ALA WAI ALTERNATIVES ANALYSIS

APPENDIX C:

BRIDGE USE FORECAST

Honolulu COMPLETE STREETS

ALA PONO
an Ala Wai crossing

MEMORANDUM

To: Dr. Nicola Szibbo, Ph.D, Department of Transportation Services, City and County of Honolulu

From: Nelson\Nygaard

Date: May 7, 2019

Subject: Task 4: General Travel Corridor Identification and Mode Definitions
Task 5: Bridge Use Forecasts (Model Validation and Sensitivity Tests)

KEY FINDINGS

- Most of travel in and out of Waikiki is made by car.
- Residents of Waikiki and the surrounding neighborhoods are more likely to travel by foot or by bike than other residents of Oahu.
- 17-30% of car and motorcycle trips into Waikiki across each of the bridges are within a reasonable walking or biking distance from Waikiki.
- All of the crossing alternatives would have a positive impact on a modal shift towards walking and bicycling across the Ala Wai Canal.
- A new crossing at University Avenue could attract between 1,800 and 5,500 daily pedestrian and bicycle users.

Background

The purpose of the Ala Wai Crossing Alternatives Analysis or Ala Pono is to identify, develop, and evaluate alternatives for additional access across the Ala Wai Canal between Ala Moana Boulevard and the Manoa/Palolo Stream and select the least environmentally damaging practicable alternative (LEDPA). Ala Pono assessed options for new active transportation infrastructure over the Ala Wai Canal that will provide an additional connection between the Waikīkī, Ala Moana, and McCully/Mōʻiliʻili neighborhoods. The options include adding bikeways to an existing bridge and two new bridge locations. The additional access is intended for pedestrian and bicycle use only.

Introduction

Crossing options were assessed using several technical analyses to evaluate which alternative best meets the purpose and need of the project. This memo details the potential modal impacts and benefits associated with each proposed crossing alternative. This evaluation focuses on how project alternatives can enhance complete streets connectivity and provide access in the interest of environmental justice and public safety. An important aspect of this analysis is understanding how people currently travel across the canal and how travel could change with a new or improved crossing.

This memo delivers the results of the analysis two sections:

1. **Identification of general travel corridors and existing mode share.** A description of how people currently move in and out of Waikiki and McCully-Moiliili along corridors associate with the defined crossing alternatives.
2. **Bridge use forecasts for the various project alternatives.** Predictions of how many people bicycling and walking would use a new or improved crossing. The forecasting model can be seen in *Appendix A: Bridge Use Model.*

The results of the analysis described in this memo informed the evaluation matrix scoring of the various project alternatives, including the Complete Streets Connectivity, Sustainable Mobility and Public Health, Affordable Access, and Non-Motorized Emergency Evacuation and Public Safety metrics. For more details about how these metrics were used, see the *Evaluation Matrix Summary and Results* technical memorandum.

IDENTIFICATION OF GENERAL TRAVEL CORRIDORS AND MODE SHARE

Existing Travel around the Canal

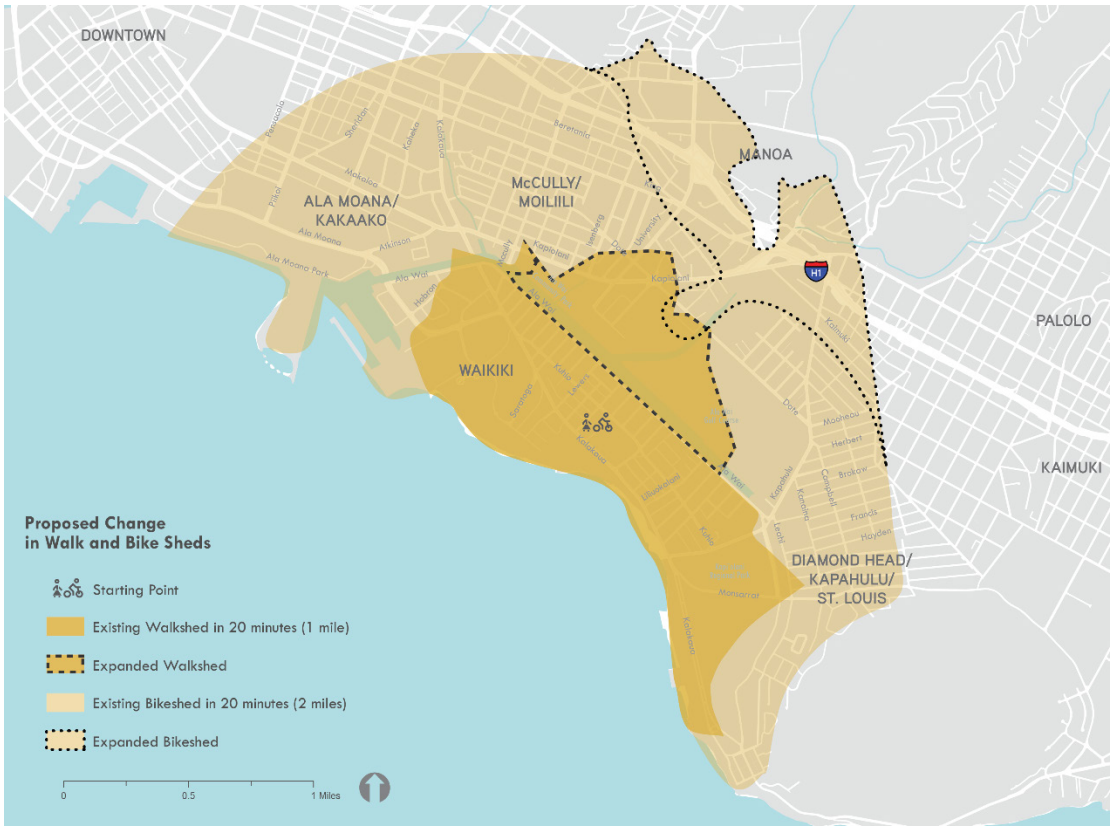
As an economic and recreational hub in Honolulu for residents and visitors alike, Waikiki and its adjacent neighborhoods are generators and attractors of a variety of trip types. To understand current patterns, a number of data sources were used to measure existing travel, ranging from island-wide flows to individual corridor counts. Figure 1 provides an outline of the various measures and their corresponding data sources. **This data revealed origin-destination pairs, travel modes, and route choices to access Waikiki.**

Figure 1 Existing Travel Measures

Travel Measure	Source	Notes
Resident commute origin-destination (O-D) pairs	LODES 2015, U.S. Census Bureau	Data represents number of commute O-D pairs. Pairs cannot be broken down into daily trips.
Airsage O-D **trip volumes**	Airsage, October 2017	Data represents number of average daily trips. Data does not provide a mode split.
Neighborhood mode split	OahuMPO Travel Demand Model	Walking and bicycling modes are combined.
Corridor travel volumes and mode split	24-hour travel counts, September 2018	Data does not provide information about origins and destinations of trips.

The project's focus on complete streets connectivity and multimodal access across the canal narrowed our analysis to areas where residents, employees, and travelers could reasonably take trips by foot or bike. A study area was defined around the canal that would capture trips within a 20 minute walking or bicycling distance of a central point in Waikiki. Figure 2 shows the areas an individual could reach from the center of Waikiki after traveling for 1 mile (walkshed) and 2 miles (bikeshed) using the existing road and off-street pathway networks and the expanded travel sheds achieved with a new mid-canal crossing. These boundaries circumscribed most of the travel analysis and defined the bounds for "short trips" to and from Waikiki.

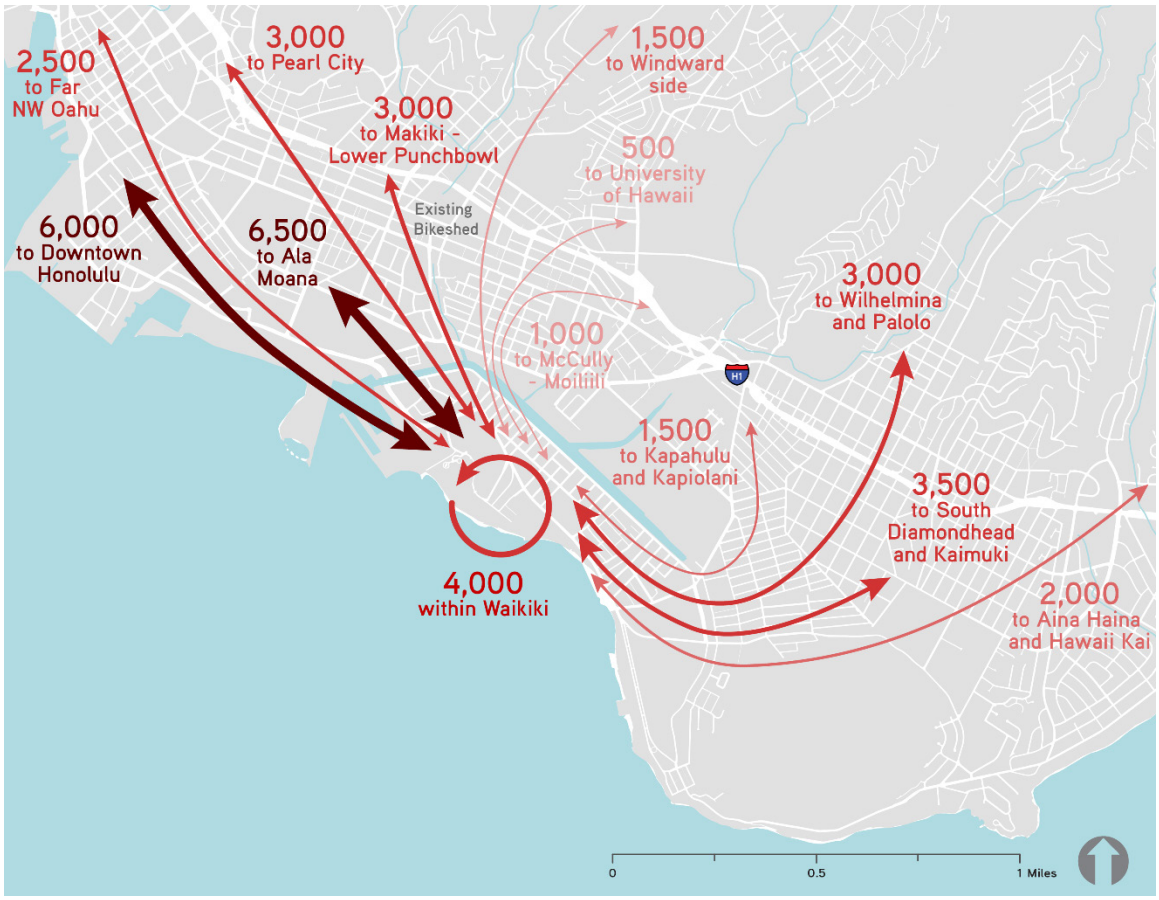
Figure 2 Proposed Change in Walk and Bike Sheds



Resident Commute Origin-Destination (O-D) Pairs

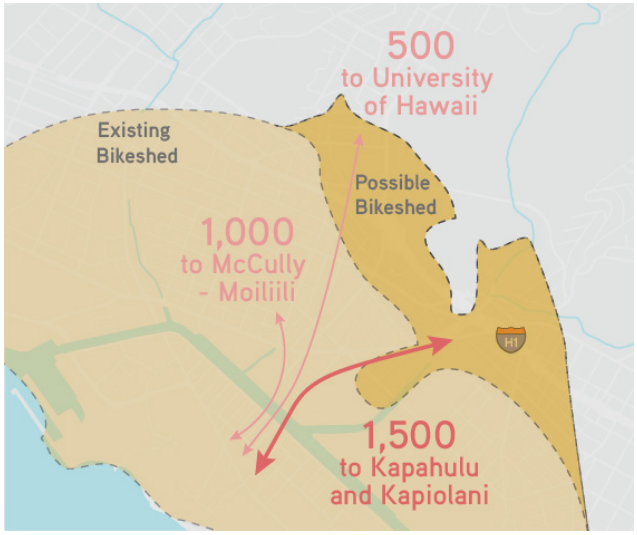
Publicly available commute data through the U.S. Census Bureau provides insight into major travel corridors in an area. **In Honolulu, approximately 38,000 Waikiki based commute trips start or end on the makai side of the canal** (Figure 3). This significant number of people are regularly using the existing infrastructure, whether crossing one of the three existing bridges or traveling via a Diamond Head side crossing via Kapahulu Avenue. The latter route is referred to throughout this memo as the Diamond Head Crossing. **With existing canal crossings, 18% of these commutes are short trips, or within a reasonable walking or bicycling distance of Waikiki.** A new mid-canal crossing could expand the bikeshed around Waikiki so **3,000 more people would be living within reasonable walking or bicycling distance of their work.** (Figure 4).

Figure 3 Approximately 38,000 Commute Trips In and Out of Waikiki



Source: Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES), 2015, U.S. Census Bureau

Figure 4 Approximately 3,000 Possible New Active Transportation Commutes with Mid-Canal Crossing



Source: Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES), 2015, U.S. Census Bureau

Airsage O-D Trip Volumes

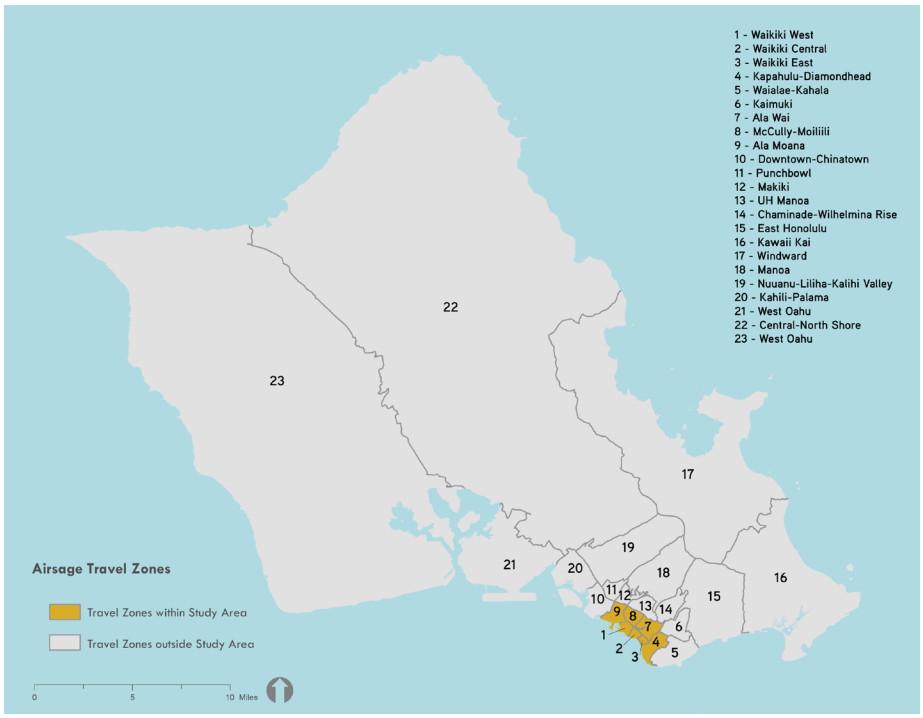
Because commute data only presents trips made for work purposes, the City and County of Honolulu purchased Airsage anonymous location information data to measure the origins and destinations of people traveling in and out of Waikiki for *all* trip purposes. To show longer trips for those travelling across Oahu, data were aggregated to trips between defined travel zones made up of census block groups (Figure 5 and Figure 6). The result of this analysis can be seen in Figure 7. In turn, trips occurring between zones directly along both sides of the canal were categorized as short trips. Short trips are highlighted in yellow represent short trips in Figure 7 With both sets of data, it was possible to isolate short trips from the ones outside of walking or bicycling distance.

To calculate the proportion of travelers making short Waikiki related trips, volumes of short trips were further aggregated by travel route. Crossing options were assigned to each O-D pair based on the most likely route between the two zones (Figure 7). Google Maps directions were used to analyze the route between the centroids of each travel zone for driving, walking, and biking. The number of short trips across each crossing were summed and normalized by the total trips across each crossing. In cases where zonal pairs had two route options with similar travel times, two crossing options were assigned. For these pairs, the proportion of trips was split evenly between the two options.

Figure 8 shows the proportion of short trips across each of the existing bridges. This distribution of trips is the key input used later in the bridge users forecast model.

Airsage data were used as an alternative to OahuMPO travel model data, due to Airsage's representation of recorded trips of all modes between the travel zones. Airsage pulls anonymous location data from wireless cellphones and tablets. It is important to note that Airsage uses their own calibration factors to extrapolate the number of trips observed from wireless data by estimating the typical percentage of people with location based services activated on their devices. Comparatively, travel model data extrapolates household interview travel survey data, which often represents a small sample of households. Because of the even smaller sample of bicycle and pedestrian households, travel models often have limitations when it comes to travel volumes of bicycle and pedestrian trips.

Figure 5 Airsage Travel Zones, Including Zones Outside the Study Area to Isolate Trips Across Oahu



Source: Airsage, October 2017

Figure 6 Airsage Travel Zones (Study Area Inset) Isolating Short Trips Across the Canal

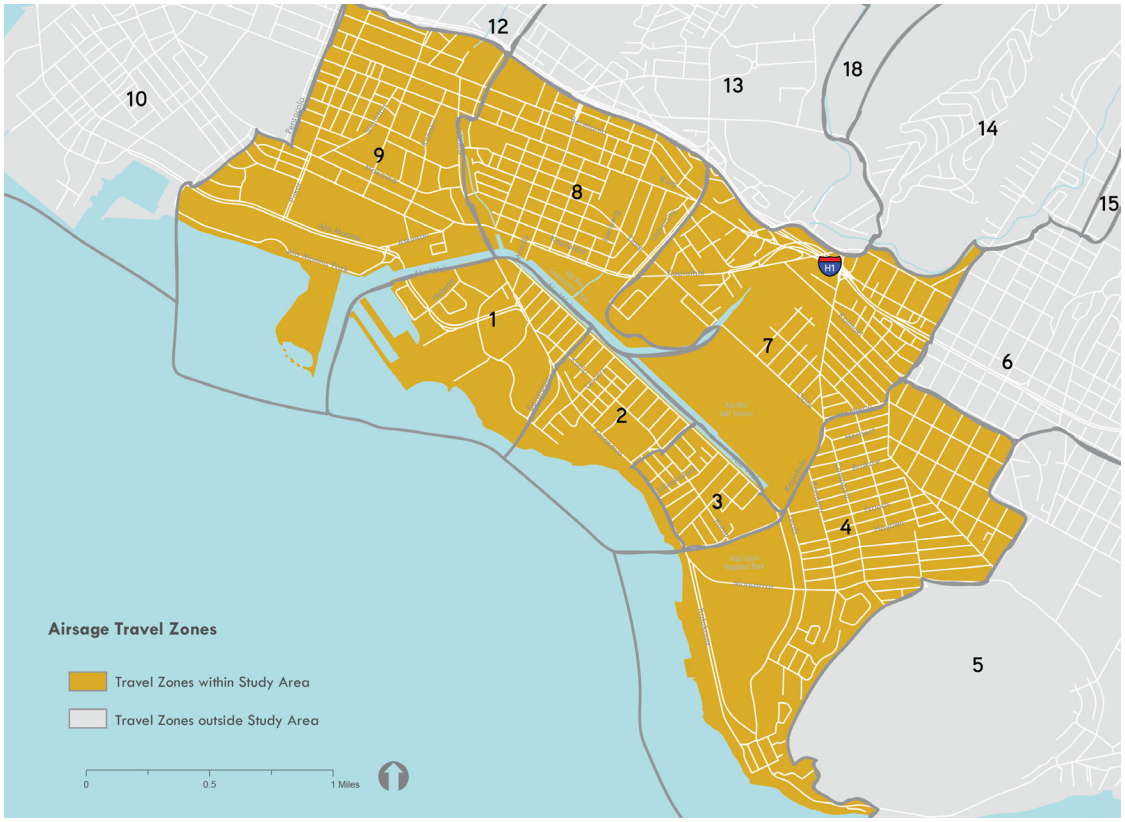


Figure 7 Airsage Trip Counts between Travel Zones and Route Assignments (calibrated daily trips)

From Travel Zone		To Travel Zone: Waikiki West	Waikiki Central	Waikiki East	Kapahulu-Diamondhead (through Waikiki)
		1	2	3	4
Ala Moana	9	1,580 (A/K)	1,120 (A/K)	1,630 (A/K)	942
Ala Wai	7	690 (M)	488 (DH)	543 (M)	
Central-North Shore	22	1,665 (M)	1,100 (DH)	1,805 (A)	
Chaminade-Wilhelmina Rise	14	116 (M)	77 (M)	78 (M)	
Downtown-Chinatown	10	1,854 (A/K)	1,084 (A/K)	1,963 (A/K)	
East Honolulu	15	356 (M)	228 (DH)	325 (M)	
Hawaii Kai	16	958 (M)	623 (DH)	903 (M)	
Kahili-Palama	20	1,076 (A/K)	634 (A/K)	1,386 (A/K)	
Kapahulu-Diamondhead	4	515 (M)	290 (DH)	400 (M)	
Kaimuki	6	767 (DH)	614 (DH)	796 (DH)	
Makiki	12	311 (K)	171 (K)	200 (K)	
Manoa	18	239 (M)	159 (M)	224 (M)	
McCully-Moliili	8	627 (M)	331 (M)	560 (M)	
Nuuanu-Liliha-Kalihi Valley	19	468 (K)	262 (K)	462 (K)	
Punchbowl	11	311 (K)	176 (K)	261 (K)	
UH Manoa	13	361 (M)	291 (M)	302 (M)	
Waialae-Kahala	5	724 (DH)	455 (DH)	617 (M)	
West Oahu	23	3,481 (M)	2,153 (DH)	3,456 (A)	
Windward	17	884 (M)	531 (DH)	853 (A)	

Notes: Trips highlighted in yellow represent those occurring between zones in the study area.
A = Ala Moana Bridge, K = Kalakaua Bridge, M = McCully Bridge, DH = Diamond Head

Sources: Airsage, October 2017, Google Maps.

Figure 8 Percentage Short Trips by Bridge

	McCully St Bridge	Kalakaua Ave Bridge	Ala Moana Blvd Bridge	Diamond Head Crossing
All Trips	14,702	9,257	12,749	8,769
Short Trips within Study Area	2,751	2,165	2,165	2,665
Percent Short Trips	**19%**	**23%**	**17%**	**30%**

Source: Airsage, October 2017

Neighborhood Mode Split

The split of primary travel modes at a neighborhood level provides insight into how people are traveling between neighborhoods. An area's mode split breaks down how many people chose to walk or bike, drive, and take transit with existing infrastructure. According to the OahuMPO Travel Demand Model, An average resident in the canal area is more likely to travel by active transportation than the average Honolulu resident. In the neighborhoods around the Ala Wai Canal, 19% of residents travel by walking or bicycling; a rate 8 percentage points higher than that of Honolulu (Figure 9). By improving multimodal access across the canal, whether through improvements to an existing crossing or the construction of a new bridge, more residents could be willing to take trips by walk or bicycle due to increased feelings of safety, greater convenience, and/or shorter travel times.

Figure 9 Travel Mode Share, By Census Tract (2015)

Mode	City and County of Honolulu	Waikiki	Ala Moana & Moiliili
		Makai Side of Canal	Mauka Side of Canal
Auto	77%	69%	69%
Transit	11%	13%	12%
Walk or Bicycle	11%	19%	19%

Notes: Waikiki values are based on census tracts 20.04, 20.06, 19.03, 18.03, 20.03, 18.01, 18.04, 19.04, 17, 20.05, and 19.01. Ala Moana & Mō'ili'ili values are based on census tracts 36.03, 36.04, 22.01, 24.02, 24.01, 37, 21, 22.02, 15, 23, 16, 25, and 36.01.
Source: OahuMPO Travel Demand Model (2015)

Corridor Travel Volumes and Mode Split

Travel volume and mode split on a corridor level measure how many people are using the existing infrastructure to travel in and out of Waikiki by each mode. This section describes the average daily travel volumes by mode on the three existing bridges and Ala Wai Blvd on the Diamond Head end of Waikiki. Twenty-four hour travel counts were taken on one weekday and one weekend day in September 2018 at the following locations:

- **McCully Bridge** - McCully St from Kapiolani Blvd to Kalakaua Ave
- **Kalakaua Bridge** - Kalakaua Ave from Kapiolani Blvd to McCully St
- **Ala Moana Bridge** - Ala Moana Blvd from Ala Moana Park Dr to Holomoana St
- **Diamond Head Crossing** - Ala Wai Blvd from Wai Nani Way to Aninakea Way (Figure 10)

The breakdown of average daily trips by bridge and mode can be seen in Figure 11. For car trips, person trips were calculated by factoring in the average weekday and weekend automobile occupancy from the 2017 National Household Travel Survey for Hawaii to the respective day counts, then averaged for daily travel.

Figure 10 Twenty-Four Hour Travel Count Corridor Segments

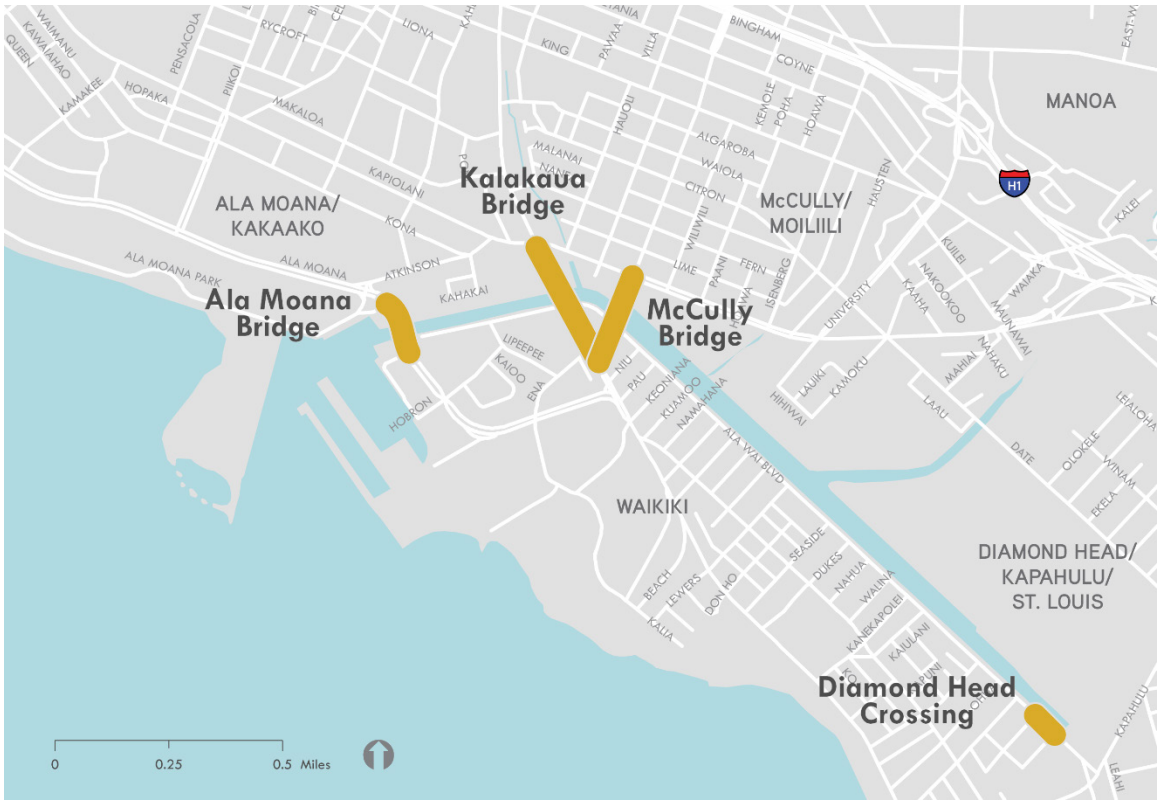


Figure 11 Existing Bridge Travel across Ala Wai Canal by Mode (2018)

	McCully St Bridge	Kalakaua Ave Bridge	Ala Moana Blvd Bridge	Diamond Head Crossing
Average Daily Trips	**76,500**	**75,000**	**77,500**	**39,500**
Car & Motorcycle	72,000 (94%)	70,000 (94%)	70,500 (91%)	36,500 (92%)
Pedestrian & Bicycle	3,000 (4%)	4,000 (5%)	4,500 (6%)	2,500 (6%)
Bus and Truck	1,500 (2%)	1,000 (1%)	2,500 (3%)	500 (1%)

Source: 24-hour count data recorded on road segments in the study area (September 2018)

Short Trips

With a general understanding of how people travel across the canal, the next step was to assess how an improved crossing could benefit or impact travel along the major corridors and influence travel mode. For the purpose of this analysis, the team focused on car & motorcycle trips across the canal. Transit trips were not measured in this analysis due to the limitations of O-D trip data for TheBus riders, which made it difficult to understand the trip distance of existing bus trips. Truck trips across the canal were also not considered, as it is assumed that few freight trips could be taken by foot or bike.

Attention was placed on travelers who were taking short trips and could feasibly replace a car or motorcycle trip with one on foot or by bike. To calculate this, it was necessary to join the two major data sources that told us the most about travel in and out of Waikiki: 1) the travel volumes and mode split by bridge, and 2) the proportion of short trips crossing each bridge. The bridge travel volumes and mode split of trips into and out of Waikiki do not provide travel distance. For instance, an individual crossing into Waikiki on the McCully Bridge in a car could be traveling from as far as the North Shore or as close as McCully-Moiliili. **To calculate short car & motorcycle trips by bridge across the canal, the proportion of short trips across each bridge, calculated from Airsage data, was applied to the travel volumes for cars and motorcycles on each existing canal crossing** (Figure 12). A diagram of this process can be seen in . Because cars and motorcycles make up such a large percentage of total trips across each bridge, this generation proportion was applied with confidence to only car & motorcycle trips. The estimate of short car & motorcycle trips represents travelers that are within walking and bicycling range of Waikiki that are currently choosing to drive across the canal.[1]

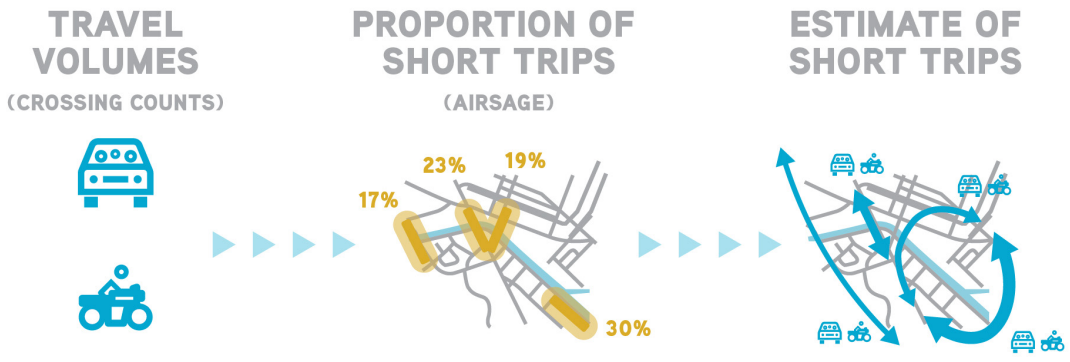
Figure 12 Number of Short Car & Motorcycle Trips by Bridge

	McCully St Bridge	Kalakaua Ave Bridge	Ala Moana Blvd Bridge	Diamond Head Crossing
Car & Motorcycle Trips (Count Data)	72,000	70,000	70,500	36,500
Percent Short Trips (Airsage Data)	19%	23%	17%	30%
Estimated Short Car & Motorcycle Trips	13,500	16,500	12,000	11,000

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017

In order to enhance complete streets connectivity and provide access in the interest of environmental justice and public safety, a conversion of existing short car & motorcycle trips to walking and bicycling trips is needed. Less cars crossing the canal would lead to increased road safety, less traffic, fewer carbon emissions, and more active trips.

Figure 13 Short Trip Process Diagram



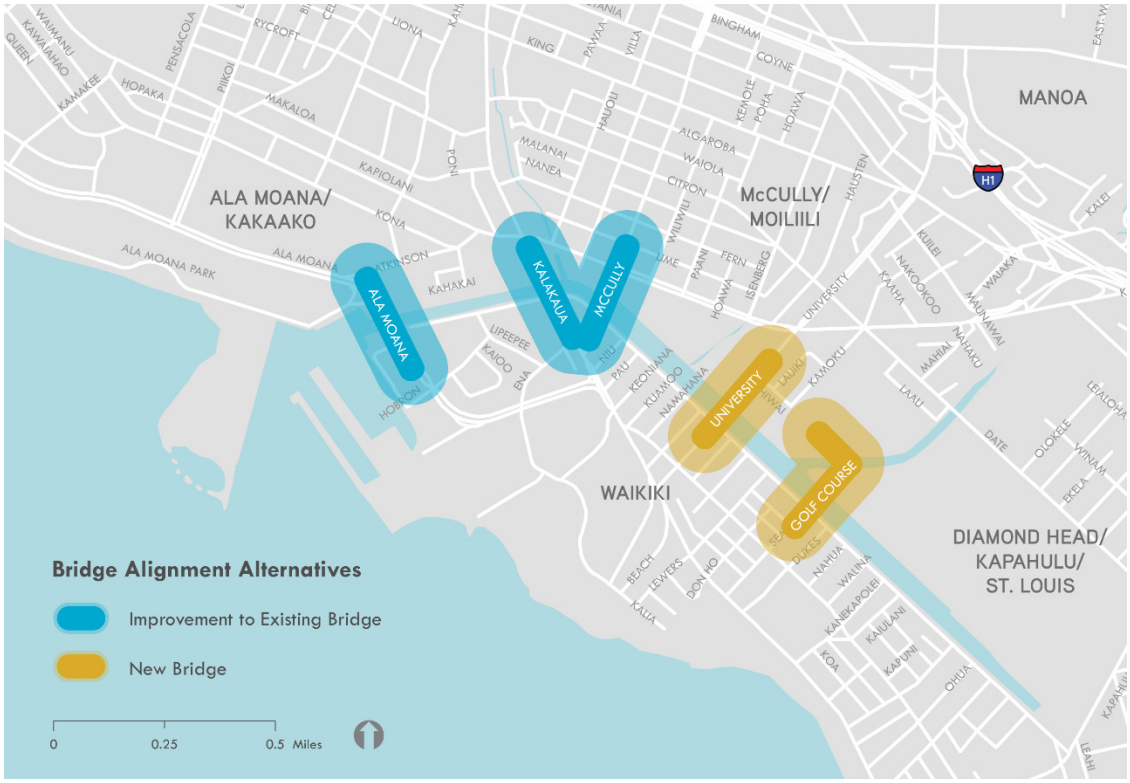
[1] While this analysis has identified these person trips as trips that are within walking and biking range, this analysis did not filter out trips that would be infeasible by walking or biking due to disability or trip purpose, or short trips that are part of a longer linked trip.

BRIDGE USE FORECASTS

Introduction

The bridge use forecast measures the benefits and impacts of an improved crossing on existing travel by estimating the number of future bridge users on the existing bridges plus multimodal improvements or a newly constructed bridge. Simply put, the purpose of this exercise is to measure how many people walking and bicycling would use the project alternatives studied in the Ala Wai Alternatives Analysis. The complete Alternative Analysis Identifies nine alternatives: no build, improvements to one of three of the existing bridges (McCully, Kalakaua, or Ala Moana), new bridge (at University or Ala Wai Golf Course), and other (aquabus, aerial tram, or pedestrian tunnel). The alternatives studied in this bridge use analysis are confined to improvements to one of the three existing bridges and a newly constructed mid-canal bridge, at either the University or Ala Wai Golf Course Alignment. (Figure 13). The bridge use results from each alternative are mutually exclusive from the other alternatives.

Figure 14 Bridge Use Forecast Alternatives



Bridge Use Forecast Model (Model Inputs)

Using the general travel corridors and mode share data identified in the prior section of the memo, the project team developed a forecast model that predicted the number of pedestrian and bicycle users for each bridge alternative. Variations of the model were utilized for the two alternative types: 1) improvements to existing bridges, and 2) a new bridge.

The alternative types were assumed to have a different level of influence on mode shift across the canal. Multimodal improvements to an existing bridge can only improve comfort levels for

pedestrians and bicycles to a certain extent because they will still be crossing alongside automobile traffic in a constrained environment. Meanwhile, a new bicycle and pedestrian bridge would completely separate active travelers from automobile traffic, creating a comfortable and safe environment that would be more enticing for new users. This assumption is based on research that pedestrians and cyclists prefer off-street paths and bridge facilities to bike lanes.[2][3]

Research informed the selection of the range of mode shift factors for the various alternative types. Peer cities that have recently made multimodal improvements to existing bridges or constructed pedestrian and bicycle bridges have seen an increase in the number of cyclists, but few have tracked if the users are new to walking or bicycling.[4][5][6][7] Although academic researchers have found that enhanced active transportation infrastructure has a positive effect on mode shift, there is a lack of a consistent value of that mode shift.[8] From a study of protected bike lanes in the U.S., bicycle lane improvements can lead to a 25% to 75% increase in the number of bicyclists, and of those new bicyclists 10% would have made the trip by another mode before the improvements.[9] The model for this study model only uses existing pedestrian and bicycle users as an input, which ignores the travel patterns of car and motorcycle users making short trips. As a result, this model was formulated to utilize both rich data sources and use the 25% to 75% increase as validation. Mode shift values for the two alternative models range from 2% to 10% of people making short trips by car or motorcycle.

Details about the two alternative models are outlined below and can be seen in *Appendix A*.

Improvements to Existing Bridges

The goal of this model was to determine the number of pedestrian and bicycle users if substantial multimodal improvements were made to each bridge. To do this, trip volumes across the canal by mode within the existing 20-minute travel shed from the center of Waikiki across the three existing bridges were used as a baseline for the improvements to existing bridges model. The travel volume inputs can be seen in Figure 14.

With information about how many people currently drive cars and motorcycles for short trips across the canal and could reasonably switch their mode to walking or bicycling, the model estimates the number of people who would shift their mode for short trips. For the three existing

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[2] Broach, Dill, & Gliebe (2012), Where do cyclists ride? A route choice model developed with revealed preference GPS data. https://www.sciencedirect.com/science/article/pii/S0965856412001164

[3] Broach (2016) Travel Mode Choice Framework Incorporating Realistic Bike and Walk Routes https://pdxscholar.library.pdx.edu/open_access_etds/2702/

[4] Rehabilitated Burrard Bridge reopens. https://vancouver.ca/news-calendar/burrard-bridge-reopens-with-significant-rehabilitation-and-safety-improvements.aspx

[5] Hawthorne Bridge Bicycle Counter about to top 1 million trips for 2013; celebration on Friday. https://www.portlandoregon.gov/transportation/article/457127

[6] What the daily grind of downtown commuting tells us about Calgary. https://www.cbc.ca/news/canada/calgary/calgary-2018-downtown-cordon-count-cars-bikes-transit-1.4876641

[7] Copenhagen's Fantastic & Stupid Bicycle Bridge Inderhavnsbro http://www.copenhagenize.com/2017/04/copenhagens-fantastic-stupid-bicycle.html

[8] Scheepers et al. (2014), Shifting from car to active transport: A systematic review of the effectiveness of interventions. https://www.tphlink.com/uploads/1/1/4/0/11401949/active_transport_systematic_review.pdf

[9] Monsere, et al. (2014), Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the U.S. https://trec.pdx.edu/research/project/583/Lessons_from_the_Green_Lanes:_Evaluating_Protected_Bike_Lanes_in_the_U.S._

bridges, a mode shift estimate of 2% was used. Together with the current pedestrian and bicycle users of the bridge, new total users were compared across the three bridges.

Figure 15 Improvements to Existing Bridge Model Inputs

	McCully St Bridge	Kalakaua Ave Bridge	Ala Moana Blvd Bridge
Existing Pedestrian & Bicycle Trips	3,000	4,000	4,500
Short Car & Motorcycle Trips	13,500	16,500	12,000

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017

New Bridge

The goal of the model for a new bridge was to forecast future trips on a crossing with no existing travel volumes. The model was structured to estimate the number of existing car, pedestrian, and bicycle trips that would be shifted from the other crossings by two means: **mode shift** or **route shift**.

For **mode shift**, the method was the same as the mode shift calculated for improvements to existing bridges, with one key difference. The construction of a mid-canal crossing would expand the travel shed to new areas reachable within 20-minutes by foot or bike, so the new bridge model incorporated additional trips that occurred within the expanded travel shed (Figure 2). The volume inputs were constrained to trips over the McCully Bridge and the no bridge access on Ala Wai Blvd (Figure 15). Kalakaua and Ala Moana Bridges were not included due to the unlikelihood that travelers would divert to a new bridge from trips currently utilizing those bridges.

Unique to the new bridge model is a **route shift**, which is the percent of people walking or bicycling across the existing bridges or on Ala Wai Blvd that would switch their route to a new bridge. This shift would be the result of directness, level of comfort, or both. For example, if an individual currently bikes from their house in Waikiki to the Safeway on Kapahulu Ave across the McCully Bridge, they may change their route with a comfortable, safe bridge. The route shift ratio was applied to bicycle and pedestrian trips evenly to both the McCully Bridge and the No Bridge access to capture travelers from both zones that may shift to a more central, direct route.

Because of the greater unknowns, this model was calibrated with three scenarios that varied the mode and route shift rate (Figure 16). This method of calibration has been used in similar pedestrian and bicycle demand forecasts.[10]

Figure 16 New Bridge Model Inputs

Travel Mode	McCully St Bridge	Diamond Head Crossing
Existing Pedestrian & Bicycle Trips	3,700	2,500
Short Car & Motorcycle Trips	18,000	11,000

Note: Number of trips vary from existing travel due to inclusion of trips within expanded 20-minute travel shed.

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017

[10] Columbia River Crossing: Pedestrian and Bicycle Demand Forecasts for I-5 Bridge, August 2008, https://www.wsdot.wa.gov/accountability/ssb5806/docs/6_Project_Development/Conceptual_Design_And_Preliminary_Engineering/Pedestrian_Bicycle_ForecastingMemo.pdf

Figure 17 New Bridge Scenarios

Scenario	Mode Shift	Route Shift
Scenario 1: Conservative	2%	20%
Scenario 2: Moderate	5%	50%
Scenario 3: Optimistic	10%	50%

Bridge Use Estimates (Model Output)

This section presents the results of the bridge use forecasts. Figure 14 and Figure 18 show the forecasted pedestrian and bicycle users by alternative. The results are broken up into new trips and total trips.

For improvements to the existing bridges:

- **New trips** represent the estimated users that will shift their mode from car and motorcycle.
- **Total trips** represents the all pedestrian and bicycle trips across the bridge, including existing users.

For a new bridge:

- Even though all trips will technically be "new", **new trips** represent the number of existing car and motorcycle users that will shift their mode and walk or bike across a bridge
- **Total trips** represents all users that will shift their mode and existing pedestrians and bicycle users that will adjust their route to use the new crossing.
- The three scenarios present a range of both **new trips and total trips.**

The estimates are based on current travel volumes across the canal. They assume that volumes would stay constant until the completion of the project alternative. To project what ridership would look like on the bridges in the future, OahuMPO Transportation Demand Forecasting Model (TDFM) data was used to predict how the mode share of car, motorcycle, pedestrian, and bicycle trips would change into 2040. According to the TDFM, in the Transportation Analysis Zones (TAZs) in the study area will see an increase of 27% walking and bicycling trips and an increase of 18% of driving trips.[11] This growth was applied to the travel volumes for each mode across the existing crossings. The O-D distributions were assumed to remain the same. Figure 19 shows the forecasts for all alternatives in 2040.

The largest predictor of bridge use estimates for the alternatives is the current travel volumes across the existing bridges. Because the existing bridges have high volumes of trips across all modes, improvements to those bridges would affect the most people and lead to high total pedestrian and bicycle trips. On the other hand, because the new bridge does not have an existing user base and would be pulling trips from the other alternatives there are more unknowns about how many travelers would take advantage of a new crossing. Figure 20 and Figure 21 show the bridge use results in a map format.

[11] The future model is likely conservative, as the continuing trend of infill mixed use development and key TOD overlays within the study area will likely open up more opportunities for residents and visitors to make shorter trips in 2040.

Figure 18 Improvements to Existing Bridge Mode Outputs

Crossing	McCully St Bridge	Kalakaua Ave Bridge	Ala Moana Blvd Bridge
Short Car & Motorcycle Trips	13,500	16,500	12,000
Mode Shift Factor	2%		
Existing Pedestrian & Bicycle Trips	3,250	3,900	4,650
New Trips (Short Trips x 2%)	**250**	**350**	**250**
Total Trips (Existing + New Trips)	**3,500**	**4,200**	**4,900**

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017

Figure 19 New Bridge Model Outputs

	Scenario 1: Conservative		Scenario 2: Moderate		Scenario 3: Optimistic	
Crossing	McCully Bridge	Diamond Head	McCully Bridge	Diamond Head	McCully Bridge	Diamond Head
Short Car & Motorcycle Trips	18,000	11,000	18,000	11,000	18,000	11,000
Mode Shift Factor	2%		5%		10%	
Existing Pedestrian & Bicycle Trips	3,700	2,500	3,700	2,500	3,700	2,500
Route Shift Factor	20%		50%		50%	
Route Shift Trips (Existing Pedestrian & Bicycle Trips x Route Shift)	**1,200**		**2,850**		**2,850**	
New Trips (Short Trips x Mode Shift x Route Shift)	**100**		**750**		**1,500**	
Total Trips (Existing + New Trips)	**1,300**		**3,600**		**4,350**	

Note: Number of trips vary from existing travel due to inclusion of trips within expanded 20-minute travel shed.

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017

Figure 20 New Bridge Model Outputs - 2040

	Scenario 1: Conservative		Scenario 2: Moderate		Scenario 3: Optimistic	
Crossing	McCully Bridge	Diamond Head	McCully Bridge	Diamond Head	McCully Bridge	Diamond Head
Short Car & Motorcycle Trips	21,000	13,000	21,000	13,000	21,000	13,000
Mode Shift Factor	2%		5%		10%	
Existing Pedestrian & Bicycle Trips	4,000	3,200	4,000	3,200	4,000	3,200
Route Shift Factor	20%		50%		50%	
Route Shift Trips (Existing Pedestrian & Bicycle Trips x Route Shift)	**1,650**		**3,600**		**3,800**	
New Trips (Short Trips x Mode Shift x Route Shift)	**150**		**900**		**1,700**	
Total Trips (Existing + New Trips)	**1,800**		**4,500**		**5,500**	

Note: Number of trips vary from existing travel due to inclusion of trips within expanded 20-minute travel shed.

Sources: 24-hour count data recorded on road segments around the canal (September 2018); Airsage, October 2017; OahuMPO 2040 TDFM

Figure 21 Bridge Use Estimates by Alternative

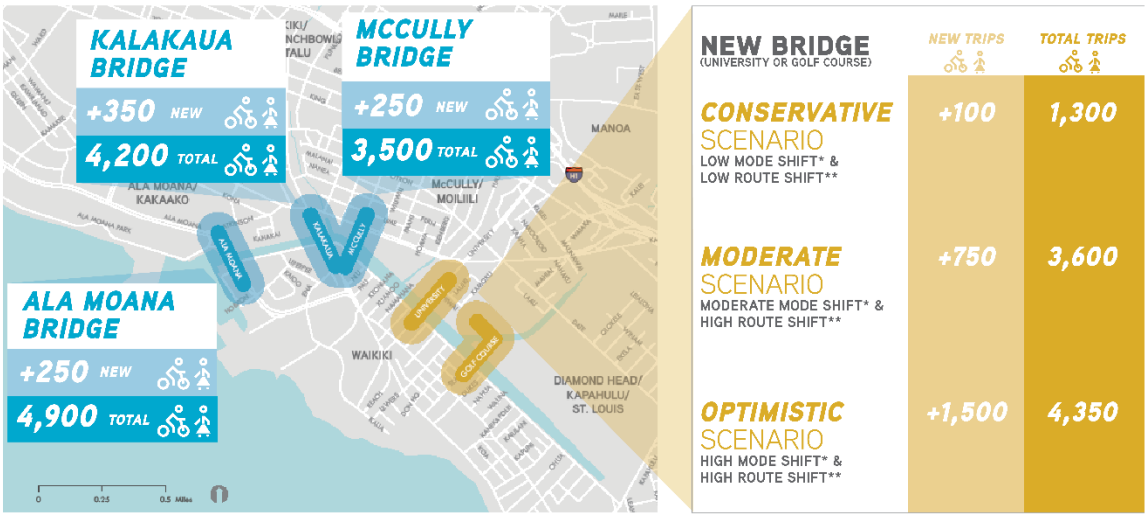
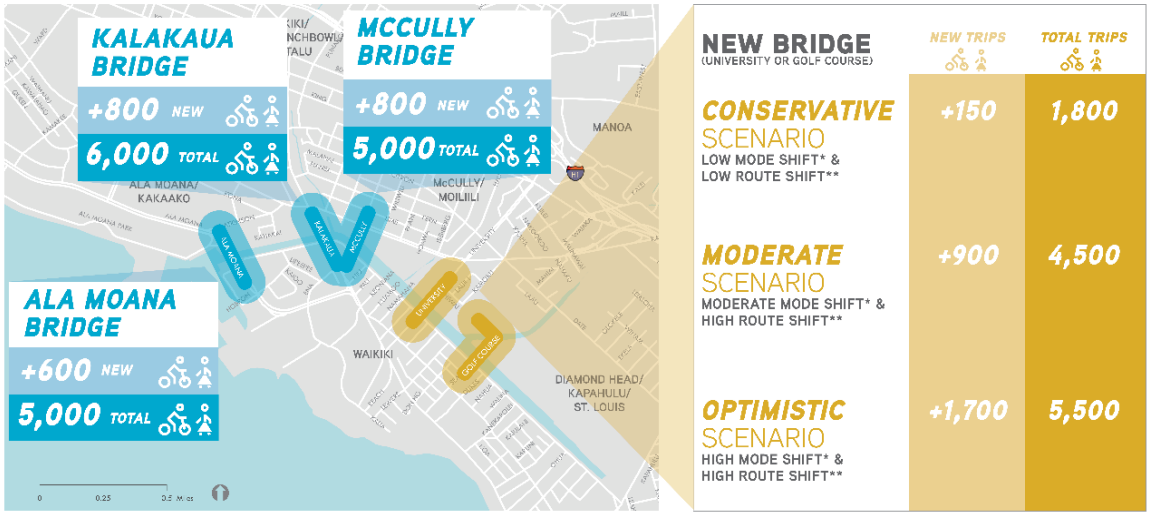


Figure 22 Bridge Use Estimates by Alternative – 2040



CONCLUSION

This memo explores existing travel in and out of Waikiki and forecasts what future travel would look like with the adoption of one of the bridge alignment alternatives. The impacts and benefits analysis for the alternatives show that all of the alternatives would have a positive impact on a modal shift towards pedestrians and bicycles around the Ala Wai Canal. A solid basis for warranting bridge improvements or a constructing a new bridge already exists, as seen in the resident mode split in the neighborhoods around the canal. These warrants are further validated after investigation of the real-world data of existing pedestrian and bicycle travel volumes on major corridors in and out of Waikiki and their origin-destination pairs.

Appendix A Bridge Use Model

Ala Pono Ridership/User Forecast Model

Instructions: Edit cells in gray boxes labeled "CALIBRATION INPUT" for both mode shift (both alternatives) and route shift (new bridge alternative only)

Definitions:
Short Trip - A trip in the study area into or out of Waikiki that is within the walk and bike-shed determined at onset of project (2 miles)
Mode Shift - The percentage of people in cars and motorcycling making "short trips" on each bridge that will switch to a walk or bike trip across same bridge
Route Shift- The percentage of existing bike and ped users crossing the McCully Bridge or Kapahulu route that will shift to a new bridge if constructed
Existing Bike & Ped- The existing number of users walking or bicycling across each bridge per day based on data collected in Sempteber 2018, aggregated as a weekday average
Forecasted Bike & Ped Total- The total forecast users walking or bicycling across each bridge per day
2040 Forecast- Travel forecast using Oahu MPO Transportation Demand Forecast Model percentages for growth in trips by mode

Color Coding	Total Forecasted Users	Mode Shift	Route Shift

Improvements to Existing Structures Alternative

CALIBRATION INPUT	
Mode Shift	2.0%

Current Forecast: Existing Bike/Ped Users + **Short Trip** Mode Shift from Cars & Motorcycles

McCully	
Existing Bike & Ped	3,237
Forcasted Bike & Ped Total	**3,505**
New users	268

Kalakaua	
Existing Bike & Ped	3,887
Forcasted Bike & Ped Total	**4,216**
New users	329

Ala Moana	
Existing Bike & Ped	4,630
Forcasted Bike & Ped Total	**4,869**
New users	239

2040 Forecast (OahuMPO TDFM)

McCully	
Existing Bike & Ped	4,111
Forcasted Bike & Ped Total	**4,427**
New users	316

Kalakaua	
Existing Bike & Ped	4,937
Forcasted Bike & Ped Total	**5,325**
New users	388

Ala Moana	
Existing Bike & Ped	5,880
Forcasted Bike & Ped Total	**6,163**
New users	283

New Bridge Alternative

CALIBRATION INPUT	
Mode Shift	Route Shift
10.0%	100%

		Mode Shift Users	Route Shift Users
Forcasted Bike & Ped Total	**8,655**	**2,908**	**5,748**

		Mode Shift Users	Route Shift Users
2040 Bike & Ped Total	**10,731**	**3,431**	**7,300**

Recommended Scenarios - Outputs (Non-adjustable)

Scenario 1: Low

Conservative Mode Shift from Cars and Motorcycles + Low Route Shift from McCully and Kapahulu

Mode Shift	Route Shift
2.0%	20%

		Mode Shift Subtotal	Route Shift Subtotal
Forcasted Bike & Ped Total	**1,266**	**116**	**1,150**
2040 Bike & Ped Total	**1,597**	**137**	**1,460**

Scenario 2: Med

Medium Mode Shift from Cars and Motorcycles + High Route Shift from McCully and Kapahulu

Mode Shift	Route Shift
5.0%	50%

		Mode Shift Subtotal	Route Shift Subtotal
Forcasted Bike & Ped Total	**3,601**	**727**	**2,874**
2040 Bike & Ped Total	**4,508**	**858**	**3,650**

Scenario 3: High

High Mode Shift from Cars and Motorcycles + High Route Shift from McCully and Kapahulu

Mode Shift	Route Shift
10.0%	50%

		Mode Shift Subtotal	Route Shift Subtotal
Forcasted Bike & Ped Total	**4,328**	**1,454**	**2,874**
2040 Bike & Ped Total	**5,365**	**1,716**	**3,650**

Existing Bridge Travel from Pulled from October 2017 Airsage Data

Bridge Assignment

		Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
		18	19	20	10
Ala Moana	1	A/K	A/K	A/K	A/K
Ala Wai	2	M	x	M	
Central-North Shore	3	M	x	A	
Chaminade-Wilhelmina Rise	4	M	M	M	
Downtown-Chinatown	5	A/K	A/K	A/K	
East Honolulu	6	M	x	M	
Hawaii Kai	7	M	x	M	
Kahili-Palama	8	A/K	A/K	A/K	
Kaimuki	9	M	x	M	
Kapahulu-Diamondhead		x	x	x	
Makiki	11	K	K	K	
Manoa	12	M	M	M	
McCully-Moliili	13	M	M	M	
Nuuanu-Liliha-Kalihi Valley	14	K	K	K	
Punchbowl	15	K	K	K	
UH Manoa	16	M	M	M	
Waialae-Kahala	17	x	x	M	
West Oahu	21	M	x	A	
Windward	22	M	x	A	

Airsage Counts

	Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
	18	19	20	10
Ala Moana	1580	1120	1630	942
Ala Wai	690	488	543	
Central-North Shore	1665	1180	1805	
Chaminade-Wilhelmina Rise	116	77	78	
Downtown-Chinatown	1854	1084	1963	
East Honolulu	356	228	325	
Hawaii Kai	958	623	903	
Kahili-Palama	1076	634	1386	
Kaimuki	515	290	400	
Kapahulu-Diamondhead	767	614	796	
Makiki	311	171	200	
Manoa	239	159	224	
McCully-Moliili	627	331	560	
Nuuanu-Liliha-Kalihi Valley	468	262	462	
Punchbowl	311	176	261	
UH Manoa	361	291	302	
Waialae-Kahala	724	455	617	
West Oahu	3481	2153	3456	
Windward	884	531	853	

Airsage Zone Ranges

1 (bikeshed)	
2	
3	
4	

	Total Airsage	Shed Airsage	% Shed
Ala Moana	12749	2165	**17%**
Kalakaua	9257	2165	**23%**
McCully	14702	2751	**19%**
Total	**36707**		

McCully	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Pedestrians & bicycles	3237	**100%**	3237	127%	4,110.99
Cars	70893	**19%**	13265	118%	15,653.03
Motorcycles	768	**19%**	144	118%	169.48

Kalakaua	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Bicycles	752	**100%**	752	127%	955.22
Pedestrians	3135	**100%**	3135	127%	3,981.81
Cars	69549	**23%**	16267	118%	19,194.90
Motorcycles	766	**23%**	179	118%	211.29

Ala Moana	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Bicycles	565	**100%**	565	127%	718.09
Pedestrians	4065	**100%**	4065	127%	5,162.01
Cars	70027	**17%**	11892	118%	14,032.84
Motorcycles	482	**17%**	82	118%	96.50

	Current	2040
Existing B & P	**3,237**	**4,111**
Forcasted B & P	**3,505**	**4,427**
New	268	316

	Current	2040
Existing B & P	**3,887**	**4,937**
Forcasted B & P	**4,216**	**5,325**
New	329	388

	Current	2040
Existing B & P	**4,630**	**5,880**
Forcasted B & P	**4,869**	**6,163**
New	239	283

	Shift from SOV
MODE SHIFT FACTOR	**2.0%**

Proposed Bridge Travel from Pulled from October 2017 Airsage Data

Bridge Assignment

		Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
		18	19	20	10
Ala Moana	1	A/K	A/K	A/K	A/K
Ala Wai	2	M	x	M	
Central-North Shore	3	M	x	A	
Chaminade-Wilhelmina Rise	4	M	M	M	
Downtown-Chinatown	5	A/K	A/K	A/K	
East Honolulu	6	M	x	M	
Hawaii Kai	7	M	x	M	
Kahili-Palama	8	A/K	A/K	A/K	
Kapahulu-Diamondhead		x	x	x	
Kaimuki	9	M	x	M	
Makiki	11	K	K	K	
Manoa	12	M	M	M	
McCully-Moliili	13	M	M	M	
Nuuanu-Liliha-Kalihi Valley	14	K	K	K	
Punchbowl	15	K	K	K	
UH Manoa	16	M	M	M	
Waialae-Kahala	17	x	x	M	
West Oahu	21	M	x	A	
Windward	22	M	x	A	

Airsage Counts

	Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
	18	19	20	10
Ala Moana	1580	1120	1630	942
Ala Wai	690	488	543	
Central-North Shore	1665	1100	1805	
Chaminade-Wilhelmina Rise	116	77	78	
Downtown-Chinatown	1854	1084	1963	
East Honolulu	356	228	325	
Hawaii Kai	958	623	903	
Kahili-Palama	1076	634	1386	
Kapahulu-Diamondhead	767	614	796	
Kaimuki	515	290	400	
Makiki	311	171	200	
Manoa	239	159	224	
McCully-Moliili	627	331	560	
Nuuanu-Liliha-Kalihi Valley	468	262	462	
Punchbowl	311	176	261	
UH Manoa	361	291	302	
Waialae-Kahala	724	455	617	
West Oahu	3481	2153	3456	
Windward	884	531	853	

Airsage Zone (based on Walkshed Analysis)

1 (existing bikeshed)
1 (expanded bikeshed
2
3
4

	Total Airsage	Shed Airsage	Shed +1 Airsage	% Shed	% Shed +1
McCully	14702	3705	5703	**25%**	39%
No Bridge (Kapahulu)	8769	2665	1667	**30%**	19%
Total	**14702**				

McCully	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Pedestrians & bicycles	3237		3237	127%	4,110.99
Cars	70893	**25%**	17865	118%	21,081.24
Motorcycles	768	**25%**	193	118%	228.25

No Bridge	Date Counts	Proportion	Est w/i bikeshed		
Bicycles	666		666	127%	845.46
Pedestrians	1845		1845	127%	2,343.15
Cars	35730	**30%**	10859	118%	12,813.32
Motorcycles	524	**30%**	159	118%	187.97

Current		2040	
Forcasted B & P	**8,655**	**Forcasted B & P**	**10,731**
2908	5748	3431	7300
SHIFT from SOV	**ROUTE**	**SHIFT from**	**ROUTE**

	Shift from SOV	Route Shift
MODE SHIFT	**10.0%**	**100%**

Proposed Bridge Travel from Pulled from October 2017 Airsage Data

Bridge Assignment

		Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
		18	19	20	10
Ala Moana	1	A/K	A/K	A/K	A/K
Ala Wai	2	M	x	M	
Central-North Shore	3	M	x	A	
Chaminade-Wilhelmina Rise	4	M	M	M	
Downtown-Chinatown	5	A/K	A/K	A/K	
East Honolulu	6	M	x	M	
Hawaii Kai	7	M	x	M	
Kahili-Palama	8	A/K	A/K	A/K	
Kapahulu-Diamondhead		x	x	x	
Kaimuki	9	M	x	M	
Makiki	11	K	K	K	
Manoa	12	M	M	M	
McCully-Moliili	13	M	M	M	
Nuuanu-Liliha-Kalihi Valley	14	K	K	K	
Punchbowl	15	K	K	K	
UH Manoa	16	M	M	M	
Waialae-Kahala	17	x	x	M	
West Oahu	21	M	x	A	
Windward	22	M	x	A	

Airsage Counts

	Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
	18	19	20	10
Ala Moana	1580	1120	1630	942
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Punchbowl	311	176	261	
UH Manoa	361	291	302	
Waialae-Kahala	724	455	617	
West Oahu	3481	2153	3456	
Windward	884	531	853	

Airsage Zone (based on Walkshed Analysis)

1 (existing bikeshed)
1 (expanded bikeshed
2
3
4

	Total Airsage	Shed Airsage	% Shed
McCully	14702	3705	**25%**
No Bridge (Kapahulu)	8769	2665	**30%**
Total	**14702**		

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Pedestrians	1845		1845	127%	2,343.15
Cars	35730	**30%**	10859	118%	12,813.32
Motorcycles	524	**30%**	159	118%	187.97

Forcasted B & P	**1,266**	**Forcasted B & P**	**1,597**
	116	1150	137	1460
SHIFT from SOV		**ROUTE SHIFT**	**SHIFT from SOV**	**ROUTE SHIFT**

	Shift from SOV	Route Shift
MODE SHIFT	**2.0%**	**20%**

Proposed Bridge Travel from Pulled from October 2017 Airsage Data

Bridge Assignment

		Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
		18	19	20	10
Ala Moana	1	A/K	A/K	A/K	A/K
Ala Wai	2	M	x	M	
Central-North Shore	3	M	x	A	
Chaminade-Wilhelmina Rise	4	M	M	M	
Downtown-Chinatown	5	A/K	A/K	A/K	
East Honolulu	6	M	x	M	
Hawaii Kai	7	M	x	M	
Kahili-Palama	8	A/K	A/K	A/K	
Kapahulu-Diamondhead		x	x	x	
Kaimuki	9	M	x	M	
Makiki	11	K	K	K	
Manoa	12	M	M	M	
McCully-Moliili	13	M	M	M	
Nuuanu-Liliha-Kalihi Valley	14	K	K	K	
Punchbowl	15	K	K	K	
UH Manoa	16	M	M	M	
Waialae-Kahala	17	x	x	M	
West Oahu	21	M	x	A	
Windward	22	M	x	A	

Airsage Counts

	Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
	18	19	20	10
Ala Moana	1580	1120	1630	942
Ala Wai	690	488	543	
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Punchbowl	311	176	261	
UH Manoa	361	291	302	
Waialae-Kahala	724	455	617	
West Oahu	3481	2153	3456	
Windward	884	531	853	

Airsage Zone (based on Walkshed Analysis)

1 (existing bikeshed)
1 (expanded bikeshed
2
3
4

	Total Airsage	Shed Airsage	% Shed
McCully	14702	3705	**25%**
No Bridge (Kapahulu)	8769	2665	**30%**
Total	**14702**		

McCully	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
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No Bridge	Date Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Bicycles	666		666	127%	845.46
Pedestrians	1845		1845	127%	2,343.15
Cars	35730	**30%**	10859	118%	12,813.32
Motorcycles	524	**30%**	159	118%	187.97

Forcasted B & P	**3,601**	**Forcasted B & P**	**4,508**
727	2874	858	3650
SHIFT from SOV	**ROUTE**	**SHIFT from**	**ROUTE**

	Shift from SOV	Route Shift
MODE SHIFT	**5.0%**	**50%**

Proposed Bridge Travel from Pulled from October 2017 Airsage Data

Bridge Assignment

		Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
		18	19	20	10
Ala Moana	1	A/K	A/K	A/K	A/K
Ala Wai	2	M	x	M	
Central-North Shore	3	M	x	A	
Chaminade-Wilhelmina Rise	4	M	M	M	
Downtown-Chinatown	5	A/K	A/K	A/K	
East Honolulu	6	M	x	M	
Hawaii Kai	7	M	x	M	
Kahili-Palama	8	A/K	A/K	A/K	
Kapahulu-Diamondhead		x	x	x	
Kaimuki	9	M	x	M	
Makiki	11	K	K	K	
Manoa	12	M	M	M	
McCully-Moliili	13	M	M	M	
Nuuanu-Liliha-Kalihi Valley	14	K	K	K	
Punchbowl	15	K	K	K	
UH Manoa	16	M	M	M	
Waialae-Kahala	17	x	x	M	
West Oahu	21	M	x	A	
Windward	22	M	x	A	

Airsage Counts

	Waikiki Central	Waikiki East	Waikiki West	Kapahulu-Diamondhead
	18	19	20	10
Ala Moana	1580	1120	1630	942
Ala Wai	690	488	543	
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Chaminade-Wilhelmina Rise	116	77	78	
Downtown-Chinatown	1854	1084	1963	
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Punchbowl	311	176	261	
UH Manoa	361	291	302	
Waialae-Kahala	724	455	617	
West Oahu	3481	2153	3456	
Windward	884	531	853	

Airsage Zone (based on Walkshed Analysis)

1 (existing bikeshed)
1 (expanded bikeshed
2
3
4

	Total Airsage	Shed Airsage	% Shed
McCully	14702	3705	**25%**
No Bridge (Kapahulu)	8769	2665	**30%**
Total	**14702**		

McCully	Bridge Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Pedestrians & bicycles	3237		3237	127%	4,110.99
Cars	70893	**25%**	17865	118%	21,081.24
Motorcycles	768	**25%**	193	118%	228.25

No Bridge	Date Counts	Proportion	Est w/i bikeshed	TDFM Growth	TDFM Forecast
Bicycles	666		666	127%	845.46
Pedestrians	1845		1845	127%	2,343.15
Cars	35730	**30%**	10859	118%	12,813.32
Motorcycles	524	**30%**	159	118%	187.97

Forcasted B & P	**4,328**	**Forcasted B & P**	**5,365**
1454	2874	1716	3650
SHIFT from SOV	**ROUTE**	**SHIFT from**	**ROUTE**

	Shift from SOV	Route Shift
MODE SHIFT	**10.0%**	**50%**

Bridge Counts from September 2018 Counts

McCully

	27-Sep	29-Sep	Daily Average
Bicycles on Road	587	685	**615**
Cars	36115	40293	**70893**
Motorcycles	721	884	**768**
Buses	975	1055	**998**
Single-Unit Trucks	454	335	**420**
Articulated Trucks	26	16	**23**
BikePed Ewa	1103		**1103**
BikePed DH	1519		**1519**

		%
BikePed	3237	4%
Cars	70893	95%
Motorcycle	768	1%
Buses	998	
Single-Unit	420	
Articulated	23	
Total	**74897**	

Kalakaua

	27-Sep	29-Sep	Daily Average
Bicycles on Road	262	313	**277**
Cars	36922	37312	**69549**
Motorcycles	755	792	**766**
Buses	760	855	**787**
Single-Unit Trucks	325	199	**289**
Articulated Trucks	31	15	**26**
Bicycles Ewa	304	383	**327**
Bicycles DH	157	129	**149**
Pedestrians Ewa	2177	2292	**2210**
Pedestrians DH	992	759	**925**

Bicycles	752	1%
Pedestrian	3135	4%
Cars	69549	94%
Motorcycle	766	1%
Buses	787	
Single-Unit	289	
Articulated	26	
Total	**74202**	

Ala Moana

	27-Sep	29-Sep	Daily Average
Bicycles on Road	141	212	**161**
Cars	38794	35162	**70027**
Motorcycles	449	563	**482**
Buses	2119	1770	**2019**
Single-Unit Trucks	724	410	**634**
Articulated Trucks	40	30	**37**
Bicycles Makai	152	383	**218**
Bicycles Mauka	157	259	**186**
Pedestrians Makai	2460	2292	**2412**
Pedestrians Mauka	992	3304	**1653**

Bicycles	565	1%
Pedestrian	4065	5%
Cars	70027	93%
Motorcycle	482	1%
Buses	2019	
Single-Unit	634	
Articulated	37	
Total	**75138**	

Diamondhead (No Bridge)

	27-Sep	29-Sep	Daily Average

2017 National Household Travel Survey - Hawaii

Weekday C	1.57
Weekend C	2.64

Bicycles on Road	363	684	**455**
Cars	18799	19420	**35730**
Motorcycles	517	542	**524**
Buses	287	433	**329**
Single-Unit Trucks	143	99	**130**
Articulated Trucks	10	9	**10**
Bicycles Makai	133	87	**120**
Bicycles Mauka	62	164	**91**
Pedestrians Makai	1177	736	**1051**
Pedestrians Mauka	614	1244	**794**

Bicycles	666	2%
Pedestrian	1845	5%
Cars	35730	91%
Motorcycle	524	1%
Buses	329	1%
Single-Unit	130	0%
Articulatec	10	0%
Total	**39234**	

McCully	27-Sep NB			29-Sep NB			27-Sep SB			29-Sep SB			27-Sep Total	29-Sep Total	Daily Average
	P & Mc	Mc & K	Total	P & Mc	Mc & K	Total	SB	Turn	Total	SB	Turn	Total			
Bicycles on Road	537	142	395	672	195	477	178	14	192	170	38	208	587	685	**615**
Cars	41023	17444	23579	41988	16345	25643	11188	1348	12536	13211	1439	14650	36115	40293	**70893**
Motorcycles	888	445	443	923	338	585	249	29	278	274	25	299	721	884	**768**
Buses	908	224	684	983	205	778	278	13	291	260	17	277	975	1055	**998**
Single-Unit Trucks	523	195	328	376	111	265	105	21	126	55	15	70	454	335	**420**
Articulated Trucks	25	11	14	19	7	12	11	1	12	4	0	4	26	16	**23**
Bicycles Makai/Ewa							50		50	63		63	50	63	**54**
Bicycles Mauka/DH	189	54	135	289	45	244	169		169	179		179	304	423	**338**
Pedestrians Makai/Ewa							692		692	676		676	692	676	**687**
Pedestrians Mauka/DH	1264	171	1093	1178	195	983	1587		1587	1441		1441	2680	2424	**2607**

Pair	Origin	Destinatior	Origin	Destination	o_x	o_y	d_x	d_y	Count	West Waik	Central Wa	East Waikik
10-10	10	10	Kapahulu-Diamondhead	Kapahulu-Diamondhead	1703366	36505.03	1703366	36505.03	459	0	0	0
10-11	10	11	Kapahulu-Diamondhead	Makiki	1703366	36505.03	1697142	51475.06	209	0	0	0
10-12	10	12	Kapahulu-Diamondhead	Manoa	1703366	36505.03	1706440	57493.96	168	0	0	0
10-13	10	13	Kapahulu-Diamondhead	McCully-Moliili	1703366	36505.03	1698417	45789.69	438	0	0	0
10-14	10	14	Kapahulu-Diamondhead	Nuuanu-Liliha-Kalihi Valley	1703366	36505.03	1697994	64056.47	275	0	0	0
10-15	10	15	Kapahulu-Diamondhead	Punchbowl	1703366	36505.03	1693196	53177.15	135	0	0	0
10-16	10	16	Kapahulu-Diamondhead	UH Manoa	1703366	36505.03	1701615	48394.79	348	0	0	0
10-17	10	17	Kapahulu-Diamondhead	Waialae-Kahala	1703366	36505.03	1709756	35491.22	653	0	0	0
10-18	10	18	Kapahulu-Diamondhead	Waikiki Central	1703366	36505.03	1698997	40353.7	767	0	1	0
10-19	10	19	Kapahulu-Diamondhead	Waikiki East	1703366	36505.03	1701237	39386.71	614	0	0	1
10-20	10	20	Kapahulu-Diamondhead	Waikiki West	1703366	36505.03	1695760	42368.31	796	1	0	0
10-21	10	21	Kapahulu-Diamondhead	West Oahu	1703366	36505.03	1607115	96574.62	1142	0	0	0
10-22	10	22	Kapahulu-Diamondhead	Windward	1703366	36505.03	1708744	94317.07	445	0	0	0
1-1	1	1	Ala Moana	Ala Moana	1693096	45438.1	1693096	45438.1	1066	0	0	0
1-10	1	10	Ala Moana	Kapahulu-Diamondhead	1693096	45438.1	1703366	36505.03	942	0	0	0
1-11	1	11	Ala Moana	Makiki	1693096	45438.1	1697142	51475.06	486	0	0	0
11-11	11	11	Makiki	Makiki	1697142	51475.06	1697142	51475.06	196	0	0	0
11-12	11	12	Makiki	Manoa	1697142	51475.06	1706440	57493.96	314	0	0	0
11-13	11	13	Makiki	McCully-Moliili	1697142	51475.06	1698417	45789.69	269	0	0	0
11-14	11	14	Makiki	Nuuanu-Liliha-Kalihi Valley	1697142	51475.06	1697994	64056.47	400	0	0	0
11-15	11	15	Makiki	Punchbowl	1697142	51475.06	1693196	53177.15	199	0	0	0
11-16	11	16	Makiki	UH Manoa	1697142	51475.06	1701615	48394.79	366	0	0	0
11-17	11	17	Makiki	Waialae-Kahala	1697142	51475.06	1709756	35491.22	174	0	0	0
11-18	11	18	Makiki	Waikiki Central	1697142	51475.06	1698997	40353.7	311	0	1	0
11-19	11	19	Makiki	Waikiki East	1697142	51475.06	1701237	39386.71	171	0	0	1
1-12	1	12	Ala Moana	Manoa	1693096	45438.1	1706440	57493.96	550	0	0	0
11-20	11	20	Makiki	Waikiki West	1697142	51475.06	1695760	42368.31	200	1	0	0
11-21	11	21	Makiki	West Oahu	1697142	51475.06	1607115	96574.62	853	0	0	0
11-22	11	22	Makiki	Windward	1697142	51475.06	1708744	94317.07	394	0	0	0
1-13	1	13	Ala Moana	McCully-Moliili	1693096	45438.1	1698417	45789.69	891	0	0	0
1-14	1	14	Ala Moana	Nuuanu-Liliha-Kalihi Valley	1693096	45438.1	1697994	64056.47	1019	0	0	0
1-15	1	15	Ala Moana	Punchbowl	1693096	45438.1	1693196	53177.15	445	0	0	0
1-16	1	16	Ala Moana	UH Manoa	1693096	45438.1	1701615	48394.79	721	0	0	0
1-17	1	17	Ala Moana	Waialae-Kahala	1693096	45438.1	1709756	35491.22	513	0	0	0
1-18	1	18	Ala Moana	Waikiki Central	1693096	45438.1	1698997	40353.7	1580	0	1	0
1-19	1	19	Ala Moana	Waikiki East	1693096	45438.1	1701237	39386.71	1120	0	0	1
1-2	1	2	Ala Moana	Ala Wai	1693096	45438.1	1702768	42812.17	963	0	0	0
1-20	1	20	Ala Moana	Waikiki West	1693096	45438.1	1695760	42368.31	1630	1	0	0
1-21	1	21	Ala Moana	West Oahu	1693096	45438.1	1607115	96574.62	3134	0	0	0
12-12	12	12	Manoa	Manoa	1706440	57493.96	1706440	57493.96	347	0	0	0
12-13	12	13	Manoa	McCully-Moliili	1706440	57493.96	1698417	45789.69	294	0	0	0
12-14	12	14	Manoa	Nuuanu-Liliha-Kalihi Valley	1706440	57493.96	1697994	64056.47	319	0	0	0
12-15	12	15	Manoa	Punchbowl	1706440	57493.96	1693196	53177.15	209	0	0	0

12-16	12	16	Manoa	UH Manoa	1706440	57493.96	1701615	48394.79	472	0	0	0
12-17	12	17	Manoa	Waialae-Kahala	1706440	57493.96	1709756	35491.22	146	0	0	0
12-18	12	18	Manoa	Waikiki Central	1706440	57493.96	1698997	40353.7	239	0	1	0
12-19	12	19	Manoa	Waikiki East	1706440	57493.96	1701237	39386.71	159	0	0	1
1-22	1	22	Ala Moana	Windward	1693096	45438.1	1708744	94317.07	1088	0	0	0
12-20	12	20	Manoa	Waikiki West	1706440	57493.96	1695760	42368.31	224	1	0	0
12-21	12	21	Manoa	West Oahu	1706440	57493.96	1607115	96574.62	619	0	0	0
12-22	12	22	Manoa	Windward	1706440	57493.96	1708744	94317.07	328	0	0	0
1-3	1	3	Ala Moana	Central-North Shore	1693096	45438.1	1652081	133266.1	1923	0	0	0
13-13	13	13	McCully-Moliili	McCully-Moliili	1698417	45789.69	1698417	45789.69	372	0	0	0
13-14	13	14	McCully-Moliili	Nuuanu-Liliha-Kalihi Valley	1698417	45789.69	1697994	64056.47	547	0	0	0
13-15	13	15	McCully-Moliili	Punchbowl	1698417	45789.69	1693196	53177.15	228	0	0	0
13-16	13	16	McCully-Moliili	UH Manoa	1698417	45789.69	1701615	48394.79	478	0	0	0
13-17	13	17	McCully-Moliili	Waialae-Kahala	1698417	45789.69	1709756	35491.22	340	0	0	0
13-18	13	18	McCully-Moliili	Waikiki Central	1698417	45789.69	1698997	40353.7	627	0	1	0
13-19	13	19	McCully-Moliili	Waikiki East	1698417	45789.69	1701237	39386.71	331	0	0	1
13-20	13	20	McCully-Moliili	Waikiki West	1698417	45789.69	1695760	42368.31	560	1	0	0
13-21	13	21	McCully-Moliili	West Oahu	1698417	45789.69	1607115	96574.62	1394	0	0	0
13-22	13	22	McCully-Moliili	Windward	1698417	45789.69	1708744	94317.07	585	0	0	0
1-4	1	4	Ala Moana	Chaminade-Wilhelmina Rise	1693096	45438.1	1708540	48359.02	293	0	0	0
14-14	14	14	Nuuanu-Liliha-Kalihi Valley	Nuuanu-Liliha-Kalihi Valley	1697994	64056.47	1697994	64056.47	592	0	0	0
14-15	14	15	Nuuanu-Liliha-Kalihi Valley	Punchbowl	1697994	64056.47	1693196	53177.15	366	0	0	0
14-16	14	16	Nuuanu-Liliha-Kalihi Valley	UH Manoa	1697994	64056.47	1701615	48394.79	509	0	0	0
14-17	14	17	Nuuanu-Liliha-Kalihi Valley	Waialae-Kahala	1697994	64056.47	1709756	35491.22	204	0	0	0
14-18	14	18	Nuuanu-Liliha-Kalihi Valley	Waikiki Central	1697994	64056.47	1698997	40353.7	468	0	1	0
14-19	14	19	Nuuanu-Liliha-Kalihi Valley	Waikiki East	1697994	64056.47	1701237	39386.71	262	0	0	1
14-20	14	20	Nuuanu-Liliha-Kalihi Valley	Waikiki West	1697994	64056.47	1695760	42368.31	462	1	0	0
14-21	14	21	Nuuanu-Liliha-Kalihi Valley	West Oahu	1697994	64056.47	1607115	96574.62	1564	0	0	0
14-22	14	22	Nuuanu-Liliha-Kalihi Valley	Windward	1697994	64056.47	1708744	94317.07	1545	0	0	0
1-5	1	5	Ala Moana	Downtown-Chinatown	1693096	45438.1	1688620	49239.66	1828	0	0	0
15-15	15	15	Punchbowl	Punchbowl	1693196	53177.15	1693196	53177.15	146	0	0	0
15-16	15	16	Punchbowl	UH Manoa	1693196	53177.15	1701615	48394.79	260	0	0	0
15-17	15	17	Punchbowl	Waialae-Kahala	1693196	53177.15	1709756	35491.22	104	0	0	0
15-18	15	18	Punchbowl	Waikiki Central	1693196	53177.15	1698997	40353.7	311	0	1	0
15-19	15	19	Punchbowl	Waikiki East	1693196	53177.15	1701237	39386.71	176	0	0	1
15-20	15	20	Punchbowl	Waikiki West	1693196	53177.15	1695760	42368.31	261	1	0	0
15-21	15	21	Punchbowl	West Oahu	1693196	53177.15	1607115	96574.62	930	0	0	0
15-22	15	22	Punchbowl	Windward	1693196	53177.15	1708744	94317.07	443	0	0	0
1-6	1	6	Ala Moana	East Honolulu	1693096	45438.1	1720269	49321.5	530	0	0	0
16-16	16	16	UH Manoa	UH Manoa	1701615	48394.79	1701615	48394.79	369	0	0	0
16-17	16	17	UH Manoa	Waialae-Kahala	1701615	48394.79	1709756	35491.22	305	0	0	0
16-18	16	18	UH Manoa	Waikiki Central	1701615	48394.79	1698997	40353.7	361	0	1	0
16-19	16	19	UH Manoa	Waikiki East	1701615	48394.79	1701237	39386.71	291	0	0	1
16-20	16	20	UH Manoa	Waikiki West	1701615	48394.79	1695760	42368.31	302	1	0	0

16-21	16	21	UH Manoa	West Oahu	1701615	48394.79	1607115	96574.62	1154	0	0	0
16-22	16	22	UH Manoa	Windward	1701615	48394.79	1708744	94317.07	549	0	0	0
1-7	1	7	Ala Moana	Hawaii Kai	1693096	45438.1	1741001	53601.19	809	0	0	0
17-17	17	17	Waialae-Kahala	Waialae-Kahala	1709756	35491.22	1709756	35491.22	417	0	0	0
17-18	17	18	Waialae-Kahala	Waikiki Central	1709756	35491.22	1698997	40353.7	724	0	1	0
17-19	17	19	Waialae-Kahala	Waikiki East	1709756	35491.22	1701237	39386.71	455	0	0	1
17-20	17	20	Waialae-Kahala	Waikiki West	1709756	35491.22	1695760	42368.31	617	1	0	0
17-21	17	21	Waialae-Kahala	West Oahu	1709756	35491.22	1607115	96574.62	781	0	0	0
17-22	17	22	Waialae-Kahala	Windward	1709756	35491.22	1708744	94317.07	316	0	0	0
1-8	1	8	Ala Moana	Kahili-Palama	1693096	45438.1	1682070	55324.72	1854	0	0	0
18-18	18	18	Waikiki Central	Waikiki Central	1698997	40353.7	1698997	40353.7	1321	0	1	0
18-19	18	19	Waikiki Central	Waikiki East	1698997	40353.7	1701237	39386.71	1042	0	1	1
18-20	18	20	Waikiki Central	Waikiki West	1698997	40353.7	1695760	42368.31	1485	1	1	0
18-21	18	21	Waikiki Central	West Oahu	1698997	40353.7	1607115	96574.62	3481	0	1	0
18-22	18	22	Waikiki Central	Windward	1698997	40353.7	1708744	94317.07	884	0	1	0
1-9	1	9	Ala Moana	Kaimuki	1693096	45438.1	1710616	43105.02	849	0	0	0
19-19	19	19	Waikiki East	Waikiki East	1701237	39386.71	1701237	39386.71	714	0	0	1
19-20	19	20	Waikiki East	Waikiki West	1701237	39386.71	1695760	42368.31	647	1	0	1
19-21	19	21	Waikiki East	West Oahu	1701237	39386.71	1607115	96574.62	2153	0	0	1
19-22	19	22	Waikiki East	Windward	1701237	39386.71	1708744	94317.07	531	0	0	1
20-20	20	20	Waikiki West	Waikiki West	1695760	42368.31	1695760	42368.31	1600	1	0	0
20-21	20	21	Waikiki West	West Oahu	1695760	42368.31	1607115	96574.62	3456	1	0	0
20-22	20	22	Waikiki West	Windward	1695760	42368.31	1708744	94317.07	853	1	0	0
2-10	2	10	Ala Wai	Kapahulu-Diamondhead	1702768	42812.17	1703366	36505.03	573	0	0	0
2-11	2	11	Ala Wai	Makiki	1702768	42812.17	1697142	51475.06	331	0	0	0
2-12	2	12	Ala Wai	Manoa	1702768	42812.17	1706440	57493.96	321	0	0	0
21-21	21	21	West Oahu	West Oahu	1607115	96574.62	1607115	96574.62	5506	0	0	0
21-22	21	22	West Oahu	Windward	1607115	96574.62	1708744	94317.07	2718	0	0	0
2-13	2	13	Ala Wai	McCully-Moliili	1702768	42812.17	1698417	45789.69	562	0	0	0
2-14	2	14	Ala Wai	Nuuanu-Liliha-Kalihi Valley	1702768	42812.17	1697994	64056.47	485	0	0	0
2-15	2	15	Ala Wai	Punchbowl	1702768	42812.17	1693196	53177.15	294	0	0	0
2-16	2	16	Ala Wai	UH Manoa	1702768	42812.17	1701615	48394.79	472	0	0	0
2-17	2	17	Ala Wai	Waialae-Kahala	1702768	42812.17	1709756	35491.22	500	0	0	0
2-18	2	18	Ala Wai	Waikiki Central	1702768	42812.17	1698997	40353.7	690	0	1	0
2-19	2	19	Ala Wai	Waikiki East	1702768	42812.17	1701237	39386.71	488	0	0	1
2-2	2	2	Ala Wai	Ala Wai	1702768	42812.17	1702768	42812.17	400	0	0	0
2-20	2	20	Ala Wai	Waikiki West	1702768	42812.17	1695760	42368.31	543	1	0	0
2-21	2	21	Ala Wai	West Oahu	1702768	42812.17	1607115	96574.62	1291	0	0	0
2-22	2	22	Ala Wai	Windward	1702768	42812.17	1708744	94317.07	598	0	0	0
22-22	22	22	Windward	Windward	1708744	94317.07	1708744	94317.07	2552	0	0	0
2-3	2	3	Ala Wai	Central-North Shore	1702768	42812.17	1652081	133266.1	1026	0	0	0
2-4	2	4	Ala Wai	Chaminade-Wilhelmina Rise	1702768	42812.17	1708540	48359.02	268	0	0	0
2-5	2	5	Ala Wai	Downtown-Chinatown	1702768	42812.17	1688620	49239.66	990	0	0	0
2-6	2	6	Ala Wai	East Honolulu	1702768	42812.17	1720269	49321.5	537	0	0	0

2-7	2	7	Ala Wai	Hawaii Kai	1702768	42812.17	1741001	53601.19	703	0	0	0
2-8	2	8	Ala Wai	Kahili-Palama	1702768	42812.17	1682070	55324.72	774	0	0	0
2-9	2	9	Ala Wai	Kaimuki	1702768	42812.17	1710616	43105.02	651	0	0	0
3-10	3	10	Central-North Shore	Kapahulu-Diamondhead	1652081	133266.1	1703366	36505.03	789	0	0	0
3-11	3	11	Central-North Shore	Makiki	1652081	133266.1	1697142	51475.06	678	0	0	0
3-12	3	12	Central-North Shore	Manoa	1652081	133266.1	1706440	57493.96	532	0	0	0
3-13	3	13	Central-North Shore	McCully-Moliili	1652081	133266.1	1698417	45789.69	1059	0	0	0
3-14	3	14	Central-North Shore	Nuuanu-Liliha-Kalihi Valley	1652081	133266.1	1697994	64056.47	1377	0	0	0
3-15	3	15	Central-North Shore	Punchbowl	1652081	133266.1	1693196	53177.15	698	0	0	0
3-16	3	16	Central-North Shore	UH Manoa	1652081	133266.1	1701615	48394.79	939	0	0	0
3-17	3	17	Central-North Shore	Waialae-Kahala	1652081	133266.1	1709756	35491.22	583	0	0	0
3-18	3	18	Central-North Shore	Waikiki Central	1652081	133266.1	1698997	40353.7	1665	0	1	0
3-19	3	19	Central-North Shore	Waikiki East	1652081	133266.1	1701237	39386.71	1100	0	0	1
3-20	3	20	Central-North Shore	Waikiki West	1652081	133266.1	1695760	42368.31	1805	1	0	0
3-21	3	21	Central-North Shore	West Oahu	1652081	133266.1	1607115	96574.62	7291	0	0	0
3-22	3	22	Central-North Shore	Windward	1652081	133266.1	1708744	94317.07	3911	0	0	0
3-3	3	3	Central-North Shore	Central-North Shore	1652081	133266.1	1652081	133266.1	4330	0	0	0
3-4	3	4	Central-North Shore	Chaminade-Wilhelmina Rise	1652081	133266.1	1708540	48359.02	335	0	0	0
3-5	3	5	Central-North Shore	Downtown-Chinatown	1652081	133266.1	1688620	49239.66	2116	0	0	0
3-6	3	6	Central-North Shore	East Honolulu	1652081	133266.1	1720269	49321.5	624	0	0	0
3-7	3	7	Central-North Shore	Hawaii Kai	1652081	133266.1	1741001	53601.19	1372	0	0	0
3-8	3	8	Central-North Shore	Kahili-Palama	1652081	133266.1	1682070	55324.72	2217	0	0	0
3-9	3	9	Central-North Shore	Kaimuki	1652081	133266.1	1710616	43105.02	833	0	0	0
4-10	4	10	Chaminade-Wilhelmina Rise	Kapahulu-Diamondhead	1708540	48359.02	1703366	36505.03	132	0	0	0
4-11	4	11	Chaminade-Wilhelmina Rise	Makiki	1708540	48359.02	1697142	51475.06	126	0	0	0
4-12	4	12	Chaminade-Wilhelmina Rise	Manoa	1708540	48359.02	1706440	57493.96	116	0	0	0
4-13	4	13	Chaminade-Wilhelmina Rise	McCully-Moliili	1708540	48359.02	1698417	45789.69	195	0	0	0
4-14	4	14	Chaminade-Wilhelmina Rise	Nuuanu-Liliha-Kalihi Valley	1708540	48359.02	1697994	64056.47	151	0	0	0
4-15	4	15	Chaminade-Wilhelmina Rise	Punchbowl	1708540	48359.02	1693196	53177.15	86	0	0	0
4-16	4	16	Chaminade-Wilhelmina Rise	UH Manoa	1708540	48359.02	1701615	48394.79	188	0	0	0
4-17	4	17	Chaminade-Wilhelmina Rise	Waialae-Kahala	1708540	48359.02	1709756	35491.22	127	0	0	0
4-18	4	18	Chaminade-Wilhelmina Rise	Waikiki Central	1708540	48359.02	1698997	40353.7	116	0	1	0
4-19	4	19	Chaminade-Wilhelmina Rise	Waikiki East	1708540	48359.02	1701237	39386.71	77	0	0	1
4-20	4	20	Chaminade-Wilhelmina Rise	Waikiki West	1708540	48359.02	1695760	42368.31	78	1	0	0
4-21	4	21	Chaminade-Wilhelmina Rise	West Oahu	1708540	48359.02	1607115	96574.62	388	0	0	0
4-22	4	22	Chaminade-Wilhelmina Rise	Windward	1708540	48359.02	1708744	94317.07	207	0	0	0
4-4	4	4	Chaminade-Wilhelmina Rise	Chaminade-Wilhelmina Rise	1708540	48359.02	1708540	48359.02	152	0	0	0
4-5	4	5	Chaminade-Wilhelmina Rise	Downtown-Chinatown	1708540	48359.02	1688620	49239.66	247	0	0	0
4-6	4	6	Chaminade-Wilhelmina Rise	East Honolulu	1708540	48359.02	1720269	49321.5	187	0	0	0
4-7	4	7	Chaminade-Wilhelmina Rise	Hawaii Kai	1708540	48359.02	1741001	53601.19	192	0	0	0
4-8	4	8	Chaminade-Wilhelmina Rise	Kahili-Palama	1708540	48359.02	1682070	55324.72	236	0	0	0
4-9	4	9	Chaminade-Wilhelmina Rise	Kaimuki	1708540	48359.02	1710616	43105.02	231	0	0	0
5-10	5	10	Downtown-Chinatown	Kapahulu-Diamondhead	1688620	49239.66	1703366	36505.03	754	0	0	0
5-11	5	11	Downtown-Chinatown	Makiki	1688620	49239.66	1697142	51475.06	538	0	0	0

5-12	5	12	Downtown-Chinatown	Manoa	1688620	49239.66	1706440	57493.96	472	0	0	0
5-13	5	13	Downtown-Chinatown	McCully-Moliili	1688620	49239.66	1698417	45789.69	945	0	0	0
5-14	5	14	Downtown-Chinatown	Nuuanu-Liliha-Kalihi Valley	1688620	49239.66	1697994	64056.47	1109	0	0	0
5-15	5	15	Downtown-Chinatown	Punchbowl	1688620	49239.66	1693196	53177.15	497	0	0	0
5-16	5	16	Downtown-Chinatown	UH Manoa	1688620	49239.66	1701615	48394.79	787	0	0	0
5-17	5	17	Downtown-Chinatown	Waialae-Kahala	1688620	49239.66	1709756	35491.22	472	0	0	0
5-18	5	18	Downtown-Chinatown	Waikiki Central	1688620	49239.66	1698997	40353.7	1854	0	1	0
5-19	5	19	Downtown-Chinatown	Waikiki East	1688620	49239.66	1701237	39386.71	1084	0	0	1
5-20	5	20	Downtown-Chinatown	Waikiki West	1688620	49239.66	1695760	42368.31	1963	1	0	0
5-21	5	21	Downtown-Chinatown	West Oahu	1688620	49239.66	1607115	96574.62	3420	0	0	0
5-22	5	22	Downtown-Chinatown	Windward	1688620	49239.66	1708744	94317.07	1301	0	0	0
5-5	5	5	Downtown-Chinatown	Downtown-Chinatown	1688620	49239.66	1688620	49239.66	974	0	0	0
5-6	5	6	Downtown-Chinatown	East Honolulu	1688620	49239.66	1720269	49321.5	512	0	0	0
5-7	5	7	Downtown-Chinatown	Hawaii Kai	1688620	49239.66	1741001	53601.19	756	0	0	0
5-8	5	8	Downtown-Chinatown	Kahili-Palama	1688620	49239.66	1682070	55324.72	1923	0	0	0
5-9	5	9	Downtown-Chinatown	Kaimuki	1688620	49239.66	1710616	43105.02	752	0	0	0
6-10	6	10	East Honolulu	Kapahulu-Diamondhead	1720269	49321.5	1703366	36505.03	410	0	0	0
6-11	6	11	East Honolulu	Makiki	1720269	49321.5	1697142	51475.06	194	0	0	0
6-12	6	12	East Honolulu	Manoa	1720269	49321.5	1706440	57493.96	176	0	0	0
6-13	6	13	East Honolulu	McCully-Moliili	1720269	49321.5	1698417	45789.69	389	0	0	0
6-14	6	14	East Honolulu	Nuuanu-Liliha-Kalihi Valley	1720269	49321.5	1697994	64056.47	301	0	0	0
6-15	6	15	East Honolulu	Punchbowl	1720269	49321.5	1693196	53177.15	155	0	0	0
6-16	6	16	East Honolulu	UH Manoa	1720269	49321.5	1701615	48394.79	334	0	0	0
6-17	6	17	East Honolulu	Waialae-Kahala	1720269	49321.5	1709756	35491.22	515	0	0	0
6-18	6	18	East Honolulu	Waikiki Central	1720269	49321.5	1698997	40353.7	356	0	1	0
6-19	6	19	East Honolulu	Waikiki East	1720269	49321.5	1701237	39386.71	228	0	0	1
6-20	6	20	East Honolulu	Waikiki West	1720269	49321.5	1695760	42368.31	325	1	0	0
6-21	6	21	East Honolulu	West Oahu	1720269	49321.5	1607115	96574.62	814	0	0	0
6-22	6	22	East Honolulu	Windward	1720269	49321.5	1708744	94317.07	381	0	0	0
6-6	6	6	East Honolulu	East Honolulu	1720269	49321.5	1720269	49321.5	349	0	0	0
6-7	6	7	East Honolulu	Hawaii Kai	1720269	49321.5	1741001	53601.19	1360	0	0	0
6-8	6	8	East Honolulu	Kahili-Palama	1720269	49321.5	1682070	55324.72	427	0	0	0
6-9	6	9	East Honolulu	Kaimuki	1720269	49321.5	1710616	43105.02	674	0	0	0
7-10	7	10	Hawaii Kai	Kapahulu-Diamondhead	1741001	53601.19	1703366	36505.03	531	0	0	0
7-11	7	11	Hawaii Kai	Makiki	1741001	53601.19	1697142	51475.06	264	0	0	0
7-12	7	12	Hawaii Kai	Manoa	1741001	53601.19	1706440	57493.96	243	0	0	0
7-13	7	13	Hawaii Kai	McCully-Moliili	1741001	53601.19	1698417	45789.69	514	0	0	0
7-14	7	14	Hawaii Kai	Nuuanu-Liliha-Kalihi Valley	1741001	53601.19	1697994	64056.47	496	0	0	0
7-15	7	15	Hawaii Kai	Punchbowl	1741001	53601.19	1693196	53177.15	184	0	0	0
7-16	7	16	Hawaii Kai	UH Manoa	1741001	53601.19	1701615	48394.79	417	0	0	0
7-17	7	17	Hawaii Kai	Waialae-Kahala	1741001	53601.19	1709756	35491.22	762	0	0	0
7-18	7	18	Hawaii Kai	Waikiki Central	1741001	53601.19	1698997	40353.7	958	0	1	0
7-19	7	19	Hawaii Kai	Waikiki East	1741001	53601.19	1701237	39386.71	623	0	0	1
7-20	7	20	Hawaii Kai	Waikiki West	1741001	53601.19	1695760	42368.31	903	1	0	0

7-21	7	21	Hawaii Kai	West Oahu	1741001	53601.19	1607115	96574.62	1577	0	0	0
7-22	7	22	Hawaii Kai	Windward	1741001	53601.19	1708744	94317.07	2359	0	0	0
7-7	7	7	Hawaii Kai	Hawaii Kai	1741001	53601.19	1741001	53601.19	1997	0	0	0
7-8	7	8	Hawaii Kai	Kahili-Palama	1741001	53601.19	1682070	55324.72	653	0	0	0
7-9	7	9	Hawaii Kai	Kaimuki	1741001	53601.19	1710616	43105.02	963	0	0	0
8-10	8	10	Kahili-Palama	Kapahulu-Diamondhead	1682070	55324.72	1703366	36505.03	529	0	0	0
8-11	8	11	Kahili-Palama	Makiki	1682070	55324.72	1697142	51475.06	571	0	0	0
8-12	8	12	Kahili-Palama	Manoa	1682070	55324.72	1706440	57493.96	365	0	0	0
8-13	8	13	Kahili-Palama	McCully-Moliili	1682070	55324.72	1698417	45789.69	864	0	0	0
8-14	8	14	Kahili-Palama	Nuuanu-Liliha-Kalihi Valley	1682070	55324.72	1697994	64056.47	1093	0	0	0
8-15	8	15	Kahili-Palama	Punchbowl	1682070	55324.72	1693196	53177.15	549	0	0	0
8-16	8	16	Kahili-Palama	UH Manoa	1682070	55324.72	1701615	48394.79	638	0	0	0
8-17	8	17	Kahili-Palama	Waialae-Kahala	1682070	55324.72	1709756	35491.22	384	0	0	0
8-18	8	18	Kahili-Palama	Waikiki Central	1682070	55324.72	1698997	40353.7	1076	0	1	0
8-19	8	19	Kahili-Palama	Waikiki East	1682070	55324.72	1701237	39386.71	634	0	0	1
8-20	8	20	Kahili-Palama	Waikiki West	1682070	55324.72	1695760	42368.31	1386	1	0	0
8-21	8	21	Kahili-Palama	West Oahu	1682070	55324.72	1607115	96574.62	3949	0	0	0
8-22	8	22	Kahili-Palama	Windward	1682070	55324.72	1708744	94317.07	1171	0	0	0
8-8	8	8	Kahili-Palama	Kahili-Palama	1682070	55324.72	1682070	55324.72	773	0	0	0
8-9	8	9	Kahili-Palama	Kaimuki	1682070	55324.72	1710616	43105.02	631	0	0	0
9-10	9	10	Kaimuki	Kapahulu-Diamondhead	1710616	43105.02	1703366	36505.03	547	0	0	0
9-11	9	11	Kaimuki	Makiki	1710616	43105.02	1697142	51475.06	325	0	0	0
9-12	9	12	Kaimuki	Manoa	1710616	43105.02	1706440	57493.96	283	0	0	0
9-13	9	13	Kaimuki	McCully-Moliili	1710616	43105.02	1698417	45789.69	552	0	0	0
9-14	9	14	Kaimuki	Nuuanu-Liliha-Kalihi Valley	1710616	43105.02	1697994	64056.47	441	0	0	0
9-15	9	15	Kaimuki	Punchbowl	1710616	43105.02	1693196	53177.15	233	0	0	0
9-16	9	16	Kaimuki	UH Manoa	1710616	43105.02	1701615	48394.79	570	0	0	0
9-17	9	17	Kaimuki	Waialae-Kahala	1710616	43105.02	1709756	35491.22	542	0	0	0
9-18	9	18	Kaimuki	Waikiki Central	1710616	43105.02	1698997	40353.7	515	0	1	0
9-19	9	19	Kaimuki	Waikiki East	1710616	43105.02	1701237	39386.71	290	0	0	1
9-20	9	20	Kaimuki	Waikiki West	1710616	43105.02	1695760	42368.31	400	1	0	0
9-21	9	21	Kaimuki	West Oahu	1710616	43105.02	1607115	96574.62	955	0	0	0
9-22	9	22	Kaimuki	Windward	1710616	43105.02	1708744	94317.07	484	0	0	0
9-9	9	9	Kaimuki	Kaimuki	1710616	43105.02	1710616	43105.02	362	0	0	0