DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
PIILANI PROMENADE

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June 2014

CHRIS HART
& PARTNERS, INC.

APPENDIX I

Cultural Impact Assessment

CULTURAL IMPACT ASSESSMENT
For the
PROPOSED
Piilani Promenade Project

December 2013

Hana Pono, LLC - PO Box 2039 Wailuku, HI 96793 – hanapono@gmail.com

CULTURAL IMPACT ASSESSMENT
For the

PROPOSED

Piilani Promenade Project

TMK: (2) 3-9-01:016, (2) 3-9-01:169-174, (2) 3-9-048:122, (2) 3-9-001:148, (2) 2-2-02:077, (2) 2-2-02:016 (portion), (2) 2-2-02:082 (portion)

Prepared for:
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December 2013

Management Summary

Report	Cultural Impact Assessment for the proposed Piilani Promenade project
Date	November 2013
Project Location	County of Maui; Kula District; Ka'ono'ulu ahupua'a, TMK(s): (2) 3-9-01:016, (2) 3-9-01:169-174, (2) 3-9-048:122, (2) 3-9-001:148, (2) 2-2-02:077, (2) 2-2-02:016 (portion), (2) 2-2-02:082 (portion)
Acreage	Approximately 88 acres
Ownership	Sarofim Realty Advisors
Developer/Applicant	Pacific Rim Land, Inc
Project Description	The proposed project will include light-industrial and commercial uses.
Region of Influence	Ka'ono'ulu ahupua'a, Kula Moku
Agencies Involved	SHPD/DLNR, Maui County, State Land Use Commission
Environmental Regulatory Context	The undertaking is subject to both State and County zoning regulations, and other environmental regulations
Results of Consultation	No significant impacts to cultural practices, resources, or beliefs. Lands in question have long been disturbed by ranching and construction.
Recommendations	• Adherence to all applicable rules governing earth-disturbance activities • Adherence to accepted SHPD-MLIBC archaeological monitoring plans

Cultural Summary

Sarofim Realty Advisors is proposing the construction of a mixed -use development just mauka (upland) of Pi'ilani Highway at Ka'ono'ulu Road. The entire project sits in the moku of Kula and the ahupua'a of Ka'ono'ulu, adjacent to the Pi'ilani Hwy and other previously disturbed lands. Whatever cultural practices or resources were practiced there in ancient times have long been abandoned and paved over in the construction of modern-day Kihei.

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Introduction

At the request of Mr. Charlie Jencks, owner representative for Sarofim Realty Advisors, Hana Pono LLC has completed a report for the Cultural Impact Assessment of the proposed Piilani Promenade project at TMK(s): (2) 3-9-01:016, (2) 3-9-01:169-174, (2) 3-9-048:122, (2) 3-9-001:148, (2) 2-2-02:077, (2) 2-2-02:016 (portion), (2) 2-2-02:082 (portion). This study was completed in accordance with State of Hawaii Chapter 343, HRS, and the State of Hawaii Office of Environmental Quality Control (OEQC) Guidelines for Assessing Cultural Impacts (1997).

Guiding Legislation for Cultural Impact Assessments

It is the policy of the State of Hawaii under Chapter 343, Hawaii Revised Statutes, to alert decision makers about significant environmental effects that may occur due to actions such as development, re-development, or other actions taken on lands. Articles IX and XII of the State Constitution, other state laws, and the courts of the state require the promotion and preservation of cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups.

The Guidelines for Assessing Cultural Impacts, as adopted by the Environmental Council, State of Hawaii 1997 and administered by the Office of Environmental Quality Control, including HAR Title 11 Chapter 200-4(a), include effects on the cultural practices of the community and state. The Guidelines also amend the definition of "significant effect" to include adverse effects on cultural practices.

Goal and Purpose

The goal of this study is to identify any and all Native Hawaiian, traditional, historical, or otherwise noteworthy practices, resources, sites, and beliefs attached to the project area in order to analyze the impact of the proposed development on these practices and features. Consultations with lineal descendents or kupuna (Hawaiian elders) with knowledge of the area in gleaning further information are a central part of this study.

Scope

The scope of this report compiles various historical, cultural and topographical accounts and facts of the project area and its adjacent ahupua'a.

> *The geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices. (OEQC, Guidelines for Assessing Cultural Impacts, Nov 9, 1997)*

Data will be compiled beginning with the first migrations of Polynesians to the area, progressing through the pre-contact period of Hawaiian settlement, containing data on the post-contact period, through to the current day and any cultural practices or beliefs still occurring in the project area. Hawaiian kupuna with ties to the area will be interviewed on their knowledge of the area and its associated beliefs, practices, and resources. Additionally, any other individuals or organizations with expertise concerning the types of cultural resources, practices and beliefs found within the geographical area in question will be consulted.

Project Area

The project is located in the State of Hawaii, County of Maui, at TMK(s): TMK(s): (2) 3-9-01:016, (2) 3-9-01:169-174, (2) 3-9-048:122, (2) 3-9-001:148, (2) 2-2-02:077, (2) 2-2-02:016 (portion), (2) 2-2-02:082 (portion). The project is in the moku of Kula, the ahupua'a of Ka'ono'ulu, and centers around Pi'ilani Highway and its intersection with Ka'ono'ulu Street.

Approach & Method

The approach taken in this study was two-fold. Foremost, historical, involving as appropriate, a review of: mahele (land division of 1848), land court, census and tax records, previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs and other archival documents. Secondly, an in-depth study involving oral interviews with living persons with ties, either lineal or cultural, to the project area and the surrounding region.

Objectives

The objectives of the Cultural Impact Assessment are as follows:

- to compile and identify historical and current cultural uses of the project area,
- to identify historical and current cultural beliefs & practices associated with project area,
- To assess the impact of the proposed action on the cultural resources, practices, and beliefs.

Tasks

Data gathered combined oral interviews of knowledgeable kupuna and families/individuals with long-standing ties to the area with all available written and recorded background information.

Archival Research

All sources of historical written data, old maps, and literature were culled for information.

Oral Interviews

Tasks completed for oral interviews included: identification of appropriate individuals to be interviewed, determination of legitimate ties to project area and surrounding region, interview recorded in writing and by digital audiocassette, transcription of interview, compilation of pertinent data.

Level of Effort Undertaken

Interviewees are contacted and selected for inclusion in this report based on a sliding scale of legitimate authority based on the following characteristics: lineal descendents, cultural descendents, traditional practitioners, cultural practitioners, knowledgeable area residents of Hawaiian ancestry, knowledgeable concerned citizens. Every effort is made to obtain the highest quality interviewees and determination of appropriate individuals follows this criteria.

Historical & Current Cultural Resources & Practices

The island of Maui is comprised of twelve (12) traditional land districts, called moku. Each moku is made up of numerous ahupua'a, smaller land divisions wherein a self-inclusive community could find all the things needed for a satisfactory life. Usually these ahupua'a ran from the heights of the mountain peak to the edge of the outer reef like a giant pie slice, although many ahupua'a did not fit this template. As previously mentioned, the project area resides in the moku of Kula and the ahupua'a of Ka'ono'ulu. Handy relates that, "Kula was always an arid region, throughout its long, low seashore, vast stony kula [open country] lands and broad uplands. Both on the coast, where fishing was good, and on the lower westward slopes of Haleakalā a considerable population existed" (ESC Handy, 114). The moku of Kula is so called for its kula lands, meaning broad open expanses, likened to pasture land by the ranchers of the last century.

Although Kihei is one of the more dry areas of Maui in present time, it once was home to many fresh and brackish wetlands. Such as the wisdom of the ahupua'a system, the events mauka (upland) effected the land below. The mauka portion of Kula underwent major deforestation for farming and ranching and therefore, rainwater was less able to filter into the ground and recharge the ponds near the coast. The Honolulu Star-Bulletin and Advertiser reported in 1962, "a secondary result of the clearing of the Kula forests, he said, was the destruction of extensive fresh water ponds in Kihei, on the Mā'alaea Bay coast below Kula. When the forest was cleared, water was free to rush down the mountain, carrying soil from Kula to the coast and filling with mud the ponds for which Kihei was once famous" (Sterling, 245). This destruction started with the large-scale deforestation of the native Sandalwood in the 1800's and although short-lived was a major source of commerce for this area in those times.

The project area has been severely disturbed from its original and unaltered state for many decades, by the effects of grazing cattle and the construction of ranch roads, county roads and the construction of the Pi'ilani Highway. Any resources or practices occurring traditionally in the area are now non-existent and would have been obliterated.

First migrations

Traditional stories start with the creation chant called "Kumulipo." The Kumulipo brings darkness into light. Embedded in this all-encompassing chant includes the tale of the coming of the Hawaiian Islands through the mythical stories of Pele and another demigod named Maui who, with his brothers, pulls up all the islands from the bottom of the sea. The latest and last physical appearance of Pele occurred as late as mid-1800s when the Fire Goddess flowed from the top of the southern slopes of Haleakalā, south of our project area, down through Honua'ula and landing at the surf of Mākena and southward. In the Hawaiian Annual published by Thomas Thrum and James Dana's "Characteristics of Volcanoes", are reported Father Bailey's statements of his oral interviews explaining that the last flow had occurred in 1750 (Sterling 1998: 228). Many of the lava flows in the summit depression and in the Ulupalakua to Nu'u area were dark black and bare 'a'ā (rough, jagged type of lava landscape). The two freshest lava flows run near La Perouse Bay. The upper flow broke out of a fissure near Pu'u Mahoe and the lower flow broke out at Kalua o Lapa cone. Both flows contain large balls or wrapped masses of typical 'a'a found throughout Hawai'i.

The occupation of the Hawaiian archipelago after its mythical creation came in distinct eras starting around 0 to 600 A.D. This was the time of migrations from Polynesia, particularly the Marquesas. Between 600 and 1100 A.D. the population in the Hawaiian Islands primarily expanded from natural internal growth on all of the islands. Through the course of this period the inhabitants of the Hawaiian Islands grew to share common ancestors and a common heritage. More significantly, they had developed a Hawaiian culture and language uniquely adapted to the islands of Hawai'i which was distinct from that of other Polynesian peoples (Fornander, 222).

Between 1100 and 1400 A.D., marks the era of the long voyages between Hawai'i and Tahiti and the introduction of major changes in the social system of the Hawaiian nation. The chants, myths and legends record the voyages of great Polynesian chiefs and priests, such as the high priest Pa'ao, the ali'inui (Head Chief) Mō'ikeha and his sons Kiha and La'amaikahiki, and high chief Hawai'iloa. Traditional chants and myths describe how these new Polynesian chiefs and their sons and daughters gradually appropriated the rule over the land from the original inhabitants through intermarriage, battles and ritual sacrifices. The high priest Pa'ao introduced a new religious system that used human sacrifices, feathered images, and enclosed heiau (temples) to facilitate their sacred religious practices. The migration coincided also with a period of rapid internal population growth. Remnant structures and artifacts dating to this time suggest that previously uninhabited leeward areas were settled during this period.

Settling of Kula Moku & Ahupua'a

With its gentle and open white sand beaches, the coastal areas of Kula were surely a favorite location for fisherman and their families. Accounts tell of a large population on the coast with much bounty from the ocean, not only by fishing the open sea, but also by the construction of fishponds, gathering limu (seaweed), and diving for octopus, lobster, and other marine life. Inhabitants of this region relied on vegetable foods from other areas of the island. Possibly obtaining kalo (taro) from across the Mā'alaea plain in Waikapū and uala (sweet potato) from the mauka slopes of Haleakalā, the inhabitants of the coastal region were able to supplement their diet of fish, shellfish, and limu. Handy and Handy elaborate on the lands of the moku, "there were some patches of upland taro, not irrigated; but this was a notable area for sweet potato, which, combined with the fishing, must have supported a sizable population although it cannot be counted as one of the chief centers" (272).

The project area rests in the Ahupua'a of Ka'ono'ulu, named for the delicious Ulu trees that grew in the upper, cooler portion of the ahupua'a that those residents on the coast would trek up the mountain to obtain. In ancient times the surrounding areas makai from the project were known for their fresh (brackish) water ponds that would fill up in times of rain and become dry during the summer months. Previously, there were many of these types of ponds that have now been filled in for development. There were no perennial streams here and the water supplied by these ponds and freshets of water that filled the gulches were an important lifeline for these peoples.

Hewahewa claimed Kalepolepo during the Great Mahele and was awarded over five thousand acres referred to as "Kaonoulu Ahupua'a" (Waihona). This award likely includes the project area. Hewahewa calls Kalepolepo his "fixed place of residence" (Waihona).

Place Names Associated With This Area

The Hawaiian culture places a particular importance on place-names. Throughout Polynesia, cultures are for the most part ocean-based, surviving and building their cultures around the bounty of the sea. While Hawaiians share common history with all Pacific peoples, because of the unique factors of these high-islands, their culture turned decidedly more land-oriented than many other Pacific cultures. The abundant access to fresh water sources, fertile soil, relative lack of reef and reef fish compared to older south pacific islands all contributed to their formation of a completely unique and distinct culture; a culture that placed a high inherent value on land and landforms, landscapes and their relationship to people's lives. In place-names one can find its purpose, their purpose, and the hidden *kaona* (symbolism) behind the word.

Ka'ono'ulu

The ahupua'a the project resides in is named for the breadfruit grown on its upper slopes in the cooler mauka region on Haleakala. This breadfruit would have been carried down to the coastline and traded for fish and other products.

Waiakoa

The ahupua'a adjacent and to the north of the project area, it is named for the Koa tree that grew on the upper slopes of that ahupua'a.

Waiohuli

The ahupua'a adjacent and to the south of the project area, it is named for the clouds that come down the slopes of Haleakala and let loose their rain before retreating again to the mauka regions.

Kalepolepo

The small coastal region directly makai of the project area that houses the fishpond of Ko'ie'ie, so called for the dirty (lepo) waters in the area during times of rain.

Ko'ie'ie

The name of the major ancient fishpond in the Ka'ono'ulu ahupua'a, that along with others supplied a variety of food to the residents. See the following sections for more detailed information on the history of Ko'ie'ie.

Kaipukaiohina

A section of beach named for the bounty of its waters, *Ka ipu kai o Hina* is the Ocean-basket of Hina.

Kihei

The contemporary name for the entire coastal area of Kula, Kihei literally means a cape or shawl as is interpreted as representing the cloak of dust spread over the area by fierce trade winds and/or the cloak of the clouds created by Haleakala that stretch out into the channel sometimes connecting to Kaho'olawe and Lana'i.

Traditional Hawaiian Uses & Practices

The inhabitants of the coastal areas of Ka'ono'ulu sustained themselves through the bounty of the ocean. Nearby to them was the fishpond of Kalepolepo, commonly called Ko'ie'ie. Kalepolepo was built by an early Maui chief and by the 16th century King Umi of Hawai'i Island tasked the commoners with rebuilding the walls. Later, during the reign of Kamehameha I he rebuilt Kalepolepo again, tasking all the people of the west side of Maui to work. Ke Alaloa o Maui, the broad highway of Maui constructed by King Pi'ilani crosses through the ahupua'a of Ka'ono'ulu on its way to Mākena and not much is mentioned of this area besides Kalepolepo pond and the dryness of the area.

Post-Contact Historical Uses & Practices

It was near Kalepolepo and the shoreline north of the project area that Kamehameha is said to have landed his canoes for his invasion of Maui. Kamehameha had previously been beaten by the forces of Maui because of their furious use of the ma'a (sling) for which Maui's warriors were famous. But Kamehameha this time had the foreign technology of mortars, muskets, and cannons. It was here he uttered the now famous saying, "Imua e nā poki'i. He inu i ka wai 'awa'awa", forward my brothers or drink of the bitter waters. He set fire to his canoes, their only form of retreat and challenged his men to win the battle or drink the bitter water of defeat and certain death. From Kalepolepo the army of Kamehameha pushed the warriors of Maui back to the West Maui Mountains.

With the arrival of the foreigners came the foreign interest of making money and one of the first goods to be mass exported from the islands was the Sandalwood. Ili'ahi in Hawaiian, the sandalwood tree has a fragrance highly prized by the Chinese and entire forests were denuded in the rush to make foreign money. Many of these forests were in the upper part of the Kula moku and the deforestation of these forests was a contributor to the siltation of the brackish ponds and loko i'a (fishponds).

While the rest of the island was undergoing a radical transformation of landscape with the construction of large sugar and pineapple plantations, the Kihei area remained largely unchanged due to the lack of water. No foreign investors wanted to stake a claim to land out there knowing there was no way to water their crops. For a long time, Kihei remained the same, a few hundred Hawaiian families living off the bounty of the ocean.

In 1828 the first Catholic priest to the Hawaiian Islands, Father Bachelot, brought with him from Paris a seed which he grew into a tree and planted in a church in Honolulu. Soon after the seeds of this tree were taken to all the islands and began to dominate the leeward landscape of Maui. Kiawe soon was the most prolific tree in South Maui, so much so, that the kupuna (elders) of today remember Kihei as being covered in kiawe. There was so much kiawe that they would make slippers out of old car tires, the only thing that would stop the kiawe thorn from puncturing their feet. Oral accounts detailed how they would take the rubber tires off their bikes and replace it with a garden hose, wrapped multiple times and bound with wire, after getting too many flats with a regular tube tire.

Current Uses, Practices, & Resources of Project Area

Currently the project area is generally unmaintained former ranch lands mauka of the highway. There are no cultural practices or resources in the project area. The closest cultural resource of significance is the Ko'ie'ie fishpond and the other fishponds along the coast which are undergoing a revitalization effort to bring them back to their former glory and provide educational opportunities for the community.

Summary of Interviews

Paula Kalanikau

Paula was interviewed for another Kihei project in 2006 and again in October 2013, both interviews took place at her residence on Kenolio Street in Kihei. Paula married into the Kalanikau ʻohana, the family who owned the ahupua'a of Kaonoulu. She stated that there were three families involved in the ownership prior to the Great Mahele: the Waiwaiole's and the Kalanikauikealaleo's.

Paula Kalanikau moved to Kihei in the early 1960ʻs. She reminisced that all of the people lived in the flood inundation zone and when the floods came from a Kona storm, people couldnʻt get in or get out. That was before Piʻilani Highway. The old Suda Store at the beginning of South Kihei Road was the gateway to Kihei back in the 1960ʻs and 1970ʻs.

In 1972, Paulaʻs husband worked with a group of neighborhood men to start the Kihei Canoe Club on Sugar Beach. All of the Sugar Beach hotels were already there by the time Kihei Canoe Club got that land from the County. The Kalanikaus were all active in the Kihei community.

Mrs. Kalanikau talked about the changes in Kihei and how a lot of the changes are for the worse. Her final comment sums up her feelings about the future of Kihei:

"Oh, I'm definitely interested in them having a High School here. I think the children deserve that; and a hospital. But we need to be also aware of what our ancestors have established in these areas and be mindful to developers what would be our priorities. And that is our priority: to look after our ʻaina."

Paula and Minette Ngalu

Paula and Minette are both long-time residents of Kihei. Although each of them grew up further south of the project area, both recalled there being an abundant mango grove on the project area.

Synthesis of Archival, Literary, & Oral Accountings

The ahupua'a of Ka'ono'ulu carried a relatively large population in pre-contact times that survived on marine life, sweet potato, and ulu that was carried down from the upper slopes of Haleakala. Post-contact the area nearer the coast continued to support a variety of commerce and recreational activities centered around Ko'ie'ie fishpond until the siltation of the ocean area and breakdown of the fishpond wall made it unusable. The proposed project area has been used for ranching for the past century with no cultural resources in the vicinity.

Potential Effects of Development & Proposed Recommendations

This report finds that the proposed Piilani Promenade Project located at TMK(s): TMK(s): (2) 3-9-01:016, (2) 3-9-01:169-174, (2) 3-9-048:122, (2) 3-9-001:148, (2) 2-2-02:077, (2) 2-2-02:016 (portion), (2) 2-2-02:082 (portion) has no significant effects to cultural resources, beliefs, or practices. As always, all applicable county, state, and federal laws concerning discovery of burials or other cultural materials should be followed to the letter.

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APPENDIX J

Baseline Assessment of Marine Water Chemistry and Marine Biotic Communities

BASELINE ASSESSMENT OF MARINE WATER CHEMISTRY AND MARINE BIOTIC COMMUNITIES PIILANI PROMENADE KIHEI, MAUI, HAWAII

Prepared for:

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&
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February 2014

I. INTRODUCTION AND PURPOSE

The Piilani Promenade project, located in North Kihei, Maui, is a development with a mix of Light Industrial and Business/Commercial uses with 226 apartment units which are proposed on three large developable parcels comprising 68.19 acres. Associated onsite and offsite infrastructure improvements are also proposed, including but not limited to water, sewer, roads, drainage, electrical, bicycle and pedestrian pathways and landscaping. A Maui Electric Company (MECO) substation is also proposed on the project site.

The main part of project site is located mauka of Piilani Highway, with two small triangular shaped parcels makai of the highway at the intersection with no aspect of the project involving direct alteration of the shoreline or nearshore marine environment (Figure 1).
None of the proposed land uses includes any direct alteration of the coastal areas or nearshore waters, and the entire project site is separated from the coastline by other development as well as North Kihei Road. As a result, potential effects to the marine environment from the project are limited only to alteration of basal groundwater flowing beneath the site with subsequent discharge to the ocean.

In the interest of addressing these concerns and assuring maintenance of environmental quality, a baseline marine environmental assessment and potential impact analysis of the nearshore areas makai of the Piilani Promenade project site was conducted in November 2013. The rationale of this assessment was to collect a set of baseline data to accurately depict both qualitatively and quantitatively the existing physical, chemical and biological setting of the marine areas that could be potentially affected by the project. Because the only reasonable way the project could affect marine waters is by adding subsidies to groundwater, it was determined that the most effective method of determining the potential for such impacts was to determine the existing degree of groundwater input to the ocean off the site. If the existing groundwater input is of a minor extent, it can be assumed that there is not sufficient input for any subsidies from the project site to affect water quality to a detectable degree.

Existing marine community structure, primarily in terms of coral reef assemblages was also described based on rapid ecological assessment (REA) surveys. Evaluation of the existing condition of the water chemistry and marine communities provides an insight into the physical and chemical factors that influence the marine setting, which provide a basis for determining the potential for changes that could be produced by the project. As coral communities are both long-lived and attached to the bottom, they serve as the best indicators of the time-integrated forces that affect offshore reef areas. Understanding the existing physical, chemical and biological conditions of the marine environment that presently occur provides a basis for predicting potential affects that might occur as a result of the proposed Piilani Promenade project.

II. METHODS

A. Water Quality/Chemistry

All fieldwork was conducted on November 20, 2013. As the goal of the assessment was to evaluate the potential for alteration of groundwater discharge, evaluation of water chemistry was limited to determining variations in salinity and temperature, which are the two physico/chemical components that reflect the mixing of groundwater and marine water in the coastal ocean. Groundwater has a salinity of essentially zero, which open ocean water has a salinity of approximately 35 parts per thousand (‰). Submarine groundwater typically enters the ocean at or near the shoreline resulting in a nearshore zone of mixing characterized by lower salinity, and often lowered temperature (groundwater is typically cooler than ocean water). Weather and sea conditions during the sampling consisted of calm winds and small surf of 1-2 feet breaking on the shoreline. These conditions are somewhat atypical for the Kihei coastline which is generally affected by tradewinds. As a result, conditions during the survey can be considered to have minimum mixing, which should represent the highest detectable groundwater discharge.

Salinity and temperature were assessed along three survey transects that extended perpendicular to the shoreline originated at the beach and extending approximately 100 meters (m) offshore. Data was collected by towing a continuously recording CTD instrument (RBR Model 620) behind a personal watercraft at a dept of approximately 10 centimeters (3 inches) below the surface (Figure 1). These tows were conducted at the upper layer of the water as this is the zone that lower density groundwater will be most evident. Hence, the three surface transects comprised a sampling scheme is designed to span the greatest range of salinity with respect to potential freshwater efflux at the shoreline. Sampling was limited to the nearshore zone because this area receives the majority of groundwater discharge, and hence is most important with respect to identifying the effects of shoreline modification.

B. Marine Biotic Community Structure

Biotic composition of the survey area was assessed by divers using SCUBA working from a small boat. Dive surveys were conducted by swimming in a zigzag pattern from the shoreline across the reef to a water depth of approximately 10 m (30 feet) in the same areas as the CTD tows were conducted. During these underwater investigations, notes on species composition were recorded, and numerous digital photographs recorded the existing conditions of the area. All fieldwork was conducted by Dr. Steven Dollar.

III. RESULTS

A. Water Quality/Chemistry - *Distribution of Salinity and Temperature*

Figure 2 shows values of salinity and temperature for continuous horizontal tows along three transects originating downslope from the north (transect 1) central (transect 2) and southern (transect 3) boundaries of the Piilani Promenade project site. With respect to salinity, several trends are apparent. First, on all three transects there is a zone between the shoreline and approximately 30 m (90 feet) offshore where there is a distinct gradient of salinity, with lowest values nearest the shoreline. On all three transects the gradients span a salinity range of about 0.5‰. These gradients reflect the dimension of the zone where groundwater is mixing with ocean water, and is consistently restricted to within approximately 30 m of the shoreline.

The second major trend is that the overall salinity on transect 1 is lower than on transects 2 and 3. In addition the variation within the trace of transect 1 is substantially wider than on transects 2 and 3. These patterns indicate that the location of transect 1 is subjected to somewhat different water masses than transects 2 and 3. The most likely explanation for these patterns is that transect 1 is located on a boundary between water from Maalaea Bay, which may have lower salinity as a result of recent heavy rainfall and runoff, and open ocean waters. Thus, the slightly lower overall values and increased "noise" in the profile for transect 1 relative to the other transects reflects the incomplete mixing of these two water masses. The slightly upward trend of the profile in transect 1 near the ocean terminus of the transect also suggests that there is some mixing of fresh water emanating from the shoreline that diminishes with distance from shore.

Results of the temperature trances in Figure 2 also reveal patterns that indicate a mixing of groundwater and marine waters in the nearshore zone extending from the shoreline to a distance of approximately 30 m from shore. Beyond this distance, temperature is nearly constant on transects 2 and 3. However, the nearshore gradients for each transect are slightly different with temperature slightly elevated on transects 1 and 3 relative to offshore values, and slightly lower values on transect 2 relative to offshore values. These differences indicate that while slightly different factors may be affecting temperature in the nearshore zone, the effect of cooler groundwater is not a dominant feature affecting these overall patterns.

In sum, horizontal gradients of salinity and temperature indicate that there is a detectable zone of mixing of groundwater and ocean water from the shoreline to a distance of approximately 30 m offshore. Beyond this distance, water chemistry, in terms of salinity and temperature reflect open ocean conditions with little effect from inputs from land. Thus, any future input from groundwater subsidies would likewise be limited in effects to water chemistry to a distance of approximately 30 m from shore.

B. Reef Community Structure

1. Physical Structure

Physical composition of the shoreline area makai of the Piilani Promenade site consists of several structures. The approximate northern half of the shoreline area consists of a narrow sand beach that grades into a rubble zone within the intertidal zone. At the approximate center of the survey area the shoreline is built up with a boulder wall that extends into the intertidal zone. The shoreline area at the southern end of the survey area consists of a small corridor of white sand that is the ocean terminus of a stream bed. Just to the south of the sand delta is a rock wall of a fishpond (Figure 1).

As can be seen in Figure 1, the offshore area fronting the project site is composed of a wide shallow reef platform that extends 50-60 meters (~150-180 feet) offshore and extends to a depth of about 3-4 meters (~10-13 feet). Within the intertidal zone along the beach front bottom composition consists of a rubble bed consisting of broken and eroded limestone chunks interspersed with sand patches (Figure 3). With increasing distance from shore beyond the zone of wave impact, rubble chunks become larger, and are interspersed with patches of coarse white sand (Figure 3). Moving seaward water depth increases gradually, with bottom composition remaining a mix of sand and rubble with occasional outcroppings of eroded limestone from fossil reef structures (Figures 4-6).

At the outer edge of the reef platform, bottom composition turns to a bed of coarse white sand that extends seaward beyond the limits of the present survey (Figure 7).

2. Biotic Community Structure

Overall, biotic community structure throughout the shallow reef flat fronting the Piilani Promenade project site can be considered depauperate, with no well-developed coral reef communities. Such lack of well-developed living coral reef structure is likely a result of the combination of large volumes of sand and loose rubble, which do not provide for an abundance of solid surfaces for settling coral planular. In addition, the frequent occurrence of breaking waves over the shallow platform result in concussive forces that are too strong for most corals to withstand. Wave action also causes resuspension of sand and movement of rubble fragments which scour the bottom, creating conditions too harsh for settlement and growth of rich reef communities.

However, the area is not completely devoid of macrobenthic (bottom dwelling) organisms. In the sand rubble zone, isolated coral heads colonies occur, primarily of the species *Porites lobata* (Figure 4), and *Pocillopora* spp. (Figure 5). These two genera are the two most common on virtually all Hawaiian reefs. Other species observed were the "soft coral" *Zooanthus* sp. (Figure 6). As can be seen in Figures 5 and 6, most of the coral heads were growing on large rubble fragments that extended somewhat above the level of the sand rubble floor of the shallow platform. Although the elevation above the reef floor is only several inches, the distance is apparently required for reduction in sand and rubble scouring to allow coral colonization.

The other class of benthic organisms that were common on the reef platform was sea urchins. The most common urchins were the small boring species *Echinometra mathaei* that occurred in holes bored into the limestone outcrops and rubble mounds. Other urchin species that were observed included the spiny urchins *Echinothrix diadema*, and *E. calamaris*, and the collector urchin *Tripneustes gratilla* (Figures 5 and 6). Many of these urchins were observed in holes in elevated chunks of coral rubble (Figure 6).

Macroalgae were rare in the inner sand-rubble zone, likely in response to the shifting nature of the substratum. However, at the outer boundaries of the shallow reef platform, where bottom composition consists of beds of coarse sand, the introduced red alga Acanthophora specifera occurs in monospecific beds (Figure 7, top). These beds extend to a depth of approximately 15 feet where they disappear, and bottom composition consists entirely of sand flats (Figure 7, bottom).

IV. DISCUSSION and CONCLUSIONS

The purpose of this assessment is to assemble the information to make valid evaluations of the potential for impact to the marine environment from the proposed Piilani Promenade project that is planned for a 69 acre parcel of land mauka and makai of Piilani Highway in Kihei, Maui. As the project is not located on the shoreline, and will not structurally alter the shoreline or nearshore marine environment, the only source of potential effect to the ocean is through changes to groundwater as a result of materials leaching from the project site to basal groundwater lens, with subsequent input to the nearshore ocean. As there have been no preliminary estimates of the amount of changes to groundwater hydraulic and chemical fluxes that will result from the project, a most reasonable technique for evaluating potential for impact is to evaluate the magnitude of groundwater flux downslope from the project. If the present magnitude can be considered minor, it can be reasoned that there is even if there are subsidies to groundwater from the project, the overall input over existing conditions will not be sufficient to cause significant negative impacts to the marine environment.

Results of recorded continual horizontal profiles of salinity and temperature from the shoreline to a distance offshore beyond the influence of input from land revealed that there was indeed a detectable input of groundwater (noted by decreased values of salinity below open ocean values) at the shoreline. However, the groundwater signals consistently extended only to a distance of approximately 30 meters (~90 feet offshore). The width of the mixing zone is a result of both relatively low input, and dilution-mixing by physical forces of wind waves and currents. At the time of the surveys winds were calm and surf breaking on the shoreline was less than one foot. These conditions represent the calmest that can occur, hence the documented width and magnitude of the zone of mixing can be considered maximal; during typical tradewind conditions with higher surf, the zone of mixing will be commensurately smaller.

Results of assessments of the physical and biotic setting of the nearshore area indicates that within a distance of 30 meters from shore, bottom composition consists of a mix of sand and rubble which provides a constantly shifting unstable surface for marine organisms to settle and grow. In addition, continual scour by moving sand in the nearshore zone adds to the harshness of the habitat in terms of suitable habitat. As a result, the reef zone that has any potential for being affected by input from land contains no biotic communities that could be affected. While some isolated corals and other benthic fauna and flora occur on the outer regions of the reef flat, these areas are beyond the influence of inputs from land.

All of these considerations indicate that the proposed Piilani Promenade project will not have any significant negative or likely even measurable, effect on water quality or marine biota in the coastal ocean offshore of the property. Because of groundwater subsidies are likely to be small, based on calculations from similar projects, they are likely to remain within the wide variation in nutrient concentrations of the entirely of Central Maui. As the effects of groundwater input have been shown to be small and restricted in area, and typical ocean conditions have strong mixing characteristics of the nearshore environment, and there is not a biotic community structure in the area of effect, the changes to the marine environment as a result of Piilani Promenade project will likely be undetectable, with no change from the present conditions.

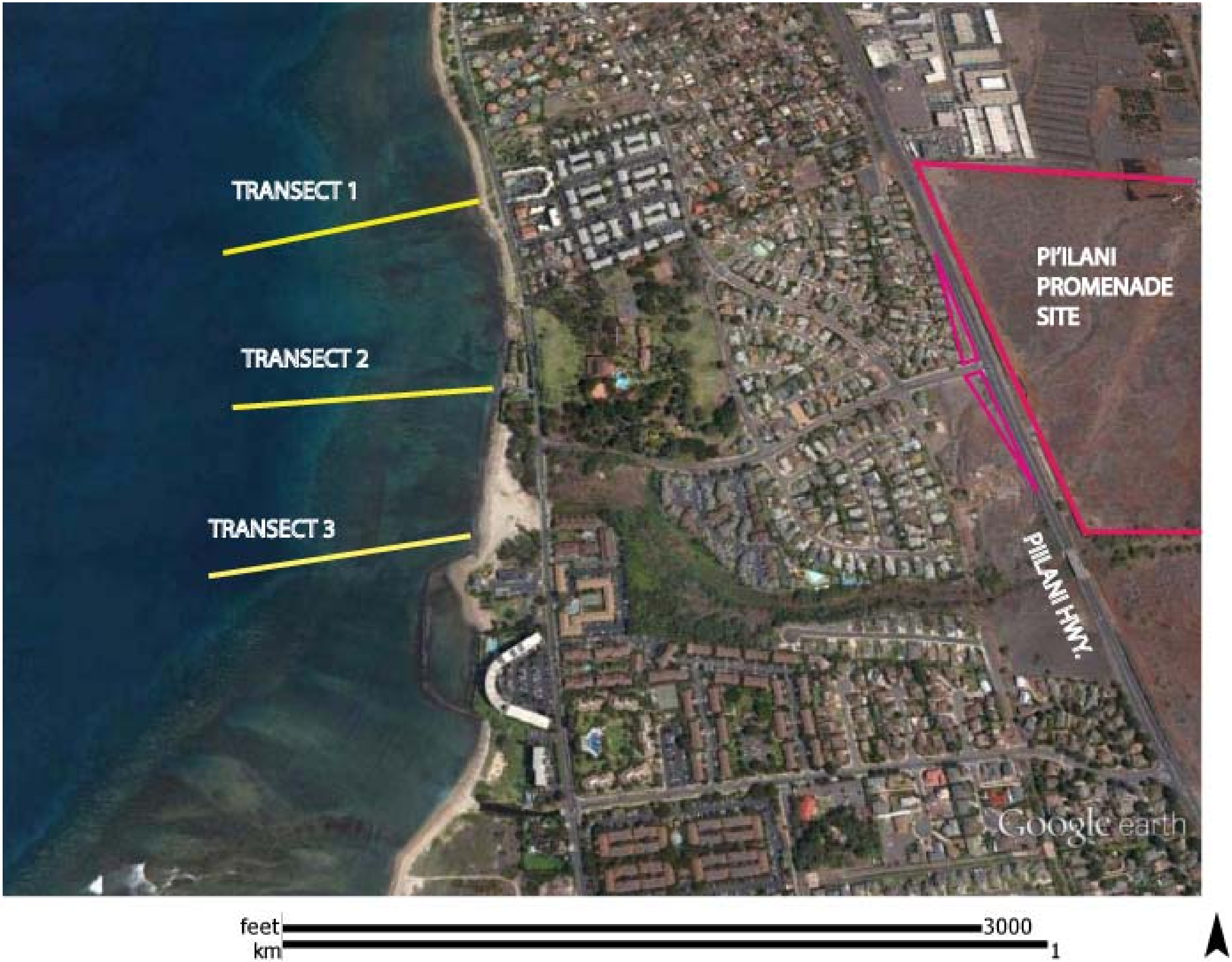

FIGURE 1. Aerial photograph of area of North Kihei, Maui, Hawaii showing location of Piilani Promenade project site. The main project site is located mauka of Piilani Highway, while two small triangular parcels are located makai of the Highway. Also shown are locations of three ocean transects extending from the shoreline to approximately 100 m offshore along which salinity and temperature profiles were acquired.

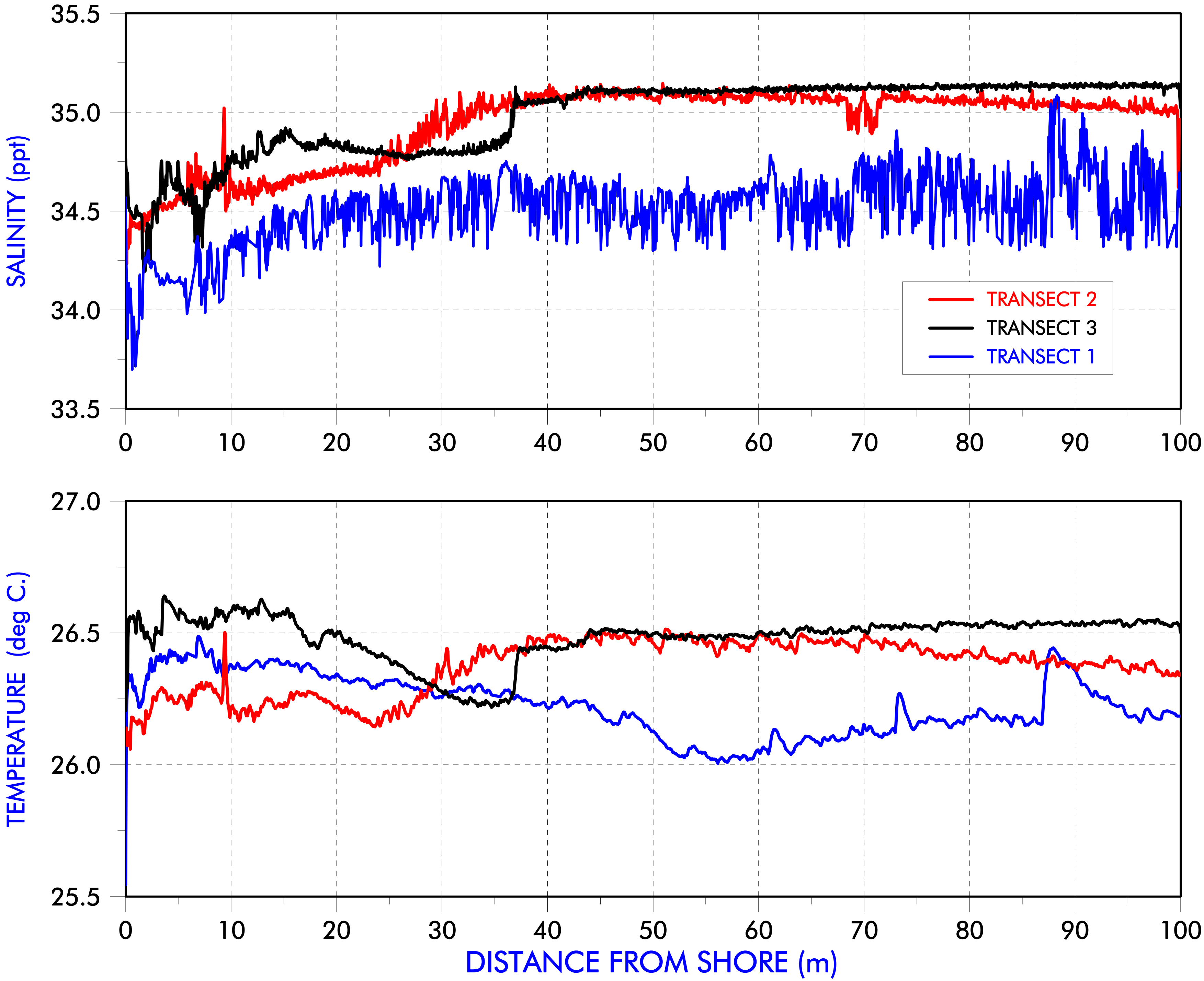

FIGURE 2. Plots of salinity (top) and temperature (bottom) in surface water on three transects that extended from the shoreline to approximately 100 m offshore of the Piilani Promenade property. For locations of transects, see Figure 1.

FIGURE 3. Two views of sand and rubble bottom of nearshore zone downslope from the Piilani Promenade Project site in Kihei, Maui, Hawaii. Water depth in both photos is 2-3 feet.

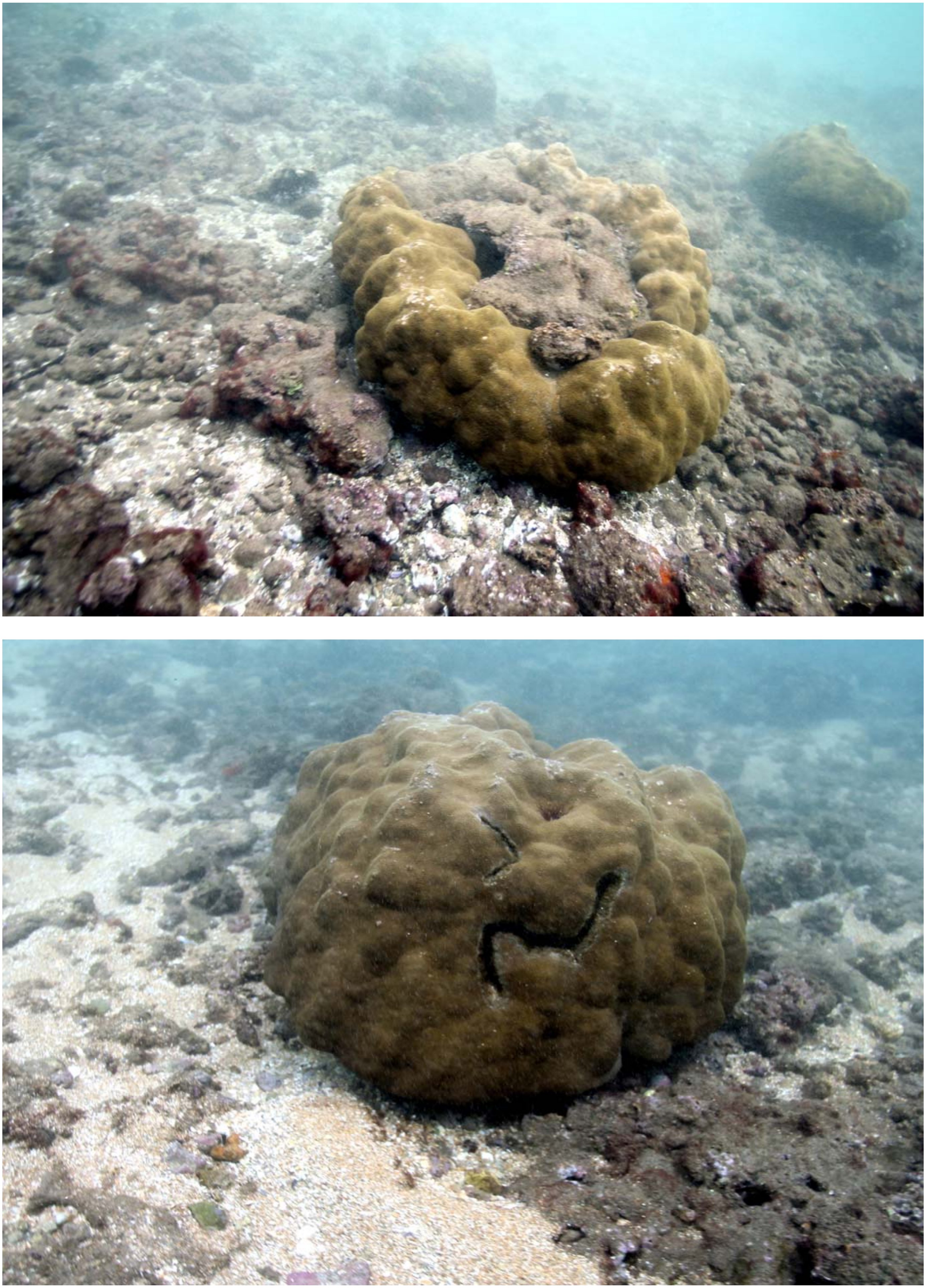

FIGURE 4. Two views of rubble zone with isolated coral colonies. Corals in both photos is *Porites lobata*. Water depth in both photos is 4-5 feet.

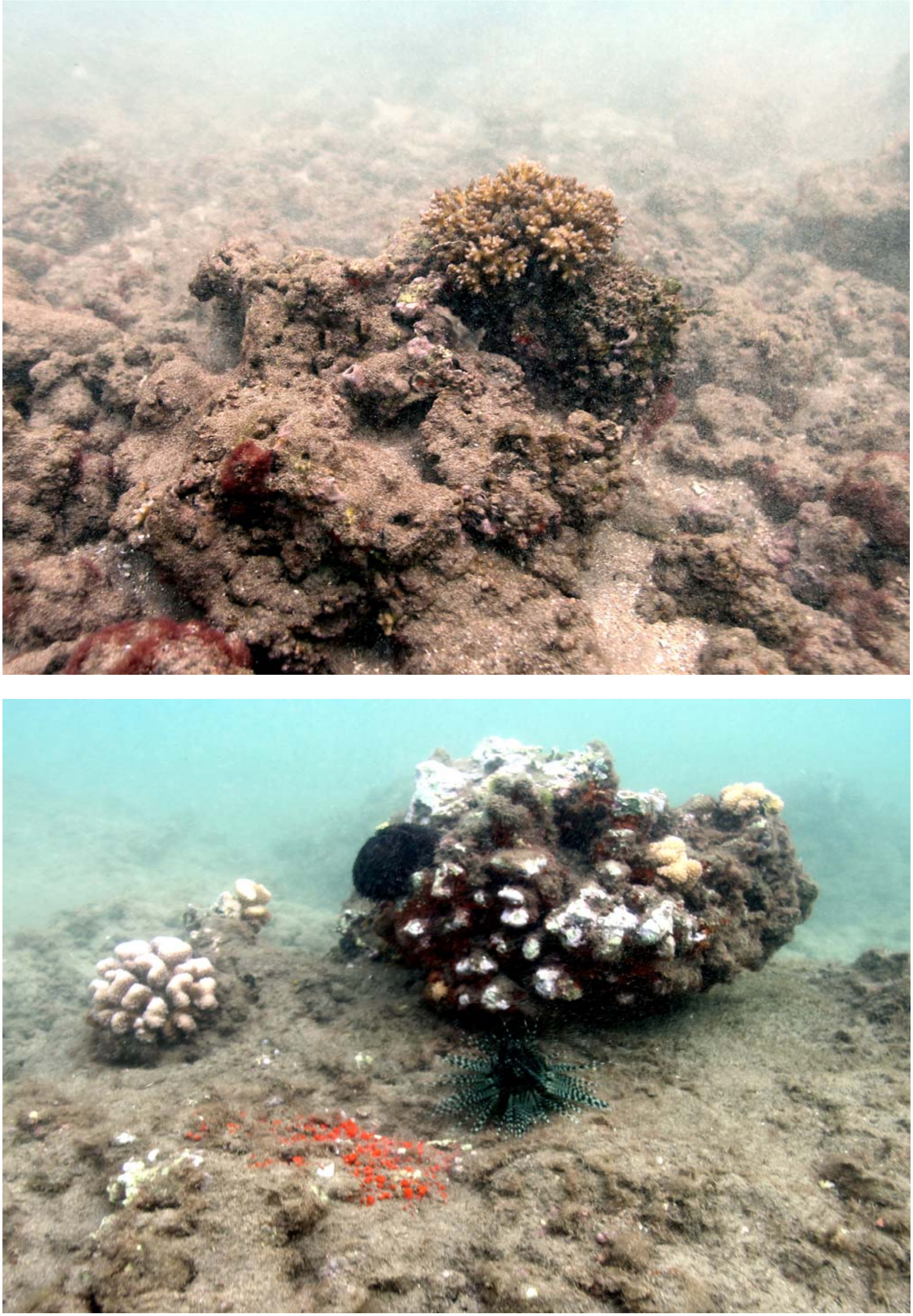

FIGURE 5. Two views of rubble zone with isolated coral colonies. Coral in upper photo is *Pocillopora damicornis;* corals in bottom photo are *Pocillopora meandrina*. Round sea urchin in upper center is *Tripneustes gratilla*; striped long-spined sea urchin in bottom center is *Echinothrix calamaris*. Water depth in both photos is 4-5 feet.

FIGURE 6. Upper photo shows colony of soft coral *Zoanthus* sp. growing on ledge of fossilized reef. Bottom photo shows a cluster of spiny sea urchins (*Echinothrix diadema*) inhabiting holes in mound of dead coral on outer reef off of Kihei. Water depth in both photos is approximately 10 feet.

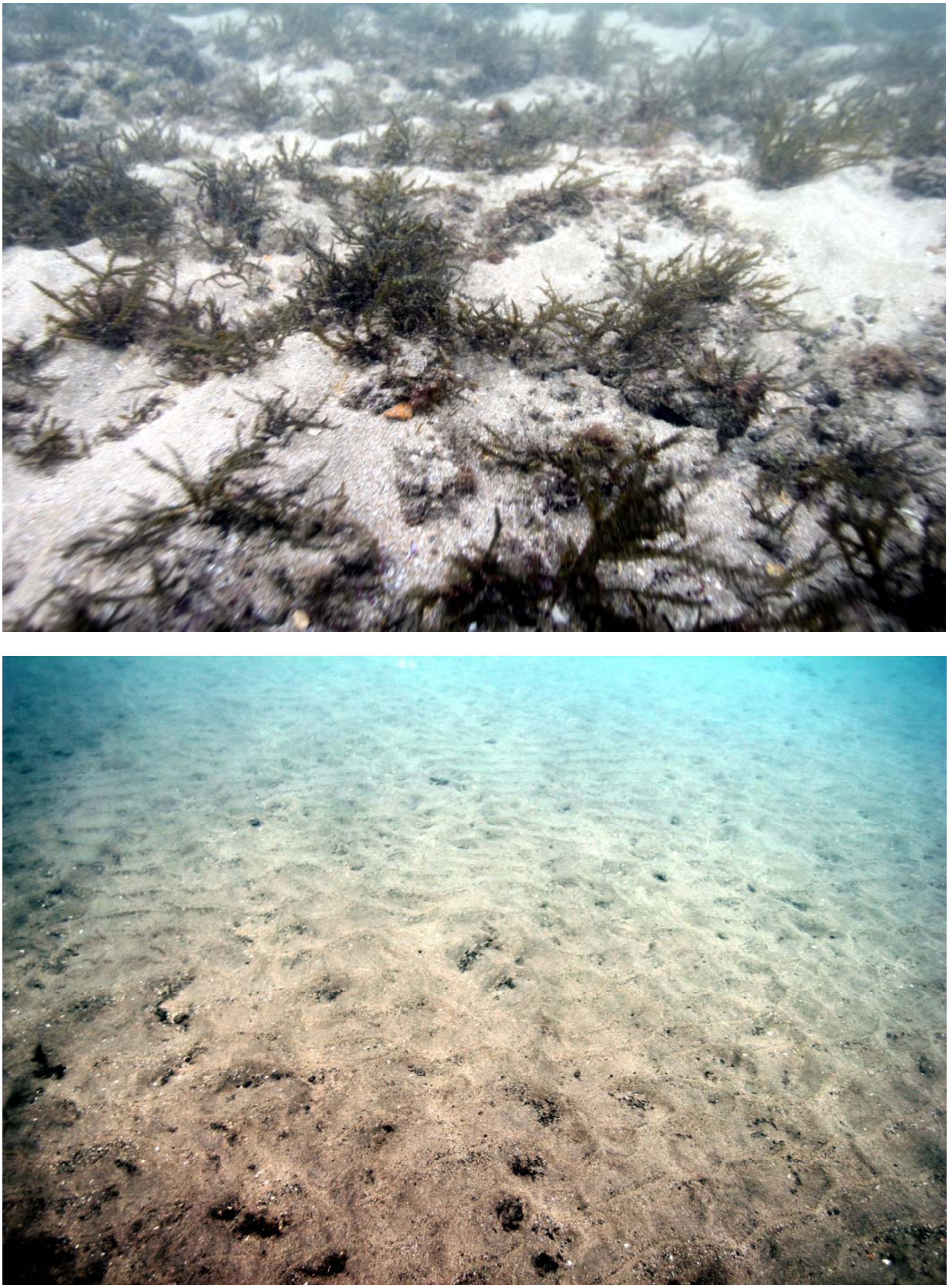

FIGURE 7. Upper photo shows clusters of introduced alga *Acanthophora specifera* in sand flat in outer zone of reef flat off Kihei. Bottom photo shows sand flats that extend offshore into deep water. Water depth top photo is approximately 10 feet, water depth in bottom photo is 15 feet.

APPENDIX K
Economic and Fiscal Impact Assessment

Market Study,
Economic Impact Analysis, and
Public Fiscal Assessment
of the Proposed

PIILANI PROMENADE

Kihei, Maui, Hawaii

THE HALLSTROM GROUP INC.
REAL ESTATE
CONSULTANTS
& APPRAISERS

December 20, 2013

Mr. Robert Poynor
Vice President
Sarofim Realty Advisors
8115 Preston Road, Suite 400
Dallas, Texas 75225

Market Study, Economic Impact Analysis and Public Fiscal Assessment of the Proposed Piilani Promenade Kihei, Maui, Hawaii

Dear Mr. Poynor:

The Kaonoulu Industrial Subdivision was entitled in the mid-1990s to provide land in support of economic growth in Kihei, a rapidly expanding community with then scarce development sites. The project was intended to meet a portion of the long-term demand for industrial and commercial floor space in South Maui; providing needed space for business opportunities that would in turn lead to increased economic activity, regional employment and tax revenues.

Over the past two decades the Maui light industrial sector has meaningfully evolved, and the initial conceptual plan envisioning 123 small lots to support some 900,000 square feet of business floor area is no longer valid in today's market.

In compliance with the in-place land use designations and reflecting prevailing market trends, the landowners have proposed the Piilani Promenade master plan, a mixed-use project containing commercial, light industrial and residential components on 68.19 acres of the subdivision.

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We have completed a series of market and econometric analyses regarding the revised master plan for the well-located site fronting the mauka side of Piilani Highway at the northerly interior gateway of Kihei Town, approximately 10 miles south of Kahului Airport, Maui.

Under the updated concept, the project will include approximately:

- Up to 530,000 square feet of gross leasable business commercial space, including neighborhood/general retail and restaurant, anchor/large retail outlets, and service/office tenants.

- Up to 60,000 square feet of gross leasable light industrial space, including general industrial, warehouse, supply and service/office uses.

- 226 one and two-bedroom rental apartments.

The project site, comprised of three currently vacant parcels is identified on State of Hawaii Tax Maps as Second Division, Tax Map Key 3-9-1, Parcels 16, 170 & 171, with respective street addresses of 451, 524 & 376 Kaonoulu Street, Kihei, Hawaii, 96753. It is located in an urbanizing corridor along the Highway, which stretches some seven miles from north Kihei to Wailea.

The subject holding is designated for urban and light industrial use by the State of Hawaii and County of Maui. It is level to moderately sloping, in an arid climate zone, offers makai and upslope Haleakala panoramas from some areas, and is currently overgrown with bunch grass and scattered small trees. The highway frontage is unimproved apart from a paved shoulder and streetlights, and portions of the site are fenced.

Our assignment was to: determine the level of demand for the Piilani Promenade inventory relative to available supply; assess the appropriateness of the site and master plan from a market perspective; and quantify the economic impacts of the project within the public and private spheres presently and in the future. Our study was primarily comprised of three elements:

1. **Market Study**. To ascertain whether there currently exists, or will exist, sufficient demand in the Maui and Kihei-Makena commercial, industrial and residential real estate sectors to successfully absorb the finished subject inventory in a timely manner given its characteristics and those of competing in-place and proposed regional developments.

2. **Economic Impact Analysis**. To estimate the general and specific effects on the local economy which will result from the build-out of the project, including construction and business employment, wages and income, contractor/supplier profits, end-user expenditures, and other regional monetary and employment effects. This study also forecasts the population of the subject community

including residents and workers, and their household income and discretionary spending levels.

3. **Public Fiscal Assessment**. To quantify the gross tax receipts, public costs, and net benefits which will be received by the State of Hawaii and the County of Maui resulting from the actualization and operation of Piilani Promenade.

The pertinent results from our studies are presented in the following report, which opens with an Executive Summary focusing on brief narrative describing our conclusions. The remainder of the report is comprised of a series of six addenda exhibits containing the tabular presentation of our data, analysis and modeling for each aspect of the assignment.

As part of our investigation program, we have: visited the subject property and its environs; researched the Maui and Kihei-Makena submarkets including residential, industrial/business park and commercial real property sectors; interviewed knowledgeable parties active in the regional economy; reviewed government statistics, policies and publications; accessed on-line databases; and compiled materials from published and private sources.

All conclusions presented herein are subject to the limiting conditions, assumptions and certifications of The Hallstrom Group, Inc., in addition to any others specifically set forth in the text. All work has been completed in conformance with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice (USPAP).

We appreciate the opportunity to be of service to Piilani Promenade LLC and Sarofim Realty Advisors in regards to this prominent mixed-use project.

Respectfully submitted,

THE HALLSTROM GROUP, INC.

James E. Hallstrom, Jr., MAI, CRE

Tom W. Holliday

Tom W. Holliday

THE HALLSTROM GROUP INC.
REAL ESTATE
CONSULTANTS
& APPRAISERS

Market Study, Economic Impact Analysis, and Public Fiscal Assessment of the

PROPOSED

PIILANI PROMENADE

Located at

Kihei, Maui, Hawaii

Prepared for

Mr. Robert Poynor
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&

Piilani Promenade North LLC

&

Piilani Promenade South LLC

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As of

November 2013

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Qualifications of The Hallstrom Group, Inc.

Qualifications of the Analysts

PROJECT OVERVIEW

The Subject Property

The proposed Piilani Promenade (PP) project site is comprised of approximately 68.2 acres of vacant urban-classified lands within the undeveloped Kaonoulu Industrial Subdivision located mauka of Piilani Highway at the northerly, interior gateway to the Kihei-Makena corridor. It is situated on the coastal plain/lower northwesterly flanks of Haleakala, one-half mile from the shoreline and ten miles from the Kahului Airport (OGG).

The irregularly/L-shaped site has approximately 2,400 lineal feet of frontage along the mauka side of the highway across from the current inland terminus of Kaonoulu Street, the extension of which will bisect and provide the primary access for PP.

There are existing light industrial and commercial uses immediately north of the subject project along with some limited specialty agricultural, with single family residential beyond. The lands makai across the highway are for the most part fully-developed with resident, visitor-oriented and commercial uses which stretch to the shoreline. The lands on the mauka side of the highway to the south of the site are undeveloped.

The property has been entitled for light industrial uses since achieving State Land Use redistricting to Urban for the proposed Kaonoulu Industrial Park in 1995. At that time, the concept plan showed 123 lots for commercial and light industrial uses ranging in size from approximately 14,000 square feet (.32 acres) to 54,000 square feet (1.24 acres).

Kihei is one of Hawaii's fastest growing suburban towns and is emerging as another focal point for future, modern commercial and light industrial uses on the island in support of, and complimentary to, the historic and expanding residential and visitor-oriented development in the region.

History and Analysis of the Proposed Kaonoulu Industrial Subdivision

When announced in the early-1990s, the purpose of the Kaonoulu Industrial Subdivison was to support business growth and economic activity serving resident households and visitors in the urbanizing Kihei-Makena corridor, which was undergoing transition from a secondary coastal village into an expanding, distinct, major suburban market area.

As stated in the July 1994, *Project Assessment Report* (Section 1.B.):

> "**Reason for Reclassification**
>
> The proposed reclassification is being sought in order to develop a commercial and light industrial subdivision. Light industrial space in the South Maui Region is generally very sparse….Thus, residents and businesses must rely heavily on goods and services being delivered from the Wailuku-Kahului Area. This results in higher cost for goods and services, increase in traffic and other inconveniences for both providers and receivers of these goods and services.
>
> In addition, the proposed commercial and light industrial subdivision is anticipated to address the needs for goods and services from a growing population based in the region."

The petitioners sought approvals allowing the conversion of marginally-productive agricultural lands into urban uses identified under Maui County "M-1 Light Industrial" zoning regulations, which also permit the uses allowable under B-1, B-2 and B-3 classifications and residential development. The Subdivision was to provide needed space for business opportunities that would in turn lead to increased economic activity, regional employment and tax revenues over the long-term.

The conceptual plan forwarded during the entitlement process showed a 123-lot subdivision with parcels ranging from 14,000 to 54,000 square feet. However, as noted in the *Market Feasibility Study* (Exhibit "A", page 8):

> "These estimates of lot size, quantity and values are provided for planning purposes only. It is only one conceptual alternative which meets current market conditions with considerations for economic, social and physical variables. These estimates require reassessments from time to time and may need to be adjusted accordingly."

Market conditions in the Maui Light Industrial sector have meaningfully evolved during the past twenty years and the initial master plan concept now "requires reassessment" within an updating context.

Historically, light industrial lands on Maui, reflecting the agrarian-based and limited-scale of economic activity on the island, were typically:

- Subdivided into smaller lots;
- Owner-occupied;
- Single business/tenant buildings; and,
- Placing lesser emphasis on exposure, appearance of improvements and patron functionality.

Over the past two decades, the sector has changed dramatically; a result of the movement towards a service-based economy, the emergence of "retail warehouses", influx of mainland companies and franchises, adapting business models, trending consumer preferences, and economic realities on the island.

The outcome has been that the newer light industrial subdivisons on Maui (and throughout Hawaii) are now primarily developed with:

- Larger projects/complexes and structures,
- Multi-tenant buildings,
- Ownership by investors (rather than owner-occupants),
- Major commercial components;

- Higher quality of building design and construction;
- Emphasize frontage/exposure and appearance, larger parking areas and ease of access; and,
- Heightened efforts to improve the customer experience and broaden appeal.

The juxtaposition of "old" versus "new" light industrial-zoned development along Dairy Road evidences the inexorable evolutionary changes in the sector.

The business commercial/industrial subdivision and building model of the past, as reflected in the original Kaonoulu Industrial Subdivision concept plan, is not amenable to supporting prevailing business and consumer trends, and would fail to satisfy demand under current and forecast market conditions.

At the start of its entitlement process the Maui economy (and specifically real estate) was in a major down period and the commercial/industrial market was just beginning the fundamental transformation towards the modern light industrial park design and mix of uses. The initially-envisioned plan for the project reflected the historically "safe and tested" model within the context of an unstable period.

From a market viewpoint, it is illogical to require that a master plan, in the face of obvious market evolutions, unyieldingly maintain a static design that will inevitably result in lesser ability to meet evident business demands and negatively impact the economic activity, employment and tax revenues for which the Subdivison was created.

<u>Master plans for all real estate use types are invariably revised over time to reflect changes in the marketplace</u>. In the years between conceptualization and build-out there are transformations constantly taking place in regards to business models, consumer preferences, construction design and techniques, ownership, and developer/investor perspective.

A successful and sustainable master plan must be sufficiently malleable to accommodate generally-conforming evolutions over time in order to achieve maximum efficiency of entitled lands and supporting infrastructure systems. Otherwise a project can stagnate, devolve into lesser orders of use, and fail to actualize the goals of the entitlement effort.

There are numerous examples of master plan revisions on Maui.

In a highly similar manner as at Kaonoulu, the Maui Research & Technology Park (MRTP) master plan is currently in the process of a major revision, updating the design in regards to allowable uses, lot sizes, development standards, and including a residential component.

The MRTP changes are acknowledged by virtually all to be necessary in order to adapt the Park to evident market changes and in support of it achieving the long-term business expansion, economic activity and employment objectives for which it was entitled. As at Kaonoula, the originally forwarded MRTP concept lacked functionality and desirability/competitiveness on a current and going-forward basis, resulting in entitled lands going unused for decades.

Since the mid-1980s, the master plans for the major destination resorts statewide have been changed to provide large numbers of house lots, which were initially a tertiary consideration at best, but have become a driving economic factor in the continuing success of the communities. Conversely, the focus on large scale hotel and condominium development ebbed, with many master planned multifamily building sites being converted to single family subdivision.

The uses are meaningfully different in design, ownership, price, market orientation, buyer demographics and appearance; yet, they are conforming uses in regards to the underlying land use classifications and generally consistent with the original planning objective of providing resort product for the Maui market.

The North Beach Makai area of Kaanapali was long master-planned (and entitled) primarily for hotel development. Changes in the market have resulted in the area being dominated by timeshare projects, along with a single family subdivision, which are again different in design, ownership, price, etc., but conforming with in-place zoning, and timeshare being generally consistent with the intent of providing on-beach transient lodging inventory.

The master plans of the Project Districts mauka of Kapalua and Wailea Resorts have also been through several iterations of use, density and lay-out changes in response to market trends. before construction has even begun.

The Proposed Piilani Promenade Master Plan Revision

The updated master plan creating PP (shown below), designed by Architects Orange along with Chris Hart & Partners (shown below), is intended to offer a diverse mix of competitive business commercial and light industrial use-types within a major complex having some 588,000 square feet of gross leasable area serving neighborhood and regional demand. Additionally, it will contain an apartment project providing needed rental housing opportunities for on-site workers and the South Maui community.

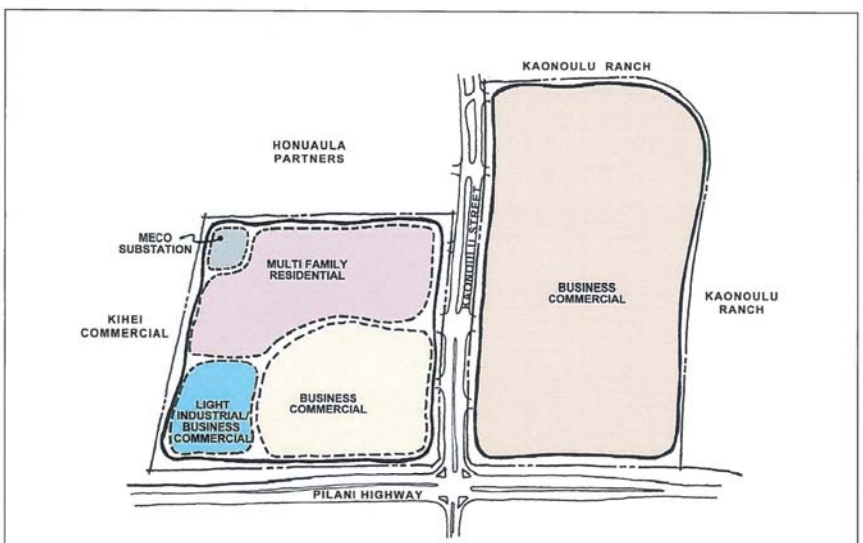


FIGURE 4

Conceptual Site Plan
Pi`ilani Promenade
TMKs (2) 3-9-001: 016, 170-174

The following chart summarizes the primary proposed components of the project within the revised design. Overall, the updated lay-out will contain about 750,000 square feet of total floor area, the same as would have been developed on the acreage under the original Kaonoulu Industrial Subdivision plan. The evolved master plan is intended to be general and conceptual.

PIILANI PROMENADE MASTER PLAN COMPONENTS			
Use	**Business Commercial**	**Light Industrial/Business**	**Rental Apartment**
Gross Leaseable Area in Square Feet/ or Number of Units	530,706 Total Square Feet Gross Leaseable Floor Area	57,588 Total Square Feet Gross Leaseable Floor Area	226 Total One-Bedroom to Three-Bedroom Units

- The 530,706 square foot Business Commercial component, the focal use of the project, is envisioned to be comprised of General Retail, Anchor/Large Retail Outlets, Neighborhood Retail, Restaurants, and Service Providers and Business Office uses.

- The 57,588 square foot Business/Light Industrial component is envisioned to be comprised of General Industrial, Warehouse, Building Materials/Supply, Service Providers, and Business Office uses.

- The proposed apartment complex, which will be separated from the business/commercial component by an extensive open space buffer, is intended to provide proximate housing for some of the on-site workforce and expand the number of market rental apartments in the community, is currently envisioned to be comprised of about 226 spacious one, two (majority type) and three bedroom units.

  The final mix of use-types and square footages for the business commercial and business industrial components, and final apartment unit count and mix, are subject to change in accordance with market trends, Kihei and regional customer demands, and evolving design and business needs over the coming decade.

The developers anticipate commencing with on and off-site infrastructure emplacement in 2015, continuing through 2016, with vertical construction of the apartment complex and the initial business commercial and light industrial improvements breaking-ground in 2016 and available for occupancy in 2017-18.

The updated PP master plan is essentially for a moderate-size, largely self-contained urban village, generally reflecting leading-edge land planning and development techniques, which will provide opportunities for a population of residents, workers and customers within a sustainable, diverse project.

PP will become a major economic engine and employment center for Maui over the next generation, providing an opportunity for expanding and new businesses to find space in a modern, amenitied, mixed-use project outside of the island's traditional industrial parks and commercial centers. The development is complementary to the other uses and existing and proposed projects within the urbanizing Piilani Highway corridor; particularly in conjunction with the revised MRTP master plan which will attract some smaller, true light industrial users that might have previously considered Kaonoulu as an alternative location.

From a market perspective, the master plan builds upon several favorable factors, focal of which are:

- *The site has superior attributes for a business commercial and business/light industrial project*. It has extensive frontage and excellent exposure along the primary highway in the region past which thousands of vehicles travel daily, and it is at the gateway to the Kihei-Makena Corridor (just one mile south of the junction serving as the northerly entrance to the region) with a permanent intercept position.

  The holding has sufficient width/depth to support a variety of uses, project designs and building opportunities, a moderate terrain capable of supporting the proposed components, and will be accessed via fully signalized/channelized intersection.

- *It is within an expanding, high-demand area.* Kihei has grown many-fold in the past forty years while evolving from a sleepy visitor-oriented beach town into Maui's "second city".

  The demand for residential units in the area is strong, it experiences some of the highest industrial and non-resort commercial occupancy levels on Maui, with available space typically quickly filled. Many of the stores, restaurants and service providers in the region have been at their locations for decades. It is becoming a more desirable business and shopping destination over time, with solid highway access characteristics and a well-populated neighborhood trade area. Kihei is an increasingly competitive location for new and expanding businesses on Maui.

- *PP will contribute to the standing of South Maui as a destination for business* by offering quality, well-located, building parcel inventory capable of supporting a wide variety of commercial and light industrial use types meeting the demands of companies seeking a high-volume/high-exposure, readily accessible location within an integrated master planned environment. Similar quality sites for major anchor and "big box" operations are exceptionally scarce in Kihei and these types of retailers (which help create cumulative attraction for an area) will be seeking to locate in the Kihei-Makena Corridor as the population and economic importance of the area increase in coming years.

- *In concert with market trends.* The PP master plan will contain the components necessary to maximize penetration in the competitive sectors within the context of prevailing and anticipated near to mid-term market trends; incorporating a diverse mix of uses (including a substantial residential complex), and will be capable of achieving a desirable critical mass to a far greater degree than possible within the antiquated small lot industrial park previously planned for the property.

Based on our analysis of the subject property and project from a market perspective, we conclude the proposed PP master plan will:

- Embrace leading edge mixed-use design concepts.

- Maximize the reasonable development potentials of a well-located parcel having superior access, frontage, intercept and exposure characteristics.

- Complement the existing and proposed urban development in the Piilani Highway corridor.

- Competitively address existing and forecast needs for rental residential, business commercial and light industrial inventory in the study area.

- Be representative of the highest and best use of the property.

ASSIGNMENT

The Hallstrom Appraisal Group, Inc.'s assignment was to analyze the proposed PP master plan from a real estate market perspective and to identify and quantify probable market and economic impacts associated with its development in light of competitive, regional, prevailing and forecast trends to answer four basic study questions:

1. Is there sufficient demand to absorb the various components of the subject project during a reasonable exposure period given competing developments (supply) and projected regional market trends?

2. Will PP be an appropriate use of the underlying site relative to market needs?

3. What will be the general/specific and direct/indirect economic impacts on Maui resulting from the undertaking of the subject community via employment, wages, business operations, population, and other economic activity related to the real property asset?

4. What will be the effect on the state and county "public purse" from the project in regards to costs of services required to service the PP population and increased tax/fee receipts flowing from its development?

These issues were addressed through a comprehensive research and inquiry process utilizing data from market investigation, governmental agencies, various Hawaii-based media, industry spokespersons/sources, on-line databases, and published public and private documents.

The pertinent results of our study are highlighted in the body of our report, which contains a concise narrative and tabular synopsis of our conclusions. Additional materials, contained in data tables and models depicting the subject community's lifespan from commencement to completion, upon which our conclusions are based, are presented in the Addenda.

Our summary narrative presentation is divided into four sections:

1. Primary Study Conclusions

3. Market Study of the Piilani Promenade Components and Absorption Estimates

4. Economic Impacts of the Proposed Development

5. Public Fiscal Costs and Benefits Associated With PP

The primary sources of information regarding the subject community used in our study were: maps, master plans, GLA/unit counts, infrastructure and vertical cost estimates and background materials provided by Piilani Promenade North LLC, Piilani Promenade South LLC, Sarofim Realty Advisors, Architects Orange, Chris Hart & Partners, and other members of the development/consultant team; resident population and housing projections, community plan materials and other data from the Maui County Planning Department; the United States 2010 Census; rental housing data from the Maui Board of Realtors and Hawaii Information Service (and others); and data from our files.

The PP site and environs have been viewed by our firm on many occasions and specifically for this assignment. The effective date of study was November 1, 2013.

PRIMARY STUDY CONCLUSIONS

Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions regarding the probable market standing and economic impacts of the proposed Piilani Promenade development:

Market Study

- Hawaii has steadily rebounded from the 2008-09 recession and associated down-cycle in the real estate market, with Maui and Oahu showing the strongest recovery movement, regaining most of the ground "lost" in most sectors by mid-2013. Expectations are for continuing economic expansion within the current up-cycle during 2014-15 (and into the mid-term) resulting in increasing demand for real estate inventory within a limited-supply market environment, with activity levels reaching long-term averages.

- Among the favorable economic indicators and trends on Maui, the unemployment rate has dropped to a current level of about 4.5 percent from a high of 9.1 percent during the depths of the recession; median household income has grown two percent in each of the last two years; residential sales activity and prices are moving upwards; commercial and industrial space absorption has shown strong gains in 2013; and, total visitor days and spending have had annual escalations averaging 6.1 percent and 12.4 percent respectively since 2010.

- The "Kihei-Makena Study Area" is a suburban coastal community, with residential-oriented uses in the inland areas (housing units, neighborhood commercial and limited industrial), and resort/vacation-oriented uses dominating the shoreline (condos, hotels, timeshare and destination resorts). It has expanded dramatically in the past three decades, growing four-fold in resident population, adding nearly one million square feet of commercial and industrial floor area and more than 2,500 visitor units, and evolving into a major hub of Maui investment and business activity. Forecasts are the study area resident population will grow from the current figure of 28,650 to between 42,000 to 46,000 by 2035 (a gain of 46 to 61 percent), and the de facto population to grow between 69,700 to 74,100 (total growth of 42 to 51 percent) as shown in the chart below:

Scenario	Year-End 2013	Projected Kihei-Makena Population 2015	2020	2025	2030	2035
One: Minimum Based on Planning Department Baseline Population Forecasts						
Resident	28,653	30,597	33,227	35,962	38,757	41,750
De Facto	48,957	51,510	55,709	60,130	64,737	69,679
Two: Maximum Based on Planning Department Historical Trend Run Population Forecasts						
Resident	28,653	30,500	34,000	38,000	42,000	46,200
De Facto	48,957	51,413	56,482	62,168	67,980	74,129

The population expansion will increase the standing and importance of the study region, making it a distinct suburban market area within the island's economy; particularly as the Maui Research & Technology Park (MRTP) and Makena Resort experience further development and Honuaula and other large master-planned projects are manifest.

- Historically, the study area has been a secondary, commercial sector on Maui, meaningfully behind and substantially dependent upon Kahului-Wailuku, with an estimated 764,000 square feet of commercial floor area, or 16 percent of the island total. Kihei-Makena contains about one-quarter of the de facto population of Maui, resulting in the regional commercial sector being "under-serviced" relative to average consumer needs on a gross basis (by some 415,000 square feet of space); a product of commercial development failing to keep pace with population growth and the lack/scarcity of many use-types within the regional inventory such as big box, destination projects and regional centers.

- On a going-forward basis, the Kihei-Makena Corridor will evolve into a more primary trade area with significantly less dependence upon Wailuku-Kahului businesses, which are ten to 15 miles distant from the subject area residents. There is a meaningful potential for expansion by: capturing more of the locally-generated demand that now flows elsewhere on the island (primarily Kahului); continuing growth in the community de facto population (more customers); and through diversification of commercial, light industrial and business/service product offerings.

- The vacancy rate on the island for retail, restaurant and service/support commercial floor space is currently at eight percent; down more than a point from the depth of the recession. It is anticipated to further decline by two-plus points in 2014. After numerous quarters of "negative absorption" (vacated space) from late 2008 to 2010, and mixed absorption levels in 2011-12, positive net absorption of competitive retail/restaurant space returned to the Maui market in 2013, with 51,488 square feet of net newly leased space through the first three quarters of the year, leading all the major islands in the State. Rents have stabilized over the past year and are beginning to show escalations for the first time since 2007-08. In Kihei-Makena vacancy rates are at 3.8 percent, the lowest of any primary commercial region, with most of the available bays located on Ohukai Road or Lipoa Parkway (not the highway or S. Kihei Road). Rents in competitive spaces are among the highest on the island, tenant stability is relatively solid (particularly compared to West Maui), and there are fewer quality vacant bays remaining as the sector continues through its post-recession ramp-up period.

- Maui currently has some 16.1 million square feet of "commercial" floor area, including light industrial, retail and office uses, or about 108.8 square feet per resident. This is at the low-end of surveyed market areas in the US which ranged from 97.6 square feet to 237.7 square feet per capita, and average of 138.8 square feet per resident. The Kihei-Makena region currently has some 1.8 million square feet of commercial space, or about 63.4 square feet per resident. Given the large numbers of high-spending tourists contributing to demand in addition to residents on Maui and in Kihei, the demand created by the de facto population is proportionately higher than in the surveyed market areas, indicating that the island and study region are not over-serviced with commercial development.

- We estimate there will be demand for an additional 936,000 to 1,505,000 million square feet of gross leasable commercial floor space in the Kihei-Makena Study Area by 2035, more than doubling the existing inventory. This equates to an additional 92 to 147 acres of vacant gross land area to support expected market needs.

- The existing supply of vacant commercial development sites is limited in Kihei-Makena, with much of the scarce inventory being less-desirably located in the interior of the community, not along the primary thoroughfares of Piilani Highway and South Kihei Road. Virtually all of the choice commercial parcels in the region have already been developed. The updated MRTP development code provides only for some 100,000 square foot of neighborhood retail space, intended to service the added residential component of the community, but it will be uncompetitive as it is well removed from the highway. Several of the major proposed master-planned residential developments will contain commercial uses, but these are limited in size, often in the interior of the project, and are primarily intended to service their neighborhood residents. Our analysis indicates there will be insufficient competitive acreage to meet the forecast regional mid-point demand for commercial floor space in the region.

- The study area industrial space sector has approximately 960,000 square feet of inventory, or less than nine percent of the total amount built on Maui; again, indicating the region is under-serviced relative to its full share of the overall island market (by some 2.67 million square feet). The majority of space is in business commercial, storage/warehousing, suppliers, offices, staging, and other uses. Island-wide the vacancy rate for industrial floor area is about 2.0 percent (well below the State average of 3.2 percent), and is indicative of a "tight" sector, which showed a positive absorption of 41,870 square feet in the first nine months of 2013. Vacancy in Kihei-Makena is estimated at less than two percent, rents are at or above island-wide averages, and brokers report increasing interest in regional industrial spaces, with several owner/user and multi-tenant buildings under construction or in the final approval stages.

- As has occurred throughout the country over the past two decades in response to an evolving market, light industrial parks/zoned lands on Maui and within the Kihei-Makena region often have major business commercial components, blurring the line between traditional industrial-type uses and retail/service/office uses. An excellent example is a store such as Home Depot, which are now often located in industrial subdivisons (particularly in Hawaii), and are essentially retail industrial parks under a single roof. This mixed-use trend has strongly and steadily increased over the past two decades and is anticipated to continue, with newer anchor retailers, strip centers and large retail outlets often being located on well-located industrial-zoned sites. In many of the more recent major "light industrial" developments on the island, business commercial uses represent from 40 to 70-plus percent of the total floor space. This aspect, which is embodied in the evolution of the subject property master plan from the small-lot Kaonoulu Industrial Park to the envisioned Piilani Promenade, is critical in analyzing and forecasting light industrial demand and supply factors.

- We estimate the demand for additional light industrial (and associated uses) floor space on Maui over the next 22 years (through 2035) will total from 1.8 million to 2.3 million square feet, an increase of from 83 to 137 percent above current levels. This equates to a demand for between 153 to 200 additional gross acres of underlying sites at prevailing "business park" densities; and significantly more acreage if base yards, quarries, and open storage uses are included.

- Again, apart from MRTP, which potentially could have up to two million square feet of light industrial/business park development, and the subject property, there are limited competitive vacant industrial sites in the Kihei-Makena Corridor; markedly less than what will be required to meet regional demand. There are no other major inventory additions proposed at this time, and few of the master-planned communities will contain light industrial building sites.

- The rental housing market in the study area has been chronically under-supplied, with low vacancies even during recessionary periods and relatively high rents for the neighbor islands. This status is a result of a limited supply of housing units of all types in the area and their comparatively high prices in relationship to household income levels, pressures on the sector from non-residents absorbing supply across the spectrum, the focus of developers on upper-end product, and high land and construction costs. The currently available supply of rental units is virtually non-existent, with fewer than 15 units listed on the primary websites and in local publications. Brokers report occupancies of agency units at nearly 100 percent, a continually rising demand, rapidly escalating rents, and low tenant turnover in most units; all opining that any new and/or available rental apartments would quickly be "snapped up" within the prevailing and anticipated near to mid-term market context.

- The demand for new residential units in the Kihei-Makena Corridor will be from 7,250 to 11,500 units over the next 22 years (through 2035), approximately 46 percent of which, or 3,327 to 5,276 total units, will be for rental housing opportunities.

- While any housing unit could be used as a residential rental, it is estimated there are fewer than 500 market units within dedicated rental apartment projects in the study area; less than four percent of the total regional inventory; and several of the projects are considered as having marginal desirability (and higher tenant turnover). Apart from the subject, proposed supply of rental apartment units though somewhat limited, may increase sharply over the mid to long-term as a result of the workforce/affordable housing requirements for the proposed major master-planned communities; an example of which are the 125 rental units proposed within the 250 unit project to be located adjacent to the subject (associated with the planned Honuaula community).

- From a market perspective, the subject property is a superior location for the proposed mixed-use PP development in regards to frontage, exposure, intercept potentials, access, topography, shape, size, and interior view potentials. It will be complimentary with existing adjacent uses and provide quality business opportunities for a diverse range of retail, restaurant, service/office, and light industrial space owners and end-users. The rental apartment is a complimentary component, offering housing opportunities for the PP workforce and others in the community (close by to traffic corridors), and an on-site customer base. PP will have the attributes necessary to be highly competitive in all its product sectors.

- We forecast the Piilani Promenade development will capture a meaningful share of the Kihei-Makena regional commercial space demand during its offering period (achieving a 40 to 45 percent market share), and a lesser share of industrial space demand (15 to 25 percent of the total market) comprised of both standard light industrial uses and business commercial users who typically locate on industrial-zoned lands. The 226 rental apartment units are projected to capture a market share of 19 to 33 percent of the study area demand for rental housing units during its lease-up.

Our annualized mid-point absorption estimates are summarized on Table A.

We anticipate the serviced, vacant sites comprising the project will be:

- Sold to business commercial and light industrial builders and owner-users within an eight to ten year period commencing with initial offerings during infrastructure emplacement (beginning in 2015-16).

- Built-out with the 588,288 square feet of gross leasable business commercial and light industrial floor space and the 226 unit apartment complex within 12 to 14 years of the first site closing (by 2028 to 2030).

- Achieve full absorption and stabilized operations of the finished business commercial and light industrial floor space within 15 years of the first sales (by 2031).

Economic Impact Analysis

We have constructed a model depicting the economic impact of the proposed PP development on the Maui and Statewide community during the course of its "lifespan" from ground-breaking in 2015 through the final build-out, absorption and stabilized operations of the commercial component in 2031. The model builds on the data and forecasts contained in our market study.

All estimated amounts are in constant 2013 dollars.

- The subject development will bring in $212 million of new capital investment into the island's real estate market during its build-out over a 12 to 15 year period (from 2015 to circa 2028-30), generate $2.3 billion in total on-site economic activity during the construction and initial operations period (17 years, 2015 to 2031), and some $348.7 million in annual economic activity on a stabilized basis thereafter.

- The construction of the PP components will directly create an estimated 878 “worker-years” of employment (the equivalent of 52 work weeks at 40 hours per week) in the trades and associated businesses during build-out, averaging 52 worker years annually, with an estimated $66.5 million in wages (averaging $3.9 million per year). Secondary/off-site employment resulting from subject construction will total another 220 worker-years of employment with wages of $8.9 million.

- The on-going operations and maintenance of the business commercial, light industrial and apartment components will directly provide an estimated 8,816 worker-years and $274.4 million in total wages over the 15-year period from opening of the first businesses until full build-out and stabilization are achieved (2017 to 2031). Associated secondary/off-site employment during the time-frame will total 2,778 worker-years with wages of $112.2 million. After "stabilization" the mixed-use community will support some 1,210 permanent jobs on-site with an annual payroll of about $36.6 million, and an additional 303 secondary/off-site positions with $12.2 million in yearly wages off-site.

- The large majority of the gross operating revenues within the project, 97 percent, will be a result of outside patrons coming to the in-project companies (the remaining 3.0

percent will be from consumption and rents paid by the residents of the 226 on-site rental apartments). The base economic impact on Maui will total at least $2.6 billion during build-out and $352.3 million annually upon stabilization.

- At build-out the resident population of the community will be some 607 persons, with up to 100 to 120 total children, of which 60 to 70 would be attending public schools. The cumulative resident household income during the 17-year build-out and absorption modeling period will total $241 million, and will stabilize at $17.2 million annually thereafter. Discretionary expenditures into Maui businesses by the PP population will be some $120.5 million during build-out and average $8.6 million per year on a stabilized basis.

- Application of the State Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from development of PP results in significantly higher economic out-flow indicators than those from our direct, subject-specific micro model.

  The total State economic impact from construction of the project would reach $449.5 million, there would be 2,933 total worker-years of jobs created, and the total increase in earnings statewide would be $134.3 million.

  The State model also estimates the total annual economic output from business operations within PP would be more than double the gross revenues at $728.8 million annually on a stabilized basis, the total number of worker years attributable to the PP dollars flowing through the economy would be 6,626 positions annually, and the increase in direct earnings would be $230.2 million per year.

Secondary Impacts

- The project will have nominal impacts on the socio-economic aspects of the surrounding community that relate to real estate issues.

1. The proposed components will be compatible with adjacent (light industrial/commercial) and nearby (residential) development and the subject end uses/users should have nominal impact on the desirability of real property interests in the neighborhood.

2. Property values in the Kihei Makena region are largely driven by external, cyclical economic factors and its existing cumulative mass, not any single new project. PP will have nominal impact on the market values or real property assessments of nearby real estate.

3. It is not expected there will be meaningful in-migration to Maui as a direct result of the operating components of the projects.

4. The rental apartments will provide housing for some of the PP workforce as well as needed, quality housing opportunities for others in the community. The subject project should have a generally positive impact on the local rental unit sector by increasing competitively-priced, available supply.

5. All traffic movement of customers, employees, residents and servicers will flow directly from Piilani Highway (through a signalized/channelized intersection), onto/through the subject development, and contained on-site, and will not directly impact the internal road systems of adjacent/nearby projects and subdivisions.

Public Fiscal Assessment

- The County of Maui will realize Real Property Taxes and other secondary receipts and impact fees of $34 million during the 17-year construction and absorption period, and $2.6 million annually on a stabilized basis thereafter. The net benefit to the County purse will be of $25.9

million during development, and $2.2 million annually on a stabilized basis.

- The State of Hawaii will receive Gross Excise and Income Taxes, secondary revenues, and impact fees of $210.7 million during the build-out and ramp-up time frame, and $26.0 million per year thereafter. The net benefit to the State purse will be in excess of $194.9 million during development, and a stabilized 'profit' of $25.0 million per year.

The major economic impacts and public fiscal conclusions are shown on Table B. The column on the left summarizes the cumulative impacts during the initial 17-year construction and absorption period, and the right hand column the annual impacts after stabilization.

MARKET STUDY OF THE MASTER PLAN COMPONENTS AND ABSORPTION ESTIMATES

Within the general real estate market “commercial” development is comprised of a broad spectrum of uses including light industrial, retail, and office types, all allowable under the in-place entitlements, which will be the focus of the updated PP master plan.

As summarized on Table 1, our survey of major US urban/suburban market areas showed an overall range of combined light industrial, retail and office floor area at between 97.6 square feet and 237.7 square feet per resident in the market area, averaging 138.8 square feet per capita.

The survey averages are shown on the chart below along with those for Maui and Kihei:

COMMERCIAL FLOOR SPACE COMPARISONS OF SELECTED US METROPOLITAN AREAS
WITH THE ISLAND OF MAUI AND KIHEI MARKET AREAS
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

	Surveyed Cities Averages	Island of Maui	Kihei
Resident Population	**2,115,840**	147,700	28,653
Industrial Floor Area in Sq. Ft. (1)	**163,963,843**	10,723,580	925,295
Industrial Space Per Capita in Sq. Ft.	**77.5**	**72.6**	**32.3**
Primary Retail Floor Area in Sq. Ft. (2)	**51,881,859**	2,517,214	525,422
Primary Retail Space Per Capita in Sq. Ft.	**24.5**	17.0	18.3
Other Retail Floor Area in Sq. Ft.	**19,749,537**	2,260,600	238,314
Other Retail Space Per Capita in Sq. Ft.	**9.3**	15.3	8.3
Total Retail Area in Sq. Ft.	**71,631,396**	**4,777,814**	**763,736**
Total Retail Space Per Capita in Sq. Ft.	**33.9**	**32.3**	**26.7**
Office Floor Space in Sq. Ft. (3)	**58,160,925**	573,306	128,427
Office Space Per Capita in Sq. Ft.	**27.5**	**3.9**	**4.5**
Total Commercial Space in Sq. Ft.	**293,756,165**	**16,074,700**	**1,817,458**
Total Commercial Space Per Capita in Sq. Ft.	**138.8**	**108.8**	**63.4**

(1) Include retail, office and other commercial uses in industrial parks & on industrial-zoned sites.
(2) Includes only centers with more than 50,000 gross square feet in market area.
(3) Estimated square footage of free-standing office buildings not on industrial-zoned land or within mixed-use projects.
Total square foot figure may be over-stated for Island of Maui.

Source: CBRE and The Hallstrom Group, Inc.

The total Maui figure of 108.8 square feet per capita is below the survey average and towards the lower end of the overall range; but is reasonably comparable given the rarity of stand-alone major office development to date.

The total Kihei figure of 63.4 square feet of floor space per resident is well below the survey and Maui range/average.

The primary shortfalls are in the light industrial-classified sector, particularly in regards to the mix-use and retail warehouse potentials, and in office space, which will take years to expand with much of demand focused on the MRTP.

The Kihei-Makena Business Commercial Sector

The tables containing the commercial market data and demand/supply projection models summarized in this section are presented in Addenda Exhibit I.

The primary focus for commercial uses at Piilani Promenade will be to provide a diverse spectrum of neighborhood, general, regional, destination and big box business commercial opportunities to meet the retail, restaurant, service, medical and support demands created by Kihei-Makena residents and visitors, and residents and workers within the project.

Historically, Kihei-Makena has been a secondary commercial sector on Maui. While floor space has been steadily added since the mid-1980s, including major new projects during the past two decades, it has continued to be oriented towards resident-serving "neighborhood" and general retail/restaurants fronting S. Kihei Road and within the interior of the community, with visitor-oriented businesses in the resorts and makai areas. Most "big box", major mall, destination and specialty retailers serving the island are still located in Wailuku-Kahului.

To some degree, this trend will continue in the near to mid-term; however, as the de facto population and disposable income in the study area increase, congestion in Kahului worsens, and Kihei continues its maturation into a modern, suburban community, an increase in demand for all retail, restaurant and service types will follow and big box, specialty/destination and regional center/mall-type development typical for a community of this scale and scope will occur.

While driving into Wailuku/Kahului from other island areas to patronize big box, destination/specialty and regional centers has been a traditional part of the Maui commercial market, with distance and time being secondary considerations, an expanding population, deteriorating traffic flow, rising gas costs, and modern time constraints will all stimulate commercial development elsewhere.

And PP, at circa nine miles from the Dairy Road/Hana Highway commercial nexus in Kahului, with the Greater Kihei trade area stretching another six miles southerly beyond, is sufficiently far removed (and in a distinctly different trade area) to be the location of additional stores. In example, on Oahu the four Costco stores are each located 10 to 13 miles apart, and the three regional malls are between five and 11 miles distant. And, the subject parcel has the superior intercept/"gateway", exposure/access and size/shape characteristics highly sought by regional and destination retailers.

Demand for business commercial space is a direct function of the number of consumers in the effective trade area. Each individual, resident or visitor, generates the "need" for more retail opportunities.

At present, there is some 4.8 million square feet of commercial floor space on Maui, or the equivalent of 24.1 square feet of gross leasable area per capita of the de facto population (residents and visitors).

This is slightly above the statewide average of 22.6 square feet per capita, and a moderate to lower-moderate amount for an economy of Maui's size and composition relative to similar markets; particularly given that being an island consumers can't readily access other nearby trade areas. Given the generational evolution of the economy from agrarian to service-based, a continually diversifying consumer base, and the expanding competitive context of the market, we forecast Maui will support a spatial allowance of between 30 and 35 square feet per person by mid-century.

Maui experienced significant "negative absorption" (existing tenants vacating space faster than new tenant or expanding business leasing space up) during the 2008-09 recession and for several years afterward, with the initial signs of recovery, within an erratic market environment, beginning in mid-2011.

The market has picked up positive velocity since that time, the product of a recovering economy, favorable credit environment, rebounding tourism and an increasing population. Through the first three quarters of 2013, Maui has led the state in absorption, with some 51,488 more square feet of floor space in major centers being leased than being vacated.

The 8.0 percent vacancy rate is down more than a point from the nadir of the market, and rents have stabilized and are starting to move upwards once again. Commercial brokers islandwide are reporting an increase in interest and activity, particularly in Kihei, Paia and Wailuku.

In Kihei-Makena, there is an estimated 763,736 square feet of competitive commercial floor space, or about 16 percent of the gross floor area on the island.

This equates to a per capita spatial allowance of 15.6 square feet per member of the study area de facto population, or only 65 percent of the islandwide per capita average.

Given the shortfall between the study area per capita floor space (15.6 square feet) and the islandwide average (24.1 square feet), **the Kihei-Makena region is "underserviced" in regards to commercial floor space on a gross demand/supply basis.**

Were it to be equitably developed as is the overall island with 24.1 square feet of space per capita, there would be an additional 411,000 square feet of business commercial space in Kihei-Makena, an increase of 54 percent above current supply. This demand is currently spread to other areas on the island (notably Wailuku/Kahului).

Kihei-Makena vacancy rates are at 3.8 percent, the lowest of any primary commercial region on the island, with most of the available bays located on Ohukai Road or Lipoa Parkway, not in the prime projects fronting Piilani Highway or S. Kihei Road. Rents in competitive spaces are among the highest on the island, tenant stability is relatively solid (particularly compared to West Maui), and there are fewer quality vacant bays remaining as the as the sector continues through its post-recession ramp-up period.

Neighborhood retail uses typically constitute about 45 to 55 percent of per capita demand, with Service Commercial, Medical and Support commercial spaces combining for another 20 to 30 percent of the total. The remaining 15 to 35 percent of per capita demand is oriented towards big boxes, major centers, destination and specialty retailers and in-hotel space.

As Greater Kihei continues to grow and evolve as a community, the commercial uses in the region will intensify and diversify as a broader range of businesses seek to locate in an expanding market area. The regional capture rate of the study area per capita demand will increase over time from its current level of 65 percent to between 80 and 90 percent by 2035.

Total regional capture (100 percent) of all per capita demand is not likely, as many businesses serving an islandwide market will remain focused in Wailuku/Kahului.

The combination of a growing de facto population, increasing per capita demand (forecast to reach 30.5 to 34.0 square feet per person on Maui by 2035), and an escalating regional capture rate, will create demand for between 936,428 and 1,504,606 square feet of new gross commercial floor area in Kihei-Makena over the next 22 years, with a mid-point of 1,220,517 square feet; more than double the existing inventory.

An estimated 92 to 147 gross acres of land (119 acres mid-point) will be needed to support this forthcoming demand.

The existing supply of vacant commercial development sites is limited in Kihei-Makena, with much of the scarce inventory being less-desirably located in the interior of the community, not along the primary thoroughfares of Piilani Highway and S. Kihei Road. Virtually all of the choice commercial parcels in the region have already been developed.

The updated MRTP development code provides for only some 100,000 square foot of total retail space (equating to about 8 gross acres of land), in a Neighborhood Retail context.

Several of the major proposed master-planned residential developments will contain commercial components, but these are limited in size, often in the interior of the project, and are primarily intended to service the neighborhood retail needs of community residents.

Our analysis indicates there will be insufficient competitive acreage to meet the forecast regional mid-point demand for commercial floor space in the region.

On a gross demand/supply comparison basis, Kihei-Makena is presently significantly underserviced and there will be shortfall of commercial land in the study area over the next 22 years.

Given the limited amount of currently vacant floor space, scarce competitive high-volume development opportunities, the timing relative to other proposed projects, and the excellent traits of the subject site, we estimate PP could achieve a Market Share (or "Capture Rate") of circa 40 to 45 percent of the total Kihei-Makena demand for new commercial floor space during its offering period from 2017 onward. This would equate to between 323,184 and 577,145 square feet of gross leasable floor area during the 2014 through 2035 study time-frame, with a mid-point of 450,165 square feet.

An estimated 30,450 square feet of this demand would be generated by PP residents and its workers, calculated as shown on the following table.

SUMMARY OF NEIGHBORHOOD COMMERCIAL SPACE DEMAND CREATED BY SUBJECT RESIDENTS AND WORKERS AT BUILD-OUT	
1. Stabilized Subject Population	
Full-Time Residents	607
Full Time Eqivalent On-Site Workers	1,210
2. Project Resident Per Capita Demand for Commercial Space (in Gross Square Feet per Person)	
Total for All Commercial Needs (1)	32.0
Total Commercial Demand Created by Subject Residents	19,424.0
Capture Rate of In-Project Resident Neighborhood Demand	85.0%
Total Floor Space Demand for Resident-Oriented/Neighborhood Commercial Space	**16,510**
3. Project Worker Resident Per Capita Demand for Commercial Space (in Gross Square Feet per Person)	
Estimated Percent of Workers not Residing in Project	90.0%
Non-Resident Workers Patronizing Subject Commercial Businesses	1,089
Total Per Capita Floor Space Demand by Workers for Neighborhood Commercial Space (2)	12.8
Total Floor Space Demand by Workers for Neighborhood Commercial Space	**13,939**
4. Indicated Subject Commercial Floor Space Demand	
From Subject Project Population (Items #2 & #3 Above)	**30,450**

(1) Based on mid-point per person spatial demand in 2030.
(2) Based on capture rate of 40 percent of per capita resident demand in square feet.

Source: The Hallstrom Group, Inc.

The Kihei-Makena Light Industrial Sector

The tables containing the market data and absorption model component summarized in this section are presented in Addenda Exhibit II.

Historically, the focus of industrial development on Maui has been in Wailuku/Kahului, owing to its proximity to the island's working port, airport, large population, seat of government, central location and access to major highways.

As a result of zoning code allowances, business commercial uses are permitted in light industrial subdivisions and parks (common to the neighbor islands), which has resulted in an ever-escalating trend over the past two decades of commercial/retail users locating on industrial-zoned land; in many ways rendering the distinction moot.

At present, there are some 10.72 million square feet of light industrial space on Maui, or about 54.03 square feet per person of the de facto population. More than 70 percent of the island's industrial space is in Wailuku/Kahului and Central Maui.

The per capita figure is higher than the statewide average of 38.61 square feet, due to the large numbers of business commercial users that locate in industrial parks as a result of the zoning allowances; which is also seen on the Big Island (47.52 square feet per capita), but not to a major degree on Oahu (34.41 square feet).

Newer Maui industrial projects have particularly large amounts of commercial/retail space. This has been an increasing trend for the past two decades, with some developments having upwards of 45 to 70 percent of the total project floor space occupied by commercial (often big box) or quasi-commercial users.

Whether these uses are located in industrial or commercial complexes is irrelevant to total per capita floor space demand square foot multipliers and our conclusions. Regardless of how it is classified the total floor space required by the market would not be meaningfully different, just moved from one designated market sector to another.

The market is highly cognizant of the relative interchangeability between commercial and light industrial sites, as evidenced in the wide-spread use of high exposure industrial locations for retail businesses and that per square foot land prices for comparable commercial and industrial lots are similar.

The majority of floor area on Maui industrial lands is in business commercial, storage/warehousing, suppliers, big box, offices, staging, and other uses. Island-wide the vacancy rate for industrial space is about 2.0 percent (well below the State average of 3.2 percent), and indicative of a "tight" sector. There was positive absorption of 41,870 square feet of space in the first nine months of 2013, and brokers stated the market is now strongly recovering from the lingering effects of the recession, interest in space is high, turn-over is decreasing, asking rents are starting to move upwards, and quality spaces are limited.

Until the mid-1990s, Kihei-Makena did not have significant amounts of industrial development; as few sites were available, established businesses preferred a Wailuku/Kahului location, and prior to the opening of Piilani Highway, access was inferior and traffic congestion common.

Over the past two decades there has been increasing industrial development in the study area, fueled by an expanding regional population, increasing economic importance, rising land costs in Kahului, land use entitlement efforts, and enhanced transportation in and out of Kihei (while Kahului became more congested).

Today, increasing amounts of, and interest in, new industrial/business/office development on Maui is oriented towards Kihei-Makena; a trend which will increase in coming decades as the region evolves from being a secondary dependent trade area into a more primary independent sector; capturing a greater share of the locally-generated demand which now flows ten-plus miles to Kahului.

The study area industrial space sector has approximately 960,000 square feet of inventory, or less than nine percent of the total amount built on Maui.

Given that about 25 percent of the de facto population on Maui is located in Kihei-Makena, the region is under-serviced on a gross basis relative to its potential full share of the overall island market by some 2.67 million square feet.

We forecast that over the coming two decades the in-region capture rate of the Kihei trade area will increase from its current sub-par level of about 35 percent of inferred regional demand to between 60 and 65 percent. This includes capturing the large majority of new demand from an increasing population/consumer base in Kihei-Makena, redirection of some historic demand from Kahului/Wailuku towards Kihei locations, and attracting some demand from other districts as the diversity and scale of uses in the study area increases over time.

Vacancy in Kihei-Makena is estimated at less than two percent, rents are at or above island-wide averages, and brokers report increasing interest in regional industrial spaces.

As with elsewhere on the island light industrial parks/zoned lands within the Kihei-Makena region have major business commercial components, again blurring the line between traditional industrial-type uses and retail/service/office uses. This aspect is embodied in the evolution of the subject property master plan from the small-lot Kaonoulu Industrial Park to the envisioned Piilani Promenade.

Using similar "per capital spatial demand" methodology as for our commercial space analysis, we quantified the demand for additional industrial floor space in the Kihei-Makena area through 2035.

We assume the per capita demand will continue to rise slowly from the current level to between 66.75 and 70.75 square feet by the end of the projection period. Even with the large business commercial component contributing to the figure, Maui will still be at the low-end of the national range for a trade area of its scale and economic orientation (generally at 75 to 125-plus square feet per capita); primarily as it lacks a meaningful manufacturing and trans-shipping base.

We estimate the demand for additional "light industrial" floor space (of all types) in Kihei-Makena from 2014 through 2035 will be from 1.76 million to 2.28 million square feet, with a mid-point of about two million square feet. This would represent a two to three-fold increase over the current in-place total.

An estimated 153 to 200 gross acres of land (176 acres mid-point) will be needed to support forecast demand.

Again, apart from MRTP, which potentially could have upwards of one million square feet of light industrial/business park development, and the subject property, there are limited competitive vacant industrial sites in the Kihei-Makena Corridor at present; markedly less than what will be required to meet regional demand. There are no other major inventory additions proposed at this time, and few of the master-planned communities will contain industrial building sites.

In light of its favorable characteristics, including a northerly Kihei intercept location, superior frontage/exposure on and ease of access to Piilani Highway, benefits of a mixed use project, and limited availability of alternative sites, we forecast PP will capture a market share averaging about 18 percent of total South Maui industrial demand during its prospective offering period (2017 to 2035).

Absorption would start at 25 percent of the regional market in the initial years of offering (commencing in 2017), as it would be a new, desirable project within a market environment with limited competition, declining to 15 percent as MRTP (with a new master plan) achieves critical mass/cumulative attraction and other alternatives come on-line.

A CB Richard Ellis survey estimated there are currently 884 parcels comprising some 2,620 acres of vacant industrial lands on Maui. This figure includes specialized sites near the harbor and airport, base yards, surrounding the Puunene mill, quarries, dump, and many parcels that are lacking infrastructure or otherwise not competitive in the general market. Most are located in Central Maui. While there is not a general shortage islandwide, the availability of quality sites is limited in the study area.

Overall, we estimate PP would have the potential to absorb some 294,000 to 382,300 square feet of light industrial, business commercial and related uses during 2017 through 2035 offering period, with a mid-point of 338,000 square feet.

This total absorption would include at least 57,600 square feet of "true" industrial uses as specifically provided for in the PP master plan with remainder being business commercial, big box and quasi-commercial uses as is typical of the Maui light industrial market.

An estimated 41,761 square feet of this demand would be generated by PP residents and its workers, calculated as shown on the following table.

SUMMARY OF LIGHT INDUSTRIAL SPACE DEMAND CREATED BY SUBJECT RESIDENTS AND WORKERS AT BUILD-OUT	
1. Stabilized Subject Population	
Full-Time Residents	607
Full Time Eqivalent On-Site Workers	1,210
2. Project Resident Per Capita Demand for Light Industrial Space (in Gross Square Feet per Person)	
Total for All Light Industrial Needs (1)	63.0
Total LightIndustrial Demand Created by Subject Residents	38,241.0
Capture Rate of In-Project Resident Demand	50.0%
Total Floor Space Demand for Resident-Oriented/Neighborhood Commercial Space	**19,121**
3. Project Worker Resident Per Capita Demand for Light Industrial Space (in Gross Square Feet per Person)	
Estimated Percent of Workers not Residing in Project	90.0%
Non-Resident Workers Patronizing Subject Light Industrial Businesses	1,089
Total Per Capita Floor Space Demand by Workers for Light Industrial Space (2)	20.8
Total Floor Space Demand by Workers for Light Industrial Space	**22,640**
4. Indicated Subject Light Industrial Floor Space Demand	
From Subject Project Population (Items #2 & #3 Above)	**41,761**

(1) Based on mid-point per person spatial demand in 2030.
(2) Based on capture rate of 33 percent of per capita resident demand in square feet.

Source: The Hallstrom Group, Inc.

The Study Area Residential Rental Market

The tables containing the market data and absorption model component summarized in this section are presented in Addenda Exhibit III.

Prior to the 1970s, Kihei was a small coastal village with fewer than 3,000 residents, with very limited resort-oriented and commercial uses. The development of Wailea Resort coupled with numerous condominium projects along South Kihei Road served to create a desirable visitor destination. At the same time, Kihei was identified as the most appropriate location for resident housing for the employees of the South and West Maui resort areas and to support the natural and in-migrating population growth of the island.

By 1980, the population had more than doubled to about 7,000 persons, substantial commercial space was being developed, and the region was well-established as a desirable vacation locale offering a wide variety of resort units.

While the near-makai areas continued to be dominated by resort/transient-oriented and non-resident use and ownership, the inland areas of Kihei began being developed at a rapid pace for local resident households. Over the next two decades, the resident population more than tripled.

Initially during this surge, most resident-oriented product was developed as vacant home sites which were then built-out individually as "custom" homes. However, over-time the trend became larger builders constructing spec tract homes and multifamily projects (resident-oriented in the interior and a mix of visitor and resident in the makai areas).

Today, the residential inventory in the study area remains tilted towards single family type, with under 60 percent being single family product and over 40 percent multifamily units. On a going-forward basis it is expected that multifamily construction will outpace single family, and that over the next two decades multifamily units will comprise 52 percent of the new housing units in Kihei-Makena as available entitled, serviced land becomes further scarce and unit prices increase over time.

There were 17,981 non-resort "residential" units in the Kihei-Makena region as of the 2010 census. Of these, 4,433 units were transient vacation rentals (DBEDT Visitor Inventory Survey) and 13,548 were used for housing; 10,731 units (79.21%) by full-time resident households and 2,817 (20.79%) were second homes/part-time residences.

Residential construction in Greater Kihei has progressed at a generally consistent and fairly rapid pace over the past three decades; a trend we anticipate will continue as long as suitable lands are made available for development. Among the primary reasons for this conclusion are:

- The region provides for a quality, comprehensive, modern, suburban lifestyle;

- There is a scarcity of alternative, entitled acceptable development areas throughout the island;

- In addition to the in-community availability of a broad range of commercial, industrial and service businesses, Kihei is proximate to goods, services, and support uses in Central Maui;

- Relative ease of access to major South Maui and Central Maui employment centers and other areas of the island;

- A warm, generally dry climate considered highly desirable by many residents and most non-residents; and

- Superior view panoramas from many interior locations.

The balance between demand and supply in Kihei-Makena has been more stable than in many neighbor island regions; although like elsewhere the market remains generally under-supplied (just not acutely) from a long-term perspective. Yet, there remains significant unmet need for additional affordable housing opportunities.

Long-range planning done by/for the County of Maui indicates there will be a need for an increase of between 50 percent to 80 percent in the number of housing units in order to service the anticipated demand created by community growth. This includes the demand by second home/non-resident purchasers which comprise between 20 and 30 percent of total demand for non-resort residential units in Kihei-Makena.

Based on regional population forecasts (as utilized in the Commercial and Industrial analyses), household size trending, and allowances for non-resident purchasers and vacancies, we project the demand for new residential units in the Kihei-Makena Corridor will be from 7,250 to 11,500 units over the next 22 years (through 2035), with a mid-point of 9,383 units.

According to 2010 Census data, about 52 percent of the housing units in the study area are owner-occupied and 48 percent are renter-occupied, with multifamily units comprising a larger share of the rental sector than single family homes. The ratio of owner-to-renter occupancy was little changed from the prior Census. The total number of renter-occupied housing units in Kihei-Makena is currently estimated at about 6,750 units.

Given the number of potential residential units in major proposed projects in the interior and mauka areas Kihei-Makena (many comprised of mostly modest product), County workforce/affordable housing regulations and requirements, and continuing low mortgage interest rates, it is anticipated that homeownership in the region will minorly increase over the next two decades, with about 54 percent of new inventory being owner-occupied and 46 percent renter-occupied.

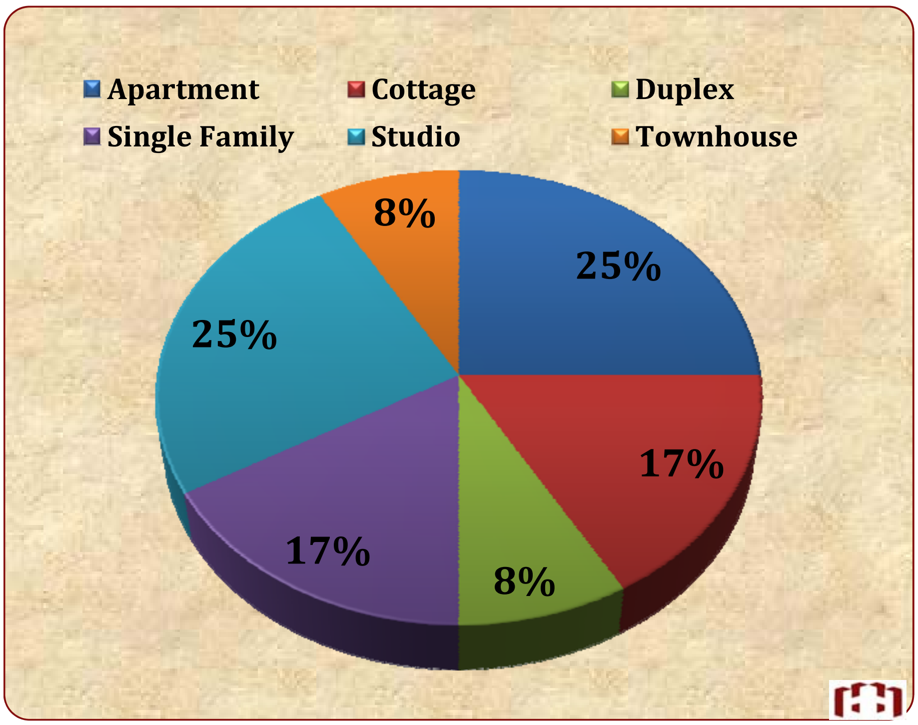
However, if the changes to the Truth in Lending Act (Regulation Z) commencing January 2014 limit the availability of mortgages, as many industry analysts predict, there could be fewer homeowners and more renters in the South Maui market than anticipated.

We estimate the demand for rental housing units in Kihei-Makena during the projection period (2014 to 2035) will be between 3,327 and 5,276 total additional units, with a mid-point of 4,302 units. The majority, between 60 and 70 percent, or 2,581 to 3,011 units at mid-point demand, will be directed towards multifamily product, either in "for sale" condominium complexes or in rental apartment projects as proposed at PP.

The rental housing market in the study area has been chronically under-supplied, with low vacancies even during recessionary periods and relatively high rents for the neighbor islands. This status is a result of a limited supply of housing units of all types in the area and their comparatively high prices in relationship to household income levels, pressures on the sector from non-residents absorbing supply across the spectrum, the focus of developers on upper-end product, and high land and construction costs.

The currently available supply of rental units is virtually non-existent, with 32 units listed on the primary websites and in local publications as of the report date. The average asking rental rates and types of units available are shown in the following charts.

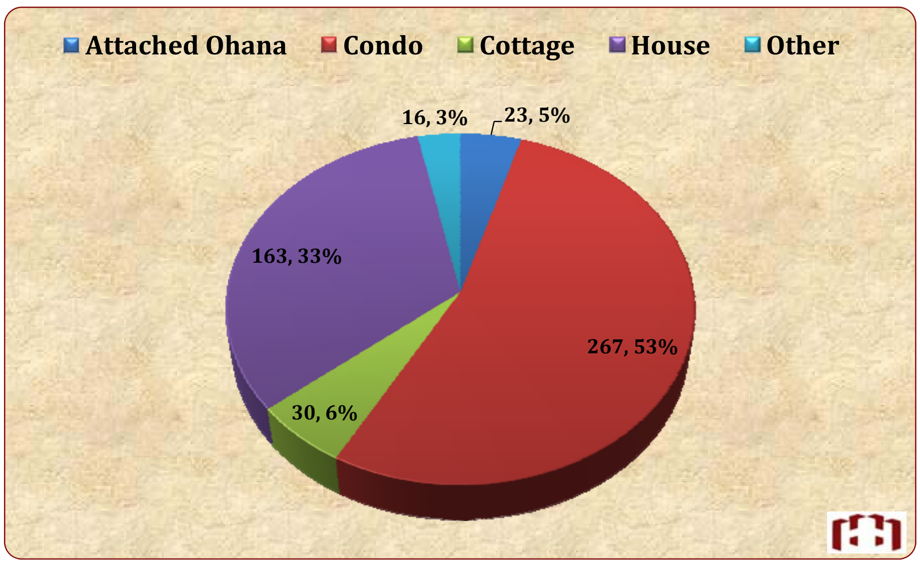
Average Asking Rents in Kihei-Makena	
Apartment	$1,250
Cottage	$1,275
Duplex	$1,200
Single Family	$3,350
Studio	$843
Townhouse	$3,200

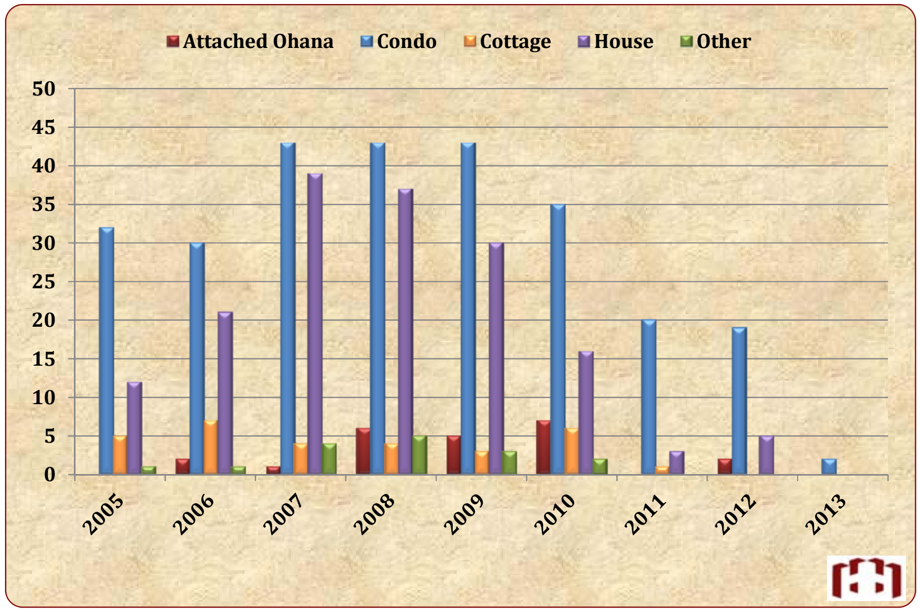


Brokers report occupancies of agency units at nearly 100 percent, a continually rising demand, rapidly escalating rents, and low tenant turnover in most units; all opining that any new and/or available rental apartments would quickly be "snapped up" within the prevailing and anticipated near to mid-term market context.

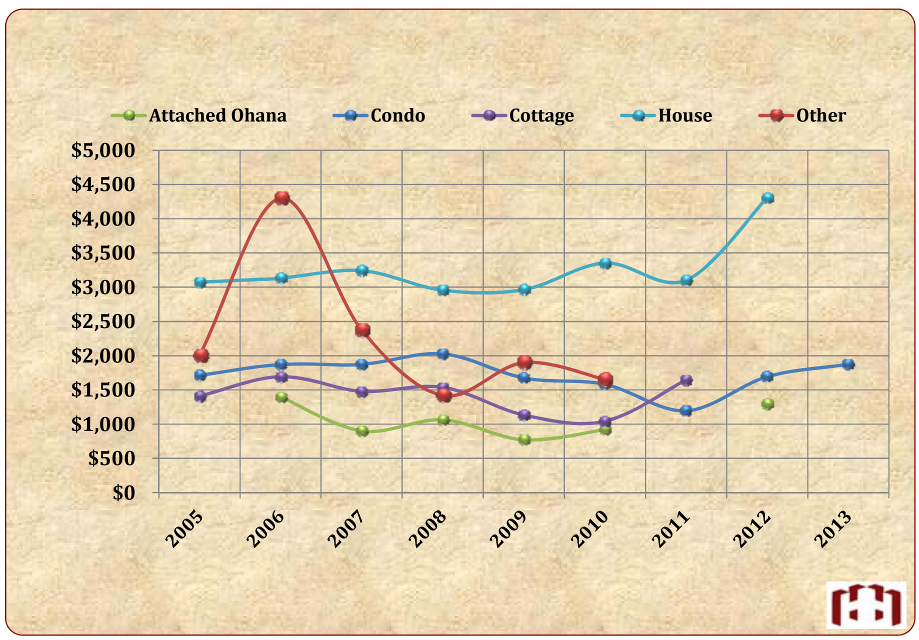
Agency rental data (as compiled by the Maui Multiple Listing Service) provides insight into the limited availability of rental units and their trending over time as a reflection of the larger market which has a major non-agency (private party rental) component.

From 2005 through October 2013, there were only 499 rental listings available in agency units, an average of 62 per year; with 53 percent being condominium/multifamily product, with supply highest during 2007-2009, and almost non-existent today, as shown.





Average rents were relatively stable during much of the survey period, but have moved upwards in 2012 and 2013.



The average market rates are generally above the monthly affordability guidelines set by Maui County and HUD.

MONTHLY AFFORDABLE RENT GUIDELINES FOR MAUI COUNTY
BY UNIT SIZE AND PERCENTAGE OF MEDIAN FAMILY INCOME

Percent of Median Income	Unit Size By Number of Bedrooms					
	Studio	1 BR	2 BR	3BR	4 BR	5 BR
10%	$138	$147	$177	$204	$228	$252
20%	$275	$295	$354	$409	$456	$503
30%	$413	$442	$531	$613	$684	$755
40%	$550	$737	$708	$818	$912	$1,006
50%	$688	$884	$884	$1,022	$1,140	$1,258
60%	$825	$1,032	$1,061	$1,226	$1,368	$1,509
70%	$963	$1,179	$1,238	$1,431	$1,896	$1,761
80%	$1,101	$1,326	$1,415	$1,635	$1,824	$2,012
90%	$1,238	$1,474	$1,592	$1,839	$2,052	$2,264
100%	$1,376	$1,621	$1,769	$2,044	$2,280	$2,515
110%	$1,513	$1,769	$1,945	$2,248	$2,507	$2,767
120%	$1,651	$1,916	$2,122	$2,452	$2,735	$3,018
130%	$1,788	$2,063	$2,299	$2,657	$2,963	$3,270
140%	$1,926	$2,476	$2,476	$2,861	$3,191	$3,521

Note: Affordable Rents are beased on 30% of gross monthly income. Does not include utilities.

Source: Housing Division, Department of Housing and Human Concerns, County of Maui

While any housing unit could be used as a residential rental, it is estimated there are fewer than 800 market units within dedicated rental apartment projects within the study area; equal to about 12 percent of the total regional rental inventory. Major projects include Kihei Regency (200 units), Kalama Heights (a 120 unit senior living facility), Paradise Gardens (100 units), Hotel Wailea workers housing (24 units), and Uwapo Road Apartments (18 units).

Apart from the subject the announced proposed supply of rental apartment units is currently limited, but will increase over the mid to long-term as a result of the workforce/affordable housing requirements for the proposed major master-planned communities. An example is the 125 rental units proposed within the 250 unit project to be located adjacent to the Piilani Promenade (associated with the planned Honuaula community).

Given the benefits of a location in an amenitied mixed-use project offering a broad mix of retail, restaurant and service business (and associated employment opportunities), easy access to Piilani Highway, potentially favorable view panoramas, and scarcity of available units and of competing new inventory, the PP rental apartments will garner a significant share of demand during its offering period. Several rental brokers interviewed opined it would easily be completely occupied within six to eight months, and could even be fully pre-leased out during construction if the rents were reasonable.

While we are not so bullish, we do forecast the subject could achieve a market capture rate of circa 40 percent of the total Kihei-Makena demand for new rental units during its offering period (commencing in 2017), equating to some 75 units per year at mid-point demand levels and resulting in a total absorption period of three years. If the market continues in its current condition to 2017, it is likely absorption will at the even quicker.

ECONOMIC IMPACTS FROM DEVELOPMENT

Selected summary tables from the modeling process are contained in Addenda Exhibit IV. The primary sources and variables contributing to the model are footnoted on each table. All monetary figures are expressed in constant 2013 dollars.

Piilani Promenade has the potential to become a significant contributor to the Maui economy over the coming generation with investment, employment and business activity on a par with the primary resort and industrial/business projects on the island.

In order to forecast the primary and higher-level secondary economic impacts resulting from the development of the project, we have constructed a model depicting the "lifespan" of PP from groundbreaking (assumed in 2015), through build-out (projected for 2029-30), and absorption and ramp-up to stabilized "operations" (achieved by 2031).

The total "Infrastructure/Build-Out/Stabilization" time-frame in the model stretches across 17-years.

Sources for the primary model factors include:

- Construction timing and costs were estimated by the development team.

- Job counts were taken from similar projects and operations, and/or based on industry standards.

- Wages are based on data from the State Department of Labor & Industrial Relations.

- Household size, income and spending, and population estimates were based on government materials including US Department of Housing and Urban Development and 2010 census data.

- Business activity variables are based on our analysis of similar use-types on Maui and Statewide.

The development and build-out of PP over the coming two decades will infuse some $212 million in direct capital investment into the Maui real estate and construction sectors. Local contractor and supplier profits are estimated to total more than $29.7 million.

On and off-site infrastructure emplacement is projected at $33 million, and the construction of the rental apartment component is forecast at $31,878,000, or $193 per square foot for the 165,600 square foot complex. The vertical construction costs of the commercial and industrial components of the project are estimated as follows:

ESTIMATE OF CONSTRUCTION COSTS FOR COMMERCIAL COMPONENT

Type	Percent of Total Sq. Ft	Component Sq. Ft	Per Sq. Ft Direct Costs	Total Costs
General Retail	30%	159,210	$330	$52,539,300
Restaurant	5%	26,535	$375	$9,950,625
Anchor/Big Box	55%	291,885	$200	$58,377,000
Services	10%	53,070	$300	$15,921,000
	100%	530,700		$136,787,925
		Average Construction Cost per Sq. Ft.		$258

ESTIMATE OF CONSTRUCTION COSTS FOR INDUSTRIAL COMPONENT				
Type	Percent of Total Sq. Ft	Component Sq. Ft	Per Sq. Ft Direct Costs	Total Costs
General Industrial	35%	20,156	$165	$3,325,707
Warehouse	30%	17,276	$150	$2,591,460
Building/Supply	25%	14,397	$200	$2,879,400
Services	10%	5,759	$275	$1,583,670
	100%	57,588		$10,380,237
		Average Construction Cost per Sq. Ft.		$180

The construction of the approximately 590,000 square feet of industrial/commercial floor area and 226 apartment units in the project will require an estimated 878 of direct "worker years" in a variety of trades, suppliers and services; an average of 55 Full Time Equivalent (FTE) positions per year for the circa 16 years of building.

A worker year may be comprised of numerous individuals completing a variety of tasks whose cumulative efforts equate to 2,080 aggregate hours of work. We estimate that one direct worker year of employment is created on and off-site via every $400,000 in infrastructure costs and ever $225,000 in vertical construction costs.

Most of these positions will not be new jobs for new businesses, but work flowing to existing contractors, suppliers and tradespersons.

The operations within the finished business commercial and light industrial space at PP will operations will generate some 8,816 FTE worker years during the build-out, absorption and ramping-up to stabilization period and provide stabilized employment for 1,189 FTE permanent positions, estimated as follows:

ESTIMATE OF FTE EMPLOYMENT COUNT FOR COMMERCIAL COMPONENT				
Type	Percent of Total Sq. Ft	Component Sq. Ft	Per Sq. Ft per Employee	Total Employees
General Retail	30%	**159,210**	500	**318**
Restaurant	5%	**26,535**	100	**265**
Anchor/Big Box	55%	**291,885**	900	**324**
Services	10%	**53,070**	300	**177**
	100%	**530,700**		**1,085**
			Average per Sq. Ft. per Employee	**489.1**

ESTIMATE OF FTE EMPLOYMENT COUNT FOR INDUSTRIAL COMPONENT				
Type	Percent of Total Sq. Ft	Component Sq. Ft	Per Sq. Ft per Employee	Total Employees
General Industrial	35%	**20,156**	475	**42**
Warehouse	30%	**17,276**	700	**25**
Building Supply	25%	**14,397**	800	**18**
Services	10%	**5,759**	300	**19**
	100%	**57,588**		**104**
			Average per Sq. Ft. per Employee	**552.1**

Administration, maintenance and security requirements within the project (including the apartment component) will create a projected 21 FTE positions.

In addition to these direct/on-site positions, significant indirect/off-site employment resulting from PP will flow into the Maui economy, estimated at one indirect FTE for every four direct FTEs. This accounts only for the "higher-order" indirect employment; substantial additional secondary/indirect and induced employment will be generated (as quantified later in the report using the State Input-Output Economic Model).

In aggregate, during the 17-year build-out and move to stabilization of PP, some 1.2692 worker years of employment will be created in construction and operations, on and off-site, with stabilized employment after completion of 1,513 total FTE jobs.

Wages paid to direct/on-site construction workers will total an estimated $66.5 million during build-out, with indirect/off-site wages associated with the effort reaching $8.9 million.

Employment related to Park operations during build-out and ramp-up will total $386.6 million including direct/on-site ($274.4 million) and indirect/off-site ($112.2 million); stabilizing at $48.9 million annually in 2031 and beyond.

Current average annual wages for the various worker-types contributing to the construction and operations of PP, as taken from State wide data, are as follows:

2013 ANNUAL WAGES FOR DIRECT AND INDIRECT WORKER-TYPES ASSOCIATED WITH DEVELOPMENT				
Construction	Commercial	Industrial	Maintenance/ Security	General Worker
$75,712	$29,521	$37,700	$32,000	$40,400

At build-out the resident population of Piilani Promenade will be some 607 persons of which an estimated 100 to 120 total children, of which 60 to 70 would be attending public schools.

Resident household income during build-out will total $241 million and average $17.2 million annually on a stabilized basis.

Discretionary expenditures into Maui businesses by the PP resident population are estimated at $120.5 million during construction and $8.6 million per year on a stabilized basis.

After completion and operational stabilization of the project (forecast by 2031), the on-site businesses will generate an estimated $348.7 million in revenues/sales ("economic activity") per year; the majority coming from the business commercial component. During the build-out period, activity will total some $2.3 billion in economic activity.

We estimate annual average gross revenues/sales/rents for the various components of PP will be as follows (2013 dollars):

- Business Commercial – Total annual sales averaging $600 per square foot of gross floor area.
- Light Industrial – Total annual revenues averaging $400 per square foot of gross floor area.

- Rental Apartments – Average monthly rents of $1,600 for one bedroom units, $2,100 for two-bedroom units and $2,500 for three-bedroom units.

PP business will be dominated by outside patronage. The project resident population is estimated to create about three percent of total on-site revenues/sales at stabilization and beyond, the remaining 97 percent by customers residing elsewhere.

During the 17 years of build-out and absorption (2015-2031), the project will have a base economic impact on Maui of some $2.6 billion with a stabilized annual benefit of $352.3 million thereafter.

Not all of this spending will be "new" to Maui. Some portion of patronage, particularly that flowing to retail and restaurant businesses from the intercept of Piilani Highway traffic, represents a relocation of their demand from other commercial locations in Kihei. Similarly, there will be some businesses which are relocating to the PP for a variety of reasons, and will not be newly created or an expansion outlet.

However, our fundamental demand calculations demonstrating future market support for PP are based on overall growth in the Maui economy creating the need for new business commercial and light industrial spaces. So whether that new growth takes place in PP, or it is a new business filling the vacated space elsewhere, a similar level of economic expansion will take place on Maui. Our task is to identify the specific economics related to the development of the subject property.

We have also analyzed the impacts of the project for Maui and Statewide using the State Input-Output economic model Type II multipliers. These factors quantify the total Direct, Indirect and Induced "effects" of various forms of business and spending activity as it flows through the economy of the islands.

In every instance, application of the macro Input-Output multipliers resulted in higher dollar, employment and tax revenue indicators than in our subject-focused micro model

which was designed to reflect Direct/On-Site and primary ("higher order") Indirect/Off-Site impacts only.

Among the outputs using the State method:

- The $212 million in cumulative PP construction costs will generate a total State Economic Output of $449.5 million.

- Direct subject construction wage earnings of $66.5 million will yield another $134.3 million in statewide wage earnings.

- Indirect and induced State taxes associated with construction will total more than $25.4 million in addition to direct taxes paid by the project.

- Direct effect jobs created by PP construction employment will be 2.68 times the number of on-site workers, or a total of 2,354 worker years of employment. The total job multipliers from the construction activity as it spreads directly and indirectly across the islands will be 13.83 times the on-site employment, or more than 2.933 worker years during the build-out period.

- The $2.3 billion in cumulative PP business activity during the 17-year build-out and absorption period equates to a total State Economic Output of $4.8 billion. On a stabilized basis, the $348.7 million in annual business activity will result in $728.8 million in total impact per year.

- Direct on-site wages paid by operating businesses of $244.3 million during construction and ramp-up will yield another $461.6 billion in statewide wage earnings. Upon stabilization, the direct wages of $48.9 million annually equates to an additional $92.3 million in other wages around the state.

- Indirect and induced State taxes associated with business operations will total $370.8 million in addition to direct taxes paid by the project during build-out and $55.8 million more per year thereafter.

- Direct effect jobs created by PP business operations will be about 2.05 times the number of on-site workers, or a total of 22,778 worker years of employment from 2015 through 2031, and 2,481 annually after stabilization.

PUBLIC FISCAL COSTS/BENEFITS ASSOCIATED WITH THE PROJECT

The master summary and break-out tables from the modeling process are presented in Exhibit V.

Public Fiscal Benefits (Tax Revenues)

Maui County and the State of Hawaii will receive millions of dollars in tax receipts from the construction and "operation" of PP, from numerous revenue sources.

For the County, the primary tax source will be from <u>Real Property Taxes</u> paid by the owners of the various subject components. The property tax receipts were estimated by applying prevailing tax rates against the projected market value of the finished inventory (total construction costs, plus underlying land value, and developer's profit). We assumed there would be no exemptions.

We estimate the County will receive some $21.6 million in real property tax receipts during the 17-year build-out and absorption of the project, and annual collections of $1.7 million on a stabilized basis thereafter.

Secondary taxes associated with other daily activities in the subject project will contribute additional funds.

Real Property Taxes (RPT) were expected to generate about 68.1 percent of total County General Fund revenues, with secondary taxes and fees the forming the remainder. It is logical to assume the PP development and business activities will generate secondary taxes in proportion to RPT as does the overall Maui community.

The secondary Maui County receipts are equal to 47 percent of the RPT and TAT total (31.9% divided by 68.1%).

Application of this ratio to the PP property tax sum results in a cumulative total estimated County tax collection from the subject of $31.8 million during the initial construction and sales period, and $2.6 million annually on a stabilized basis.

The County will additionally receive some $2.2 million in impact fees for parks, water service and wastewater service. These fees will push the total County collections (primary taxes, secondary taxes and impact fees) upward during the development period.

The State of Hawaii will receive an estimated $47.3 million in primary receipts from State Income Taxes from worker wages, resident household incomes and profits from operating businesses during the 17-year construction-to-stabilization period based on average statewide corporate and personal payment rates of 4.4 percent and 5.1 percent, respectively, applied against the economic model forecasts.

On an annualized basis after completion and ramp-up of the project by 2031, the State will generate income taxes of $4.9 million; the majority (69 percent) from personal returns.

The State will collect Gross Excise Taxes (GET) of 4.166 percent on the gross amount of building contracts, construction supplies, spending by workers and residents, and outside patronage at operating businesses in PP. During the 17-year construction and absorption period they will total $120.9 million and reach a stabilized amount of $15.9 million annually.

Income Tax and GET generate about 80 percent of total State revenues, secondary taxes and fees the remainder. We anticipate PP activity will result in similar ratios of secondary taxes flowing from the project relative to the primary sources quantified.

The secondary State receipts are equal to 25 percent of the Income, GET and TAT totals (20% divided by 80%).

Application of this ratio to the PP income tax and GET sums results in a cumulative total estimated tax collection for the state from the subject of $210.2 million during the initial 17-year construction and ramp-up period, and $26 million annually on a stabilized basis.

Additionally the State will receive Department of Education school impact fees estimated at $535,846, pushing the total State collections (primary taxes, secondary taxes and impact fees) even higher during the development time-frame.

Public Fiscal Costs

Having quantified the cumulative revenue benefits, the second step in public fiscal assessment is to quantify the probable costs of local government services which will be required directly due to, or in general support of, the project. This is done using a "per capita costs" method described and applied following.

By comparing the tax benefits (revenues) generated by the subject with the estimated costs of providing public services, the net fiscal impact of the development can be determined.

The most appropriate way to estimate governmental expenses associated with a major new project is on a "per capita basis". This is founded on the assumption that every individual in a community is equally responsible for all costs of governance regardless of the actual services they, their household, or business may avail themselves of.

This approach is founded on a "commonweal" concept. If a project results in the expansion of the community, the costs of governance generally rise proportionately, and the new development should bear the direct, indirect and implied government expenses, which is best reflected on a per person (or per capita) cost per year.

This method represents the <u>maximum cost perspective</u> in regards to estimating public costs for a modern, mixed-use project containing significant numbers of resident households, and is appropriate as most costs of government are related to individual living needs. In general, businesses pay (in fact, collect) taxes and people require services.

The State 2013-14 combined operating and capital budgets totals some $13.43 billion servicing a de facto population of circa 1,550,000 individuals (residents and tourists), or an average per capita expense of $8,687 per person in aggregate State spending.

Similarly, the County of Maui 2014 fiscal year budget will spend some $664.03 million in operating and capital costs servicing a de facto population of 205,000 individuals, or an average per capita expense of $3,239 per person.

Application of these per capita figures to the stabilized projected resident population of PP upon full absorption of 607 persons, results in total per capita costs of:

- $1.05 million to the State of Hawaii on an annual, stabilized basis with costs totaling $15.8 million during build-out; and,

- $393,288 per year on average to the County of Maui upon completion, and an aggregate expense of $5.9 million from ground-breaking through 2031.

Correlation of Public Costs and Net Fiscal Impact

It is estimated the County of Maui will:

- Receive an aggregate total of $34 million in primary and secondary revenues and impact fees over the course of the 17-year construction period and $2.6 million thereafter on a stabilized annual basis.

- Expend $5.9 million in allocated per capita costs in servicing the project during its build-out and absorption period, and $393,000 per year thereafter.

- Realize a net benefit of $25.9 million during the modeling time-frame, and a stabilized net "profit" margin of $2.2 million per year thereafter.

The State of Hawaii will:

- Receive an aggregate total of $210.7 million in primary and secondary tax revenues and impact fees during the construction period and $26 million thereafter on a stabilized annual basis.

- Spend $15.8 million in servicing the project during its absorption period on a per capita basis, and $1.1 million per year thereafter.

- Realize a net benefit of $194.9 million on a per capita basis during the modeling time-frame, and a stabilized net profit margin ranging of $25 million annually.

ADDENDA

TABLE I-1

SUMMARY OF EXISTING COMMERCIAL SPACE DEVELOPMENT IN HAWAII
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
As of 3rd Quarter 2013

County	C& C of Honolulu	Maui	Kauai	Hawaii	State Totals
Resident Population	991,000	147,700	69,461	191,083	1,399,243
De Facto Population	1,090,066	198,462	91,846	219,812	1,600,187
1. Summary of Inventory					
Number of Retail Centers	126	52	17	38	226
Gross Leasable Area in Surveyed Major Centers (1) (Square Feet)	13,607,375	2,517,214	771,652	2,377,112	19,273,353
Other Gross Leasable Area in Other Centers (1) (Square Feet)	6,804,000	1,585,600	735,000	1,675,000	10,799,600
Other Gross Leasable Area in Other/Minor Projects (2) (Square Feet)	4,100,000	675,000	337,600	902,000	6,014,600
Total Estimated Commercial GLA (Square Feet)	**24,511,375**	**4,777,814**	**1,844,252**	**4,954,112**	**36,087,553**
2. Per Capita Spatial Allowance ***(Square Feet per Person)***					
Per Resident Population Member	24.73	32.35	26.55	25.93	25.79
Per De Facto Population Member	22.49	24.07	20.08	22.54	22.55
3. Surveyed Major Center Operating Overview					**State Averages**
Vacancy Rate	5.0%	8.0%	8.2%	5.3%	5.5%
Estimated Vacant Square Feet of GLA	687,958	202,178	63,734	164,579	1,118,089
Avg. Monthly Base per Square Foot Rents Range (3)					
Low	$4.37	$3.21	$2.73	$3.12	$3.91
High	$9.98	$4.72	$4.15	$4.41	$7.99
Percentage Overage Rents Range (4)					
Low	3.8%	5.4%	5.5%	7.3%	4.9%
High	10.8%	9.2%	10.0%	10.3%	10.8%
Average Monthly per Square Foot Operating Expenses	$1.40	$1.32	$1.04	$1.31	$1.36
Space Absorbed in 2013 Through 3rd Quarter	(30,484)	51,488	36,227	25,951	83,182

(1) Complexes with circa 50,000 square feet and up.
(2) Includes smaller projects and hotels. Does not include space within mixed-use, multi-tenant buildings located in Light Industrial parks.
(3) Recent leases. Generally excludes "anchor" spaces and single-tenant buildings, which typically have lower rents.
(4) For properties and spaces with leases calling for percentage rents, which are generally paid to the extent they exceed base rents.

Source: CB Richard Ellis, State DBEDT and The Hallstrom Group, Inc.

TABLE I-2

CURRENTLY AVAILABLE COMMERCIAL AND INDUSTRIAL SPACES IN KIHEI
OFFERED ON THE MAUI MULIPLE LISTING SERVICE
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

MLS #	Type	Price	LT	Status	Address	Interior Area Conveyed	Sale/Rent	Price/Unit SQFT
350048	Commercial-Lease Unit	$798	FS	ACT	535 Lipoa PKWY	290	For Rent	$2.75
353097	Commercial-Lease Unit	$832	FS	ACT	300 Ohukai RD	616	For Rent	$1.35
352821	Commercial-Lease Unit	$832	FS	ACT	300 Ohukai RD	616	For Rent	$1.35
345622	Commercial-Lease Unit	$832	FS	ACT	300 Ohukai RD	616	For Rent	$1.35
345029	Commercial-Lease Unit	$832	FS	ACT	300 Ohukai RD	616	For Rent	$1.35
345028	Commercial-Lease Unit	$855	FS	ACT	300 Ohukai RD	633	For Rent	$1.35
345624	Commercial-Lease Unit	$1,126	FS	ACT	300 Ohukai RD	834	For Rent	$1.35
356890	Commercial-Lease Unit	$1,232	FS	ACT	300 Ohukai RD	1,232	For Rent	$1.00
357304	Commercial-Lease Unit	$1,276	FS	ACT	310 Ohukai RD	1,160	For Rent	$1.10
345625	Commercial-Lease Unit	$1,664	FS	ACT	300 Ohukai RD	1,232	For Rent	$1.35
344958	Commercial-Lease Unit	$1,703	FS	ACT	300 Ohukai RD	1,261	For Sale	$1.35
351931	Commercial-Lease Unit	$1,797	FS	ACT	300 Ohukai RD	1,331	For Rent	$1.35
344959	Commercial-Lease Unit	$1,797	FS	ACT	300 Ohukai RD	1,331	For Sale	$1.35
350047	Commercial-Lease Unit	$1,898	FS	ACT	535 Lipoa PKWY	690	For Rent	$2.75
355091	Commercial-Lease Unit	$2,341	FS	ACT	300 Ohukai RD	2,128	For Rent	$1.10
351932	Commercial-Lease Unit	$2,341	FS	ACT	300 Ohukai RD	2,128	For Rent	$1.10
350046	Commercial-Lease Unit	$2,720	FS	ACT	535 Lipoa PKWY	989	For Rent	$2.75
350049	Commercial-Lease Unit	$2,940	FS	ACT	535 Lipoa PKWY	1,069	For Rent	$2.75
344962	Commercial-Lease Unit	$3,506	FS	ACT	300 Ohukai RD	2,597	For Sale	$1.35
352837	Commercial-Lease Unit	$3,594	FS	ACT	300 Ohukai RD	2,662	For Rent	$1.35
357811	Commercial-Lease Unit	$6,122	FS	ACT	535 Lipoa Pkwy	2,226	For Sale	$2.75
352423	Commercial-Lease Unit	$8,198	FS	ACT	535 Lipoa PKWY	2,981	For Rent	$2.75
					Total	**29,238**		

Note: Data retrieved on 10/31/2013.
The Maui MLS places retail, restaurant, office and industrial spaces in a single "Commercial" category.

Source: Maui Board of Realtors Multiple Listing Service and The Hallstrom Group, Inc.

TABLE I-3

COMMERCIAL CLASSIFIED VACANT LAND SUPPLY IN KIHEI
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Tax Key	PITT	Land SF	Land Acres	Tenure	Vacant Land
Maui Research & Technology Park		The Updated MRTP Master Plan, in the approval process, provides for up to 520,000 square feet of commercial floor and upwards of 1,000,000 SF of industrial floor space, the equivalent of some 44 and 83 acres, respectively.			
2-3-9-2-91	Commercial	64,164	1.473	Fee Simple	Yes
2-3-9-2-215	Commercial	69,565	1.597	Fee Simple	Yes
2-3-9-3-33	Commercial	1,102	0.025	Fee Simple	Yes
2-3-9-3-45	Commercial	3,485	0.080	Fee Simple	Yes
2-3-9-4-140-2	Commercial	52,490	1.205	Leasehold	Yes
2-3-9-4-149	Commercial	35,932	0.825	Leasehold	Yes
2-3-9-8-16	Commercial	40,418	0.928	Fee Simple	Yes
2-3-9-12-41	Commercial	421	0.010	Fee Simple	Yes
2-3-9-20-8	Commercial	6,534	0.150	Fee Simple	Yes
2-3-9-20-29	Commercial	15,856	0.364	Fee Simple	Yes
2-3-9-51-2	Commercial	11,050	0.254	Fee Simple	Yes
2-3-9-51-3	Commercial	11,050	0.254	Fee Simple	Yes
2-3-9-51-6	Commercial	29,681	0.681	Fee Simple	Yes
2-3-9-51-7	Commercial	25,880	0.594	Fee Simple	Yes
2-3-9-51-8	Commercial	10,790	0.248	Fee Simple	Yes
2-3-9-51-10	Commercial	10,790	0.248	Fee Simple	Yes
2-3-9-51-11	Commercial	10,790	0.248	Fee Simple	Yes
2-3-9-51-12	Commercial	10,790	0.248	Fee Simple	Yes
2-3-9-51-18	Commercial	10,015	0.230	Fee Simple	Yes
2-3-9-51-19	Commercial	10,011	0.230	Fee Simple	Yes
2-3-9-51-20	Commercial	29,953	0.688	Fee Simple	Yes
2-3-9-51-21	Commercial	27,263	0.626	Fee Simple	Yes
2-3-9-51-22	Commercial	10,458	0.240	Fee Simple	Yes
2-3-9-51-26	Commercial	10,755	0.247	Fee Simple	Yes
2-3-9-51-27	Commercial	11,106	0.255	Fee Simple	Yes
2-3-9-51-30	Commercial	10,771	0.247	Fee Simple	Yes
2-3-9-51-31	Commercial	10,853	0.249	Fee Simple	Yes
2-3-9-51-32	Commercial	12,396	0.285	Fee Simple	Yes
2-3-9-51-33	Commercial	13,243	0.304	Fee Simple	Yes
2-3-9-51-43	Commercial	10,417	0.239	Fee Simple	Yes
2-3-9-51-45	Commercial	13,554	0.311	Fee Simple	Yes
2-3-9-51-45	Commercial	13,554	0.311	Fee Simple	Yes
	Totals	**184,334**	**57.892**		

Note: Data retrieved from Hawaii Information Service,

Source: Hawaii Information Service, and The Hallstrom Group, Inc.

TABLE I-4

QUANTIFICATION OF COMMERCIAL FLOOR SPACE DEMAND IN THE GENERAL STUDY AREA FROM 2013 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Scenario One: Minimum Population Estimates and Growth Rates

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (2)	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		24.00		1,174,978		65.0%		763,736
2015	0.99%	51,510		24.50		1,261,998		68.0%		858,159
2020	1.51%	55,709		26.00		1,448,424		71.0%		1,028,381
2025	1.47%	60,130		27.50		1,653,567		74.0%		1,223,640
2030	1.42%	64,737		29.00		1,877,382		77.0%		1,445,584
2035	1.42%	69,679		30.50		2,125,204		80.0%		1,700,163

Scenario Two: Maximum Population Estimates and Growth Rates

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (2)	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		24.00		1,174,978		65.0%		763,736
2015	0.96%	51,413		26.00		1,336,741		70.0%		935,719
2020	1.79%	56,482		28.00		1,581,485		75.0%		1,186,114
2025	1.83%	62,168		30.00		1,865,032		80.0%		1,492,025
2030	1.71%	67,980		32.00		2,175,370		85.0%		1,849,064
2035	1.66%	74,129		34.00		2,520,380		90.0%		2,268,342

Indicated Projection Mid-Point

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		24.00		1,174,978		65.0%		763,736
2015	0.97%	51,462		25.25		1,299,406		69.0%		896,590
2020	1.65%	56,095		27.00		1,514,568		73.0%		1,105,634
2025	1.65%	61,149		28.75		1,758,026		77.0%		1,353,680
2030	1.57%	66,359		30.50		2,023,944		81.0%		1,639,394
2035	1.54%	71,904		32.25		2,318,898		85.0%		1,971,064

(1) In 2012, the average daily visitor census on Maui was 50,762 persons. We have estimated that 40 percent of this total finds lodging in the study area, as the Kihei/Wailea corridor has 7,233 (or 37 percent) of the total visitor units on the island.

Source: The Hallstrom Group, Inc.

TABLE I-5

ESTIMATED TOTAL ADDITIONAL COMMERCIAL FLOOR SPACE AND ACREAGE DEMAND
FOR THE GENERAL STUDY AREA 2014 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Scenario One: Minimum

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
Year-End 2013	763,736		72
2015	858,159	0.238	83
2020	1,028,381	0.238	99
2025	1,223,640	0.238	118
2030	1,445,584	0.238	139
2035	1,700,163	0.238	164

Scenario Two: Maximum

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
Year-End 2013	763,736		72
2015	935,719	0.238	90
2020	1,186,114	0.238	114
2025	1,492,025	0.238	144
2030	1,849,064	0.238	178
2035	2,268,342	0.238	219

FINISHED FLOOR SPACE ANALYSIS (in Square Feet)

	Minimum	Maximum
Periodic Additions Required (Sq. Ft.):		
2014 to 2015	94,423	171,983
2015 to 2020	170,222	250,395
2021 to 2025	195,259	305,912
2026 to 2030	221,944	357,039
2031 to 2035	254,579	419,278
Cumulative Additional Space Required:	**936,428**	**1,504,606**
Increase as a Percent of Existing Floor Space	**122.61%**	**197.01%**
Estimated Mid-Point Additional Space Required (2):		**1,220,517**

DEVELOPABLE LAND AREA ANALYSIS (in Acres)

	Minimum	Maximum
Periodic Additions Required (Acres):		
2014 to 2015	11	18
2015 to 2020	16	24
2021 to 2025	19	30
2026 to 2030	21	34
2031 to 2035	25	40
Cumulative Additional Acreage Required	**92**	**147**
Increase as a Percent of Existing Acreage:	**127.77%**	**203.89%**
Estimated Mid-Point Additional Acreage Required (2):		**119**

(1) Assuming average finished "Floor Area Ratio" of .28 for finished commercial development sites, and a net to gross ratio of 85 percent on the underlying site.

Source: The Hallstrom Group, Inc.

TABLE I-6

SUMMARY OF SUBJECT PROJECTED COMMERCIAL DEMAND LEVELS
USING THE MARKET SHARES METHOD
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
Assuming Pre-Leasing to Begin in 2017

Scenario One: Using Minimum Demand Assumptions

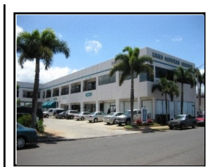
Sales Year Date	Sales Year Period	Total Regional Demand (in Square Feet)	Effective Subject Share	Indicated Total Subject Absorption (in Square Feet)
2017	1	34,044	40.00%	13,618
2018	2	34,044	40.00%	13,618
2019	3	34,044	40.00%	13,618
2020	4	34,044	40.00%	13,618
2021	5	39,052	40.00%	15,621
2022	6	39,052	40.00%	15,621
2023	7	39,052	40.00%	15,621
2024	8	39,052	40.00%	15,621
2025	9	39,052	40.00%	15,621
2026	10	44,389	40.00%	17,756
2027	11	44,389	40.00%	17,756
2028	12	44,389	40.00%	17,756
2029	13	44,389	40.00%	17,756
2030	14	44,389	40.00%	17,756
2031	15	50,916	40.00%	20,366
2032	16	50,916	40.00%	20,366
2033	17	50,916	40.00%	20,366
2034	18	50,916	40.00%	20,366
2035	19	50,916	40.00%	20,366
Totals		**807,960**	**40.00%**	**323,184**

Scenario Two: Using Maximum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Demand (in Square Feet)	Effective Subject Share	Indicated Total Subject Absorption (in Square Feet)
2017	1	50,079	45.00%	22,536
2018	2	50,079	45.00%	22,536
2019	3	50,079	45.00%	22,536
2020	4	50,079	45.00%	22,536
2021	5	61,182	45.00%	27,532
2022	6	61,182	45.00%	27,532
2023	7	61,182	45.00%	27,532
2024	8	61,182	45.00%	27,532
2025	9	61,182	45.00%	27,532
2026	10	71,408	45.00%	32,133
2027	11	71,408	45.00%	32,133
2028	12	71,408	45.00%	32,133
2029	13	71,408	45.00%	32,133
2030	14	71,408	45.00%	32,133
2031	15	83,856	45.00%	37,735
2032	16	83,856	45.00%	37,735
2033	17	83,856	45.00%	37,735
2034	18	83,856	45.00%	37,735
2035	19	83,856	45.00%	37,735
Totals		**1,282,544**	**45.00%**	**577,145**

Source: The Hallstrom Group, Inc.

Properties for Lease

						
Address	1215 South Kihei Rd Kihei,HI96753	95 E. Lipoa Street Kihei,HI96753	381 Huku Li'i Kihei,HI96753	2395 So. Kihei Road Kihei,HI96753	375 Huku Li'i Pl. Kihei,HI96753	1215 South Kihei Road Kihei,HI96753
Property Type	Retail	Retail	Office	Retail	Office	Retail
Property Subtype	Neighborhood Center	Neighborhood Center	Office Building	Neighborhood Center	Office Building	Neighborhood Center
Zoning		Business				
Building Size	17,897 SF GLA	20,000 SF GLA	22,190 SF Bldg	18,001 SF GLA	17,873 SF Bldg	5,000 SF GLA
Year Built		2008				
No. Stories						
Lot Size		1.20 AC		1 AC		
APN / Parcel ID						
Space Available	1,512 SF	360 - 940 SF	278 - 3,281 SF	576 - 1,204 SF	665 - 1,764 SF	3,500 SF
Asking Rent	$3.25 /SF/Mo	$2.36 - 3.24 /SF/Mo	$1.10 - 1.75 /SF/Mo	$1.60 - 2.15 /SF/Mo	$1 - 1.35 /SF/Mo	$2.98 /SF/Mo
Spaces	1 Space	3 Spaces	8 Spaces	5 Spaces	7 Spaces	1 Space
Property Description	Neighborhood daily needs center anchored by Longs Drugs. Only one space is currently available (space occupied by Prudential Real Estate). Space i...	Brand new Retail/Office center on a busy street. Tons of parking. Vary quality construction. On site experienced management. Other tenants include...	FIRST FLOOR: Office/Retail spaces. Retail glass storefronts. Suite 102 and 103 have additional back storage. SECOND FLOOR: SIGN A THREE YEAR...	The Dolphin Plaza is an 18,001 square foot resort shopping center located in South Maui in the fastest growing community on the island. The Dolphi...	Well maintained mixed use building building. Building has a handicap lift to the second floor.	Free standing pad site within Longs Drugs Stores anchored shopping center. Pad can accommodate up to 3,500 SF restaurant/fast-food with drive thru,...
Location Description	Located at the intersection of South Kihei Road & Piikea Avenue.	In the commercial core of Kihei, Hawaii. This is the center of of tourist resorts and attractions. Approximatelly 7,500 vacation condos nearby. Super High end Wailea resort is nearby wuth Waldorf...	Located in central Kihei near Piilani Hwy. Close to shopping and restaurants.	In the heart of Kihei's resort district at 2395 So. Kihei Road, directly across the street from Kamaole Beach Park I. There are close to 2,000 resort condos as well as numerous shops and restaura...	Located at the entry to Kihei.	Located in the city of Kihei in Maui.
Notes						

						
Address	1941 So. Kihei Road Kihei,HI96753	34 Wailea Gateway Place Kihei,HI96753	2463 South Kihei Road Kihei,HI96753	255 Piikea Ave Kihei,HI96753	1280 South Kihei Road Kihei,HI96753	1280 S. Kihei Rd. #116 Kihei,HI96753
Property Type	Retail	Retail	Retail	Retail	Retail	Retail
Property Subtype	Retail (Other)	Specialty Center	Community Center	Neighborhood Center	Neighborhood Center	Neighborhood Center
Zoning	B2				B-2	
Building Size	10,000 SF Bldg	35,000 SF GLA	5,100 SF GLA	155,000 SF GLA	129,089 SF GLA	136,000 SF GLA
Year Built						
No. Stories						
Lot Size	1.50 AC	3 AC			11.60 AC	
APN / Parcel ID						
Space Available	70 - 260 SF	1,073 - 1,340 SF	5,100 SF	1,775 SF	166 - 3,240 SF	1,904 SF
Asking Rent	$9 /SF/Mo	$4 - 5.50 /SF/Mo	$2.50 /SF/Mo		$2.25 - 2.50 /SF/Mo	$2.50 /SF/Mo
Spaces	13 Spaces	3 Spaces	1 Space	1 Space	6 Spaces	1 Space
Property Description	Unique shopping and dining destination. Over 45 gift shops and 14 restaurants. Tropical lush landscaping throughout the shopping center. 700+ vi...	Wailea Gateway Center is a Resort Retail Center at the entrance to the Wailea Resort. This brand new center has current Tenants of Coldwell Banker...	This Kamaole Shopping Center unit is an excellent leasing opportunity. The Center is one of South Maui's busiest centers. Ample parking directly ...	Desirable tenant mix that caters to the local market as well as over 1.2 million South Maui Visitors per year.	One of Kihei's larger shopping centers. Built in the traditional hawaiian architecture. Provides a unique destination for the local resident, bus...	Veterinary Clinic with great visibility, well known location.
Location Description	Located in South Maui on main street through town. Directly across from ocean and large public park.	Wailea Resort is the premier resort area of Maui including high end hotels such as the Four Seasons, Marriott Wailea, The Grand Wailea, and the Fairmount Kealani	Kamaole Shopping Center is located at 2463 South Kihei Road, Kihei, Hawaii on the island of Maui. The Center offers high visibility in a heavy traffic area.	Located in the heart of "Downtown Kihei" with excellent visibilty from the Piilani Highway. One of South Maui's most visited shopping centers.	Located in the "Heart and Soul of Kihei." The center flanks both sides of South Kihei Road, the main artery through Kihei.	Azeka Shopping Center-Makai
Notes						

			No Photo Provided	
Address	1794 S. Kihei Rd. Kihei,HI96753	41 East Lipoa Street Kihei,HI96753	100 Wailea Ike Wailea,HI96753	1881 South Kihei Road Kihei,HI96753
Property Type	Retail	Retail	Retail	Retail
Property Subtype	Retail (Other)	Strip Center	Neighborhood Center	Neighborhood Center
Zoning				
Building Size	10,000 SF Bldg	45,199 SF GLA	27,000 SF GLA	36,892 SF GLA
Year Built	2002	1988		
No. Stories	1	1		
Lot Size	16,940 SF	3.35 AC	3 AC	
APN / Parcel ID				
Space Available	100 - 200 SF	760 - 3,106 SF	2,000 SF	3,335 SF
Asking Rent	$4.67 - 6 /SF/Mo	$2 - 2.75 /SF/Mo	$4.50 /SF/Mo	$2.50 /SF/Mo
Spaces	3 Spaces	3 Spaces	1 Space	1 Space
Property Description	Only 2 prime retail spaces and 2 kiosk spaces left at Aloha Open Marketplace. The market has 24 partially open stalls and 5 kiosk spaces with most...	Lipoa Center is centrally located in Kihei Town in the island of Maui with ample customer parking. Current tenants include First Hawaiian Bank, Val...	Pre-Construction Leasing. Owner has SMA approval and we're in for building permits. Many pad sites to choose from. Sizes from 2,000sf to 10,000sf. ...	The Kihei Town Center is anchored by Foodland and Sansei Seafood Restaurant and Sushi Bar. There are two spaces available in the center, Unit B1, w...
Location Description	Prime location on S. Kihei Rd. near Kalama Beach Park.	High traffic area in busy Kihei Town. High visibility.	Located on busy entry road to Wailea on the Golf Course. Immediately adjacent to the Club House and Manoli's Pizza Company.	This commercial real estate retail center is located on Kihei' s Gold Coast on the island of Maui in Hawaii at the signalized intersection of South Kihei Road and Keala Place in Central Kihei. With...
Notes				

TABLE II-1

SUMMARY OF EXISTING INDUSTRIAL SPACE DEVELOPMENT IN HAWAII
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
As of 3rd Qtr. 2013

County	C& C of Honolulu	Maui	Kauai	Hawaii	State Totals
Resident Population	991,000	147,700	69,461	191,083	1,399,243
De Facto Population	991,000	198,462	69,461	191,083	1,450,005
Total Estimated Industrial GLA (Square Feet)	**34,097,718**	**10,723,580**	**1,852,587**	**9,079,769**	**55,983,505**
2. Per Capita Spatial Allowance ***(Square Feet per Person)***					
Per Resident Population Member	34.41	72.60	26.67	47.52	40.01
Per De Facto Population Member	34.41	54.03	26.67	47.52	38.61
3. General Market Operating Overview					**State Averages**
Vacancy Rate	4.0%	2.0%	1.3%	2.1%	3.2%
Estimated Vacant Square Feet of GLA	1,365,208	214,560	23,183	192,804	1,795,755
Weighted Avg. Monthly Base per Square Foot Rents (1)					
Net	$1.06	$1.15	$0.87	$0.89	$1.05
Gross	$1.41	$1.48	$1.19	$1.21	$1.33
Average Monthly per Square Foot Operating Expenses (1)	$0.36	$0.33	$0.33	$0.32	$0.35
Space Absorbed in 2013 Through 3rd Quarter	113,480	41,870	2,176	(24,644)	132,882

(1) Recent leases.

Source: CB Richard Ellis, State DBEDT and The Hallstrom Group, Inc.

TABLE II-2

COMMERCIAL & INDUSTRIAL CLASSIFIED VACANT LAND SUPPLY IN KIHEI
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Tax Key	PITT	Land SF	Land Acres	Tenure	Vacant Land
Subject Property					
2-3-9-1-16	Industrial	1,312,550	30.132	Fee Simple	Yes
2-3-9-1-170	Industrial	806,687	18.519	Fee Simple	Yes
2-3-9-1-171	Industrial	851,118	19.539	Fee Simple	Yes
Maui Research & Technology Park		The Updated MRTP Master Plan, in the approval process, provides for up to 520,000 square feet of commercial floor and upwards of 1,000,000 SF of industrial floor space, the equivalent of some 44 and 83 acres, respectively.			
2-3-9-1-169	Industrial	571,899	13.129	Fee Simple	Yes
2-3-9-1-172	Industrial	213,356	4.898	Fee Simple	Yes
2-3-9-1-173	Industrial	40,249	0.924	Fee Simple	Yes
2-3-9-1-174	Industrial	37,418	0.859	Fee Simple	Yes
2-3-9-45-2	Industrial	20,119	0.462	Fee Simple	Yes
2-3-9-45-16	Industrial	73,602	1.690	Fee Simple	Yes
2-3-9-45-18	Industrial	29,480	0.677	Fee Simple	Yes
2-3-9-45-20	Industrial	38,172	0.876	Fee Simple	Yes
2-3-9-45-21	Industrial	10,341	0.237	Fee Simple	Yes
2-3-9-45-25	Industrial	535	0.012	Fee Simple	Yes
	Total Including Subject Property	**4,005,526**	**174.954**		
	Total Excluding Subject Property	**1,035,171**	**106.764**		

Note: Data retrieved from Hawaii Information Service,

Source: Hawaii Information Service, and The Hallstrom Group, Inc.

TABLE II-3

QUANTIFICATION OF INDUSTRIAL FLOOR SPACE DEMAND
IN THE GENERAL STUDY AREA FROM 2013 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Scenario One: Minimum Population Estimates and Growth Rates

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		54.00		2,643,701		35.0%		925,295
2015	0.99%	51,510		55.00		2,833,057		37.0%		1,048,231
2020	1.51%	55,709		57.50		3,203,245		42.0%		1,345,363
2025	1.47%	60,130		60.00		3,607,783		48.0%		1,731,736
2030	1.42%	64,737		62.50		4,046,081		54.0%		2,184,884
2035	1.42%	69,679		65.00		4,529,124		60.0%		2,717,474

Scenario Two: Maximum Population Estimates and Growth Rates

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		54.00		2,643,701		35.0%		925,295
2015	0.96%	51,413		55.25		2,840,575		37.0%		1,051,013
2020	1.79%	56,482		58.25		3,290,053		43.0%		1,414,723
2025	1.83%	62,168		61.25		3,807,773		50.0%		1,903,887
2030	1.71%	67,980		64.25		4,367,735		57.0%		2,489,609
2035	1.66%	74,129		68.25		5,059,292		64.0%		3,237,947

Indicated Projection Mid-Point

Year	De Facto Population (1) Annual Growth Rate	De Facto Population (1) Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
Year-End 2013		48,957		54.00		2,643,701		35.0%		925,295
2015	0.97%	51,462		55.13		2,836,822		37.0%		1,049,624
2020	1.65%	56,095		57.88		3,246,504		42.5%		1,379,764
2025	1.65%	61,149		60.63		3,707,141		49.0%		1,816,499
2030	1.57%	66,359		63.38		4,205,489		55.5%		2,334,046
2035	1.54%	71,904		66.63		4,790,592		62.0%		2,970,167

(1) In 2012, the average daily visitor census on Maui was 50,762 persons. We have estimated that 40 percent of this total finds lodging in the study area, as the Kihei/Wailea corridor has 7,233 (or 37 percent) of the total visitor units on the island.

Source: The Hallstrom Group, Inc.

TABLE II-4

ESTIMATED TOTAL ADDITIONAL INDUSTRIAL FLOOR SPACE AND ACREAGE DEMAND
FOR THE GENERAL STUDY AREA 2014 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Scenario One: Minimum

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
Year-End 2013	960,000		92
2015	1,048,231	0.255	94
2020	1,345,363	0.255	121
2025	1,731,736	0.255	156
2030	2,184,884	0.255	197
2035	2,717,474	0.255	245

Scenario Two: Maximum

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
Year-End 2013	960,000		92
2015	1,051,013	0.255	95
2020	1,414,723	0.255	127
2025	1,903,887	0.255	171
2030	2,489,609	0.255	224
2035	3,237,947	0.255	292

FINISHED FLOOR SPACE ANALYSIS (in Square Feet)

	Minimum	Maximum
Periodic Additions Required (Sq. Ft.):		
2014 to 2015	88,231	91,013
2015 to 2020	297,132	363,710
2021 to 2025	386,373	489,164
2026 to 2030	453,148	585,722
2031 to 2035	532,590	748,338
Cumulative Additional Space Required:	**1,757,474**	**2,277,947**
Increase as a Percent of Existing Floor Space	**183.07%**	**237.29%**
Estimated Mid-Point Additional Space Required (2):		**2,017,711**

DEVELOPABLE LAND AREA ANALYSIS (in Acres)

	Minimum	Maximum
Periodic Additions Required (Acres):		
2014 to 2015	2	3
2015 to 2020	27	33
2021 to 2025	35	44
2026 to 2030	41	53
2031 to 2035	48	67
Cumulative Additional Acreage Required	**153**	**200**
Increase as a Percent of Existing Acreage:	**165.92%**	**216.85%**
Estimated Mid-Point Additional Acreage Required (2):		**176**

(1) Assuming average finished "Floor Area Ratio" of .30 for finished industrial development sites, and a net to gross ratio of 85 percent on the underlying site.

Source: The Hallstrom Group, Inc.

TABLE II-5

**SUMMARY OF SUBJECT PROJECTED INDUSTRIAL DEMAND LEVELS
USING THE MARKET SHARES METHOD
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
Assuming Pre-Leasing to Begin in 2017**

Scenario One: Using Minimum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Demand (in Square Feet)	Effective Subject Share	Indicated Total Subject Absorption (in Square Feet)
2017	1	59,426	25.00%	14,857
2018	2	59,426	25.00%	14,857
2019	3	59,426	25.00%	14,857
2020	4	59,426	25.00%	14,857
2021	5	77,275	20.00%	15,455
2022	6	77,275	20.00%	15,455
2023	7	77,275	20.00%	15,455
2024	8	77,275	20.00%	15,455
2025	9	77,275	20.00%	15,455
2026	10	90,630	17.00%	15,407
2027	11	90,630	17.00%	15,407
2028	12	90,630	17.00%	15,407
2029	13	90,630	17.00%	15,407
2030	14	90,630	17.00%	15,407
2031	15	106,518	15.00%	15,978
2032	16	106,518	15.00%	15,978
2033	17	106,518	15.00%	15,978
2034	18	106,518	15.00%	15,978
2035	19	106,518	15.00%	15,978
Totals		**1,609,817**	**18.24%**	**293,625**

Scenario Two: Using Maximum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Demand (in Square Feet)	Effective Subject Share	Indicated Total Subject Absorption (in Square Feet)
2017	1	72,742	25.00%	18,186
2018	2	72,742	25.00%	18,186
2019	3	72,742	25.00%	18,186
2020	4	72,742	25.00%	18,186
2021	5	97,833	20.00%	19,567
2022	6	97,833	20.00%	19,567
2023	7	97,833	20.00%	19,567
2024	8	97,833	20.00%	19,567
2025	9	97,833	20.00%	19,567
2026	10	117,144	17.00%	19,915
2027	11	117,144	17.00%	19,915
2028	12	117,144	17.00%	19,915
2029	13	117,144	17.00%	19,915
2030	14	117,144	17.00%	19,915
2031	15	149,668	15.00%	22,450
2032	16	149,668	15.00%	22,450
2033	17	149,668	15.00%	22,450
2034	18	149,668	15.00%	22,450
2035	19	149,668	15.00%	22,450
Totals		**2,114,192**	**18.09%**	**382,398**

Source: The Hallstrom Group, Inc.

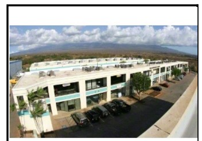
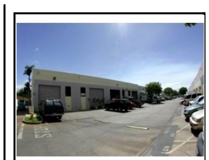
Properties for Lease

						
Address	535 Lipoa Parkway Kihei,HI96753	380 Huku Lii Kihei,HI96753	310 Ohukai Road Unit 320 Kihei,HI96753	1325 S. Kihei Road Kihei,HI96753	95 E. Lipoa Street Kihei,HI96753	381 Huku Li'i Kihei,HI96753
Property Type	Office	Office	Office	Office	Retail	Office
Property Subtype	Office Building	Office Building	Creative/Loft	Office Building	Neighborhood Center	Office Building
Zoning					Business	
Building Size	46,557 SF Bldg	18,706 SF Bldg	1,160 SF Bldg	33,717 SF Bldg	20,000 SF GLA	22,190 SF Bldg
Year Built					2008	
No. Stories						
Lot Size		39,570 SF			1.20 AC	
APN / Parcel ID						
Space Available	290 - 2,981 SF	274 - 2,041 SF	1,160 SF	102 - 3,029 SF	360 - 940 SF	278 - 3,281 SF
Asking Rent		$1.25 - 1.75 /SF/Mo	$1.10 /SF/Mo	$1.50 - 2 /SF/Mo	$2.36 - 3.24 /SF/Mo	$1.10 - 1.75 /SF/Mo
Spaces	7 Spaces	5 Spaces	1 Space	21 Spaces	3 Spaces	8 Spaces
Property Description	Premier Place is a Class A Office Building and the first private sector building in the Maui Research & Technology Park. Airy and spacious luxury o...	The Aloha Plaza has one of the best parking lots in Kihei for an office building that makes it a great place for retail / mixed office and medical....	Spacious second-floor office/retail unit at Kihei Commercial Plaza. Upgraded, remodeled, and very comfortable for high-end office. Prime corner uni...	Premier 2-story office building located in a prominent location along South Kihei Road in the rapidly growing town of Kihei. Property features ope...	Brand new Retail/Office center on a busy street. Tons of parking. Vary quality construction. On site experienced management. Other tenants include...	FIRST FLOOR: Office/Retail spaces. Retail glass storefronts. Suite 102 and 103 have additional back storage. SECOND FLOOR: SIGN A THREE YEAR...
Location Description	On the mountain side of the Piilani Highway in Central Kihei is the Maui Research and Technology Park. The R&T Park offiers fiber optic cables and SATCOM ground stations for commercial down-	The Aloha Plaza is located on the highway in North Kihei, between two gas stations. It's unique building style make it highly visible as one enters into the Kihei, Wailea and Makena vicinity.	High-traffic, multi-unit commercial condominium center in North Kihei	Highly visible frontage along South Kihei Road; positioned on the corner of South Kihei Road and Lipoa Street. 15 minutes from the Kahului Airport.	In the commercial core of Kihei, Hawaii. This is the center of of tourist resorts and attractions. Approximately 7,500 vacation condos nearby. Super High end Wailea resort is nearby wuth	Located in central Kihei near Piilani Hwy. Close to shopping and restaurants.
Notes						

						
Address	2395 So. Kihei Road Kihei,HI96753	375 Huku Li'i Pl. Kihei,HI96753	300 B3 Ohukai Rd Kihei,HI96753	411 Huku Li'i Place Kihei,HI96753	362 Huku Li'i Place Kihei,HI96753	1325 South Kihei Road Kihei,HI96753
Property Type	Retail	Office	Industrial	Office	Office	Office
Property Subtype	Neighborhood Center	Office Building	Office Showroom	Office Building	Office-R&D	Office Building
Zoning			M-1 Light Industrial			
Building Size	18,001 SF GLA	17,873 SF Bldg	18,380 SF Bldg	15,801 SF Bldg	21,410 SF Bldg	33,002 SF Bldg
Year Built			1991			1981
No. Stories						2
Lot Size	1 AC		5.71 AC	1.74 AC	0.64 AC	62,233 SF
APN / Parcel ID						
Space Available	576 - 1,204 SF	665 - 1,764 SF	1,261 - 2,662 SF	355 - 1,320 SF	828 SF	186 - 3,029 SF
Asking Rent	$1.60 - 2.15 /SF/Mo	$1 - 1.35 /SF/Mo	$1.35 /SF/Mo	$1.25 - 1.97 /SF/Mo	$1.75 /SF/Mo	$2.25 - 2.50 /SF/Mo
Spaces	5 Spaces	7 Spaces	5 Spaces	6 Spaces	1 Space	14 Spaces
Property Description	The Dolphin Plaza is an 18,001 square foot resort shopping center located in South Maui in the fastest growing community on the island. The Dolphi...	Well maintained mixed use building building. Building has a handicap lift to the second floor.	Great combo unit with high ceiling warehouse with roll-up door in the back section and showroom/office on the front side. Visible in the front Buil...	The South Shore Plaza consists of retail/office units on the fround floor and offices on levels 2 and 3.All units have a Certificate of Occupancy, ...	The Kihei Gateway Plaza is host to the Maui Clothing Outlet Stores. Unit 200 is a corner unit with large windows and lots of light. it also has a s...	Kihei's premier office building; 2-story building; centrally located, close to banks, post office, restaurants and shopping centers.
Location Description	In the heart of Kihei's resort district at 2395 So. Kihei Road, directly across the street from Kamaole Beach Park I. There are close to 2,000 resort condos as well as numerous shops and restaura...	Located at the entry to Kihei.	Located in the expanding commercial area of North Kihei easily accessible to the island.	located at the end of Huku Li'i Place which is close to Pi'ilani Highway, which makes access to highway easy. Building faces West creating a spectacular sunset view from the upper floors.	Located next to Tesoro Pi'ilani on the highway. Very visible upon entrance to Kihei.	Located in the heart of Kihei, Maui on the corner of South Kihei Road and Lipoa Street.
Notes						

Address	1280 South Kihei Road Kihei,HI96753
Property Type	Retail
Property Subtype	Neighborhood Center
Zoning	B-2
Building Size	129,089 SF GLA
Year Built	
No. Stories	
Lot Size	11.60 AC
APN / Parcel ID	
Space Available	166 - 3,240 SF
Asking Rent	$2.25 - 2.50 /SF/Mo
Spaces	6 Spaces
Property Description	One of Kihei's larger shopping centers. Built in the traditional hawaiian architecture. Provides a unique destination for the local resident, bus...
Location Description	Located in the "Heart and Soul of Kihei." The center flanks both sides of South Kihei Road, the main artery through Kihei.
Notes	

Properties for Lease

						
Address	300 Ohukai Road Kihei,HI96753	375 Huku Li'i Pl. Kihei,HI96753	300 Building 3 Ohukai Rd. Kihei,HI96753	300 B3 Ohukai Rd Kihei,HI96753	300 Ohukai Road Kihei,HI96753	300 Building 1 Ohukai Road Kihei,HI96753
Property Type	Industrial	Office	Industrial	Industrial	Industrial	Industrial
Property Subtype	Warehouse	Office Building	Office Showroom	Office Showroom	Warehouse	Warehouse
Zoning				M-1 Light Industrial		M-1 Light Electric
Building Size	2,128 SF Bldg	17,873 SF Bldg	21,000 SF Bldg	18,380 SF Bldg	194,266 SF Bldg	14,818 SF Bldg
Year Built				1991		1991
No. Stories						
Lot Size				5.71 AC	5.74 AC	5.74 AC
APN / Parcel ID						
Space Available	2,128 SF	665 - 1,764 SF	616 - 1,232 SF	1,261 - 2,662 SF	616 - 2,662 SF	1,232 SF
Asking Rent	$1.10 /SF/Mo	$1 - 1.35 /SF/Mo	$1.35 /SF/Mo	$1.35 /SF/Mo	$1 - 1.45 /SF/Mo	$1 /SF/Mo
Spaces	2 Spaces	7 Spaces	8 Spaces	5 Spaces	15 Spaces	1 Space
Property Description	These combined units of 2128 sq ft contains showroom with window frontage, warehouse area, and private restroom. The buildings are made with high ...	Well maintained mixed use building building. Building has a handicap lift to the second floor.	Price Reduced!! 2nd floor Office/Showroom spaces with visibility in the front building of the complex for great exposure. Convenient North Kihei lo...	Great combo unit with high ceiling warehouse with roll-up door in the back section and showroom/office on the front side. Visible in the front Buil...	consist of three buildings, the Kihei Commercial Center is built w/ tilt up concrete and each warehouse unit has a private restroom. Building 1 is ...	One warehouse unit of 1232 square feet each with high ceiling, roll-up door, and private restroom. 2 Assigned Parking Stalls per unit. Available no...
Location Description	Conveniently located in North Kihei in the expanding commercial area with great access.Complex consists of 3 buildings with warehouse, showroom, and office units. Multiple	Located at the entry to Kihei.	Located in the expanding commercial area of North Kihei.	Located in the expanding commercial area of North Kihei easily accessible to the island.	located in North Kihei near the highway which makes for easy accessibility to the most of the island	Conveniently located in North Kihei in the expanding commercial area with great access.
Notes						

Address	357 Huku Li'i Place Kihei,HI 96753
Property Type	Industrial
Property Subtype	Office Showroom
Zoning	
Building Size	18,003 SF Bldg
Year Built	
No. Stories	
Lot Size	0.65 AC
APN / Parcel ID	
Space Available	620 - 864 SF
Asking Rent	$1.35 - 1.50 /SF/Mo
Spaces	6 Spaces
Property Description	Ohukai Plaza consists of three buildings with a very mixed array of Tenants; an antique store, Tire Warehouse and a pawn shop. Well groomed this pr...
Location Description	Ohukai Plaza sits on the corner of Ohukai Road and Huku Li'i Place, in a residential/industrial mix,and allows easy access to the highway and the rest of Maui. Across the street is Tesoro gas Stati...
Notes	

TABLE III-1

QUANTIFICATION OF HOUSING UNIT DEMAND FOR THE KIHEI-MAKENA STUDY AREA 2013 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

	Year-End 2013	2015	2020	2025	2030	2035	Additional Units Required by 2035
Scenario One: Minimum Based on Planning Department Baseline Population Forecasts							
Resident Population	28,653 (1)	30,597	33,227	35,962	38,757	41,750	
Average Household Size (2)	2.50	2.48	2.46	2.44	2.42	2.41	
Total Resident Units Required	11,461	12,338	13,507	14,739	16,015	17,324	
Vacancy Allowance (3 % of resident unit demand)	344	370	405	442	480	520	
Non-Resident Purchaser Allowance (3) (20% of resident unit demand)	2,292	2,468	2,701	2,948	3,203	3,465	
TOTAL MARKET UNIT DEMAND	**14,097**	**15,175**	**16,614**	**18,128**	**19,699**	**21,308**	**7,258**
Scenario Two: Maximum Based on Planning Department Historical Trend Run Population Forecasts							
Resident Population	28,653 (1)	30,500	34,000	38,000	42,000	46,200	
Average Household Size (2)	2.50	2.46	2.43	2.40	2.37	2.35	
Total Resident Units Required	11,461	12,398	13,992	15,833	17,722	19,660	
Vacancy Allowance (5% of resident unit demand)	573	620	700	792	886	983	
Non-Resident Purchaser Allowance (3) (25% of resident unit demand)	2,865	3,100	3,498	3,958	4,430	4,915	
TOTAL MARKET UNIT DEMAND	**14,900**	**16,118**	**18,189**	**20,583**	**23,038**	**25,557**	**11,507**

CONCLUDED HOUSING UNIT DEMAND RANGE

	Existing	2014-2015	2016-2020	2021-2025	2026-2030	2031-2035	Totals
MINIMUM DEMAND							
Periodic	47	1,078	1,438	1,515	1,570	1,609	7,258
Cumulative	47	1,101	2,564	4,078	5,649	7,258	
Average Annual Demand (4)		551	292	303	314	322	
MAXIMUM DEMAND							
Periodic	850	1,218	2,071	2,394	2,455	2,519	11,507
Cumulative	850	1,643	4,139	6,533	8,988	11,507	
Average Annual Demand (4)		821	499	479	491	504	
MID-POINT DEMAND							
Periodic	449	1,148	1,755	1,954	2,013	2,064	9,383
Cumulative	449	1,372	3,351	5,306	7,318	9,383	
Average Annual Demand (4)		686	396	391	403	413	

(1) According to the 2010 US Census, there were 26,810 residents in the Primary Study Area (Kihei and Wailea CDPs). Figure escalated to year-end 2013 at compounded annual growth rate from 2000 to 2010 of 2.23 percent.
(2) Census reported average household size for Primary Study Area in 2010 was 2.499 persons (2.55 in Kihei and 2.20 in Wailea).
(3) There were 17,981 total "housing units" in the Primary Study Area in 2010 according to the Census, of which 4,433 were transient vacation rentals (DBEDT survey) resulting in a total residential unit count of 13,548 units in the study area Of these, 10,731 units (79.21%) were occupied by full-time resident households and 2,817 units (20.79%) were second-homes/part-time residences. We estimate the total residential units count is now 14,050.
(4) Existing (or latent) demand is assumed absorbed evenly from 2014 though 2020.

Source: US Census, County of Maui Planning Dept. "Socio-Economic Forecast: Report", Various and The Hallstrom Group, Inc.

TABLE III-2

STRIATED PROJECTIONS OF HOUSING UNIT DEMAND
BY SELLING PRICE IN KIHEI-MAKENA STUDYAREA 2013 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
Expressed in Constant 2013 Dollars

	Periodic Demand					Total
Period	2014 to 2015	2016 to 2020	2021 to 2025	2026 to 2030	2031 to 2035	Demand 2014-2035
1. Minimum Demand Forecasts						
Less Than $350,000 (1)	**275**	**366**	**379**	**393**	**402**	**1,815**
Percent of Total Demand	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
$350,000 to $700,000 (2)	**441**	**585**	**606**	**628**	**644**	**2,903**
Percent of Total Demand	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
$700,000 to $1,000,000	**220**	**292**	**303**	**314**	**322**	**1,452**
Percent of Total Demand	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Over $1,000,000	**165**	**219**	**227**	**236**	**241**	**1,089**
Percent of Total Demand	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Total Market Demand	**1,101**	**1,462**	**1,515**	**1,570**	**1,609**	**7,258**
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2. Maximum Demand Forecasts						
Less Than $350,000 (1)	**411**	**624**	**599**	**614**	**630**	**2,877**
Percent of Total Demand	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
$350,000 to $700,000 (2)	**657**	**999**	**958**	**982**	**1,008**	**4,603**
Percent of Total Demand	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
$700,000 to $1,000,000	**329**	**499**	**479**	**491**	**504**	**2,301**
Percent of Total Demand	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Over $1,000,000	**246**	**374**	**359**	**368**	**378**	**1,726**
Percent of Total Demand	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Total Market Demand	**1,643**	**2,496**	**2,394**	**2,455**	**2,519**	**11,507**
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Current Median Housing Prices in South Maui (Year-to-Date 2013 Average to October 22)

Single Family Home Median Price	$635,000
Multi-Family Unit Average Price	$379,000
Average Price All Residential Units	$449,531

Note: The estimated median household income for Maui in 2013 is $78,600 for a four-person household; the accepted median baseline.

(1) This price is considered "affordable" for households earning 80% of the median county household income ("Low Income").
(2) This price is considered "affordable" for households earning from 81% to 160% of county median (includes "Below Moderate" to "Gap Income" categories).

Source: Maui County, DBEDT, MLS and The Hallstrom Group, Inc.

TABLE III-3

DIVISION OF PROJECTED DEMAND BY UNIT TYPE
FOR HOUSING UNITS IN KIEHI-MAKENA STUDY AREA 2014 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

	Periodic Demand (1)					Total	
	2014 to 2015	2016 to 2020	2021 to 2025	2026 to 2030	2031 to 2035	Demand 2014-2035	Comments
1. Using Minimum Demand Projections							
Single Family Homes	419	556	576	597	612	2,758	The study area was among the first neighbor island regions to have significant numbers of "tract/spec" homes built relative to size of market, and this type of development has been the primary segment in the single family sector over the past two decades.
Percent of Total	38%	38%	38%	38%	38%	38%	
Single Family Lots	132	161	151	141	129	715	Prior to mid-80s, vacant lots were the primary single family development type. Now mainly limited to smaller and/or more upscale subdivisions. However, several major projects being proposed are expected to have some lot offerings.
Percent of Total	12%	11%	10%	9%	8%	10%	
Multifamily Units	551	746	788	832	869	3,785	The primary residential development type in the makai/resort areas of the region, although the number of available and competitive sites has become somewhat limited. Need for affordable/workforce units will fuel continuing development as will demand for more moderate-priced vacation units.
Percent of Total	50%	51%	52%	53%	54%	52%	
Total	**1,101**	**1,462**	**1,515**	**1,570**	**1,609**	**7,258**	
	100%	100%	100%	100%	100%	100%	
2. Using Maximum Projections							
Single Family Homes	624	949	910	933	957	4,373	
Percent of Total	38%	38%	38%	38%	38%	38%	
Single Family Lots	197	275	239	221	202	1,134	
Percent of Total	12%	11%	10%	9%	8%	10%	
Multifamily Units	821	1,273	1,245	1,301	1,361	6,001	
Percent of Total	50%	51%	52%	53%	54%	52%	
Total	**1,643**	**2,496**	**2,394**	**2,455**	**2,519**	**11,507**	
	100%	100%	100%	100%	100%	100%	
Mid-Point							
Single Family Homes	521	752	743	765	784	**3,565**	
Single Family Lots	165	218	195	181	165	**924**	
Multifamily Units	686	1,009	1,016	1,067	1,115	**4,893**	
Total	**1,372**	**1,979**	**1,954**	**2,013**	**2,064**	**9,383**	

Source: The Hallstrom Group, Inc.

TABLE III-4

DIVISION OF PROJECTED DEMAND BETWEEN ONWER-OCCUPANTS AND RENTALS FOR HOUSING UNITS IN KIEHI-MAKENA STUDY AREA 2014 TO 2035
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

	Periodic Demand (1)					Total
	2014 to 2015	**2016 to 2020**	**2021 to 2025**	**2026 to 2030**	**2031 to 2035**	**Demand 2014-2035**
1. Using Minimum Demand Projections						
Owner-Occupied Units	573	775	818	864	901	3,931
Percent of Total	52%	53%	54%	55%	56%	54%
Renter-Occupied Units	529	687	697	707	708	3,327
Percent of Total	48%	47%	46%	45%	44%	46%
Total	**1,101**	**1,462**	**1,515**	**1,570**	**1,609**	**7,258**
	100%	100%	100%	100%	100%	100%
2. Using Maximum Projections						
Owner-Occupied Units	854	1,323	1,293	1,350	1,411	6,231
Percent of Total	52%	53%	54%	55%	56%	54%
Renter-Occupied Units	789	1,173	1,101	1,105	1,109	5,276
Percent of Total	48%	47%	46%	45%	44%	46%
Total	**1,643**	**2,496**	**2,394**	**2,455**	**2,519**	**11,507**
	100%	100%	100%	100%	100%	100%
Mid-Point						
Owner-Occupied Units	714	1,049	1,055	1,107	1,156	**5,081**
Renter-Occupied Units	659	930	899	906	908	**4,302**
Total	**1,372**	**1,979**	**1,954**	**2,013**	**2,064**	**9,383**

Note: The 2010 Census identified owner-occupants as comprising 52 percent of the market and rental-occupied units at 48 percent of the Kihei-Makena study area, with nominal change from the 2000 census.

Source: The Hallstrom Group, Inc.

TABLE III-5

COMPARISON OF PROPOSED KIHEI-MAKENA STUDY AREA LONG-TERM RESIDENTIAL SUPPLY ESTIMATES
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

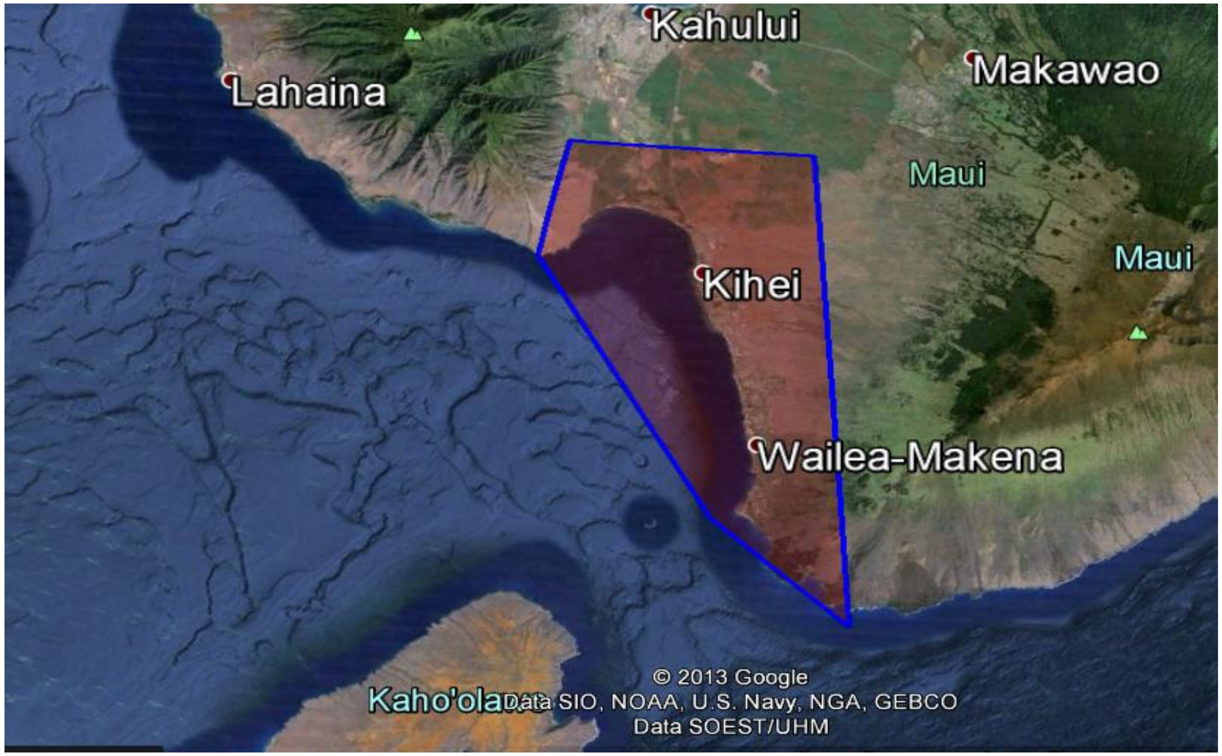
Estimate Title	South Maui Development Projects Directed Growth Boundaries Map	Advisory Committee Final Recommendations
Purpose	To identify the extent of the proposed Directed Growth Boundaries in the Kihei-Makena region and the proposed development therein.	To support the on-going updating of the Kihei-Makena Community Plan
Prepared By	Long Range Planning Div. Dept. of Planning, Maui County	Maui General Plan Advisory Committee
Estimate of Approved/Proposed Future Supply		
Perspective	**Within Proposed DGB**	**Within Community Plan Region**
All Units in Study Area (1)		
Single Family	4,709	No Distinction by Unit Type
Multi Family	4,293	
Total	**9,002**	**7,034** (2)
Resort-Residential Units (3)		
Single Family	884	
Multi Family	832	
Total	**1,716**	
Net Resident-Oriented Housing Units (4)		
Single Family	4,114	
Multi Family	3,675	
Total	**7,789**	

Note: Both estimates include proposed Resort-Residential units in the Wailea and Makena destination resorts that are not intended for, nor competitive with the resident-oriented housing sector.

(1) Excludes "Time Share/Hotel" Units. Only a portion of the proposed 2,417 unit Kaonoulu Village site is within the DGB. We estimate about 60 percent of the project area is within the DGB, and have allocated the units accordingly.
(2) GPAC Maps include only a portion of several projects including Kaonoulu Village and Ohukai Village, and/or reflect lower densities than proposed by the developer. We have made appropriate allowances. Also included are the proposed 1,250 units within the Maui Research & Technology Park.
(3) Proposed units in the Wailea and Makena destination resorts, and ocean-influenced projects between them.
(4) We estimate that 40 percent of the proposed Makena Inventory of lots (669) and multifamily units (436) will be competitive within the resident-oriented housing market sector along with 10 percent of the other proposed resort-residential inventory in the area.

Source: As cited, and The Hallstrom Group, Inc.

MARKET STUDY TARGET AREA



Source: Residential Listings in Study Area posted on various websites compiled by PadMapper.com from 10/13/2013.

TABLE III-6

RENTAL UNIT IN STUDY AREA BY UNIT TYPE (2005-2013)
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
With Number and Percent of Total Listings
Based on Maui MLS Data

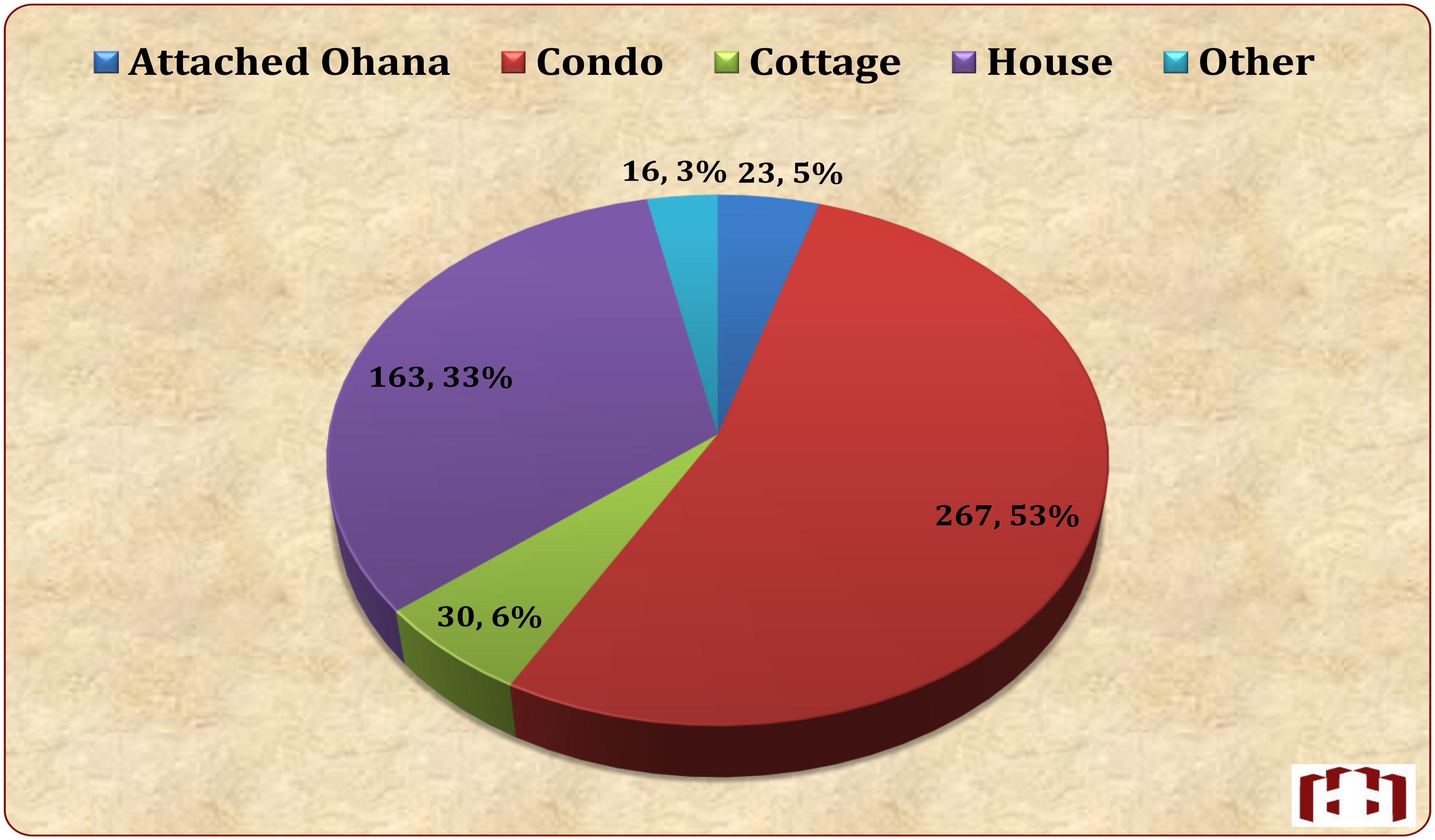


TABLE III-7

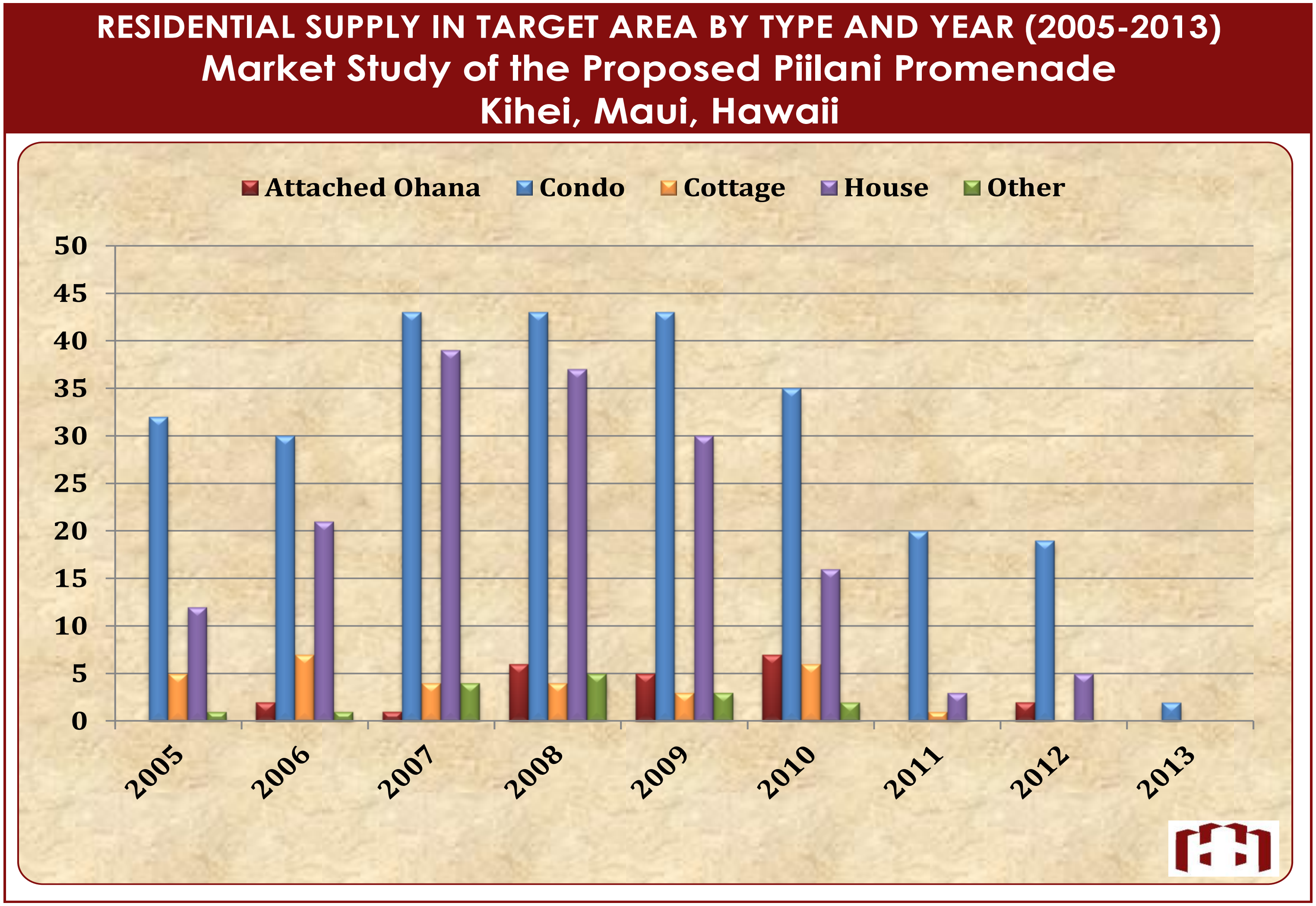
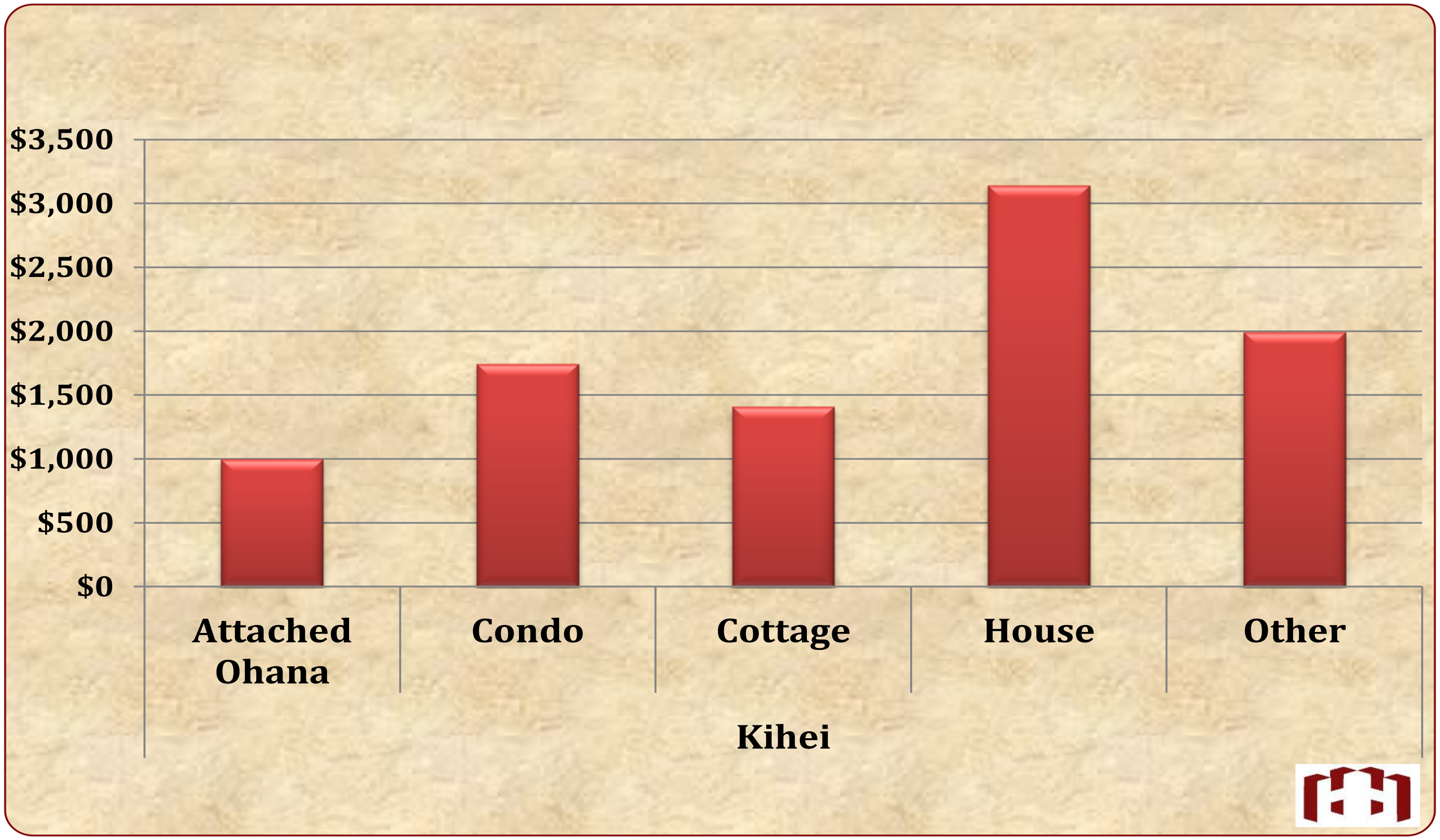

RESIDENTIAL SUPPLY IN TARGET AREA BY TYPE AND YEAR (2005-2013)
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
Attached Ohana
Condo
Cottage
House
Other
50
45
40
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013

TABLE III-8

AVERAGE RENTAL ASKING PRICE BY LOCATION AND TYPE (2005-2013)
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii



Note: Maalaea, Maui Meadows & Wailea/Makena presented no residential listings during the study period.

TABLE III-9

AVERAGE ASKING RENT BY TYPE AND YEAR (2005-2013)
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

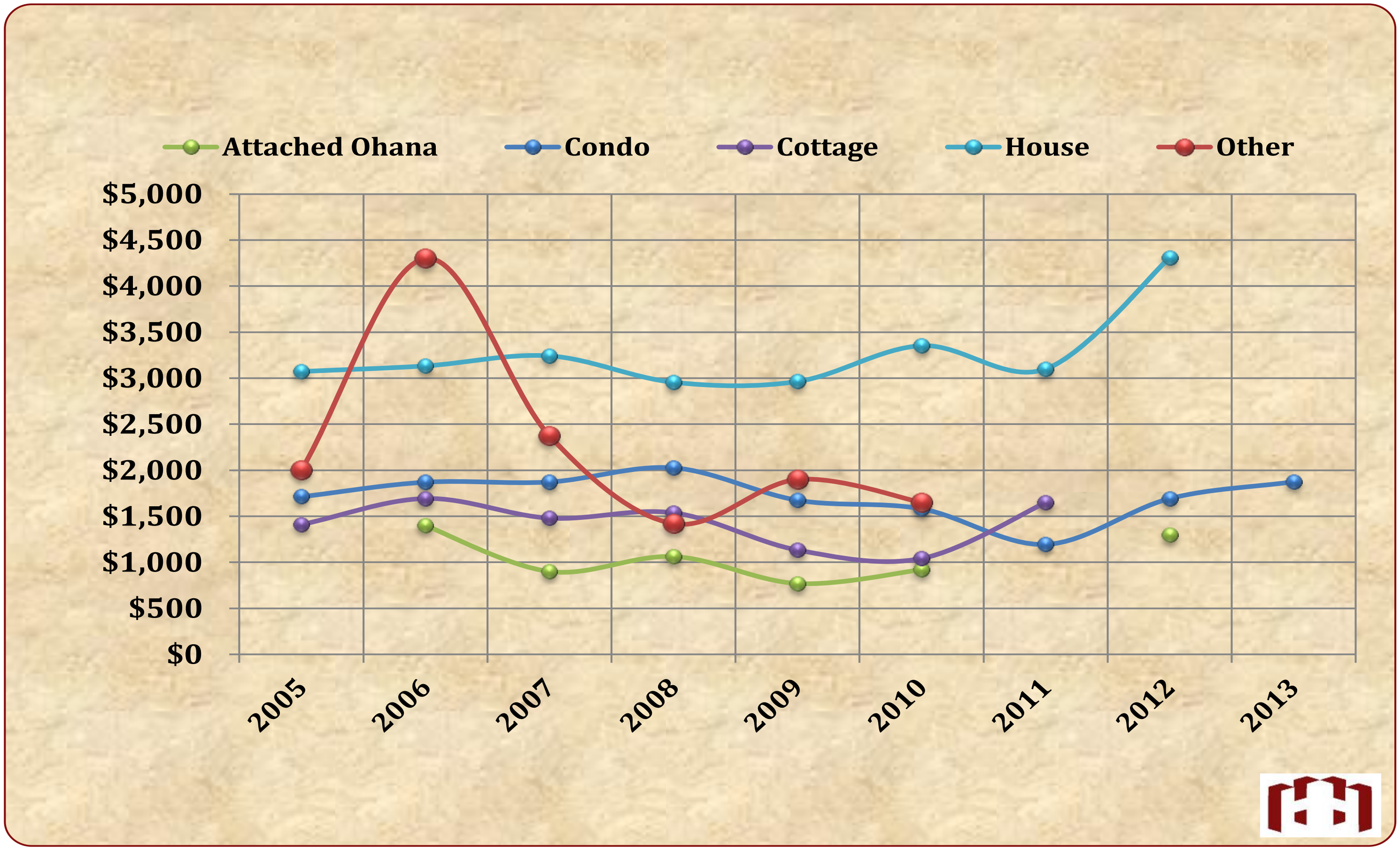


TABLE III-10

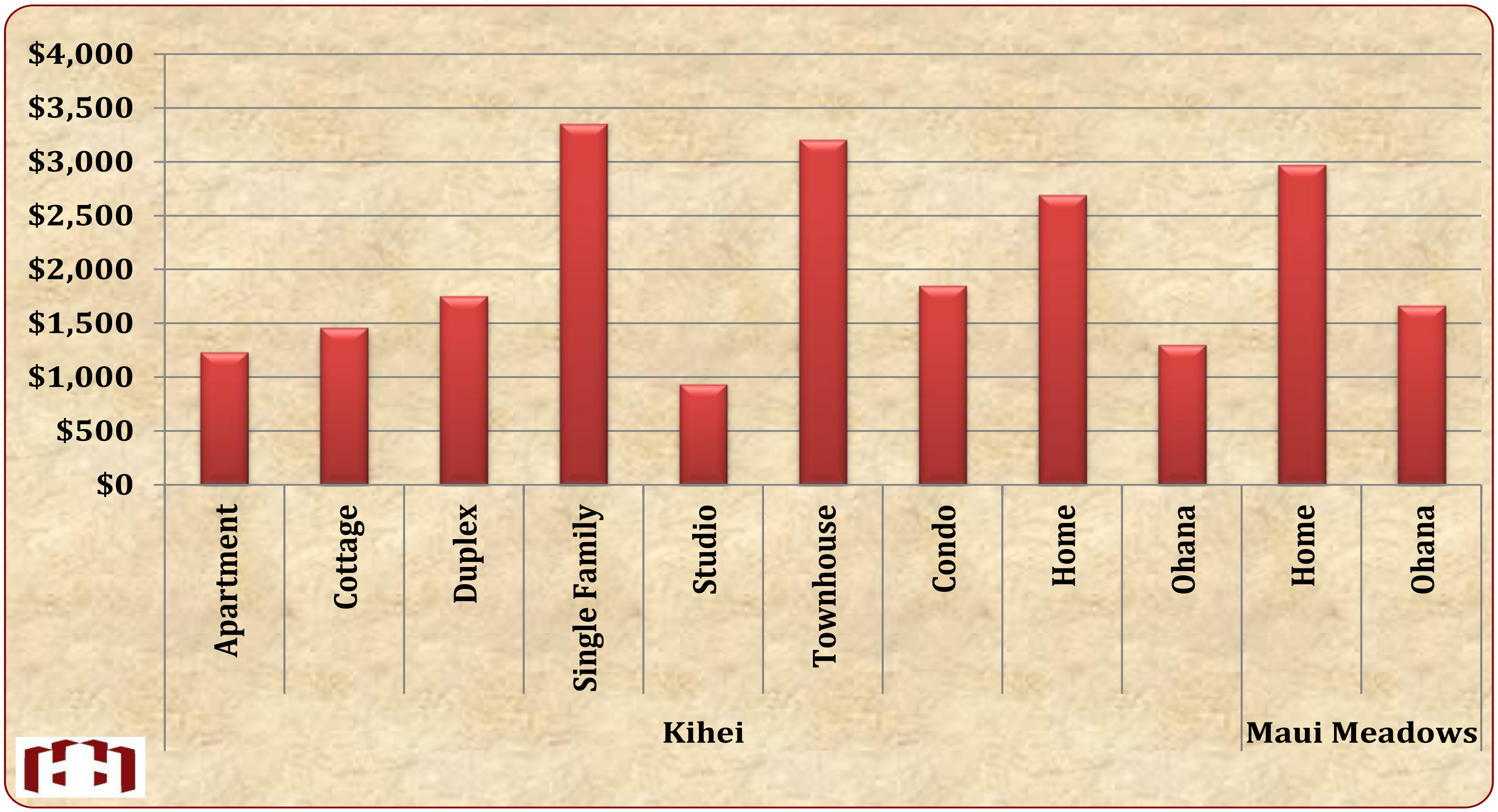
RENTAL RESIDENTIAL LISTINGS IN STUDY AREA
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Location	Sub Location	Type	Subtype	Bed	Baths	Asking Rent	Utilities	Date Posted	Address	Listing #
Kihei		Studio		0	1	$650	Water	10/16/2013	Uwapo Road at Piilani Hwy	4133936242
Kihei		Single Family		4	3	$3,500	No	10/26/2013	303 Wikani Street	4153200044
Kihei		Duplex		1	1	$1,200	Water	10/13/2013	Waikalani hema pl. at kULANIHAKOI ST.	4128133926
Kihei		Studio		0	1	$580	ALL	10/14/2013	91 Eleu Pl	4130286622
Kihei		Cottage		1	1	$1,550	No	10/27/2013	33 NOHOKAI	4155900592
Kihei		Apartment		1	1	$1,350	Water	10/25/2013	2124 Awihi Place	4152380267
Kihei		Studio		0	1	$1,300	ALL	10/18/2013	Ohina St. at Alaume St.	4137645224
Kihei		Apartment		2	1	$1,500	ALL	10/28/2013	210 humupea pl	4158253571
Kihei		Townhouse		2	2	$3,200	No	9/20/2013	940 S Kihei Rd	
Kihei		Cottage		1	1	$1,000	Water	10/29/2013	1601 N. alaniu	4159885983
Kihei		Single Family		3	2	$3,200	No	9/30/2013	Kumulani Drive at Kupulau Dr	4101095663
Kihei		Apartment		1	1	$900	No	10/29/2013	AUHANA at KANANI	4160293831
Kihei		Condo		3	2	$1,995	No	10/31/2013	40 Halili Ln	4163774613
Kihei		Condo		2	1	$1,700	Water	11/2/2013	14 F Apuhihi Ln	4167328943
Kihei		Duplex		1	1	$1,100	Yes	11/5/2013	984 Konia Place	4173438354
Kihei		Duplex		3	2	$2,400	Water	10/30/2013	Malama at Mehani	4161590126
Kihei		Cottage		1	1	$1,950	Water	11/3/2013	Malama at Mehani Circle	4169907182
Kihei		Home		5	3	$1,500	No	10/16/2013	165 Ahekolo	4133643956
Maui Meadows		Ohana		2	1	$1,600	Yes	11/2/2013	Kupulau Drive at Keha	4167526532
Maui Meadows		Home		3	2	$3,200	No	11/4/2013	Kumulani Drive at Kupulau Drive	
Kihei		Apartment		1	1	$1,300	No	11/7/2013	679 S. Kihei Road	4177526729
Kihei		Studio		0	1	$1,200	Yes	11/6/2013	715 S. Kihei Rd	4176164295
Kihei		Ohana		1	1	$1,300	Yes	11/5/2013	Mehani at Malama	4174332955
Kihei		Apartment		2	1	$1,100	No	11/11/2013	140 Uwapo Rd	4186241067
Kihei		Duplex		3	2	$2,300	Yes	11/11/2013	983 S Kihei Rd	4185101189
Kihei		Cottage		1	1	$1,300	Water	11/10/2013	129 Namauu	4183620895
Kihei		Home		3	1	$1,895	Water	11/11/2013	ewa pl at waipuilani	4186370241
Kihei		Cottage		1	1	$950	Yes	11/7/2013	115 E. Waipuilani Rd	4178717246
Maui Meadows		Home		3	2	$2,850	No	11/19/2013	Malina Pl.	4202384862
Kihei		Home		2	2	$1,650	Water	11/19/2013	2611 Lioholo Place	4202870297
Kihei		Home		4	3	$4,200	No	11/19/2013	147 Hoohale St	4202888897
Kihei		Cottage		2	1	$2,000	No	11/19/2013	3449 Akala Dr	4202593532
Maui Meadows		Ohana		1	1	$1,725	No	11/18/2013	3251 Waileia Place	4199753529
Maui Meadows		Home		3	2	$2,850	Water	11/19/2013	Malina Pl. at Malina Pl.	4202384862
Kihei		Home		4	3	$4,200	No	11/19/2013	147 Hoohale St	4202888897

Source: Residential Listings on Target Area posted on various websites compiled by PadMapper.com from 10/13/2013.

TABLE III-11

AVERAGE ASKING PRICE BY LOCATION AND TYPE (October 2013)
Market Study of the Proposed Piilani Promenade
South Maui, Hawaii



Note: Maalaea, Maui Meadows & Wailea/Makena presented no residential listings during the study period.

TABLE III-12

SUMMARY OF SUBJECT PROJECTED DEMAND LEVELS
USING THE MARKET SHARES METHOD BASED ON RENTAL DEMAND
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

Scenario One: Using Minimum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Rental Demand	Effective Subject Share	Indicated Total Subject Absorption
2017	1	137	40.00%	55
2018	2	137	40.00%	55
2019	3	137	40.00%	55
2020	4	137	40.00%	55
2021	5	137	4.50%	6
Totals		**687**	**32.90%**	**226**

Scenario Two: Using Maximum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Rental Demand	Effective Subject Share	Indicated Total Subject Absorption
2017	1	235	40.00%	94
2018	2	235	40.00%	94
2019	3	235	16.50%	39
Totals		**704**	**32.17%**	**226**

ANALYSIS MID-POINT 3.25 Years	**696**	**32.53%**	**226**

Source: The Hallstrom Group, Inc.

TABLE IV-1

PROPOSED DEVELOPMENT SCHEDULE AND ESTIMATED CONSTRUCTION COSTS
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period				Totals During Build-Out
	2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031	
Infrastructure Emplacement	$33,000,000				**$33,000,000**
Commercial Construction (1)	$6,180,328	$34,977,382	$51,945,463	$43,684,752	**$136,787,925**
Industrial Construction (2)	$2,076,047	$8,304,190			**$10,380,237**
Apartment Construction (3)	$12,751,200	$19,126,800			**$31,878,000**
TOTAL PERIODIC CONSTRUCTION COSTS	**$54,007,576**	**$62,408,372**	**$51,945,463**	**$43,684,752**	**$212,046,162**
Contractor Profits	$5,400,758	$6,240,837	$5,194,546	$4,368,475	**$21,204,616**
Supplier Profits	$2,160,303	$2,496,335	$2,077,819	$1,747,390	**$8,481,846**

(1) Includes retail, restaurant, service and office/other components. Estimated average direct development cost of $258 per sq ft.
(2) Estimated average direct development cost of $180 per square foot.
(3) Assuming 226 total units with 29 one bedroom units at 600 Sq. Ft., 192 two bedroom units at 750 Sq. Ft., and 5 three-bedroom units at 900 sq. ft., with average cost of $193 per sq. ft.

Source: The Hallstrom Group, Inc.

TABLE IV-2

ESTIMATED YEARLY FULL-TIME EQUIVALENT EMPLOYMENT POSITIONS CREATED BY DEVELOPMENT
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii

	Development and Sales Period				Totals During Build-Out	Stabilized Annually
Construction Employment (1)	**2015 to 2016**	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**		
Infrastructure Emplacement	83				**83**	
Commercial Construction	27	155	231	194	**608**	
Industrial Construction	9	37			**46**	
Apartment Units	57	85			**142**	
Total Periodic Construction Jobs	**176**	**277**	**231**	**194**	**878**	
On-Going Business Employment						
Commercial Worker Years (2)		613	2,242	4,342	**7,197**	
Total FTE Jobs in Place at End of Period		245	652	1,085		**1,085**
Industrial Worker Years (3)		261	522	522	**1,304**	
Total FTE Jobs in Place at End of Period		104	104	104		**104**
Maintenance & Common Element (4)		105	105	105	**315**	
Total FTE Jobs in Place at End of Period		21	21	21		**21**
Total Periodic On-Going Business Jobs		**1,328**	**3,625**	**6,158**	**8,816**	
Total FTE Jobs in Place at End of Period		**370**	**777**	**1,210**		**1,210**
Off-Site Employment (5)	44	401	964	1,588	**2,997**	
Total FTE Jobs in Place at End of Period		93	194	303		**303**
TOTAL PERIODIC WORKER YEARS	**220**	**2,007**	**4,820**	**7,940**	**12,692**	
TOTAL END-OF-PERIOD PERMANENT JOBCOUNT	**0**	**463**	**971**	**1,513**		**1,513**

(1) Infrastructure construction employment estimated at 1 worker-year for every $400,000 in costs. Vertical construction (all types) employment estimated at 1 worker-year for every $225,000 in costs. Includes all direct employment associated with construction, on and off-site.
(2) Employment estimated at 1 full-time-equivalent worker for every 350 square feet of gross floor area. First stores opening in 2017.
(3) Employment estimated at 1 full-time-equivalent worker for every 400 square feet of gross floor area. First businesses opening in 2017
(4) Includes project common element administration, security and maintenance staff of 10 jobs, and apartment staff of 11.
(5) Estimated at one cumulative off-site employment position for every four on site positions.

Source: Hallstrom Group, Inc.

TABLE IV-3

ESTIMATED YEARLY EMPLOYEE WAGES CREATED BY DEVELOPMENT
ASSUMING HISTORICAL ECONOMIC GROWTH TRENDS
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period				Totals During Build-Out	
Construction Wages (1)	2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031		
Infrastructure Emplacement	$6,246,240				$6,246,240	
Commercial Construction	$2,079,667	$11,769,811	$17,479,533	$14,699,822	$46,028,833	
Industrial Construction	$698,585	$2,794,341			$3,492,927	
Multifamily Units	$4,290,750	$6,436,126			$10,726,876	
Total Periodic Construction Wages	**$13,315,243**	**$21,000,278**	**$17,479,533**	**$14,699,822**	**$66,494,876**	
On-Going Business Wages						**Stabilized Annually**
Commercial (2)		$19,969,058	$73,076,165	$141,501,311	$212,471,513	$32,029,891
Industrial (3)		$9,832,734	$19,665,467	$19,665,467	$49,163,668	$3,933,093
Maintenance & Common Element (4)		$4,242,000	$4,242,000	$4,242,000	$12,726,000	$672,000
Total Periodic On-Going Business Wages	**$0**	**$34,043,791**	**$96,983,633**	**$165,408,778**	**$274,361,181**	**$36,634,985**
Off-Site Employment Wages (5)	$1,776,257	$16,214,451	$38,946,617	$64,157,324	$121,094,649	$12,224,159
TOTAL PERIODIC WAGES	**$15,091,499**	**$71,258,521**	**$153,409,782**	**$244,265,924**	**$461,950,706**	**$48,859,144**

(1) Average annual wage for full-time-equivalent construction worker (all trades) at $75,712 ($35.26/hour X 2,080 hours).
(2) Average annual wage for full-time-equivalent retail trade& restaurant workers at $29,521 ($14.19/hour).
(3) Average annual wage for full-time-equivalent industrial worker estimated at $37,700 ($18.13/hour) based on average wage for manufacturing, trade, wholesale workers.
(2) Average annual wage for full-time-equivalent maintenance and security workers at $32,000 ($15.38/hour).
(5) Average annual wage for full-time-equivalent general worker at $40,400 ($19.42/hour), the average wage for all "Total Private Workers" in the state.

Wages taken from State of Hawaii "Hawaii Workforce Infonet" "Data and Publications>Hours and Earnings" for January 2012.

Source: Hallstrom Group, Inc.

TABLE IV-4

ESTIMATED RESIDENT POPULATION, HOUSEHOLD INCOME AND DISCRETIONARY EXPENDITURES
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period				
	2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031	Totals
				Stabilized	
Apartment Units					
Number of Units Occupied		226	226	226	
One Bedroom Units		30	30	30	
Percent of Total Units		13%	13%	13%	
Two Bedroom Units		192	192	192	
Percent of Total Units		85%	85%	85%	
Three Bedroom Units		4	4	4	
Percent of Total Units		2%	2%	2%	
One Bedroom Unit Population (1)		54	54	54	
Two Bedroom Unit Population (2)		538	538	538	
Three Bedroom Unit Population (3)		15	15	15	
Total Resident Population		607	607	607	
RESIDENT HOUSEHOLD INCOME (4)					During Build-Out
Annually		$17,213,400	$17,213,400	$17,213,400	
Periodic		$68,853,600	$86,067,000	$86,067,000	$240,987,600
TOTAL DISPOSABLE EXPENDITURES AFTER HOUSING COSTS (5)					
Annually (at end of period)		$8,606,700	$8,606,700	$8,606,700	
Periodic		$34,426,800	$43,033,500	$43,033,500	$120,493,800

(1) Average household size of 1.80 persons.
(2) Average household size of 2.80 persons.
(3) Average household size of 3.80 persons.
(4) One-bedroom unit households at 75% of Maui household income average, two-bedroom unit households at 100% of Maui average, three-bedroom units at 110%.
(5) Assumes 15% of gross income for taxes, 30% for rent and 5% for utilities. Leaving 50% of gross income as net disposable.

Source: The Hallstrom Group, Inc.

TABLE IV-5

PROJECTED ON-SITE OPERATING ECONOMIC ACTIVITY
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period					
	2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031	Totals During Build-Out	Stabilized Annually
Commercial Businesses (1)		$179,834,965	$658,100,641	$1,094,480,712	$1,932,416,317	$318,420,000
In-Project Resident Population Patronage %		1.50%	1.25%	1.00%	1.25%	1.00%
Outside Project Patronage Expenditures		$177,137,440	$649,874,383	$1,083,535,905	$1,908,261,113	$315,235,800
Industrial Businesses (2)		$57,588,000	$115,176,000	$115,176,000	$287,940,000	$23,035,200
In-Project Resident Population Patronage %		0.50%	0.50%	0.50%	0.50%	0.50%
Outside Project Patronage Expenditures		$57,300,060	$114,600,120	$114,600,120	$286,500,300	$22,920,024
Apartment Rents (3)		$24,953,400	$27,726,000	$27,726,000	$80,405,400	$5,545,200
In-Project Resident Population Patronage %		100%	100%	100%	100%	100%
Outside Project Patronage Expenditures		$0	$0	$0	$0	$0
Maintenance & Common Element (4)		$3,056,990	$5,481,549	$8,135,049	$16,673,587	$1,718,976
In-Project Resident Population Patronage %		100%	100%	100%	100%	100%
Outside Project Patronage Expenditures		$0	$0	$0	$0	$0
Total Economic Activity						
In-Project Resident Population Patronage		$30,995,854	$42,009,687	$47,381,736	$120,387,277	$10,563,552
% of Total Activity		11.7%	5.2%	3.8%	5.2%	3.0%
Outside Project Patronage Spending		$234,437,500	$764,474,503	$1,198,136,025	$2,197,048,028	$338,155,824
% of Total Activity		88.3%	94.8%	96.2%	94.8%	97.0%
TOTAL PERIODIC PROJECT GROSS REVENUES	$0	$265,433,354	$806,484,190	$1,245,517,761	$2,317,435,305	$348,719,376

(1) Estimated based on average annual sales of $600 per square foot.
(2) Estimated based on average annual sales of $400 per square foot.
(3) Estimated at average rent of $1,600/month for one-bedroom units, $2,100 per month for two-bedroom, and $2,500 per month for three-bedroom.
(4) Estimated at $2,400 per apartment unit per year and $2 per square foot of total leaseable area per year.

Source: Hallstrom Group, Inc.

EXHIBIT IV
Page 6

TABLE IV-6

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period					
	2015 to 2016	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**	**Totals During Build-Out**	**Stabilized Annually**
Construction Activity						
Construction Wages	$13,315,243	$21,000,278	$17,479,533	$14,699,822	**$66,494,876**	
Contractor Profits	$5,400,758	$6,240,837	$5,194,546	$4,368,475	**$21,204,616**	
Supplier Profits	$2,160,303	$2,496,335	$2,077,819	$1,747,390	**$8,481,846**	
Other Construction Costs	$33,131,273	$32,670,921	$27,193,565	$22,869,065	**$115,864,824**	
Total Construction Impact	**$54,007,576**	**$62,408,372**	**$51,945,463**	**$43,684,752**	**$212,046,162**	
Project De Facto Population Spending						
On-Site Spending		$30,995,854	$42,009,687	$47,381,736	**$120,387,277**	$10,563,552
Off-Site Spending		$28,384,346	$28,749,813	$23,377,764	**$80,511,923**	$3,588,348
Total Project Population Impact		$59,380,200	$70,759,500	$70,759,500	**$200,899,200**	**$14,151,900**
Outside Patronage Spending		**$234,437,500**	**$764,474,503**	**$1,198,136,025**	**$2,197,048,028**	**$338,155,824**
TOTAL BASE ECONOMIC IMPACT	**$54,007,576**	**$356,226,072**	**$887,179,466**	**$1,312,580,276**	**$2,609,993,390**	**$352,307,724**

Source: Hallstrom Group, Inc.

TABLE IV-7

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT CONSTRUCTION
USING STATE INPUT-OUTPUT MODEL "TYPE II" MULTIPLIERS
Market Study of the Proposed Piilani Promenade
Kihei, Maui,, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period				Totals
Year	**2015 to 2016**	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**	
Construction Costs	**$54,007,576**	**$62,408,372**	**$51,945,463**	**$43,684,752**	**$212,046,162**
1. Economic Output Multiplier	2.12	2.12	2.12	2.12	2.12
Total State Economic Output	**$114,496,060**	**$132,305,748**	**$110,124,382**	**$92,611,674**	**$449,537,863**
2. Earnings Multiplier	0.61	0.61	0.61	0.61	0.61
Total Increase in State Earnings	**$32,944,621**	**$38,069,107**	**$31,686,733**	**$26,647,699**	**$129,348,159**
3. State Tax Multipliers	0.12	0.12	0.12	0.12	0.12
Total Increase in State Taxes	**$6,480,909**	**$7,489,005**	**$6,233,456**	**$5,242,170**	**$25,445,539**
4. Total Job Multipliers	13.83	13.83	13.83	13.83	13.83
Total State Jobs Created	**746.9**	**863.1**	**718.4**	**604.2**	**2,932.6**
Construction Employment	**176**	**277**	**231**	**194**	**878**
5. Direct-Effect Job Multipliers	2.68	2.68	2.68	2.68	2.68
Total Direct Jobs Created	**471.3**	**743.4**	**618.7**	**520.3**	**2,353.7**
Construction Wages	**$13,315,243**	**$21,000,278**	**$17,479,533**	**$14,699,822**	**$66,494,876**
6. Direct-Effect Earnings	2.02	2.02	2.02	2.02	2.02
Total Increase in Direct Earnings	**$26,896,790**	**$42,420,562**	**$35,308,656**	**$29,693,640**	**$134,319,649**

Source: State Input-Output Model (approved July 2011), and The Hallstrom Group, Inc.

TABLE IV-8

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT OPERATIONS
USING STATE INPUT-OUTPUT MODEL "TYPE II" MULTIPLIERS
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development Year			Totals	Stabilized
Year	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**	**During Build-Out**	**Annually**
Operating Revenues	**$265,433,354**	**$806,484,190**	**$1,245,517,761**	**$2,317,435,305**	**$348,719,376**
1. Economic Output Multiplier	2.09	2.09	2.09	2.09	2.09
Total State Economic Output	**$554,755,711**	**$1,685,551,957**	**$2,603,132,120**	**$4,843,439,787**	**$728,823,496**
2. Earnings Multiplier	0.66	0.66	0.66	0.66	0.66
Total Increase in State Earnings	**$175,186,014**	**$532,279,565**	**$822,041,722**	**$1,529,507,301**	**$230,154,788**
3. State Tax Multipliers	0.16	0.16	0.16	0.16	0.16
Total Increase in State Taxes	**$42,469,337**	**$129,037,470**	**$199,282,842**	**$370,789,649**	**$55,795,100**
4. Total Job Multipliers	19.00	19.00	19.00	19.00	19.00
Total State Jobs Created	**5,043.2**	**15,323.2**	**23,664.8**	**44,031.3**	**6,625.7**
Operating Employment	**1,328**	**3,625**	**6,158**	**11,111**	**1,210**
5. Direct-Effect Job Multipliers	2.05	2.05	2.05	2.05	2.05
Total Direct Jobs Created	**2,722.4**	**7,431.7**	**12,624.0**	**22,778.2**	**2,481.1**
Operating Wages	**$15,091,499**	**$71,258,521**	**$153,409,782**	**$244,265,924**	**$48,859,144**
6. Direct-Effect Earnings	1.89	1.89	1.89	1.89	1.89
Total Increase in Direct Earnings	**$28,522,934**	**$134,678,605**	**$289,944,489**	**$461,662,596**	**$92,343,782**

Source: State Input-Output Model (approved July 2011), and The Hallstrom Group, Inc.

TABLE V-1

PUBLIC FISCAL COSTS/BENEFITS SUMMARY TABLE
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

Development Period	Development and Sales Period: 2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031	Totals During Build-Out Period	Stabilized Annually After Build-out
PUBLIC BENEFITS (Revenues)						
1. COUNTY REAL PROPERTY TAXES						
Land Assessed Value						
Commercial		$41,164,200	$41,164,200	$41,164,200		$41,164,200
Industrial	$26,250,000	$23,522,400	$23,522,400	$23,522,400		$23,522,400
Residential		$5,645,376	$5,645,376	$5,645,376		$5,645,376
Total Assessed Value	**$26,250,000**	**$70,331,976**	**$70,331,976**	**$70,331,976**		**$70,331,976**
Improvements Assessed Value						
Commercial		$41,157,710	$93,103,173	$136,787,925		$136,787,925
Industrial	$0	$10,380,237	$10,380,237	$10,380,237		$10,380,237
Residential		$31,878,000	$31,878,000	$31,878,000		$31,878,000
Total Assessed Value	**$0**	**$83,415,947**	**$135,361,410**	**$179,046,162**		**$179,046,162**
REAL PROPERTY TAXES						
Commercial		$2,901,847	$4,732,925	$6,272,812	$13,907,585	$1,254,562
Industrial	$383,250	$1,237,446	$1,237,446	$1,237,446	$4,095,589	$247,489
Residential		$1,200,748	$1,200,748	$1,200,748	$3,602,244	$240,150
Total Real Property Taxes	**$383,250**	**$5,340,042**	**$7,171,119**	**$8,711,007**	**$21,605,417**	**$1,742,201**
2. STATE INCOME TAXES						
Taxable Personal Income	$15,091,499	$140,112,121	$239,476,782	$330,332,924	$725,013,327	**$66,072,544**
Taxable Corporate Profits	$756,106	$27,417,053	$81,375,655	$125,163,363	$234,712,177	**$34,871,938**
Personal Taxes Paid	$769,666	$7,145,718	$12,213,316	$16,846,979	$36,975,680	**$3,369,700**
Corporate Taxes Paid	$33,269	$1,206,350	$3,580,529	$5,507,188	$10,327,336	**$1,534,365**
TOTAL STATE INCOME TAXES	**$802,935**	**$8,352,068**	**$15,793,845**	**$22,354,167**	**$47,303,015**	**$4,904,065**
3. STATE GROSS EXCISE TAX						
Taxable Transactions						
Construction Contracts	$54,007,576	$62,408,372	$51,945,463	$43,684,752	$212,046,162	
Worker Disposable Income Purchases	$9,054,900	$42,755,113	$92,045,869	$146,559,554	$290,415,436	$29,315,486
Resident Population Discretionary Expenditures (on/off site) & Rents	$0	$59,380,200	$70,759,500	$70,759,500	$200,899,200	$14,151,900
Non-Resident Patronage Expenditures	$0	$234,437,500	$764,474,503	$1,198,136,025	$2,197,048,028	$338,155,824
Total Taxable Transactions	**$63,062,475**	**$398,981,184**	**$979,225,335**	**$1,459,139,831**	**$2,900,408,826**	**$381,623,210**
TOTAL STATE EXCISE TAX	**$2,627,624**	**$16,624,349**	**$40,801,382**	**$60,797,979**	**$120,851,335**	**$15,901,094**
TOTAL GROSS PUBLIC REVENUES						
To County of Maui (Item #1)	**$383,250**	**$5,340,042**	**$7,171,119**	**$8,711,007**	**$21,605,417**	**$1,742,201**
Adjustment for Other Proportional Taxes (1)	**1.47**	**1.47**	**1.47**	**1.47**	**1.47**	**1.47**
Adjusted Maui County Revenues	**$563,378**	**$7,849,861**	**$10,541,545**	**$12,805,180**	**$31,759,964**	**$2,561,036**
Plus Impact Fees (2)	**$2,214,749**	**$0**	**$0**	**$0**	**$2,214,749**	
Total County of Maui Receipts	**$2,778,126**	**$7,849,861**	**$10,541,545**	**$12,805,180**	**$33,974,713**	**$2,561,036**
To State (Items #2 & #3)	**$3,430,559**	**$24,976,417**	**$56,595,227**	**$83,152,146**	**$168,154,350**	**$20,805,159**
Adjustment for Other Proportional Taxes (3)	**1.25**	**1.25**	**1.25**	**1.25**	**1.25**	**1.25**
Adjusted State Revenues	**$4,288,199**	**$31,220,522**	**$70,744,033**	**$103,940,183**	**$210,192,937**	**$26,006,449**
Plus Impact Fees (2)	**$535,846**	**$0**	**$0**	**$0**	**$535,846**	
Total State of Hawaii Receipts	**$4,824,045**	**$31,220,522**	**$70,744,033**	**$103,940,183**	**$210,728,783**	**$26,006,449**
AGGREGATE TAX REVENUES	**$5,387,423**	**$39,070,383**	**$81,285,579**	**$116,745,363**	**$242,488,747**	**$28,567,485**
PUBLIC COSTS (Expenses)						
By County of Maui	**$0**	**$1,966,439**	**$1,966,439**	**$1,966,439**	**$5,899,317**	**$393,288**
By State of Hawaii	**$0**	**$5,273,869**	**$5,273,869**	**$5,273,869**	**$15,821,606**	**$1,054,774**
TOTAL PUBLIC COSTS	**$0**	**$7,240,308**	**$7,240,308**	**$7,240,308**	**$21,720,924**	**$1,448,062**
TOTAL NET PUBLIC BENEFITS						
To County of Maui	**$563,378**	**$5,883,422**	**$8,575,106**	**$10,838,741**	**$25,860,646**	**$2,167,748**
To State of Hawaii	**$4,824,045**	**$25,946,653**	**$65,470,165**	**$98,666,314**	**$194,907,177**	**$24,951,675**
AGGREGATE NET BENEFITS	**$5,387,423**	**$31,830,075**	**$74,045,271**	**$109,505,055**	**$220,767,823**	**$27,119,423**

(1) Real property taxes comprise 68.1 percent of General Fund in the Maui County 2012-13 budget.. Economic activity generates other revenue items of 31.9 percent or additional 46.8 percent above real property taxes.
(2) For parks, water/wastewater service, schools and other items. Additional impact fees may be assessed.
(3) In recent fiscal years, Gross Excise and Income Taxes have averaged circa 80 percent of total State revenues; other revenue items 20 percent, or 25 percent above income and gross excise taxes.

Source: The Hallstrom Group, Inc.

TABLE V-2

PUBLIC FISCAL COSTS/BENEFITS BREAK-OUT TABLE
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period					
Development Period	**2015 to 2016**	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**	**Totals During Build-Out Period**	**Stabilized Annually After Build-out**
PUBLIC BENEFITS (Revenues)						
1. COUNTY REAL PROPERTY TAXES						
Land Assessed Value						
Commercial		$41,164,200	$41,164,200	$41,164,200		$41,164,200
Industrial	$26,250,000	$23,522,400	$23,522,400	$23,522,400		$23,522,400
Residential		$5,645,376	$5,645,376	$5,645,376		$5,645,376
Total Assessed Value	**$26,250,000**	**$70,331,976**	**$70,331,976**	**$70,331,976**		**$70,331,976**
Improvements Assessed Value						
Commercial		$41,157,710	$93,103,173	$136,787,925		$136,787,925
Industrial	$0	$10,380,237	$10,380,237	$10,380,237		$10,380,237
Residential		$31,878,000	$31,878,000	$31,878,000		$31,878,000
Total Assessed Value	**$0**	**$83,415,947**	**$135,361,410**	**$179,046,162**		**$179,046,162**
REAL PROPERTY TAXES						
Commercial		$2,901,847	$4,732,925	$6,272,812	$13,907,585	$1,254,562
Industrial	$383,250	$1,237,446	$1,237,446	$1,237,446	$4,095,589	$247,489
Residential		$1,200,748	$1,200,748	$1,200,748	$3,602,244	$240,150
Total Real Property Taxes	**$383,250**	**$5,340,042**	**$7,171,119**	**$8,711,007**	**$21,605,417**	**$1,742,201**

Source: The Hallstrom Group, Inc.

TABLE V-3

PUBLIC FISCAL COSTS/BENEFITS BREAK-OUT TABLE
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period					
Development Period	**2015 to 2016**	**2017 to 2021**	**2022 to 2026**	**2027 to 2031**	**Totals During Build-Out Period**	**Stabilized Annually After Build-out**
2. STATE INCOME TAXES						
Taxable Personal Income	$15,091,499	$140,112,121	$239,476,782	$330,332,924	$725,013,327	**$66,072,544**
Taxable Corporate Profits	$756,106	$27,417,053	$81,375,655	$125,163,363	$234,712,177	**$34,871,938**
Personal Taxes Paid	$769,666	$7,145,718	$12,213,316	$16,846,979	$36,975,680	**$3,369,700**
Corporate Taxes Paid	$33,269	$1,206,350	$3,580,529	$5,507,188	$10,327,336	**$1,534,365**
TOTAL STATE INCOME TAXES	**$802,935**	**$8,352,068**	**$15,793,845**	**$22,354,167**	**$47,303,015**	**$4,904,065**
3. STATE GROSS EXCISE TAX						
Taxable Transactions						
Construction Contracts	$54,007,576	$62,408,372	$51,945,463	$43,684,752	$212,046,162	
Worker Disposable Income Purchases	$9,054,900	$42,755,113	$92,045,869	$146,559,554	$290,415,436	$29,315,486
Resident Population Discretionary Expenditures (on/off site)	$0	$59,380,200	$70,759,500	$70,759,500	$200,899,200	$14,151,900
Non-Resident Patronage Expenditures	$0	$234,437,500	$764,474,503	$1,198,136,025	$2,197,048,028	$338,155,824
Total Taxable Transactions	**$63,062,475**	**$398,981,184**	**$979,225,335**	**$1,459,139,831**	**$2,900,408,826**	**$381,623,210**
TOTAL STATE EXCISE TAX	**$2,627,624**	**$16,624,349**	**$40,801,382**	**$60,797,979**	**$120,851,335**	**$15,901,094**

Source: The Hallstrom Group, Inc.

TABLE V-4

PUBLIC FISCAL COSTS/BENEFITS BREAK-OUT TABLE
Market Study of the Proposed Piilani Promenade
Kihei, Maui, Hawaii
All Amounts Expressed in Constant 2013 Dollars

	Development and Sales Period					
Development Period	2015 to 2016	2017 to 2021	2022 to 2026	2027 to 2031	Totals During Build-Out Period	Stabilized Annually After Build-out
TOTAL GROSS PUBLIC REVENUES						
To County of Maui (Item #1)	$383,250	$5,340,042	$7,171,119	$8,711,007	$21,605,417	$1,742,201
Adjustment for Other Proportional Taxes (1)	1.47	1.47	1.47	1.47	1.47	1.47
Adjusted Maui County Revenues	$563,378	$7,849,861	$10,541,545	$12,805,180	$31,759,964	$2,561,036
Plus Impact Fees (2)	$2,214,749	$0	$0	$0	$2,214,749	
Total County of Maui Receipts	$2,778,126	$7,849,861	$10,541,545	$12,805,180	$33,974,713	$2,561,036
To State (Items #2 & #3)	$3,430,559	$24,976,417	$56,595,227	$83,152,146	$168,154,350	$20,805,159
Adjustment for Other Proportional Taxes (3)	1.25	1.25	1.25	1.25	1.25	1.25
Adjusted State Revenues	$4,288,199	$31,220,522	$70,744,033	$103,940,183	$210,192,937	$26,006,449
Plus Impact Fees (2)	$535,846	$0	$0	$0	$535,846	
Total State of Hawaii Receipts	$4,824,045	$31,220,522	$70,744,033	$103,940,183	$210,728,783	$26,006,449
AGGREGATE TAX REVENUES	$5,387,423	$39,070,383	$81,285,579	$116,745,363	$242,488,747	$28,567,485
PUBLIC COSTS (Expenses)						
By County of Maui	$0	$1,966,439	$1,966,439	$1,966,439	$5,899,317	$393,288
By State of Hawaii	$0	$5,273,869	$5,273,869	$5,273,869	$15,821,606	$1,054,774
TOTAL PUBLIC COSTS	$0	$7,240,308	$7,240,308	$7,240,308	$21,720,924	$1,448,062
TOTAL NET PUBLIC BENEFITS						
To County of Maui	$563,378	$5,883,422	$8,575,106	$10,838,741	$25,860,646	$2,167,748
To State of Hawaii	$4,824,045	$25,946,653	$65,470,165	$98,666,314	$194,907,177	$24,951,675
AGGREGATE NET BENEFITS	$5,387,423	$31,830,075	$74,045,271	$109,505,055	$220,767,823	$27,119,423

(1) Real property taxes comprise 68.1 percent of General Fund in the Maui County 2012-13 budget. Economic activity generates other revenue items of 31.9 percent or additional 46.8 percent above real property taxes.
(2) For parks, water/wastewater service, schools and other items. Additional impact fees may be assessed.
(3) In recent fiscal years, Gross Excise and Income Taxes have averaged circa 80 percent of total State revenues; other revenue items 20 percent, or 25 percent above income and gross excise taxes.

Source: The Hallstrom Group, Inc.

THE HALLSTROM GROUP INC.

REAL ESTATE
CONSULTANTS
& APPRAISERS

PROFESSIONAL BACKGROUND AND SERVICES

The Hallstrom Group, Inc. is a Honolulu based independent professional organization that provides a wide scope of real estate consulting services throughout the State of Hawaii with particular emphasis on valuation studies. The purpose of the firm is to assist clients in formulating realistic real estate decisions. It provides solutions to complex issues by delivering thoroughly researched, objective analyses in a timely manner. Focusing on specific client problems and needs, and employing a broad range of tools including after-tax cash flow simulations and feasibility analyses, the firm minimizes the financial risks inherent in the real estate decision making process.

The principals and associates of the firm have been professionally trained, are experienced in Hawaiian real estate, and are actively associated with the Appraisal Institute and the Counselors of Real Estate, nationally recognized real estate appraisal and counseling organizations.

The real estate appraisals prepared by The Hallstrom Group accomplish a variety of needs and function to provide professional value opinions for such purposes as mortgage loans, investment decisions, lease negotiations and arbitrations, condemnations, assessment appeals, and the formation of policy decisions. Valuation assignments cover a spectrum of property types including existing and proposed resort and residential developments, industrial properties, high-rise office buildings and condominiums, shopping centers, subdivisions, apartments, residential leased fee conversions, special purpose properties, and vacant acreage, as well as property assemblages and portfolio reviews.

Market studies are research-intensive, analytical tools oriented to provide insight into investment opportunities and development challenges, and range in focus from highest and best use determinations for a specific site or improved property, to an evaluation of multiple (present and future) demand and supply characteristics for long-term, mixed-use projects. Market studies are commissioned for a variety of purposes where timely market information, insightful trends analyses, and perceptive conceptual conclusions or recommendations are critical. Uses include the formation of development strategies, bases for capital commitment decisions, evidence of appropriateness for state and county land use classification petitions, fiscal and social impact evaluations, and the identification of alternative economic use/conversion opportunities.

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- SREA Course 201- Principles of Income Property Appraising
- Expert witness testimony before State of Hawaii Land Use Commission and various state and county boards and agencies since 1983.
- Numerous professional seminars and clinics.
- Contributing author to Hawaii Real Estate Investor, Honolulu Star Bulletin

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

Recent Neighbor Island Assignments

- Market Study, Economic Impact Analyses and Public Costs/ Benefits (Fiscal Impact) Assessments

Maui
-- Maui Research & Tech Park (Mixed-Use Community)
-- Maui Lani (Mixed-Use Community)
-- Honuaula (Mixed-Use Community)
-- Makena Beach Resort
-- Maui Business Park, Phase II (Industrial/Commercial)
-- Kapalua Mauka (Master Planned Community)
-- Hailiimaile (Mixed-Use Master Planned Community)
-- Pulelehua (Master Planned Community)
-- Westin Kaanapali Ocean Villas Expansion (Resort/ Timeshare)
-- Upcountry Town Center (Mixed-Use Project)

Big Island
-- Kamakana Villages (Mixed-Use Residential Development)
-- W.H. Shipman Ltd, Master Plan (Various Urban Uses)
-- Nani Kahuku Aina (Mixed-Use Resort Community
-- Kona Kai Ola (Mixed-Use Resort Community)
-- Waikoloa Highlands (Residential)
-- Waikoloa Heights (Mixed-Use Residential Development)

Kauai
-- Hanalei Plantation Resort (Resort/Residential)
-- Kukuiula (Resort/Residential)
-- Waipono/Puhi (Mixed-Use Planned Development)
-- Eleele Commercial Expansion (Commercial)
-- Village at Poipu (Resort/Residential)
-- Ocean Bay Plantation (Resort/Residential)

- Major Neighbor Island Valuation Assignments

  -- Mauna Lani Bay Hotel
  -- Courtyard Kahului Airport Hotel
  -- Maui Oceanfront Days Inn
  -- Holiday Inn Express – Kona Hotel (proposed)
  -- Keauhou Beach Hotel
  -- Courtyard King Kamehameha Kona Beach Hotel
  -- Aloha Beach Resort
  -- Coco Palms Resort
  -- Grand Hyatt Kauai
  -- Islander on the Beach
  -- Waimea Plantation Cottages
  -- Coconut Beach Resort
  -- Sheraton Maui Hotel
  -- Outrigger Wailea Resort Hotel
  -- Maui Lu Hotel
  -- Coconut Grove Condominiums
  -- Palauea Bay Holdings
  -- Wailea Ranch
  -- Maui Coast Hotel
  -- Westin Maui Hotel
  -- Maui Marriott Hotel
  -- Waihee Beach
  -- Kapalua Bay Hotel and The Shops at Kapalua

Email Address TWH@HallstromGroup.com

APPENDIX L
Preliminary Engineering Report

Established 1969

Preliminary Engineering Report

PIILANI PROMENADE

Kihei, Maui, Hawaii
TMK: (2) 2-2-02: por. 16 and por. 82
TMK: (2) 3-9-01: 16, por. 148, por. 169, 170 - 174
TMK: (2) 3-9-48: por. 122

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December 17, 2013

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Preliminary Engineering Report
for
Piilani Promenade

1. INTRODUCTION

1.1 Purpose

This report describes the existing infrastructure in the vicinity of the Piilani Promenade project and identifies the key infrastructure improvements that will be needed to implement the proposed development plan.

1.2 Project Description

The project is located in Kihei, Maui on the easterly side of Piilani Highway. It lies south of Kihei Commercial Center and north of Kulanihakoi Gulch.

1.3 Project Location

Piilani Promenade will be a mixed-use development project combining light industrial, commercial, public/quasi-public and residential components on approximately 68 acres of M-1 (light-industrial) zoned land. The current development plan proposes approximately 530,000 square feet of commercial building space, 57,000 square feet of light industrial building space, a 2.3 acre recreational park and 226 residential units within a low-rise multi-family apartment complex.

The mixed use development will be part of a larger 76 acre project area consisting of: three developable lots (TMK 3-9-01: 16, 170 and 171) with a combined area of approximately 68 acres; three roadway lots (TMK 3-9-01: 172, 173 and 174) totaling approximately 7 acres; a 1 acre water tank lot (TMK 2-2-07: 77); and portions of adjacent land parcels on which various improvements will be constructed (TMK 3-9-01: 148 and 169; TMK 2-2-02: 16 and 82; and TMK 3-9-048: 122.)

1.4 Existing Obligation to Construct Infrastructure

Piilani Promenade will be constructed on Lots 2A, 2C and 2D of the Kaonoulu Ranch Large-Lot Subdivision No. 2, which received final subdivision approval from the County of Maui in 2009 with all required subdivision improvements secured by an obligation agreement and $22 million performance bond.[1] These bonded subdivision improvements, which include extensive roadway and utility infrastructure[2], also represent most of the major infrastructure components needed to develop Piilani Promenade.

---

[1]Ref. letters dated:

- August 14, 2009 from Maui County Department of Public Works granting final subdivision approval under bond to *Kaonoulu Ranch (Large-Lot) Subdivision No. 2* (Subdivision File No. 2.2795) and *Kaonoulu Ranch Water Tank Subdivision* (Subdivision File No. 2.2995); and
- September 17, 2010 from Maui County Department of Public Works acknowledging assumption of subdivision bond obligation by Piilani Promenade LLC.

[2]The bonded improvements are described by the *Construction Plans for Kaonoulu Marketplace*, approved in 2008 by the State of Hawaii Dept. of Transportation, various County of Maui Departments and the local Public Utilities. Construction of these improvements has been authorized by permits issued between 2010 and 2012 by the approving State and County Departments.

2. DRAINAGE

2.1 Existing Conditions

2.1.1 Topography and Soils

The project area is currently undeveloped pasture land covered by brush and scattered trees. The existing terrain generally slopes steadily downward from east to west at an average slope of roughly 4%. Elevation across the project area ranges from approximately 234 feet above Mean Sea Level (MSL) at the 1.0 MG Water Tank site to approximately 30 feet MSL at Piilani Highway. An existing minor natural drainageway (Drainageway "A") runs northeast-to-southwest across the project area before converging with the main stem of Kulanihakoi Gulch below Piilani Highway.

According to the USDA's *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii,*[3] the predominant soil classification found on the project area is Waiakoa extremely stony silty clay loam (WID2) (see Figure 2-1). This soil is characterized as having medium runoff and posing a potentially severe erosion hazard if left exposed.

---

[3] United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972, p. 127, Map 107.

2.1.2 Flood and Tsunami Zone

The Federal Emergency Management Agency's Flood Insurance Rate Maps[4] for the Kihei area place Piilani Promenade within Zone X, indicating that it lies outside of the 500-year floodplain (see Figure 2-2).

2.1.3 Existing Drainage Pattern

Offsite Storm Flows

Storm runoff from approximately 471 acres of undeveloped land east (mauka) of Piilani Promenade is conveyed by Drainageway "A" to the eastern boundary of the project area (see Figure 2-3). The 100-year, 24-hour peak runoff conveyed in Drainageway "A" is 498 cfs[5] at this point. Once across the eastern boundary, Drainageway "A" continues across the project area in an east-west direction to an existing 102-inch twin barrel culvert crossing at Piilani Highway. Once across Piilani Highway, Drainageway "A" converges with the main stem of Kulanihakoi Gulch before reaching the Pacific Ocean.

---

[4] U.S. Department of Homeland Security, Federal Emergency Management Agency, *Flood Insurance Rate Map, Maui County, Hawaii*, Community-Panel Number 150003 0580E and 0586E, September 25, 2009.

[5] Offsite flow rate is documented in Appendix B, "Drainage Report for Kaonoulu Market Place," page 4.

Ohukai Subdivision, an existing residential development located to the northeast of Piilani Promenade, discharges approximately 25 cfs [6] of stormwater runoff toward the project area from a drainage outlet located on the south side of Ohukai Road. Runoff discharged from Ohukai Subdivision's drainage culvert is conveyed by Drainageway "B" southward, until it converges with Drainageway "A", described earlier.

Onsite Storm Flows

The existing, undeveloped project area generates approximately 85 cfs of surface runoff during a 50-year 1-hour storm.[7] This runoff sheet flows in a westerly direction until it is intercepted by either Kulanihakoi Gulch, Drainageway "A", existing concrete drainage ditches along Piilani Highway, or an existing 54-inch culvert[8] at Piilani Highway located near the northwest corner of the project area (see Figure 2-3) – all of which eventually drain to the main stem of Kulanihakoi Gulch before reaching the ocean.

---

[6] Offsite discharge rate from Ohukai Subdivision can be found in Appendix B, "Drainage Report for Kaonoulu Market Place," page 4.

[7] See Appendix A-1 for supporting calculations.

[8] Runoff entering the 54-inch culvert at Piilani Highway enters the Kaonoulu Estates subdivision's drainage system, which eventually discharges into Kulanihakoi Gulch.

2.2 Drainage Plan for Offsite Runoff

Offsite runoff will be allowed to pass through the project area and will not be affected by the development of Piilani Promenade. Offsite surface runoff conveyed in Drainageways "A" and "B" will be routed to a new diversion ditch constructed along the project's eastern boundary, then down along East Kaonoulu Street in a large underground drainline which will convey the runoff to the existing 102-inch culvert crossing at Piilani Highway (see Figure 2-4).

2.3 Drainage Plan for Onsite Runoff

2.3.1 Projected Increase in Runoff

Once developed, the Piilani Promenade project area is expected to produce a peak runoff volume of 292 cfs from a 50-year 1-hour storm.[9] This represents a net increase of approximately 207 cfs attributable to development of the project area. A comparative summary of pre-development and post-development surface runoff is presented in Table 2-1 below:

Table 2-1 - Increase in Runoff Attributable to Development of Piiilani Promenade

Drainage Area	Pre-Development Flow	Post-Development Flow Before Mitigation	Net Change
Onsite	85 cfs	292 cfs	+207 cfs

[9] See Appendix A-2 for supporting calculations.

2.3.2 Proposed Improvements

Collection, Disposal, and Mitigation of Peak Flow

Surface runoff generated by Piilani Promenade's buildings and pavement will be directed to drain inlets located throughout the development, then conveyed by underground drainlines to stormwater detention facilities for peak flow mitigation (see Figure 2-4). Underground detention chambers within Promenade South and an open detention pond within Promenade North with a combined storage capacity of 7.6 acre-feet will limit downstream stormwater discharges to a peak flow rates that do not exceed pre-development levels, in compliance with Maui County's Drainage Rules.[10]

Water Quality Measures

Maui County now requires the implementation of water quality control measures to reduce water pollution from stormwater runoff.[11] Both "flow through" and "detention based" treatments will be employed by Piilani Promenade to mitigate stormwater-related water pollution

---

[10] County of Maui, Department of Public Works and Waste Management, "Rules for the Design of Storm Drainage Facilities in the County of Maui," Title MC-15, Chapter 4, November 2, 1995.

[11] County of Maui, Department of Public Works, "Rules for the Design of Storm Water Treatment Best Management Practices," Title MC-15, Chapter 111, November 15, 2012.

associated with the Promenade North and South development sites.[12] "Flow through" treatment will be achieved by outfitting parking lot drain inlets with filters capable removing up to 80 percent of Total Suspended Solids.[13] "Detention based" treatment will be provided by providing additional storage volume in the subsurface detention chambers and surface detention pond to facilitate sediment removal in addition to peak flow mitigation.

2.3.3 Post-Development Runoff After Application of Mitigation Measures

The proposed stormwater detention improvements must fully mitigate the increase in peak flow attributable to development while simultaneously providing water pollution control. Table 2-2 summarizes the storage capacity within the stormwater detention system needed to achieve both these objectives.

---

[12] The East Kaonoulu Street roadway improvements, Piilani Highway roadway improvements, 1.0 MG water storage tank and other improvements associated with the Kaonoulu Ranch Large-Lot Subdivision No. 2 were approved prior to the effective date of County Ordinance 3902 which established the storm water quality requirements and so are exempt from these requirements. *Ref. Maui County Ordinance 3902:*

> *"SECTION 2. The requirements of this ordinance shall not apply to any subdivision that receives preliminary subdivision approval prior to the effective date [July 7, 2012] of this ordinance."*

[13] See Appendix A-5 for a representative example of the type of drain inlet pollution filter system which will be employed.

Table 2-2 - Drainage Detention System Capacity for Piilani Promenade

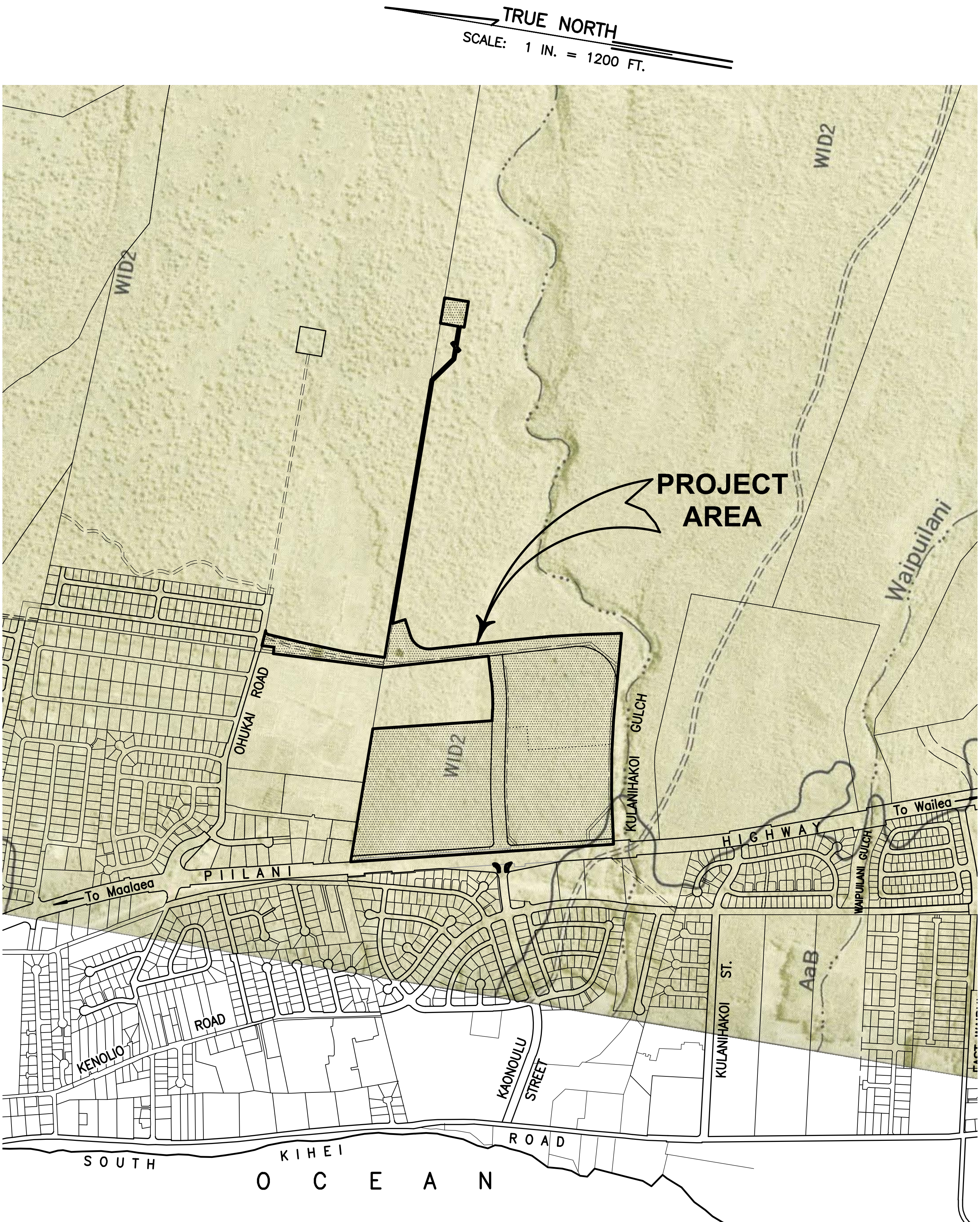
Storage Capacity Required to Meet Water Quality Criteria	Additional Storage Capacity Required to Mitigate Peak Flow	Total Storage Capacity to be Provided
2.5 ac.-ft.	5.1 ac.-ft.[14]	7.6 ac.-ft.

Once the stormwater detention facilities are in place, the hydrologic impact on downstream properties resulting from the proposed development of Piilani Promenade will be negligible, as summarized in Table 2-3.

Table 2-3 - Result of Peak Runoff Mitigation by Piilani Promenade

Drainage Area	Acreage	Pre-Development Peak Flow	Post-Development Peak Flow *Before* Mitigation	Post-Development Peak Flow *After* Mitigation	Net Change in Peak Runoff
North	30.1	31.2 cfs	107.7 cfs	9.6 cfs	-21.6 cfs
South	38.1	41.0 cfs	148.2 cfs	39.2 cfs	-1.8 cfs
Roads, Water Tank, Diversion Ditch	9.4	12.5 cfs	35.9 cfs	35.9 cfs	+23.4 cfs
Total	**77.6**	**84.7 cfs**	**291.8 cfs**	**84.7 cfs**	**0.0 cfs**

[14] See Appendices A-3 and A-4 for supporting calculations.



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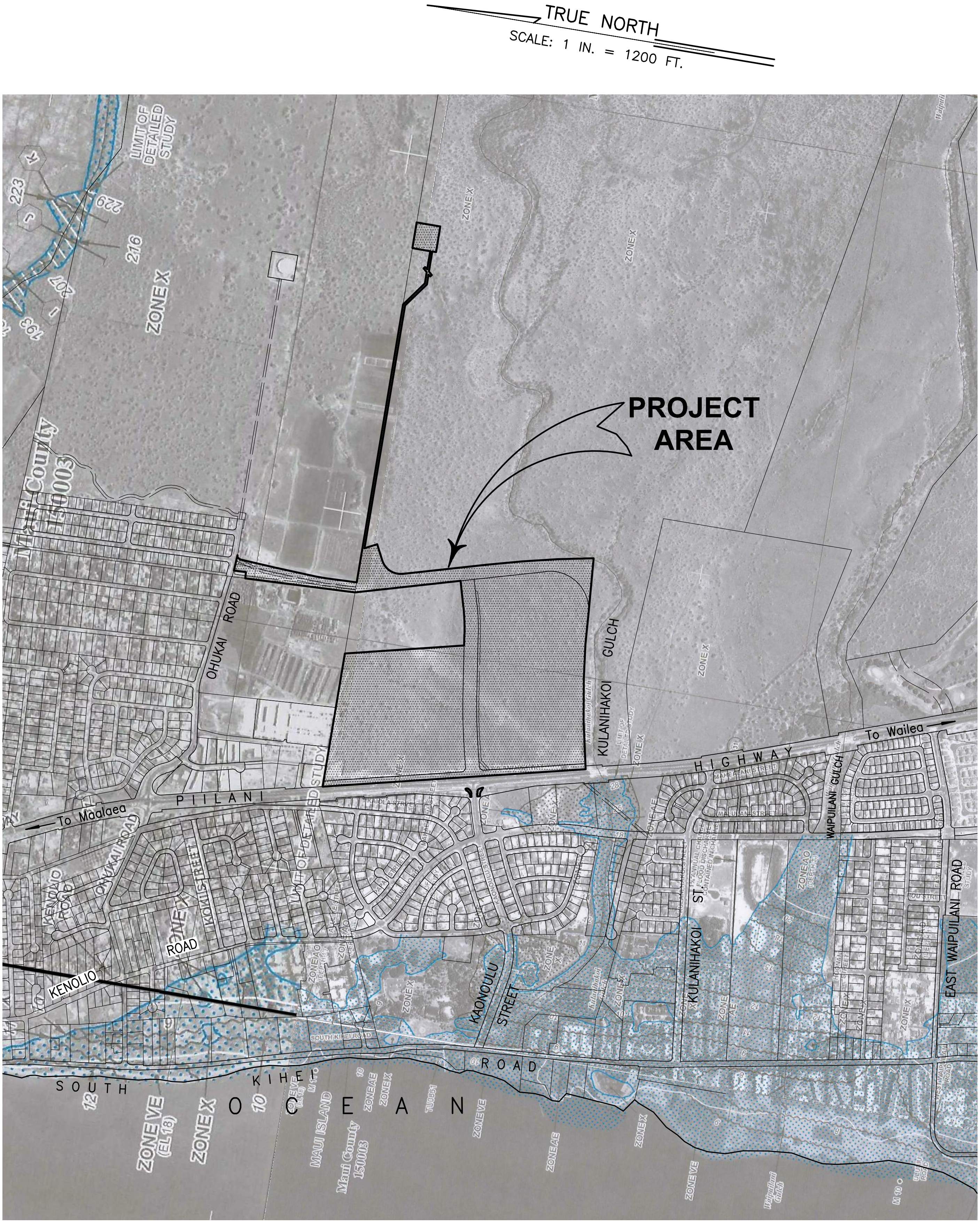
Source:
U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", 1972, Map Sheet 107.

FIGURE 2-1
Soil Survey Map



Source:
U.S. Department of Homeland Security, Federal Emergency Management Agency, "Flood Insurance Rate Map, Maui County, Hawaii", Map Numbers 1500030580E and 1500030586E
September 25, 2009.

FIGURE 2-2
Flood Insurance Rate Map

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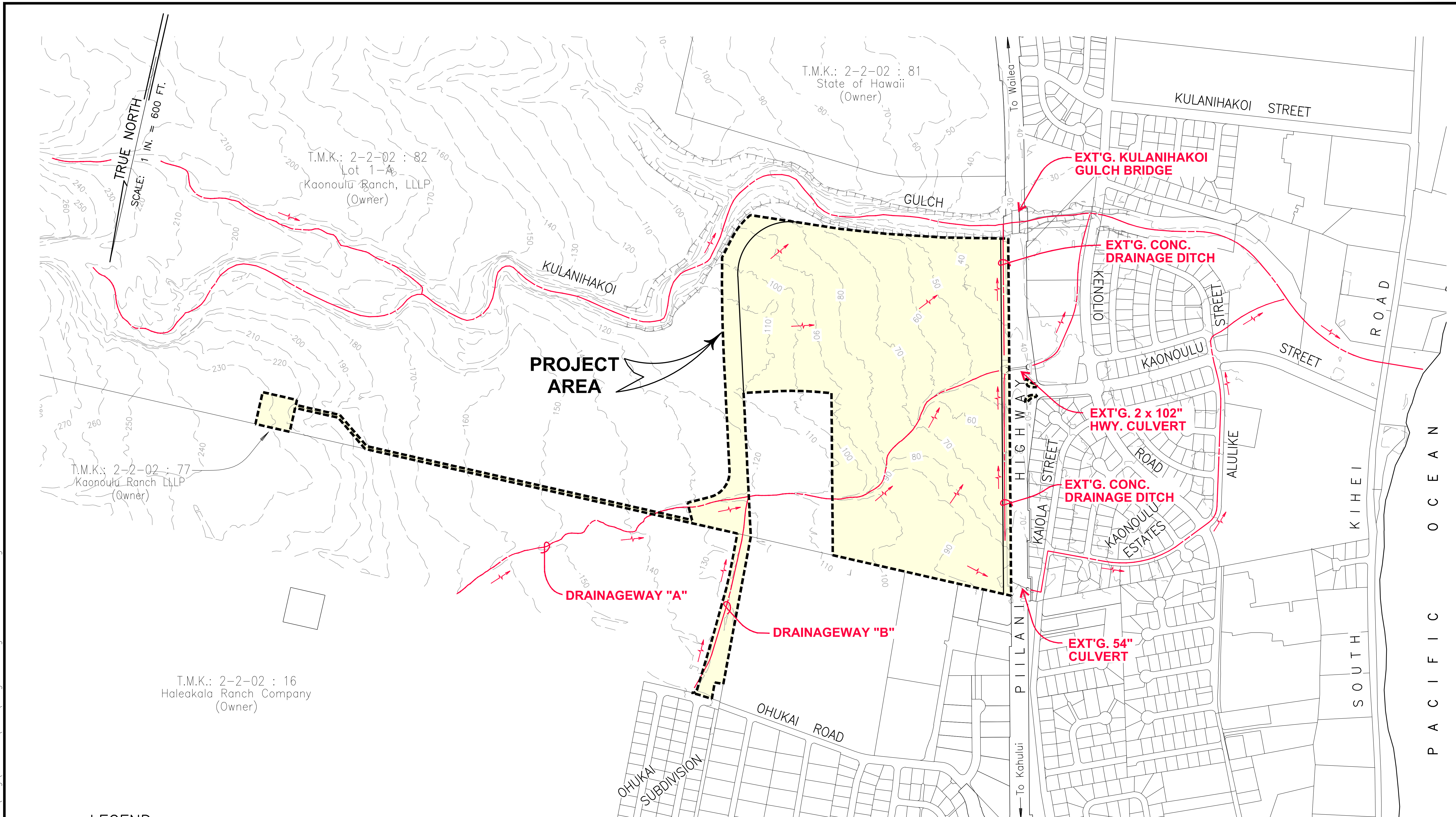

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FIGURE 2-3
Existing Drainage Pattern

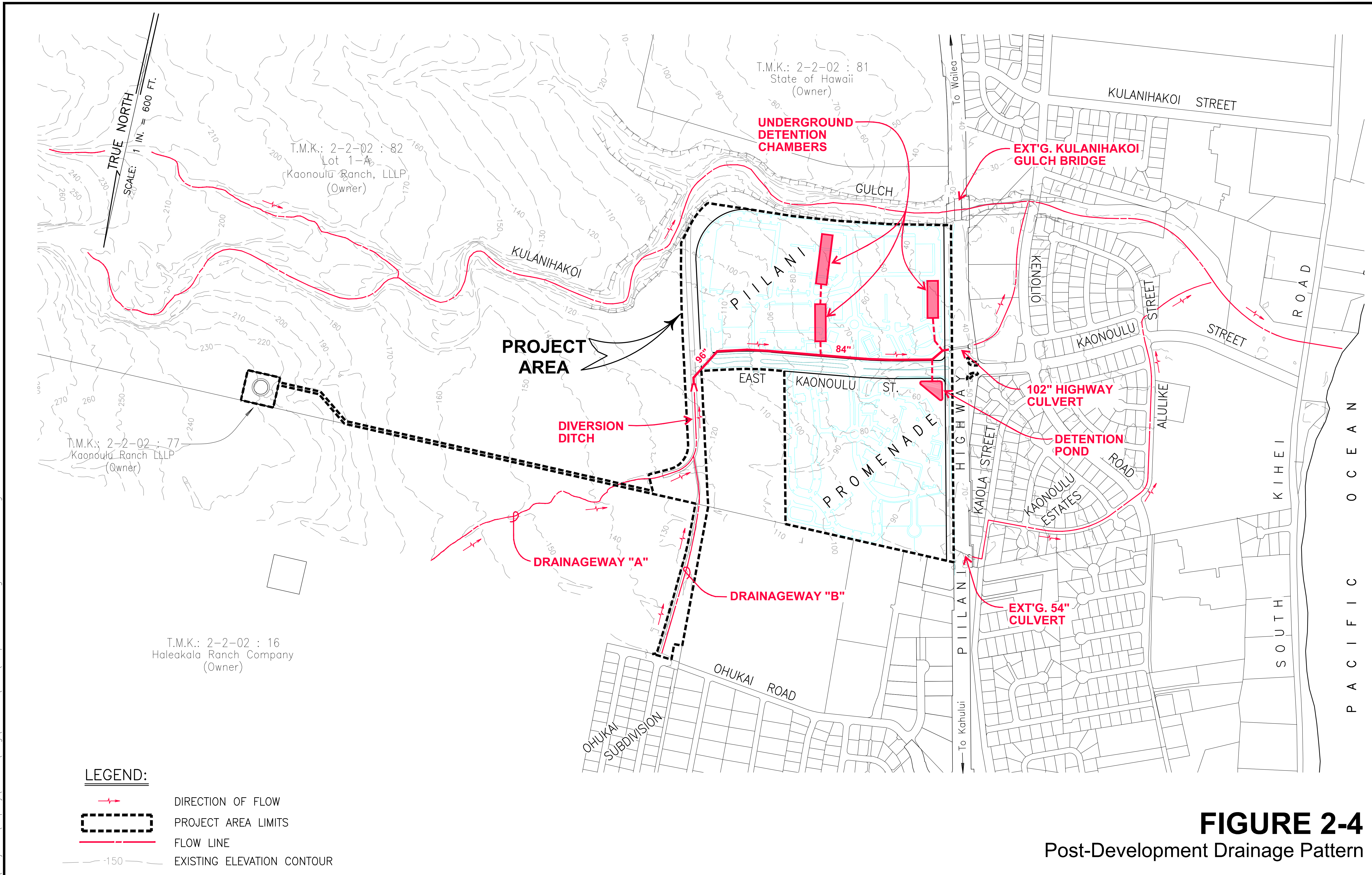

FIGURE 2-4
Post-Development Drainage Pattern

3. WATER SYSTEM

3.1 Existing Infrastructure

3.1.1 Potable Water System

The Piilani Promenade development is located within the Maui County Department of Water Supply's Central Maui service area. Potable water for the proposed development will come from existing groundwater wells located in upper Waiehu and North Waihee which draw groundwater from the Iao and Waihee Aquifers. Potable water from these wells is pumped into an existing 1.0 million gallon (MG) capacity concrete water storage tank located in upper Waiehu[15], then conveyed across the isthmus by the Central Maui Water Transmission System's 36-inch diameter transmission main to consumers in South Maui. The existing Department of Water Supply water distribution system does not currently extend into the project area.

3.1.2 Non-Potable Water System

An irrigation well permit was obtained from the State Water Resource Commission for a well which was constructed in 2011 on Lot 2B[16] of the Kaonoulu Ranch Large-Lot Subdivision No. 2 at a wellhead elevation of 118 feet. The well has been proven capable of producing 216,000 gallons of non-potable

[15]The floor elevation of the 1.0 MG Waiehu Storage Tank is approximately 490 feet MSL.

[16]Lot 2B of the Kaonoulu Ranch Large-Lot Subdivision No. 2 is TMK (2) 3-9-001: 169.

water per day and a permanent 150 gpm pump has since been installed. No distribution infrastructure has yet been constructed to utilize the water, however.

3.2 Proposed Improvements

3.2.1 Potable Water System

Piilani Promenade will be served by the water system improvements that it will construct to complete the subdivision improvement requirements for Kaonoulu Ranch Large-Lot Subdivision No. 2.[17] (See Figure 3-1) These improvements will consist of:

1) relocating a 2,500 ft. long segment of DWS' existing 36-inch diameter Central Maui Water Transmission System waterline from its present alignment, which now crosses the project area, onto a new alignment along East Kaonoulu Street;
2) constructing a new 1.0 million gallon (MG) capacity concrete water storage reservoir located at elevation 220 feet that will be dedicated to the Dept. of Water Supply upon completion;
3) installing a 3200 ft. long, 12-inch diameter transmission waterline extending from the DWS' existing 36-inch Central Maui Water

[17] Ref. Letter dated August 14, 2009 from County of Maui Department of Public Works granting final subdivision approval under bond to *Kaonoulu Ranch (Large-Lot) Subdivision No. 2* (Subdivision File No. 2.2795) and *Kaonoulu Ranch Water Tank Subdivision* (Subdivision File No. 2.2995).

Transmission line to the 1.0 MG storage reservoir that will be used to fill the new storage tank;

4) installing a 5,500 ft. long, 16-inch diameter distribution main extending from the new 1.0 MG storage reservoir to East Kaonoulu Street which will deliver potable water for domestic use and fire protection to the Piilani Promenade project site; and

5) installing a further 1,100 ft. long extension of a 12-inch diameter distribution main across Piilani Highway to a connection point at the 18-inch diameter waterline on Kenolio Road to provide water circulation and link the new water system improvements to the County water distribution system serving the Kihei area.

3.2.2 Non-Potable Water System

Permanent electrical power, a permanent pump control system and a small control tank will be installed at the existing irrigation well site on Lot 2B to complete the outfitting of this well and enable it to be used as a permanent source of irrigation water for Piilani Promenade. A 6-inch diameter water main will be installed along one shoulder of East Kaonoulu Street to deliver non-potable well water to the various irrigation systems that will be used to irrigate landscaping on East Kaonoulu Street and throughout the Piilani Promenade development. (See Figure 3-2)

A future connection point at the eastern end of the irrigation main will be provided to enable the irrigation system to utilize reclaimed water from the County's R-1 system in the future, once that system has expanded northward and reaches the Piilani Promenade development.[18]

3.3 Water Requirements

3.3.1 Water Sources

Piilani Promenade will consume an average of 252,000 gallons of water per day (gpd) at build-out, including 171,000 gpd of potable water for domestic uses and 81,000 gpd of non-potable water for irrigation.[19]

The development currently has three 3-inch Dept. of Water Supply-issued domestic water meters available, whose combined 1050 gpm flow capacity exceeds the roughly 600 gpm of flow capacity expected to be needed by Piilani Promenade to complete the build out of its proposed development plan.[20] Consequently, no additional potable water sources beyond the issued County water meters should be needed to implement the Piilani Promenade development plan.

The existing 216,000 gpd capacity irrigation well is capable of supplying both the expected 81,000 average and 121,000 maximum daily demand of non-

---

[18] Providing for a future connection to the County reclaimed water system is a condition of County zoning for this project. (Ref. Maui County Ordinance 2772, effective May 25, 1999.)

[19] Water demand calculations may be found in Appendix C-1.

[20] Water meter capacity calculations may be found in Appendix C-2.

potable irrigation water needed to complete the build out of the proposed development plan. Consequently, no additional non-potable water sources beyond the existing well are needed.

3.3.2 Fire Protection

Piilani Promenade will require a fire protection system capable of delivering a fire flow of 3,000 gallons-per-minute (gpm)[21] from a storage reservoir with at least a 360,000 gallon storage capacity[22] to meet Maui County Fire Department and Department of Water Supply requirements for fire suppression. These requirements will be met or exceeded by the construction of the 1.0 MG capacity water storage tank and 16-inch distribution main, which together will be capable of delivering the required volume of water.

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[21] See Appendix B-4 for fire flow demand calculation.

[22] Reservoir storage capacity required to support needed fire flow for two hours:
3000 gpm x 120 minutes = 360,000 gallons

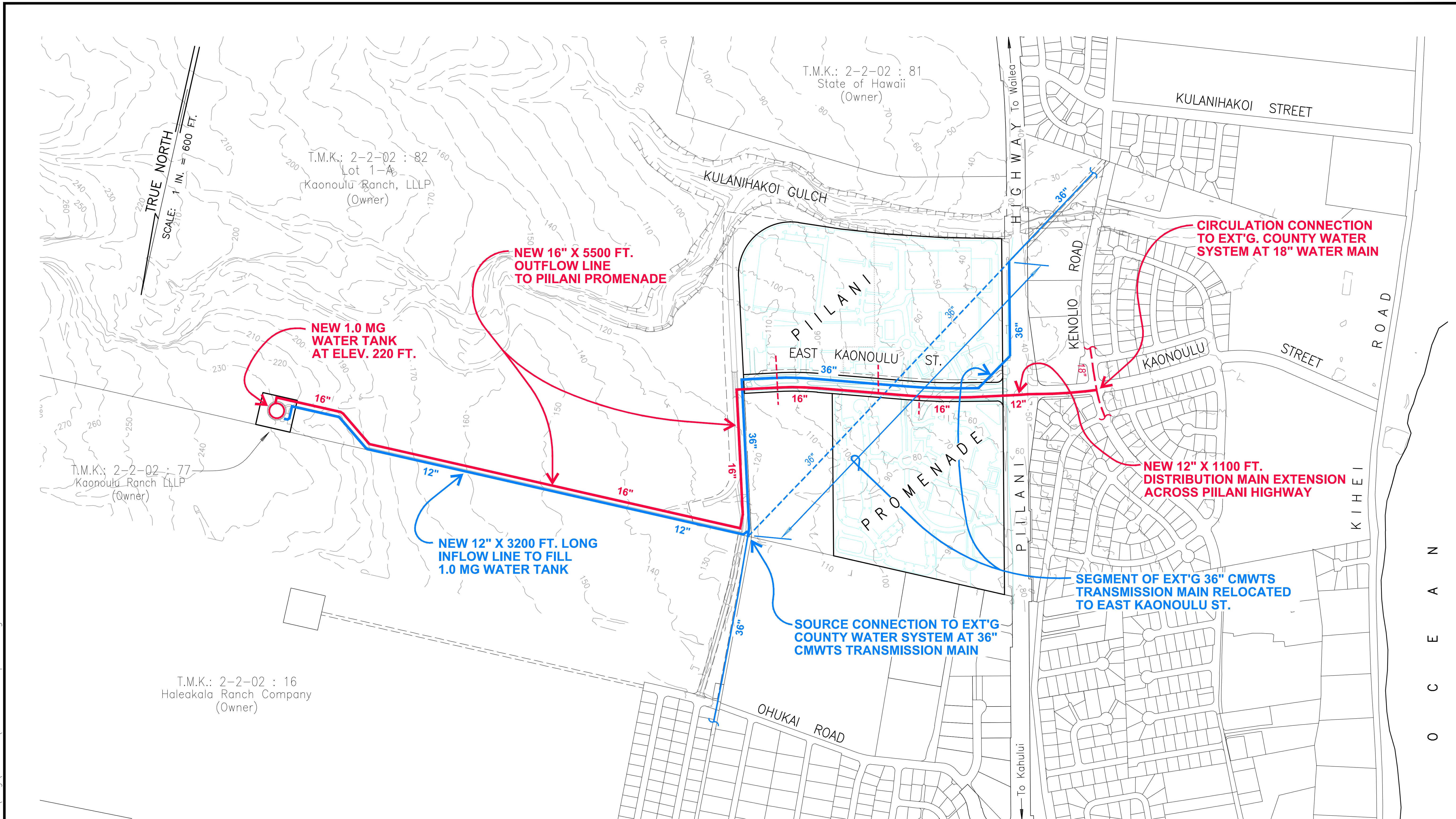

FIGURE 3-1

Potable Water System Improvements

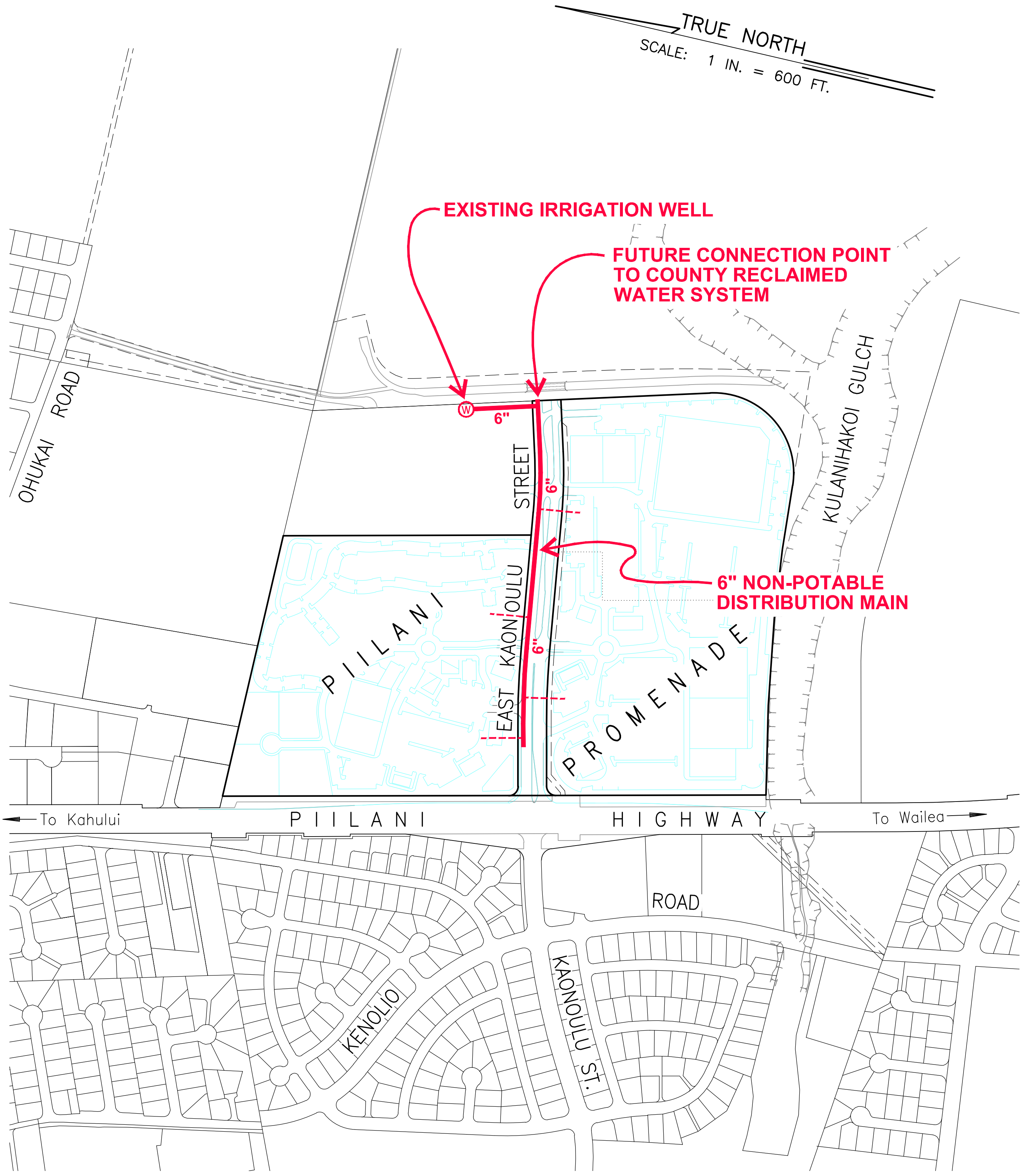

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FIGURE 3-2

Non-Potable Water System Improvements

4. WASTEWATER SYSTEM

4.1 Existing Infrastructure

The project site is currently not sewered; however, the sewerage system operated by the County of Maui is located nearby, to the west of project site across Piilani Highway. Wastewater collected by the County's Kihei sewerage sewer system is conveyed by a series of existing gravity lines, pump stations and force mains along Kihei Road which transports the collected wastewater to the County of Maui's Kihei Wastewater Reclamation Facility (KWWRF) for processing and disposal.

4.2 Sewer Improvements

Piilani Promenade is expected to generate 114,000 gallons of wastewater per day.[23] The development will connect to the existing County sewerage system at a point approximately 1,400 feet west of project site at the intersection of Kaonoulu and Alulike Streets, makai of Piilani Highway, where the County's sewer system has sufficient capacity to accept the wastewater generated by the project. A 2,600 ft. long gravity sewer mainline consisting of 8- and 10-inch diameter pipe will extend eastward along Kaonoulu Street and across Piilani Highway from this connection point to the Piilani Promenade project site. (See Figure 4-1)

---

[23]Sewer demand calculations may be found in Appendix D.

4.3 Treatment Capacity

The Maui County Dept. of Environmental Management, Wastewater Reclamation Division reports that the County's Kihei Wastewater Reclamation Facility has approximately 4.6 million-gallons-per-day (mgd) of its 8.0 mgd treatment capacity still available based on measured average daily flows.[24] Consequently, there should be ample treatment capacity available to accommodate the 114,000 gallon (0.1 mgd) daily wastewater flow expected to be generated by the Piilani Promenade project.[25]

4.4 Impact Fees

Piilani Promenade will be subject to two impact fees levied by the County of Maui to cover the cost of wastewater collection and treatment infrastructure serving the Kihei area, including:

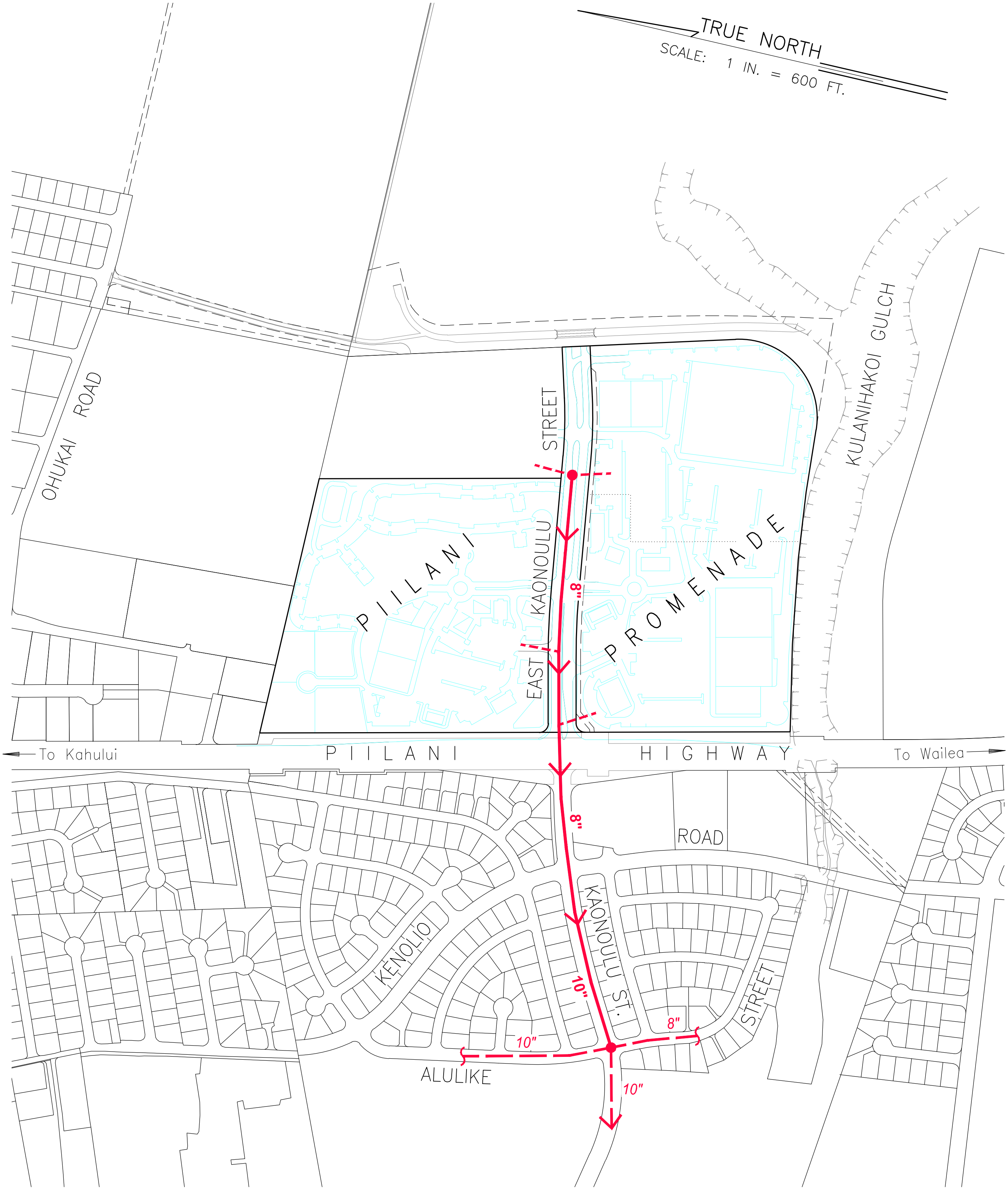
- A "Regional Wastewater Treatment System Facility Expansion Assessment Fee," for treatment plant expansion, which is assessed at $4.65 per gallon of project flow. Piilani Promenade will be assessed approximately $530,100 for the 114,000 gpd of wastewater flow which the project is expected to generate.

---

[24] Actual average daily wastewater flows into the Kihei wastewater treatment plant measured 3.4 mgd as of December 31, 2012.

[25] Under the provisions of Hawaii Administrative Rules, Title 11, Chapter 62 - Wastewater Systems, Section 23.1, the County of Maui is required to initiate a treatment facility expansion plan once actual wastewater flows reach 75 percent of current plant capacity and implement that plan once actual wastewater flows reach 90 percent of plant capacity. Given this statutory mandate that treatment capacity be programmed to keep pace with demand, treatment capacity at the KWWRF can be relied upon to accommodate regional demand over time.

- A “Kihei Regional Wastewater Treatment System - Collection/Transmission System Project Assessment Fee,” for collection system upgrades, which is assessed at $6.64 per gallon of project flow. Piilani Promenade will be assessed approximately $756,960 for the 114,000 gpd of wastewater flow which the project is expected to generate.



LEGEND:

8" NEW GRAVITY SEWERLINE

SEWER LATERAL

DIRECTION OF FLOW

EXISTING GRAVITY SEWERLINE

FIGURE 4-1

Sewer System Improvements

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5. ROADWAY IMPROVEMENTS

5.1 Existing Roadways

Piilani Highway – a four-lane highway which is owned and maintained by the Hawaii State Department of Transportation and serves as the primary north-south arterial highway linking Kihei and the other cities on the island of Maui – currently provides the only improved access to the project site. Its intersection with Kaonoulu Street planned western terminus of the Kihei-Upcountry Maui Highway, whose alignment was approved in 2002.[26]

A secondary access route to the project site in the form of a 44-foot wide access easement extending from the Ohukai Road / Hale Kai Street intersection across Haleakala Ranch lands was obtained in 2001; however, this access easement has remained unimproved to date.

5.2 Proposed Improvements

5.2.1 Vehicular Access

Piilani Promenade will signalize and substantially widen the existing intersection at Piilani Highway and Kaonoulu Street and construct a four-lane, 1,800 ft. long extension of Kaonoulu Street east of Piilani Highway. Once completed, East Kaonoulu Street will provide the primary vehicular access to and

[26]The Record of Decision for the Kihei-Upcountry Maui Highway Final Environmental Impact Statement was approved on May 21, 2002.

from the Piilani Promenade development onto Piilani Highway. Access to and from the Northern and Southern portions of Piilani Promenade development will be provided by a combination of driveways along East Kaonoulu Street that will include: (See Figure 5-1)

- one full-movement signalized driveway;
- one full-movement stop-controlled driveway;
- two right-turn-only stop-controlled driveways; and
- one stop-controlled service-vehicle driveway with a restricted left-turn - movement.

A Traffic Impact Analysis Report has been prepared which discusses the needed geometric improvements on Piilani Highway and East Kaonoulu Street in greater detail.[27]

5.2.2 Bicycle and Pedestrian Access

Bicycle and pedestrian access to Piilani Promenade will be facilitated by a number of improvements constructed with the development.

- East Kaonoulu Street will be constructed with walking and cycling paths on both shoulders to allow convenient bike and pedestrian access to Piilani Promenade. (See Figures 5-2 and 5-3) The bike paths will tie into the

[27] Phillip Rowell and Associates, *Traffic Impact Analysis Report for Piilani Promenade in Kihei, Maui, Hawaii*, November 2013.

bicycle lanes along Piilani Highway to provide connectivity with the rest of Kihei.

- The new signalized intersection at Kaonoulu Street will include crosswalks enabling pedestrians from the residential area below Piilani Highway to cross the Highway safely.
- A separate bike path running parallel to Piilani Highway will be constructed within the Piilani Promenade development.

Among the improvements will also be a gated, 20-foot wide paved bike and pedestrian way which will be constructed from Ohukai Road to East Kaonoulu Street within the 44-foot wide Access and Utility Easement obtained from Haleakala Ranch to provide a more direct link between Piilani Promenade and the residential area to the north of the development.[28] (See Figure 5-4)

[28] The paved bike and pedestrian way will also be used to enable service and maintenance vehicles to access the drainage channel and culvert improvements located on TMK 2-2-02: 82, the irrigation pump station on Lot 2B, and the new 1.0 MG water tank site. Maintenance vehicle access over the bike and pedestrian way will be limited to authorized personnel during normal daylight working hours and emergencies in order to minimize noise and traffic nuisance to the existing residences along Ohukai Road.

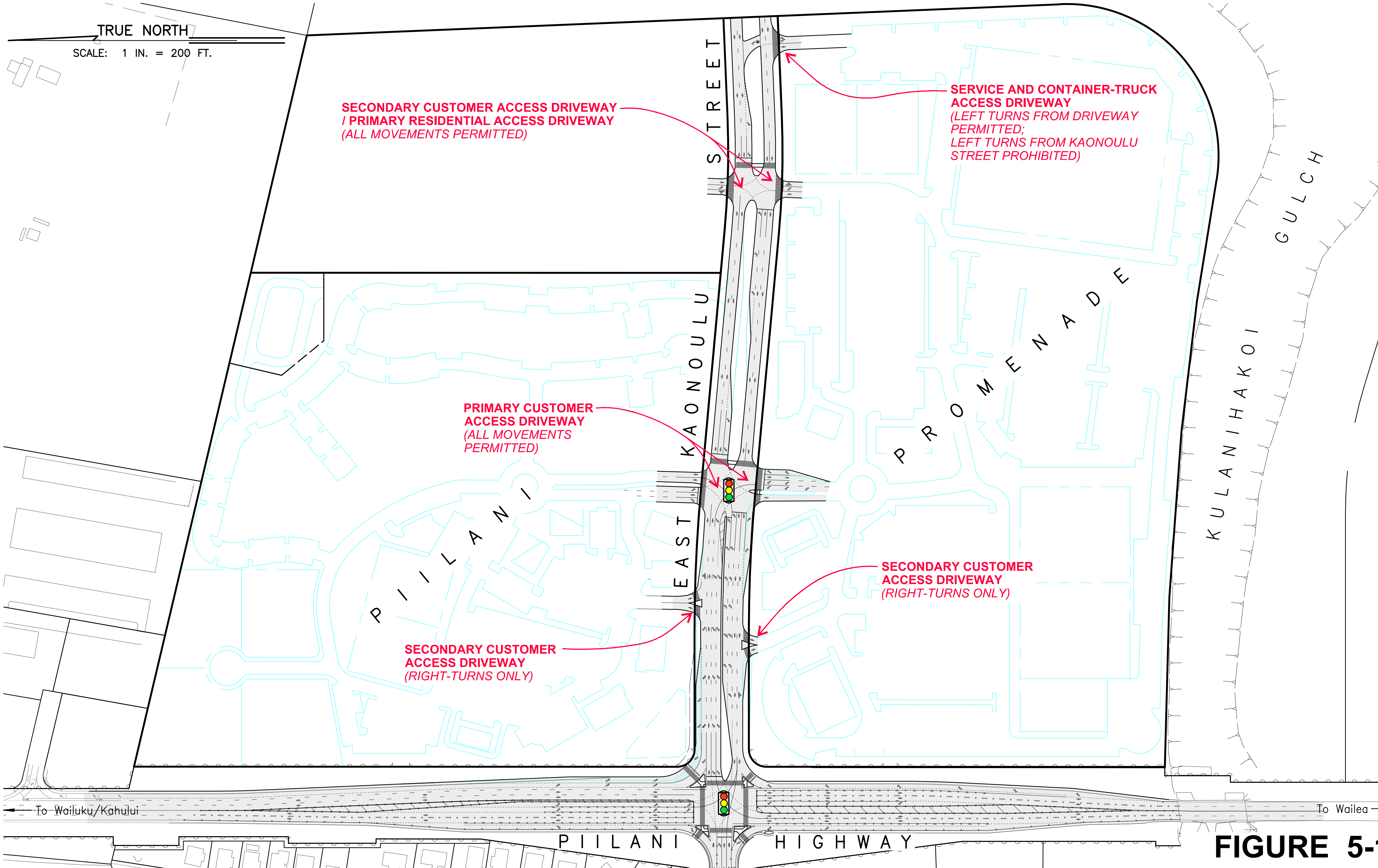

FIGURE 5-1
Vehicular Access Plan

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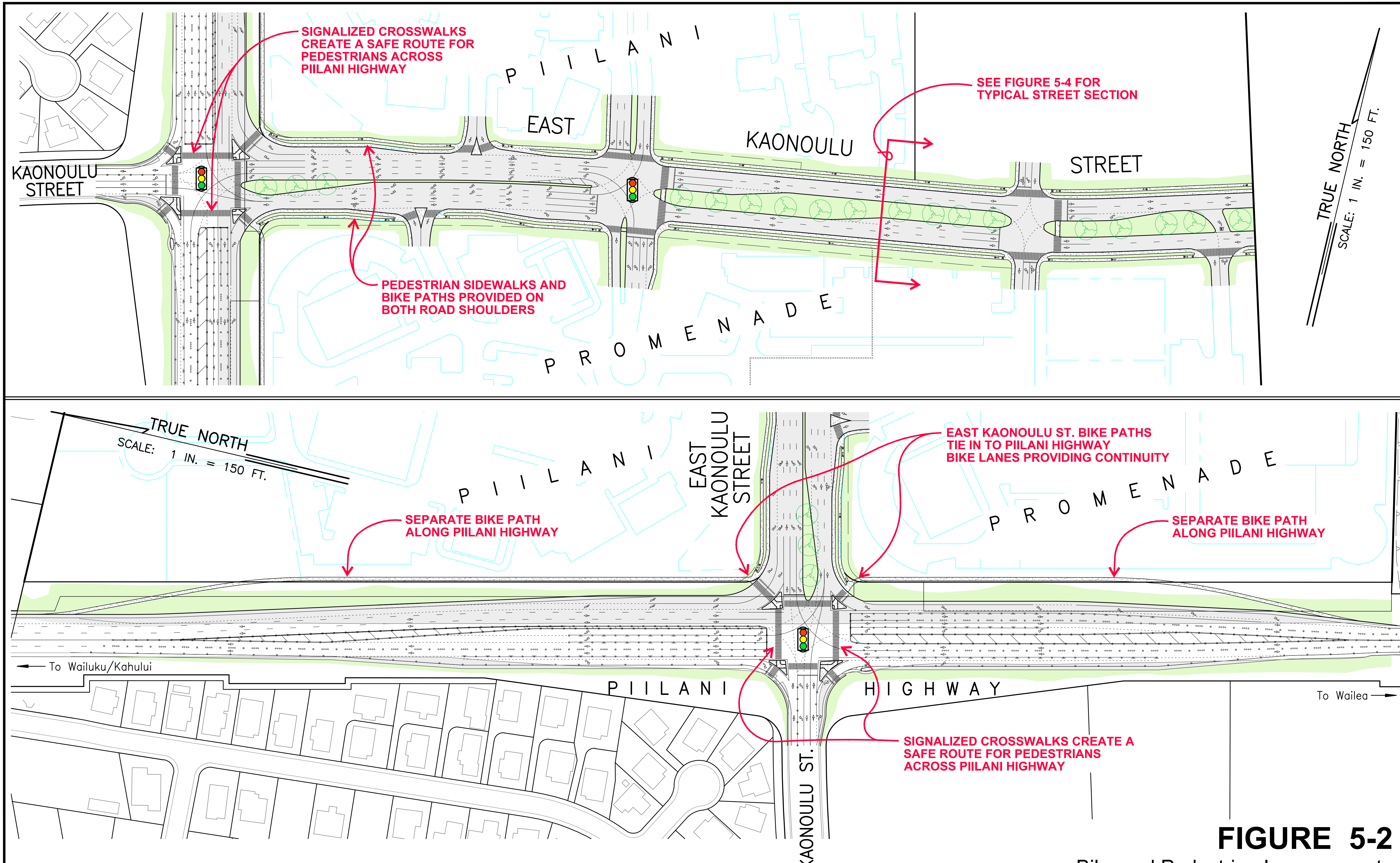

FIGURE 5-2

Bike and Pedestrian Improvements

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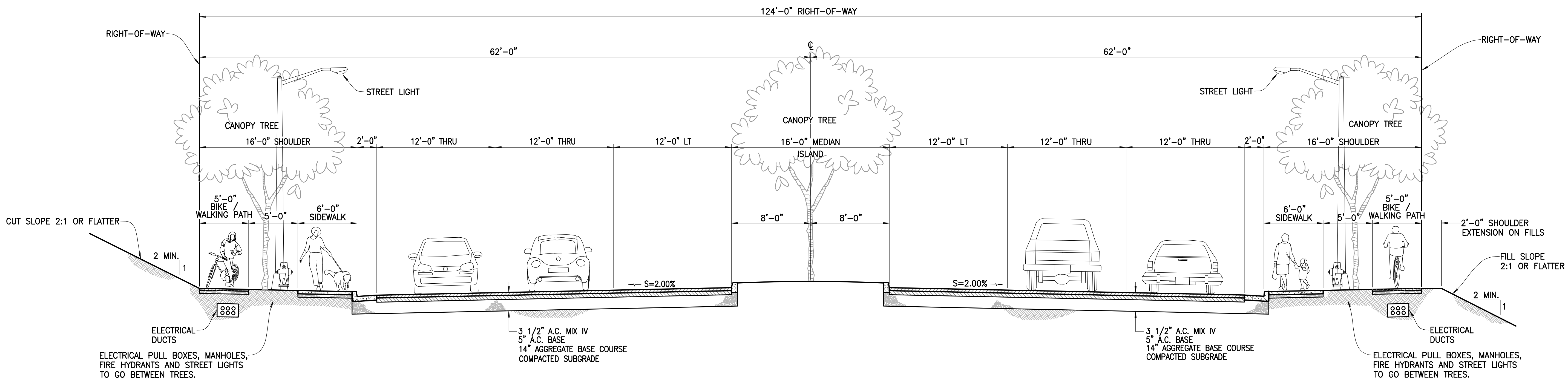

TYPICAL SECTION ALONG EAST KAONOULU STREET

SCALE: 3/32" = 1'-0"

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FIGURE 5-3

Typical Section Along East Kaonoulu Street

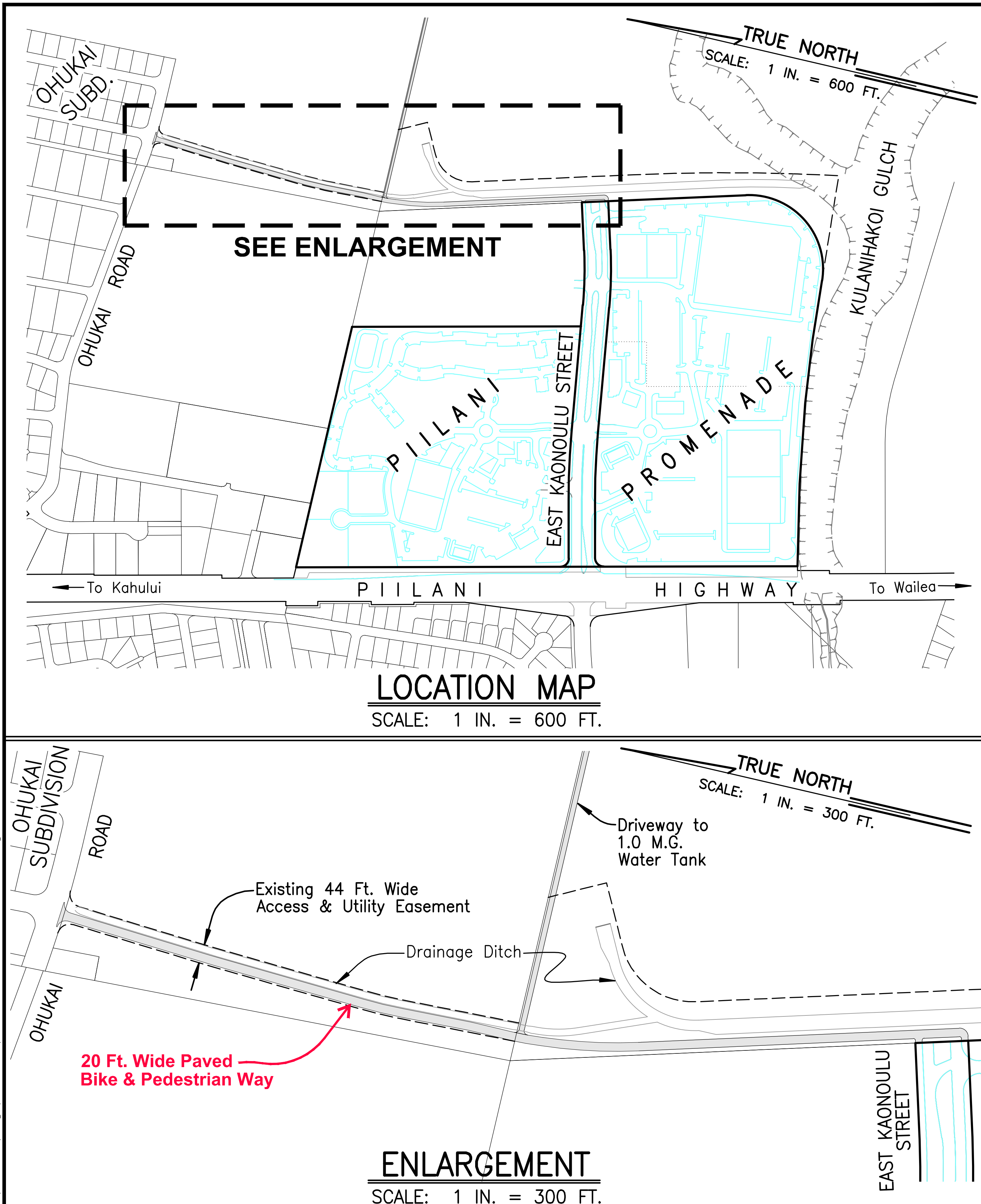

FIGURE 5-4

Bike & Pedestrian Way from Ohukai Road to East Kaonoulu Street

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6. POWER AND TELECOMMUNICATIONS[29]

6.1 Maui Electric Company Power System

There are no existing MECo power sources in the immediate vicinity of the proposed development. The closest existing MECo power source is an overhead 69 kV and 12 kV pole line running through the existing subdivision just makai of Piilani Highway. The 69 kV is part of MECo's transmission loop for the Island of Maui, and is the nearest source of large power. The 12 kV pole lines provide distribution power to existing commercial and residential developments in the area. However, MECo has advised that the existing 12 kV system does not have sufficient spare capacity to accommodate the estimated 6,250 kVA of load required by the current Piilani Promenade development plan.

Maui Electric Company is planning a new substation to provide the additional capacity needed to accommodate further growth in the north Kihei area. The new substation will be located in the northwest corner of the Piilani Promenade development, and will be fed by an overhead 69 kV line extension across Piilani Highway, which will be tapped into MECo's transmission loop pole line below the Highway. (See Figure 6-1) Public Utilities Commission (PUC) review and approval are required for MECo's new substation.

The substation will contain two (2) MECo transformers to step down the voltage from 69 kV to 12 kV for local distribution. A new 12 kV concrete-encased underground ductline and manholes will be provided to extend power from the substation, along the

---

[29]Discussion provided by ECS, Inc.

north boundary of the residential site, and to a major ductline along Kaonoulu Street extension. Stubouts for 12 kV distribution will be provided at each bulk-lot for future on-site distribution. All distribution will be underground, including wiring along East Kaonoulu Street for MECo's street lighting system.

6.2 Telephone and CATV System

Hawaiian Telcom (HT) and Oceanic Time Warner Cable (OTWC) also do not have any existing telecommunications facilities in the immediate vicinity of the proposed development. The closest source of telephone and CATV service is MECo's 69 kV pole line, which runs below Piilani Highway. It is proposed to build an underground ductline extension from the existing 69 kV pole line, across Piilani Highway, and underground along Kaonoulu Street extension. Conduit stubouts will be provided for each bulk-lot for future on-site distribution.

HT and OTWC will provide the fiber optic cables in the ductlines on an as-needed basis. No Central Offices or electronic equipment pads are anticipated. However, small cross connects and CATV node pads may be required along Kaonoulu Street. As with MECo, all distribution will be underground.

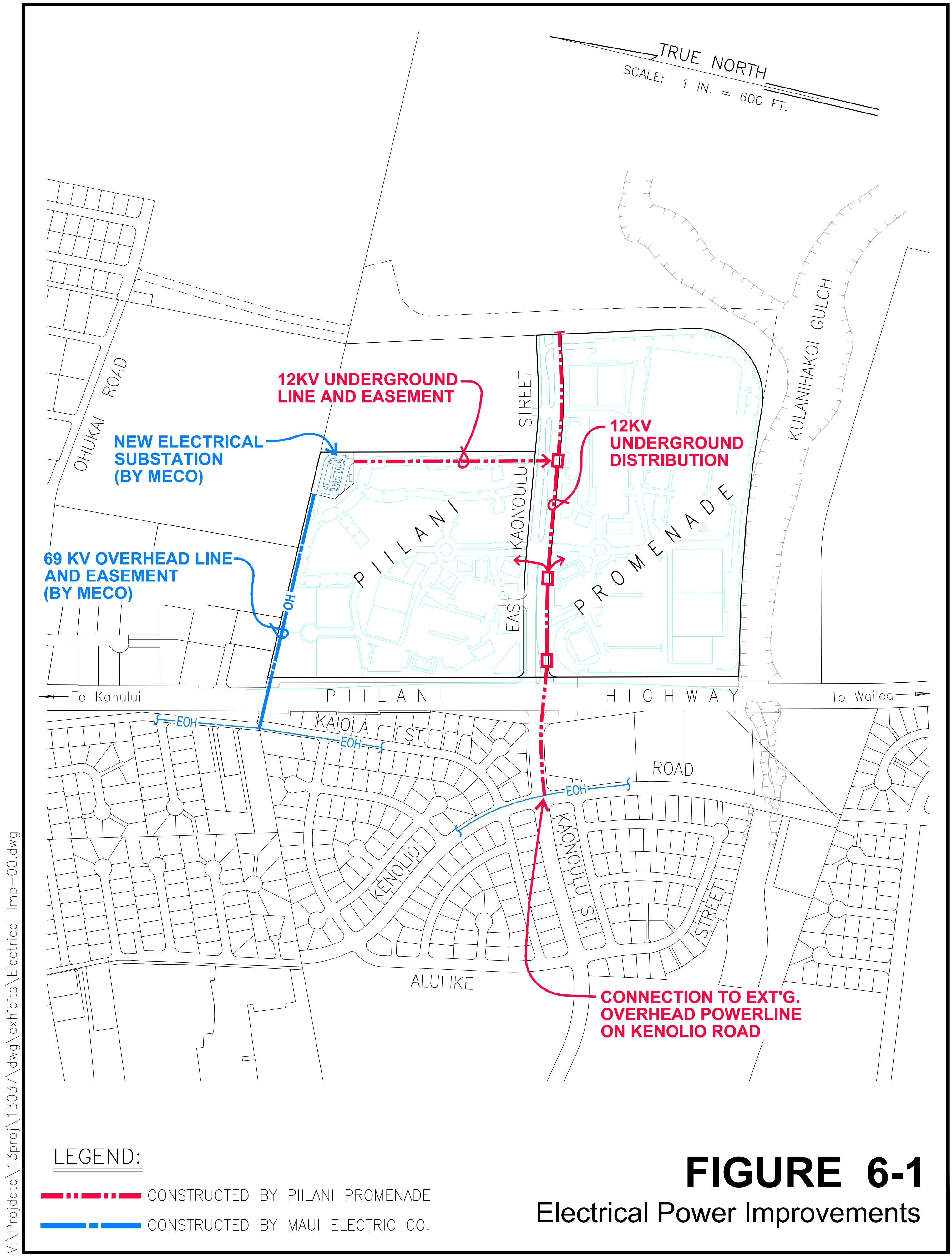


FIGURE 6-1

Electrical Power Improvements

APPENDIX A

Drainage Calculations

APPENDIX A-1

Pre-Development Onsite Surface Runoff (50-yr./1-hr.)

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Area

Description: Pre-development onsite surface runoff

Area (A): 77.59 acres

Runoff Coefficient

Infiltration:	[Medium]	→	0.07
Relief:	[Rolling]	→	0.03
Vegetal Cover:	[Good]	→	0.03
Development:	[Agricultural]	→	0.15
	Composite Runoff Coefficient:		0.28

Time of Concentration

Average Slope: 4.0 %
Time of Concentration (T_c): 19 minutes

Intensity

Project Location: Kihei, Maui, Hawaii
Design Storm: 50-year recurrence interval, 1-hour duration
Rainfall Depth: 2.3 in.
Intensity (I): 3.90 in./hr.

Flow Rate

$$Q = C \cdot I \cdot A$$
$$= 84.7 \text{ ft.}^3\text{/sec.}$$

APPENDIX A-2

Post-Development Onsite Surface Runoff (50-yr./1-hr.) Total

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Area

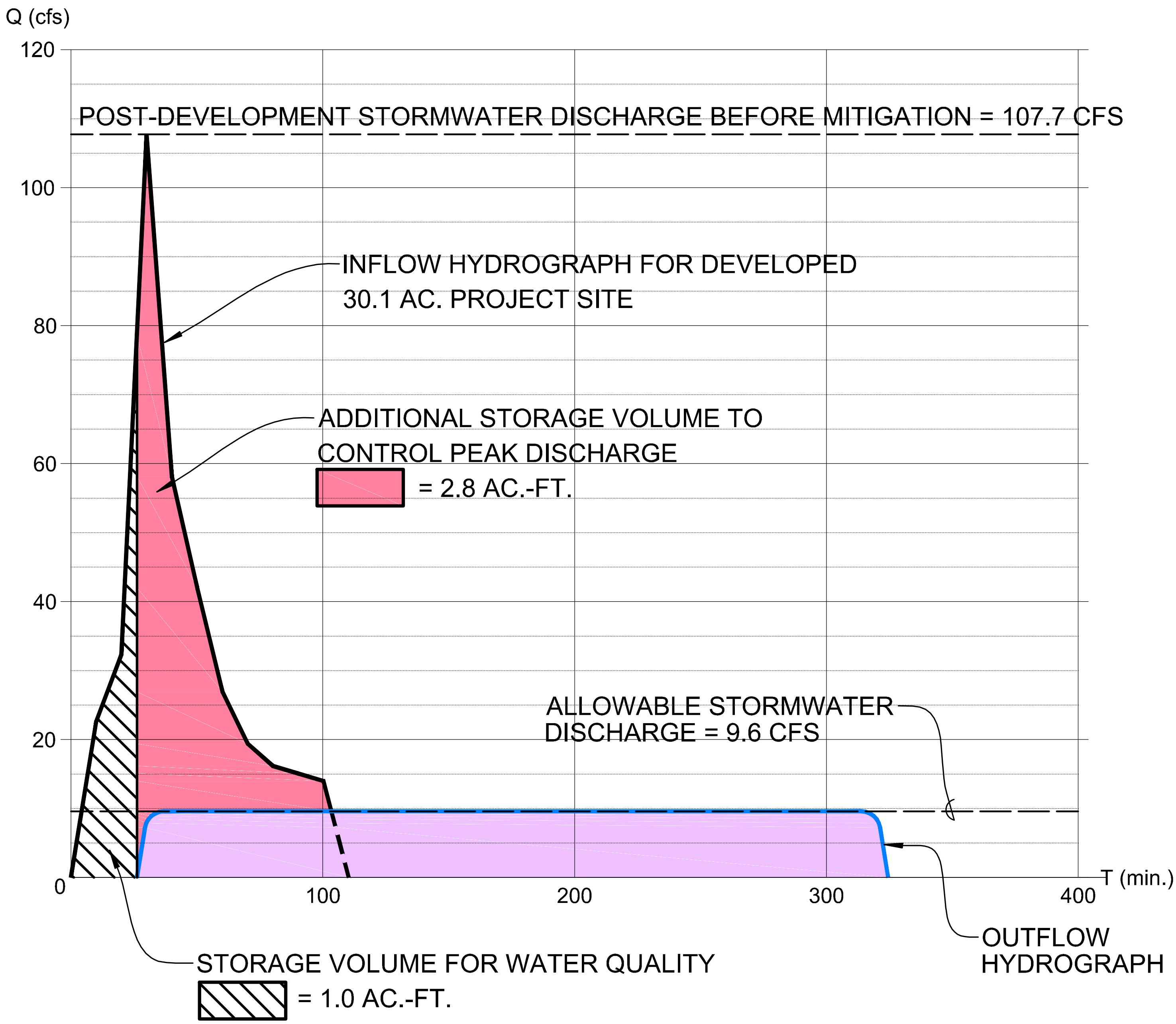
Description: Total post-development onsite surface runoff
Area: 77.59 acres
Project Location: Kihei, Maui, Hawaii
Design Storm: 50-year recurrence interval, 1-hour duration
Rainfall Depth: 2.3 in.

Flow Rate

$$Q = Q_{north} + Q_{south} + Q_{roads,\text{water tank, diversion ditch}}$$
$$= 107.7 + 148.2 + 35.9$$
$$= 291.8 \quad ft.^3/sec.$$

APPENDIX A-3

North Detention Basin Sizing Calculations



NOTE:

1. TOTAL REQUIRED STORAGE VOLUME = [hatched] + [shaded] = 3.8 AC.–FT.
2. BASED ON 50–YR., 1–HR. STORM FOR KIHEI, HI (DEPTH=2.3 IN.)

FIGURE A-3.1

Inflow & Outflow Hydrographs for Piilani Promenade (North)

APPENDIX A-3.1

Post-Development Onsite Surface Runoff (50-yr./1-hr.) North

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Area

Description: Post-development onsite surface runoff for north portion

Area (A):	30.13	acres
Light Industrial Area:	3.59	acres
Impervious Area:	16.15	acres
Gravel Area:	0.48	acres
Landscaped Area:	9.91	acres
Apartment Area:	14.25	acres
Industrial Area:	15.88	acres

Runoff Coefficient

Light Industrial Runoff Coefficient:	0.80
Impervious Runoff Coefficient:	0.95
Gravel Runoff Coefficient:	0.60
Landscape Runoff Coefficient:	0.15
Weighted Runoff Coefficient:	0.66
Minimum Runoff Coefficient for Apartment Areas:	0.70
Minimum Runoff Coefficient for Industrial Areas:	0.80
Weighted Runoff Coefficient (C):	0.75

Time of Concentration

Time of Concentration (T_c): 10 minutes

Intensity

Project Location:	Kihei, Maui, Hawaii
Design Storm:	50-year recurrence interval, 1-hour duration
Rainfall Depth:	2.3 in.
Intensity (I):	4.75 in./hr.

Flow Rate

$$Q = C \cdot I \cdot A$$
$$= 107.7 \text{ ft.}^3\text{/sec.}$$

APPENDIX A-3.2

Post-Development Onsite Surface Runoff (50-yr./1-hr.)
Roads, Water Tank and Diversion Ditch

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Area

Description: Post-development onsite surface runoff for roads, water tank, and diversion ditch

Area (A):	9.40	acres
Impervious Area:	7.69	acres
Landscaped Area:	1.71	acres

Runoff Coefficient

Impervious Runoff Coefficient:	0.95
Landscape Runoff Coefficient:	0.15
Weighted Runoff Coefficient (C):	0.80

Time of Concentration

Time of Concentration (T_c): 10 minutes

Intensity

Project Location:	Kihei, Maui, Hawaii	
Design Storm:	50-year recurrence interval, 1-hour duration	
Rainfall Depth:	2.3	in.
Intensity (I):	4.75	in./hr.

Flow Rate

$$Q = C \cdot I \cdot A$$
$$= 35.9 \quad \text{ft.}^3\text{/sec.}$$

APPENDIX A-3.3

North Detention Basin Sizing for Water Quality Protection

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Storm Water Treatment (North)

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Purpose: To determine the required volume of the above-ground basin to meet the County of Maui, Department of Public Works' "Rules for the Design of Storm Water Treatment Best Management Practices"

Calculations: The required design volume for detention based control is computed by the MCC §15-111-5.a.1.C formula:

$$WQDV = C \cdot 1'' \cdot A \cdot 3630$$

where, WQDV = water quality design volume in cubic feet
C = EPA volumetric runoff coefficient
A = gross area of the site in acres = 30.13 ac.
1" = design storm for detention based water quality system
3630 = conversion factor

The EPA volumetric runoff coefficient, C, calculated from the formula given in MCC §15-111-5.a.1.A is:

$$C = 0.05 + (0.009) \cdot (IMP)$$

where, IMP = percentage of impervious area
= (impervious area) / (gross area) · 100
= (19.50 ac.) / (30.13 ac.) · 100
= 65

Since IMP = 65, the value of C is:

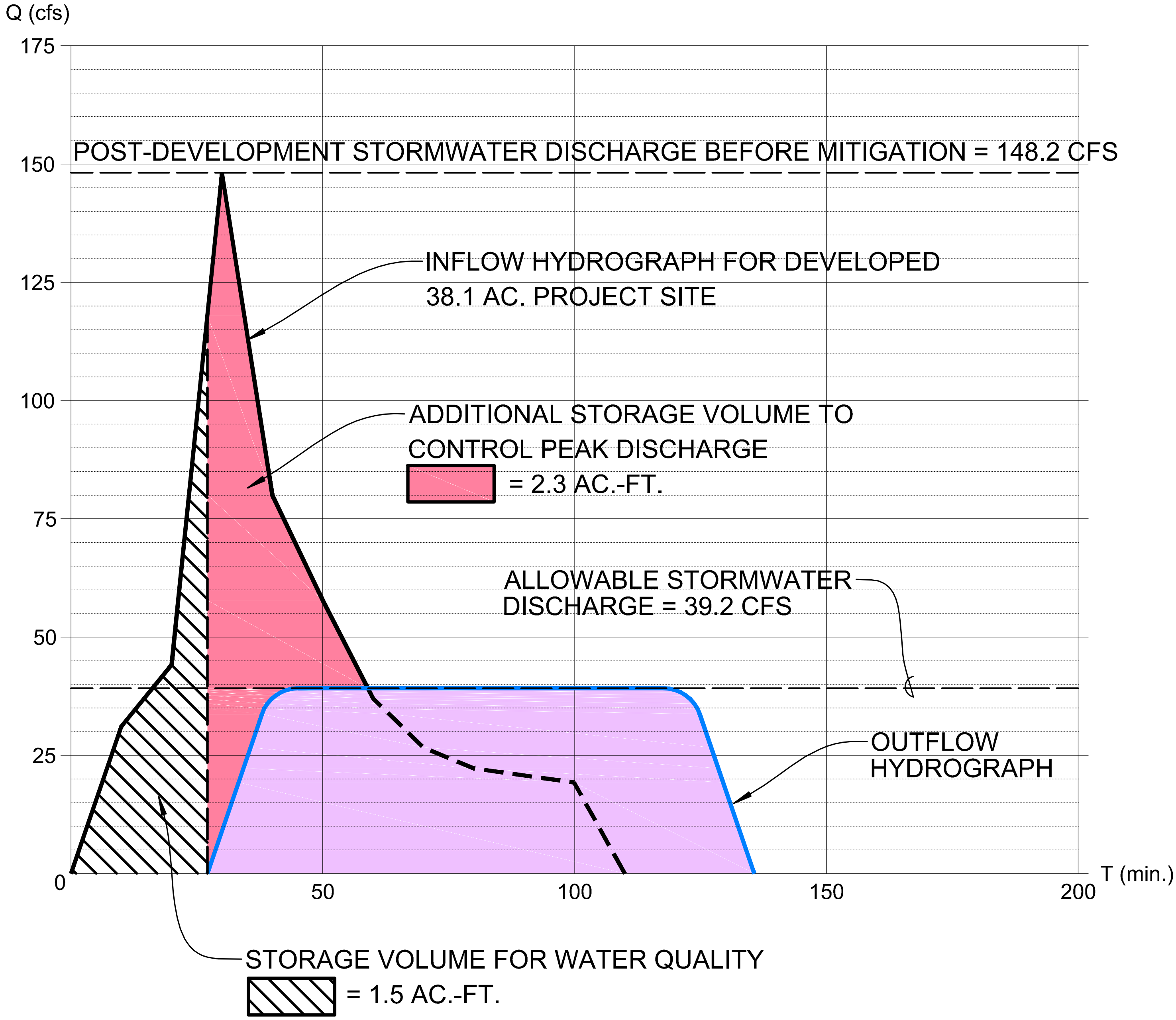
$$\begin{aligned} C &= 0.05 + (0.009) \cdot (65) \\ &= 0.64 \end{aligned}$$

For this project, upstream flow-through treatment (catch basin filter inserts) will be utilitzed in combination with detention based treatment. Thus, the design storm for the combined system may be reduced to 0.6" as allowed in MCC §15-111-5.d.

Compute the required design volume for a 0.6" storm with C = 0.64:

$$\begin{aligned} WQDV &= C \cdot 0.6'' \cdot A \cdot 3630 \\ &= 0.64 \cdot 0.6'' \cdot 30.13 \cdot 3630 \\ &= 41{,}999 \text{ ft}^3 \\ &= 1.0 \text{ ac.-ft.} \end{aligned}$$

APPENDIX A-4
South Detention Basin Sizing Calculations



NOTE:

1. TOTAL REQUIRED STORAGE VOLUME = [hatched] + [pink] = 3.8 AC.–FT.
2. BASED ON 50–YR., 1–HR. STORM FOR KIHEI, HI (DEPTH=2.3 IN.)

FIGURE A-4.1

Inflow & Outflow Hydrographs for Piilani Promenade (South)

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APPENDIX A-4.1

Post-Development Onsite Surface Runoff (50-yr./1-hr.) South

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Area

Description: Post-development onsite surface runoff for south portion

Area (A):	38.06	acres
Impervious Area:	31.86	acres
Landscaped Area:	6.20	acres

Runoff Coefficient

Impervious Runoff Coefficient:	0.95
Landscape Runoff Coefficient:	0.15
Weighted Runoff Coefficient (C):	0.82

Time of Concentration

Time of Concentration (T_c): 10 minutes

Intensity

Project Location:	Kihei, Maui, Hawaii	
Design Storm:	50-year recurrence interval, 1-hour duration	
Rainfall Depth:	2.3	in.
Intensity (I):	4.75	in./hr.

Flow Rate

$$Q = C \cdot I \cdot A$$
$$= 148.2 \quad ft.^3/sec.$$

APPENDIX A-4.2

South Detention Basin Sizing for Water Quality Protection

Warren S. Unemori Engineering, Inc.
Civil & Structural Engineers · Land Surveyors
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Storm Water Treatment (South)

Project Name: Piilani Promenade
Project No.: 13037
Engineer: Derek T. Ono
Date: 10/28/2013

Purpose: To determine the required volume of the subsurface storage chambers to meet the County of Maui, Department of Public Works' "Rules for the Design of Storm Water Treatment Best Management Practices"

Calculations: The required design volume for detention based control is computed by the MCC §15-111-5.a.1.C formula:

$$WQDV = C \cdot 1'' \cdot A \cdot 3630$$

where, WQDV = water quality design volume in cubic feet
C = EPA volumetric runoff coefficient
A = gross area of the site in acres = 38.06 ac.
1" = design storm for detention based water quality system
3630 = conversion factor

The EPA volumetric runoff coefficient, C, calculated from the formula given in MCC §15-111-5.a.1.A is:

$$C = 0.05 + (0.009) \cdot (IMP)$$

where, IMP = percentage of impervious area
= (impervious area) / (gross area) · 100
= (31.86 ac.) / (38.06 ac.) · 100
= 84

Since IMP = 84, the value of C is:

$$C = 0.05 + (0.009) \cdot (84) = 0.81$$

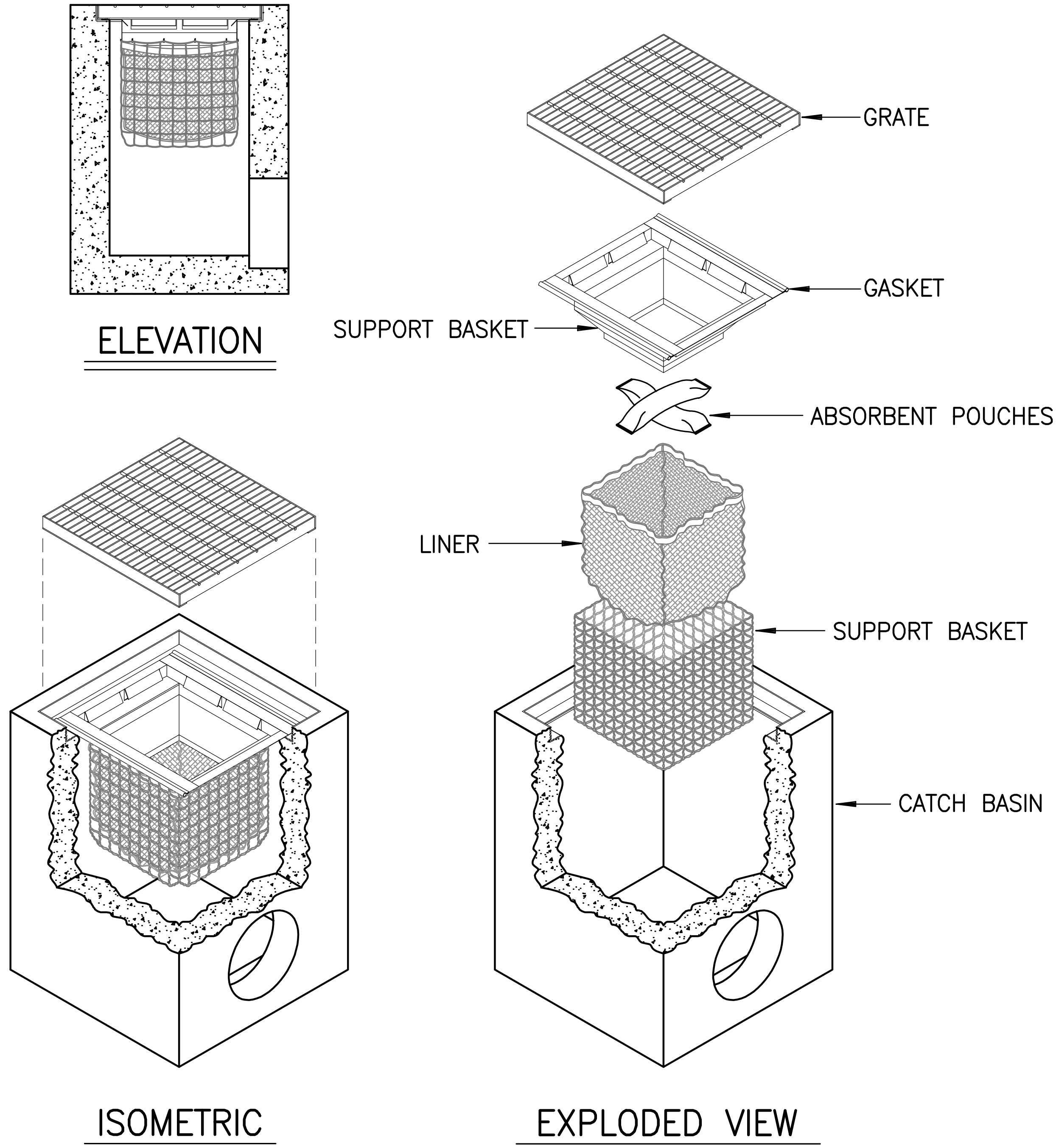
For this project, upstream flow-through treatment (catch basin filter inserts) will be utilitzed in combination with detention based treatment. Thus, the design storm for the combined system may be reduced to 0.6" as allowed in MCC §15-111-5.d.

Compute the required design volume for a 0.6" storm with C = 0.81:

$$\begin{aligned} WQDV &= C \cdot 0.6'' \cdot A \cdot 3630 \\ &= 0.81 \cdot 0.6'' \cdot 38.06 \cdot 3630 \\ &= 66{,}813\ ft^3 \\ &= 1.5\ ac.\text{-}ft. \end{aligned}$$

APPENDIX A-5

Drain Inlet Pollution Filter Details



NOTES:

1. FILTER INSERTS SHALL BE INSTALLED IN ALL CATCH BASINS.
2. FILTER INSERTS TO BE KRISTAR ENTERPRISES, INC. FLOGARD+PLUS OR SIMILAR.

FIGURE A-5.1
Typical Drain Inlet Filter

V:\Projdata\13proj\13037\dwg\exhibits\exb-catch-basin-insert.dwg

KRISTAR

FloGard® +PLUS

Catch Basin Insert Filter

FloGard®+PLUS Catch Basin Insert Filter

GENERAL FILTER CONFIGURATION

FloGard®+PLUS catch basin insert filter shall provide solids filtration through a filter screen or filter liner, and hydrocarbon capture shall be effected using a non-leaching absorbent material contained in a pouch or similar removable restraint. Hydrocarbon absorbent shall not be placed at an exposed location at the entry to the filter that would allow blinding by debris and sediment without provision for self-cleaning in operation.

Filter shall conform to the dimensions of the inlet in which it is applied, allow removal and replacement of all internal components, and allow complete inspection and cleaning in the field.

FLOW CAPACITY

Filter shall provide two internal high-flow bypass locations that in total exceed the inlet peak flow capacity. Filter shall provide filtered flow capacity in excess of the required "first flush" treatment flow. Unit shall not impede flow into or through the catch basin when properly sized and installed.

MATERIALS

Filter support frame shall be constructed of type 304 stainless steel. Filter screen, when used in place of filter liner, shall be type 304 or 316 stainless steel, with an apparent opening size of not less than 4 U.S. mesh. Filter liner, when used in place of filter screen, shall be woven polypropylene geotextile fabric liner with an apparent opening size (AOS) of not less than 40 U.S. mesh as determined by ASTM D 4751. Filter liner shall include a support basket of polypropylene geogrid with stainless steel cable reinforcement.

Filter frame shall be rated at a minimum 25-year service life. All other materials, with the exception of the hydrocarbon absorbent, shall have a rated service life in excess of 2 years.

FloGard®+PLUS TEST RESULTS SUMMARY

Testing Agency	% TSS Removal	% Oil and Grease Removal	% PAH Removal
UCLA	80	70 to 80	
U of Auckland Tonking & Taylor Ltd. (for city of Auckland)	78 to 95		
U of Hawaii (for city of Honolulu)	80		20 to 40

FEATURES

- Easy to install, inspect and maintain
- Can be retrofitted to existing drain catch basins – or used in new projects
- Economical and efficient
- Catches pollutants where they are easiest to catch (at the inlet)
- No standing water – minimizes vector, bacteria and odor problems
- Can be incorporated as part of a "Treatment Train"

BENEFITS

- Lower installation, inspection and maintenance costs
- Versatile installation applications
- Higher return on investment
- Allows for installation on small and confined sites
- Minimizes vector, bacteria and odor problems
- Allows user to target specific pollutants

FloGard® +PLUS

Catch Basin Insert Filter

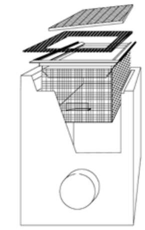
KRISTAR

INSTALLATION AND MAINTENANCE

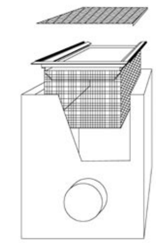
Filter shall be installed and maintained in accordance with manufacturer's general instructions and recommendations.

PERFORMANCE

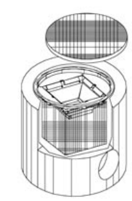
Filter shall provide 80% removal of total suspended solids (TSS) from treated flow with a particle size distribution consistent with typical urban street deposited sediments. Filter shall capture at least 70% of oil and grease and 40% of total phosphorus (TP) associated with organic debris from treated flow. Unit shall provide for isolation of trapped pollutants, including debris, sediments, and floatable trash and hydrocarbons, from bypass flow such that re-suspension and loss of pollutants is minimized during peak flow events.



FloGard+PLUS Combination Inlet



FloGard+PLUS Flat Grate



FloGard+PLUS Round Gated Inlet

FloGard®+PLUS COMPETITIVE FEATURE COMPARISON

Evaluation of FloGard+PLUS Units (Based on flow-comparable units) (Scale 1-10, 10 being best)	**FloGard+PLUS**	**Other Insert Filter Types****
Flow Rate	10	7
Removal Efficiency*	80%	45%
Capacity – Sludge and Oil	7	7
Service Life	10	3
Installation – Ease of Handling / Installation	8	6
Ease of Inspections & Maintenance	7	7
Value	**10**	**2**

*approximate, based on field sediment removal testing in urban street application **average

Long-Term Cost Comparison (Scale 1-10, 10 being lowest cost, higher number being best)	**FloGard+PLUS**	**Other Insert Filter Types**
Unit cost — initial ($/cfs treated)	10	4
Installation cost ($/cfs treated)	10	7
Adsorbent replacement (annual avg $/cfs treated)	10	2
Unit materials replacement (annual avg $/cfs treated)	10	10
Maintenance cost (annual avg $/cfs treated)	10	7
Total first yr ($/cfs treated)	10	5
Total Annual Avg ($/cfs treated, avg over 20 yrs)*	**10**	**5**

*assumes 3% annual inflation

Captured debris from FloGard+PLUS, Dana Point, CA

KriStar Enterprises, Inc.
360 Sutton Place
Santa Rosa, CA 95407

PH: 800-579-8819
FAX: 707-524-8186
www.kristar.com

FGP-T 05.19.09.1M

APPENDIX B

Drainage Report for Kaonoulu Market Place
(Approved by State of Hawaii Dept. of Transportation
and Maui County Dept. of Public Works in 2009)

Established 1969

Drainage Report

Kaonoulu Market Place

Kihei, Maui, Hawaii

TMK: (2) 2-2-02:Por. of 15
and (2) 3-9-01:16

Prepared For:

Maui Industrial Partners LLC
Kihei, Maui, Hawaii

WARREN S. UNEMORI LICENSED PROFESSIONAL ENGINEER NO. 1569-C HAWAII, U.S.A.

WARREN S. UNEMORI ENGINEERING, INC.
Civil and Structural Engineers - Land Surveyors
Wells Street Professional Center - Suite 403
2145 Wells Street
Wailuku, Maui, Hawaii 96793

Date: October 2008

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B. Project Description 1

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B. Drainage 2-3
C. Flood and Tsunami Zone 3

IV. DRAINAGE PLAN

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C. Conclusion 8

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2 Site Specific Soil Classification Map
3 Flood Insurance Rate Map
4A Individual Onsite Drainage Area Map
4B Offsite Drainage Area Map
5 Storm Sewer Schematic
6 Drainage Flow Path to Kulanihakoi Gulch
7 Existing vs. Post Diversion Inundation Limits

APPENDICES

A Hydrologic Calculations
B Hydraulic (Backwater) Calculations

Drainage Report
for
Kaonoulu Market Place

I. INTRODUCTION

This report has been prepared to examine the existing site drainage conditions and the proposed drainage plan for the subject development.

II. PROPOSED PROJECT

A. Site Location:

The project site is located in Kihei, on the island of Maui, in the State of Hawaii. The project encompasses Lot 2 of the Kaonoulu Ranch (Large-Lot) Subdivision. It is situated on the easterly side of Piilani Highway, south of Piilani Business Park, and north of Kulanihakoi Gulch. (see Exhibit 1).

The project site encompasses an area of approximately 88.0 acres.

B. Project Description:

The proposed plan for the Kaonoulu Market Place is to develop the project site into a commercial center consisting of 4 light industrial lots numbered 1 through 4 (see Exhibit 4A). Proposed improvements include asphalt paved roadways, concrete curb and gutter, concrete sidewalks and landscaping. Utility improvements will consist of underground sewer, drainage, water, electrical and telephone distribution systems.

III. EXISTING CONDITIONS:

A. Topography and Soil Conditions:

The project site is presently vacant and not being used for any particular purpose. Natural vegetation includes, but is not limited to, buffelgrass, feather finegrass, ilima, kiawe, uhaloa, and zinnia. The project site generally slopes from an elevation of approx. (+) 124± feet M.S.L. to approx. (+) 31± feet M.S.L. in a northeasterly to southwesterly direction, with an average slope of approx. 4.1%.

According to the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* [1], prepared by the United States Department of Agriculture, Soil Conservation Service, the predominant soil classification found on the project site is the Waiakoa extremely stony silty clay loam, 3 to 25 percent slopes, eroded (WID2). The Waiakoa soil is characterized as having medium runoff and a severe erosion hazard. (See Exhibit 2).

B. Drainage:

According to our calculations, the project site lots 1-4 presently generate approximately 31.22, 15.44, 20.22, and 20.79 cfs of onsite surface runoff during a 50-year recurrence interval, 1-hr. duration storm, respectively (see Appendix A). This surface runoff volume presently sheet flows across the project in an easterly to westerly direction, where it either flows directly into Kulanihakoi Gulch or is intercepted by existing drainageways, and eventually discharges into Kulanihakoi Gulch downstream. Kulanihakoi Gulch runs along the southern boundary of the project site.

Offsite surface runoff from the area located immediately mauka of the subject development was estimated to be 498 cfs for a 100 year-24 hour storm and 911 cfs for a 100 year-6 hour storm. (see Appendix A). This runoff presently flows through the project site by means of an existing natural drainageway. According to the "Hydrology Report for Piilani Highway" prepared by Trans-Meridian Engineers and Surveyors, Inc., the drainageway discharges the entire pre-development onsite and offsite design flow of approximately 1,136 cfs for a 100 year-6 hour storm across existing twin 102 inch culverts under Piilani Highway and into an existing gully that ties into Kulanihakoi Gulch approximately 1,000 feet downstream of the makai boundary of the project site.

C. Flood and Tsunami Zone:

According to Panel Number 150003 0265C dated September 6, 1989 of the Flood Insurance Rate Map[2], prepared by the United States Federal Emergency Management Agency, the project site is situated within Zone C. Zone C is designated as an area which is subject to minimal flooding. (See Exhibit 3)

IV. DRAINAGE PLAN

A. General:

The drainage criteria that will be used for the proposed development will be to try and maintain the natural drainage pattern of the onsite surface runoff.

The onsite surface runoff generated by the proposed development of the Kaonoulu Street Extension will be intercepted by new curb inlet type catch basins and conveyed by means of a new underground drainage system located within the subdivision roadway. In the fully built-out industrial condition, the individual commercial lots 1-4 will each retain their own additional post-development runoff and discharge their pre-development flow into stubouts placed at the downstream end of each industrial lot which will tie into the underground drainage system. In the interim, prior to complete industrial development of the 4 lots, a berm will be installed along the western boundary of Lots 1 & 4 to keep the onsite runoff within the property and off the Piilani Highway. The minimal grading being done on the individual lots will not result in any increase in the post development runoff. Lots 3 & 4 will continue to flow to the gulch as it is presently doing and Lots 1 & 2 will tie into the new drainage system.

The offsite surface runoff presently sheet flowing onto the project site will be intercepted by a new drainage diversion ditch that runs along the eastern boundary of the property up to the northern edge of the proposed Kihei Upcountry Highway ROW. The diversion ditch is sized to accommodate both the entire 498 cfs of offsite runoff generated from the 100yr - 24 hr storm flowing into the project site and the 25 cfs of runoff conveyed by the new grassed ditch that runs along the access road from Ohukai Road. (see Appendix A & C). The runoff generated by the existing Ohukai Subdivision is presently conveyed by a grassed swale and discharged into an existing gully that runs through Kaonoulu Market Place. Since this existing gully will be intercepted by the new diversion ditch, a new grassed ditch is to be installed along the access road to route the 25 cfs of existing runoff from the Ohukai Subdivision and to intercept the additional runoff generated by the paved access road. The new grassed ditch is not sized to accommodate the runoff from the mauka ranch. It will convey the 25 cfs to the diversion ditch and allow any additional runoff from the mauka areas to continue to sheet flow onto the downstream properties as it is presently doing. The offsite runoff and the runoff from the access road grassed ditch will be conveyed through the open channel diversion ditch and piped underground to tie into the new underground drainage system and eventually discharge into the existing Kulanihakoi Gulch as it is presently doing. Offsite runoff in excess of this capacity will be intercepted and conveyed to Kulanihakoi Gulch via an overflow ditch that runs along the easterly boundary of the project site.

The combined 523 cfs of offsite surface runoff and runoff from the access road grassed ditch will be added to the 106 cfs generated by the 4 industrial lots and the Kaonoulu Street Extension for a total of 629 cfs. Therefore, one of the existing twin 102 inch culverts presently routing the runoff across the Piilani Highway will be sealed off and the other 102 inch pipe will tie into the new project development drainage system. This existing drainline has adequate capacity to route the 629 cfs of surface runoff within the new drainage system underneath the Highway and into the Kulanihakoi Gulch via an existing gully that runs through several of the downstream properties (see Exhibit 6).

Based on a Flood Inundation Limits Analysis, it was determined that the maximum discharge capacity of the existing gully located makai of Piilani Highway is approximately 640 cfs. The existing twin 8.0' x 6.5' box culverts immediately downstream of the existing gully was similarly analyzed to have a capacity of 800 cfs. Therefore, the discharge capacities of both the existing gully and the twin box culverts are higher than the anticipated discharge from the new subdivision drainage system of 629 cfs.

The existing runoff from the existing drop intake catch basin located at the southwestern corner of Piilani Business Park will be piped underground along its original alignment and continue to the existing outlet located mauka of the Kulanihakoi Bridge as it is presently doing. (see Exhibit 5). Surface runoff generated on the eastern shoulder of Piilani Highway will be intercepted by new concrete swales and directed to grated inlet catch basins that tie into this new underground drainage system.

B. Hydrologic Calculations:

The onsite hydrologic calculations are based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui", Title MC-15, Chapter 4 and the "Rainfall Frequency Atlas of the Hawaiian Islands", Technical Paper No. 43, U. S. Department of Commerce, Weather Bureau.

Rational Formula used:

$$Q = CIA$$

Where
Q = Rate of Flow (cfs)
C = Runoff Coefficient
I = Rainfall Intensity (inches/hour)
A = Area (Acres)

Rational Method calculations are based on a 50 yr-1 hr storm duration interval. Hydrologic calculations for drainage areas greater than 100 acres are based on procedures developed by the U.S. Department of Agriculture, Soil Conservation Service (SCS). This procedure is described in detail in the SCS National Engineering Handbook, Section 4, Hydrology (NEH-4). Hydrologic calculations were computed by utilizing the "SCS Unit Hydrograph Method " in the PONDPACK computer program, by Haestad Methods, which is based on the procedures outlined in NEH-4. The hydrologic calculations for this project may be found in Appendix A.

C. Conclusion:

In the fully built-out condition, the industrial lots 1-4 will each retain their own additional post-development runoff but discharge of their pre-development runoff into stubouts located at the low end of each lot which will tie into the new underground drainage system. The onsite surface runoff generated by the proposed roadway, Kaonoulu Street Extension, will be intercepted by new curb inlet type catch basins which will be installed as part of the project improvements. The offsite runoff presently flowing onto the project site along with the runoff conveyed by the proposed access road grassed ditch will be intercepted by a new drainage diversion ditch that runs along the eastern boundary of the property until it hits the future Kihei Upcountry Highway ROW where it is piped underground and ties into the new underground drainage system. The new underground drainage system will then convey the intercepted surface runoff underneath Piilani Highway and safely discharge it into the Kulanihakoi Gulch via an existing gully that runs through several of the downstream properties. A Flood Inundation Limits Analysis demonstrated that there will be adequate capacity within the existing downstream gully and twin box culverts to route the runoff from the project drainage system. Therefore, it is our professional opinion that the proposed development will not have any adverse effect on drainage conditions in the area.

Report Prepared By:

Darren K. Okimoto

Darren K. Okimoto

Report Checked By:

Warren S. Unemori

VII. REFERENCES

1. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* August 1972. United States Department of Agriculture, Soil Conservation Service.

2. *Flood Insurance Rate Map, Maui County, Hawaii.* Community-Panel Number 150003 0260 B, June 1, 1981. Federal Emergency Management Agency, Federal Insurance Administration.

3. *Rainfall Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43.* 1962. U.S. Department of Commerce, Weather Bureau.

4. *Rules for the Design of Storm Drainage Facilities in the County of Maui.* July 1995. Department of Public Works and Waste Management, County of Maui.

5. *SCS National Engineering Handbook, Section 4 - Hydrology.* 1969. Soil Conservation Service, U.S. Department of Agriculture.

6. *Hydrology Report for Piilani Highway.* 1978. Trans-Meridian Engineers & Surveyors, Inc.

EXHIBITS

1 Location Map

2 Site Specific Soil Classification Map

3 Flood Insurance Rate Map

4A Individual Onsite Drainage Area Map

4B Offsite Drainage Area Map

5 Storm Sewer Schematic

6 Drainage Flow Path to Kulanihakoi Gulch

7 Existing vs. Post Diversion Inundation Limits

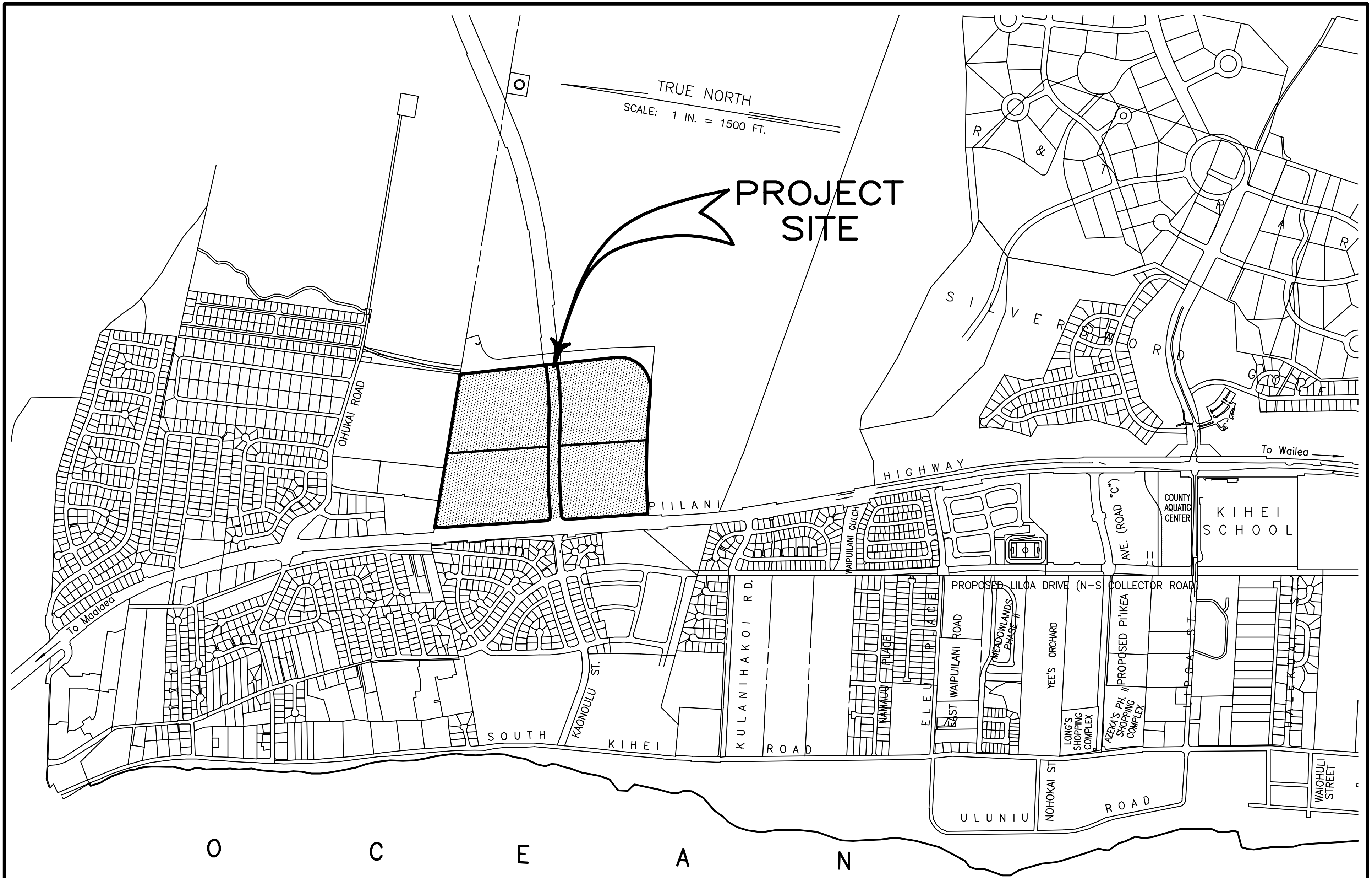

EXHIBIT 1
LOCATION MAP

04proj/04010.10/dwg2004/exhibits/exb-soil.dwg

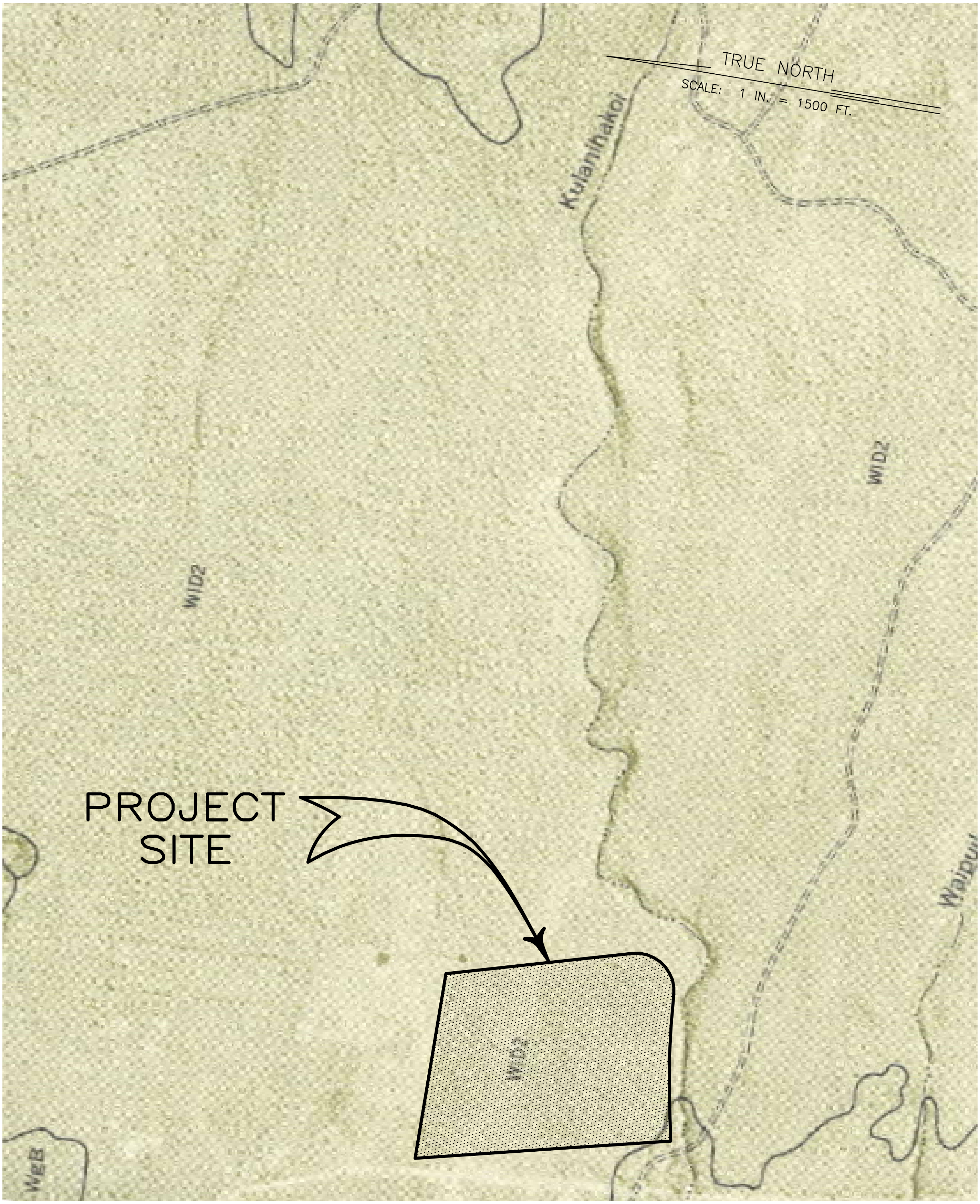

EXHIBIT 2

SITE SPECIFIC SOIL CLASSIFICATION MAP

04proj/04010.10/dwg2004/exhibits/exb-soil.dwg

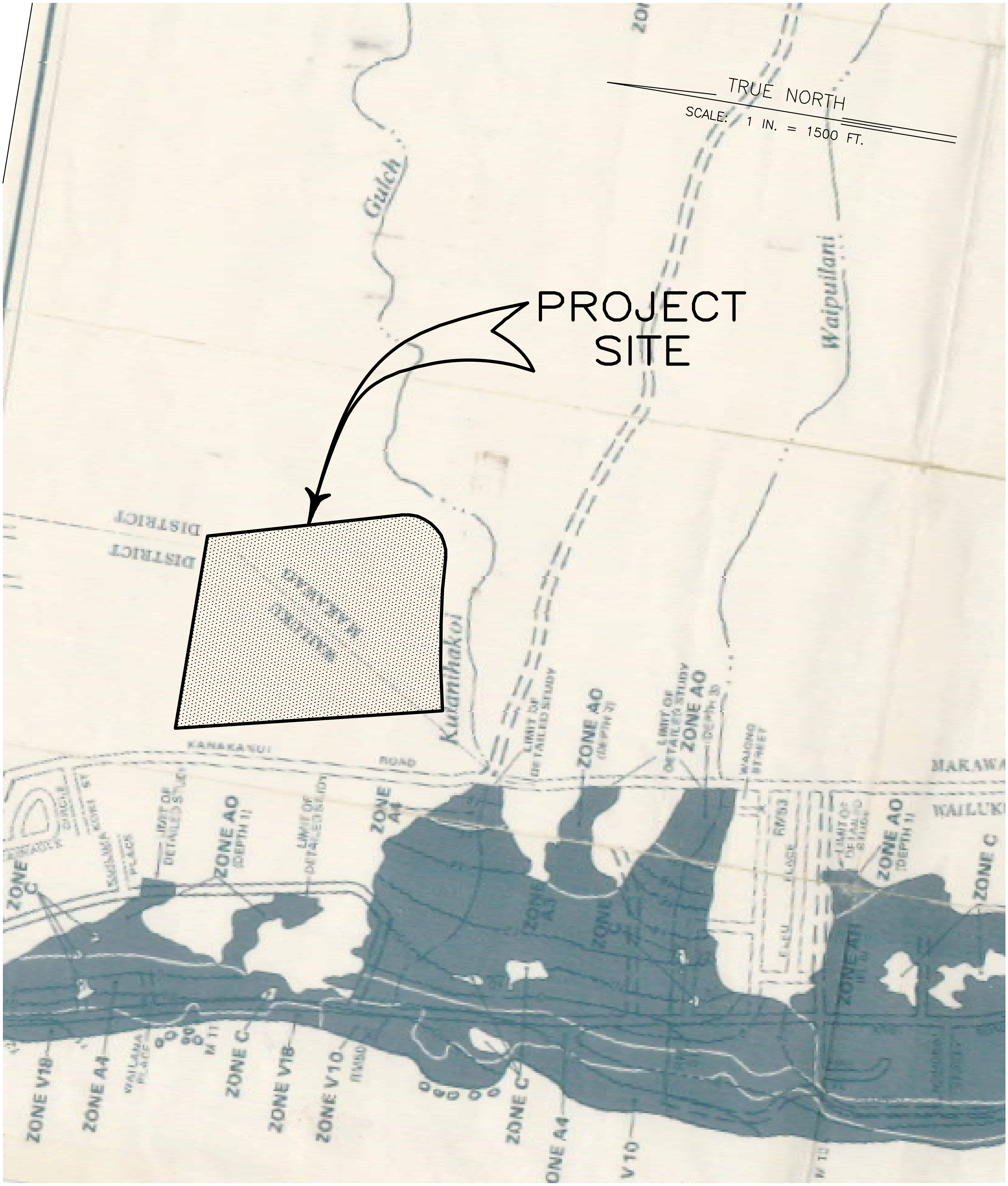

EXHIBIT 3

FLOOD INSURANCE RATE MAP

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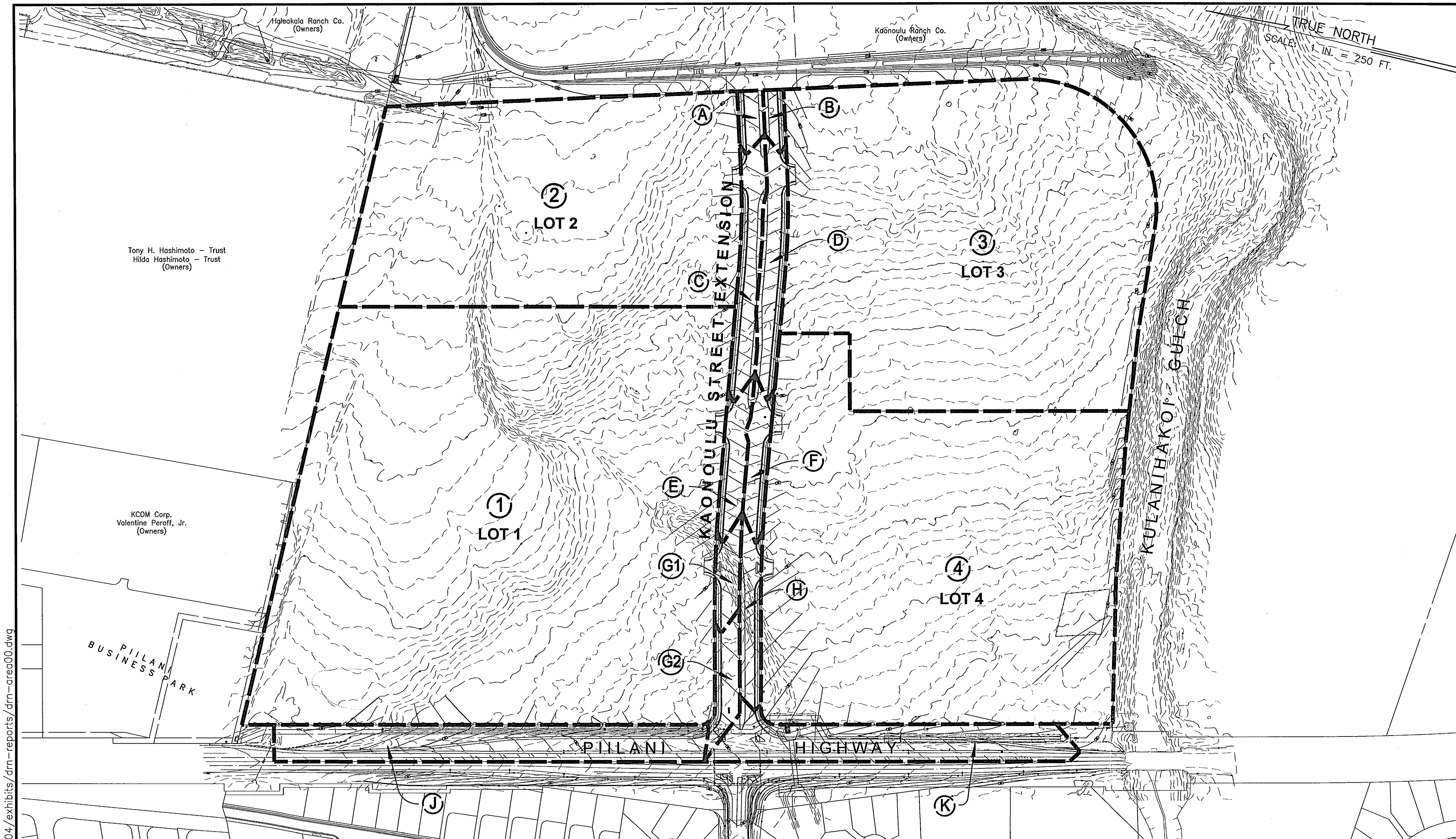

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LEGEND:

- 1680 FINISH GRADE W/ ELEVATION
- 1680 EXISTING GRADE W/ ELEVATION
- DRAINAGE AREA LIMITS
- (25) DRAINAGE AREA NUMBER

EXHIBIT 4A

INDIVIDUAL ONSITE DRAINAGE AREA MAP

SCALE: 1 IN. = 250 FT.

WARREN S. UNEMORI ENGINEERING, INC.
CIVIL & STRUCTURAL ENGINEERS / LAND SURVEYORS

October 9, 2006

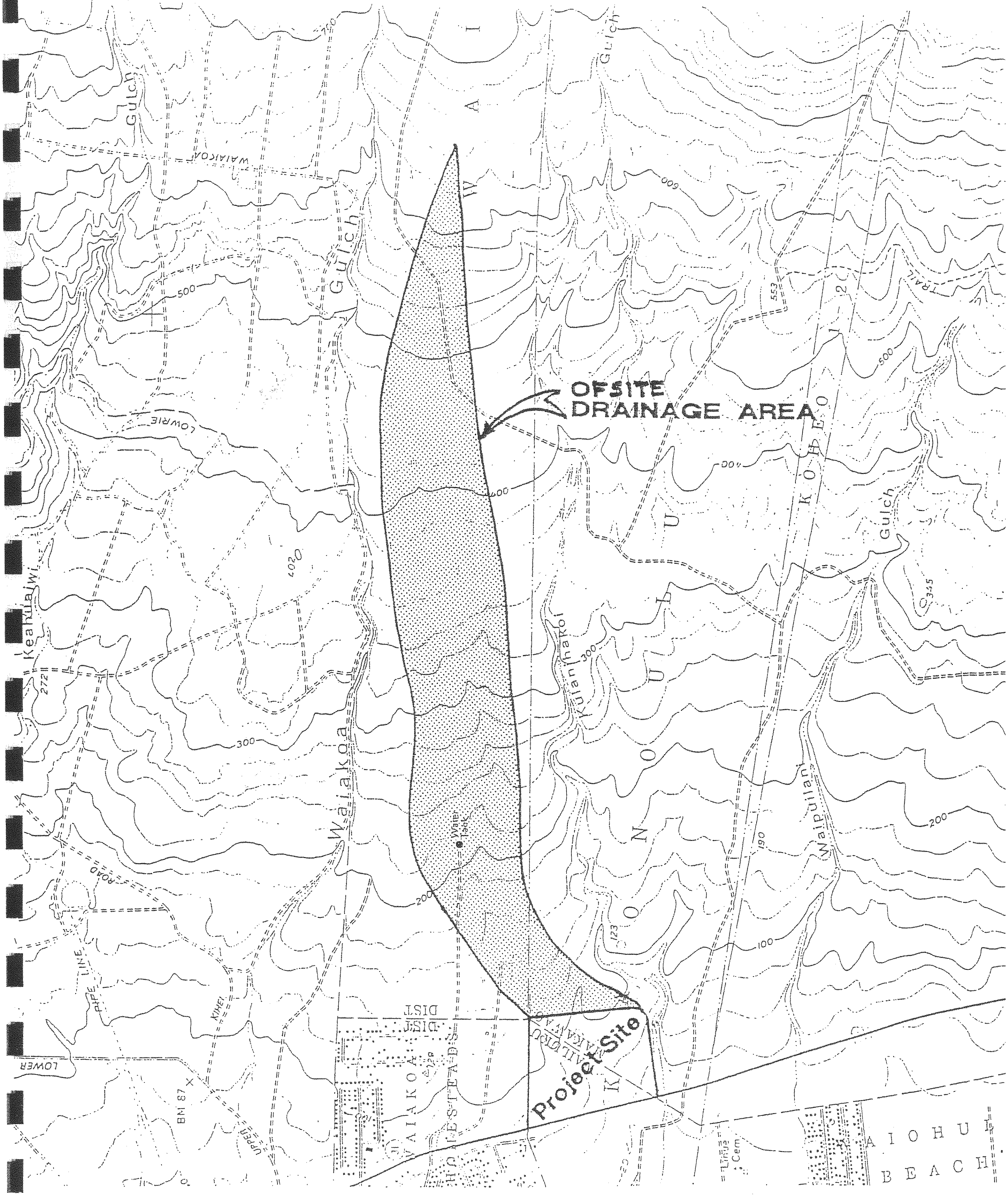

EXHIBIT 4B
OFFSITE DRAINAG

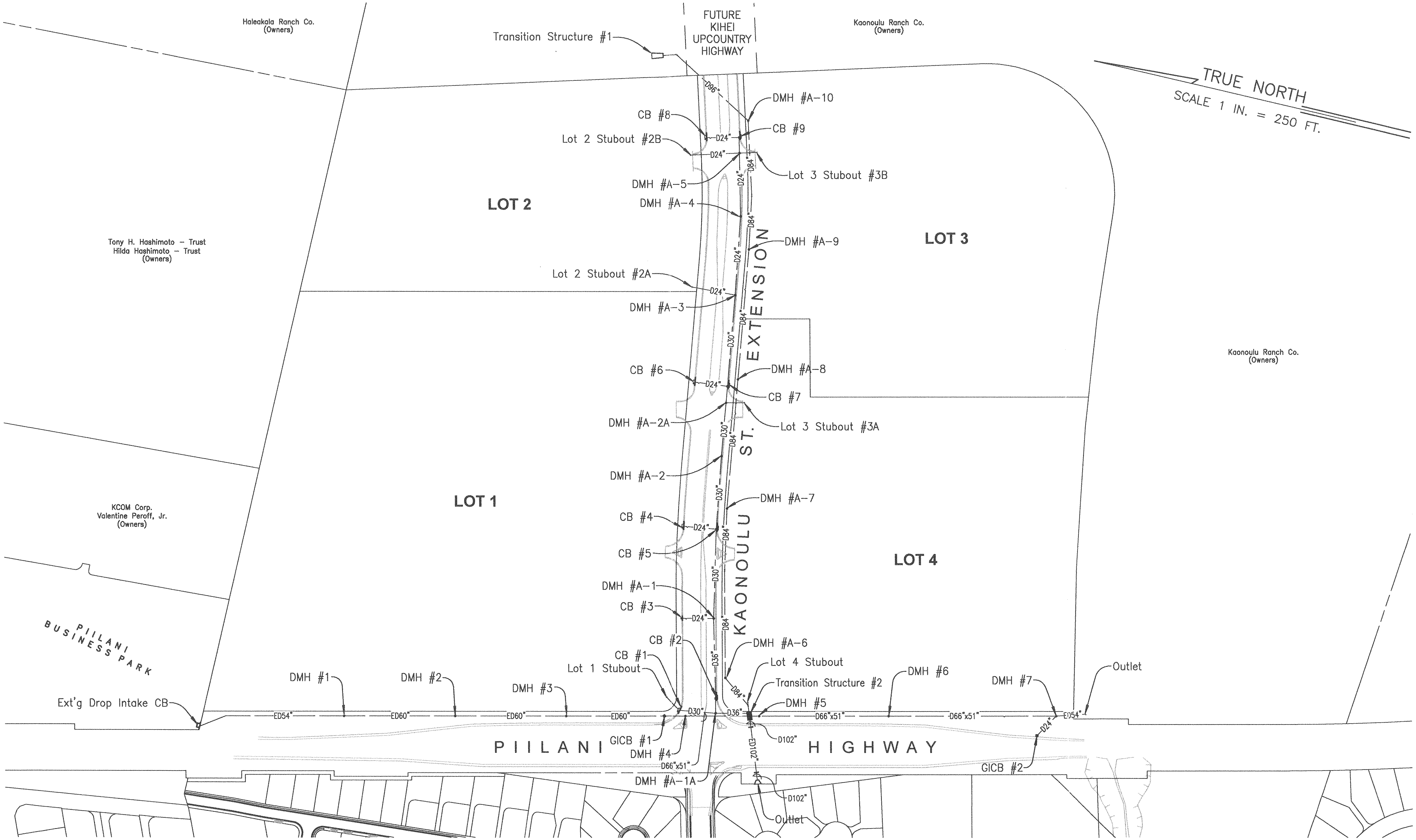

EXHIBIT 5

STORM SEWER SCHEMATIC

SCALE: 1 IN. = 250 FT.

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CIVIL & STRUCTURAL ENGINEERS / LAND SURVEYORS

October 22, 2008

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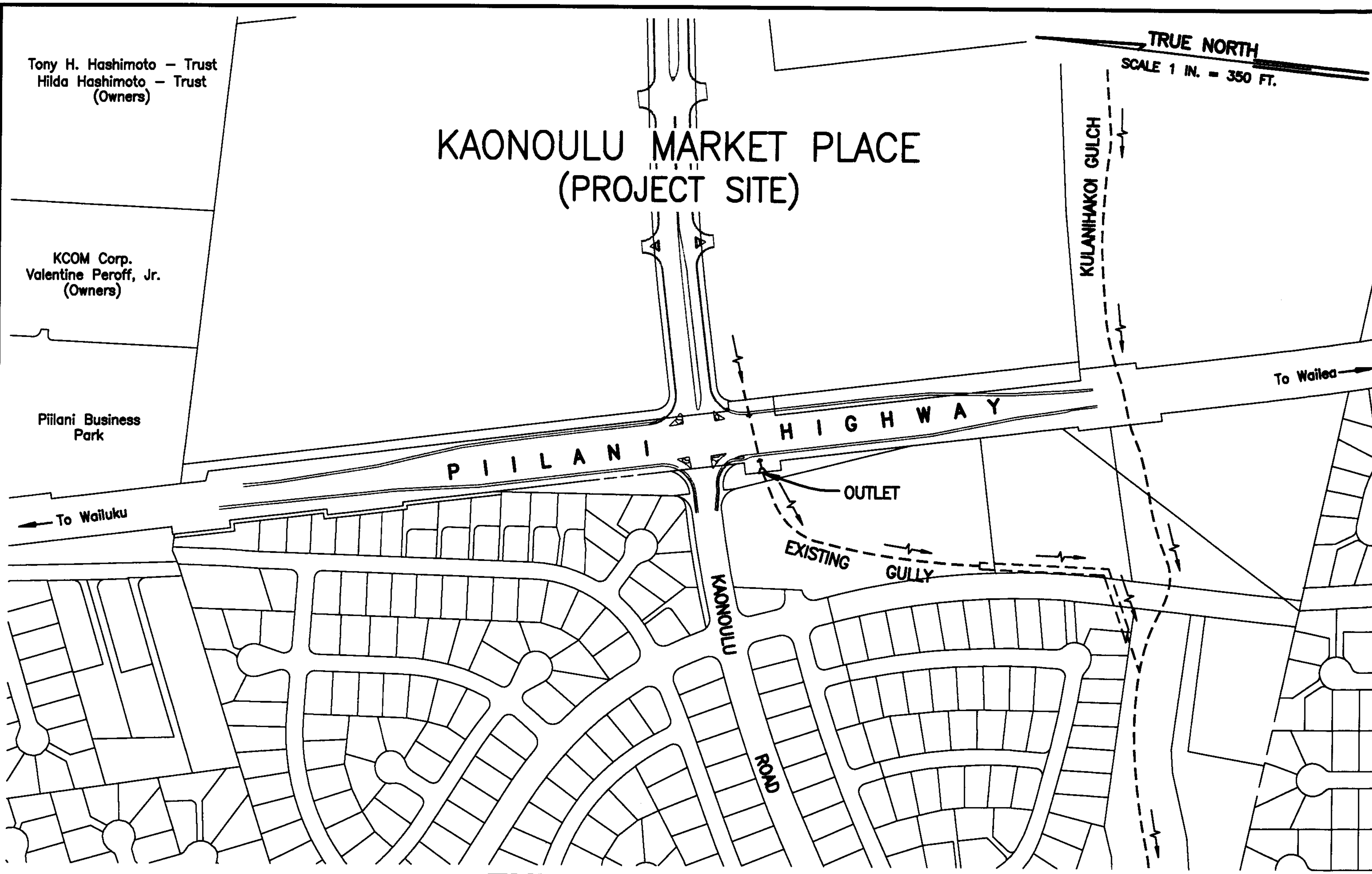

EXHIBIT 6

DRAINAGE FLOW PATH TO KULANIHAKOI GULCH

0 350 700 1050 1400

SCALE: 1 IN. = 350 FT.

WARREN S. UNEMORI ENGINEERING, INC.

October 22, 2008

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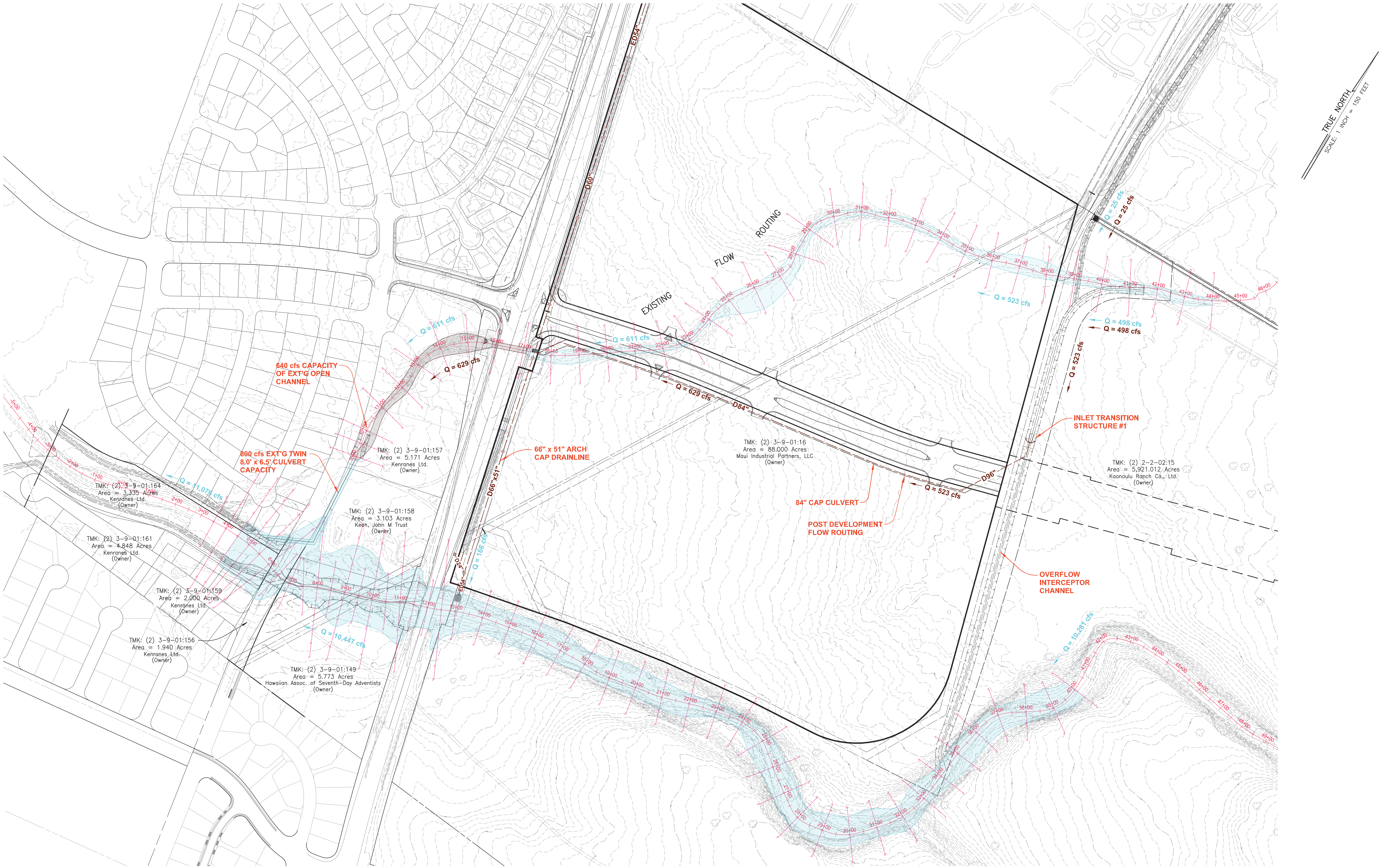

EXISTING INUNDATION LIMIT

PROPOSED DEVELOPMENT INUNDATION LIMIT

EXHIBIT 7 - COMPARISON BETWEEN INUNDATION LIMITS OF EXISTING AND PROPOSED DEVELOPMENT

0 150 300 450 600

SCALE: 1 IN. = 150 FT.

WARREN S. UNEMORI - ENGINEERING, INC.
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2145 Wells Street - Wailuku, Maui, Hawaii 96793
(808)242-4403 FAX: (808)244-4856

October 3, 2008

WSUE #04010.10

24"x36"

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APPENDIX A

HYDROLOGIC CALCULATIONS

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, Hawaii 96793

Date: September 13, 2006

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed Kaonoulu Market Place (Area 1)

I. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(50 Yr.-1Hr.) = 2.30 inches

2. Total Area:

Area (Ac.):		30.13

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		55
Higher Elev. (ft.):	107	
Lower Elev. (ft.):	52	
Approx. Runoff Length (ft.):		1,491
Average Slope:		3.69%
Time of Concentration (min.):		22

5. Intensity:

Intensity (in./hr.):		3.7

6. Total Runoff:

Q = C x I x A (cfs):		**31.22**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: September 13, 2006

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed Kaonoulu Market Place (Area 2)

I. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(50 Yr.-1Hr.) = 2.30 inches

2. Total Area:

Area (Ac.):		13.13

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		30
Higher Elev. (ft.):	121	
Lower Elev. (ft.):	91	
Approx. Runoff Length (ft.):		684
Average Slope:		4.39%
Time of Concentration (min.):		15.5

5. Intensity:

Intensity (in./hr.):		4.2

6. Total Runoff:

Q = C x I x A (cfs):		**15.44**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: September 13, 2006

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed Kaonoulu Market Place (Area 3)

I. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(50 Yr.-1Hr.) = 2.30 inches

2. Total Area:

Area (Ac.):		18.52

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		44
Higher Elev. (ft.):	114	
Lower Elev. (ft.):	70	
Approx. Runoff Length (ft.):		985
Average Slope:		4.46%
Time of Concentration (min.):		18

5. Intensity:

Intensity (in./hr.):		3.9

6. Total Runoff:

Q = C x I x A (cfs):		**20.22**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: September 13, 2006

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed Kaonoulu Market Place (Area 4)

I. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(50 Yr.-1Hr.) = 2.3 inches

2. Total Area:

Area (Ac.):		19.54

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		53
Higher Elev. (ft.):	86	
Lower Elev. (ft.):	33	
Approx. Runoff Length (ft.):		1,228
Average Slope:		4.32%
Time of Concentration (min.):		20

5. Intensity:

Intensity (in./hr.):		3.8

6. Total Runoff:

Q = C x I x A (cfs):		**20.79**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: October 22, 2008

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed Kaonoulu Market Place (Kaonoulu Street Extension).

I. 50-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(50 Yr.-1Hr.) = 2.3 inches

2. Total Area:

Area (Ac.):		4.81

3. Runoff Coefficents:

Area of Paved Road (Ac.):		3.88
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.93
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28
Weighted Runoff Coeff't., C:		0.82

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		71
Higher Elev. (ft.):	110	
Lower Elev. (ft.):	39	
Approx. Runoff Length (ft.):		1,765
Average Slope:		4.02%
Time of Concentration (min.):		10.5

5. Intensity:

Intensity (in./hr.):		4.65

6. Total Runoff:

Q = C x I x A (cfs):		**18.35**

DRAINAGE CALCULATION - INDIVIDUAL POST DEVELOPMENT DRAINAGE AREAS ALONG ROADWAY

Drainage Area	Catch Basin	Total Area (sqft.)	Total Area (acres)	Runoff Coefficient	Time of Conc. (Min.)	Rainfall Intensity (50yr.-1hr.) (in./hr.)	Drainage Area Q (50yr.-1hr.) (cfs)	Q + Bypass Flow (cfs)	Inlet Capacity (cfs)[1]	Bypass Flow (cfs)	Channel Slope	Flooded Width (ft.)[2]
A	CB #8	10092.53	0.232	0.78	5	5.9	1.07	1.07	1.07	0.00	3.24%	3.95
B	CB #9	8345.86	0.192	0.75	5	5.9	0.85	0.85	0.85	0.00	3.24%	3.36
C	CB #6	40936.31	0.940	0.79	7.5	5.3	3.94	3.94	3.94	0.00	4.19%*	7.47
D	CB #7	41252.98	0.947	0.77	7.5	5.3	3.86	3.86	3.86	0.00	4.19%*	7.40
E	CB #4	24916.95	0.572	0.89	6	5.7	2.89	2.89	2.89	0.00	4.12%*	6.47
F	CB #5	22175.12	0.509	0.86	6	5.7	2.50	2.50	2.50	0.00	4.12%*	6.01
G1	CB #3	16560.37	0.380	0.92	5.5	5.8	2.03	2.03	2.03	0.00	2.43%	6.18
G2	CB #1	16336.03	0.375	0.90	6.5	5.5	1.85	1.85	1.85	0.00	2.08%	6.14
H	CB #2	28870.84	0.663	0.75	7.5	5.25	2.60	2.60	2.60	0.00	2.08%	7.24
J	GICB #1	103206.71	2.369	0.68	19	3.85	6.19	6.19	6.19	0.00	2.35%	N/A
K	GICB #2	95415.24	2.190	0.76	16	4.1	6.85	6.85	6.85	0.00	1.11%	N/A

* For grades 4% and greater, 10-foot long deflector inlets shall be used.

Notes: [1] Acceptable Catch Basin Inlet Capacity (Standard 10-foot Curb Inlets) based on Department of Planning and Permitting January 2000 *Rules Relating to Storm Drainage Standards*.
[2] Flooded Width Calculated from Haestad Methods Program FlowMaster 2005

LONGEST RUN CALCULATIONS FOR INDIVIDUAL DRAINAGE AREAS

Drainage Area	Runoff Length (ft.)	High Elev. (ft.)	Low Elev. (ft.)	Elevation Diff. (ft.)	Average Slope
A	200	110	105	5	0.025
B	200	110	105	5	0.025
C	737	106	79	27	0.037
D	721	106	79	27	0.037
E	450	82	62	20	0.044
F	439	81	62	19	0.043
G1	326	66	55	11	0.034
G2	318	55	50	5	0.016
H	557	63	50	13	0.023
J	1208	80	51	29	0.024
K	1029	48	31	17	0.017

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Offsite Runoff

Return Event	Total Depth in	Rainfall Type	RNF ID
Pre100	9.0000	Synthetic Curve	TypeI 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10		JCT	100	252.974		11.9000	498.21		
POND 10	IN	POND	100	252.974		11.9000	498.21		
POND 10	OUT	POND	100	252.974		11.9000	498.21		
SUBAREA 10		AREA	100	252.974		11.9000	498.21		

SCS UNIT HYDROGRAPH METHOD
Calc.Method Option = 2
STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 9.0000 in
Rain Dir = V:\Projdata\04PROJ\04010.10\calcs\drainage\offsite areas\
Rain File -ID = - TypeI 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\Projdata\04PROJ\04010.10\calcs\drainage\offsite areas\
HYG File - ID = - SUBAREA 10 Pre100
Tc = 2.8615 hrs
Drainage Area = 471.000 acres Runoff CN= 79
Calc.Increment= .05020 hrs Out.Incr.= .0500 hrs
HYG Volume = 252.974 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
3.4000	.00	.00	.00	.01	.01
3.6500	.01	.02	.03	.04	.05
3.9000	.07	.09	.11	.14	.17
4.1500	.21	.26	.31	.37	.44
4.4000	.51	.60	.69	.80	.92
4.6500	1.04	1.18	1.34	1.50	1.68
4.9000	1.87	2.08	2.29	2.52	2.77
5.1500	3.03	3.30	3.58	3.88	4.19
5.4000	4.52	4.86	5.21	5.57	5.94
5.6500	6.33	6.72	7.13	7.55	7.98
5.9000	8.41	8.86	9.32	9.79	10.26
6.1500	10.74	11.23	11.73	12.24	12.75
6.4000	13.27	13.80	14.33	14.87	15.42
6.6500	15.98	16.54	17.12	17.70	18.29
6.9000	18.89	19.50	20.12	20.76	21.40
7.1500	22.06	22.73	23.42	24.12	24.84
7.4000	25.57	26.32	27.09	27.87	28.67
7.6500	29.49	30.32	31.18	32.05	32.94
7.9000	33.84	34.76	35.70	36.65	37.62
8.1500	38.61	39.61	40.63	41.66	42.72
8.4000	43.79	44.89	46.01	47.15	48.32
8.6500	49.52	50.75	52.02	53.32	54.66
8.9000	56.05	57.48	58.97	60.51	62.11
9.1500	63.79	65.53	67.36	69.27	71.27
9.4000	73.37	75.58	77.90	80.35	82.95
9.6500	85.74	88.76	92.07	95.75	99.97
9.9000	104.78	110.19	116.24	122.97	130.38
10.1500	138.40	147.03	156.18	165.87	176.08
10.4000	186.89	198.30	210.32	222.94	236.23
10.6500	250.14	264.62	279.59	294.97	310.65

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
10.9000	326.44	342.18	357.55	372.41	386.70
11.1500	400.29	413.08	425.01	436.08	446.21
11.4000	455.40	463.63	470.93	477.27	482.66
11.6500	487.18	490.86	493.79	496.00	497.49
11.9000	498.21	498.05	497.04	495.29	492.87
12.1500	489.97	486.63	482.88	478.71	474.14
12.4000	469.15	463.77	457.94	451.65	444.94
12.6500	437.84	430.38	422.60	414.63	406.54
12.9000	398.55	390.76	383.17	375.85	368.84
13.1500	362.12	355.67	349.47	343.43	337.56
13.4000	331.84	326.29	320.91	315.69	310.62
13.6500	305.73	300.99	296.40	291.93	287.57
13.9000	283.29	279.08	274.94	270.85	266.81
14.1500	262.83	258.92	255.11	251.38	247.75
14.4000	244.21	240.76	237.39	234.10	230.87
14.6500	227.70	224.58	221.52	218.52	215.58
14.9000	212.70	209.88	207.11	204.40	201.75
15.1500	199.15	196.62	194.15	191.73	189.36
15.4000	187.03	184.76	182.52	180.35	178.25
15.6500	176.21	174.24	172.31	170.44	168.62
15.9000	166.84	165.11	163.44	161.80	160.22
16.1500	158.68	157.19	155.75	154.34	152.98
16.4000	151.66	150.38	149.13	147.91	146.72
16.6500	145.56	144.44	143.36	142.30	141.28
16.9000	140.28	139.30	138.35	137.43	136.53
17.1500	135.66	134.81	133.98	133.17	132.38
17.4000	131.59	130.83	130.07	129.34	128.61
17.6500	127.91	127.23	126.56	125.91	125.28
17.9000	124.65	124.03	123.42	122.81	122.22
18.1500	121.63	121.04	120.47	119.89	119.33
18.4000	118.76	118.21	117.65	117.10	116.56
18.6500	116.02	115.48	114.95	114.42	113.89
18.9000	113.36	112.84	112.33	111.81	111.30
19.1500	110.79	110.29	109.80	109.31	108.83
19.4000	108.37	107.91	107.47	107.04	106.61
19.6500	106.18	105.75	105.33	104.91	104.50
19.9000	104.08	103.67	103.26	102.85	102.44
20.1500	102.03	101.63	101.22	100.82	100.42
20.4000	100.01	99.61	99.21	98.81	98.41
20.6500	98.02	97.62	97.22	96.82	96.43
20.9000	96.03	95.64	95.24	94.85	94.45
21.1500	94.06	93.67	93.27	92.88	92.49
21.4000	92.10	91.70	91.31	90.92	90.53
21.6500	90.14	89.74	89.35	88.96	88.57
21.9000	88.18	87.79	87.40	87.00	86.61

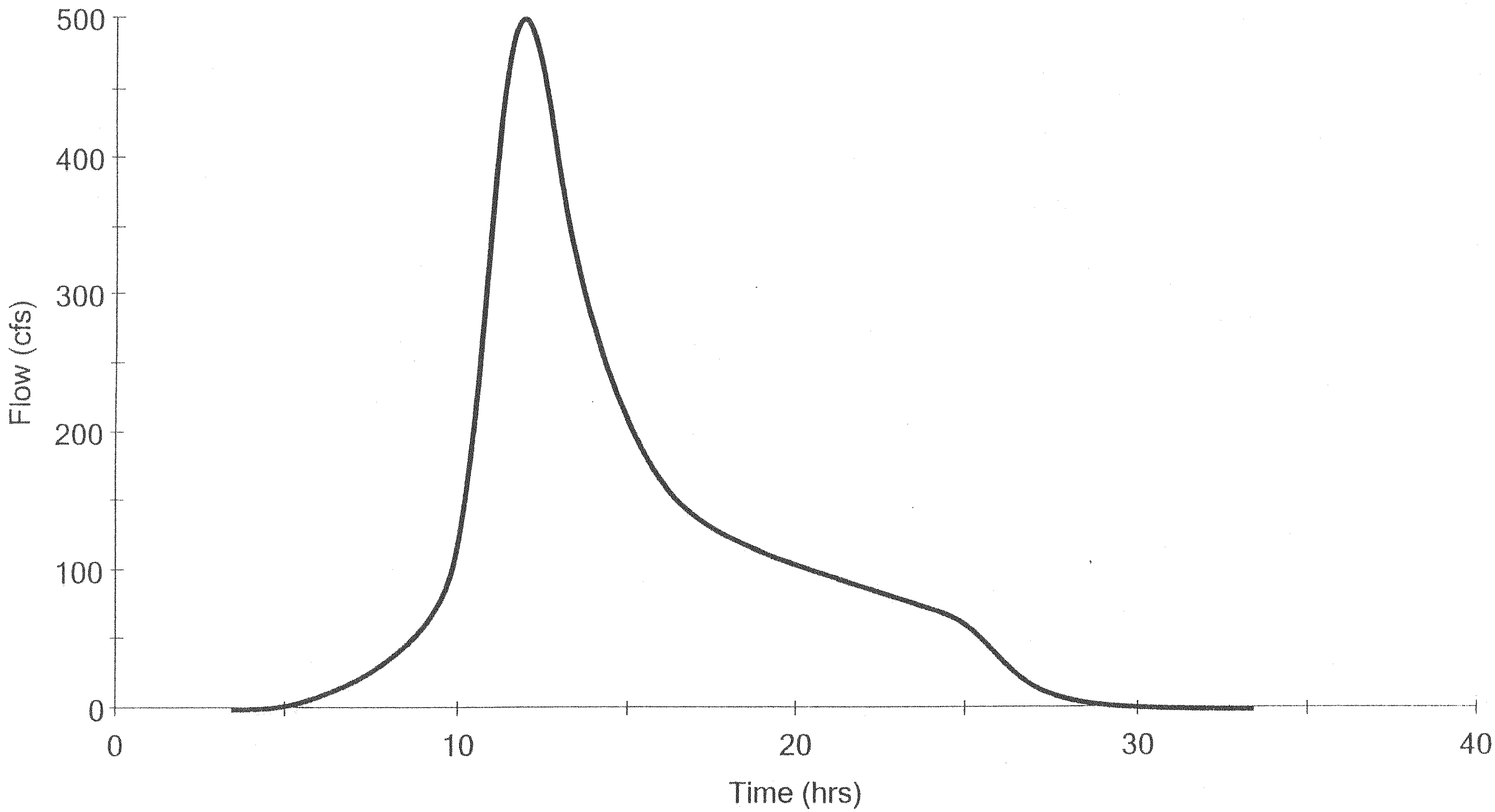
HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
22.1500	86.22	85.83	85.44	85.05	84.66
22.4000	84.27	83.88	83.49	83.09	82.70
22.6500	82.31	81.92	81.53	81.14	80.75
22.9000	80.36	79.96	79.57	79.18	78.79
23.1500	78.40	78.01	77.61	77.22	76.83
23.4000	76.44	76.04	75.65	75.26	74.87
23.6500	74.47	74.08	73.69	73.29	72.90
23.9000	72.51	72.11	71.72	71.32	70.90
24.1500	70.49	70.06	69.61	69.14	68.66
24.4000	68.16	67.63	67.08	66.50	65.90
24.6500	65.27	64.61	63.92	63.18	62.41
24.9000	61.60	60.75	59.85	58.91	57.92
25.1500	56.88	55.81	54.69	53.54	52.36
25.4000	51.16	49.93	48.68	47.41	46.13
25.6500	44.85	43.56	42.26	40.97	39.69
25.9000	38.41	37.15	35.89	34.64	33.41
26.1500	32.19	31.00	29.84	28.70	27.58
26.4000	26.49	25.43	24.39	23.38	22.40
26.6500	21.45	20.53	19.64	18.78	17.96
26.9000	17.17	16.42	15.70	15.03	14.38
27.1500	13.77	13.18	12.63	12.10	11.59
27.4000	11.10	10.63	10.18	9.76	9.35
27.6500	8.96	8.58	8.22	7.87	7.54
27.9000	7.23	6.92	6.63	6.35	6.07
28.1500	5.81	5.56	5.33	5.10	4.88
28.4000	4.67	4.47	4.28	4.10	3.92
28.6500	3.75	3.59	3.44	3.29	3.15
28.9000	3.01	2.88	2.76	2.64	2.52
29.1500	2.41	2.31	2.20	2.11	2.02
29.4000	1.93	1.84	1.76	1.68	1.61
29.6500	1.54	1.47	1.40	1.34	1.28
29.9000	1.22	1.17	1.12	1.07	1.02
30.1500	.97	.93	.88	.84	.80
30.4000	.77	.73	.70	.66	.63
30.6500	.60	.57	.54	.52	.49
30.9000	.47	.44	.42	.40	.38
31.1500	.36	.34	.32	.31	.29
31.4000	.28	.26	.25	.23	.22
31.6500	.21	.19	.18	.17	.16
31.9000	.15	.14	.13	.12	.12
32.1500	.11	.10	.09	.08	.08
32.4000	.07	.06	.06	.05	.05
32.6500	.04	.04	.03	.03	.02
32.9000	.02	.02	.01	.01	.01
33.1500	.01	.01	.00	.00	.00

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs	
33.4000	.00

SCS Unit Hydrograph - Kaonoulu Market Place
(100 Yr - 24 Hr)



W.S. UNEMORI ENGINEERING, INC.
Wailuku, Maui, Hawaii
MAY 3, 1994

HYDROLOGIC REPORT FOR

KAONOULU BUSINESS PARK

6 HOUR S. C. S. HYDROGRAPH

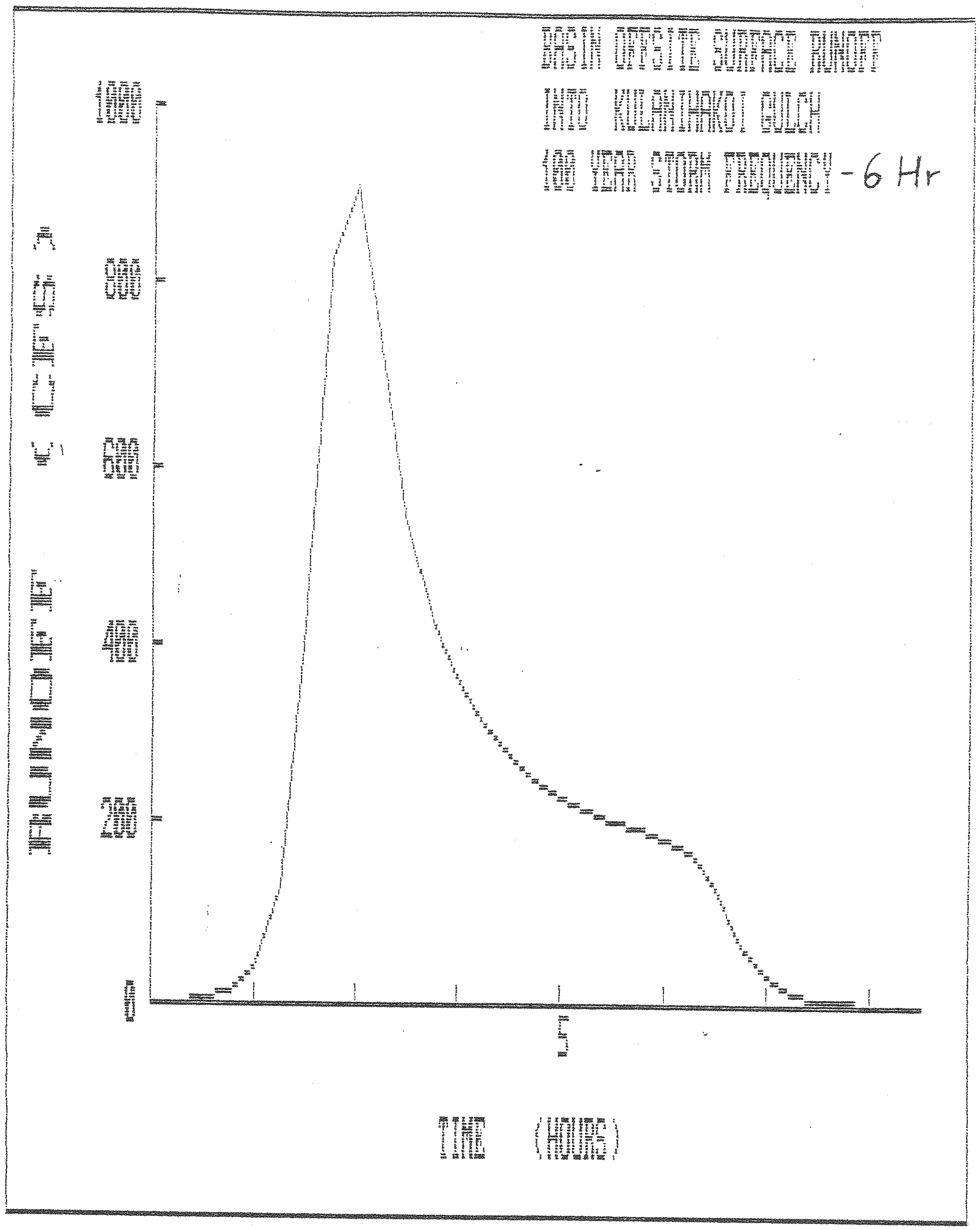
BASIN IDENTIFICATION OFFSITE SURFACE RUNOFF
BASIN DISCHARGES INTO KULANIHAKOI GULCH

BASIN AREA	=	471.00	ACRES
BASIN CURVE NUMBER	=	79.00	
6-HOUR PRECIPITATION	=	5.80	INCHES
6-HOUR RUNOFF	=	3.50	INCHES
AVERAGE BASIN SLOPE	=	3.20	%
HYDRAULIC LENGTH	=	16,400.00	FEET
BASIN LAG ,(Tc)	=	0.46	HOURS , 0.77 HOURS
UNITPEAK COEFFICIENT	=	484.00	
RAINFALL DISTRIBUTION	=	6 HR SCS	

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
0.00	0.0	0.25	0.0	0.50	0.0	0.75	0.0
1.00	0.0	1.25	0.0	1.50	1.6	1.75	12.1
2.00	41.0	2.25	124.1	2.50	419.2	2.75	827.0
3.00	910.7	3.25	719.6	3.50	537.7	3.75	426.6
4.00	356.6	4.25	310.5	4.50	278.2	4.75	252.8
5.00	231.7	5.25	215.5	5.50	202.8	5.75	192.8
6.00	184.4	6.25	171.4	6.50	125.2	6.75	65.0
7.00	28.9	7.25	12.8	7.50	5.7	7.75	2.4
8.00	1.0	8.25	0.3	8.50	0.0	8.75	0.0
9.00	0.0	9.25	0.0	9.50	0.0	9.75	0.0

TIME TO PEAK = 3.00 HOURS
PEAK RUNOFF = 910.73 C.F.S.



BASIN OFFSITE SURFACE RUNOFF
INTO KULANIHAKOI GULCH
100 YEAR STORM FREQUENCY - 6 Hr
1000
800
600
400
200
0
5
TIME (HOURS)

MASTER DESIGN STORM SUMMARY

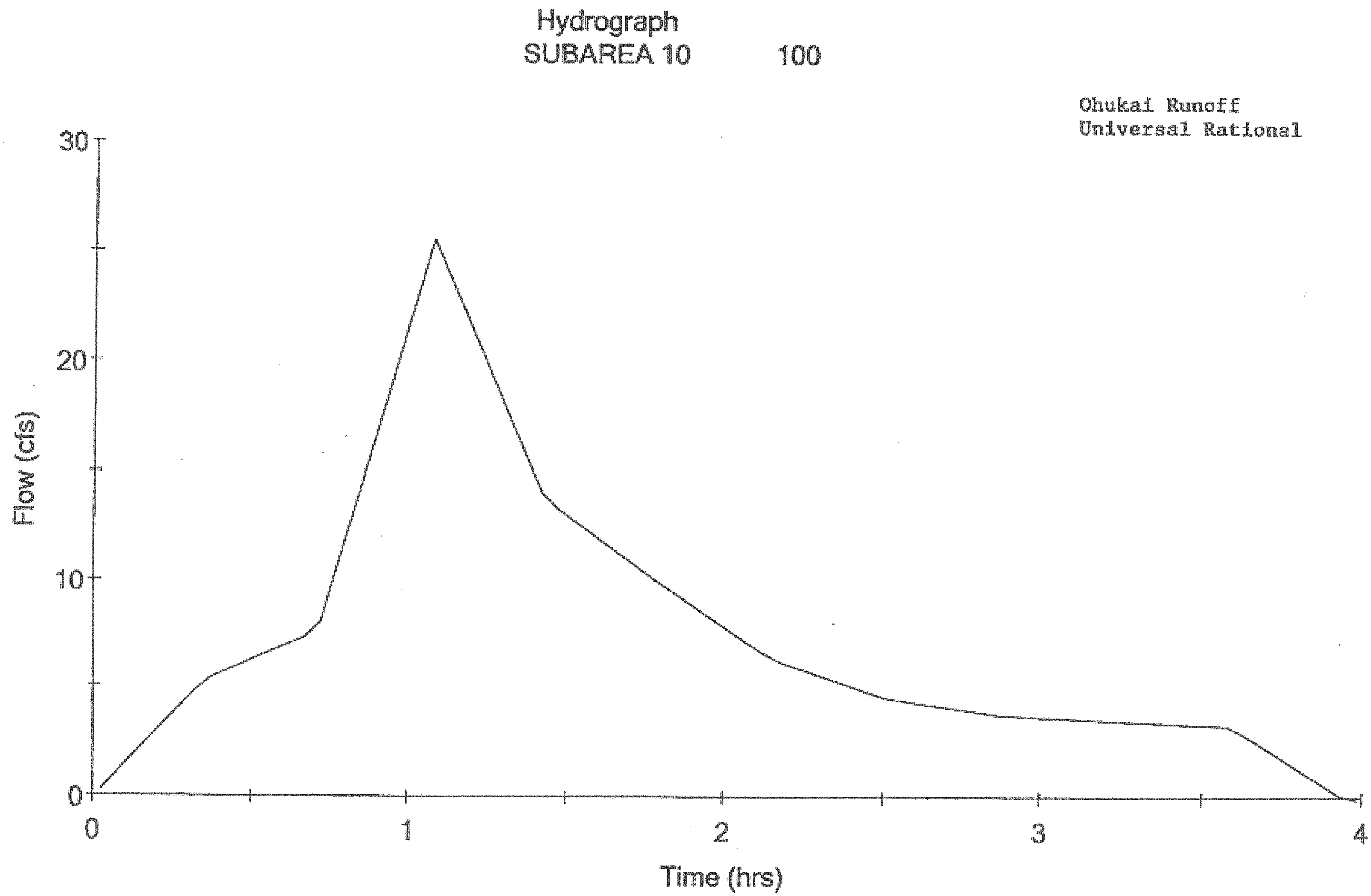
Default Network Design Storm File, ID   IDF Storms

Return Event	Rainfall Type	IDF ID
100	I-D-F Curve	100yr-1hrKihei

MASTER NETWORK SUMMARY
Rational Method -- q/Qp

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

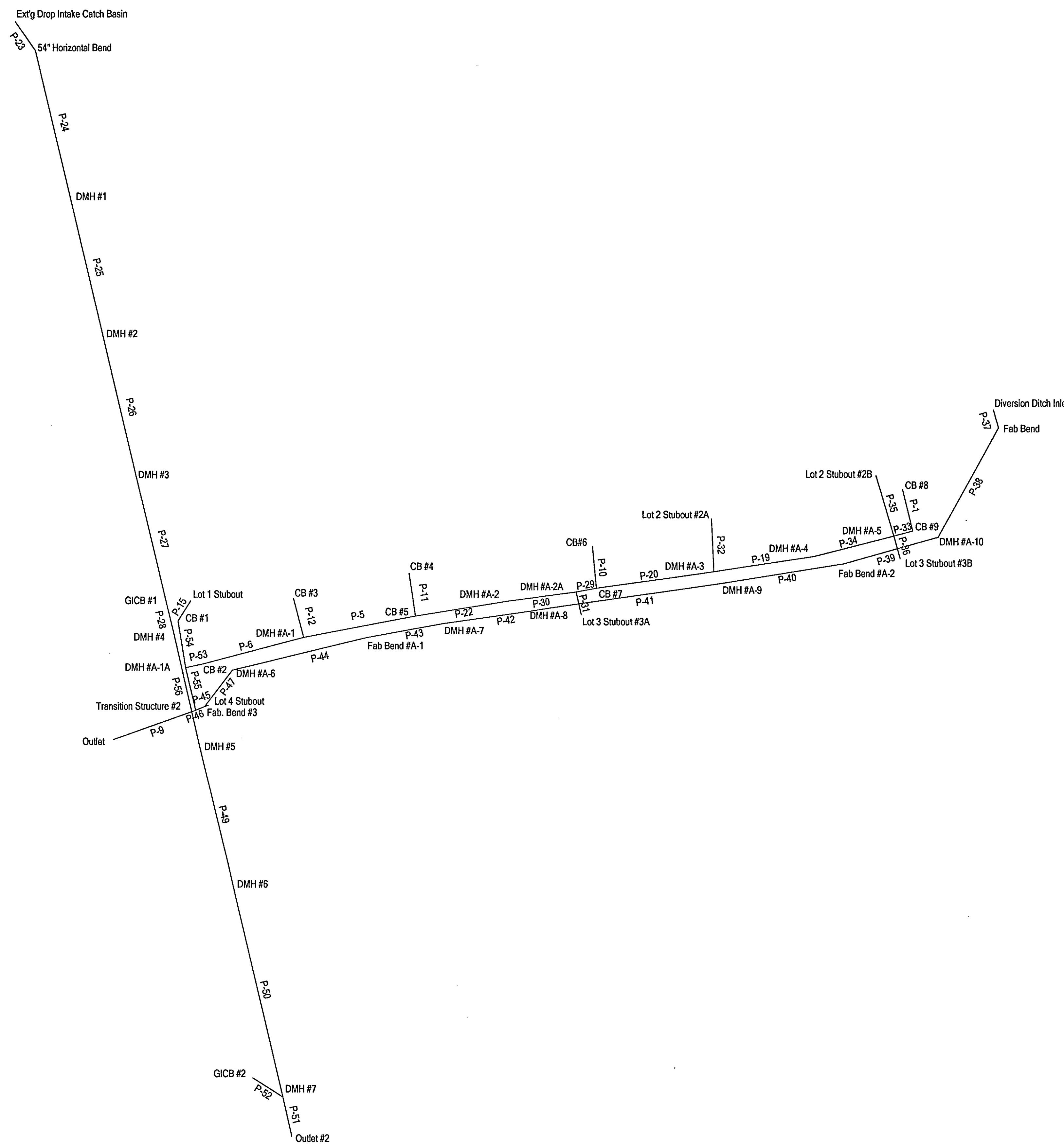
Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10		JCT	100	2.492		1.1000	24.76		
POND 10	IN	POND	100	2.492		1.1000	24.76		
POND 10	OUT	POND	100	2.492		1.1000	24.76		
SUBAREA 10		AREA	100	2.492	L	1.0760	25.55		


Hydrograph
SUBAREA 10 100
Ohukai Runoff
Universal Rational
30
20
10
0
Flow (cfs)
0
1
2
3
4
Time (hrs)

APPENDIX B

HYDRAULIC (BACKWATER) CALCULATIONS

Scenario: Base



Calculation Results Summary

==
Scenario: Base

>>>> Info: Subsurface Network Rooted by: Outlet
>>>> Info: Subsurface Analysis iterations: 1
>>>> Info: Convergence was achieved.

>>>> Info: Subsurface Network Rooted by: Outlet #2
>>>> Info: Subsurface Analysis iterations: 1
>>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Captur Efficie (%)
Lot 4 Stubout	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Diversion Ditch Inlet	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Lot 3 Stubout #3B	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Lot 2 Stubout #2B	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Lot 2 Stubout #2A	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Lot 3 Stubout #3A	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #2	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #5	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #4	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #3	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #7	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB#6	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #9	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #8	Generic Inlet	Generic Default 100%	0.00	0.00	1C
CB #1	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Lot 1 Stubout	Generic Inlet	Generic Default 100%	0.00	0.00	1C
GICB #2	Generic Inlet	Generic Default 100%	0.00	0.00	1C
GICB #1	Generic Inlet	Generic Default 100%	0.00	0.00	1C
Ext'g Drop Intake Catch Basin	Generic Inlet	Generic Default 100%	0.00	0.00	1C

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: Outlet

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-9	1	102 inch	Circular	164.00	632.26	12.99	38.07	35.89
P-46	1	84 inch	Circular	33.93	543.79	14.13	41.41	40.71
P-55	1	36 inch	Circular	91.07	88.47	12.52	42.31	40.71
P-45	1	24 inch	Circular	8.07	20.79	6.62	43.96	43.89
P-47	1	84 inch	Circular	96.00	523.00	13.59	45.74	43.89
P-54	1	30 inch	Circular	97.82	33.07	6.74	45.38	44.74
P-53	1	36 inch	Circular	39.75	55.40	7.84	45.02	44.74
P-44	1	84 inch	Circular	288.65	523.00	19.25	53.04	47.75
P-15	1	24 inch	Circular	50.00	31.22	9.94	47.04	46.09
P-6	1	36 inch	Circular	215.02	52.80	7.47	47.32	45.97
P-43	1	84 inch	Circular	166.65	523.00	19.27	58.30	54.79
P-12	1	24 inch	Circular	84.75	2.03	0.65	48.19	48.19
P-5	1	30 inch	Circular	239.93	50.77	15.05	52.31	48.19
P-42	1	84 inch	Circular	348.44	523.00	22.57	74.71	60.40

P-11	1	24 inch	Circular	88.73	2.89	0.92	54.11	54.09
P-22	1	30 inch	Circular	196.52	45.38	20.80	65.43	54.09
P-41	1	84 inch	Circular	350.89	523.00	20.63	87.84	76.81
P-30	1	30 inch	Circular	145.00	45.38	17.08	71.18	66.55
P-40	1	84 inch	Circular	144.95	523.00	19.02	92.27	89.94
P-31	1	24 inch	Circular	50.37	18.22	10.52	71.50	71.18
P-29	1	30 inch	Circular	44.00	27.16	15.16	72.54	71.18
P-39	1	84 inch	Circular	201.53	523.00	19.04	98.45	94.02
P-10	1	24 inch	Circular	88.72	3.94	6.91	73.73	73.36
P-20	1	30 inch	Circular	246.17	19.36	13.72	82.19	73.36
P-38	1	96 inch	Circular	261.86	523.00	14.57	102.26	100.90
P-19	1	24 inch	Circular	212.31	6.42	11.30	93.45	82.82
P-32	1	24 inch	Circular	110.23	12.94	9.65	84.70	82.82
P-37	1	96 inch	Circular	38.00	523.00	14.56	104.42	104.19
P-34	1	24 inch	Circular	170.03	6.42	8.12	97.05	93.70
P-35	1	24 inch	Circular	132.25	2.50	6.06	99.35	97.39
P-33	1	24 inch	Circular	42.02	1.92	5.72	97.52	97.39
P-36	1	24 inch	Circular	48.32	2.00	5.68	97.61	97.39
P-1	1	24 inch	Circular	88.72	1.07	4.70	99.17	97.69

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Outlet	632.26	45.00	29.58	29.58
Transition Structure #2	632.26	45.83	40.71	38.07
Fab. Bend #3	543.79	48.40	43.89	41.41
DMH #A-1A	88.47	49.13	44.74	42.31
Lot 4 Stubout	20.79	48.50	44.64	43.96
DMH #A-6	523.00	51.71	47.75	45.74
CB #1	33.07	48.87	46.09	45.38
CB #2	55.40	49.76	45.97	45.02
Fab Bend #A-1	523.00	59.30	54.79	53.04
Lot 1 Stubout	31.22	49.50	48.57	47.04
DMH #A-1	52.80	54.74	48.19	47.32
DMH #A-7	523.00	65.42	60.40	58.30
CB #3	2.03	54.26	48.20	48.19
CB #5	50.77	62.32	54.09	52.31
DMH #A-8	523.00	80.28	76.81	74.71
CB #4	2.89	62.32	54.12	54.11
DMH #A-2	45.38	70.88	66.55	65.43
DMH #A-9	523.00	94.70	89.94	87.84
DMH #A-2A	45.38	76.93	71.18	71.18
Fab Bend #A-2	523.00	100.30	94.02	92.27
Lot 3 Stubout #3A	18.22	77.10	72.27	71.50
CB #7	27.16	78.52	73.36	72.54
DMH #A-10	523.00	107.60	100.90	98.45
CB#6	3.94	78.52	73.98	73.73
DMH #A-3	19.36	88.05	82.82	82.19
Fab Bend	523.00	106.00	104.19	102.26
DMH #A-4	6.42	97.70	93.70	93.45
Lot 2 Stubout #2A	12.94	90.50	85.27	84.70
Diversion Ditch Inlet	523.00	107.00	106.22	104.42
DMH #A-5	6.42	103.75	97.39	97.05
Lot 2 Stubout #2B	2.50	104.40	99.55	99.35
CB #9	1.92	104.82	97.69	97.52
Lot 3 Stubout #3B	2.00	105.40	97.78	97.61
CB #8	1.07	104.82	99.29	99.17

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: Outlet #2

Calculation Results Summary

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-51	1	54 inch	Circular	81.40	160.04	17.99	27.70	22.40
P-52	1	24 inch	Circular	74.00	6.85	2.18	29.80	29.73
P-50	1	60 inch	Circular	452.44	153.19	9.35	35.33	30.46
P-49	1	60 inch	Circular	350.00	153.19	11.85	41.16	36.69
P-56	1	60 inch	Circular	199.56	153.19	9.42	44.59	42.80
P-28	1	60 inch	Circular	58.16	153.19	21.30	45.42	45.53
P-27	1	60 inch	Circular	264.81	147.00	21.07	53.87	47.06
P-26	1	60 inch	Circular	300.00	147.00	21.08	63.53	55.05
P-25	1	60 inch	Circular	300.00	147.00	20.16	72.08	64.71
P-24	1	54 inch	Circular	321.00	147.00	13.22	76.33	73.18
P-23	1	54 inch	Circular	74.00	147.00	13.29	77.77	77.44

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Outlet #2	160.04	27.32	19.82	19.82
DMH #7	160.04	32.00	29.73	27.70
GICB #2	6.85	31.30	29.87	29.80
DMH #6	153.19	37.90	36.69	35.33
DMH #5	153.19	46.25	42.80	41.16
DMH #4	153.19	49.91	45.53	44.59
GICB #1	153.19	51.00	47.06	45.42
DMH #3	147.00	59.60	55.05	53.87
DMH #2	147.00	68.10	64.71	63.53
DMH #1	147.00	76.60	73.26	72.08
54" Horizontal Bend	147.00	79.80	77.44	76.33
Ext'g Drop Intake Catch Basin	147.00	79.80	78.77	77.77

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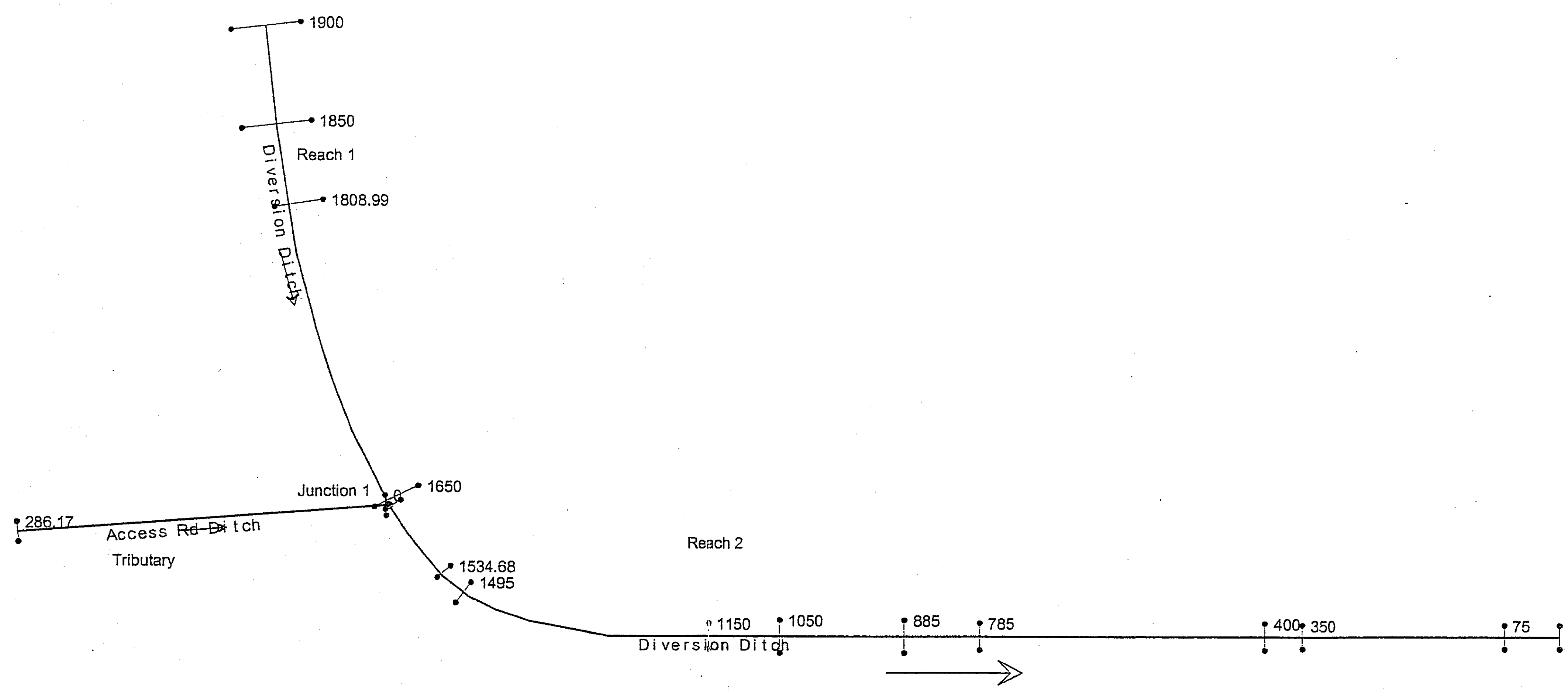
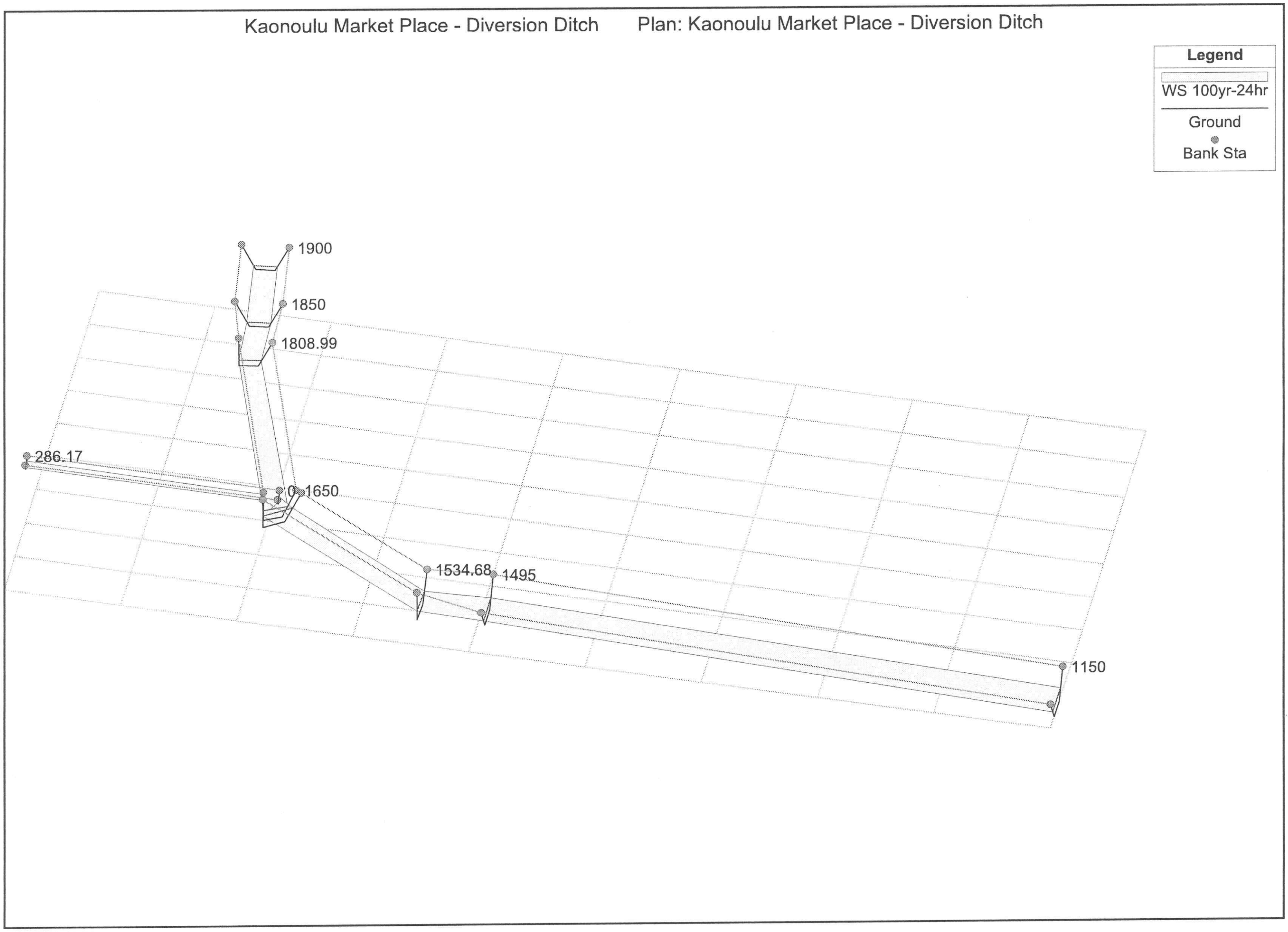


KAONOULU MARKET PLACE – OFFSITE DIVERSION DITCH

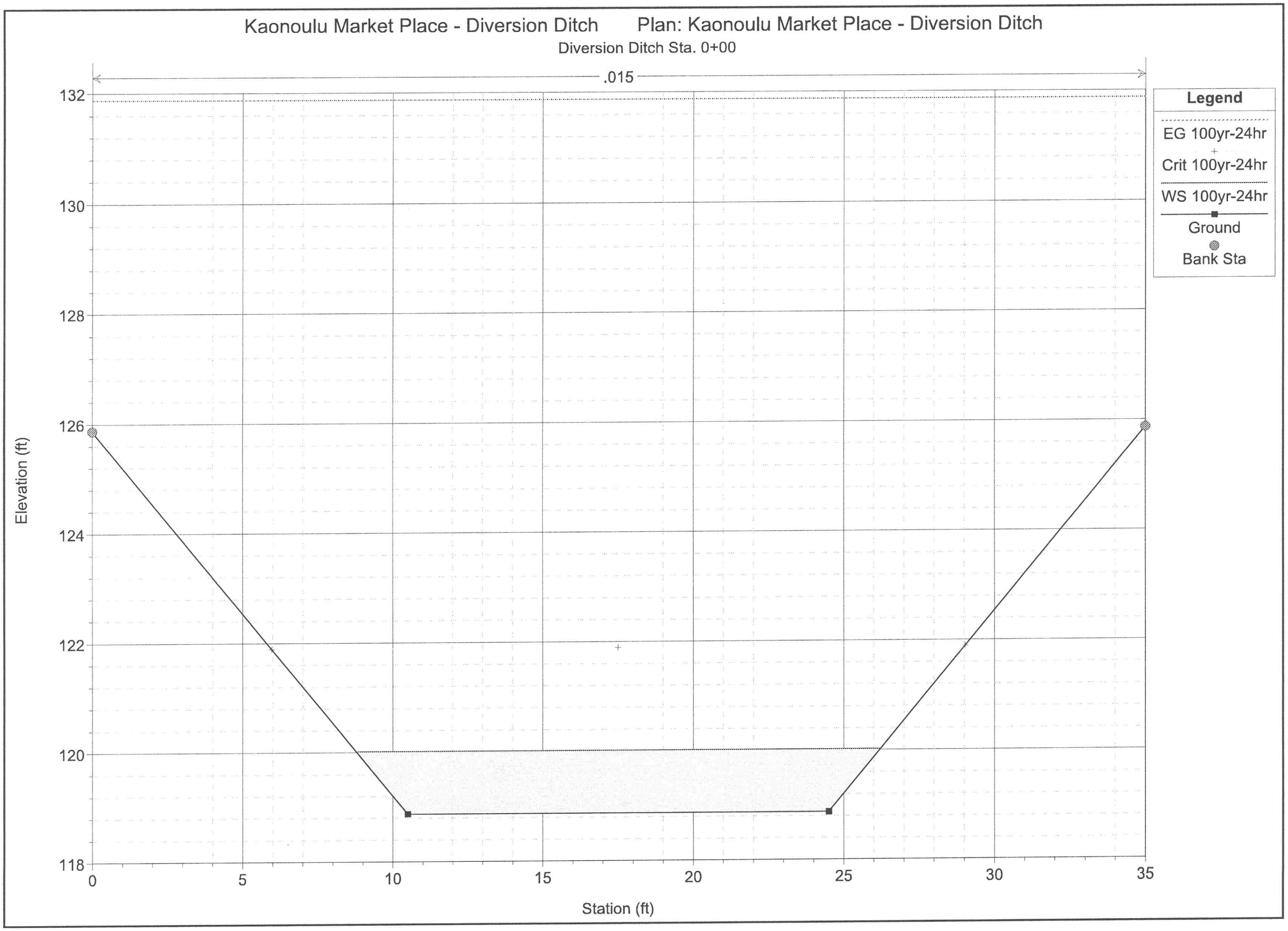

Kaonoulu Market Place - Diversion Ditch
Plan: Kaonoulu Market Place - Diversion Ditch
Legend
WS 100yr-24hr
Ground
Bank Sta
1900
1850
1808.99
286.17
0
1650
1534.68
1495
1150

HEC-RAS Plan: DivDitch Profile: 100yr-24hr

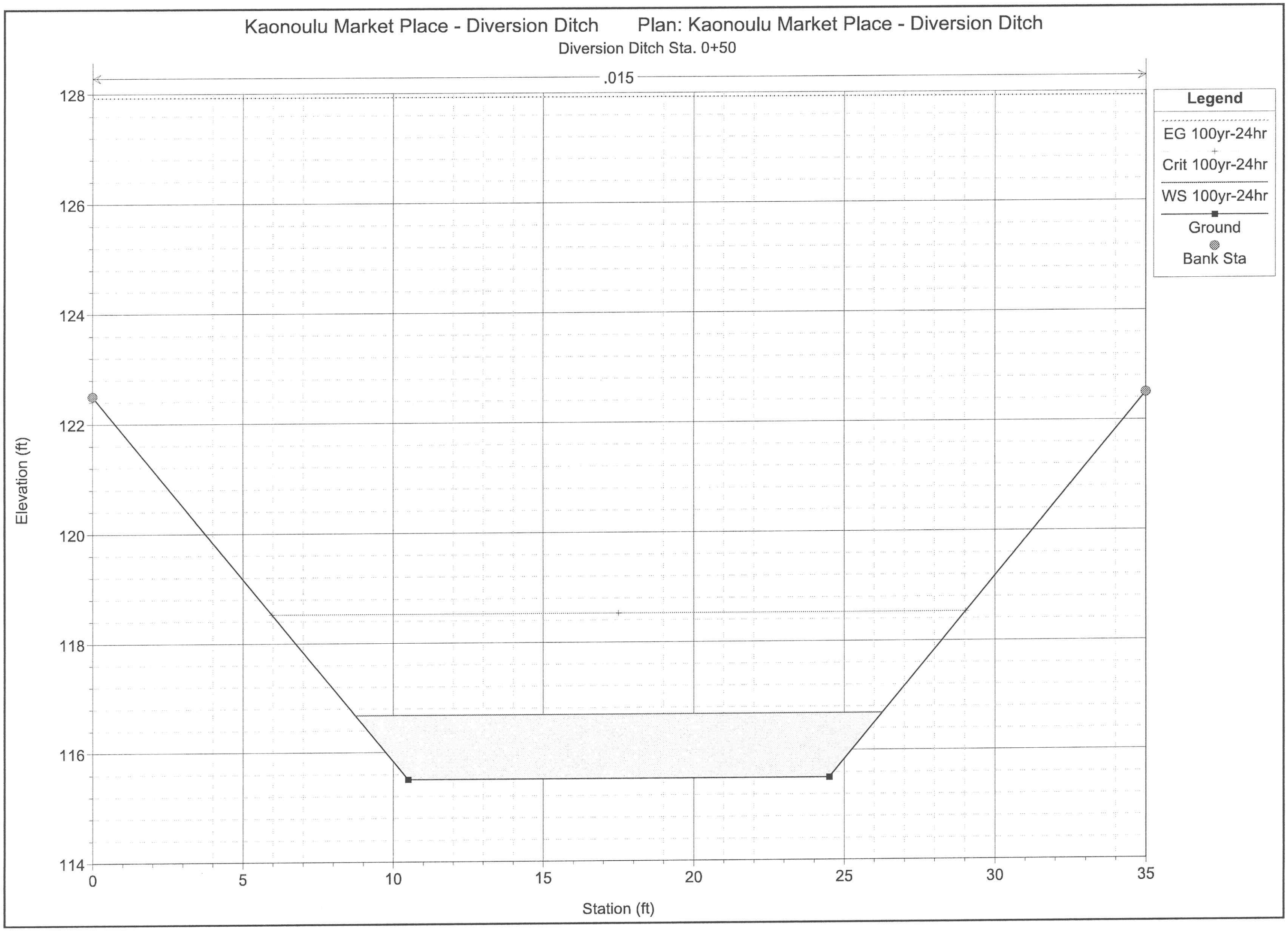
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Diversion Ditch	Reach 1	1900	100yr-24hr	498.00	118.87	120.02	121.89	131.87	0.078414	27.63	18.03	17.44	4.79
Diversion Ditch	Reach 1	1850	100yr-24hr	498.00	115.50	116.67	118.52	127.92	0.072387	26.91	18.50	17.52	4.62
Diversion Ditch	Reach 1	1808.99	100yr-24hr	498.00	114.91	116.47	118.10	123.32	0.088910	21.00	23.71	16.34	3.07
Diversion Ditch	Reach 1	1650	100yr-24hr	498.00	112.62	115.38	115.81	117.34	0.013810	11.23	44.33	18.14	1.27
Diversion Ditch	Reach 2	1650	100yr-24hr	523.00	112.62	115.91	115.91	117.36	0.008528	9.65	54.17	18.93	1.01
Diversion Ditch	Reach 2	1534.68	100yr-24hr	523.00	110.97	113.66	114.26	115.94	0.016470	12.12	43.16	18.04	1.38
Diversion Ditch	Reach 2	1495	100yr-24hr	523.00	110.40	112.78	113.51	115.22	0.019615	12.54	41.71	21.13	1.57
Diversion Ditch	Reach 2	1150	100yr-24hr	523.00	105.44	108.20	108.55	109.89	0.011533	10.44	50.10	22.28	1.23
Access Rd Ditch	Tributary	286.17	100yr-24hr	25.00	121.50	122.43	122.23	122.59	0.009220	3.23	7.75	10.65	0.67
Access Rd Ditch	Tributary	0	100yr-24hr	25.00	117.63	118.36	118.36	118.66	0.022403	4.39	5.70	9.64	1.01

Kaonoulu Market Place UpStream Diversion Ditch to Transition Section Hydraulic Grade Line for 100-year 24-hr Storm

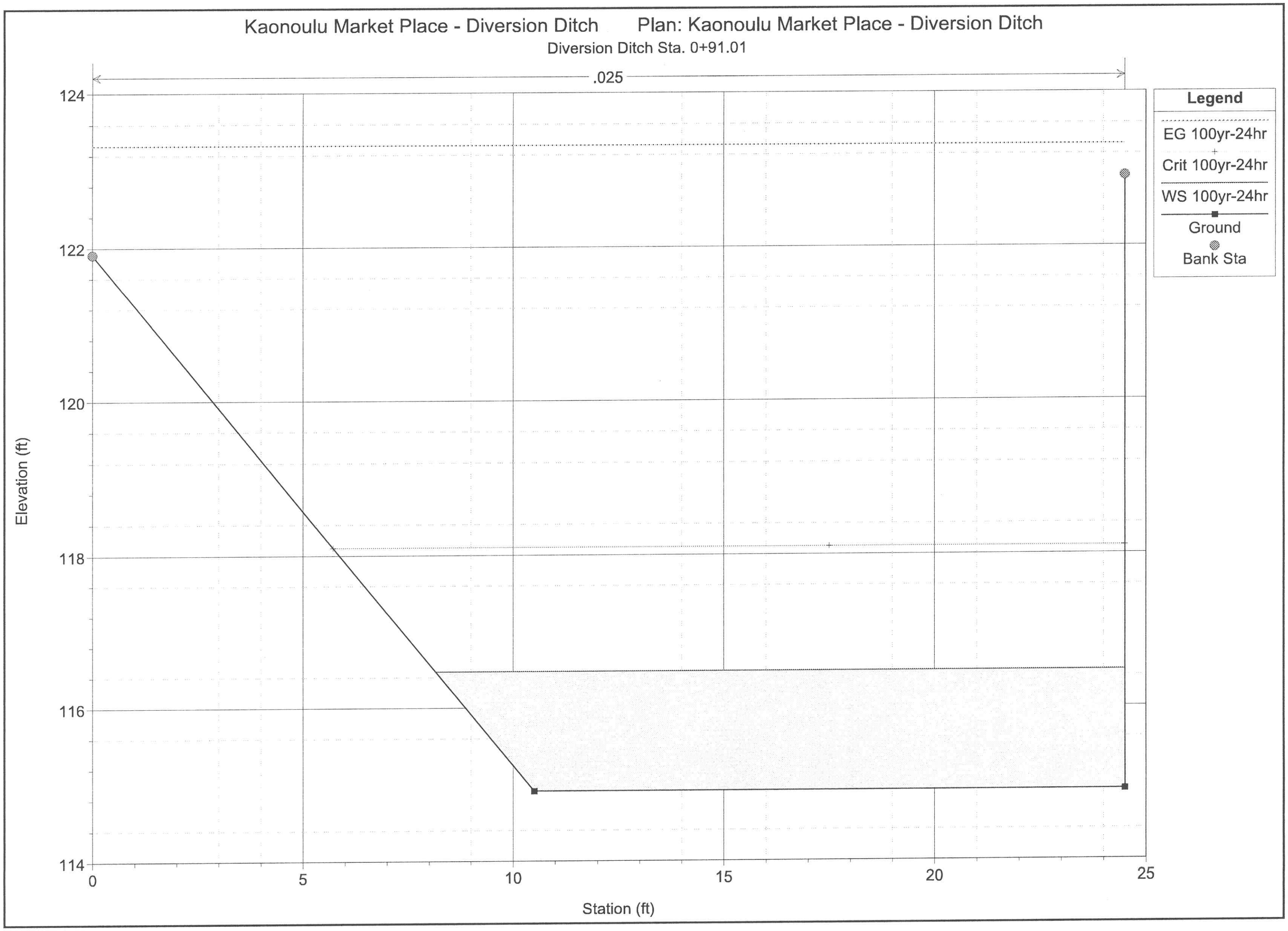
River	*Sta*	*HEC-RAS Sta*	*Min Channel Elevation (ft)*	*W.S. Elevation (ft)*	*Top Width (ft)*	*Depth (ft)*
Diversion Ditch	0+00	1900	118.87	120.02	17.44	1.15
	0+50	1850	115.50	116.67	17.52	1.17
	0+91.01	1808.99	114.91	116.47	16.34	1.56
	2+50	1650	112.62	115.91	18.93	3.29
	3+65.32	1534.68	110.97	113.66	18.04	2.69
	4+05	1495	110.40	112.78	21.13	2.38
	7+50	1150	105.44	108.20	22.28	2.76
Access Road Ditch	0+00	286.17	121.50	122.43	10.65	0.93
	2+86.17	0	117.63	118.36	9.64	0.73

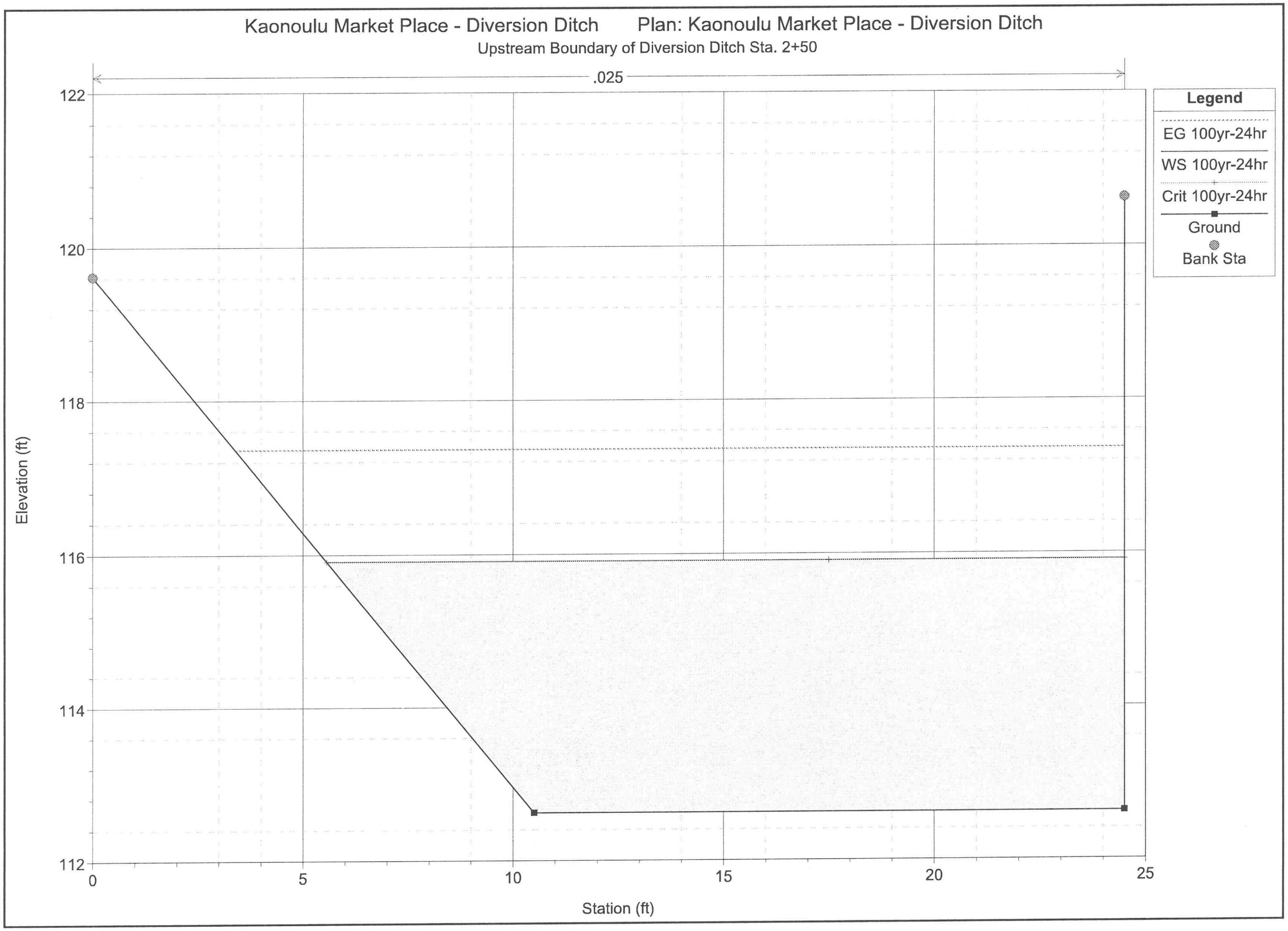


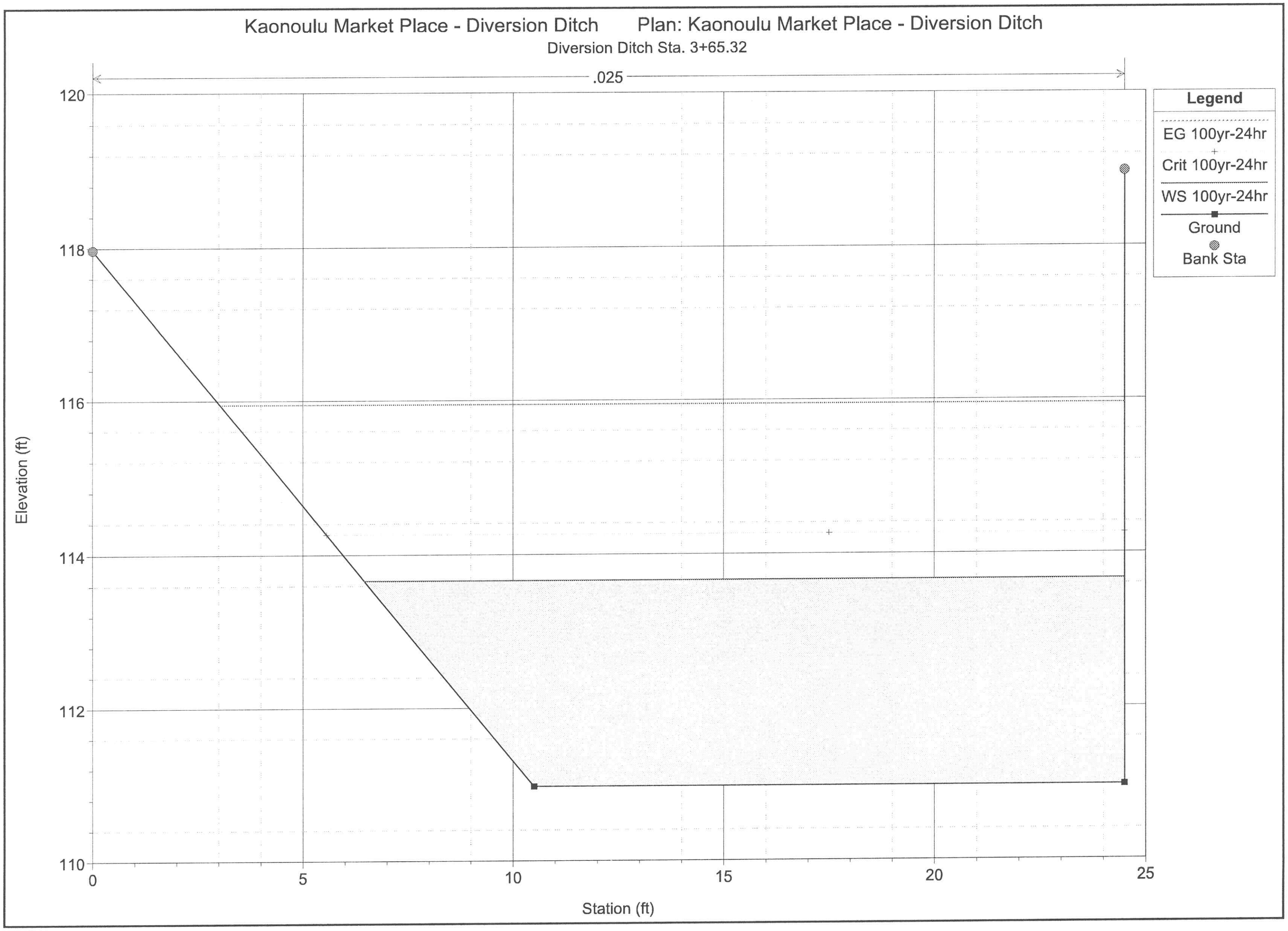
Kaonoulu Market Place - Diversion Ditch
Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 0+00
.015
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
132
130
128
126
124
122
120
118
0
5
10
15
20
25
30
35
Station (ft)



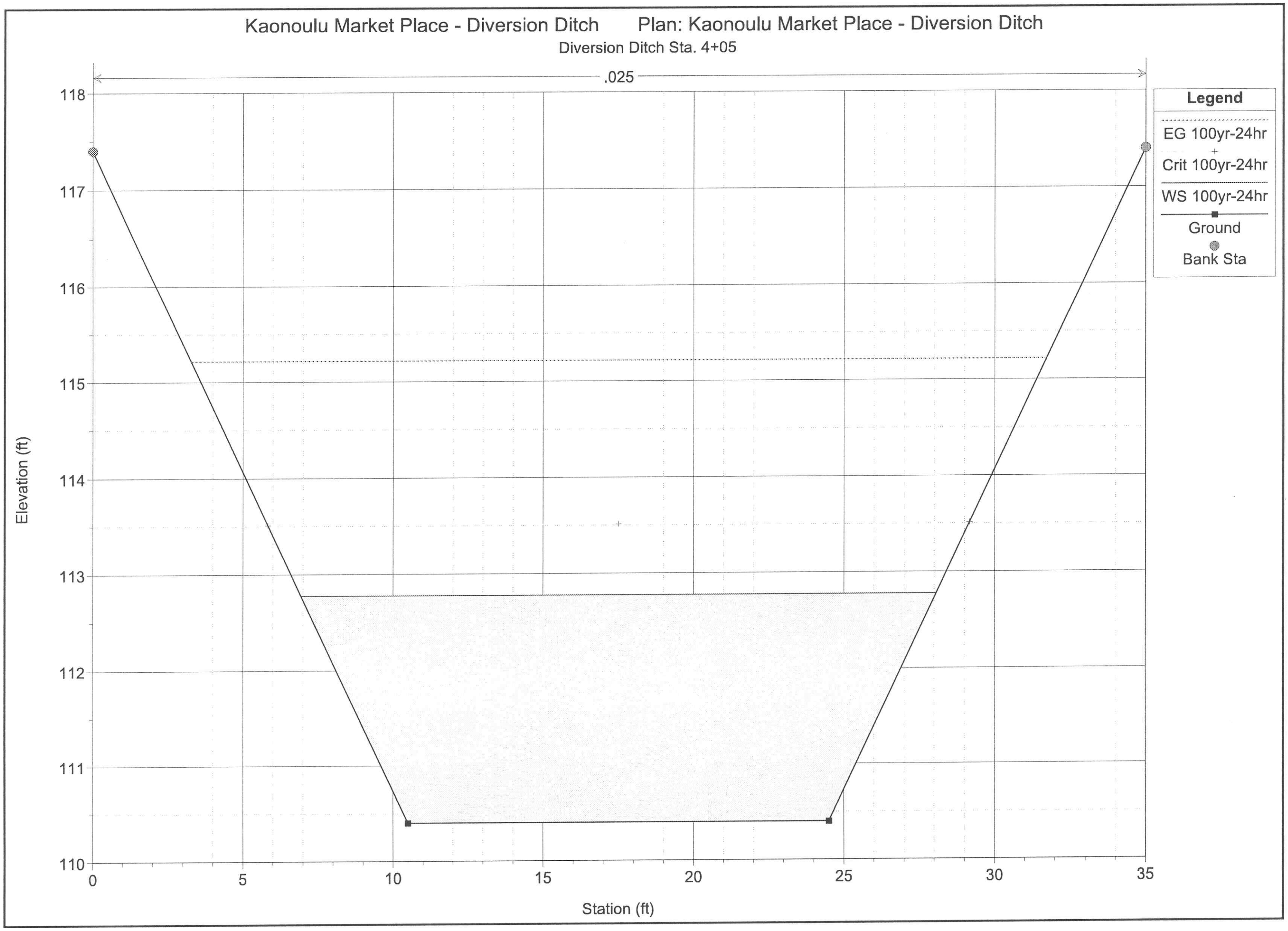
Kaonoulu Market Place - Diversion Ditch Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 0+50
.015
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
128
126
124
122
120
118
116
114
0
5
10
15
20
25
30
35
Station (ft)

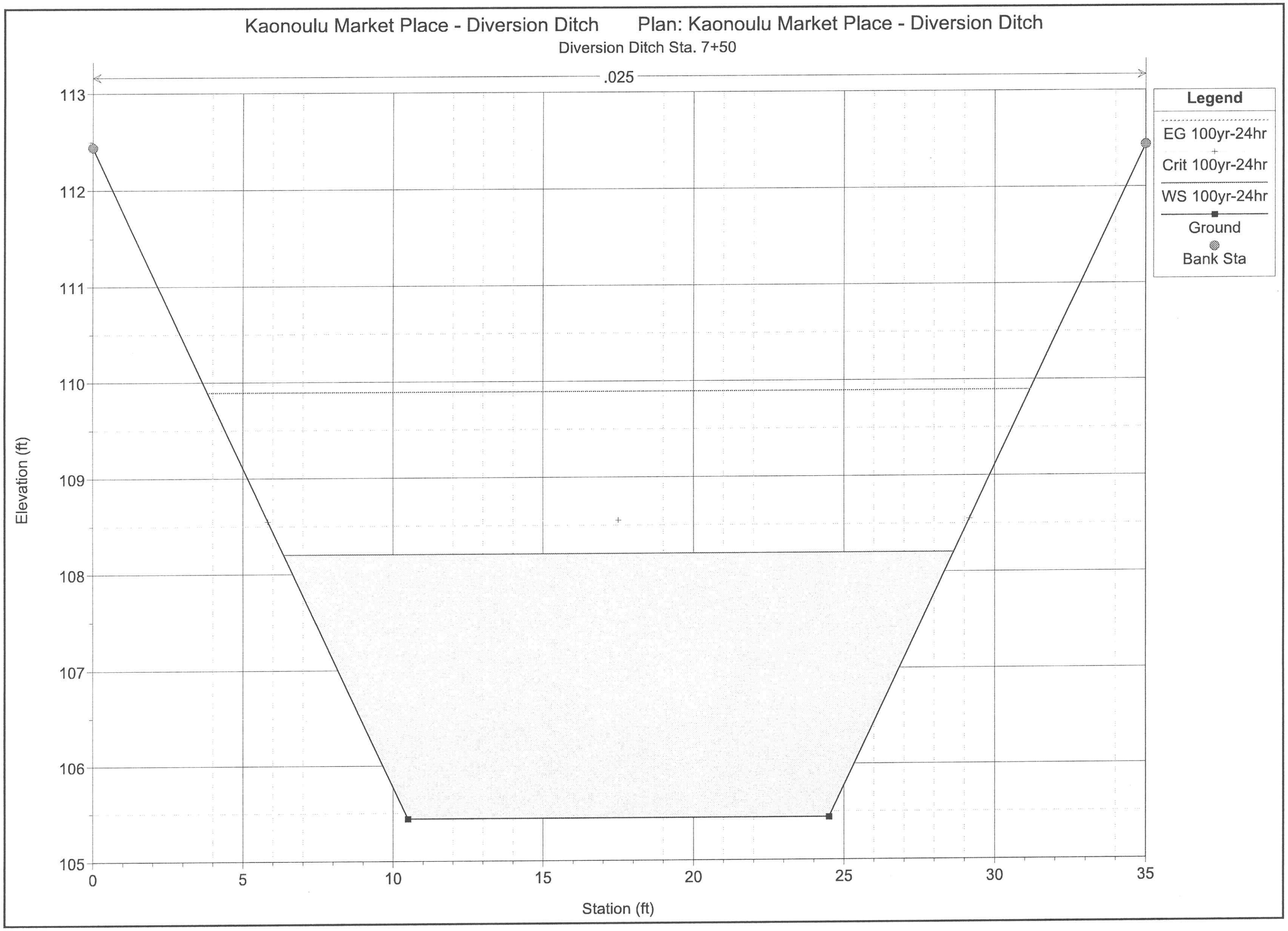

Kaonoulu Market Place - Diversion Ditch
Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 0+91.01
.025
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
Station (ft)
124
122
120
118
116
114
0
5
10
15
20
25


Kaonoulu Market Place - Diversion Ditch
Plan: Kaonoulu Market Place - Diversion Ditch
Upstream Boundary of Diversion Ditch Sta. 2+50
.025
Legend
EG 100yr-24hr
WS 100yr-24hr
Crit 100yr-24hr
Ground
Bank Sta
Elevation (ft)
122
120
118
116
114
112
0
5
10
15
20
25
Station (ft)

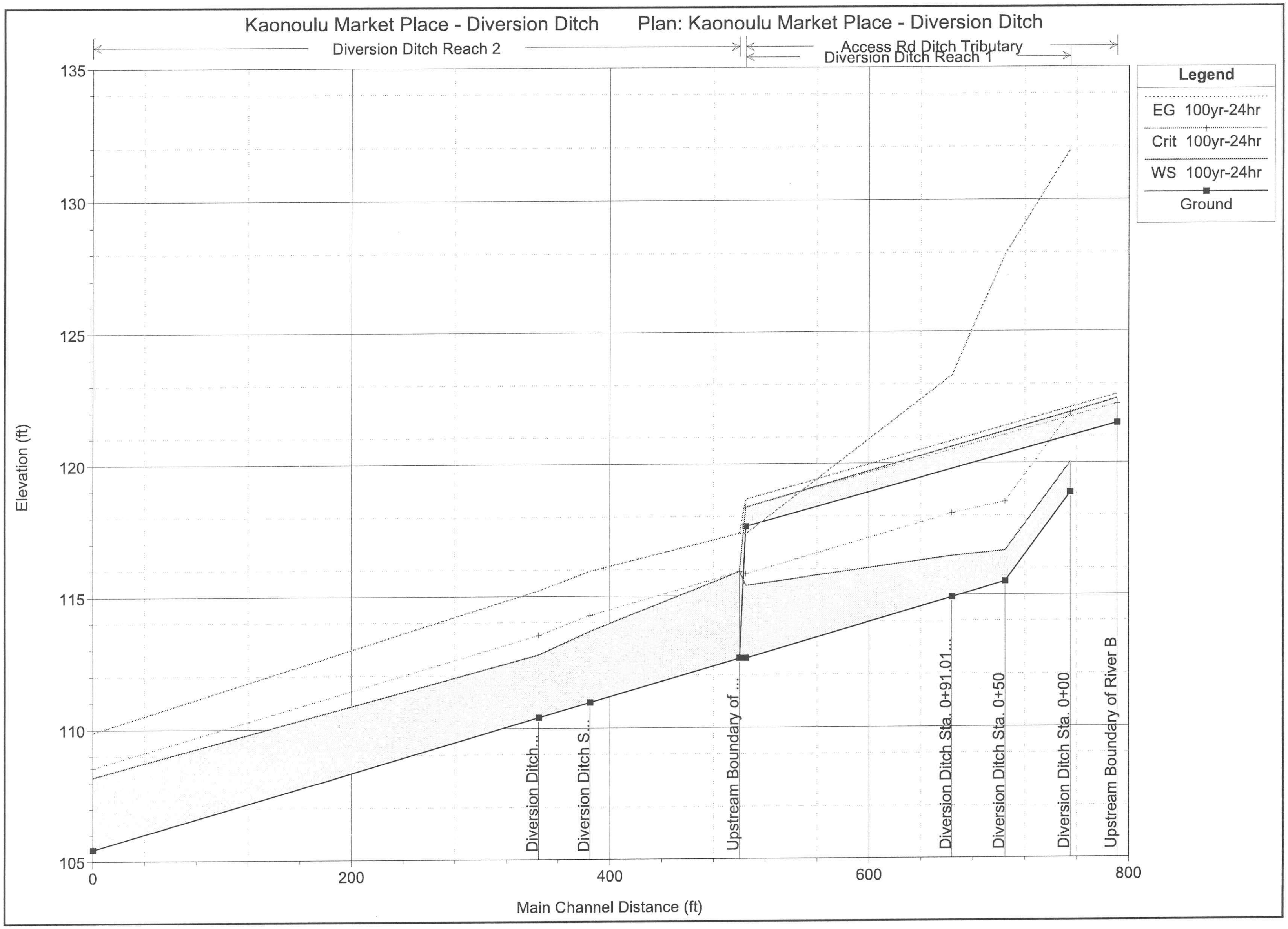


Kaonoulu Market Place - Diversion Ditch
Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 3+65.32
.025
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
120
118
116
114
112
110
0
5
10
15
20
25
Station (ft)


Kaonoulu Market Place - Diversion Ditch Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 4+05
.025
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
Station (ft)
118
117
116
115
114
113
112
111
110
0
5
10
15
20
25
30
35

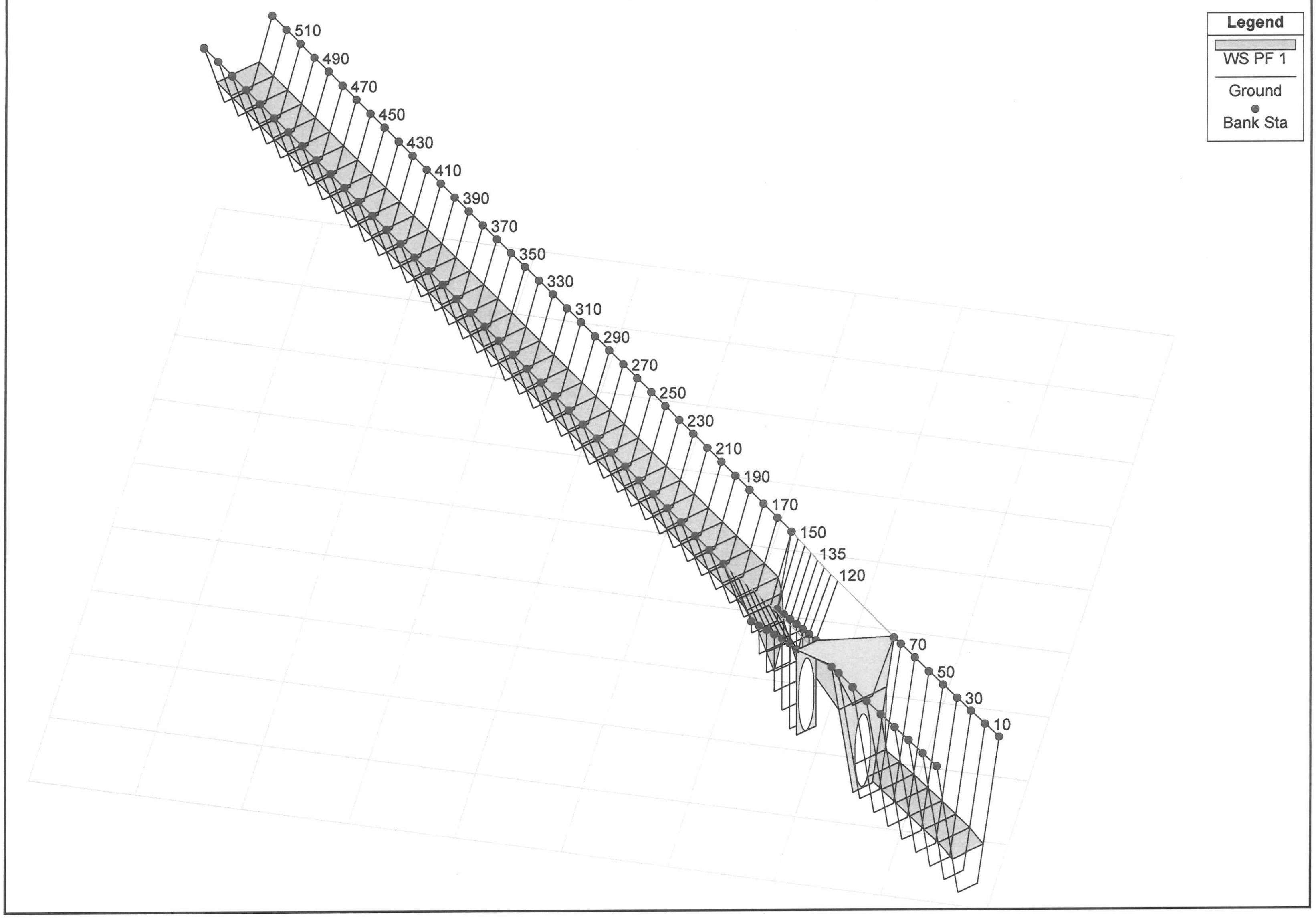


Kaonoulu Market Place - Diversion Ditch Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Sta. 7+50
.025
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Bank Sta
Elevation (ft)
113
112
111
110
109
108
107
106
105
0
5
10
15
20
25
30
35
Station (ft)



Kaonoulu Market Place - Diversion Ditch Plan: Kaonoulu Market Place - Diversion Ditch
Diversion Ditch Reach 2
Access Rd Ditch Tributary
Diversion Ditch Reach 1
Legend
EG 100yr-24hr
Crit 100yr-24hr
WS 100yr-24hr
Ground
Elevation (ft)
Main Channel Distance (ft)
Diversion Ditch...
Diversion Ditch S...
Upstream Boundary of ...
Diversion Ditch Sta. 0+91.01...
Diversion Ditch Sta. 0+50
Diversion Ditch Sta. 0+00
Upstream Boundary of River B

KaonouluDiversionDitchIntercptorChannelT Plan: 1) Plan 01



HEC-RAS Plan: Plan 01 River: Diversion Ditch Reach: One Profile: PF 1

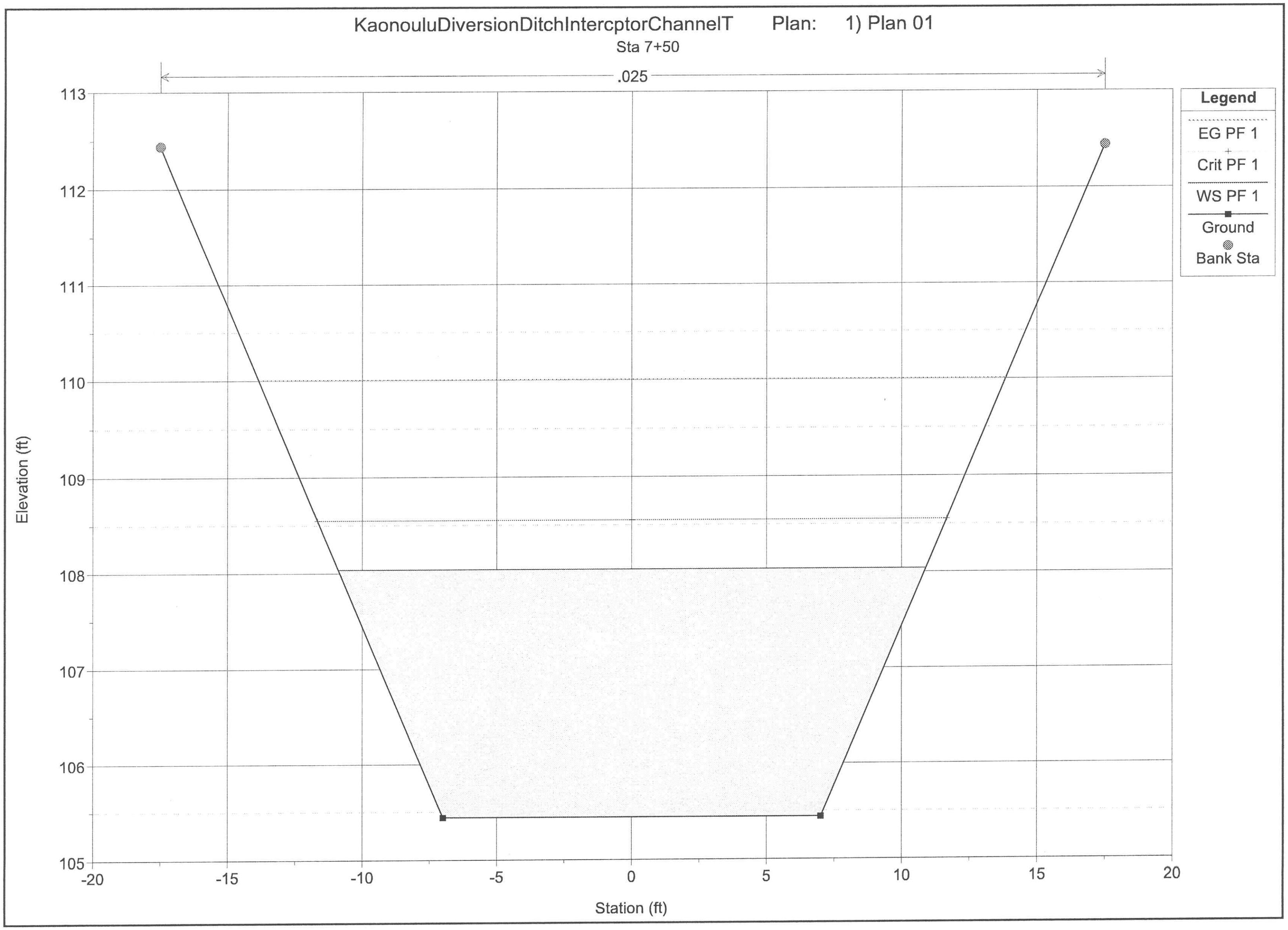
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
One	520	PF 1	523.00	110.76	113.35	113.87	115.33	0.014402	11.27	46.39	21.78	1.36
One	510	PF 1	523.00	110.62	113.24	113.73	115.17	0.013949	11.15	46.91	21.85	1.34
One	500	PF 1	523.00	110.47	113.07	113.58	115.03	0.014299	11.25	46.51	21.80	1.36
One	490	PF 1	523.00	110.33	112.93	113.44	114.89	0.014299	11.25	46.51	21.80	1.36
One	480	PF 1	523.00	110.19	112.79	113.30	114.75	0.014299	11.25	46.51	21.80	1.36
One	470	PF 1	523.00	110.04	112.65	113.15	114.60	0.014164	11.21	46.66	21.82	1.35
One	460	PF 1	523.00	109.90	112.51	113.01	114.46	0.014164	11.21	46.66	21.82	1.35
One	450	PF 1	523.00	109.75	112.35	112.86	114.31	0.014322	11.25	46.48	21.79	1.36
One	440	PF 1	523.00	109.61	112.21	112.72	114.17	0.014322	11.25	46.48	21.79	1.36
One	430	PF 1	523.00	109.47	112.07	112.58	114.03	0.014322	11.25	46.48	21.79	1.36
One	420	PF 1	523.00	109.32	111.92	112.43	113.88	0.014191	11.22	46.63	21.81	1.35
One	410	PF 1	523.00	109.18	111.78	112.29	113.74	0.014191	11.22	46.63	21.81	1.35
One	400	PF 1	523.00	109.04	111.64	112.15	113.60	0.014191	11.22	46.63	21.81	1.35
One	390	PF 1	523.00	108.89	111.49	112.00	113.45	0.014345	11.26	46.46	21.79	1.36
One	380	PF 1	523.00	108.75	111.35	111.86	113.31	0.014345	11.26	46.46	21.79	1.36
One	370	PF 1	523.00	108.60	111.20	111.71	113.16	0.014219	11.22	46.60	21.81	1.35
One	360	PF 1	523.00	108.46	111.06	111.57	113.02	0.014219	11.22	46.60	21.81	1.35
One	350	PF 1	523.00	108.32	110.92	111.43	112.88	0.014219	11.22	46.60	21.81	1.35
One	340	PF 1	523.00	108.17	110.77	111.28	112.74	0.014368	11.26	46.43	21.78	1.36
One	330	PF 1	523.00	108.03	110.63	111.14	112.60	0.014368	11.26	46.43	21.78	1.36
One	320	PF 1	523.00	107.89	110.49	111.00	112.46	0.014368	11.26	46.43	21.78	1.36
One	310	PF 1	523.00	107.74	110.34	110.85	112.30	0.014246	11.23	46.57	21.80	1.35
One	300	PF 1	523.00	107.60	110.20	110.71	112.16	0.014246	11.23	46.57	21.80	1.35
One	290	PF 1	523.00	107.45	110.04	110.56	112.02	0.014391	11.27	46.41	21.78	1.36
One	280	PF 1	523.00	107.31	109.90	110.42	111.88	0.014391	11.27	46.41	21.78	1.36
One	270	PF 1	523.00	107.17	109.76	110.28	111.74	0.014391	11.27	46.41	21.78	1.36
One	260	PF 1	523.00	107.02	109.62	110.13	111.58	0.014273	11.24	46.54	21.80	1.36
One	250	PF 1	523.00	106.88	109.48	109.99	111.44	0.014273	11.24	46.54	21.80	1.36
One	240	PF 1	523.00	106.74	109.34	109.85	111.30	0.014273	11.24	46.54	21.80	1.36
One	230	PF 1	523.00	106.59	109.18	109.70	111.16	0.014414	11.28	46.38	21.78	1.36
One	220	PF 1	523.00	106.45	109.04	109.56	111.02	0.014414	11.28	46.38	21.78	1.36
One	210	PF 1	523.00	106.30	108.90	109.41	110.86	0.014300	11.25	46.51	21.80	1.36
One	200	PF 1	523.00	106.16	108.76	109.27	110.72	0.014300	11.25	46.51	21.80	1.36
One	190	PF 1	523.00	106.02	108.62	109.13	110.58	0.014300	11.25	46.51	21.80	1.36
One	180	PF 1	523.00	105.87	108.48	108.98	110.43	0.014166	11.21	46.66	21.82	1.35
One	170	PF 1	523.00	105.73	108.34	108.84	110.29	0.014166	11.21	46.66	21.82	1.35
One	160	PF 1	523.00	105.59	108.20	108.70	110.15	0.014166	11.21	46.66	21.82	1.35
One	150	PF 1	523.00	105.44	108.04	108.55	110.00	0.014324	11.25	46.48	21.79	1.36

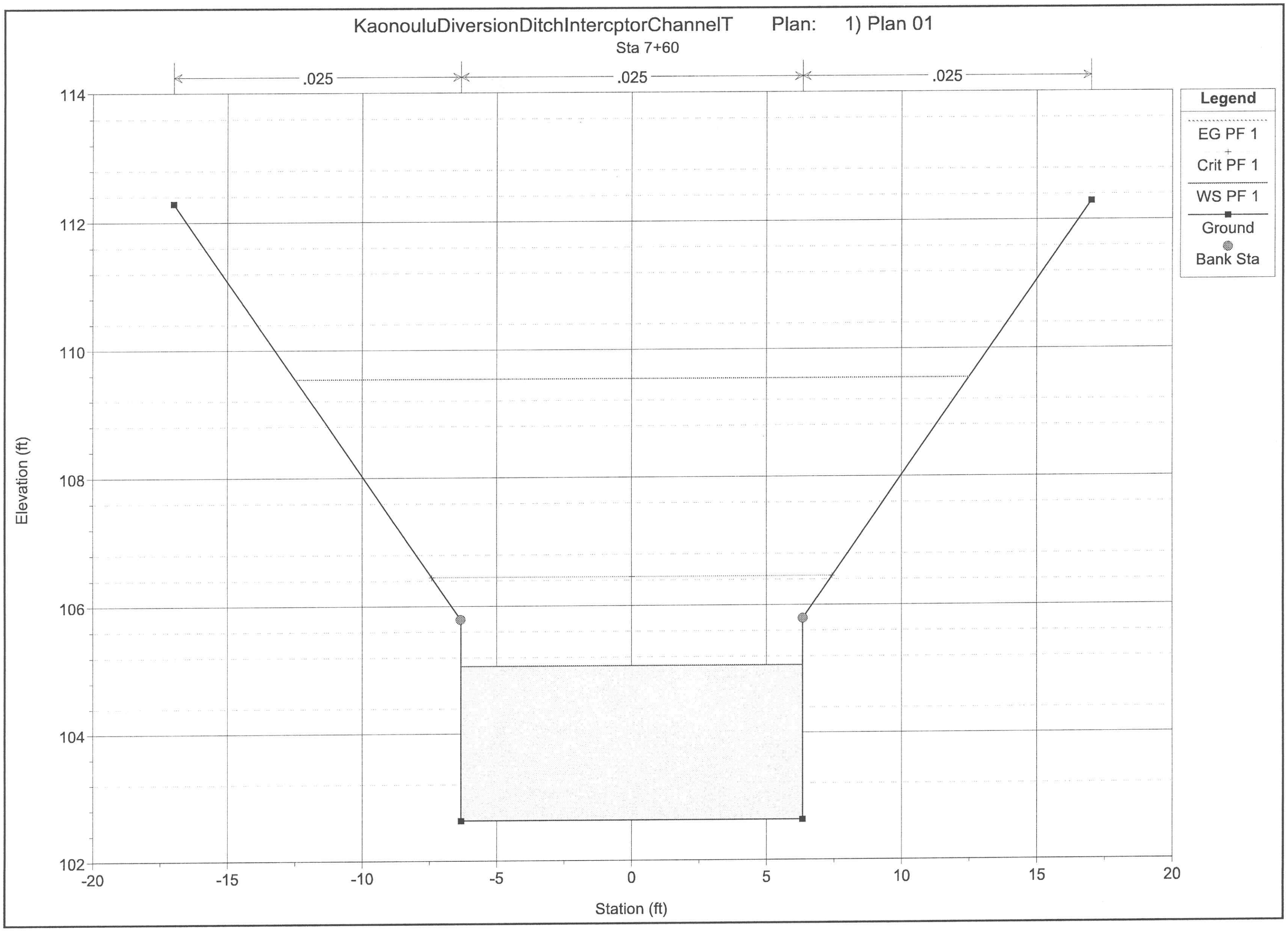
HEC-RAS Plan: Plan 01 River: Diversion Ditch Reach: One Profile: PF 1 (Continued)

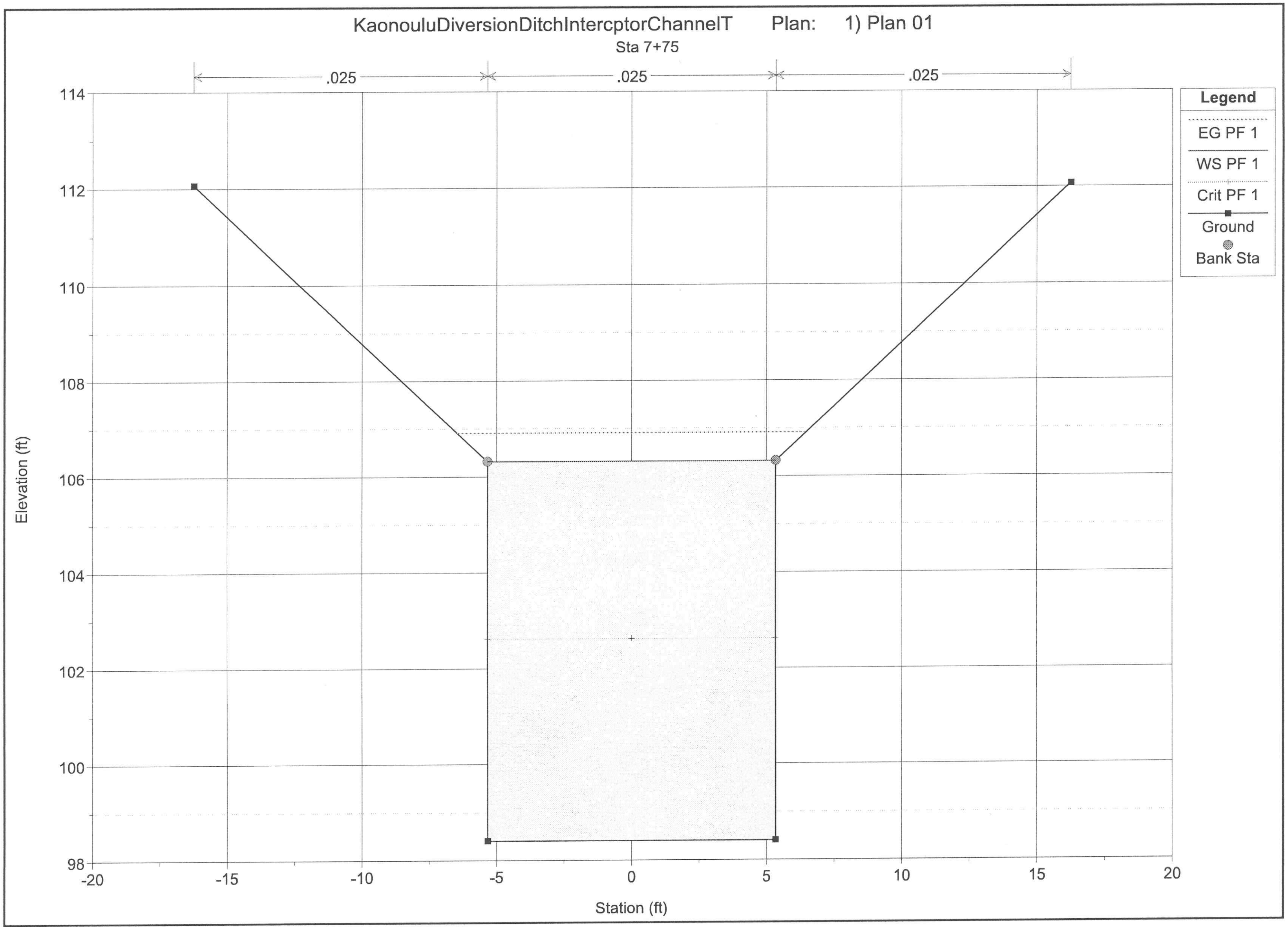
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
One	145	PF 1	523.00	104.33	107.13	107.95	109.85	0.016404	13.45	40.96	18.09	1.42
One	140	PF 1	523.00	102.63	105.06	106.45	109.54	0.038489	16.98	30.80	12.68	1.92
One	135	PF 1	523.00	101.22	103.49	105.10	109.19	0.053235	19.15	27.31	12.01	2.24
One	130	PF 1	523.00	99.81	102.02	103.85	108.78	0.066346	20.86	25.07	11.35	2.47
One	125	PF 1	523.00	98.41	106.31	102.62	106.91	0.002325	6.20	84.29	10.68	0.39
One	120	PF 1	523.00	97.00	106.38	101.38	106.86	0.001813	5.57	93.90	10.02	0.32
One	115		Culvert									
One	70	PF 1	523.00	96.28	100.34	100.23	101.87	0.007716	9.93	52.65	15.95	0.96
One	60	PF 1	523.00	96.13	100.38	100.08	101.75	0.006594	9.39	55.71	16.23	0.89
One	50	PF 1	523.00	95.99	100.40		101.65	0.005800	8.96	58.34	16.47	0.84
One	40	PF 1	523.00	95.94	100.33		101.59	0.005872	9.00	58.08	16.44	0.84
One	30	PF 1	523.00	95.89	100.27		101.54	0.005952	9.05	57.80	16.42	0.85
One	20	PF 1	523.00	95.84	100.20		101.48	0.006042	9.10	57.49	16.39	0.86
One	10	PF 1	523.00	95.79	100.12	99.74	101.42	0.006184	9.17	57.01	16.35	0.87
One	0	PF 1	523.00	95.74	99.69	99.69	101.33	0.008434	10.25	51.00	15.80	1.01

Kaonoulu Market Place Diversion Ditch-Interceptor Channel Hydraulic Grade Line for 100-year 24-hr Storm

Sta	HEC-RAS Sta	Min Channel Elevation (ft)	W.S. Elevation (ft)	Top Width (ft)	Depth (ft)
3+80	520	110.76	113.35	21.78	2.59
3+90	510	110.62	113.24	21.85	2.62
4+00	500	110.47	113.07	21.80	2.60
4+10	490	110.33	112.93	21.80	2.60
4+20	480	110.19	112.79	21.80	2.60
4+30	470	110.04	112.65	21.82	2.61
4+40	460	109.90	112.51	21.82	2.61
4+50	450	109.75	112.35	21.79	2.60
4+60	440	109.61	112.21	21.79	2.60
4+70	430	109.47	112.07	21.79	2.60
4+80	420	109.32	111.92	21.81	2.60
4+90	410	109.18	111.78	21.81	2.60
5+00	400	109.04	111.64	21.81	2.60
5+10	390	108.89	111.49	21.79	2.60
5+20	380	108.75	111.35	21.79	2.60
5+30	370	108.60	111.20	21.81	2.60
5+40	360	108.46	111.06	21.81	2.60
5+50	350	108.32	110.92	21.81	2.60
5+60	340	108.17	110.77	21.78	2.60
5+70	330	108.03	110.63	21.78	2.60
5+80	320	107.89	110.49	21.78	2.60
5+90	310	107.74	110.34	21.80	2.60
6+00	300	107.60	110.20	21.80	2.60
6+10	290	107.45	110.04	21.78	2.59
6+20	280	107.31	109.90	21.78	2.59
6+30	270	107.17	109.76	21.78	2.59
6+40	260	107.02	109.62	21.80	2.60
6+50	250	106.88	109.48	21.80	2.60
6+60	240	106.74	109.34	21.80	2.60
6+70	230	106.59	109.18	21.78	2.59
6+80	220	106.45	109.04	21.78	2.59
6+90	210	106.30	108.90	21.80	2.60
7+00	200	106.16	108.76	21.80	2.60
7+10	190	106.02	108.62	21.80	2.60
7+20	180	105.87	108.48	21.82	2.61
7+30	170	105.73	108.34	21.82	2.61
7+40	160	105.59	108.20	21.82	2.61
7+50	150	105.44	108.04	21.79	2.60
7+55	145	104.33	107.13	18.09	2.80
7+60	140	102.63	105.06	12.68	2.43
7+65	135	101.22	103.49	12.01	2.27
7+70	130	98.41	106.31	10.68	7.90
7+75	125	97.00	106.38	10.02	9.38
7+80	120				
7+85	115				
7+90	110				
7+95	105		96-inch CAP Culvert		
8+00	100				
8+10	90				
8+20	80				
8+30	70				
8+40	60				
8+50	50				
8+60	40				
8+70	30				
8+80	20				
8+90	10				
9+00	0				


KaonouluDiversionDitchIntercptorChannelT Plan: 1) Plan 01
Sta 7+50
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
113
112
111
110
109
108
107
106
105
-20
-15
-10
-5
0
5
10
15
20


KaonouluDiversionDitchIntercptorChannelT Plan: 1) Plan 01
Sta 7+60
.025
.025
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
114
112
110
108
106
104
102
-20
-15
-10
-5
0
5
10
15
20
Station (ft)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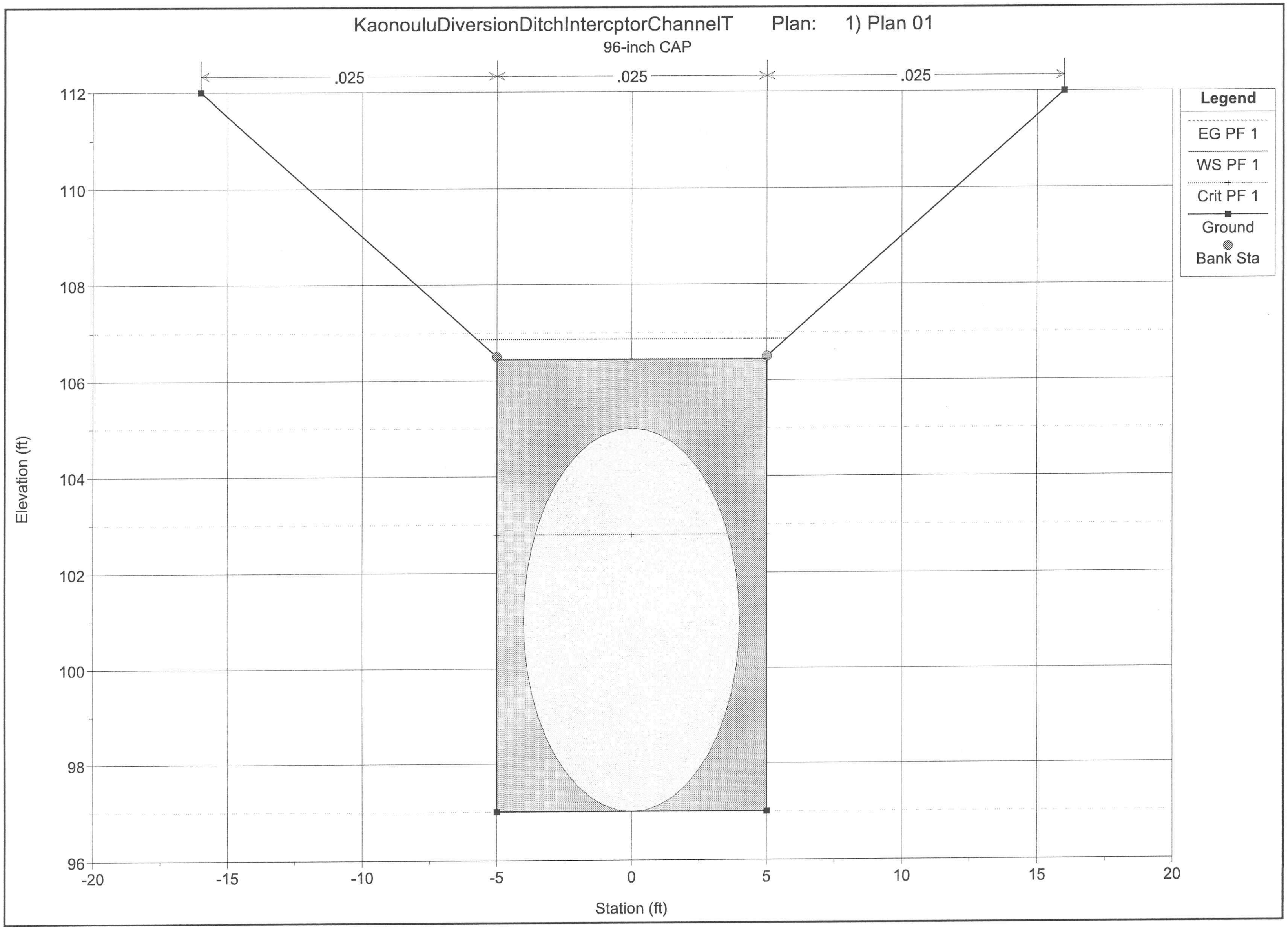
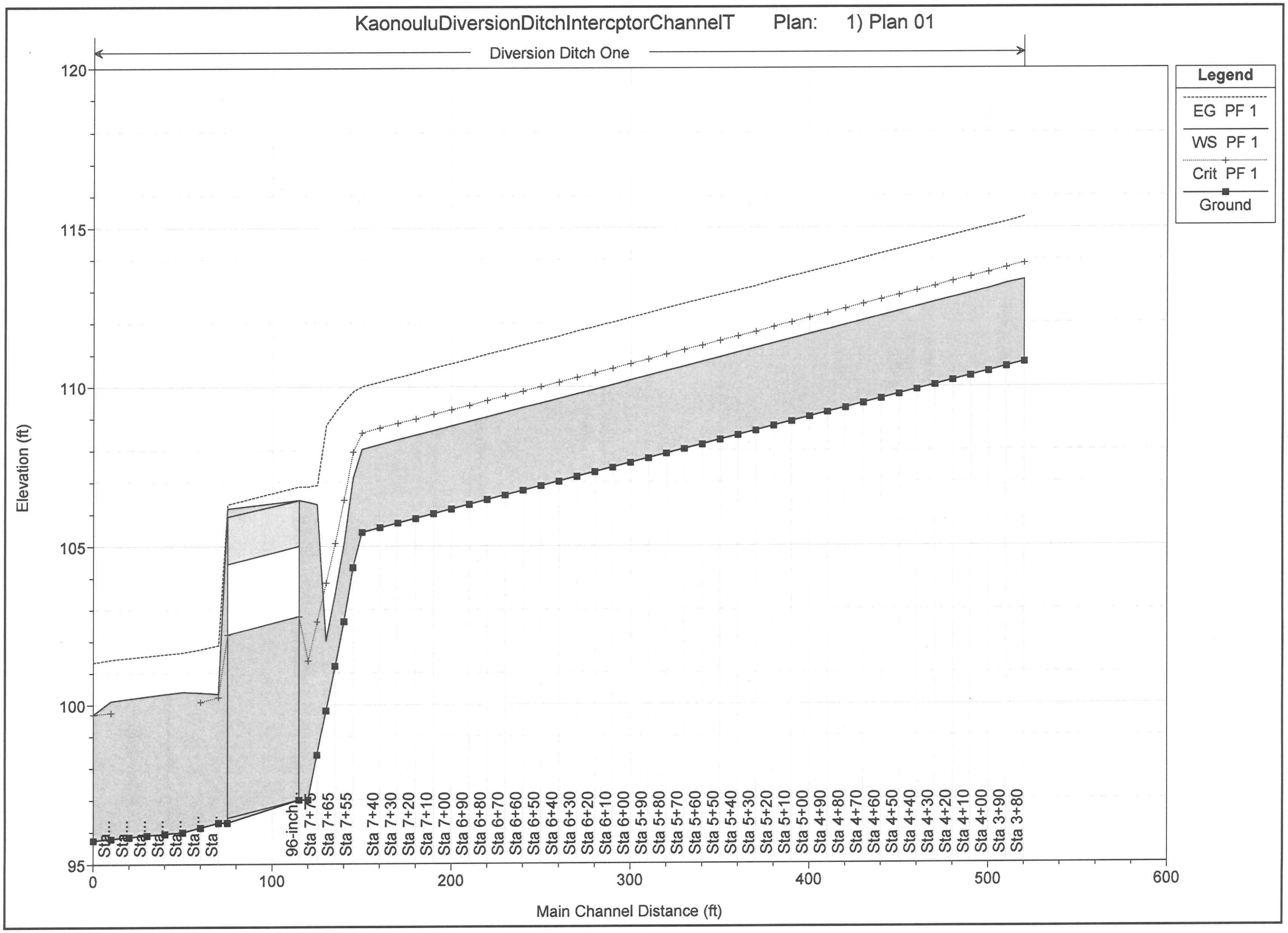
Sta 7+75
.025
.025
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
114
112
110
108
106
104
102
100
98
-20
-15
-10
-5
0
5
10
15
20



KaonouluDiversionDitchIntercptorChannelT Plan: 1) Plan 01
96-inch CAP
.025
.025
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
112
110
108
106
104
102
100
98
96
-20
-15
-10
-5
0
5
10
15
20
Station (ft)



KaonouluDiversionDitchIntercptorChannelT Plan: 1) Plan 01
Diversion Ditch One
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
Main Channel Distance (ft)
96-inch
Sta 7+75
Sta 7+65
Sta 7+55
Sta 7+40
Sta 7+30
Sta 7+20
Sta 7+10
Sta 7+00
Sta 6+90
Sta 6+80
Sta 6+70
Sta 6+60
Sta 6+50
Sta 6+40
Sta 6+30
Sta 6+20
Sta 6+10
Sta 6+00
Sta 5+90
Sta 5+80
Sta 5+70
Sta 5+60
Sta 5+50
Sta 5+40
Sta 5+30
Sta 5+20
Sta 5+10
Sta 5+00
Sta 4+90
Sta 4+80
Sta 4+70
Sta 4+60
Sta 4+50
Sta 4+40
Sta 4+30
Sta 4+20
Sta 4+10
Sta 4+00
Sta 3+90
Sta 3+80

APPENDIX C
Water Demand Calculations

APPENDIX C-1

Potable and Non-Potable Water Demand Calculation

PIILANI PROMENADE
Projected Daily Water Demand

POTABLE WATER	Base Unit		Consumption Rate[1]		Average Daily Demand			Max. Daily Demand
Multi-Family Residential	226 units	x	392 gals/unit [2]	==>	88,592 gpd	x 1.5	==>	132,888 gpd
Business Commercial	530,706 s.f.	x	140 gals/1000 s.f.	==>	74,299 gpd	x 1.5	==>	111,448 gpd
Light Industrial	57,588 s.f.	x	140 gals/1000 s.f.	==>	8,062 gpd	x 1.5	==>	12,093 gpd
Subtotal - Potable Water					170,953 gpd			256,430 gpd

NON-POTABLE WATER	Base Unit		Consumption Rate*		Average Daily Demand			Max. Daily Demand
Multi-Family Residential	226 units	x	168 gals/unit [3]	==>	37,968 gpd	x 1.5	==>	56,952 gpd
Park	2.3 Ac.	x	1,700 gals/Acre	==>	3,910 gpd	x 1.5	==>	5,865 gpd
Onsite Landscaping	21.0 Ac.	x	1,700 gals/Acre	==>	35,700 gpd	x 1.5	==>	53,550 gpd
Kaonoulu Street Landscaping	1.7 Ac.	x	1,700 gals/Acre	==>	2,890 gpd	x 1.5	==>	4,335 gpd
Subtotal - Non-Potable Water					80,468 gpd			120,702 gpd
COMBINED TOTAL					251,421 gpd			377,132 gpd

Notes:

[1] Consumption rates taken from Water System Standards, Department of Water Supply County of Maui, State of Hawaii, 2002, Table 100-18, p. 111-3.

[2] Multi-Family domestic consumption estimated to be 70% of total consumption:
MF domestic consumption = 560 gpd x 70% = 392 gpd

[3] Multi-Family irrigation consumption estimated to be 30% of total consumption:
MF irrigation consumption = 560 gpd x 30% = 168 gpd

APPENDIX C-2

Available Meter Capacity vs. Projected Demand

ADEQUACY OF DOMESTIC WATER METER CAPACITY AVAILABLE TO PIILANI PROMENADE

Compare available water meter capacity to projected capacity needed to complete build-out of Piilani Promenade.

Available Water Meter Capacity

Combined normal flow capacity of three 3-inch water meters already issued to Piilani Promenade by Maui County Dept. of Water Supply:

3 meters x 350 gpm/meter[1] = 1050 gpm

Needed Water Meter Capacity (Projected)

Needed Meter Capacity

= Average Daily Domestic Demand x Peaking Factor

= 171,000 gpd X 5.0

= 594 gpm

Since 1050 gpm < 594 gpm, available meter capacity should be adequate to meet projected need.

October 24, 2013

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---

[1] Safe Maximum Operating Capacity of 3-inch cold water meter per AWWA C701-88.

APPENDIX C-3

Fire Flow Demand Calculation

PRELIMINARY ISO FIRE FLOW DEMAND[1] CALCULATION FOR PIILANI PROMENADE

Required Fire Flow, $F = 18\ C\ A^{0.5}$

Where: C = Construction Type Coefficient
A = Total Floor Area

C = 0.8 (Non-combustible construction)
A = 160,000 sq.ft.
F = $18(0.8)(160,000)^{0.5}$
= 5760 gpm ==> 5750 gpm (Rounded to nearest 250 gpm)

CLOSEST BUILDINGS:

100 ft. to North
150+ ft. to South
150+ ft. to East
150+ ft. to West

ADJUSTMENTS FOR HAZARD AND EXPOSURE:

	5750 gpm	
-	0 gpm	(No adjustment for Occupancy)
+	575 gpm	(+10% Building Separation to North)
+	0 gpm	(+0% Building Separation to South)
+	0 gpm	(+0% Building Separation to East)
+	0 gpm	(+0% Building Separation to West)
	6325 gpm	

[1]Based on Insurance Services Office, "Guide for the Determination of Required Fire Flow", Second Edition, December 1974.

ADJUSTMENT FOR AUTOMATIC SPRINKLER PROTECTION:

```
     6325 gpm
-    4745 gpm (-75% Reduction for Automatic Fire Sprinklers)
+    1000 gpm (Estimated flow demand from fire sprinklers)
+     500 gpm (Additional hose streams)
     ________

     3080 gpm  ==>  3000 gpm (Rounded to nearest 250 gpm)
```

October 24, 2013

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APPENDIX D
Wastewater Calculations

PIILANI PROMENADE
Projected Daily Sewer Demand

RESIDENTIAL	Base Unit		Contribution Rate[1]				Average Daily Sewer Demand
Multi-Family Residential	226 units	x	255 gals/unit/day			==>	57,630 gpd

COMMERCIAL	Base Unit		No. Persons		Contribution Rate		Average Daily Sewer Demand
Business Commercial	530,706 s.f.	÷	200 s.f./person	x	20 gpcpd	==>	53,071 gpd
Light Industrial	57,588 s.f.	÷	500 s.f./person	x	25 gpcpd	==>	2,879 gpd
Subtotal							55,950 gpd

COMBINED TOTAL	113,580 gpd

Note:
[1] Contribution rates taken from County of Maui, Wastewater Reclamation Division, "Wastewater Flow Standards," February 2, 2000.

APPENDIX M
Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT FOR

PIILANI PROMENADE

IN KIHEI, MAUI, HAWAII

Prepared For

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Dallas, Texas 75225

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Kaneohe, Hawai‘I 96744
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June 6, 2014

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1. INTRODUCTION

Phillip Rowell and Associates has been retained to update the Traffic Impact Analysis Report for the proposed Piilani Promenade project in Kihei, Maui, Hawaii. This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

Project Location and Description

The following is a summary of the project:

1. The project is located along the mauka (east) side of Piilani Highway opposite Kaonoulu Street in the Kihei area of Maui. Figure 1 indicates the approximate location in the Kihei area.

2. A preliminary site plan indicating the approximate locations of buildings and driveways is provided as Figure 2.

3. Primary access to and egress from the project will be provided by extension of Kaonoulu Street mauka of Piilani Highway. This extension is referred to as East Kaonoulu Street. Initially, this extension will be through the project only. In the future, this road will be extended to Haleakala Highway at Haliiemaile Road, providing a connection between Kihei and Upcountry (Upcountry Highway).

4. There will be four (4) driveways along East Kaonoulu Street to serve the project. Refer to Figure 3.

    a. Drive A is the major access and egress driveway. This driveway is located approximately 600 feet east of Piilani Highway. This will be a full access, signalized intersection.

b. Drive B is located approximately midway between Piilani Highway and Drive A. Drive B provides for right turns only into and out of the north parcel and the south parcel. This intersection is unsignalized.

c. Drive C is located approximately 500 feet east of Drive A. This driveway provides service to the south parcel and future affordable housing units (Honua'ula Off-site Affordable Housing) to be located along the north side of East Kaonoulu Street and east of the North Parcel. All movements will be allowed and the intersection will be unsignalized.

d. Drive D is located approximately 300 feet east of Drive C near the eastern property line of the project. This driveway is behind the last building and will most likely be used be service and employee vehicles. Anticipated use of this driveway is minimal.

4. The extension of Kaonoulu Street will divide the project into two parcels. The north parcel will consist of approximately 100,000 square feet of business commercial, approximately 226 rental apartment units and approximately 5 acres of light industrial uses. The south parcel will consist of approximately 430,000 square feet of business commercial.

5. It is understood that the objective of this project is to provide services for the tourist and residents of the Kihei area and that marketing efforts will be directed toward the South Maui area.

6. The intersection of Piilani Highway at Kaonoulu Street will be signalized and improved to accommodate additional left turn lanes, acceleration lanes and deceleration lanes. This study will determine the final lane configuration.

7.

8. Estimated completion date for the project is 2018. The year 2018 is used as the design year to be consistent with other projects in the area and Institute of Transportation Engineers guidelines.

Study Methodology

The following is a summary list of the tasks performed:

1. State of Hawaii Department of Transportation officials were contacted to confirm the study area and the scope of work.

2. A field reconnaissance was performed to identify existing roadway cross-sections, intersection lane configurations, traffic control devices, and surrounding land uses.

3. Existing weekday and Saturday peak hour traffic volumes were obtained for the study intersections. Existing levels-of-service of the study intersections were determined using the methodology described in the *2000 Highway Capacity Manual*.

4. Existing traffic operating deficiencies were identified. Improvements to mitigate these deficiencies were identified and assessed.

5. A list of related development projects within and adjacent to the study area that will impact traffic conditions at the study intersections was compiled. This list included both development projects and anticipated highway improvement projects.

6. Future background traffic volumes at the study intersections without traffic generated by the study project were estimated. Intersections that are not expected to operate at acceptable levels-of-service were identified. Mitigation measures were identified and assessed.

7. Peak hour traffic that the proposed project will generate was estimated using trip generation analysis procedures recommended by the Institute of Transportation Engineers. Project generated traffic was distributed and assigned to the adjacent roadway network.

8. A level-of-service analysis for future traffic conditions with traffic generated by the study project was performed.

9. The impacts of traffic generated by the proposed project at the study intersections was quantified and summarized. Locations that project generated traffic significantly impacts traffic operating conditions were identified.

10. Improvements or modifications necessary to mitigate the traffic impacts of the project and to provide adequate access to and egress from the site were identified and analyzed.

11. Based on discussions with State of Hawaii Department of Transportation, it was concluded that construction of the Upcountry Highway is not likely until after 2018, the design year for this project. To insure that the intersection of Piilani Highway at Kaonoulu Street is designed to accommodate additional traffic associated with the extension of East Kaonoulu Street, a separate analysis of this intersection was performed to determine the ultimate intersection configuration.

12. A report documenting the conclusions of the analyses performed and recommendations was prepared.

Study Area

The study area for this study is consistent with the study area used in the preparation of traffic studies for other projects in the area. The study intersections are listed in Table 1.

Table 1 Study Intersections

Number	Intersection	Jurisdiction	Existing Right-of-Way Control
1	Piilani Highway at Ohukai Road	State	Signals
2	Piilani Highway at Kaiwahine Street & Uwapo Road	State	Signals
3	Piilani Highway at Mokulele Highway & North Kihei Road	State	Signals
4	North Kihei Road at South Kihei Road	State	Signals
5	Piilani Highway at Piikea Avenue	State	Signals
6	Piilani Highway at Kaonoulu Street	State	Stop Sign
7	Kaonoulu Street at South Kihei Road	County	Stop Sign
8	Piilani Highway at Kulanihakoi Street	State	Stop Sign
9	Kaonoulu Street at Kenolio Road	County	Stop Sign
10	Kaonoulu Street at Alulike Street	County	Stop Sign

Order of Presentation

Chapter 2 describes existing traffic conditions, the Level-of-Service (LOS) concept and the results of the Level-of-Service analysis of existing conditions.

Chapter 3 describes the process used to estimate 2018 background traffic volumes and the resulting background traffic projections. Background conditions are defined as future background traffic conditions without traffic generation by the study project.

Chapter 4 describes the methodology used to estimate the traffic characteristics of the proposed project, including 2018 background plus project traffic projections.

Chapter 5 describes the traffic impacts of the proposed project, conclusions of the impact analysis and recommended mitigation measures.

Chapter 6 describes the impacts of the Honua'ula Off-Site Affordable Housing project at the study intersections.

Chapter 7 describes the long range traffic projections along Piilani Highway.

Chapter 8 describes the design requirements of the intersection of Piilani Highway at Kaonoulu Street and Kaonoulu Street between Piilani Highway and the east end of the project.

Chapter 9 summarizes the recommended traffic management strategies for the proposed project.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service (LOS) concept and the results of the LOS analysis for existing conditions are also presented. The purpose of this analysis is to identify existing deficiencies and to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

Existing Streets and Intersection Controls

The primary streets and roadways serving the project are Piilani Highway, South Kihei Road and Kaonoulu Street. These streets and the lane configurations of the study intersections are shown as Figure 4. Also shown are the methods of right-of-way control at the study intersections.

Piilani Highway is a four-lane, undivided highway with a north-south orientation connecting Mokulele Highway to the north with the Wailea Resort to the south. The posted speed limit is 40 miles per hour south of Ohukai Road and 45 miles per hour north of Ohukai Road.

Ohukai Road is a basically a two-lane, two-way street, but widens to provide two approach lanes as it approaches Piilani Highway. The posted speed limit is 20 miles per hour. Both the eastbound and westbound approaches provide a through and left turn lane and a separate right turn lane. The eastbound and westbound approaches move concurrently, which means that left turns are permitted rather than protected.

Kaonoulu Street currently connects Piilani Highway with South Kihei Road. Currently, it is a two-lane, two-way street with separate left turn lanes at intersections. The posted speed limit is 20 miles per hour. The intersection with Piilani Highway is currently an unsignalized, T-intersection.

Kaiwahine Street is a two-lane, two-way residential collector street connecting the project with Piilani Highway. The posted speed limit is 20 miles per hour. Residential parking is allowed along both sides of the street.

Uwapo Road is an extension of Kaiwahine Street west of Piilani Highway to South Kihei Road. Uwapo Road is a two-lane, two-way roadway. There is no development along the north side and there are multi-family residential unit along the south side. No parking is allowed along either side. The assumed speed limit is 20 miles per hour.

Study Intersections

The study intersections were selected in consultation with State of Hawaii Department of Transportation. Generally, there are no signalized intersections north of North Kihei Road or west of South Kihei Road for several miles. The intersection of Piilani Highway at Piikea Avenue is the southernmost intersection and is approximately 1.25 miles from the project. Most of the project generated traffic has dissipated before reaching this intersection.

The intersection of Piilani Highway at Ohukai Road is located approximately 2,950 feet north of Kaonoulu Street. The intersection is a four-legged signalized intersection. The northbound and southbound approaches are Piilani Highway and the eastbound and westbound approaches are Ohukai Road. There are separate left turn lanes and separate right turn lanes along the northbound and southbound approaches of Piilani Highway. Left turns are protected. The eastbound and westbound approaches each have an optional left turn or through lane and a separate right turn lane. The eastbound and westbound approaches are split.

The intersection of Piilani Highway at Kaiwahine Street and Uwapo Road is located approximately 1,290 feet north of Ohukai Road along Piilani Highway. The intersection is a four-legged signalized intersection. The northbound and southbound approaches are Piilani Highway, the eastbound approach is Uwapo Road and the westbound approach is Kaiwahine Street. There are separate left turn lanes and separate right turn lanes along the northbound and southbound approaches of Piilani Highway. Left turns are protected. The eastbound and westbound approaches each have an optional left turn or through lane and a separate right turn lane. The eastbound and westbound left turns are permitted.

The intersection of Piilani Highway at North Kihei Road is located approximately 2,175 feet north of Uwapo Road along Piilani Highway. The intersection is a four-legged signalized intersection. The northbound approach is Piilani Highway, the southbound approach is Mokulele Highway and the eastbound and westbound approaches are North Kihei Road. The northbound approach has two left turn lanes, one through lane and an optional through or right turn lane. The southbound approach has one left turn lane, two through lanes and one right turn lane. The northbound and southbound left turns are protected. The eastbound approach has one left turn lane, an optional left turn or through lane and two right turn lanes. Right turns are allowed on right turn green arrows only. The westbound approach is one lane only.

The intersection of North Kihei Road at South Kihei Road is located approximately 1,500 feet west of Piilani Highway along North Kihei Road. The intersection is a three-legged signalized intersection. The northbound approach is South Kihei Road. The eastbound and westbound approaches are North Kihei Road. The northbound approach has two left turn lanes and one right turn lane. The eastbound approach has one through lane and one right turn lane. The westbound approach has one left turn lane and two through lanes. The westbound left turns are protected.

The intersection of Piilani Highway at Kaonoulu Street is a three-legged unsignalized intersection. The northbound and southbound approaches are Piilani Highway and the eastbound approach is Kaonoulu Street. The northbound approach has one left turn lane and two through lanes. The eastbound approach is the STOP signed controlled approach and has one left turn lane and one right lane. The right turn is channelized.

The intersection of Piilani Highway at Kulanihakoi Road is located approximately 2,100 feet south of Kaonoulu Street along Piilani Highway. The intersection is a three-legged unsignalized intersection. The northbound and southbound approaches are Piilani Highway. The northbound approach has one left turn lane and two through lanes. The southbound approach has two through lanes and one right turn lane. The eastbound approach is Kulanihakoi Road and is the STOP sign controlled approach. The Kulanihakoi Road approach has one left turn lane and one right turn lane. The eastbound to southbound right turns are channelized.

The intersection of Piilani Highway at Piikea Avenue is located approximately 3,850 feet south of Kulanihakoi Road. The intersection is a three legged signalized intersection. The northbound and southbound approaches are Piilani Highway and the eastbound approach is Piikea Avenue. The northbound approach as one left turn lane and two through lanes. The northbound left turns are protected. The southbound approach has two through lanes and one right turn lane. The eastbound approach has one left turn lane and one right turn lane.

The intersection of South Kihei Road at Kaonoulu Street is located approximately 3,230 along Kaonoulu Street west of Piilani Highway. The intersection is a three legged, STOP sign controlled intersection. The northbound and southbound approaches are South Kihei Road. The northbound approach has one optional through or right turn lane. The southbound approach has one optional left turn or through lane. The westbound approach is Kaonoulu Street and is the controlled approach. The westbound approach has one left turn lane and one right turn lane.

The intersection of Kaonoulu Street at Kenolio Road is located approximately 500 feet along Kaonoulu Street west of Piilani Highway. The intersection is a four legged STOP sign controlled intersection. The eastbound and westbound approaches are Kaonoulu Street and the northbound and southbound approaches are Kenolio Road. The northbound and southbound approaches are the controlled approaches. Each approach has a left turn lane and an optional through or right turn lane.

The intersection of Kaonoulu Street at Alulike Street is located approximately 830 feet west of Kenolio Street. The intersection is a four legged STOP sign controlled intersection. The eastbound and westbound approaches each have one left turn lane and an optional through or right turn lane. The northbound and southbound approaches are the controlled approaches and has one left turn, through or right turn lane.

Existing Peak Hour Traffic Volumes

The existing peak hour traffic volumes are shown in Figures 5, 6 and 7.

1. The traffic counts were performed during May 2013. The intersection of Piilani Highway at Piikea Avenue was added to the study area in response to comments from State of Hawaii Department of Transportation. These counts were performed in October 2013.

2. The traffic counts include buses, trucks, motorcycles, mopeds and other large vehicles. Bicycles and pedestrians were not counted.

3. The weekday traffic counts were performed between 6:00 AM and 9:00 AM and between 3:00 PM and 6:00 PM on either a Tuesday or Thursday. Several of the intersections were recounted and the recounts were performed on other days because of scheduling or unusual traffic conditions in or adjacent to the intersection. Counts that were performed on days other than Tuesday or Thursday were compared to counts of adjacent intersections to confirm consistency. If the counts were inconsistent, the intersection was recounted again.

4. Saturday traffic counts were performed from 10:00 AM to 2:00 PM with the exceptions of the intersections of North Kihei Road at South Kihei Road, Kaonoulu Street at Kenolio Road and Kaonoulu Street at Alulike Street. The intersections were counted for a shorter time period as determined from counts of adjacent intersections.

5. The traffic volumes shown are the peak hourly volume of the total intersection. The traffic volumes of adjacent intersections may not match the volumes shown for an adjacent intersection because the peak hours of the adjacent intersections may not coincide and there are driveways between the intersections.

6. Pedestrian activity was negligible at the study intersections during the traffic counts.

The traffic count summary worksheets are provided as Appendix A.

Level-of-Service Concept

Signalized Intersections

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 2. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.[1]

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 2 Level-of-Service Definitions for Signalized Intersections[(1)]

Level of Service	Interpretation	Volume-to-Capacity Ratio[(2)]	Stopped Delay (Seconds)
A	Uncongested operations; all vehicles clear in a single cycle.	0.000 - 0.700	< 10.0
B			10.1 - 20.0
C	Light congestion; occasional backups on critical approaches	0.701 - 0.800	20.1 - 35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801 - 0.900	35.1 - 55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901 - 1.000	55.1 - 80.0
F	Total breakdown with stop-and-go operation	> 1.001	> 80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

[1] Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development*, Washington, D.C., 2006, page 56 - 60

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 3 summarizes the definitions for level-of-service and the corresponding delay.

Table 3 Level-of-Service Definitions for Unsignalized Intersections(1)

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Methodology for Level-of-Service Analysis

1. Synchro 6 was used to analyze the study intersections, which is based on the *Highway Capacity Manual*.

2. The *Highway Capacity Manual* methodology does not report a volume-to-capacity ratio for unsignalized intersections or results for the overall unsignalized intersection. Synchro 6 reports an overall delay for unsignalized intersections. This overall intersection delay and the corresponding level-of-service from the table above is shown in the following tables for unsignalized intersections.

3. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.

2013 Levels-of-Service Analysis

The existing levels-of-service of the signalized study intersections are summarized in Table 4. The results shown in the table are the volume-to-capacity ratios, delays and levels-of-service of the overall intersections as reported by the *Highway Capacity Software*.

Table 4 2013 Levels-of-Service of Signalized Intersections

Intersection and Lane Group	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	V/C	Delay [1]	LOS [2]	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Highway at Ohukai Road	***0.95***	***46.7***	***D***	***0.87***	***50.3***	***D***	***0.88***	***29.7***	***C***
Eastbound Left & Thru	0.88	80.6	F	0.97	122.0	F	0.85	50.1	D
astbound Right	0.08	46.8	D	0.06	60.4	E	0.11	26.6	C
Westbound Left & Thru	**1.05**	**116.6**	**F**	**0.91**	**84.4**	**F**	**0.71**	**37.9**	**D**
Westbound Right	0.13	44.4	D	0.12	49.4	D	0.03	26.7	C
Northbound Left	0.36	61.1	E	0.70	67.9	E	0.60	40.8	D
Northbound Thru	0.86	31.7	C	0.87	47.5	D	0.92	32.5	C
Northbound Right	0.04	13.0	B	0.08	30.4	C	0.10	15.2	B
Southbound Left	0.91	100.0	F	0.71	90.1	F	0.68	40.9	D
Southbound Thru	0.97	37.3	D	0.85	33.6	C	0.82	23.4	C
Southbound Right	0.06	2.6	A	0.08	7.4	A	0.05	12.9	B
Piilani Highway at Kaiwahine Street	***0.69***	***32.0***	***C***	***0.64***	***33.3***	***C***	***0.55***	***10.4***	***B***
Eastbound Left & Thru	0.87	77.6	E	0.82	93.9	F	0.55	30.0	C
Eastbound Right	0.11	41.4	D	0.06	58.0	E	0.05	24.2	C
Westbound Left & Thru	0.61	52.2	D	0.51	63.5	E	0.43	27.4	C
Westbound Right	0.06	40.9	D	0.04	57.8	E	0.03	24.1	C
Northbound Left	0.28	31.8	C	0.50	57.2	E	0.49	30.5	C
Northbound Thru	0.64	30.3	C	0.61	32.6	C	0.51	7.5	A
Northbound Right	0.04	42.6	D	0.07	36.3	D	0.03	5.1	A
Southbound Left	0.38	45.1	D	0.60	51.4	D	0.55	30.9	C
Southbound Thru	0.57	23.1	C	0.54	22.2	C	0.59	7.7	A
Southbound Right	0.02	12.9	B	0.05	26.9	C	0.05	4.7	A
Piilani Highway at North Kihei Road	***0.66***	***30.5***	***C***	***0.86***	***48.0***	***D***	***0.58***	***16.6***	***B***
Eastbound Left	0.70	70.8	E	0.82	65.4	E	0.55	31.2	C
Eastbound Left & Thru	0.72	72.0	E	0.86	71.2	E	0.55	31.0	C
Eastbound Right	0.22	26.7	C	0.09	134.3	F	0.15	15.2	B
Westbound Left, Thru & Right	0.31	60.0	E	0.84	83.6	F	0.06	32.4	C
Northbound Left	0.71	41.2	D	0.89	77.4	E	0.55	27.0	C
Northbound Thru & Right	0.54	19.2	B	0.61	15.3	B	0.45	8.3	A
Southbound Left	0.73	172.3	F	0.57	86.1	F	0.60	62.4	E
Southbound Thru	0.66	27.0	C	0.82	41.6	D	0.70	17.9	B
Southbound Right	0.08	18.1	B	0.18	25.7	C	0.11	12.0	B
North Kihei Road at South Kihei Road	***0.39***	***19.5***	***B***	***0.53***	***22.4***	***C***	***0.51***	***10.4***	***B***
Eastbound Thru	0.27	9.7	A	0.54	29.3	C	0.39	9.9	A
Eastbound Right	0.14	8.6	A	0.30	24.5	C	0.20	8.7	A
Westbound Left	0.59	57.3	E	0.58	25.4	C	0.70	26.6	C
Westbound Thru	0.17	1.3	A	0.16	3.7	A	0.13	3.3	A
Northbound Left	0.75	54.2	D	0.32	44.2	D	0.47	16.7	B
Northbound Right	0.13	0.0	A	0.12	0.0	A	0.11	0.0	A
Piilani Highway at Piikea Avenue	***0.71***	***19.2***	***B***	***0.98***	***19.8***	***B***	***0.73***	***16.3***	***B***
Eastbound Left	0.87	71.2	E	0.99	113.8	F	0.76	29.4	C
Eastbound Right	0.51	47.4	D	0.66	71.8	E	0.17	18.5	B
Northbound left	0.67	27.9	C	0.96	57.8	E	0.74	32.7	C
Northbound Thru	0.41	6.0	A	0.54	6.7	A	0.45	6.4	A
Southbound Thru	0.60	12.0	B	0.46	1.7	A	0.71	18.7	B
Southbound Right	0.25	31.3	C	0.25	0.8	A	0.24	13.4	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix B for Level-of-Service Analysis Worksheets.

The results of the Level-of-Service analysis of the unsignalized study intersections are summarized in Table 5. The methodology for unsignalized intersections does not calculate the volume-to-capacity ratio of the controlled movements or the overall intersection. Shown in the table are the average vehicle delays and levels-of-service of the controlled movements and the weighted delay and corresponding level-of-service of the overall intersection. The weighted delays consider traffic using the uncontrolled lane groups, which has no delay because these movements do not stop or yield, and therefore indicate a lower delay than the controlled movements, even though the controlled movement may have a delay implying Level-of-Service E to F.

Table 5 2013 Levels-of-Service of Unsignalized Intersections

	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
Intersection and Lane Group	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS
Piilani Highway at Kaonoulu Street	***11.5***	***B***	***1.8***	***A***	***1.7***	***A***
Eastbound Left	72.3	F	36.0	E	24.0	C
Eastbound Right	122.6	F	24.2	C	15.6	C
Northbound Left	20.7	C	16.9	C	12.4	B
South Kihei Road at Kaonoulu Street	***2.7***	***A***	***2.9***	***A***	***3.2***	***A***
Westbound Left	29.6	D	42.7	E	32.7	D
Westbound Right	13.5	B	12.8	B	12.5	B
Southbound Left	0.6	A	1.9	A	0.6	A
Piilani Highway at Kulanihakoi Street	***5.0***	***A***	***2.0***	***A***	***1.4***	***A***
Eastbound Left	159.2	0	62.5	F	23.7	C
Eastbound Right	44.2	E	24.0	C	15.0	C
Northbound Left	24.4	C	19.3	C	11.8	B
Kaonoulu Street at Kenolio Road	***7.5***	***A***	***5.4***	***A***	***5.7***	***A***
Eastbound Left	7.5	A	7.6	A	7.5	A
Westbound Left	7.4	A	7.5	A	7.4	A
Northbound Left	0.0	A	0.0	A	0.0	A
Northbound Thru & Right	9.1	A	10.0	B	9.6	A
Southbound Left	14.5	B	14.4	B	12.2	B
Southbound Thru & Right	9.1	A	10.2	B	9.1	A
Kaonoulu Street at Alulike Street	***3.8***	***A***	***3.4***	***A***	***5.0***	***A***
Eastbound Left	7.4	A	7.5	A	7.5	A
Westbound Left	7.4	A	7.5	A	7.5	A
Northbound Left, Thru & Right	10.2	B	11.3	A	10.9	B
Southbound Left, Thru & Right	9.0	A	9.5	A	10.2	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix B for Level-of-Service Analysis Worksheets.

Existing Deficiencies

For signalized intersections, Level-of-Service D is the minimum acceptable Level-of-Service[2] and that this standard is applicable to the overall intersection and major through movements. Minor movements, such as left turns, and minor side street approaches may operate at Level-of-Service E or F for short periods of time during the peak hours so that the overall intersection and major movements along the major highway will operate at Level-of-Service D, or better. All volume-to-capacity ratios must be 1.00 or less[3].

A standard has not been established for unsignalized intersections that has been agreed to by State of Hawaii Department of Transportation. Therefore, we have used a standard that Level-of-Service D is an acceptable level-of-service for major controlled lane groups, such as left turns from a major street to a minor street. Side street approaches may operate at Level-of-Service E or F for short periods of time. This is determined from the delays of the individual lane groups. If the delay of any of the side street approaches appears to be so long that it will affect the overall level-of-service of the intersection, then mitigation measures should be accessed.

Using this standard, the following deficiencies were identified:

At the intersection of Piilani Highway at Ohukai Road, the westbound left and through lane group operates at Level-of-Service F during the morning peak hour. The volume-to-capacity ratio is 1.05 and the average vehicle delay is 116.6. This lane group operates at Level-of-Service F during the afternoon peak hour and Level-of-Service D during the Saturday peak hour, but the volume-to-capacity ratio is less than 1.00.

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[2] Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development: A Recommended Practice*, 2006, page 60.

[3] Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, p. 16-35.

3. PROJECTED BACKGROUND TRAFFIC CONDITIONS

The purpose of this chapter is to discuss anticipated 2018 background conditions without project generated traffic. Background traffic conditions are defined as future traffic projections without traffic generated by the proposed project, Piilani Promenade.

Future traffic projections without project generated traffic are first estimated. Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This growth also considers traffic associated with minor, or small, projects for which no traffic data, or traffic study, are available. The second component is estimated traffic that will be generated by other major development projects in the vicinity of the proposed project. Included in the assessment of future background conditions are roadway improvements that are part of the related projects.

A level-of-service of future (2018) background traffic conditions is then performed and any deficiencies identified.

Design Year for Traffic Forecasts

The design, or horizon, year of a project is the future year for which background traffic conditions are estimated. The design year is typically several years after completion of the study project or the anticipated year of100% occupancy. The year 2018 is used in this study to be compatible with the traffic studies for other major projects within and adjacent to the study area. It is also anticipated that the project will be 100%, or near, occupancy by 2018.

Background Traffic Growth

The *Maui Long Range Transportation Plan*[4] concluded that traffic in Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was used to estimate the background growth between 2013 and 2018, which is the design year for this project. The growth factor was calculated using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate, or 0.016
n = Growth period, or 5 years

It should be noted that some traffic studies for projects in Kihei have used a growth factor of 2.0% rather that 1.6% used in the study. We have checked with the other consultants and verified that this is the result of rounding.

This growth factor was applied to the northbound and southbound through traffic movements at the study intersections along Piilani Highway and South Kihei Road. All increases of turning movement traffic volumes and side street approach volumes will be the result of traffic generated by related projects, not the result of regional traffic growth.

Related Projects

The second component in estimating background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are under construction or have been approved for construction and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements. The following related projects were identified.

A. Kaiwahine Village

The proposed Kaiwahine Subdivision is located at the east end of Kaiwahine Drive and will consist of 120 multi-family units. This project received an approval for affordable housing but no permits have been filed with the County of Maui for development of this parcel. Timing of this project is uncertain.

The traffic assignments for the subdivision were obtained from the traffic study for the project[5].

B. Maui Lu Resort

Maui Lu Resort is located in the northeast quadrant of the intersection of South Kihei Road at Kaonoulu Street. The existing resort will be demolished and a 400 unit timeshare will be constructed. Each timeshare unit will have one lock off unit which may be used as a separate hotel room. As part of the Maui Lu project, the intersection of South Kihei Road at Kaonoulu Street will

[4] Kaku Associates, *Maui Long Range Land Transportation Plan*, October 1996

[5] Phillip Rowell and Associates, *TIAR for Kaiwahine Village*, July 15, 2010

be signalized. A separate southbound to eastbound left turn lane will also be constructed. The intersection of Kaonoulu Street at Alulike Street will be converted to a roundabout.

Groundbreaking is scheduled for late 2014 or early 2015. The project may not be completed by 2018, the horizon year for this TIAR, but the project will be generating a majority of its estimated traffic. Therefore, the project is included as a related project.

The traffic assignments for the project were obtained from the traffic study for the project[6].

C. Kihei High School

The proposed Kihei High School will be located along the east side of Piilani Highway across from the Piilani Subdivision. According to the Environmental Impact Statement, the school will have a capacity of approximately 1600 students for grades 9 through 12. The development of the school will be in two phases with 800 students in each phase. Phase 1 will be completed in 2015 and Phase 2 in 2025.

Work on Phase 1 has not been initiated as of the date of this report nor is it expected to be completed by 2015. Traffic generation from this project is not expected to occur until at least 2017.

Access and egress will be via the intersection of Piilani Highway at Kulanihakoi Road, which will be modified with an extension of Kulanihakoi Road across Piilani Highway. The intersection of Piilani Highway at Kulanihakoi Street will be signalized.

The number of trips that the high school will generate during weekday peak hours was obtained from the TIAR[7] for the project. Based on trip generation data provided in *Trip Generation*, the number of trips generated on a Saturday will be negligible.

D. Kenolio 6 Affordable Housing Project

The Kenolio 6 Affordable Housing Project is located between Piilani Highway and Kenolio Road in the southwest quadrant of the intersection of Kaonoulu Street at Piilani Highway. The project is a 124 unit multi-family affordable housing development. It is anticipated that the project will be completed in 2017.

Access to and egress from will be via two driveways along the east side of Kenolio Road. The first driveway, referred to as Drive A, is south of the intersection of Kenolio Road at Hoopili Akau Street. Drive B is south of Drive A along Kenolio Road.

The traffic assignments for the project were obtained from the traffic study for the project [8].

The projects that were identified as related projects and the estimated number of peak hour trips generated by each are summarized in Table 6. The approximate locations of these projects are shown in Figure 8.

[6] Phillip Rowell and Associates, *TIAR for Maui Lu Resort*, March 7, 2007

[7] Wilson Okamoto Corporation, *Traffic Impact Report Kihei High School*, September 2011

[8] Phillip Rowell and Associates, *TIAR for Kenolio 6 Affordable Housing Project*, May 27, 2010

Table 6 Trip Generation Summary of Related Projects

			AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	Related Project	Description	In	Out	Total	In	Out	Total	In	Out	Total
A	Kaiwahine Village	120 Multi-Family	19	47	66	49	31	80	26	26	52
B	Maui Lu Resort	400 Timeshares + 400 Lock Off Units (Maximum)	245	140	385	205	230	435	350	275	625
C	Kihei High School (Phase 1)	800 Students Grades 9 thru 12	228	108	336	104	55	159	0	0	0
D	Kenolio 6 Affordable Housing Project	124 Multi-Family	20	48	68	51	32	83	32	32	64
TOTALS FOR 2018			512	343	855	409	348	757	408	333	741

The Honua'ula Affordable Housing project was not included as a background project because it cannot be constructed until after East Kaonoulu Road is completed, which will be done as part of the Piilani Promenade project. Until this roadway is completed, there is no roadway to assign Honua'ula trips. However, since Honua'ula traffic must be considered in the projections to confirm that they can be accommodated by East Kaonoulu Road, the results of the trip generation analysis of Honua'ula and the results of the trip distribution and assignment process are presented in Chapter 4.

2018 Background Traffic Projections

2018 background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates and then superimposing traffic generated by related projects. The resulting 2018 background peak hour traffic projections are shown in Figures 9, 10 and 11.

2018 Background Levels-of-Service

Figure 12 illustrates the intersection configurations and right-of-way controls used for the level-of-service analysis of 2018 background conditions without project generated traffic. The roadway improvements that are proposed as part of the related projects are assumed to be in place for the level-of-service analysis since the project's traffic is included in the projections. These improvements include:

1. The intersection of South Kihei Road at Kaonoulu Street has been signalized and the southbound approach has been modified to provide a separate left turn lane. *These improvements are recommended as part of the Maui Lu Resort Redevelopment project.*

2. The intersection of Piilani Highway at Kaonoulu Street has been signalized. This is recommended as part of the Piilani Promenade project. *This improvement is included because Maui Lu Resort is to participate in this improvement.*

3. The intersection of Kaonoulu Street at Alulike Street has been converted from a STOP sign controlled intersection to a roundabout.

4. The intersection of Piilani Highway at Kulanihakoi Road has been signalized, the northbound approach has been modified to provide a right turn only lane, the southbound approach has been modified to provide a left turn lane and the eastbound and westbound approached have been modified to provide an optional left turn or through lane and a right turn only lane. *These improvements are those recommended in the TIAR for the proposed Kihei High School to be located at this location.*

Table 7 summarizes the results of the level-of-service analysis of the signalized intersections for 2018 background without project generated traffic. Shown in the table are the volume-to-capacity ratios, average vehicle delays and levels-of-service of the overall intersection and all controlled lane groups. Even though the level-of-service is defined by delay, the volume-to-capacity ratios are shown as it is a factor used to determine whether the delay of a particular traffic movement, or lane group, is the result of the traffic signal timing or the result of a capacity deficiency. The level-of-service analysis also used the existing traffic signal cycle lengths.

Table 8 summarizes the results of the level-of-service analysis of the unsignalized intersections along Kaonoulu Street (Kaonoulu Street at Kenolio Road and Kaonoulu Street at Alulike Street)for 2018 background without project traffic conditions. Shown in the table are the average vehicle delays and levels-of-service of the controlled movements. Delays and levels-of-service are not calculated for uncontrolled movements.

Table 7 2018 Background Levels-of-Service of Signalized Intersections

	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
Intersection and Lane Group	V/C	Delay [1]	LOS [2]	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Highway at Ohukai Road	***0.86***	***34.4***	***C***	***0.92***	***49.6***	***D***	***0.77***	***23.8***	***C***
Eastbound Left & Thru	0.78	65.6	E	0.91	100.5	F	0.79	40.6	D
Eastbound Right	0.05	46.7	D	0.06	57.7	E	0.09	24.5	C
Westbound Left & Thru	0.92	82.3	F	0.93	93.8	F	0.96	93.2	F
Westbound Right	0.12	44.5	D	0.12	52.2	D	0.03	29.6	C
Northbound Left	0.27	75.5	E	0.70	92.0	F	0.42	32.9	C
Northbound Thru	0.77	21.4	C	0.92	30.9	C	0.74	19.6	B
Northbound Right	0.03	3.1	A	0.05	6.2	A	0.07	12.3	B
Southbound Left	0.82	83.7	F	0.91	92.3	F	0.57	32.2	C
Southbound Thru	0.90	26.6	C	0.85	47.4	D	0.72	17.0	B
Southbound Right	0.07	2.8	A	0.08	50.4	D	0.07	10.4	B
Piilani Highway at Kaiwahine Street	***0.64***	***29.1***	***C***	***0.68***	***22.8***	***C***	***0.59***	***10.2***	***B***
Eastbound Left & Thru	0.81	69.9	E	0.78	88.3	F	0.55	22.0	C
Eastbound Right	0.07	42.2	D	0.05	58.8	E	0.04	19.8	B
Westbound Left & Thru	0.60	53.0	D	0.52	65.0	E	0.54	23.9	C
Westbound Right	0.07	42.2	D	0.05	58.8	E	0.03	20.1	C
Northbound Left	0.25	35.2	D	0.47	85.7	F	0.33	26.9	C
Northbound Thru	0.62	26.5	C	0.67	15.8	B	0.53	11.9	B
Northbound Right	0.04	35.7	D	0.08	7.3	A	0.04	6.7	A
Southbound Left	0.37	44.0	D	0.63	77.8	E	0.67	28.3	C
Southbound Thru	0.60	22.5	C	0.62	16.1	B	0.62	9.4	A
Southbound Right	0.01	15.6	B	0.05	7.4	A	0.03	4.6	A
Piilani Highway at North Kihei Road	***0.61***	***29.6***	***C***	***0.78***	***36.5***	***D***	***0.61***	***17.1***	***B***
Eastbound Left	0.57	59.7	E	0.75	56.8	E	0.46	29.8	C
Eastbound Left & Thru	0.59	60.9	E	0.78	59.6	E	0.46	29.8	C
Eastbound Right	0.22	59.9	E	0.13	58.2	E	0.14	15.6	B
Westbound Left, Thru & Right	0.20	58.3	E	0.58	73.5	E	0.02	32.5	C
Northbound Left	0.71	42.1	D	0.84	72.9	E	0.54	27.4	C
Northbound Thru & Right	0.54	19.0	B	0.56	16.9	B	0.50	8.7	A
Southbound Left	0.19	63.6	E	0.46	78.4	E	0.35	38.3	D
Southbound Thru	0.66	23.0	C	0.76	32.5	C	0.80	20.6	C
Southbound Right	0.08	14.7	B	0.16	20.0	B	0.11	11.8	B
North Kihei Road at South Kihei Road	***0.40***	***20.5***	***C***	***0.58***	***24.5***	***C***	***0.59***	***10.1***	***B***
Eastbound Thru	0.27	9.9	A	0.42	19.8	C	0.39	10.1	B
Eastbound Right	0.18	9.2	A	0.36	18.8	C	0.27	9.3	A
Westbound Left	0.59	68.9	E	0.71	98.7	F	0.57	21.2	C
Westbound Thru	0.17	1.1	A	0.15	2.1	A	0.14	3.3	A
Northbound Left	0.77	54.8	D	0.37	49.7	D	0.52	17.9	B
Northbound Right	0.13	0.0	A	0.12	0.0	A	0.10	0.0	A
Piilani Highway at Kaonoulu Street	***0.79***	***16.1***	***B***	***0.74***	***13.0***	***B***	***0.61***	***6.1***	***A***
Eastbound Left	0.36	55.5	E	0.45	70.2	E	0.27	21.0	C
Eastbound Right	0.42	56.3	E	0.13	66.6	E	0.46	22.4	C
Northbound Left	0.62	43.2	D	0.72	71.9	E	0.59	8.6	A
Northbound Thru	0.39	7.9	A	0.56	4.1	A	0.46	4.1	A
Southbound Thru	0.68	12.7	B	0.63	9.0	A	0.52	4.4	A
Southbound Right	0.05	13.4	B	0.07	7.6	A	0.08	2.9	A

Table 7 2018 Background Levels-of-Service of Signalized Intersections (Continued)

South Kihei Road at Kaonoulu Street	***0.45***	***6.2***	***A***	***0.50***	***8.4***	***A***	***0.44***	***5.4***	***A***
Westbound Left	0.42	23.8	C	0.46	28.4	C	0.48	23.6	C
Westbound Right	0.03	21.5	C	0.03	25.4	C	0.02	20.8	C
Northbound Thru	0.45	3.5	A	0.49	6.1	A	0.44	3.6	A
Northbound Right	0.06	2.3	A	0.11	4.3	A	0.09	2.5	A
Southbound Left	0.06	2.3	A	0.70	48.5	D	0.10	2.5	A
Southbound Thru	0.30	2.9	A	0.40	2.6	A	0.37	3.3	A
Piilani Highway at Kulanihakoi Road	***0.76***	***15.5***	***B***	***0.66***	***10.8***	***B***	***0.53***	***6.4***	***A***
Eastbound Left & Thru	0.37	54.2	D	0.51	72.0	E	0.29	28.2	C
Eastbound Right	0.27	53.1	D	0.06	65.8	E	0.06	26.6	C
Westbound Left & Thru	0.61	62.3	E	0.47	71.3	E	0.00	0.0	A
Westbound Right	0.02	50.8	D	0.01	65.4	E	0.00	0.0	A
Northbound Left	0.51	74.1	E	0.60	67.0	E	0.73	73.4	E
Northbound Thru	0.54	9.7	A	0.68	4.6	A	0.48	3.1	A
Northbound Right	0.08	4.3	A	0.02	2.1	A	0.00	0.0	A
Southbound Left	0.51	63.0	E	0.32	57.3	E	0.00	0.0	A
Southbound Thru	0.76	12.4	B	0.64	8.4	A	0.53	5.7	A
Southbound Right	0.02	5.5	A	0.06	7.8	A	0.05	3.7	A
Piilani Highway at Piikea Avenue	***0.80***	***19.7***	***B***	***0.78***	***30.8***	***C***	***0.79***	***17.4***	***B***
Eastbound Left	0.86	67.2	E	0.86	77.1	E	0.79	30.8	C
Eastbound Right	0.16	42.1	D	0.17	50.8	D	0.17	18.2	B
Northbound left	0.67	65.1	E	0.85	79.9	E	0.77	35.5	D
Northbound Thru	0.46	7.0	A	0.61	9.5	A	0.51	7.0	A
Southbound Thru	0.80	17.2	B	0.72	32.3	C	0.80	21.4	C
Southbound Right	0.28	10.5	B	0.34	31.6	C	0.26	13.5	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix C for Level-of-Service Analysis Worksheets.

Table 8 2018 Background Levels-of-Service of Unsignalized Intersections

	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
Intersection and Lane Group	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS
Kaonoulu Street at Kenolio Road	***6.7***	***A***	***5.1***	***A***	***6.4***	***A***
Eastbound Left	7.6	A	7.7	A	8.1	A
Westbound Left	7.5	A	7.6	A	7.7	A
Northbound Left	11.2	B	12.8	B	17.9	C
Northbound Thru & Right	9.4	A	10.2	B	11.5	B
Southbound Left	16.0	C	16.2	C	27.7	D
Southbound Thru & Right	9.5	A	11.0	B	12.0	B
Kaonoulu Street at Alulike Street	V/C	LOS	V/C	LOS	V/C	LOS
	0.14	***A***	***0.22***	***A***	***0.20***	***A***
Eastbound Left	0.14	A	0.22	A	0.20	A
Westbound Left	0.09	A	0.12	A	0.14	A
Northbound Left, Thru & Right	0.01	A	0.01	A	0.02	A
Southbound Left, Thru & Right	0.06	A	0.05	A	0.09	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix C for Level-of-Service Analysis Worksheets.

Mitigation Required for 2018 Background Conditions

The conclusion of the level-of-service of 2018 baseline conditions is that roadway improvements are required at the intersection of Piilani Highway at Ohukai Road and the intersection of Piilani Highway at Kaiwahine Street and Uwapo Road to accommodate traffic associated with background growth and the related projects.

1. At the intersection of Piilani Highway at Ohukai Road, the eastbound and westbound approaches should be modified to provide one left turn lane, one optional left turn or thru lane and one right turn lane and the southbound approach should be modified to provide an additional left turn only lane. The second left turn lane will require the widening of eastbound Ohukai to accommodate traffic from the second lane at least to the driveway into the service station.

2. At the intersection of Piilani Highway at Kaiwahine Street and Uwapo Road, the eastbound and westbound approaches should be modified to provide separate left turn, through and right turn lanes.

These improvements are shown on Figure 13.

These improvements are required to mitigate the impacts of background growth and traffic generated by the related projects. The level-of-service resulting from the improvements are summarized in Table 9.

Table 9 Mitigation Analysis - Background Conditions

Intersection and Lane Group	AM Peak Hour						PM Peak Hour						Saturday Peak Hour					
	Without Mitigation			With Mitigation			Without Mitigation			With Mitigation			Without Mitigation			With Mitigation		
	V/C	Delay [1]	LOS [2]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Highway at Ohukai Road	***0.86***	***34.4***	***C***	***0.77***	***25.8***	***C***	***0.92***	***49.6***	***D***	***0.77***	***34.3***	***C***	***0.77***	***29.2***	***C***	***0.62***	***18.8***	***B***
	Cycle Length = 125 Seconds						***Cycle Length = 150 Seconds***						***Cycle Length = 70 Seconds***					
Eastbound Left				0.46	51.7	D				0.62	72.7	E				0.57	37.7	D
Eastbound Left & Thru	0.78	65.6	E	0.41	51.1	D	0.91	100.5	F	0.63	73.1	E	0.79	40.6	D	0.59	38.4	D
Eastbound Right	0.05	46.7	D	0.05	47.6	D	0.06	57.7	E	0.06	61.7	E	0.09	24.5	C	0.09	32.2	C
Westbound Left				0.60	55.9	E				0.69	72.8	E				0.63	48.2	D
Westbound Left & Thru	0.92	82.3	F	0.63	56.9	E	0.93	93.8	F	0.72	74.2	E	0.96	93.2	F	0.55	42.4	D
Westbound Right	0.12	44.5	D	0.12	48.3	D	0.12	52.2	D	0.24	60.1	E	0.03	29.6	C	0.03	35.8	C
Northbound Left	0.27	75.5	E	0.27	74.8	E	0.70	92.0	F	0.69	85.4	F	0.42	32.9	C	0.43	38.8	D
Northbound Thru	0.77	21.4	C	0.69	14.1	B	0.92	30.9	C	0.76	13.9	B	0.74	19.6	B	0.60	14.9	B
Northbound Right	0.03	3.1	A	0.03	2.2	A	0.05	6.2	A	0.05	2.3	A	0.07	12.3	B	0.07	10.2	B
Southbound Left	0.82	83.7	F	0.46	65.2	E	0.91	92.3	F	0.62	63.4	D	0.57	32.2	C	0.30	34.4	C
Southbound Thru	0.90	26.6	D	0.83	19.1	B	0.85	47.4	D	0.74	33.8	C	0.72	17.0	B	0.60	12.7	B
Southbound Right	0.07	2.8	A	0.07	2.4	A	0.08	50.4	D	0.07	35.6	D	0.07	10.4	B	0.07	8.3	A
Piilani Highway at Kaiwahine Street	***0.64***	***29.1***	***C***	***0.60***	***24.5***	***C***	***0.68***	***22.8***	***C***	***0.65***	***22.1***	***C***	***0.59***	***10.2***	***B***	***0.58***	***10.0***	***B***
	Cycle Length = 125 Seconds						***Cycle Length = 150 Seconds***						***Cycle Length = 60 Seconds***					
Eastbound Left	0.81	69.9	E	0.66	56.8	E	0.78	88.3	F	0.65	75.9	E	0.55	22.0	C	0.44	33.0	C
Eastbound Thru				0.06	44.1	D				0.12	62.2	E				0.07	29.1	C
Eastbound Right	0.07	42.2	D	0.07	44.3	D	0.05	58.8	E	0.05	61.7	E	0.04	19.8	B	0.04	28.9	C
Westbound Left & Thru	0.60	53.0	D	0.33	47.3	D	0.52	65.0	E	0.27	63.9	E	0.54	23.9	C	0.30	31.2	C
Westbound Thru				0.10	44.5	D				0.26	63.5	E				0.21	30.0	C
Westbound Right	0.07	42.2	D	0.07	44.3	D	0.05	58.8	E	0.05	61.6	E	0.03	20.1	C	0.03	28.9	C
Northbound Left	0.25	35.2	D	0.25	38.0	D	0.47	85.7	F	0.47	79.2	E	0.33	26.9	C	0.33	34.3	C
Northbound Thru	0.62	26.5	C	0.60	19.7	B	0.67	15.8	B	0.65	18.2	B	0.53	11.9	B	0.53	6.7	A
Northbound Right	0.04	35.7	D	0.04	26.7	C	0.08	7.3	A	0.08	10.2	B	0.04	6.7	A	0.04	4.3	A
Southbound Left	0.37	44.0	D	0.37	44.4	D	0.63	77.8	E	0.63	83.5	F	0.67	28.3	C	0.67	45.2	D
Southbound Thru	0.60	22.5	C	0.56	20.3	C	0.62	16.1	B	0.60	12.3	B	0.62	9.4	A	0.62	7.2	A
Southbound Right	0.01	15.6	B	0.01	13.3	B	0.05	7.4	A	0.05	5.0	A	0.03	4.6	A	0.03	3.8	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. This chapter presents the trip generation, distribution and assignment of project generated traffic and the background plus project traffic projections. The results of the level-of-service analysis of background plus project conditions is presented in the following chapter.

Methodology

Future traffic volumes generated by the project were estimated using the procedures described in the *Trip Generation Handbook*[9] and data provided in *Trip Generation*[10]. This method used trip generation rates or equations to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

Trip Generation of Proposed Development

The assumptions used for the trip generation analysis are:

1. Trip generation equations for shopping centers were used to estimate the number of peak hour trips generated by the retail areas of the project. These rates are based on the leasable floor area. The trip generation equations for shopping centers are summarized in Table 10.

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[9] Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

[10] Institute of Transportation Engineers, *Trip Generation*, Washington, D.C., 2003

Table 10 Trip Generation Formulas for Retail Uses

	Weekday AM Peak Hour	Weekday PM Peal Hour	Saturday Peak Hour
Total	Ln (T) = 0.59Ln(A)+2.32	Ln (T) = 0.67Ln(A)+3.37	Ln (T) = 0.65Ln(A)+3.76
Inbound	61%	49%	52%
Outbound	39%	51%	48%

Notes: (1) Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*
(2) T = Trips, A = 1,000 gross leasable square feet
(3) Formulas shown are for the peak hour of the adjacent street.

2. The percentage of pass by trips generated by the retail uses was estimated using the data provided in the *Trip Generation Handbook*.[11] The equations for estimating the number of pass by trips are summarized in Table 11. The equations are also based on the gross leasable floor area.

Table 11 Formulas For Pass By Trips

	Weekday AM Peak Hour	Weekday PM Peal Hour	Saturday Peak Hour
Total	No Formula Provided	Ln (T) = - 0.29 Ln(A)+5.00	T = -0.02 + 38.59
Inbound		50%	50%
Outbound		50%	50%

Notes: (1) Source: Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., June 2004, p 47 and 50
(2) T = Percent Pass By Trips, A = 1,000 gross leasable square feet
(3) Formulas shown are for the peak hour of the adjacent street.

3. Trip generation rates for outdoor nurseries were used to estimate the number of peak hour trips generated by the outdoor garden area. These rates are based on the gross square feet of floor area. The trip generation equations for outdoor garden uses are summarized in Table 12. *Trip Generation* did not provide directional distribution data (% inbound and % outbound). Therefore, it was assumed that the directional distribution would be 50% inbound and 50% outbound.

Table 12 Trip Generation Rates for Outdoor Garden Uses

	Weekday AM Peak Hour	Weekday PM Peal Hour	Saturday Peak Hour
Total	1.31	3.80	11.00
Inbound	50%	50%	50%
Outbound	50%	50%	50%

Notes: (1) Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*
(2) T = Trips, A = 1,000 gross square feet
(3) Formulas shown are for the peak hour of the adjacent street.

4. Trip generation rates for general light industrial uses were used to estimate the number of peak hour trips generated by the light industrial portion of the project. These equations are based on the number of acres developed. The trip generation equations for general light industrial uses are summarized in Table 13.

[11] Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., June 2004

Table 13 Trip Generation Formulas for Light Industrial Uses

	Weekday AM Peak Hour	Weekday PM Peal Hour	Saturday Peak Hour
Total	T=7.51(A)	T=3.68(A)+116.82	T=0.96(A)
Inbound	83%	22%	47%
Outbound	17%	78%	53%

Notes: (1) Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*
(2) T = Trips, A = Number of acres
(3) Formulas shown are for the peak hour of the adjacent street.

5. Trip generation rates for apartments are based on the number of dwelling units. The trip generation equations for apartments are summarized in Table 14.

Table 14 Trip Generation Formulas for Apartments

	Weekday AM Peak Hour	Weekday PM Peal Hour	Saturday Peak Hour
Total	T=0.49(X)+3.73	T=0.55(X)+17.65	T=0.41(X)+19.23
Inbound	20%	65%	50%
Outbound	80%	35%	50%

Notes: (1) Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*
(2) T = Trips, X = 1,000 number of dwelling units
(3) Formulas shown are for the peak hour of the adjacent street.

The results of the trip generation calculations are summarized in Table 15. The trips shown are the peak hourly trips generated by the project during the peak hours of the adjacent street. As shown, the project will generate 613 new trips during the morning peak hour, 1,830 new trips during the afternoon peak hour and 2,278 new trips during the Saturday peak hour.

Table 15 Summary of Trip Generation Analysis

		North Parcel					South Parcel				Total Project		
		Retail (100,000 SF)					Retail (358,091 SF)						
Time Period	Direction	Total Trips	Pass By Trips	Net New Trips	Light Industrial (5 Acres)	Apartment (226 Units)	Total Trips	Pass By Trips	Net New Trips	Outdoor Garden Total Trips (28,000 SF)	Total Trips	Pass By Trips	Net New Trips
AM Peak Hour	Total	145	15	130	38	114	327	33	294	37	661	48	613
	In	88	8	80	32	23	199	17	182	19	361	25	336
	Out	57	7	50	6	91	128	16	112	18	300	23	277
PM Peak Hour	Total	593	238	355	135	142	1496	404	1092	106	2472	642	1830
	In	291	119	172	30	92	733	202	531	53	1199	321	878
	Out	302	119	183	105	50	763	202	561	53	1273	321	952
Saturday Peak Hour	Total	800	294	506	5	112	1964	617	1347	308	3189	911	2278
	In	416	147	269	2	56	1021	309	712	154	1649	456	1193
	Out	384	147	237	3	56	943	308	635	154	1540	455	1085

Trip Distribution and Assignments

The project-related trips were distributed along the anticipated approach routes to the project site based on following assumptions:

1. The purpose of the project is to provide services for the residents and tourists of South Maui. Thus marketing and advertising will be directed toward this area. Accordingly, it was assumed that 75% of the traffic to and from the project will be generated by Kihei and South Maui.

2. 25% of the project generated traffic will approach and depart via Mokulele Highway (10%) and North Kihei Road (15%). Of the 15% from North Kihei Road, 10% will use North Kihei Road to Piilani Highway at then Piilani Highway to the project. The remaining 5% will use South Kihei Road and Kaonoulu Street.

3. The traffic generated from within Kihei (75%) was distributed based on the distribution of residential units and hotel rooms (including timeshares and vacation rentals) using the data presented in the *Maui Long-Range Land Transportation Plan* with adjustments to reflect Maui Lu Resort Redevelopment, the Kihei Residential Development, Honuaula, Makena Resort and additional Wailea Resort units. Using this distribution, 20% of the trips would be generated by the area north of Kaonoulu Street and 80% would be generated by the area south of Kaonoulu Street.

Trips were assigned based on the following assumptions:

1. Kaonoulu Street is extended mauka of Piilani Highway to provide access to the project and the intersection of Piilani Highway at Kaonoulu Street is signalized.

2. There will be four (4) driveways along East Kaonoulu Street to serve the project. Drive A is the major access and egress driveway. This driveway is located approximately 600 feet east of Piilani Highway. This will be a full access, signalized intersection.

3. Drive B is located approximately midway between Piilani Highway and Drive A. Drive B provides for right turns only into and out of the north parcel and the south parcel. This intersection is unsignalized.

4. Drive C is located approximately 500 feet east of Drive A. This driveway provides service to the south parcel and future affordable housing units (Honua'ula Off-site Affordable Housing) to be located along the north side of East Kaonoulu Street and east of the North Parcel. All movements will be allowed and the intersection will be unsignalized.

5. Drive D is located approximately 300 feet east of Drive C near the eastern property line of the project. This driveway is behind the last building and will most likely be used be service and employee vehicles. Anticipated use of this driveway is minimal.

The lane configurations and right-of-way controls of the study intersections used for the 2018 traffic assignments are shown on Figure 14. The project morning peak hour, afternoon peak hour and Saturday peak hour trip assignments are shown in Figures 15, 16 and 17, respectively.

2018 Background Plus Project Projections

Background plus project traffic conditions are defined as 2018 background traffic conditions plus project related traffic. The incremental difference between background and background plus project is the traffic impact of the project under study.

2018 background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the 2018 background peak hour traffic volumes presented in Chapter 3. The 2018 background plus project traffic projections at the study intersections are shown on Figures 18, 19 and 20. The 2018 background plus project traffic projections along East Kaonoulu Street and at the project driveways are shown on Figure 21.

Honua'ula Affordable Housing Project Traffic

The Honua'ula Affordable Housing Project will consist of 125 owner occupied residential condominiums and 125 residential apartments along the north side of East Kaonoulu Street east of the project. Access to and egress from the project will be via Drive C.

Trip Generation provides rates and equations to estimate the number of peak hour trips during the peak hours of the adjacent street and the peak hours of the generator, which may or may not coincide. The AM peak hour of the adjacent street is typically between 7:00 AM and 9:00 AM and PM peak hour is between 4:00 PM and 6:00 PM, typical commute hours. *Trip Generation* does not note the peak hours of the generators. The trip generation rates and equations are based on the number of dwelling units proposed. For this project, the trip generation equations for the generator have been used as the results are slightly higher than the results using the equations for the peak hours of the adjacent street

The trip generation equations used for the trip generation analysis and the results are summarized in Table 16. The trip generation analysis estimated that the project will generate a total of 131 trips during the morning peak hour, 168 trips during the afternoon peak hour and 149 trip during the Saturday peak hour.

Table 16 Trip Generation Analysis for Honua'ula

Period & Direction		Condominiums (Land Use Code 230) Trips per Unit or Percent[(1),(2)]	Units	Trips	Apartments (Land Use Code 220) Trips per Unit or Percent	Units	Trips	Total
AM Peak Hour of Adjacent Street	Total	Ln(T) = 0.80 Ln(X) + 0.26	125	62	T = 0.49 (X) + 3.73	125	65	127
	Inbound	17%		11	20%		13	24
	Outbound	83%		51	80%		52	103
PM Peak Hour of Adjacent Street	Total	Ln(T) = 0.82 Ln(X) + 0.32		72	T = 0.55 (X) + 17.65		86	158
	Inbound	67%		48	65%		56	104
	Outbound	33%		24	35%		30	54
AM Peak Hour of Generator	Total	Ln(T) = 0.82 Ln(X) + 0.15		61	T = 0.54 (X) + 2.45		70	131
	Inbound	19%		12	29%		20	32
	Outbound	81%		49	71%		50	99
PM Peak Hour of Generator	Total	T = 0.34 (X) + 35.87		78	T = 0.60 (X) + 14.91		90	168
	Inbound	64%		50	61%		55	105
	Outbound	36%		28	39%		35	63
Saturday Peak Hour	Total	T = 0.29 (X) + 42.63		79	T = 0.41(X) + 19.23		70	149
	Inbound	54%		43	50% [(3)]		35	78
	Outbound	46%		36	50%		35	71

Notes:
(1) Source: Institute of Transportation Engineers, *Trip Generation 8th Edition*, 2008, pages 389 and 390.
(2) T=trips, X=number of dwelling units
(3) Trip Generation did not provide directional split data. A directional split of 50/50 was assumed.

Honua'ula trips were distributed and assigned based on existing traffic patterns as estimated from the traffic counts. The traffic assignments are shown as Figures 22,23, 24 and 25. These trips are included in the analysis as background traffic to confirm that the improvements along East kaonoulu Street will accommodate both Piilani Promenade traffic and Honua'ula traffic.

Honua'ula trip assignments were added to the background traffic projections for Piilani Promenade to estimate total traffic of the two projects along East Kaonoulu Street. These projections include both Piilani Promenade and Honua'ula Traffic and are shown as Figures 26, 27, 28 and 29.

5. TRAFFIC IMPACT ANALYSIS

The traffic impacts of the project was assessed by analyzing the changes in traffic volumes and levels-of-service at the study intersections. These impacts are discussed in this chapter. Intersections with overall levels-of-service or traffic movements that do not meet the standard for acceptable levels-of-service are identified and improvements that will provide acceptable levels-of-service are identified and assessed. This chapter also describes anticipated traffic operating conditions at the project's driveways along East Kaonoulu Street.

Changes in Total Intersection Volumes

An analysis of the project's share of 2018 background plus project intersection approach volumes at the study intersections is summarized in Table 17. The table summarizes the project's share of total 2018 peak hour approach volumes at each intersection. Also shown are the percentage of 2018 background plus project traffic that is the result of background growth and traffic generated by related projects.

The project's traffic impacts are concentrated at the intersection of Piilani Highway at Kaonoulu Street where project generated traffic represents almost a third of the afternoon peak hour traffic and almost half of the Saturday peak hour traffic. Also, it should be noted that project generated traffic represents a larger percentage of Saturday peak hour traffic than weekday peak hour traffic because the project generates more traffic during the Saturday peak hour and background traffic is less during the Saturday peak hour than weekday peak hours.

Table 17 Analysis of Project's Share of Total Intersection Approach Volumes (1)

Intersection	Period	Existing	2018 Background	2018 Background Plus Project	Background Growth Trips	Background Growth Percent of Total Traffic (2)	Project Traffic Trips	Project Traffic Percent of Total Traffic (3)
Piilani Hwy at Ohukai Road	AM	3321	3601	3830	280	7.3%	229	6.0%
	PM	3688	3976	4630	288	6.2%	654	14.1%
	SAT	2622	2961	3778	339	9.0%	817	21.6%
Piilani Hwy at Uwapo Rd & Kaiwahine St	AM	2939	3249	3421	310	9.1%	172	5.0%
	PM	3337	3669	4160	332	8.0%	491	11.8%
	SAT	2619	2981	3594	362	10.1%	613	17.1%
Piilani Hwy at N. Kihei Rd & Mokulele Hwy	AM	3081	3381	3495	300	8.6%	114	3.3%
	PM	3402	3711	4039	309	7.7%	328	8.1%
	SAT	2738	3077	3487	339	9.7%	410	11.8%
S. Kihei Rd at N. Kihei Rd	AM	1498	1677	1763	179	10.2%	86	4.9%
	PM	1730	1879	2125	149	7.0%	246	11.6%
	SAT	1329	1538	1845	209	11.3%	307	16.6%
Piilani Hwy at Kaonoulu St	AM	2941	3117	3711	176	4.7%	594	16.0%
	PM	3288	3581	5537	293	5.3%	1956	35.3%
	SAT	2296	2680	5181	384	7.4%	2501	48.3%
S. Kihei Rd at Kaonoulu St	AM	1017	1183	1285	166	12.9%	102	7.9%
	PM	1242	1407	1701	165	9.7%	294	17.3%
	SAT	1122	1306	1676	184	11.0%	370	22.1%
Piilani Hwy at Kulanihakoi St	AM	3363	3698	3921	335	8.5%	223	5.7%
	PM	3488	3772	4409	284	6.4%	637	14.4%
	SAT	2323	2597	3395	274	8.1%	798	23.5%
Kaonoulu Street at Kenolio Drive	AM	366	556	677	190	28.1%	121	17.9%
	PM	364	583	926	219	23.7%	343	37.0%
	SAT	273	532	961	259	27.0%	429	44.6%
Kaonoulu Street at Alulike Drive	AM	200	347	450	147	32.7%	103	22.9%
	PM	272	486	780	214	27.4%	294	37.7%
	SAT	246	537	905	291	32.2%	368	40.7%
Piilani Highway at Piikea Avenue	AM	3385	3641	3841	256	6.7%	200	5.2%
	PM	3679	3938	4511	259	5.7%	573	12.7%
	SAT	2930	3203	3920	273	7.0%	717	18.3%

Notes:
(1) Volumes shown are total intersection approach volumes or projections.
(2) Percentage of total 2018 background plus project traffic.

2018 Background Plus Project Level-of-Service Analysis

The level-of-service analysis was performed for background and background plus project conditions. The incremental difference between the two conditions quantifies the impact of the project. The assumptions used for the level-of-service analysis are:

1. The intersection of South Kihei Road at Kaonoulu Street is signalized.

2. The intersection of Piilani Highway at Kaonoulu Street is improved as follows as part of the proposed project:

    a. The intersection is signalized. Northbound and southbound left turns are protected.

    b. Two southbound to eastbound left turn lanes are added.

    c. Two northbound to eastbound right turn and deceleration lanes are added.

    d. Two eastbound through lanes are added.

    e. A westbound approach with two left turn lanes, one through lane and two right turn lanes is added.

3. The traffic signal cycle lengths of the traffic signals along Piilani Highway are150 seconds for the afternoon peak hour. The morning peak hour traffic signal cycle lengths are 125 seconds. These are the existing signal cycle lengths.

4. The mitigation measures to accommodate 2018 background traffic as described in the previous chapter are implemented. The eastbound approach has been modified to provide one separate left turn lane, one through lane and one right turn lane. The westbound approach has been modified to provide one left turn lane, one thru or left turn lane and one right turn lane.

The results of the Level-of-Service analysis of the signalized intersections are summarized in Table 18 and the results of the Level-of-Service analysis of the unsignalized intersections are summarized in Table 19.

Table 18 2018 Background Plus Project Levels-of-Service - Signalized Intersections

	AM Peak Hour						PM Peak Hour						Saturday Peak Hour					
	Without Promenade Without Honuaula			With Promenade With Honuaula			Without Promenade Without Honuaula			With Promenade With Honuaula			Without Promenade Without Honuaula			With Promenade With Honuaula		
Intersection and Movement	V/C	Delay [1]	LOS [2]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Hwy at Ohukai Rd	***0.77***	***25.8***	***C***	***0.82***	***29.9***	***C***	***0.77***	***34.3***	***C***	***0.90***	***44.2***	***D***	***.62***	***18.8***	***B***	***0.80***	***24.3***	***C***
Eastbound Left	0.46	51.7	D	0.46	51.7	D	0.62	72.7	E	0.72	84.2	F	0.57	37.7	D	0.54	38.2	D
Eastbound Left & Thru	0.41	51.1	D	0.41	51.1	D	0.63	73.1	E	0.72	83.4	F	0.59	38.4	D	0.56	38.8	D
Eastbound Right	0.05	47.6	D	0.06	47.7	D	0.06	61.7	E	0.08	63.7	E	0.09	32.2	C	0.39	36.1	D
Westbound Left	0.60	55.9	E	0.63	56.6	E	0.69	72.8	E	0.78	80.7	F	0.63	48.2	D	0.80	68.6	E
Westbound Left & Thru	0.63	56.9	E	0.65	58.0	E	0.72	74.2	E	0.80	83.1	F	0.55	42.4	D	0.81	70.1	E
Westbound Right	0.12	48.3	D	0.12	47.9	D	0.24	60.1	E	0.43	62.2	E	0.03	35.8	C	0.03	37.4	D
Northbound Left	0.27	74.8	E	0.32	58.9	E	0.69	85.4	F	0.82	86.6	F	0.43	38.8	D	0.83	77.0	E
Northbound Thru	0.69	14.1	B	0.76	18.6	B	0.76	13.9	B	0.87	28.1	C	0.60	14.9	B	0.75	18.2	B
Northbound Right	0.03	2.2	A	0.04	17.1	B	0.05	2.3	A	0.08	11.3	B	0.07	10.2	B	0.10	10.1	B
Southbound Left	0.46	65.2	E	0.46	66.4	E	0.62	63.4	D	0.73	65.2	E	0.30	34.4	C	0.37	38.1	D
Southbound Thru	0.83	19.1	B	0.92	25.8	C	0.74	33.8	C	0.90	43.7	D	0.60	12.7	B	0.81	18.6	B
Southbound Right	0.07	2.4	A	0.07	4.1	A	0.07	35.6	D	0.07	33.0	C	0.07	8.3	A	0.07	9.2	A
Piilani Hwy at Kaiwahine St	***0.60***	***24.5***	***C***	***0.63***	***26.6***	***C***	***0.65***	***22.1***	***C***	***0.74***	***26.9***	***C***	***0.58***	***10.0***	***B***	***0.71***	***15.1***	***B***
Eastbound Left	0.66	56.8	E	0.66	56.8	E	0.65	75.9	E	0.63	73.7	E	0.44	33.0	C	0.35	37.2	D
Eastbound Thru	0.06	44.1	D	0.06	44.1	D	0.12	62.2	E	0.11	61.7	E	0.07	29.1	C	0.06	34.3	C
Eastbound Right	0.07	44.3	D	0.08	44.4	D	0.05	61.7	E	0.08	61.5	E	0.04	28.9	C	0.08	34.5	C
Westbound Left	0.33	47.3	D	0.41	48.3	D	0.27	63.9	E	0.56	69.5	E	0.30	31.2	C	0.55	40.9	D
Westbound Thru	0.10	44.5	D	0.10	44.5	D	0.26	63.5	E	0.25	63.0	E	0.21	30.0	C	**0.17**	**35.1**	**D**
Westbound Right	0.07	44.3	D	0.07	44.3	D	0.05	61.6	E	0.05	61.2	E	0.03	28.9	C	0.03	34.2	C
Northbound Left	0.25	38.0	D	0.33	32.5	C	0.47	79.2	E	0.62	76.5	E	0.33	34.3	C	0.56	43.4	D
Northbound Thru	0.60	19.7	B	0.64	22.5	C	0.65	18.2	B	0.74	23.5	C	0.53	6.7	A	0.64	10.2	B
Northbound Right	0.04	26.7	C	0.05	26.3	C	0.08	10.2	B	0.11	13.2	B	0.04	4.3	A	0.07	5.8	A
Southbound Left	0.37	44.4	D	0.37	45.5	D	0.63	83.5	F	0.63	82.9	F	0.67	45.2	D	0.53	41.8	D
Southbound Thru	0.56	20.3	C	0.63	22.6	C	0.60	12.3	B	0.71	17.2	B	0.62	7.2	A	0.77	12.8	B
Southbound Right	0.01	13.3	B	0.01	16.9	B	0.05	5.0	A	0.05	6.7	A	0.03	3.8	A	0.03	5.6	A
Piilani Hwy at N. Kihei Rd	***0.61***	***29.6***	***C***	***0.64***	***29.6***	***C***	***0.78***	***36.5***	***D***	***0.85***	***39.9***	***D***	***0.61***	***17.1***	***B***	***0.69***	***19.0***	***B***
Eastbound Left	0.57	59.7	E	0.58	58.9	E	0.75	56.8	E	0.74	55.6	E	0.46	29.8	C	0.54	37.8	D
Eastbound Left & Thru	0.59	60.9	E	0.60	59.8	E	0.78	59.6	E	0.77	58.1	E	0.46	29.8	C	0.54	37.8	D
Eastbound Right	0.22	59.9	E	0.28	54.4	D	0.13	58.2	E	0.23	39.5	D	0.14	15.6	B	0.33	20.4	C
Westbound Left, Thru & Rt	0.20	58.3	E	0.22	59.0	E	0.58	73.5	E	0.58	73.5	E	0.02	32.5	C	0.02	38.5	D
Northbound Left	0.71	42.1	D	0.74	44.5	D	0.84	72.9	E	0.94	85.0	F	0.54	27.4	C	0.69	34.3	C
Northbound Thru & Right	0.54	19.0	B	0.56	18.7	B	0.56	16.9	B	0.61	18.7	B	0.50	8.7	A	0.51	7.9	A
Southbound Left	0.19	63.6	E	0.21	64.4	E	0.46	78.4	E	0.46	78.4	E	0.35	38.3	D	0.41	46.3	D
Southbound Thru	0.66	23.0	C	0.68	23.8	C	0.76	32.5	C	0.86	39.0	D	0.80	20.6	C	**0.81**	**21.4**	**C**
Southbound Right	0.08	14.7	B	0.08	14.8	B	0.16	20.0	C	0.17	21.4	C	0.11	11.8	B	0.11	11.7	B
N. KIhei Rd at S. Kihei Rd	***0.40***	***20.5***	***C***	***0.42***	***20.2***	***C***	***0.58***	***24.5***	***C***	***0.64***	***28.6***	***C***	***0.59***	***10.1***	***B***	***0.61***	***12.5***	***B***
Eastbound Thru	0.27	9.9	A	0.30	10.5	B	0.42	19.8	B	0.51	21.8	C	0.39	10.1	B	0.54	14.0	B
Eastbound Right	0.18	9.2	A	0.19	9.5	A	0.36	18.8	B	**0.42**	**20.1**	**C**	0.27	9.3	A	0.30	11.7	B
Westbound Left	0.59	68.9	E	0.59	70.5	E	0.71	98.7	F	0.71	99.7	F	0.57	21.2	C	0.51	24.5	C
Westbound Thru	0.17	1.1	A	0.19	1.1	A	0.15	2.1	A	0.19	1.8	A	0.14	3.3	A	0.18	4.2	A
Northbound Left	0.77	54.8	D	0.77	54.5	D	0.37	49.7	D	0.43	50.7	D	0.52	17.9	B	0.52	21.8	C
Northbound Right	0.13	0.0	A	0.13	0.0	A	0.12	0.0	A	0.12	46.1	D	0.10	0.0	A	0.10	0.0	A

Table 18 2018 Background Plus Projects Levels-of-Service - Signalized Intersections (Continued)

	AM Peak Hour						PM Peak Hour						Saturday Peak Hour					
	Without Promenade Without Honuaula			With Promenade With Honuaula			Without Promenade Without Honuaula			With Promenade With Honuaula			Without Promenade Without Honuaula			With Promenade With Honuaula		
Intersection and Movement	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Hwy at Kaonoulu St	***0.79***	***16.1***	***B***	***0.78***	***32.9***	***C***	***0.74***	***13.0***	***B***	***0.88***	***50.5***	***D***	***0.61***	***6.1***	***A***	***0.87***	***37.2***	***D***
Eastbound Left	0.36	55.5	E	0.48	59.8	E	0.45	70.2	E	0.57	91.8	F	0.27	21.0	C	0.51	41.9	D
Eastbound Thru				0.26	53.7	D				0.66	85.0	F				0.64	41.4	D
Eastbound Right	0.42	56.3	E	0.64	48.4	D	0.13	66.6	E	0.62	75.1	E	0.46	22.4	C	0.39	30.5	C
Westbound Left				0.74	70.0	E				0.90	78.7	E				0.97	62.3	E
Westbound Thru				0.50	56.6	E				0.52	66.4	E				0.54	31.4	C
Westbound Right				0.05	42.4	D				0.40	44.8	D				0.36	15.5	B
Northbound Left	0.62	43.2	D	0.55	38.6	D	0.72	71.9	E	0.57	84.0	F	0.59	8.6	A	0.74	54.0	D
Northbound Thru	0.39	7.9	A	0.52	26.8	C	0.56	4.1	A	0.90	51.0	D	0.46	4.1	A	0.94	49.4	D
Northbound Right				0.05	36.4	D				0.28	13.6	B				0.48	16.5	B
Southbound Left				0.53	41.3	D				0.89	86.8	F				0.96	56.5	E
Southbound Thru	0.68	12.7	B	0.80	26.1	C	0.63	9.0	A	0.70	28.7	C	0.52	4.4	A	0.73	25.4	C
Southbound Right	0.05	13.4	B	0.05	26.2	C	0.07	7.6	A	0.08	16.8	B	0.08	2.9	A	0.08	17.4	B
S. Kihei Rd at Kaonoulu St.	***0.45***	***6.2***	***A***	***0.47***	***6.6***	***A***	***0.50***	***8.4***	***A***	***0.66***	***15.9***	***B***	***0.44***	***6.4***	***A***	***0.55***	***7.2***	***A***
Westbound Left	0.42	23.8	C	0.42	20.8	C	0.46	28.4	C	0.57	22.6	C	0.48	23.6	C	0.55	15.4	B
Westbound Right	0.03	21.5	C	0.05	18.6	B	0.03	25.4	C	**0.08**	**18.6**	**B**	0.02	20.8	C	0.08	12.5	B
Northbound Thru	0.45	3.5	A	0.49	4.7	A	0.49	6.1	A	0.63	10.9	B	0.44	3.6	A	0.55	6.0	A
Northbound Thru	0.06	2.3	A	0.08	3.2	A	0.11	4.3	A	0.16	7.3	A	0.09	2.5	A	0.16	4.2	A
Southbound Left	0.06	2.3	A	0.14	3.5	A	0.70	48.5	D	**0.95**	**79.1**	**E**	0.10	2.5	A	0.43	5.8	A
Southbound Thru	0.30	2.9	A	0.33	4.0	A	0.40	2.6	A	0.45	4.3	A	0.37	3.3	A	0.46	5.4	A
Piilani Hwy at Kulanihakoi St	***0.76***	***15.5***	***B***	***0.81***	***16.7***	***B***	***0.66***	***10.8***	***B***	***0.79***	***15.1***	***B***	***0.53***	***6.4***	***A***	***0.67***	***8.1***	***A***
Eastbound Left & Thru	0.37	54.2	D	0.52	57.0	E	0.51	72.0	E	0.64	75.2	E	0.29	28.2	C	0.57	41.3	D
Eastbound Right	0.27	53.1	D	0.37	54.1	D	0.06	65.8	E	0.06	62.1	E	0.06	26.6	C	0.06	34.5	C
Westbound Left & Thru	0.61	62.3	E	0.66	67.4	E	0.47	71.3	E	0.39	66.2	E	0.00	0.0	A	0.00	0.0	A
Westbound Right	0.02	50.8	D	0.02	50.8	D	0.01	65.4	E	0.01	61.6	E	0.00	0.0	A	0.00	0.0	A
Northbound Left	0.51	74.1	E	0.60	85.6	F	0.60	67.0	E	0.60	64.7	E	0.73	73.4	E	0.44	44.0	D
Northbound Thru	0.54	9.7	A	**0.58**	**10.0**	**B**	0.68	4.6	A	0.80	8.5	A	0.48	3.1	A	0.63	4.2	A
Northbound Right	0.08	4.3	A	0.08	3.1	A	0.02	2.1	A	0.02	3.9	A	0.00	0.0	A	0.00	0.0	A
Southbound Left	0.51	63.0	E	0.55	56.9	E	0.32	57.3	E	0.32	77.5	E	0.00	0.0	A	0.00	0.0	A
Southbound Thru	0.76	12.4	B	0.80	14.5	B	0.64	8.4	A	0.80	14.8	B	0.53	5.7	A	0.68	8.4	A
Southbound Right	0.02	5.5	A	0.03	7.7	A	0.06	7.8	A	0.09	5.4	A	0.05	3.7	A	0.07	4.3	A
Piilani Hwy at Piikea Ave	***0.80***	***19.7***	***B***	***0.84***	***21.6***	***C***	***0.78***	***30.8***	***C***	***0.92***	***32.3***	***C***	***0.79***	***17.4***	***B***	***0.91***	***28.4***	***C***
Eastbound Left	0.86	67.2	E	0.89	70.4	E	0.86	77.1	E	0.97	93.6	F	0.79	30.8	C	**0.92**	**55.5**	**E**
Eastbound Right	0.16	42.1	D	0.24	41.3	D	0.17	50.8	D	0.25	47.3	D	0.17	18.2	B	0.18	24.8	C
Northbound Left	0.67	65.1	E	0.76	77.3	E	0.85	79.9	E	0.85	79.9	E	0.77	35.5	D	0.91	75.1	E
Northbound Thru	0.46	7.0	A	0.51	8.3	A	0.61	9.5	A	0.73	14.8	B	0.51	7.0	A	0.65	12.3	B
Southbound Thru	0.80	17.2	B	0.84	19.3	B	0.72	32.3	C	0.91	31.5	C	0.80	21.4	C	0.90	32.7	C
Southbound Right	0.28	10.5	B	0.32	11.6	B	0.34	31.6	C	0.47	17.7	B	0.26	13.5	B	0.33	18.2	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix D for Level-of-Service Analysis Worksheets without Promenade without Honuaula conditions
(4) See Appendix F for Level-of-Service Analysis Worksheets with Promenade with Honuaula conditions.

Table 19 2018 Background Plus Project Levels-of-Service - Unsignalized Intersections

	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
	Without Promenade Without Honuaula		With Promenade With Honuaula		Without Promenade Without Honuaula		With Promenade With Honuaula		With Promenade With Honuaula		With Promenade With Honuaula	
Intersection and Movement	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Kaonoulu St at Kenolio Rd	***6.9***	***A***	***6.9***	***A***	***5.1***	***A***	***6.8***	***A***	***6.4***	***A***	***6.2***	***A***
Eastbound Left	7.6	A	7.8	A	7.7	A	8.3	A	8.1	A	8.4	A
Westbound Left	7.5	A	7.6	A	7.6	A	8.0	A	7.7	A	8.1	A
Northbound Left	11.2	B	12.5	B	12.8	B	19.1	C	17.9	C	19.6	C
Northbound Thru & Right	9.4	A	9.9	A	10.2	B	12.3	B	11.5	B	13.1	B
Southbound Left	16.0	C	20.4	C	16.2	C	39.0	E	27.7	D	39.5	E
Southbound Thru & Right	9.5	A	10.0	B	11.0	B	14.2	B	12.0	B	12.6	B
Kaonoulu St at Alulike St	***2.8***	***A***	***2.4***	***A***	***2.7***	***A***	***1.9***	***A***	***3.4***	***A***	***2.4***	***A***
Eastbound Left	7.5	A	7.6	A	7.7	A	8.1	A	7.7	A	8.2	A
Westbound Left	7.5	A	7.6	A	7.7	A	8.0	A	7.6	A	8.1	A
Northbound Left, Thru & Right	11.7	B	12.8	B	11.9	B	15.5	C	12.6	B	18.5	C
Southbound Left, Thru & Right	9.2	A	9.6	A	9.7	A	11.2	B	10.3	B	12.8	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix D for Level-of-Service Analysis Worksheets for Without Project conditions.
(4) See Appendix F for Level-of-Service Analysis Worksheets for With Project conditions.

Project Driveways

The results of the Level-of-Service analysis of the project driveways are summarized in Table 20. Drive A, which is the only signalized driveway, will operate at Level-of-Service A during the morning peak hour, Level-of-Service D during the afternoon peak hour and Level-of-Service C during the Saturday. Drives B, C and D will operate at Level-of-Service A during all peak hours.

Mitigation Measures

Table 21 summarizes the recommended mitigation.

Table 20 2018 Levels-of-Service of Project Driveways

	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	With Promenade With Honuaula			With Promenade With Honuaula			With Promenade With Honuaula		
Intersection and Movement	V/C (1)	Delay (2)	LOS (3)	V/C	Delay	LOS	V/C	Delay	LOS
E. Kaonoulu Street at Drive A	***0.13***	***7.7***	***A***	***0.61***	***33.9***	***C***	***0.72***	***32.2***	***C***
Eastbound Left	0.15	8.0	A	0.62	40.9	D	0.76	40.8	D
Eastbound Thru	0.05	7.3	A	0.17	20.5	C	0.20	15.9	B
Eastbound Right	0.06	7.6	A	0.20	24.3	D	0.30	16.9	B
Westbound Left	0.00	0.0	A	0.00	0.0	A	0.00	0.0	A
Westbound Thru & Right	0.13	7.4	A	0.75	39.3	D	0.84	42.4	D
Northbound Left	0.07	7.5	A	0.62	34.5	C	0.79	39.3	D
Northbound Thru & Right	0.02	0.0	A	0.04	12.2	A	0.07	12.8	B
Southbound Left & Thru	0.01	0.0	A	0.14	27.4	C	0.14	28.6	C
Southbound Right	0.04	7.5	A	0.12	27.1	C	0.12	28.4	C
E. Kaonoulu St at Drive B South	***nc***	***0.0***	***A***	***nc***	***0.0***	***A***	***nc***	***0.0***	***A***
Northbound Right	nc	0.0	A	nc	0.0	A	nc	0.0	A
E. Kaonoulu St at Drive B North	***nc***	***1.3***	***A***	***nc***	***1.7***	***A***	***nc***	***1.6***	***A***
Southbound Right	nc	9.7	A	nc	16.0	C	nc	19.7	C
E. Kaonoulu Street at Drive C	***nc***	***7.7***	***A***	***nc***	***16.4***	***B***	***nc***	***8.9***	***A***
Eastbound Left	nc	7.3	A	nc	7.5	A	nc	7.5	A
Westbound Left	nc	0.0	A	nc	0.0	A	nc	0.0	A
Northbound Left	nc	10.9	B	nc	28.5	D	nc	47.0	E
Northbound Thru & Right	nc	0.0	A	nc	0.0	A	nc	0.0	A
Southbound Left & Thru	nc	0.0	A	nc	0.0	A	nc	0.0	A
Southbound Right	nc	8.8	A	nc	8.7	A	nc	8.8	A
E. Kaonoulu Street at Drive D	***nc***	***4.3***	***A***	***nc***	***5.8***	***A***	***nc***	***5.8***	***A***
Northbound Left & Right	nc	8.5	A	nc	8.7	A	nc	8.8	A

NOTES:
(1) Denotes volume-to-capacity ratio. Volume-to-capacity ratios are not calculated for the unsignalized intersections.
(2) Delay is in seconds per vehicle.
(3) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(4) See Appendix F for Level-of-Service Analysis Worksheets.
(5) nc = not calculated.

Table 21 Summary of Recommended Mitigation Measures Conditions

Location	Mitigation Required to Mitigate 2018 Background Conditions (These improvements are to be implemented by others)	Improvements Recommended As Part of Piilani Promenade Project	Additional Mitigation Required to Mitigate 2018 Background Plus Project
Overall			1. Provide set backs along East Kaonoulu Street at all project driveways for future right turn decelerations lanes . (Required by SDOT)
Piilani Highway at Ohukai Street	1. Modify the westbound approach to provide a one left turn lane, one optional left or thru lane and one right turn lane. 2. Modify the eastbound approach to provide one left turn lane, one thru lane and one right turn lane. 3. Modify the southbound approach to provide an additional left turn lane.		No additional mitigation required
Piilani Highway at Kaiwahine St and Uwapo Road	1. Modify the eastbound approach to provide separate left, through and right turn lanes 2. Modify the westbound approach to provide two left turn lanes, one through lane and one right turn lane. 3. Modify the southbound approach to provide a second left turn lane.		No additional mitigation required
Piilani Highway at Kaonoulu Street	1. Install traffic signals	1. Modify eastbound approach to provide one left turn lane, one through lane and one right turn lane 2. Provide two southbound to eastbound left turn lanes 3. Provide two left turn lanes, one through lane and one right turn lanes along the westbound approach	No additional mitigation required
South Kihei Road at Kaonoulu Street	1. Install traffic signals 2. Provide southbound to eastbound left turn lane and northbound to eastbound right turn lane.		No additional mitigation required
Piilani Highway at Kulanihakoi Road			No additional mitigation required

Roundabout Analysis

The viability of providing a roundabout at the intersection of Piilani Highway at Kaonoulu Street was assessed and the results are summarized in Table 22. Shown are the high and low volume-to-capacity ratios. High and low volume-to-capacity ratios are reported since there is a learning process as drivers learn to drive a roundabout. The high volume-to-capacity ratio would be the condition expected after the roundabout has been in use sufficiently long for drivers to learn to drive the roundabout.

The roundabout analysis was performed to different scenarios of configuration. The number of lanes was varied from one to three lanes and the inside radius was varied from 25 to 80 feet. The data reported was the same for all scenarios.

Table 22 Roundabout Analysis of Piilani Highway at Kaonoulu Street

	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
Approach	High V/C	Low V/C	High V/C	Low V/C	High V/C	Low V/C
Eastbound	1.49	2.12	2.61	3.92	2.97	4.44
Westbound	0.87	1.16	3.75	5.17	2.84	3.69
Northbound	1.32	1.60	2.95	3.73	3.06	3.99
Southbound	1.87	2.29	3.03	3.87	3.26	4.23

Impacts of Pedestrians

An assessment of the potential impacts of pedestrians on traffic conditions at the intersection of Piilani Highway at Kaonoulu Street was performed. It is anticipated that there will be pedestrian traffic across Piilani Highway at this intersection. However, there are no pedestrian trip generation data to develop reliable estimates. In order to assess the impacts of pedestrian traffic across Piilani Highway, the level-of-service was rerun assuming that 100 pedestrians per hour would use the crosswalks across Piilani Highway. The addition of 100 pedestrians per hour increased the intersection volume-to-capacity ratios and increased the overall intersection delays slightly but not enough to change the intersection level-of-service.

It has been recommended that traffic conditions at this intersection be assessed at 65% occupancy.

Impacts on Emergency Services

There is no indication within the TIAR that operation of emergency vehicles on the Piilani Highway or the future improved section of the Kihei Upcountry Highway within the proposed Piilani Promenade project will be impaired in any way. All the final levels-of-service are within accepted standards. To the contrary, the traffic signal systems planned for the project will be designed to automatically prioritize emergency vehicle operations, subject to State of Hawaii Department of Transportation's approval of the plans. The roadways and intersections included in the TIAR will operate within acceptable ranges of operation and there is no indication that development of the proposed project or roadway improvements will create a system that impairs the operation of emergency vehicles.

6. TRAFFIC IMPACTS OF HONUA'ULA DEVELOPMENT

The following chapter discusses the impacts of the Honua'ula Affordable Housing Project. The Honua'ula Affordable Housing Project is not part of the Piilani Promenade Project, nor is it considered a related background project, for the reasons discussed previously (page 17). However, if completed, Honua'ula Affordable Housing Project traffic would impact traffic along East Kaonoulu Road and is discussed in this chapter in response to public comments.

2018 Background Plus Project Plus Honua'ula Level-of-Service Analysis

The level-of-service analysis was performed using traffic conditions for background plus project plus mitigation roadway conditions and the traffic projections presented at the end of Chapter 4. The results of the Level-of-Service analysis of the signalized intersections are summarized in Table 23 and the results of the Level-of-Service analysis of the unsignalized intersections are summarized in Table 24.

Table 23 2018 Background Plus Project Plus Honuaula Levels-of-Service - Signalized Intersections

	AM Peak Hour						PM Peak Hour						Saturday Peak Hour					
	With Promenade Without Honuaula			With Promenade With Honuaula			With Promenade Without Honuaula			With Promenade With Honuaula			With Promenade Without Honuaula			With Promenade With Honuaula		
Intersection and Movement	V/C	Delay [1]	LOS [2]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Hwy at Ohukai Rd	***0.82***	***29.4***	***C***	***0.82***	***29.9***	***C***	***0.86***	***43.4***	***D***	***0.90***	***44.2***	***D***	***0.79***	***24.1***	***C***	***0.80***	***24.3***	***C***
Eastbound Left	0.46	51.7	D	0.46	51.7	D	0.72	84.2	F	0.72	84.2	F	0.53	37.5	D	0.54	38.2	D
Eastbound Left & Thru	0.41	51.1	D	0.41	51.1	D	0.72	83.4	F	0.72	83.4	F	0.55	38.0	D	0.56	38.8	D
Eastbound Right	0.06	47.7	D	0.06	47.7	D	0.08	63.7	E	0.08	63.7	E	0.38	35.5	D	0.39	36.1	D
Westbound Left	0.63	56.6	E	0.63	56.6	E	0.78	80.7	F	0.78	80.7	F	0.80	69.8	E	0.80	68.6	E
Westbound Left & Thru	0.65	58.0	E	0.65	58.0	E	0.80	83.1	F	0.80	83.1	F	0.82	71.4	E	0.81	70.1	E
Westbound Right	0.12	47.9	D	0.12	47.9	D	0.42	62.1	E	0.43	62.2	E	0.03	37.2	D	0.03	37.4	D
Northbound Left	0.32	58.7	E	0.32	58.9	E	0.82	86.6	F	0.82	86.6	F	0.82	74.6	E	0.83	77.0	E
Northbound Thru	0.74	17.9	B	0.76	18.6	B	0.86	27.2	C	0.87	28.1	C	0.75	18.0	B	0.75	18.2	B
Northbound Right	0.04	17.6	B	0.04	17.1	B	0.08	11.3	B	0.08	11.3	B	0.10	10.2	B	0.10	10.1	B
Southbound Left	0.46	66.5	E	0.46	66.4	E	0.73	65.1	E	0.73	65.2	E	0.37	37.7	D	0.37	38.1	D
Southbound Thru	0.91	24.6	C	0.92	25.8	C	0.87	41.9	D	0.90	43.7	D	0.79	18.3	B	0.81	18.6	B
Southbound Right	0.07	3.7	A	0.07	4.1	A	0.07	34.0	C	0.07	33.0	C	0.07	9.3	A	0.07	9.2	A
Piilani Hwy at Kaiwahine St	***0.62***	***26.5***	***C***	***0.63***	***26.6***	***C***	***0.73***	***26.5***	***C***	***0.74***	***26.9***	***C***	***0.70***	***14.9***	***B***	***0.71***	***15.1***	***B***
Eastbound Left	0.66	56.8	E	0.66	56.8	E	0.63	73.7	E	0.63	73.7	E	0.35	36.8	D	0.35	37.2	D
Eastbound Thru	0.06	44.1	D	0.06	44.1	D	0.11	61.7	E	0.11	61.7	E	0.06	34.0	C	0.06	34.3	C
Eastbound Right	0.08	44.4	D	0.08	44.4	D	0.08	61.5	E	0.08	61.5	E	0.08	34.1	C	0.08	34.5	C
Westbound Left	0.41	48.3	D	0.41	48.3	D	0.56	69.5	E	0.56	69.5	E	0.55	40.3	D	0.55	40.9	D
Westbound Thru	0.10	44.5	D	0.10	44.5	D	0.25	63.0	E	0.25	63.0	E	0.17	34.8	C	0.17	35.1	D
Westbound Right	0.07	44.3	D	0.07	44.3	D	0.05	61.2	E	0.05	61.2	E	0.03	33.8	C	0.03	34.2	C
Northbound Left	0.33	32.8	C	0.33	32.5	C	0.62	76.7	E	0.62	76.5	E	0.56	42.9	D	0.56	43.4	D
Northbound Thru	0.62	21.9	C	0.64	22.5	C	0.73	22.9	C	0.74	23.5	C	0.63	10.0	B	0.64	10.2	B
Northbound Right	0.05	27.1	C	0.05	26.3	C	0.11	13.5	B	0.11	13.2	B	0.07	5.8	A	0.07	5.8	A
Southbound Left	0.37	44.9	D	0.37	45.5	D	0.63	83.3	F	0.63	82.9	F	0.53	41.9	D	0.53	41.8	D
Southbound Thru	0.62	22.6	C	0.63	22.6	C	0.69	16.6	B	0.71	17.2	B	0.75	12.5	B	0.77	12.8	B
Southbound Right	0.01	16.4	B	0.01	16.9	B	0.05	6.9	A	0.05	6.7	A	0.03	5.7	A	0.03	5.6	A
Piilani Hwy at N. Kihei Rd	***0.63***	***29.5***	***C***	***0.64***	***29.6***	***C***	***0.84***	***39.4***	***D***	***0.85***	***39.9***	***D***	***0.65***	***16.4***	***B***	***0.69***	***19.0***	***B***
Eastbound Left	0.58	59.4	E	0.58	58.9	E	0.75	56.6	E	0.74	55.6	E	0.53	35.9	D	0.54	37.8	D
Eastbound Left & Thru	0.61	60.5	E	0.60	59.8	E	0.78	59.2	E	0.77	58.1	E	0.53	35.9	D	0.54	37.8	D
Eastbound Right	0.28	54.8	D	0.28	54.4	D	0.22	40.9	D	0.23	39.5	D	0.35	22.0	C	0.33	20.4	C
Westbound Left, Thru & Rt	0.22	59.0	E	0.22	59.0	E	0.58	73.5	E	0.58	73.5	E	0.02	37.3	D	0.02	38.5	D
Northbound Left	0.73	44.7	D	0.74	44.5	D	0.93	84.9	F	0.94	85.0	F	0.42	31.8	C	0.69	34.3	C
Northbound Thru & Right	0.54	18.3	B	0.56	18.7	B	0.60	18.2	B	0.61	18.7	B	0.51	8.0	A	0.51	7.9	A
Southbound Left	0.21	64.4	E	0.21	64.4	E	0.46	78.4	E	0.46	78.4	E	0.39	44.3	D	0.41	46.3	D
Southbound Thru	0.67	23.4	C	0.68	23.8	C	0.83	37.3	D	0.86	39.0	D	0.75	17.2	B	0.81	21.4	C
Southbound Right	0.08	14.7	B	0.08	14.8	B	0.17	21.2	C	0.17	21.4	C	0.11	10.0	B	0.11	11.7	B
N. Kihei Rd at S. Kihei Rd	***0.42***	***20.3***	***C***	***0.42***	***20.2***	***C***	***0.64***	***28.5***	***C***	***0.64***	***28.6***	***C***	***0.61***	***12.5***	***B***	***0.61***	***12.5***	***B***
Eastbound Thru	0.30	10.5	B	0.30	10.5	B	0.50	21.7	C	0.51	21.8	C	0.53	13.9	B	0.54	14.0	B
Eastbound Right	0.19	9.5	A	0.19	9.5	A	0.41	20.0	B	0.42	20.1	C	0.30	11.8	B	0.30	11.7	B
Westbound Left	0.59	70.2	E	0.59	70.5	E	0.70	98.4	F	0.71	99.7	F	0.51	24.5	C	0.51	24.5	C
Westbound Thru	0.18	1.1	A	0.19	1.1	A	0.19	1.8	A	0.19	1.8	A	0.18	4.2	A	0.18	4.2	A
Northbound Left	0.77	54.5	D	0.77	54.5	D	0.43	50.7	D	0.43	50.7	D	0.52	21.6	C	0.52	21.8	C
Northbound Right	0.13	0.0	A	0.13	0.0	A	0.12	46.1	D	0.12	46.1	D	0.10	0.0	A	0.10	0.0	A

Table 23 2018 Background Plus Project Plus Honuaula Levels-of-Service - Signalized Intersections (Continued)

	AM Peak Hour						PM Peak Hour						Saturday Peak Hour					
	With Promenade Without Honuaula			With Promenade With Honuaula			With Promenade Without Honuaula			With Promenade With Honuaula			With Promenade Without Honuaula			With Promenade With Honuaula		
Intersection and Movement	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Piilani Hwy at Kaonoulu St	***0.78***	***33.0***	***C***	***0.78***	***32.9***	***C***	***0.86***	***48.4***	***D***	***0.88***	***50.5***	***D***	***0.84***	***35.1***	***D***	***0.87***	***37.2***	***D***
Eastbound Left	0.48	59.8	E	0.48	59.8	E	0.57	91.8	F	0.57	91.8	F	0.51	41.9	D	0.51	41.9	D
Eastbound Thru	0.26	53.7	D	0.26	53.7	D	0.61	83.6	F	0.66	85.0	F	0.60	40.3	D	0.64	41.4	D
Eastbound Right	0.64	48.4	D	0.64	48.4	D	0.63	76.2	E	0.62	75.1	E	0.39	30.5	C	0.39	30.5	C
Westbound Left	0.74	70.0	E	0.74	70.0	E	0.89	77.1	E	0.90	78.7	E	0.93	53.9	D	0.97	62.3	E
Westbound Thru	0.50	56.6	E	0.50	56.6	E	0.51	66.4	E	0.52	66.4	E	0.50	30.7	C	0.54	31.4	C
Westbound Right	0.05	42.4	D	0.05	42.4	D	0.39	45.4	D	0.40	44.8	D	0.34	15.3	B	0.36	15.5	B
Northbound Left	0.55	38.7	D	0.55	38.6	D	0.57	84.0	F	0.57	84.0	F	0.74	54.0	D	0.74	54.0	D
Northbound Thru	0.52	26.9	C	0.52	26.8	C	0.88	48.1	D	0.90	51.0	D	0.94	49.4	D	0.94	49.4	D
Northbound Right	0.05	36.6	D	0.05	36.4	D	0.25	12.8	B	0.28	13.6	B	0.48	16.2	B	0.48	16.5	B
Southbound Left	0.53	41.5	D	0.53	41.3	D	0.82	80.3	F	0.89	86.8	F	0.92	49.2	D	0.96	56.5	E
Southbound Thru	0.80	26.1	C	0.80	26.1	C	0.69	27.5	C	0.70	28.7	C	0.73	25.4	C	0.73	25.4	C
Southbound Right	0.05	25.2	C	0.05	26.2	C	0.08	16.1	B	0.08	16.8	B	0.08	17.4	B	0.08	17.4	B
S. Kihei Rd at Kaonoulu St.	***0.46***	***6.3***	***A***	***0.47***	***6.6***	***A***	***0.62***	***15.8***	***B***	***0.66***	***15.9***	***B***	***0.54***	***7.1***	***A***	***0.55***	***7.2***	***A***
Westbound Left	0.41	21.3	C	0.42	20.8	C	0.55	25.0	C	0.57	22.6	C	0.53	15.5	B	0.55	15.4	B
Westbound Right	0.04	19.1	B	0.05	18.6	B	**0.08**	**21.2**	**C**	**0.08**	**18.6**	**B**	0.08	12.7	B	0.08	12.5	B
Northbound Thru	0.48	4.5	A	0.49	4.7	A	0.59	10.5	B	0.63	10.9	B	0.54	6.0	A	0.55	6.0	A
Northbound Thru	0.08	3.1	A	0.08	3.2	A	0.18	7.2	A	0.16	7.3	A	0.15	4.2	A	0.16	4.2	A
Southbound Left	0.13	3.3	A	0.14	3.5	A	**0.94**	**80.2**	**F**	**0.95**	**79.1**	**E**	0.40	5.6	A	0.43	5.8	A
Southbound Thru	0.32	3.8	A	0.33	4.0	A	0.44	4.4	A	0.45	4.3	A	0.46	5.4	A	0.46	5.4	A
Piilani Hwy at Kulanihakoi St	***0.79***	***16.5***	***B***	***0.81***	***16.7***	***B***	***0.77***	***14.9***	***B***	***0.79***	***15.1***	***B***	***0.66***	***8.0***	***A***	***0.67***	***8.1***	***A***
Eastbound Left & Thru	0.52	57.0	E	0.52	57.0	E	0.64	76.2	E	0.64	75.2	E	0.57	40.7	D	0.57	41.3	D
Eastbound Right	0.35	53.9	D	0.37	54.1	D	0.06	62.1	E	0.06	62.1	E	0.06	34.2	C	0.06	34.5	C
Westbound Left & Thru	0.66	67.4	E	0.66	67.4	E	0.39	66.2	E	0.39	66.2	E	0.00	0.0	A	0.00	0.0	A
Westbound Right	0.02	50.8	D	0.02	50.8	D	0.01	61.6	E	0.01	61.6	E	0.00	0.0	A	0.00	0.0	A
Northbound Left	0.60	85.9	F	0.60	85.6	F	0.60	64.8	E	0.60	64.7	E	0.44	43.7	D	0.44	44.0	D
Northbound Thru	**0.58**	**9.9**	**A**	**0.58**	**10.0**	**B**	0.78	8.2	A	0.80	8.5	A	0.62	4.2	A	0.63	4.2	A
Northbound Right	0.08	3.1	A	0.08	3.1	A	0.02	3.9	A	0.02	3.9	A	0.00	0.0	A	0.00	0.0	A
Southbound Left	0.55	56.6	E	0.55	56.9	E	0.32	77.5	E	0.32	77.5	E	0.00	0.0	A	0.00	0.0	A
Southbound Thru	0.79	14.0	B	0.80	14.5	B	0.79	14.4	B	0.80	14.8	B	0.67	8.2	A	0.68	8.4	A
Southbound Right	0.03	7.8	A	0.03	7.7	A	0.09	5.4	A	0.09	5.4	A	0.07	4.3	A	0.07	4.3	A
Piilani Hwy at Piikea Ave	***0.84***	***21.4***	***C***	***0.84***	***21.6***	***C***	***0.90***	***30.6***	***C***	***0.92***	***32.3***	***C***	***0.89***	***27.5***	***C***	***0.91***	***28.4***	***C***
Eastbound Left	0.88	68.8	E	0.89	70.4	E	0.95	88.7	F	0.97	93.6	F	**0.89**	**50.7**	**D**	**0.92**	**55.5**	**E**
Eastbound Right	0.24	41.5	D	0.24	41.3	D	0.22	47.7	D	0.25	47.3	D	0.18	24.8	C	0.18	24.8	C
Northbound Left	0.76	77.3	E	0.76	77.3	E	0.85	79.9	E	0.85	79.9	E	0.91	75.1	E	0.91	75.1	E
Northbound Thru	0.51	8.2	A	0.51	8.3	A	0.72	13.9	B	0.73	14.8	B	0.64	12.2	B	0.65	12.3	B
Southbound Thru	0.83	19.2	B	0.84	19.3	B	0.89	29.3	C	0.91	31.5	C	0.89	31.8	C	0.90	32.7	C
Southbound Right	0.30	11.8	B	0.32	11.6	B	0.45	17.0	B	0.47	17.7	B	0.32	18.1	B	0.33	18.2	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix D for Level-of-Service Analysis Worksheets for With Promenade Without Honuaula Conditions.
(4) See Appendix F for Level-of-Service Analysis Worksheets With Promenade With Honuaula Conditions.

Table 24 2018 Background Plus Project Plus Honua'ula Levels-of-Service - Unsignalized Intersections

Intersection & Movement	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
	With Promenade Without Honuaula		With Promenade With Honuaula		With Promenade Without Honuaula		With Promenade With Honuaula		With Promenade Without Honuaula		With Promenade With Honuaula	
Kaonoulu Street at Kenolio Road	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
	6.9	***A***	***7.0***	***A***	***6.8***	***A***	***7.4***	***A***	***6.3***	***A***	***6.7***	***A***
Eastbound Left	7.8	A	7.8	A	8.3	A	8.4	A	8.4	A	8.4	A
Westbound Left	7.6	A	7.6	A	8.0	A	8.1	A	8.1	A	8.1	A
Northbound Left	12.5	B	12.9	B	19.1	C	20.2	C	19.7	C	20.6	C
Northbound Thru & Right	9.9	A	10.0	A	12.3	B	12.7	B	13.1	B	13.5	B
Southbound Left	20.4	C	21.9	E	39.0	E	44.8	E	39.7	E	44.8	E
Southbound Thru & Right	10.0	B	10.2	B	14.2	B	14.7	B	12.7	B	13.0	B
Kaonoulu Street at Alulike Street	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
	0.21	***A***	***0.21***	***A***	***0.39***	***A***	***0.41***	***A***	***0.42***	***A***	***0.44***	***A***
Eastbound Approach	0.21	A	0.21	A	0.39	A	0.41	A	0.42	A	0.44	A
Westbound Approach	0.15	A	0.17	A	0.30	A	0.31	A	0.35	A	0.36	A
Northbound Approach	0.01	A	0.01	A	0.01	A	0.01	A	0.02	A	0.02	A
Southbound Approach	0.07	A	0.08	A	0.08	A	0.08	A	0.13	A	0.13	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix E for Level-of-Service Analysis Worksheets for With Promenade Without Honuaula conditions.
(4) See Appendix F for Level-of-Service Analysis Worksheets for With Promenade With Honuaula conditions.

Project Driveways Along Kaonoulu Street With Honua'ula

The results of the Level-of-Service analysis of the project driveways are summarized in Table 25.

Table 25 2018 Levels-of-Service of Project Driveways

	AM Peak Hour With Promenade With Honuaula			PM Peak Hour With Promenade With Honuaula			Saturday Peak Hour With Promenade With Honuaula		
Intersection and Movement	V/C(1)	Delay (2)	LOS (3)	V/C	Delay	LOS	V/C	Delay	LOS
E. Kaonoulu Street at Drive A	***0.13***	***7.7***	***A***	***0.61***	***33.9***	***C***	***0.72***	***32.2***	***C***
Eastbound Left	0.15	8.0	A	0.62	40.9	D	0.76	40.8	D
Eastbound Thru	0.05	7.3	A	0.17	20.5	C	0.20	15.9	B
Eastbound Right	0.06	7.6	A	0.20	24.3	D	0.30	16.9	B
Westbound Left	0.00	0.0	A	0.00	0.0	A	0.00	0.0	A
Westbound Thru & Right	0.13	7.4	A	0.75	39.3	D	0.84	42.4	D
Northbound Left	0.07	7.5	A	0.62	34.5	C	0.79	39.3	D
Northbound Thru & Right	0.02	0.0	A	0.04	12.2	A	0.07	12.8	B
Southbound Left & Thru	0.01	0.0	A	0.14	27.4	C	0.14	28.6	C
Southbound Right	0.04	7.5	A	0.12	27.1	C	0.12	28.4	C
E. Kaonoulu St at Drive B South	***nc***	***0.0***	***A***	***nc***	***0.0***	***A***	***nc***	***0.0***	***A***
Northbound Right	nc	0.0	A	nc	0.0	A	nc	0.0	A
E. Kaonoulu St at Drive B North	***nc***	***1.3***	***A***	***nc***	***1.7***	***A***	***nc***	***1.6***	***A***
Southbound Right	nc	9.7	A	nc	16.0	C	nc	19.7	C
E. Kaonoulu Street at Drive C	***nc***	***7.7***	***A***	***nc***	***16.4***	***B***	***nc***	***8.9***	***A***
Eastbound Left	nc	7.3	A	nc	7.5	A	nc	7.5	A
Westbound Left	nc	0.0	A	nc	0.0	A	nc	0.0	A
Northbound Left	nc	10.9	B	nc	28.5	D	nc	47.0	E
Northbound Thru & Right	nc	0.0	A	nc	0.0	A	nc	0.0	A
Southbound Left & Thru	nc	0.0	A	nc	0.0	A	nc	0.0	A
Southbound Right	nc	8.8	A	nc	8.7	A	nc	8.8	A
E. Kaonoulu Street at Drive D	***nc***	***4.3***	***A***	***nc***	***5.8***	***A***	***nc***	***5.8***	***A***
Northbound Left & Right	nc	8.5	A	nc	8.7	A	nc	8.8	A

NOTES:
(1) Denotes volume-to-capacity ratio. Volume-to-capacity ratios are not calculated for the unsignalized intersections.
(2) Delay is in seconds per vehicle.
(3) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(4) See Appendix F for Level-of-Service Analysis Worksheets.
(5) nc = not calculated.

Mitigation Measures

No additional mitigation is required to accommodate traffic generated by the Honua'ula Affordable Housing project.

7. LONG-RANGE FORECASTS

State of Hawaii Department of Transportation requested long-range forecasts of the intersections along Piilani Highway that included traffic generated by the south Maui projects (Honua'ula, Wailea Resort and Makena Resort).

Methodology

The *Kihei Master Traffic Plan Study*[12] contained morning and afternoon traffic forecasts for the intersections along Piilani Highway that included traffic associated the Upcountry Highway. The report also implies that the forecast include traffic associated with major South Maui projects known at the time, primarily Wailea, Makena and Honua'ula.

The traffic forecasts in the *Kihei Master Traffic Plan Study* were also adjusted to include traffic from the following projects

(1) Kaiwahine Village
(2) Maui Lu Resort
(3) Kenolio 6 Residential
(4) Kihei Residential
(5) Kihei High School Phases 1 and 2
(6) Honua'ula Off-site Affordable Housing
(7) Maui Research and Technology park

[12] Parsons Brinckerhoff Quade & Douglas, *Kihei Master Traffic Plan Study*, Honolulu, HI, September 2003

The resulting morning and afternoon 2025 traffic projections are shown on Figures 29 and 30, respectively. The resulting peak hour projections along East Kaonoulu Street are shown on Figure 31. A level-of-service analysis was performed to confirm that the study intersections would operate at acceptable levels-of-service. The level-of-service analysis confirmed that the following improvements should be implemented:

(1) The North-South Collector Road should be completed between Kaonoulu Street and Waipuilani Road.

(2) The mauka roadway should be completed between Ohukai Street and Lipoa Street. It should be noted that the connection between Lipoa Street and the proposed Kihei High School was recommended in the TIAR for the Maui Research and Technology Park and the connection between Ohukai Road and East Kaonoulu Street is recommended in this report.

(3) The intersection of East Kaonoulu Street at Drive C should be signalized. This intersection provides access and egress to the proposed Honua'ula Affordable Housing project.

The final levels-of-service are summarized in Tables 26 and 27.

Table 26 2025 Levels-of-Service - Signalized Intersections

Intersection and Movement	AM Peak Hour V/C	AM Peak Hour Delay [1]	AM Peak Hour LOS [2]	PM Peak Hour V/C	PM Peak Hour Delay	PM Peak Hour LOS
Piilani Hwy at Ohukai Rd	***0.78***	***27.5***	***C***	***0.98***	***37.6***	***D***
Eastbound Left	0.52	54.8	D	0.47	83.5	F
Eastbound Thru	0.31	51.9	D	0.43	82.7	F
Eastbound Right	0.06	49.7	D	0.06	78.2	E
Westbound Left	0.77	66.2	E	0.66	88.6	F
Westbound Left & Thru	0.25	49.2	D	0.67	89.5	F
Westbound Right	0.09	47.7	D	0.08	75.0	E
Northbound Left	0.38	51.3	D	0.63	79.0	E
Northbound Thru	0.83	26.1	C	1.00	29.7	C
Northbound Right	0.11	22.8	C	0.13	8.1	A
Southbound Left	0.55	64.1	E	0.85	83.8	F
Southbound Thru	0.84	16.5	B	0.83	32.8	C
Southbound Right	0.03	4.8	A	0.09	19.7	B
Piilani Hwy at Kaiwahine St	***0.78***	***31.8***	***C***	***0.87***	***44.7***	***D***
Eastbound Left	0.09	41.6	D	0.19	71.4	E
Eastbound Thru	0.14	42.0	D	0.44	74.5	E
Eastbound Right	0.04	41.1	D	0.08	70.1	E
Westbound Left	0.72	52.6	D	0.82	97.0	F
Westbound Thru	0.25	43.2	D	0.31	72.7	E
Westbound Right	0.64	51.1	D	0.07	69.9	E
Northbound Left	0.41	32.5	C	0.65	77.8	E
Northbound Thru	0.75	26.6	C	0.89	39.3	D
Northbound Right	0.05	32.0	C	0.14	19.3	B
Southbound Left	0.39	46.3	D	0.73	76.0	E
Southbound Thru	0.63	25.3	C	0.82	37.4	D
Southbound Right	0.01	11.7	B	0.03	14.2	B
Piilani Hwy at N. Kihei Rd	***0.63***	***29.0***	***C***	***0.97***	***58.5***	***E***
Eastbound Left	0.57	59.3	E	0.82	76.9	E
Eastbound Left & Thru	0.59	60.1	E	0.85	81.9	F
Eastbound Right	0.29	34.4	C	0.42	46.6	D
Westbound Left, Thru & Right	0.22	59.0	E	0.92	143.1	F
Northbound Left	0.68	39.5	D	1.14	141.9	F
Northbound Thru & Right	0.61	17.1	B	0.67	20.2	C
Southbound Left	0.27	66.6	E	0.55	105.8	F
Southbound Thru	0.70	30.7	C	0.94	53.3	D
Southbound Right	0.09	20.4	C	0.18	25.0	C
N. KIhei Rd at S. Kihei Rd	***0.49***	***19.7***	***B***	***0.64***	***31.1***	***c***
Eastbound Thru	0.38	13.2	B	0.53	25.4	C
Eastbound Right	0.18	11.0	B	0.46	23.8	C
Westbound Left	0.59	68.1	E	0.66	90.4	F
Westbound Thru	0.29	2.0	A	0.23	1.4	A
Northbound Left	0.79	52.2	D	0.48	62.3	E
Northbound Right	0.13	0.0	A	0.12	56.0	E

Table 26 2025 Levels-of-Service - Signalized Intersections (Continued)

Intersection and Movement	AM Peak Hour V/C	AM Peak Hour Delay [1]	AM Peak Hour LOS [2]	PM Peak Hour V/C	PM Peak Hour Delay	PM Peak Hour LOS
Piilani Hwy at Kaonoulu St	***0.82***	***57.6***	***E***	***0.98***	***62.3***	***E***
Eastbound Left	0.87	74.4	E	0.98	141.2	F
Eastbound Thru	0.18	45.9	D	0.76	92.8	F
Eastbound Right	0.31	35.6	D	0.43	55.6	E
Westbound Left	0.64	73.3	E	0.99	104.9	F
Westbound Thru	0.69	84.4	F	0.98	126.7	F
Westbound Right	0.10	212.8	F	0.56	49.3	D
Northbound Left	0.78	50.1	D	0.83	89.0	F
Northbound Thru	0.59	38.7	D	0.98	66.5	E
Northbound Right	0.11	92.9	F	0.27	14.1	B
Southbound Left	0.72	47.7	D	0.98	114.7	C
Southbound Thru	0.84	33.9	C	0.71	20.5	C
Southbound Right	0.10	39.9	D	0.22	5.5	A
S. Kihei Rd at Kaonoulu St.	***0.64***	***7.6***	***A***	***0.67***	***14.9***	***B***
Westbound Left	0.54	23.5	C	0.75	31.3	C
Westbound Right	0.04	19.9	B	0.08	19.4	B
Northbound Thru	0.67	6.6	A	0.68	12.6	B
Northbound Thru	0.11	3.1	A	0.18	7.7	A
Southbound Left	0.24	3.8	A	0.84	54.9	D
Southbound Thru	0.32	3.8	A	0.64	6.5	A
Piilani Hwy at Kulanihakoi St	***0.73***	***24.5***	***C***	***0.84***	***16.7***	***B***
Eastbound Left & Thru	0.30	44.7	D	0.43	79.2	E
Eastbound Right	0.02	41.9	D	0.02	73.6	E
Westbound Left & Thru	0.85	74.5	E	0.75	101.4	F
Westbound Right	0.04	42.0	D	0.02	73.5	E
Northbound Left	0.52	75.2	E	0.64	78.6	E
Northbound Thru	0.68	15.9	B	0.85	11.4	B
Northbound Right	0.21	6.1	A	0.05	4.7	A
Southbound Left	0.68	51.5	D	0.51	80.4	F
Southbound Thru	0.72	25.0	C	0.71	12.8	B
Southbound Right	0.01	13.1	B	0.05	6.5	A
Piilani Hwy at Piikea Ave	***0.89***	***26.6***	***C***	***0.89***	***34.9***	***C***
Eastbound Left	0.92	69.3	E	0.93	90.3	F
Eastbound Right	0.14	36.1	D	0.34	53.9	D
Northbound Left	0.80	72.9	E	0.84	94.4	F
Northbound Thru	0.57	11.5	B	0.80	22.2	C
Southbound Thru	0.89	25.7	C	0.88	29.7	C
Southbound Right	0.20	6.3	A	0.41	10.9	B
Kaonoulu St at Kenolio Rd	***0.69***	***20.1***	***C***	***1.00***	***35.3***	***D***
Eastbound Left	0.20	17.7	B	0.48	19.1	B
Eastbound Thru & Right	0.45	18.8	B	0.43	14.5	B
Westbound Left	0.09	21.5	C	0.11	8.0	A
Westbound Thru & Right	0.76	46.7	D	0.93	44.8	D
Northbound Left	0.03	5.5	A	0.04	16.2	B
Northbound Thru & Right	0.26	7.0	A	0.59	24.1	C
Southbound Left	0.60	12.7	B	1.00	85.6	F
Southbound Thru & Right	0.30	7.2	A	0.48	21.7	C

Table 26 2025 Levels-of-Service - Signalized Intersections (Continued)

Intersection and Movement	AM Peak Hour V/C	AM Peak Hour Delay [1]	AM Peak Hour LOS [2]	PM Peak Hour V/C	PM Peak Hour Delay	PM Peak Hour LOS
Kaonoulu St at Drive A	***0.28***	***34.0***	***C***	***0.55***	***45.3***	***D***
Eastbound Left	0.17	43.2	D	0.68	45.8	D
Eastbound Thru	0.30	35.6	D	0.31	29.2	C
Eastbound Right	0.04	84.6	F	0.16	139.2	F
Westbound Left	0.06	35.8	D	0.42	31.5	C
Westbound Thru & Right	0.43	24.9	C	0.70	37.9	D
Northbound Left	0.09	32.7	C	0.58	38.6	D
Northbound Thru & Right	0.01	31.8	C	0.12	12.1	B
Southbound Left & Thru	0.06	32.5	C	0.14	22.2	C
Southbound Right	0.04	32.2	C	0.12	21.7	C
Kaonoulu Street at Drive C	***0.36***	***17.5***	***B***	***0.60***	***25.8***	***C***
Eastbound Left	0.33	44.0	D	0.58	53.6	D
Eastbound Thru	0.57	21.3	C	0.69	28.5	C
Eastbound Right	0.00	5.6	A	0.02	9.8	A
Westbound Left	0.33	34.8	C	0.41	44.3	D
Westbound Thru & Right	0.32	13.2	B	0.13	23.4	C
Northbound Left	0.13	13.9	B	0.52	19.2	B
Northbound Thru & Right	0.01	12.8	B	0.03	12.5	B
Southbound Left & Thru	0.03	13.0	B	0.02	12.4	B
Southbound Right	0.06	13.2	B	0.04	12.6	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix D for Level-of-Service Analysis Worksheets without Project.
(4) See Appendix E for Level-of-Service Analysis Worksheets with Project.

Table 27 2025 Levels-of-Service of Unsignalized Intersections

Intersection and Movement	AM Peak Hour Delay [1]	AM Peak Hour LOS [2]	PM Peak Hour Delay	PM Peak Hour LOS
Kaonoulu Street at Alulike Street	***1.9***	***A***	***1.7***	***A***
Eastbound Left	7.9	A	8.3	A
Westbound Left	7.8	A	8.2	A
Northbound Left, Thru & Right	15.8	B	17.7	B
Southbound Left, Thru & Right	10.6	B	11.9	B
Kaonoulu Street At Drive B South	***0.0***	***A***	***0.0***	***A***
Northbound Right	0.0	A	0.0	A
Kaonoulu Street at Drive B North	***0.6***	***A***	***1.9***	***A***
Southbound Right	11.6	B	16.4	C
Kaonoulu Street at Drive D	***0.1***	***A***	***0.9***	***A***
Northbound Left & Right	16.8	C	13.5	B

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) See Appendix C for Level-of-Service Analysis Worksheets.

8. INTERSECTION DESIGN REQUIREMENTS

Based on discussions with State of Hawaii Department of Transportation, it is understood that the Upcountry Highway will not be constructed until several years after Piilani Promenade has been completed. However, East Kaonoulu east of Piilani Highway should be constructed with capacity to accommodate Upcountry Highway traffic. The intersections along East Kaonoulu Street, including the intersection of Piilani Highway at East Kaonoulu Street, are to be constructed with capacity to accommodate traffic associated with the Upcountry Highway as well as traffic generated by the Piilani Promenade project.

This chapter describes the methodology used to estimate future design volumes of the intersections of Piilani Highway at East Kaonoulu Street and East Kaonoulu Street at Drive A to determine the design requirements of the intersections without and with the Upcountry Highway.

Required Left Turn Storage Lane Lengths

The left turn storage lengths required to accommodate estimated traffic volumes were calculated using guidelines in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials. There are separate policies for signalized and unsignalized intersections. Based on this policy, the assumptions used to determine the required lengths of the left turn storage lanes are:

1. For signalized intersections, the length of the left turn storage lane should be "1.5 to 2.0 times the average number of vehicles that would store per cycle, which is predicted on the design volume."

2. For unsignalized intersections, the length of the left turn storage lane is "based on the number of vehicles likely to arrive in an average 2-minute period within the peak hour. As a minimum requirement, space for at least two passenger cars should be provided; with over 10 percent truck traffic, provisions should be made for at least one car and one truck."

3. The average length required per vehicle is 25 feet.

Left Turn Storage Lane Requirements Without Upcountry Highway

Using the above criteria, the turn storage lane requirements were calculated and the results are summarized in Table 28. Also shown are the storage lane length recommended. Figure 32 is a schematic drawing of the proposed lane configurations along East Kaonoulu Street between Piilani Highway and Drive D.

Table 28 Left Turn Storage Lane Requirements Without Upcountry Highway

Intersection	Approach & Time Period		Design Volume	Cycle Length (Seconds)	Cycles per Hour	Average Vehicles per Cycle	Recommended Length (1) Minimum Veh	Minimum Ft	Desirable Veh	Desirable Ft	Recommendation
Piilani Hwy at Kaonoulu Street	EB	AM	50	125	29	2	3	75	4	100	1 Lane at 100 ft
		PM	49	180	20	2	3	75	4	100	
		Sat	74	45	80	1	2	50	2	50	
	WB	AM	152	125	29	5	8	200	10	250	2 Lanes with 1300 ft Total
		PM	515	180	20	26	39	975	52	1300	
		Sat	647	45	80	8	12	300	16	400	
	NB	AM	111	125	29	4	6	150	8	200	1 Lane at 350 ft
		PM	135	180	20	7	11	275	14	350	
		Sat	129	45	80	2	3	75	4	100	
	SB	AM	154	125	29	5	8	200	10	250	2 Lanes with 1350 ft Total
		PM	512	180	20	26	39	975	52	1300	
		Sat	704	45	80	9	14	350	18	450	
East Kaonoulu Street at Drive A	EB	AM	131	60	60	2	3	75	4	100	2 Lanes with 500 ft Total
		PM	376	90	40	9	14	350	18	450	
		Sat	414	90	40	10	15	375	20	500	
	WB	AM	0	60	60	0	0	0	0	0	1 lane at 60 ft.
		PM	0	90	40	0	0	0	0	0	
		Sat	0	90	40	0	0	0	0	0	

NOTE:
(1) Minimum queue length is 1.5 time average number of vehicles. Desirable queue length is 2.0 time average number of vehicles.

Left Turn Storage Lane Requirements With Upcountry Highway

Using the AASHTO standards described in the previous section, the left turn storage lengths required to accommodate Upcountry Highway traffic plus Piilani Promenade traffic was estimated. The results are presented in Table 29. A comparison of the required lengths without versus with the Upcountry Highway as calculated using the AASHTO standards is presented in Table 30.

Table 29 Left Turn Storage Lane Requirements With Upcountry Highway

Intersection	Approach & Time Period		Design Volume	Cycle Length (Seconds)	AASHTO Method: Cycles per Hour	AASHTO Method: Average Vehicles per Cycle	Recommended Length (1): Minimum Veh	Minimum Ft	Desirable Veh	Desirable Ft	Provided (3)
Piilani Hwy at Kaonoulu Street	EB	AM	201	125	29	7	11	275	14	350	1 Lane at 400 ft
		PM	156	180	20	8	12	300	16	400	
	WB	AM	183	125	29	6	9	225	12	300	2 Lanes with 1400 ft Total
		PM	556	180	20	28	42	1050	56	1400	
	NB	AM	149	125	29	5	8	200	10	250	1 Lane at 400 ft
		PM	166	180	20	8	12	300	16	400	
	SB	AM	290	125	29	10	15	375	20	500	2 Lanes with 1250 ft Total
		PM	495	180	20	25	38	950	50	1250	
East Kaonoulu Street at Drive A	EB	AM	123	60	60	2	3	75	4	100	2 Lanes with 450 ft Total
		PM	369	90	40	9	14	350	18	450	
	WB	AM	18	60	60	0	0	0	0	0	1 lane at 60 ft.
		PM	53	90	40	1	2	50	2	50	

NOTE:
(1) Minimum queue length is 1.5 time average number of vehicles. Desirable queue length is 2.0 time average number of vehicles.
(2) See Appendix I.

Table 30 Comparison of Left Turn Storage Lane Requirements Without versus With Upcountry Highway

Intersection	Approach	Recommended Left Turn Storage Lengths: Without Upcountry Highway	With Upcountry Highway
Piilani Hwy at Kaonoulu Street	EB	1 lane at 100 ft	1 lane at 400 ft
	WB	2 lanes with 1300 ft Total	2 lanes with 1400 ft Total
	NB	1 lane at 350 ft	1 lane at 400 ft
	SB	2 lanes with 1350 ft Total	2 lanes with 1250 ft Total
East Kaonoulu Street at Drive A	EB	2 lanes with 500 ft Total	2 lanes with 450 ft Total
	WB	1 lane at 60 ft.	1 lane at 60 ft.

9. TRANSPORTATION MANAGEMENT PLAN

Purpose and Approach of the Transportation Management Plan

The purpose of the Transportation Management Plan (TMP) is typically to identify and describe transportation management strategies to reduce travel demand, primarily “single-occupancy private vehicles”, or to redistribute demand in time. These strategies should accomplish the following:

1. Reduce the need for employees and customers of Piilani Promenade to use “single-occupancy private vehicles” by encouraging the use of alternative modes of transportation, such as walking, biking, and public transportation and ride sharing.

2. Provide alternative modes and facilities for these alternative modes.

3. Coordinate the establishment of programs, such as carpools and other ride sharing programs, that reduce the amount of traffic generated by the project.

Transportation Management Plan Strategies

1. A Transportation Coordinator should be designated by the developer or property manager. The Transportation Coordinator will be responsible for establishing, coordinating and managing the TMP strategies identified in the plan. The Transportation Coordinator should also document any traffic related complaints received from the surrounding community.

2. Employers should allow flexible work hours. Examples of flexible work hour are:

    A. Start the work day such that employees get to work before or after the weekday commute peak hours.

    B. Some employees have scheduled four 10-hour work days per week, with alternating Monday through Thursday and Tuesday through Friday work weeks. Every other week end is a four day weekend. Employees are divided into two groups so that offices are always covered with half the staff on the alternating Monday and Fridays.

3. The Transportation Coordinator should establish and coordinate a ride sharing program for employees. Since the Transportation Coordinator is employed by the developer or property manager, employees of various employers of Piilani Promenade can be brought into the program, not those from just a single major employer.

4. The Transportation Coordinator should coordinate with the Maui Department of Transportation to establish bus routes to provide service between the project, hotels and Kihei.

5. Bus passes should be provided to employees free or at a subsidized price.

6. Bus stops should be provided within the project that will minimize walking distances to the various businesses in the project.

7. The Transportation Coordinator should coordinate with the hotels, especially those in Kihei and adjacent area, to provide shuttle bus service between the hotels and Piilani Promenade.

8. A voucher program should be established for employees that participate in one of the ride sharing programs or bus pass programs and have to leave work for family emergencies.

9. Preferential parking spaces should be provided for employees participating it in ride sharing programs.

10. Secure bicycle storage facilities should be provided at several locations within the project. Showers for employees should also be considered.

11. Pedestrian walkways should be designated within the parking lot area to encourage pedestrian circulation and enhance safety of pedestrians between the roadways and buildings.

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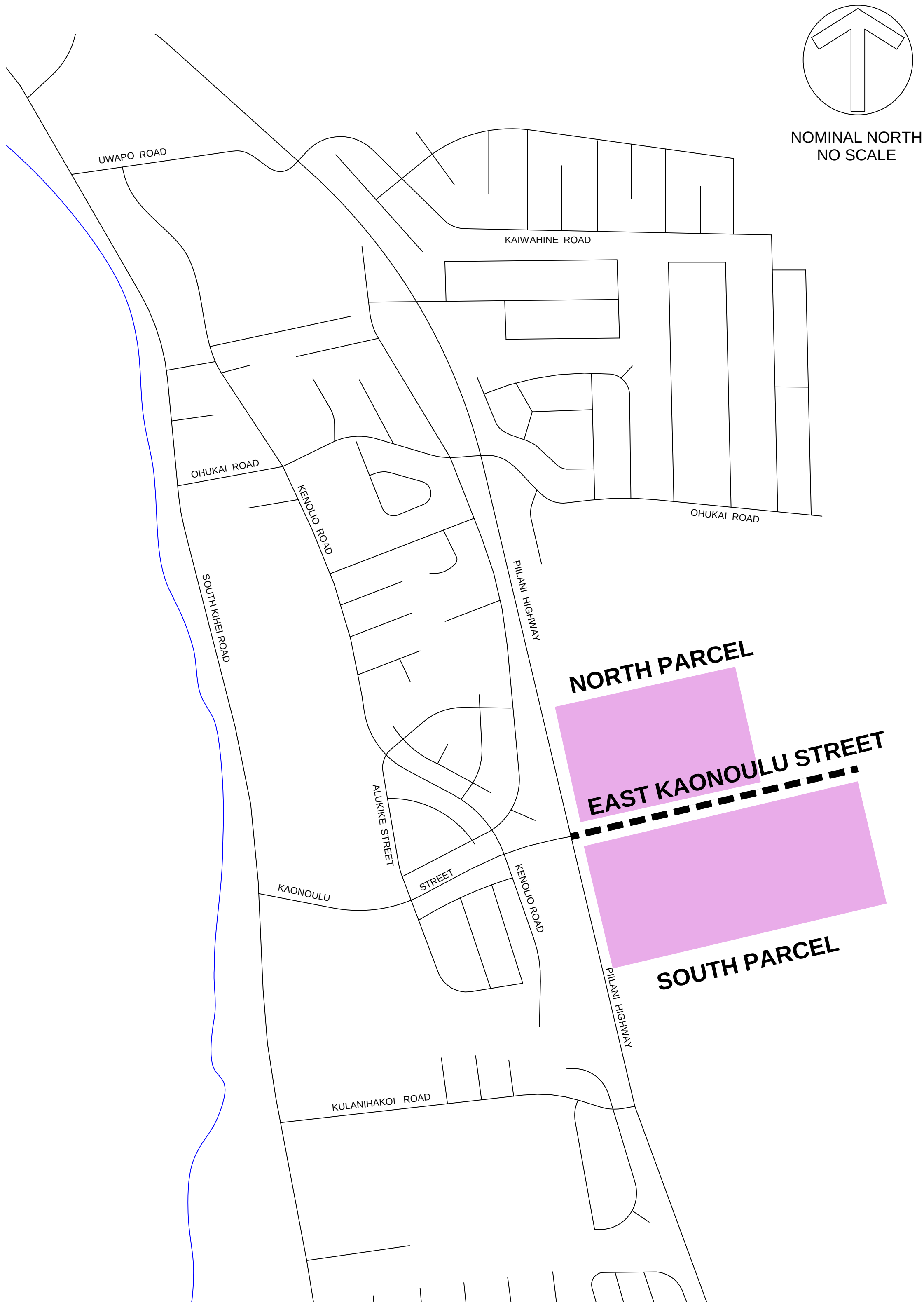

Figure 1
PROJECT LOCATION IN KIHEI

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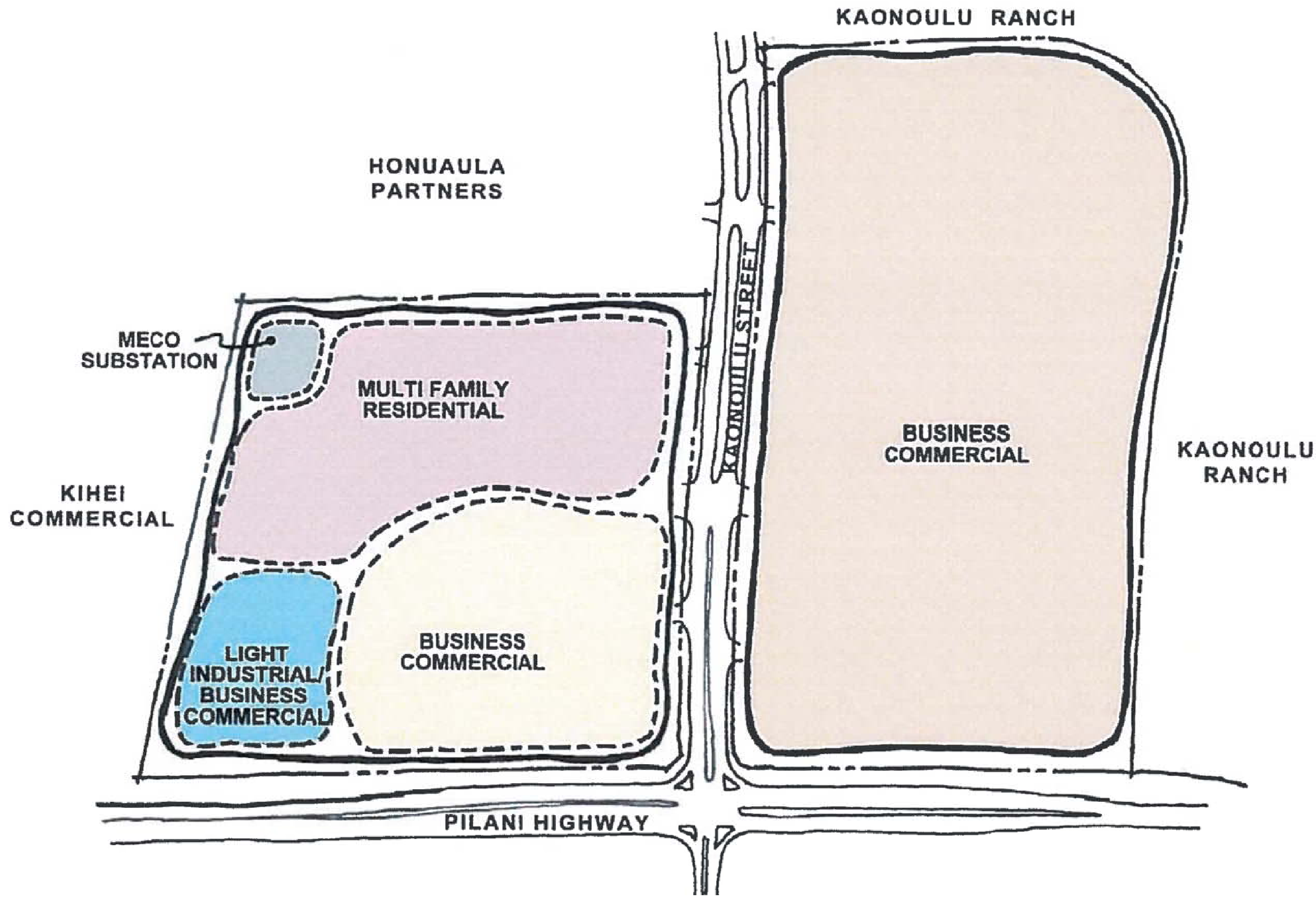

Figure 2
SITE PLAN

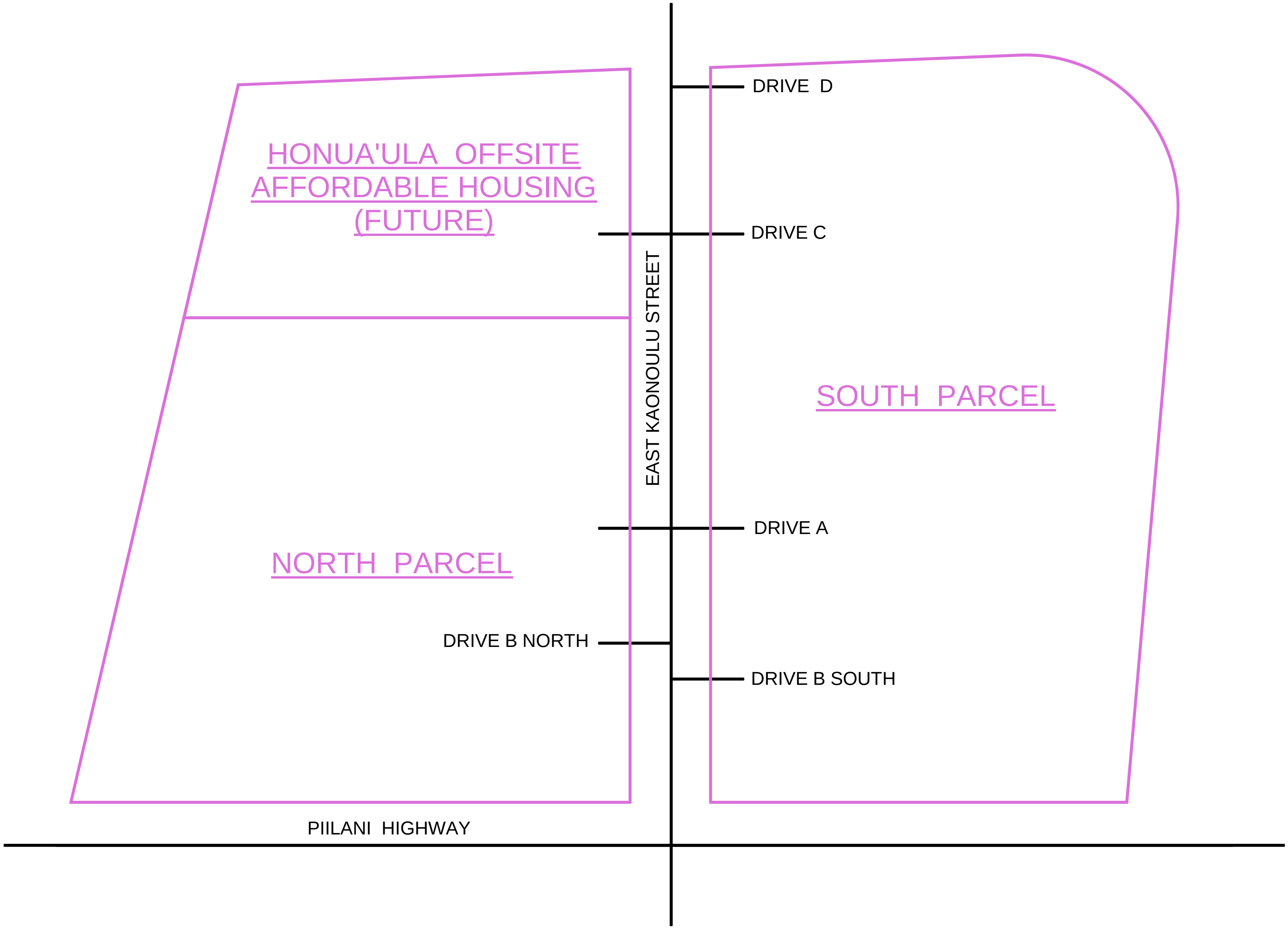

Figure 3
SCHEMATIC DRAWING INDICATING APPROXIMATE LOCATIONS OF PROJECT DRIVEWAYS

Phillip Rowell and Associates

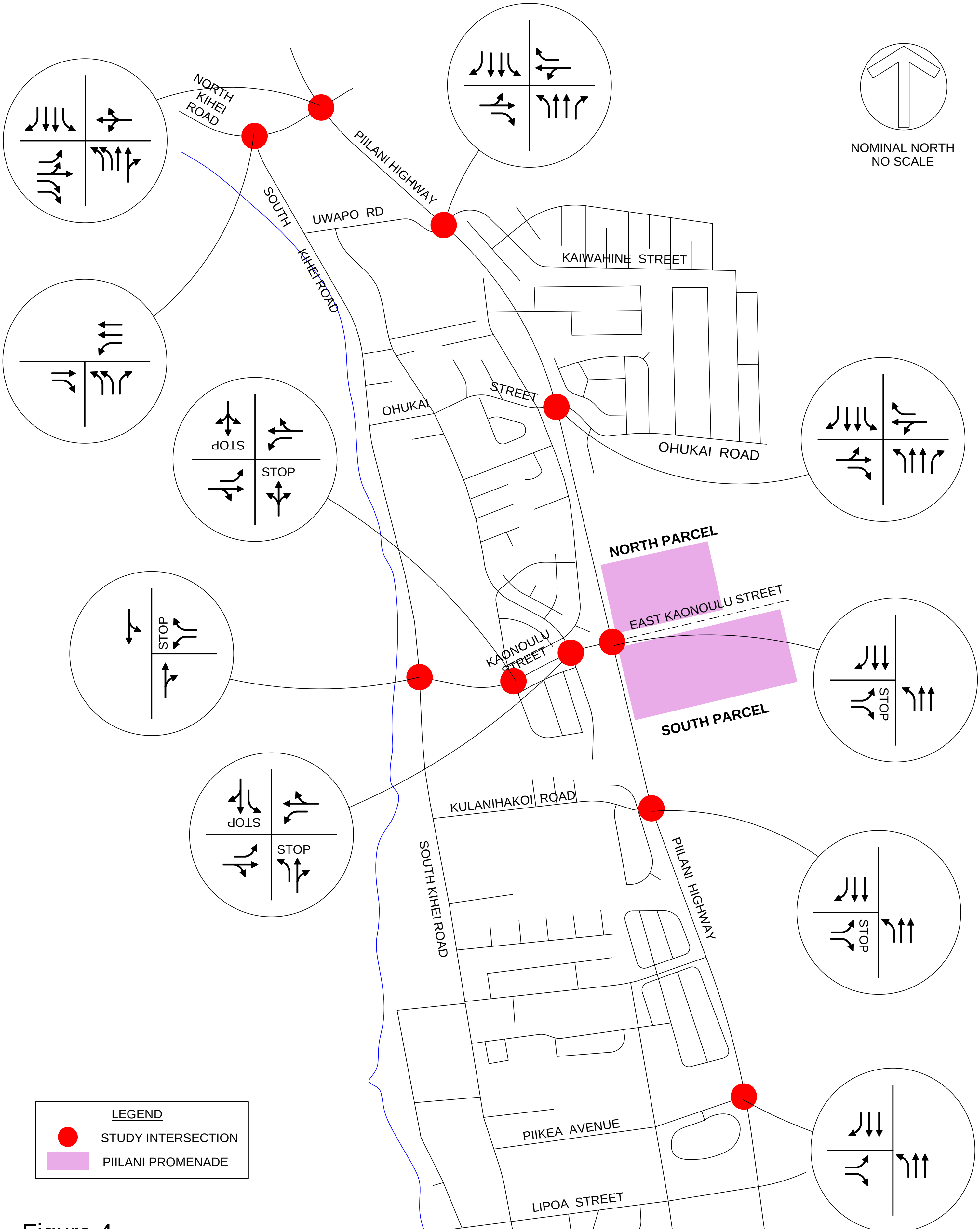

Figure 4
EXISTING LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS

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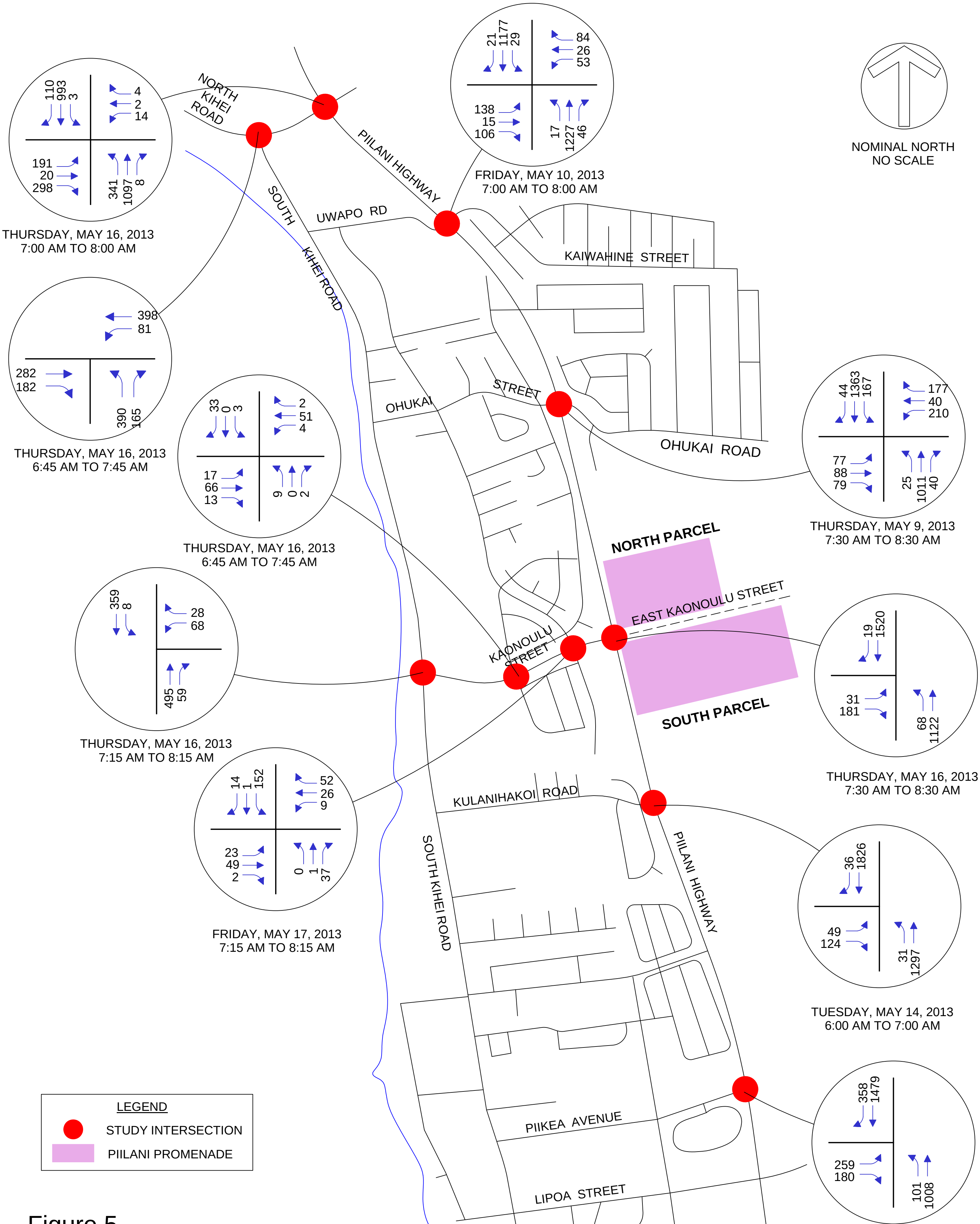

Figure 5
2013 WEEKDAY AM PEAK HOUR VOLUMES

Phillip Rowell and Associates

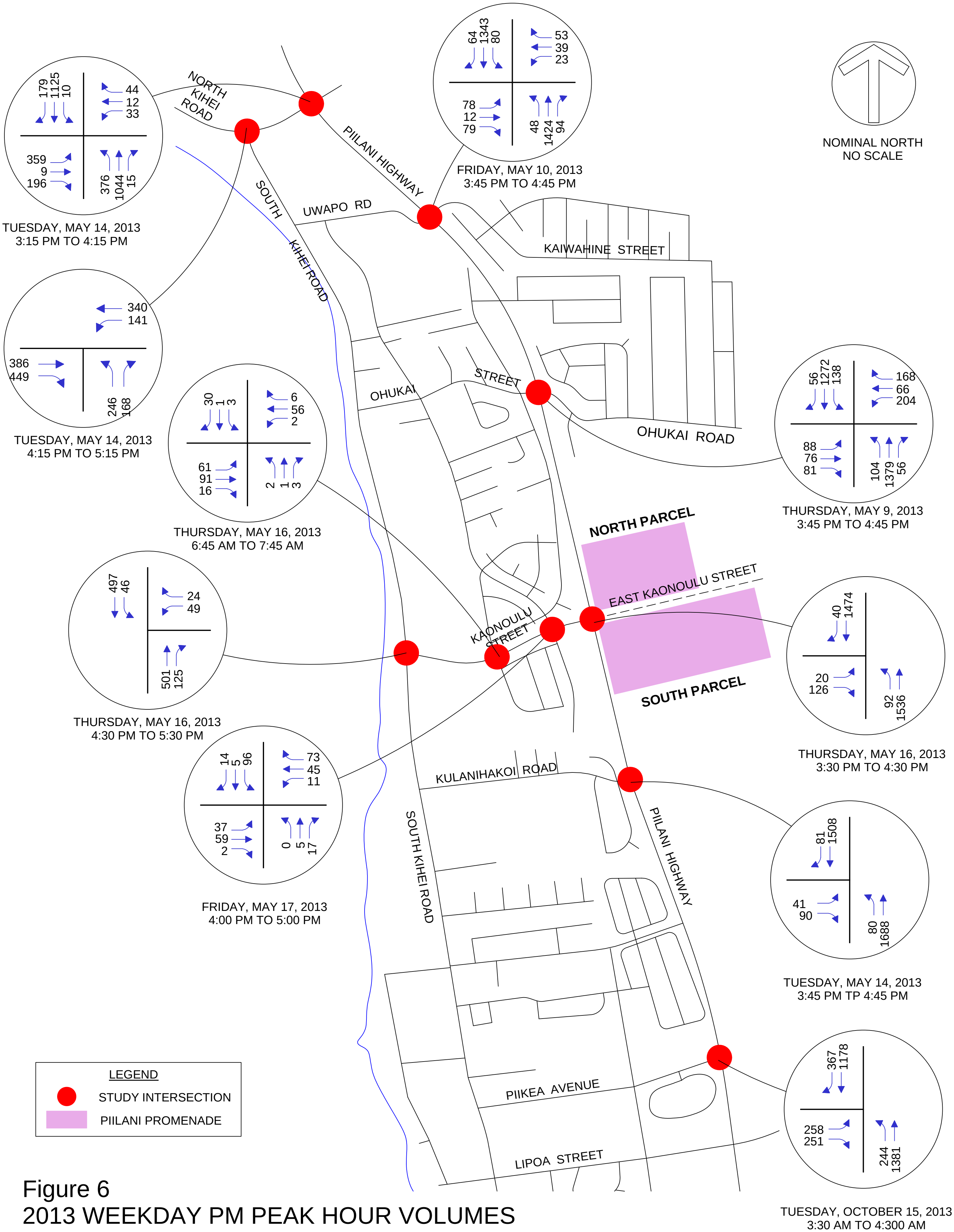

Figure 6
2013 WEEKDAY PM PEAK HOUR VOLUMES

Phillip Rowell and Associates

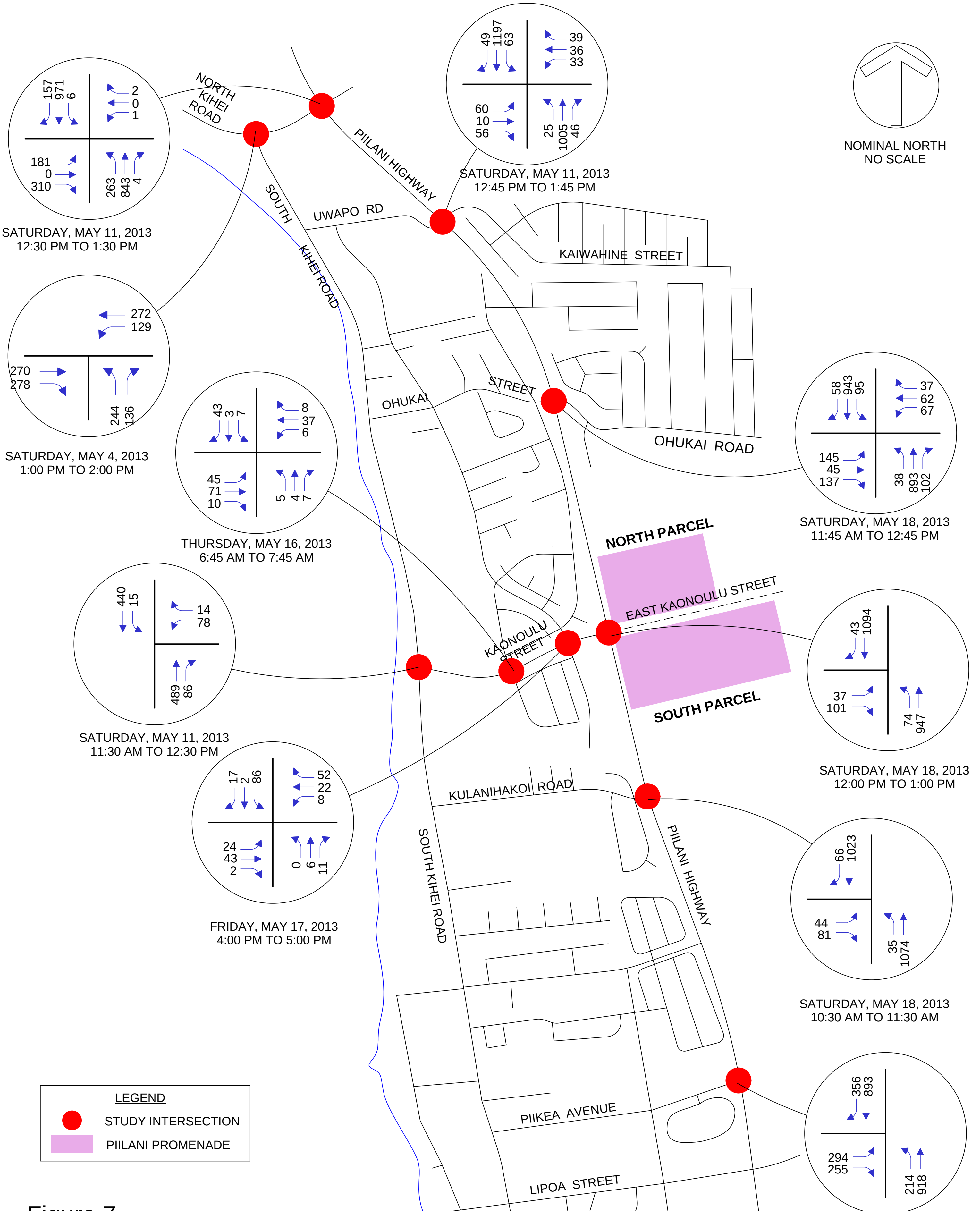

Figure 7
2013 SATURDAY PEAK HOUR VOLUMES

Phillip Rowell and Associates

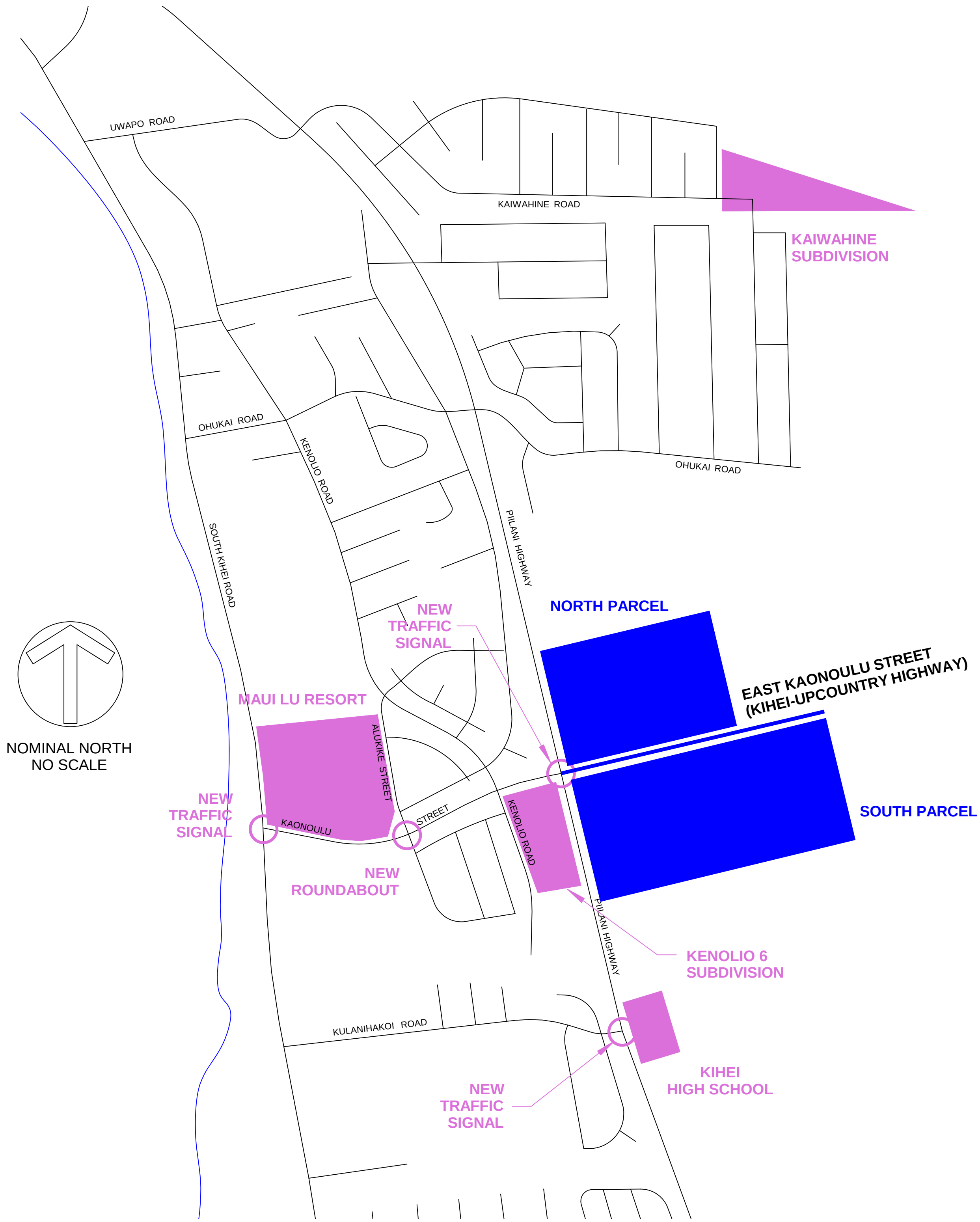

Figure 8
LOCATIONS OF RELATED PROJECTS

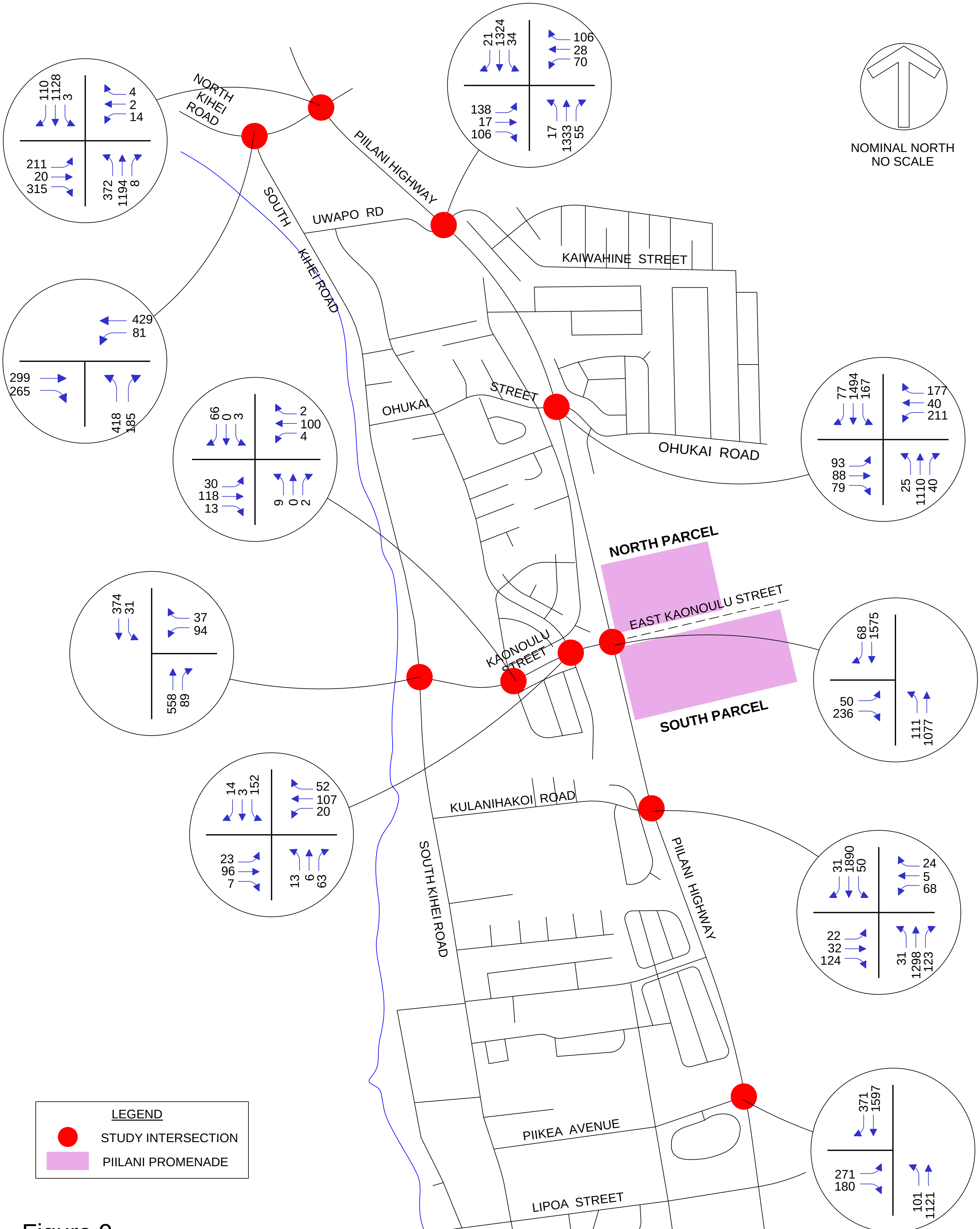

Figure 9
2018 BACKGROUND WEEKDAY AM PEAK HOUR PROJECTIONS

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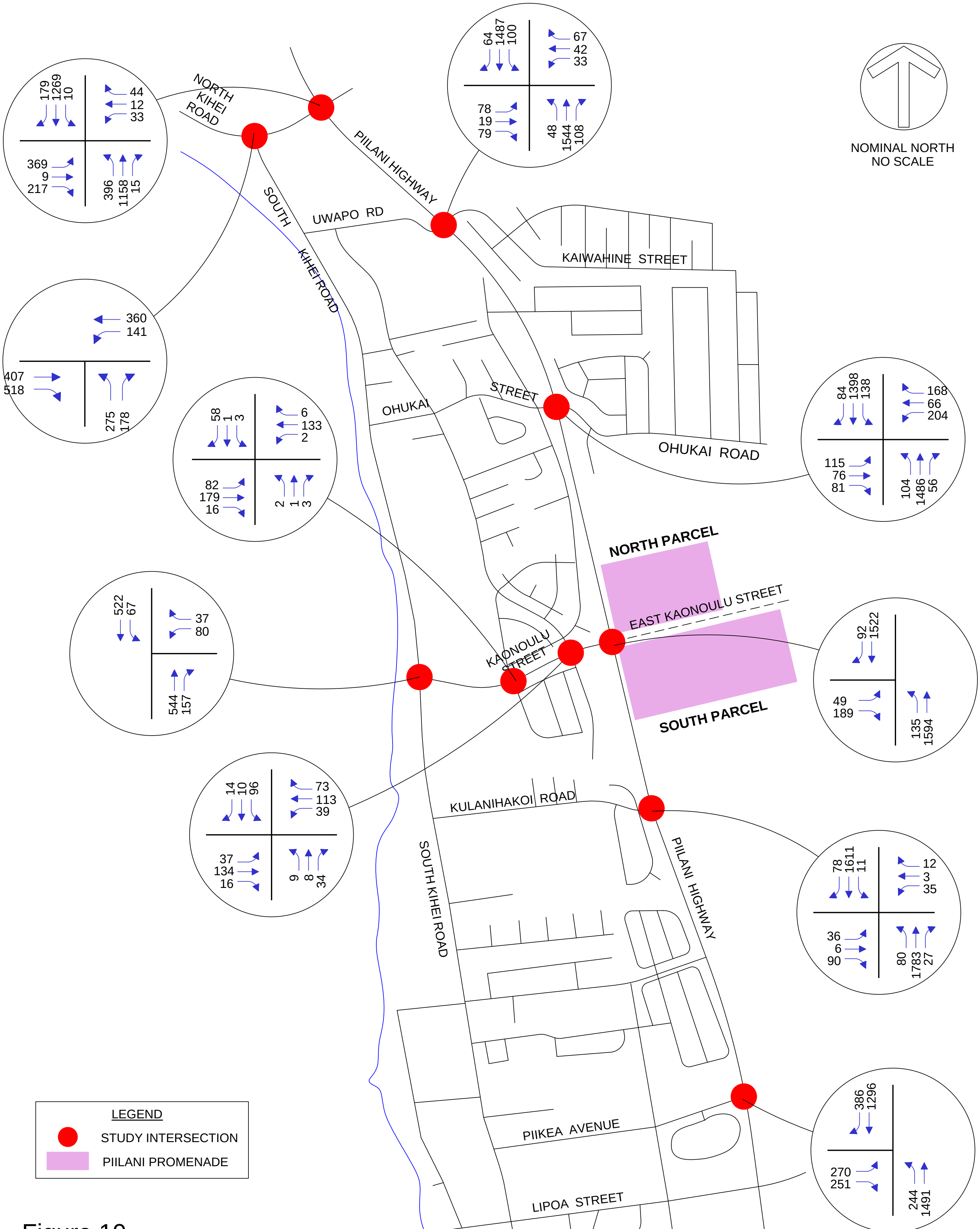

Figure 10
2018 BACKGROUND WEEKDAY PM PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

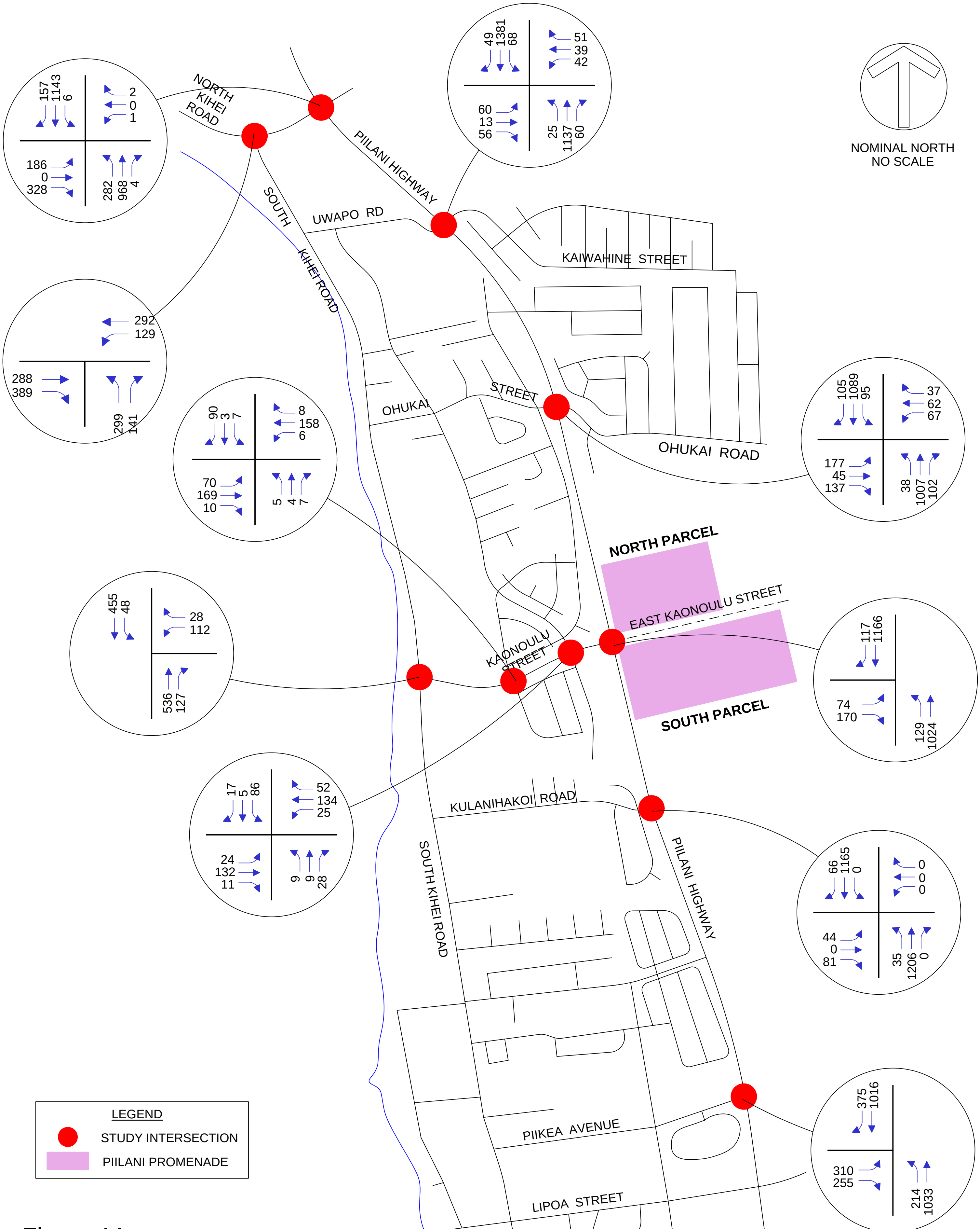

Figure 11
2018 BACKGROUND SATURDAY PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

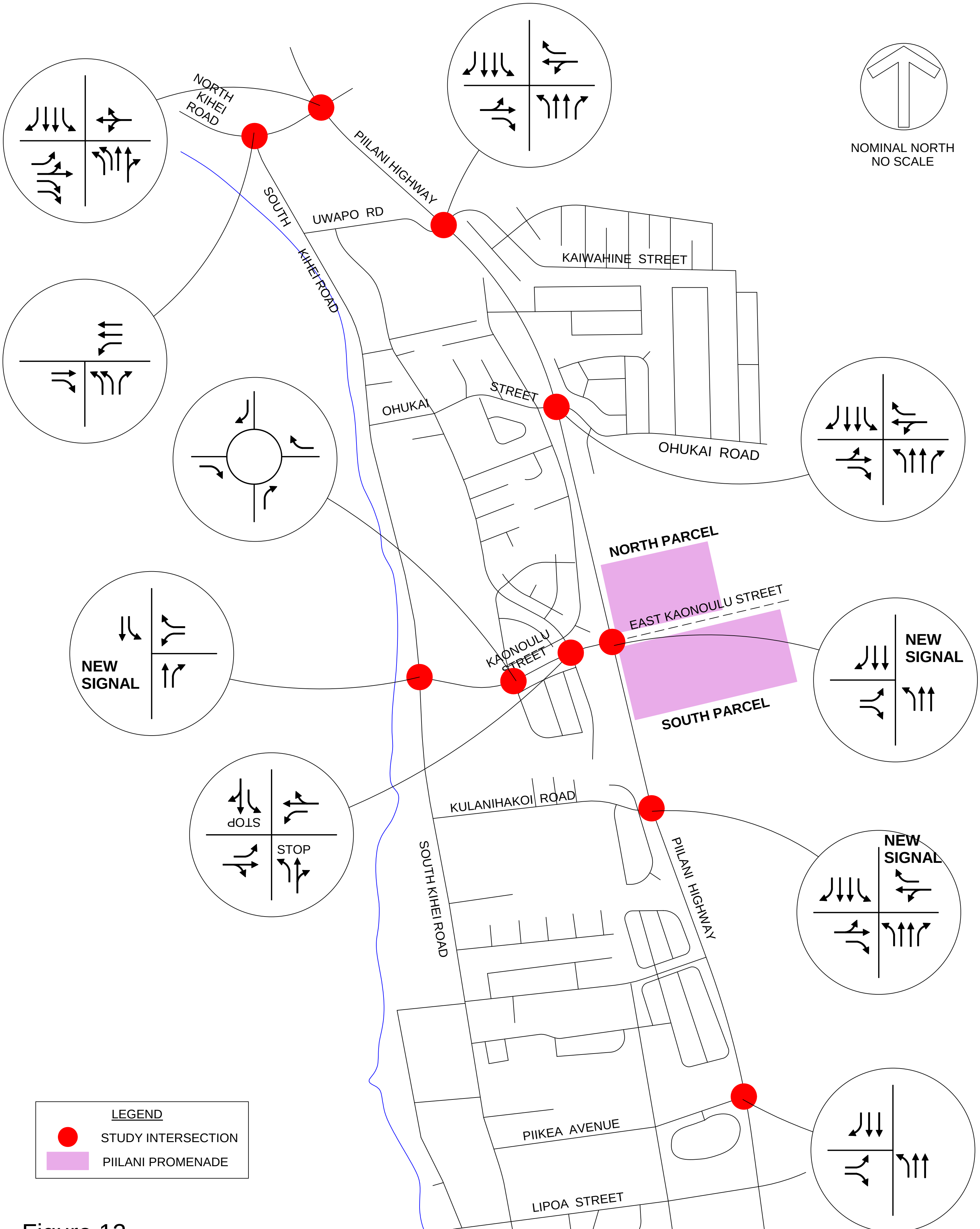

Figure 12
2018 BASELINE LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS

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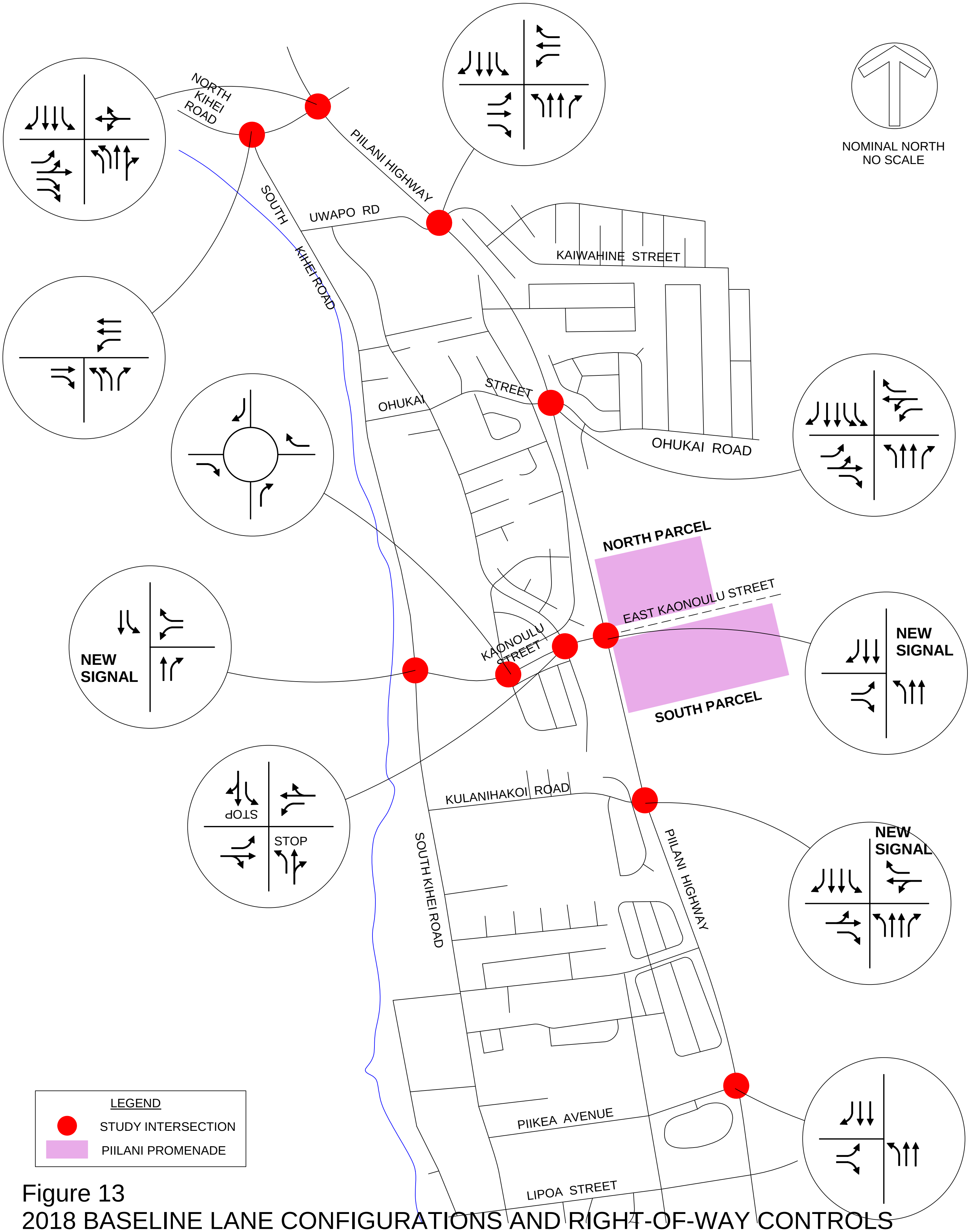

Figure 13
2018 BASELINE LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS WITH MITIGATION

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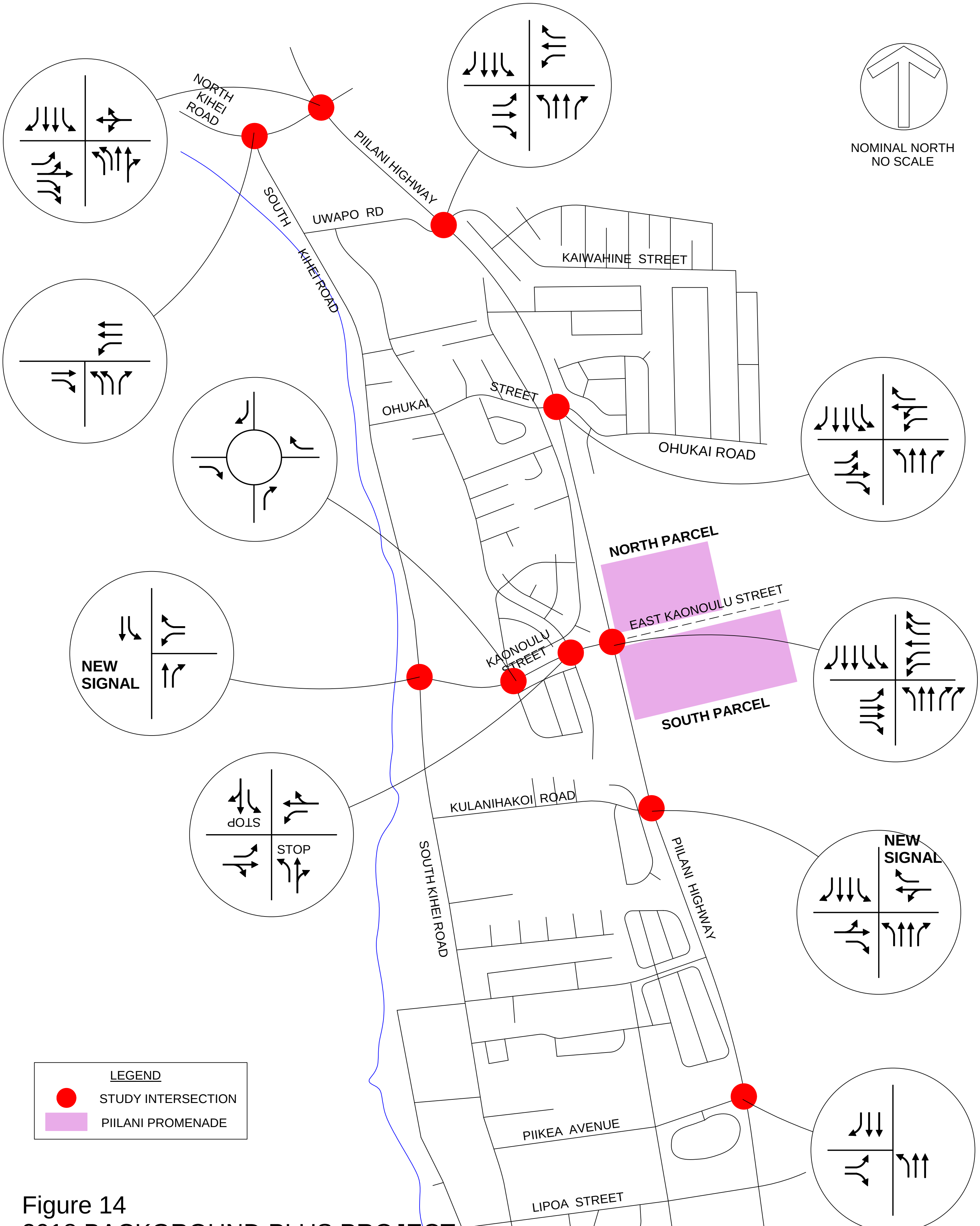

Figure 14
2018 BACKGROUND PLUS PROJECT
LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS

Phillip Rowell and Associates

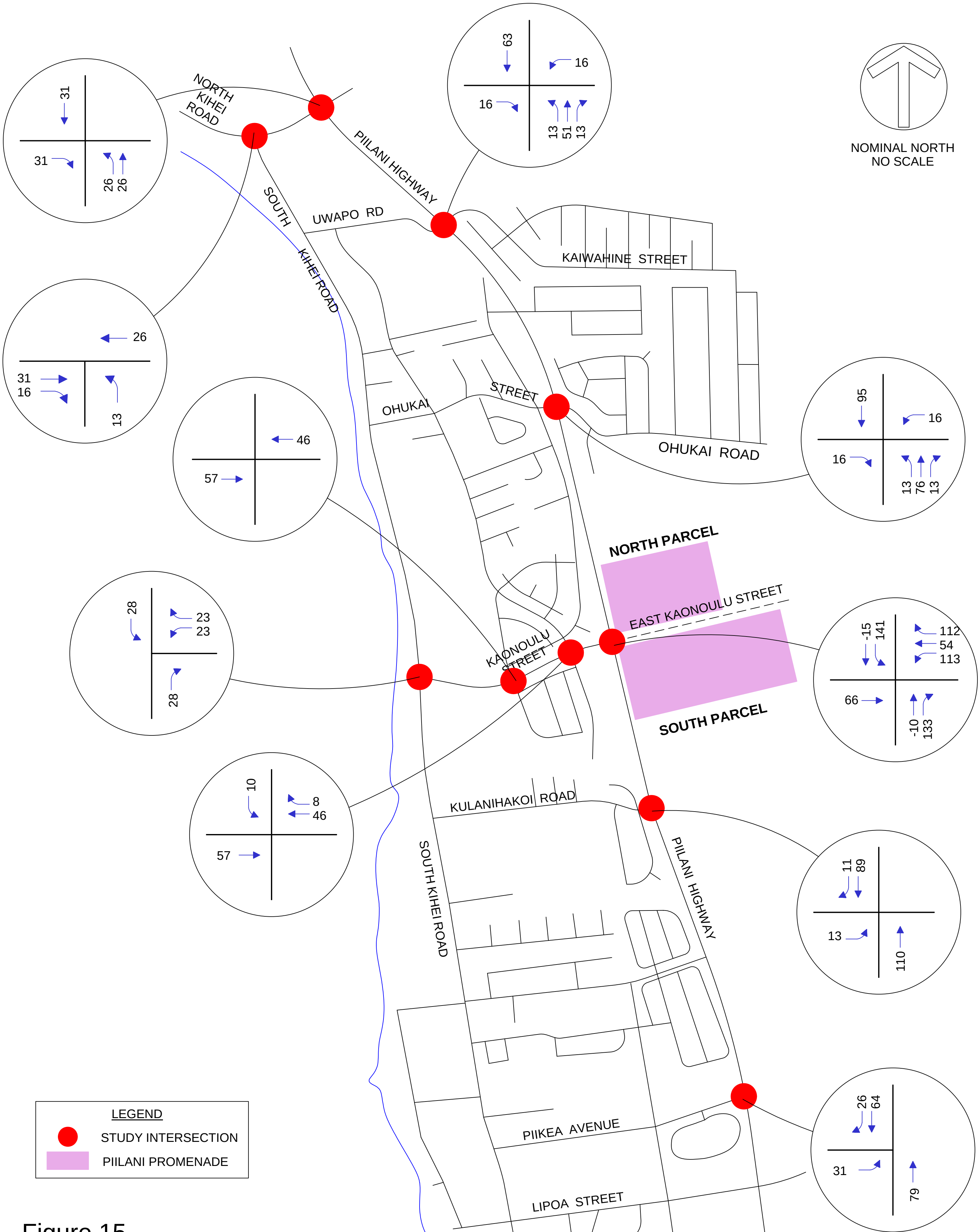

Figure 15
AM PEAK HOUR TRIP ASSIGNMENTS

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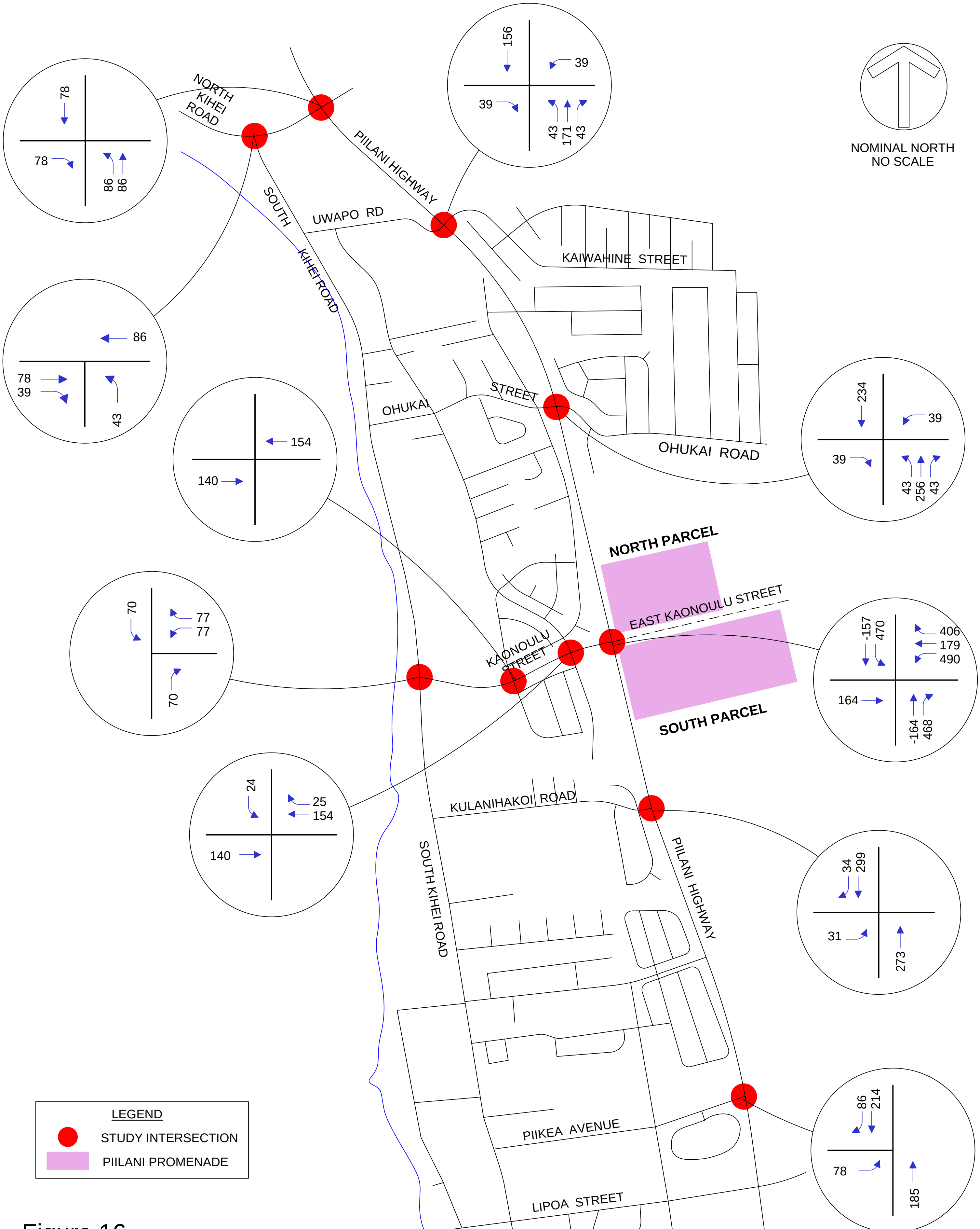


Figure 16
PM PEAK HOUR TRIP ASSIGNMENTS

Phillip Rowell and Associates

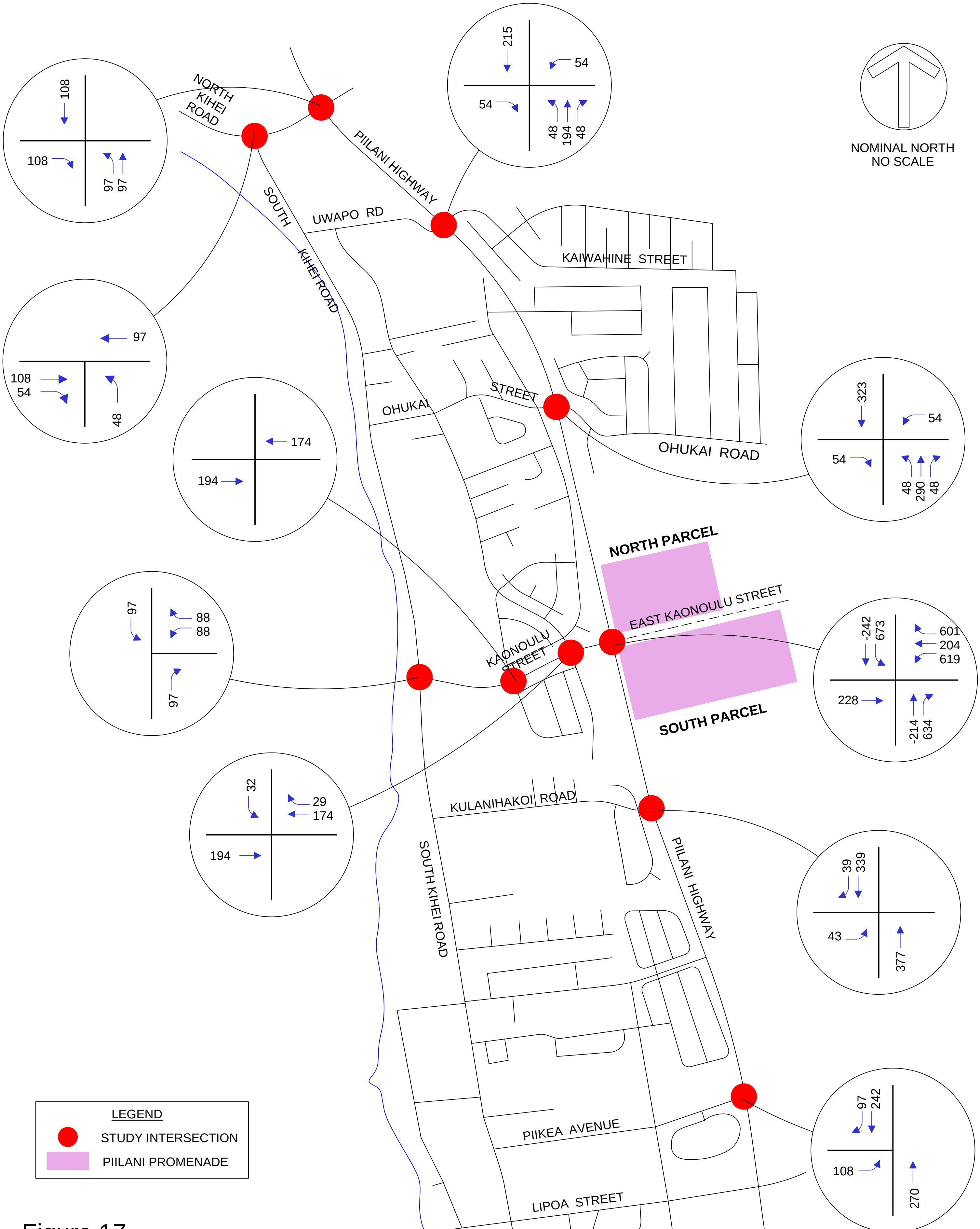


Figure 17
SATURDAY PEAK HOUR TRIP ASSIGNMENTS

Phillip Rowell and Associates

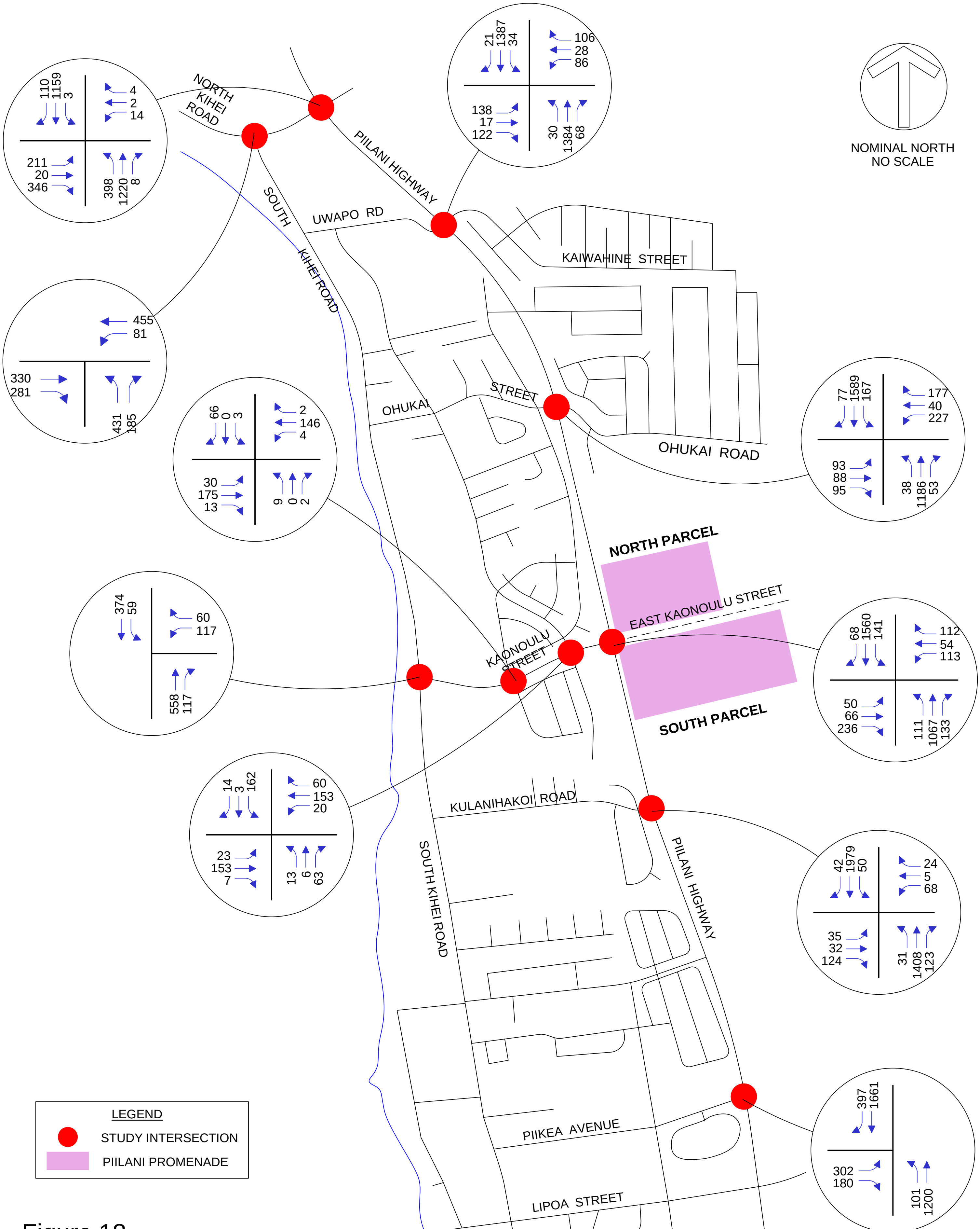


Figure 18
2018 BACKGROUND PLUS PROJECT WEEKDAY AM PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

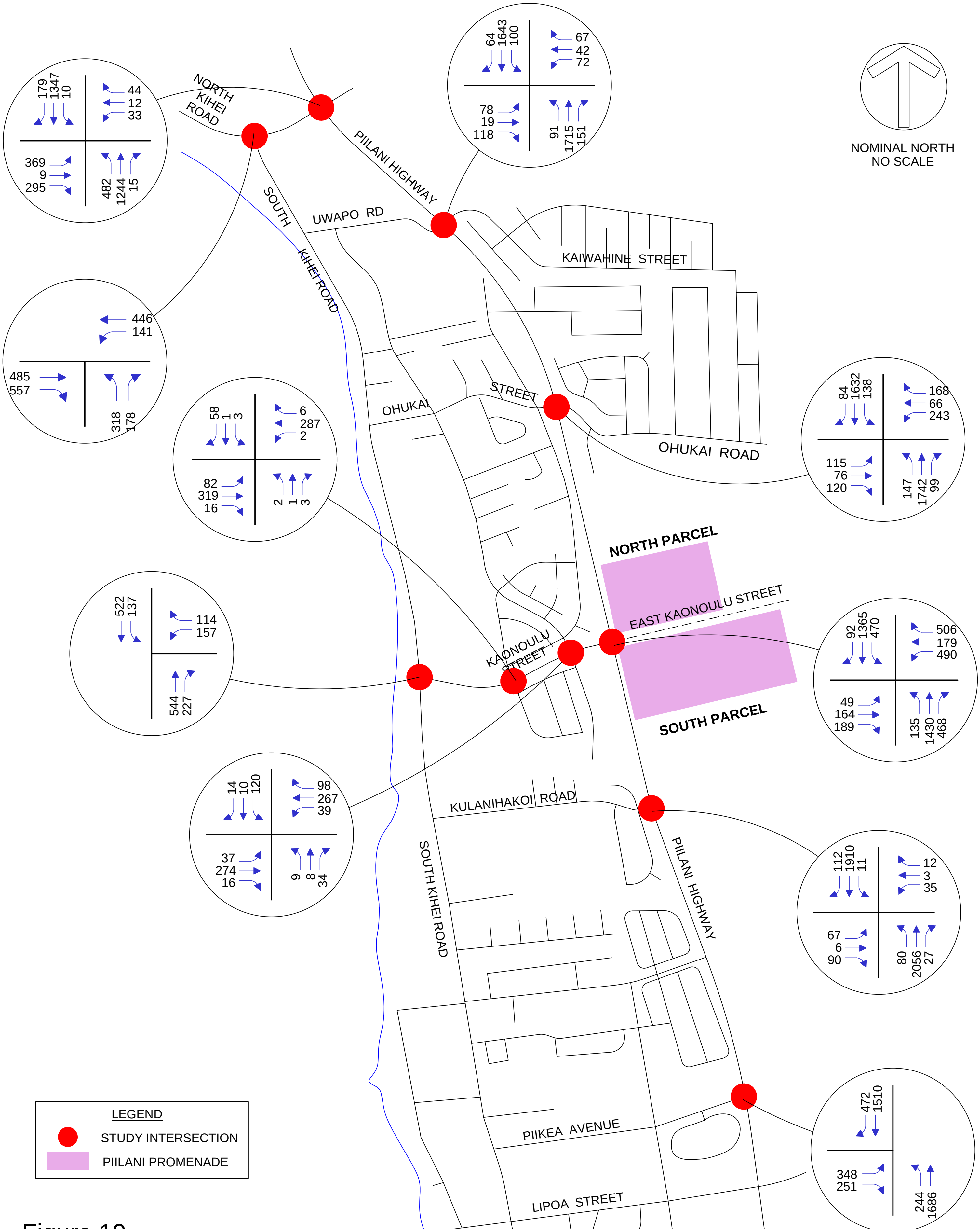


Figure 19
2018 BACKGROUND PLUS PROJECT WEEKDAY PM PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

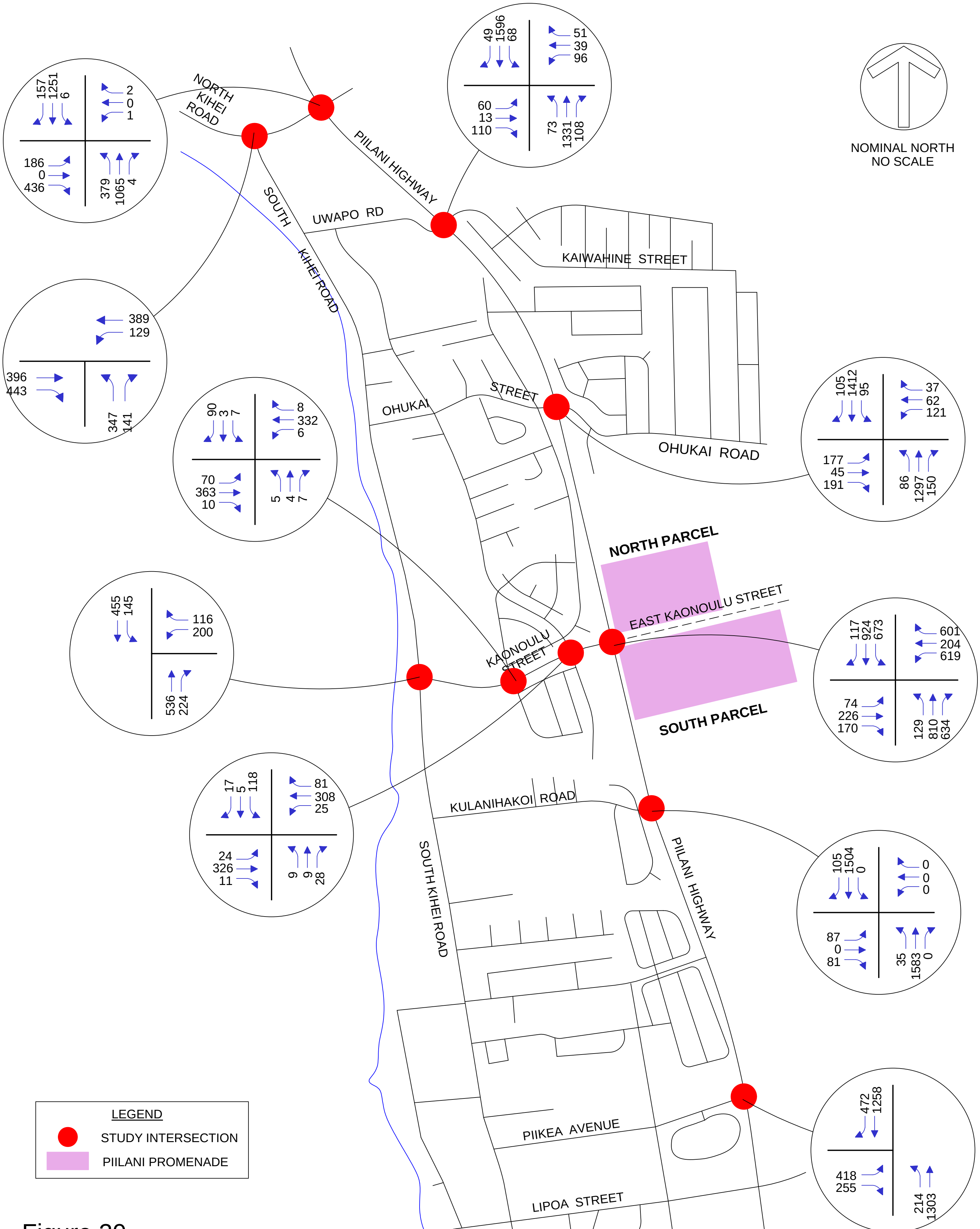


Figure 20
2018 BACKGROUND PLUS PROJECT SATURDAY PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

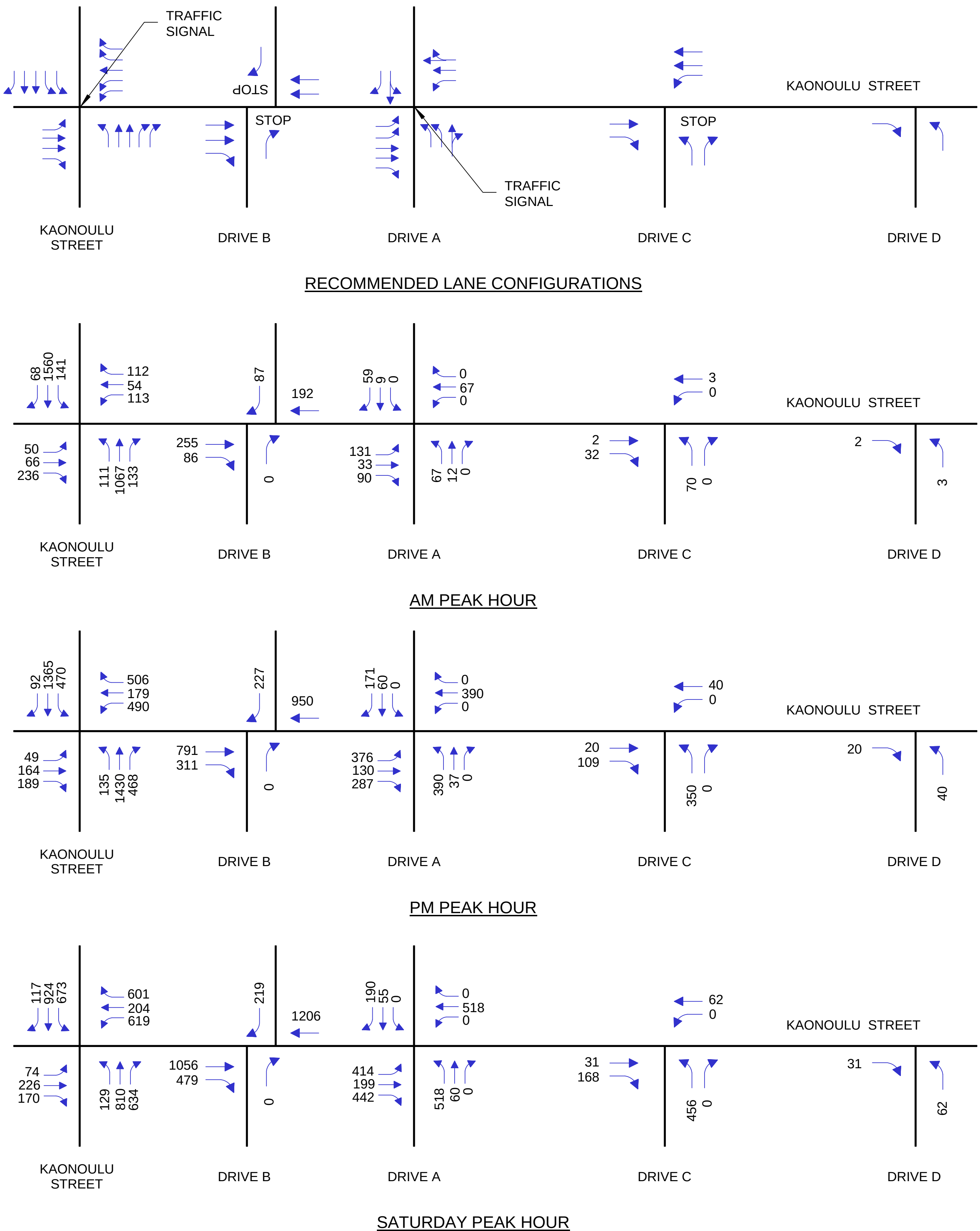


Figure 21
2018 TRAFFIC PROJECTIONS AT PROJECT DRIVEWAYS

Phillip Rowell and Associates

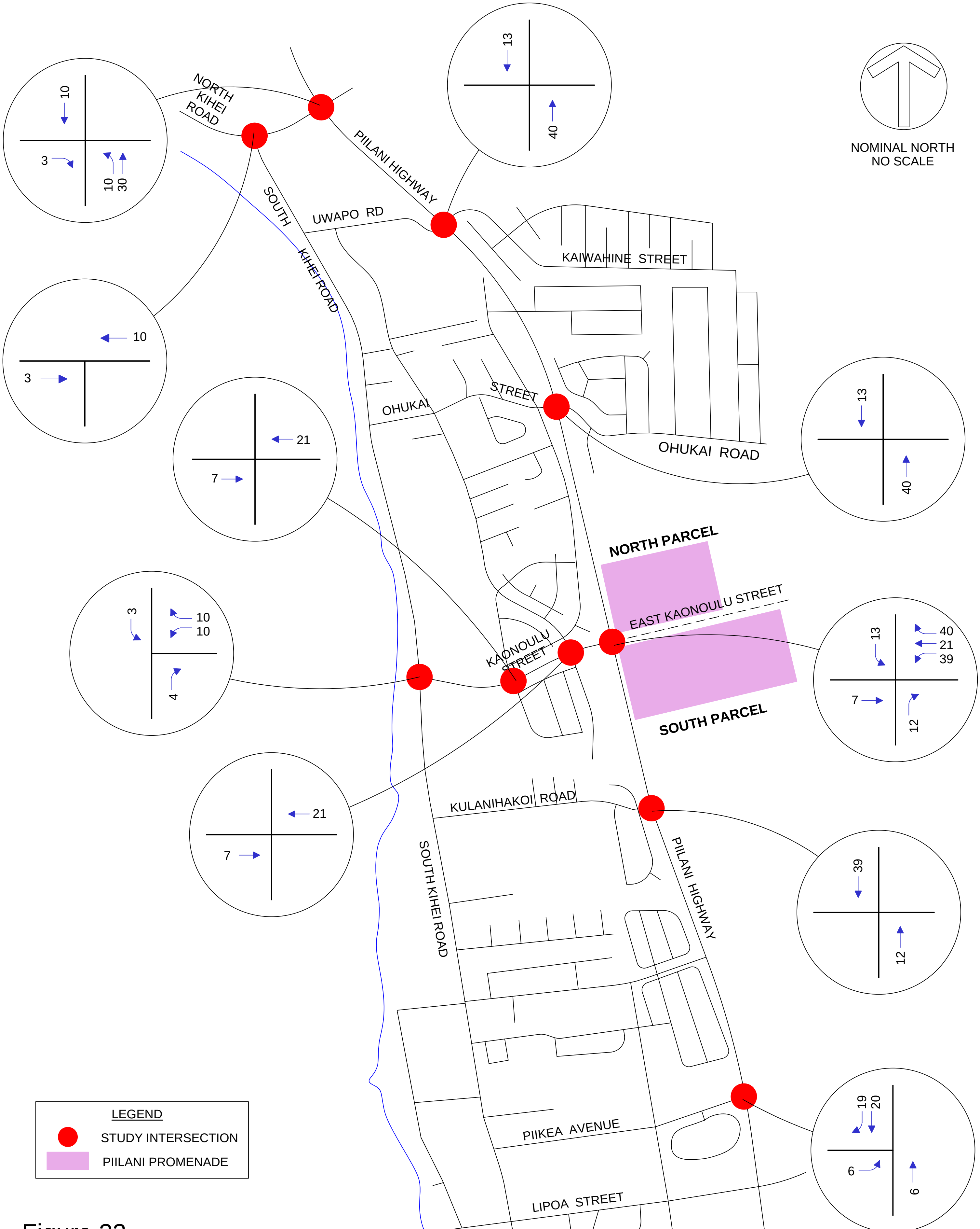


Figure 22
AM PROJECT TRIP ASSIGNMENTS FOR HONUA'ULA

Phillip Rowell and Associates

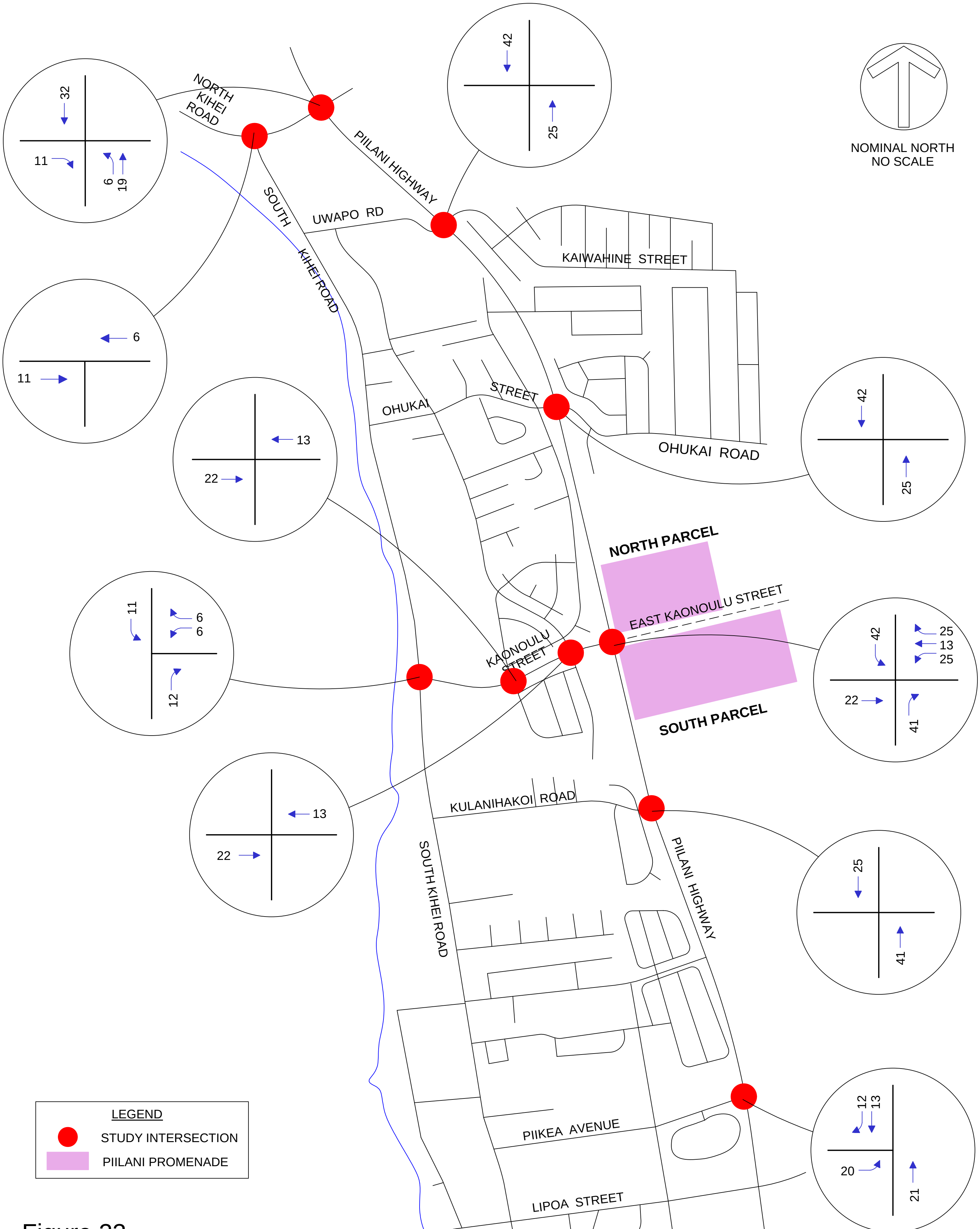


Figure 23
PM PROJECT TRIP ASSIGNMENTS FOR HONUA'ULA

Phillip Rowell and Associates

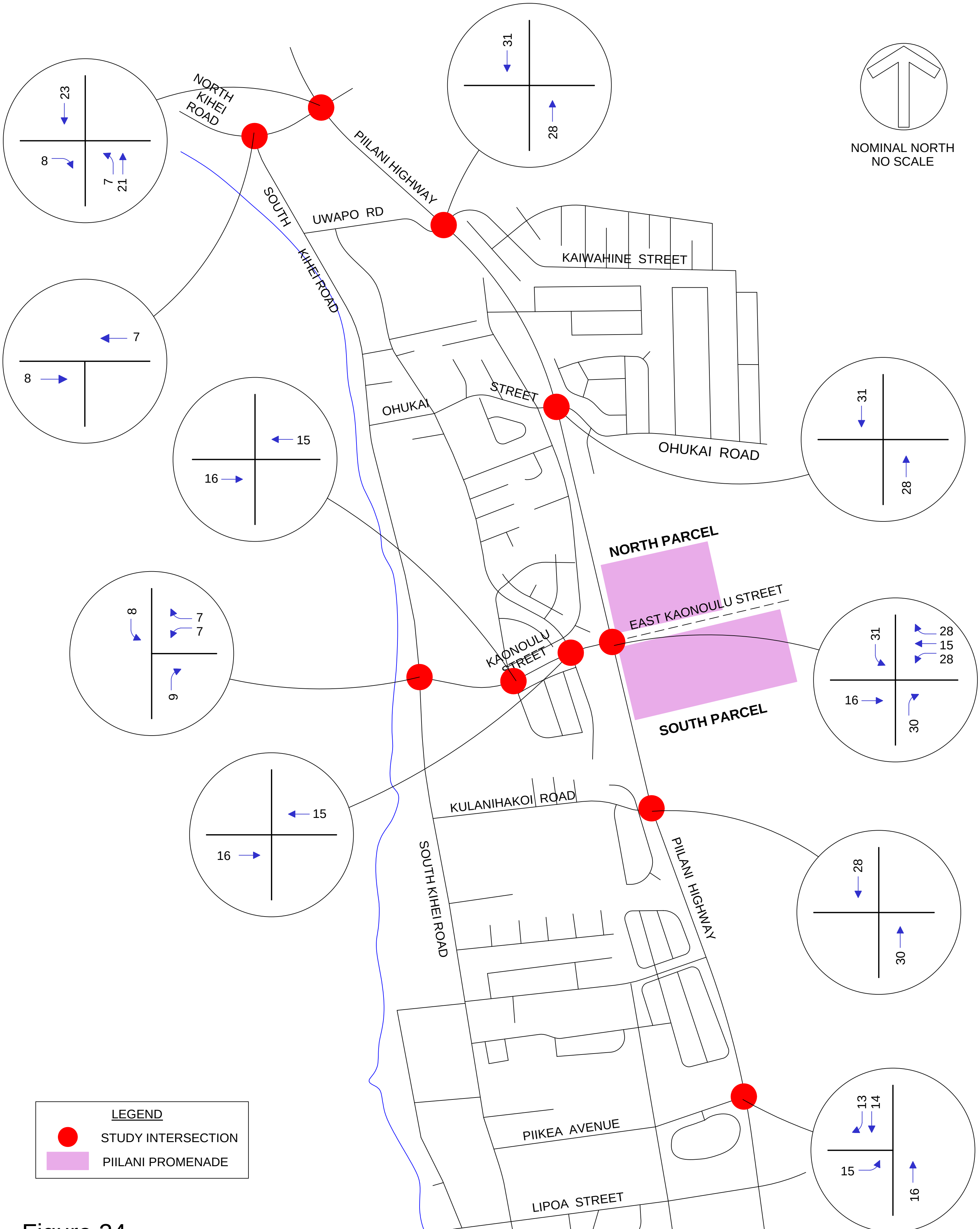


Figure 24
SATURDAY PROJECT TRIP ASSIGNMENTS FOR HONUA'ULA

Phillip Rowell and Associates

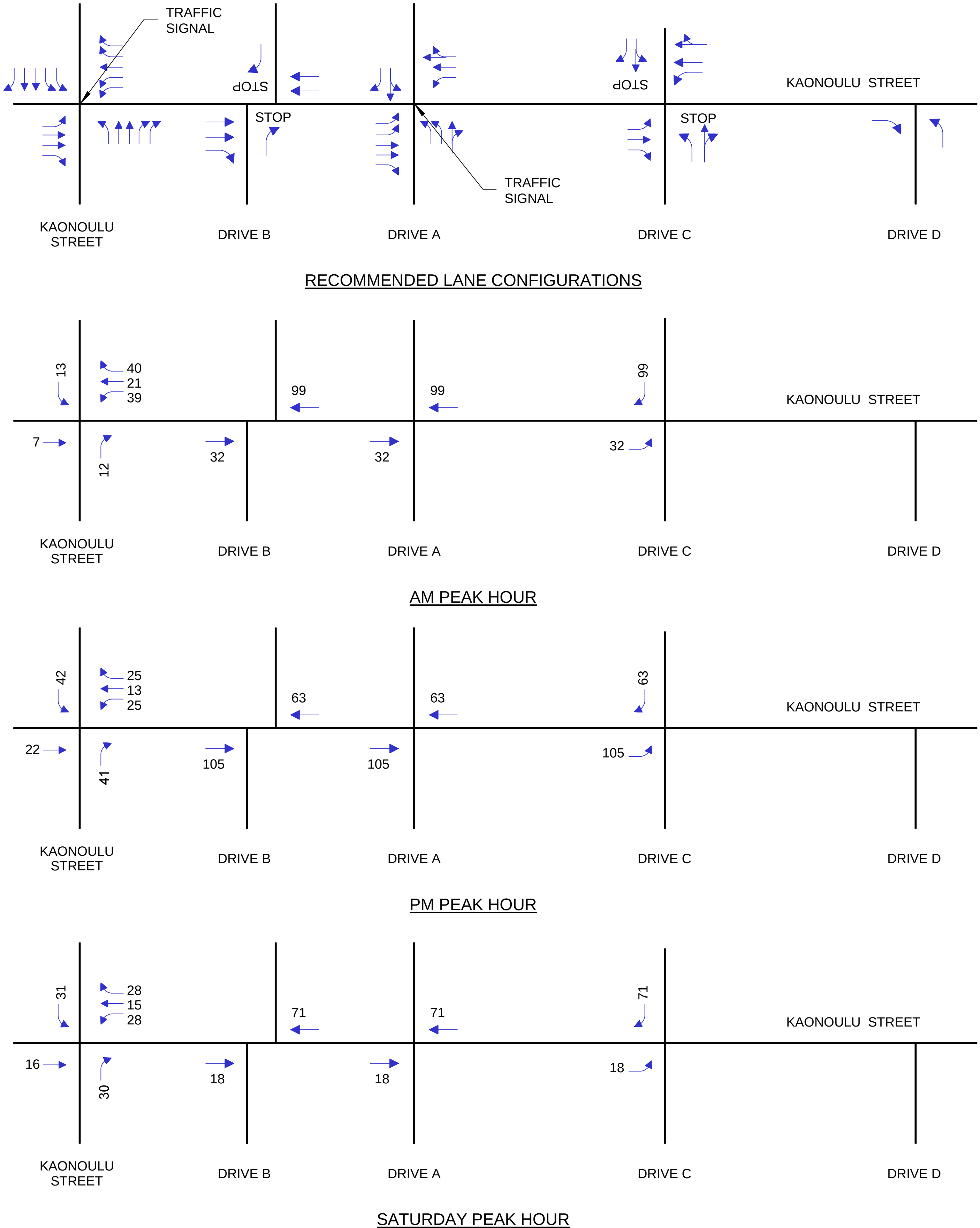


Figure 25
PROJECT TRIP ASSIGNMENTS FOR HONUA'ULA ALONG EAST KAONOULU STREET

Phillip Rowell and Associates

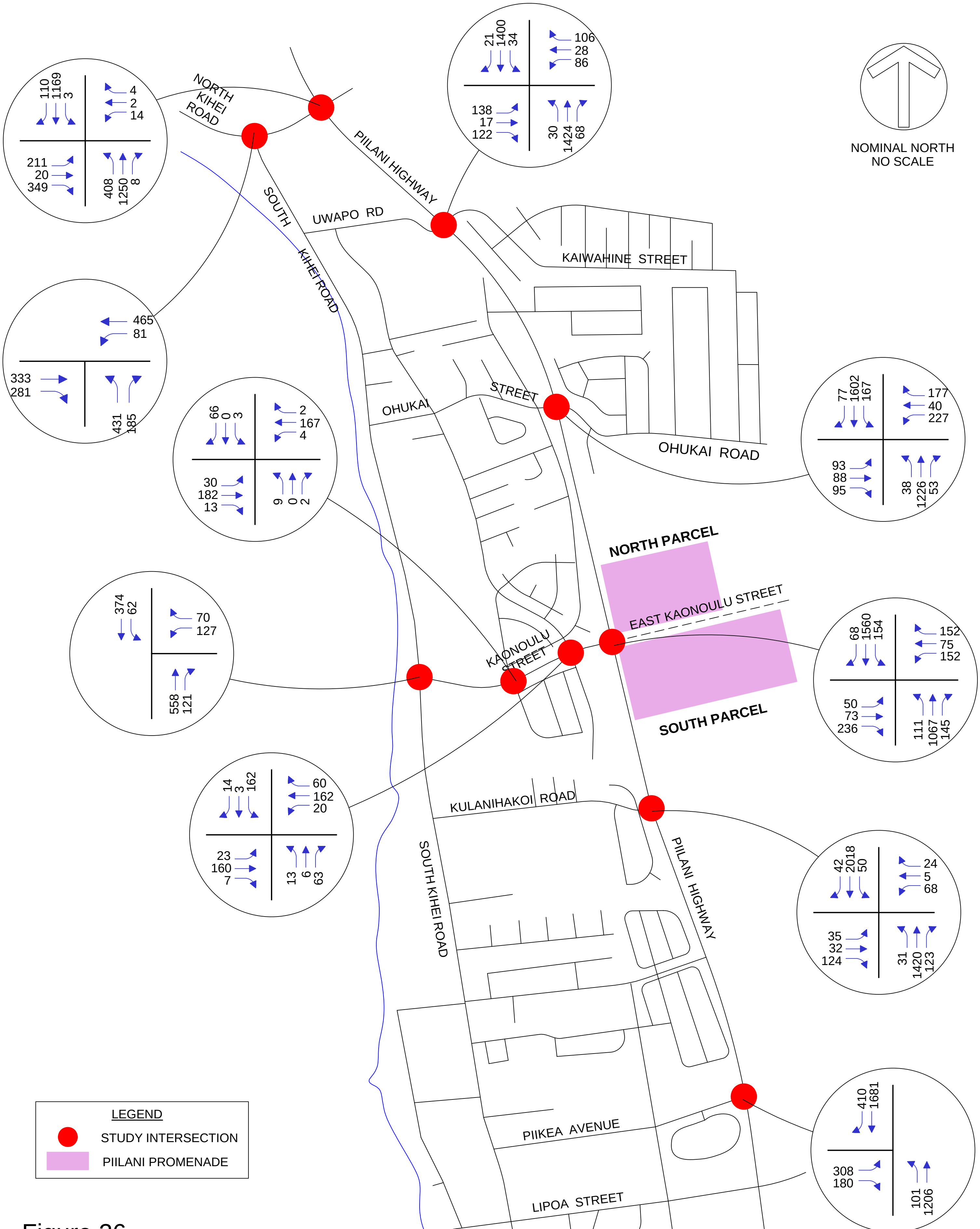


Figure 26
PIILANI PROMNADE PLUS HONUA'ULA AM PEAK HOUR TRAFFIC PROJECTIONS

Phillip Rowell and Associates

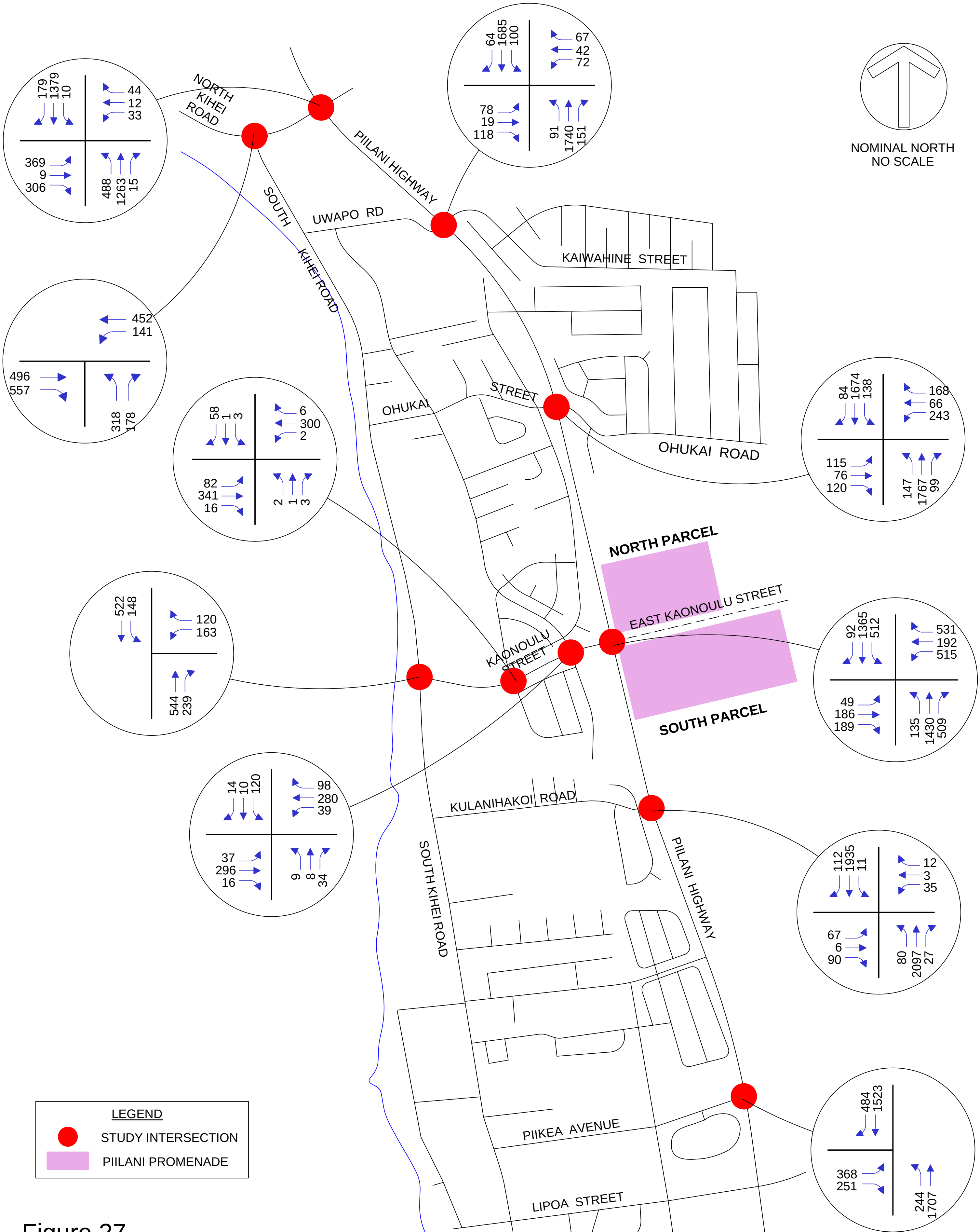


Figure 27
PIILANI PROMENADE PLUS HONUA'ULA PM PEAK HOUR TRAFFIC PROJECTIONS

Phillip Rowell and Associates

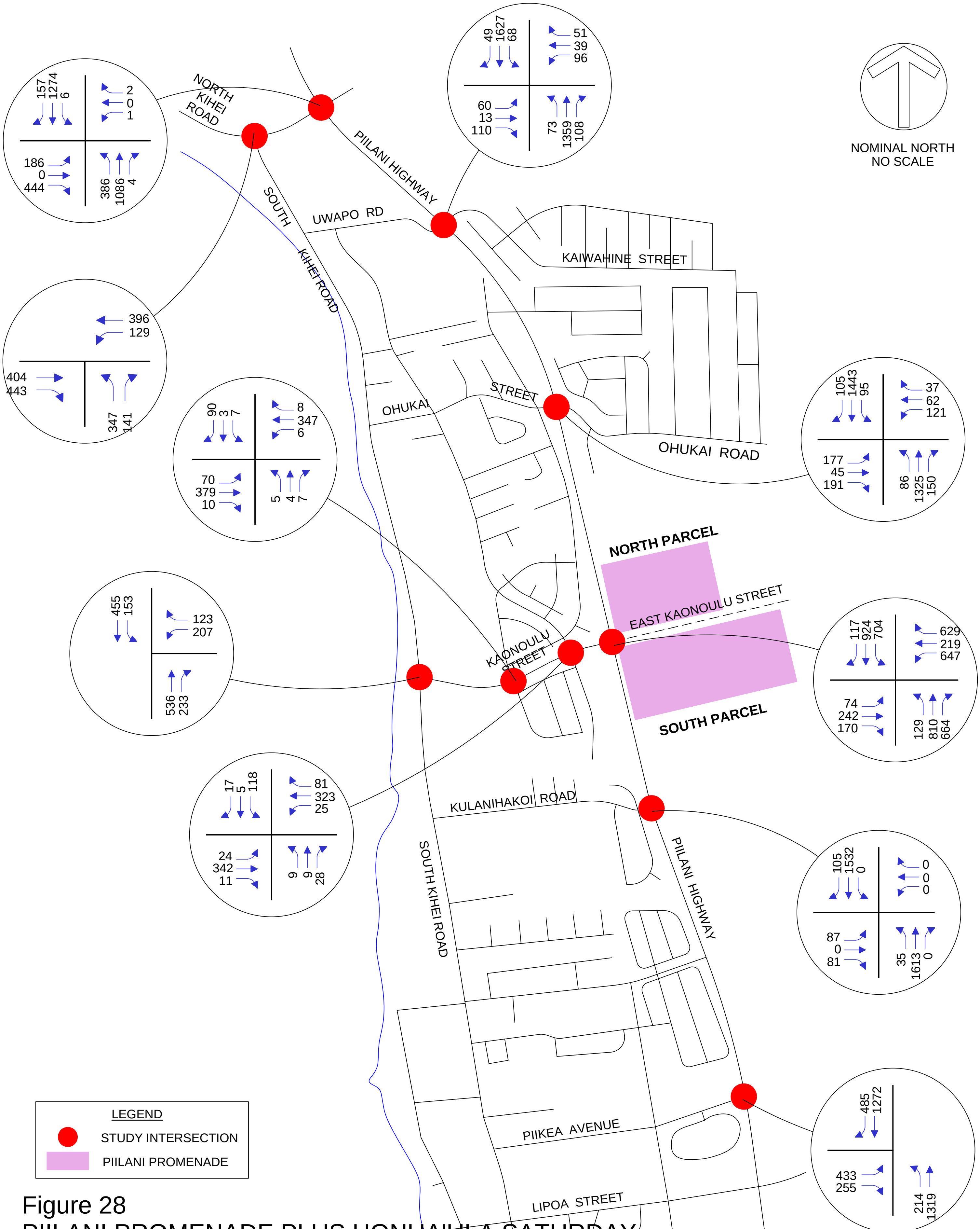


Figure 28
PIILANI PROMENADE PLUS HONUA'ULA SATURDAY PEAK HOUR TRAFFIC PROJECTIONS

Phillip Rowell and Associates

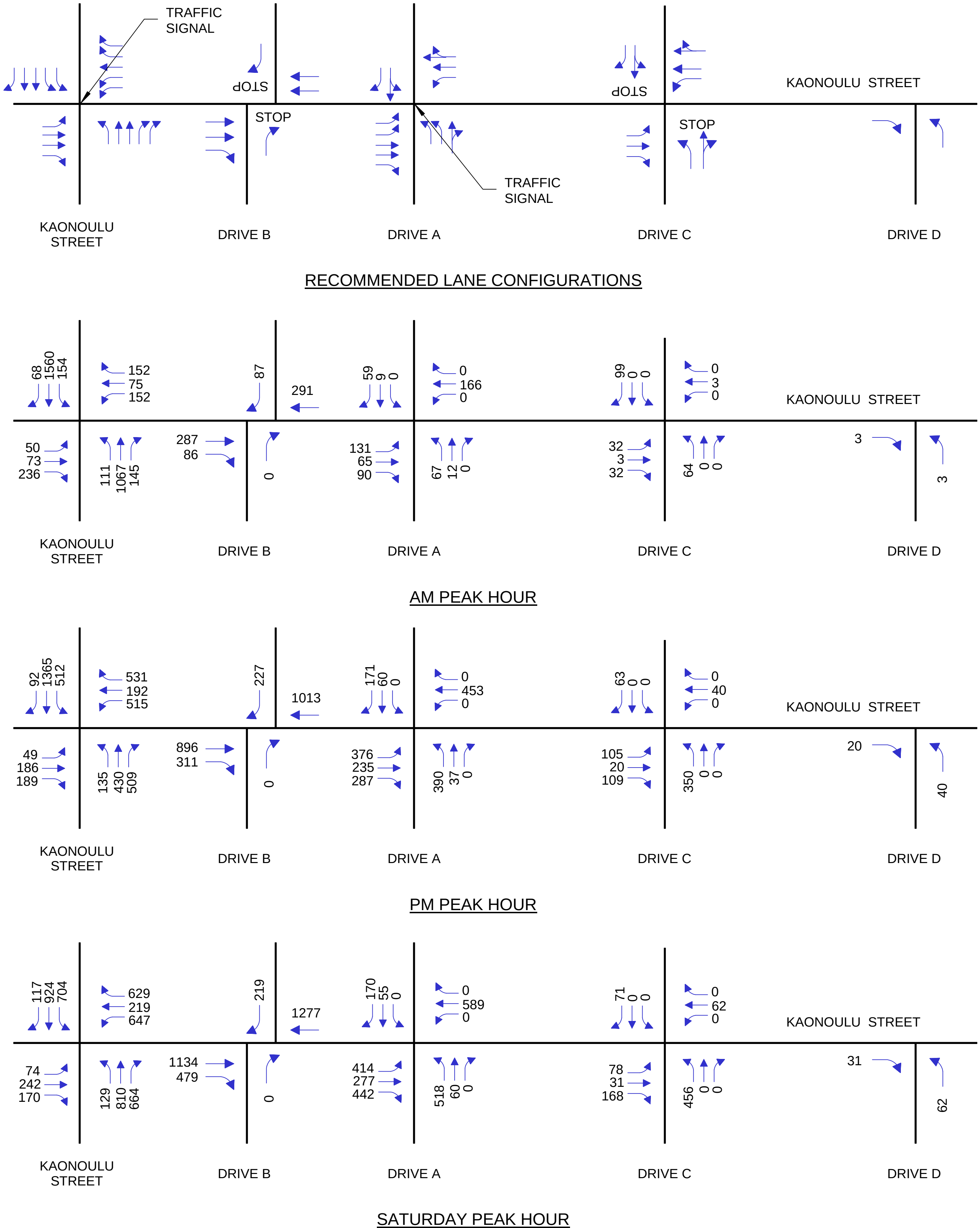


Figure 29
PIILANI PROMENADE PLUS HONUA'ULA PEAK HOUR TRAFFIC PROJECTIONS ALONG EAST KAONOULU STREET

Phillip Rowell and Associates

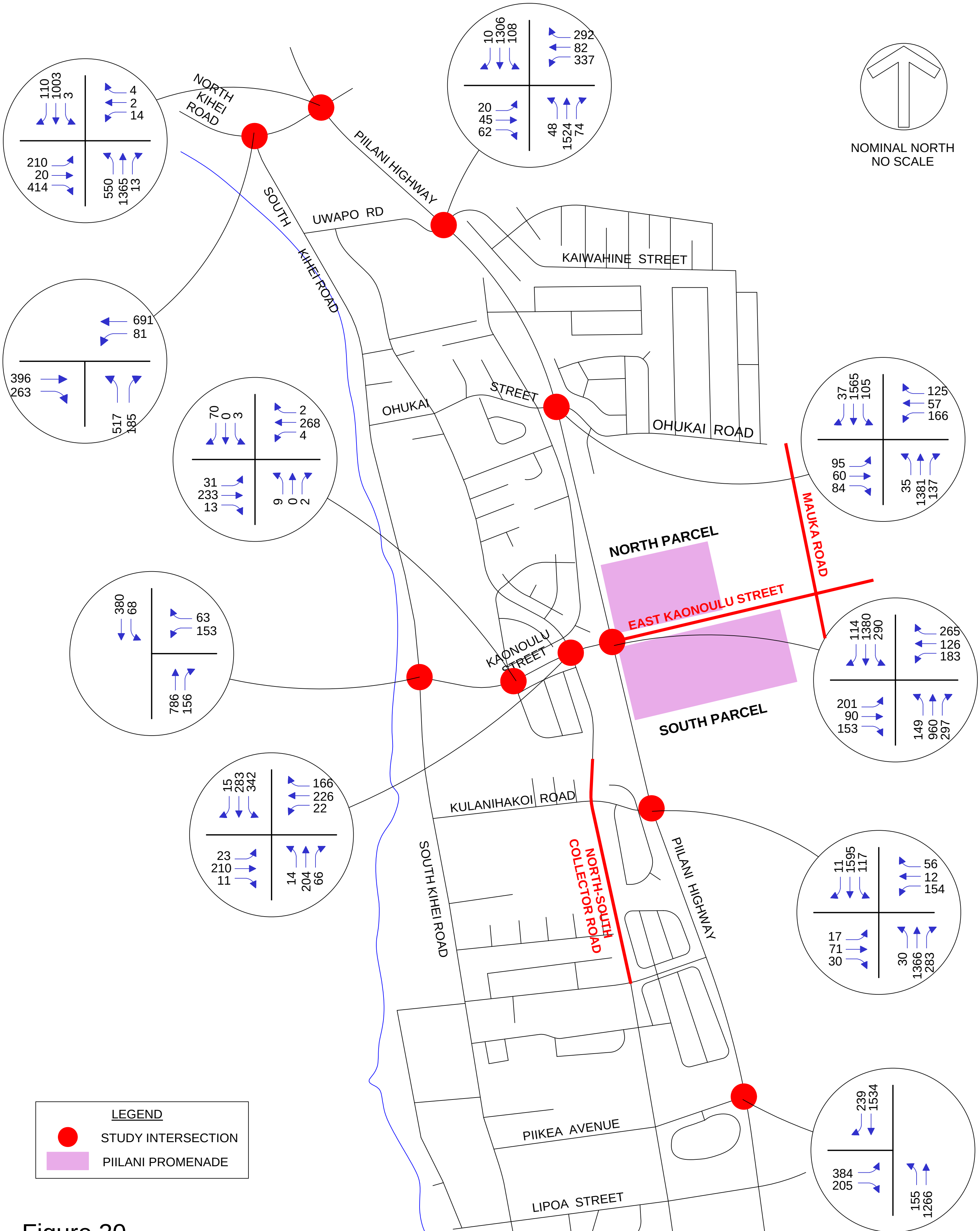


Figure 30
2025 BACKGROUND PLUS PROJECT WEEKDAY AM PEAK HOUR PROJECTIONS

Phillip Rowell and Associates

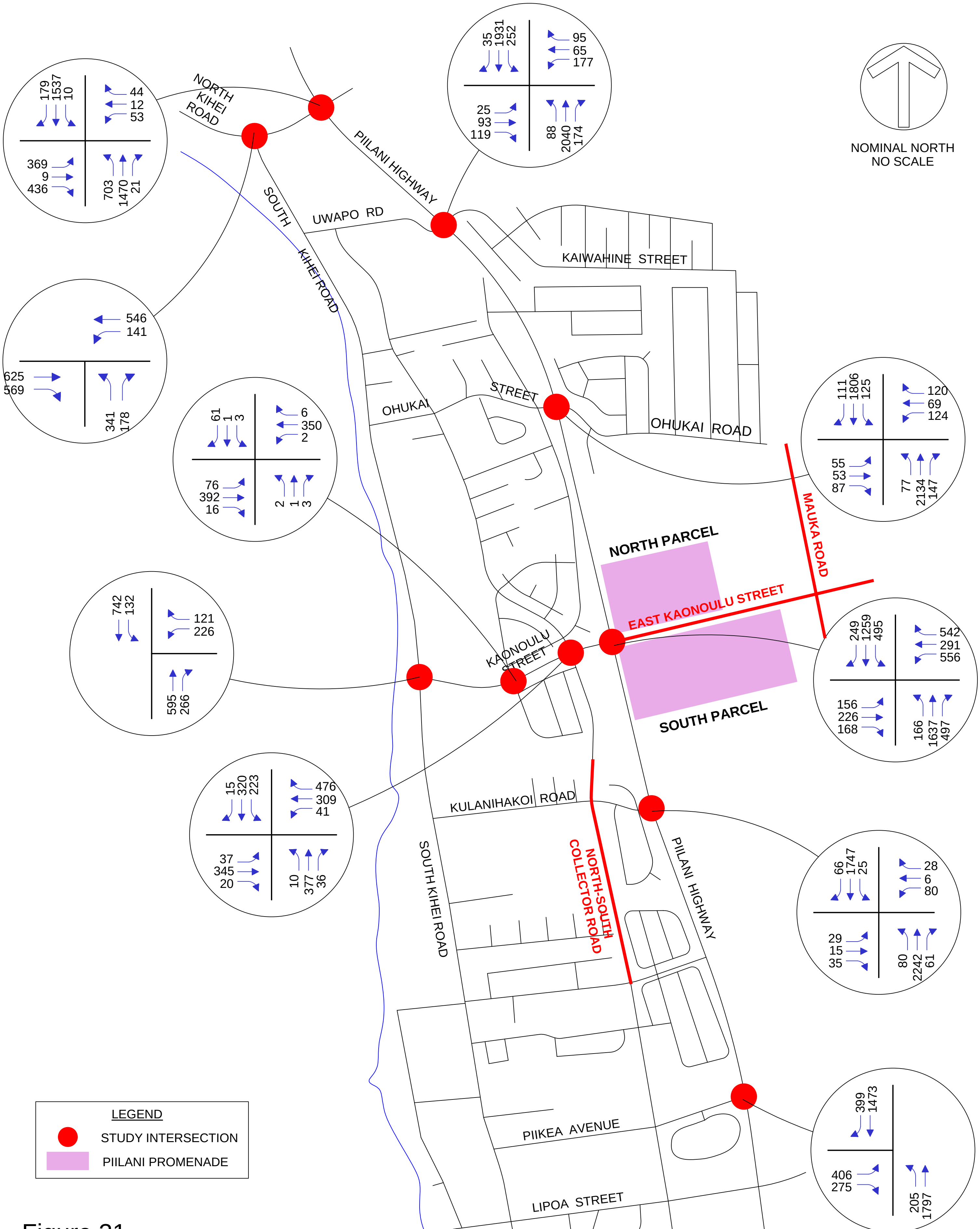
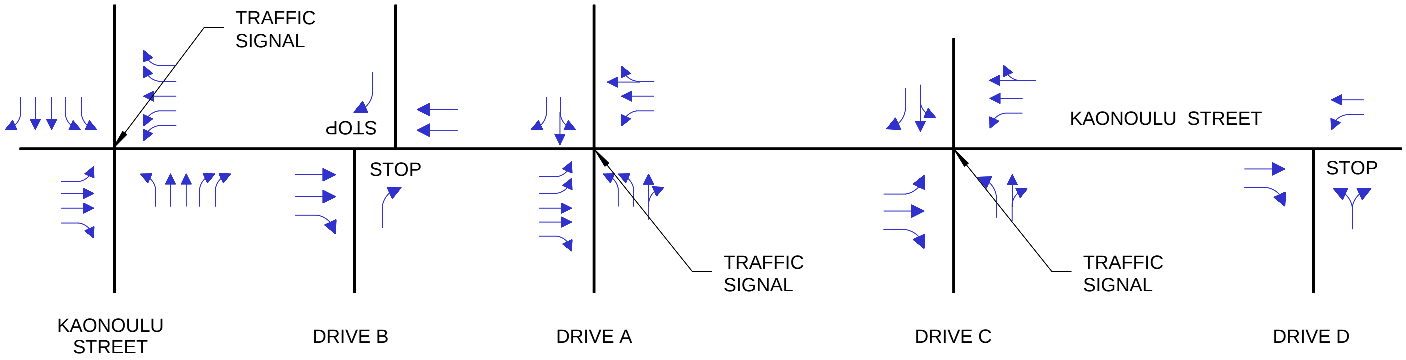
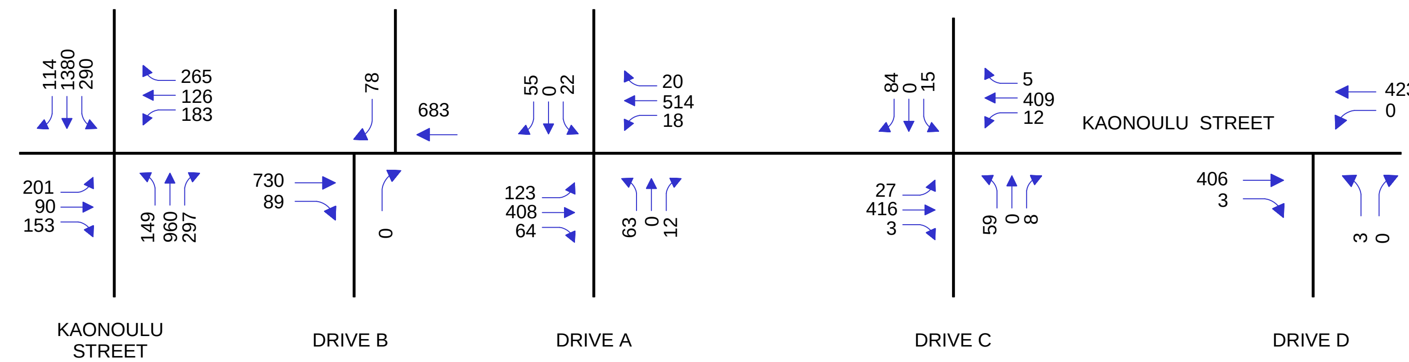


Figure 31
2025 BACKGROUND WEEKDAY PM PEAK HOUR PROJECTIONS

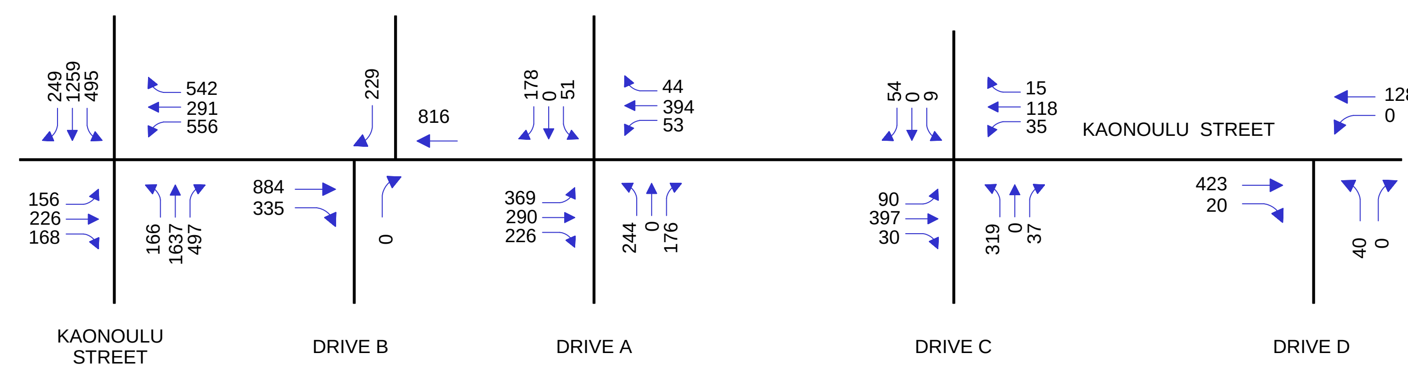
Phillip Rowell and Associates



RECOMMENDED LANE CONFIGURATIONS



AM PEAK HOUR



PM PEAK HOUR

NOTES
1. PROJECTIONS OF ADJACENT INTERSECTIONS MAY NOT MATCH BECAUSE OF ROUNDING.

Figure 32
2025 TRAFFIC PROJECTIONS AT PROJECT DRIVEWAYS

Phillip Rowell and Associates

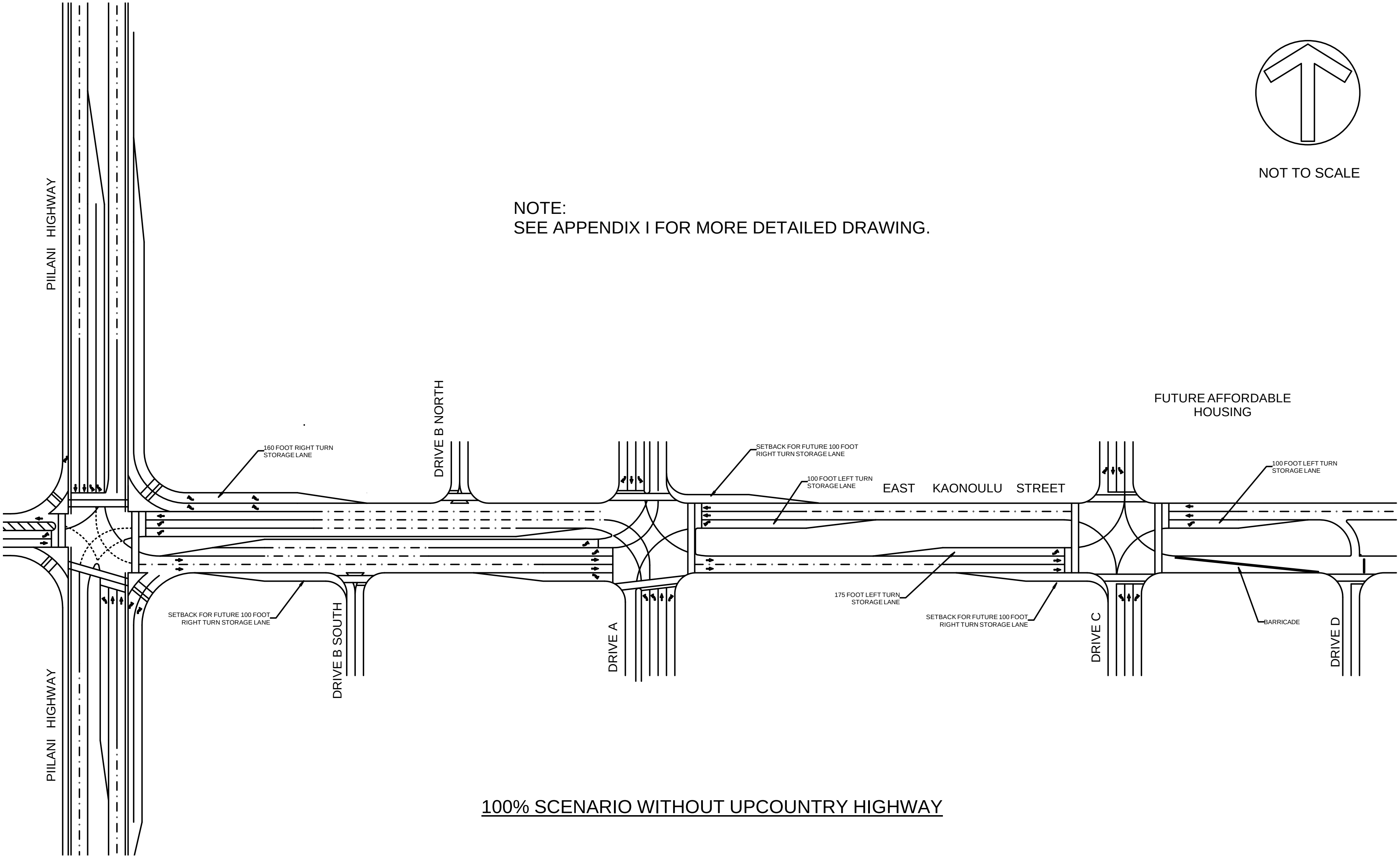


Figure 33
SCHEMATIC DRAWING OF EAST KAONOULU STREET

Phillip Rowell and Associates

Appendix A
Traffic County Summary Worksheets

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Ohukai Street
DAY & DATE: Thursday, May 9, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am	3	149	20	20	5	23	3	121	0	3	8	12	367
2	6:15 am	7	202	15	26	6	30	1	136	6	6	10	12	457
3	6:30 am	8	254	19	35	5	35	2	183	4	12	13	30	600
4	6:45 am	10	282	32	38	2	26	12	218	3	23	17	29	692
5	7:00 am	8	230	25	54	8	40	5	257	11	19	16	26	699
6	7:15 am	5	228	30	49	11	50	6	201	7	27	20	16	650
7	7:30 am	8	438	45	42	14	57	12	332	6	32	34	21	1041
8	7:45 am	16	363	51	51	11	65	11	227	4	15	23	15	852
9	8:00 am	7	282	31	45	7	51	5	199	6	21	8	23	685
10	8:15 am	13	280	40	39	8	37	12	253	9	11	23	18	743
11	8:30 am	12	280	28	35	10	34	13	250	10	13	12	16	713
12	8:45 am	11	224	38	24	14	37	7	185	4	19	15	14	592
13	9:00 am													0
14	9:15 am													0
	Maximum:	16	438	51	51	14	65	12	332	9	32	34	23	1041

Hourly Volume of Each Movement

6:00 am	7:00 am	28	887	86	119	18	114	18	658	13	44	48	83	2116
6:15 am	7:15 am	33	968	91	153	21	131	20	794	24	60	56	97	2448
6:30 am	7:30 am	31	994	106	176	26	151	25	859	25	81	66	101	2641
6:45 am	7:45 am	31	1178	132	183	35	173	35	1008	27	101	87	92	3082
7:00 am	8:00 am	37	1259	151	196	44	212	34	1017	28	93	93	78	3242
7:15 am	8:15 am	36	1311	157	187	43	223	34	959	23	95	85	75	3228
7:30 am	8:30 am	44	1363	167	177	40	210	40	1011	25	79	88	77	3321
7:45 am	8:45 am	48	1205	150	170	36	187	41	929	29	60	66	72	2993
8:00 am	9:00 am	43	1066	137	143	39	159	37	887	29	64	58	71	2733
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		44	1363	167	177	40	210	40	1011	25	79	88	77	3321
Per Cent of Approach		3%	87%	11%	41%	9%	49%	4%	94%	2%	32%	36%	32%	
Peak Hour Factor:		0.69	0.78	0.82	0.87	0.71	0.81	0.83	0.76	0.69	0.62	0.65	0.84	0.8
Total Arrivals			1574			427			1076			244		
Total Departures			1265			295			1652			109		
Total			2839			722			2728			353		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Ohukai Street
DAY & DATE: Thursday, May 9, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	10	325	21	41	14	62	10	268	21	11	14	15	812
2	3:15 pm	12	269	32	35	13	43	12	234	21	11	14	17	713
3	3:30 pm	11	301	39	42	11	49	11	321	20	10	9	17	841
4	3:45 pm	11	297	37	40	22	59	11	313	30	19	14	24	877
5	4:00 pm	14	361	27	37	13	45	14	356	23	21	16	17	944
6	4:15 pm	22	324	37	44	15	46	22	346	18	19	23	23	939
7	4:30 pm	9	290	37	47	16	54	9	364	33	22	23	24	928
8	4:45 pm	11	263	25	47	14	55	11	264	26	17	25	20	778
9	5:00 pm	17	308	35	53	16	70	17	295	22	25	24	17	899
10	5:15 pm	14	340	29	33	15	48	14	322	26	17	18	10	886
11	5:30 pm	12	245	32	27	11	33	12	175	15	9	11	18	600
12	5:45 pm	13	286	30	29	13	38	13	250	22	9	16	20	739
13	6:00 pm													0
14	6:15 pm													0
	Maximum:	22	361	37	47	22	59	22	364	33	22	23	24	944

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
3:00 pm	4:00 pm	44	1192	129	158	60	213	44	1136	92	51	51	73	3243
3:15 pm	4:15 pm	48	1228	135	154	59	196	48	1224	94	61	53	75	3375
3:30 pm	4:30 pm	58	1283	140	163	61	199	58	1336	91	69	62	81	3601
3:45 pm	4:45 pm	56	1272	138	168	66	204	56	1379	104	81	76	88	3688
4:00 pm	5:00 pm	56	1238	126	175	58	200	56	1330	100	79	87	84	3589
4:15 pm	5:15 pm	59	1185	134	191	61	225	59	1269	99	83	95	84	3544
4:30 pm	5:30 pm	51	1201	126	180	61	227	51	1245	107	81	90	71	3491
4:45 pm	5:45 pm	54	1156	121	160	56	206	54	1056	89	68	78	65	3163
5:00 pm	6:00 pm	56	1179	126	142	55	189	56	1042	85	60	69	65	3124
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		56	1272	138	168	66	204	56	1379	104	81	76	88	3688
Per Cent of Approach		4%	87%	9%	38%	15%	47%	4%	90%	7%	33%	31%	36%	
Peak Hour Factor:		0.64	0.88	0.93	0.89	0.75	0.86	0.64	0.95	0.79	0.92	0.83	0.92	0.98
Total Arrivals			1466			438			1539			245		
Total Departures			1635			270			1557			226		
Total			3101			708			3096			471		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Ohukai Street
DAY & DATE: Saturday, May 18, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	5	184	25	13	16	20	11	226	8	40	12	35	595
2	10:15 am	14	206	31	16	19	21	24	246	5	25	14	34	655
3	10:30 am	7	207	23	14	11	20	25	233	10	29	11	39	629
4	10:45 am	11	242	36	13	18	17	28	275	10	39	8	41	738
5	11:00 am	17	160	18	14	11	16	18	130	8	28	14	37	471
6	11:15 am	8	173	26	11	21	19	27	221	6	24	12	22	570
7	11:30 am	16	231	38	12	14	15	15	234	13	22	18	42	670
8	11:45 am	15	303	29	12	20	29	38	300	14	44	18	42	864
9	12:00 pm	8	146	15	6	10	8	12	127	9	22	9	18	390
10	12:15 pm	14	232	25	13	16	15	23	218	11	32	9	44	652
11	12:30 pm	21	262	26	6	16	15	29	248	4	39	9	41	716
12	12:45 pm	18	312	38	13	18	15	16	242	13	33	11	48	777
13	1:00 pm													0
14	1:15 pm													0
15	1:30 pm													0
16	1:45 pm													0
		21	303	29	13	20	29	38	300	14	44	18	44	864

Hourly Volume of Each Movement

10:00 am	11:00 am	37	839	115	56	64	78	88	980	33	133	45	149	2617
10:15 am	11:15 am	49	815	108	57	59	74	95	884	33	121	47	151	2493
10:30 am	11:30 am	43	782	103	52	61	72	98	859	34	120	45	139	2408
10:45 am	11:45 am	52	806	118	50	64	67	88	860	37	113	52	142	2449
11:00 am	12:00 pm	56	867	111	49	66	79	98	885	41	118	62	143	2575
11:15 am	12:15 pm	47	853	108	41	65	71	92	882	42	112	57	124	2494
11:30 am	12:30 pm	53	912	107	43	60	67	88	879	47	120	54	146	2576
11:45 am	12:45 pm	58	943	95	37	62	67	102	893	38	137	45	145	2622
12:00 pm	1:00 pm	61	952	104	38	60	53	80	835	37	126	38	151	2535
12:15 pm	1:15 pm													
12:30 pm	1:30 pm													
12:45 pm	1:45 pm													
1:00 pm	2:00 pm													
Peak Hour Volume		58	943	95	37	62	67	102	893	38	137	45	145	2622
Per Cent of Approach		5%	86%	9%	22%	37%	40%	10%	86%	4%	42%	14%	44%	
Peak Hour Factor:		0.69	0.78	0.82	0.71	0.78	0.58	0.67	0.74	0.68	0.78	0.63	0.82	
Total Arrivals			1096			166			1033			327		
Total Departures			1075			242			1147			158		
Total			2171			408			2180			485		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaiwahine Street and Uwapo Road
DAY & DATE: Friday, May 10, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am	1	136	5	8	0	7	1	126	1	12	0	7	304
2	6:15 am	4	217	7	6	1	15	8	171	7	21	6	19	482
3	6:30 am	5	221	8	9	4	17	13	245	1	33	3	18	577
4	6:45 am	1	185	7	8	2	16	7	231	1	27	4	20	509
5	7:00 am	5	272	6	23	7	17	10	355	2	44	7	37	785
6	7:15 am	4	274	12	20	5	9	15	310	5	32	3	43	732
7	7:30 am	6	339	5	25	9	19	6	328	5	18	2	29	791
8	7:45 am	6	292	6	16	5	8	15	234	5	12	3	29	631
9	8:00 am	2	380	10	19	5	3	14	254	11	25	5	23	751
10	8:15 am	4	239	10	13	2	16	9	243	1	12	0	22	571
11	8:30 am	2	223	8	8	6	13	9	260	6	23	2	16	576
12	8:45 am	4	227	12	9	1	10	6	256	9	23	4	16	577
13	9:00 am													0
14	9:15 am													0
	Maximum:	6	339	12	25	9	19	15	355	5	44	7	43	791

Hourly Volume of Each Movement

6:00 am	7:00 am	11	759	27	31	7	55	29	773	10	93	13	64	1872
6:15 am	7:15 am	15	895	28	46	14	65	38	1002	11	125	20	94	2353
6:30 am	7:30 am	15	952	33	60	18	59	45	1141	9	136	17	118	2603
6:45 am	7:45 am	16	1070	30	76	23	61	38	1224	13	121	16	129	2817
7:00 am	8:00 am	21	1177	29	84	26	53	46	1227	17	106	15	138	2939
7:15 am	8:15 am	18	1285	33	80	24	39	50	1126	26	87	13	124	2905
7:30 am	8:30 am	18	1250	31	73	21	46	44	1059	22	67	10	103	2744
7:45 am	8:45 am	14	1134	34	56	18	40	47	991	23	72	10	90	2529
8:00 am	9:00 am	12	1069	40	49	14	42	38	1013	27	83	11	77	2475
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		21	1177	29	84	26	53	46	1227	17	106	15	138	2939
Per Cent of Approach		2%	96%	2%	52%	16%	33%	4%	95%	1%	41%	6%	53%	
Peak Hour Factor:		0.88	0.87	0.6	0.84	0.72	0.7	0.77	0.86	0.85	0.6	0.54	0.8	0.93
Total Arrivals			1227			163			1290			259		
Total Departures			1449			90			1336			64		
Total			2676			253			2626			323		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaiwahine Street and Uwapo Road
DAY & DATE: Friday, May 10, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	10	297	16	12	3	5	15	266	12	13	3	15	667
2	3:15 pm	15	332	17	10	4	7	13	317	7	19	4	20	765
3	3:30 pm	14	313	21	15	6	6	12	317	13	12	0	15	744
4	3:45 pm	14	327	24	14	8	5	27	326	11	12	1	23	792
5	4:00 pm	13	348	18	16	8	8	27	346	9	25	2	16	836
6	4:15 pm	20	339	23	15	15	7	24	382	14	21	4	21	885
7	4:30 pm	17	329	15	8	8	3	16	370	14	21	5	18	824
8	4:45 pm	19	306	13	13	18	11	18	315	6	18	3	18	758
9	5:00 pm	14	320	20	14	17	10	30	277	8	17	3	19	749
10	5:15 pm	15	331	17	19	16	6	20	307	12	20	3	11	777
11	5:30 pm	14	282	14	15	9	9	11	236	9	20	4	15	638
12	5:45 pm	17	295	22	13	11	7	15	213	5	16	6	15	635
13	6:00 pm													0
14	6:15 pm													0
	Maximum:	20	348	24	16	15	8	27	382	14	25	5	23	885

Hourly Volume of Each Movement

3:00 pm	4:00 pm	53	1269	78	51	21	23	67	1226	43	56	8	73	2968
3:15 pm	4:15 pm	56	1320	80	55	26	26	79	1306	40	68	7	74	3137
3:30 pm	4:30 pm	61	1327	86	60	37	26	90	1371	47	70	7	75	3257
3:45 pm	4:45 pm	64	1343	80	53	39	23	94	1424	48	79	12	78	3337
4:00 pm	5:00 pm	69	1322	69	52	49	29	85	1413	43	85	14	73	3303
4:15 pm	5:15 pm	70	1294	71	50	58	31	88	1344	42	77	15	76	3216
4:30 pm	5:30 pm	65	1286	65	54	59	30	84	1269	40	76	14	66	3108
4:45 pm	5:45 pm	62	1239	64	61	60	36	79	1135	35	75	13	63	2922
5:00 pm	6:00 pm	60	1228	73	61	53	32	76	1033	34	73	16	60	2799
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		64	1343	80	53	39	23	94	1424	48	79	12	78	3337
Per Cent of Approach		4%	90%	5%	46%	34%	20%	6%	91%	3%	47%	7%	46%	
Peak Hour Factor:		0.8	0.96	0.83	0.83	0.65	0.72	0.87	0.93	0.86	0.79	0.6	0.85	0.94
Total Arrivals			1487			115			1566			169		
Total Departures			1555			186			1445			151		
Total			3042			301			3011			320		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaiwahine Street and Uwapo Road
DAY & DATE: Saturday, May 11, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	5	185	7	11	3	12	16	277	5	20	2	17	560
2	10:15 am	9	203	9	14	3	9	10	323	5	15	1	13	614
3	10:30 am	10	168	9	13	1	12	8	280	5	20	5	11	542
4	10:45 am	11	198	9	10	7	9	15	256	5	22	5	6	553
5	11:00 am	12	250	10	8	3	6	9	335	4	15	6	15	673
6	11:15 am	12	225	11	6	5	11	12	276	7	9	1	9	584
7	11:30 am	10	267	15	14	3	10	12	165	8	16	2	15	537
8	11:45 am	6	234	10	9	4	13	12	241	7	12	1	15	564
9	12:00 pm	12	243	13	9	2	10	15	278	12	15	3	12	624
10	12:15 pm	10	221	14	6	9	12	17	266	9	11	2	15	592
11	12:30 pm	11	278	17	11	3	13	11	259	2	10	3	11	629
12	12:45 pm	9	327	13	12	10	10	11	252	5	15	5	18	687
13	1:00 pm	9	292	18	12	11	9	10	255	5	14	1	10	646
14	1:15 pm	21	262	17	6	6	5	13	227	3	9	1	13	583
15	1:30 pm	10	316	15	9	9	9	12	271	12	18	3	19	703
16	1:45 pm	6	244	11	14	5	14	17	204	4	10	8	14	551
	Maximum:	21	327	18	12	11	10	13	271	12	18	5	19	703

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	35	754	34	48	14	42	49	1136	20	77	13	47	2269
10:15 am	11:15 am	42	819	37	45	14	36	42	1194	19	72	17	45	2382
10:30 am	11:30 am	45	841	39	37	16	38	44	1147	21	66	17	41	2352
10:45 am	11:45 am	45	940	45	38	18	36	48	1032	24	62	14	45	2347
11:00 am	12:00 pm	40	976	46	37	15	40	45	1017	26	52	10	54	2358
11:15 am	12:15 pm	40	969	49	38	14	44	51	960	34	52	7	51	2309
11:30 am	12:30 pm	38	965	52	38	18	45	56	950	36	54	8	57	2317
11:45 am	12:45 pm	39	976	54	35	18	48	55	1044	30	48	9	53	2409
12:00 pm	1:00 pm	42	1069	57	38	24	45	54	1055	28	51	13	56	2532
12:15 pm	1:15 pm	39	1118	62	41	33	44	49	1032	21	50	11	54	2554
12:30 pm	1:30 pm	50	1159	65	41	30	37	45	993	15	48	10	52	2545
12:45 pm	1:45 pm	49	1197	63	39	36	33	46	1005	25	56	10	60	2619
1:00 pm	2:00 pm	46	1114	61	41	31	37	52	957	24	51	13	56	2483
Peak Hour Volume		49	1197	63	39	36	33	46	1005	25	56	10	60	2619
Per Cent of Approach		4%	92%	46%	36%	31%	3%	4%	93%	27%	44%	0%	2%	
Peak Hour Factor:		0.58	0.92	0.88	0.81	0.82	0.83	0.88	0.93	0.52	0.78	0.5	0.79	0.93
Total Arrivals			1309			108			1076			126		
Total Departures			1104			119			1286			110		
Total			2413			227			2362			236		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at North Kihei Road
DAY & DATE: Thursday, May 16, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am	9	137	10	1	2	0	6	110	41	38	1	24	379
2	6:15 am	12	144	9	0	0	2	7	123	80	52	1	16	446
3	6:30 am	24	176	14	2	2	5	9	181	74	52	3	30	572
4	6:45 am	23	161	14	4	1	1	8	202	89	53	5	26	587
5	7:00 am	29	234	2	1	0	5	4	321	92	76	20	65	849
6	7:15 am	29	275	0	1	1	3	1	319	129	68	0	44	870
7	7:30 am	24	228	1	1	1	5	1	208	53	67	0	38	627
8	7:45 am	28	256	0	1	0	1	2	249	67	87	0	44	735
9	8:00 am	32	257	2	1	1	3	6	192	68	73	1	37	673
10	8:15 am	29	186	1	0	0	1	4	164	51	57	0	55	548
11	8:30 am	27	206	2	4	0	1	2	211	60	57	0	49	619
12	8:45 am	23	187	1	5	1	1	0	222	68	57	0	38	603
13	9:00 am													0
14	9:15 am													0
	Maximum:	29	275	2	1	1	5	4	321	129	87	20	65	870

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:00 am	7:00 am	68	618	47	7	5	8	30	616	284	195	10	96	1984
6:15 am	7:15 am	88	715	39	7	3	13	28	827	335	233	29	137	2454
6:30 am	7:30 am	105	846	30	8	4	14	22	1023	384	249	28	165	2878
6:45 am	7:45 am	105	898	17	7	3	14	14	1050	363	264	25	173	2933
7:00 am	8:00 am	110	993	3	4	2	14	8	1097	341	298	20	191	3081
7:15 am	8:15 am	113	1016	3	4	3	12	10	968	317	295	1	163	2905
7:30 am	8:30 am	113	927	4	3	2	10	13	813	239	284	1	174	2583
7:45 am	8:45 am	116	905	5	6	1	6	14	816	246	274	1	185	2575
8:00 am	9:00 am	111	836	6	10	2	6	12	789	247	244	1	179	2443
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		110	993	3	4	2	14	8	1097	341	298	20	191	3081
Per Cent of Approach		10%	90%	0%	20%	10%	70%	1%	76%	24%	59%	4%	38%	
Peak Hour Factor:		0.95	0.9	0.38	1	0.5	0.7	0.5	0.85	0.66	0.86	0.25	0.73	0.89

	North Approach	East Approach	South Approach	West Approach
Total Arrivals	1106	20	1446	509
Total Departures	1292	31	1305	453
Total	2398	51	2751	962

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at North Kihei Road
DAY & DATE: Tuesday, May 14, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	39	266	4	1	0	1	3	228	65	34	0	62	703
2	3:15 pm	42	262	5	0	0	1	8	222	84	32	2	91	749
3	3:30 pm	40	280	4	32	3	20	5	285	90	62	3	81	905
4	3:45 pm	49	260	1	8	7	8	2	239	98	43	3	115	833
5	4:00 pm	48	323	0	4	2	4	0	298	104	59	1	72	915
6	4:15 pm	23	175	0	1	0	0	1	177	65	20	1	61	524
7	4:30 pm	47	284	0	1	1	2	2	324	115	48	0	77	901
8	4:45 pm	44	247	1	1	0	4	0	264	120	23	0	85	789
9	5:00 pm	59	244	0	3	0	0	1	247	75	36	3	74	742
10	5:15 pm	45	298	0	1	1	2	5	246	75	53	0	95	821
11	5:30 pm	36	277	0	3	0	2	0	231	77	32	2	92	752
12	5:45 pm	29	240	0	1	0	0	1	214	57	25	0	70	637
13	6:00 pm													0
14	6:15 pm													0
	Maximum:	49	323	5	32	7	20	8	298	104	62	3	115	915

Hourly Volume of Each Movement

3:00 pm	4:00 pm	170	1068	14	41	10	30	18	974	337	171	8	349	3190
3:15 pm	4:15 pm	179	1125	10	44	12	33	15	1044	376	196	9	359	3402
3:30 pm	4:30 pm	160	1038	5	45	12	32	8	999	357	184	8	329	3177
3:45 pm	4:45 pm	167	1042	1	14	10	14	5	1038	382	170	5	325	3173
4:00 pm	5:00 pm	162	1029	1	7	3	10	3	1063	404	150	2	295	3129
4:15 pm	5:15 pm	173	950	1	6	1	6	4	1012	375	127	4	297	2956
4:30 pm	5:30 pm	195	1073	1	6	2	8	8	1081	385	160	3	331	3253
4:45 pm	5:45 pm	184	1066	1	8	1	8	6	988	347	144	5	346	3104
5:00 pm	6:00 pm	169	1059	0	8	1	4	7	938	284	146	5	331	2952
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		179	1125	10	44	12	33	15	1044	376	196	9	359	3402
Per Cent of Approach		14%	86%	1%	49%	13%	37%	1%	73%	26%	35%	2%	64%	
Peak Hour Factor:		0.91	0.87	0.5	0.34	0.43	0.41	0.47	0.88	0.9	0.79	0.75	0.78	0.93
Total Arrivals			1314			89			1435			564		
Total Departures			1447			34			1354			567		
Total			2761			123			2789			1131		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at North Kihei Road
DAY & DATE: Saturday, May 11, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	25	145	4	1	0		1	156	47	40	1	49	469
2	10:15 am	9	143	1	0	0		0	268	52	30	1	86	590
3	10:30 am	42	143	2	0	2	2	0	245	70	29	0	33	568
4	10:45 am	35	227	0	0		0	0	297	51	50	0	70	730
5	11:00 am	21	190	0	5		0	3	253	57	57	0	42	628
6	11:15 am	40	202	0	1		3	1	258	57	67	2	46	677
7	11:30 am	30	194	2			0	1	201	58	62	1	55	604
8	11:45 am	43	214	2		1	0	0	220	56	64	0	36	636
9	12:00 pm	41	220	0		0	0	0	277	60	55	1	50	704
10	12:15 pm	39	172	0		0	0	0	194	57	44	1	33	540
11	12:30 pm	36	266	1		0	0	1	231	53	82	0	58	728
12	12:45 pm	42	205	3		0	1	0	195	61	91	0	23	621
13	1:00 pm	41	242	2	2	0	0	2	207	79	51	0	40	666
14	1:15 pm	38	258	0		0	0	1	210	70	86	0	60	723
15	1:30 pm	26	175	1		0	0	1	163	30	42	0	39	477
16	1:45 pm	43	214	1		0	0	0	196	61	56	0	43	614
	Maximum:	42	266	3	2	0	1	2	231	79	91	0	60	728

Hourly Volume of Each Movement

10:00 am	11:00 am	111	658	7	1	2	2	1	966	220	149	2	238	2357
10:15 am	11:15 am	107	703	3	5	2	2	3	1063	230	166	1	231	2516
10:30 am	11:30 am	138	762	2	6	2	5	4	1053	235	203	2	191	2603
10:45 am	11:45 am	126	813	2	6	0	3	5	1009	223	236	3	213	2639
11:00 am	12:00 pm	134	800	4	6	1	3	5	932	228	250	3	179	2545
11:15 am	12:15 pm	154	830	4	1	1	3	2	956	231	248	4	187	2621
11:30 am	12:30 pm	153	800	4	0	1	0	1	892	231	225	3	174	2484
11:45 am	12:45 pm	159	872	3	0	1	0	1	922	226	245	2	177	2608
12:00 pm	1:00 pm	158	863	4	0	0	1	1	897	231	272	2	164	2593
12:15 pm	1:15 pm	158	885	6	2	0	1	3	827	250	268	1	154	2555
12:30 pm	1:30 pm	157	971	6	2	0	1	4	843	263	310	0	181	2738
12:45 pm	1:45 pm	147	880	6	2	0	1	4	775	240	270	0	162	2487
1:00 pm	2:00 pm	148	889	4	2	0	0	4	776	240	235	0	182	2480
Peak Hour Volume		157	971	6	2	0	1	4	843	263	310	0	181	2738
Per Cent of Approach		14%	86%	1%	67%	0%	33%	0%	76%	24%	63%	0%	37%	
Peak Hour Factor:		0.93	0.91	0.5	0.25	0	0.25	0.5	0.91	0.83	0.85	0	0.75	0.94
Total Arrivals			1134			3			1110			491		
Total Departures			1026			10			1282			420		
Total			2160			13			2392			911		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	North Kihei Road at South Kihei Road
DAY & DATE:	Thursday, May 16, 2013
START TIME:	6:30 am
END TIME:	8:30 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:30 am					82	14	30		100	28	52		306
2	6:45 am					94	20	33		94	45	66		352
3	7:00 am					92	18	43		107	35	60		355
4	7:15 am					117	22	37		105	48	73		402
5	7:30 am					95	21	52		84	54	83		389
6	7:45 am					55	21	45		96	51	81		349
7	8:00 am					67	27	38		73	56	70		331
8	8:15 am					70	28	38		76	37	48		297
	Maximum:					117	22	52		107	54	83		402

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:30 am	7:30 am	0	0	0	0	385	74	143	0	406	156	251	0	1415
6:45 am	7:45 am	0	0	0	0	398	81	165	0	390	182	282	0	1498
7:00 am	8:00 am	0	0	0	0	359	82	177	0	392	188	297	0	1495
7:15 am	8:15 am	0	0	0	0	334	91	172	0	358	209	307	0	1471
7:30 am	8:30 am	0	0	0	0	287	97	173	0	329	198	282	0	1366
Maximum Volume		0	0	0	0	398	81	165	0	390	182	282	0	1498
Per Cent of Approach		0%	0%	0%	0%	83%	17%	30%	0%	70%	39%	61%	0%	
Peak Hour Factor:		0	0	0	0	0.85	0.92	0.79	0	0.91	0.84	0.85	0	0.93
Total Arrivals			0			479			555			464		
Total Departures			0			447			263			788		
Total			0			926			818			1252		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: North Kihei Road at South Kihei Road
DAY & DATE: Tuesday, May 14, 2013
START TIME: 3:30 pm
END TIME: 5:30 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:30 pm					67	37	39		61	92	106		402
2	3:45 pm					90	37	39		67	104	92		429
3	4:00 pm					81	28	37		53	94	80		373
4	4:15 pm					83	42	30		54	102	85		396
5	4:30 pm					95	38	47		74	117	93		464
6	4:45 pm					85	36	47		63	119	87		437
7	5:00 pm					77	25	44		55	111	121		433
8	5:15 pm					80	41	23		60	110	78		392
	Maximum:					95	42	47		74	119	121		464

Hourly Volume of Each Movement

3:30 pm	4:30 pm	0	0	0	0	321	144	145	0	235	392	363	0	1600
3:45 pm	4:45 pm	0	0	0	0	349	145	153	0	248	417	350	0	1662
4:00 pm	5:00 pm	0	0	0	0	344	144	161	0	244	432	345	0	1670
4:15 pm	5:15 pm	0	0	0	0	340	141	168	0	246	449	386	0	1730
4:30 pm	5:30 pm	0	0	0	0	337	140	161	0	252	457	379	0	1726
Maximum Volume		0	0	0	0	340	141	168	0	246	449	386	0	1730
Per Cent of Approach		0%	0%	0%	0%	71%	29%	41%	0%	59%	54%	46%	0%	
Peak Hour Factor:		0	0	0	0	0.89	0.84	0.89	0	0.83	0.94	0.8	0	0.93
Total Arrivals			0			481			414			835		
Total Departures			0			554			590			586		
Total			0			1035			1004			1421		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: North Kihei Road at South Kihei Road
DAY & DATE: Saturday, May 4, 2013
START TIME: 12:00 pm
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	12:00 pm					69	27	36		70	59	57		318
2	12:15 pm					65	28	27		49	64	60		293
3	12:30 pm					75	42	35		60	62	71		345
4	12:45 pm					62	37	34		64	70	56		323
5	1:00 pm					61	35	29		53	64	59		301
6	1:15 pm					69	26	31		76	74	68		344
7	1:30 pm					74	41	42		54	62	75		348
8	1:45 pm					68	27	34		61	78	68		336
9	2:00 pm													0
10	2:15 pm													0
11	2:30 pm													0
12	2:45 pm													0
13	3:00 pm													0
14	3:15 pm													0
15	3:30 pm													0
16	3:45 pm													0
	Maximum:					74	41	42		76	78	75		348

Hourly Volume of Each Movement

12:00 pm	1:00 pm	0	0	0	0	271	134	132	0	243	255	244	0	1279
12:15 pm	1:15 pm	0	0	0	0	263	142	125	0	226	260	246	0	1262
12:30 pm	1:30 pm	0	0	0	0	267	140	129	0	253	270	254	0	1313
12:45 pm	1:45 pm	0	0	0	0	266	139	136	0	247	270	258	0	1316
1:00 pm	2:00 pm	0	0	0	0	272	129	136	0	244	278	270	0	1329
1:15 pm	2:15 pm	0	0	0	0	211	94	107	0	191	214	211	0	1028
1:30 pm	2:30 pm	0	0	0	0	142	68	76	0	115	140	143	0	684
1:45 pm	2:45 pm	0	0	0	0	68	27	34	0	61	78	68	0	336
2:00 pm	3:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 pm	3:15 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 pm	3:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 pm	3:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 pm	4:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Volume		0	0	0	0	272	129	136	0	244	278	270	0	1329
Per Cent of Approach		0%	0%	0%	0%	68%	32%	36%	0%	64%	51%	49%	0%	
Peak Hour Factor:		0	0	0	0	0.92	0.79	0.81	0	0.8	0.89	0.9	0	0.95

	North	East	South	West
Total Arrivals	0	401	380	548
Total Departures	0	406	407	516
Total	0	807	787	1064

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaonoulu Street
DAY & DATE: Thursday, May 16, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am	1	129						131	8	14		2	285
2	6:15 am	1	254						138	4	17		3	417
3	6:30 am	1	253						211	5	29		7	506
4	6:45 am	2	285						237	12	30		9	575
5	7:00 am	6	316						344	8	43		10	727
6	7:15 am	3	285						226	8	51		6	579
7	7:30 am	4	455						380	25	77		15	956
8	7:45 am	4	366						232	18	36		7	663
9	8:00 am	7	356						259	16	32		2	672
10	8:15 am	4	343						251	9	36		7	650
11	8:30 am	6	268						227	8	28		5	542
12	8:45 am	5	303						236	9	37		3	593
13	9:00 am													0
14	9:15 am													0
	Maximum:	7	455						380	25	77		15	956

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:00 am	7:00 am	5	921	0	0	0	0	0	717	29	90	0	21	1783
6:15 am	7:15 am	10	1108	0	0	0	0	0	930	29	119	0	29	2225
6:30 am	7:30 am	12	1139	0	0	0	0	0	1018	33	153	0	32	2387
6:45 am	7:45 am	15	1341	0	0	0	0	0	1187	53	201	0	40	2837
7:00 am	8:00 am	17	1422	0	0	0	0	0	1182	59	207	0	38	2925
7:15 am	8:15 am	18	1462	0	0	0	0	0	1097	67	196	0	30	2870
7:30 am	8:30 am	19	1520	0	0	0	0	0	1122	68	181	0	31	2941
7:45 am	8:45 am	21	1333	0	0	0	0	0	969	51	132	0	21	2527
8:00 am	9:00 am	22	1270	0	0	0	0	0	973	42	133	0	17	2457
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		19	1520	0	0	0	0	0	1122	68	181	0	31	2941
Per Cent of Approach		1%	99%	0%	0%	0%	0%	0%	94%	6%	85%	0%	15%	
Peak Hour Factor:		0.68	0.84	0	0	0	0	0	0.74	0.68	0.59	0	0.52	0.77

	North	East	South	West
Total Arrivals	1539	0	1190	212
Total Departures	1153	0	1701	87
Total	2692	0	2891	299

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaonoulu Street
DAY & DATE: Thursday, May 16, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	12	320						359	22	29		4	746
2	3:15 pm	13	334						381	23	29		8	788
3	3:30 pm	10	381						401	20	25		5	842
4	3:45 pm	10	375						329	23	33		6	776
5	4:00 pm	7	335						380	22	28		4	776
6	4:15 pm	13	383						426	27	40		5	894
7	4:30 pm	11	334						357	29	22		5	758
8	4:45 pm	12	362						334	23	41		3	775
9	5:00 pm	6	366						414	20	38		9	853
10	5:15 pm	10	257						268	17	21		3	576
11	5:30 pm	9	288						232	22	28		6	585
12	5:45 pm	8	325						258	14	30		2	637
13	6:00 pm													0
14	6:15 pm													0
	Maximum:	13	383						426	27	40		6	894

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
3:00 pm	4:00 pm	45	1410	0	0	0	0	0	1470	88	116	0	23	3152
3:15 pm	4:15 pm	40	1425	0	0	0	0	0	1491	88	115	0	23	3182
3:30 pm	4:30 pm	40	1474	0	0	0	0	0	1536	92	126	0	20	3288
3:45 pm	4:45 pm	41	1427	0	0	0	0	0	1492	101	123	0	20	3204
4:00 pm	5:00 pm	43	1414	0	0	0	0	0	1497	101	131	0	17	3203
4:15 pm	5:15 pm	42	1445	0	0	0	0	0	1531	99	141	0	22	3280
4:30 pm	5:30 pm	39	1319	0	0	0	0	0	1373	89	122	0	20	2962
4:45 pm	5:45 pm	37	1273	0	0	0	0	0	1248	82	128	0	21	2789
5:00 pm	6:00 pm	33	1236	0	0	0	0	0	1172	73	117	0	20	2651
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		40	1474	0	0	0	0	0	1536	92	126	0	20	3288
Per Cent of Approach		3%	97%	0%	0%	0%	0%	0%	94%	6%	86%	0%	14%	
Peak Hour Factor:		0.77	0.96	0	0	0	0	0	0.9	0.85	0.79	0	0.83	0.92
Total Arrivals			1514			0			1628			146		
Total Departures			1556			0			1600			132		
Total			3070			0			3228			278		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kaonoulu Street
DAY & DATE: Saturday, May 18, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	11	231						245	12	33		12	544
2	10:15 am	11	187						212	33	22		24	489
3	10:30 am	10	260						288	12	25		6	601
4	10:45 am	8	250						250	21	22		7	558
5	11:00 am	9	198						233	14	27		3	484
6	11:15 am	5	240						242	11	19		15	532
7	11:30 am	14	271						235	15	34		3	572
8	11:45 am	5	202						255	17	20		4	503
9	12:00 pm	12	269						224	17	18		8	548
10	12:15 pm	13	267						272	18	31		12	613
11	12:30 pm	12	286						230	24	24		8	584
12	12:45 pm	6	272						221	15	28		9	551
13	1:00 pm	8	237						228	19	24		8	524
14	1:15 pm	6	240						268	13	21		11	559
15	1:30 pm	15	283						265	16	29		11	619
16	1:45 pm	12	230						227	9	22		6	506
	Maximum:	13	286						272	24	31		12	613

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	40	928	0	0	0	0	0	995	78	102	0	49	2192
10:15 am	11:15 am	38	895	0	0	0	0	0	983	80	96	0	40	2132
10:30 am	11:30 am	32	948	0	0	0	0	0	1013	58	93	0	31	2175
10:45 am	11:45 am	36	959	0	0	0	0	0	960	61	102	0	28	2146
11:00 am	12:00 pm	33	911	0	0	0	0	0	965	57	100	0	25	2091
11:15 am	12:15 pm	36	982	0	0	0	0	0	956	60	91	0	30	2155
11:30 am	12:30 pm	44	1009	0	0	0	0	0	986	67	103	0	27	2236
11:45 am	12:45 pm	42	1024	0	0	0	0	0	981	76	93	0	32	2248
12:00 pm	1:00 pm	43	1094	0	0	0	0	0	947	74	101	0	37	2296
12:15 pm	1:15 pm	39	1062	0	0	0	0	0	951	76	107	0	37	2272
12:30 pm	1:30 pm	32	1035	0	0	0	0	0	947	71	97	0	36	2218
12:45 pm	1:45 pm	35	1032	0	0	0	0	0	982	63	102	0	39	2253
1:00 pm	2:00 pm	41	990	0	0	0	0	0	988	57	96	0	36	2208
Peak Hour Volume		43	1094	0	0	0	0	0	947	74	101	0	37	2296
Per Cent of Approach		4%	96%	0%	0%	0%	0%	0%	93%	7%	73%	0%	27%	
Peak Hour Factor:		0.83	0.96	0	0	0	0	0	0.87	0.77	0.81	0	0.77	0.94
Total Arrivals			1137			0			1021			138		
Total Departures			984			0			1195			117		
Total			2121			0			2216			255		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: South Kihei Road at Kaonoulu Street
DAY & DATE: Thursday, May 16, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am		32	0	7		6	4	59					108
2	6:15 am		40	1	8		5	5	74					133
3	6:30 am		77	4	5		9	7	124					226
4	6:45 am		69	5	12		10	6	105					207
5	7:00 am		59	4	8		14	8	108					201
6	7:15 am		93	3	6		22	16	158					298
7	7:30 am		80	1	9		18	14	99					221
8	7:45 am		87	4	4		17	13	142					267
9	8:00 am		99	0	9		11	16	96					231
10	8:15 am		93	5	6		8	19	106					237
11	8:30 am		82	3	4		12	15	116					232
12	8:45 am		66	2	6		11	18	88					191
13	9:00 am													0
14	9:15 am													0
	Maximum:		99	4	9		22	16	158					298

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:00 am	7:00 am	0	218	10	32	0	30	22	362	0	0	0	0	674
6:15 am	7:15 am	0	245	14	33	0	38	26	411	0	0	0	0	767
6:30 am	7:30 am	0	298	16	31	0	55	37	495	0	0	0	0	932
6:45 am	7:45 am	0	301	13	35	0	64	44	470	0	0	0	0	927
7:00 am	8:00 am	0	319	12	27	0	71	51	507	0	0	0	0	987
7:15 am	8:15 am	0	359	8	28	0	68	59	495	0	0	0	0	1017
7:30 am	8:30 am	0	359	10	28	0	54	62	443	0	0	0	0	956
7:45 am	8:45 am	0	361	12	23	0	48	63	460	0	0	0	0	967
8:00 am	9:00 am	0	340	10	25	0	42	68	406	0	0	0	0	891
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		0	359	8	28	0	68	59	495	0	0	0	0	1017
Per Cent of Approach		0%	98%	2%	29%	0%	71%	11%	89%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.91	0.5	0.78	0	0.77	0.92	0.78	0	0	0	0	0.85

	North	East	South	West
Total Arrivals	367	96	554	0
Total Departures	523	67	427	0
Total	890	163	981	0

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	South Kihei Road at Kaonoulu Street
DAY & DATE:	Thursday, May 16, 2013
START TIME:	3:00 pm
END TIME:	6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm		145	8	10		10	19	133					325
2	3:15 pm		116	3	4		13	23	127					286
3	3:30 pm		109	9	4		14	33	115					284
4	3:45 pm		131	8	8		9	32	140					328
5	4:00 pm		103	4	11		21	24	125					288
6	4:15 pm		135	7	5		21	23	119					310
7	4:30 pm		82	9	7		11	31	138					278
8	4:45 pm		148	10	7		9	31	127					332
9	5:00 pm		118	17	4		15	33	110					297
10	5:15 pm		149	10	6		14	30	126					335
11	5:30 pm		130	5	5		13	21	90					264
12	5:45 pm		98	2	7		11	22	104					244
13	6:00 pm													0
14	6:15 pm													0
	Maximum:		149	17	7		15	33	138					335

Hourly Volume of Each Movement

3:00 pm	4:00 pm	0	501	28	26	0	46	107	515	0	0	0	0	1223
3:15 pm	4:15 pm	0	459	24	27	0	57	112	507	0	0	0	0	1186
3:30 pm	4:30 pm	0	478	28	28	0	65	112	499	0	0	0	0	1210
3:45 pm	4:45 pm	0	451	28	31	0	62	110	522	0	0	0	0	1204
4:00 pm	5:00 pm	0	468	30	30	0	62	109	509	0	0	0	0	1208
4:15 pm	5:15 pm	0	483	43	23	0	56	118	494	0	0	0	0	1217
4:30 pm	5:30 pm	0	497	46	24	0	49	125	501	0	0	0	0	1242
4:45 pm	5:45 pm	0	545	42	22	0	51	115	453	0	0	0	0	1228
5:00 pm	6:00 pm	0	495	34	22	0	53	106	430	0	0	0	0	1140
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		0	497	46	24	0	49	125	501	0	0	0	0	1242
Per Cent of Approach		0%	92%	8%	33%	0%	67%	20%	80%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.83	0.68	0.86	0	0.82	0.95	0.91	0	0	0	0	0.93

	North	East	South	West
Total Arrivals	543	73	626	0
Total Departures	525	171	546	0
Total	1068	244	1172	0

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	South Kihei Road at Kaonoulu Street
DAY & DATE:	Saturday, May 11, 2013
START TIME:	10:00 am
END TIME:	2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am		80	4	3		15	26	141					269
2	10:15 am		71	2	3		15	30	121					242
3	10:30 am		71	0	3		7	22	131					234
4	10:45 am		94	1	9		13	21	111					249
5	11:00 am		91	5	2		18	23	122					261
6	11:15 am		95	4	4		11	25	128					267
7	11:30 am		110	5	5		11	20	114					265
8	11:45 am		115	3	3		25	24	124					294
9	12:00 pm		108	4	5		16	20	114					267
10	12:15 pm		107	3	1		26	22	137					296
11	12:30 pm		115	2	2		10	15	114					258
12	12:45 pm		115	7	10		20	33	96					281
13	1:00 pm		107	6	5		13	31	98					260
14	1:15 pm		102	2	1		17	25	132					279
15	1:30 pm		108	2	3		5	24	114					256
16	1:45 pm		117	6	3		13	15	122					276
	Maximum:		115	5	5		26	24	137					296

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	0	316	7	18	0	50	99	504	0	0	0	0	994
10:15 am	11:15 am	0	327	8	17	0	53	96	485	0	0	0	0	986
10:30 am	11:30 am	0	351	10	18	0	49	91	492	0	0	0	0	1011
10:45 am	11:45 am	0	390	15	20	0	53	89	475	0	0	0	0	1042
11:00 am	12:00 pm	0	411	17	14	0	65	92	488	0	0	0	0	1087
11:15 am	12:15 pm	0	428	16	17	0	63	89	480	0	0	0	0	1093
11:30 am	12:30 pm	0	440	15	14	0	78	86	489	0	0	0	0	1122
11:45 am	12:45 pm	0	445	12	11	0	77	81	489	0	0	0	0	1115
12:00 pm	1:00 pm	0	445	16	18	0	72	90	461	0	0	0	0	1102
12:15 pm	1:15 pm	0	444	18	18	0	69	101	445	0	0	0	0	1095
12:30 pm	1:30 pm	0	439	17	18	0	60	104	440	0	0	0	0	1078
12:45 pm	1:45 pm	0	432	17	19	0	55	113	440	0	0	0	0	1076
1:00 pm	2:00 pm	0	434	16	12	0	48	95	466	0	0	0	0	1071
Peak Hour Volume		0	440	15	14	0	78	86	489	0	0	0	0	1122
Per Cent of Approach		0%	97%	3%	15%	0%	85%	15%	85%	0%	0%	0%	0%	
Peak Hour Factor:		0	0.96	0.75	0.7	0	0.75	0.9	0.89	0	0	0	0	0.95
Total Arrivals			455			92			575			0		
Total Departures			503			101			518			0		
Total			958			193			1093			0		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kulanihakoi Street
DAY & DATE: Tuesday, May 14, 2013
START TIME: 6:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:00 am	1	189						104	0	11		6	311
2	6:15 am	0	251						167	3	13		9	443
3	6:30 am	5	265						184	4	20		19	497
4	6:45 am	10	303						216	2	18		10	559
5	7:00 am	6	420						316	6	28		17	793
6	7:15 am	6	511						366	5	28		11	927
7	7:30 am	10	480						302	2	31		13	838
8	7:45 am	14	415						313	18	37		8	805
9	8:00 am	17	362						235	21	41		11	687
10	8:15 am	15	398						266	7	32		14	732
11	8:30 am	7	282						270	9	25		9	602
12	8:45 am	8	309						250	12	23		9	611
13	9:00 am													0
14	9:15 am													0
	Maximum:	14	511						366	18	37		17	927

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:00 am	7:00 am	16	1008	0	0	0	0	0	671	9	62	0	44	1810
6:15 am	7:15 am	21	1239	0	0	0	0	0	883	15	79	0	55	2292
6:30 am	7:30 am	27	1499	0	0	0	0	0	1082	17	94	0	57	2776
6:45 am	7:45 am	32	1714	0	0	0	0	0	1200	15	105	0	51	3117
7:00 am	8:00 am	36	1826	0	0	0	0	0	1297	31	124	0	49	3363
7:15 am	8:15 am	47	1768	0	0	0	0	0	1216	46	137	0	43	3257
7:30 am	8:30 am	56	1655	0	0	0	0	0	1116	48	141	0	46	3062
7:45 am	8:45 am	53	1457	0	0	0	0	0	1084	55	135	0	42	2826
8:00 am	9:00 am	47	1351	0	0	0	0	0	1021	49	121	0	43	2632
8:15 am	9:15 am													
8:30 am	9:30 am													
Peak Hour Volume		36	1826	0	0	0	0	0	1297	31	124	0	49	3363
Per Cent of Approach		2%	98%	0%	0%	0%	0%	0%	98%	2%	72%	0%	28%	
Peak Hour Factor:		0.64	0.89	0	0	0	0	0	0.89	0.43	0.84	0	0.72	0.91

	North	East	South	West
Total Arrivals	1862	0	1328	173
Total Departures	1346	0	1950	67
Total	3208	0	3278	240

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kulanihakoi Street
DAY & DATE: Tuesday, May 14, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	17	284						339	20	27		11	698
2	3:15 pm	14	330						346	16	19		10	735
3	3:30 pm	21	366						397	15	25		4	828
4	3:45 pm	17	366						398	19	26		7	833
5	4:00 pm	25	426						413	23	28		14	929
6	4:15 pm	14	352						480	17	10		6	879
7	4:30 pm	25	364						395	21	26		14	845
8	4:45 pm	20	373						368	13	28		7	809
9	5:00 pm	28	420						413	21	31		9	922
10	5:15 pm	18	293						278	14	19		4	626
11	5:30 pm	22	354						322	11	17		7	733
12	5:45 pm	17	300						259	17	17		12	622
13	6:00 pm													0
14	6:15 pm													0
	Maximum:	25	426						480	23	28		14	929

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
3:00 pm	4:00 pm	69	1346	0	0	0	0	0	1480	70	97	0	32	3094
3:15 pm	4:15 pm	77	1488	0	0	0	0	0	1554	73	98	0	35	3325
3:30 pm	4:30 pm	77	1510	0	0	0	0	0	1688	74	89	0	31	3469
3:45 pm	4:45 pm	81	1508	0	0	0	0	0	1686	80	90	0	41	3486
4:00 pm	5:00 pm	84	1515	0	0	0	0	0	1656	74	92	0	41	3462
4:15 pm	5:15 pm	87	1509	0	0	0	0	0	1656	72	95	0	36	3455
4:30 pm	5:30 pm	91	1450	0	0	0	0	0	1454	69	104	0	34	3202
4:45 pm	5:45 pm	88	1440	0	0	0	0	0	1381	59	95	0	27	3090
5:00 pm	6:00 pm	85	1367	0	0	0	0	0	1272	63	84	0	32	2903
5:15 pm	6:15 pm													
5:30 pm	6:30 pm													
Peak Hour Volume		81	1508	0	0	0	0	0	1686	80	90	0	41	3486
Per Cent of Approach		5%	95%	0%	0%	0%	0%	0%	95%	5%	69%	0%	31%	
Peak Hour Factor:		0.81	0.88	0	0	0	0	0	0.88	0.87	0.8	0	0.73	0.94
Total Arrivals			1589			0			1766			131		
Total Departures			1727			0			1598			161		
Total			3316			0			3364			292		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Kulanihakoi Street
DAY & DATE: Saturday, May 18, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	6	263						275	9	15		17	585
2	10:15 am	8	221						220	8	22		12	491
3	10:30 am	22	280						305	10	22		5	644
4	10:45 am	16	240						270	7	19		10	562
5	11:00 am	17	264						244	9	12		14	560
6	11:15 am	11	239						255	9	28		15	557
7	11:30 am	5	310						249	11	16		15	606
8	11:45 am	7	232						224	15	10		9	497
9	12:00 pm	12	210						201	8	6		11	448
10	12:15 pm	15	370						331	18	13		11	758
11	12:30 pm	18	270						212	7	9		12	528
12	12:45 pm	15	210						155	11	12		11	414
13	1:00 pm	17	239						221	13	18		21	529
14	1:15 pm	14	241						230	13	16		9	523
15	1:30 pm	16	275						258	9	16		22	596
16	1:45 pm	12	265						232	14	21		13	557
	Maximum:	22	280						305	10	28		15	

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	52	1004	0	0	0	0	0	1070	34	78	0	44	2282
10:15 am	11:15 am	63	1005	0	0	0	0	0	1039	34	75	0	41	2257
10:30 am	11:30 am	66	1023	0	0	0	0	0	1074	35	81	0	44	2323
10:45 am	11:45 am	49	1053	0	0	0	0	0	1018	36	75	0	54	2285
11:00 am	12:00 pm	40	1045	0	0	0	0	0	972	44	66	0	53	2220
11:15 am	12:15 pm	35	991	0	0	0	0	0	929	43	60	0	50	2108
11:30 am	12:30 pm	39	1122	0	0	0	0	0	1005	52	45	0	46	2309
11:45 am	12:45 pm	52	1082	0	0	0	0	0	968	48	38	0	43	2231
12:00 pm	1:00 pm	60	1060	0	0	0	0	0	899	44	40	0	45	2148
12:15 pm	1:15 pm	65	1089	0	0	0	0	0	919	49	52	0	55	2229
12:30 pm	1:30 pm	64	960	0	0	0	0	0	818	44	55	0	53	1994
12:45 pm	1:45 pm	62	965	0	0	0	0	0	864	46	62	0	63	2062
1:00 pm	2:00 pm	59	1020	0	0	0	0	0	941	49	71	0	65	2205
Peak Hour Volume		66	1023	0	0	0	0	0	1074	35	81	0	44	2323
Per Cent of Approach		6%	94%	0%	0%	0%	0%	0%	97%	3%	65%	0%	35%	
Peak Hour Factor:		0.75	0.91	0	0	0	0	0	0.88	0.88	0.72	0	0.73	??
Total Arrivals			1089			0			1109			125		
Total Departures			1118			0			1104			101		
Total			2207			0			2213			226		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	Kaonoulu Street at Kenolio Road
DAY & DATE:	Friday, May 17, 2013
START TIME:	6:30 am
END TIME:	8:30 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:30 am	4	0	27	6	0	0	2	0	0	1	8	7	55
2	6:45 am	3	0	27	8	1	3	4	1	0	0	10	1	58
3	7:00 am	6	1	27	9	1	3	3	0	1	0	12	3	66
4	7:15 am	2	0	47	7	5	0	16	0	0	2	18	2	99
5	7:30 am	3	0	46	17	8	3	15	1	0	0	10	9	112
6	7:45 am	4	1	30	20	4	5	2	0	0	0	11	6	83
7	8:00 am	5	0	29	8	9	1	4	0	0	0	10	6	72
8	8:15 am	3	0	23	5	2	3	2	1	0	0	11	3	53
9	8:30 am													0
10	8:45 am													0
	Maximum:	5	1	47	20	9	5	16	1	0	2	18	9	112

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:30 am	7:30 am	15	1	128	30	7	6	25	1	1	3	48	13	278
6:45 am	7:45 am	14	1	147	41	15	9	38	2	1	2	50	15	335
7:00 am	8:00 am	15	2	150	53	18	11	36	1	1	2	51	20	360
7:15 am	8:15 am	14	1	152	52	26	9	37	1	0	2	49	23	366
7:30 am	8:30 am	15	1	128	50	23	12	23	2	0	0	42	24	320
7:45 am	8:45 am	12	1	82	33	15	9	8	1	0	0	32	15	208
8:00 am	9:00 am	8	0	52	13	11	4	6	1	0	0	21	9	125
Maximum Volume		14	1	152	52	26	9	37	1	0	2	49	23	366
Per Cent of Approach		8%	1%	91%	60%	30%	10%	97%	3%	0%	3%	66%	31%	
Peak Hour Factor:		0.7	0.25	0.81	0.65	0.72	0.45	0.58	0.25	0	0.25	0.68	0.64	0.82

	North	East	South	West
Total Arrivals	167	87	38	74
Total Departures	76	238	12	40
Total	243	325	50	114

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	Kaonoulu Street at Kenolio Road
DAY & DATE:	Friday, May 17, 2013
START TIME:	3:30 pm
END TIME:	5:30 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:30 pm	5	2	26	18	8	2	6	0	1	1	13	8	90
2	3:45 pm	3	1	27	19	12	6	7	1			8	5	89
3	4:00 pm	5	0	20	22	14	5	1	0			5	7	79
4	4:15 pm	1	3	31	19	12	3	4	2			10	12	97
5	4:30 pm	5	0	22	13	12	1	6	2		1	8	13	83
6	4:45 pm	3	2	23	19	7	2	6	1		1	36	5	105
7	5:00 pm	1	0	17	17	6	5	3	1		1	11	8	70
8	5:15 pm	4	0	15	9	7	2	0	0	1	0	9	13	60
9	5:30 pm													0
10	5:45 pm													0
11	6:00 pm													0
12	6:15 pm													0
	Maximum:	5	3	31	22	14	5	6	2		1	36	13	105

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
3:30 pm	4:30 pm	14	6	104	78	46	16	18	3	1	1	36	32	355
3:45 pm	4:45 pm	14	4	100	73	50	15	18	5	0	1	31	37	348
4:00 pm	5:00 pm	14	5	96	73	45	11	17	5	0	2	59	37	364
4:15 pm	5:15 pm	10	5	93	68	37	11	19	6	0	3	65	38	355
4:30 pm	5:30 pm	13	2	77	58	32	10	15	4	1	3	64	39	318
4:45 pm	5:45 pm	8	2	55	45	20	9	9	2	1	2	56	26	235
5:00 pm	6:00 pm	5	0	32	26	13	7	3	1	1	1	20	21	130
5:15 pm	6:15 pm	4	0	15	9	7	2	0	0	1	0	9	13	60
5:30 pm	6:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Volume		14	5	96	73	45	11	17	5	0	2	59	37	364
Per Cent of Approach		12%	4%	83%	57%	35%	9%	77%	23%	0%	2%	60%	38%	1
Peak Hour Factor:		0.7	0.42	0.77	0.83	0.8	0.55	0.71	0.63	0	0.5	0.41	0.71	0.87

	North	East	South	West
Total Arrivals	115	129	22	98
Total Departures	115	172	18	59
Total	230	301	40	157

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Kaonoulu Street at Kenolio Road
DAY & DATE: Saturday
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	1	0	23	12	5	3	3	2		1	10	3	63
2	10:15 am	6	1	20	11	2	2	4	3		0	11	8	68
3	10:30 am	7	0	26	9	9	3	4	0		0	8	7	73
4	10:45 am	3	1	17	20	6	0	0	1		1	14	6	69
5	11:00 am	3	0	18	7	4	0	3	1		0	13	5	54
6	11:15 am	3	0	17	13	2	1	5	1		0	14	10	66
7	11:30 am	3	0	19	9	5	3	4	2		1	5	7	58
8	11:45 am	3	1	17	9	6	3	4	1		0	11	8	63
9	12:00 pm	6	0	20	15	6	3	1	2		0	5	9	67
10	12:15 pm	4	1	17	7	2	1	1	1		0	7	4	45
11	12:30 pm	4	0	12	9	1	2	7	2	1	0	5	11	54
12	12:45 pm	5	1	12	5	4	5	0	2		1	5	4	44
13	1:00 pm	0	1	16	7	4	3	4	1		0	7	5	48
14	1:15 pm	3	0	9	12	8	3	3	0		0	10	8	56
15	1:30 pm	2	1	15	9	8	1	3	0		1	13	1	54
16	1:45 pm	1	1	12	6	11	2	0	0	1	0	10	7	51
	Maximum:	7	1	26	20	9	3	4	3		1	14	8	73

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	17	2	86	52	22	8	11	6	0	2	43	24	273
10:15 am	11:15 am	19	2	81	47	21	5	11	5	0	1	46	26	264
10:30 am	11:30 am	16	1	78	49	21	4	12	3	0	1	49	28	262
10:45 am	11:45 am	12	1	71	49	17	4	12	5	0	2	46	28	247
11:00 am	12:00 pm	12	1	71	38	17	7	16	5	0	1	43	30	241
11:15 am	12:15 pm	15	1	73	46	19	10	14	6	0	1	35	34	254
11:30 am	12:30 pm	16	2	73	40	19	10	10	6	0	1	28	28	233
11:45 am	12:45 pm	17	2	66	40	15	9	13	6	1	0	28	32	229
12:00 pm	1:00 pm	19	2	61	36	13	11	9	7	1	1	22	28	210
12:15 pm	1:15 pm	13	3	57	28	11	11	12	6	1	1	24	24	191
12:30 pm	1:30 pm	12	2	49	33	17	13	14	5	1	1	27	28	202
12:45 pm	1:45 pm	10	3	52	33	24	12	10	3	0	2	35	18	202
1:00 pm	2:00 pm	6	3	52	34	31	9	10	1	1	1	40	21	209
Peak Hour Volume		17	2	86	52	22	8	11	6	0	2	43	24	273
Per Cent of Approach		16%	2%	82%	63%	27%	10%	65%	35%	0%	3%	62%	35%	
Peak Hour Factor:		0.61	0.5	0.83	0.65	0.61	0.67	0.69	0.5	0	0.5	0.77	0.75	0.93
Total Arrivals			105			82			17			69		
Total Departures			82			140			12			39		
Total			187			222			29			108		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Kaonoulu Street at Alulike Street
DAY & DATE: Thursday, February 25, 2010
START TIME: 6:30 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:30 am	6	0	2	0	9	0	1	0	4	1	13	1	37
2	6:45 am	9	1	0	0	6	0	0	1	2	1	10	5	35
3	7:00 am	7	0	0	1	10	1	2	0	2	1	9	3	36
4	7:15 am	9	0	1	1	11	2	0	0	3	2	13	2	44
5	7:30 am	6	0	1	1	14	0	1	0	2	4	17	1	47
6	7:45 am	9	0	0	0	12	0	0	0	2	4	18	9	54
7	8:00 am	9	0	1	0	14	2	1	0	2	3	18	5	55
8	8:15 am	7	0	0	1	6	0	2	1	4	0	13	6	40
9	8:30 am	8	0	1	0	4	2	1	1	1	5	12	4	39
10	8:45 am	11	0	0	1	12	1	0	1	3	0	18	3	50
	Maximum:	9	0	1	1	14	2	1	0	3	4	18	9	55

Hourly Volume of Each Movement

6:30 am	7:30 am	31	1	3	2	36	3	3	1	11	5	45	11	152
6:45 am	7:45 am	31	1	2	3	41	3	3	1	9	8	49	11	162
7:00 am	8:00 am	31	0	2	3	47	3	3	0	9	11	57	15	181
7:15 am	8:15 am	33	0	3	2	51	4	2	0	9	13	66	17	200
7:30 am	8:30 am	31	0	2	2	46	2	4	1	10	11	66	21	196
7:45 am	8:45 am	33	0	2	1	36	4	4	2	9	12	61	24	188
8:00 am	9:00 am	35	0	2	2	36	5	4	3	10	8	61	18	184
Maximum Volume		33	0	3	2	51	4	2	0	9	13	66	17	200
Per Cent of Approach		92%	0%	8%	4%	89%	7%	18%	0%	82%	14%	69%	18%	
Peak Hour Factor:		0.92	0	0.75	0.5	0.91	0.5	0.5	0	0.75	0.81	0.92	0.47	0.91
Total Arrivals			36			57			11			96		
Total Departures			19			71			17			93		
Total			55			128			28			189		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	Kaonoulu Street at Alulike Street
DAY & DATE:	Thursday, February 25
START TIME:	3:00 pm
END TIME:	6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	9	0	1	0	14	1	0	2	5	1	22	13	68
2	3:15 pm	8	1	0	1	13	1	0	0	4	6	15	7	56
3	3:30 pm	6	0	0	0	11	3	0	0	2	3	14	6	45
4	3:45 pm	11	0	0	1	6	1	2	0	2	2	11	12	48
5	4:00 pm	7	0	0	0	21	1	0	0	0	7	16	14	66
6	4:15 pm	11	0	1	1	15	0	0	1	2	2	24	17	74
7	4:30 pm	5	1	1	4	8	0	0	0	1	5	22	15	62
8	4:45 pm	7	0	1	1	12	1	2	0	0	2	29	15	70
9	5:00 pm	8	1	1	0	13	0	0	0	3	1	16	16	59
10	5:15 pm	7	0	0	0	6	0	0	0	2	7	15	13	50
11	5:30 pm	8	0	0	1	4	0	1	0	1	6	15	11	47
12	5:45 pm	11	0	0	3	13	2	1	0	2	2	19	12	65
	Maximum:	11	1	1	4	21	1	2	1	2	7	29	17	74

Hourly Volume of Each Movement

3:00 pm	4:00 pm	34	1	1	2	44	6	2	2	13	12	62	38	217
3:15 pm	4:15 pm	32	1	0	2	51	6	2	0	8	18	56	39	215
3:30 pm	4:30 pm	35	0	1	2	53	5	2	1	6	14	65	49	233
3:45 pm	4:45 pm	34	1	2	6	50	2	2	1	5	16	73	58	250
4:00 pm	5:00 pm	30	1	3	6	56	2	2	1	3	16	91	61	272
4:15 pm	5:15 pm	31	2	4	6	48	1	2	1	6	10	91	63	265
4:30 pm	5:30 pm	27	2	3	5	39	1	2	0	6	15	82	59	241
4:45 pm	5:45 pm	30	1	2	2	35	1	3	0	6	16	75	55	226
5:00 pm	6:00 pm	34	1	1	4	36	2	2	0	8	16	65	52	221
Maximum Volume		30	1	3	6	56	2	2	1	3	16	91	61	272
Per Cent of Approach		88%	3%	9%	9%	88%	3%	33%	17%	50%	10%	54%	36%	1
Peak Hour Factor:		0.68	0.25	0.75	0.38	0.67	0.5	0.25	0.25	0.38	0.57	0.78	0.9	0.92

	North	East	South	West
Total Arrivals	34	64	6	168
Total Departures	68	96	19	89
Total	102	160	25	257

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Kaonoulu Street at Alulike Street
DAY & DATE: Saturday
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	14	1	0	5	8	0	3	0	2	2	24	9	68
2	10:15 am	17	2	0	4	4	0	2	0	0	2	14	10	55
3	10:30 am	5	0	1	1	12	0	0	0	2	2	8	13	44
4	10:45 am	12	0	0	1	13	0	0	1	0	3	19	12	61
5	11:00 am	7	1	1	2	8	2	2	3	0	4	23	11	64
6	11:15 am	10	0	1	1	10	0	1	1	2	1	23	8	58
7	11:30 am	10	1	3	0	9	0	3	0	1	1	13	14	55
8	11:45 am	16	1	2	5	10	4	1	0	2	4	12	12	69
9	12:00 pm	10	0	1	1	12	0	2	0	1	3	15	11	56
10	12:15 pm	5	0	1	2	12	0	0	0	1	2	22	13	58
11	12:30 pm	6	1	1	1	7	1	1	0	1	0	22	12	53
12	12:45 pm	7	1	3	3	8	0	0	0	2	3	20	7	54
13	1:00 pm	14	0	7	2	11	2	0	0	2	2	22	16	78
14	1:15 pm	12	0	0	1	6	0	0	1	2	3	20	7	52
15	1:30 pm	5	1	3	0	5	1	1	1	1	3	10	11	42
16	1:45 pm	4	0	0	1	12	1	1	0	2	7	18	10	56
	Maximum:	16	1	3	5	10	4	3	3	2	4	23	14	69

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
10:00 am	11:00 am	48	3	1	11	37	0	5	1	4	9	65	44	228
10:15 am	11:15 am	41	3	2	8	37	2	4	4	2	11	64	46	224
10:30 am	11:30 am	34	1	3	5	43	2	3	5	4	10	73	44	227
10:45 am	11:45 am	39	2	5	4	40	2	6	5	3	9	78	45	238
11:00 am	12:00 pm	43	3	7	8	37	6	7	4	5	10	71	45	246
11:15 am	12:15 pm	46	2	7	7	41	4	7	1	6	9	63	45	238
11:30 am	12:30 pm	41	2	7	8	43	4	6	0	5	10	62	50	238
11:45 am	12:45 pm	37	2	5	9	41	5	4	0	5	9	71	48	236
12:00 pm	1:00 pm	28	2	6	7	39	1	3	0	5	8	79	43	221
12:15 pm	1:15 pm	32	2	12	8	38	3	1	0	6	7	86	48	243
12:30 pm	1:30 pm	39	2	11	7	32	3	1	1	7	8	84	42	237
12:45 pm	1:45 pm	38	2	13	6	30	3	1	2	7	11	72	41	226
1:00 pm	2:00 pm	35	1	10	4	34	4	2	2	7	15	70	44	228
Peak Hour Volume		43	3	7	8	37	6	7	4	5	10	71	45	246
Per Cent of Approach		81%	6%	13%	16%	73%	12%	44%	25%	31%	8%	56%	36%	
Peak Hour Factor:		0.67	0.75	0.58	0.4	0.93	0.38	0.58	0.33	0.63	0.63	0.77	0.8	0.89

	North	East	South	West
Total Arrivals	53	51	16	126
Total Departures	57	85	19	85
Total	110	136	35	211

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT:	Piilani Promenade 2013
INTERSECTION:	Piilani Highway at Piikea Avenue
DAY & DATE:	Tuesday, October 15, 2013
START TIME:	6:30 am
END TIME:	8:30 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:30 am	55	272						186	10	39		42	604
2	6:45 am	58	211						162	22	33		43	529
3	7:00 am	75	326						273	23	40		58	795
4	7:15 am	94	345						282	25	46		53	845
5	7:30 am	105	487						237	23	41		78	971
6	7:45 am	84	321						216	30	53		71	775
7	8:00 am	81	336						220	38	43		64	782
8	8:15 am	74	322						259	62	58		47	822
9														
10														
	Maximum:	105	487						282	30	53		78	971

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
6:30 am	7:30 am	282	1154	0	0	0	0	0	903	80	158	0	196	2773
6:45 am	7:45 am	332	1369	0	0	0	0	0	954	93	160	0	232	3140
7:00 am	8:00 am	358	1479	0	0	0	0	0	1008	101	180	0	260	3386
7:15 am	8:15 am	364	1489	0	0	0	0	0	955	116	183	0	266	3373
7:30 am	8:30 am	344	1466	0	0	0	0	0	932	153	195	0	260	3350
7:45 am	8:45 am	239	979	0	0	0	0	0	695	130	154	0	182	2379
8:00 am	9:00 am	155	658	0	0	0	0	0	479	100	101	0	111	1604
Maximum Volume		358	1479	0	0	0	0	0	1008	101	180	0	260	3386
Per Cent of Approach		19%	81%	0%	0%	0%	0%	0%	91%	9%	41%	0%	59%	
Peak Hour Factor:		0.85	0.76	0	0	0	0	0	0.89	0.84	0.85	0	0.83	0.87
Total Arrivals			1837			0			1109			440		
Total Departures			1268			0			1659			459		
Total			3105			0			2768			899		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Piikea Avenue
DAY & DATE: Tuesday, October 15, 2013
START TIME: 3:00 pm
END TIME: 6:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
		Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:00 pm	102	323						355	60	68		75	983
2	3:15 pm	88	264						305	59	48		56	820
3	3:30 pm	115	356						418	71	89		88	1137
4	3:45 pm	62	235						303	54	46		39	739
5	4:00 pm	93	294						355	50	59		76	927
6	4:15 pm	88	289						265	57	57		57	813
7	4:30 pm	91	299						325	54	51		66	886
8	4:45 pm	77	286						279	59	60		55	816
9	5:00 pm													0
10	5:15 pm													0
11	5:30 pm													0
12	5:45 pm													0
	Maximum:	115	356						418	71	89		88	1137

Hourly Volume of Each Movement

		1	2	3	4	5	6	7	8	9	10	11	12	Totals
3:00 pm	4:00 pm	367	1178	0	0	0	0	0	1381	244	251	0	258	3679
3:15 pm	4:15 pm	358	1149	0	0	0	0	0	1381	234	242	0	259	3623
3:30 pm	4:30 pm	358	1174	0	0	0	0	0	1341	232	251	0	260	3616
3:45 pm	4:45 pm	334	1117	0	0	0	0	0	1248	215	213	0	238	3365
4:00 pm	5:00 pm	349	1168	0	0	0	0	0	1224	220	227	0	254	3442
4:15 pm	5:15 pm	256	874	0	0	0	0	0	869	170	168	0	178	2515
4:30 pm	5:30 pm	168	585	0	0	0	0	0	604	113	111	0	121	1702
4:45 pm	5:45 pm													
5:00 pm	6:00 pm													
Maximum Volume		367	1178	0	0	0	0	0	1381	244	251	0	258	3679
Per Cent of Approach		24%	76%	0%	0%	0%	0%	0%	85%	15%	49%	0%	51%	1
Peak Hour Factor:		0.8	0.83	0	0	0	0	0	0.83	0.86	0.71	0	0.73	0.81
Total Arrivals			1545			0			1625			509		
Total Departures			1639			0			1429			611		
Total			3184			0			3054			1120		

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Piilani Promenade 2013
INTERSECTION: Piilani Highway at Piikea Avenue
DAY & DATE: Saturday, November 23, 2013
START TIME: 10:00 am
END TIME: 2:00 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	10:00 am	58	185						227	43	47		69	629
2	10:15 am	94	213						228	57	46		75	713
3	10:30 am	57	191						202	43	57		65	615
4	10:45 am	98	216						186	46	58		66	670
5	11:00 am	107	273						302	68	94		88	932
6	11:15 am	54	147						160	28	31		42	462
7	11:30 am	68	228						237	53	63		68	717
8	11:45 am	102	228						267	59	64		75	795
9	12:00 pm	73	206						237	54	54		78	702
10	12:15 pm	82	194						236	44	51		64	671
11	12:30 pm	93	253						228	48	62		75	759
12	12:45 pm	90	213						196	60	54		66	679
13	1:00 pm	80	239						220	50	81		65	735
14	1:15 pm	91	241						254	54	56		56	752
15	1:30 pm	69	267						228	44	65		69	742
16	1:45 pm	80	262						261	42	68		68	781
	Maximum:	107	273						302	68	94		88	932

Hourly Volume of Each Movement

10:00 am	11:00 am	307	805	0	0	0	0	0	843	189	208	0	275	2627
10:15 am	11:15 am	356	893	0	0	0	0	0	918	214	255	0	294	2930
10:30 am	11:30 am	316	827	0	0	0	0	0	850	185	240	0	261	2679
10:45 am	11:45 am	327	864	0	0	0	0	0	885	195	246	0	264	2781
11:00 am	12:00 pm	331	876	0	0	0	0	0	966	208	252	0	273	2906
11:15 am	12:15 pm	297	809	0	0	0	0	0	901	194	212	0	263	2676
11:30 am	12:30 pm	325	856	0	0	0	0	0	977	210	232	0	285	2885
11:45 am	12:45 pm	350	881	0	0	0	0	0	968	205	231	0	292	2927
12:00 pm	1:00 pm	338	866	0	0	0	0	0	897	206	221	0	283	2811
12:15 pm	1:15 pm	345	899	0	0	0	0	0	880	202	248	0	270	2844
12:30 pm	1:30 pm	354	946	0	0	0	0	0	898	212	253	0	262	2925
12:45 pm	1:45 pm	330	960	0	0	0	0	0	898	208	256	0	256	2908
1:00 pm	2:00 pm	320	1009	0	0	0	0	0	963	190	270	0	258	3010
Peak Hour Volume		356	893	0	0	0	0	0	918	214	255	0	294	2930
Per Cent of Approach		29%	71%	0%	0%	0%	0%	0%	81%	19%	46%	0%	54%	
Peak Hour Factor:		0.83	0.82	0	0	0	0	0	0.76	0.79	0.68	0	0.84	0.79
Total Arrivals			1249			0			1132			549		
Total Departures			1212			0			1148			570		
Total			2461			0			2280			1119		

Appendix B
Level-of-Service Worksheets for Existing (2013) Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1826	1583		1789	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1826	1583		1789	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	77	88	79	210	40	177	25	1011	40	167	1363	44
Peak-hour factor, PHF	0.84	0.65	0.62	0.81	0.71	0.87	0.69	0.76	0.83	0.82	0.78	0.69
Adj. Flow (vph)	92	135	127	259	56	203	36	1330	48	204	1747	64
RTOR Reduction (vph)	0	0	109	0	0	169	0	0	21	0	0	20
Lane Group Flow (vph)	0	227	18	0	315	34	36	1330	27	204	1747	44
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		16.6	16.6		20.0	20.0	6.0	53.6	53.6	14.8	62.4	62.4
Effective Green, g (s)		17.6	17.6		21.0	21.0	7.0	54.6	54.6	15.8	63.4	63.4
Actuated g/C Ratio		0.14	0.14		0.17	0.17	0.06	0.44	0.44	0.13	0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		257	223		301	266	99	1546	691	224	1795	803
v/s Ratio Prot		c0.12			c0.18		0.02	0.38		c0.12	c0.49	
v/s Ratio Perm			0.08			0.13			0.03			0.04
v/c Ratio		0.88	0.08		1.05	0.13	0.36	0.86	0.04	0.91	0.97	0.06
Uniform Delay, d1		52.7	46.7		52.0	44.2	56.9	31.8	20.2	53.9	30.0	15.6
Progression Factor		1.00	1.00		1.00	1.00	1.06	0.80	0.64	1.22	0.74	0.16
Incremental Delay, d2		27.9	0.2		64.6	0.2	0.8	6.1	0.1	34.2	15.0	0.1
Delay (s)		80.6	46.8		116.6	44.4	61.1	31.7	13.0	100.0	37.3	2.6
Level of Service		F	D		F	D	E	C	B	F	D	A
Approach Delay (s)		68.5			88.3			31.8			42.5	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM Average Control Delay	46.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1782	1583		1802	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.60	1.00		0.50	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1112	1583		931	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	138	10	106	53	26	84	17	1227	46	29	1177	21
Peak-hour factor, PHF	0.80	0.54	0.60	0.70	0.72	0.84	0.85	0.86	0.77	0.60	0.87	0.88
Adj. Flow (vph)	172	19	177	76	36	100	20	1427	60	48	1353	24
RTOR Reduction (vph)	0	0	142	0	0	80	0	0	22	0	0	8
Lane Group Flow (vph)	0	191	35	0	112	20	20	1427	38	48	1353	16
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		23.7	23.7		23.7	23.7	4.0	78.3	78.3	8.0	82.3	82.3
Effective Green, g (s)		24.7	24.7		24.7	24.7	5.0	79.3	79.3	9.0	83.3	83.3
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.04	0.63	0.63	0.07	0.67	0.67
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		220	313		184	313	71	2245	1004	127	2358	1055
v/s Ratio Prot							0.01	c0.40		c0.03	c0.38	
v/s Ratio Perm		c0.17	0.11		0.12	0.06			0.04			0.02
v/c Ratio		0.87	0.11		0.61	0.06	0.28	0.64	0.04	0.38	0.57	0.02
Uniform Delay, d1		48.6	41.1		45.7	40.7	58.3	14.0	8.6	55.3	11.3	7.0
Progression Factor		1.00	1.00		1.00	1.00	0.54	2.11	4.97	0.80	1.97	1.84
Incremental Delay, d2		29.1	0.2		6.5	0.1	0.4	0.8	0.0	0.6	0.9	0.0
Delay (s)		77.6	41.4		52.2	40.9	31.8	30.3	42.6	45.1	23.1	12.9
Level of Service		E	D		D	D	C	C	D	D	C	B
Approach Delay (s)		60.2			46.9			30.8			23.7	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1723	2787		1764		3433	3533		1770	3539	1583
Flt Permitted	0.95	0.97	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1723	2787		1764		3433	3533		1770	3539	1583
Volume (vph)	191	20	298	14	2	4	341	1097	8	3	993	110
Peak-hour factor, PHF	0.73	0.25	0.86	0.70	0.50	1.00	0.66	0.85	0.50	0.38	0.90	0.95
Adj. Flow (vph)	262	80	347	20	4	4	517	1291	16	8	1103	116
RTOR Reduction (vph)	0	0	113	0	4	0	0	1	0	0	0	54
Lane Group Flow (vph)	167	175	234	0	24	0	517	1306	0	8	1103	62
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	15.6	15.6	47.5		3.6		25.9	83.0		0.8	57.4	57.4
Effective Green, g (s)	17.6	17.6	48.0		5.6		26.4	85.0		0.8	59.4	59.4
Actuated g/C Ratio	0.14	0.14	0.38		0.04		0.21	0.68		0.01	0.48	0.48
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	237	243	1070		79		725	2402		11	1682	752
v/s Ratio Prot	0.10	c0.10			c0.02		c0.15	0.37		0.00	c0.31	
v/s Ratio Perm			0.12									0.07
v/c Ratio	0.70	0.72	0.22		0.31		0.71	0.54		0.73	0.66	0.08
Uniform Delay, d1	51.2	51.3	25.9		57.8		45.8	10.2		62.0	25.0	17.9
Progression Factor	1.21	1.21	1.03		1.00		0.84	1.82		1.00	1.00	1.00
Incremental Delay, d2	9.1	10.0	0.1		2.2		2.7	0.7		110.3	2.0	0.2
Delay (s)	70.8	72.0	26.7		60.0		41.2	19.2		172.3	27.0	18.1
Level of Service	E	E	C		E		D	B		F	C	B
Approach Delay (s)		48.9			60.0			25.4			27.1	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	282	182	81	398	390	165
Peak-hour factor, PHF	0.85	0.84	0.92	0.85	0.91	0.79
Adj. Flow (vph)	332	217	88	468	429	209
RTOR Reduction (vph)	0	75	0	0	0	0
Lane Group Flow (vph)	332	142	88	468	429	209
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	80.1	80.1	10.5	94.6	19.4	125.0
Effective Green, g (s)	81.6	81.6	10.5	96.1	20.9	125.0
Actuated g/C Ratio	0.65	0.65	0.08	0.77	0.17	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	1216	1033	149	2721	574	1583
v/s Ratio Prot	c0.18		c0.05	0.13	c0.12	
v/s Ratio Perm		0.14				0.13
v/c Ratio	0.27	0.14	0.59	0.17	0.75	0.13
Uniform Delay, d1	9.2	8.3	55.2	3.8	49.5	0.0
Progression Factor	1.00	1.00	0.97	0.31	1.00	1.00
Incremental Delay, d2	0.6	0.3	3.7	0.1	4.6	0.0
Delay (s)	9.7	8.6	57.3	1.3	54.2	0.0
Level of Service	A	A	E	A	D	A
Approach Delay (s)	9.3			10.2	36.4	
Approach LOS	A			B	D	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.12	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	217	3539	3539	1583
Volume (vph)	259	180	101	1008	1479	358
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	282	196	110	1096	1608	389
RTOR Reduction (vph)	0	48	0	0	0	96
Lane Group Flow (vph)	282	148	110	1096	1608	293
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	22.9	22.9	94.1	94.1	94.1	94.1
Effective Green, g (s)	22.9	22.9	94.1	94.1	94.1	94.1
Actuated g/C Ratio	0.18	0.18	0.75	0.75	0.75	0.75
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	324	290	163	2664	2664	1192
v/s Ratio Prot	c0.16			0.31	0.45	
v/s Ratio Perm		0.12	c0.51			0.25
v/c Ratio	0.87	0.51	0.67	0.41	0.60	0.25
Uniform Delay, d1	49.6	46.0	7.8	5.5	7.0	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.62	6.60
Incremental Delay, d2	21.6	1.4	20.1	0.5	0.7	0.3
Delay (s)	71.2	47.4	27.9	6.0	12.0	31.3
Level of Service	E	D	C	A	B	C
Approach Delay (s)	61.4			8.0	15.8	
Approach LOS	E			A	B	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	88	79	40	177	25	1011	40	167	1363	44
Lane Group Flow (vph)	227	127	315	203	36	1330	48	204	1747	64
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	22.0	22.0
Minimum Split (s)	22.0	22.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (s)	22.0	22.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (%)	17.6%	17.6%	20.0%	20.0%	14.4%	46.4%	46.4%	16.0%	48.0%	48.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.88	0.38	1.05	0.47	0.23	0.86	0.07	0.91	0.94	0.08
Control Delay	82.2	11.5	114.7	9.8	58.8	32.4	5.6	101.0	33.8	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	11.5	114.7	9.8	58.8	32.4	5.6	101.0	33.8	1.5
Queue Length 50th (ft)	182	0	~277	0	28	394	1	148	~813	5
Queue Length 95th (ft)	188	9	#310	60	m46	370	m14	#272	451	3
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	263	337	301	435	198	1544	712	227	1850	847
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.38	1.05	0.47	0.18	0.86	0.07	0.90	0.94	0.08

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 145

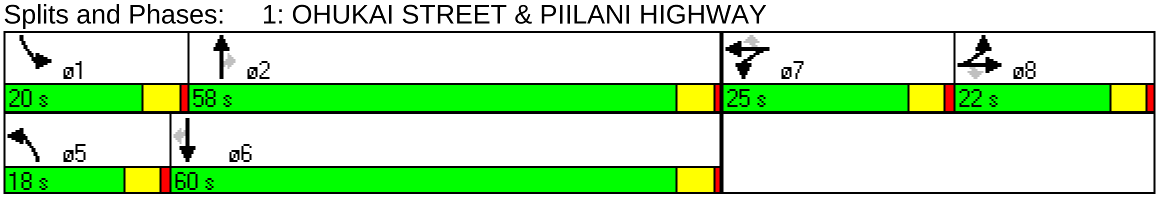
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	10	106	53	26	84	17	1227	46	29	1177	21
Lane Group Flow (vph)	0	191	177	0	112	100	20	1427	60	48	1353	24
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0	25.0	10.0	25.0	25.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	12.0%	64.0%	64.0%	12.0%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio		0.86	0.39		0.58	0.26	0.13	0.63	0.06	0.31	0.55	0.02
Control Delay		74.8	8.3		56.4	9.3	29.5	31.9	12.3	47.9	22.9	6.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		74.8	8.3		56.4	9.3	29.5	31.9	12.3	47.9	22.9	6.7
Queue Length 50th (ft)		149	0		82	0	15	490	16	33	508	5
Queue Length 95th (ft)		129	0		113	39	m16	557	m23	44	645	m12
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		234	469		203	408	156	2275	1039	156	2444	1101
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.82	0.38		0.55	0.25	0.13	0.63	0.06	0.31	0.55	0.02

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 50 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 125

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	191	20	298	2	341	1097	3	993	110
Lane Group Flow (vph)	167	175	347	28	517	1307	8	1103	116
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	4.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	14.5	26.0	8.0	26.0	26.0
Total Split (s)	23.0	23.0	61.5	12.0	38.5	82.0	8.0	51.5	51.5
Total Split (%)	18.4%	18.4%	49.2%	9.6%	30.8%	65.6%	6.4%	41.2%	41.2%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.71	0.72	0.29	0.24	0.71	0.51	0.14	0.63	0.14
Control Delay	74.1	74.8	11.9	54.9	39.8	16.9	64.3	27.8	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.1	74.8	11.9	54.9	39.8	16.9	64.3	27.8	6.3
Queue Length 50th (ft)	144	151	34	19	226	414	6	358	6
Queue Length 95th (ft)	178	61	73	27	177	503	11	508	46
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	256	262	1341	117	948	2562	57	1752	835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.67	0.26	0.24	0.55	0.51	0.14	0.63	0.14

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 40 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 75

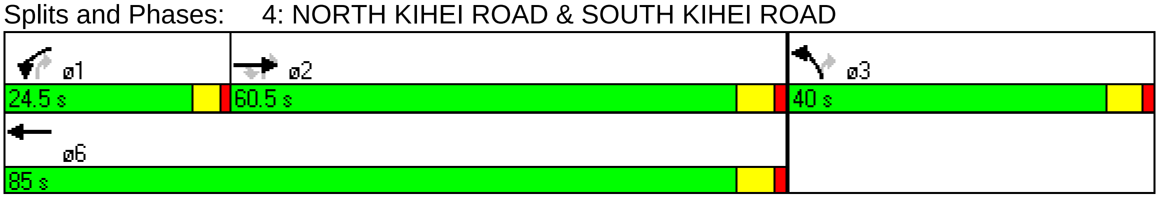
Control Type: Actuated-Coordinated

Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	282	182	81	398	390	165
Lane Group Flow (vph)	332	217	88	468	429	209
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	15.5	15.5	9.0	15.5	12.5	
Total Split (s)	60.5	60.5	24.5	85.0	40.0	125.0
Total Split (%)	48.4%	48.4%	19.6%	68.0%	32.0%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	Min	C-Min	Min	
v/c Ratio	0.27	0.20	0.59	0.17	0.75	0.13
Control Delay	11.1	1.9	55.2	1.4	50.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	1.9	55.2	1.4	50.5	0.2
Queue Length 50th (ft)	104	0	75	10	173	0
Queue Length 95th (ft)	179	26	131	24	217	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1216	1109	290	2722	989	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.20	0.30	0.17	0.43	0.13

Intersection Summary
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 30 (24%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	259	180	101	1008	1479	358
Lane Group Flow (vph)	282	196	110	1096	1608	389
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	29.0	29.0	96.0	96.0	96.0	96.0
Total Split (%)	23.2%	23.2%	76.8%	76.8%	76.8%	76.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.87	0.58	0.70	0.41	0.60	0.30
Control Delay	66.4	37.6	36.1	6.3	12.7	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.4	37.6	36.1	6.3	12.7	3.5
Queue Length 50th (ft)	219	99	43	156	443	55
Queue Length 95th (ft)	#353	180	#178	190	m465	m75
Internal Link Dist (ft)	682			1061	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	354	364	158	2666	2666	1288
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.54	0.70	0.41	0.60	0.30

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 16 (13%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	31	181	68	1122	1520	19
Peak Hour Factor	0.52	0.59	0.68	0.74	0.84	0.68
Hourly flow rate (vph)	60	307	100	1516	1810	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	3					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2768	905	1837			
vC1, stage 1 conf vol	1810					
vC2, stage 2 conf vol	958					
vCu, unblocked vol	2768	905	1837			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	0	69			
cM capacity (veh/h)	109	279	328			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	60	307	100	758	758	905	905	28
Volume Left	60	0	100	0	0	0	0	0
Volume Right	0	307	0	0	0	0	0	28
cSH	109	279	328	1700	1700	1700	1700	1700
Volume to Capacity	0.55	1.10	0.31	0.45	0.45	0.53	0.53	0.02
Queue Length 95th (ft)	64	314	32	0	0	0	0	0
Control Delay (s)	72.3	122.6	20.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	C					
Approach Delay (s)	114.4		1.3			0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	11.5		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	68	28	495	59	8	359
Peak Hour Factor	0.77	0.78	0.78	0.92	0.50	0.91
Hourly flow rate (vph)	88	36	635	64	16	395
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1093	667			699	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1093	667			699	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	62	92			98	
cM capacity (veh/h)	233	459			898	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	88	36	699	411
Volume Left	88	0	0	16
Volume Right	0	36	64	0
cSH	233	459	1700	898
Volume to Capacity	0.38	0.08	0.41	0.02
Queue Length 95th (ft)	42	6	0	1
Control Delay (s)	29.6	13.5	0.0	0.6
Lane LOS	D	B		A
Approach Delay (s)	25.0		0.0	0.6
Approach LOS	C			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	49	124	31	1297	1826	36
Peak Hour Factor	0.72	0.84	0.43	0.89	0.89	0.64
Hourly flow rate (vph)	68	148	72	1457	2052	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2925	1026	2108			
vC1, stage 1 conf vol	2052					
vC2, stage 2 conf vol	873					
vCu, unblocked vol	2925	1026	2108			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	13	36	72			
cM capacity (veh/h)	78	232	257			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	68	148	72	729	729	1026	1026	56
Volume Left	68	0	72	0	0	0	0	0
Volume Right	0	148	0	0	0	0	0	56
cSH	78	232	257	1700	1700	1700	1700	1700
Volume to Capacity	0.87	0.64	0.28	0.43	0.43	0.60	0.60	0.03
Queue Length 95th (ft)	111	96	28	0	0	0	0	0
Control Delay (s)	159.2	44.2	24.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	E	C					
Approach Delay (s)	80.5		1.2			0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	49	2	9	26	52	0	1	37	152	1	14
Peak Hour Factor	0.64	0.68	0.25	0.45	0.72	0.65	0.42	0.25	0.58	0.81	0.25	0.70
Hourly flow rate (vph)	36	72	8	20	36	80	0	4	64	188	4	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	116			80			246	304	76	326	268	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	116			80			246	304	76	326	268	76
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	99	94	67	99	98
cM capacity (veh/h)	1473			1518			670	586	985	567	614	985

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	36	80	20	116	0	68	188	24
Volume Left	36	0	20	0	0	0	188	0
Volume Right	0	8	0	80	0	64	0	20
cSH	1473	1700	1518	1700	1700	947	567	895
Volume to Capacity	0.02	0.05	0.01	0.07	0.00	0.07	0.33	0.03
Queue Length 95th (ft)	2	0	1	0	0	6	36	2
Control Delay (s)	7.5	0.0	7.4	0.0	0.0	9.1	14.5	9.1
Lane LOS	A		A		A	A	B	A
Approach Delay (s)	2.3		1.1		9.1		13.9	
Approach LOS					A		B	

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	66	13	4	51	2	9	0	2	3	0	33
Peak Hour Factor	0.47	0.92	0.65	0.50	0.91	0.50	0.56	0.25	0.25	0.38	0.25	0.75
Hourly flow rate (vph)	36	72	20	8	56	4	16	0	8	8	0	44
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	60			92			270	230	82	226	238	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	60			92			270	230	82	226	238	58
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	100	99	99	100	96
cM capacity (veh/h)	1543			1503			638	651	978	707	644	1008

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	36	92	8	60	24	52
Volume Left	36	0	8	0	16	8
Volume Right	0	20	0	4	8	44
cSH	1543	1700	1503	1700	722	947
Volume to Capacity	0.02	0.05	0.01	0.04	0.03	0.05
Queue Length 95th (ft)	2	0	0	0	3	4
Control Delay (s)	7.4	0.0	7.4	0.0	10.2	9.0
Lane LOS	A		A		B	A
Approach Delay (s)	2.1		0.9		10.2	9.0
Approach LOS					B	A

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1816	1583		1797	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1816	1583		1797	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	88	76	81	204	66	168	104	1379	56	138	1272	56
Peak-hour factor, PHF	0.92	0.83	0.92	0.86	0.75	0.89	0.79	0.95	0.64	0.93	0.88	0.64
Adj. Flow (vph)	96	92	88	237	88	189	132	1452	88	148	1445	88
RTOR Reduction (vph)	0	0	79	0	0	151	0	0	27	0	0	26
Lane Group Flow (vph)	0	188	9	0	325	38	132	1452	61	148	1445	62
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		15.0	15.0		28.9	28.9	15.0	69.6	69.6	16.5	71.1	71.1
Effective Green, g (s)		16.0	16.0		29.9	29.9	16.0	70.6	70.6	17.5	72.1	72.1
Actuated g/C Ratio		0.11	0.11		0.20	0.20	0.11	0.47	0.47	0.12	0.48	0.48
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.5	3.5		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		194	169		358	316	189	1666	745	207	1701	761
v/s Ratio Prot		c0.10			c0.18		0.07	c0.41		c0.08	0.41	
v/s Ratio Perm			0.06			0.12			0.06			0.06
v/c Ratio		0.97	0.06		0.91	0.12	0.70	0.87	0.08	0.71	0.85	0.08
Uniform Delay, d1		66.8	60.2		58.7	49.3	64.7	35.6	21.9	63.8	34.2	21.0
Progression Factor		1.00	1.00		1.00	1.00	0.93	1.17	1.38	1.32	0.60	0.12
Incremental Delay, d2		55.2	0.2		25.7	0.2	7.6	5.8	0.2	8.5	5.0	0.2
Delay (s)		122.0	60.4		84.4	49.4	67.9	47.4	30.3	92.9	25.5	2.7
Level of Service		F	E		F	D	E	D	C	F	C	A
Approach Delay (s)		102.3			71.5			48.1			30.2	
Approach LOS		F			E			D			C	

Intersection Summary			
HCM Average Control Delay	47.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1789	1583		1831	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.59	1.00		0.77	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1094	1583		1441	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	78	12	79	23	39	53	48	1424	94	80	1343	64
Peak-hour factor, PHF	0.85	0.60	0.79	0.72	0.65	0.83	0.86	0.93	0.87	0.83	0.96	0.80
Adj. Flow (vph)	92	20	100	32	60	64	56	1531	108	96	1399	80
RTOR Reduction (vph)	0	0	87	0	0	56	0	0	29	0	0	21
Lane Group Flow (vph)	0	112	13	0	92	8	56	1531	79	96	1399	59
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		18.8	18.8		18.8	18.8	8.5	104.9	104.9	12.3	108.7	108.7
Effective Green, g (s)		18.8	18.8		18.8	18.8	9.5	105.9	105.9	13.3	109.7	109.7
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.06	0.71	0.71	0.09	0.73	0.73
Clearance Time (s)		4.0	4.0		4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		137	198		181	198	112	2499	1118	157	2588	1158
v/s Ratio Prot							0.03	c0.43		c0.05	c0.40	
v/s Ratio Perm		c0.10	0.06		0.06	0.04			0.07			0.05
v/c Ratio		0.82	0.06		0.51	0.04	0.50	0.61	0.07	0.61	0.54	0.05
Uniform Delay, d1		63.9	57.8		61.3	57.7	68.0	11.4	6.8	65.9	9.0	5.6
Progression Factor		1.00	1.00		1.00	1.00	0.82	2.89	5.25	0.86	2.70	4.72
Incremental Delay, d2		30.0	0.1		2.2	0.1	1.9	0.6	0.1	4.4	0.5	0.1
Delay (s)		93.9	58.0		63.5	57.8	57.4	33.7	35.9	61.2	24.7	26.6
Level of Service		F	E		E	E	E	C	D	E	C	C
Approach Delay (s)		77.0			61.2			34.6			27.0	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	2787		1697		3433	3525		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	2787		1697		3433	3525		1770	3539	1583
Volume (vph)	359	9	196	33	12	44	376	1044	15	10	1125	179
Peak-hour factor, PHF	0.78	0.75	0.79	0.41	0.43	0.34	0.90	0.88	0.47	0.50	0.87	0.91
Adj. Flow (vph)	460	12	248	80	28	129	418	1186	32	20	1293	197
RTOR Reduction (vph)	0	0	207	0	29	0	0	1	0	0	0	73
Lane Group Flow (vph)	230	242	41	0	208	0	418	1217	0	20	1293	124
Turn Type	Split		Prot	Split			Prot			Prot		Perm
Protected Phases	8	8	8	7	7		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	22.9	22.9	22.9		19.9		20.1	82.2		3.0	64.6	64.6
Effective Green, g (s)	24.9	24.9	24.9		21.9		20.6	84.2		3.0	66.6	66.6
Actuated g/C Ratio	0.17	0.17	0.17		0.15		0.14	0.56		0.02	0.44	0.44
Clearance Time (s)	6.0	6.0	6.0		6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	279	280	463		248		471	1979		35	1571	703
v/s Ratio Prot	0.14	c0.14	0.09		c0.14		c0.12	0.35		0.01	c0.37	
v/s Ratio Perm												0.12
v/c Ratio	0.82	0.86	0.09		0.84		0.89	0.61		0.57	0.82	0.18
Uniform Delay, d1	60.4	60.9	52.9		62.3		63.6	22.0		72.9	36.5	25.1
Progression Factor	0.80	0.81	2.54		1.00		0.99	0.64		1.00	1.00	1.00
Incremental Delay, d2	16.8	22.1	0.1		21.2		14.8	1.2		13.2	5.0	0.5
Delay (s)	65.4	71.2	134.3		83.6		77.4	15.3		86.1	41.6	25.7
Level of Service	E	E	F		F		E	B		F	D	C
Approach Delay (s)		91.1			83.6			31.1			40.1	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM Average Control Delay	48.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	386	449	141	340	246	168
Peak-hour factor, PHF	0.80	0.94	0.84	0.89	0.83	0.89
Adj. Flow (vph)	482	478	168	382	296	189
RTOR Reduction (vph)	0	229	0	0	0	0
Lane Group Flow (vph)	482	249	168	382	296	189
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	76.4	76.4	19.1	99.5	39.5	150.0
Effective Green, g (s)	77.9	77.9	19.1	101.0	41.0	150.0
Actuated g/C Ratio	0.52	0.52	0.13	0.67	0.27	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	968	822	225	2383	938	1583
v/s Ratio Prot	0.26		c0.09	0.11	c0.09	
v/s Ratio Perm		0.30				0.12
v/c Ratio	0.50	0.30	0.75	0.16	0.32	0.12
Uniform Delay, d1	23.4	20.6	63.1	9.0	43.3	0.0
Progression Factor	1.00	1.00	1.55	0.34	1.00	1.00
Incremental Delay, d2	1.8	0.9	8.6	0.1	0.9	0.0
Delay (s)	25.2	21.5	106.2	3.1	44.2	0.0
Level of Service	C	C	F	A	D	A
Approach Delay (s)	23.4			34.6	27.0	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	352	3539	3539	1583
Volume (vph)	258	251	244	1381	1178	367
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	280	273	265	1501	1280	399
RTOR Reduction (vph)	0	107	0	0	0	85
Lane Group Flow (vph)	280	166	265	1501	1280	314
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	24.0	24.0	118.0	118.0	118.0	118.0
Effective Green, g (s)	24.0	24.0	118.0	118.0	118.0	118.0
Actuated g/C Ratio	0.16	0.16	0.79	0.79	0.79	0.79
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	283	253	277	2784	2784	1245
v/s Ratio Prot	0.16			0.42	0.36	
v/s Ratio Perm		0.17	c0.75			0.25
v/c Ratio	0.99	0.66	0.96	0.54	0.46	0.25
Uniform Delay, d1	62.9	59.1	13.8	5.9	5.3	4.3
Progression Factor	1.00	1.00	1.00	1.00	0.23	0.10
Incremental Delay, d2	50.9	12.6	44.0	0.8	0.4	0.4
Delay (s)	113.8	71.8	57.8	6.7	1.7	0.8
Level of Service	F	E	E	A	A	A
Approach Delay (s)	93.0			14.4	1.4	
Approach LOS	F			B	A	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	76	81	66	168	104	1379	56	138	1272	56
Lane Group Flow (vph)	188	88	325	189	132	1452	88	148	1445	88
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	20.0	20.0	35.0	35.0	30.0	65.0	65.0	30.0	65.0	65.0
Total Split (%)	13.3%	13.3%	23.3%	23.3%	20.0%	43.3%	43.3%	20.0%	43.3%	43.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.97	0.36	0.91	0.41	0.70	0.87	0.11	0.71	0.85	0.11
Control Delay	122.5	15.7	82.0	8.8	63.3	48.3	16.3	88.2	26.6	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.5	15.7	82.0	8.8	63.3	48.3	16.3	88.2	26.6	1.6
Queue Length 50th (ft)	186	0	311	0	129	713	27	126	768	9
Queue Length 95th (ft)	#305	55	345	64	m164	m#886	m38	228	#513	1
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	194	247	372	477	307	1666	772	307	1703	788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.36	0.87	0.40	0.43	0.87	0.11	0.48	0.85	0.11

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	12	79	23	39	53	48	1424	94	80	1343	64
Lane Group Flow (vph)	0	112	100	0	92	64	56	1531	108	96	1399	80
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	100.0	100.0	20.0	100.0	100.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	13.3%	66.7%	66.7%	13.3%	66.7%	66.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.76	0.35		0.45	0.25	0.44	0.61	0.09	0.61	0.54	0.07
Control Delay		72.8	11.6		62.4	13.2	56.1	37.6	11.3	62.5	28.2	8.4
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		72.8	11.6		62.4	13.2	56.1	37.6	11.3	62.5	28.2	8.4
Queue Length 50th (ft)		107	0		85	0	48	761	38	80	684	20
Queue Length 95th (ft)		108	36		97	35	m55	m866	m63	m103	818	m42
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		203	357		281	327	189	2497	1146	189	2611	1189
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.55	0.28		0.33	0.20	0.30	0.61	0.09	0.51	0.54	0.07

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	359	9	196	12	376	1044	10	1125	179
Lane Group Flow (vph)	230	242	248	237	418	1218	20	1293	197
Turn Type	Split		Prot		Prot		Prot		Perm
Protected Phases	8	8	8	7	5	2	1	6	
Permitted Phases									6
Detector Phases	8	8	8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0	7.0	5.0	5.0	20.0	5.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	11.0	22.5	26.0	9.0	33.0	33.0
Total Split (s)	30.0	30.0	30.0	27.0	26.0	84.0	9.0	67.0	67.0
Total Split (%)	20.0%	20.0%	20.0%	18.0%	17.3%	56.0%	6.0%	44.7%	44.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.82	0.86	0.37	0.86	0.89	0.60	0.34	0.82	0.25
Control Delay	67.3	71.0	16.5	75.4	74.5	15.3	86.4	42.9	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	71.0	16.5	75.4	74.5	15.3	86.4	42.9	10.4
Queue Length 50th (ft)	240	254	47	197	182	610	20	603	38
Queue Length 95th (ft)	295	295	72	110	#279	170	28	667	94
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	291	293	688	289	504	2016	59	1570	776
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.83	0.36	0.82	0.83	0.60	0.34	0.82	0.25

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

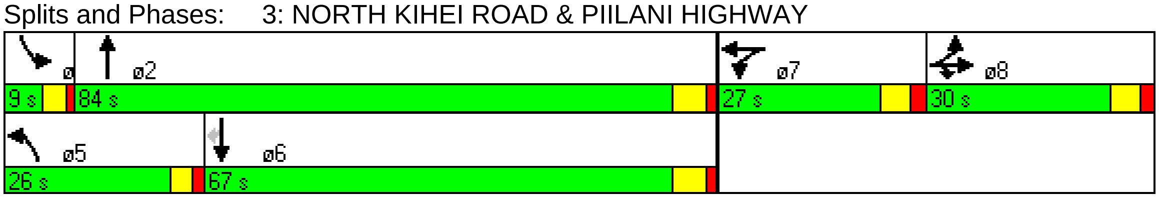
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	386	449	141	340	246	168
Lane Group Flow (vph)	482	478	168	382	296	189
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	4.0	4.0	5.0	4.0	4.0	
Minimum Split (s)	30.5	30.5	9.0	21.5	21.5	
Total Split (s)	71.5	71.5	33.5	105.0	45.0	150.0
Total Split (%)	47.7%	47.7%	22.3%	70.0%	30.0%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	Max	
v/c Ratio	0.50	0.45	0.74	0.16	0.32	0.12
Control Delay	26.4	3.3	100.2	3.2	44.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	3.3	100.2	3.2	44.5	0.2
Queue Length 50th (ft)	297	1	173	22	119	0
Queue Length 95th (ft)	370	61	m192	m23	148	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	967	1051	348	2383	938	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.45	0.48	0.16	0.32	0.12

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

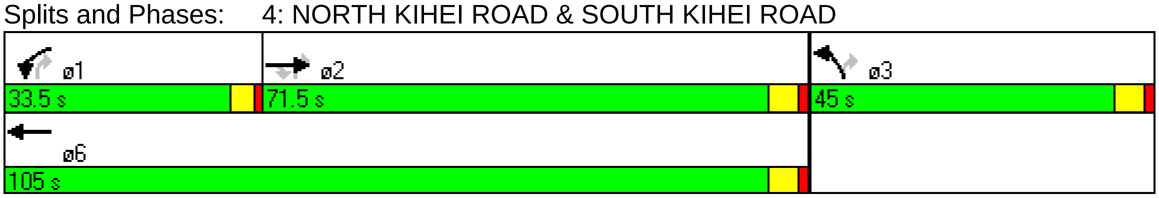
Offset: 30 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	258	251	244	1381	1178	367
Lane Group Flow (vph)	280	273	265	1501	1280	399
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	28.0	28.0	122.0	122.0	122.0	122.0
Total Split (%)	18.7%	18.7%	81.3%	81.3%	81.3%	81.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.99	0.76	0.96	0.54	0.46	0.30
Control Delay	112.7	46.1	61.3	6.8	1.7	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	112.7	46.1	61.3	6.8	1.7	0.5
Queue Length 50th (ft)	277	141	194	248	31	0
Queue Length 95th (ft)	#471	#258	#165	287	33	m0
Internal Link Dist (ft)	502			1044	1040	
Turn Bay Length (ft)						
Base Capacity (vph)	283	360	277	2784	2784	1330
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.76	0.96	0.54	0.46	0.30

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 16 (11%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	126	92	1536	1474	40
Peak Hour Factor	0.83	0.79	0.85	0.90	0.96	0.77
Hourly flow rate (vph)	24	159	108	1707	1535	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	3					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2605	768	1587			
vC1, stage 1 conf vol	1535					
vC2, stage 2 conf vol	1070					
vCu, unblocked vol	2605	768	1587			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	54	74			
cM capacity (veh/h)	140	344	410			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	159	108	853	853	768	768	52
Volume Left	24	0	108	0	0	0	0	0
Volume Right	0	159	0	0	0	0	0	52
cSH	140	344	410	1700	1700	1700	1700	1700
Volume to Capacity	0.17	0.46	0.26	0.50	0.50	0.45	0.45	0.03
Queue Length 95th (ft)	15	59	26	0	0	0	0	0
Control Delay (s)	36.0	24.2	16.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	C	C					
Approach Delay (s)	25.7		1.0			0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	49	24	501	125	46	497
Peak Hour Factor	0.82	0.86	0.91	0.95	0.68	0.83
Hourly flow rate (vph)	60	28	551	132	68	599
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1350	616			682	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1350	616			682	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	61	94			93	
cM capacity (veh/h)	153	490			911	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	60	28	682	666
Volume Left	60	0	0	68
Volume Right	0	28	132	0
cSH	153	490	1700	911
Volume to Capacity	0.39	0.06	0.40	0.07
Queue Length 95th (ft)	42	5	0	6
Control Delay (s)	42.7	12.8	0.0	1.9
Lane LOS	E	B		A
Approach Delay (s)	33.2		0.0	1.9
Approach LOS	D			

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	41	90	80	1686	1508	61
Peak Hour Factor	0.73	0.80	0.87	0.88	0.88	0.81
Hourly flow rate (vph)	56	112	92	1916	1714	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	3					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2855	857	1789			
vC1, stage 1 conf vol	1714					
vC2, stage 2 conf vol	1142					
vCu, unblocked vol	2855	857	1789			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	51	63	73			
cM capacity (veh/h)	116	301	342			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	56	112	92	958	958	857	857	75
Volume Left	56	0	92	0	0	0	0	0
Volume Right	0	112	0	0	0	0	0	75
cSH	116	301	342	1700	1700	1700	1700	1700
Volume to Capacity	0.49	0.37	0.27	0.56	0.56	0.50	0.50	0.04
Queue Length 95th (ft)	55	42	27	0	0	0	0	0
Control Delay (s)	62.5	24.0	19.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C	C					
Approach Delay (s)	36.8		0.9			0.0		
Approach LOS	E							

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	59	2	11	45	73	0	5	17	96	5	14
Peak Hour Factor	0.71	0.41	0.50	0.55	0.80	0.83	0.25	0.63	0.71	0.77	0.42	0.70
Hourly flow rate (vph)	52	144	4	20	56	88	0	8	24	125	12	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	144			148			372	434	146	416	392	100
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	144			148			372	434	146	416	392	100
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			100	98	97	75	98	98
cM capacity (veh/h)	1438			1434			541	489	901	506	517	955

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	52	148	20	144	0	32	125	32
Volume Left	52	0	20	0	0	0	125	0
Volume Right	0	4	0	88	0	24	0	20
cSH	1438	1700	1434	1700	1700	745	506	725
Volume to Capacity	0.04	0.09	0.01	0.08	0.00	0.04	0.25	0.04
Queue Length 95th (ft)	3	0	1	0	0	3	24	3
Control Delay (s)	7.6	0.0	7.5	0.0	0.0	10.0	14.4	10.2
Lane LOS	A		A		A	B	B	B
Approach Delay (s)	2.0		0.9		10.0		13.6	
Approach LOS					B		B	

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	61	91	16	2	56	6	3	1	2	3	1	30
Peak Hour Factor	0.90	0.78	0.57	0.25	0.67	0.38	0.25	0.26	0.25	0.75	0.25	0.68
Hourly flow rate (vph)	68	117	28	8	84	16	12	4	8	4	4	44
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	99			145			412	382	131	370	388	91
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	99			145			412	382	131	370	388	91
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			98	99	99	99	99	95
cM capacity (veh/h)	1493			1438			502	523	919	556	519	966

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	68	145	8	99	24	52
Volume Left	68	0	8	0	12	4
Volume Right	0	28	0	16	8	44
cSH	1493	1700	1438	1700	597	860
Volume to Capacity	0.05	0.09	0.01	0.06	0.04	0.06
Queue Length 95th (ft)	4	0	0	0	3	5
Control Delay (s)	7.5	0.0	7.5	0.0	11.3	9.5
Lane LOS	A		A		B	A
Approach Delay (s)	2.4		0.6		11.3	9.5
Approach LOS					B	A

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1799	1583		1809	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.97	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1799	1583		1809	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	145	45	137	67	62	37	38	893	102	95	943	58
Peak-hour factor, PHF	0.82	0.63	0.78	0.58	0.78	0.71	0.68	0.74	0.67	0.82	0.78	0.69
Adj. Flow (vph)	177	71	176	116	79	52	56	1207	152	116	1209	84
RTOR Reduction (vph)	0	0	148	0	0	44	0	0	96	0	0	49
Lane Group Flow (vph)	0	248	28	0	195	8	56	1207	56	116	1209	35
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		10.9	10.9		10.2	10.2	2.9	26.3	26.3	6.1	29.5	29.5
Effective Green, g (s)		11.9	11.9		11.2	11.2	3.9	27.3	27.3	7.1	30.5	30.5
Actuated g/C Ratio		0.16	0.16		0.15	0.15	0.05	0.37	0.37	0.10	0.41	0.41
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.5	3.5		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		291	256		276	241	94	1314	588	171	1469	657
v/s Ratio Prot		c0.14			c0.11		0.03	c0.34		c0.07	c0.34	
v/s Ratio Perm			0.11			0.03			0.10			0.05
v/c Ratio		0.85	0.11		0.71	0.03	0.60	0.92	0.10	0.68	0.82	0.05
Uniform Delay, d1		29.9	26.3		29.6	26.5	34.0	22.0	15.1	32.1	19.1	12.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		21.1	0.2		8.0	0.1	6.6	10.8	0.1	8.1	4.3	0.1
Delay (s)		51.1	26.5		37.6	26.6	40.6	32.9	15.2	40.2	23.4	12.9
Level of Service		D	C		D	C	D	C	B	D	C	B
Approach Delay (s)		40.9			35.3			31.3			24.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1792	1583		1819	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.71	1.00		0.80	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1331	1583		1491	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	60	10	56	33	36	39	25	1005	46	63	1197	49
Peak-hour factor, PHF	0.79	0.50	0.78	0.83	0.82	0.81	0.52	0.93	0.88	0.88	0.92	0.58
Adj. Flow (vph)	76	20	72	40	44	48	48	1081	52	72	1301	84
RTOR Reduction (vph)	0	0	62	0	0	42	0	0	21	0	0	32
Lane Group Flow (vph)	0	96	10	0	84	6	48	1081	31	72	1301	52
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		7.4	7.4		7.4	7.4	2.5	37.4	37.4	3.7	38.6	38.6
Effective Green, g (s)		8.4	8.4		8.4	8.4	3.5	38.4	38.4	4.7	39.6	39.6
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.06	0.60	0.60	0.07	0.62	0.62
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		176	209		197	209	98	2140	957	131	2207	987
v/s Ratio Prot							0.03	0.31		c0.04	c0.37	
v/s Ratio Perm		c0.07	0.05		0.06	0.03			0.03			0.05
v/c Ratio		0.55	0.05		0.43	0.03	0.49	0.51	0.03	0.55	0.59	0.05
Uniform Delay, d1		25.8	24.1		25.3	24.0	29.1	7.1	5.1	28.4	7.1	4.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		4.3	0.1		2.0	0.1	1.4	0.4	0.0	2.5	0.6	0.0
Delay (s)		30.0	24.2		27.4	24.1	30.5	7.5	5.1	30.9	7.7	4.7
Level of Service		C	C		C	C	C	A	A	C	A	A
Approach Delay (s)		27.5			26.2			8.4			8.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1681	2787		1667		3433	3535		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1681	2787		1667		3433	3535		1770	3539	1583
Volume (vph)	181	0	310	1	0	2	263	843	4	6	971	157
Peak-hour factor, PHF	0.75	0.25	0.85	0.25	0.25	0.25	0.83	0.91	0.50	0.50	0.91	0.93
Adj. Flow (vph)	241	0	365	4	0	8	317	926	8	12	1067	169
RTOR Reduction (vph)	0	0	212	0	8	0	0	1	0	0	0	97
Lane Group Flow (vph)	121	120	153	0	4	0	317	933	0	12	1067	72
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	7.1	7.1	24.5		0.8		11.4	37.8		0.8	27.2	27.2
Effective Green, g (s)	9.1	9.1	24.5		2.8		11.4	39.8		0.8	29.2	29.2
Actuated g/C Ratio	0.13	0.13	0.36		0.04		0.17	0.58		0.01	0.43	0.43
Clearance Time (s)	6.0	6.0			6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	223	223	997		68		571	2054		21	1509	675
v/s Ratio Prot	c0.07	0.07			c0.01		c0.09	0.26		0.01	c0.30	
v/s Ratio Perm			0.13									0.11
v/c Ratio	0.54	0.54	0.15		0.06		0.56	0.45		0.57	0.71	0.11
Uniform Delay, d1	27.8	27.7	15.0		31.6		26.2	8.2		33.7	16.1	11.8
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	2.5	0.0		0.4		0.7	0.3		21.2	1.8	0.1
Delay (s)	30.4	30.2	15.0		32.0		26.9	8.4		54.9	17.9	11.9
Level of Service	C	C	B		C		C	A		D	B	B
Approach Delay (s)		21.1			32.0			13.1			17.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	270	278	129	272	244	136
Peak-hour factor, PHF	0.90	0.89	0.79	0.92	0.80	0.81
Adj. Flow (vph)	300	312	163	296	305	168
RTOR Reduction (vph)	0	182	0	0	0	0
Lane Group Flow (vph)	300	130	163	296	305	168
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	17.6	17.6	6.0	27.6	7.1	45.7
Effective Green, g (s)	19.1	19.1	6.0	29.1	8.6	45.7
Actuated g/C Ratio	0.42	0.42	0.13	0.64	0.19	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	779	662	232	2253	646	1583
v/s Ratio Prot	0.16		c0.09	0.08	c0.09	
v/s Ratio Perm		0.20				0.11
v/c Ratio	0.39	0.20	0.70	0.13	0.47	0.11
Uniform Delay, d1	9.2	8.4	19.0	3.3	16.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3	7.6	0.1	0.2	0.0
Delay (s)	9.9	8.7	26.6	3.3	16.7	0.0
Level of Service	A	A	C	A	B	A
Approach Delay (s)	9.3			11.6	10.8	
Approach LOS	A			B	B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

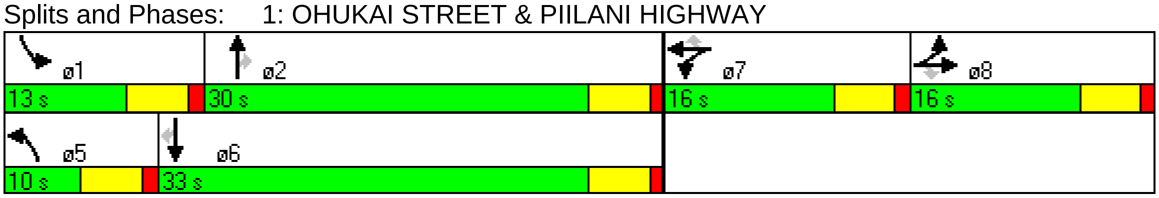
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	294	255	214	918	893	356
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	320	277	233	998	971	387
RTOR Reduction (vph)	0	211	0	0	0	237
Lane Group Flow (vph)	320	66	233	998	971	150
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.2	14.2	10.6	37.8	23.2	23.2
Effective Green, g (s)	14.2	14.2	10.6	37.8	23.2	23.2
Actuated g/C Ratio	0.24	0.24	0.18	0.63	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	419	375	313	2230	1368	612
v/s Ratio Prot	c0.18		c0.13	0.28	c0.27	
v/s Ratio Perm		0.17				0.24
v/c Ratio	0.76	0.17	0.74	0.45	0.71	0.24
Uniform Delay, d1	21.3	18.2	23.4	5.7	15.6	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.1	0.2	9.2	0.7	3.1	0.9
Delay (s)	29.4	18.5	32.7	6.4	18.7	13.4
Level of Service	C	B	C	A	B	B
Approach Delay (s)	24.3			11.3	17.2	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	45	137	62	37	38	893	102	95	943	58
Lane Group Flow (vph)	248	176	195	52	56	1207	152	116	1209	84
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	16.0	16.0	16.0	16.0	10.0	30.0	30.0	13.0	33.0	33.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	13.3%	40.0%	40.0%	17.3%	44.0%	44.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.82	0.43	0.69	0.18	0.39	0.93	0.22	0.54	0.80	0.12
Control Delay	53.7	8.6	41.0	10.2	42.0	37.5	4.3	41.2	24.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	8.6	41.0	10.2	42.0	37.5	4.3	41.2	24.2	4.4
Queue Length 50th (ft)	114	0	87	0	25	287	0	52	268	0
Queue Length 95th (ft)	125	33	129	18	44	280	14	92	283	13
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	304	414	302	308	142	1301	678	215	1527	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.43	0.65	0.17	0.39	0.93	0.22	0.54	0.79	0.11

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 71.5
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	10	56	33	36	39	25	1005	46	63	1197	49
Lane Group Flow (vph)	0	96	72	0	84	48	48	1081	52	72	1301	84
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	10.0	28.0	28.0	10.0	28.0	28.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	20.0%	56.0%	56.0%	20.0%	56.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio		0.49	0.24		0.38	0.17	0.27	0.50	0.05	0.39	0.57	0.08
Control Delay		27.4	8.1		23.6	8.7	24.9	8.7	2.8	26.4	8.5	2.4
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		27.4	8.1		23.6	8.7	24.9	8.7	2.8	26.4	8.5	2.4
Queue Length 50th (ft)		26	0		22	0	13	114	0	20	75	0
Queue Length 95th (ft)		32	20		49	18	21	166	12	49	220	6
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		197	296		220	276	179	2152	983	186	2293	1055
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.49	0.24		0.38	0.17	0.27	0.50	0.05	0.39	0.57	0.08

Intersection Summary
Cycle Length: 50
Actuated Cycle Length: 62
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

3: NORTH KIHEI ROAD & PIILANI HIGHWAY

6/18/2014

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	181	0	310	0	263	843	6	971	157
Lane Group Flow (vph)	121	120	365	12	317	934	12	1067	169
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	26.0	26.0	9.0	26.0	26.0
Total Split (s)	13.0	13.0	39.0	11.0	26.0	47.0	9.0	30.0	30.0
Total Split (%)	16.3%	16.3%	48.8%	13.8%	32.5%	58.8%	11.3%	37.5%	37.5%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.0	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	Min	None	Min	Min
v/c Ratio	0.48	0.47	0.27	0.07	0.49	0.40	0.09	0.70	0.22
Control Delay	33.2	33.1	3.0	21.7	23.5	6.6	32.7	18.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	33.1	3.0	21.7	23.5	6.6	32.7	18.3	3.6
Queue Length 50th (ft)	40	40	3	1	51	51	4	140	0
Queue Length 95th (ft)	90	27	27	2	93	194	12	#315	36
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	254	254	1549	176	1071	2408	132	1538	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.47	0.24	0.07	0.30	0.39	0.09	0.69	0.22

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 60.3

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

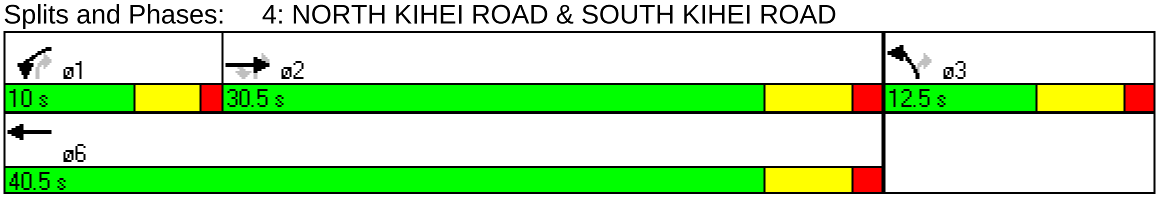
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	270	278	129	272	244	136
Lane Group Flow (vph)	300	312	163	296	305	168
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	30.5	30.5	9.0	15.5	12.5	
Total Split (s)	30.5	30.5	10.0	40.5	12.5	53.0
Total Split (%)	57.5%	57.5%	18.9%	76.4%	23.6%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	Min	Min	
v/c Ratio	0.39	0.37	0.70	0.13	0.47	0.11
Control Delay	9.9	2.3	42.1	3.2	21.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	2.3	42.1	3.2	21.0	0.1
Queue Length 50th (ft)	51	0	43	12	38	0
Queue Length 95th (ft)	93	29	#112	21	68	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	933	948	234	2437	646	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.33	0.70	0.12	0.47	0.11

Intersection Summary

Cycle Length: 53
Actuated Cycle Length: 45.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	294	255	214	918	893	356
Lane Group Flow (vph)	320	277	233	998	971	387
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	15.0	40.0	25.0	25.0
Total Split (%)	33.3%	33.3%	25.0%	66.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.76	0.47	0.74	0.45	0.71	0.46
Control Delay	29.4	5.3	37.7	6.9	20.1	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	5.3	37.7	6.9	20.1	3.8
Queue Length 50th (ft)	103	0	80	91	161	0
Queue Length 95th (ft)	#200	48	#173	128	227	49
Internal Link Dist (ft)	658			1062	1738	
Turn Bay Length (ft)						
Base Capacity (vph)	472	625	328	2227	1366	849
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.44	0.71	0.45	0.71	0.46

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	37	101	74	947	1094	43
Peak Hour Factor	0.77	0.81	0.77	0.87	0.96	0.83
Hourly flow rate (vph)	48	125	96	1089	1140	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	3					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1876	570	1191			
vC1, stage 1 conf vol	1140					
vC2, stage 2 conf vol	736					
vCu, unblocked vol	1876	570	1191			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	73	83			
cM capacity (veh/h)	237	465	582			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	48	125	96	544	544	570	570	52
Volume Left	48	0	96	0	0	0	0	0
Volume Right	0	125	0	0	0	0	0	52
cSH	237	465	582	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.27	0.17	0.32	0.32	0.34	0.34	0.03
Queue Length 95th (ft)	18	27	15	0	0	0	0	0
Control Delay (s)	24.0	15.6	12.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C	B					
Approach Delay (s)	17.9		1.0			0.0		
Approach LOS	C							

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	78	14	489	86	15	440
Peak Hour Factor	0.75	0.70	0.89	0.90	0.75	0.96
Hourly flow rate (vph)	104	20	549	96	20	458
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1096	597			645	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1096	597			645	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	55	96			98	
cM capacity (veh/h)	231	503			940	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	104	20	645	478
Volume Left	104	0	0	20
Volume Right	0	20	96	0
cSH	231	503	1700	940
Volume to Capacity	0.45	0.04	0.38	0.02
Queue Length 95th (ft)	54	3	0	2
Control Delay (s)	32.7	12.5	0.0	0.6
Lane LOS	D	B		A
Approach Delay (s)	29.4		0.0	0.6
Approach LOS	D			

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	44	81	35	1074	1023	66
Peak Hour Factor	0.73	0.72	0.88	0.88	0.91	0.75
Hourly flow rate (vph)	60	112	40	1220	1124	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	3					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1814	562	1212			
vC1, stage 1 conf vol	1124					
vC2, stage 2 conf vol	690					
vCu, unblocked vol	1814	562	1212			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	76	93			
cM capacity (veh/h)	252	470	571			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	60	112	40	610	610	562	562	88
Volume Left	60	0	40	0	0	0	0	0
Volume Right	0	112	0	0	0	0	0	88
cSH	252	470	571	1700	1700	1700	1700	1700
Volume to Capacity	0.24	0.24	0.07	0.36	0.36	0.33	0.33	0.05
Queue Length 95th (ft)	23	23	6	0	0	0	0	0
Control Delay (s)	23.7	15.0	11.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C	B					
Approach Delay (s)	18.1		0.4			0.0		
Approach LOS	C							

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	43	2	8	22	52	0	6	11	86	2	17
Peak Hour Factor	0.55	0.77	0.50	0.40	0.50	0.65	0.25	0.50	0.39	0.83	0.50	0.61
Hourly flow rate (vph)	44	56	4	20	44	80	0	12	28	104	4	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	124			60			259	309	58	301	271	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	124			60			259	309	58	301	271	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			100	98	97	83	99	97
cM capacity (veh/h)	1463			1544			649	580	1008	603	609	975

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	44	60	20	124	0	40	104	32
Volume Left	44	0	20	0	0	0	104	0
Volume Right	0	4	0	80	0	28	0	28
cSH	1463	1700	1544	1700	1700	826	603	907
Volume to Capacity	0.03	0.04	0.01	0.07	0.00	0.05	0.17	0.04
Queue Length 95th (ft)	2	0	1	0	0	4	15	3
Control Delay (s)	7.5	0.0	7.4	0.0	0.0	9.6	12.2	9.1
Lane LOS	A		A		A	A	B	A
Approach Delay (s)	3.2		1.0		9.6		11.5	
Approach LOS					A		B	

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	45	71	10	6	37	8	5	4	7	7	3	43
Peak Hour Factor	0.70	0.74	0.63	0.38	0.71	0.40	0.63	0.33	0.58	0.25	0.38	0.63
Hourly flow rate (vph)	64	96	16	16	52	20	8	12	12	28	8	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	72			112			388	336	104	336	334	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72			112			388	336	104	336	334	62
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			98	98	99	95	99	93
cM capacity (veh/h)	1528			1478			505	554	951	575	555	1003

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	64	112	16	72	32	104
Volume Left	64	0	16	0	8	28
Volume Right	0	16	0	20	12	68
cSH	1528	1700	1478	1700	639	795
Volume to Capacity	0.04	0.07	0.01	0.04	0.05	0.13
Queue Length 95th (ft)	3	0	1	0	4	11
Control Delay (s)	7.5	0.0	7.5	0.0	10.9	10.2
Lane LOS	A		A		B	B
Approach Delay (s)	2.7		1.3		10.9	10.2
Approach LOS					B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	19.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		601										
pX, platoon unblocked												
vC, conflicting volume	0			0			0	0	0	0	0	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			0	0	0	0	0	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1622			1622			1023	896	1084	1023	896	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	0	0	0	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							A	A	A
Approach Delay (s)	0.0			0.0			0.0	0.0	
Approach LOS							A	A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	751					
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1622		1023	1084

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C

Level-of-Service Worksheets for 2018 Background Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1816	1583		1787	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1816	1583		1787	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	93	88	79	211	40	177	25	1110	40	167	1494	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	96	86	229	43	192	27	1207	43	182	1624	84
RTOR Reduction (vph)	0	0	74	0	0	160	0	0	21	0	0	27
Lane Group Flow (vph)	0	197	12	0	272	32	27	1207	22	182	1624	57
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		16.5	16.5		19.8	19.8	6.0	54.1	54.1	14.6	62.7	62.7
Effective Green, g (s)		17.5	17.5		20.8	20.8	7.0	55.1	55.1	15.6	63.7	63.7
Actuated g/C Ratio		0.14	0.14		0.17	0.17	0.06	0.44	0.44	0.12	0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		254	222		297	263	99	1560	698	221	1803	807
v/s Ratio Prot		c0.11			c0.15		0.02	0.34		c0.10	c0.46	
v/s Ratio Perm			0.05			0.12			0.03			0.05
v/c Ratio		0.78	0.05		0.92	0.12	0.27	0.77	0.03	0.82	0.90	0.07
Uniform Delay, d1		51.9	46.6		51.2	44.3	56.6	29.7	19.8	53.4	27.8	15.6
Progression Factor		1.00	1.00		1.00	1.00	1.33	0.60	0.15	1.22	0.70	0.17
Incremental Delay, d2		13.8	0.1		31.0	0.2	0.5	3.6	0.1	18.6	7.0	0.2
Delay (s)		65.6	46.7		82.3	44.5	75.5	21.4	3.1	83.7	26.6	2.8
Level of Service		E	D		F	D	E	C	A	F	C	A
Approach Delay (s)		59.9			66.7			22.0			31.0	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1583		1798	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.61	1.00		0.52	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1128	1583		960	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	138	17	106	70	28	106	17	1333	55	34	1324	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	18	115	76	30	115	18	1449	60	37	1439	23
RTOR Reduction (vph)	0	0	94	0	0	94	0	0	20	0	0	7
Lane Group Flow (vph)	0	168	21	0	106	21	18	1449	40	37	1439	16
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		22.1	22.1		22.1	22.1	4.0	81.9	81.9	6.0	83.9	83.9
Effective Green, g (s)		23.1	23.1		23.1	23.1	5.0	82.9	82.9	7.0	84.9	84.9
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.04	0.66	0.66	0.06	0.68	0.68
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		208	293		177	293	71	2347	1050	99	2404	1075
v/s Ratio Prot							0.01	c0.41		c0.02	0.41	
v/s Ratio Perm		c0.15	0.07		0.11	0.07			0.04			0.01
v/c Ratio		0.81	0.07		0.60	0.07	0.25	0.62	0.04	0.37	0.60	0.01
Uniform Delay, d1		48.8	42.1		46.7	42.1	58.2	12.0	7.3	56.9	10.8	6.5
Progression Factor		1.00	1.00		1.00	1.00	0.60	2.14	4.91	0.76	1.99	2.39
Incremental Delay, d2		21.0	0.1		6.3	0.1	0.5	0.8	0.0	0.7	0.9	0.0
Delay (s)		69.9	42.2		53.0	42.2	35.2	26.5	35.7	44.0	22.5	15.6
Level of Service		E	D		D	D	D	C	D	D	C	B
Approach Delay (s)		58.6			47.4			27.0			22.9	
Approach LOS		E			D			C			C	

Intersection Summary

HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Flt Permitted	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Volume (vph)	211	20	315	14	2	4	372	1194	8	3	1128	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	22	342	15	2	4	404	1298	9	3	1226	120
RTOR Reduction (vph)	0	0	142	0	4	0	0	0	0	0	0	51
Lane Group Flow (vph)	122	129	200	0	17	0	404	1307	0	3	1226	69
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	14.0	14.0	40.3		4.1		20.3	83.8		1.1	64.1	64.1
Effective Green, g (s)	16.0	16.0	40.8		6.1		20.8	85.8		1.1	66.1	66.1
Actuated g/C Ratio	0.13	0.13	0.33		0.05		0.17	0.69		0.01	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	215	217	910		85		571	2427		16	1871	837
v/s Ratio Prot	0.07	c0.08			c0.01		c0.12	0.37		0.00	c0.35	
v/s Ratio Perm			0.12									0.08
v/c Ratio	0.57	0.59	0.22		0.20		0.71	0.54		0.19	0.66	0.08
Uniform Delay, d1	51.2	51.4	30.5		57.1		49.2	9.7		61.5	21.2	14.5
Progression Factor	1.10	1.10	1.96		1.00		0.79	1.88		1.00	1.00	1.00
Incremental Delay, d2	3.4	4.3	0.1		1.2		3.3	0.7		2.1	1.8	0.2
Delay (s)	59.7	60.9	59.9		58.3		42.1	19.0		63.6	23.0	14.7
Level of Service	E	E	E		E		D	B		E	C	B
Approach Delay (s)		60.1			58.3			24.4			22.4	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	299	265	81	429	418	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	325	288	88	466	454	201
RTOR Reduction (vph)	0	101	0	0	0	0
Lane Group Flow (vph)	325	187	88	466	454	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	79.5	79.5	10.5	94.0	20.0	125.0
Effective Green, g (s)	81.0	81.0	10.5	95.5	21.5	125.0
Actuated g/C Ratio	0.65	0.65	0.08	0.76	0.17	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	1207	1026	149	2704	590	1583
v/s Ratio Prot	0.17		c0.05	0.13	c0.13	
v/s Ratio Perm		0.18				0.13
v/c Ratio	0.27	0.18	0.59	0.17	0.77	0.13
Uniform Delay, d1	9.4	8.8	55.2	4.0	49.4	0.0
Progression Factor	1.00	1.00	1.18	0.24	1.00	1.00
Incremental Delay, d2	0.5	0.4	3.7	0.1	5.4	0.0
Delay (s)	9.9	9.2	68.9	1.1	54.8	0.0
Level of Service	A	A	E	A	D	A
Approach Delay (s)	9.6			11.8	38.0	
Approach LOS	A			B	D	

Intersection Summary

HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	50	236	111	1077	1575	68
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	257	121	1171	1712	74
RTOR Reduction (vph)	0	201	0	0	0	19
Lane Group Flow (vph)	54	56	121	1171	1712	55
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.6	10.6	13.7	106.4	88.7	88.7
Effective Green, g (s)	10.6	10.6	13.7	106.4	88.7	88.7
Actuated g/C Ratio	0.08	0.08	0.11	0.85	0.71	0.71
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	150	134	194	3012	2511	1123
v/s Ratio Prot	0.03		c0.07	0.33	c0.48	
v/s Ratio Perm		0.16				0.05
v/c Ratio	0.36	0.42	0.62	0.39	0.68	0.05
Uniform Delay, d1	54.0	54.3	53.2	2.1	10.2	5.5
Progression Factor	1.00	1.00	0.71	3.65	1.17	2.45
Incremental Delay, d2	1.5	2.1	5.3	0.3	0.8	0.0
Delay (s)	55.5	56.3	43.2	7.9	12.7	13.4
Level of Service	E	E	D	A	B	B
Approach Delay (s)	56.2			11.2	12.7	
Approach LOS	E			B	B	

Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.39	1.00
Satd. Flow (perm)	1770	1583	1863	1583	731	1863
Volume (vph)	94	37	558	89	31	374
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	40	607	97	34	407
RTOR Reduction (vph)	0	35	0	27	0	0
Lane Group Flow (vph)	102	5	607	70	34	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	7.8	7.8	41.4	41.4	41.4	41.4
Effective Green, g (s)	7.8	7.8	41.4	41.4	41.4	41.4
Actuated g/C Ratio	0.14	0.14	0.72	0.72	0.72	0.72
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	241	216	1348	1146	529	1348
v/s Ratio Prot	c0.06		c0.33			0.22
v/s Ratio Perm		0.03		0.06	0.05	
v/c Ratio	0.42	0.03	0.45	0.06	0.06	0.30
Uniform Delay, d1	22.6	21.4	3.2	2.3	2.3	2.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.0	0.2	0.0	0.1	0.1
Delay (s)	23.8	21.5	3.5	2.3	2.3	2.9
Level of Service	C	C	A	A	A	A
Approach Delay (s)	23.2		3.3			2.9
Approach LOS	C		A			A

Intersection Summary

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1826	1583		1779	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.86	1.00		0.70	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1594	1583		1298	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	22	32	124	68	5	24	31	1298	123	50	1890	31
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	35	135	74	5	26	34	1411	134	54	2054	34
RTOR Reduction (vph)	0	0	92	0	0	23	0	0	34	0	0	8
Lane Group Flow (vph)	0	59	43	0	79	3	34	1411	100	54	2054	26
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		12.4	12.4		12.4	12.4	4.7	93.1	93.1	7.5	95.9	95.9
Effective Green, g (s)		12.4	12.4		12.4	12.4	4.7	93.1	93.1	7.5	95.9	95.9
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.04	0.74	0.74	0.06	0.77	0.77
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		158	157		129	157	67	2636	1179	106	2715	1214
v/s Ratio Prot							0.02	0.40		c0.03	c0.58	
v/s Ratio Perm		0.04	0.09		0.06	0.02			0.08			0.02
v/c Ratio		0.37	0.27		0.61	0.02	0.51	0.54	0.08	0.51	0.76	0.02
Uniform Delay, d1		52.7	52.1		54.0	50.8	59.0	6.8	4.3	57.0	8.1	3.4
Progression Factor		1.00	1.00		1.00	1.00	1.17	1.33	0.95	1.05	1.34	1.59
Incremental Delay, d2		1.5	1.0		8.3	0.0	5.2	0.7	0.1	3.0	1.6	0.0
Delay (s)		54.2	53.1		62.3	50.8	74.1	9.7	4.3	63.0	12.4	5.5
Level of Service		D	D		E	D	E	A	A	E	B	A
Approach Delay (s)		53.4			59.5			10.6			13.6	
Approach LOS		D			E			B			B	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	271	180	101	1121	1597	371
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	196	110	1218	1736	403
RTOR Reduction (vph)	0	147	0	0	0	126
Lane Group Flow (vph)	295	49	110	1218	1736	277
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	24.3	24.3	11.6	92.7	77.1	77.1
Effective Green, g (s)	24.3	24.3	11.6	92.7	77.1	77.1
Actuated g/C Ratio	0.19	0.19	0.09	0.74	0.62	0.62
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	344	308	164	2625	2183	976
v/s Ratio Prot	c0.17		c0.06	0.34	c0.49	
v/s Ratio Perm		0.12				0.25
v/c Ratio	0.86	0.16	0.67	0.46	0.80	0.28
Uniform Delay, d1	48.7	41.9	54.9	6.4	18.0	11.1
Progression Factor	1.00	1.00	1.00	1.00	0.84	0.90
Incremental Delay, d2	18.6	0.2	10.3	0.6	2.1	0.5
Delay (s)	67.2	42.1	65.1	7.0	17.2	10.5
Level of Service	E	D	E	A	B	B
Approach Delay (s)	57.2			11.8	15.9	
Approach LOS	E			B	B	

Intersection Summary

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

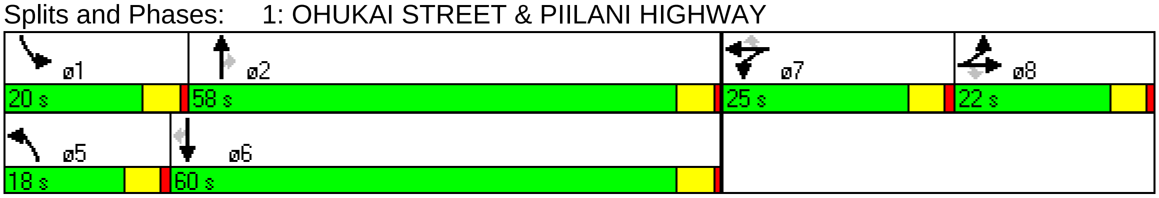
c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	88	79	40	177	25	1110	40	167	1494	77
Lane Group Flow (vph)	197	86	272	192	27	1207	43	182	1624	84
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	22.0	22.0
Minimum Split (s)	22.0	22.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (s)	22.0	22.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (%)	17.6%	17.6%	20.0%	20.0%	14.4%	46.4%	46.4%	16.0%	48.0%	48.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.78	0.29	0.92	0.45	0.17	0.77	0.06	0.82	0.87	0.10
Control Delay	70.2	12.3	84.3	9.8	72.1	21.8	1.3	87.7	25.7	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	12.3	84.3	9.8	72.1	21.8	1.3	87.7	25.7	1.5
Queue Length 50th (ft)	155	0	218	0	0	473	1	127	727	6
Queue Length 95th (ft)	#266	48	#380	66	56	105	1	#270	#818	m3
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	262	302	300	426	198	1561	719	227	1861	859
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.28	0.91	0.45	0.14	0.77	0.06	0.80	0.87	0.10

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	17	106	70	28	106	17	1333	55	34	1324	21
Lane Group Flow (vph)	0	168	115	0	106	115	18	1449	60	37	1439	23
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0	25.0	10.0	25.0	25.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	12.0%	64.0%	64.0%	12.0%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio		0.79	0.30		0.55	0.30	0.12	0.60	0.05	0.24	0.58	0.02
Control Delay		64.4	9.0		53.3	9.0	32.6	28.4	12.2	43.9	23.1	8.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		64.4	9.0		53.3	9.0	32.6	28.4	12.2	43.9	23.1	8.8
Queue Length 50th (ft)		127	0		76	0	14	486	15	25	566	5
Queue Length 95th (ft)		#226	50		138	50	m18	590	m27	m44	714	m15
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		239	420		219	420	156	2404	1095	156	2489	1120
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.70	0.27		0.48	0.27	0.12	0.60	0.05	0.24	0.58	0.02

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 50 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	211	20	315	2	372	1194	3	1128	110
Lane Group Flow (vph)	122	129	342	21	404	1307	3	1226	120
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	4.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	14.5	26.0	8.0	26.0	26.0
Total Split (s)	23.0	23.0	50.9	13.0	27.9	79.0	10.0	61.1	61.1
Total Split (%)	18.4%	18.4%	40.7%	10.4%	22.3%	63.2%	8.0%	48.9%	48.9%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.56	0.59	0.33	0.17	0.71	0.51	0.04	0.63	0.13
Control Delay	62.0	62.8	21.6	50.1	42.1	17.7	58.7	23.9	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	62.8	21.6	50.1	42.1	17.7	58.7	23.9	4.7
Queue Length 50th (ft)	105	112	34	13	169	420	2	406	5
Queue Length 95th (ft)	173	181	125	40	210	590	13	513	39
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	256	258	1109	130	656	2584	85	1939	917
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.50	0.31	0.16	0.62	0.51	0.04	0.63	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 40 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

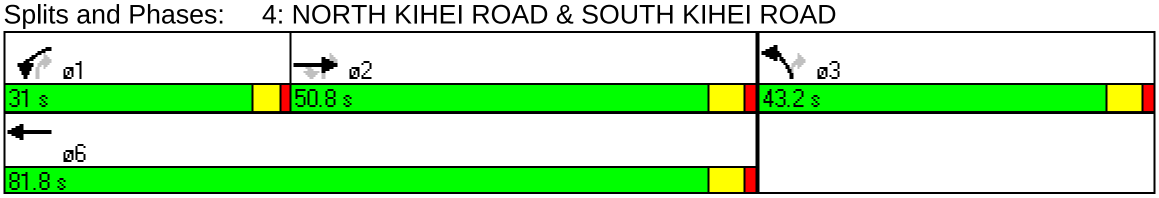
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	299	265	81	429	418	185
Lane Group Flow (vph)	325	288	88	466	454	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	15.5	15.5	9.0	15.5	12.5	
Total Split (s)	50.8	50.8	31.0	81.8	43.2	125.0
Total Split (%)	40.6%	40.6%	24.8%	65.4%	34.6%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	Min	C-Min	Min	
v/c Ratio	0.27	0.26	0.59	0.17	0.77	0.13
Control Delay	11.3	1.9	65.5	1.2	50.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	1.9	65.5	1.2	50.1	0.2
Queue Length 50th (ft)	102	0	74	11	183	0
Queue Length 95th (ft)	192	38	m124	17	227	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1207	1127	382	2703	1077	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.23	0.17	0.42	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 30 (24%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	50	236	111	1077	1575	68
Lane Group Flow (vph)	54	257	121	1171	1712	74
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	21.0	100.0	79.0	79.0
Total Split (%)	20.0%	20.0%	16.8%	80.0%	63.2%	63.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.36	0.76	0.62	0.39	0.68	0.06
Control Delay	53.4	16.1	43.2	9.2	14.8	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	16.1	43.2	9.2	14.8	6.4
Queue Length 50th (ft)	43	29	91	267	391	10
Queue Length 95th (ft)	80	114	139	466	450	m14
Internal Link Dist (ft)	253			2017	2865	
Turn Bay Length (ft)						
Base Capacity (vph)	297	449	247	3012	2511	1142
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.57	0.49	0.39	0.68	0.06

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

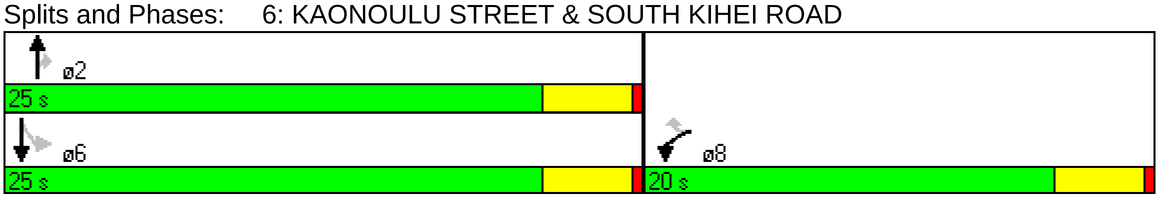
Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	94	37	558	89	31	374
Lane Group Flow (vph)	102	40	607	97	34	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	25.0	25.0	25.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.35	0.14	0.44	0.08	0.09	0.29
Control Delay	12.1	5.4	5.5	1.5	4.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	5.4	5.5	1.5	4.9	4.4
Queue Length 50th (ft)	19	0	60	0	2	34
Queue Length 95th (ft)	43	14	143	12	12	83
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	489	467	1380	1197	366	1380
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.09	0.44	0.08	0.09	0.29

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 57.6
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	32	124	68	5	24	31	1298	123	50	1890	31
Lane Group Flow (vph)	0	59	135	0	79	26	34	1411	134	54	2054	34
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	11.0	90.0	90.0	14.0	93.0	93.0
Total Split (%)	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	8.8%	72.0%	72.0%	11.2%	74.4%	74.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.37	0.54		0.61	0.14	0.33	0.53	0.11	0.44	0.74	0.03
Control Delay		54.2	20.6		61.1	17.8	73.1	10.9	1.2	64.4	14.0	2.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.2	20.6		61.1	17.8	73.1	10.9	1.2	64.4	14.0	2.7
Queue Length 50th (ft)		45	25		62	0	27	365	3	45	495	1
Queue Length 95th (ft)		87	87		112	28	m56	475	m13	m66	796	m6
Internal Link Dist (ft)		212			349			829			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		221	303		177	238	107	2659	1223	144	2759	1242
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.27	0.45		0.45	0.11	0.32	0.53	0.11	0.38	0.74	0.03

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	271	180	101	1121	1597	371
Lane Group Flow (vph)	295	196	110	1218	1736	403
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	32.0	32.0	17.0	93.0	76.0	76.0
Total Split (%)	25.6%	25.6%	13.6%	74.4%	60.8%	60.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.86	0.43	0.67	0.46	0.80	0.37
Control Delay	60.4	9.6	68.4	7.4	18.5	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	9.6	68.4	7.4	18.5	3.1
Queue Length 50th (ft)	229	9	86	187	669	40
Queue Length 95th (ft)	#335	73	150	246	476	33
Internal Link Dist (ft)	652			1058	2861	
Turn Bay Length (ft)						
Base Capacity (vph)	396	496	184	2624	2183	1102
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.40	0.60	0.46	0.80	0.37

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	96	7	20	107	52	13	6	63	152	3	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	104	8	22	116	57	14	7	68	165	3	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		817			333							
pX, platoon unblocked												
vC, conflicting volume	173			112			335	374	108	414	350	145
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			112			335	374	108	414	350	145
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			98	99	93	66	99	98
cM capacity (veh/h)	1404			1478			591	538	946	492	556	903

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	25	112	22	173	14	75	165	18
Volume Left	25	0	22	0	14	0	165	0
Volume Right	0	8	0	57	0	68	0	15
cSH	1404	1700	1478	1700	591	887	492	813
Volume to Capacity	0.02	0.07	0.01	0.10	0.02	0.08	0.34	0.02
Queue Length 95th (ft)	1	0	1	0	2	7	37	2
Control Delay (s)	7.6	0.0	7.5	0.0	11.2	9.4	16.0	9.5
Lane LOS	A		A		B	A	C	A
Approach Delay (s)	1.4		0.8		9.7		15.3	
Approach LOS					A		C	

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	118	30	4	100	2	9	0	2	3	0	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	128	33	4	109	2	10	0	2	3	0	72
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		370			780							
pX, platoon unblocked												
vC, conflicting volume	111			161			399	329	145	314	345	110
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			161			399	329	145	314	345	110
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	100	100	99	100	92
cM capacity (veh/h)	1479			1418			509	575	903	625	564	944

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	33	161	4	111	12	75
Volume Left	33	0	4	0	10	3
Volume Right	0	33	0	2	2	72
cSH	1479	1700	1418	1700	553	923
Volume to Capacity	0.02	0.09	0.00	0.07	0.02	0.08
Queue Length 95th (ft)	2	0	0	0	2	7
Control Delay (s)	7.5	0.0	7.5	0.0	11.7	9.2
Lane LOS	A		A		B	A
Approach Delay (s)	1.3		0.3		11.7	9.2
Approach LOS					B	A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1808	1583		1795	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1808	1583		1795	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	115	76	81	204	66	168	104	1486	56	138	1398	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	83	88	222	72	183	113	1615	61	150	1520	91
RTOR Reduction (vph)	0	0	77	0	0	151	0	0	19	0	0	30
Lane Group Flow (vph)	0	208	11	0	294	32	113	1615	42	150	1520	61
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		18.0	18.0		25.4	25.4	11.4	73.6	73.6	13.0	75.2	75.2
Effective Green, g (s)		19.0	19.0		26.4	26.4	12.4	74.6	74.6	14.0	76.2	76.2
Actuated g/C Ratio		0.13	0.13		0.18	0.18	0.08	0.50	0.50	0.09	0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.5	3.5		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		229	201		316	279	146	1760	787	165	1798	804
v/s Ratio Prot		c0.12			c0.16		0.06	c0.46		c0.08	0.43	
v/s Ratio Perm			0.06			0.12			0.04			0.06
v/c Ratio		0.91	0.06		0.93	0.12	0.77	0.92	0.05	0.91	0.85	0.08
Uniform Delay, d1		64.6	57.6		60.9	52.0	67.4	34.9	19.5	67.4	31.8	18.9
Progression Factor		1.00	1.00		1.00	1.00	1.10	0.66	0.31	0.80	1.36	2.66
Incremental Delay, d2		35.8	0.1		32.9	0.2	17.7	8.0	0.1	38.0	4.2	0.2
Delay (s)		100.5	57.7		93.8	52.2	92.0	30.9	6.2	92.3	47.4	50.4
Level of Service		F	E		F	D	F	C	A	F	D	D
Approach Delay (s)		87.8			77.9			34.0			51.4	
Approach LOS		F			E			C			D	

Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1791	1583		1823	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.62	1.00		0.72	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1155	1583		1335	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	78	19	79	33	42	67	48	1544	108	100	1487	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	21	86	36	46	73	52	1678	117	109	1616	70
RTOR Reduction (vph)	0	0	76	0	0	64	0	0	25	0	0	15
Lane Group Flow (vph)	0	106	10	0	82	9	52	1678	92	109	1616	55
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		17.7	17.7		17.7	17.7	8.4	104.7	104.7	13.6	109.9	109.9
Effective Green, g (s)		17.7	17.7		17.7	17.7	9.4	105.7	105.7	14.6	110.9	110.9
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.06	0.70	0.70	0.10	0.74	0.74
Clearance Time (s)		4.0	4.0		4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		136	187		158	187	111	2494	1115	172	2617	1170
v/s Ratio Prot							0.03	c0.47		c0.06	0.46	
v/s Ratio Perm		c0.09	0.05		0.06	0.05			0.07			0.04
v/c Ratio		0.78	0.05		0.52	0.05	0.47	0.67	0.08	0.63	0.62	0.05
Uniform Delay, d1		64.3	58.7		62.2	58.7	67.9	12.4	6.9	65.1	9.4	5.3
Progression Factor		1.00	1.00		1.00	1.00	1.24	1.22	1.05	1.11	1.63	1.39
Incremental Delay, d2		24.0	0.1		2.9	0.1	1.5	0.7	0.1	5.8	0.9	0.1
Delay (s)		88.3	58.8		65.0	58.8	85.7	15.8	7.3	77.8	16.1	7.4
Level of Service		F	E		E	E	F	B	A	E	B	A
Approach Delay (s)		75.1			62.1			17.2			19.5	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Volume (vph)	369	9	217	33	12	44	396	1158	15	10	1269	179
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	10	236	36	13	48	430	1259	16	11	1379	195
RTOR Reduction (vph)	0	0	112	0	24	0	0	0	0	0	0	65
Lane Group Flow (vph)	201	210	124	0	73	0	430	1275	0	11	1379	130
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	21.9	21.9	49.8		9.1		21.9	95.0		2.0	74.6	74.6
Effective Green, g (s)	23.9	23.9	50.3		11.1		22.4	97.0		2.0	76.6	76.6
Actuated g/C Ratio	0.16	0.16	0.34		0.07		0.15	0.65		0.01	0.51	0.51
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	268	269	935		126		513	2285		24	1807	808
v/s Ratio Prot	0.12	c0.12			c0.06		c0.13	0.36		0.01	c0.39	
v/s Ratio Perm			0.08									0.12
v/c Ratio	0.75	0.78	0.13		0.58		0.84	0.56		0.46	0.76	0.16
Uniform Delay, d1	60.2	60.5	34.7		67.2		62.0	14.6		73.5	29.4	19.6
Progression Factor	0.76	0.77	1.68		1.00		1.04	1.10		1.00	1.00	1.00
Incremental Delay, d2	10.8	13.2	0.0		6.3		8.6	0.8		5.0	3.1	0.4
Delay (s)	56.8	59.6	58.2		73.5		72.9	16.9		78.4	32.5	20.0
Level of Service	E	E	E		E		E	B		E	C	B
Approach Delay (s)		58.2			73.5			31.0			31.3	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	36.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	407	518	141	360	275	178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	442	563	153	391	299	193
RTOR Reduction (vph)	0	244	0	0	0	0
Lane Group Flow (vph)	442	319	153	391	299	193
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	83.4	83.4	18.2	105.6	33.4	150.0
Effective Green, g (s)	84.9	84.9	18.2	107.1	34.9	150.0
Actuated g/C Ratio	0.57	0.57	0.12	0.71	0.23	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	1054	896	215	2527	799	1583
v/s Ratio Prot	0.24		c0.09	0.11	c0.09	
v/s Ratio Perm		0.36				0.12
v/c Ratio	0.42	0.36	0.71	0.15	0.37	0.12
Uniform Delay, d1	18.5	17.7	63.4	6.9	48.4	0.0
Progression Factor	1.00	1.00	1.44	0.28	1.00	1.00
Incremental Delay, d2	1.2	1.1	7.3	0.1	1.3	0.0
Delay (s)	19.8	18.8	98.7	2.1	49.7	0.0
Level of Service	B	B	F	A	D	A
Approach Delay (s)	19.2			29.2	30.2	
Approach LOS	B			C	C	

Intersection Summary

HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	49	189	135	1594	1522	92
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	205	147	1733	1654	100
RTOR Reduction (vph)	0	191	0	0	0	19
Lane Group Flow (vph)	53	14	147	1733	1654	81
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.9	9.9	17.3	132.1	110.8	110.8
Effective Green, g (s)	9.9	9.9	17.3	132.1	110.8	110.8
Actuated g/C Ratio	0.07	0.07	0.12	0.88	0.74	0.74
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	117	104	204	3117	2614	1169
v/s Ratio Prot	0.03		c0.08	0.49	c0.47	
v/s Ratio Perm		0.13				0.06
v/c Ratio	0.45	0.13	0.72	0.56	0.63	0.07
Uniform Delay, d1	67.4	66.0	64.0	2.1	9.6	5.4
Progression Factor	1.00	1.00	0.98	1.70	0.87	1.40
Incremental Delay, d2	2.8	0.6	9.3	0.6	0.6	0.1
Delay (s)	70.2	66.6	71.9	4.1	9.0	7.6
Level of Service	E	E	E	A	A	A
Approach Delay (s)	67.3			9.4	8.9	
Approach LOS	E			A	A	

Intersection Summary

HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	80	37	544	157	67	522
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	40	591	171	73	567
RTOR Reduction (vph)	0	36	0	61	0	0
Lane Group Flow (vph)	87	4	591	110	73	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.7	6.7	40.8	40.8	3.7	48.5
Effective Green, g (s)	6.7	6.7	40.8	40.8	3.7	48.5
Actuated g/C Ratio	0.11	0.11	0.65	0.65	0.06	0.77
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	188	168	1203	1022	104	1430
v/s Ratio Prot	c0.05		c0.32		c0.04	0.30
v/s Ratio Perm		0.03		0.11		
v/c Ratio	0.46	0.03	0.49	0.11	0.70	0.40
Uniform Delay, d1	26.6	25.3	5.8	4.3	29.2	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	0.3	0.0	19.2	0.2
Delay (s)	28.4	25.4	6.1	4.3	48.5	2.6
Level of Service	C	C	A	A	D	A
Approach Delay (s)	27.4		5.7			7.9
Approach LOS	C		A			A

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1787	1583		1780	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.73	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1359	1583		1319	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	36	6	90	35	3	12	80	1783	27	11	1611	78
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	7	98	38	3	13	87	1938	29	12	1751	85
RTOR Reduction (vph)	0	0	91	0	0	12	0	0	4	0	0	15
Lane Group Flow (vph)	0	46	7	0	41	1	87	1938	25	12	1751	70
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		10.0	10.0		10.0	10.0	12.4	124.9	124.9	3.1	115.6	115.6
Effective Green, g (s)		10.0	10.0		10.0	10.0	12.4	124.9	124.9	3.1	115.6	115.6
Actuated g/C Ratio		0.07	0.07		0.07	0.07	0.08	0.83	0.83	0.02	0.77	0.77
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		91	106		88	106	146	2947	1318	37	2727	1220
v/s Ratio Prot							c0.05	c0.55		0.01	0.49	
v/s Ratio Perm		0.03	0.06		0.03	0.01			0.02			0.05
v/c Ratio		0.51	0.06		0.47	0.01	0.60	0.66	0.02	0.32	0.64	0.06
Uniform Delay, d1		67.6	65.6		67.4	65.4	66.4	4.6	2.1	72.4	7.8	4.1
Progression Factor		1.00	1.00		1.00	1.00	0.93	0.79	0.99	0.74	0.96	1.87
Incremental Delay, d2		4.4	0.2		3.9	0.0	5.3	1.0	0.0	4.0	0.9	0.1
Delay (s)		72.0	65.8		71.3	65.4	67.0	4.6	2.1	57.3	8.4	7.8
Level of Service		E	E		E	E	E	A	A	E	A	A
Approach Delay (s)		67.8			69.9			7.2			8.7	
Approach LOS		E			E			A			A	

Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	270	251	244	1491	1296	386
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	273	265	1621	1409	420
RTOR Reduction (vph)	0	220	0	0	0	127
Lane Group Flow (vph)	293	53	265	1621	1409	293
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	29.0	29.0	26.3	113.0	82.7	82.7
Effective Green, g (s)	29.0	29.0	26.3	113.0	82.7	82.7
Actuated g/C Ratio	0.19	0.19	0.18	0.75	0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	342	306	310	2666	1951	873
v/s Ratio Prot	0.17		c0.15	0.46	c0.40	
v/s Ratio Perm		0.17				0.27
v/c Ratio	0.86	0.17	0.85	0.61	0.72	0.34
Uniform Delay, d1	58.5	50.5	60.0	8.4	25.1	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.21	1.66
Incremental Delay, d2	18.6	0.3	19.9	1.0	1.9	0.8
Delay (s)	77.1	50.8	79.9	9.5	32.3	31.6
Level of Service	E	D	E	A	C	C
Approach Delay (s)	64.4			19.4	32.2	
Approach LOS	E			B	C	

Intersection Summary

HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	76	81	66	168	104	1486	56	138	1398	84
Lane Group Flow (vph)	208	88	294	183	113	1615	61	150	1520	91
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	23.0	23.0	31.0	31.0	17.0	78.0	78.0	18.0	79.0	79.0
Total Split (%)	15.3%	15.3%	20.7%	20.7%	11.3%	52.0%	52.0%	12.0%	52.7%	52.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.91	0.32	0.93	0.43	0.77	0.92	0.08	0.91	0.84	0.11
Control Delay	103.7	14.1	92.0	9.9	97.2	31.6	3.1	98.0	48.5	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.7	14.1	92.0	9.9	97.2	31.6	3.1	98.0	48.5	21.3
Queue Length 50th (ft)	204	0	286	0	105	597	9	154	592	33
Queue Length 95th (ft)	#360	54	#461	69	#202	748	m13	#286	863	m105
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	229	277	323	435	153	1760	806	165	1799	834
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.32	0.91	0.42	0.74	0.92	0.08	0.91	0.84	0.11

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	19	79	33	42	67	48	1544	108	100	1487	64
Lane Group Flow (vph)	0	106	86	0	82	73	52	1678	117	109	1616	70
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	19.0	92.0	92.0	26.0	99.0	99.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	12.7%	61.3%	61.3%	17.3%	66.0%	66.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.72	0.33		0.44	0.29	0.41	0.67	0.10	0.63	0.61	0.06
Control Delay		68.7	11.8		62.3	12.6	83.8	18.1	3.6	74.9	18.5	3.6
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		68.7	11.8		62.3	12.6	83.8	18.1	3.6	74.9	18.5	3.6
Queue Length 50th (ft)		102	0		76	0	46	834	15	94	763	10
Queue Length 95th (ft)		161	50		126	47	m51	914	m38	m125	921	m27
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		234	365		293	355	177	2494	1141	260	2640	1196
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.45	0.24		0.28	0.21	0.29	0.67	0.10	0.42	0.61	0.06

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	369	9	217	12	396	1158	10	1269	179
Lane Group Flow (vph)	201	210	236	97	430	1275	11	1379	195
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	5.0	20.0	5.0	20.0	20.0
Minimum Split (s)	22.0	22.0		11.0	22.5	26.0	9.0	33.0	33.0
Total Split (s)	31.0	31.0	60.0	16.0	29.0	94.0	9.0	74.0	74.0
Total Split (%)	20.7%	20.7%	40.0%	10.7%	19.3%	62.7%	6.0%	49.3%	49.3%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.75	0.78	0.23	0.64	0.84	0.55	0.19	0.76	0.22
Control Delay	56.3	57.9	16.8	65.3	70.9	17.0	77.9	34.4	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	57.9	16.8	65.3	70.9	17.0	77.9	34.4	8.3
Queue Length 50th (ft)	196	206	55	68	221	233	11	595	32
Queue Length 95th (ft)	292	304	98	132	278	528	34	712	83
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	303	304	1080	160	572	2339	59	1805	873
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.69	0.22	0.61	0.75	0.55	0.19	0.76	0.22

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

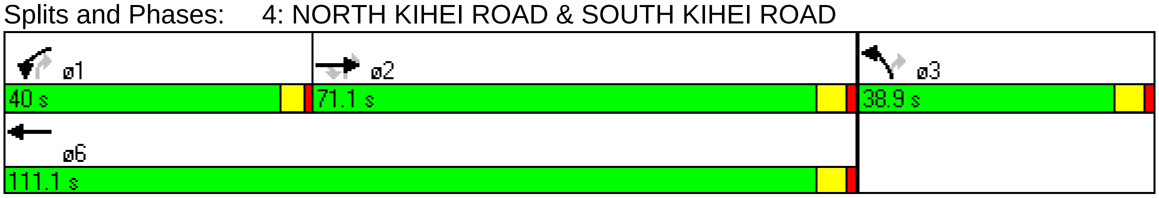
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	407	518	141	360	275	178
Lane Group Flow (vph)	442	563	153	391	299	193
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	4.0	4.0	5.0	4.0	4.0	
Minimum Split (s)	30.5	30.5	9.0	21.5	21.5	
Total Split (s)	71.1	71.1	40.0	111.1	38.9	150.0
Total Split (%)	47.4%	47.4%	26.7%	74.1%	25.9%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	Max	
v/c Ratio	0.42	0.49	0.71	0.15	0.37	0.12
Control Delay	21.3	3.1	91.1	2.1	50.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	3.1	91.1	2.1	50.0	0.2
Queue Length 50th (ft)	236	0	156	16	127	0
Queue Length 95th (ft)	382	61	m144	17	173	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1054	1140	425	2527	799	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.49	0.36	0.15	0.37	0.12

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 30 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	49	189	135	1594	1522	92
Lane Group Flow (vph)	53	205	147	1733	1654	100
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	29.0	29.0	30.0	121.0	91.0	91.0
Total Split (%)	19.3%	19.3%	20.0%	80.7%	60.7%	60.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
v/c Ratio	0.45	0.69	0.72	0.56	0.63	0.08
Control Delay	67.8	11.7	65.8	4.5	10.1	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	11.7	65.8	4.5	10.1	3.8
Queue Length 50th (ft)	51	0	145	130	275	7
Queue Length 95th (ft)	96	81	202	472	304	m11
Internal Link Dist (ft)	253			2017	2865	
Turn Bay Length (ft)						
Base Capacity (vph)	295	435	307	3116	2613	1187
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.47	0.48	0.56	0.63	0.08

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	80	37	544	157	67	522
Lane Group Flow (vph)	87	40	591	171	73	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	31.0	31.0	9.0	40.0
Total Split (%)	33.3%	33.3%	51.7%	51.7%	15.0%	66.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
v/c Ratio	0.35	0.15	0.46	0.15	0.46	0.38
Control Delay	18.0	8.1	9.1	1.9	30.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	8.1	9.1	1.9	30.4	4.1
Queue Length 50th (ft)	20	0	111	0	18	54
Queue Length 95th (ft)	56	20	224	23	#59	124
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	435	419	1314	1167	157	1503
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.10	0.45	0.15	0.46	0.38

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 61.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	6	90	35	3	12	80	1783	27	11	1611	78
Lane Group Flow (vph)	0	46	98	0	41	13	87	1938	29	12	1751	85
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	25.0	107.0	107.0	16.0	98.0	98.0
Total Split (%)	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	16.7%	71.3%	71.3%	10.7%	65.3%	65.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.48	0.50		0.44	0.11	0.59	0.65	0.02	0.15	0.64	0.07
Control Delay		68.7	13.8		68.3	27.2	64.2	4.9	1.5	51.4	9.4	3.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		68.7	13.8		68.3	27.2	64.2	4.9	1.5	51.4	9.4	3.7
Queue Length 50th (ft)		44	0		39	0	85	138	0	11	208	3
Queue Length 95th (ft)		88	58		80	23	m136	435	m5	m20	321	m21
Internal Link Dist (ft)		212			261			1847			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		219	326		214	254	248	3003	1347	142	2727	1234
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.21	0.30		0.19	0.05	0.35	0.65	0.02	0.08	0.64	0.07

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 40 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	270	251	244	1491	1296	386
Lane Group Flow (vph)	293	273	265	1621	1409	420
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	39.0	39.0	36.0	111.0	75.0	75.0
Total Split (%)	26.0%	26.0%	24.0%	74.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.86	0.52	0.85	0.61	0.72	0.42
Control Delay	67.8	7.8	69.8	10.3	35.3	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	7.8	69.8	10.3	35.3	12.8
Queue Length 50th (ft)	277	0	253	353	566	121
Queue Length 95th (ft)	376	76	347	469	739	135
Internal Link Dist (ft)	745			1063	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	413	579	378	2666	1950	1000
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.47	0.70	0.61	0.72	0.42

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	134	16	39	113	73	9	8	34	96	10	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	146	17	42	123	79	10	9	37	104	11	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		817			333							
pX, platoon unblocked												
vC, conflicting volume	202			163			463	522	154	515	491	162
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202			163			463	522	154	515	491	162
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			98	98	96	75	98	98
cM capacity (veh/h)	1370			1416			469	433	892	424	450	882

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	40	163	42	202	10	46	104	26
Volume Left	40	0	42	0	10	0	104	0
Volume Right	0	17	0	79	0	37	0	15
cSH	1370	1700	1416	1700	469	742	424	630
Volume to Capacity	0.03	0.10	0.03	0.12	0.02	0.06	0.25	0.04
Queue Length 95th (ft)	2	0	2	0	2	5	24	3
Control Delay (s)	7.7	0.0	7.6	0.0	12.8	10.2	16.2	11.0
Lane LOS	A		A		B	B	C	B
Approach Delay (s)	1.5		1.3		10.6		15.2	
Approach LOS					B		C	

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	82	179	16	2	133	6	2	1	3	3	1	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	195	17	2	145	7	2	1	3	3	1	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		370			780							
pX, platoon unblocked												
vC, conflicting volume	151			212			594	537	203	529	542	148
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	151			212			594	537	203	529	542	148
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			99	100	100	99	100	93
cM capacity (veh/h)	1430			1358			368	422	837	435	419	899

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	89	212	2	151	7	67
Volume Left	89	0	2	0	2	3
Volume Right	0	17	0	7	3	63
cSH	1430	1700	1358	1700	527	840
Volume to Capacity	0.06	0.12	0.00	0.09	0.01	0.08
Queue Length 95th (ft)	5	0	0	0	1	7
Control Delay (s)	7.7	0.0	7.7	0.0	11.9	9.7
Lane LOS	A		A		B	A
Approach Delay (s)	2.3		0.1		11.9	9.7
Approach LOS					B	A

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1791	1583		1815	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1791	1583		1815	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	177	45	137	67	62	37	38	1007	102	95	1089	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	49	149	73	67	40	41	1095	111	103	1184	114
RTOR Reduction (vph)	0	0	124	0	0	37	0	0	65	0	0	61
Lane Group Flow (vph)	0	241	25	0	140	3	41	1095	46	103	1184	53
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)		10.9	10.9		4.6	4.6	2.8	28.0	28.0	6.1	31.3	31.3
Effective Green, g (s)		11.9	11.9		5.6	5.6	3.8	29.0	29.0	7.1	32.3	32.3
Actuated g/C Ratio		0.17	0.17		0.08	0.08	0.05	0.42	0.42	0.10	0.46	0.46
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.5	3.5		3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		306	271		146	127	97	1475	660	181	1642	735
v/s Ratio Prot		c0.13			c0.08		0.02	0.31		c0.06	c0.33	
v/s Ratio Perm			0.09			0.03			0.07			0.07
v/c Ratio		0.79	0.09		0.96	0.03	0.42	0.74	0.07	0.57	0.72	0.07
Uniform Delay, d1		27.6	24.3		31.9	29.5	31.8	17.1	12.2	29.8	15.0	10.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		12.9	0.2		61.3	0.1	1.1	2.5	0.1	2.4	2.0	0.1
Delay (s)		40.6	24.5		93.2	29.6	32.9	19.6	12.3	32.2	17.0	10.4
Level of Service		D	C		F	C	C	B	B	C	B	B
Approach Delay (s)		34.4			79.1			19.4			17.6	
Approach LOS		C			E			B			B	

Intersection Summary

HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1789	1583		1815	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.70	1.00		0.79	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1312	1583		1479	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	60	13	56	42	39	51	25	1137	60	68	1381	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	14	61	46	42	55	27	1236	65	74	1501	53
RTOR Reduction (vph)	0	0	54	0	0	49	0	0	22	0	0	17
Lane Group Flow (vph)	0	79	7	0	88	6	27	1236	43	74	1501	36
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)		6.9	6.9		6.9	6.9	2.3	46.9	46.9	3.5	48.1	48.1
Effective Green, g (s)		7.9	7.9		7.9	7.9	3.3	47.9	47.9	4.5	49.1	49.1
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.05	0.66	0.66	0.06	0.68	0.68
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)		143	173		162	173	81	2345	1049	110	2403	1075
v/s Ratio Prot							0.02	0.35		c0.04	c0.42	
v/s Ratio Perm		c0.06	0.04		0.06	0.03			0.04			0.03
v/c Ratio		0.55	0.04		0.54	0.03	0.33	0.53	0.04	0.67	0.62	0.03
Uniform Delay, d1		30.5	28.8		30.5	28.8	33.4	6.3	4.2	33.2	6.5	3.8
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.6	0.1		4.6	0.1	0.9	0.4	0.0	12.0	0.7	0.0
Delay (s)		36.1	28.9		35.1	28.9	34.3	6.7	4.3	45.2	7.2	3.8
Level of Service		D	C		D	C	C	A	A	D	A	A
Approach Delay (s)		33.0			32.7			7.2			8.8	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Volume (vph)	186	0	328	1	0	2	282	968	4	6	1143	157
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	0	357	1	0	2	307	1052	4	7	1242	171
RTOR Reduction (vph)	0	0	216	0	2	0	0	0	0	0	0	96
Lane Group Flow (vph)	101	101	141	0	1	0	307	1056	0	7	1242	75
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	7.1	7.1	24.7		0.8		11.6	39.5		0.8	28.7	28.7
Effective Green, g (s)	9.1	9.1	24.7		2.8		11.6	41.5		0.8	30.7	30.7
Actuated g/C Ratio	0.13	0.13	0.35		0.04		0.17	0.59		0.01	0.44	0.44
Clearance Time (s)	6.0	6.0			6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	218	218	981		66		567	2091		20	1548	692
v/s Ratio Prot	c0.06	0.06			c0.00		c0.09	0.30		0.00	c0.35	
v/s Ratio Perm			0.13									0.11
v/c Ratio	0.46	0.46	0.14		0.02		0.54	0.50		0.35	0.80	0.11
Uniform Delay, d1	28.3	28.3	15.5		32.4		26.9	8.4		34.4	17.1	11.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	1.6	0.0		0.1		0.6	0.3		3.8	3.5	0.1
Delay (s)	29.8	29.8	15.6		32.5		27.4	8.7		38.3	20.6	11.8
Level of Service	C	C	B		C		C	A		D	C	B
Approach Delay (s)		20.7			32.5			12.9			19.6	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	288	389	129	292	299	141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	313	423	140	317	325	153
RTOR Reduction (vph)	0	243	0	0	0	0
Lane Group Flow (vph)	313	180	140	317	325	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	18.8	18.8	6.6	29.4	7.2	47.6
Effective Green, g (s)	20.3	20.3	6.6	30.9	8.7	47.6
Actuated g/C Ratio	0.43	0.43	0.14	0.65	0.18	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	795	675	245	2297	627	1583
v/s Ratio Prot	0.17		c0.08	0.09	c0.09	
v/s Ratio Perm		0.27				0.10
v/c Ratio	0.39	0.27	0.57	0.14	0.52	0.10
Uniform Delay, d1	9.4	8.8	19.2	3.2	17.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4	2.0	0.1	0.3	0.0
Delay (s)	10.1	9.3	21.2	3.3	17.9	0.0
Level of Service	B	A	C	A	B	A
Approach Delay (s)	9.6			8.8	12.1	
Approach LOS	A			A	B	

Intersection Summary

HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.18	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	342	3539	3539	1583
Volume (vph)	74	170	129	1024	1166	117
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	185	140	1113	1267	127
RTOR Reduction (vph)	0	62	0	0	0	39
Lane Group Flow (vph)	80	123	140	1113	1267	88
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	9.6	9.6	39.1	39.1	39.1	39.1
Effective Green, g (s)	9.6	9.6	39.1	39.1	39.1	39.1
Actuated g/C Ratio	0.17	0.17	0.69	0.69	0.69	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	268	236	2440	2440	1092
v/s Ratio Prot	0.05			0.31	0.36	
v/s Ratio Perm		0.12	c0.41			0.08
v/c Ratio	0.27	0.46	0.59	0.46	0.52	0.08
Uniform Delay, d1	20.5	21.2	4.6	4.0	4.3	2.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.2	4.0	0.1	0.2	0.0
Delay (s)	21.0	22.4	8.6	4.1	4.4	2.9
Level of Service	C	C	A	A	A	A
Approach Delay (s)	22.0			4.6	4.3	
Approach LOS	C			A	A	

Intersection Summary

HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	1770	1583	1863	1583	752	1863
Volume (vph)	112	28	536	127	48	455
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	30	583	138	52	495
RTOR Reduction (vph)	0	26	0	39	0	0
Lane Group Flow (vph)	122	4	583	99	52	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	8.1	8.1	40.3	40.3	40.3	40.3
Effective Green, g (s)	8.1	8.1	40.3	40.3	40.3	40.3
Actuated g/C Ratio	0.14	0.14	0.71	0.71	0.71	0.71
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	254	227	1331	1131	537	1331
v/s Ratio Prot	c0.07		c0.31			0.27
v/s Ratio Perm		0.02		0.09	0.07	
v/c Ratio	0.48	0.02	0.44	0.09	0.10	0.37
Uniform Delay, d1	22.2	20.7	3.3	2.5	2.5	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.0	0.2	0.0	0.1	0.2
Delay (s)	23.6	20.8	3.6	2.5	2.5	3.3
Level of Service	C	C	A	A	A	A
Approach Delay (s)	23.1		3.4			3.2
Approach LOS	C		A			A

Intersection Summary

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	1.00
Frt		1.00	0.85				1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)		1770	1583				1770	3539			3539	1583
Flt Permitted		0.76	1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)		1410	1583				1770	3539			3539	1583
Volume (vph)	44	0	81	0	0	0	35	1206	0	0	1165	66
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	0	88	0	0	0	38	1311	0	0	1266	72
RTOR Reduction (vph)	0	0	78	0	0	0	0	0	0	0	0	23
Lane Group Flow (vph)	0	48	10	0	0	0	38	1311	0	0	1266	49
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		7.9	7.9				2.0	51.6			45.6	45.6
Effective Green, g (s)		7.9	7.9				2.0	51.6			45.6	45.6
Actuated g/C Ratio		0.12	0.12				0.03	0.76			0.68	0.68
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		165	185				52	2705			2391	1069
v/s Ratio Prot							0.02	c0.37			c0.36	
v/s Ratio Perm		0.03	0.06									0.05
v/c Ratio		0.29	0.06				0.73	0.48			0.53	0.05
Uniform Delay, d1		27.2	26.5				32.5	3.0			5.5	3.7
Progression Factor		1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2		1.0	0.1				40.9	0.1			0.2	0.0
Delay (s)		28.2	26.6				73.4	3.1			5.7	3.7
Level of Service		C	C				E	A			A	A
Approach Delay (s)		27.2			0.0			5.1			5.6	
Approach LOS		C			A			A			A	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	310	255	214	1033	1016	375
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	277	233	1123	1104	408
RTOR Reduction (vph)	0	210	0	0	0	250
Lane Group Flow (vph)	337	67	233	1123	1104	158
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.5	14.5	10.2	37.5	23.3	23.3
Effective Green, g (s)	14.5	14.5	10.2	37.5	23.3	23.3
Actuated g/C Ratio	0.24	0.24	0.17	0.62	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	428	383	301	2212	1374	615
v/s Ratio Prot	c0.19		c0.13	0.32	c0.31	
v/s Ratio Perm		0.17				0.26
v/c Ratio	0.79	0.17	0.77	0.51	0.80	0.26
Uniform Delay, d1	21.3	18.0	23.8	6.2	16.3	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.3	0.2	11.7	0.8	5.1	1.0
Delay (s)	30.6	18.2	35.5	7.0	21.4	13.5
Level of Service	C	B	D	A	C	B
Approach Delay (s)	25.0			11.9	19.3	
Approach LOS	C			B	B	

Intersection Summary

HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

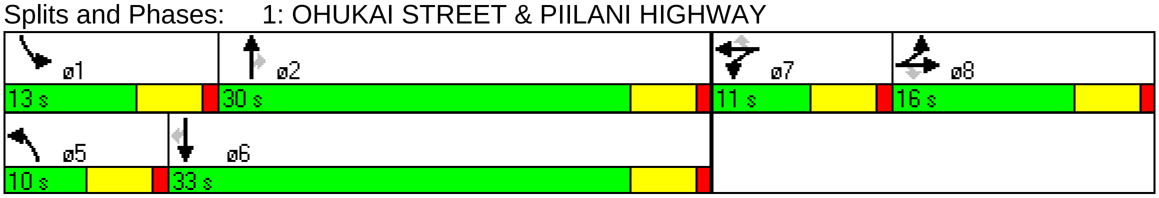
c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	45	137	62	37	38	1007	102	95	1089	105
Lane Group Flow (vph)	241	149	140	40	41	1095	111	103	1184	114
Turn Type		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases	8		7		5	2		1	6	
Permitted Phases		8		7			2			6
Detector Phases	8	8	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	16.0	16.0	11.0	11.0	10.0	30.0	30.0	13.0	33.0	33.0
Total Split (%)	22.9%	22.9%	15.7%	15.7%	14.3%	42.9%	42.9%	18.6%	47.1%	47.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.75	0.37	0.75	0.20	0.27	0.73	0.15	0.45	0.69	0.14
Control Delay	43.0	8.1	57.7	13.3	35.2	22.2	4.1	34.9	18.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	8.1	57.7	13.3	35.2	22.2	4.1	34.9	18.0	3.5
Queue Length 50th (ft)	101	0	60	0	17	220	0	42	227	0
Queue Length 95th (ft)	#210	45	#148	26	45	#306	29	87	307	27
Internal Link Dist (ft)	459		456			2865			2675	
Turn Bay Length (ft)										
Base Capacity (vph)	327	411	186	198	152	1500	735	231	1723	829
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.36	0.75	0.20	0.27	0.73	0.15	0.45	0.69	0.14

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 66.4
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	13	56	42	39	51	25	1137	60	68	1381	49
Lane Group Flow (vph)	0	79	61	0	88	55	27	1236	65	74	1501	53
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	10.0	38.0	38.0	10.0	38.0	38.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	16.7%	63.3%	63.3%	16.7%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio		0.49	0.24		0.48	0.23	0.18	0.52	0.06	0.47	0.60	0.05
Control Delay		34.1	10.2		32.6	10.4	28.5	7.7	2.0	35.3	7.8	2.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		34.1	10.2		32.6	10.4	28.5	7.7	2.0	35.3	7.8	2.2
Queue Length 50th (ft)		27	0		30	0	9	138	0	26	95	0
Queue Length 95th (ft)		64	28		68	27	29	193	13	61	266	11
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)		163	250		184	245	153	2392	1091	158	2510	1138
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.48	0.24		0.48	0.22	0.18	0.52	0.06	0.47	0.60	0.05

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 70
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	186	0	328	0	282	968	6	1143	157
Lane Group Flow (vph)	101	101	357	3	307	1056	7	1242	171
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	26.0	26.0	9.0	26.0	26.0
Total Split (s)	13.0	13.0	39.0	11.0	26.0	47.0	9.0	30.0	30.0
Total Split (%)	16.3%	16.3%	48.8%	13.8%	32.5%	58.8%	11.3%	37.5%	37.5%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.0	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	Min	None	Min	Min
v/c Ratio	0.41	0.41	0.27	0.02	0.48	0.45	0.05	0.80	0.22
Control Delay	32.0	32.0	2.9	25.7	24.1	6.7	33.5	21.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	32.0	2.9	25.7	24.1	6.7	33.5	21.1	3.4
Queue Length 50th (ft)	32	32	2	0	49	60	2	175	0
Queue Length 95th (ft)	#103	#103	32	8	106	225	16	#431	36
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	248	248	1531	168	1053	2407	129	1559	793
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.41	0.23	0.02	0.29	0.44	0.05	0.80	0.22

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 61.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

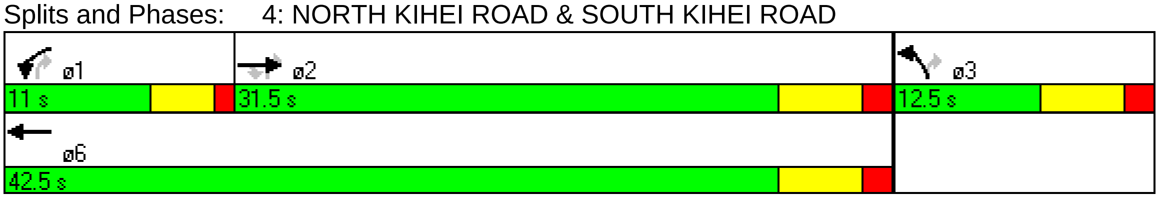
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	288	389	129	292	299	141
Lane Group Flow (vph)	313	423	140	317	325	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	30.5	30.5	9.0	15.5	12.5	
Total Split (s)	31.5	31.5	11.0	42.5	12.5	55.0
Total Split (%)	57.3%	57.3%	20.0%	77.3%	22.7%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	Min	Min	
v/c Ratio	0.40	0.46	0.58	0.14	0.52	0.10
Control Delay	10.2	2.5	31.6	3.1	23.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	2.5	31.6	3.1	23.0	0.1
Queue Length 50th (ft)	56	0	38	13	44	0
Queue Length 95th (ft)	100	35	#110	22	86	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	940	1008	261	2477	624	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.42	0.54	0.13	0.52	0.10

Intersection Summary

Cycle Length: 55
Actuated Cycle Length: 47.8
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	74	170	129	1024	1166	117
Lane Group Flow (vph)	80	185	140	1113	1267	127
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	45.0	45.0	45.0	45.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.27	0.56	0.66	0.46	0.52	0.11
Control Delay	20.4	15.3	25.7	5.2	5.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	15.3	25.7	5.2	5.7	1.2
Queue Length 50th (ft)	21	30	20	65	79	0
Queue Length 95th (ft)	57	87	#133	141	171	14
Internal Link Dist (ft)	253			2017	2865	
Turn Bay Length (ft)						
Base Capacity (vph)	455	463	218	2516	2516	1162
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.40	0.64	0.44	0.50	0.11

Intersection Summary

Cycle Length: 65
Actuated Cycle Length: 57
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

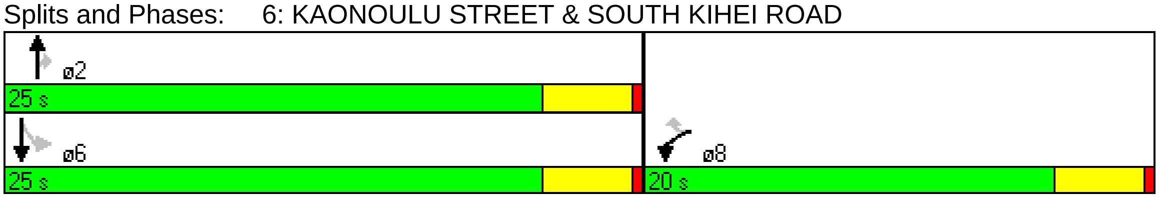
Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	112	28	536	127	48	455
Lane Group Flow (vph)	122	30	583	138	52	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	25.0	25.0	25.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.39	0.10	0.43	0.12	0.13	0.36
Control Delay	12.2	5.7	5.7	1.4	5.5	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	5.7	5.7	1.4	5.5	5.1
Queue Length 50th (ft)	22	0	59	0	4	47
Queue Length 95th (ft)	50	12	144	15	18	113
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	498	467	1366	1198	391	1366
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.06	0.43	0.12	0.13	0.36

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 56.7
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	SBR	ø1	ø8
Lane Configurations									
Volume (vph)	44	0	81	35	1206	1165	66		
Lane Group Flow (vph)	0	48	88	38	1311	1266	72		
Turn Type	Perm		Perm	Prot			Perm		
Protected Phases		4		5	2	6		1	8
Permitted Phases	4		4				6		
Detector Phases	4	4	4	5	2	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	8.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	8.0	32.0	32.0	32.0	8.0	20.0
Total Split (%)	33.3%	33.3%	33.3%	13.3%	53.3%	53.3%	53.3%	13%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag				Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	None	None
v/c Ratio		0.27	0.32	0.34	0.49	0.51	0.06		
Control Delay		19.0	6.6	30.8	4.2	6.9	2.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay		19.0	6.6	30.8	4.2	6.9	2.2		
Queue Length 50th (ft)		10	0	9	67	63	0		
Queue Length 95th (ft)		37	30	35	128	204	14		
Internal Link Dist (ft)		212			1953	2017			
Turn Bay Length (ft)									
Base Capacity (vph)		332	441	113	2680	2467	1125		
Starvation Cap Reductn		0	0	0	0	0	0		
Spillback Cap Reductn		0	0	0	0	0	0		
Storage Cap Reductn		0	0	0	0	0	0		
Reduced v/c Ratio		0.14	0.20	0.34	0.49	0.51	0.06		

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 66.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	310	255	214	1033	1016	375
Lane Group Flow (vph)	337	277	233	1123	1104	408
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	14.0	40.0	26.0	26.0
Total Split (%)	33.3%	33.3%	23.3%	66.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.79	0.47	0.77	0.51	0.80	0.47
Control Delay	31.1	5.3	42.9	7.5	23.1	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	5.3	42.9	7.5	23.1	3.8
Queue Length 50th (ft)	110	0	82	108	187	0
Queue Length 95th (ft)	#216	48	#184	151	#297	48
Internal Link Dist (ft)	620			1070	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	472	625	307	2210	1373	864
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.44	0.76	0.51	0.80	0.47

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	132	11	25	134	52	9	9	28	86	5	17
Peak Hour Factor	0.55	0.77	0.50	0.40	0.50	0.65	0.25	0.50	0.39	0.83	0.50	0.61
Hourly flow rate (vph)	44	171	22	62	268	80	36	18	72	104	10	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		817			333							
pX, platoon unblocked												
vC, conflicting volume	348			193			696	743	182	772	714	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	348			193			696	743	182	772	714	308
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			95			89	94	92	60	97	96
cM capacity (veh/h)	1211			1380			314	316	860	261	328	732

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	44	193	62	348	36	90	104	38
Volume Left	44	0	62	0	36	0	104	0
Volume Right	0	22	0	80	0	72	0	28
cSH	1211	1700	1380	1700	314	639	261	553
Volume to Capacity	0.04	0.11	0.05	0.20	0.11	0.14	0.40	0.07
Queue Length 95th (ft)	3	0	4	0	10	12	45	5
Control Delay (s)	8.1	0.0	7.7	0.0	17.9	11.5	27.7	12.0
Lane LOS	A		A		C	B	D	B
Approach Delay (s)	1.5		1.2		13.4		23.5	
Approach LOS					B		C	

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	70	169	10	6	158	8	5	4	7	7	3	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	184	11	7	172	9	5	4	8	8	3	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		370			780							
pX, platoon unblocked												
vC, conflicting volume	180			195			626	535	189	535	536	176
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			195			626	535	189	535	536	176
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			98	99	99	98	99	89
cM capacity (veh/h)	1395			1379			334	425	853	428	424	867

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	76	195	7	180	17	109
Volume Left	76	0	7	0	5	8
Volume Right	0	11	0	9	8	98
cSH	1395	1700	1379	1700	491	786
Volume to Capacity	0.05	0.11	0.00	0.11	0.04	0.14
Queue Length 95th (ft)	4	0	0	0	3	12
Control Delay (s)	7.7	0.0	7.6	0.0	12.6	10.3
Lane LOS	A		A		B	B
Approach Delay (s)	2.2		0.3		12.6	10.3
Approach LOS					B	B

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D
Level-of-Service Worksheets for 2018 Background Conditions
With Mitigation

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1770	1583	1681	1710	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1770	1583	1681	1710	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	93	88	79	211	40	177	25	1110	40	167	1494	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	96	86	229	43	192	27	1207	43	182	1624	84
RTOR Reduction (vph)	0	0	75	0	0	167	0	0	19	0	0	25
Lane Group Flow (vph)	101	96	11	132	140	25	27	1207	24	182	1624	59
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	15.4	15.4	15.4	15.3	15.3	15.3	6.0	61.0	61.0	13.3	68.3	68.3
Effective Green, g (s)	16.4	16.4	16.4	16.3	16.3	16.3	7.0	62.0	62.0	14.3	69.3	69.3
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.06	0.50	0.50	0.11	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	221	232	208	219	223	206	99	1755	785	393	1962	878
v/s Ratio Prot	c0.06	0.05		0.08	0.08		0.02	0.34		c0.05	c0.46	
v/s Ratio Perm			0.05			0.12			0.03			0.05
v/c Ratio	0.46	0.41	0.05	0.60	0.63	0.12	0.27	0.69	0.03	0.46	0.83	0.07
Uniform Delay, d1	50.2	49.9	47.5	51.3	51.5	48.0	56.6	24.1	16.1	51.8	22.9	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.31	0.50	0.13	1.25	0.67	0.18
Incremental Delay, d2	1.5	1.2	0.1	4.6	5.4	0.3	0.5	2.1	0.1	0.3	3.8	0.1
Delay (s)	51.7	51.1	47.6	55.9	56.9	48.3	74.8	14.1	2.2	65.0	19.1	2.4
Level of Service	D	D	D	E	E	D	E	B	A	E	B	A
Approach Delay (s)		50.2			53.1			15.0			22.8	
Approach LOS		D			D			B			C	

Intersection Summary

HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1374	1863	1583	1389	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	138	17	106	70	28	106	17	1333	55	34	1324	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	18	115	76	30	115	18	1449	60	37	1439	23
RTOR Reduction (vph)	0	0	96	0	0	96	0	0	19	0	0	7
Lane Group Flow (vph)	150	18	19	76	30	19	18	1449	41	37	1439	16
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	19.6	19.6	19.6	19.6	19.6	19.6	4.0	84.4	84.4	6.0	86.4	86.4
Effective Green, g (s)	20.6	20.6	20.6	20.6	20.6	20.6	5.0	85.4	85.4	7.0	87.4	87.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.04	0.68	0.68	0.06	0.70	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	226	307	261	229	307	261	71	2418	1082	99	2474	1107
v/s Ratio Prot		0.01			0.02		0.01	c0.41		c0.02	0.41	
v/s Ratio Perm	c0.11		0.07	0.05		0.07			0.04			0.01
v/c Ratio	0.66	0.06	0.07	0.33	0.10	0.07	0.25	0.60	0.04	0.37	0.58	0.01
Uniform Delay, d1	49.0	44.0	44.1	46.1	44.3	44.1	58.2	10.6	6.4	56.9	9.5	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.64	1.77	4.13	0.77	2.04	2.32
Incremental Delay, d2	7.8	0.1	0.2	1.2	0.2	0.2	0.5	0.9	0.1	0.7	0.8	0.0
Delay (s)	56.8	44.1	44.3	47.3	44.5	44.3	38.0	19.7	26.7	44.4	20.3	13.3
Level of Service	E	D	D	D	D	D	D	B	C	D	C	B
Approach Delay (s)		50.9			45.3			20.2			20.8	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

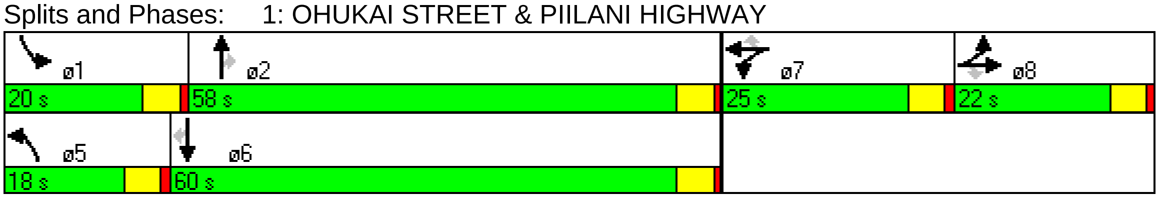
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	88	79	211	40	177	25	1110	40	167	1494	77
Lane Group Flow (vph)	101	96	86	132	140	192	27	1207	43	182	1624	84
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	22.0	22.0
Minimum Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (%)	17.6%	17.6%	17.6%	20.0%	20.0%	20.0%	14.4%	46.4%	46.4%	16.0%	48.0%	48.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.46	0.41	0.30	0.60	0.62	0.51	0.17	0.69	0.05	0.46	0.80	0.09
Control Delay	55.9	54.5	12.4	56.1	56.6	9.9	71.4	14.7	1.0	67.6	19.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	54.5	12.4	56.1	56.6	9.9	71.4	14.7	1.0	67.6	19.9	1.4
Queue Length 50th (ft)	81	76	0	107	114	0	19	433	1	67	714	5
Queue Length 95th (ft)	141	133	48	171	181	66	56	105	1	118	#818	4
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	242	255	302	282	287	426	198	1755	804	439	2018	927
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.38	0.28	0.47	0.49	0.45	0.14	0.69	0.05	0.41	0.80	0.09

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	17	106	70	28	106	17	1333	55	34	1324	21
Lane Group Flow (vph)	150	18	115	76	30	115	18	1449	60	37	1439	23
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0	25.0	10.0	25.0	25.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	12.0%	64.0%	64.0%	12.0%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.66	0.06	0.32	0.33	0.10	0.32	0.12	0.59	0.05	0.24	0.56	0.02
Control Delay	54.8	41.4	9.0	46.8	42.2	9.0	35.4	21.8	10.2	44.2	21.7	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	41.4	9.0	46.8	42.2	9.0	35.4	21.8	10.2	44.2	21.7	8.5
Queue Length 50th (ft)	114	12	0	55	21	0	14	343	7	23	557	4
Queue Length 95th (ft)	180	33	50	99	47	50	m22	588	m35	m44	714	m15
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	286	388	420	289	388	420	156	2475	1125	156	2560	1151
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.05	0.27	0.26	0.08	0.27	0.12	0.59	0.05	0.24	0.56	0.02

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 50 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1750	1583	1681	1724	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1750	1583	1681	1724	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	115	76	81	204	66	168	104	1486	56	138	1398	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	83	88	222	72	183	113	1615	61	150	1520	91
RTOR Reduction (vph)	0	0	79	0	0	137	0	0	17	0	0	26
Lane Group Flow (vph)	101	107	9	143	151	46	113	1615	44	150	1520	65
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	13.5	13.5	13.5	17.4	17.4	17.4	12.9	89.6	89.6	9.5	86.2	86.2
Effective Green, g (s)	14.5	14.5	14.5	18.4	18.4	18.4	13.9	90.6	90.6	10.5	87.2	87.2
Actuated g/C Ratio	0.10	0.10	0.10	0.12	0.12	0.12	0.09	0.60	0.60	0.07	0.58	0.58
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	162	169	153	206	211	194	164	2138	956	240	2057	920
v/s Ratio Prot	0.06	c0.06		0.09	0.09		c0.06	c0.46		0.04	0.43	
v/s Ratio Perm			0.06			0.12			0.04			0.06
v/c Ratio	0.62	0.63	0.06	0.69	0.72	0.24	0.69	0.76	0.05	0.62	0.74	0.07
Uniform Delay, d1	65.1	65.2	61.5	63.1	63.3	59.5	66.0	21.6	12.1	67.8	23.0	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.18	0.54	0.18	0.74	1.38	2.59
Incremental Delay, d2	7.6	7.9	0.2	9.7	11.0	0.6	7.9	2.2	0.1	3.0	2.0	0.1
Delay (s)	72.7	73.1	61.7	72.8	74.2	60.1	85.4	13.9	2.3	53.4	33.8	35.6
Level of Service	E	E	E	E	E	E	F	B	A	D	C	D
Approach Delay (s)		69.6			68.4			18.1			35.5	
Approach LOS		E			E			B			D	

Intersection Summary

HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1354	1863	1583	1385	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	78	19	79	33	42	67	48	1544	108	100	1487	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	21	86	36	46	73	52	1678	117	109	1616	70
RTOR Reduction (vph)	0	0	78	0	0	66	0	0	23	0	0	14
Lane Group Flow (vph)	85	21	8	36	46	7	52	1678	94	109	1616	56
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	14.5	14.5	14.5	14.5	14.5	14.5	8.3	107.9	107.9	13.6	113.2	113.2
Effective Green, g (s)	14.5	14.5	14.5	14.5	14.5	14.5	9.3	108.9	108.9	14.6	114.2	114.2
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.06	0.73	0.73	0.10	0.76	0.76
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	131	180	153	134	180	153	110	2569	1149	172	2694	1205
v/s Ratio Prot		0.01			0.02		0.03	c0.47		c0.06	0.46	
v/s Ratio Perm	c0.06		0.05	0.03		0.05			0.07			0.04
v/c Ratio	0.65	0.12	0.05	0.27	0.26	0.05	0.47	0.65	0.08	0.63	0.60	0.05
Uniform Delay, d1	65.3	61.9	61.5	62.8	62.8	61.5	68.0	10.7	6.0	65.1	7.9	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.13	1.62	1.68	1.19	1.47	1.12
Incremental Delay, d2	10.6	0.3	0.1	1.1	0.8	0.1	2.2	0.9	0.1	5.8	0.8	0.1
Delay (s)	75.9	62.2	61.7	63.9	63.5	61.6	79.2	18.2	10.2	83.5	12.3	5.0
Level of Service	E	E	E	E	E	E	E	B	B	F	B	A
Approach Delay (s)		68.0			62.7			19.4			16.3	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	76	81	204	66	168	104	1486	56	138	1398	84
Lane Group Flow (vph)	101	107	88	143	151	183	113	1615	61	150	1520	91
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	20.0	20.0	20.0	26.0	26.0	26.0	21.0	89.0	89.0	15.0	83.0	83.0
Total Split (%)	13.3%	13.3%	13.3%	17.3%	17.3%	17.3%	14.0%	59.3%	59.3%	10.0%	55.3%	55.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.62	0.63	0.38	0.69	0.71	0.55	0.69	0.76	0.06	0.62	0.74	0.10
Control Delay	77.4	77.4	15.7	72.2	72.8	17.7	86.4	14.7	1.1	58.8	36.4	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.4	77.4	15.7	72.2	72.8	17.7	86.4	14.7	1.1	58.8	36.4	16.9
Queue Length 50th (ft)	101	106	0	143	151	24	106	484	3	74	473	23
Queue Length 95th (ft)	170	177	55	220	230	101	168	590	m1	109	813	99
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	179	187	247	247	253	365	201	2136	973	252	2057	947
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.57	0.36	0.58	0.60	0.50	0.56	0.76	0.06	0.60	0.74	0.10

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	19	79	33	42	67	48	1544	108	100	1487	64
Lane Group Flow (vph)	85	21	86	36	46	73	52	1678	117	109	1616	70
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	19.0	92.0	92.0	26.0	99.0	99.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	12.7%	61.3%	61.3%	17.3%	66.0%	66.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.65	0.12	0.37	0.27	0.25	0.33	0.42	0.65	0.10	0.63	0.59	0.06
Control Delay	67.7	59.5	12.6	61.8	61.5	13.3	77.6	20.8	4.9	80.5	14.1	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	59.5	12.6	61.8	61.5	13.3	77.6	20.8	4.9	80.5	14.1	2.5
Queue Length 50th (ft)	82	19	0	33	43	0	45	795	19	96	694	4
Queue Length 95th (ft)	136	46	52	68	81	49	m63	915	m55	m125	864	m23
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	253	348	365	259	348	355	177	2569	1172	260	2716	1228
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.06	0.24	0.14	0.13	0.21	0.29	0.65	0.10	0.42	0.59	0.06

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1681	1770	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1681	1770	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	177	45	137	67	62	37	38	1007	102	95	1089	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	49	149	73	67	40	41	1095	111	103	1184	114
RTOR Reduction (vph)	0	0	131	0	0	37	0	0	54	0	0	50
Lane Group Flow (vph)	117	124	18	73	67	3	41	1095	57	103	1184	64
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	9.1	9.1	9.1	4.6	4.6	4.6	3.4	41.1	41.1	7.3	45.0	45.0
Effective Green, g (s)	10.1	10.1	10.1	5.6	5.6	5.6	4.4	42.1	42.1	8.3	46.0	46.0
Actuated g/C Ratio	0.12	0.12	0.12	0.07	0.07	0.07	0.05	0.51	0.51	0.10	0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	207	211	195	115	121	108	95	1815	812	347	1983	887
v/s Ratio Prot	0.07	0.07		c0.04	0.04		c0.02	0.31		0.03	c0.33	
v/s Ratio Perm			0.09			0.03			0.07			0.07
v/c Ratio	0.57	0.59	0.09	0.63	0.55	0.03	0.43	0.60	0.07	0.30	0.60	0.07
Uniform Delay, d1	33.9	34.0	31.9	37.3	37.0	35.7	37.6	14.1	10.1	34.2	11.9	8.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	4.4	0.2	10.9	5.4	0.1	1.1	0.8	0.1	0.2	0.7	0.1
Delay (s)	37.7	38.4	32.2	48.2	42.4	35.8	38.8	14.9	10.2	34.4	12.7	8.3
Level of Service	D	D	C	D	D	D	D	B	B	C	B	A
Approach Delay (s)		35.8			43.3			15.3			13.9	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1359	1863	1583	1394	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	60	13	56	42	39	51	25	1137	60	68	1381	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	14	61	46	42	55	27	1236	65	74	1501	53
RTOR Reduction (vph)	0	0	54	0	0	49	0	0	22	0	0	17
Lane Group Flow (vph)	65	14	7	46	42	6	27	1236	43	74	1501	36
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	6.9	6.9	6.9	6.9	6.9	6.9	2.3	46.9	46.9	3.5	48.1	48.1
Effective Green, g (s)	7.9	7.9	7.9	7.9	7.9	7.9	3.3	47.9	47.9	4.5	49.1	49.1
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.66	0.66	0.06	0.68	0.68
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	148	204	173	152	204	173	81	2345	1049	110	2403	1075
v/s Ratio Prot		0.01			0.02		0.02	0.35		c0.04	c0.42	
v/s Ratio Perm	c0.05		0.04	0.03		0.03			0.04			0.03
v/c Ratio	0.44	0.07	0.04	0.30	0.21	0.03	0.33	0.53	0.04	0.67	0.62	0.03
Uniform Delay, d1	30.1	28.9	28.8	29.7	29.3	28.8	33.4	6.3	4.2	33.2	6.5	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.2	0.1	1.5	0.7	0.1	0.9	0.4	0.0	12.0	0.7	0.0
Delay (s)	33.0	29.1	28.9	31.2	30.0	28.9	34.3	6.7	4.3	45.2	7.2	3.8
Level of Service	C	C	C	C	C	C	C	A	A	D	A	A
Approach Delay (s)		30.8			30.0			7.2			8.8	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

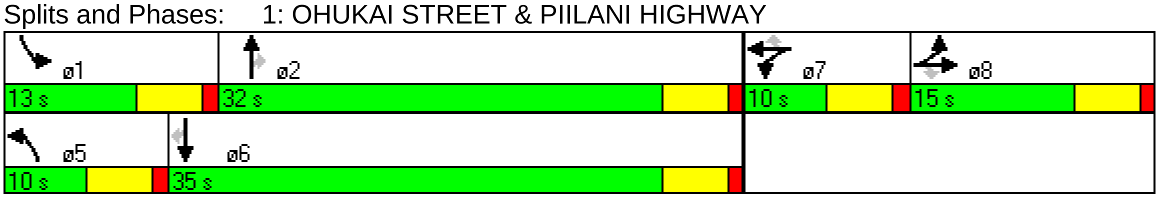
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	45	137	67	62	37	38	1007	102	95	1089	105
Lane Group Flow (vph)	117	124	149	73	67	40	41	1095	111	103	1184	114
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	32.0	32.0	13.0	35.0	35.0
Total Split (%)	21.4%	21.4%	21.4%	14.3%	14.3%	14.3%	14.3%	45.7%	45.7%	18.6%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.49	0.51	0.42	0.56	0.49	0.25	0.31	0.59	0.13	0.26	0.57	0.12
Control Delay	33.3	33.7	9.1	47.2	42.1	15.1	36.7	17.5	3.5	28.2	14.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.3	33.7	9.1	47.2	42.1	15.1	36.7	17.5	3.5	28.2	14.4	2.9
Queue Length 50th (ft)	48	51	0	32	29	0	17	208	0	21	214	0
Queue Length 95th (ft)	98	103	46	#82	68	27	45	283	27	41	290	25
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	239	244	352	131	138	160	134	1841	877	399	2063	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.51	0.42	0.56	0.49	0.25	0.31	0.59	0.13	0.26	0.57	0.12

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 80
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	13	56	42	39	51	25	1137	60	68	1381	49
Lane Group Flow (vph)	65	14	61	46	42	55	27	1236	65	74	1501	53
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	10.0	38.0	38.0	10.0	38.0	38.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	16.7%	63.3%	63.3%	16.7%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.39	0.06	0.24	0.27	0.18	0.23	0.18	0.52	0.06	0.47	0.60	0.05
Control Delay	30.4	23.5	10.2	27.3	24.9	10.4	28.5	7.7	2.0	35.3	7.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	23.5	10.2	27.3	24.9	10.4	28.5	7.7	2.0	35.3	7.8	2.2
Queue Length 50th (ft)	22	5	0	15	14	0	9	138	0	26	95	0
Queue Length 95th (ft)	54	18	28	42	38	27	29	193	13	61	266	11
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	169	231	250	173	231	245	153	2392	1091	158	2510	1138
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.06	0.24	0.27	0.18	0.22	0.18	0.52	0.06	0.47	0.60	0.05

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 70
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Appendix E
Level-of-Service Worksheets for With Promenade Without Honuaula Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1770	1583	1681	1709	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1770	1583	1681	1709	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	93	88	95	227	40	177	38	1188	53	167	1589	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	96	103	247	43	192	41	1291	58	182	1727	84
RTOR Reduction (vph)	0	0	89	0	0	166	0	0	24	0	0	25
Lane Group Flow (vph)	101	96	14	141	149	26	41	1291	34	182	1727	59
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	15.4	15.4	15.4	15.7	15.7	15.7	8.1	60.6	60.6	13.3	65.8	65.8
Effective Green, g (s)	16.4	16.4	16.4	16.7	16.7	16.7	9.1	61.6	61.6	14.3	66.8	66.8
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.07	0.49	0.49	0.11	0.53	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	221	232	208	225	228	211	129	1744	780	393	1891	846
v/s Ratio Prot	0.06	0.05		0.08	0.09		0.02	0.36		c0.05	c0.49	
v/s Ratio Perm			0.07			0.12			0.04			0.05
v/c Ratio	0.46	0.41	0.06	0.63	0.65	0.12	0.32	0.74	0.04	0.46	0.91	0.07
Uniform Delay, d1	50.2	49.9	47.6	51.2	51.4	47.7	55.0	25.3	16.4	51.8	26.5	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.60	1.07	1.28	0.65	0.25
Incremental Delay, d2	1.5	1.2	0.1	5.4	6.6	0.3	0.5	2.6	0.1	0.3	7.4	0.1
Delay (s)	51.7	51.1	47.7	56.6	58.0	47.9	58.7	17.9	17.6	66.5	24.6	3.7
Level of Service	D	D	D	E	E	D	E	B	B	E	C	A
Approach Delay (s)		50.1			53.6			19.1			27.5	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1374	1863	1583	1389	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	138	17	122	86	28	106	30	1384	68	34	1387	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	18	133	93	30	115	33	1504	74	37	1508	23
RTOR Reduction (vph)	0	0	111	0	0	96	0	0	23	0	0	7
Lane Group Flow (vph)	150	18	22	93	30	19	33	1504	51	37	1508	16
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	19.6	19.6	19.6	19.6	19.6	19.6	6.0	84.4	84.4	6.0	84.4	84.4
Effective Green, g (s)	20.6	20.6	20.6	20.6	20.6	20.6	7.0	85.4	85.4	7.0	85.4	85.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.06	0.68	0.68	0.06	0.68	0.68
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	226	307	261	229	307	261	99	2418	1082	99	2418	1082
v/s Ratio Prot		0.01			0.02		0.02	0.42		c0.02	c0.43	
v/s Ratio Perm	c0.11		0.08	0.07		0.07			0.05			0.01
v/c Ratio	0.66	0.06	0.08	0.41	0.10	0.07	0.33	0.62	0.05	0.37	0.62	0.01
Uniform Delay, d1	49.0	44.0	44.2	46.7	44.3	44.1	56.8	10.9	6.5	56.9	10.9	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.57	1.93	4.18	0.78	1.98	2.58
Incremental Delay, d2	7.8	0.1	0.2	1.6	0.2	0.2	0.5	0.9	0.1	0.7	1.0	0.0
Delay (s)	56.8	44.1	44.4	48.3	44.5	44.3	32.8	21.9	27.1	44.9	22.6	16.4
Level of Service	E	D	D	D	D	D	C	C	C	D	C	B
Approach Delay (s)		50.6			45.9			22.4			23.1	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Flt Permitted	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Volume (vph)	211	20	346	14	2	4	398	1220	8	3	1159	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	22	376	15	2	4	433	1326	9	3	1260	120
RTOR Reduction (vph)	0	0	122	0	4	0	0	0	0	0	0	51
Lane Group Flow (vph)	122	129	254	0	17	0	433	1335	0	3	1260	69
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	13.7	13.7	40.7		3.6		21.0	84.7		1.0	64.2	64.2
Effective Green, g (s)	15.7	15.7	41.2		5.6		21.5	86.7		1.0	66.2	66.2
Actuated g/C Ratio	0.13	0.13	0.33		0.04		0.17	0.69		0.01	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	211	213	919		78		590	2453		14	1874	838
v/s Ratio Prot	0.07	c0.08			c0.01		c0.13	0.38		0.00	c0.36	
v/s Ratio Perm			0.13									0.08
v/c Ratio	0.58	0.61	0.28		0.22		0.73	0.54		0.21	0.67	0.08
Uniform Delay, d1	51.5	51.7	30.9		57.6		49.0	9.4		61.6	21.5	14.5
Progression Factor	1.08	1.08	1.77		1.00		0.83	1.87		1.00	1.00	1.00
Incremental Delay, d2	3.8	4.7	0.2		1.4		3.9	0.7		2.8	1.9	0.2
Delay (s)	59.4	60.5	54.8		59.0		44.7	18.3		64.4	23.4	14.7
Level of Service	E	E	D		E		D	B		E	C	B
Approach Delay (s)		56.8			59.0			24.8			22.8	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	330	281	81	455	431	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	305	88	495	468	201
RTOR Reduction (vph)	0	109	0	0	0	0
Lane Group Flow (vph)	359	196	88	495	468	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	78.9	78.9	10.5	93.4	20.6	125.0
Effective Green, g (s)	80.4	80.4	10.5	94.9	22.1	125.0
Actuated g/C Ratio	0.64	0.64	0.08	0.76	0.18	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	1198	1018	149	2687	607	1583
v/s Ratio Prot	c0.19		c0.05	0.14	c0.14	
v/s Ratio Perm		0.19				0.13
v/c Ratio	0.30	0.19	0.59	0.18	0.77	0.13
Uniform Delay, d1	9.9	9.1	55.2	4.2	49.0	0.0
Progression Factor	1.00	1.00	1.21	0.22	1.00	1.00
Incremental Delay, d2	0.6	0.4	3.6	0.1	5.5	0.0
Delay (s)	10.5	9.5	70.2	1.1	54.5	0.0
Level of Service	B	A	E	A	D	A
Approach Delay (s)	10.0			11.5	38.2	
Approach LOS	B			B	D	

Intersection Summary

HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	1.00	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Volume (vph)	50	73	236	152	75	152	111	1067	145	154	1560	68
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	79	257	165	82	165	121	1160	158	167	1696	74
RTOR Reduction (vph)	0	0	12	0	0	135	0	0	49	0	0	22
Lane Group Flow (vph)	54	79	245	165	82	30	121	1160	109	167	1696	52
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.9	10.9	26.4	8.1	11.1	22.6	15.5	78.5	86.6	11.5	74.5	74.5
Effective Green, g (s)	7.9	10.9	26.4	8.1	11.1	22.6	15.5	78.5	86.6	11.5	74.5	74.5
Actuated g/C Ratio	0.06	0.09	0.21	0.06	0.09	0.18	0.12	0.63	0.69	0.09	0.60	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	112	309	385	222	165	593	219	2222	2020	316	2109	943
v/s Ratio Prot	0.03	0.02	c0.08	c0.05	0.04	0.03	0.07	c0.33	0.01	0.05	c0.48	
v/s Ratio Perm			0.08			0.03			0.05			0.05
v/c Ratio	0.48	0.26	0.64	0.74	0.50	0.05	0.55	0.52	0.05	0.53	0.80	0.05
Uniform Delay, d1	56.6	53.3	44.9	57.4	54.3	42.3	51.5	12.9	6.1	54.2	19.6	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.70	2.03	5.97	0.75	1.24	2.39
Incremental Delay, d2	3.2	0.4	3.4	12.6	2.3	0.0	2.5	0.7	0.0	0.9	1.8	0.1
Delay (s)	59.8	53.7	48.4	70.0	56.6	42.4	38.7	26.9	36.6	41.5	26.1	25.2
Level of Service	E	D	D	E	E	D	D	C	D	D	C	C
Approach Delay (s)		51.0			56.3			28.9			27.4	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.38	1.00
Satd. Flow (perm)	1770	1583	1863	1583	701	1863
Volume (vph)	117	60	558	117	59	374
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	65	607	127	64	407
RTOR Reduction (vph)	0	53	0	41	0	0
Lane Group Flow (vph)	127	12	607	86	64	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	9.9	9.9	38.0	38.0	38.0	38.0
Effective Green, g (s)	9.9	9.9	38.0	38.0	38.0	38.0
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.68	0.68
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	313	280	1266	1076	477	1266
v/s Ratio Prot	c0.07		c0.33			0.22
v/s Ratio Perm		0.04		0.08	0.09	
v/c Ratio	0.41	0.04	0.48	0.08	0.13	0.32
Uniform Delay, d1	20.4	19.1	4.3	3.0	3.2	3.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	0.3	0.0	0.1	0.1
Delay (s)	21.3	19.1	4.5	3.1	3.3	3.8
Level of Service	C	B	A	A	A	A
Approach Delay (s)	20.5		4.3			3.7
Approach LOS	C		A			A

Intersection Summary

HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1815	1583		1779	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.76	1.00		0.64	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1409	1583		1201	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	35	32	124	68	5	24	31	1408	123	50	1979	42
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	35	135	74	5	26	34	1530	134	54	2151	46
RTOR Reduction (vph)	0	0	79	0	0	23	0	0	34	0	0	10
Lane Group Flow (vph)	0	73	56	0	79	3	34	1530	100	54	2151	36
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		12.4	12.4		12.4	12.4	4.0	93.6	93.6	7.0	96.6	96.6
Effective Green, g (s)		12.4	12.4		12.4	12.4	4.0	93.6	93.6	7.0	96.6	96.6
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.03	0.75	0.75	0.06	0.77	0.77
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		140	157		119	157	57	2650	1185	99	2735	1223
v/s Ratio Prot							0.02	0.43		c0.03	c0.61	
v/s Ratio Perm		0.05	0.09		0.07	0.02			0.08			0.03
v/c Ratio		0.52	0.35		0.66	0.02	0.60	0.58	0.08	0.55	0.79	0.03
Uniform Delay, d1		53.5	52.6		54.3	50.8	59.7	6.9	4.2	57.5	8.2	3.3
Progression Factor		1.00	1.00		1.00	1.00	1.21	1.31	0.70	0.92	1.51	2.35
Incremental Delay, d2		3.5	1.4		13.1	0.0	13.4	0.8	0.1	4.0	1.6	0.0
Delay (s)		57.0	53.9		67.4	50.8	85.9	9.9	3.1	56.6	14.0	7.8
Level of Service		E	D		E	D	F	A	A	E	B	A
Approach Delay (s)		55.0			63.3			10.9			14.9	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	302	180	101	1200	1661	397
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	328	196	110	1304	1805	432
RTOR Reduction (vph)	0	114	0	0	0	137
Lane Group Flow (vph)	328	82	110	1304	1805	295
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.3	26.3	10.2	90.7	76.5	76.5
Effective Green, g (s)	26.3	26.3	10.2	90.7	76.5	76.5
Actuated g/C Ratio	0.21	0.21	0.08	0.73	0.61	0.61
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	372	333	144	2568	2166	969
v/s Ratio Prot	c0.19		c0.06	0.37	c0.51	
v/s Ratio Perm		0.12				0.27
v/c Ratio	0.88	0.24	0.76	0.51	0.83	0.30
Uniform Delay, d1	47.8	41.1	56.2	7.5	19.2	11.6
Progression Factor	1.00	1.00	1.00	1.00	0.86	0.98
Incremental Delay, d2	20.9	0.4	21.1	0.7	2.6	0.5
Delay (s)	68.8	41.5	77.3	8.2	19.2	11.8
Level of Service	E	D	E	A	B	B
Approach Delay (s)	58.6			13.5	17.7	
Approach LOS	E			B	B	

Intersection Summary

HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.71	1.00	1.00		1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	2555	3539	1583		3539		2714	1863			1863	1583
Volume (vph)	131	33	90	0	67	0	67	12	0	0	9	59
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	36	98	0	73	0	73	13	0	0	10	64
RTOR Reduction (vph)	0	0	59	0	0	0	0	0	0	0	0	38
Lane Group Flow (vph)	142	36	39	0	73	0	73	13	0	0	10	26
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	16.0	16.0	16.0		16.0		16.0	16.0			16.0	16.0
Effective Green, g (s)	16.0	16.0	16.0		16.0		16.0	16.0			16.0	16.0
Actuated g/C Ratio	0.40	0.40	0.40		0.40		0.40	0.40			0.40	0.40
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)	1022	1416	633		1416		1086	745			745	633
v/s Ratio Prot		0.01			0.02			0.01			0.01	
v/s Ratio Perm	0.06		0.06				0.03					0.04
v/c Ratio	0.14	0.03	0.06		0.05		0.07	0.02			0.01	0.04
Uniform Delay, d1	7.6	7.3	7.4		7.4		7.4	7.3			7.2	7.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	0.0	0.2		0.1		0.1	0.0			0.0	0.1
Delay (s)	7.9	7.3	7.6		7.4		7.5	7.3			7.3	7.4
Level of Service	A	A	A		A		A	A			A	A
Approach Delay (s)		7.7			7.4			7.5			7.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

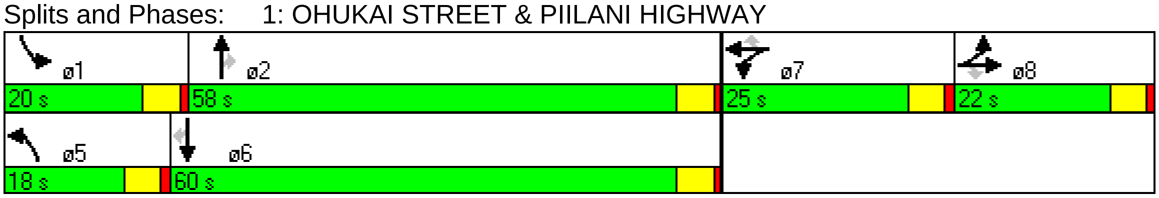
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	88	95	227	40	177	38	1188	53	167	1589	77
Lane Group Flow (vph)	101	96	103	141	149	192	41	1291	58	182	1727	84
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	22.0	22.0
Minimum Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (%)	17.6%	17.6%	17.6%	20.0%	20.0%	20.0%	14.4%	46.4%	46.4%	16.0%	48.0%	48.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.46	0.41	0.35	0.63	0.65	0.51	0.26	0.74	0.07	0.46	0.90	0.10
Control Delay	55.9	54.5	12.0	56.7	57.3	9.8	59.0	18.7	7.5	69.1	25.6	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	54.5	12.0	56.7	57.3	9.8	59.0	18.7	7.5	69.1	25.6	2.1
Queue Length 50th (ft)	81	76	0	114	122	0	33	95	1	79	768	1
Queue Length 95th (ft)	141	133	52	182	191	66	m67	335	m24	119	#918	m8
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	242	255	316	282	287	426	198	1743	804	439	1919	883
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.38	0.33	0.50	0.52	0.45	0.21	0.74	0.07	0.41	0.90	0.10

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	17	122	86	28	106	30	1384	68	34	1387	21
Lane Group Flow (vph)	150	18	133	93	30	115	33	1504	74	37	1508	23
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0	25.0	10.0	25.0	25.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	12.0%	64.0%	64.0%	12.0%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.66	0.06	0.36	0.41	0.10	0.32	0.21	0.61	0.07	0.24	0.61	0.02
Control Delay	54.8	41.4	8.7	48.4	42.2	9.0	32.7	24.3	9.3	44.7	25.1	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	41.4	8.7	48.4	42.2	9.0	32.7	24.3	9.3	44.7	25.1	9.4
Queue Length 50th (ft)	114	12	0	68	21	0	21	556	22	23	636	6
Queue Length 95th (ft)	180	33	54	117	47	50	m36	618	m37	m44	746	m14
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	286	388	435	289	388	420	156	2475	1129	156	2475	1114
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.05	0.31	0.32	0.08	0.27	0.21	0.61	0.07	0.24	0.61	0.02

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 50 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	211	20	346	2	398	1220	3	1159	110
Lane Group Flow (vph)	122	129	376	21	433	1335	3	1260	120
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	4.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	14.5	26.0	8.0	26.0	26.0
Total Split (s)	22.0	22.0	50.3	12.0	28.3	82.0	9.0	62.7	62.7
Total Split (%)	17.6%	17.6%	40.2%	9.6%	22.6%	65.6%	7.2%	50.2%	50.2%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.58	0.60	0.36	0.19	0.73	0.51	0.05	0.65	0.13
Control Delay	62.6	63.3	27.3	51.6	44.5	16.5	59.0	24.0	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	63.3	27.3	51.6	44.5	16.5	59.0	24.0	4.6
Queue Length 50th (ft)	106	112	52	13	188	463	2	422	5
Queue Length 95th (ft)	173	182	154	41	212	598	13	520	39
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	242	245	1086	116	667	2611	71	1942	918
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.53	0.35	0.18	0.65	0.51	0.04	0.65	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 40 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

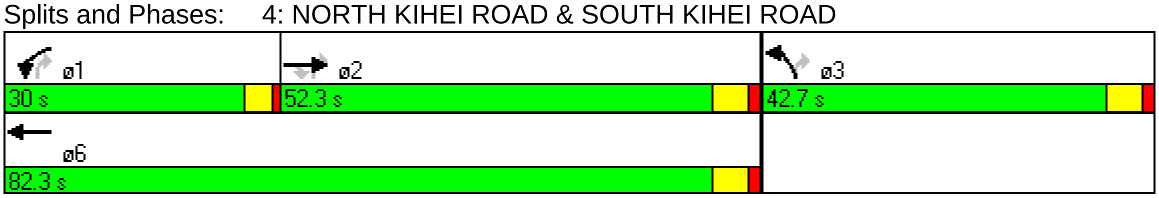
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	330	281	81	455	431	185
Lane Group Flow (vph)	359	305	88	495	468	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	15.5	15.5	9.0	15.5	12.5	
Total Split (s)	52.3	52.3	30.0	82.3	42.7	125.0
Total Split (%)	41.8%	41.8%	24.0%	65.8%	34.2%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	Min	C-Min	Min	
v/c Ratio	0.30	0.27	0.59	0.18	0.77	0.13
Control Delay	11.9	2.0	67.0	1.2	49.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	2.0	67.0	1.2	49.9	0.2
Queue Length 50th (ft)	118	0	74	11	188	0
Queue Length 95th (ft)	216	40	m120	18	233	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1199	1127	368	2687	1063	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.24	0.18	0.44	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 30 (24%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	73	236	152	75	152	111	1067	145	154	1560	68
Lane Group Flow (vph)	54	79	257	165	82	165	121	1160	158	167	1696	74
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	20.0	28.0	16.0	12.0	20.0	14.0	16.0	71.0	12.0	14.0	69.0	69.0
Total Split (%)	16.0%	22.4%	12.8%	9.6%	16.0%	11.2%	12.8%	56.8%	9.6%	11.2%	55.2%	55.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	C-Min
v/c Ratio	0.42	0.23	0.66	0.74	0.50	0.23	0.55	0.52	0.08	0.53	0.80	0.08
Control Delay	57.2	50.6	47.8	77.5	57.8	6.0	44.5	29.5	7.4	43.4	27.7	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.2	50.6	47.8	77.5	57.8	6.0	44.5	29.5	7.4	43.4	27.7	12.7
Queue Length 50th (ft)	43	31	177	69	64	0	89	465	17	71	457	14
Queue Length 95th (ft)	84	53	243	#121	115	29	142	579	51	m79	#582	m25
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	227	679	387	223	238	729	220	2246	2081	325	2131	975
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.66	0.74	0.34	0.23	0.55	0.52	0.08	0.51	0.80	0.08

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	117	60	558	117	59	374
Lane Group Flow (vph)	127	65	607	127	64	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	22.0	22.0	33.0	33.0	33.0	33.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.39	0.19	0.49	0.12	0.17	0.33
Control Delay	13.6	5.4	6.3	1.3	5.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	5.4	6.3	1.3	5.6	5.0
Queue Length 50th (ft)	21	0	61	0	5	35
Queue Length 95th (ft)	65	22	155	14	22	91
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	553	539	1314	1154	390	1314
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.12	0.46	0.11	0.16	0.31

Intersection Summary

Cycle Length: 55
Actuated Cycle Length: 57.2
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	32	124	68	5	24	31	1408	123	50	1979	42
Lane Group Flow (vph)	0	73	135	0	79	26	34	1530	134	54	2151	46
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	92.0	92.0	13.0	95.0	95.0
Total Split (%)	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	8.0%	73.6%	73.6%	10.4%	76.0%	76.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.48	0.57		0.64	0.14	0.37	0.57	0.11	0.47	0.77	0.04
Control Delay		57.7	26.3		64.3	18.1	79.5	11.0	0.8	58.2	15.7	3.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.7	26.3		64.3	18.1	79.5	11.0	0.8	58.2	15.7	3.2
Queue Length 50th (ft)		56	36		62	0	0	420	1	41	552	1
Queue Length 95th (ft)		104	100		114	28	m52	521	m6	m53	821	m10
Internal Link Dist (ft)		212			349			829			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		195	279		158	225	93	2671	1228	128	2779	1253
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.37	0.48		0.50	0.12	0.37	0.57	0.11	0.42	0.77	0.04

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	302	180	101	1200	1661	397
Lane Group Flow (vph)	328	196	110	1304	1805	432
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	33.0	33.0	14.0	92.0	78.0	78.0
Total Split (%)	26.4%	26.4%	11.2%	73.6%	62.4%	62.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.88	0.44	0.76	0.51	0.83	0.39
Control Delay	62.6	14.8	85.1	8.6	20.2	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	14.8	85.1	8.6	20.2	3.2
Queue Length 50th (ft)	252	33	89	232	746	38
Queue Length 95th (ft)	#393	102	#189	282	516	37
Internal Link Dist (ft)	652			1058	2861	
Turn Bay Length (ft)						
Base Capacity (vph)	411	479	148	2568	2166	1106
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.41	0.74	0.51	0.83	0.39

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

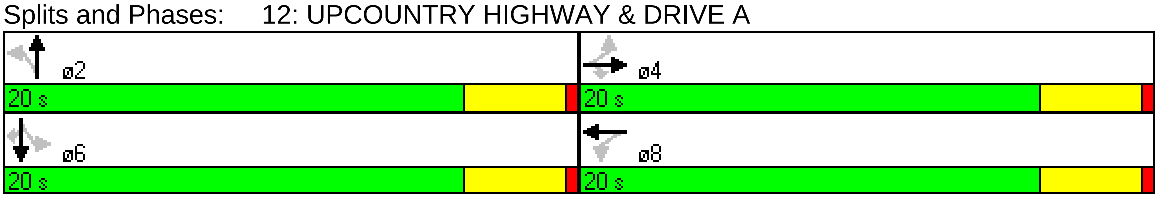
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	131	33	90	67	67	12	9	59
Lane Group Flow (vph)	142	36	98	73	73	13	10	64
Turn Type	Perm		Perm		Perm			Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		4		2			6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.14	0.03	0.14	0.05	0.07	0.02	0.01	0.10
Control Delay	8.1	7.4	3.0	7.5	7.7	7.4	7.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	7.4	3.0	7.5	7.7	7.4	7.3	3.2
Queue Length 50th (ft)	9	2	0	4	4	2	1	0
Queue Length 95th (ft)	21	7	18	13	12	8	7	14
Internal Link Dist (ft)		86		521		103	80	
Turn Bay Length (ft)								
Base Capacity (vph)	1022	1416	692	1416	1086	745	745	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.03	0.14	0.05	0.07	0.02	0.01	0.10

Intersection Summary

Cycle Length: 40
Actuated Cycle Length: 40
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 12: UPCOUNTRY HIGHWAY & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	153	7	20	153	60	13	6	63	162	3	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	166	8	22	166	65	14	7	68	176	3	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	232			174			447	495	170	530	466	199
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			174			443	492	170	527	463	193
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			97	99	92	57	99	98
cM capacity (veh/h)	1333			1403			496	458	874	407	476	842

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	25	174	22	232	14	75	176	18
Volume Left	25	0	22	0	14	0	176	0
Volume Right	0	8	0	65	0	68	0	15
cSH	1333	1700	1403	1700	496	810	407	742
Volume to Capacity	0.02	0.10	0.02	0.14	0.03	0.09	0.43	0.02
Queue Length 95th (ft)	1	0	1	0	2	8	53	2
Control Delay (s)	7.8	0.0	7.6	0.0	12.5	9.9	20.4	10.0
Lane LOS	A		A		B	A	C	A
Approach Delay (s)	1.0		0.7		10.3		19.4	
Approach LOS					B		C	

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	30	175	13	4	146	2	9	0	2	3	0	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	190	14	4	159	2	10	0	2	3	0	72
Approach Volume (veh/h)		237			165			12			75	
Crossing Volume (veh/h)		8			42			226			173	
High Capacity (veh/h)		1376			1340			1160			1210	
High v/c (veh/h)		0.17			0.12			0.01			0.06	
Low Capacity (veh/h)		1154			1120			957			1002	
Low v/c (veh/h)		0.21			0.15			0.01			0.07	

Intersection Summary

Maximum v/c High	0.17		
Maximum v/c Low	0.21		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	255	86	0	279	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	277	93	0	303	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked						
vC, conflicting volume			371		429	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			371		429	139
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1184		554	884

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	139	139	93	152	152	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	93	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.08	0.05	0.09	0.09	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	11.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	255	192	0	0	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	277	209	0	0	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		435	166			
pX, platoon unblocked						
vC, conflicting volume	209				347	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209				347	104
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	90
cM capacity (veh/h)	1359				624	930

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	139	139	104	104	0	95
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	95
cSH	1700	1700	1700	1700	1700	930
Volume to Capacity	0.08	0.08	0.06	0.06	0.00	0.10
Queue Length 95th (ft)	0	0	0	0	0	8
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.3
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.3
Approach LOS						A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	3	32	0	3	64	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	35	0	3	70	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	601					
pX, platoon unblocked						
vC, conflicting volume			38		5	3
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		5	3
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1570		1016	1079

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	3	35	0	2	2	70
Volume Left	0	0	0	0	0	70
Volume Right	0	35	0	0	0	0
cSH	1700	1700	1700	1700	1700	1016
Volume to Capacity	0.00	0.02	0.00	0.00	0.00	0.07
Queue Length 95th (ft)	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	8.8
Lane LOS						A
Approach Delay (s)	0.0		0.0			8.8
Approach LOS						A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	13.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	3	0	0	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	0	0	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	751					
pX, platoon unblocked						
vC, conflicting volume			3		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			3		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1619		1023	1085

Direction, Lane #	EB 1	NB 1
Volume Total	3	3
Volume Left	0	3
Volume Right	3	0
cSH	1700	1023
Volume to Capacity	0.00	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	8.5
Lane LOS		A
Approach Delay (s)	0.0	8.5
Approach LOS		A

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1751	1583	1681	1720	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1751	1583	1681	1720	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	115	76	120	243	66	168	147	1742	99	138	1632	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	83	130	264	72	183	160	1893	108	150	1774	91
RTOR Reduction (vph)	0	0	119	0	0	100	0	0	28	0	0	25
Lane Group Flow (vph)	102	106	11	164	172	83	160	1893	80	150	1774	66
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.6	11.6	11.6	17.7	17.7	17.7	15.6	92.7	92.7	8.0	85.1	85.1
Effective Green, g (s)	12.6	12.6	12.6	18.7	18.7	18.7	16.6	93.7	93.7	9.0	86.1	86.1
Actuated g/C Ratio	0.08	0.08	0.08	0.12	0.12	0.12	0.11	0.62	0.62	0.06	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	141	147	133	210	214	197	196	2211	989	206	2031	909
v/s Ratio Prot	0.06	0.06		0.10	0.10		c0.09	c0.53		0.04	0.50	
v/s Ratio Perm			0.08			0.12			0.07			0.06
v/c Ratio	0.72	0.72	0.08	0.78	0.80	0.42	0.82	0.86	0.08	0.73	0.87	0.07
Uniform Delay, d1	67.0	67.0	63.4	63.7	63.9	60.7	65.2	22.7	11.1	69.3	27.3	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.82	1.38	2.38
Incremental Delay, d2	17.2	16.5	0.3	17.0	19.2	1.5	21.3	4.5	0.2	8.0	4.3	0.1
Delay (s)	84.2	83.4	63.7	80.7	83.1	62.1	86.6	27.2	11.3	65.1	41.9	34.0
Level of Service	F	F	E	F	F	E	F	C	B	E	D	C
Approach Delay (s)		76.1			74.9			30.8			43.3	
Approach LOS		E			E			C			D	

Intersection Summary

HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1354	1863	1583	1385	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	78	19	118	72	42	67	91	1715	151	100	1643	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	21	128	78	46	73	99	1864	164	109	1786	70
RTOR Reduction (vph)	0	0	115	0	0	66	0	0	34	0	0	15
Lane Group Flow (vph)	85	21	13	78	46	7	99	1864	130	109	1786	55
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	12.6	107.4	107.4	13.6	108.4	108.4
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	13.6	108.4	108.4	14.6	109.4	109.4
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.72	0.72	0.10	0.73	0.73
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	135	186	158	139	186	158	160	2558	1144	172	2581	1155
v/s Ratio Prot		0.01			0.02		0.06	c0.53		c0.06	0.50	
v/s Ratio Perm	0.06		0.08	0.06		0.05			0.10			0.04
v/c Ratio	0.63	0.11	0.08	0.56	0.25	0.05	0.62	0.73	0.11	0.63	0.69	0.05
Uniform Delay, d1	64.8	61.4	61.2	64.4	62.3	61.0	65.7	12.2	6.3	65.1	11.1	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.79	2.13	1.20	1.40	1.20
Incremental Delay, d2	8.9	0.3	0.2	5.1	0.7	0.1	3.8	1.0	0.1	5.4	1.1	0.1
Delay (s)	73.7	61.7	61.5	69.5	63.0	61.2	76.7	22.9	13.5	83.3	16.6	6.9
Level of Service	E	E	E	E	E	E	E	C	B	F	B	A
Approach Delay (s)		65.9			64.9			24.6			20.0	
Approach LOS		E			E			C			B	

Intersection Summary

HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Volume (vph)	369	9	295	33	12	44	482	1244	15	10	1347	179
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	10	321	36	13	48	524	1352	16	11	1464	195
RTOR Reduction (vph)	0	0	105	0	24	0	0	0	0	0	0	63
Lane Group Flow (vph)	201	210	216	0	73	0	524	1368	0	11	1464	132
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	21.9	21.9	52.0		9.1		24.1	95.0		2.0	72.4	72.4
Effective Green, g (s)	23.9	23.9	52.5		11.1		24.6	97.0		2.0	74.4	74.4
Actuated g/C Ratio	0.16	0.16	0.35		0.07		0.16	0.65		0.01	0.50	0.50
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	268	269	975		126		563	2285		24	1755	785
v/s Ratio Prot	0.12	c0.12			c0.06		c0.15	0.39		0.01	c0.41	
v/s Ratio Perm			0.12									0.12
v/c Ratio	0.75	0.78	0.22		0.58		0.93	0.60		0.46	0.83	0.17
Uniform Delay, d1	60.2	60.5	34.3		67.2		61.9	15.3		73.5	32.5	20.8
Progression Factor	0.77	0.77	1.19		1.00		1.10	1.14		1.00	1.00	1.00
Incremental Delay, d2	10.2	12.5	0.0		6.3		17.1	0.8		5.0	4.8	0.5
Delay (s)	56.6	59.2	40.9		73.5		84.9	18.2		78.4	37.3	21.2
Level of Service	E	E	D		E		F	B		E	D	C
Approach Delay (s)		50.5			73.5			36.7			35.7	
Approach LOS		D			E			D			D	

Intersection Summary

HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	485	557	141	446	318	178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	527	605	153	485	346	193
RTOR Reduction (vph)	0	239	0	0	0	148
Lane Group Flow (vph)	527	366	153	485	346	45
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	83.0	83.0	18.5	105.5	33.5	33.5
Effective Green, g (s)	84.5	84.5	18.5	107.0	35.0	35.0
Actuated g/C Ratio	0.56	0.56	0.12	0.71	0.23	0.23
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	5.5
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	2.0
Lane Grp Cap (vph)	1049	892	218	2524	801	369
v/s Ratio Prot	0.28		c0.09	0.14	0.10	
v/s Ratio Perm		0.38				0.12
v/c Ratio	0.50	0.41	0.70	0.19	0.43	0.12
Uniform Delay, d1	19.9	18.6	63.1	7.1	49.0	45.4
Progression Factor	1.00	1.00	1.47	0.23	1.00	1.00
Incremental Delay, d2	1.7	1.4	5.5	0.1	1.7	0.7
Delay (s)	21.7	20.0	98.4	1.8	50.7	46.1
Level of Service	C	B	F	A	D	D
Approach Delay (s)	20.8			25.0	49.1	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: KAONOULU STREET & PIILANI HIGHWAY 5/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	0.97	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	3433	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	3433	3539	2787	3433	3539	1583
Volume (vph)	49	164	189	490	179	506	135	1430	468	470	1365	92
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	173	199	516	188	533	142	1505	493	495	1437	97
RTOR Reduction (vph)	0	0	24	0	0	103	0	0	27	0	0	25
Lane Group Flow (vph)	52	173	175	516	188	430	142	1505	466	495	1437	72
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.3	14.5	27.5	30.5	35.7	67.3	13.0	87.4	117.9	31.6	106.0	106.0
Effective Green, g (s)	9.3	14.5	27.5	30.5	35.7	67.3	13.0	87.4	117.9	31.6	106.0	106.0
Actuated g/C Ratio	0.05	0.08	0.15	0.17	0.20	0.37	0.07	0.49	0.66	0.18	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	91	285	277	582	369	1104	248	1718	1887	603	2084	932
v/s Ratio Prot	0.03	0.05	c0.05	c0.15	0.10	0.08	0.04	c0.43	0.04	c0.14	0.41	
v/s Ratio Perm			0.07			0.11			0.13			0.06
v/c Ratio	0.57	0.61	0.63	0.89	0.51	0.39	0.57	0.88	0.25	0.82	0.69	0.08
Uniform Delay, d1	83.4	80.0	71.5	73.1	64.3	41.3	80.8	41.4	12.8	71.5	25.6	15.9
Progression Factor	1.00	1.00	1.00	0.86	1.02	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.4	3.6	4.7	14.1	1.0	0.2	3.2	6.6	0.1	8.8	1.9	0.2
Delay (s)	91.8	83.6	76.2	77.1	66.4	45.4	84.0	48.1	12.8	80.3	27.5	16.1
Level of Service	F	F	E	E	E	D	F	D	B	F	C	B
Approach Delay (s)		81.1			61.8			42.3			39.8	
Approach LOS		F			E			D			D	

Intersection Summary

HCM Average Control Delay	48.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	157	114	544	227	137	522
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	124	591	247	149	567
RTOR Reduction (vph)	0	102	0	114	0	0
Lane Group Flow (vph)	171	22	591	133	149	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	10.8	10.8	33.0	33.0	5.5	42.5
Effective Green, g (s)	10.8	10.8	33.0	33.0	5.5	42.5
Actuated g/C Ratio	0.18	0.18	0.54	0.54	0.09	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	312	279	1003	852	159	1292
v/s Ratio Prot	c0.10		c0.32		c0.08	0.30
v/s Ratio Perm		0.08		0.16		
v/c Ratio	0.55	0.08	0.59	0.16	0.94	0.44
Uniform Delay, d1	23.0	21.1	9.6	7.1	27.7	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1	0.9	0.1	52.5	0.2
Delay (s)	25.0	21.2	10.5	7.2	80.2	4.4
Level of Service	C	C	B	A	F	A
Approach Delay (s)	23.4		9.5			20.2
Approach LOS	C		A			C

Intersection Summary

HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1781	1583		1780	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.71	1.00		0.61	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1332	1583		1127	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	67	6	90	35	3	12	80	2056	27	11	1910	112
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	7	98	38	3	13	87	2235	29	12	2076	122
RTOR Reduction (vph)	0	0	89	0	0	12	0	0	4	0	0	20
Lane Group Flow (vph)	0	80	9	0	41	1	87	2235	25	12	2076	102
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		14.1	14.1		14.1	14.1	12.4	120.8	120.8	3.1	111.5	111.5
Effective Green, g (s)		14.1	14.1		14.1	14.1	12.4	120.8	120.8	3.1	111.5	111.5
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.08	0.81	0.81	0.02	0.74	0.74
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		125	149		106	149	146	2850	1275	37	2631	1177
v/s Ratio Prot							c0.05	c0.63		0.01	0.59	
v/s Ratio Perm		0.06	0.06		0.04	0.01			0.02			0.08
v/c Ratio		0.64	0.06		0.39	0.01	0.60	0.78	0.02	0.32	0.79	0.09
Uniform Delay, d1		65.5	61.9		63.9	61.6	66.4	7.7	2.9	72.4	11.9	5.3
Progression Factor		1.00	1.00		1.00	1.00	0.91	0.86	1.34	1.00	1.00	1.00
Incremental Delay, d2		10.7	0.2		2.3	0.0	4.5	1.6	0.0	5.1	2.5	0.1
Delay (s)		76.2	62.1		66.2	61.6	64.8	8.2	3.9	77.5	14.4	5.4
Level of Service		E	E		E	E	E	A	A	E	B	A
Approach Delay (s)		68.4			65.1			10.2			14.3	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	348	251	244	1686	1510	472
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	378	273	265	1833	1641	513
RTOR Reduction (vph)	0	193	0	0	0	143
Lane Group Flow (vph)	378	80	265	1833	1641	370
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	33.8	33.8	26.3	108.2	77.9	77.9
Effective Green, g (s)	33.8	33.8	26.3	108.2	77.9	77.9
Actuated g/C Ratio	0.23	0.23	0.18	0.72	0.52	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	399	357	310	2553	1838	822
v/s Ratio Prot	c0.21		c0.15	0.52	c0.46	
v/s Ratio Perm		0.17				0.32
v/c Ratio	0.95	0.22	0.85	0.72	0.89	0.45
Uniform Delay, d1	57.2	47.4	60.0	12.1	32.3	22.6
Progression Factor	1.00	1.00	1.00	1.00	0.76	0.70
Incremental Delay, d2	31.5	0.3	19.9	1.8	4.7	1.1
Delay (s)	88.7	47.7	79.9	13.9	29.3	17.0
Level of Service	F	D	E	B	C	B
Approach Delay (s)	71.5			22.2	26.3	
Approach LOS	E			C	C	

Intersection Summary

HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433	3539	1583		3539		3433	1863			1863	1583
Volume (vph)	376	130	287	0	390	0	390	37	0	0	60	171
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	409	141	312	0	424	0	424	40	0	0	65	186
RTOR Reduction (vph)	0	0	103	0	0	0	0	0	0	0	0	141
Lane Group Flow (vph)	409	141	209	0	424	0	424	40	0	0	65	45
Turn Type	Prot		pt+ov	Prot			Prot			Perm		Perm
Protected Phases	7	4	4 5	3	8		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	17.7	37.2	60.2		15.5		19.0	44.8			21.8	21.8
Effective Green, g (s)	17.7	37.2	60.2		15.5		19.0	44.8			21.8	21.8
Actuated g/C Ratio	0.20	0.41	0.67		0.17		0.21	0.50			0.24	0.24
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	675	1463	1059		609		725	927			451	383
v/s Ratio Prot	c0.12	0.04	0.20		c0.12		c0.12	0.02			0.03	
v/s Ratio Perm												0.12
v/c Ratio	0.61	0.10	0.20		0.70		0.58	0.04			0.14	0.12
Uniform Delay, d1	33.0	16.1	5.7		35.0		32.0	11.6			26.8	26.6
Progression Factor	1.20	1.26	5.22		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.4	0.0	0.1		3.5		1.2	0.1			0.7	0.6
Delay (s)	40.9	20.3	29.7		38.5		33.2	11.7			27.4	27.2
Level of Service	D	C	C		D		C	B			C	C
Approach Delay (s)		33.5			38.5			31.3			27.3	
Approach LOS		C			D			C			C	

Intersection Summary

HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	76	120	243	66	168	147	1742	99	138	1632	84
Lane Group Flow (vph)	102	106	130	164	172	183	160	1893	108	150	1774	91
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	17.0	17.0	17.0	24.0	24.0	24.0	22.0	96.0	96.0	13.0	87.0	87.0
Total Split (%)	11.3%	11.3%	11.3%	16.0%	16.0%	16.0%	14.7%	64.0%	64.0%	8.7%	58.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.72	0.72	0.52	0.78	0.80	0.62	0.82	0.86	0.11	0.73	0.87	0.10
Control Delay	91.2	90.3	17.2	82.5	83.8	32.1	86.6	28.2	4.6	73.1	43.4	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.2	90.3	17.2	82.5	83.8	32.1	86.6	28.2	4.6	73.1	43.4	15.8
Queue Length 50th (ft)	104	108	0	165	173	62	154	774	13	77	654	26
Queue Length 95th (ft)	#196	#201	67	#273	#289	148	#263	895	38	m#118	980	m74
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	146	152	256	224	229	310	212	2212	1017	206	2031	933
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.70	0.51	0.73	0.75	0.59	0.75	0.86	0.11	0.73	0.87	0.10

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	19	118	72	42	67	91	1715	151	100	1643	64
Lane Group Flow (vph)	85	21	128	78	46	73	99	1864	164	109	1786	70
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	100.0	100.0	22.0	102.0	102.0
Total Split (%)	18.7%	18.7%	18.7%	18.7%	18.7%	18.7%	13.3%	66.7%	66.7%	14.7%	68.0%	68.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.63	0.11	0.47	0.56	0.25	0.33	0.62	0.73	0.14	0.63	0.69	0.06
Control Delay	68.8	58.9	11.7	67.3	61.1	13.6	78.1	26.0	5.5	83.7	18.6	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	58.9	11.7	67.3	61.1	13.6	78.1	26.0	5.5	83.7	18.6	3.2
Queue Length 50th (ft)	82	19	0	74	43	0	88	916	26	98	817	5
Queue Length 95th (ft)	135	45	61	125	81	48	m109	1084	m56	m123	1006	m22
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	217	298	361	222	298	315	189	2558	1178	212	2582	1170
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.07	0.35	0.35	0.15	0.23	0.52	0.73	0.14	0.51	0.69	0.06

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	369	9	295	12	482	1244	10	1347	179
Lane Group Flow (vph)	201	210	321	97	524	1368	11	1464	195
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	5.0	20.0	5.0	20.0	20.0
Minimum Split (s)	22.0	22.0		11.0	22.5	26.0	9.0	33.0	33.0
Total Split (s)	31.0	31.0	60.0	16.0	29.0	94.0	9.0	74.0	74.0
Total Split (%)	20.7%	20.7%	40.0%	10.7%	19.3%	62.7%	6.0%	49.3%	49.3%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.75	0.78	0.30	0.64	0.93	0.58	0.19	0.83	0.23
Control Delay	56.2	57.7	20.0	65.3	83.9	18.3	77.9	38.8	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	57.7	20.0	65.3	83.9	18.3	77.9	38.8	9.3
Queue Length 50th (ft)	195	205	97	68	280	234	11	670	37
Queue Length 95th (ft)	294	308	140	132	#372	535	34	785	88
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	303	304	1076	160	572	2340	59	1754	847
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.69	0.30	0.61	0.92	0.58	0.19	0.83	0.23

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

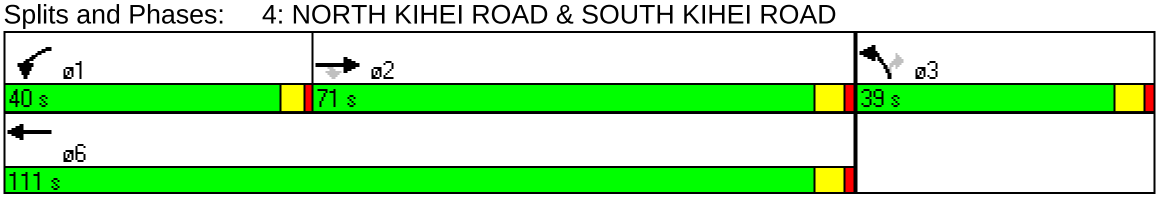
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	485	557	141	446	318	178
Lane Group Flow (vph)	527	605	153	485	346	193
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	3	
Permitted Phases		2				3
Detector Phases	2	2	1	6	3	3
Minimum Initial (s)	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	30.5	30.5	9.0	21.5	21.5	21.5
Total Split (s)	71.0	71.0	40.0	111.0	39.0	39.0
Total Split (%)	47.3%	47.3%	26.7%	74.0%	26.0%	26.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
v/c Ratio	0.50	0.53	0.70	0.19	0.43	0.37
Control Delay	23.1	4.4	93.0	1.8	51.0	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	4.4	93.0	1.8	51.0	8.0
Queue Length 50th (ft)	298	24	156	16	150	0
Queue Length 95th (ft)	467	112	m134	m16	200	66
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1049	1131	425	2524	801	517
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.53	0.36	0.19	0.43	0.37

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 30 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	164	189	490	179	506	135	1430	468	470	1365	92
Lane Group Flow (vph)	52	173	199	516	188	533	142	1505	493	495	1437	97
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	20.0	20.0	23.0	36.0	36.0	35.0	23.0	89.0	36.0	35.0	101.0	101.0
Total Split (%)	11.1%	11.1%	12.8%	20.0%	20.0%	19.4%	12.8%	49.4%	20.0%	19.4%	56.1%	56.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	C-Min
v/c Ratio	0.50	0.64	0.68	0.89	0.51	0.44	0.57	0.87	0.26	0.82	0.68	0.10
Control Delay	87.0	87.3	66.1	75.4	71.1	30.4	83.4	47.9	9.7	81.0	28.3	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.0	87.3	66.1	75.4	71.1	30.4	83.4	47.9	9.7	81.0	28.3	7.6
Queue Length 50th (ft)	61	106	193	322	224	205	85	851	103	291	606	18
Queue Length 95th (ft)	111	150	278	#394	316	273	123	961	133	#368	761	51
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	157	315	345	610	370	1223	362	1745	1947	628	2099	964
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.55	0.58	0.85	0.51	0.44	0.39	0.86	0.25	0.79	0.68	0.10

Intersection Summary

Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	157	114	544	227	137	522
Lane Group Flow (vph)	171	124	591	247	149	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	31.0	31.0	9.0	40.0
Total Split (%)	33.3%	33.3%	51.7%	51.7%	15.0%	66.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
v/c Ratio	0.52	0.31	0.60	0.26	0.94	0.44
Control Delay	19.9	5.5	13.4	2.3	87.0	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	5.5	13.4	2.3	87.0	6.2
Queue Length 50th (ft)	42	0	125	0	42	67
Queue Length 95th (ft)	97	33	270	32	#157	169
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	455	499	1054	1003	159	1343
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.25	0.56	0.25	0.94	0.42

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 61.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	6	90	35	3	12	80	2056	27	11	1910	112
Lane Group Flow (vph)	0	80	98	0	41	13	87	2235	29	12	2076	122
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	25.0	107.0	107.0	16.0	98.0	98.0
Total Split (%)	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	16.7%	71.3%	71.3%	10.7%	65.3%	65.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.64	0.41		0.32	0.08	0.59	0.77	0.02	0.16	0.79	0.10
Control Delay		70.0	12.8		63.9	25.0	62.3	9.0	3.1	69.8	16.4	3.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		70.0	12.8		63.9	25.0	62.3	9.0	3.1	69.8	16.4	3.0
Queue Length 50th (ft)		77	0		38	0	85	283	1	12	593	10
Queue Length 95th (ft)		131	56		77	22	m113	682	m6	35	925	36
Internal Link Dist (ft)		212			261			1847			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		205	326		209	254	248	2908	1304	142	2631	1197
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.39	0.30		0.20	0.05	0.35	0.77	0.02	0.08	0.79	0.10

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 40 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	348	251	244	1686	1510	472
Lane Group Flow (vph)	378	273	265	1833	1641	513
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	39.0	39.0	36.0	111.0	75.0	75.0
Total Split (%)	26.0%	26.0%	24.0%	74.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.95	0.50	0.85	0.72	0.89	0.53
Control Delay	84.1	10.6	69.8	14.4	30.8	8.4
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	84.1	10.6	69.8	14.7	30.8	8.4
Queue Length 50th (ft)	364	18	253	514	668	57
Queue Length 95th (ft)	#559	101	347	594	#984	189
Internal Link Dist (ft)	745			1063	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	413	560	378	2551	1836	964
Starvation Cap Reductn	0	0	0	233	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.49	0.70	0.79	0.89	0.53

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

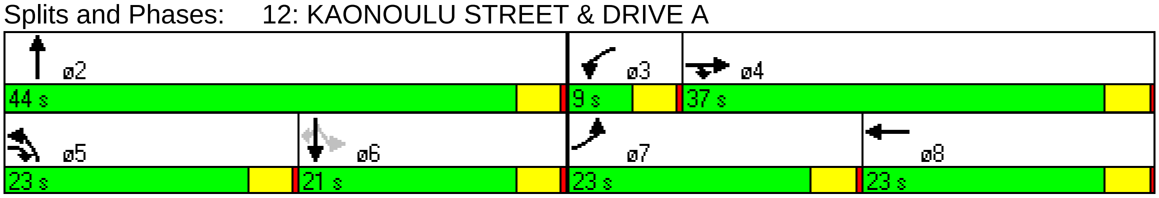
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	376	130	287	390	390	37	60	171	
Lane Group Flow (vph)	409	141	312	424	424	40	65	186	
Turn Type	Prot		pt+ov		Prot			Perm	
Protected Phases	7	4	4 5	8	5	2	6		3
Permitted Phases								6	
Detector Phases	7	4	4 5	8	5	2	6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		20.0	8.0	20.0	20.0	20.0	8.0
Total Split (s)	23.0	37.0	60.0	23.0	23.0	44.0	21.0	21.0	9.0
Total Split (%)	25.6%	41.1%	66.7%	25.6%	25.6%	48.9%	23.3%	23.3%	10%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag		Lag	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.61	0.10	0.27	0.70	0.59	0.04	0.14	0.35	
Control Delay	42.2	19.5	2.2	37.9	34.9	13.5	31.2	7.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.2	19.5	2.2	37.9	34.9	13.5	31.2	7.2	
Queue Length 50th (ft)	199	48	13	120	107	12	31	0	
Queue Length 95th (ft)	247	m65	m84	163	160	31	67	54	
Internal Link Dist (ft)		146		432		103	80		
Turn Bay Length (ft)									
Base Capacity (vph)	725	1492	1174	747	759	929	453	526	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.56	0.09	0.27	0.57	0.56	0.04	0.14	0.35	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: KAONOULU STREET & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	274	16	39	267	98	9	8	34	120	10	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	298	17	42	290	107	10	9	37	130	11	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	397			315			783	868	307	848	824	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			315			763	857	307	834	808	285
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			96	97	95	44	96	98
cM capacity (veh/h)	1117			1245			265	252	733	231	269	692

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	40	315	42	397	10	46	130	26
Volume Left	40	0	42	0	10	0	130	0
Volume Right	0	17	0	107	0	37	0	15
cSH	1117	1700	1245	1700	265	538	231	418
Volume to Capacity	0.04	0.19	0.03	0.23	0.04	0.08	0.56	0.06
Queue Length 95th (ft)	3	0	3	0	3	7	78	5
Control Delay (s)	8.3	0.0	8.0	0.0	19.1	12.3	39.0	14.2
Lane LOS	A		A		C	B	E	B
Approach Delay (s)	0.9		0.8		13.5		34.8	
Approach LOS					B		D	

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	82	319	16	2	287	6	2	1	3	3	1	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	347	17	2	312	7	2	1	3	3	1	63
Approach Volume (veh/h)		453			321			7			67	
Crossing Volume (veh/h)		7			92			439			316	
High Capacity (veh/h)		1378			1288			980			1080	
High v/c (veh/h)		0.33			0.25			0.01			0.06	
Low Capacity (veh/h)		1155			1074			796			886	
Low v/c (veh/h)		0.39			0.30			0.01			0.08	

Intersection Summary			
Maximum v/c High	0.33		
Maximum v/c Low	0.39		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	791	311	0	1177	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	860	338	0	1279	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked			0.98		0.91	0.98
vC, conflicting volume			1198		1499	430
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1185		1394	404
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			576		120	586

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	430	430	338	640	640	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	338	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.25	0.25	0.20	0.38	0.38	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	791	950	0	0	227
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	860	1033	0	0	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		375	226			
pX, platoon unblocked	0.89				0.90	0.89
vC, conflicting volume	1033				1462	516
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	918				1375	340
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	58
cM capacity (veh/h)	661				123	586

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	430	430	516	516	0	247
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	247
cSH	1700	1700	1700	1700	1700	586
Volume to Capacity	0.25	0.25	0.30	0.30	0.00	0.42
Queue Length 95th (ft)	0	0	0	0	0	52
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.5
Lane LOS						C
Approach Delay (s)	0.0		0.0			15.5
Approach LOS						C

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	20	109	0	40	350	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	118	0	43	380	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	512					
pX, platoon unblocked						
vC, conflicting volume			140		43	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			140		43	22
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		60	100
cM capacity (veh/h)			1441		962	1050

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	22	118	0	22	22	380
Volume Left	0	0	0	0	0	380
Volume Right	0	118	0	0	0	0
cSH	1700	1700	1700	1700	1700	962
Volume to Capacity	0.01	0.07	0.00	0.01	0.01	0.40
Queue Length 95th (ft)	0	0	0	0	0	48
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.2
Lane LOS						B
Approach Delay (s)	0.0		0.0			11.2
Approach LOS						B

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	20	0	0	40	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	0	0	43	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	712					
pX, platoon unblocked						
vC, conflicting volume			22		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1594		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	22	0	43
Volume Left	0	0	43
Volume Right	22	0	0
cSH	1700	1700	1023
Volume to Capacity	0.01	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1681	1740	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1681	1740	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	177	45	191	121	62	37	86	1297	150	95	1412	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	49	208	132	67	40	93	1410	163	103	1535	114
RTOR Reduction (vph)	0	0	129	0	0	37	0	0	77	0	0	52
Lane Group Flow (vph)	117	124	79	97	102	3	93	1410	86	103	1535	62
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	10.3	10.3	10.3	5.2	5.2	5.2	4.5	44.5	44.5	6.0	46.0	46.0
Effective Green, g (s)	11.3	11.3	11.3	6.2	6.2	6.2	5.5	45.5	45.5	7.0	47.0	47.0
Actuated g/C Ratio	0.13	0.13	0.13	0.07	0.07	0.07	0.06	0.53	0.53	0.08	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	221	226	208	121	125	114	113	1872	838	279	1934	865
v/s Ratio Prot	0.07	0.07		0.06	c0.06		c0.05	0.40		0.03	c0.43	
v/s Ratio Perm			0.13			0.03			0.10			0.07
v/c Ratio	0.53	0.55	0.38	0.80	0.82	0.03	0.82	0.75	0.10	0.37	0.79	0.07
Uniform Delay, d1	34.9	35.0	34.2	39.3	39.3	37.1	39.8	15.9	10.1	37.4	15.6	9.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	3.0	1.4	30.5	32.0	0.1	34.8	2.1	0.1	0.3	2.7	0.1
Delay (s)	37.5	38.0	35.5	69.8	71.4	37.2	74.6	18.0	10.2	37.7	18.3	9.3
Level of Service	D	D	D	E	E	D	E	B	B	D	B	A
Approach Delay (s)		36.7			65.0			20.4			18.9	
Approach LOS		D			E			C			B	

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1359	1863	1583	1394	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	60	13	110	96	39	51	73	1331	108	68	1596	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	14	120	104	42	55	79	1447	117	74	1735	53
RTOR Reduction (vph)	0	0	104	0	0	47	0	0	41	0	0	19
Lane Group Flow (vph)	65	14	16	104	42	8	79	1447	76	74	1735	34
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	11.3	11.3	11.3	11.3	11.3	11.3	6.2	57.7	57.7	6.1	57.6	57.6
Effective Green, g (s)	12.3	12.3	12.3	12.3	12.3	12.3	7.2	58.7	58.7	7.1	58.6	58.6
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.65	0.65	0.08	0.65	0.65
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	186	254	216	190	254	216	141	2306	1031	139	2302	1030
v/s Ratio Prot		0.01			0.02		c0.04	0.41		0.04	c0.49	
v/s Ratio Perm	0.05		0.08	0.07		0.03			0.07			0.03
v/c Ratio	0.35	0.06	0.08	0.55	0.17	0.03	0.56	0.63	0.07	0.53	0.75	0.03
Uniform Delay, d1	35.3	33.8	33.9	36.3	34.4	33.7	39.9	9.3	5.7	39.9	10.8	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.2	4.0	0.4	0.1	3.0	0.8	0.1	2.0	1.7	0.0
Delay (s)	36.8	34.0	34.1	40.3	34.8	33.8	42.9	10.0	5.8	41.9	12.5	5.7
Level of Service	D	C	C	D	C	C	D	B	A	D	B	A
Approach Delay (s)		35.0			37.4			11.3			13.5	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Volume (vph)	186	0	436	1	0	2	179	1065	4	6	1251	157
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	0	474	1	0	2	195	1158	4	7	1360	171
RTOR Reduction (vph)	0	0	181	0	2	0	0	0	0	0	0	83
Lane Group Flow (vph)	101	101	293	0	1	0	195	1162	0	7	1360	88
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	7.1	7.1	23.9		0.8		10.8	49.1		0.8	39.1	39.1
Effective Green, g (s)	9.1	9.1	23.9		2.8		10.8	51.1		0.8	41.1	41.1
Actuated g/C Ratio	0.11	0.11	0.30		0.04		0.14	0.64		0.01	0.52	0.52
Clearance Time (s)	6.0	6.0			6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	192	192	835		58		465	2265		18	1823	815
v/s Ratio Prot	0.06	0.06			c0.00		0.06	0.33		0.00	c0.38	
v/s Ratio Perm			0.17									0.11
v/c Ratio	0.53	0.53	0.35		0.02		0.42	0.51		0.39	0.75	0.11
Uniform Delay, d1	33.3	33.3	21.9		37.2		31.6	7.7		39.3	15.2	9.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	2.6	0.1		0.1		0.2	0.3		5.0	1.9	0.1
Delay (s)	35.9	35.9	22.0		37.3		31.8	8.0		44.3	17.2	10.0
Level of Service	D	D	C		D		C	A		D	B	B
Approach Delay (s)		26.1			37.3			11.4			16.5	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	396	443	129	389	347	141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	430	482	140	423	377	153
RTOR Reduction (vph)	0	272	0	0	0	0
Lane Group Flow (vph)	430	210	140	423	377	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	25.3	25.3	9.5	38.8	11.6	61.4
Effective Green, g (s)	26.8	26.8	9.5	40.3	13.1	61.4
Actuated g/C Ratio	0.44	0.44	0.15	0.66	0.21	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	813	691	274	2323	732	1583
v/s Ratio Prot	0.23		c0.08	0.12	c0.11	
v/s Ratio Perm		0.30				0.10
v/c Ratio	0.53	0.30	0.51	0.18	0.52	0.10
Uniform Delay, d1	12.7	11.2	23.8	4.1	21.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.5	0.7	0.1	0.3	0.0
Delay (s)	13.9	11.8	24.5	4.2	21.6	0.0
Level of Service	B	B	C	A	C	A
Approach Delay (s)	12.8			9.2	15.4	
Approach LOS	B			A	B	

Intersection Summary

HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	61.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	1.00	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Volume (vph)	74	226	170	619	204	601	129	810	634	673	924	117
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	246	185	673	222	653	140	880	689	732	1004	127
RTOR Reduction (vph)	0	0	21	0	0	164	0	0	28	0	0	77
Lane Group Flow (vph)	80	246	164	673	222	489	140	880	661	732	1004	50
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.0	10.5	20.1	19.0	21.5	42.5	9.6	23.9	42.9	21.0	35.3	35.3
Effective Green, g (s)	8.0	10.5	20.1	19.0	21.5	42.5	9.6	23.9	42.9	21.0	35.3	35.3
Actuated g/C Ratio	0.09	0.12	0.22	0.21	0.24	0.47	0.11	0.26	0.47	0.23	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	411	422	722	443	1434	188	936	1446	797	1382	618
v/s Ratio Prot	0.05	0.07	0.05	c0.20	0.12	c0.11	0.08	c0.25	0.10	c0.21	0.28	
v/s Ratio Perm			0.07			0.13			0.15			0.08
v/c Ratio	0.51	0.60	0.39	0.93	0.50	0.34	0.74	0.94	0.46	0.92	0.73	0.08
Uniform Delay, d1	39.3	37.9	29.9	35.1	29.8	15.1	39.2	32.6	15.9	33.9	23.4	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	2.3	0.6	18.8	0.9	0.1	14.8	16.8	0.2	15.4	1.9	0.1
Delay (s)	41.9	40.3	30.5	53.9	30.7	15.3	54.0	49.4	16.2	49.2	25.4	17.4
Level of Service	D	D	C	D	C	B	D	D	B	D	C	B
Approach Delay (s)		37.0			34.3			36.4			34.2	
Approach LOS		D			C			D			C	

Intersection Summary

HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.36	1.00
Satd. Flow (perm)	1770	1583	1863	1583	676	1863
Volume (vph)	200	116	536	224	145	455
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	126	583	243	158	495
RTOR Reduction (vph)	0	97	0	102	0	0
Lane Group Flow (vph)	217	29	583	141	158	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	9.7	9.7	24.3	24.3	24.3	24.3
Effective Green, g (s)	9.7	9.7	24.3	24.3	24.3	24.3
Actuated g/C Ratio	0.23	0.23	0.58	0.58	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	409	366	1078	916	391	1078
v/s Ratio Prot	c0.12		c0.31			0.27
v/s Ratio Perm		0.08		0.15	0.23	
v/c Ratio	0.53	0.08	0.54	0.15	0.40	0.46
Uniform Delay, d1	14.2	12.7	5.4	4.1	4.9	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.1	0.6	0.1	0.7	0.3
Delay (s)	15.5	12.7	6.0	4.2	5.6	5.4
Level of Service	B	B	A	A	A	A
Approach Delay (s)	14.5		5.5			5.4
Approach LOS	B		A			A

Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	42.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	1.00
Frt		1.00	0.85				1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)		1770	1583				1770	3539			3539	1583
Flt Permitted		0.76	1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)		1410	1583				1770	3539			3539	1583
Volume (vph)	87	0	81	0	0	0	35	1583	0	0	1504	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	0	88	0	0	0	38	1721	0	0	1635	114
RTOR Reduction (vph)	0	0	78	0	0	0	0	0	0	0	0	35
Lane Group Flow (vph)	0	95	10	0	0	0	38	1721	0	0	1635	79
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		10.3	10.3				4.3	68.8			60.5	60.5
Effective Green, g (s)		10.3	10.3				4.3	68.8			60.5	60.5
Actuated g/C Ratio		0.12	0.12				0.05	0.79			0.69	0.69
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		167	187				87	2795			2458	1100
v/s Ratio Prot							0.02	c0.49			c0.46	
v/s Ratio Perm		c0.07	0.06									0.07
v/c Ratio		0.57	0.06				0.44	0.62			0.67	0.07
Uniform Delay, d1		36.3	34.1				40.2	3.7			7.6	4.3
Progression Factor		1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2		4.4	0.1				3.5	0.4			0.7	0.0
Delay (s)		40.7	34.2				43.7	4.2			8.2	4.3
Level of Service		D	C				D	A			A	A
Approach Delay (s)		37.6			0.0			5.0			8.0	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	87.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	418	255	214	1303	1258	472
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	454	277	233	1416	1367	513
RTOR Reduction (vph)	0	197	0	0	0	291
Lane Group Flow (vph)	454	80	233	1416	1367	222
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.0	26.0	13.0	56.0	39.0	39.0
Effective Green, g (s)	26.0	26.0	13.0	56.0	39.0	39.0
Actuated g/C Ratio	0.29	0.29	0.14	0.62	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	511	457	256	2202	1534	686
v/s Ratio Prot	c0.26		c0.13	0.40	c0.39	
v/s Ratio Perm		0.17				0.32
v/c Ratio	0.89	0.18	0.91	0.64	0.89	0.32
Uniform Delay, d1	30.6	24.0	37.9	10.7	23.5	16.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.0	0.8	37.1	1.5	8.2	1.3
Delay (s)	50.7	24.8	75.1	12.2	31.8	18.1
Level of Service	D	C	E	B	C	B
Approach Delay (s)	40.9			21.1	28.0	
Approach LOS	D			C	C	

Intersection Summary

HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433	3539	1583		3539		3433	1863			1863	1583
Volume (vph)	414	199	442	0	518	0	518	60	0	0	55	170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	450	216	480	0	563	0	563	65	0	0	60	185
RTOR Reduction (vph)	0	0	278	0	0	0	0	0	0	0	0	141
Lane Group Flow (vph)	450	216	202	0	563	0	563	65	0	0	60	44
Turn Type	Prot		Prot	Prot			Prot			Prot		Perm
Protected Phases	7	4	4	3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	15.6	37.9	37.9		18.3		18.8	44.1			21.3	21.3
Effective Green, g (s)	15.6	37.9	37.9		18.3		18.8	44.1			21.3	21.3
Actuated g/C Ratio	0.17	0.42	0.42		0.20		0.21	0.49			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	595	1490	667		720		717	913			441	375
v/s Ratio Prot	0.13	0.06	c0.30		0.16		c0.16	0.03			0.03	
v/s Ratio Perm												0.12
v/c Ratio	0.76	0.14	0.30		0.78		0.79	0.07			0.14	0.12
Uniform Delay, d1	35.4	16.1	17.3		34.0		33.7	12.1			27.1	27.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.5	0.0	0.3		5.5		5.7	0.2			0.6	0.6
Delay (s)	40.8	16.1	17.5		39.5		39.3	12.3			27.7	27.6
Level of Service	D	B	B		D		D	B			C	C
Approach Delay (s)		26.4			39.5			36.5			27.6	
Approach LOS		C			D			D			C	

Intersection Summary

HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	45	191	121	62	37	86	1297	150	95	1412	105
Lane Group Flow (vph)	117	124	208	97	102	40	93	1410	163	103	1535	114
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	15.0	15.0	15.0	12.0	12.0	12.0	11.0	50.0	50.0	13.0	52.0	52.0
Total Split (%)	16.7%	16.7%	16.7%	13.3%	13.3%	13.3%	12.2%	55.6%	55.6%	14.4%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.52	0.53	0.61	0.64	0.65	0.22	0.66	0.73	0.17	0.29	0.77	0.12
Control Delay	46.0	46.4	21.3	58.0	57.8	15.8	61.5	19.0	2.5	39.6	19.0	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	46.4	21.3	58.0	57.8	15.8	61.5	19.0	2.5	39.6	19.0	2.5
Queue Length 50th (ft)	67	71	32	56	60	0	53	325	0	28	356	0
Queue Length 95th (ft)	#127	#140	103	#131	#136	30	#126	415	29	53	455	24
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	227	232	342	157	163	185	146	1948	945	361	2017	951
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.53	0.61	0.62	0.63	0.22	0.64	0.72	0.17	0.29	0.76	0.12

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 83.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	13	110	96	39	51	73	1331	108	68	1596	49
Lane Group Flow (vph)	65	14	120	104	42	55	79	1447	117	74	1735	53
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	13.0	59.0	59.0	13.0	59.0	59.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	14.4%	65.6%	65.6%	14.4%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.35	0.05	0.37	0.54	0.16	0.21	0.49	0.62	0.11	0.47	0.75	0.05
Control Delay	38.4	33.0	9.8	42.7	34.4	11.5	46.9	11.5	1.7	45.9	14.2	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	33.0	9.8	42.7	34.4	11.5	46.9	11.5	1.7	45.9	14.2	2.2
Queue Length 50th (ft)	33	7	0	55	21	0	43	258	0	40	360	0
Queue Length 95th (ft)	72	24	47	106	50	32	88	331	19	84	461	13
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	210	288	346	215	288	291	174	2329	1082	174	2327	1059
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.05	0.35	0.48	0.15	0.19	0.45	0.62	0.11	0.43	0.75	0.05

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	186	0	436	0	179	1065	6	1251	157
Lane Group Flow (vph)	101	101	474	3	195	1162	7	1360	171
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	26.0	26.0	9.0	26.0	26.0
Total Split (s)	13.0	13.0	39.0	11.0	26.0	57.0	9.0	40.0	40.0
Total Split (%)	14.4%	14.4%	43.3%	12.2%	28.9%	63.3%	10.0%	44.4%	44.4%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.0	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	Min	None	Min	Min
v/c Ratio	0.47	0.47	0.43	0.02	0.38	0.46	0.06	0.73	0.19
Control Delay	39.7	39.7	9.6	29.3	29.2	6.1	38.5	16.6	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	39.7	9.6	29.3	29.2	6.1	38.5	16.6	2.5
Queue Length 50th (ft)	41	41	35	0	37	70	3	202	0
Queue Length 95th (ft)	#127	#127	100	9	84	252	18	415	31
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	214	214	1336	148	920	2559	113	1865	915
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.47	0.35	0.02	0.21	0.45	0.06	0.73	0.19

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 71.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

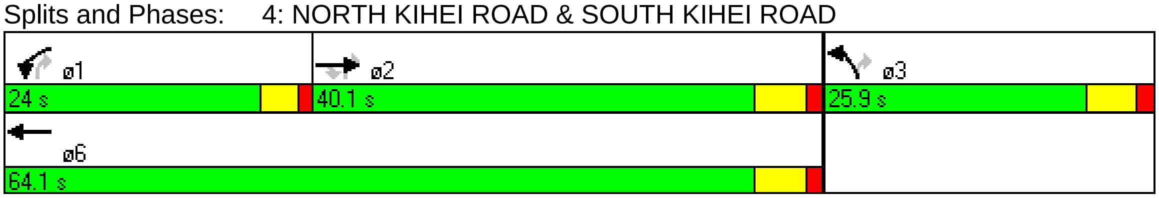
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	396	443	129	389	347	141
Lane Group Flow (vph)	430	482	140	423	377	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	30.5	30.5	9.0	15.5	12.5	
Total Split (s)	40.1	40.1	24.0	64.1	25.9	90.0
Total Split (%)	44.6%	44.6%	26.7%	71.2%	28.8%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	Min	Min	
v/c Ratio	0.54	0.51	0.52	0.18	0.52	0.10
Control Delay	15.8	3.1	29.6	4.5	25.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	3.1	29.6	4.5	25.0	0.1
Queue Length 50th (ft)	109	0	51	26	68	0
Queue Length 95th (ft)	246	53	120	54	128	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	955	1047	504	2618	1097	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.46	0.28	0.16	0.34	0.10

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 62.3
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	226	170	619	204	601	129	810	634	673	924	117
Lane Group Flow (vph)	80	246	185	673	222	653	140	880	689	732	1004	127
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	16.0	14.0	14.0	23.0	21.0	25.0	14.0	28.0	23.0	25.0	39.0	39.0
Total Split (%)	17.8%	15.6%	15.6%	25.6%	23.3%	27.8%	15.6%	31.1%	25.6%	27.8%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
v/c Ratio	0.45	0.65	0.43	0.92	0.50	0.41	0.74	0.93	0.46	0.91	0.72	0.18
Control Delay	41.8	45.9	27.0	55.0	35.8	8.1	59.7	49.5	13.6	50.5	26.7	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	45.9	27.0	55.0	35.8	8.1	59.7	49.5	13.6	50.5	26.7	4.1
Queue Length 50th (ft)	43	71	73	194	113	60	78	256	121	209	251	0
Queue Length 95th (ft)	86	111	135	#300	193	111	#166	#376	170	#314	325	34
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	226	394	422	729	447	1596	197	948	1485	805	1395	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.62	0.44	0.92	0.50	0.41	0.71	0.93	0.46	0.91	0.72	0.18

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

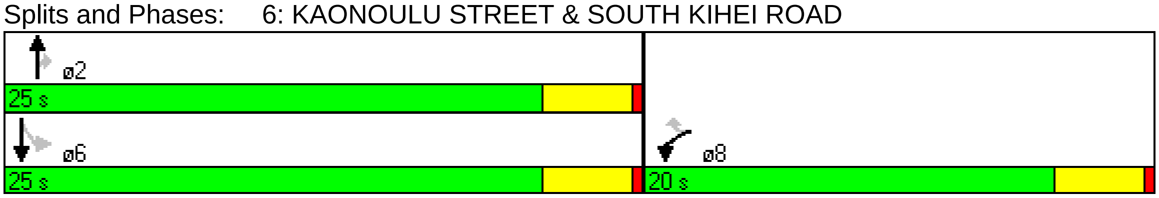
Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	200	116	536	224	145	455
Lane Group Flow (vph)	217	126	583	243	158	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	25.0	25.0	25.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.49	0.26	0.53	0.23	0.50	0.45
Control Delay	12.6	3.7	8.8	1.8	16.1	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	3.7	8.8	1.8	16.1	7.9
Queue Length 50th (ft)	32	0	67	0	18	53
Queue Length 95th (ft)	80	24	186	25	#103	148
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	609	627	1160	1077	332	1160
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.20	0.50	0.23	0.48	0.43

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 41.9
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	SBR	ø1	ø8
Lane Configurations									
Volume (vph)	87	0	81	35	1583	1504	105		
Lane Group Flow (vph)	0	95	88	38	1721	1635	114		
Turn Type	Perm		Perm	Prot			Perm		
Protected Phases		4		5	2	6		1	8
Permitted Phases	4		4				6		
Detector Phases	4	4	4	5	2	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	8.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	21.0	11.0	60.0	58.0	58.0	9.0	21.0
Total Split (%)	23.3%	23.3%	23.3%	12.2%	66.7%	64.4%	64.4%	10%	23%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag				Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	None	None
v/c Ratio		0.52	0.31	0.28	0.61	0.65	0.10		
Control Delay		33.9	9.1	40.7	5.5	10.2	1.7		
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay		33.9	9.1	40.7	5.5	10.2	1.7		
Queue Length 50th (ft)		42	0	17	151	258	0		
Queue Length 95th (ft)		94	39	51	284	413	19		
Internal Link Dist (ft)		212			1953	2017			
Turn Bay Length (ft)									
Base Capacity (vph)		271	376	145	2850	2590	1189		
Starvation Cap Reductn		0	0	0	0	0	0		
Spillback Cap Reductn		0	0	0	0	0	0		
Storage Cap Reductn		0	0	0	0	0	0		
Reduced v/c Ratio		0.35	0.23	0.26	0.60	0.63	0.10		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	255	214	1303	1258	472
Lane Group Flow (vph)	454	277	233	1416	1367	513
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	17.0	60.0	43.0	43.0
Total Split (%)	33.3%	33.3%	18.9%	66.7%	47.8%	47.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
v/c Ratio	0.89	0.42	0.91	0.64	0.89	0.53
Control Delay	52.2	5.4	77.3	12.4	32.5	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	5.4	77.3	12.4	32.5	3.7
Queue Length 50th (ft)	246	0	132	242	366	0
Queue Length 95th (ft)	#421	56	#269	308	#509	56
Internal Link Dist (ft)	620			1070	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	511	654	256	2202	1534	977
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.42	0.91	0.64	0.89	0.53

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

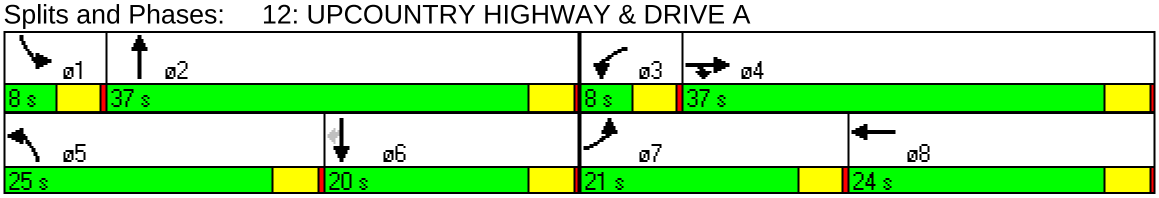
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	ø1	ø3
Lane Configurations										
Volume (vph)	414	199	442	518	518	60	55	170		
Lane Group Flow (vph)	450	216	480	563	563	65	60	185		
Turn Type	Prot		Prot		Prot			Perm		
Protected Phases	7	4	4	8	5	2	6		1	3
Permitted Phases								6		
Detector Phases	7	4	4	8	5	2	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	8.0	20.0	20.0	20.0	8.0	8.0
Total Split (s)	21.0	37.0	37.0	24.0	25.0	37.0	20.0	20.0	8.0	8.0
Total Split (%)	23.3%	41.1%	41.1%	26.7%	27.8%	41.1%	22.2%	22.2%	9%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.76	0.15	0.51	0.78	0.78	0.07	0.14	0.36		
Control Delay	41.4	15.6	3.5	39.4	38.6	13.9	31.7	7.4		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	41.4	15.6	3.5	39.4	38.6	13.9	31.7	7.4		
Queue Length 50th (ft)	124	36	0	156	153	20	29	0		
Queue Length 95th (ft)	175	57	52	214	208	43	64	55		
Internal Link Dist (ft)		86		399		103	80			
Turn Bay Length (ft)										
Base Capacity (vph)	648	1508	950	788	801	914	441	516		
Starvation Cap Reductn	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.69	0.14	0.51	0.71	0.70	0.07	0.14	0.36		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 12: UPCOUNTRY HIGHWAY & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	326	11	25	308	81	9	9	28	118	5	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	354	12	27	335	88	10	10	30	128	5	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	423			366			823	890	360	875	852	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			366			808	881	360	865	840	328
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			96	96	96	43	98	97
cM capacity (veh/h)	1094			1192			255	252	684	227	266	659

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	26	366	27	423	10	40	128	24
Volume Left	26	0	27	0	10	0	128	0
Volume Right	0	12	0	88	0	30	0	18
cSH	1094	1700	1192	1700	255	483	227	494
Volume to Capacity	0.02	0.22	0.02	0.25	0.04	0.08	0.57	0.05
Queue Length 95th (ft)	2	0	2	0	3	7	78	4
Control Delay (s)	8.4	0.0	8.1	0.0	19.7	13.1	39.7	12.7
Lane LOS	A		A		C	B	E	B
Approach Delay (s)	0.6		0.5		14.4		35.5	
Approach LOS					B		E	

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	70	363	10	6	332	8	5	4	7	7	3	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	395	11	7	361	9	5	4	8	8	3	98
Approach Volume (veh/h)		482			376			17			109	
Crossing Volume (veh/h)		17			86			478			373	
High Capacity (veh/h)		1366			1295			950			1033	
High v/c (veh/h)		0.35			0.29			0.02			0.11	
Low Capacity (veh/h)		1144			1080			769			843	
Low v/c (veh/h)		0.42			0.35			0.02			0.13	

Intersection Summary			
Maximum v/c High	0.35		
Maximum v/c Low	0.42		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1056	479	0	1415	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1148	521	0	1538	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked					0.86	
vC, conflicting volume			1668		1917	574
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1668		1903	574
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			381		52	462

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	574	574	521	769	769	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	521	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.34	0.31	0.45	0.45	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1056	1206	0	0	219
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1148	1311	0	0	238
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		435	166			
pX, platoon unblocked	0.85				0.85	0.85
vC, conflicting volume	1311				1885	655
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1191				1865	422
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	52
cM capacity (veh/h)	496				55	494

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	574	574	655	655	0	238
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	238
cSH	1700	1700	1700	1700	1700	494
Volume to Capacity	0.34	0.34	0.39	0.39	0.00	0.48
Queue Length 95th (ft)	0	0	0	0	0	64
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	18.9
Lane LOS						C
Approach Delay (s)	0.0		0.0			18.9
Approach LOS						C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	31	168	0	62	456	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	183	0	67	496	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	479					
pX, platoon unblocked						
vC, conflicting volume			216		67	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			216		67	34
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		47	100
cM capacity (veh/h)			1351		930	1032

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	34	183	0	34	34	496
Volume Left	0	0	0	0	0	496
Volume Right	0	183	0	0	0	0
cSH	1700	1700	1700	1700	1700	930
Volume to Capacity	0.02	0.11	0.00	0.02	0.02	0.53
Queue Length 95th (ft)	0	0	0	0	0	81
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	13.2
Lane LOS						B
Approach Delay (s)	0.0		0.0			13.2
Approach LOS						B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	31	0	0	62	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	0	0	67	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	629					
pX, platoon unblocked						
vC, conflicting volume			34		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			34		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1578		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	34	0	67
Volume Left	0	0	67
Volume Right	34	0	0
cSH	1700	1700	1023
Volume to Capacity	0.02	0.00	0.07
Queue Length 95th (ft)	0	0	5
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	6.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F
Level-of-Service Worksheets for With Promenade With Honuaula Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1770	1583	1681	1709	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1770	1583	1681	1709	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	93	88	95	227	40	177	38	1226	53	167	1602	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	96	103	247	43	192	41	1333	58	182	1741	84
RTOR Reduction (vph)	0	0	89	0	0	166	0	0	23	0	0	25
Lane Group Flow (vph)	101	96	14	141	149	26	41	1333	35	182	1741	59
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	15.4	15.4	15.4	15.7	15.7	15.7	8.1	60.6	60.6	13.3	65.8	65.8
Effective Green, g (s)	16.4	16.4	16.4	16.7	16.7	16.7	9.1	61.6	61.6	14.3	66.8	66.8
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.07	0.49	0.49	0.11	0.53	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	221	232	208	225	228	211	129	1744	780	393	1891	846
v/s Ratio Prot	0.06	0.05		0.08	0.09		0.02	0.38		c0.05	c0.49	
v/s Ratio Perm			0.07			0.12			0.04			0.05
v/c Ratio	0.46	0.41	0.06	0.63	0.65	0.12	0.32	0.76	0.04	0.46	0.92	0.07
Uniform Delay, d1	50.2	49.9	47.6	51.2	51.4	47.7	55.0	25.8	16.4	51.8	26.7	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.61	1.03	1.28	0.67	0.28
Incremental Delay, d2	1.5	1.2	0.1	5.4	6.6	0.3	0.5	3.0	0.1	0.3	7.9	0.1
Delay (s)	51.7	51.1	47.7	56.6	58.0	47.9	58.9	18.6	17.1	66.4	25.8	4.1
Level of Service	D	D	D	E	E	D	E	B	B	E	C	A
Approach Delay (s)		50.1			53.6			19.7			28.6	
Approach LOS		D			D			B			C	

Intersection Summary

HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.74	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1374	1863	1583	1389	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	138	17	122	86	28	106	30	1424	68	34	1400	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	18	133	93	30	115	33	1548	74	37	1522	23
RTOR Reduction (vph)	0	0	111	0	0	96	0	0	23	0	0	7
Lane Group Flow (vph)	150	18	22	93	30	19	33	1548	51	37	1522	16
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	19.6	19.6	19.6	19.6	19.6	19.6	6.0	84.4	84.4	6.0	84.4	84.4
Effective Green, g (s)	20.6	20.6	20.6	20.6	20.6	20.6	7.0	85.4	85.4	7.0	85.4	85.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.06	0.68	0.68	0.06	0.68	0.68
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	226	307	261	229	307	261	99	2418	1082	99	2418	1082
v/s Ratio Prot		0.01			0.02		0.02	c0.44		c0.02	0.43	
v/s Ratio Perm	c0.11		0.08	0.07		0.07			0.05			0.01
v/c Ratio	0.66	0.06	0.08	0.41	0.10	0.07	0.33	0.64	0.05	0.37	0.63	0.01
Uniform Delay, d1	49.0	44.0	44.2	46.7	44.3	44.1	56.8	11.1	6.5	56.9	11.0	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.56	1.93	4.05	0.79	1.96	2.51
Incremental Delay, d2	7.8	0.1	0.2	1.6	0.2	0.2	0.5	0.9	0.1	0.7	1.0	0.0
Delay (s)	56.8	44.1	44.4	48.3	44.5	44.3	32.5	22.5	26.3	45.5	22.6	15.9
Level of Service	E	D	D	D	D	D	C	C	C	D	C	B
Approach Delay (s)		50.6			45.9			22.9			23.0	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Flt Permitted	0.95	0.96	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	2787		1752		3433	3536		1770	3539	1583
Volume (vph)	211	20	349	14	2	4	408	1250	8	3	1169	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	22	379	15	2	4	443	1359	9	3	1271	120
RTOR Reduction (vph)	0	0	121	0	4	0	0	0	0	0	0	51
Lane Group Flow (vph)	122	129	258	0	17	0	443	1368	0	3	1271	69
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	13.8	13.8	41.0		3.6		21.2	84.6		1.0	63.9	63.9
Effective Green, g (s)	15.8	15.8	41.5		5.6		21.7	86.6		1.0	65.9	65.9
Actuated g/C Ratio	0.13	0.13	0.33		0.04		0.17	0.69		0.01	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	212	215	925		78		596	2450		14	1866	835
v/s Ratio Prot	0.07	c0.08			c0.01		c0.13	0.39		0.00	c0.36	
v/s Ratio Perm			0.14									0.08
v/c Ratio	0.58	0.60	0.28		0.22		0.74	0.56		0.21	0.68	0.08
Uniform Delay, d1	51.4	51.6	30.7		57.6		49.0	9.6		61.6	21.8	14.6
Progression Factor	1.07	1.07	1.76		1.00		0.82	1.87		1.00	1.00	1.00
Incremental Delay, d2	3.7	4.4	0.2		1.4		4.1	0.7		2.8	2.0	0.2
Delay (s)	58.9	59.8	54.4		59.0		44.5	18.7		64.4	23.8	14.8
Level of Service	E	E	D		E		D	B		E	C	B
Approach Delay (s)		56.4			59.0			25.0			23.1	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	333	281	81	465	431	185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	362	305	88	505	468	201
RTOR Reduction (vph)	0	109	0	0	0	0
Lane Group Flow (vph)	362	196	88	505	468	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	78.9	78.9	10.5	93.4	20.6	125.0
Effective Green, g (s)	80.4	80.4	10.5	94.9	22.1	125.0
Actuated g/C Ratio	0.64	0.64	0.08	0.76	0.18	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	1198	1018	149	2687	607	1583
v/s Ratio Prot	c0.19		c0.05	0.14	c0.14	
v/s Ratio Perm		0.19				0.13
v/c Ratio	0.30	0.19	0.59	0.19	0.77	0.13
Uniform Delay, d1	9.9	9.1	55.2	4.2	49.0	0.0
Progression Factor	1.00	1.00	1.21	0.22	1.00	1.00
Incremental Delay, d2	0.6	0.4	3.6	0.1	5.5	0.0
Delay (s)	10.5	9.5	70.5	1.1	54.5	0.0
Level of Service	B	A	E	A	D	A
Approach Delay (s)	10.1			11.4	38.2	
Approach LOS	B			B	D	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	1.00	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Volume (vph)	50	73	236	152	75	152	111	1067	145	154	1560	68
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	79	257	165	82	165	121	1160	158	167	1696	74
RTOR Reduction (vph)	0	0	12	0	0	135	0	0	49	0	0	22
Lane Group Flow (vph)	54	79	245	165	82	30	121	1160	109	167	1696	52
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.9	10.9	26.4	8.1	11.1	22.6	15.5	78.5	86.6	11.5	74.5	74.5
Effective Green, g (s)	7.9	10.9	26.4	8.1	11.1	22.6	15.5	78.5	86.6	11.5	74.5	74.5
Actuated g/C Ratio	0.06	0.09	0.21	0.06	0.09	0.18	0.12	0.63	0.69	0.09	0.60	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	112	309	385	222	165	593	219	2222	2020	316	2109	943
v/s Ratio Prot	0.03	0.02	c0.08	c0.05	0.04	0.03	0.07	c0.33	0.01	0.05	c0.48	
v/s Ratio Perm			0.08			0.03			0.05			0.05
v/c Ratio	0.48	0.26	0.64	0.74	0.50	0.05	0.55	0.52	0.05	0.53	0.80	0.05
Uniform Delay, d1	56.6	53.3	44.9	57.4	54.3	42.3	51.5	12.9	6.1	54.2	19.6	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.70	2.03	5.94	0.75	1.24	2.38
Incremental Delay, d2	3.2	0.4	3.4	12.6	2.3	0.0	2.5	0.7	0.0	0.8	1.8	0.1
Delay (s)	59.8	53.7	48.4	70.0	56.6	42.4	38.6	26.8	36.4	41.3	26.1	25.2
Level of Service	E	D	D	E	E	D	D	C	D	D	C	C
Approach Delay (s)		51.0			56.6			28.9			27.4	
Approach LOS		D			E			C			C	

Intersection Summary

HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.37	1.00
Satd. Flow (perm)	1770	1583	1863	1583	695	1863
Volume (vph)	127	70	558	121	62	374
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	76	607	132	67	407
RTOR Reduction (vph)	0	62	0	44	0	0
Lane Group Flow (vph)	138	14	607	88	67	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	10.2	10.2	37.0	37.0	37.0	37.0
Effective Green, g (s)	10.2	10.2	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.18	0.18	0.67	0.67	0.67	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	293	1249	1061	466	1249
v/s Ratio Prot	c0.08		c0.33			0.22
v/s Ratio Perm		0.05		0.08	0.10	
v/c Ratio	0.42	0.05	0.49	0.08	0.14	0.33
Uniform Delay, d1	19.9	18.5	4.4	3.2	3.3	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	0.3	0.0	0.1	0.2
Delay (s)	20.8	18.6	4.7	3.2	3.5	4.0
Level of Service	C	B	A	A	A	A
Approach Delay (s)	20.0		4.5			3.9
Approach LOS	B		A			A

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1815	1583		1779	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.76	1.00		0.64	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1409	1583		1201	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	35	32	124	68	5	24	31	1420	123	50	2018	42
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	35	135	74	5	26	34	1543	134	54	2193	46
RTOR Reduction (vph)	0	0	77	0	0	23	0	0	34	0	0	10
Lane Group Flow (vph)	0	73	58	0	79	3	34	1543	100	54	2193	36
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		12.4	12.4		12.4	12.4	4.0	93.6	93.6	7.0	96.6	96.6
Effective Green, g (s)		12.4	12.4		12.4	12.4	4.0	93.6	93.6	7.0	96.6	96.6
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.03	0.75	0.75	0.06	0.77	0.77
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		140	157		119	157	57	2650	1185	99	2735	1223
v/s Ratio Prot							0.02	0.44		c0.03	c0.62	
v/s Ratio Perm		0.05	0.09		0.07	0.02			0.08			0.03
v/c Ratio		0.52	0.37		0.66	0.02	0.60	0.58	0.08	0.55	0.80	0.03
Uniform Delay, d1		53.5	52.6		54.3	50.8	59.7	7.0	4.2	57.5	8.5	3.3
Progression Factor		1.00	1.00		1.00	1.00	1.21	1.32	0.71	0.92	1.50	2.31
Incremental Delay, d2		3.5	1.5		13.1	0.0	13.3	0.8	0.1	4.1	1.8	0.0
Delay (s)		57.0	54.1		67.4	50.8	85.6	10.0	3.1	56.9	14.5	7.7
Level of Service		E	D		E	D	F	A	A	E	B	A
Approach Delay (s)		55.1			63.3			11.0			15.4	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	308	180	101	1206	1661	416
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	335	196	110	1311	1805	452
RTOR Reduction (vph)	0	114	0	0	0	144
Lane Group Flow (vph)	335	82	110	1311	1805	308
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.5	26.5	10.2	90.5	76.3	76.3
Effective Green, g (s)	26.5	26.5	10.2	90.5	76.3	76.3
Actuated g/C Ratio	0.21	0.21	0.08	0.72	0.61	0.61
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	336	144	2562	2160	966
v/s Ratio Prot	c0.19		c0.06	0.37	c0.51	
v/s Ratio Perm		0.12				0.29
v/c Ratio	0.89	0.24	0.76	0.51	0.84	0.32
Uniform Delay, d1	47.9	40.9	56.2	7.6	19.4	11.8
Progression Factor	1.00	1.00	1.00	1.00	0.86	0.94
Incremental Delay, d2	22.5	0.4	21.1	0.7	2.6	0.5
Delay (s)	70.4	41.3	77.3	8.3	19.3	11.6
Level of Service	E	D	E	A	B	B
Approach Delay (s)	59.7			13.6	17.7	
Approach LOS	E			B	B	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.64	1.00	1.00		1.00		0.75	1.00			1.00	1.00
Satd. Flow (perm)	2307	3539	1583		3539		2714	1863			1863	1583
Volume (vph)	131	65	90	0	166	0	67	12	0	0	9	59
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	71	98	0	180	0	73	13	0	0	10	64
RTOR Reduction (vph)	0	0	59	0	0	0	0	0	0	0	0	38
Lane Group Flow (vph)	142	71	39	0	180	0	73	13	0	0	10	26
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	16.0	16.0	16.0		16.0		16.0	16.0			16.0	16.0
Effective Green, g (s)	16.0	16.0	16.0		16.0		16.0	16.0			16.0	16.0
Actuated g/C Ratio	0.40	0.40	0.40		0.40		0.40	0.40			0.40	0.40
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)	923	1416	633		1416		1086	745			745	633
v/s Ratio Prot		0.02			0.05			0.01			0.01	
v/s Ratio Perm	0.06		0.06				0.03					0.04
v/c Ratio	0.15	0.05	0.06		0.13		0.07	0.02			0.01	0.04
Uniform Delay, d1	7.7	7.3	7.4		7.6		7.4	7.3			7.2	7.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.1	0.2		0.2		0.1	0.0			0.0	0.1
Delay (s)	8.0	7.4	7.6		7.8		7.5	7.3			7.3	7.4
Level of Service	A	A	A		A		A	A			A	A
Approach Delay (s)		7.7			7.8			7.5			7.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

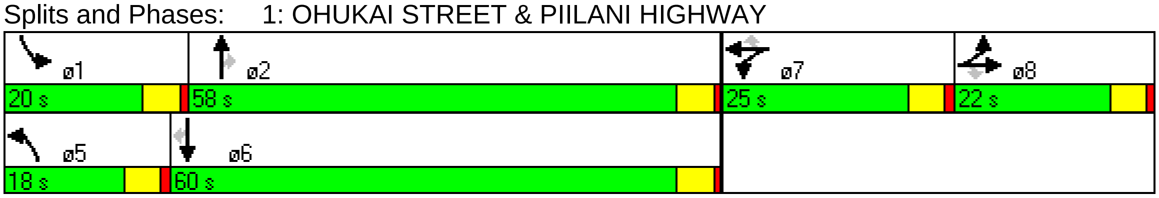
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	88	95	227	40	177	38	1226	53	167	1602	77
Lane Group Flow (vph)	101	96	103	141	149	192	41	1333	58	182	1741	84
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	22.0	22.0
Minimum Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (s)	22.0	22.0	22.0	25.0	25.0	25.0	18.0	58.0	58.0	20.0	60.0	60.0
Total Split (%)	17.6%	17.6%	17.6%	20.0%	20.0%	20.0%	14.4%	46.4%	46.4%	16.0%	48.0%	48.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.46	0.41	0.35	0.63	0.65	0.51	0.26	0.76	0.07	0.46	0.91	0.10
Control Delay	55.9	54.5	12.0	56.7	57.3	9.8	59.3	19.5	7.7	68.9	26.6	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	54.5	12.0	56.7	57.3	9.8	59.3	19.5	7.7	68.9	26.6	2.4
Queue Length 50th (ft)	81	76	0	114	122	0	34	104	1	79	776	1
Queue Length 95th (ft)	141	133	52	182	191	66	m67	350	m24	119	#929	m8
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	242	255	316	282	287	426	198	1743	803	439	1920	883
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.38	0.33	0.50	0.52	0.45	0.21	0.76	0.07	0.41	0.91	0.10

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	17	122	86	28	106	30	1424	68	34	1400	21
Lane Group Flow (vph)	150	18	133	93	30	115	33	1548	74	37	1522	23
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	25.0	25.0	10.0	25.0	25.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	15.0	80.0	80.0	15.0	80.0	80.0
Total Split (%)	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	12.0%	64.0%	64.0%	12.0%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.66	0.06	0.36	0.41	0.10	0.32	0.21	0.63	0.07	0.24	0.61	0.02
Control Delay	54.8	41.4	8.7	48.4	42.2	9.0	32.4	25.0	9.3	45.2	25.0	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	41.4	8.7	48.4	42.2	9.0	32.4	25.0	9.3	45.2	25.0	9.2
Queue Length 50th (ft)	114	12	0	68	21	0	21	565	22	24	643	6
Queue Length 95th (ft)	180	33	54	117	47	50	m34	636	m37	m44	752	m14
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	286	388	435	289	388	420	156	2475	1129	156	2475	1114
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.05	0.31	0.32	0.08	0.27	0.21	0.63	0.07	0.24	0.61	0.02

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 50 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	211	20	349	2	408	1250	3	1169	110
Lane Group Flow (vph)	122	129	379	21	443	1368	3	1271	120
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	4.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	14.5	26.0	8.0	26.0	26.0
Total Split (s)	22.0	22.0	50.3	12.0	28.3	82.0	9.0	62.7	62.7
Total Split (%)	17.6%	17.6%	40.2%	9.6%	22.6%	65.6%	7.2%	50.2%	50.2%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.58	0.60	0.36	0.19	0.74	0.52	0.05	0.66	0.13
Control Delay	62.2	63.0	27.5	51.6	44.4	16.9	59.0	24.4	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.2	63.0	27.5	51.6	44.4	16.9	59.0	24.4	4.7
Queue Length 50th (ft)	106	112	54	13	194	451	2	428	5
Queue Length 95th (ft)	174	182	156	41	212	619	13	526	39
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	242	245	1085	116	667	2608	71	1933	913
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.53	0.35	0.18	0.66	0.52	0.04	0.66	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 40 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

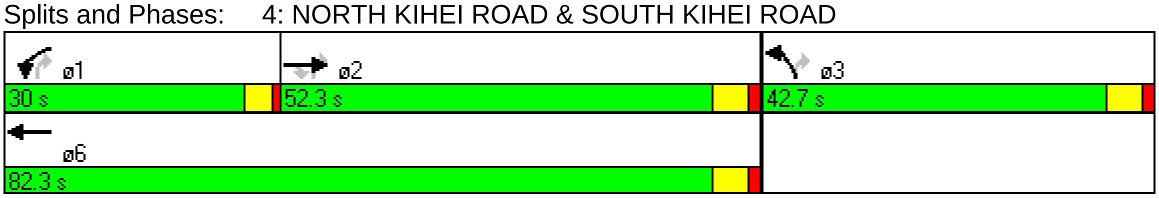
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	333	281	81	465	431	185
Lane Group Flow (vph)	362	305	88	505	468	201
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	15.5	15.5	9.0	15.5	12.5	
Total Split (s)	52.3	52.3	30.0	82.3	42.7	125.0
Total Split (%)	41.8%	41.8%	24.0%	65.8%	34.2%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	Min	C-Min	Min	
v/c Ratio	0.30	0.27	0.59	0.19	0.77	0.13
Control Delay	11.9	2.0	67.3	1.1	49.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	2.0	67.3	1.1	49.9	0.2
Queue Length 50th (ft)	119	0	75	11	188	0
Queue Length 95th (ft)	219	40	m118	17	233	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1199	1127	368	2687	1063	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.24	0.19	0.44	0.13

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 30 (24%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	73	236	152	75	152	111	1067	145	154	1560	68
Lane Group Flow (vph)	54	79	257	165	82	165	121	1160	158	167	1696	74
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	20.0	28.0	16.0	12.0	20.0	14.0	16.0	71.0	12.0	14.0	69.0	69.0
Total Split (%)	16.0%	22.4%	12.8%	9.6%	16.0%	11.2%	12.8%	56.8%	9.6%	11.2%	55.2%	55.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	C-Min
v/c Ratio	0.42	0.23	0.66	0.74	0.50	0.23	0.55	0.52	0.08	0.53	0.80	0.08
Control Delay	57.2	50.6	47.8	77.5	57.8	6.0	44.4	29.5	7.4	43.2	27.8	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.2	50.6	47.8	77.5	57.8	6.0	44.4	29.5	7.4	43.2	27.8	12.6
Queue Length 50th (ft)	43	31	177	69	64	0	88	466	18	70	460	14
Queue Length 95th (ft)	84	53	243	#121	115	29	142	580	51	m78	#580	m25
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	227	679	387	223	238	729	220	2246	2081	325	2131	975
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.66	0.74	0.34	0.23	0.55	0.52	0.08	0.51	0.80	0.08

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	127	70	558	121	62	374
Lane Group Flow (vph)	138	76	607	132	67	407
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	22.0	22.0	33.0	33.0	33.0	33.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.41	0.21	0.49	0.12	0.18	0.33
Control Delay	13.6	5.1	6.6	1.4	5.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	5.1	6.6	1.4	5.9	5.2
Queue Length 50th (ft)	21	0	62	0	5	36
Queue Length 95th (ft)	70	24	161	15	24	94
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	562	555	1309	1151	389	1309
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.14	0.46	0.11	0.17	0.31

Intersection Summary

Cycle Length: 55
Actuated Cycle Length: 56.6
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	32	124	68	5	24	31	1420	123	50	2018	42
Lane Group Flow (vph)	0	73	135	0	79	26	34	1543	134	54	2193	46
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	92.0	92.0	13.0	95.0	95.0
Total Split (%)	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	8.0%	73.6%	73.6%	10.4%	76.0%	76.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.48	0.57		0.64	0.14	0.37	0.58	0.11	0.47	0.79	0.04
Control Delay		57.7	27.0		64.3	18.1	79.2	11.1	0.8	58.5	16.2	3.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.7	27.0		64.3	18.1	79.2	11.1	0.8	58.5	16.2	3.2
Queue Length 50th (ft)		56	37		62	0	0	427	1	41	578	1
Queue Length 95th (ft)		104	102		114	28	m52	528	m6	m54	837	m9
Internal Link Dist (ft)		212			349			829			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		195	278		158	225	93	2671	1228	128	2779	1253
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.37	0.49		0.50	0.12	0.37	0.58	0.11	0.42	0.79	0.04

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	308	180	101	1206	1661	416
Lane Group Flow (vph)	335	196	110	1311	1805	452
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	33.0	33.0	14.0	92.0	78.0	78.0
Total Split (%)	26.4%	26.4%	11.2%	73.6%	62.4%	62.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.89	0.44	0.76	0.51	0.84	0.41
Control Delay	63.9	14.8	85.4	8.7	20.2	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.9	14.8	85.4	8.7	20.2	3.1
Queue Length 50th (ft)	258	33	89	235	740	39
Queue Length 95th (ft)	#406	102	#189	284	532	m36
Internal Link Dist (ft)	652			1058	2861	
Turn Bay Length (ft)						
Base Capacity (vph)	411	479	147	2562	2161	1111
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.41	0.75	0.51	0.84	0.41

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

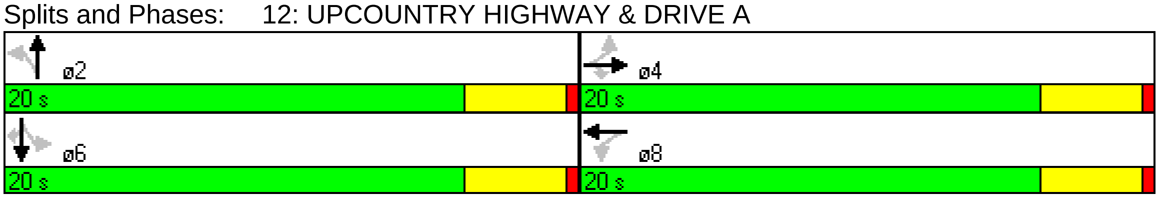
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	131	65	90	166	67	12	9	59
Lane Group Flow (vph)	142	71	98	180	73	13	10	64
Turn Type	Perm		Perm		Perm			Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		4		2			6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.15	0.05	0.14	0.13	0.07	0.02	0.01	0.10
Control Delay	8.3	7.5	3.0	7.9	7.7	7.4	7.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	7.5	3.0	7.9	7.7	7.4	7.3	3.2
Queue Length 50th (ft)	9	4	0	12	4	2	1	0
Queue Length 95th (ft)	21	12	18	25	12	8	7	14
Internal Link Dist (ft)		86		521		103	80	
Turn Bay Length (ft)								
Base Capacity (vph)	922	1416	692	1416	1086	745	745	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.05	0.14	0.13	0.07	0.02	0.01	0.10

Intersection Summary

Cycle Length: 40
Actuated Cycle Length: 40
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 12: UPCOUNTRY HIGHWAY & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	160	7	20	174	60	13	6	63	162	3	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	174	8	22	189	65	14	7	68	176	3	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	254			182			477	526	178	561	497	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			182			469	518	178	554	488	209
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			97	99	92	54	99	98
cM capacity (veh/h)	1303			1394			472	439	865	387	456	818

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	25	182	22	254	14	75	176	18
Volume Left	25	0	22	0	14	0	176	0
Volume Right	0	8	0	65	0	68	0	15
cSH	1303	1700	1394	1700	472	798	387	717
Volume to Capacity	0.02	0.11	0.02	0.15	0.03	0.09	0.46	0.03
Queue Length 95th (ft)	1	0	1	0	2	8	58	2
Control Delay (s)	7.8	0.0	7.6	0.0	12.9	10.0	21.9	10.2
Lane LOS	A		A		B	A	C	B
Approach Delay (s)	0.9		0.6		10.4		20.8	
Approach LOS					B		C	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	30	182	13	4	167	2	9	0	2	3	0	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	198	14	4	182	2	10	0	2	3	0	72
Approach Volume (veh/h)		245			188			12			75	
Crossing Volume (veh/h)		8			42			234			196	
High Capacity (veh/h)		1376			1340			1153			1188	
High v/c (veh/h)		0.18			0.14			0.01			0.06	
Low Capacity (veh/h)		1154			1120			951			983	
Low v/c (veh/h)		0.21			0.17			0.01			0.08	

Intersection Summary

Maximum v/c High	0.18		
Maximum v/c Low	0.21		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	287	86	0	378	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	312	93	0	411	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked						
vC, conflicting volume			405		517	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			405		517	156
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1150		488	862

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	156	156	93	205	205	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	93	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.09	0.05	0.12	0.12	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	13.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	287	291	0	0	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	312	316	0	0	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		435	166			
pX, platoon unblocked						
vC, conflicting volume	316				472	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316				472	158
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	89
cM capacity (veh/h)	1241				521	859

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	156	156	158	158	0	95
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	95
cSH	1700	1700	1700	1700	1700	859
Volume to Capacity	0.09	0.09	0.09	0.09	0.00	0.11
Queue Length 95th (ft)	0	0	0	0	0	9
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.7
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.7
Approach LOS						A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	3	32	0	3	0	64	0	0	0	0	99
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	3	35	0	3	0	70	0	0	0	0	108
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		601										
pX, platoon unblocked												
vC, conflicting volume	3			38			182	76	3	76	111	2
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3			38			182	76	3	76	111	2
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			90	100	100	100	100	90
cM capacity (veh/h)	1617			1570			675	796	1079	890	762	1082

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	35	3	35	0	2	1	70	0	0	108
Volume Left	35	0	0	0	0	0	70	0	0	0
Volume Right	0	0	35	0	0	0	0	0	0	108
cSH	1617	1700	1700	1700	1700	1700	675	1700	1700	1082
Volume to Capacity	0.02	0.00	0.02	0.00	0.00	0.00	0.10	0.00	0.00	0.10
Queue Length 95th (ft)	2	0	0	0	0	0	9	0	0	8
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	8.7
Lane LOS	A						B	A	A	A
Approach Delay (s)	3.5			0.0			10.9		8.7	
Approach LOS							B		A	

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	3	0	0	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	0	0	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	751					
pX, platoon unblocked						
vC, conflicting volume			3		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			3		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1619		1023	1085

Direction, Lane #	EB 1	NB 1
Volume Total	3	3
Volume Left	0	3
Volume Right	3	0
cSH	1700	1023
Volume to Capacity	0.00	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	8.5
Lane LOS		A
Approach Delay (s)	0.0	8.5
Approach LOS		A

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1751	1583	1681	1720	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1751	1583	1681	1720	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	115	76	120	243	66	168	147	1767	99	138	1674	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	83	130	264	72	183	160	1921	108	150	1820	91
RTOR Reduction (vph)	0	0	119	0	0	99	0	0	27	0	0	24
Lane Group Flow (vph)	102	106	11	164	172	84	160	1921	81	150	1820	67
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.6	11.6	11.6	17.7	17.7	17.7	15.6	92.7	92.7	8.0	85.1	85.1
Effective Green, g (s)	12.6	12.6	12.6	18.7	18.7	18.7	16.6	93.7	93.7	9.0	86.1	86.1
Actuated g/C Ratio	0.08	0.08	0.08	0.12	0.12	0.12	0.11	0.62	0.62	0.06	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	141	147	133	210	214	197	196	2211	989	206	2031	909
v/s Ratio Prot	0.06	0.06		0.10	0.10		c0.09	0.54		0.04	c0.51	
v/s Ratio Perm			0.08			0.12			0.07			0.06
v/c Ratio	0.72	0.72	0.08	0.78	0.80	0.43	0.82	0.87	0.08	0.73	0.90	0.07
Uniform Delay, d1	67.0	67.0	63.4	63.7	63.9	60.7	65.2	23.1	11.1	69.3	28.0	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.83	1.38	2.31
Incremental Delay, d2	17.2	16.5	0.3	17.0	19.2	1.5	21.3	5.0	0.2	7.8	5.1	0.1
Delay (s)	84.2	83.4	63.7	80.7	83.1	62.2	86.6	28.1	11.3	65.2	43.7	33.0
Level of Service	F	F	E	F	F	E	F	C	B	E	D	C
Approach Delay (s)		76.1			75.0			31.5			44.8	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	44.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1354	1863	1583	1385	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	78	19	118	72	42	67	91	1740	151	100	1685	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	21	128	78	46	73	99	1891	164	109	1832	70
RTOR Reduction (vph)	0	0	115	0	0	66	0	0	34	0	0	15
Lane Group Flow (vph)	85	21	13	78	46	7	99	1891	130	109	1832	55
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	12.6	107.4	107.4	13.6	108.4	108.4
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	13.6	108.4	108.4	14.6	109.4	109.4
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.72	0.72	0.10	0.73	0.73
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	135	186	158	139	186	158	160	2558	1144	172	2581	1155
v/s Ratio Prot		0.01			0.02		0.06	c0.53		c0.06	0.52	
v/s Ratio Perm	0.06		0.08	0.06		0.05			0.10			0.04
v/c Ratio	0.63	0.11	0.08	0.56	0.25	0.05	0.62	0.74	0.11	0.63	0.71	0.05
Uniform Delay, d1	64.8	61.4	61.2	64.4	62.3	61.0	65.7	12.4	6.3	65.1	11.4	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.82	2.09	1.19	1.40	1.16
Incremental Delay, d2	8.9	0.3	0.2	5.1	0.7	0.1	3.7	1.0	0.1	5.3	1.2	0.1
Delay (s)	73.7	61.7	61.5	69.5	63.0	61.2	76.5	23.5	13.2	82.9	17.2	6.7
Level of Service	E	E	E	E	E	E	E	C	B	F	B	A
Approach Delay (s)		65.9			64.9			25.2			20.4	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	2787		1707		3433	3533		1770	3539	1583
Volume (vph)	369	9	306	33	12	44	488	1263	15	10	1379	179
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	10	333	36	13	48	530	1373	16	11	1499	195
RTOR Reduction (vph)	0	0	103	0	24	0	0	0	0	0	0	62
Lane Group Flow (vph)	201	210	230	0	73	0	530	1389	0	11	1499	133
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	22.1	22.1	52.3		9.1		24.2	94.8		2.0	72.1	72.1
Effective Green, g (s)	24.1	24.1	52.8		11.1		24.7	96.8		2.0	74.1	74.1
Actuated g/C Ratio	0.16	0.16	0.35		0.07		0.16	0.65		0.01	0.49	0.49
Clearance Time (s)	6.0	6.0			6.0		4.5	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	270	271	981		126		565	2280		24	1748	782
v/s Ratio Prot	0.12	c0.12			c0.06		c0.15	0.39		0.01	c0.42	
v/s Ratio Perm			0.12									0.12
v/c Ratio	0.74	0.77	0.23		0.58		0.94	0.61		0.46	0.86	0.17
Uniform Delay, d1	60.0	60.3	34.3		67.2		61.9	15.5		73.5	33.3	21.0
Progression Factor	0.77	0.77	1.15		1.00		1.08	1.15		1.00	1.00	1.00
Incremental Delay, d2	9.6	11.7	0.0		6.3		17.8	0.8		5.0	5.7	0.5
Delay (s)	55.6	58.1	39.5		73.5		85.0	18.7		78.4	39.0	21.4
Level of Service	E	E	D		E		F	B		E	D	C
Approach Delay (s)		49.1			73.5			37.0			37.3	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	496	557	141	452	318	178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	539	605	153	491	346	193
RTOR Reduction (vph)	0	234	0	0	0	148
Lane Group Flow (vph)	539	371	153	491	346	45
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	83.1	83.1	18.4	105.5	33.5	33.5
Effective Green, g (s)	84.6	84.6	18.4	107.0	35.0	35.0
Actuated g/C Ratio	0.56	0.56	0.12	0.71	0.23	0.23
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	5.5
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	2.0
Lane Grp Cap (vph)	1051	893	217	2524	801	369
v/s Ratio Prot	0.29		c0.09	0.14	0.10	
v/s Ratio Perm		0.38				0.12
v/c Ratio	0.51	0.42	0.71	0.19	0.43	0.12
Uniform Delay, d1	20.1	18.6	63.2	7.2	49.0	45.4
Progression Factor	1.00	1.00	1.49	0.23	1.00	1.00
Incremental Delay, d2	1.8	1.4	5.5	0.1	1.7	0.7
Delay (s)	21.8	20.1	99.7	1.8	50.7	46.1
Level of Service	C	C	F	A	D	D
Approach Delay (s)	20.9			25.0	49.1	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	0.97	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	3433	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	3433	3539	2787	3433	3539	1583
Volume (vph)	49	186	189	515	192	531	135	1430	509	512	1365	92
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	196	199	542	202	559	142	1505	536	539	1437	97
RTOR Reduction (vph)	0	0	23	0	0	101	0	0	19	0	0	26
Lane Group Flow (vph)	52	196	176	542	202	458	142	1505	517	539	1437	71
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.3	15.2	28.2	31.4	37.3	69.2	13.0	85.5	116.9	31.9	104.4	104.4
Effective Green, g (s)	9.3	15.2	28.2	31.4	37.3	69.2	13.0	85.5	116.9	31.9	104.4	104.4
Actuated g/C Ratio	0.05	0.08	0.16	0.17	0.21	0.38	0.07	0.48	0.65	0.18	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	91	299	283	599	386	1133	248	1681	1872	608	2053	918
v/s Ratio Prot	0.03	0.06	c0.05	c0.16	0.11	0.09	0.04	c0.43	0.05	c0.16	0.41	
v/s Ratio Perm			0.07			0.11			0.14			0.06
v/c Ratio	0.57	0.66	0.62	0.90	0.52	0.40	0.57	0.90	0.28	0.89	0.70	0.08
Uniform Delay, d1	83.4	79.9	70.9	72.8	63.4	40.4	80.8	43.2	13.5	72.3	26.7	16.6
Progression Factor	1.00	1.00	1.00	0.86	1.03	1.10	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.4	5.1	4.2	15.8	1.2	0.2	3.2	7.8	0.1	14.5	2.0	0.2
Delay (s)	91.8	85.0	75.1	78.7	66.4	44.8	84.0	51.0	13.6	86.8	28.7	16.8
Level of Service	F	F	E	E	E	D	F	D	B	F	C	B
Approach Delay (s)		81.4			62.3			44.0			43.3	
Approach LOS		F			E			D			D	

Intersection Summary

HCM Average Control Delay	50.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	163	120	544	239	148	522
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	130	591	260	161	567
RTOR Reduction (vph)	0	107	0	129	0	0
Lane Group Flow (vph)	177	23	591	131	161	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.4	9.4	27.0	27.0	5.1	36.1
Effective Green, g (s)	9.4	9.4	27.0	27.0	5.1	36.1
Actuated g/C Ratio	0.18	0.18	0.50	0.50	0.10	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	311	278	940	799	169	1257
v/s Ratio Prot	c0.10		c0.32		c0.09	0.30
v/s Ratio Perm		0.08		0.16		
v/c Ratio	0.57	0.08	0.63	0.16	0.95	0.45
Uniform Delay, d1	20.2	18.4	9.6	7.2	24.1	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.1	1.3	0.1	55.0	0.3
Delay (s)	22.6	18.6	10.9	7.3	79.1	4.3
Level of Service	C	B	B	A	E	A
Approach Delay (s)	20.9		9.8			20.9
Approach LOS	C		A			C

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1781	1583		1780	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.71	1.00		0.61	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1332	1583		1127	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	67	6	90	35	3	12	80	2097	27	11	1935	112
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	7	98	38	3	13	87	2279	29	12	2103	122
RTOR Reduction (vph)	0	0	89	0	0	12	0	0	4	0	0	20
Lane Group Flow (vph)	0	80	9	0	41	1	87	2279	25	12	2103	102
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		14.1	14.1		14.1	14.1	12.4	120.8	120.8	3.1	111.5	111.5
Effective Green, g (s)		14.1	14.1		14.1	14.1	12.4	120.8	120.8	3.1	111.5	111.5
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.08	0.81	0.81	0.02	0.74	0.74
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		125	149		106	149	146	2850	1275	37	2631	1177
v/s Ratio Prot							c0.05	c0.64		0.01	0.59	
v/s Ratio Perm		0.06	0.06		0.04	0.01			0.02			0.08
v/c Ratio		0.64	0.06		0.39	0.01	0.60	0.80	0.02	0.32	0.80	0.09
Uniform Delay, d1		65.5	61.9		63.9	61.6	66.4	8.0	2.9	72.4	12.2	5.3
Progression Factor		1.00	1.00		1.00	1.00	0.91	0.86	1.35	1.00	1.00	1.00
Incremental Delay, d2		10.7	0.2		2.3	0.0	4.3	1.6	0.0	5.1	2.6	0.1
Delay (s)		76.2	62.1		66.2	61.6	64.7	8.5	3.9	77.5	14.8	5.4
Level of Service		E	E		E	E	E	A	A	E	B	A
Approach Delay (s)		68.4			65.1			10.5			14.6	
Approach LOS		E			E			B			B	

Intersection Summary

HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	368	251	244	1707	1523	484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	400	273	265	1855	1655	526
RTOR Reduction (vph)	0	180	0	0	0	148
Lane Group Flow (vph)	400	93	265	1855	1655	378
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	34.9	34.9	26.3	107.1	76.8	76.8
Effective Green, g (s)	34.9	34.9	26.3	107.1	76.8	76.8
Actuated g/C Ratio	0.23	0.23	0.18	0.71	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	368	310	2527	1812	810
v/s Ratio Prot	c0.23		c0.15	0.52	c0.47	
v/s Ratio Perm		0.17				0.33
v/c Ratio	0.97	0.25	0.85	0.73	0.91	0.47
Uniform Delay, d1	57.0	46.9	60.0	12.9	33.6	23.5
Progression Factor	1.00	1.00	1.00	1.00	0.77	0.70
Incremental Delay, d2	36.6	0.4	19.9	1.9	5.7	1.2
Delay (s)	93.6	47.3	79.9	14.8	31.5	17.7
Level of Service	F	D	E	B	C	B
Approach Delay (s)	74.8			23.0	28.2	
Approach LOS	E			C	C	

Intersection Summary

HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433	3539	1583		3539		3433	1863			1863	1583
Volume (vph)	376	235	287	0	453	0	390	37	0	0	60	171
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	409	255	312	0	492	0	424	40	0	0	65	186
RTOR Reduction (vph)	0	0	104	0	0	0	0	0	0	0	0	141
Lane Group Flow (vph)	409	255	208	0	492	0	424	40	0	0	65	45
Turn Type	Prot		pt+ov	Prot			Prot			Perm		Perm
Protected Phases	7	4	4 5	3	8		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	17.4	38.1	60.1		16.7		18.0	43.9			21.9	21.9
Effective Green, g (s)	17.4	38.1	60.1		16.7		18.0	43.9			21.9	21.9
Actuated g/C Ratio	0.19	0.42	0.67		0.19		0.20	0.49			0.24	0.24
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	664	1498	1057		657		687	909			453	385
v/s Ratio Prot	c0.12	0.07	0.20		c0.14		c0.12	0.02			0.03	
v/s Ratio Perm												0.12
v/c Ratio	0.62	0.17	0.20		0.75		0.62	0.04			0.14	0.12
Uniform Delay, d1	33.2	16.1	5.7		34.7		32.9	12.1			26.7	26.5
Progression Factor	1.19	1.27	5.98		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.4	0.0	0.1		4.7		1.7	0.1			0.7	0.6
Delay (s)	40.9	20.5	34.3		39.3		34.5	12.2			27.4	27.1
Level of Service	D	C	C		D		C	B			C	C
Approach Delay (s)		33.5			39.3			32.6			27.2	
Approach LOS		C			D			C			C	

Intersection Summary

HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	76	120	243	66	168	147	1767	99	138	1674	84
Lane Group Flow (vph)	102	106	130	164	172	183	160	1921	108	150	1820	91
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	17.0	17.0	17.0	24.0	24.0	24.0	22.0	96.0	96.0	13.0	87.0	87.0
Total Split (%)	11.3%	11.3%	11.3%	16.0%	16.0%	16.0%	14.7%	64.0%	64.0%	8.7%	58.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.72	0.72	0.52	0.78	0.80	0.62	0.82	0.87	0.11	0.73	0.90	0.10
Control Delay	91.2	90.3	17.2	82.5	83.8	32.5	86.6	29.0	4.7	73.0	44.9	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.2	90.3	17.2	82.5	83.8	32.5	86.6	29.0	4.7	73.0	44.9	16.0
Queue Length 50th (ft)	104	108	0	165	173	63	154	798	13	76	694	28
Queue Length 95th (ft)	#196	#201	67	#273	#289	149	#263	923	39	m#113	1005	m68
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	146	152	256	224	229	309	212	2212	1017	206	2031	932
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.70	0.51	0.73	0.75	0.59	0.75	0.87	0.11	0.73	0.90	0.10

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	19	118	72	42	67	91	1740	151	100	1685	64
Lane Group Flow (vph)	85	21	128	78	46	73	99	1891	164	109	1832	70
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	20.0	100.0	100.0	22.0	102.0	102.0
Total Split (%)	18.7%	18.7%	18.7%	18.7%	18.7%	18.7%	13.3%	66.7%	66.7%	14.7%	68.0%	68.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.63	0.11	0.47	0.56	0.25	0.33	0.62	0.74	0.14	0.63	0.71	0.06
Control Delay	68.8	58.9	11.7	67.3	61.1	13.6	77.8	26.8	5.6	83.2	19.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	58.9	11.7	67.3	61.1	13.6	77.8	26.8	5.6	83.2	19.3	3.2
Queue Length 50th (ft)	82	19	0	74	43	0	88	931	27	97	838	5
Queue Length 95th (ft)	135	45	61	125	81	48	m107	1100	m56	m121	1033	m22
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	217	298	361	222	298	315	189	2557	1177	212	2582	1170
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.07	0.35	0.35	0.15	0.23	0.52	0.74	0.14	0.51	0.71	0.06

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	369	9	306	12	488	1263	10	1379	179
Lane Group Flow (vph)	201	210	333	97	530	1389	11	1499	195
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	5.0	20.0	5.0	20.0	20.0
Minimum Split (s)	22.0	22.0		11.0	22.5	26.0	9.0	33.0	33.0
Total Split (s)	31.0	31.0	60.0	16.0	29.0	94.0	9.0	74.0	74.0
Total Split (%)	20.7%	20.7%	40.0%	10.7%	19.3%	62.7%	6.0%	49.3%	49.3%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.5	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	C-Min	None	C-Min	C-Min
v/c Ratio	0.74	0.77	0.31	0.64	0.94	0.59	0.19	0.86	0.23
Control Delay	55.7	57.2	20.5	65.3	84.3	18.8	77.9	40.4	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	57.2	20.5	65.3	84.3	18.8	77.9	40.4	9.6
Queue Length 50th (ft)	195	205	105	68	283	261	11	698	39
Queue Length 95th (ft)	295	307	147	132	#379	546	34	817	90
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	303	304	1077	160	572	2335	59	1747	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.69	0.31	0.61	0.93	0.59	0.19	0.86	0.23

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

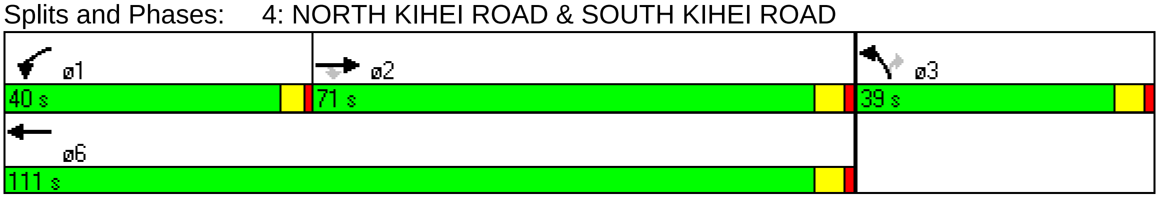
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	496	557	141	452	318	178
Lane Group Flow (vph)	539	605	153	491	346	193
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	3	
Permitted Phases		2				3
Detector Phases	2	2	1	6	3	3
Minimum Initial (s)	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	30.5	30.5	9.0	21.5	21.5	21.5
Total Split (s)	71.0	71.0	40.0	111.0	39.0	39.0
Total Split (%)	47.3%	47.3%	26.7%	74.0%	26.0%	26.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max
v/c Ratio	0.51	0.54	0.71	0.19	0.43	0.37
Control Delay	23.3	4.7	94.1	1.8	51.0	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	4.7	94.1	1.8	51.0	8.0
Queue Length 50th (ft)	308	29	156	16	150	0
Queue Length 95th (ft)	480	124	m132	m16	200	66
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	1050	1127	425	2524	801	517
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.54	0.36	0.19	0.43	0.37

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 30 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	186	189	515	192	531	135	1430	509	512	1365	92
Lane Group Flow (vph)	52	196	199	542	202	559	142	1505	536	539	1437	97
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	20.0	20.0	23.0	36.0	36.0	35.0	23.0	89.0	36.0	35.0	101.0	101.0
Total Split (%)	11.1%	11.1%	12.8%	20.0%	20.0%	19.4%	12.8%	49.4%	20.0%	19.4%	56.1%	56.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	C-Min
v/c Ratio	0.50	0.69	0.67	0.90	0.52	0.45	0.57	0.89	0.28	0.89	0.70	0.10
Control Delay	87.0	89.5	65.7	78.3	71.3	31.0	83.4	49.9	10.9	87.5	29.3	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.0	89.5	65.7	78.3	71.3	31.0	83.4	49.9	10.9	87.5	29.3	7.8
Queue Length 50th (ft)	61	120	193	340	242	215	85	851	123	325	617	18
Queue Length 95th (ft)	111	167	279	#429	339	294	122	961	155	#432	762	51
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	157	315	350	613	387	1238	362	1714	1913	617	2067	950
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.62	0.57	0.88	0.52	0.45	0.39	0.88	0.28	0.87	0.70	0.10

Intersection Summary

Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	163	120	544	239	148	522
Lane Group Flow (vph)	177	130	591	260	161	567
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	31.0	31.0	9.0	40.0
Total Split (%)	33.3%	33.3%	51.7%	51.7%	15.0%	66.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
v/c Ratio	0.51	0.31	0.62	0.28	0.94	0.44
Control Delay	20.0	5.5	14.0	2.4	87.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	5.5	14.0	2.4	87.2	6.4
Queue Length 50th (ft)	44	0	126	0	46	68
Queue Length 95th (ft)	100	34	270	33	#169	169
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	480	524	1017	982	171	1340
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.25	0.58	0.26	0.94	0.42

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 53
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	6	90	35	3	12	80	2097	27	11	1935	112
Lane Group Flow (vph)	0	80	98	0	41	13	87	2279	29	12	2103	122
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	27.0	25.0	107.0	107.0	16.0	98.0	98.0
Total Split (%)	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	16.7%	71.3%	71.3%	10.7%	65.3%	65.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio		0.64	0.41		0.32	0.08	0.60	0.78	0.02	0.16	0.80	0.10
Control Delay		70.0	12.8		63.9	25.0	62.3	9.4	3.2	69.8	16.8	3.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		70.0	12.8		63.9	25.0	62.3	9.4	3.2	69.8	16.8	3.0
Queue Length 50th (ft)		77	0		38	0	85	303	1	12	613	10
Queue Length 95th (ft)		131	56		77	22	m112	m715	m6	35	956	37
Internal Link Dist (ft)		212			261			1847			2017	
Turn Bay Length (ft)												
Base Capacity (vph)		205	326		209	254	248	2908	1304	142	2632	1197
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.39	0.30		0.20	0.05	0.35	0.78	0.02	0.08	0.80	0.10

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 40 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	368	251	244	1707	1523	484
Lane Group Flow (vph)	400	273	265	1855	1655	526
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	39.0	39.0	36.0	111.0	75.0	75.0
Total Split (%)	26.0%	26.0%	24.0%	74.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.97	0.50	0.85	0.73	0.91	0.55
Control Delay	93.5	12.3	69.8	15.1	32.6	8.7
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	93.5	12.3	69.8	15.5	32.6	8.7
Queue Length 50th (ft)	391	30	253	527	671	60
Queue Length 95th (ft)	#606	115	347	609	#1002	194
Internal Link Dist (ft)	745			1063	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	413	550	378	2527	1812	958
Starvation Cap Reductn	0	0	0	230	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.50	0.70	0.81	0.91	0.55

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

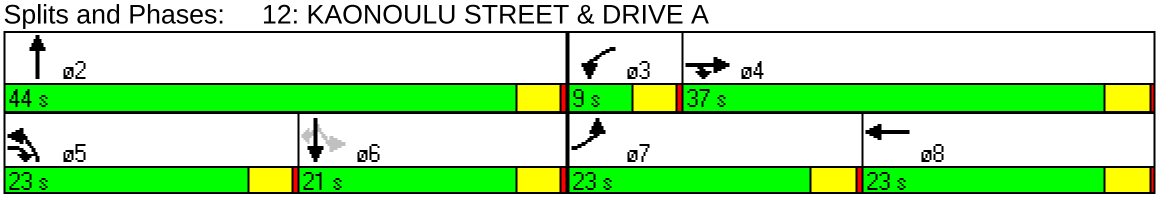
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	376	235	287	453	390	37	60	171	
Lane Group Flow (vph)	409	255	312	492	424	40	65	186	
Turn Type	Prot		pt+ov		Prot			Perm	
Protected Phases	7	4	4 5	8	5	2	6		3
Permitted Phases								6	
Detector Phases	7	4	4 5	8	5	2	6	6	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		20.0	8.0	20.0	20.0	20.0	8.0
Total Split (s)	23.0	37.0	60.0	23.0	23.0	44.0	21.0	21.0	9.0
Total Split (%)	25.6%	41.1%	66.7%	25.6%	25.6%	48.9%	23.3%	23.3%	10%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag		Lag	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.62	0.17	0.27	0.75	0.62	0.04	0.14	0.35	
Control Delay	41.9	20.0	2.5	39.0	36.0	14.0	31.2	7.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.9	20.0	2.5	39.0	36.0	14.0	31.2	7.2	
Queue Length 50th (ft)	200	91	20	139	109	12	31	0	
Queue Length 95th (ft)	m241	m111	m66	190	160	31	67	54	
Internal Link Dist (ft)		146		432		103	80		
Turn Bay Length (ft)									
Base Capacity (vph)	725	1523	1177	747	739	909	452	525	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.56	0.17	0.27	0.66	0.57	0.04	0.14	0.35	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: KAONOULU STREET & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	296	16	39	280	98	9	8	34	120	10	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	322	17	42	304	107	10	9	37	130	11	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	411			339			821	907	330	886	862	358
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			339			803	897	330	875	849	295
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			96	96	95	39	96	98
cM capacity (veh/h)	1098			1220			246	237	711	215	253	678

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	40	339	42	411	10	46	130	26
Volume Left	40	0	42	0	10	0	130	0
Volume Right	0	17	0	107	0	37	0	15
cSH	1098	1700	1220	1700	246	515	215	399
Volume to Capacity	0.04	0.20	0.03	0.24	0.04	0.09	0.61	0.07
Queue Length 95th (ft)	3	0	3	0	3	7	87	5
Control Delay (s)	8.4	0.0	8.1	0.0	20.2	12.7	44.8	14.7
Lane LOS	A		A		C	B	E	B
Approach Delay (s)	0.9		0.8		14.0		39.8	
Approach LOS					B		E	

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	82	341	16	2	300	6	2	1	3	3	1	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	371	17	2	326	7	2	1	3	3	1	63
Approach Volume (veh/h)		477			335			7			67	
Crossing Volume (veh/h)		7			92			463			330	
High Capacity (veh/h)		1378			1288			961			1068	
High v/c (veh/h)		0.35			0.26			0.01			0.06	
Low Capacity (veh/h)		1155			1074			779			875	
Low v/c (veh/h)		0.41			0.31			0.01			0.08	

Intersection Summary			
Maximum v/c High	0.35		
Maximum v/c Low	0.41		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	896	311	0	1240	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	974	338	0	1348	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked			0.97		0.89	0.97
vC, conflicting volume			1312		1648	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1293		1515	446
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			518		98	545

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	487	487	338	674	674	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	338	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.20	0.40	0.40	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	896	1013	0	0	227
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	974	1101	0	0	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		375	226			
pX, platoon unblocked	0.87				0.88	0.87
vC, conflicting volume	1101				1588	551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	971				1467	341
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	57
cM capacity (veh/h)	616				105	572

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	487	487	551	551	0	247
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	247
cSH	1700	1700	1700	1700	1700	572
Volume to Capacity	0.29	0.29	0.32	0.32	0.00	0.43
Queue Length 95th (ft)	0	0	0	0	0	54
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	16.0
Lane LOS						C
Approach Delay (s)	0.0		0.0			16.0
Approach LOS						C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	105	20	109	0	40	0	350	0	0	0	0	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	22	118	0	43	0	380	0	0	0	0	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		512										
pX, platoon unblocked												
vC, conflicting volume	43			140			340	293	22	293	412	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			140			340	293	22	293	412	22
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			27	100	100	100	100	93
cM capacity (veh/h)	1563			1441			520	571	1050	601	490	1050

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	114	22	118	0	29	14	380	0	0	68
Volume Left	114	0	0	0	0	0	380	0	0	0
Volume Right	0	0	118	0	0	0	0	0	0	68
cSH	1563	1700	1700	1700	1700	1700	520	1700	1700	1050
Volume to Capacity	0.07	0.01	0.07	0.00	0.02	0.01	0.73	0.00	0.00	0.07
Queue Length 95th (ft)	6	0	0	0	0	0	151	0	0	5
Control Delay (s)	7.5	0.0	0.0	0.0	0.0	0.0	28.5	0.0	0.0	8.7
Lane LOS	A						D	A	A	A
Approach Delay (s)	3.4			0.0			28.5		8.7	
Approach LOS							D		A	

Intersection Summary			
Average Delay	16.4		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	20	0	0	40	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	0	0	43	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	712					
pX, platoon unblocked						
vC, conflicting volume			22		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1594		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	22	0	43
Volume Left	0	0	43
Volume Right	22	0	0
cSH	1700	1700	1023
Volume to Capacity	0.01	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1681	1740	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1681	1740	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	177	45	191	121	62	37	86	1325	150	95	1443	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	49	208	132	67	40	93	1440	163	103	1568	114
RTOR Reduction (vph)	0	0	128	0	0	37	0	0	76	0	0	51
Lane Group Flow (vph)	117	124	80	97	102	3	93	1440	87	103	1568	63
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Actuated Green, G (s)	10.2	10.2	10.2	5.3	5.3	5.3	4.5	45.2	45.2	6.0	46.7	46.7
Effective Green, g (s)	11.2	11.2	11.2	6.3	6.3	6.3	5.5	46.2	46.2	7.0	47.7	47.7
Actuated g/C Ratio	0.13	0.13	0.13	0.07	0.07	0.07	0.06	0.53	0.53	0.08	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	217	222	204	122	126	115	112	1886	844	277	1947	871
v/s Ratio Prot	0.07	0.07		0.06	c0.06		c0.05	0.41		0.03	c0.44	
v/s Ratio Perm			0.13			0.03			0.10			0.07
v/c Ratio	0.54	0.56	0.39	0.80	0.81	0.03	0.83	0.76	0.10	0.37	0.81	0.07
Uniform Delay, d1	35.3	35.4	34.6	39.6	39.6	37.3	40.1	15.9	10.0	37.8	15.8	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	3.3	1.5	29.0	30.5	0.1	36.8	2.2	0.1	0.3	2.9	0.1
Delay (s)	38.2	38.8	36.1	68.6	70.1	37.4	77.0	18.2	10.1	38.1	18.6	9.2
Level of Service	D	D	D	E	E	D	E	B	B	D	B	A
Approach Delay (s)		37.4			64.0			20.6			19.2	
Approach LOS		D			E			C			B	

Intersection Summary

HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.73	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1359	1863	1583	1394	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	60	13	110	96	39	51	73	1359	108	68	1627	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	14	120	104	42	55	79	1477	117	74	1768	53
RTOR Reduction (vph)	0	0	104	0	0	48	0	0	41	0	0	18
Lane Group Flow (vph)	65	14	16	104	42	7	79	1477	76	74	1768	35
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Actuated Green, G (s)	11.3	11.3	11.3	11.3	11.3	11.3	6.2	58.3	58.3	6.2	58.3	58.3
Effective Green, g (s)	12.3	12.3	12.3	12.3	12.3	12.3	7.2	59.3	59.3	7.2	59.3	59.3
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.65	0.65	0.08	0.65	0.65
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	184	252	214	189	252	214	140	2311	1034	140	2311	1034
v/s Ratio Prot		0.01			0.02		c0.04	0.42		0.04	c0.50	
v/s Ratio Perm	0.05		0.08	0.07		0.03			0.07			0.03
v/c Ratio	0.35	0.06	0.08	0.55	0.17	0.03	0.56	0.64	0.07	0.53	0.77	0.03
Uniform Delay, d1	35.6	34.2	34.3	36.7	34.7	34.1	40.3	9.4	5.7	40.2	10.9	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.2	4.2	0.4	0.1	3.1	0.8	0.1	1.7	1.8	0.0
Delay (s)	37.2	34.3	34.5	40.9	35.1	34.2	43.4	10.2	5.8	41.8	12.8	5.6
Level of Service	D	C	C	D	D	C	D	B	A	D	B	A
Approach Delay (s)		35.4			37.9			11.5			13.7	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		1.00		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1681	2787		1667		3433	3537		1770	3539	1583
Volume (vph)	186	0	444	1	0	2	386	1086	4	6	1274	157
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	0	483	1	0	2	420	1180	4	7	1385	171
RTOR Reduction (vph)	0	0	170	0	2	0	0	0	0	0	0	88
Lane Group Flow (vph)	101	101	313	0	1	0	420	1184	0	7	1385	83
Turn Type	Split		custom	Split			Prot			Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			5 8									6
Actuated Green, G (s)	7.1	7.1	27.7		0.8		14.6	51.5		0.8	37.7	37.7
Effective Green, g (s)	9.1	9.1	27.7		2.8		14.6	53.5		0.8	39.7	39.7
Actuated g/C Ratio	0.11	0.11	0.34		0.03		0.18	0.65		0.01	0.48	0.48
Clearance Time (s)	6.0	6.0			6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		2.0	4.5		2.0	4.5	4.5
Lane Grp Cap (vph)	186	186	939		57		610	2302		17	1709	765
v/s Ratio Prot	0.06	0.06			c0.00		c0.12	0.33		0.00	c0.39	
v/s Ratio Perm			0.17									0.11
v/c Ratio	0.54	0.54	0.33		0.02		0.69	0.51		0.41	0.81	0.11
Uniform Delay, d1	34.6	34.6	20.4		38.4		31.7	7.5		40.5	18.1	11.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	3.2	0.1		0.1		2.6	0.3		5.8	3.3	0.1
Delay (s)	37.8	37.8	20.4		38.5		34.3	7.9		46.3	21.4	11.7
Level of Service	D	D	C		D		C	A		D	C	B
Approach Delay (s)		25.6			38.5			14.8			20.4	
Approach LOS		C			D			B			C	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	3539	3433	1583
Volume (vph)	404	443	129	396	347	141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	439	482	140	430	377	153
RTOR Reduction (vph)	0	270	0	0	0	0
Lane Group Flow (vph)	439	212	140	430	377	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Actuated Green, G (s)	25.7	25.7	9.5	39.2	11.7	61.9
Effective Green, g (s)	27.2	27.2	9.5	40.7	13.2	61.9
Actuated g/C Ratio	0.44	0.44	0.15	0.66	0.21	1.00
Clearance Time (s)	5.5	5.5	4.0	5.5	5.5	
Vehicle Extension (s)	5.0	5.0	2.0	5.0	2.0	
Lane Grp Cap (vph)	819	696	272	2327	732	1583
v/s Ratio Prot	0.24		c0.08	0.12	c0.11	
v/s Ratio Perm		0.30				0.10
v/c Ratio	0.54	0.30	0.51	0.18	0.52	0.10
Uniform Delay, d1	12.7	11.2	24.1	4.1	21.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.5	0.7	0.1	0.3	0.0
Delay (s)	14.0	11.7	24.8	4.2	21.8	0.0
Level of Service	B	B	C	A	C	A
Approach Delay (s)	12.8			9.3	15.5	
Approach LOS	B			A	B	

Intersection Summary

HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.88	1.00	0.95	0.88	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	2787	1770	3539	2787	3433	3539	1583
Volume (vph)	74	242	170	647	219	629	129	810	664	704	924	117
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	263	185	703	238	684	140	880	722	765	1004	127
RTOR Reduction (vph)	0	0	20	0	0	164	0	0	23	0	0	77
Lane Group Flow (vph)	80	263	165	703	238	520	140	880	699	765	1004	50
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.0	10.5	20.1	19.0	21.5	42.5	9.6	23.9	42.9	21.0	35.3	35.3
Effective Green, g (s)	8.0	10.5	20.1	19.0	21.5	42.5	9.6	23.9	42.9	21.0	35.3	35.3
Actuated g/C Ratio	0.09	0.12	0.22	0.21	0.24	0.47	0.11	0.26	0.47	0.23	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	411	422	722	443	1434	188	936	1446	797	1382	618
v/s Ratio Prot	0.05	0.07	0.05	c0.20	c0.13	0.11	0.08	c0.25	0.10	c0.22	0.28	
v/s Ratio Perm			0.07			0.13			0.15			0.08
v/c Ratio	0.51	0.64	0.39	0.97	0.54	0.36	0.74	0.94	0.48	0.96	0.73	0.08
Uniform Delay, d1	39.3	38.1	29.9	35.5	30.1	15.3	39.2	32.6	16.2	34.3	23.4	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	3.3	0.6	26.9	1.3	0.2	14.8	16.8	0.3	22.3	1.9	0.1
Delay (s)	41.9	41.4	30.5	62.3	31.4	15.5	54.0	49.4	16.5	56.5	25.4	17.4
Level of Service	D	D	C	E	C	B	D	D	B	E	C	B
Approach Delay (s)		37.7			38.1			36.1			37.4	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.36	1.00
Satd. Flow (perm)	1770	1583	1863	1583	673	1863
Volume (vph)	207	123	536	233	153	455
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	134	583	253	166	495
RTOR Reduction (vph)	0	103	0	108	0	0
Lane Group Flow (vph)	225	31	583	145	166	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	9.6	9.6	23.6	23.6	23.6	23.6
Effective Green, g (s)	9.6	9.6	23.6	23.6	23.6	23.6
Actuated g/C Ratio	0.23	0.23	0.57	0.57	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	369	1067	907	386	1067
v/s Ratio Prot	c0.13		c0.31			0.27
v/s Ratio Perm		0.08		0.16	0.25	
v/c Ratio	0.55	0.08	0.55	0.16	0.43	0.46
Uniform Delay, d1	13.9	12.4	5.5	4.1	5.0	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.1	0.6	0.1	0.8	0.3
Delay (s)	15.4	12.5	6.0	4.2	5.8	5.4
Level of Service	B	B	A	A	A	A
Approach Delay (s)	14.3		5.5			5.5
Approach LOS	B		A			A

Intersection Summary

HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	1.00
Frt		1.00	0.85				1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)		1770	1583				1770	3539			3539	1583
Flt Permitted		0.76	1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)		1410	1583				1770	3539			3539	1583
Volume (vph)	87	0	81	0	0	0	35	1613	0	0	1532	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	0	88	0	0	0	38	1753	0	0	1665	114
RTOR Reduction (vph)	0	0	78	0	0	0	0	0	0	0	0	35
Lane Group Flow (vph)	0	95	10	0	0	0	38	1753	0	0	1665	79
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		10.3	10.3				4.3	69.3			61.0	61.0
Effective Green, g (s)		10.3	10.3				4.3	69.3			61.0	61.0
Actuated g/C Ratio		0.12	0.12				0.05	0.79			0.70	0.70
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	4.0
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		166	186				87	2800			2464	1102
v/s Ratio Prot							0.02	c0.50			c0.47	
v/s Ratio Perm		c0.07	0.06									0.07
v/c Ratio		0.57	0.06				0.44	0.63			0.68	0.07
Uniform Delay, d1		36.6	34.3				40.5	3.8			7.6	4.3
Progression Factor		1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2		4.7	0.1				3.5	0.4			0.7	0.0
Delay (s)		41.3	34.5				44.0	4.2			8.4	4.3
Level of Service		D	C				D	A			A	A
Approach Delay (s)		38.0			0.0			5.1			8.1	
Approach LOS		D			A			A			A	

Intersection Summary

HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	433	255	214	1319	1272	485
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	277	233	1434	1383	527
RTOR Reduction (vph)	0	197	0	0	0	299
Lane Group Flow (vph)	471	80	233	1434	1383	228
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.0	26.0	13.0	56.0	39.0	39.0
Effective Green, g (s)	26.0	26.0	13.0	56.0	39.0	39.0
Actuated g/C Ratio	0.29	0.29	0.14	0.62	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	511	457	256	2202	1534	686
v/s Ratio Prot	c0.27		c0.13	0.41	c0.39	
v/s Ratio Perm		0.17				0.33
v/c Ratio	0.92	0.18	0.91	0.65	0.90	0.33
Uniform Delay, d1	31.0	24.0	37.9	10.8	23.7	16.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.5	0.8	37.1	1.5	8.9	1.3
Delay (s)	55.5	24.8	75.1	12.3	32.7	18.2
Level of Service	E	C	E	B	C	B
Approach Delay (s)	44.1			21.1	28.7	
Approach LOS	D			C	C	

Intersection Summary

HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.95		0.97	1.00			1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433	3539	1583		3539		3433	1863			1863	1583
Flt Permitted	0.95	1.00	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433	3539	1583		3539		3433	1863			1863	1583
Volume (vph)	414	277	442	0	589	0	518	60	0	0	55	170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	450	301	480	0	640	0	563	65	0	0	60	185
RTOR Reduction (vph)	0	0	273	0	0	0	0	0	0	0	0	143
Lane Group Flow (vph)	450	301	207	0	640	0	563	65	0	0	60	42
Turn Type	Prot		Prot	Prot			Prot			Prot		Perm
Protected Phases	7	4	4	3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	15.6	38.9	38.9		19.3		18.8	43.1			20.3	20.3
Effective Green, g (s)	15.6	38.9	38.9		19.3		18.8	43.1			20.3	20.3
Actuated g/C Ratio	0.17	0.43	0.43		0.21		0.21	0.48			0.23	0.23
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	595	1530	684		759		717	892			420	357
v/s Ratio Prot	0.13	0.09	c0.30		c0.18		c0.16	0.03			0.03	
v/s Ratio Perm												0.12
v/c Ratio	0.76	0.20	0.30		0.84		0.79	0.07			0.14	0.12
Uniform Delay, d1	35.4	15.9	16.7		33.9		33.7	12.7			27.9	27.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.5	0.1	0.3		8.5		5.7	0.2			0.7	0.7
Delay (s)	40.8	15.9	16.9		42.4		39.3	12.8			28.6	28.4
Level of Service	D	B	B		D		D	B			C	C
Approach Delay (s)		25.4			42.4			36.6			28.4	
Approach LOS		C			D			D			C	

Intersection Summary

HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	45	191	121	62	37	86	1325	150	95	1443	105
Lane Group Flow (vph)	117	124	208	97	102	40	93	1440	163	103	1568	114
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	8	8		7	7		5	2		1	6	
Permitted Phases			8			7			2			6
Detector Phases	8	8	8	7	7	7	5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	20.0	20.0	8.0	20.0	20.0
Minimum Split (s)	15.0	15.0	15.0	10.0	10.0	10.0	10.0	25.0	25.0	13.0	25.0	25.0
Total Split (s)	15.0	15.0	15.0	12.0	12.0	12.0	11.0	50.0	50.0	13.0	52.0	52.0
Total Split (%)	16.7%	16.7%	16.7%	13.3%	13.3%	13.3%	12.2%	55.6%	55.6%	14.4%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.52	0.54	0.61	0.64	0.65	0.22	0.66	0.74	0.17	0.29	0.78	0.12
Control Delay	46.2	46.7	21.7	58.5	58.3	15.8	62.1	19.4	2.5	39.6	19.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	46.7	21.7	58.5	58.3	15.8	62.1	19.4	2.5	39.6	19.5	2.5
Queue Length 50th (ft)	67	71	32	56	60	0	53	337	0	28	371	0
Queue Length 95th (ft)	#127	#140	104	#131	#136	30	#126	431	29	53	472	24
Internal Link Dist (ft)		459			456			2865			2675	
Turn Bay Length (ft)												
Base Capacity (vph)	224	229	339	156	162	183	144	1948	945	357	2017	951
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.54	0.61	0.62	0.63	0.22	0.65	0.74	0.17	0.29	0.78	0.12

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 84.4
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
\#   95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: OHUKAI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	13	110	96	39	51	73	1359	108	68	1627	49
Lane Group Flow (vph)	65	14	120	104	42	55	79	1477	117	74	1768	53
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		8			8		5	2		1	6	
Permitted Phases	8		8	8		8			2			6
Detector Phases	8	8	8	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	13.0	59.0	59.0	13.0	59.0	59.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	14.4%	65.6%	65.6%	14.4%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.35	0.05	0.37	0.54	0.16	0.21	0.50	0.63	0.11	0.47	0.76	0.05
Control Delay	38.4	33.0	9.8	42.8	34.4	11.5	47.0	11.6	1.7	46.0	14.6	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	33.0	9.8	42.8	34.4	11.5	47.0	11.6	1.7	46.0	14.6	2.2
Queue Length 50th (ft)	33	7	0	55	21	0	43	267	0	40	373	0
Queue Length 95th (ft)	72	24	47	106	50	32	88	343	19	84	480	13
Internal Link Dist (ft)		530			620			2675			2120	
Turn Bay Length (ft)												
Base Capacity (vph)	208	285	344	214	285	289	173	2336	1085	173	2334	1062
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.05	0.35	0.49	0.15	0.19	0.46	0.63	0.11	0.43	0.76	0.05

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: UWAPO ROAD & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	186	0	444	0	386	1086	6	1274	157
Lane Group Flow (vph)	101	101	483	3	420	1184	7	1385	171
Turn Type	Split		custom		Prot		Prot		Perm
Protected Phases	8	8		7	5	2	1	6	
Permitted Phases			5 8						6
Detector Phases	8	8	5 8	7	5	2	1	6	6
Minimum Initial (s)	7.0	7.0		5.0	10.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		11.0	26.0	26.0	9.0	26.0	26.0
Total Split (s)	13.0	13.0	39.0	11.0	26.0	57.0	9.0	40.0	40.0
Total Split (%)	14.4%	14.4%	43.3%	12.2%	28.9%	63.3%	10.0%	44.4%	44.4%
Yellow Time (s)	4.0	4.0		4.0	3.0	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0		2.0	1.0	1.5	1.0	1.5	1.5
Lead/Lag	Lag	Lag		Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None		None	None	Min	None	Min	Min
v/c Ratio	0.49	0.49	0.40	0.02	0.62	0.46	0.06	0.80	0.20
Control Delay	42.0	42.0	8.5	30.0	29.0	6.1	39.8	22.1	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	42.0	8.5	30.0	29.0	6.1	39.8	22.1	3.3
Queue Length 50th (ft)	44	44	36	0	87	71	3	238	0
Queue Length 95th (ft)	#127	#127	88	9	151	258	18	#557	38
Internal Link Dist (ft)		1420		460		2120		1468	
Turn Bay Length (ft)									
Base Capacity (vph)	207	207	1350	143	933	2569	109	1740	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.49	0.36	0.02	0.45	0.46	0.06	0.80	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 74
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

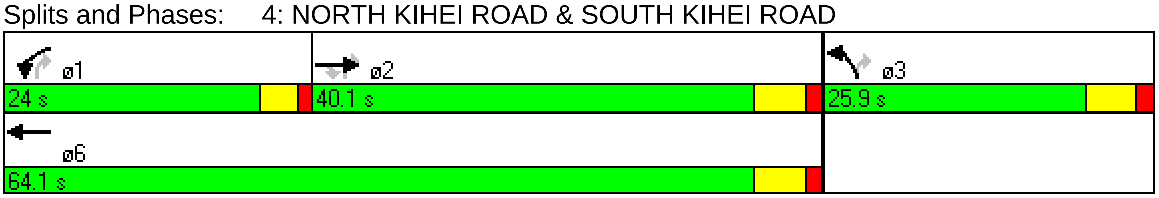
Splits and Phases: 3: NORTH KIHEI ROAD & PIILANI HIGHWAY

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	404	443	129	396	347	141
Lane Group Flow (vph)	439	482	140	430	377	153
Turn Type		Perm	Prot			custom
Protected Phases	2		1	6	3	
Permitted Phases		2				1 2 3
Detector Phases	2	2	1	6	3	1 2 3
Minimum Initial (s)	10.0	10.0	5.0	10.0	7.0	
Minimum Split (s)	30.5	30.5	9.0	15.5	12.5	
Total Split (s)	40.1	40.1	24.0	64.1	25.9	90.0
Total Split (%)	44.6%	44.6%	26.7%	71.2%	28.8%	100.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	Min	Min	
v/c Ratio	0.55	0.50	0.52	0.19	0.52	0.10
Control Delay	15.9	3.1	29.8	4.5	25.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	3.1	29.8	4.5	25.1	0.1
Queue Length 50th (ft)	114	0	53	26	70	0
Queue Length 95th (ft)	252	53	120	55	128	0
Internal Link Dist (ft)	714			1420	691	
Turn Bay Length (ft)						
Base Capacity (vph)	955	1046	502	2617	1091	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.46	0.28	0.16	0.35	0.10

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 62.7
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: NORTH KIHEI ROAD & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	242	170	647	219	629	129	810	664	704	924	117
Lane Group Flow (vph)	80	263	185	703	238	684	140	880	722	765	1004	127
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	20.0
Total Split (s)	16.0	14.0	14.0	23.0	21.0	25.0	14.0	28.0	23.0	25.0	39.0	39.0
Total Split (%)	17.8%	15.6%	15.6%	25.6%	23.3%	27.8%	15.6%	31.1%	25.6%	27.8%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
v/c Ratio	0.45	0.69	0.43	0.97	0.53	0.43	0.74	0.93	0.49	0.95	0.72	0.18
Control Delay	41.8	47.5	27.2	62.4	36.8	8.5	59.8	49.6	14.2	57.0	26.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	47.5	27.2	62.4	36.8	8.5	59.8	49.6	14.2	57.0	26.8	4.1
Queue Length 50th (ft)	43	76	74	205	122	67	78	256	132	222	251	0
Queue Length 95th (ft)	86	118	136	#319	#212	121	#166	#376	184	#337	325	34
Internal Link Dist (ft)		253			225			2017			2865	
Turn Bay Length (ft)												
Base Capacity (vph)	226	393	422	728	448	1596	197	947	1479	804	1394	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.67	0.44	0.97	0.53	0.43	0.71	0.93	0.49	0.95	0.72	0.18

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.6
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: KAONOULU STREET & PIILANI HIGHWAY

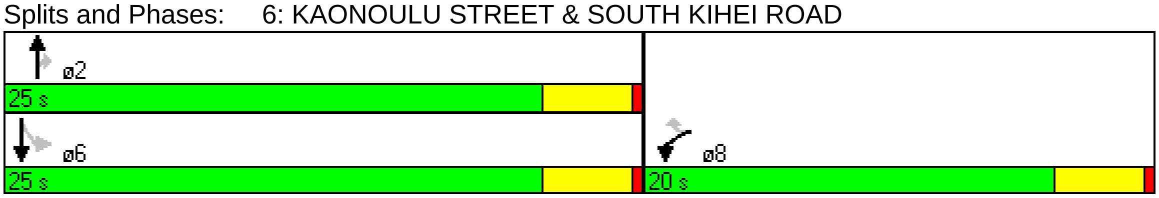
6: KAONOULU STREET & SOUTH KIHEI ROAD

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	207	123	536	233	153	455
Lane Group Flow (vph)	225	134	583	253	166	495
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	25.0	25.0	25.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.50	0.27	0.53	0.24	0.53	0.45
Control Delay	12.7	3.6	9.0	1.9	17.5	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	3.6	9.0	1.9	17.5	8.0
Queue Length 50th (ft)	35	0	69	0	19	55
Queue Length 95th (ft)	83	25	190	26	#110	151
Internal Link Dist (ft)	290		106			222
Turn Bay Length (ft)						
Base Capacity (vph)	613	636	1155	1078	331	1155
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.21	0.50	0.23	0.50	0.43

Intersection Summary

Cycle Length: 45
Actuated Cycle Length: 41
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: KAONOULU STREET & SOUTH KIHEI ROAD



Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	SBR	ø1	ø8
Lane Configurations									
Volume (vph)	87	0	81	35	1613	1532	105		
Lane Group Flow (vph)	0	95	88	38	1753	1665	114		
Turn Type	Perm		Perm	Prot			Perm		
Protected Phases		4		5	2	6		1	8
Permitted Phases	4		4				6		
Detector Phases	4	4	4	5	2	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	8.0	20.0	20.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	21.0	11.0	60.0	58.0	58.0	9.0	21.0
Total Split (%)	23.3%	23.3%	23.3%	12.2%	66.7%	64.4%	64.4%	10%	23%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag				Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	None	None
v/c Ratio		0.52	0.31	0.28	0.62	0.66	0.10		
Control Delay		34.2	9.1	40.9	5.6	10.4	1.7		
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay		34.2	9.1	40.9	5.6	10.4	1.7		
Queue Length 50th (ft)		43	0	17	157	269	0		
Queue Length 95th (ft)		94	39	51	295	428	19		
Internal Link Dist (ft)		212			1953	2017			
Turn Bay Length (ft)									
Base Capacity (vph)		269	373	144	2850	2589	1188		
Starvation Cap Reductn		0	0	0	0	0	0		
Spillback Cap Reductn		0	0	0	0	0	0		
Storage Cap Reductn		0	0	0	0	0	0		
Reduced v/c Ratio		0.35	0.24	0.26	0.62	0.64	0.10		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 85.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: KULANIHAKOI STREET & PIILANI HIGHWAY

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	433	255	214	1319	1272	485
Lane Group Flow (vph)	471	277	233	1434	1383	527
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	17.0	60.0	43.0	43.0
Total Split (%)	33.3%	33.3%	18.9%	66.7%	47.8%	47.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
v/c Ratio	0.92	0.42	0.91	0.65	0.90	0.54
Control Delay	57.2	5.4	77.3	12.6	33.5	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.2	5.4	77.3	12.6	33.5	3.8
Queue Length 50th (ft)	259	0	132	246	373	0
Queue Length 95th (ft)	#444	56	#269	315	#519	56
Internal Link Dist (ft)	620			1070	1739	
Turn Bay Length (ft)						
Base Capacity (vph)	511	654	256	2202	1534	985
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.42	0.91	0.65	0.90	0.54

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

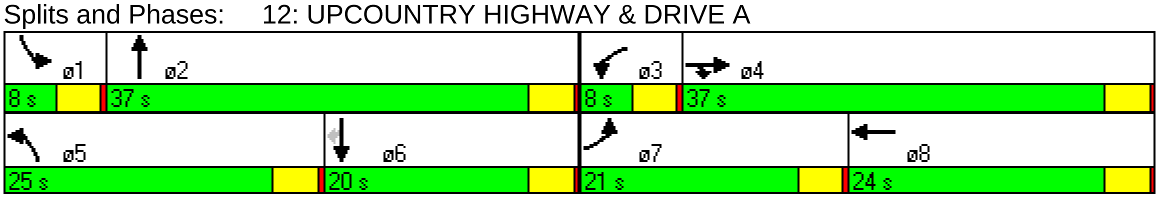
Splits and Phases: 8: PIIKEA AVENUE & PIILANI HIGHWAY

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	ø1	ø3
Lane Configurations										
Volume (vph)	414	277	442	589	518	60	55	170		
Lane Group Flow (vph)	450	301	480	640	563	65	60	185		
Turn Type	Prot		Prot		Prot			Perm		
Protected Phases	7	4	4	8	5	2	6		1	3
Permitted Phases								6		
Detector Phases	7	4	4	8	5	2	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	8.0	20.0	20.0	20.0	8.0	8.0
Total Split (s)	21.0	37.0	37.0	24.0	25.0	37.0	20.0	20.0	8.0	8.0
Total Split (%)	23.3%	41.1%	41.1%	26.7%	27.8%	41.1%	22.2%	22.2%	9%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.76	0.20	0.50	0.84	0.78	0.07	0.14	0.37		
Control Delay	41.4	15.7	3.5	43.1	38.6	14.1	32.1	7.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	41.4	15.7	3.5	43.1	38.6	14.1	32.1	7.6		
Queue Length 50th (ft)	124	51	0	182	153	20	29	0		
Queue Length 95th (ft)	175	77	52	#264	208	43	64	55		
Internal Link Dist (ft)		86		399		103	80			
Turn Bay Length (ft)										
Base Capacity (vph)	648	1535	958	791	801	892	419	500		
Starvation Cap Reductn	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.69	0.20	0.50	0.81	0.70	0.07	0.14	0.37		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: UPCOUNTRY HIGHWAY & DRIVE A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	342	11	25	323	81	9	9	28	118	5	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	372	12	27	351	88	10	10	30	128	5	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					333							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	439			384			857	923	378	909	885	395
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	390			384			844	917	378	901	875	342
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			96	96	95	40	98	97
cM capacity (veh/h)	1075			1175			240	239	669	213	252	644

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	26	384	27	439	10	40	128	24
Volume Left	26	0	27	0	10	0	128	0
Volume Right	0	12	0	88	0	30	0	18
cSH	1075	1700	1175	1700	240	465	213	476
Volume to Capacity	0.02	0.23	0.02	0.26	0.04	0.09	0.60	0.05
Queue Length 95th (ft)	2	0	2	0	3	7	86	4
Control Delay (s)	8.4	0.0	8.1	0.0	20.6	13.5	44.8	13.0
Lane LOS	A		A		C	B	E	B
Approach Delay (s)	0.5		0.5		14.9		39.8	
Approach LOS					B		E	

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	70	379	10	6	347	8	5	4	7	7	3	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	412	11	7	377	9	5	4	8	8	3	98
Approach Volume (veh/h)		499			392			17			109	
Crossing Volume (veh/h)		17			86			496			389	
High Capacity (veh/h)		1366			1295			937			1020	
High v/c (veh/h)		0.37			0.30			0.02			0.11	
Low Capacity (veh/h)		1144			1080			757			831	
Low v/c (veh/h)		0.44			0.36			0.02			0.13	

Intersection Summary

Maximum v/c High	0.37		
Maximum v/c Low	0.44		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1134	479	0	1496	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1233	521	0	1626	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	305			296		
pX, platoon unblocked					0.83	
vC, conflicting volume			1753		2046	616
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1753		2055	616
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			353		40	433

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	616	616	521	813	813	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	521	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.36	0.36	0.31	0.48	0.48	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0			0.0		0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1234	1277	0	0	219
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1341	1388	0	0	238
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		435	166			
pX, platoon unblocked	0.83				0.83	0.83
vC, conflicting volume	1388				2059	694
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1261				2071	424
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	50
cM capacity (veh/h)	453				39	479

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	671	671	694	694	0	238
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	238
cSH	1700	1700	1700	1700	1700	479
Volume to Capacity	0.39	0.39	0.41	0.41	0.00	0.50
Queue Length 95th (ft)	0	0	0	0	0	68
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	19.7
Lane LOS						C
Approach Delay (s)	0.0		0.0			19.7
Approach LOS						C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	78	31	168	0	62	0	456	0	0	0	0	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	34	183	0	67	0	496	0	0	0	0	77
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		479										
pX, platoon unblocked												
vC, conflicting volume	67			216			314	271	34	271	453	34
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	67			216			314	271	34	271	453	34
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			9	100	100	100	100	93
cM capacity (veh/h)	1532			1351			545	600	1032	632	473	1032

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	85	34	183	0	45	22	496	0	0	77
Volume Left	85	0	0	0	0	0	496	0	0	0
Volume Right	0	0	183	0	0	0	0	0	0	77
cSH	1532	1700	1700	1700	1700	1700	545	1700	1700	1032
Volume to Capacity	0.06	0.02	0.11	0.00	0.03	0.01	0.91	0.00	0.00	0.07
Queue Length 95th (ft)	4	0	0	0	0	0	272	0	0	6
Control Delay (s)	7.5	0.0	0.0	0.0	0.0	0.0	47.0	0.0	0.0	8.8
Lane LOS	A						E	A	A	A
Approach Delay (s)	2.1			0.0			47.0		8.8	
Approach LOS							E		A	

Intersection Summary			
Average Delay	26.2		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	31	0	0	62	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	0	0	67	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	629					
pX, platoon unblocked						
vC, conflicting volume			34		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			34		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1578		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	34	0	67
Volume Left	0	0	67
Volume Right	34	0	0
cSH	1700	1700	1023
Volume to Capacity	0.02	0.00	0.07
Queue Length 95th (ft)	0	0	5
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	6.8%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX N

Conditions of Motion to Amend with Proposed Changes

Below is a list of the existing conditions in the 1995 Decision and Order that would be included in the new Findings of Fact, Conclusions of Law and Decision and Order and would apply only to the Piilani Parcels, as sought by Applicant in the Motion to Amend.

1. 1995 Condition 1:

"The Petitioner shall obtain a Community Plan Amendment and Change in Zoning from the county of Maui."

Request for Modification or Deletion of Condition 1:

Piilani requests that Condition 1 be deleted.

Following the issuance of the 1995 Decision and Order, in 1998, the Original Petitioner applied to the County of Maui for a change in zoning from Agricultural to M-1 Light Industrial, and the Original Petition Property was rezoned to M-1 Light Industrial in 1999 without any limitation on uses. M-1 Light Industrial Zoning permits all of the proposed uses in the Piilani Project. In addition, as anticipated at the time the Original Petition was presented, the County of Maui adopted the current KMCP in 1998 by Ordinance 2641, effective March 6, 1998. The adoption of the KMCP changed the designation from Project District 3, allowing a mixture of single family and multi-family uses, to the current designation of Light Industrial (LI). As noted *supra*, it is the County of Maui's position that the current designation of "Light Industrial" in the Kihei-Makena Community Plan permits all of the proposed uses in the Piilani Project. Therefore, because this condition has been met, and because the uses proposed in the Piilani Project all are allowed within the LI designation as implemented by the M-1 zoning, no community plan amendment is necessary.

2. 1995 Condition 2:

Petitioner shall cooperate with the State Department of Health and the County of Maui Department of Public Works and Waste Management to conform to the program goals and objectives of the Integrated Solid Waste Management Act, Chapter 342G, Hawaii Revised Statues.

Request for Modification or Deletion:

Piilani requests that the name of the agency "County of Maui Department Environmental Management" be substituted for the name "County of Maui Department of Public Works and Waste Management" to reflect the change of County of Maui governmental agencies responsible for solid waste and waste water within the County of Maui.

3. 1995 Condition 3:

Petitioner shall contribute its pro-rata share to fund and construct adequate wastewater treatment, transmission and disposal facilities, as determined by the State Department of Health and the County of Maui Department of Public Works and Waste Management.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 3.

4. 1995 Condition 4:

Petitioner shall fund and construct adequate civil defense measures as determined by the State and County Civil Defense Agencies.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 4.

5. 1995 Condition 5:

Petitioner shall fund, design and construct necessary local and regional roadway improvements necessitated by the proposed development in designs and schedules accepted by the State Department of Transportation and the County of Maui. Petitioner shall provide traffic signals at the intersection of Piilani Highway and Kaonoulu Street, and shall submit a warrant study in coordination with the Department of Transportation. Petitioner shall also install a fence and appropriate screening, i.e., landscaping, etc., along the highway right-of-way in coordination with the State Department of Transportation. Petitioner shall provide for a frontage road parallel to Piilani Highway and other connector roads within the Petition area, in coordination with other developments in the area with the review and approval of the State Department of Transportation and the County of Maui.

Request for Modification or Deletion:

Piilani requests that the following language be deleted from Condition 5:

"Petitioner shall provide for a frontage road parallel to Piilani Highway and other connector roads within the Petition area, in coordination with other developments in the area with the review and approval of the State Department of Transportation and the County of Maui." According to testimony of Ken Tatsuguchi of the State Department of Transportation ("SDOT") at the Order to Show Cause hearing, as well as the testimony of Piilani's expert Phillip Rowell at the Order to Show Cause hearing, a frontage road adjacent to Piilani Highway would result in the Piilani Highway and Kaonoulu Street intersection being in close proximity to the frontage road causing traffic operation and safety issues. A frontage road would create a new intersection with East Kaonoulu Street less than a desirable distance east of Piilani Highway, making coordination of signals difficult and likely leading to traffic backups onto Piilani Highway and interference with traffic flow. It was the SDOT's opinion that a frontage road parallel to Piilani Highway at the Kihei Upcountry Highway intersection would not be feasible. Appropriate local accesses from the Piilani Parcels to the State Highway System will be addressed in the TIAR without the necessity of frontage roads. Therefore, Piilani requests the deletion of the requirement of a frontage road, which according to the experts at the SDOT is not feasible or desirable.

6. 1995 Condition 6:

Petitioner shall fund and construct adequate potable and non-potable water source, storage, and transmission facilities and improvements to accommodate the proposed project. Water transmission facilities and improvements shall be coordinated and approved by the appropriate State and County agencies.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 6.

7. 1995 Condition 7:

Petitioner shall participate in an air quality monitoring program as determined by the State Department of Health.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 7.

8. 1995 Condition 8:

Petitioner shall fund the design and construction of its pro-rata share of drainage improvements required as a result of the development of the Property, including oil water separators and other filters as appropriate, and other best management practices as necessary to minimize non-point source pollution into Kulanihakoi Gulch, in coordination with appropriate state and county agencies, such as the following:

a. All cleaning, repairs and maintenance of equipment involving the use of industrial liquids, such as gasoline, diesel, solvent, motor oil, hydraulic oil, gear oil, brake fluid, acidic or caustic liquids, antifreeze, detergents, degreasers, etc., shall be conducted on a concrete floor, where roofed or unroofed. The concrete floor shall be constructed so as to be able to contain any drips or spills and to provide for the recovery of any spilled liquid. Water drainage from these concrete floors, if necessary, shall pass through a separator sump before being discharged.

b. All employees shall be instructed to immediately collect and contain any industrial liquid spills on the concrete floor and should be informed against discharging or spilling any industrial liquids. Employees shall be instructed to prevent any industrial liquid spills onto the bare ground.

c. Barrels for the temporary storage of used oil or other industrial liquids shall be kept on a concrete surface. The surface shall be bermed to prevent the loss of liquid in the event of spills or leaks. The barrels shall be sealed and kept under shelter from the rain. (The Department of Labor and Industrial Relations' Occupational Safety and Health regulations, sections titles, "Housekeeping Standards" and "Storage of Flammable or Combustible Liquids," shall be followed, along with the local fire code.)

Request for Modification or Deletion:

Piilani requests that the term "Property" be deleted and replaced with "Piilani Parcels" to indicate the applicability of this condition solely to the Piilani Project. Piilani does not seek any further modification or deletion of Condition 4.

9. 1995 Condition 9:

Should any human burials or any historic artifacts, charcoal deposits, or stone platforms, pavings or walls be found, the Petitioner shall stop work in the immediate vicinity and contact the State Historic Preservation District. The significance of these finds shall be determined and approved by the Division, and an acceptable mitigation plan shall be approved by the Division. The Division must verify that the fieldwork portion of the mitigation plan has been successfully executed prior to work proceedings in the immediate vicinity of the find. Burials must be treated under specific provisions of Chapter 6E, Hawaii Revised Statues.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 9.

10. 1995 Condition 10:

A long term preservation plan for the petroglyph stone (Site 50-10-3746) that was removed from the project area shall be reviewed and approved by the State Historic Preservation Division. Long term preservation measures shall be implemented within 60 days after final approval of the preservation plan.

Request for Modification or Deletion:

Piilani request that this condition be deleted because it has already been satisfied. As stated in the Fifth Annual Report (submitted on February 11, 2000), the Petitioner prepared a long term preservation plan which has been approved by the State Historic Preservation Division, Department of Land and Natural Resources, State of Hawaii, a copy of which was transmitted to the Land Use Commission. See Exhibit "O," Letter from the State Historic Preservation Division, dated June 2, 1998.

11. 1995 Condition 11:

Petitioner shall contribute its pro-rata share to a near shore water quality monitoring program as determined by the State Department of Health and the State Division of Aquatic Resources, Department of Land and Natural Resources.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 11.

12. 1995 Condition 12:

Petitioner shall implement effective soil erosion and dust control methods during construction in compliance with the rules and regulations of the State Department of Health and the County of Maui.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 12.

13. 1995 Condition 13:

Petitioner shall create a buffer zone between lands designated as SF (Single-Family) by the County's Kihei-Makena Community Plan and industrial uses on the Property to mitigate impacts between future residential activities and the proposed industrial development.

Request for Modification or Deletion:

Piilani requests that Condition 13 be deleted, because the KMCP does not have any lands designated Single-Family (SF) that are adjacent to the Piilani Parcels, and therefore this condition is not necessary.

14. 1995 Condition 14:

In the event Petitioner sells its interest in the Project, Petitioner shall subject the Property to deed restrictions to run with the land which shall require the successors and assigns to comply with the terms and conditions set forth in the Commission's Decision and Order.

Request for Modification or Deletion:

Piilani requests that the term "Property" be deleted and replaced with "Piilani Parcels" to indicate the applicability of this condition solely to the Piilani Project.

15. 1995 Condition 15:

Petitioner shall develop the Property in substantial compliance with the representatives made to the Commission. Failure to so develop the Property may result in reversion of the Property to its former classification, or change to a more appropriate classification.

Request for Modification or Deletion:

Piilani requests that the term “Property” be deleted and replaced with “Piilani Parcels” to indicate the applicability of this condition solely to the Piilani Project.

16. 1995 Condition 16:

Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily after the ownership interests in the Property, prior to development of the Property.

Request for Modification or Deletion:

Piilani requests that the term “Property” be deleted and replaced with “Piilani Parcels” to indicate the applicability of this condition solely to the Piilani Project.

17. 1995 Condition 17:

Petitioner shall timely provide without any prior notice, annual reports to the Commission, the Office of State Planning, and the County of Maui Planning Department in connection with the status of the subject Project and Petitioner’s progress in complying with the conditions imposed herein. The annual report shall include written documentation from each State and County agency responsible, indicating that the terms of the condition(s) are progressing satisfactorily or have been completed to the satisfaction of the agency. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 17.

18. 1995 Condition 18:

Petitioner shall record the conditions imposed herein by the Commission with the Bureau of Conveyances pursuant to Section 15-15-92 Hawaii Administrative Rules.

Request for Modification or Deletion:

Piilani does not seek any modification or deletion of Condition 18.

19. 1995 Condition 19:

Within seven (7) days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall (a) record with the Bureau of Conveyances a statement that the Property is subject to conditions imposed herein by the Land Use Commission in the reclassification of the Property; and (b) shall file a copy of such recorded statement with the Commission.

Request for Modification or Deletion:

Piilani requests that the term "Property" be deleted and replaced with "Piilani Parcels" to indicate the applicability of this condition solely to the Piilani Project.

20. 1995 Condition 20:

The Commission may fully or partially release the conditions provided herein as to all or any portion of the Property upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by the Petitioner.

Request for Modification or Deletion:

Piilani requests that the term “Property” be deleted and replaced with “Piilani Parcels” to indicate the applicability of this condition solely to the Piilani Project.