Communities Plan area. The largest increases in population and employment are projected in the ʻEwa, Waipahu, Downtown, and Kakaʻako Districts, which are all located in the corridor (Figure 1-3). Major activity centers in the corridor are shown in Figure 1-4.

Table 1-1 identifies existing travel times, for both transit and autos, for selected origins and destinations. These times are modeled door-to-door trip times. In most cases, transit travel times are considerably longer than auto travel times.

According to the 2000 census, Honolulu ranks as the fifth densest city among U.S. cities larger than 500,000 population.

In 2000, 63 percent of Oʻahu's population of 876,200 and 80 percent of its 501,100 jobs were located within the study corridor. By 2030, these distributions will increase to 69 percent of the population and 83 percent of the employment as development continues to be concentrated into the PUC and ʻEwa Development Plan areas. These trends are shown in Figures 1-5 and 1-6, which illustrate existing and year 2030 projected population of 1,117,200 and employment of 632,700, respectively, by transportation analysis area.

Kapolei is the center of the ʻEwa Development Plan area and has been designated Oʻahu's "second city." City and State government offices have opened in Kapolei, and UH is developing a master plan for a new West Oʻahu campus able to serve 7,600 students. The James Campbell Company and Campbell family have donated money for the construction of the Salvation Army Kroc Center in Kapolei, which will be located on 12 acres and will be the largest community center in Hawai'i. It will contain swimming pools, basketball courts, a performing arts center, and educational facilities. It is expected to open in 2010. The Kalaeloa Community Development District (formerly known as Barbers Point Naval Air Station) covers 3,700 acres adjacent to Kapolei and is planned for redevelopment. The Department of Hawaiian Home Lands is also a major landowner in the area and has plans for residential and retail development. In addition, developers propose to continue the construction of residential subdivisions, the largest of which is Hoʻopili, which would cover approxi-

Table 1-1 Existing A.M. Peak-Period Travel Times (in Minutes)

	Travel Origin and Destination																
	From Wai`anae to Downtown	From Kapolei to Downtown	From `Ewa to Downtown	From Waipahu to Downtown	From Mililani Mauka to Downtown	From Pearlridge Center to Downtown	From Downtown to Ala Moana Center	From Downtown to Waikiki	From Downtown to UH Mānoa	From Airport to Waikiki	From Waipahu to Waikiki	From Downtown to Kapolei	From Wai`anae to UH Mānoa	From Kapolei to Ala Moana Center	From Salt Lake to Downtown	From `Ewa to Airport	From Airport to Downtown
2007 Base Year																	
Walk-to-transit	102	86	88	79	105	52	18	32	29	71	88	67	128	101	39	114	42
Auto travel time	100	89	88	58	84	35	14	19	18	35	69	32	109	94	26	75	25

mately 1,600 acres with mixed-use development, including approximately 12,000 residences.

Continuing Koko Head, the corridor follows Farrington and Kamehameha Highways through a mixture of low-density commercial, light industrial, and residential development. Population is projected to grow by more than 275 percent in the Waiawa area (Figure 1-5). This part of the corridor passes through the makai portion of the Central Oʻahu Sustainable Communities Plan area.

Farther Koko Head, the corridor enters the PUC Development Plan area, which is bounded by commercial and residential densities that begin to increase near Aloha Stadium. The Pearl Harbor Naval Reserve, Hickam Air Force Base, and Honolulu International Airport border the corridor on the makai side. Military and civilian housing are the dominant land uses mauka of the H-1 Freeway, with a concentration of high-density housing along Salt Lake Boulevard.

As the corridor continues Koko Head across the H-1 Freeway, land use becomes increasingly dense. Industrial and port land uses dominate along the harbor, shifting to a mixture of low-rise commercial, residential, and institutional uses through Kalihi.

Koko Head of Nuʻuanu Stream, the corridor continues through Chinatown and Downtown. The Downtown area, with 63,400 jobs, has the highest employment density in the corridor (Figure 1-6). The Kakaʻako and Ala Moana neighborhoods, comprised historically of low-rise industrial and commercial uses, are being revitalized with a mixture of high-rise residential, commercial, retail, and entertainment-related development. Ala Moana Center, both a major transit hub and shopping destination, is served by more than 2,000 weekday bus trips and visited by more than 56 million shoppers annually.

The corridor continues to Waikīkī and through the McCully neighborhood to UH Mānoa. Today, Waikīkī has more than 20,000 residents and provides more than 44,000 jobs. It is one of the densest tourist areas in the world, serving approximately 72,000 visitors daily (DBEDT 2003). UH Mānoa has an enrollment of more than 20,000 students and approximately 6,000 staff (UH 2005). Approximately 60 percent of students do not live within walking distance of campus (UH 2002) and must travel by vehicle or transit to attend classes.

1.3 Existing Travel Patterns in the Corridor

The vast majority of trips made on the island occur within the study corridor. Currently, morning travel patterns in the corridor are heavily directional. Morning town-bound (Koko Head direction) traffic volumes through the Waipahu and ʻAiea areas are more than twice the volume traveling in the ʻEwa direction. Afternoon flows are less directional with ʻEwa-bound traffic volumes about 50 percent greater than town-bound (Koko Head-bound) traffic.

Although most trips in the corridor are made by residents, the large number of visitors to Oʻahu and the location of visitor attractions within the corridor combine to create a transit market of visitors traveling within the corridor. Oʻahu hosted 4.6 million visitors in 2007 (DBEDT 2008). Many of these visitors stay in the Waikīkī area and travel to points of interest outside of Waikīkī, including many of the activity centers in the corridor (Figure 1-4). More than 17,000 transit trips are made by visitors daily.

1.3.1 Person-trip Patterns

Trip origins correlate closely with the level of population in a given area, while trip destinations correlate to a high degree with the level of employment. Based on these data, 2,036,000, or 73 percent, of the approximately 2,790,000 systemwide were more than five minutes late. During the a.m. peak period, express buses were more than five minutes late 36 percent of the time (OTS 2008). The Transportation Research Board defines more than 25 percent of buses running late as LOS F reliability. Transit speed and reliability with mixed-traffic operations will continue to diminish in the corridor as the number of transit passengers increases and traffic volumes approach roadway capacity on more streets.

1.6 Potential Transit Markets

A comparison of the location and number of new employment opportunities in relation to population growth shows that many workers will still be required to travel to the PUC Development Plan area for work (Figures 1-5 and 1-6). Despite the large growth of employment opportunities in the Kapolei area, population is projected to outpace and exceed the available employment in the area. Additionally, there will be a bidirectional flow of traffic throughout the day as more City and State administrative offices move their daily operations to Kapolei and as other employment grows in the area. The continued operation of UH Mānoa as a commuter school along with the opening of UH West O'ahu will generate a strong student transportation market in the study corridor. These factors point to increased travel on the transportation system between Kapolei and the PUC Development Plan area and represent an important potential future transit market.

Relatively large areas within the corridor are transit-dependent because they contain a large number of households without cars relative to other parts of O'ahu. Persons living in households without cars are much more likely to use transit than other residents. Households without cars are concentrated in much of the PUC Development Plan area (including the Central Business District, Chinatown, Kaka'ako, Kalihi-Pālama, and Iwilei) and some Waipahu neighborhoods, as indicated in Figure 1-9. These areas represent a robust transit market because they already rely on existing transit and are likely to use an improved system.

Finally, although the primary market for the transit corridor improvements is residents, the tourist industry and location of tourist attractions within the corridor combine to create a transit market for visitors traveling within the corridor. In 2007, O'ahu hosted 4.6 million visitors (DBEDT 2008), who take more than 17,000 transit trips daily. Many of these visitors stay in the Waikīkī area and travel to points of interest outside of Waikīkī, including many of the activity centers in the corridor (Figure 1-4).

1.7 Purpose of the Project

The purpose of the Honolulu High-Capacity Transit Corridor Project is to provide high-capacity rapid transit in the highly congested east-west transportation corridor between Kapolei and UH Mānoa, as specified in the *O'ahu Regional Transportation Plan 2030* (ORTP) (O'ahuMPO 2006). The project is intended to provide faster, more reliable public transportation service in the corridor than can be achieved with buses operating in congested mixed-flow traffic, to provide reliable mobility in areas of the corridor where people of limited income and an aging population live, and to serve rapidly developing areas of the corridor. The project also would provide additional transit capacity, an alternative to private automobile travel, and improve transit links within the corridor. Implementation of the project, in conjunction with other improvements included in the ORTP, would moderate anticipated traffic congestion in the corridor. The Honolulu High-Capacity Transit Corridor Project also supports the goals of the Honolulu General Plan and the ORTP by serving areas designated for urban growth.

1.8 Need for Transit Improvements

There are several needs for transit improvements in the study corridor. These needs are the basis for the following goals:

- Improve corridor mobility
- Improve corridor travel reliability
- Improve access to planned development to support City policy to develop a second urban center
- Improve transportation equity

1.8.1 Improve Corridor Mobility

Motorists and transit users experience substantial traffic congestion and delay at most times of the day, both on weekdays and on weekends. Average weekday peak-period speeds on the H-1 Freeway are currently less than 20 mph in many places and will degrade even further by 2030. Transit vehicles are caught in the same congestion. In 2007, travelers on O'ahu's roadways experienced 74,000 vehicle hours of delay on a typical weekday, a measure of how much time is lost daily by travelers stuck in traffic. This measure of delay is projected to increase to 107,000 daily vehicle hours of delay by 2030, assuming implementation of all planned improvements listed in the ORTP (except for a fixed-guideway system). Without these improvements, the ORTP indicates that daily vehicle hours of delay would increase to 154,000 vehicle hours.

Currently, motorists traveling from West O'ahu to Downtown experience highly congested traffic during the a.m. peak period. By 2030, after including all the planned roadway improvements in the ORTP, the level of congestion and travel time are projected to increase further. Average bus speeds in the corridor have been decreasing steadily as congestion has increased. TheBus travel times are projected to increase through 2030. Within the urban core, most major arterial streets will experience increasing peak-period congestion, including Ala Moana Boulevard, Dillingham Boulevard, Kalākaua Avenue, Kapi'olani Boulevard, King Street, and Nimitz Highway. Expansion of the roadway system between Kapolei and UH Mānoa is constrained by physical barriers and by dense urban neighborhoods that abut many existing roadways. Given current and increasing levels of congestion, an alternative method of travel is needed within the corridor independent of current and projected highway congestion.

1.8.2 Improve Corridor Travel Reliability

As roadways become more congested, they become more susceptible to substantial delays caused by such incidents as traffic accidents or heavy rain. Even a single driver unexpectedly braking can have a ripple effect that delays hundreds of cars. Because of the operating conditions in the study corridor, current travel times are not reliable for either transit or automobile trips. Because TheBus primarily operates in mixed-traffic, transit users experience the same level of travel time uncertainty as automobile users. To arrive at their destination on time, travelers must allow extra time in their schedules to account for the uncertainty of travel time. During the a.m. peak period, more than one-third of bus service is more than five minutes late. This lack of predictability is inefficient and results in lost productivity or free time. A need exists to provide a more reliable transit system.

1.8.3 Improve Access to Planned Development to Support City Policy to Develop a Second Urban Center

Consistent with the Honolulu General Plan, the highest population growth rates for the island are projected in the 'Ewa Development Plan area (comprised of the 'Ewa, 'Ewa Beach, Kapolei, Kalaeloa, Honokai Hale, and Makakilo areas), which is expected to grow by approximately 150 percent between 2000 and 2030. This growth represents nearly 50 percent of the total growth projected for the entire island. The communities of Wai'anae, Wahiawā, North Shore, Windward O'ahu, Waimānalo, and East Honolulu will have much lower population growth of between 0 and 23 percent if infrastructure policies support the

Several transit technologies also were eliminated for various reasons. Commuter rail, including diesel multiple unit, was eliminated based on poor operating and environmental performance because of the need for short station spacing in the study corridor. Personal rapid transit, which operates like a horizontal elevator, was eliminated based on lack of technical maturity and low capacity. Emerging rail concepts were eliminated because they have never been proven in real-world use and would not meet the rapid implementation schedule for the project.

For the Fixed Guideway Alternative screening analysis, the corridor was divided into geographic sections. Within each section, the alignments retained for evaluation in the Alternatives Analysis were those that demonstrated the best performance related to mobility and accessibility, smart growth and economic development, constructability and cost, community and environmental quality, and consistency with adopted plans.

2.1.2 Alternatives Considered in the Alternatives Analysis

Once the screening evaluations were completed, the modal, technology, and alignment options were combined to create the following alternatives, which were evaluated in the Alternatives Analysis Report (DTS 2006b):

- No Build Alternative
- Transportation System Management (TSM) Alternative
- Managed Lane Alternative
  - Two-Direction Option
  - Reversible Option
- Fixed Guideway Alternative
  - Kalaeloa-Salt Lake-North King-Hotel Option
  - Kamokila-Airport-Dillingham Option
  - Kalaeloa-Airport-Dillingham-Halekauwila Option

These alternatives were presented to the public during a scoping process for the Alternatives Analysis and the HRS Chapter 343 Environmental Review Process in December 2005. They were evaluated based on their effectiveness in meeting transportation needs, environmental effects, and cost. The comparison of the alternatives presented in the Alternatives Analysis concluded that the TSM Alternative would provide little benefit at a relatively low cost, and that the Managed Lane Alternative would provide slightly more benefit at a substantial cost. In addition to the technical findings, the overwhelming majority (more than 80 percent) of the nearly 3,000 public testimonies received during hearings on the selection of the Locally Preferred Alternative were in favor of some form of the Fixed Guideway Alternative. The findings for the TSM and Managed Lane Alternatives are summarized in the following sections. Table 2-1 compares the alternatives evaluated in the Alternatives Analysis for several performance measures. While the results for the No Build and Fixed Guideway Alternatives that are summarized here differ from the values presented in this Draft EIS as a result of refinement to the analysis and additional engineering work, the relative performance of the alternatives has not changed.

For the Fixed Guideway Alternative as compared to the Managed Lane Alternative, the cost per hour of transit-user benefits would be between 160 and 240 percent less; daily transit trips would be between 14 and 20 percent greater; vehicle miles traveled (VMT) would be reduced by between 3 and 5 percent; and congestion, as measured by vehicle hours of delay (VHD), would be reduced by between 6 and 22 percent.

Transportation System Management Alternative

In the Alternatives Analysis phase, the TSM Alternative was developed to evaluate how well a combination of relatively low-cost transit improvements could meet the study area's transportation needs. FTA requires that the TSM Alternative reflect the

Table 2-1 Summary of Alternatives Analysis Findings

Alternative	Daily Islandwide Transit Trips	Vehicle Miles Traveled	Vehicle Hours of Delay	Hours of Transit User Benefits	Total Capital Cost (Millions 2006 Dollars)	Cost per Hour of Transit-user Benefit Compared to No Build
2030 No Build	232,100	13,971,000	82,000	N/A	$660	N/A
2030 Transportation System Management (TSM)	243,100	13,874,000	80,000	4,325,100	$856	$13.54
2030 Managed Lane	244,400–247,000*	14,002,000–14,034,000*	78,500–82,500*	5,528,500–5,632,700*	$3,601–$4,727*	$50.34–$63.42*
2030 Fixed Guideway	281,900–294,100*	13,464,000–13,539,000*	65,000–73,500*	15,153,600–18,770,200*	$4,192–$6,075*	$21.32–$27.05*

* Range of values provided represents the range between options reported in the Alternatives Analysis Report (DTS 2006b).

best that can be done for mobility without constructing a new transit guideway. Bus service was optimized, per FTA guidelines, by increasing bus service but without building a new fixed guideway for transit, such as a system of dedicated bus lanes. The analysis demonstrated that the Purpose and Need for the Project could not be met through a lower-cost, bus-based alternative alone.

After consideration of various service options and operating plans, the TSM Alternative was designed to serve the study corridor based on a hub-and-spoke network of bus routes, similar to today. Bus frequencies would have been increased during peak periods to provide improved service for work-related trips, particularly from developing areas such as Royal Kunia, Koa Ridge, and Waiawa. The bus fleet was assumed to increase from 525 to 765 buses, and park-and-ride lots were assumed at West Kapolei, UH West O‘ahu, Waipi‘o, and Aloha Stadium. In addition, the present a.m. peak-hour-only zipper lane would have been modified to operate in both the a.m. and p.m. peak periods, and relatively low-cost improvements would have been made on selected roadways to give priority to buses.

The analyses found that the TSM Alternative would have improved transit travel times somewhat by reducing the amount of time riders would have to wait for a bus to arrive at a bus stop. As a result, the TSM Alternative would have led to a slightly larger number of daily transit trips than the No Build Alternative (Table 2-1). This alternative would have generated fewer hours of transit-user benefits than either the Managed Lane or Fixed Guideway Alternative. Since most buses would still operate in mixed traffic, the TSM Alternative would have done little to improve corridor mobility and travel reliability. Roadway congestion also would not have been alleviated. In addition, because of the dispersed nature of transit service, slow bus speeds, and unreliable service, the TSM Alternative would not have supported the City's goals of concentrating growth within the corridor and reducing development pressures in rural areas.

In terms of its environmental impacts, the TSM Alternative would have generated fewer physical impacts than the Managed Lane and Fixed Guideway Alternatives. However, it would have required more transportation system energy and generated more air and water pollution than the Fixed Guideway Alternative.

Although the TSM Alternative would have been very cost-effective, primarily because of this low cost, financial feasibility was a concern. Currently, State legislation does not allow the local excise and use tax surcharge to be used for enhancement of the existing bus transit system.

Managed Lane Alternative

The Managed Lane Alternative would have provided a two-lane elevated toll facility between Waipahu and Downtown, with variable pricing strategies for single-occupant vehicles to maintain free-flow speeds for transit and high-occupancy vehicles (HOVs). Two design and operational variations of the Managed Lane Alternative were evaluated: a Two-direction Option (one lane in each direction) and a two-lane Reversible Option. For both options, access to the facility from ʻEwa and Central Oʻahu would be via ramps from the H-1 and H-2 Freeways prior to the Waiawa Interchange. Both options would have required modification to the design of the Hawaiʻi Department of Transportation's planned Nimitz Flyover Project and would have terminated with ramps tying into Nimitz Highway at Pacific Street. An intermediate bus access point would have been provided near Aloha Stadium. The Two-direction Option would have served express buses operating in both directions during the entire day. The Reversible Option would have served peak-direction bus service, while reverse-direction service would have used the H-1 Freeway. Twenty-nine bus routes, with approximately 93 buses per hour, would have used the managed lane facility during peak hours for either option. The Alternatives Analysis found that of the two options, the Reversible Option would have provided a better transit-user benefit-to-cost ratio.

The Managed Lane Alternative was evaluated for its ability to meet project goals and objectives related to mobility and accessibility, supporting planned growth and economic development, constructability and cost, community and environmental quality, and planning consistency. VMT would have increased compared to any of the other alternatives. While this alternative would have slightly reduced congestion on parallel highways, systemwide traffic congestion would have been similar to the No Build Alternative as a result of increased traffic on arterials trying to access the facility. Total islandwide VHD would have increased with the Managed Lane Reversible Option as compared to the No Build Alternative, indicating an increase in systemwide congestion (Table 2-1). Transit reliability would not have been improved except for express bus service operating in the managed lanes. The Managed Lane Alternative would not have supported planned concentrated future population and employment growth because it would not provide concentrations of transit service that would serve as a nucleus for transit-oriented development. The Managed Lane Alternative would have provided very little transit benefit at a high cost. The cost-per-hour of transit-user benefits for the Managed Lane Alternative would have been two to three times higher than that for the Fixed Guideway Alternative (Table 2-1). Similar to the TSM Alternative, the Managed Lane Alternative would not have substantially improved service or access to transit for transit-dependent communities.

The Managed Lane Alternative would have generated the greatest amount of air pollution, required the greatest amount of energy for transportation use, and would have resulted in the largest number of transportation noise impacts of all the alternatives evaluated. Because the Managed Lane Alternative would have served a shorter portion of the study corridor, it would have resulted in fewer displacements and would have impacted fewer archaeological, cultural, and historic resources than the Fixed Guideway Alternative. The Managed Lane Alternative would not have affected any farmlands. Visually, the elevated structure would have extended a shorter distance, but it would have been more visually intrusive because its elevated fixed guideway alternatives (Build Alternatives) with different lengths and alignments:

- No Build Alternative
- Fixed Guideway Transit Alternative via Salt Lake Boulevard (Salt Lake Alternative) (Figure 2-2)
- Fixed Guideway Transit Alternative via the Airport (Airport Alternative) (Figure 2-3)
- Fixed Guideway Transit Alternative via the Airport & Salt Lake Boulevard (Airport & Salt Lake Alternative) (Figure 2-4)

All alternatives include existing transit and highway facilities, as well as committed transportation projects, exclusive of the fixed guideway transit project, anticipated to be operational by 2030. Committed transportation projects are those identified in the ORTP (OʻahuMPO 2007). Highway congestion relief projects in the ORTP are described in Table 2-3.

Transit fare policy is anticipated to be continued for all Build Alternatives.

Land use, population, and employment assumptions for the year 2030 have been kept constant for all alternatives. The data were provided by the City and County of Honolulu Department of Planning and Permitting (DPP) and are consistent with the ORTP forecast assumptions.

A connection to the Honolulu International Airport could be built as a construction phasing option of the Airport & Salt Lake Alternative following the completion of the section of the Project between East Kapolei and Ala Moana Center along Salt Lake Boulevard.

2.2.1 No Build Alternative

The No Build Alternative is included in this Draft EIS to provide a comparison of what the future conditions will be if none of the Build Alternatives were implemented. It includes the elements described as common to all alternatives.

The No Build Alternative bus network would include all routes in operation today, plus planned route modifications and additions to the existing bus network that are likely to occur between now and the year 2030 to respond to the population and employment estimates for the year 2030.

The No Build Alternative's transit component would include an increase in fleet size. However, due to increasing traffic congestion and slower travel times, transit service levels and passenger capacity would remain about the same as they are today (Table 2-4).

Table 2-4 Transit Vehicle Requirements

Alternative	Bus		Fixed Guideway	
	Peak	Fleet	Peak	Fleet
2007 Existing Conditions	434	540	0	0
2030 No Build	501	601	0	0
2030 Salt Lake	469	563	54	60
2030 Airport	465	558	56	62
2030 Airport & Salt Lake	465	558	56	62

2.2.2 Build Alternatives

The Build Alternatives would include the construction and operation of a grade-separated fixed guideway transit system between East Kapolei and Ala Moana Center (Figures 2-5 to 2-8). Detailed plans of the alignment are included in Appendix A of this Draft EIS. The system would use steel wheel on steel rail technology. The vehicles could either be manually operated by a driver or fully automated (driverless). All parts of the guideway would be elevated, except near Leeward Community College, where it would be in exclusive right-of-way.

The guideway would follow the same alignment for all Build Alternatives through most of the study corridor, except between Aloha Stadium and Kalihi (Figure 2-7). From Waiʻanae to Koko Head (west to east), the guideway would follow North-South

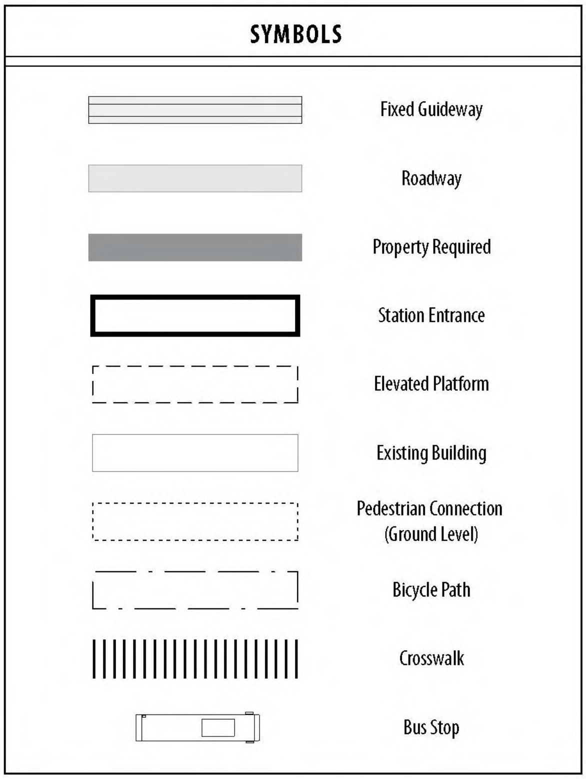

Figure 2-13 Legend for Figures 2-14 to 2-37

The system would be expandable to accommodate longer trains of up to 300 feet in the future to increase capacity by more than 50 percent. Also, the system could be operated with shorter headways (time between train arrivals) to increase peak capacity. This level of service would require a peak-period fixed guideway fleet of 54 to 56 vehicles (Table 2-4).

Transit Technology

The selected transit technology would be electrically powered, industry-standard steel wheel on steel rail powered from a third-rail system (Figure 2-9). The selected vehicle would be capable of a top speed greater than 50 mph and meet the environmental and operating parameters discussed in this Draft EIS.

The vehicles could either be manually operated by a driver or fully automated (driverless). This is possible because the fixed guideway would operate

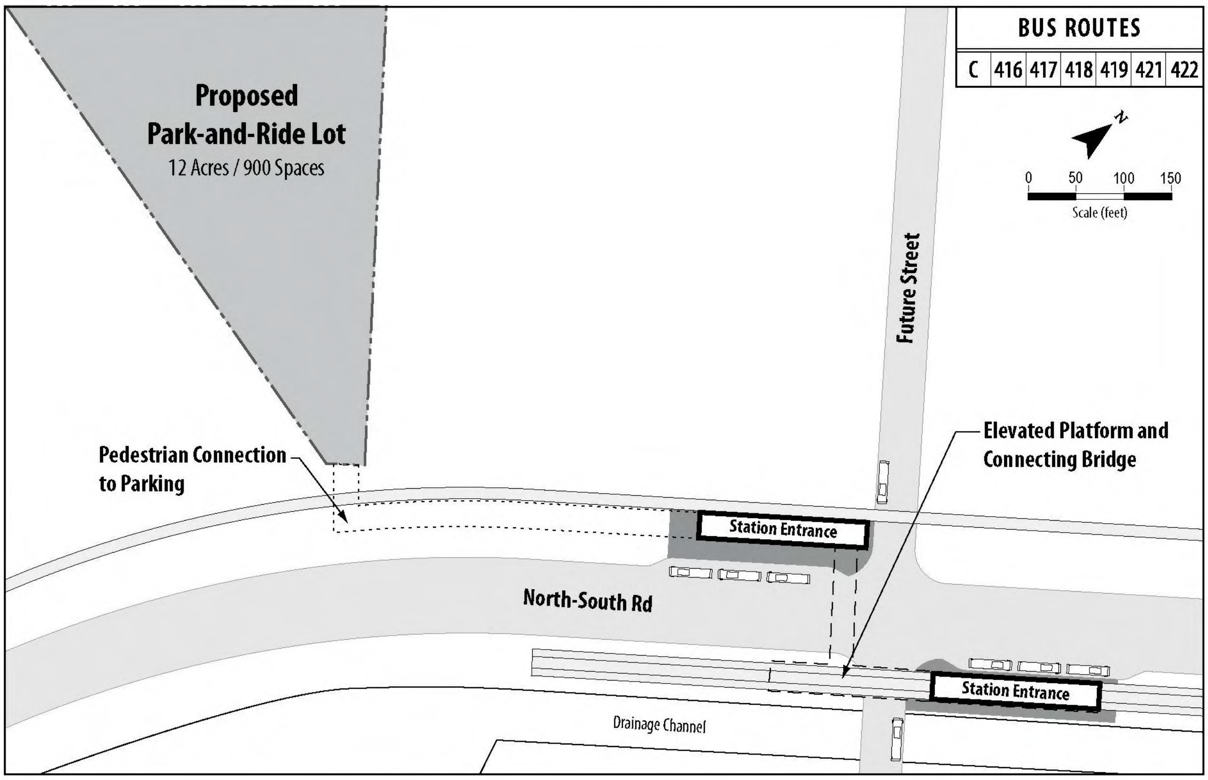

Figure 2-14 East Kapolei Station (All Build Alternatives)

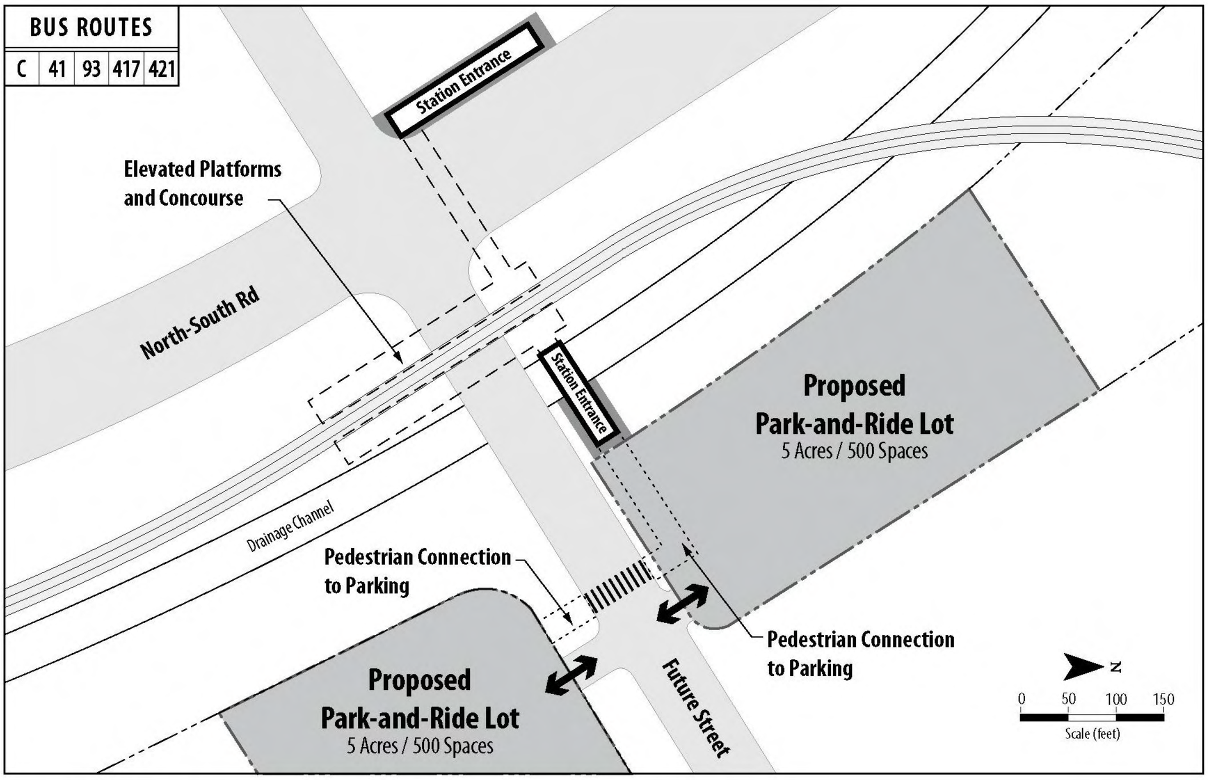

Figure 2-15 UH West O`ahu Station (All Build Alternatives)

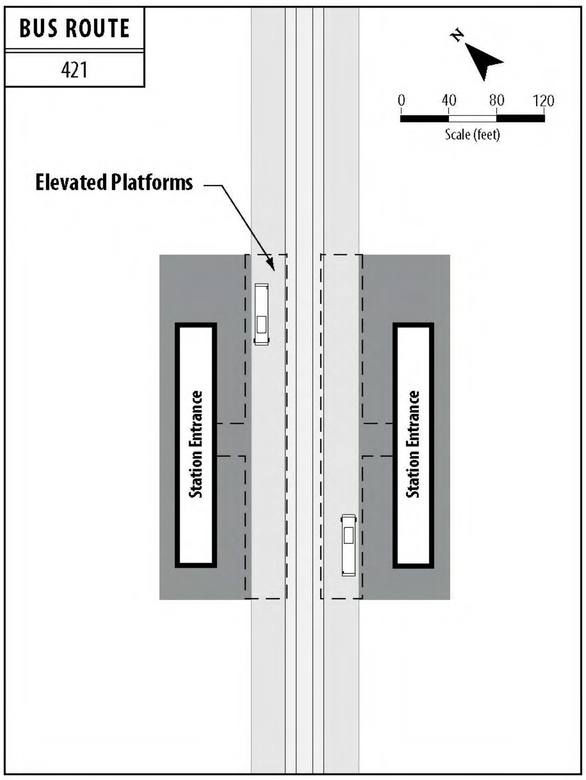

Figure 2-16 Ho`opili Station (All Build Alternatives)

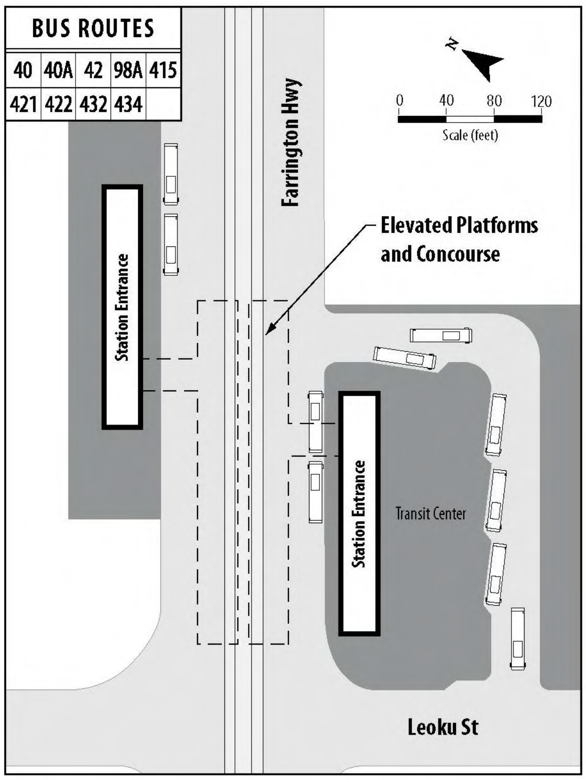

Figure 2-17 West Loch Station (All Build Alternatives)

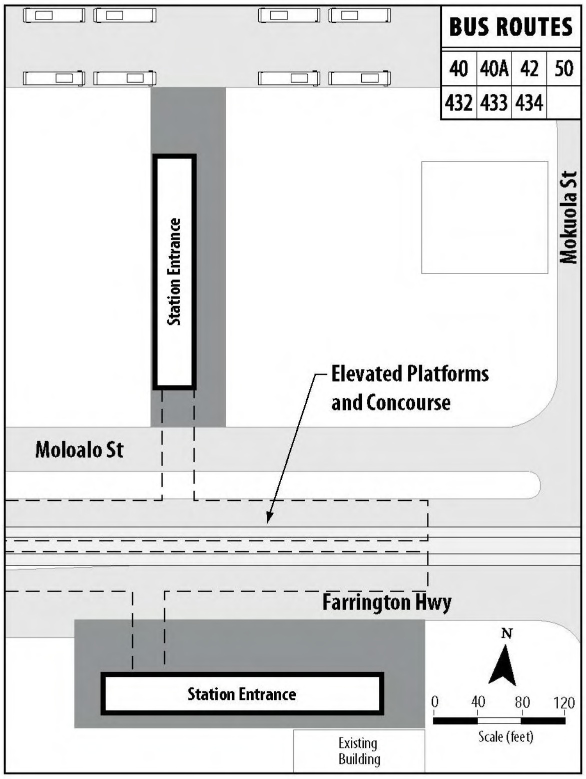

Figure 2-18 Waipahu Transit Center Station (All Build Alternatives)

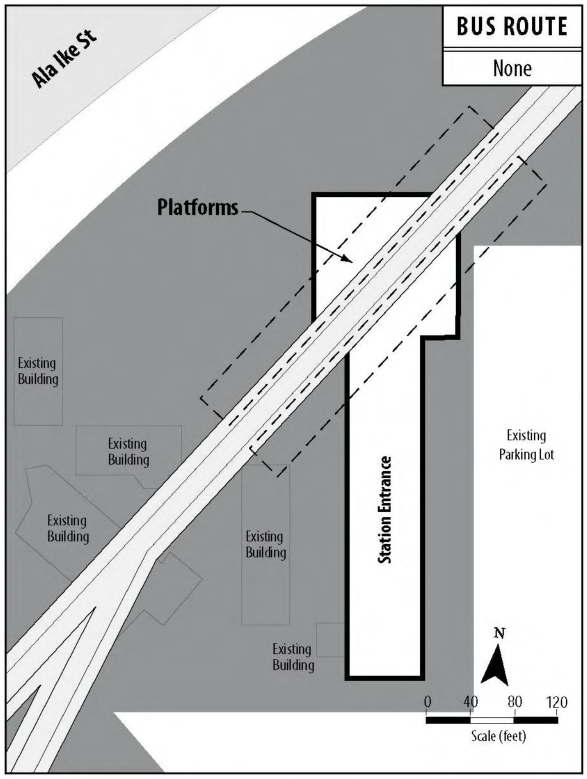

Figure 2-19 Leeward Community College Station (All Build Alternatives)

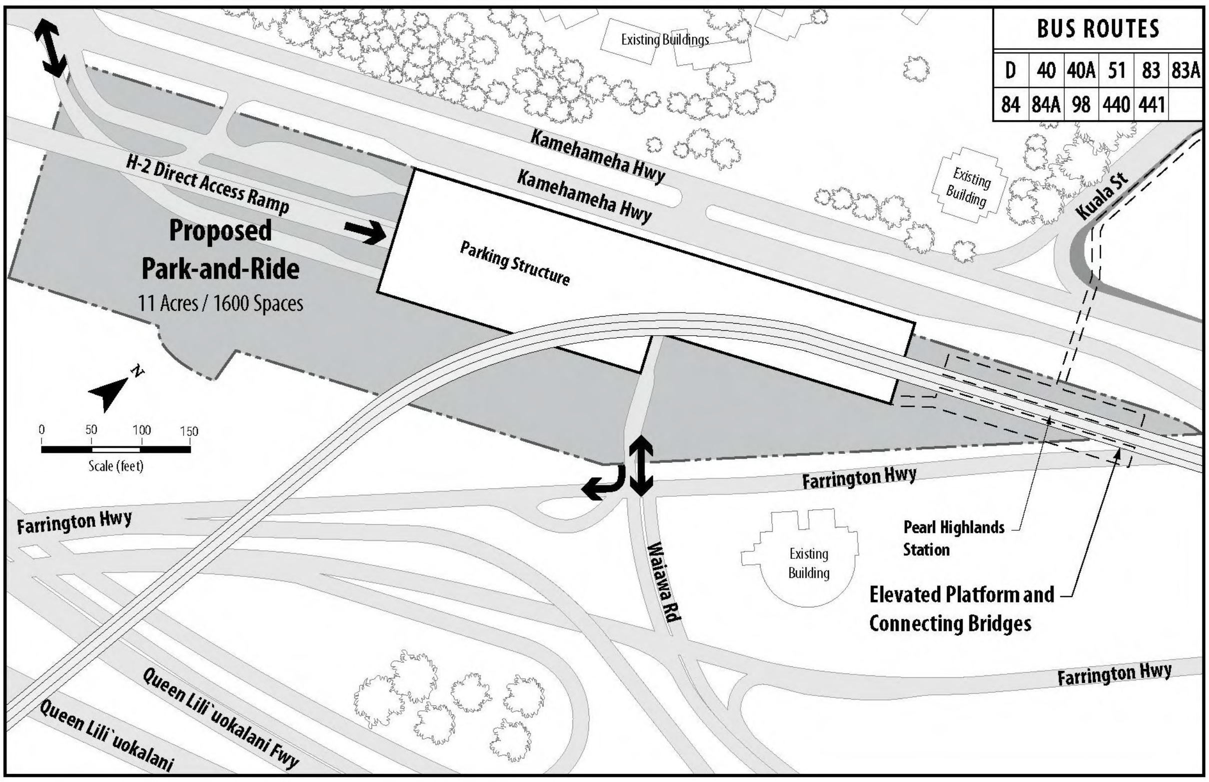

Figure 2-20 Pearl Highlands Station (All Build Alternatives)

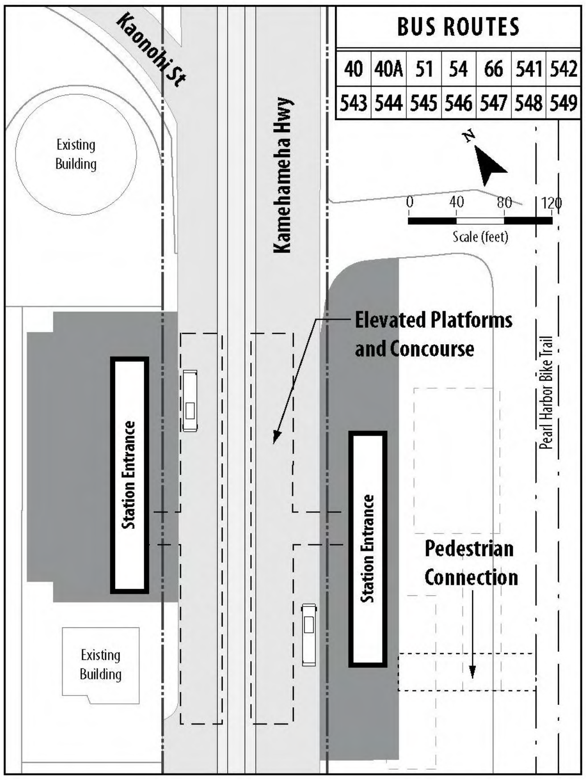

Figure 2-21 Pearlridge Station (All Build Alternatives)

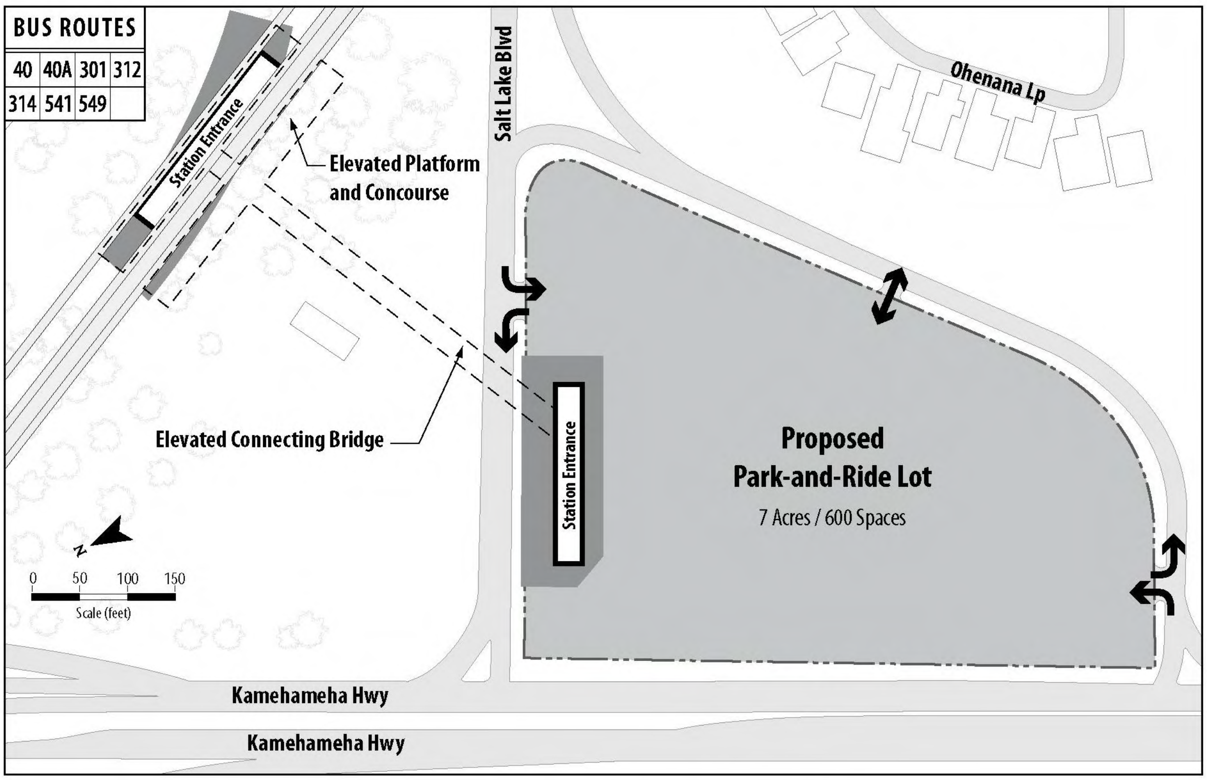

Figure 2-22 Aloha Stadium Station (Salt Lake Alternative and Airport & Salt Lake Alternative)

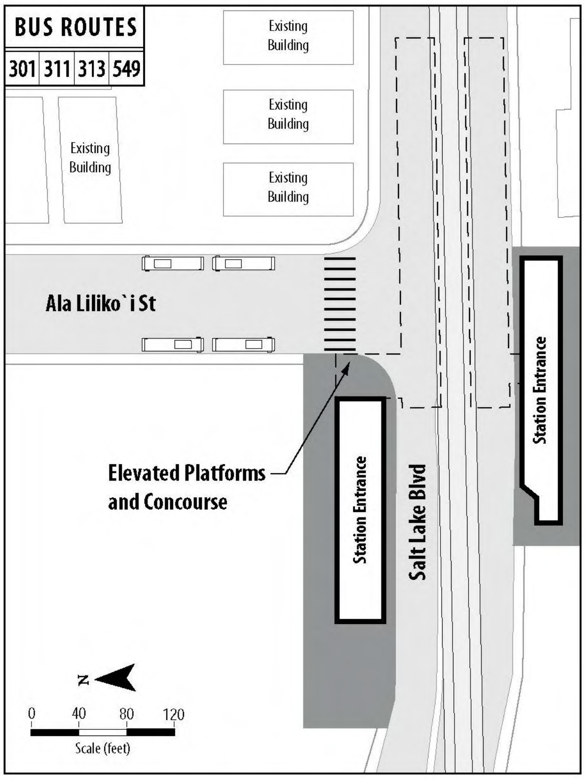

Figure 2-23 Ala Liliko`i Station (Salt Lake Alternative and Airport & Salt Lake Alternative)

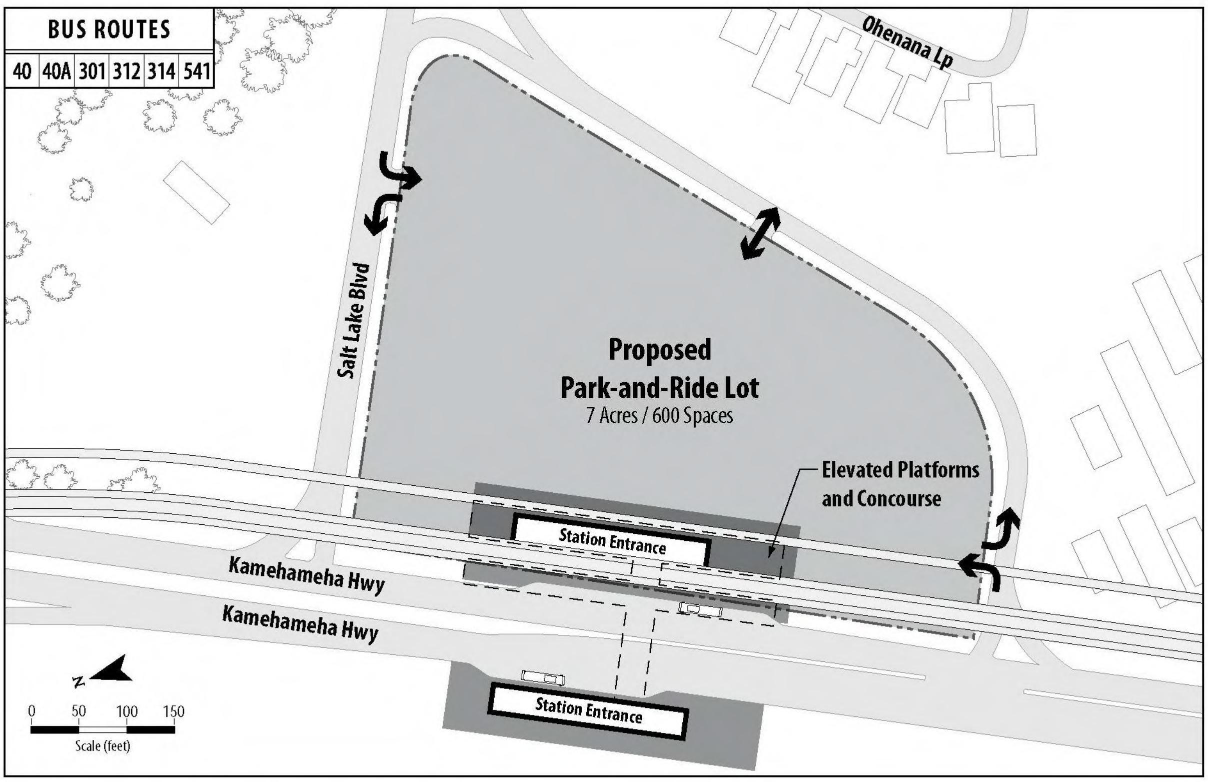

Figure 2-24 Aloha Stadium Station (Airport Alternative)

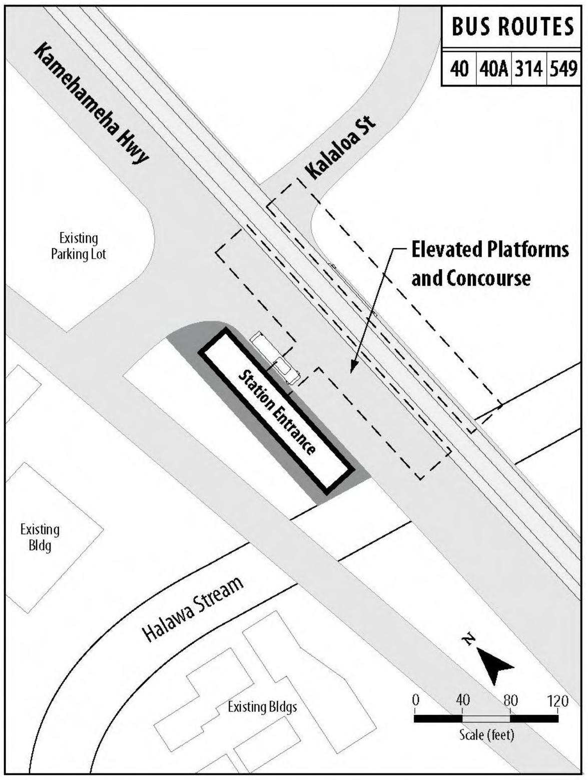

Figure 2-25 Arizona Memorial Station (Airport & Salt Lake Alternative)

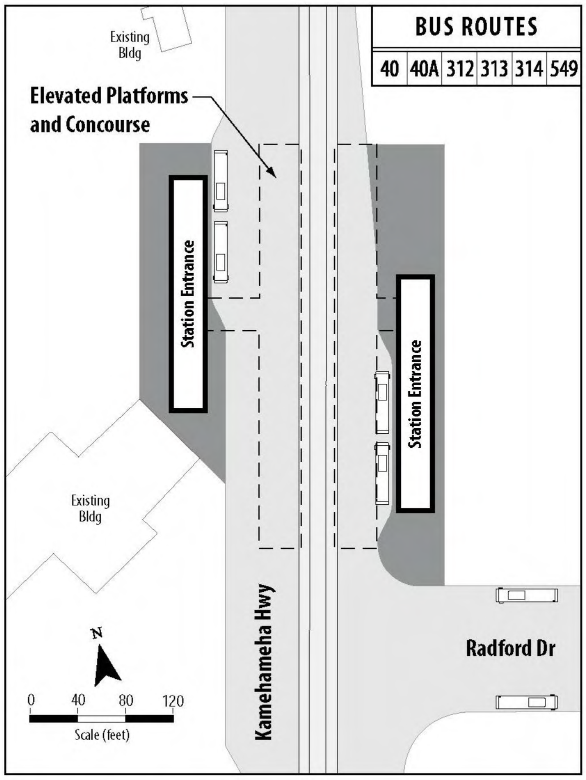

Figure 2-26 Pearl Harbor Naval Base Station (Airport Alternative and Airport & Salt Lake Alternative)

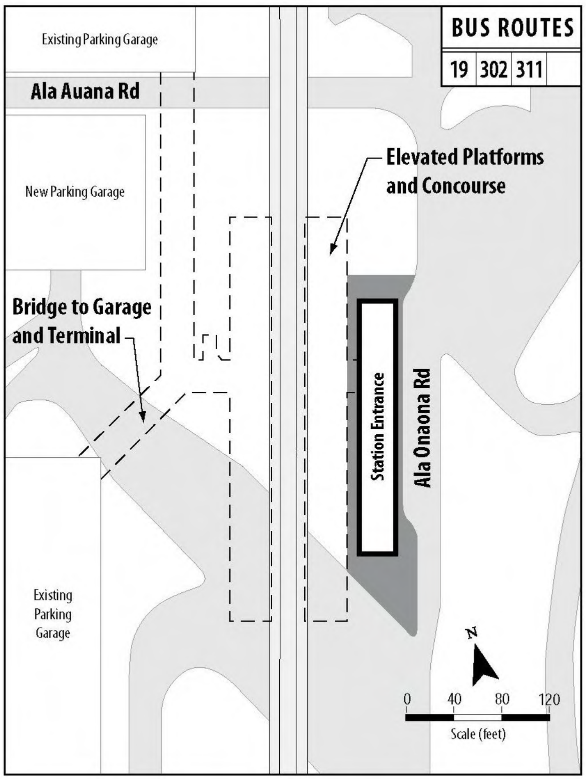

Figure 2-27 Honolulu International Airport Station (Airport Alternative and Airport & Salt Lake Alternative)

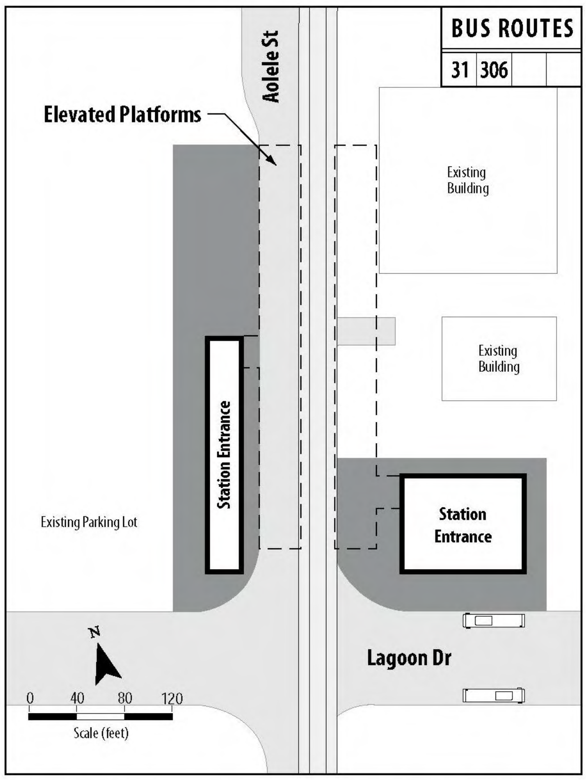

Figure 2-28 Lagoon Drive Station (Airport Alternative and Airport & Salt Lake Alternative)

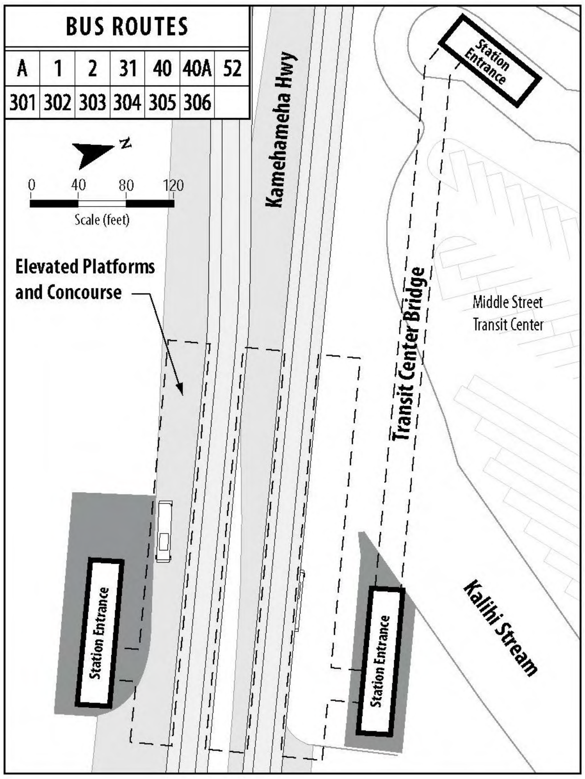

Figure 2-29 Middle Street Transit Center Station (All Build Alternatives)

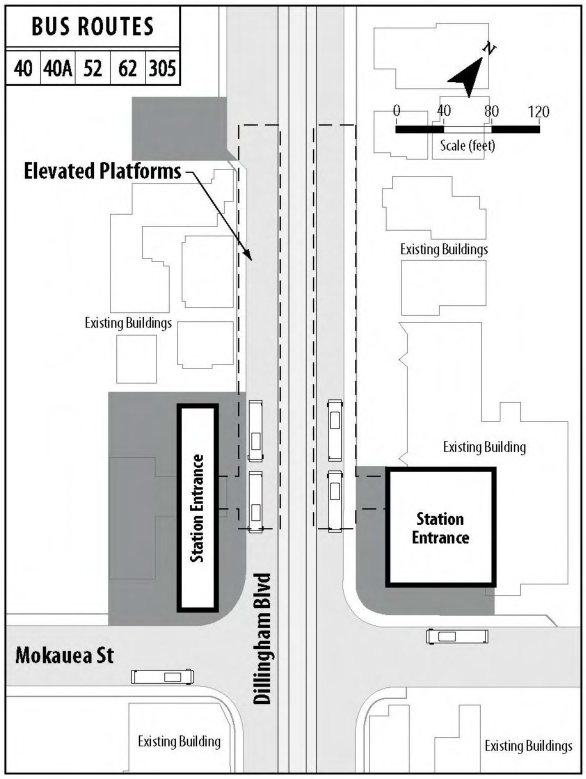

Figure 2-30 Kalihi Station (All Build Alternatives)

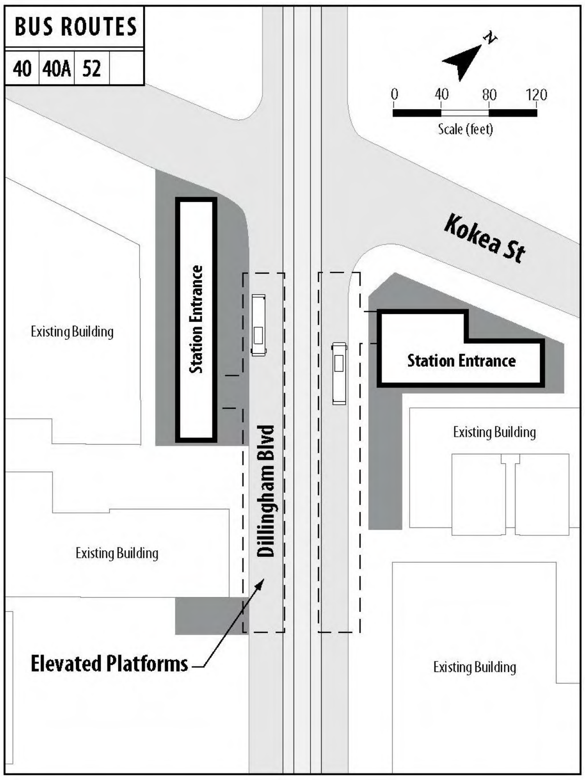

Figure 2-31 Kapālama Station (All Build Alternatives)

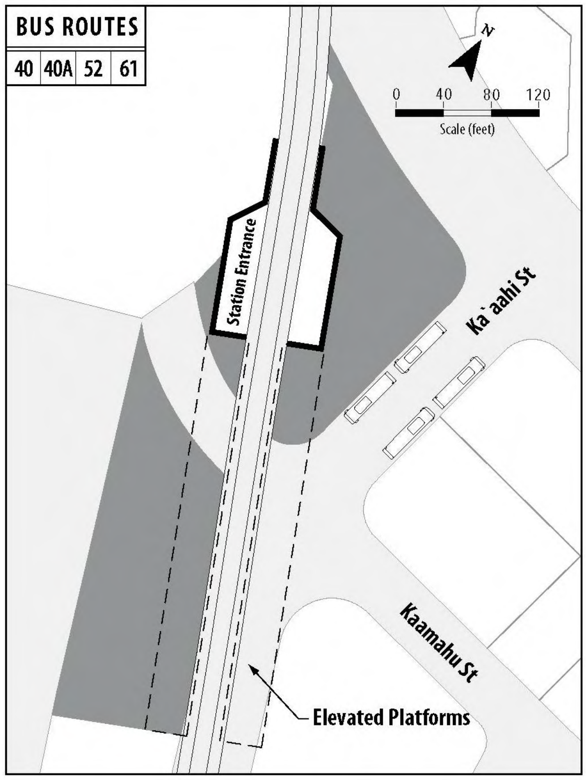

Figure 2-32 Iwilei Station (All Build Alternatives)

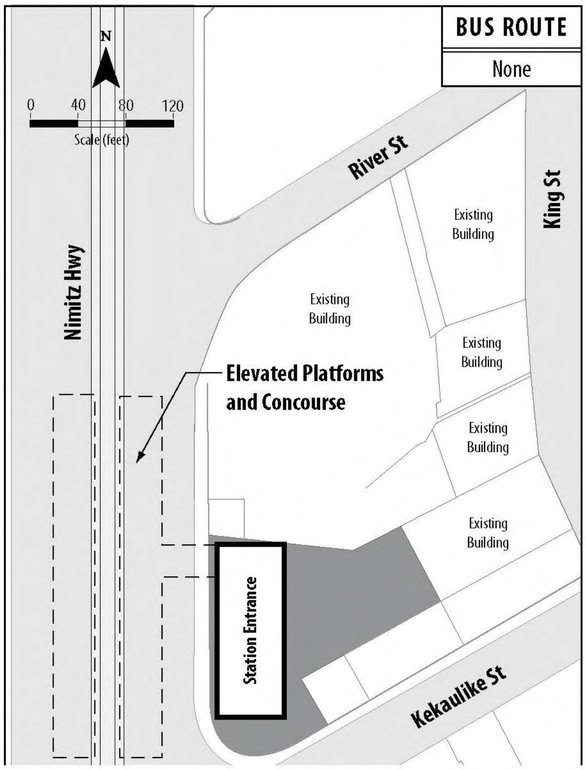

Figure 2-33 Chinatown Station (All Build Alternatives)

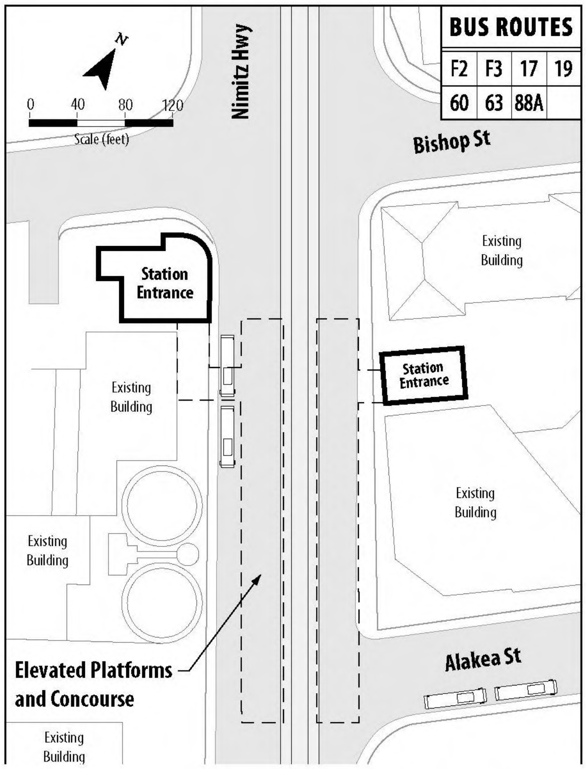

Figure 2-34 Downtown Station (All Build Alternatives)

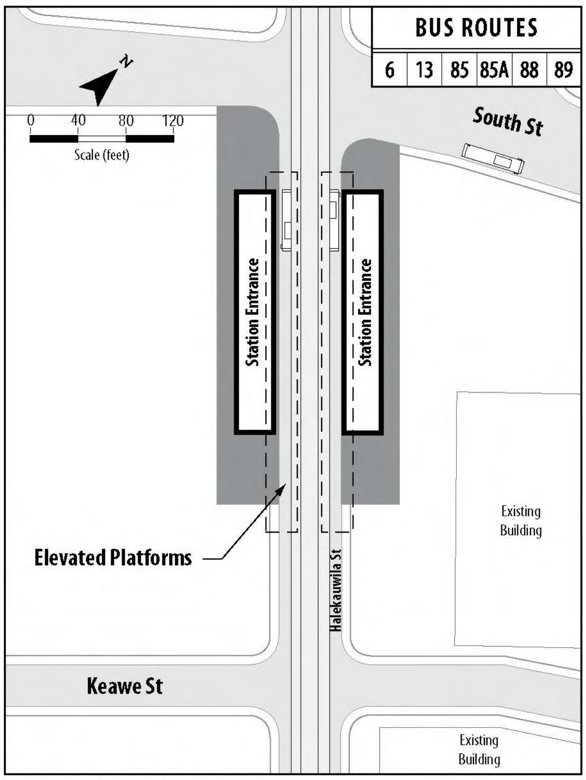

Figure 2-35 Civic Center Station (All Build Alternatives)

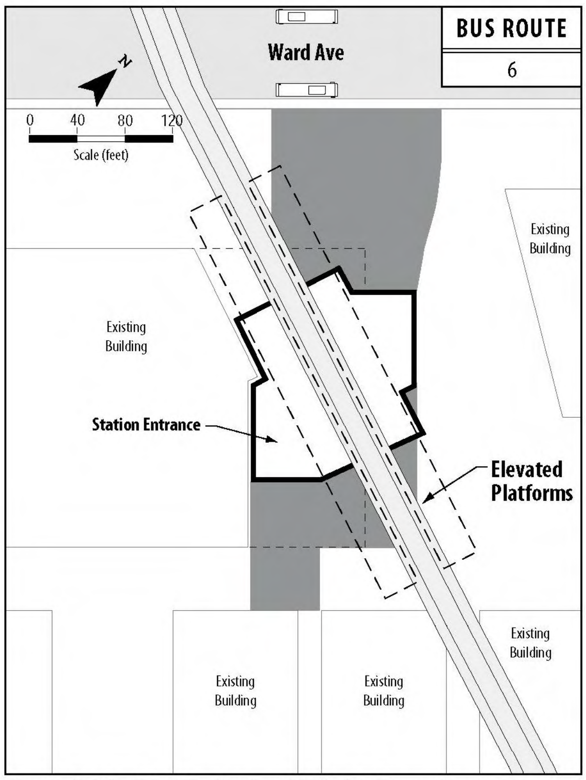

Figure 2-36 Kaka`ako Station (All Build Alternatives)

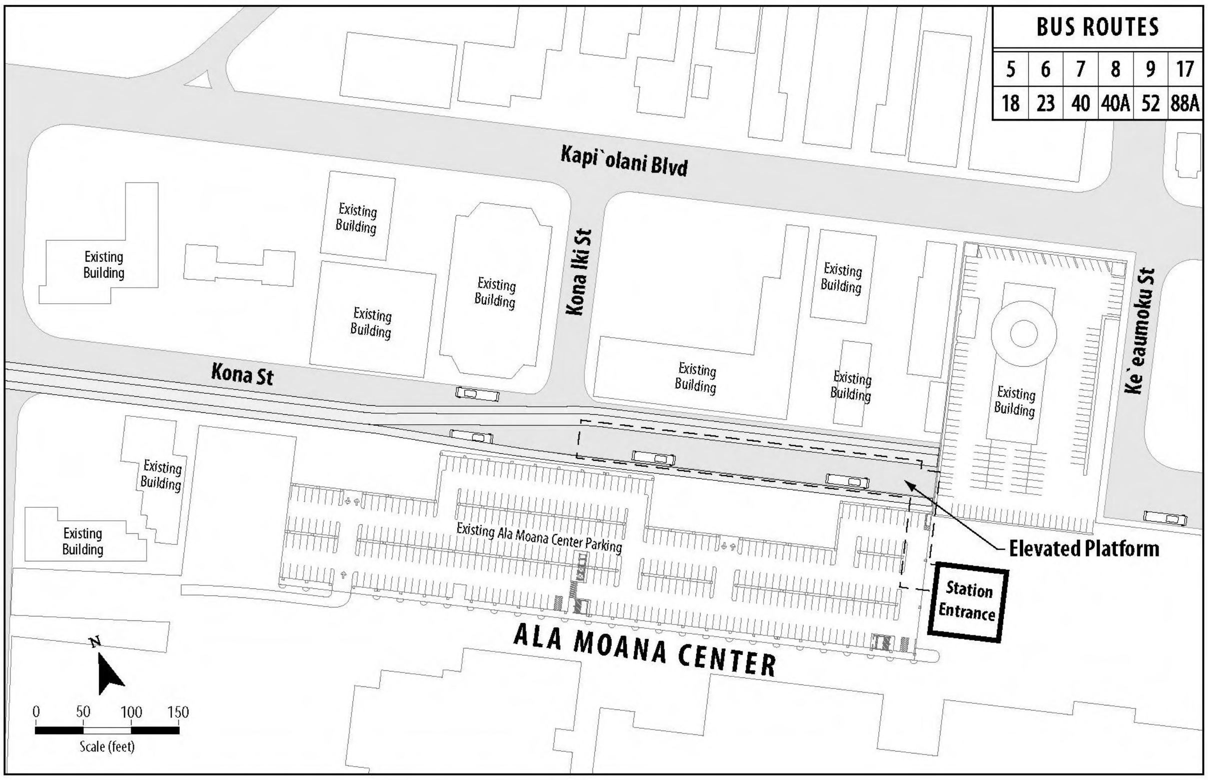

Figure 2-37 Ala Moana Center Station (All Build Alternatives)

in exclusive right-of-way with no automobile or pedestrian crossings.

Station Characteristics

All fixed guideway stations would have similar design elements. The stations would provide one, two, or three platforms 300 feet long and be a minimum of 12 feet wide to accommodate passenger demand beyond 2030. Center platform stations would have a minimum 30-foot-wide platform. All platforms would be high level (at the same level as the vehicle floor) to provide level boarding for all passengers and to accommodate wheelchairs. In addition to stairs and escalators, elevators would be provided at all stations to accommodate elderly and disabled riders. Bicycle racks or lockers also would be provided.

Each station would include the following:

- **Stairs, elevators, and escalators for access**
- **Ticket-vending machines**
- **Bicycle parking**
- **Landscaping**
- **Lighting**

Ticket-vending machines would be provided at all stations. Stations would be designed to accommodate fare gates and a station manager's booth, which could either be on the ground or mezzanine level. The stations would have one of three general configurations:

- Side platforms without a mezzanine (Figure 2-10)
- Side platforms with a mezzanine (Figure 2-11)
- Center platforms with a mezzanine (Figure 2-12)

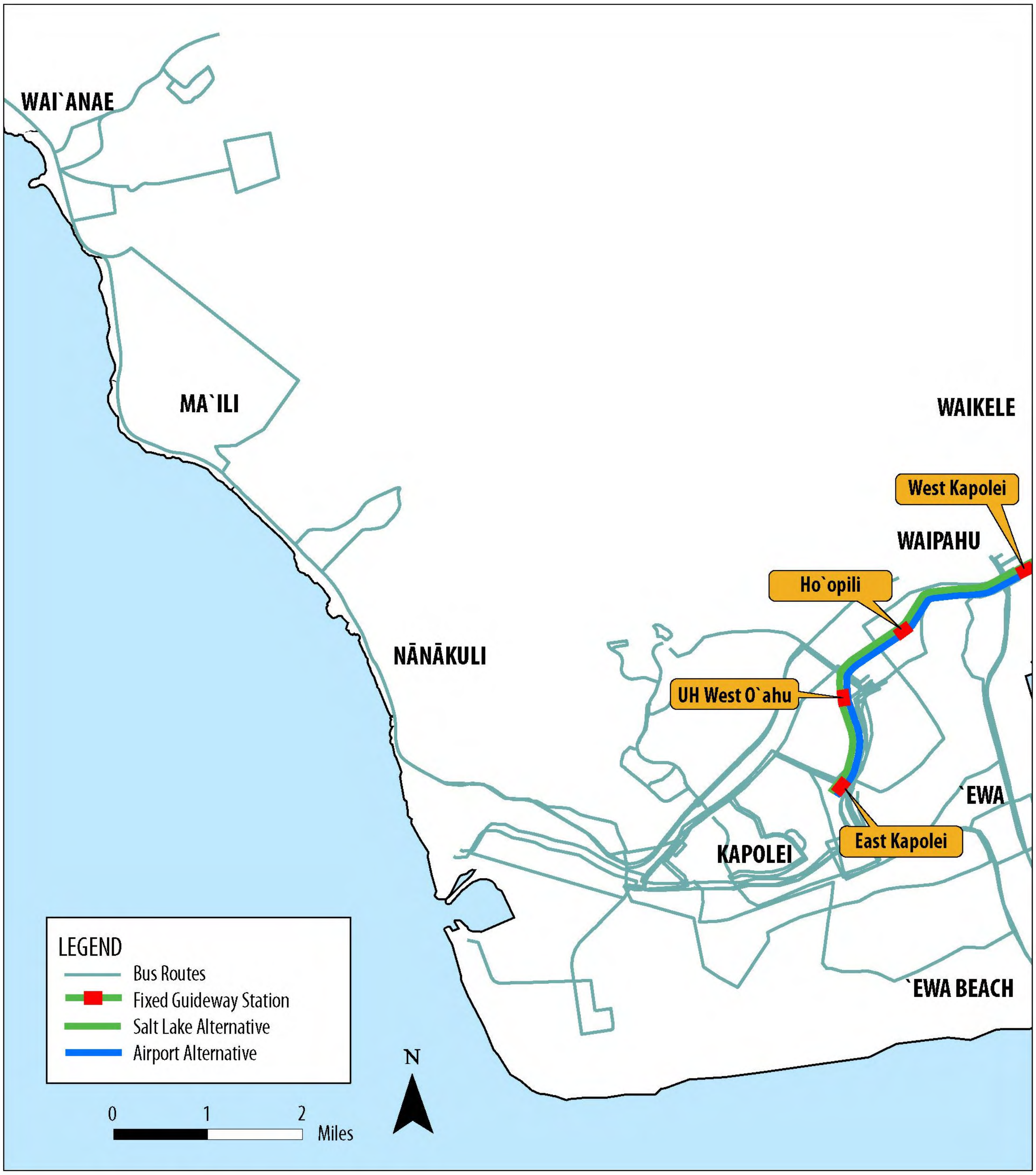

Figure 2-38 Kapolei Bus Service

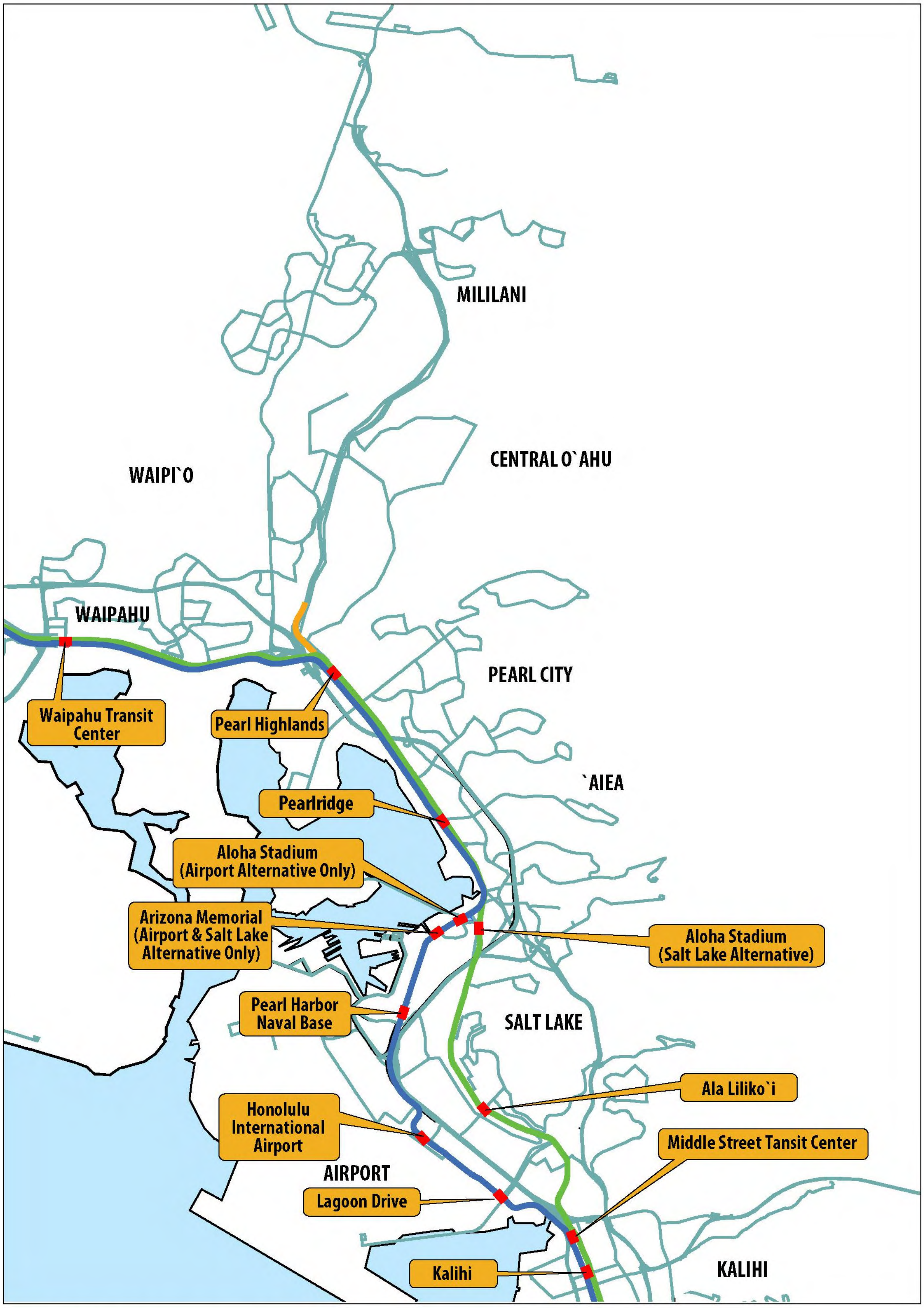

Figure 2-39 Central O`ahu Bus Service

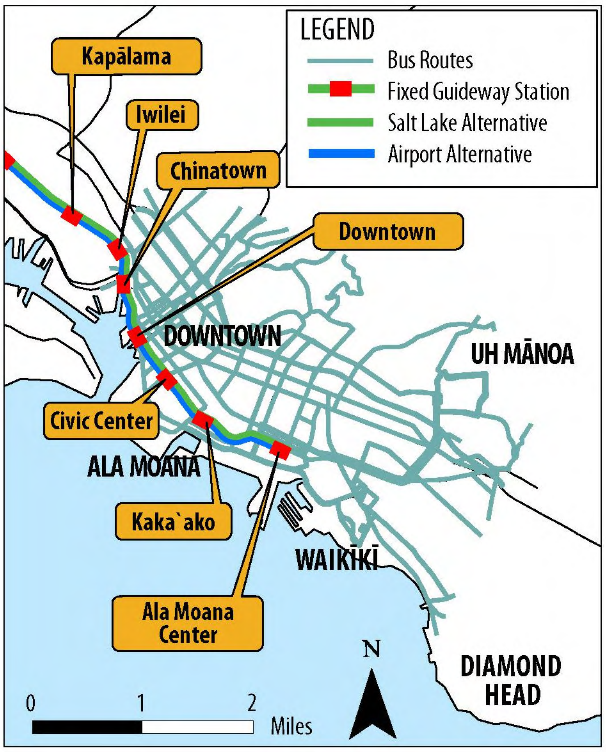

Figure 2-40 Ala Moana to UH Mānoa Bus Service

Side-platform stations without a mezzanine allow the guideway to continue through the station without changing its height above the ground, which averages approximately 30 feet to the top of the tracks. Side-platform and center-platform mezzanine stations require the guideway to climb approximately 18 feet to provide clearance for a mezzanine below the platform that would provide adequate clearance above the street below. Center-platform mezzanine stations would require the tracks to split several hundred feet before the station to pass on each side of the platform. The specific layout would vary at each station for all three station types, depending on available space, the location of bus connections, and the number of passengers that would use each station.

Each of the 24 station locations is shown in Figures 2-13 through 2-37. The figure titles indicate which of the Build Alternatives would include the station.

Bus System

Bus fleet requirements are shown in Table 2-4. Bus service would be enhanced and the bus network would be modified to coordinate with the fixed guideway system. Some existing bus routes, including peak-period express buses, would be altered or eliminated to reduce duplication of services provided by the fixed guideway system. Buses removed from service in the study corridor would be shifted to service in other parts of Oʻahu, resulting in improved transit service islandwide. Certain local routes would be rerouted or reclassified as feeder buses to provide frequent and reliable connections to the nearest fixed guideway station. Bus routes accessing the fixed guideway stations are shown in Figures 2-14 through 2-37.

In Waiʻanae, local and express services would be enhanced through shorter routes and more frequent service to connect to the fixed guideway system in East Kapolei with the major connection point at the UH West Oʻahu Station (Figure 2-38). Central Oʻahu connections to the fixed guideway system would occur at the Pearl Highlands Station (Figure 2-39). Few changes would occur in Pearl City and ʻAiea. Pearl Harbor Naval Base and Hickam Air Force Base would be served by circulators connecting to fixed guideway stations. Kalihi services are anchored at the Middle Street Transit Center. A number of routes would connect to this transit center. In Downtown and Waikīkī, buses would continue to operate on the major east-west transit streets of King, Hotel, Beretania, Kapiʻolani, and Ala Moana to provide local circulation (Figure 2-40). In Windward Oʻahu, a few routes would be altered to connect with the fixed guideway system, thus offering Windward residents connections to Leeward Oʻahu.

Most fixed guideway stations would offer connections to local bus routes. In some cases, an off-street transit center either already exists or would be built to accommodate transfers. In other cases, an on-street bus stop with dedicated curb

Table 2-6 Locations and Capacity of Park-and-Ride Facilities

Park-and-Ride Location	Size	Capacity
East Kapolei	12 acres	900 spaces
UH West O`ahu	10 acres	1,000 spaces
Pearl Highlands	11 acres	1,600 spaces
Aloha Stadium	7 acres	600 spaces

space or a pullout would be located adjacent to the fixed guideway station. Paratransit vehicles would be accommodated at all stations and, in some cases, space for private tour buses, taxis, and/or special shuttles also would be included. Dedicated kiss-and-ride pullouts (passenger drop off) or parking spaces would be provided at many stations to facilitate drop-off and pick-up.

Bus System Enhancements

Traffic-signal priority turns signals green for transit buses before other traffic.

Automated vehicle identification uses GPS to track bus location at all times.

Off-vehicle fare collection allows passengers to buy their tickets before they board the bus or train.

Transit centers are facilities that accommodate transfers between fixed guideway, bus, bicycle, and walking. Park-and-ride and kiss-and-ride access and passenger amenities (covered waiting areas, benches, and transit information) are also available at some transit centers.

Bus transfers would be made at off-street transit centers adjacent to fixed guideway stations at UH West O'ahu, West Loch, Waipahu Transit Center, Pearl Highlands, Pearlridge, Aloha Stadium, Middle Street Transit Center, and Ala Moana Center. The transit centers at UH West O'ahu, West Loch, Pearl Highlands, and Aloha Stadium would be constructed as part of this Project. The other transit centers already exist or are planned for construction to support bus operations independent of this Project. On-street bus transfers would be accommodated at most other fixed guideway stations.

Enhanced bus service would be provided between the terminal stations of the Project and the planned extensions of the total fixed guideway system. System improvements, including traffic-signal priority, automated vehicle identification, and off-vehicle fare collection, would complement frequent bus service at the East Kapolei, Pearl Highlands, and Ala Moana Center Stations. These bus improvements would reduce travel time and improve intermodal transfers. Bus and fixed guideway departures and arrivals would be coordinated and predictable to minimize transfer time and total trip time.

Park-and-Ride Lots

Park-and-ride lots would be constructed at stations with the highest demand for drive-to-transit access (Table 2-6). With the exception of Pearl Highlands, which would be a parking structure, all park-and-ride lots are expected to be constructed as surface parking. The proposed size, location, and access for each proposed lot is shown in the figures for the associated fixed guideway stations (Figures 2-14, 2-15, 2-20, and 2-22 or 2-24).

Vehicle Maintenance and Storage Facility

The Project would include a vehicle maintenance and storage facility to maintain and store up to 100 vehicles. Maintenance operations would occur over the 24-hour day in three shifts. Two locations are being considered for the facility: a 41-acre area currently in agricultural use adjacent to an electrical substation in Ho'opili (Figure 2-5) and a 43-acre vacant site near Leeward Community College (Figure 2-6). Only one maintenance and storage facility site would be selected. Either site would include a number of buildings, maintenance facilities, a vehicle wash area, storage track, a system control center, and employee parking.

Traction Power Substations

The Project would require traction power substations approximately every mile to provide vehicle propulsion and auxiliary power. The planned locations are shown in Figures 2-5 through 2-8. Each substation would be approximately 40 feet long, 16 feet wide, and 12 feet high; would include transformers, rectifiers, batteries, and ventilation equipment; and would be connected to the existing power grid. Each substation would consist of a painted steel box housing the equipment and sufficient area to access and maintain the equipment (Figure 2-41). Many substations would be incorporated into fixed guideway stations. At other locations, the substations may be enclosed within a fence.

Figure 2-41 Installation of a Traction Power Substation

Project Phasing

The Locally Preferred Alternative adopted by the City Council identified a fixed guideway transit system between Kapolei and UH Mānoa with a branch line to Waikīkī. The Build Alternatives in this Draft EIS would begin to implement the Locally Preferred Alternative. The Project would begin near the planned UH West Oʻahu campus and extend to Ala Moana Center. This is the portion of the Locally Preferred Alternative that can be constructed with anticipated funding. The remainder of the Locally Preferred Alternative, referred to in this Draft EIS as "planned extensions," would be constructed once additional funding is secured.

The Project provides logical termini at East Kapolei and Ala Moana Center because it connects two locations that may be easily accessed with buses to connect to areas beyond the Project. Kapolei has been designated as Oʻahu's "second city" and government offices have opened there. Kapolei is a logical Waiʻanae terminus because both population and employment are forecasted to grow by approximately 400 percent. The Waiʻanae terminus is near the UH West Oʻahu campus, the Salvation Army Kroc Center, and the Hoʻopili planned development, all of which are planned to open between 2009 and 2012. Ala Moana Center is the logical Koko Head terminus because it is Oʻahu's largest shopping center and currently serves as a major transit hub with more than 2,000 weekday bus trips.

The Project also has independent utility because it would connect multiple activity centers, provide cost-effective transit-user benefits, and meet the Purpose and Need for the Project whether or not the planned extensions are provided. Finally, construction of the Project would not preclude future development of the planned extensions.

Because of its size, the Project would be constructed in phases to accomplish the following:

- Match the anticipated schedule for right-of-way acquisition and utility relocations
- Reduce the time that each area will experience traffic and community disturbances
- Allow for multiple construction contracts with smaller constract size to promote more competitive bidding
- Match the rate of construction to what can be maintained with local workforce and resources

- Balance expenditure of funds to minimize borrowing

Individual construction phases would be opened as they are completed so that system benefits, even if limited during the first phases, would be realized prior to completion of construction of the entire Project. The temporary effects associated with the interim operations are discussed in Sections 3.5 and 4.16 of this Draft EIS. The Project's cash flow analysis, which is presented in Section 6.4, anticipates the use of Local funds for the first construction phase and a combination of Local and Federal funds for the remaining phases.

The Airport & Salt Lake Alternative would include additional construction phases. The section between East Kapolei and Ala Moana Center along Salt Lake Boulevard would be constructed as discussed above, followed by a 2.1-mile connection from the Middle Street Transit Center 'Ewa to the Honolulu International Airport, and finally the section from the airport to Aloha Stadium. The final phases could be completed after 2018.

Prior to completion of the section from the airport to Aloha Stadium, the connection to the airport would provide a direct link from the Koko Head terminus of the Project to the airport but would require a transfer at Middle Street for those traveling from the 'Ewa end of the line. It would accommodate the demand for access to the large employment base at and near the airport and provide access for travelers to and from the airport.

Construction Schedule

Construction is currently planned to be completed in four overlapping phases of work. Construction activities would be similar for each phase and are described in Appendix C, Construction Approach. The first phase would include construction of the vehicle maintenance and storage facility and a portion of the Project between the Wai'anae end of the Project and Pearl Highlands. The limits of the first phase have been selected so that the fixed guideway could connect to either maintenance and storage facility option because system testing and operation could not be completed without access to the maintenance and storage facility. Station areas, park-and-ride lots, and the maintenance and storage facility site would function as construction staging areas for the first construction phase.

The remainder of the Project likely would be built in three overlapping phases continuing Koko Head from Pearl Highlands, first to Aloha Stadium, then to Middle Street, and finally to Ala Moana Center (Figure 2-42). Construction staging areas for future phases beyond station areas, park-and-ride lots, and the maintenance and storage facility site would be identified and developed by the contractors and approved by the City. Variations to the schedule would continue to be evaluated during Preliminary Engineering. Conceptual design for the Project is under way, and work on the first construction phase would begin in 2009 (Figure 2-43). The entire Project is planned to be in operation in 2018.

Planned Extensions

In addition to the Project, the Locally Preferred Alternative includes three planned extensions connecting the Project to the following areas:

- West Kapolei
- UH Mānoa
- Waikīkī

The planned extensions are included as illustrative projects in the ORTP (O'ahuMPO 2007) and are anticipated by RTD to be completed at some time in the future prior to 2030 as separate projects that would receive detailed environmental review. The extensions include approximately 9 additional miles of guideway and 12 additional stations.

The West Kapolei extension would begin at the Wai'anae end of the corridor and is anticipated to follow Kapolei Parkway to Wākea Street and then turn makai to Saratoga Avenue. Proposed

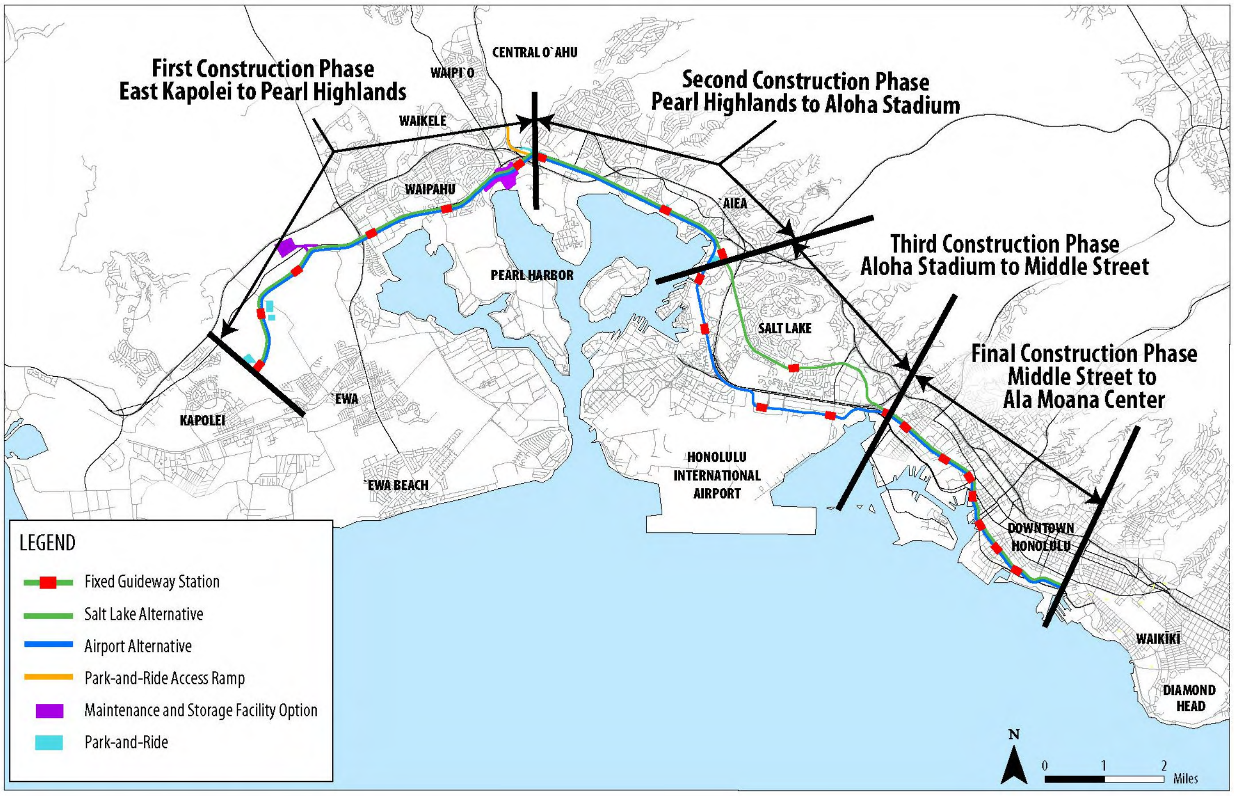

Figure 2-42 Project Construction Phases

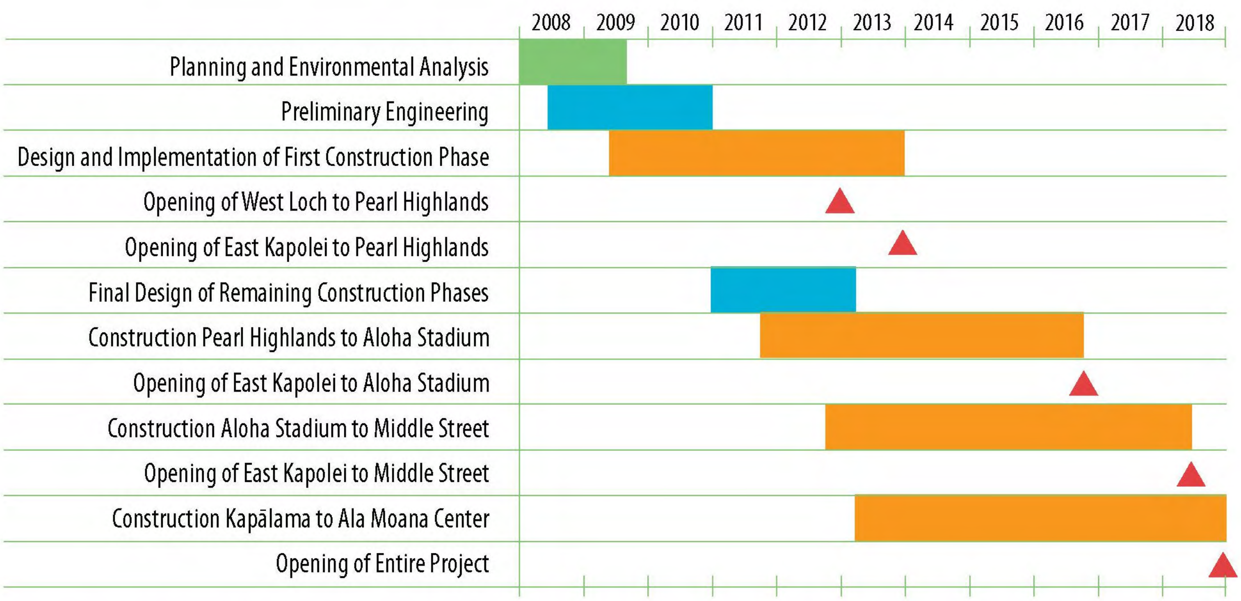

Figure 2-43 Project Schedule