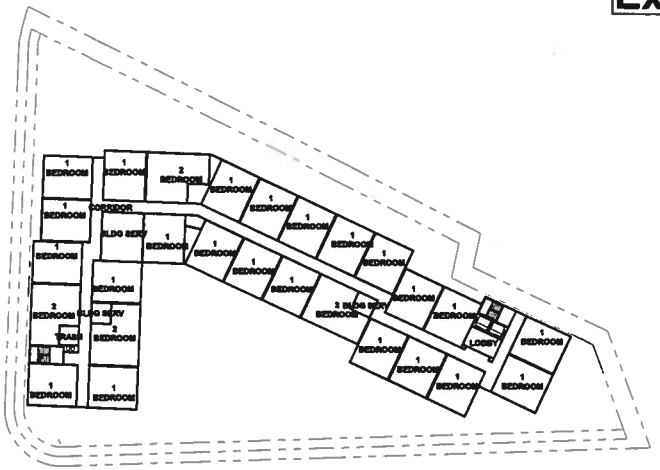
Highridge Costa

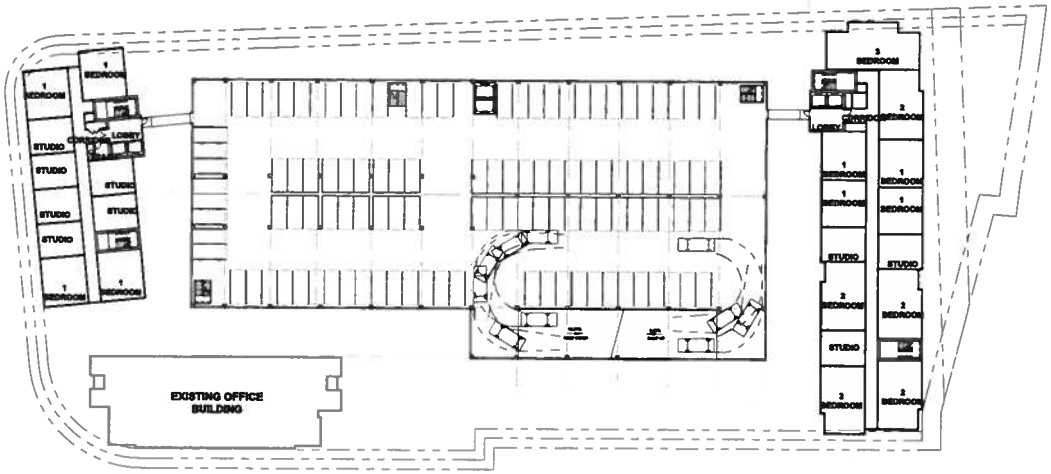
LEVEL 5

Keawalau at Waipahū

Exhibit G

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



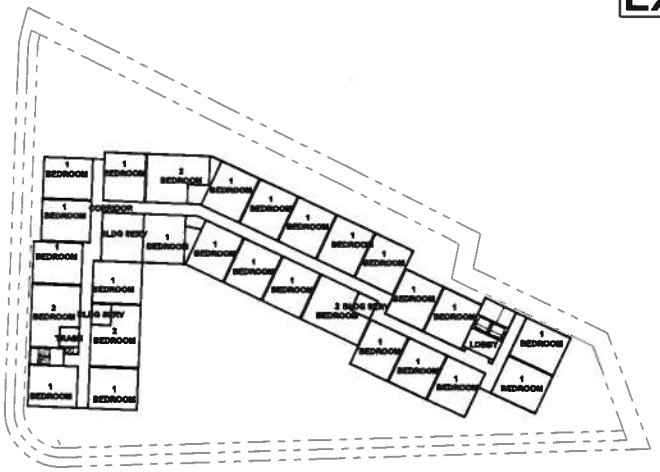


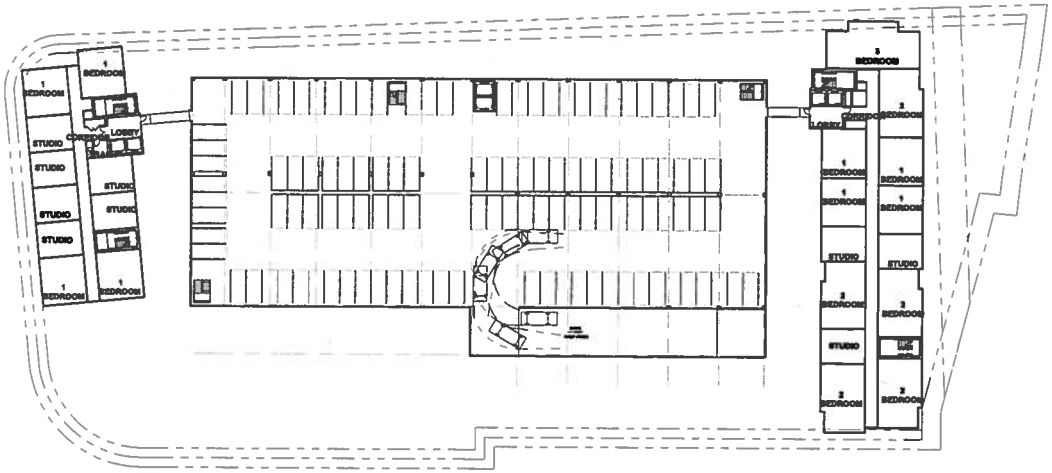
LEVEL 6

Keawalau at Waipahū

Exhibit H

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE





Kamehameha Schools

Highridge Costa

PHI HAWAII ASSOCIATES INC.

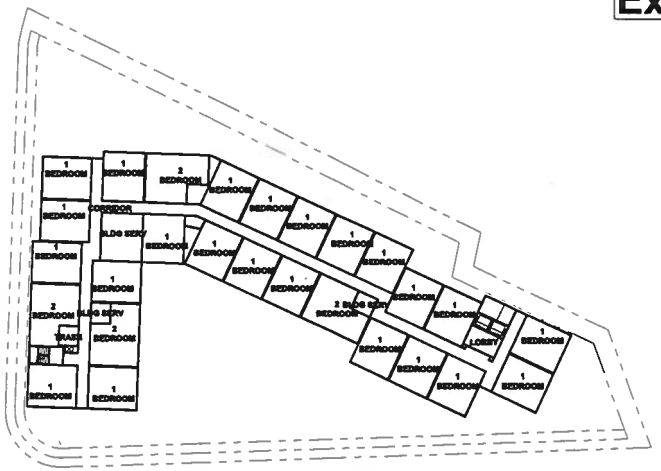
SVA

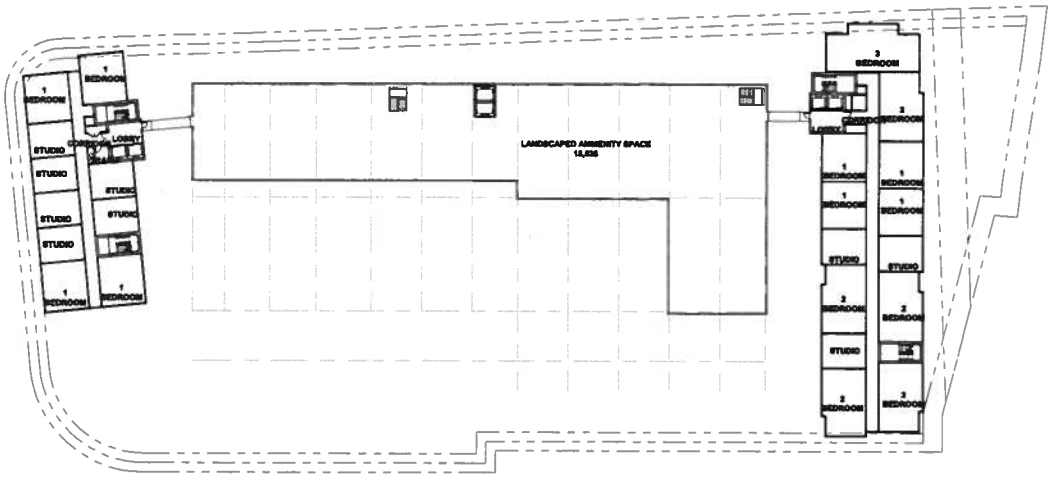
LEVEL 7

Keawalau at Waipahū

Exhibit I

NOTE:
***REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.**
***TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE**



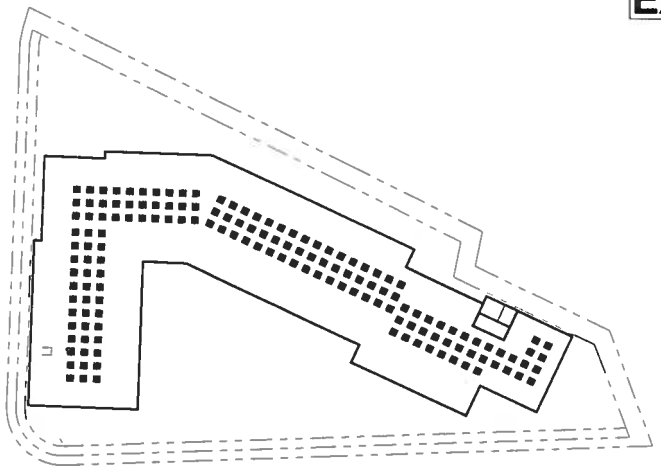


LEVEL 8-18/19

Keawalau at Waipahū

Exhibit J

NOTE:
*REFER TO PARKING SUMMARY TABLES FOR PARKING COUNT.
*TYPICAL PARKING DIMENSIONS = 8'3" X 18' UNLESS NOTED OTHERWISE



LEVEL ROOF

LEVELS 8-18

LEVELS 8-19

SITE PHASING + DATA

Keawalau at Waipahū

Exhibit K

PARKING

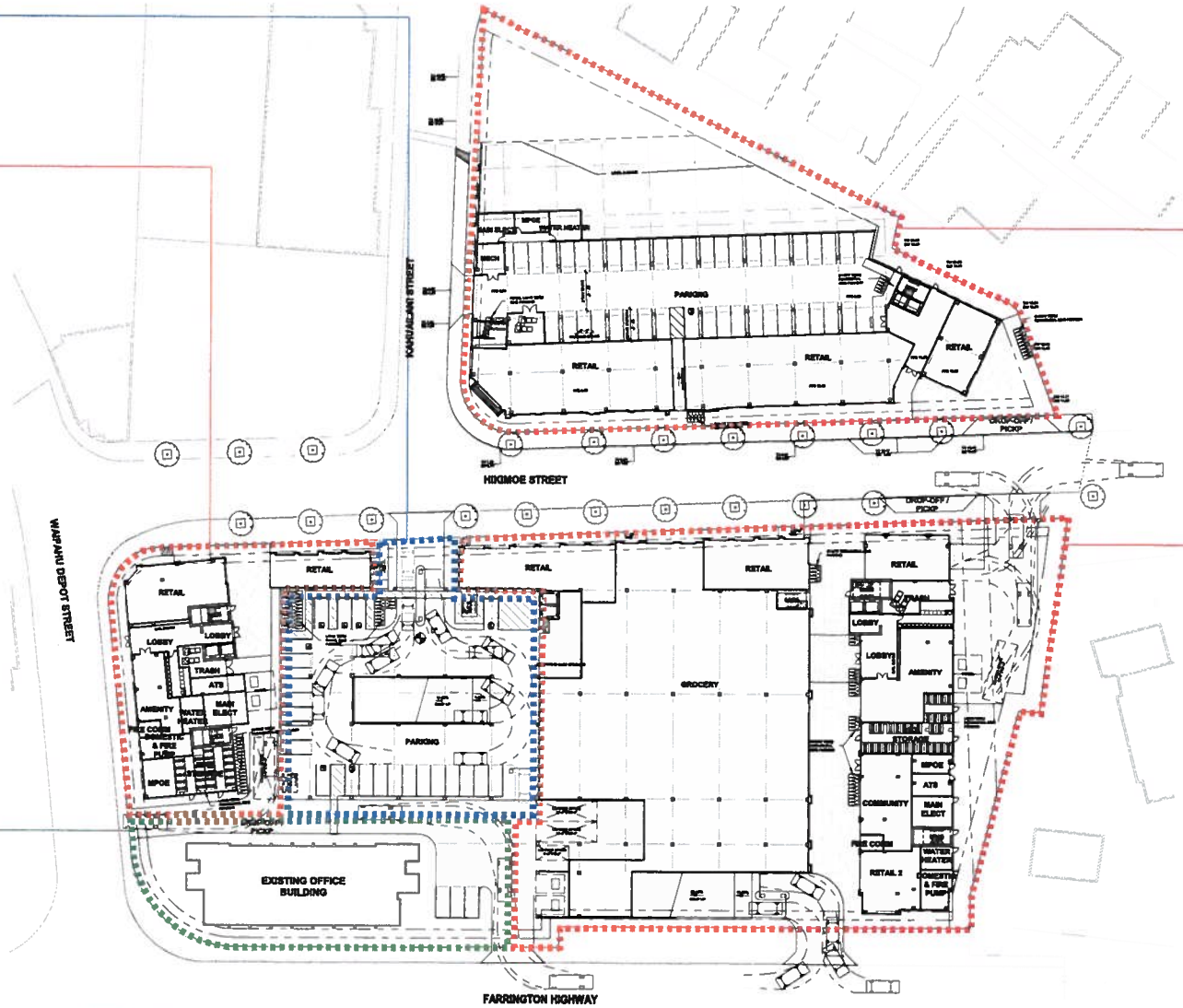
Parking structure will be allocated between phases 2 and 3 at a later date.

PHASE 3

Total Retail = 3,685 sf
Total Resi Count = 170
Total stories = 18
Total Residential stories = 17

West Tower Mix
- 6 studios
- 4 one bed

10 units per level



PHASE 1

Total Retail = 9,796 sf
Total Resi Count = 133

Low Rise Seniors Mix:
- 24 one bed
- 3 two bed

27 units per level

PHASE 2

Total Retail = 5,539 sf
Grocery Store = 23,352 sf
Total Resi Count = 234
Total stories = 19
Total Residential stories = 18

West Tower Mix
- 3 studios
- 4 one bed
- 5 two bed
- 1 three bed

13 units per level

OWNER RETAINED AREA

Existing building to be retained by KS and not included in the development.

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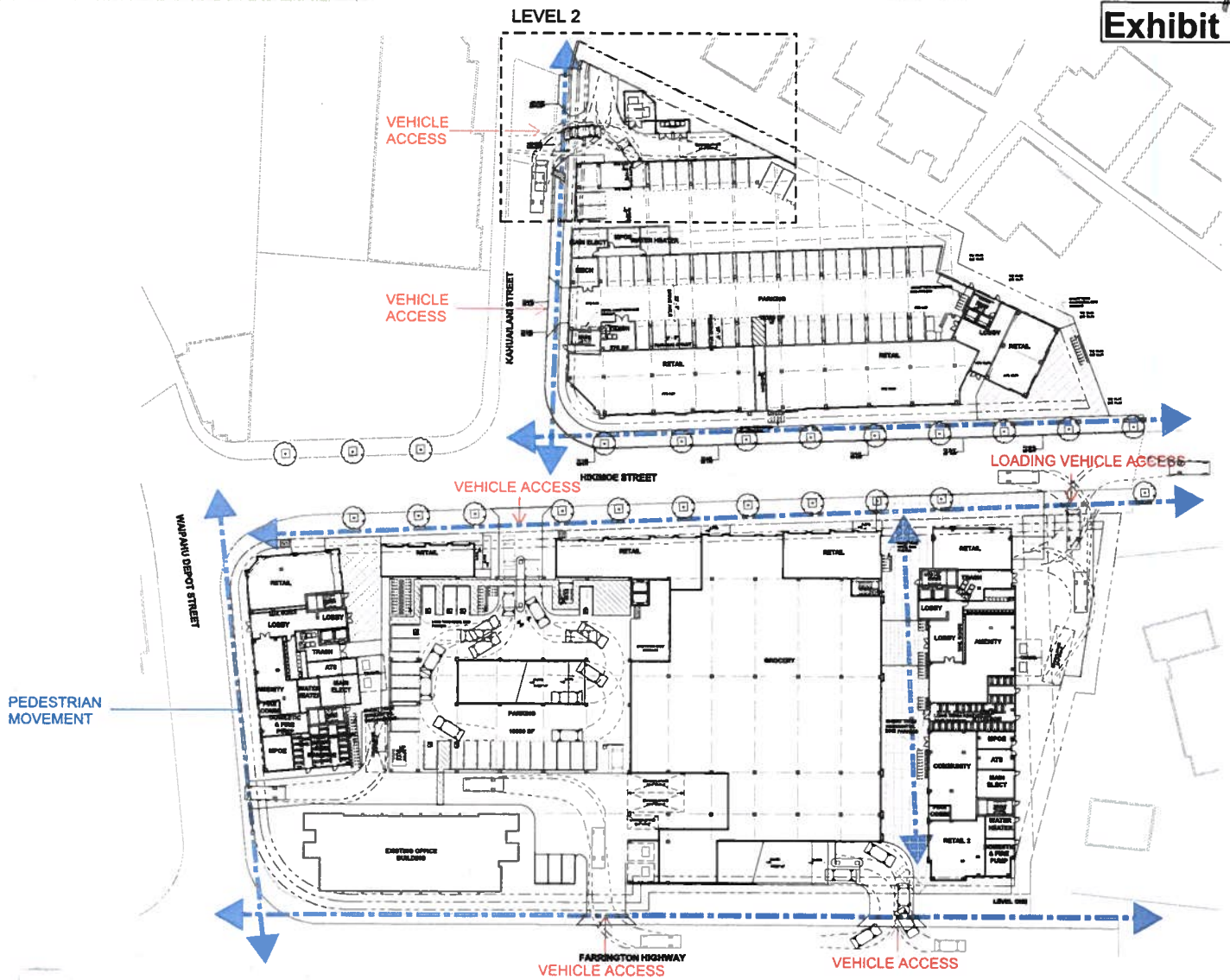
GROUND FLOOR PLAN - CIRCULATION

Keawalau at Waipahū

Exhibit L

NOTE:
*REFER TO LANDSCAPE CONCEPT PACKAGE FOR FURTHER DETAIL ON OPEN SPACE DESIGNATION



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PARKING SUMMARY

Keawalau at Waipahū

Exhibit M

Phase 1

Residential	Unit Area	No Units	Total Area				Parking Required
1 - Bdrm	595	118	70,210				Per Table 21-6.1
2 - Bdrm	779	15	11,685				
Residential Area		133	81,895	1	per	1,000	82
Retail			9,796	1	per	500	20
						Total	102
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	103

Bicycle Parking		Units				Required	Provided
	133	Short Term	1	per	10	14	14
		Long Term	1	per	2	67	67
	9,796	S.F. Commercial Uses					
		Short Term	1	per	2,000	5	5
		Long Term	1	per	12,000	1	1

Phase 2

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	54	24,300				Per Table 21-6.1
1 - Bdrm	590	72	42,480				
2 - Bdrm	830	90	74,700				
3 - Bdrm	1,160	18	20,880				
		234	162,360	1	per	1,000	163
Retail			27,146	1	per	500	55
Office			29,550	1	per	500	60
						Total	278
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	353

Bicycle Parking Provided		Units				Required	Provided
	234	Short Term	1	per	10	24	24
		Long Term	1	per	2	117	117
	56,696	S.F. Commercial Uses					
		Short Term	1	per	2,000	29	29
		Long Term	1	per	12,000	5	5

Phase 3

Residential	Unit Area	No Units	Total Area				Parking Required
Studio	450	102	45,900				Per Table 21-6.1
1 - Bdrm	590	68	40,120				
		170	86,020	1	per	1,000	87
Retail			5,814	1	per	500	12
						Total	99
Total parking required in transit-oriented development special district (See Note 1)							0
						Parking Provided	107

Bicycle Parking Provided		Units				Required	Provided
	170	Short Term	1	per	10	17	17
		Long Term	1	per	2	85	85
	5,814	S.F. Commercial Uses					
		Short Term	1	per	2,000	3	3
		Long Term	1	per	12,000	1	1

Note 1
Sec. 21-6.20 (a) no off-street parking is required in any zoning district within one-half mile of an existing or future Honolulu rail transit station, as identified in the accepted environmental impact statement, or in the transit-oriented development special districts.

Loading Spaces

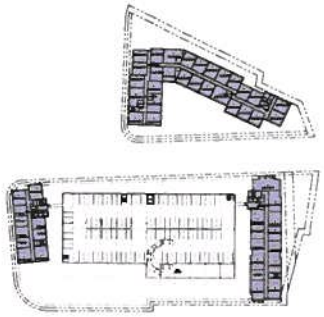
Phase 1	Residential	20 - 150 (1 Required)	133	Units	1
Phase 1	Retail	2,000 - 10,000 (1 Required)	9,796	S.F.	1
				Total Loading Spaces Required	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 1					
Phase 2	Residential	151 - 300 (2 Required)	234	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 2 residential					
Phase 3	Residential	151 - 300 (2 Required)	170	Units	2
1 Loading space provided, exemption to reduce number of loading spaces to 1 for phase 3 residential					
Phase 2 & 3	Retail	20,000 - 40,000 (3 Required)	32,960	S.F.	3
				3 Loading spaces provided	
Existing	Office	20,00 - 50,000 (1 Required)	29,550	S.F.	1
0 Loading space provided, exemption to reduce number of loading spaces to 0 for existing office building					

FAR DIAGRAM & CALCULATION

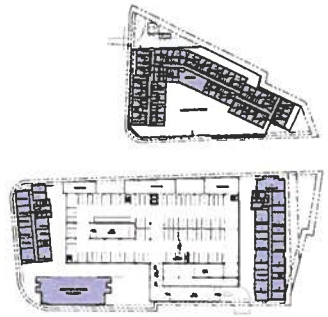
Keawalau at Waipahū

Exhibit N

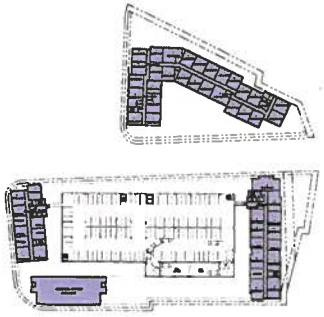
FLOOR AREA RATIO (FAR)



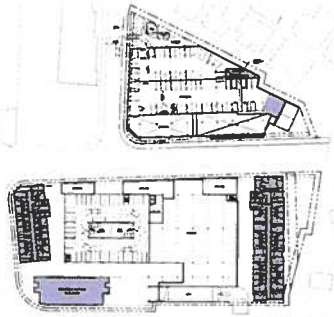
LEVEL 6 (typ upper)



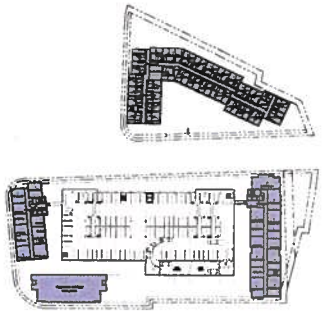
LEVEL 3



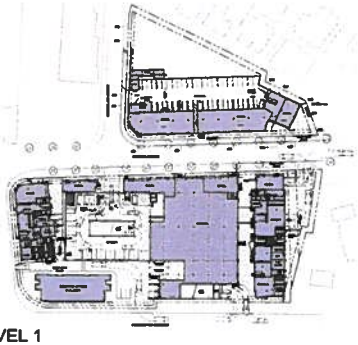
LEVEL 5



LEVEL 2



LEVEL 4



LEVEL 1

PHASE 1 (SENIOR)

Lot Area	50,925
FAR	2.41

		GFA
Level	7	21,182 SF
Level	6	21,182 SF
Level	5	21,182 SF
Level	4	21,182 SF
Level	3	21,182 SF
Level	2	2,490 SF
Level	1	14,123 SF
Total		122,523 SF

PHASE 2, 3 & EXISTING OFFICE TOWER

Lot Area	119,090 SF
FAR	3.44

GROSS FLOOR AREA	
Phase 2	247,665 SF
Phase 3	132,172 SF
Office	29,550 SF
TOTAL	409,387 SF

		GFA (Phase 2)
Level	19	11,518 SF
Level	18	11,518 SF
Level	17	11,518 SF
Level	16	11,518 SF
Level	15	11,518 SF
Level	14	11,518 SF
Level	13	11,518 SF
Level	12	11,518 SF
Level	11	11,518 SF
Level	10	11,518 SF
Level	9	11,518 SF
Level	8	11,518 SF
Level	7	11,518 SF
Level	6	11,518 SF
Level	5	11,518 SF
Level	4	11,518 SF
Level	3	11,518 SF
Level	2	11,518 SF
Level	1	40,341 SF
Total		247,665 SF

		GFA (Phase 3)
Level		
Level	18	7,252 SF
Level	17	7,252 SF
Level	16	7,252 SF
Level	15	7,252 SF
Level	14	7,252 SF
Level	13	7,252 SF
Level	12	7,252 SF
Level	11	7,252 SF
Level	10	7,252 SF
Level	9	7,252 SF
Level	8	7,252 SF
Level	7	7,252 SF
Level	6	7,252 SF
Level	5	7,252 SF
Level	4	7,252 SF
Level	3	7,252 SF
Level	2	7,252 SF
Level	1	8,888 SF
Total		132,172 SF

		GFA (Phase 2+3)
Level	19	11,518 SF
Level	18	18,770 SF
Level	17	18,770 SF
Level	16	18,770 SF
Level	15	18,770 SF
Level	14	18,770 SF
Level	13	18,770 SF
Level	12	18,770 SF
Level	11	18,770 SF
Level	10	18,770 SF
Level	9	18,770 SF
Level	8	18,770 SF
Level	7	18,770 SF
Level	6	18,770 SF
Level	5	18,770 SF
Level	4	18,770 SF
Level	3	18,770 SF
Level	2	18,770 SF
Level	1	49,229 SF
Total		379,837 SF

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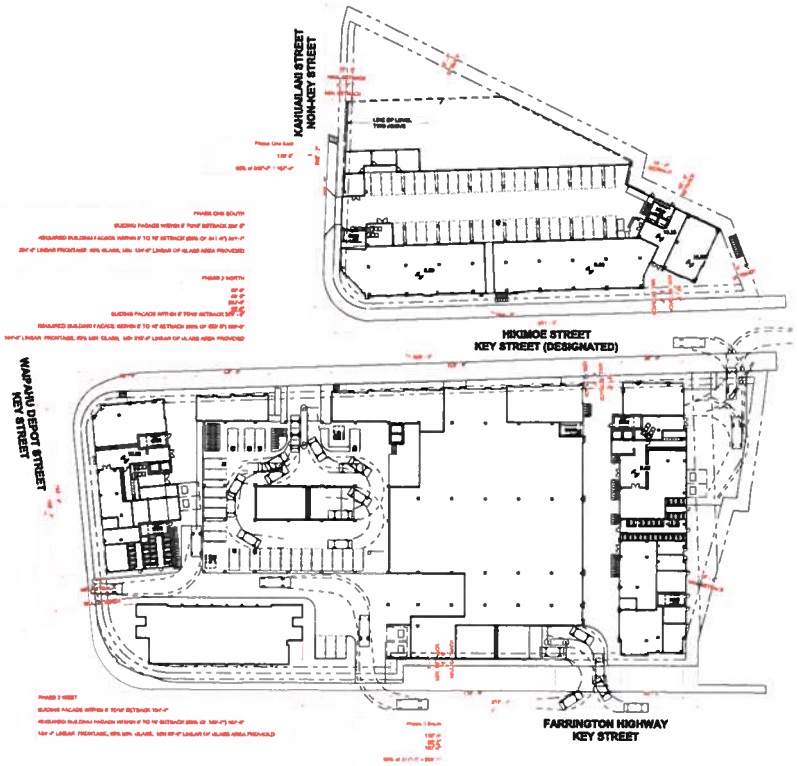
OPEN SPACE DIAGRAM & CALCULATION

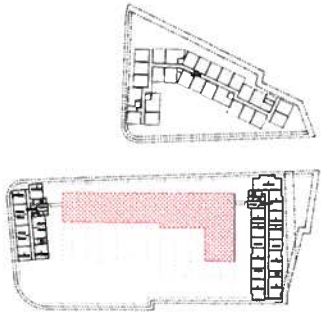
Keawalau at Waipahū

PUBLIC OPEN SPACE

Exhibit O

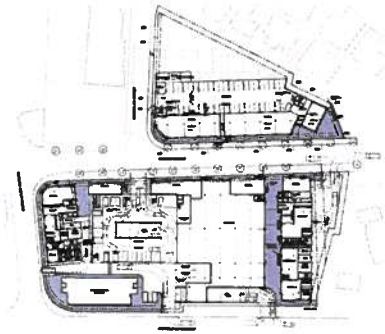
SEMI-PUBLIC OPEN SPACE
(RESIDENTIAL AMENITIES)





LEVEL 6

LEVEL 3



LEVEL 1

PHASE 1 (SENIOR)

Open Space	Level 1	6,658	sf (Public)
	Level 3	10,200	sf (Semi-Public)
	TOTAL	16,858	sf
		33.2 %	

PHASE 2, 3 & EXISTING OFFICE TOWER

Open Space	Level 1	23,663 sf	(Public)
	Level 6	18,841 sf	(Semi-Public)
		42,504 sf	
		35.7 %	

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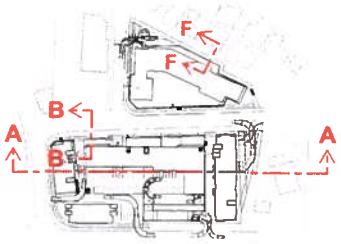
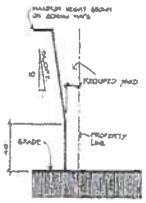
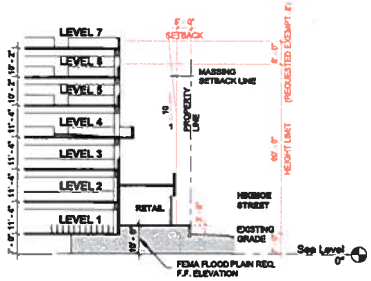
SITE SECTION

Keawalau at Waipahū

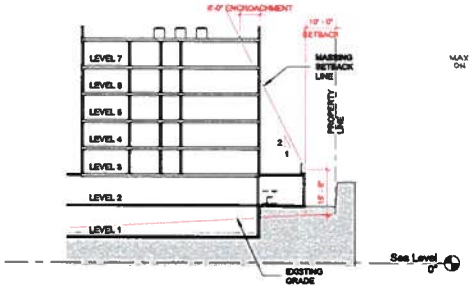
Exhibit P



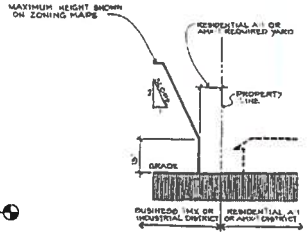


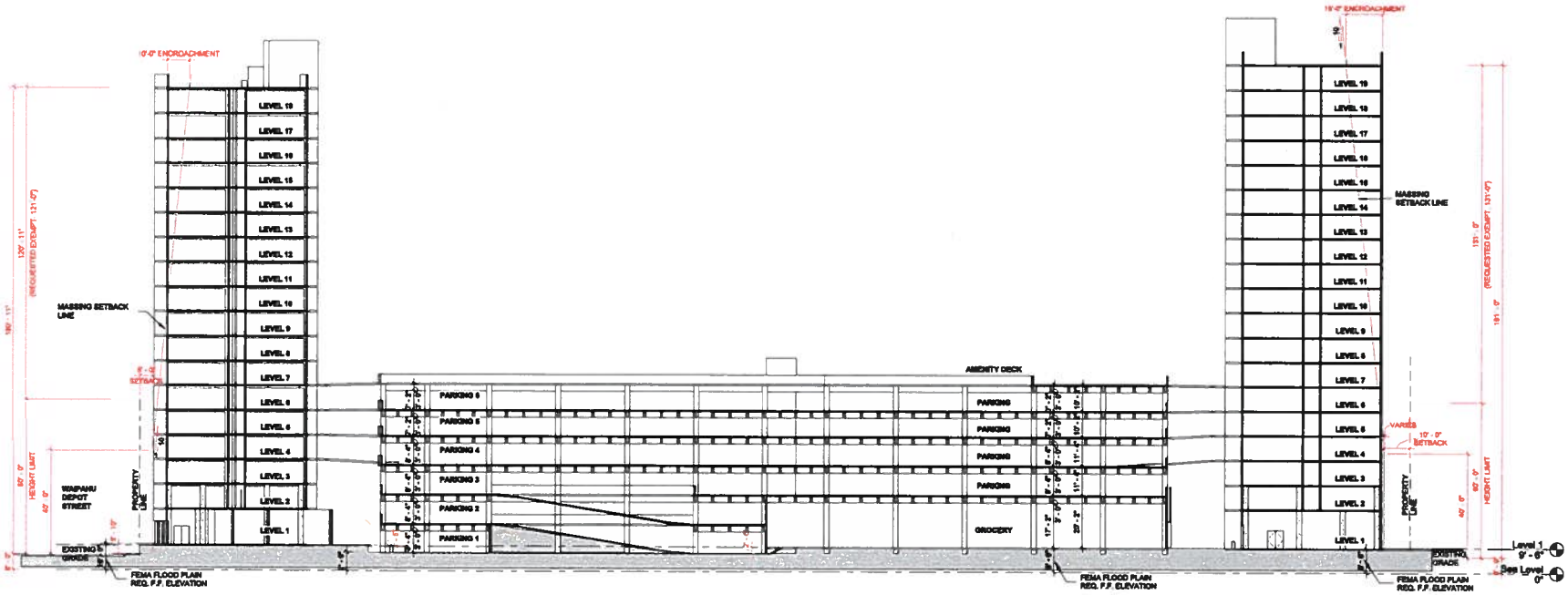


SECTION B-B



SECTION F-F





SECTION A-A

Kamehameha Schools

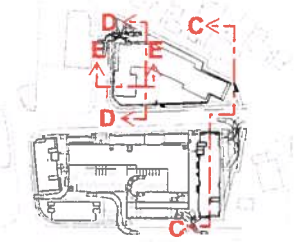
Highridge Costa

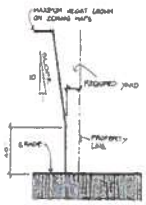
SVA

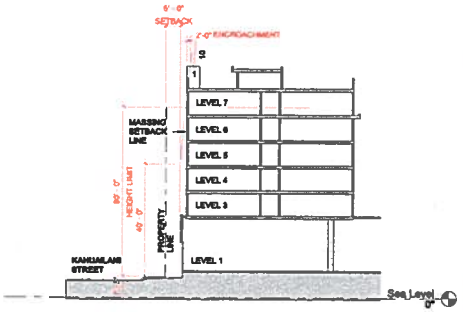
SITE SECTION

Keawalau at Waipahū

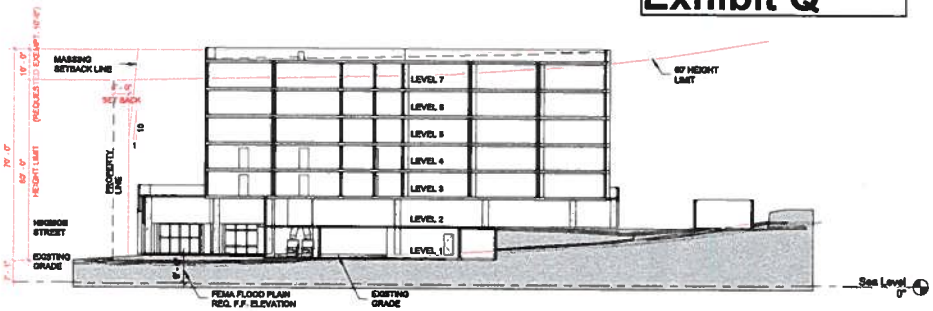
Exhibit Q



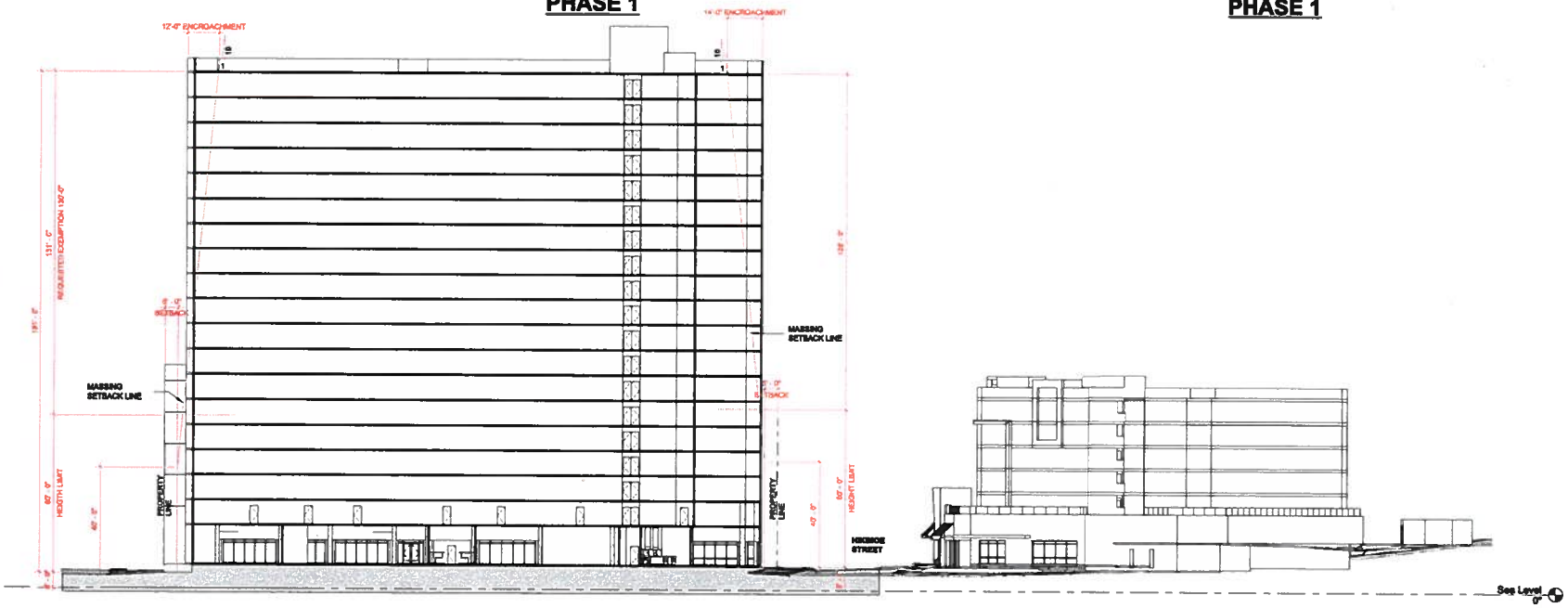




SECTION E-E
PHASE 1



SECTION D-D
PHASE 1



SECTION C-C
PHASE 2

Kamehameha Schools

Highridge Costa

#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

SOUTH ELEVATION-MAUKA SITE

Keawalau at Waipahū

Exhibit R

360' BUILDING FRONTAGE ON THIS ELEVATION

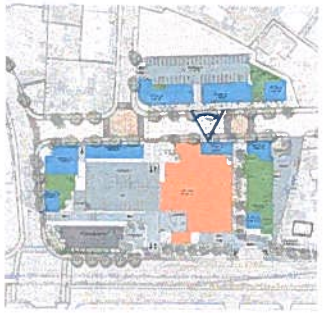
SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 360' x 1.5 = 540 SQ.F

4 TENANTS + BUILDING SIGNAGE = 8 SIGNAGE OF MAX. 67.5 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 45 SQ.F

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING



Kamehameha Schools

Highridge Costa

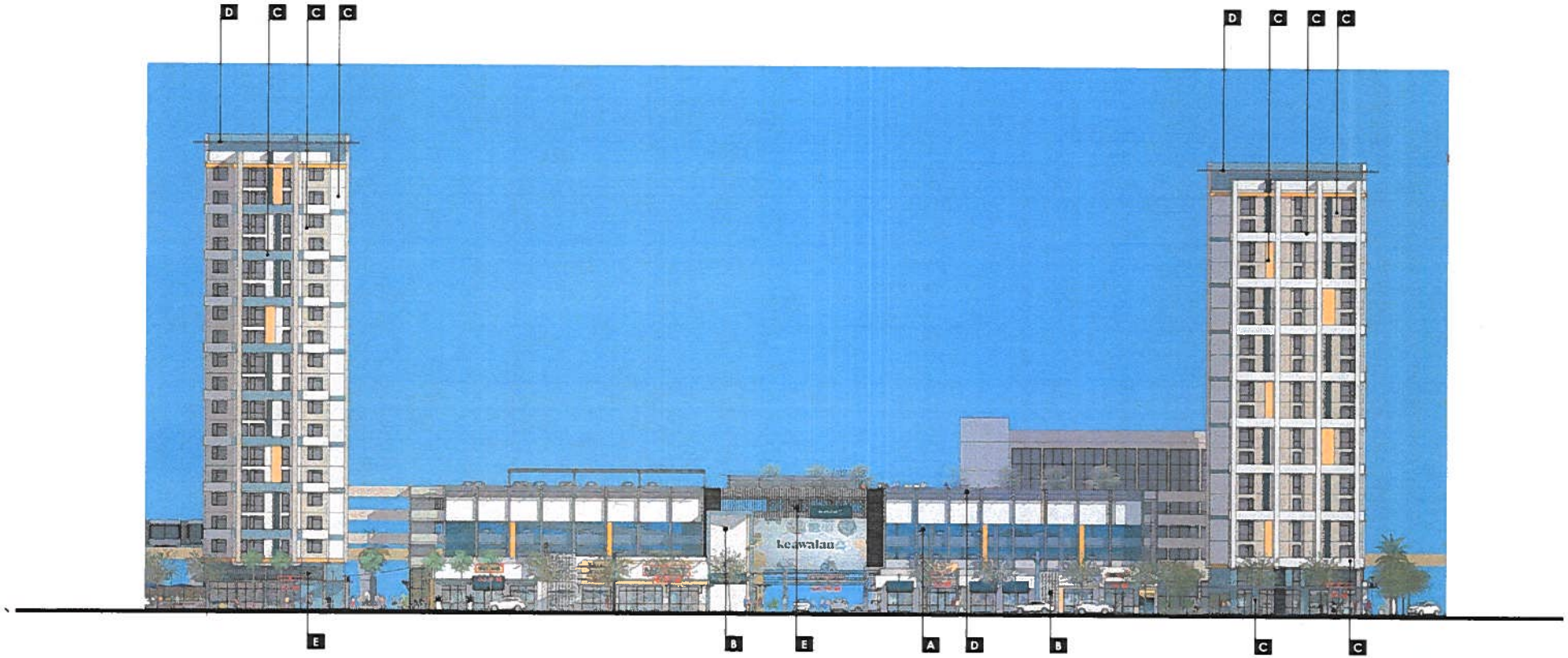
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

NORTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit S



425.2' BUILDING FRONTAGE ON THIS ELEVATION

SIGN AREA PER SIGN REGULATIONS, SEC. 21-7.40g: 1.5 SQ.F FOR EACH LINEAL FOOT OF BUILDING FRONTAGE ; 425.2' x 1.5 = 637 SQ.F

6 TENANTS + BUILDING SIGNAGE = 12 SIGNAGE OF MAX. 53 SQ.F

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools · Highridge Costa · PBR HAWAII & ASSOCIATES, INC. · SVA

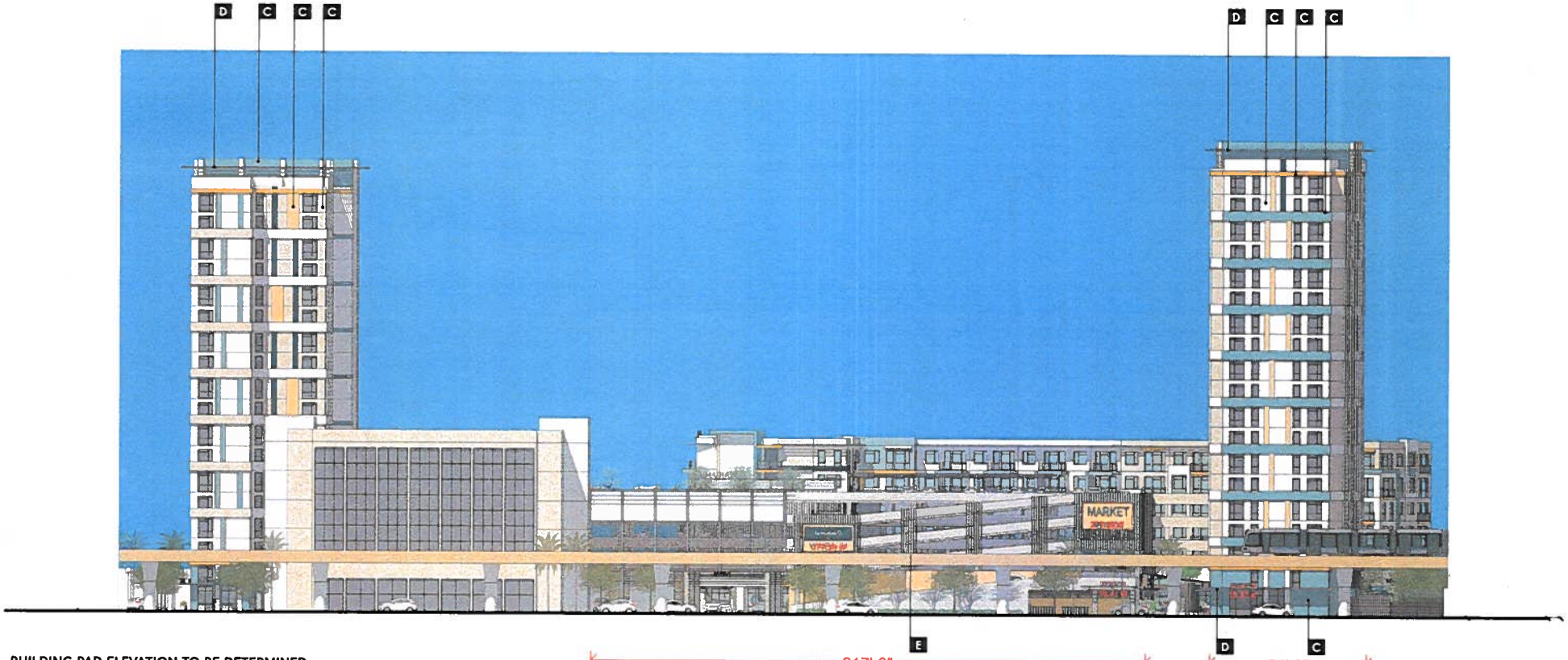
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

SOUTH ELEVATION-MAKAI SITE

Keawalau at Waipahū

Exhibit T



BUILDING PAD ELEVATION TO BE DETERMINED.
6.62' LOWEST ADJACENT GRADE FOR REFERENCE

LEGEND

- **A** PERFORATED METAL SCREEN
- **B** ACCENT PANEL
- **C** EXTERIOR CEMENT PLASTER
- **D** METAL CANOPY
- **E** METAL LOUVER
- **F** METAL MESH RAILING

Kamehameha Schools

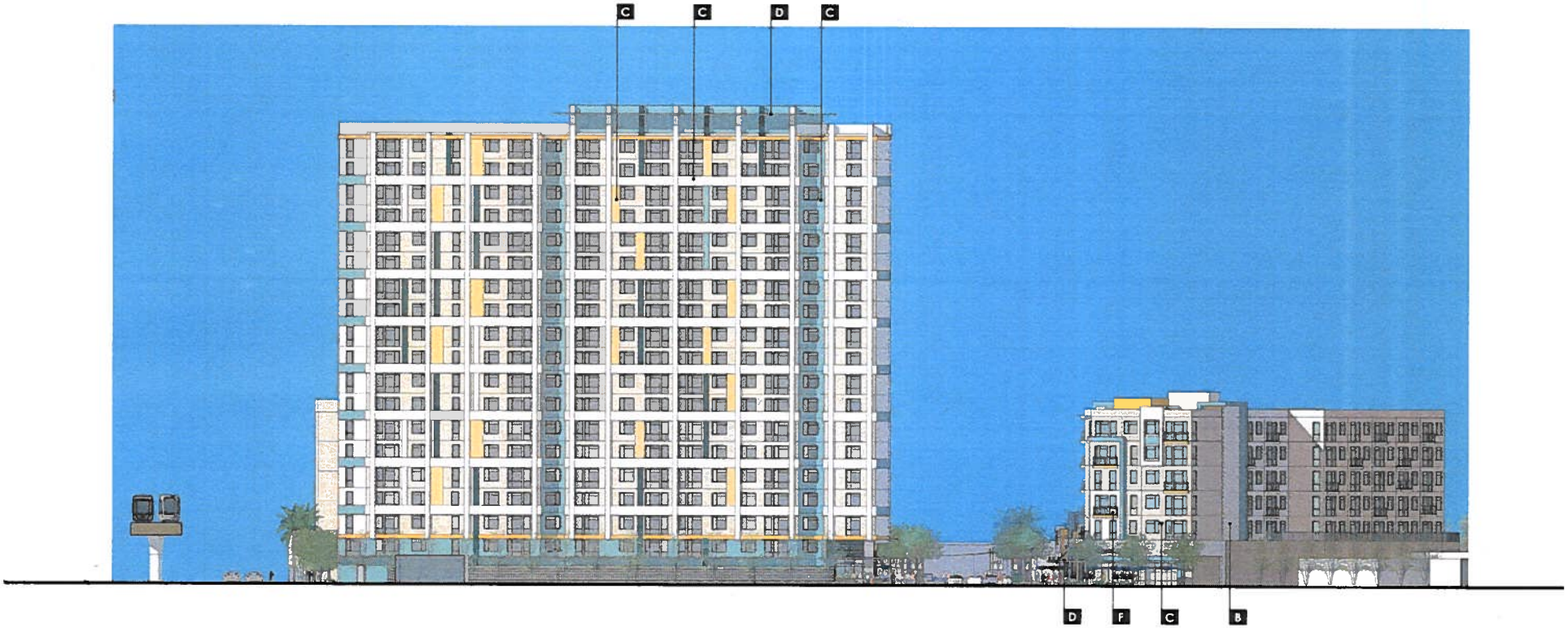
#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

EAST ELEVATION

Keawalau at Waipahū

Exhibit U



LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools

#2019.40117 SEPTEMBER 16, 2022

WAIPAHŪ TRANSIT ORIENTED COMMUNITIES DEVELOPMENT | NEC, WAIPAHŪ DEPOT ST & FARRINGTON HWY, HONOLULU, HAWAI'I

WEST ELEVATION

Keawalau at Waipahū

Exhibit V

LEGEND

- A PERFORATED METAL SCREEN
- B ACCENT PANEL
- C EXTERIOR CEMENT PLASTER
- D METAL CANOPY
- E METAL LOUVER
- F METAL MESH RAILING

Kamehameha Schools · Highridge Costa · PBR HAWAII & PARTNERS INC. · SVA

Mahalo!

Kamehameha Schools

Highridge Costa

PBR HAWAII & ASSOCIATES, INC.

SVA

ATTACHMENT B.
UPDATED REQUESTED EXEMPTIONS LIST

4. REQUESTED EXEMPTIONS PURSUANT TO SECTION 201H-38, HRS

As a 100 percent affordable housing project, Highridge Costa Development Company (Applicant) is seeking an affordable housing project approval from the City Council pursuant to Chapter 201H-38, Hawai'i Revised Statutes (HRS). Applicant requests exemptions from certain conditions relating to planning, zoning, construction standards for subdivisions, development, and improvement of land, and the construction of dwelling units thereon. The specific exemptions requested are presented in the table below.

201H-38 Exemption Request

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
1	BMX-3 District Height Setbacks	Section 21-3.120-2 (c)(2)	Exemptions from the additional height setback requirements for structures over 40 feet in height are sought to allow 2 feet encroachment for Phase 1 (Mauka Block) along Kahuailani Street, 12 feet, 14 feet, and 15 feet encroachments along Farrington Highway, Hikimoe Street, and the eastern property line for Phase 2 (Makai Block East Tower), respectively, and 10 feet encroachment for Phase 3 (Makai Block West Tower) along Waipahū Depot Street.	The requested exemptions allow for design flexibility and the provision of more affordable housing units for the community.	Not Applicable
2	BMX-3 District Transitional Height Setbacks	Section 21-3.120-2 (c)(3)	An exemption from the transitional height setback requirement is requested for the northern property line of the Mauka Block which adjoins R-5 District to allow 8 feet encroachment.	The requested exemption allows for design flexibility and the provision of more affordable housing units for the community.	Not Applicable
3	Joint Development of Two or More Adjacent Subdivision Lots	Section 21-5.380	An exemption to permit the project to proceed without obtaining a Conditional Use Permit Minor for Joint Development of two (2) or more adjacent subdivision lots.	The project site is comprised of 14 separate Tax Map Key (TMK) lots and is divided into two (2) blocks by Hikimoe Street. The exemption would expedite the delivery of affordable workforce housing.	$600 (application fee)

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
4	Need for TOD Special District Permit Major	Section 21-9.20-2(a)	An exemption to permit the project to proceed without obtaining a TOD Special District Permit Major and allow for the maximum Floor Area Ratio (FAR) of 3.5.	The exemption would expedite the delivery of affordable workforce housing and increasing the FAR would allow for the provision of more affordable housing units. The project's consistency with the TOD Special District Design Guidelines will be analyzed as part of the 201H application (refer to Section 9).	$2,400 (application fee)
5	TOD Special District Height Standards	Section 21-9.100-8 (a)(1)(D) and Zoning Map No. 8 (Waipahu Ordinance 17-56)	Exemptions from the height limit of 60 feet specified in the Zoning Map to allow the project to exceed the height limit by 10 feet for Phase 1 (Mauka Block), 131 feet for Phase 2 (Makai Block East Tower), 121 feet for Phase 3 (Makai Block West Tower), and 8 feet for the Makai Block parking structure with the residential amenity deck on top.	The 60-foot height limit would significantly limit the number of affordable housing units that could be provided. A single 60-foot building across the entire Makai Block of the project would have a more detrimental impact on views, be generally unattractive, and yield a fraction of the affordable units.	Not Applicable
6	Setback Improvements	Section 21-9.100-8 (a)(3)(E)(i)	An exemption from the requirement to provide pedestrian access to the setback area for the Farrington Highway side of the Makai Block building.	The Farrington Highway side of the building is a garage ramp to the upper levels of the parking structure. The setback area will be improved with landscaping, but pedestrian access will be provided within the Farrington Highway right-of-way, which is wider in the area of the parking garage.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
7	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(A)	Exemptions are sought for the Hikimoe Street and Farrington Highway sides of the buildings to allow that the building facades be not predominantly oriented to and parallel with the street, property line or adjacent public spaces.	The residential towers' orientation predominantly to and parallel with these streets would block the views from the surrounding residential neighborhoods and views to the smokestack. The orientation of the first level is parallel with these streets and primary entrances are provided on the street frontage, as required.	Not Applicable
8	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(B)	An exemption to allow the Farrington Highway frontage not to have separate entrances to each establishment.	No businesses are located along the front façade of the ground floor of the Makai Block building along Farrington Highway. The primary entrance to the grocery store will be via Hikimoe Street and the secondary entrance will be from inside of the garage on the ground floor.	Not Applicable
9	Building Orientation and entrances	Section 21-9.100-8 (a)(4)(C)	An exemption to allow the Farrington Highway frontage not to have entrances every 50 feet.	No businesses are located along the front façade of the ground floor of the Makai Block building along Farrington Highway. The primary entrance to the grocery store will be via Hikimoe Street and the secondary entrance will be from inside of the garage on the ground floor.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
10	Building transparency, blank wall limits and required openings for ground floor facades	Section 21-9.100-8 (a)(5)(A)	Exemptions are sought for the Farrington Highway side of the Makai Block building and the Kahuailani Street side of the Mauka Block building from the requirements to contain windows, doors, or other openings for at least 60 percent of the building façade area and blank walls cannot extend for more than 25 feet in a continuous horizontal plane.	These facades are a garage ramp (for Farrington Highway) and a garage entrance (for Kahuailani Street) and no windows or doors are located on the building elevations. With the garage ramping on the Farrington Highway side of the Makai Block building, blank walls will need to extend for more than 25 feet in a continuous horizontal plane without an opening on the ground floor of the building. With the steep topography of Kahuailani Street, ground floor retail or residential spaces are not feasible. The building elevations along Farrington Highway and Kahuailani Street will be provided with architectural detail and the area will be enhanced with landscaping.	Not Applicable
11	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(1)	Exemptions are sought for the Kahuailani Street side of the Mauka Block building and the Farrington Highway side of the Makai Block building to allow the ground floor of the parking structure to be is located within 40 feet of the property lines.	Hikimoe Street is designated as the front property line and no at-grade parking or ground floor parking will be located within 40 feet of the Hikimoe Street property line, as required. In the event that Farrington Highway and/or Kahuailani Street are considered the front property line, exemptions requested to allow the ground floor of the parking structure to be located within 40 feet of the Kahuailani Street and/or Farrington Highway property lines.	Not Applicable

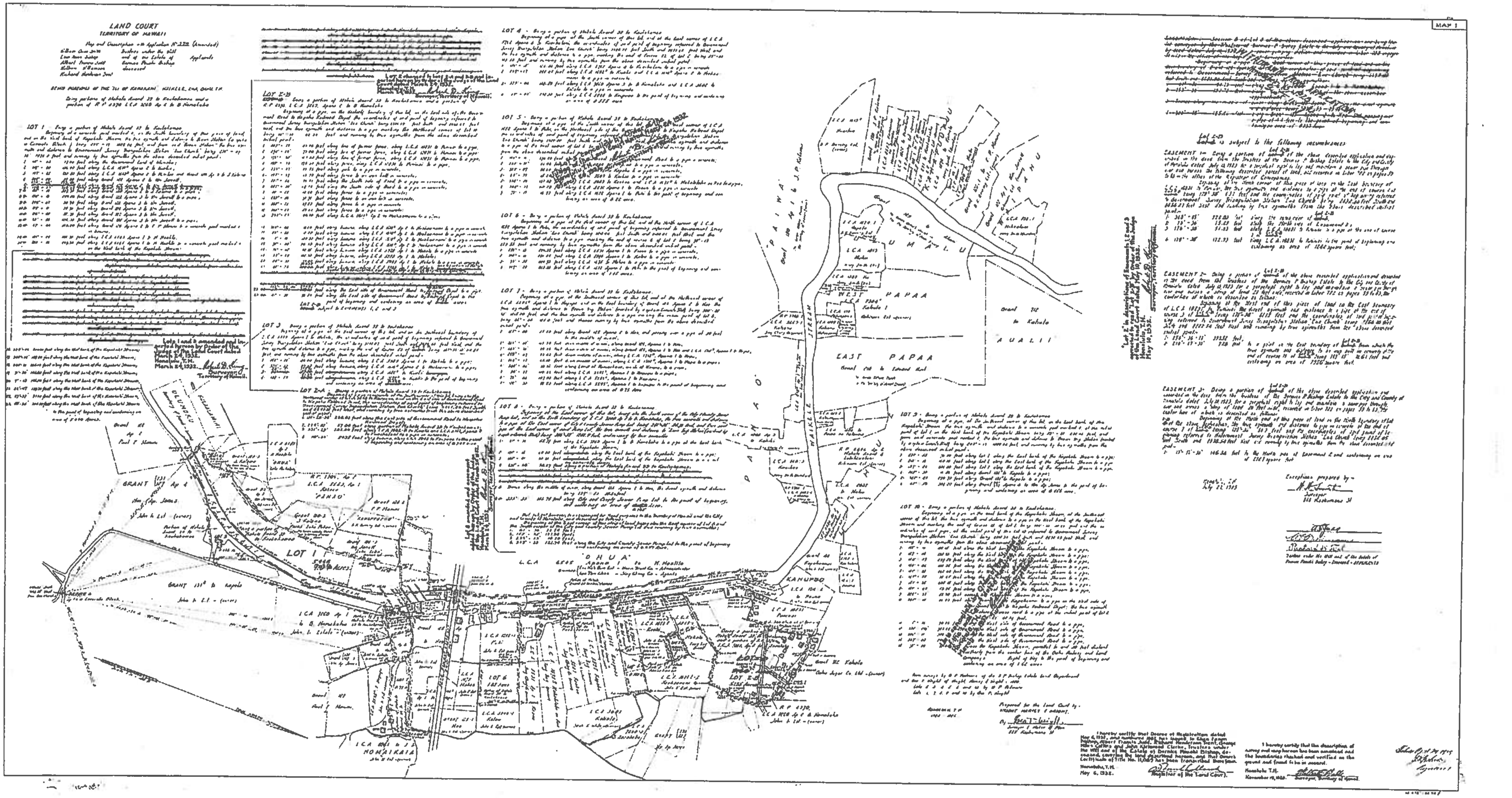
No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
12	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(2)	An exemption is sought to allow the Makai Block building to have service areas and loading spaces off of Farrington Highway at the side of the building towards the front.	Hikimoe Street is designated as the front property line for the Makai Block building and service areas and loading spaces will be located on the side and rear of the lot, as required. In the event Farrington Highway is considered the front property line, an exemption is requested to allow service areas and loading spaces off of Farrington Highway, on the interior of the site.	Not Applicable
13	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(3)	An exemption is requested from the requirement that vehicular access must be provided from a secondary street wherever possible to allow the vehicle entrances to the Makai Block building to be via Hikimoe Street and Farrington Highway.	Providing a vehicular access to the Makai Block building via Waipahū Depot Street is not feasible as it is too close to the Farrington Highway/Waipahū Depot Street intersection and would not meet driveway and intersection spacing requirements.	Not Applicable
14	Vehicle parking, loading, and bicycle parking	Section 21-9.100-8 (c)(4)	Exemptions from the requirement for the ground floor of parking structures on all streets to be designated and used for active ground floor activities within 40 feet of the front property line is sought for Farrington Highway and Kahuailani Street.	The exemptions are being requested for Kahuailani Street due to the steep topography of the street and Farrington Highway due to the lot configuration impacted by the existing office building fronting Farrington Highway and limited frontage for site access.	Not Applicable

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
15	Off-Street Loading Requirements	Section 21-6.110	Exemptions from off-street loading requirements to allow 6 loading stalls in total instead of 10 stalls in total.	The exemption would provide adequate loading stalls for residents, retail, and office uses while providing flexibility in site planning and to accommodate affordable housing development. The loading zones for residents, retail and office uses may be shared. Times will be coordinated to avoid conflicts.	Not Applicable
16	Park Dedication	Section 22-7.3	An exemption from park dedication requirements for affordable dwelling units.	The proposed project is an urban infill project and there are existing parks in the vicinity, including Waipahu District Park, Hans L'Orange Neighborhood Park, and Waipahu Cultural Garden Park. In addition, various onsite open spaces for residents and the community will also be provided.	Not Estimated
17	Plan Review Fee	Section 18-6.1	Exemptions from building permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$25,000
18	Building Permit Fee	Section 18-6.2	Exemptions from building permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$944,188
19	Public Works/Infrastructure Fees	Section 14-14.4	An exemption from grading and grubbing permit fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$3,000
20	Erosion and Sediment Control Plan Review Fee	Section 14-13.6 (d)	An exemption from payment of Erosion and Sediment Control Plan Review Fee.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$500

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
21	Wastewater System Facilities Charge	Sections 14-10.1, 14-10.2, and 14-10.3	An exemption from payment of wastewater system facilities charge for affordable housing units.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$1,843,217.60 for affordable units (the charges for manager units ($27,787.20) and non-residential parts of the project ($344,032.00) will still apply)
22	Fee Related to Connection to City-Owned Separate Storm Sewer System	Section 14-12.12 (f)	An exemption from payment of private drain connection license fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$400
23	Water System Facility and Installation of Water Service Fees	BWS Rules and Regulations Sections 1-102 and 2-202(2) & (3)	An exemption from payment of water system facility and installation of water service fees for affordable housing units.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$978,413.75 for affordable units (the charges for manager units ($10,882.25) and non-residential parts of the project ($105,46.00) will still apply)
24	Fire Department Plan Review Fees	Section 20-1.1	An exemption from payment of Honolulu Fire Department plan review fees.	The exemption will provide cost savings and will advance the affordability objectives of the project.	$12,500
25	Real Property Tax	Section 8-10.36	Exemptions from payment of real property tax for affordable rental housing units during the period in which the rental units are subject to an affordable housing agreement.	The exemption will provide cost savings and will advance the affordability objectives of the project.	Not Estimated

No.	Development Standard or Requirement	ROH Code Section	Requested Exemption	Rationale for Request	Estimated Value of Exemption
26	Real Property Tax Holiday	Section 8-10.37	For projects that contain affordable housing units, real property taxes would be kept at the current assessment (tax holiday) during the construction period for up to three (3) years or until construction is completed.	The exemption will provide cost savings and will advance the affordability objectives of the project.	Not Estimated

ATTACHMENT C.
LAND COURT MAP 1



MAP 1

LAND COURT
TERRITORY OF HAWAII

Map and Description with Application No. 232 (Amended)

Trustees under the Will and of the Estate of Bernice Pauahi Bishop, deceased — Applicants

BEING PORTIONS OF THE 'ILI OF KAMAKANI, WAIKELE, EWA, OAHU, T.H.

Being portions of Mahele Award 33 to Keohokamoa and a portion of R.P. 4370 L.C.A. 2050 Ap. 6 to B. Namauka

LOT 1 — Being a portion of Mahele Award 33 to Keohokamoa

Lots 1 and 3 amended and improved hereon by Order of the Judge of the Land Court dated March 24, 1932.
Honolulu, T.H.
March 24, 1932.
Surveyor, Territory of Hawaii.

LOT 2-B

LOT 3

LOT 2-A

LOT 4

LOT 5

LOT 6

LOT 7

LOT 8

LOT 9

LOT 10

Lot 2-B is subject to the following encumbrances

EASEMENT 1

EASEMENT 2

EASEMENT 3

Descriptions prepared by:
Surveyor
888 Kaahumanu St

Prepared for the Land Court by:
WRIGHT HARVEY & WRIGHT.
By
Surveyor & Maker of Plan
888 Kaahumanu St

I hereby certify that Decree of Registration dated May 6, 1932, and numbered [illegible] has issued to Eben Faxon Bishop, Albert Francis Judd, Richard Henderson Trent, George Miles Collins and John Kirkwood Clarke, Trustees under the Will and of the Estate of Bernice Pauahi Bishop, deceased, covering the land described hereon, and that Owner's Certificate of Title No. [illegible] has been transcribed therefrom.

Honolulu, T.H.
May 6, 1932.
Registrar of the Land Court.

I hereby certify that the description of survey and map hereon has been examined and the boundaries checked and verified on the ground and found to be in accord.

Honolulu, T.H.
November 19, 1928.
Surveyor, Territory of Hawaii.

ATTACHMENT D.
LAND COURT MAP 6

MAP 6

LAND COURT

STATE OF HAWAII

LAND COURT APPLICATION 779

SUBDIVISION OF LOT 11
AS SHOWN ON MAP 5
INTO LOTS 12 TO 24, INCLUSIVE
AND CANCELLATION OF EASEMENT 3 AS SHOWN ON MAP 1

AT WAIKELE, EWA, OAHU

235 Merchant St
Honolulu, Hawaii
July 16, 1959

R.M. TOWILL CORPORATION

By: _____
Registered Professional Surveyor
Certificate Number 151

OWNERS: Trustees under the Will and of the Estate of Bernice Pauahi Bishop, deceased

Owner's Certificate of Title: 5A, 6CP

AUTHORIZED AND APPROVED BY ORDER OF THE JUDGE OF THE LAND COURT DATED: DECEMBER 8, 1959
BY ORDER OF THE COURT

_____
REGISTRAR OF THE LAND COURT

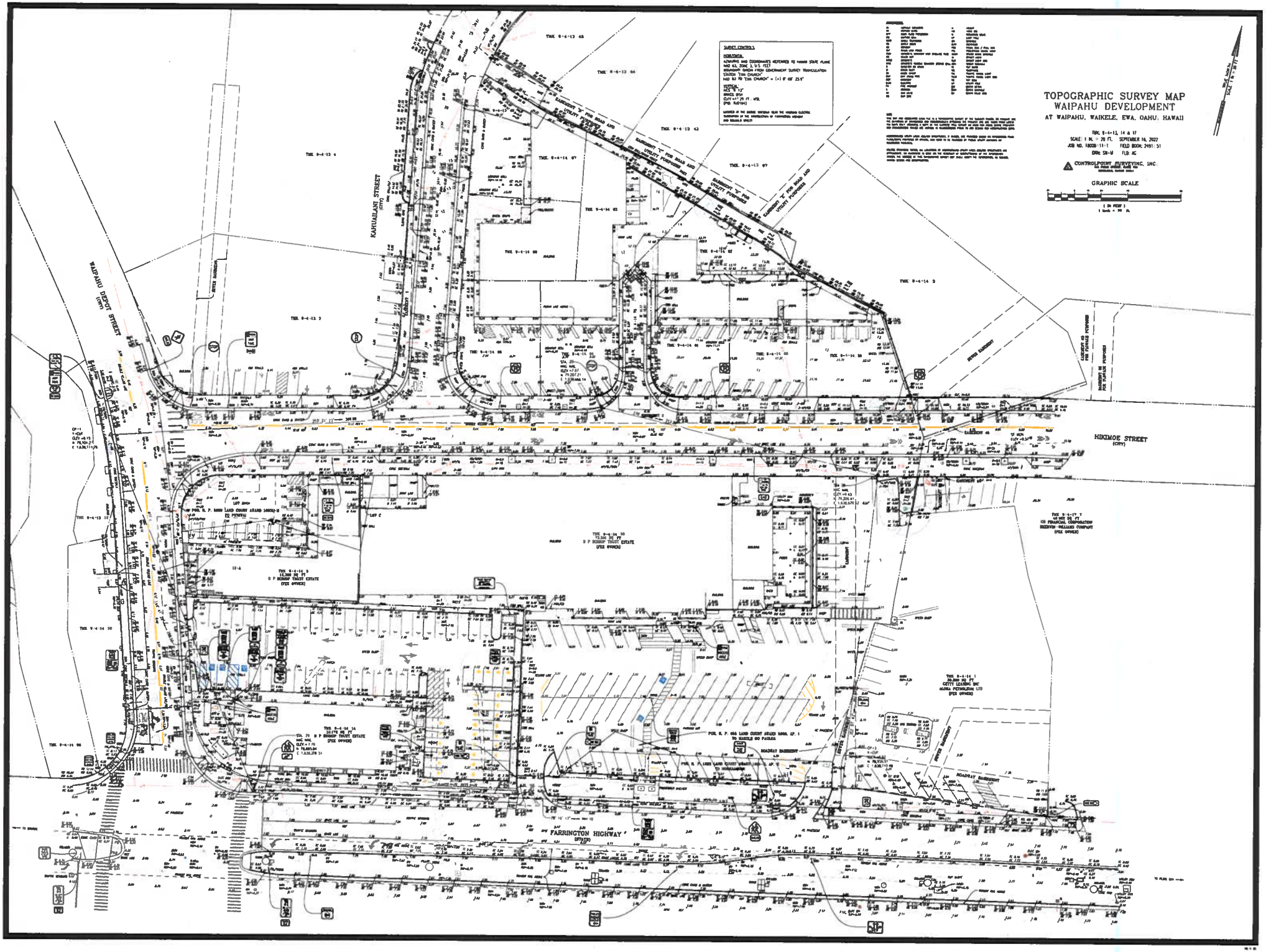
Filed Dec. 8, 1959
Assistant Registrar

Tax Map Key 9-4-14-5
6210-5-8

Parcel 5 of Remnant A-1-D-1A-1-B-4
Waikele Improvement District
12-1-1-94

21" x 32" - 47 sq. ft.

ATTACHMENT E.
TOPOGRAPHIC SURVEY


TOPOGRAPHIC SURVEY MAP
WAIPAHU DEVELOPMENT
AT WAIPAHU, WAIKELE, EWA, OAHU, HAWAII
TMK: 9-4-13, 14 & 17
SCALE: 1 IN. = 20 FT.
SEPTEMBER 16, 2022
JOB NO. 18008-11-1
FIELD BOOK: 2491-51
DWG: SW-M
FLD: AC
CONTROLPOINT SURVEYING, INC.
GRAPHIC SCALE
SURVEY CONTROLS
HORIZONTAL
ELEVATIONS
KAHUAILANI STREET (CITY)
WAIPAHU DEPOT STREET (CITY)
HIKIMOE STREET (CITY)
FARRINGTON HIGHWAY (STATE)
EASEMENT "F" FOR ROAD AND UTILITY PURPOSES
ROADWAY EASEMENT
SEWER EASEMENT
EASEMENT 46
EASEMENT 50 FOR PARKING PURPOSES
EASEMENT 51 FOR PARKING PURPOSES
TMK 9-4-13 4
TMK 9-4-13 7
TMK 9-4-13 48
TMK 9-4-13 44
TMK 9-4-13 43
TMK 9-4-14 67
TMK 9-4-14 63
TMK 9-4-14 66
TMK 9-4-14 62
TMK 9-4-14 9
TMK 9-4-14 30
TMK 9-4-14 14
TMK 9-4-16 1
TMK 9-4-16 66
TMK 9-4-17 7
B P BISHOP TRUST ESTATE (FEE OWNER)
CITY LEASING INC
ALOHA PETROLEUM LTD
CO FINANCIAL CORPORATION
SHERWIN-WILLIAMS COMPANY