EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

May 6, 1986

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
465 South King Street, Room 115
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Based on the recommendation of your office, I am pleased to accept the final environmental impact statement for the Kalakaua Avenue Safety and Beautification project as a satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in deciding whether this project should be allowed to proceed. My acceptance of the statement is an affirmation of its adequacy under applicable laws and does not constitute an endorsement of the proposal.

When the decision is made regarding this action, I expect the proposing agency to carefully weigh the societal benefits against the environmental impact which will likely occur. This impact is adequately described in the statement, and together with the comments made by reviewers, provides a useful analysis of alternatives to the proposed action.

With warm personal regards, I remain,

Yours very truly,

George R. Ariyoshi

cc: Department of Public Works
Department of Transportation Services

KALAKAUA AVENUE

Safety and Beautification Project

Final Environmental Impact Statement

May 1986

City and County of Honolulu

Frank F. Fasi, Mayor
D.G. Anderson, Managing Director

FINAL ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT
(Ala Moana Boulevard to Monsarrat Avenue)

This document is prepared pursuant to Chapter 343 HRS.

Proposing Agencies:	Dept. of Transportation Services City & County of Honolulu 650 South King Street Honolulu, Hawaii 96813	Dept. of Public Works City & County of Honolulu 650 South King Street Honolulu, Hawaii 96813
Responsible Officials:	Director	Director and Chief Engineer
	April 30, 1986 Date	April 30, 1986 Date
Accepting Authority:	Governor, State of Hawaii	City & County of Honolulu Department of Land Utilization
	Prepared By: Belt, Collins & Associates 606 Coral Street Honolulu, Hawaii 96813	Prepared For: City & County of Honolulu Frank F. Fasi, Mayor D.G. Anderson, Managing Director

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CHAPTER I

SUMMARY

Waikiki is the heart of Hawaii's visitor industry, and Kalakaua Avenue its main transportation artery. In addition to being the main Diamond Head-bound thoroughfare for vehicles, Kalakaua Avenue is also the principal commercial/shopping area. As a result, both vehicular and pedestrian traffic volumes on Kalakaua Avenue are heavy.

In some places, such as Kuhio Beach Park, Hemmeter Center, and the Royal Hawaiian Shopping Center, the sidewalks have already been widened and/or otherwise improved by the City or adjoining landowners to provide a more gracious and accommodating pedestrian environment. However, many stretches of the sidewalk remain overcrowded and/or unattractive. Opportunities exist to improve safety and vehicular traffic flow through Waikiki as well. The Kalakaua Avenue Safety and Beautification project has been proposed as a means of improving traffic flow, correcting existing deficiencies, and restoring a measure of spaciousness and elegance to Waikiki's core.

Several studies conducted over the past twenty years recommended that portions of Kalakaua Avenue be closed to vehicular traffic and converted into a pedestrian mall. A traffic study conducted by Belt, Collins & Associates indicated that complete closure would result in severe traffic congestion on Waikiki's remaining streets. At the same time, it concluded that not all of the existing 56-foot pavement width is needed to handle existing and future traffic flow. Based on these recommendations, and on input received from many City and State agencies and private groups, the City prepared conceptual plans calling for changes to traffic controls, roadway, sidewalks, and landscaping along the Kalakaua Avenue corridor. These preliminary plans were widely circulated and refined on the basis of comments received from other governmental agencies, business groups, and community organizations.

Traffic performance within the Kalakaua Avenue corridor was analyzed by the City and County of Honolulu Department of Transportation Services in December 1985 using the TRANSYT-7F computer model. In addition, numerous field tests were conducted to determine the effectiveness of various proposed improvements under actual conditions. The results of these tests led to plan changes that further improved traffic performance.

The final plans for the project provide a minimum 47-foot road width and four traffic flow lanes, (the same number as currently exists) with additional space provided as necessary for turning lanes and loading zones. A complete ban on parking would be enacted. The nine feet gained by reducing the roadway width from its current 56 feet to 47 feet would be devoted to additional pedestrian travelway and landscaping. This plan is designed to realize the optimum potential for widening the sidewalks and adding landscaping, and beautifying Kalakaua Avenue, while maintaining or increasing the existing capacity of the roadway at all points within the project area. Because of this, the completed project is not expected to significantly affect the number of vehicles using either Kalakaua or Kuhio Avenues.

Widening the sidewalks, repaving the roadway, installing additional landscaping, providing new storm drain inlets, new street lights and traffic control signals, and other changes associated with the proposed project will involve construction activities over a period of approximately 18 months. During this period, noise and dust from

construction, temporary re-routing of pedestrian traffic, obstruction of curb lanes by construction equipment, and other short-term construction impacts will be evident. Necessary work within the roadway will require temporary closure of lanes during the day, causing increased traffic congestion and inconvenience. Special duty police officers and/or other security personnel will be assigned to the project area during construction. Their presence will help maintain traffic flow on Kalakaua Avenue while portions of it are disturbed by construction activity. Emergency vehicle access to all structures along Kalakaua Avenue will be maintained throughout the construction period.

The magnitude of construction-related impacts will depend largely upon the site-specific construction techniques and mitigation measures that are employed. Limitations on the amount of time that any sidewalk segment may be disturbed by construction activities and on the number of lineal feet of sidewalk that may be disturbed at any one time will be incorporated in the construction contract. These limitations, as well as close coordination between the City, the Contractor, and adjoining property owners/business people, will minimize the disruption which construction will cause.

CHAPTER II

DESCRIPTION OF THE PROPOSED ACTION

2.1 PURPOSE AND NEED

2.1.1 Overview

At the time of the 1980 Census, an estimated 17,384 persons were permanent residents of Waikiki, the 600-plus acre area bounded by Kapahulu Avenue, the Ala Wai Canal, and the Pacific Ocean (see Figure II-1):

	Resident Population of Waikiki				1980
Census Tract	1970	1980	Difference	% Change	Employment
18.01	1,286	1,140	-146	-11.4	4,570
18.02	2,774	3,259	+485	+17.5	1,009
19.01	1,111	1,412	+301	+27.1	11,832
19.02	3,368	5,413	+2,045	+60.7	2,936
20.01	2,186	2,560	+374	+17.1	8,547
20.02	2,399	3,600	+1,201	+50.1	1,547
TOTAL =	13,124	17,384	+4,260	+32.5	30,351

Provisional population estimates by the State Department of Planning & Economic Development (Stanfield, October 15, 1985) suggest that the resident population had increased to over 22,000 by mid-1984.

While resident population is the key to understanding pedestrian and vehicular activity in many areas, this is not the case with Waikiki. There, visitors constitute such a significant proportion of the total population that they must be taken into account as well. The Hawaii Visitor's Bureau and the Waikiki Improvement Association have estimated that between 51,000 and 59,000 visitors are present in Waikiki's hotels and apartments on an "average" day. Statistics kept by the Hawaii Visitor's Bureau indicate there is considerable seasonal variation in the visitor population. For example, during February (the busiest month for visitors) the visitor census is about 15 percent above the annual average, while the slowest months are about 10 percent below the annual average.

Based on 1980 Census data, it is estimated that approximately 30,000 persons work in Waikiki (Hawaii, State of, Department of Transportation, November 7, 1985). Because many of Waikiki's businesses are round-the-clock, seven-day-per-week operations, the number of workers present at any given time is only a fraction of this, however, probably on the order of 10,000 to 15,000.

Combining the estimates of resident, visitor, and employee population given above, it appears that the average (annual) de facto population of the Waikiki District is about 100,000 persons. The number present at any one time differs significantly from this, of course, with the peak probably coming on weekend evenings in January and February when the visitor count is at its highest, employees are still at work,

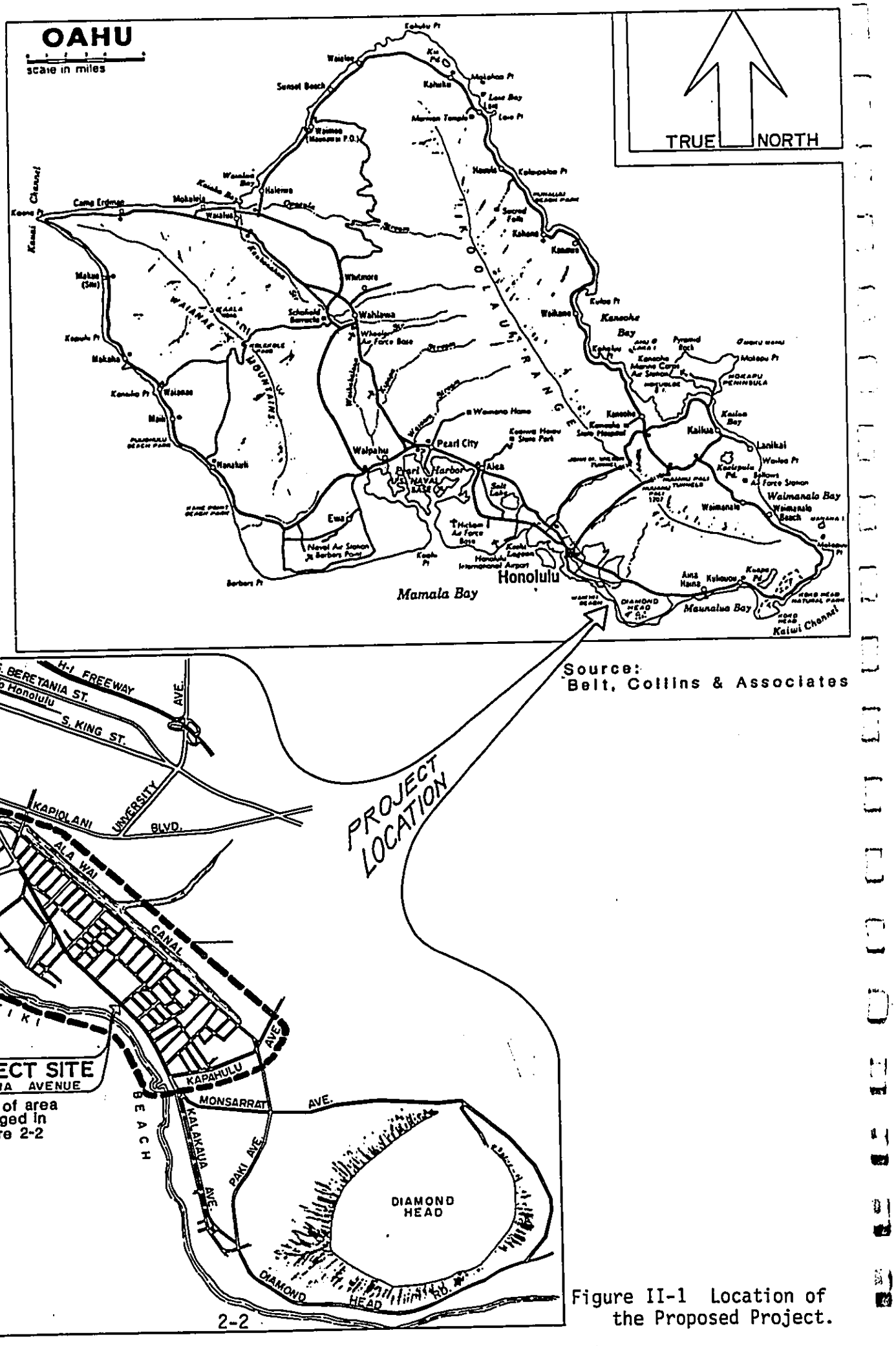


Figure II-1 Location of the Proposed Project.

residents have returned from jobs outside the district, and persons residing outside the district have come to Waikiki to avail themselves of its many recreational and entertainment facilities.

Because of Waikiki's compact size, high de facto population, and the number and type of activities which it contains, pedestrian traffic there is heavy; the same factors contribute to high vehicular traffic volumes as well. For many years competition for space between pedestrians and vehicles within Kalakaua Avenue's 80-foot right-of-way tended to be resolved in favor of the latter. Recently, however, the importance of maintaining a pleasant pedestrian environment has received increasing recognition. The current proposal to reconstruct the sidewalks along Kalakaua Avenue, to install additional landscaping and street trees, and to upgrade street furniture, light fixtures, and other elements of the streetscape reflects a major commitment on the part of all concerned to improve Waikiki's appearance and pedestrian environment while maintaining Kalakaua Avenue as a key vehicular thoroughfare.

2.1.2 Existing Roads and Pedestrian Facilities

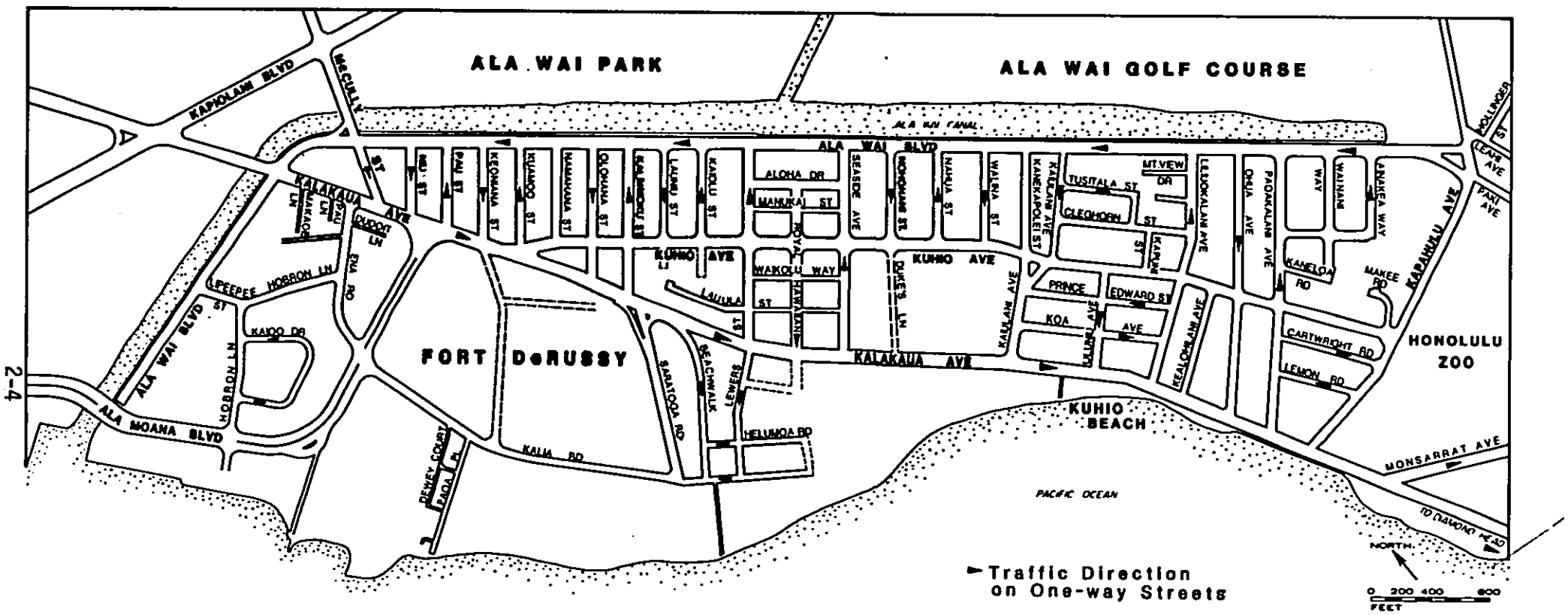
Waikiki is served by three major roadways: Kalakaua Avenue, Kuhio Avenue, and Ala Wai Boulevard (see Figure II-2). All three are essential transportation links, but, because it runs through the heart of Waikiki's hotel district and is the principal shopping street, Kalakaua is in many ways the most important.

Between Ala Moana Boulevard and Kapahulu Avenue, Kalakaua Avenue has a right-of-way width of 80 feet; the pavement width is 56 feet. The City-owned portion of the sidewalk extends approximately 12 feet on either side of the roadway. In addition, adjacent landowners have constructed private sidewalk space ranging in width from a few inches to nearly 20 feet. In the area fronting the Royal Hawaiian Shopping Center, the City has actually allowed the owner to construct a landscaped buffer zone between the edge of the roadway and the sidewalk. In return, the owner has granted the City a perpetual easement on its land for sidewalk purposes. While walkway areas outside the 80-foot right-of-way remain private property, in many instances they function as an extension of the City sidewalk and have an important influence on its visual character and pedestrian carrying capacity.

Curbside parking along Kalakaua Avenue is permitted only as follows:

Location	Time
Kuhio Avenue to Lewers Street, both sides	Daily, 11:30 pm to 6:00 am All day Sunday
200 feet east of Seaside Avenue to Kapahulu Avenue, makai side	Daily, 11:30 pm to 6:00 am All day Sunday

Even within these areas there are "no-parking" areas reserved for municipal buses and a tour bus stop zone extending along the makai side of Kalakaua Avenue between Kaiulani and Uluniu Avenues. Each of these parking areas occupies approximately 8 feet of the existing roadway's 56-foot width. Hence, in places where parking is allowed on both sides of the street, the effective width for through-traffic is reduced to 40 feet.



Source: Belt, Collins & Associates

Figure II-2 Existing Roads in Waikiki.

Kuhio Avenue runs generally parallel to Kalakaua Avenue beginning at an acute intersection with Kalakaua opposite Fort DeRussey and ending at Kapahulu Avenue. Major improvements have been made to Kuhio Avenue over the past several years, and the final increment of reconstruction was completed in the summer of 1985. Kuhio Avenue's 70-foot wide right-of-way now contains a 56-foot road pavement with 7-foot sidewalks on either side. The pavement carries five lanes; the two curb lanes are each 13 feet wide, while the three remaining lanes are each 10 feet wide. The center lane is a bi-directional turn-storage lane.

Ala Wai Boulevard runs along the makai side of the Ala Wai Canal, more or less parallel to Kalakaua Avenue. Its 75-foot wide right-of-way contains four traffic lanes, all of them for Ewa-bound vehicles. The pavement width is 42 feet. The sidewalk width on the mauka (canal) side is generally 6 feet, except where stairs leading down to the canal water surface decrease its width to 4.5 feet. The overall width from canal wall to curb on this side of the street is about 18 feet. On the makai side of the street, the sidewalk is generally four feet wide. Parking is allowed along the curb in the mauka lane except during rush hours.

As shown on Figure II-2, numerous cross-streets (nearly all of them one-way) provide for mauka-makai movement of vehicles between the three major Diamond Head-Ewa arterials described above. Among the more heavily used are Lewers Street (which is one of the few to continue on the makai side of Kalakaua Avenue), Seaside Avenue, Kaiulani Avenue/Kanekapolei Street, and Kapahulu Avenue.

Most intersections on all three of the major Diamond Head-Ewa roadways are signalized. Those on Kalakaua Avenue from Ala Wai Boulevard to Kapahulu Avenue are on a signal interconnect that allows their sequencing to be coordinated. The traffic signals at the Kalakaua Avenue/Kapiolani Boulevard and Kalia Road/Ala Moana Boulevard intersections operate independently; these two signals control the volume of traffic into the Waikiki segment of Kalakaua Avenue.

2.1.3 Existing and Projected Vehicular and Pedestrian Traffic

2.1.3.1 Vehicular Traffic

Good historical traffic data is available for Ala Moana Boulevard, Kalakaua Avenue, and McCully Street at the Ala Wai Canal screenline, and these data have been analyzed for this project. They show that total 24-hour Diamond Head-bound (i.e., inbound) traffic (the critical direction in terms of available capacity on Kalakaua Avenue), increased by about 20 percent at the Ala Wai Canal screenline between 1971 and 1984 (see Figure II-3). Peak-hour traffic volumes, which are generally a better measure of traffic congestion than the 24-hour volumes reported above, actually decreased by about 10 percent over the same period (see Figure II-4).

The data cited above was collected before the Kuhio Avenue widening project was completed; counts taken shortly after completion show only small changes. For example, 24-hour vehicular traffic volumes along Kuhio Avenue had decreased slightly, while those along Kalakaua Avenue had increased marginally. A different pattern is exhibited by peak-hour traffic. All peak-hour traffic measurements taken along Kuhio Avenue after it was reconstructed show an increase in Diamond Head-bound traffic. The most recent counts also indicate minor changes in traffic patterns along Kalakaua Avenue, including small increases in both a.m. and p.m. peak hour traffic levels; however, the differences are within the range of sampling error.

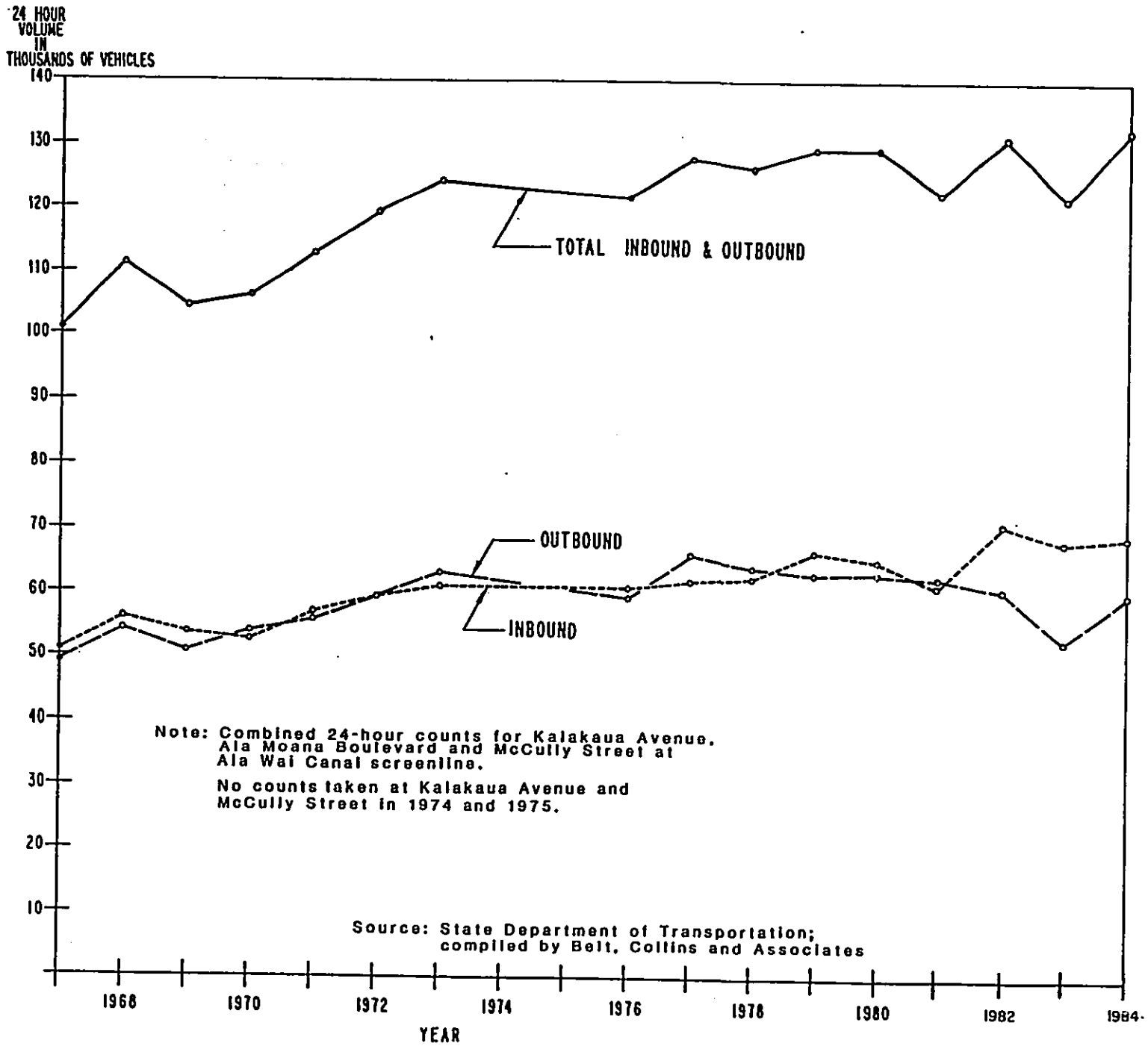


Figure II-3 24-Hour Traffic Volumes at the Ala Wai Canal Screenline: 1971-1984.

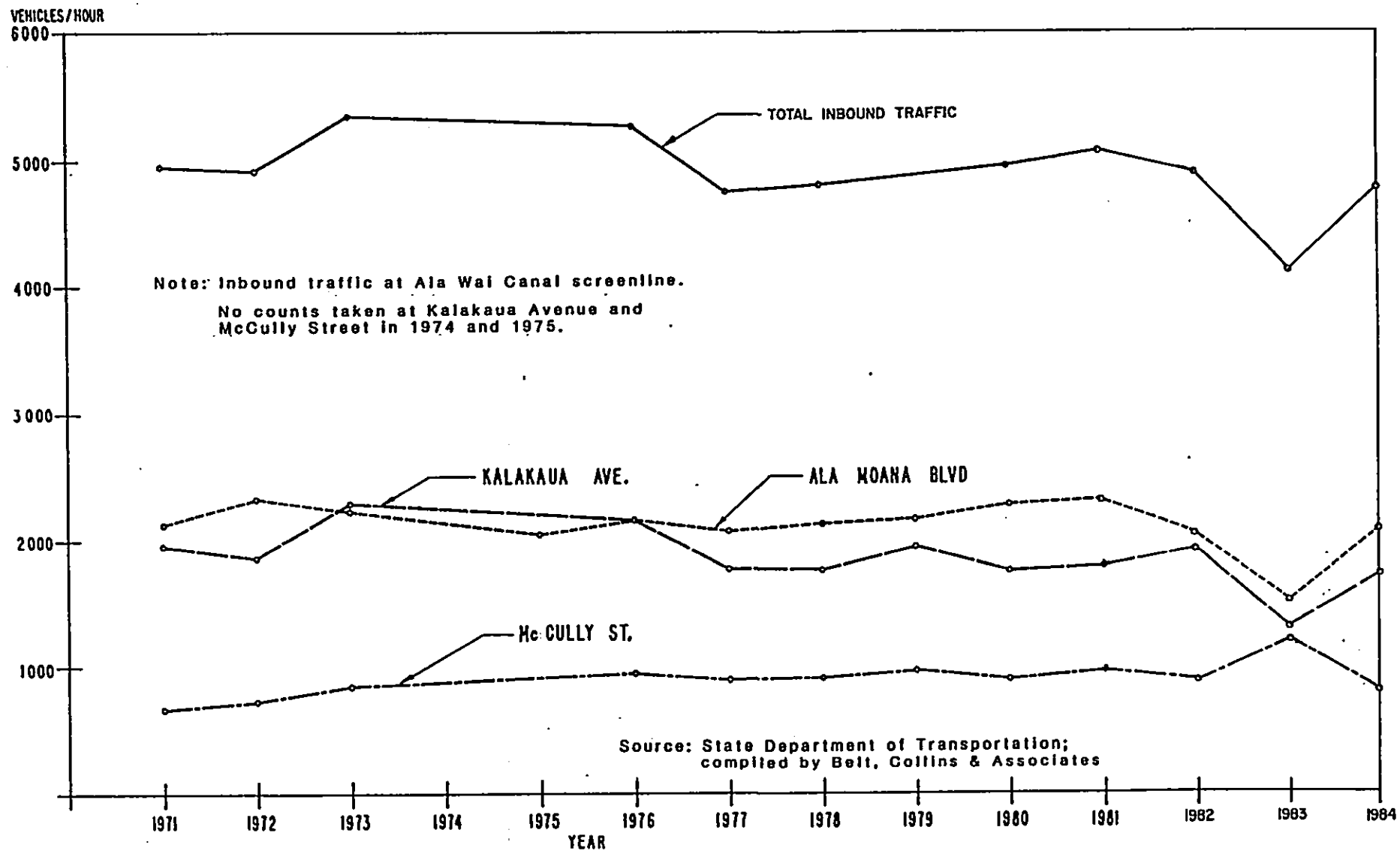


Figure II-4 Peak-Hour Traffic at the Ala Wai Canal Screenline: 1971-1984.

Overall, the changes in traffic volumes on Waikiki's major thoroughfares have been relatively small over the past decade. As explained in Section 2.1.4, the Waikiki Special Design District and the Development Plan for the Primary Urban Center limit the amount of additional traffic-generating development that can occur in Waikiki. In view of this, there is expected to be little increase in peak-hour traffic for the foreseeable future. Nevertheless, it is recognized that changes in policy can occur that would allow greater than expected growth (and traffic); the ability of the proposed design to accommodate higher traffic volumes is discussed in Section 3.5 of this report.

2.1.3.2 Pedestrian Traffic

In 1980, during the traffic study phase of this project, pedestrian movements were measured at several locations along Kalakaua Avenue. Additional pedestrian counts were taken in 1984 and 1985. The 1980 and 1984 measurements were taken during weekday afternoons and evenings, while the 1985 measurements were taken on a Friday.

Data collected in 1980 showed that:

- The number of pedestrians crossing Lewers Street on the mauka side of Kalakaua Avenue ranged from about 5 persons per minute to over 25 persons per minute (300 to 1,500 persons per hour); the mean was 11 persons per minute (660 persons per hour), and the standard deviation was approximately 5 persons per minute (300 persons per hour).

- Pedestrian traffic across Kaiulani Avenue during the same period in 1980 ranged from a low of 6 to a high of 60 persons per minute (360 to 3,600 persons per hour). The average pedestrian flow at that location was approximately 30 persons per minute (1,800 persons per hour), and the standard deviation was 10 persons per minute (600 persons per hour).

The 1984 and 1985 pedestrian counts assessed both weekday and weekend volumes. In general, higher volumes were recorded in February 1984 than in August 1985. The highest pedestrian volumes on Kalakaua Avenue seem to occur on the mauka sidewalk between Lewers Street and Kaiulani Avenue during the early evening hours. Spot-counts made at selected locations show that mid-afternoon pedestrian volumes are in the 30 to 40 person per minute range on the mauka sidewalk between Lewers Street and Kaiulani Avenue; in outlying areas they are between 20 and 30 persons per minute. As one would expect, pedestrian volumes are lower on sidewalks paralleled by internal circulation paths such as those through the Royal Hawaiian Shopping Center and the Hyatt Regency Hotel than they are where no alternate routes exist.

The Transportation Research Board (1984) has developed the following criteria for estimating the level of service provided by a given pedestrian facility:

Level of Service	Space Allocation (Square Feet per Pedestrian)	Average Flow Rate (Pedestrians/minute/ foot of walkway width)	Comments
A	> = 40	6	No restrictions
B	24 - 40	6 - 10	Minor conflicts
C	16 - 24	10 - 14	Freedom Restricted
D	11 - 16	14 - 18	Substantial restrictions
E	6 - 11	18 - 25	Greatly restricted
F	< 6	< 25	Extreme Restrictions

While the nominal sidewalk width of Kalakaua is 12 feet, much of this space is occupied by such things as trash receptacles, newsstands, utility poles, traffic signal light standards and control boxes, and benches. As a result, the effective width is considerably less -- typically on the order of 6-7 feet. Moreover, the standards were developed for typical urban areas where most pedestrians during peak hours are making purposeful trips, i.e., trips from point "A" to point "B", and thus have little concern for the quality of the environment through which they are passing. This is most definitely not the case during the busiest periods on the Kalakaua sidewalks, when most of the pedestrians are simply promenading. When these factors are taken into account, it is estimated that the level of service is no better than "C" (in which individuals' freedom to select walking speed and freely pass other pedestrians is restricted and there is a high probability of conflict with pedestrians moving in the opposite direction) during the 8:00 to 9:00 p.m. peak. It is estimated that the level of pedestrian service may be as low as "D" at two of the most congested spots during the peak period (at level of service "D", most pedestrians are restricted with respect to both speed and direction due to difficulties in bypassing slower-moving pedestrians and avoiding conflicts).

2.1.4 Relevant Land Use Plans and Policies

A number of land use plans and policy plans express the need and/or desire to improve pedestrian and vehicular circulation and the quality of its pedestrian environment within Waikiki. These are described below.

2.1.4.1 State Plan

The Hawaii State Plan (Hawaii, State of, Department of Planning and Economic Development, 1978) and the State Tourism Functional Plan adopted by the Twelfth State Legislature on April 19, 1984 call for government action aimed at maintaining the health of the visitor industry. Towards this end, they recommend improving the quality of facilities in existing visitor destination areas and greater cooperation between public and private sectors in maintaining well-designed and adequately serviced visitor-related facilities. Part III of the State Plan, "Priority Directions", contains the following policies related to Waikiki's visitor facilities.

- Protect the economic health and quality of the visitor industry.
- Maintain and enhance the quality of existing and future hotels.
- Maintain and enhance visitor satisfaction.

The Hawaii State Plan policies listed and discussed below pertain to the Hawaii Visitor Industry and its respective relationship to the proposed project.

POLICY 266-8 (b)(5): Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities.

Plans for the Kalakaua Avenue Safety and Beautification Project have been developed with the assistance of Waikiki residents, as represented in the Waikiki Neighborhood Board and various Waikiki associations. Cooperation between State and County governments and the private sector was essential in formulating the current plan. It is clear that attractive, well serviced facilities are an important aspect of visitor attraction and satisfaction. Consequently, it is expected that the improvement of Waikiki's main thoroughfare will considerably improve the surroundings of visitors as well as residents.

POLICY 266-8(b)(6): Develop the industry in a manner that will provide the greatest number of jobs and steady employment for Hawaii's people.

POLICY 226-8(b)(9): Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.

By developing a more appealing atmosphere within Waikiki, the area has a greater likelihood of remaining a popular visitor destination area. This will help ensure steady employment of Hawaii's residents. An attractive resort area which takes advantage of the mild Hawaiian climate and incoporates apects of Hawaiian culture will also help to foster the aloha spirit.

The policies of the Hawaii State Plan listed below are relevant to the transportation aspects of the Kalakaua Avenue Safety and Beautification Project.

POLICY 226-17(a)(2): A statewide transportation system consistent with planned growth objectives throughout the State.

POLICY 226-17(b)(10): Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.

The design of Kalakaua Avenue was cooperatively planned and incorporates the growth objectives of the Waikiki Special Design District. For example, initial design plans called for a laneage reduction along Kalakaua from four to three lanes. After this idea was thoroughly considered by public agencies and other interest groups, a decision was made to retain four lanes.

2.1.4.2 State Functional Plans

The twelve State Functional Plans (Hawaii, State of, Department of Planning and Economic Development, June 1984), have been developed to provide a long-range guide to planning for Hawaii's future. They are more detailed than the State Plan and include implementing policies for State Plan goals and objectives in specific areas, such as Agriculture and Energy, on a Statewide basis. Two of the Functional Plans - Tourism and Transportation - pertain to the Kalakaua Avenue Safety and Beautification Project; they are discussed below.

OBJECTIVE (D): Development of better relations and mutual awareness and sensitivity between the visitor industry and the community.

POLICY (D)(3): Foster an understanding by visitors of the Aloha Spirit and of the unique and sensitive character of Hawaii's cultures and values.

The Tourism Functional Plan states that residents, visitors, and the tourist industry should develop a keener understanding of, and sensitivity to, each other's needs. The aloha spirit is an important element in the community relations of the visitor industry; hence, the Plan emphasizes that a social atmosphere which enhances the Aloha Spirit is necessary.

In terms of physical development, the objective of the State Tourism Functional Plan is to develop and maintain a well-designed and adequately serviced visitor industry in keeping with the needs and aspirations of Hawaii's people. The most relevant policy and implementing actions include:

POLICY B(2): Improve the quality of existing visitor destination areas.

Implementing action B(2)(a) directs the City and County of Honolulu, as the lead organization, to budget and expend funds to improve Waikiki, including construction of public facilities. The Tourism Functional Plan goes on to state that immediate attention should be given to the improvement of the sidewalks along Kalakaua Avenue. The proposed Kalakaua Avenue Safety and Beautification Project proposes to widen certain portions of the sidewalks along Kalakaua, as well as to improve the safety and aesthetics of the area.

Implementing Action 2(b)(2) directs lead organizations, including the Department of Planning and Economic Development (DPED) and County Planning agencies, to recommend and prioritize capital improvement program (CIP) expenditures for site improvements that serve existing and planned visitor destination areas. Improving Kalakaua Avenue is included as a priority project for CIP expenditures.

The Transportation Functional Plan as it relates to the proposed project would fall within the objective of the Statewide Transportation Planning System:

OBJECTIVE (A): Development of a balanced, multi-modal statewide transportation system that serves clearly identified social, economic and environmental objectives of the Hawaii State Plan.

POLICY (A)(1): Base transportation and transportation-related improvements on a cooperative, comprehensive, and continuing transportation planning process.

IMPLEMENTING ACTION (A)(1)(b): Update the Transportation Improvement Program for the Island of Oahu as needed.

Improving the Kalakaua Avenue sidewalks is an established policy of the State Plan. Coordinating the improvement of Kalakaua Avenue and the revamping of it's sidewalks combines the two tasks and reduces time and construction costs.

The section of the State Transportation Functional Plan which deals with the Statewide Highway System contains the following policy and implementing action relevant to the proposed project:

POLICY (C)(3): Promote the planning for and improvement of the primary, secondary, and urban highway and street systems consistent with State and County Plans to control growth.

IMPLEMENTING ACTION (C)(3)(b): Improve vehicular and pedestrian safety on state and county highways and streets.

The proposed plan is consistent with the Waikiki Special Design District. By widening the sidewalks and reconfiguring some of the roadways within the Kalakaua Avenue corridor, this area will experience improved pedestrian safety as well as vehicular safety.

2.1.4.3 Oahu General Plan

The objectives and policies in the Oahu General Plan (Honolulu, City and County of; December 8, 1982) parallel those in The Hawaii State Plan. In order to maintain the health of Oahu's visitor industry and meet the needs of island residents, the Oahu General Plan makes it the policy of the City to:

- Provide for the long-term viability of Waikiki as Oahu's primary resort area by giving the area priority in visitor industry-related public expenditures.
- Provide for a high quality and safe environment for visitors and residents in Waikiki.
- Encourage private participation in improvements to facilities in Waikiki.
- Apply sound urban design principles to all environments.
- Develop and maintain urban parks, squares, and beautification areas in high density urban places.
- Preserve the well-known and widely publicized beauty of Oahu for visitors as well as residents.
- Protect mature trees on public and private lands and encourage their integration into new developments.
- Encourage distinctive community identities for both new and existing districts and neighborhoods.
- Promote public and private programs to beautify the urban and rural environments.
- Encourage the visitor industry to provide a high level of service to visitors.

The Kalakaua Avenue Safety and Beautification Project would promote all of these objectives.

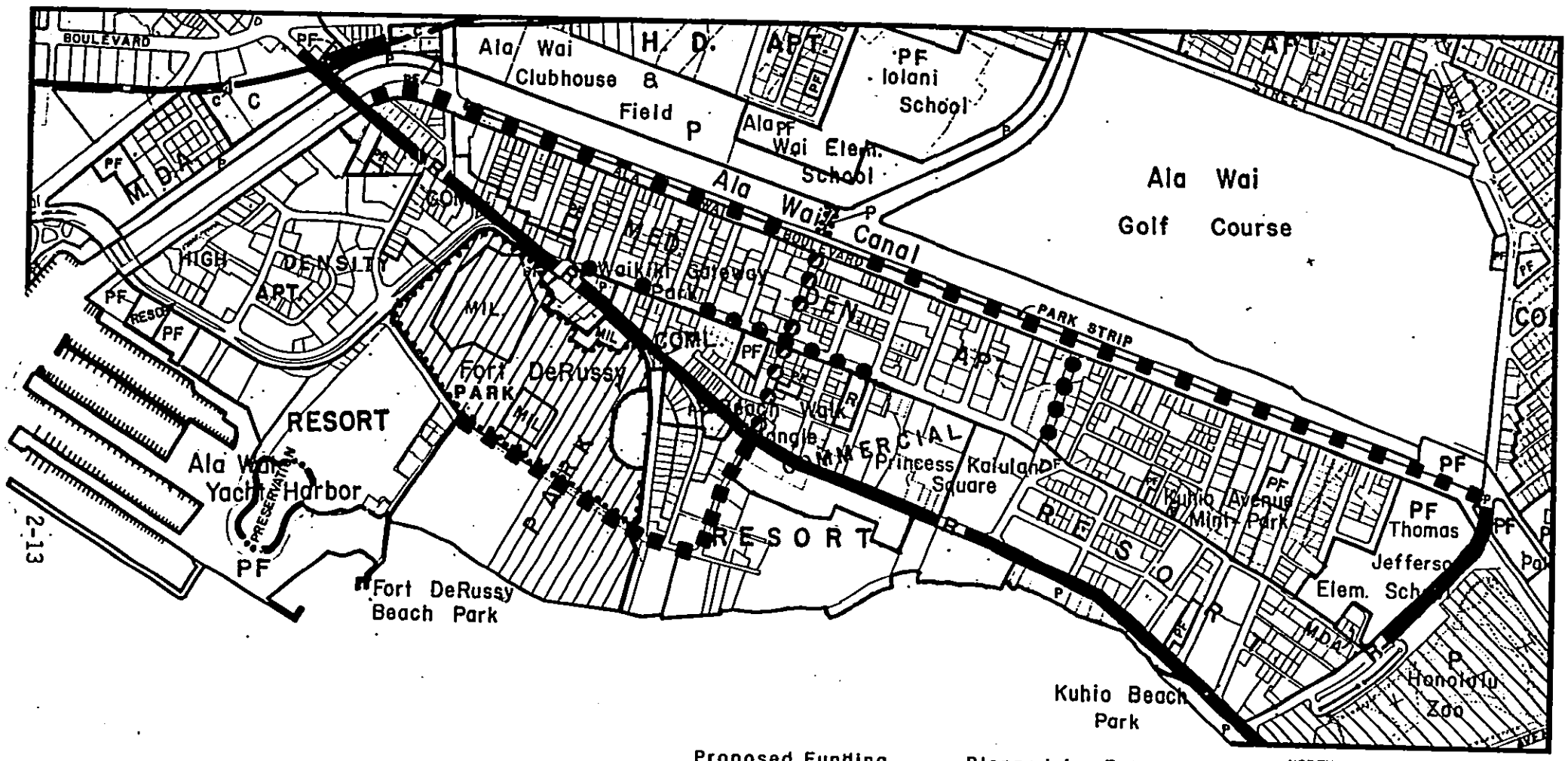
2.1.4.4 Development Plan for the Primary Urban Center

The Development Plan for the Primary Urban Center (PUC) (Honolulu, City and County of; March 9, 1983) stipulates that "Waikiki shall continue to be maintained as Hawaii's primary visitor destination area, with emphasis on improving the quality of the environment...." It also calls for plantings and open space areas as a means of enhancing the visual character of major roadway and pedestrian corridors. With specific reference to Waikiki, the Development Plan states:

> The pedestrian traffic network within the area shall be substantially improved to recognize the unique visitor destination area requirements. Special consideration shall be given to pedestrian safety, comfort, and enjoyment since walking constitutes a major activity for the visitor within this area.

The Development Plan Land Use and Public Facilities map designations for Waikiki are shown in Figure II-5.

The Department of General Planning has indicated that implementation of the proposed Kalakaua improvements is in accord with the Development Plan Public Facilities Map for the Primary Urban Center.



Source: Belt, Collins & Associates after Department of General Planning Maps for the Primary Urban Center, 1985.

Figure II-5 Development Plan Land Use and Public Facilities Map Designations.

2.1.4.5 Waikiki Special Design District

Section I of the Waikiki Special Design District (WSDD) Ordinance (Honolulu, City and County of, Department of Land Utilization; April 1976) lists the following among its purposes:

- o to promote health, safety, and social and economic well-being for the community as a whole;
- o to provide for the efficient and safe movement of people and goods;
- o to bring about a desirable level of urban design compatible with the climate and the character of Hawaii within the district.

The WSDD ordinance establishes use precincts (see Figure II-6) and a design control system which calls for improved pedestrian facilities and for "...landscape treatment in the form of street furniture, trees, and other off-site treatment as deemed appropriate by the Council...." In addition, it requires increased setbacks from streets for new structures. The older development which exists along Kalakaua Avenue does not conform to the setback requirements, and sidewalk widening is the most immediate means of increasing the distance of these buildings from the street.

The proposed sidewalk beautification project will be designed to conform to standards and rules established for the Waikiki Special Design District. The Design Control System specified in Section V of the WSDD sets traffic circulation guidelines which must be followed in designing the proposed improvements. Specifically:

(1) All development must comply with the official circulation map;

(2) Curb cuts for driveway openings and sight distances at intersections must comply with the traffic code and the Department of Transportation Services' design standards; and

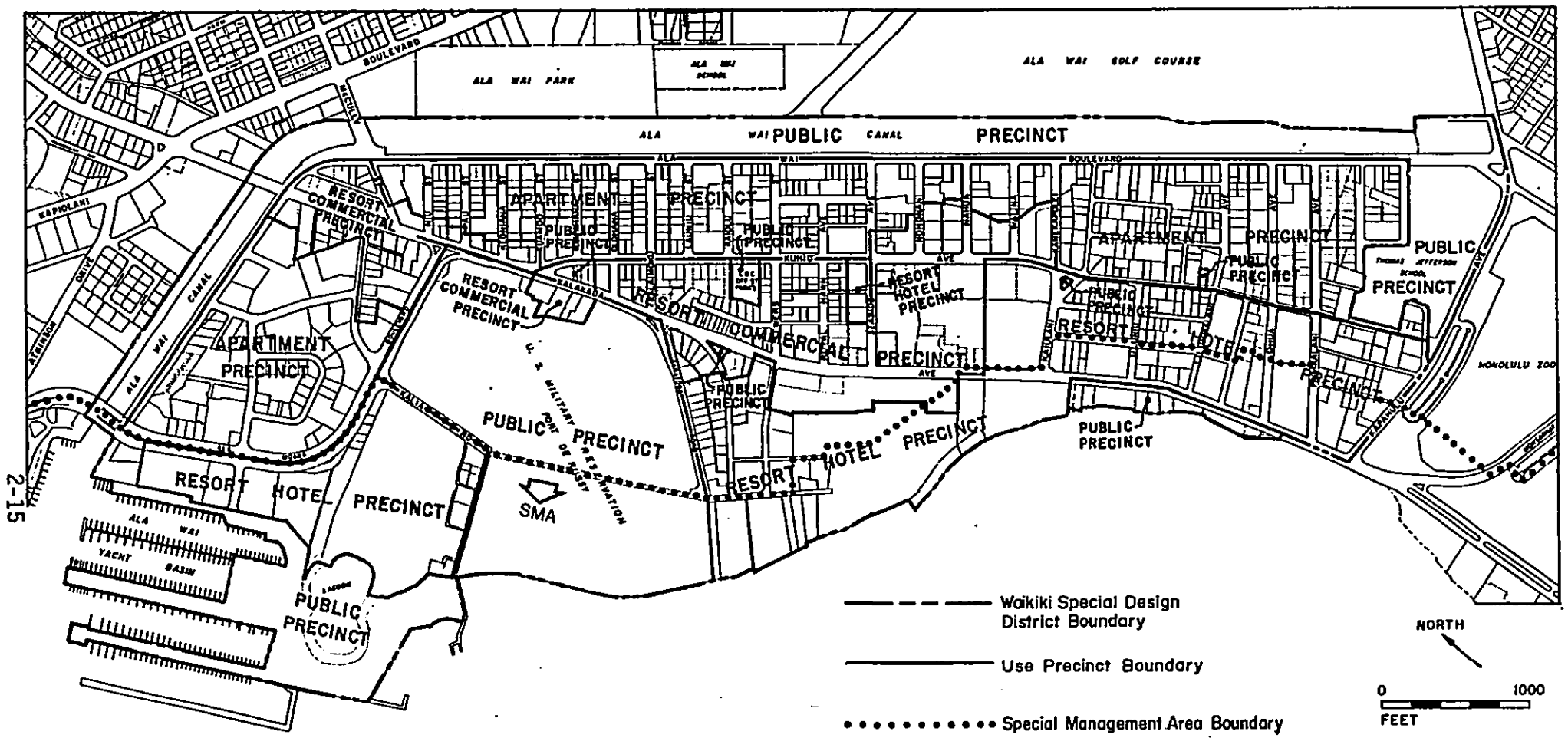
(3) Wherever possible, adequately landscaped off-street passenger and freight loading areas must be provided.

Before the project can proceed, it must receive a permit under the provisions of the WSDD. The Design Branch of the Department of Land Utilization is the office which issues the Development Conformance Permit.

2.1.4.6 Special Management Area

A portion of the project site lies within the County Special Management Area. Specifically, this area includes the sidewalks from the mid-block area between Seaside and Kaiulani Avenues east to the end of the project at Monsarrat Avenue. The Special Management Area (SMA) Regulations are coordinated by the Department of Planning and Economic Development, under Title 13, Section 205A. The SMA guideline most pertinent to the Kalakaua Avenue Safety and Beautification Project states:

> (1)(D) Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.



Source: Department of Land Utilization

Figure II-6 Waikiki Special Design District, Use Precincts, and Special Management Area.

The Kalakaua Avenue Safety and Beautification Project will have little, if any, impact on water resources. The existing storm drainage system will be left intact, and the number of storm drainage inlets will be increased where needed to reduce localized curbside flooding due to existing inlet constrictions. The probability of landslides, erosion, siltation and/or failure in the event of an earthquake would not increase as a result of project development.

The proposed plan is designed to improve the appearance of Kalakaua Avenue. The scenic aspects of the corridor will be upgraded by the addition of landscaping, new street furniture, and new sidewalks; these proposed improvements will make Waikiki a more inviting place to sightsee and shop.

An application for a Special Management Area Permit has been filed with the Department of Land Utilization. A hearing on that request is scheduled for May 8, 1986. As noted above, there is no evidence that the proposed action would adversely affect the coastal resources the Special Management Area Ordinance is intended to protect. Issuance of an SMA permit seems likely.

2.1.4.7 Waikiki 2000 Plan

The City's Waikiki 2000 Plan (Honolulu, City and County of; September 1981) was formulated as a means of implementing many of the policies enunciated above. Its opening paragraph recognizes the importance of enhancing the physical attractiveness of Waikiki:

> For many people all over the world, Waikiki symbolizes Hawaii. It represents the romantic appeal of our island state which has drawn millions of visitors each year and has helped make the visitor industry our most important economic resource today.

The Plan goes on to note that "...Waikiki's fame as the heart of the visitor industry makes its continued economic, social, and environmental health a vital concern to every resident of Hawaii". It further states the need to:

> ...reorient Waikiki back to the people, to make it a more pedestrian-oriented place by enhancing its convenience and attractiveness for pedestrians through walkways and malls; servicing its circulation needs while accommodating pedestrian needs; reducing traffic congestion while considering the needs of hotels and businesses; implementing major capital improvements to upgrade/improve streets...; and beautifying Waikiki in general.

In order accomplish this, the Waikiki 2000 Plan called for:

- The completion of the Kuhio Avenue widening project.
- Widening the sidewalks along Kalakaua Avenue together with the installation of additional landscaping and coordinated street furniture and pedestrian crosswalks.
- An immediate reduction in the number of through lanes and the eventual creation of a partial mall.

The first of these steps has now been completed, and the current proposal would accomplish the second. The third goal, a reduction in the number of through lanes, has been shown by subsequent studies to result in intolerable traffic congestion and has, therefore, been rejected.

2.1.4.8 Waikiki Task Force (1979-1984)

In 1979 the City Council created the Waikiki Task Force; this body was charged with responsibility for evaluating Waikiki's needs and proposals for improvements within it on an ongoing basis. Until it was disbanded in 1984, the Task Force consisted of representatives of the Waikiki community and other resource groups such as the Hawaii Visitors Bureau, the Hawaii Housing Authority, the Waikiki Improvement Association, the Waikiki Neighborhood Board, the Chamber of Commerce, and the Oahu Development Conference. From 1980 onwards, the Task Force consistently recommended the widening of Kalakaua's sidewalks as the most feasible means of improving the pedestrian environment and the visual character of Waikiki consistent with the maintenance of adequate vehicular traffic capacity in the district.

2.1.5 Summary of Purpose and Need

As indicated in the foregoing discussion, improvement of traffic and transportation in Waikiki along with Waikiki's pedestrian environment has been established as a high priority need in numerous public plans, policies, and regulations. These include the Waikiki Special Design District Ordinance, the Oahu General Plan, the Development Plan for the Primary Urban Center, and the Waikiki *2000 Plan*. It has been shown that the improvements should include an increase in the amount and quality of sidewalk space available along Kalakaua Avenue. Further, traffic studies have shown that the sidewalks can be widened by up to nine feet at the same time that the existing level of service for vehicular traffic is maintained or improved.

In addition to the general objectives of the plans outlined above, the City administration has established several other objectives for the proposed Kalakaua Avenue Safety and Beautification project:

- Increase the amount of sidewalk space available for pedestrians within the Kalakaua Avenue corridor between Ala Moana Boulevard and Monsarrat Avenue.
- Maintain sufficient laneage on Kalakaua Avenue to accommodate a 15% increase in vehicular traffic.
- Provide for handicapped accessibility in the design.
- Provide landscaping and "hardscape" features which improve the appearance of the thoroughfare, provide a buffer between vehicles and pedestrians, and have a coherent design theme for Waikiki.
- Complement adjacent commercial uses.
- Provide small public spaces where passers-by can pause, orient themselves, take in the surrounding happenings, and converse.
- Minimize disruptions to pedestrian and vehicular traffic flow during the construction period.
- Require a level of maintenance work and expenditures which does not impose an undue burden on City finances.

2.2 DESCRIPTION OF THE PROPOSED ACTION

2.2.1 Overview of Options Considered

The proposed action involves improvements within the Kalakaua Avenue right-of-way between Monsarrat Avenue and Ala Moana Boulevard, a distance of approximately 1.3 miles. This is the portion of Kalakaua Avenue most heavily used by pedestrians and the area whose continued attractiveness is most essential to the health and success of the visitor industry. In arriving at the proposal described below, the City considered three fundamentally different means of increasing the space available for pedestrians along Kalakaua:

(1) Right-of-way acquisition;

(2) Conversion of portions of the existing roadway into a pedestrian mall; and

(3) Widening the existing sidewalks while maintaining adequate laneage for vehicular traffic.

The City's long-range plans call for increasing the width of the Kalakaua Avenue right-of-way by 20 feet to 100 feet. The wider right-of-way is shown on the Development Plan Public Facilities map for the district. However, numerous private structures are located immediately adjacent to the existing right-of-way, and it is not practical for the City to purchase this land at the present time. Instead, it has imposed setback requirements which insure that all new construction along Kalakaua allows room for eventual acquisition of additional right-of-way. For the purposes of the current project, the existing 80-foot right-of-way width was accepted as a fixed constraint, and only those improvements which could be fitted into the existing space were considered.

Results of previous traffic studies conducted for this project have shown that complete closure of Kalakaua Avenue to vehicular through-traffic would disrupt circulation within the district, resulting in unacceptably poor levels of transportation service. Hence, it is not considered feasible to construct full or partial pedestrian malls there at this time. Further discussion of this alternative are contained in Chapter IV.

While the traffic studies (including simulation studies) that have been conducted to date show that the conversion of all or parts of Kalakaua Avenue into a pedestrian mall is not practical, they prove that it is possible to increase the sidewalk space available to pedestrians by up to nine feet without adversely impacting vehicular traffic. This can be accomplished by using narrower lanes than currently exist. It is the City's intent to pursue this option, and it is described in more detail below.

Alternatives involving partial or complete malls were also evaluated. They are described, and the reasons for their rejection discussed, in Chapter IV.

2.2.2 Description of the Proposed Action

2.2.2.1 Roadway and Sidewalk Changes

In essence, the proposed action involves modifying and improving traffic flow on Kalakaua Avenue, adding loading bays, and widening some of the sidewalks along Kalakaua Avenue between Kuhio and Kapahulu Avenues by approximately nine feet. In addition, landscape features will be created to make Kalakaua Avenue a more attractive and enjoyable pedestrian setting. The existing sidewalk will be resurfaced to match the

color and texture of the planned addition. Turnouts for tour buses, loading zones, and turning pockets at key intersections will be provided. In conjunction with this, signage and lighting fixtures having a consistent design motif will be installed, and a general cleanup of the area will be undertaken. Typical cross-sections of Kalakaua Avenue as it will exist following reconstruction are shown in Figures II-8 and II-9.

Figure II-7 provides a general indication of the areas where the sidewalk is to be widened. A more detailed conceptual plan is presented in Appendix D. Landscaping will consist primarily of shade trees; this will maximize the amount of additional space available for pedestrian movement while providing protection from the hot noon sun as well as attractive greenery, and minimize the City's ongoing maintenance responsibility and costs. The majority of the additional sidewalk space will be added to the mauka sidewalk as this is where the highest pedestrian traffic and the most severe space limitations occur.

It should be noted that relocation of trees, tourist news stands, trash receptacles, utility poles, and other street furniture to areas outside the pedestrian travelway is also planned; this will increase the effective sidewalk capacity even where the sidewalk itself is not widened. The project will increase in overall sidewalk width from 24 to 33 feet; this is equivalent to nearly 40 percent more area for pedestrians and amenities.

Until the 1970s, essentially all of the public sidewalks in Waikiki were constructed of standard grey concrete, and the majority of the district's sidewalks still consist of this material. However, sidewalks fronting a few of the newer buildings are composed of distinctive materials; included in this category are the exposed aggregate concrete at the Royal Hawaiian Shopping Center and the tile at the Hemmeter Center. Colored concrete and brick have also been used in several areas.

For the most part, all of the existing sidewalks along Kalakaua Avenue will be reconstructed using tile or exposed aggregate concrete. However, in a few areas, such as those fronting the Royal Hawaiian Shopping Center and the Hyatt Waikiki Hotel, where the existing sidewalk material is distinctive and in good condition and where grade changes are not needed to maintain adequate drainage, the existing sidewalk may be retained.

2.2.2.2 Drainage

The number of drainage inlets along Kalakaua Avenue would be increased by the project; this would help alleviate localized ponding and flooding caused by heavy rains. However, major drainage pipes and utility lines serving the project area would not be altered. Private roof drains, which now run under the sidewalk and empty through the curb, will be extended to the new curb line or connected directly to the drainage pipes under Kalakaua Avenue. All drainage plans will be approved by the City and County Department of Public Works.

Because a high percentage of the land in Waikiki is covered with impermeable surfaces and the topography is nearly flat, maintenance of adequate drainage from the roadway and sidewalks is a significant design concern. Roadways and sidewalks must be constructed with the proper side-to-side slope to maintain adequate drainage. In the case of roadways, this is usually accomplished by using a curving "crown" as shown in Figure II-10a. A recent survey of Kalakaua Avenue shows that it is from four to six inches higher at its center than at curbside; this gives it an average side-slope of 1.5 percent. Sidewalks are also designed so that they slope (typically at a 2 percent gradient) towards the curb so that stormwater runoff flows away from adjoining buildings and towards the street. This relationship is also illustrated in Figure II-10a.

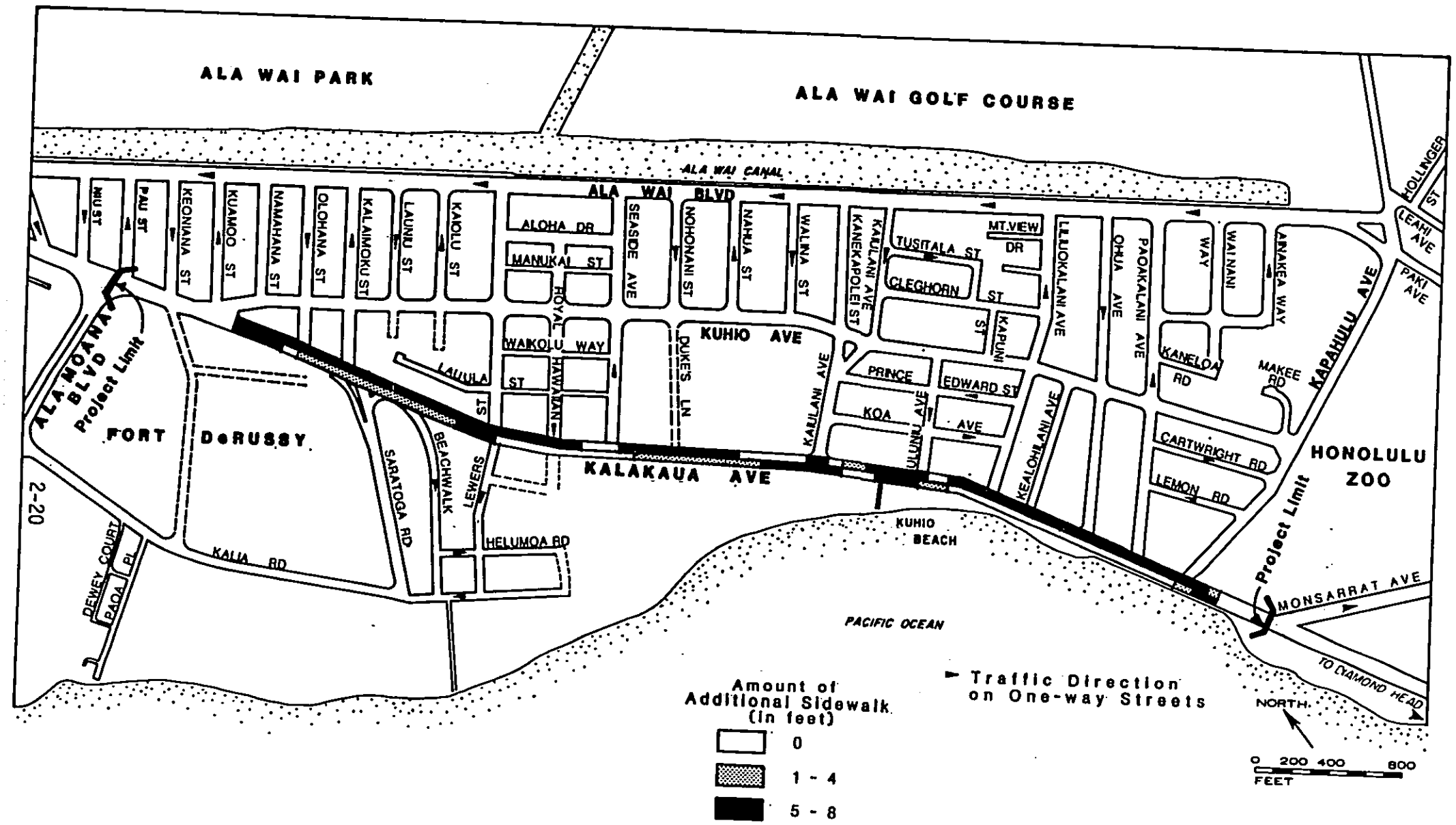


Figure II-7 Proposed Changes in Sidewalk Widths.

Source: Belt, Collins & Associates

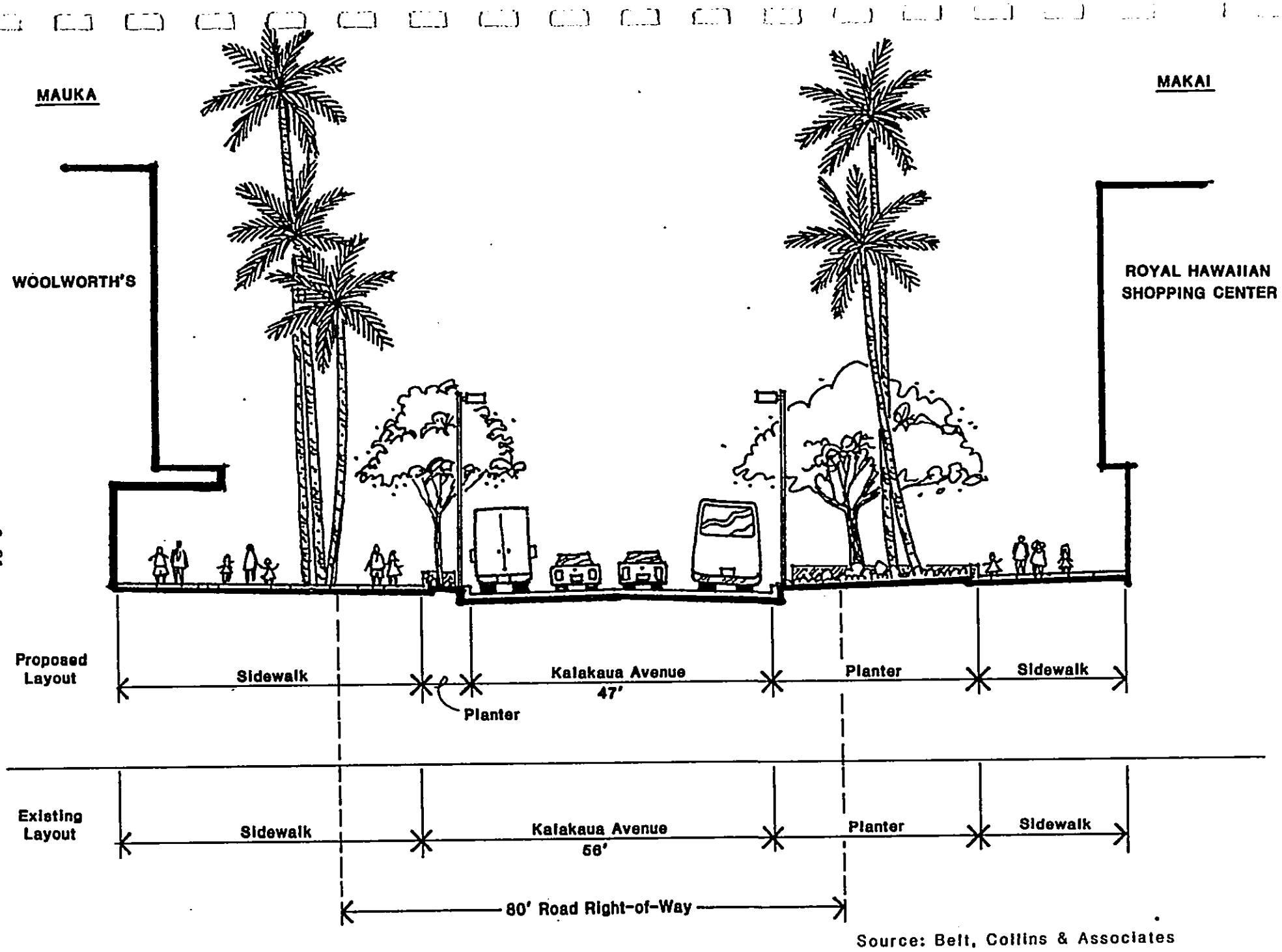
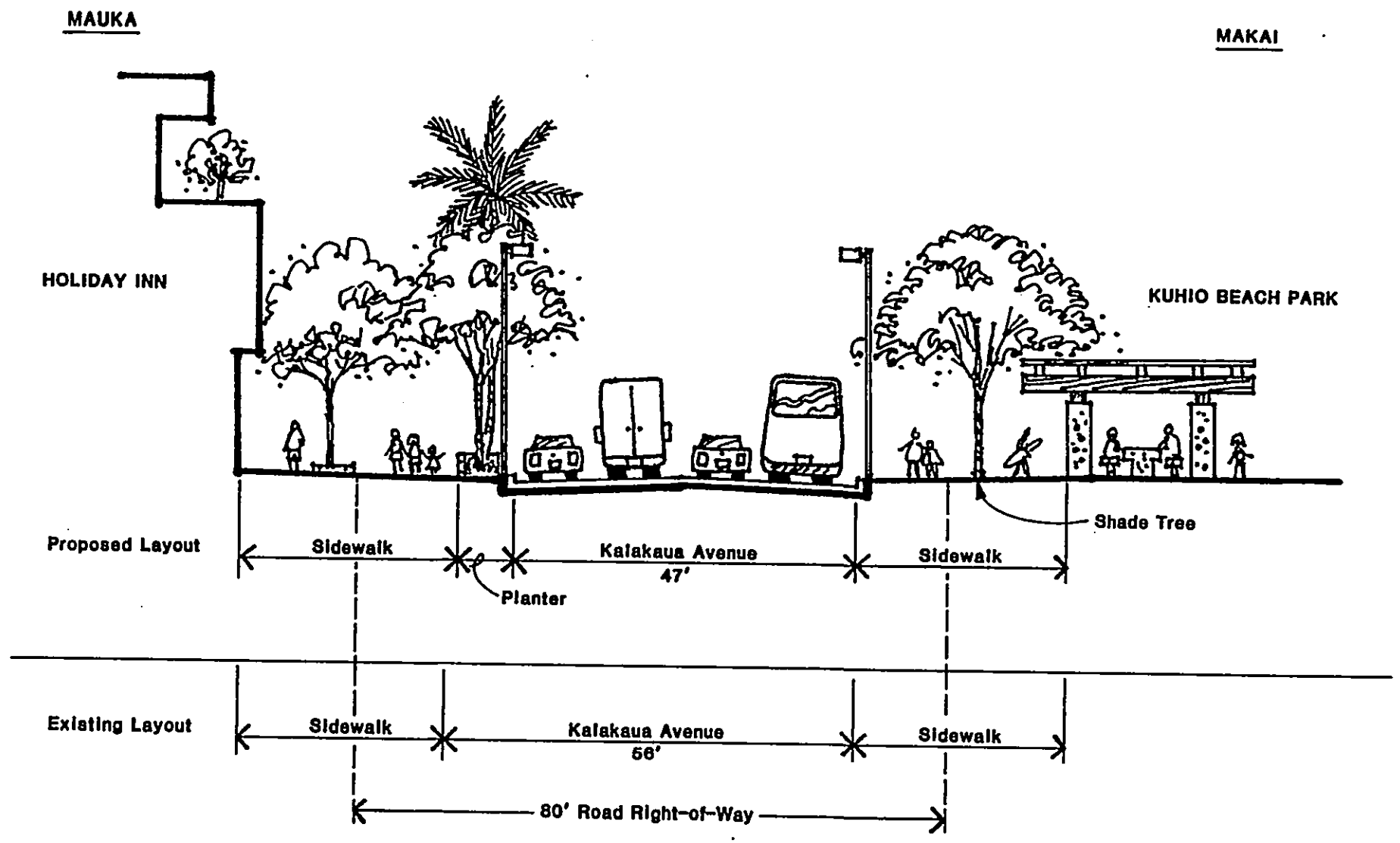


Figure II-8 Typical Cross-section of Kalakaua Avenue at Royal Hawaiian Shopping Center.



Source: Belt, Collins & Associates

Figure II-9 Typical Cross-section of Kalakaua Avenue at Kuhio Beach Park.

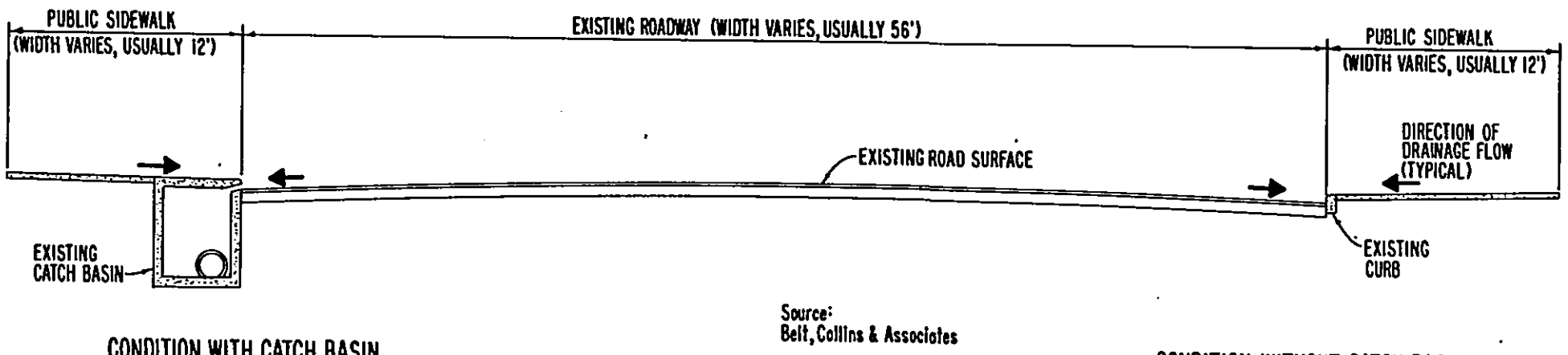


Figure II-10a Section Showing Existing Drainage Scheme.

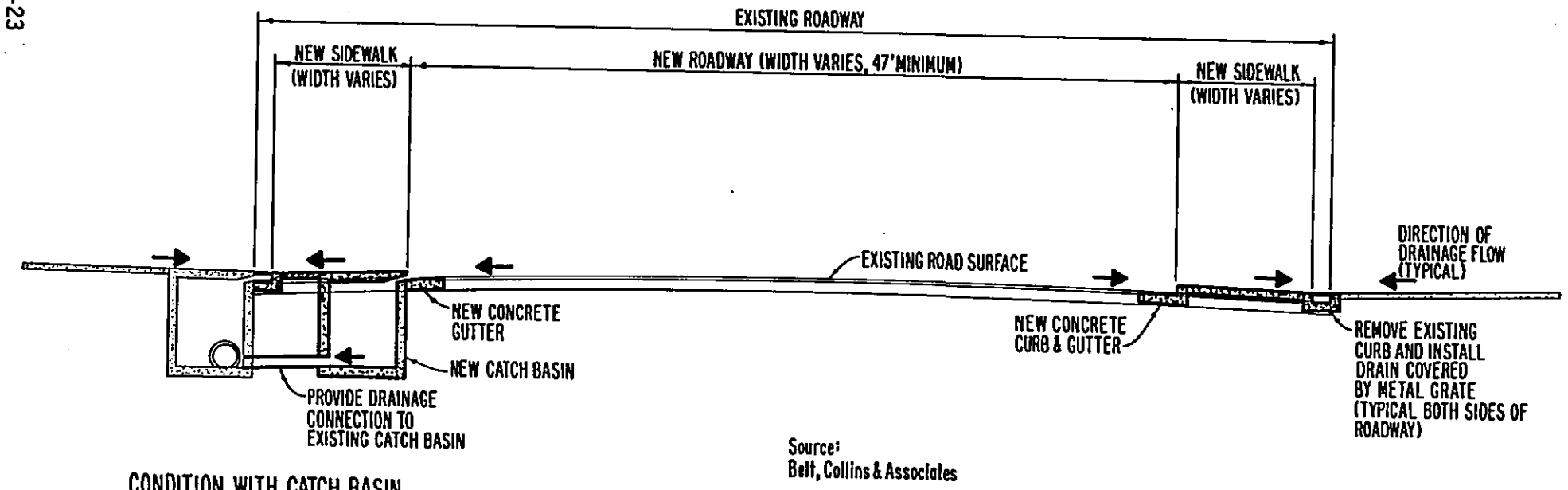


Figure II-10b Section Showing Proposed Drainage Option 1: Sidewalk Drains to Existing Curb Line.

Implementation of the sidewalk widening plan shown in Appendix D would require the extension of the sidewalks toward the center of the road by up to nine feet. If the sidewalk extensions simply continue the existing sidewalk gradient, the top of the new curb would be at or below the elevation of the existing street pavement. This would allow runoff from the street to flow onto the sidewalk, eliminate the gutters, and destroy the integrity of the storm drainage system.

Three different means of preventing this have been explored (see Figures II-10b, II-10c, and II-10d). The first two retain the concrete pavement which underlies Kalakaua's existing asphaltic concrete surface; the third requires removal of the existing concrete base as well as the asphaltic concrete (A/C) surface, reconstruction of the subgrade, and resurfacing with either concrete or A/C. Removal of the load-bearing concrete roadway would expose underlying utility lines to possible damage from heavy construction equipment; it might also create problems on the portion of Kalakaua Avenue which lies west of Saratoga Road, since that segment of the roadway was constructed on dredged fill which has uncertain load bearing characteristics. This alternative would lead to the release of vastly greater amounts of dust, a much longer construction period, and other adverse environmental impacts. It would also be much more costly. For these reasons, it was eliminated from consideration.

With the first two techniques, catch basins would probably be installed at the new curb line with connections to the existing drainage system. It is expected that both types of storm drainage approaches might be used at one point or another along the project length.

2.2.3 Required Construction Activities

The overall physical dimensions and general location of the proposed sidewalk improvements are the most important determinants of the project's potential long-term effects. Construction impacts, on the other hand, are heavily dependent upon specific design features and the construction methods used. Implementation of the proposed project will entail the following steps (not necessarily in the order listed):

- removal and reconstruction of the existing curb and gutter;
- removal of existing roadway pavement from areas which would be occupied by the widened sidewalks;
- removal of the existing concrete sidewalk and road pavement in areas that would be occupied by trees and/or planters;
- roof drain extension to new curb line or direct connection to drainage pipes under right-of-way;
- excavations for new catch basins at the new curb line and for pipes to connect them to the existing drainage system;
- construction of new curbs and gutters;
- grading, installation of steel reinforcing bars, and concrete placement for the sidewalk;
- relocation of existing street lights and traffic signals;
- removal of existing asphaltic concrete (A/C) pavement from roadway by cold planing, repair of subgrade as necessary, & replacement with new A/C pavement;

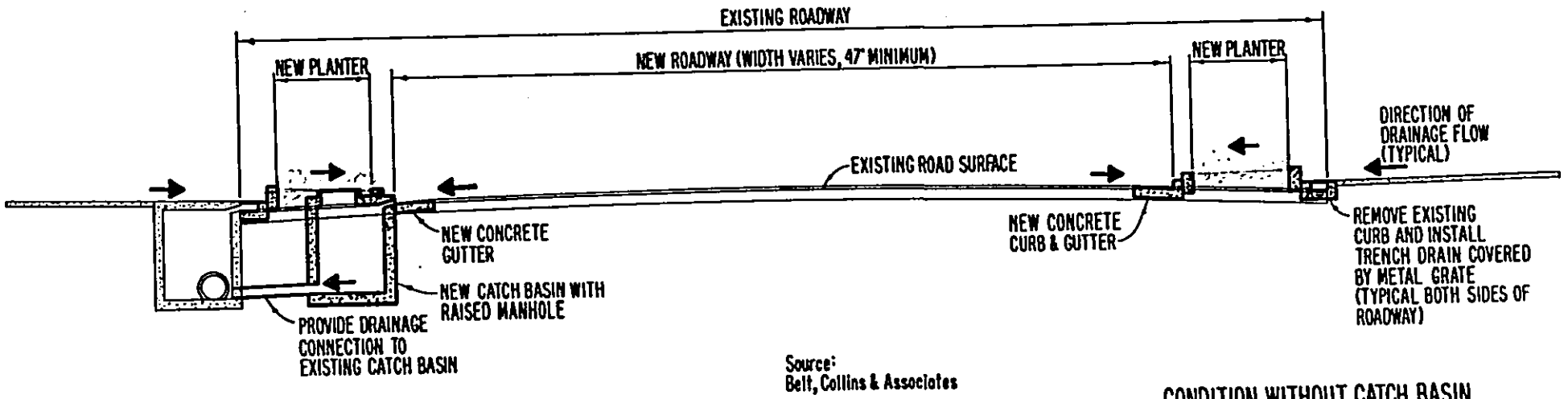


Figure II-10c Section Showing Proposed Drainage Option 2: Drainage Towards Street With Planters.

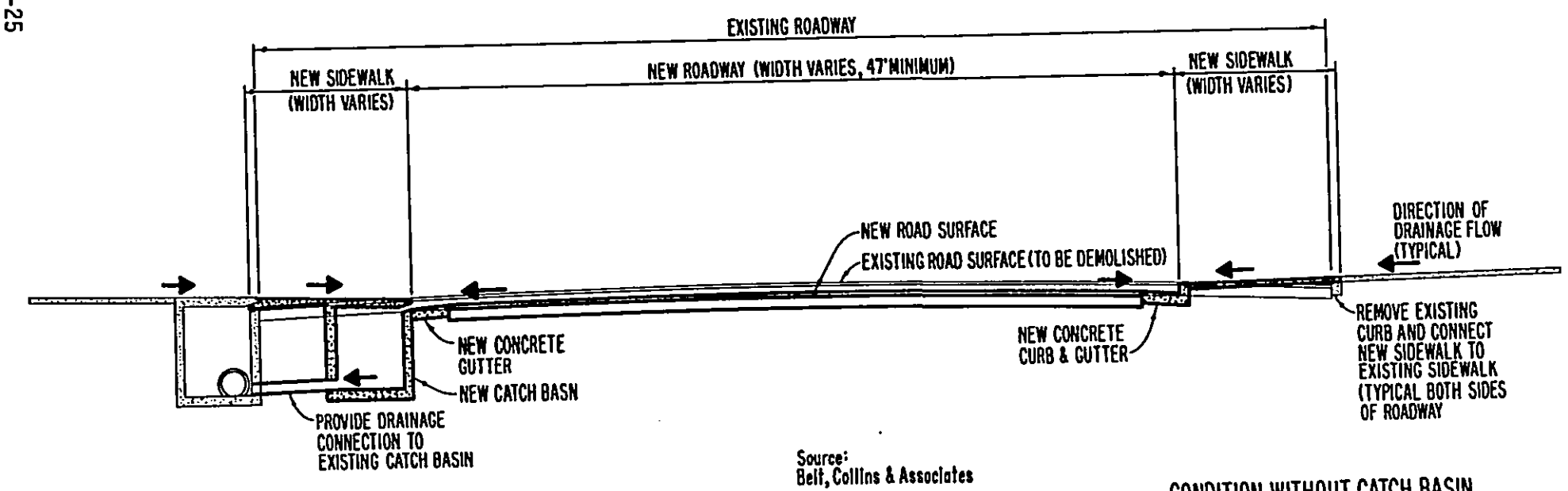


Figure II-10d Section Showing Proposed Drainage Option 3: Drainage Towards Relocated Curbside Gutters.

- o concrete, plumbing, and electrical work associated with planters and other sidewalk amenities; and

- o installation of new street furniture, signing, and sidewalk lighting standards.

Table II-1 lists the steps, shows the most important construction activities associated with each, and identifies the major types of construction equipment that would be involved. Coordination with public utilities will ensure that these facilities are adequately protected.

2.2.4 Construction Schedule and Phasing

The Waikiki 2000 Plan, the City's primary blueprint for capital improvements in Waikiki, places a high priority on widening the Kalakaua Avenue sidewalks. Current plans call for the construction contract to be awarded this year. Actual construction is expected to be spread over a period of approximately 18 months.

Because of the heavy vehicular and pedestrian traffic along Kalakaua Avenue and the presence of many restaurants, retail shops, and hotels along its sidewalks, construction phasing will be an important factor in determining the nature and magnitude of construction impacts. Traditionally, detailed phasing of construction projects has been left to the discretion of individual contractors in order to allow them the greatest possible flexibility and, consequently, the lowest costs. However, because of the sensitive nature of the activities located along Kalakaua Avenue and the adverse effect which construction activities on the sidewalk and roadway could have on adjacent businesses and landowners, the City expects to include specific phasing requirements and time constraints in the construction contract. Experience has shown that enforcement of contractual penalties is difficult, and so it is expected that these requirements will be backed by positive incentives for prompt completion, as well as penalties if deadlines are not met. The remainder of this section describes the expected phasing of the project and discusses the mechanisms that will be used to insure that construction proceeds quickly and efficiently.

2.2.4.1 Timing of Sidewalk Construction

In order to achieve a smooth finished surface, road re-paving must be done after the sidewalks and utilities have been completed; this will allow the entire roadway to be repaved at one time. To facilitate traffic control, the sidewalks along one entire side of Kalakaua will be completed before beginning work on the other side. Exceptions to this may be made while reconstructing some of the utility lines which cross the roadway and in other special circumstances. The choice of which sidewalk to reconstruct first will be discussed with the contractor before the decision is made.

2.2.4.2 Timing of Street Resurfacing

The existing roadway pavement will be left intact while work is underway on the sidewalks, but construction equipment and activities will occupy portions of the curb lane during working hours, leaving only three lanes for vehicular traffic. Normally, the fourth (curb) lane will be reopened between 4:00 pm and 6:30 am. Elevation differences may exist between the gutters and the road pavement until the project is nearly completed, and temporary measures will be needed to insure a smooth transition between the two surfaces.

Table II-1

Construction Activities by Step

Step	Construction Activities and Equipment Involved									
	Break Concrete	Remove Asphalt	Dig Trenches	Remove Debris	Build Forms	Install Bypasses	Install Utility	Pour Concrete	Install Item	Lay A/C Pavement
1. Remove existing curb.	JH,CS,DT	JH,BH,DT		FL,DT						
2. Construct underground utilities and storm drains.			BH,HT	BH,DT	SA	SA	???	MT,VI		
3. Install landscape irrigation lines.			Hand							
4. Plant large trees.			BH	DT					CR,BH	
5. Remove existing sidewalk except in designated areas.	JH,CS,CO, DT,FL			BH,DT		BH,SA,HT				
6. Construct new curb & gutter.					SA,BH,HT			MT,CP, VI, HT		
7. Pour new sidewalk & planters.					SA,BH,HT			MT,CP, VI, HT		
8. Finish landscape.									Hand	
9. Remove existing road pavement.	JH,CS,DT	PL,DT,FL								
10. Resurface roadway with asphalt.										PA,DT,RO
11. Install new signage & signals.									HT,CR	

Abbreviations Used:

BH	= Backhoe	JH	= Jackhammer
CO	= Compressor	MT	= Mixer Truck
CP	= Concrete Pump	PA	= Paver
CR	= Crane	PL	= Cold Planer
CS	= Concrete Saw	RO	= Roller
DT	= Dump Truck	SA	= Saw
FL	= Front Loader	VI	= Vibrator
HT	= Hand Tools		

As previously indicated, the finished A/C pavement will be laid down in one continuous operation. This will be immediately preceded by removal of the existing A/C pavement by a process known as "cold-planing". The large machine used for this purpose requires two lanes and recovers the old asphalt for possible reuse.

2.2.4.3 Time Limits on Construction Disturbances

The City recognizes Kalakaua Avenue's importance to the visitor industry, and will incorporate language in the contract documents designed to limit the length of time any given business fronting the roadway is adversely effected. Several methods may be used, including:

- Limiting the number of lineal feet of sidewalk that may be disturbed at any one time.
- Providing monetary incentives for contractors based on how little time they leave sidewalk areas disturbed.
- Paying bonuses if the work is completed with fewer than a predetermined number of complaints from affected businesses.

2.2.4.4 Landscape Plantings

Landscaping will be planted as soon as the concrete work is finished. Ground-cover should be well established within six months to a year. Street trees will require varying amounts of time to become well established, depending upon such things as size at planting, species, and harshness of the environment. In general, it is to be expected that most trees planted along Kalakaua will have a full head of branches and leaves within three to five years and will have reach maturity in about 20 years.

2.2.5 Estimated Cost

The current construction budget for the proposed project is approximately $7 million. It is expected that approximately 80 percent of the funds will come from the State and 20 percent from the City and County of Honolulu.

The proposed improvements will be paid for entirely with public funds; hence, no assessments will be levied against abutting property owners. The City is coordinating its plans with those of adjoining landowners so that there will be a smooth transition between City-owned and private sidewalk space. In certain instances, it is possible that owners of adjacent properties may make landscaping and other improvements outside the City right-of-way to match improvements made by the proposed project.

Improvements to the sidewalk space, particularly landscaping, must be well maintained if the objectives of the project are to be achieved. Under the City's current regulations, the responsibility for routine landscape maintenance would normally fall to adjoining landowners. However, in order to provide a stable source of funding for the improvements that are made, the Waikiki Improvement Association has tentatively agreed to assume financial responsibility for the periodic maintenance of trees (pruning), shrubs, and infrastructure, such as sprinklers.

CHAPTER III

EXISTING CONDITIONS AND POTENTIAL IMPACTS OF THE PROPOSED ACTION

3.1 LAND USE

3.1.1 Existing Conditions

3.1.1.1 General

Kalakaua Avenue runs through the heart of Waikiki's commercial and hotel district. Nearly 80 parcels and over 200 businesses front it within the project boundaries. The parcels range in size from less than 3,000 square feet to more than six acres, and their street frontages range from about 20 feet to 1,000 feet. Most of the retail establishments situated along Kalakaua Avenue, including those located within large shopping complexes, are small to moderate in size.

The historic Moana Hotel is the oldest structure along Kalakaua, and about a dozen other hostelries also front the Avenue. Many of the hotels with Kalakaua frontage are among Waikiki's best, and their location is a definite selling point. Between and within the hotels are retail establishments and restaurants. Towards the Ewa and Diamond Head ends of the project area, these are often situated in small, one and two-story, free-standing structures. In contrast, along the central portion of Kalakaua Avenue, the shops are typically consolidated into shopping centers or are located on the ground floors of hotels. The central part of Kalakaua Avenue also contains a few office buildings and the Waikiki No. 3 Theater. There are several open air marketplaces abutting Kalakaua (e.g., International Marketplace), but the total frontage used for this purpose is limited, and the marketplaces are not as visually important as the structures along the Avenue.

3.1.1.2 Fronting Land Uses

Table III-1 summarizes the types of land uses present along Kalakaua Avenue according to the percent of the total street frontage which they occupy. A detailed inventory of adjacent uses is presented in Appendix C, and the locations of these fronting businesses and other uses are shown in Appendix D.

3.1.2 Probable Long-Term Impacts

The proposed project will not directly alter any of the adjoining parcels. Access to existing driveways will be maintained, and loading areas for tour buses and service vehicles will be provided. The improvements will encourage visitors to walk along Kalakaua Avenue, increasing the number of potential customers who pass fronting businesses. As discussed in Section 3.5, the proposal maintains existing vehicular traffic service levels; hence, businesses will remain accessible to customers arriving from outside Waikiki. When completed, the proposed changes would improve the aesthetic quality of the Kalakaua Avenue corridor and further enhance the street's status as Waikiki's principle shopping area and promenade.

Table III-1

Types of Uses Fronting Kalakaua Avenue

Type of Use	Percent of Total Street Frontage
Multi-Family Residential	0.1
Hotel	6.8
Retail	32.9
Restaurant	11.9
Bar	0.7
Park	22.1
Driveway or Street	15.3
Other	10.1

Source: Summary of data contained in Appendix C; survey conducted by Belt, Collins & Associates.

3.1.3 Short-Term Construction Impacts

The data contained in Appendix C show that customer access to the majority of the businesses fronting Kalakaua Avenue is available only, or primarily, from the public sidewalks. In many areas the private sidewalk space is either lacking entirely, too narrow, or too awkwardly configured to serve as a viable alternative to the public sidewalks that will be disrupted during construction of the proposed project. Because of this, complete closure of the public sidewalks for more than short periods is undesirable. To avoid this, the City plans to incorporate specifications in the contract documents which will:

- Limit the number of lineal feet of sidewalk that may be disturbed at any one time;
- Limit the time during which any given segment of sidewalk may be disturbed by construction to one month or less; and
- Provide continuous access from the sidewalk into businesses throughout construction.

As discussed in more detail in Sections 2.2.4 and 3.5, where vehicular access to the structures along Kalakaua is currently provided, such access will be maintained while the sidewalks are reconstructed. In a few instances it may be necessary to close private driveways for short periods, but this will be done only where insufficient space prevents piecemeal reconstruction of the driveways similar to what is proposed for the sidewalks in front of Kalakaua Avenue's businesses. The winning contractor will be responsible for coordinating any closing that is necessary with affected landowners and shopkeepers.

Kalakaua Avenue will be kept open to vehicular traffic during peak traffic hours while the sidewalks are being reconstructed. The curb lane on one side may be closed during working hours so that this space may be used by construction equipment. However, the equipment and other obstructions will be removed each afternoon before the start of the rush hour. Hence, all four lanes will be available during these critical times.

As noted in Chapter II, the roadway will remain intact (except for the areas torn up to permit sidewalk construction and the installation of utility lines crossing the roadway. Once essentially all of the sidewalk has been completed, the existing asphalt overlay on the concrete base will be removed (probably by "cold-planing", the process that was used recently while resurfacing the H-1 Freeway between the Likelike Highway and downtown Honolulu). During this process, lane closures will be necessary; these will be limited to off-peak hours, but they will reduce the capacity of the roadway to the point where backups may occur. In general, access into driveways will be maintained throughout this operation. However, when work is underway immediately in front of a particular driveway, access may be denied for periods up to several hours. Hotels and tour operators will need to make their customers aware of such potential disruptions in advance so that increased travel times are taken into account in visitors' schedules.

Dirt underlying the sidewalks will be exposed while they are being reconstructed. Increased noise and particulate (dust) concentrations are inevitable, and these will have an adverse effect on the ambience of businesses exposed to them. The nature of these effects, and the steps that are being taken to limit them are discussed in

Sections 3.6 and 3.7. The restrictions that are being placed on the number of days that any given stretch of sidewalk may be disturbed will hold such disruptions to manageable proportions, and the fact that all of the sidewalks are being constructed as part of the same project means that the impacts will be evenly distributed throughout the district.

3.2 GEOLOGY, PHYSIOGRAPHY, AND SOILS

3.2.1 Existing Conditions

Waikiki is bounded by the Pacific Ocean, Kapahulu Avenue, and the Ala Wai Canal. Geologically, it consists of unconsolidated calcareous marine sediments laid down over lava flows and limestone from ancient reefs. The segment of Kalakaua Avenue between Saratoga Road and Kapahulu Avenue overlies marine calcareous sediments; the Soil Conservation Service of the U.S. Department of Agriculture (August 1972) classifies the soil as Jaucas Sand. The portion of Kalakaua Avenue west of Saratoga Road was constructed on dredged fill.

The existing pavement consists of four to six inches of asphaltic concrete over six inches of portland cement concrete; the base course is composed of two layers of crushed rock. When Kalakaua Avenue was first constructed, it included an unpaved medial strip. The strip still remains on the portion of Kalakaua Avenue between King Street and McCully streets, but the greenery within the project area was replaced with A/C paving long ago. The concrete pavement was laid about 1916 and had a design life of about 50 years. Corings taken in 1984 indicate that the concrete is still structurally sound, however, and repairs to the subgrade are needed only in limited areas, such as where trenches have been cut to accommodate utility and drain lines.

The roadway is relatively level. Within the project area its elevation ranges from a high of about ten feet above sea level (near Kapahulu Avenue) to a low of slightly over four feet at several locations (e.g., near Kalaimoku Street and Royal Hawaiian Avenue). Positive drainage from the roadway is provided by its crowned center.

3.2.2 Probable Impacts

Only extremely minor (6 inches or less) changes in the roadway elevation will be made as part of this project. Existing drainage patterns will be maintained. Materials used in the manufacture of asphaltic concrete (principally aggregate and petroleum products) and portland cement (aggregate, sand, limestone, and clay) as well as petroleum and other products used by construction equipment, would be consumed as a result of the project. All of these materials are relatively abundant and, with the exception of the petroleum, are available from local sources.

3.3 CLIMATE

3.3.1 Existing Conditions

Waikiki's climate is mild and relatively dry. The all-time high temperature is 93 degrees Fahrenheit; the record low is 51 degrees Fahrenheit. The average daily high temperature ranges from the mid-70's in winter to the mid- to upper-80's in summer. Average annual precipitation is approximately 25 inches, the bulk of it falling during

the winter months. The ten-year, one hour rainfall event is approximately 2.25 inches, a modest amount for Hawaii. Relative humidity is typically 55 to 60 percent during the daytime and about 80 percent during the middle of the night.

The prevailing winds are the northeast trades. In the summertime they persist as much as 90 percent of the time, and their average speed is about 13 miles per hour. In the winter, the tradewinds are not quite as strong, and they are more frequently replaced by winds from other directions. It is rarely completely calm in Waikiki, with winds of less than three miles per hour being recorded only five percent of the time. The persistence of these winds has favorable implications for both the physical comfort of visitors and for the dispersion of automotive-related air pollutants. Additional climatologic data relevant to air quality concerns is presented in Section 3.6.

3.3.2 Probable Impacts

The proposed project would have no measurable effect on the regional climate. The addition of shade trees and shrubbery within the right-of-way, as well as the possible construction of a trellis near the sidewalk at Kuhio Beach, could slightly alter the microclimate within and immediately adjacent to the Kalakaua Avenue right-of-way. The planting of additional shade trees would decrease direct radiation at street level, alter wind patterns, and tend to lower ground level temperatures; however, with the possible exception of the increased shading provided by trees, these changes will probably be so slight as to go unnoticed. Excessive concentrations of high shrubbery which could interfere with cooling breezes are not planned. Air quality effects are described in Section 3.6.

3.4 FLORA AND FAUNA

3.4.1 Existing Conditions

In 1900, most of what is now Waikiki was a low-lying swamp. As a result of subsequent development, including construction of the Ala Wai Canal, virtually none of Waikiki's original flora remains. However, large numbers of coconut palms, as well as specimens of many other tree species, have been planted as part of landscaping improvements on properties adjoining the sidewalks. Perhaps the most notable of these are large banyans such as those found at the Ewa end of Kuhio Beach, at the International Marketplace, and at the Moana Hotel.

Rats and mice can be found in and around many of the buildings adjacent to Kalakaua Avenue, and a few mongooses may be present in heavy landscaping as well. However, because the street right-of-way is so heavily travelled and provides no shelter, none of these mammals are normally seen within it.

Bird species sighted most frequently within the project area include the common mynah, Brazilian and American cardinals, house sparrows, pigeons (especially near the zoo), house finch, and mockingbird. However, the high volume of pedestrian and vehicular traffic in the roadway, the limited number of roosting places, and the availability of better habitat on the landscaped grounds of adjacent hotels and apartments keep the number of birds within the Kalakaua Avenue right-of-way itself to a minimum.

3.4.2 Probable Impacts

The proposed project involves the creation of additional landscaped space and the introduction of more street trees. These are superior to the existing paved areas as wildlife habitats, and it is expected that wildlife will respond positively to the proposed changes. This is especially true of birds, who will be able to take advantage of the avian habitat created by the addition of many shade trees.

3.5 VEHICULAR TRAFFIC

3.5.1 Existing Conditions

3.5.1.1 Traffic Volume

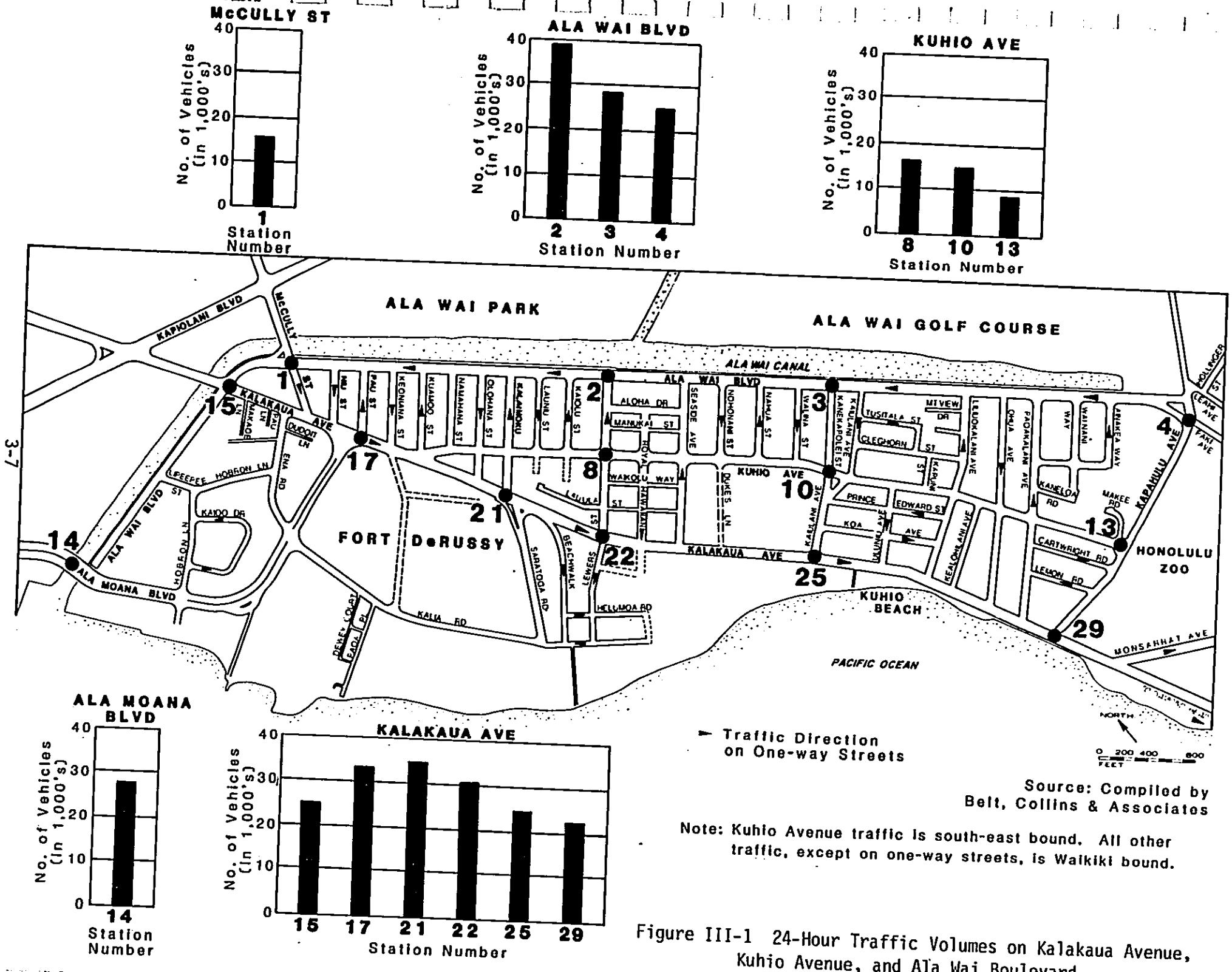
The results of 24-hour and peak-hour vehicular traffic counts at selected intersections on Kalakaua Avenue, Kuhio Avenue, and Ala Wai Boulevard, are shown on Figures III-1 and III-2. These counts were not taken simultaneously, but provide a reasonably accurate indication of the relative traffic volumes experienced at each point on the street network. As discussed previously in Section 2.1.3.1, traffic counts at the Ala Wai Canal screenline on Ala Moana Boulevard, Kalakaua Avenue, and Ala Wai Boulevard suggest that the number of vehicles entering Waikiki daily increased slightly between the mid-1970s and the present, but that peak-hour volumes have remained constant or declined. Looking only at the past five years, both 24-hour and peak-hour Diamond Head-bound traffic entering Waikiki have declined slightly.

Figure III-3 shows fluctuations in traffic volumes over the course of three typical 24-hour periods (Wednesday/Thursday, Friday/Saturday, and Saturday/Sunday) at the intersection of Kalakaua Avenue and Lewers Street, one of the most critical Waikiki intersections. The temporal variation it illustrates is typical of other locations along Kalakaua Avenue as well.

During the weekday period shown in Figure III-3 (noon Wednesday to noon Thursday), traffic had an early morning low of about 230 vehicles per hour (between 3:15 and 4:15 a.m.). It increased sharply between 7:00 and 8:00 a.m. to over 1,600 vehicles per hour, and remained at that level through most of the day. Traffic volumes peaked during the afternoon commuting period (2,115 vehicles between 4:30 and 5:30 p.m.) before falling off slightly to a relatively steady 1,400 vph between 7:00 and 11:00 p.m. After 11:00 p.m., traffic decreased sharply.

Temporal variations in weekend traffic differ slightly from those observed on weekdays, presumably because there are fewer commuters and more recreational traffic. Overall, however, the shapes of the weekday and weekend curves depicted in Figure III-3 are remarkably similar. The most obvious difference is that traffic during the 9:00 pm to 6:00 am period constitutes a significantly greater portion of the 24-hour total on weekends than it does on weekday evenings. This is due to local residents taking advantage of the night-life there. Qualitatively, Saturday night traffic appears to contain a significantly greater number of cars filled with young people who are "cruising", and who therefore drive more slowly than is true of traffic at other times.

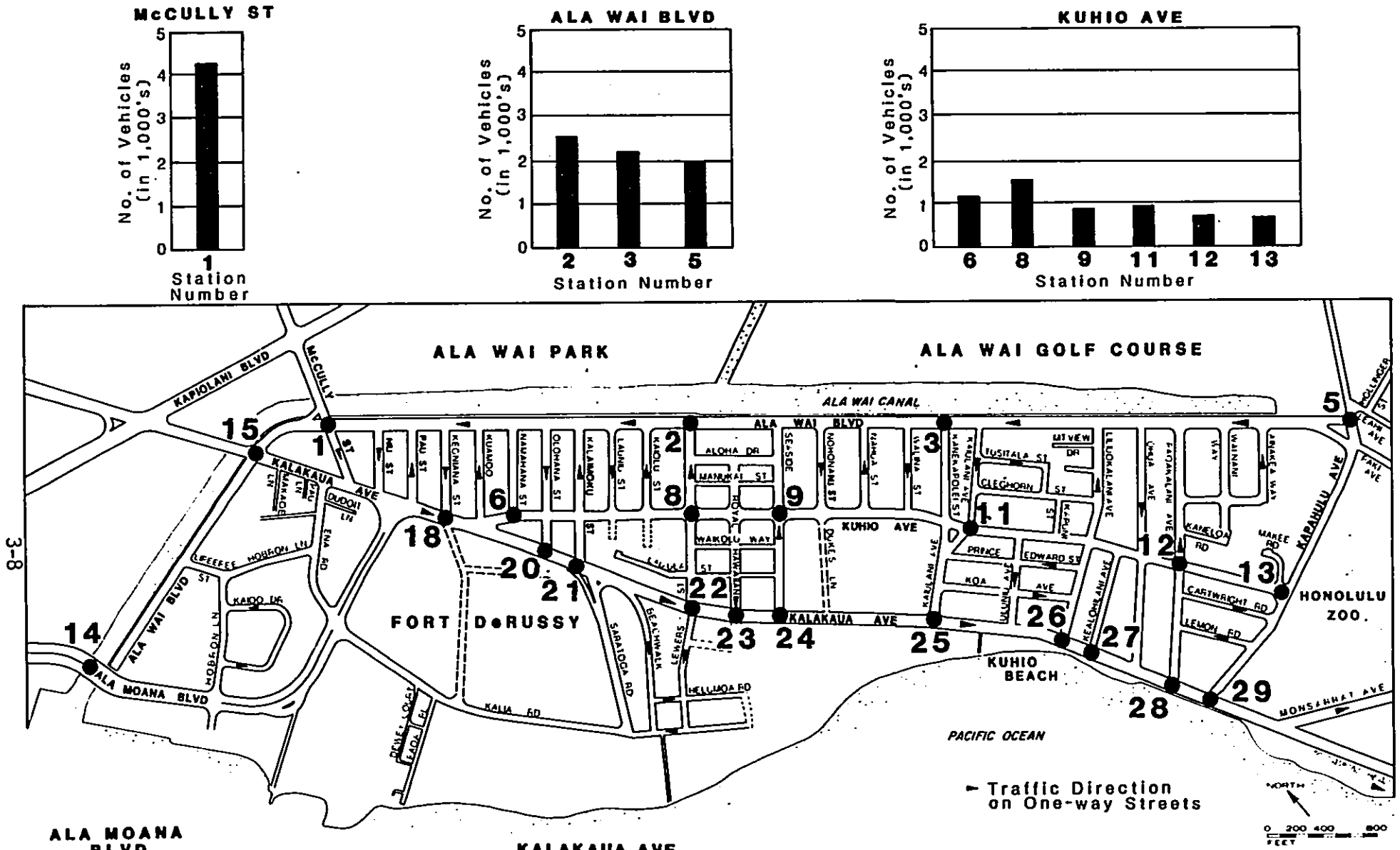
On weekdays, the number of City and County buses running eastbound along Kalakaua Avenue between Kuhio and Kapahulu Avenues varies from zero (between 1 a.m. and 5 a.m.) to almost 40 per hour during peak hours (between 3 p.m. and 5 p.m.).



Source: Compiled by Belt, Collins & Associates

Note: Kuhio Avenue traffic is south-east bound. All other traffic, except on one-way streets, is Waikiki bound.

Figure III-1 24-Hour Traffic Volumes on Kalakaua Avenue, Kuhio Avenue, and Ala Wai Boulevard.



Source: Compiled by Belt, Collins & Associates

Figure III-2 Peak-Hour Traffic Volumes on Kalakaua Avenue, Kuhio Avenue and Ala Wai Boulevard.

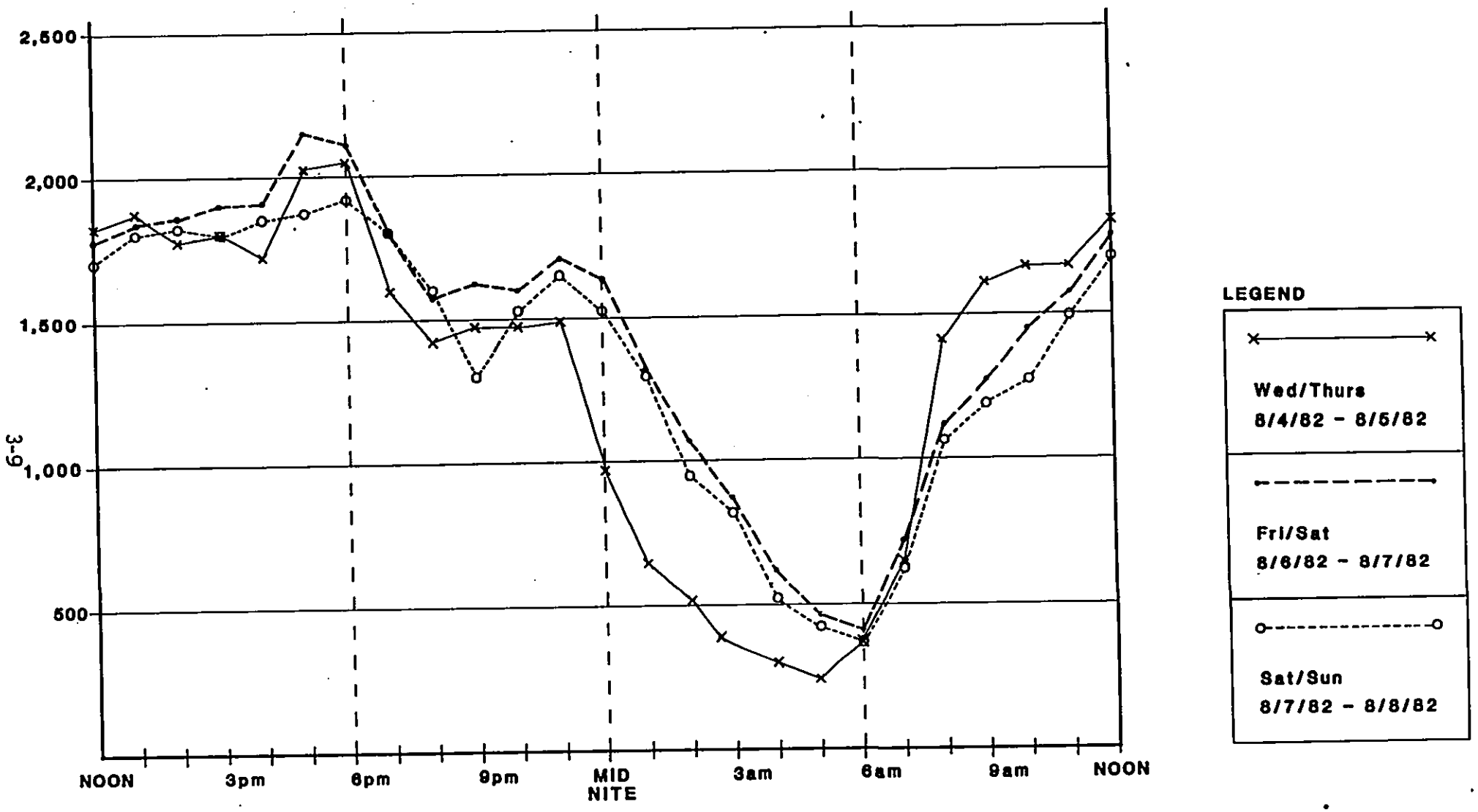


Figure III-3. Comparison of Weekday and Weekend Traffic Volumes: Northwest Approach to Lewers Street on Kalakaua Avenue.

This amounts to less than two percent of the total peak-hour traffic volume. Three routes, numbers 8, 20, and 57, enter Kalakaua Avenue eastbound at Saratoga Road and leave it at Monsarrat Avenue. Route number 2 buses turn onto Kalakaua Avenue at King Street and either turn off at Kapahulu Avenue or continue on Kalakaua Avenue to Kapiolani Park.

No precise count of tour bus activity on Kalakaua Avenue is available. However, when State Department of Transportation vehicle-type classification data for the three Ala Wai Canal screenline stations are compared with City bus schedules, it becomes apparent that tour bus volumes are not evenly distributed over the day. During the 4:30 - 5:30 p.m. peak, it is estimated that approximately 80 tour buses cross the Ala Wai Canal on Ala Moana Boulevard into Waikiki, and the great majority of these eventually reach Kalakaua Avenue.

3.5.1.2 System Performance

Existing traffic performance on Kalakaua Avenue was analyzed by the City and County of Honolulu Department of Transportation Services (December 1985) using the TRANSYT-7F computer model. TRANSYT simulates traffic flow in a signalized network, and provides a number of measures of system performance. For this reason, it is an excellent tool for evaluating alternative roadway configurations.

Table III-2 presents several measures of existing traffic performance on Kalakaua Avenue within the project area. These characterize the performance of each intersection with respect to:

- Existing peak-hour traffic on the Kalakaua Avenue approach;
- Existing degree of saturation (essentially the vehicle to capacity ratio) for through lanes and the approach having the highest volume-to-capacity ratio;
- The average delay (in terms of seconds per vehicle during the peak period for the entire section and for the worst approach); and
- Average speed on the through-lane approach link.

The table shows that on approaches with turning lanes, the through lanes are generally performing better than the turning lanes (as measured by the degree of saturation and the average delay). The highest degree of saturation (104 percent) is at the right turn lane onto Lewers Street and the left turn lane onto Kaiulani Avenue. Both approaches also have corresponding high delay values. Other approaches with degree of saturation values higher than 90 percent are at Pau Street, Saratoga Road/Kalaimoku Street, and Seaside Avenue. With the exception of the Pau Street and Saratoga Road intersection approaches, the primary reason for the high saturation percentages in the turning lanes is the decreased capacity caused by pedestrian interference with turning movements.

The data summarized in Table III-2, and other data, were used to identify the following problem intersections on Kalakaua Avenue:

- Saratoga Road/Kalaimoku Street
- Lewers Street
- Seaside Avenue
- Kaiulani Avenue

Table III-2

Existing Peak-Hour Traffic Volumes on Kalakaua Avenue
Used as Input to the Computer Simulation Model

Intersection	Appr. Vol. (veh/hr) Kalakaua Total	Kalakaua Thru	Side St.	Deg. of Sat. Thru Lane	Deg. of Sat. Worst Leg	Delay (Sec/Veh) Worst	Delay (Sec/Veh) Average	Average Speed (mph)
Niu Street	2,279	1,914	750	72%	72%	23.4	17.5	6
Pau Street	2,039	1,985	--	91%	91%	23.9	18.3	7
Olohana Street	2,324	2,324	290	70%	70%	21.6	10.0	22
Saratoga/Kalaimoku	2,414	2,329	752	95%	95%	38.2	17.4	9
Beachwalk X-walk	2,621	2,621	--	79%	79%	12.1	5.9	15
Lewers Street	2,565	1,585	180	91%	104%	110.7	30.8	15
Royal Hawaiian Ave.	2,100	1,926	540	73%	77%	26.5	9.8	15
Seaside Avenue	2,491	2,006	--	62%	90%	27.7	13.2	10
Duke's Lane X-walk	2,031	2,031	--	66%	66%	11.9	2.7	16
Int'n'l Marketpl.	2,056	2,056	--	67%	67%	2.0	1.4	17
Kaiulani Avenue	2,016	1,616	120	53%	104%	112.0	23.5	18
Uluniu Street	1,736	1,736	240	72%	72%	22.5	5.9	20
Liliuokalani Ave.	1,976	1,676	--	65%	73%	22.7	17.6	10
Kealohilani Street	1,676	1,656	10	54%	54%	18.3	0.7	23
Ohua Street	1,666	1,666	200	53%	53%	20.5	3.1	23
Paokalani Street	1,866	1,596	--	57%	70%	7.4	3.8	19
Kapahulu Avenue	1,596	1,030	290	59%	59%	23.0	4.7	22

Source: Compiled by Belt, Collins & Associates based on estimates made by the City & County of Honolulu, Department of Transportation Services (December 1985) using the TRANSYT-7F computer model.

Additional studies were conducted to identify the source of the problems at each intersection. During these studies, possible traffic engineering solutions to the problems were identified and tested with the TRANSYT model. In addition to the computer modeling, the Department of Transportation Services (December 1985b, Appendix B), conducted numerous field studies to determine the effectiveness of various proposed improvements under actual conditions. The effects of such actions as widening crosswalks, erecting new street signs, relocating newsstands to provide more clear sidewalk space, off-line loading bays, and new traffic patterns were evaluated.

3.5.2 Expected Impacts: Long-Term

The proposed design retains four lanes along the entire length of Kalakaua Avenue. However, in most areas the pavement width would be decreased by approximately 9 feet. Most of the additional sidewalk space would be obtained by reducing the average width of the curb lane on the mauka side of the roadway from 17 to 11 feet. This space is not currently utilized for through traffic, and its conversion from roadway to sidewalk would have relatively little effect on traffic flow through Waikiki. The curb lane on the makai side of the street would be narrowed from 17 feet to 14 feet, but this would have little, if any, effect on its capacity. A width of 14 feet is considered adequate for the transit and tour buses which use Kalakaua. The width of the two center lanes would remain 11 feet.

As described in this report, many traffic engineering improvements will be made as part of this project to offset the effects of the sidewalk widening. These include changes in turning movements, signal timing, and pedestrian crosswalk configuration. Results of both the computer simulation analysis and the field tests conducted by the City & County of Honolulu Department of Transportation Services (December 1985b) indicate that the proposed sidewalk widening will actually improve traffic performance over pre-project levels (see Tables III-3 and III-4) so long as pedicabs and other non-motorized vehicles unable to maintain the posted speed limit are removed from the traffic stream.

Most of the improvement is achieved by shortening the distance pedestrians have to walk to cross Kalakaua Avenue. Presently, the minimum green time for side street traffic is controlled by the time it takes pedestrians to cross Kalakaua Avenue, not by the traffic volume on the side street. As a result, the green phase time for the Kalakaua Avenue approach must be shorter than desired. Widening the sidewalk will narrow the roadway, reduce the pedestrian crossing time, and allow more green phase time to be given to Kalakaua Avenue. The performance at all intersections following widening of the sidewalks will equal or exceed pre-project levels.

Traffic flow between intersections is not expected to be affected by loading vehicles and stopped tour buses as presently experienced. Loading bays will be provided on Kalakaua Avenue outside the vehicle flow. Additional loading spaces near Kalakaua Avenue will be provided on side streets. Limits on delivery times are being proposed so that deliveries will not be made during peak traffic periods. Police will be stricter in their enforcement of the no parking/stopping regulations so that vehicle movement is facilitated.

As noted above, maintaining levels of service in the face of decreased roadway width is predicated on the assumption that pedicabs and other non-motorized vehicles unable to maintain the posted speed limit will be banned from Kalakaua Avenue. Regulations providing such a ban are currently being drafted by the Corporation Council. If these or similar regulations are not adopted, then the reduced lane widths

that are proposed will make it impossible for motor vehicles to maneuver around slower-moving pedicabs, thereby impeding traffic flow. The effect of such interference could not be quantified using TRANSYT or other available models because they do not allow the evaluation of such unusual conditions. Neither do results of the physical simulations directly address this question because they were conducted in combination with the existing wide lanes. It is not possible to precisely quantify the effect that pedicabs have on traffic flow. However, traffic engineers' and police officers' numerous observations of pedicab-motor vehicle interactions, documented by photographs, photo logs, and time lapse photographs, as well as complaints from tour bus and delivery truck drivers, indicate that the presence of pedicabs would greatly impede traffic flow if the roadway is narrowed as planned.

Table III-3

Measures of Effectiveness of the Proposed Kalakaua Avenue Design as Estimated by the TRANSYT-7F Computer

Intersection	Appr. Vol. (veh/hr) Kalakaua Total	Kalakaua Thru	Side St.	Deg. of Sat. Thru Lane	Worst Leg	Delay (Sec/Veh) Worst	Average
Niu Street	2,279	1,914	750	68	68	25.3	16.6
Pau Street	2,039	1,985	--	91	91	23.9	20.4
Gateway Park X-walk	2,324	2,324	--	62	62	14.2	5.9
Olohana Street	2,324	2,324	290	71	71	20.8	6.2
Saratoga/Kalaimoku	2,414	2,329	752	76	76	30.3	10.4
Beachwalk X-walk	2,621	2,621	--	74	74	18.7	18.7
Lewers Street	2,565	1,585	180	89	89	28.8	10.4
Royal Hawaiian Ave.	2,100	1,926	540	71	75	27.1	9.6
Seaside Avenue	2,491	2,006	--	78	69	9.9	9.8
Duke's Lane X-walk	2,031	2,031	--	62	62	11.4	1.6
Int'n'l Marketpl.	2,056	2,056	--	62	62	2.2	1.3
Kaiulani Avenue	2,016	1,616	--	71	71	12.2	11.4
Uluniu Street	1,736	1,736	360	63	74*	29.1	6.5
Liliuokalani Ave.	1,976	1,676	--	61	61	13.1	5.1
Kealohilani Street	1,676	1,656	10	48	48	21.2	1.0
Ohua Street	1,666	1,666	200	47	47	24.0	3.4
Paokalani Street	1,866	1,596	--	57	70	16.8	13.2
Kapahulu Avenue	1,596	1,030	290	55	55	25.7	5.4

* Indicates that this percentage is for side street approach rather than Kalakaua Avenue approach.

Source: Compiled by Belt, Collins & Associates based on estimates made by the City & County of Honolulu, Department of Transportation Services (December 1985) using the TRANSYT-7F computer model.

Table III-4

Comparison of Measures of Effectiveness: Existing and Post-Project

Intersection	Deg. Sat. On Worst Leg (in %)		Avg. Delay (sec/veh)				Thru Lane Avg. Speed	
			Worst Lane		Average			
	Now	With Proj.	Now	With Proj.	Now	With Proj.	Now	With Proj.
Niu Street	72	68	25.3	16.6	17.6	16.5	6	7
Pau Street	91	91	23.9	20.4	18.3	20.4	7	6
Gateway Park X-Walk	n/a	62	n/a	5.9	n/a	5.9	n/a	n/a
Olohana Street	70	71	10.0	6.2	10.0	6.2	22	16
Saratoga/Kalaimoku St.	95	76	17.4	10.4	17.4	10.0	9	17
Beachwalk Crosswalk	79	74	5.9	18.7	5.9	18.7	15	9
Lewers Street	104	89	30.8	10.4	30.8	10.4	15	14
Royal Hawaiian Avenue	77	75	9.8	9.6	9.8	9.6	15	16
Seaside Avenue	90	78	13.2	9.8	13.2	9.8	10	10
Duke's Lane Crosswalk	66	62	2.7	1.6	2.7	1.7	16	17
Int'n'l Marketpl.	67	62	1.4	1.3	1.4	1.3	17	17
Kaiulani Avenue	104	71	23.5	11.4	23.5	11.4	18	11
Uluniu Street	72	74*	5.9	6.5	5.9	6.5	20	23
Liliuokalani Avenue	73	61	17.6	5.1	17.6	5.1	10	17
Kealohilani Street	54	48	0.7	1.0	0.7	1.0	23	22
Ohua Street	53	47	3.1	3.4	3.1	3.4	23	23
Paokalani Street	70	70	3.8	13.2	3.8	13.3	19	11
Kapahulu Avenue	59	55	4.7	5.4	4.7	5.4	22	21

* Indicates that this percentage is for the side street approach rather than the Kalakaua Avenue approach.

Source: Compiled by Belt, Collins & Associates based on estimates made by the City & County of Honolulu, Department of Transportation Services (December 1985) using the TRANSYT-7F computer model.

As noted elsewhere in this report, time-series traffic counts and the fact that official land use plans call for restricted growth in Waikiki suggest that traffic volumes will not increase substantially over the coming years, and the foregoing analysis is based on that assumption. To determine what would happen if this assumption proved erroneous and traffic volumes do, in fact, increase, a sensitivity analysis was conducted using TRANSYT-7F with traffic volumes from 5 to 15 percent higher than existing levels. System-wide increases were assumed (i.e., it was assumed that traffic would increase by the same amount at all points) because accurate, detailed information on specific development projects was unavailable.

Traffic performance measures for the existing system and the proposed project are compared in Table III-4. According to the traffic simulation report:

> The existing network can only accommodate a 10 percent increase in traffic and would require a 120-second traffic signal cycle length. Many turning lanes on the existing network are already at capacity and cannot accommodate additional traffic without any improvements. Hence, the cycle length must be increased to 90 and 120 seconds for a 5 percent and 10 percent increase in current traffic, respectively. The existing network cannot accommodate a 15 percent traffic increase while maintaining current levels of performance.
>
> Plan 5 [the proposed plan] can accommodate a 5 percent increase in traffic with an 80-second cycle length, and a 10 percent increase with a 90-second cycle length. In order to accommodate a 15 percent increase, Plan 5 will require a 120-second cycle length, and average vehicle delay will increase about 10 percent relative to existing conditions.

The sensitivity analysis points to two conclusions. First, it appears that the proposed changes would leave Kalakaua Avenue with slightly greater capacity to accommodate traffic increases than it has in its existing configuration. Second, growth in Waikiki which increases traffic volumes along the Ewa end of Kalakaua Avenue by more than 10 percent would probably lead to a deterioration in service levels.

3.5.3 Short-Term Impacts

The preceding discussion addresses traffic conditions following completion of the proposed improvements. While the prognostication for the post-project period is relatively positive, there may be considerable disruption and congestion during the course of construction. In evaluating potential traffic impacts, it is useful to divide the project into two major parts, sidewalks and roadways.

3.5.3.1 Sidewalk Work

During the first phase of project construction, the roadway will be narrowed, utility lines will be relocated as necessary, drainage facilities will be adjusted, sidewalk extensions will be constructed, and the existing sidewalks will be rebuilt. The contractor will work first on one sidewalk, and then on the other. During construction hours -- probably 8:30 am to 3:00 pm, portions of one lane will be closed to accommodate construction equipment working on the adjacent sidewalk. During this period, weekday traffic volumes typically range from 70 to 80 percent of the peak experienced during the afternoon rush hour. The loss of one through lane could reduce the road capacity by as much as 900 vehicles per hour. At the current level of use, this would cause the demand to equal or exceed capacity.

The inevitable result will be congestion, delays, and a tendency for drivers to select alternate routes if they are available, both as a means of avoiding Waikiki and as a way of approaching it from the Diamond Head, rather than Ewa, side. As a result, it is expected that there will be a temporary increase in Ewa-bound traffic on Kuhio Avenue and makai-bound traffic on Kapahulu Avenue.

The magnitude of these changes cannot be accurately forecast, but the fact that they will occur mostly at hours which are "off-peak" for these other roads suggests that it will be possible for roads in surrounding areas to accommodate the diverted traffic with only modest delays. However, it will be important to monitor these streets as construction progresses so that traffic controls can be adjusted in an effort to alleviate problem areas.

In view of the temporary degradation in service levels expected while sidewalk reconstruction is underway, and as part of its overall informational effort related to the project, the City will publish advance notices of lane closures; these notices, and signs posted near the project area will identify alternative routes. Taxis, tour operators and delivery vehicles will be able to operate normally except in sections where construction is actually underway. Those requiring access to segments that are actually under construction will be encouraged to operate before the normal construction day begins. Pedicabs and all other non-motorized vehicles will be prohibited on Kalakaua Avenue; this will minimize or eliminate interference and reduce or eliminate such activity during the afternoon rush hour.

3.5.3.2 Roadway Resurfacing

During the second part of the work, the portion of the existing roadway which remains after the sidewalks have been extended and reconstructed will be resurfaced. In order to do this, it will be necessary to close one full lane at a time (probably for at least half the length of Kalakaua Avenue within the project limits) to permit safe and efficient operation of the heavy equipment used to remove the existing asphalt surface. Once the entire width of the roadway has been cold-planed, the street will be resurfaced with a/c pavement, and this, too, will require the closure of one lane at a time.

Altogether, it is expected that the repaving work will require approximately one month. During this period, lane closures, truck traffic, and other construction activities will be a major impediment to traffic flow along Kalakaua Avenue. Congestion could be minimized by scheduling the work for off-peak hours, but this would require scheduling the work between 10:00 pm and 7:00 am. Such a nighttime work schedule would lead to noise during normal sleeping hours and could add to the labor cost of the contract. At this time, the City has not decided whether or not its bid request will stipulate that work be carried out during the night.

3.6 AIR QUALITY IMPACTS

3.6.1 Introduction

The proposed project will lead to changes in traffic performance that will have long-term effects on motor vehicle emissions and, therefore, ambient levels of the principal automotive pollutants -- carbon monoxide, nitrogen oxides, and hydrocarbons. It will also have short term effects, principally fugitive dust intrusion into the numerous open-front shops along Kalakaua Avenue and additional congestion and emissions due to traffic disruption during the 18 - 24 month construction period. These impacts were the subject of an in-depth air quality impact analysis (Morrow, March 1986), and are discussed in the following sections. The discussion includes an evaluation of expected pollutant concentrations relative to federal and state air quality standards. Possible means of mitigating adverse impacts are also discussed.

3.6.2 Air Quality Standards

State of Hawaii and national ambient air quality standards are summarized in Table III-5. The federal primary standards are intended to protect public health with an adequate margin of safety; secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values. In the case of the primary automotive pollutants -- carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox), there are only primary standards. The State of Hawaii does not distinguish between primary and secondary standards.

The table clearly shows that Hawaii's standards are more stringent than their federal counterparts. This is particularly true since they are absolute ceiling values never to be exceeded, whereas the federal standards allow higher levels once per year without a violation. Changes to the State regulations are under review which would make its particulates and sulfur dioxide standards equivalent to the federal standards.

The U.S. Environmental Protection Agency (EPA) (August 1977) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings. The last review (U.S. Environmental Protection Agency, February 8, 1979) resulted in the relaxation of the oxidant standard from 140 to 160 micrograms/cubic meter (ug/m3). The ongoing review has resulted in suggestions that the carbon monoxide (CO) and sulfur dioxide (SO2) standards be made more stringent, but final action has not yet been taken.

Chapter 60, Administrative Rules of the State Department of Health, sets limits on particulate matter (PM) emanating from construction activities. There can be no visible emissions, and the maximum downwind level of PM cannot be more than 150 ug/m3 above upwind levels as measured with a Hi-Volume sampler for a 12-hour period. As noted above, the State has recently proposed amendments to its air pollution control rules. One of these amendments would delete the 150 ug/m3 standard but retain the "no visible emissions" requirement. Whether or not the proposed changes are adopted will depend on the results of the public hearing process.

3.6.3 Existing Air Quality

3.6.3.1 General

The State Department of Health (DOH) maintains a network of air monitoring stations around the state to gather data on the following regulated pollutants:

- o total suspended particulates (TSP)
- o sulfur dioxide (SO2)
- o carbon monoxide (CO)
- o ozone (O3)
- o lead (Pb)

Two of the DOH monitoring stations are (or were) located within one mile of the project site; one at Fort DeRussy and the other on the mauka side of Kalakaua Avenue. In addition, the DOH maintains monitoring stations at its own building about 2.5 miles northwest of Waikiki and on Sand Island, about 3.5 miles west of the project area.

Table III-5

Summary of State of Hawaii and Federal
Ambient Air Quality Standards

Pollutant	Sampling Period	Federal Standards		State Standards
		Primary	Secondary	
Total Suspended Particulate Matter (TSP) (Micrograms per Cubic Meter)	Annual Geometric Mean	75	60	--
	Annual Arithmetic Mean	--	--	55
	Maximum Average in Any 24 Hours	260	150	100
Sulfur Dioxide (SO2) (Micrograms per Cubic Meter)	Annual Arithmetic Mean	80	--	20
	Maximum Average in Any 24 Hours	365	--	80
	Maximum Average	--	--	--
Nitrogen Dioxide (NO2) (Micrograms per Cubic Meter)	Annual Arithmetic Mean	100	70	--
Carbon Monoxide (CO) (Milligrams per Cubic Meter)	Maximum Average in Any 8 Hours	10	5	--
	Maximum Average in Any 1 Hour	40	10	--
Photochemical Oxidants (as 03) (Micrograms per Cubic Meter)	Maximum Average in Any 1 Hour	240	100	--
Lead (Pb) (Micrograms per Cubic Meter)	Maximum Average in any Calendar Quarter	1.5	1.5	--

Sources: State of Hawaii, Title 11, Chapter 59, Air Quality Standards Title 40, Code of Federal Regulations, Part 50.

3.6.3.2 Data From Existing Monitoring Sites

Recent (1983) data on 24-hour total suspended particulate concentrations at Fort DeRussy are presented in Table III-6. Comparison with the state and federal standards indicates that those standards are being met.

A summary of 1984 carbon monoxide monitoring data from the the Waikiki (Kalakaua Avenue) microscale monitoring site is presented in Table III-7. The results indicate that the State's 1-hour and 8-hour standards are being occasionally exceeded. Examination of meteorological data indicates that these occur most frequently during the winter months when "Kona" weather characterized by lower velocity, southerly winds is most common. Federal standards appear to be met at all times.

The Department of Health also monitors continuously for photochemical oxidants at its station on Sand Island. Photochemical oxidants (measured as ozone) are secondary pollutants formed in the atmosphere largely as a result of anthropogenic emissions of hydrocarbons and oxides of nitrogen. Recent monitoring data from that station are summarized in Table III-8. The results indicate that the state's 1-hour standard is met over 99% of the time. During 1983, it was exceeded only once.

The Department of Health also collects data on ambient lead levels. They indicate that airborne lead levels have declined as leaded gasoline has been phased out. In some areas particulate lead accumulated over the years in roadside soils and plants, and inhalation exposure results whenever dust is re-entrained in the air as a result of scouring winds or mechanical disturbance due to vehicular motion. However, the absence of significant amount of bare soil within the project area means that this is not a concern for the current project.

3.6.4 Meteorology

As noted elsewhere in this report, average annual rainfall in Waikiki is about 25 inches. Average monthly rainfall ranges from 3.53 inches in January to 0.44 inch in June. In accordance with Thornwaite's (1931) climatic classification, the area is considered sub-humid.

Meteorological records from the Honolulu International Airport and Hickam Air Force Base, the closest wind monitoring stations, show that northeast tradewinds predominate during much of the year. However, directional wind roses for the months of January and August show that the northeast tradewinds are much more reliable during the summer than during the winter. The winter months also are characterized by generally lower wind velocities (see Table III-9). Light, variable winds are much more prevalent during January than in August, and not surprisingly, it is during the winter months that most of the high carbon monoxide levels are recorded by the Department of Health.

Of particular interest from an air pollution standpoint were the stability wind roses prepared for the period January 1955 to December 1968 at Hickam Air Force Base (U.S. Air Force, 4 September 1974). These data indicated that stable conditions (i.e., Pasquill-Gifford stability categories E and F) occur about 28% of the time. It is under such conditions that the greatest potential for air pollutant buildup exists.

Table III-6. Air Monitoring Data, Fort DeRussy: 1983

Month	Total Suspended Particulates (TSP) 24-Hour Concentration (ug/m3)		
	No. of Samples	Range	Mean
Feb 83	4	32 - 59	46
Mar 83	6	23 - 42	36
Apr 83	5	28 - 51	40
May 83	5	21 - 44	35
Jun 83	3	30 - 47	39
Jul 83	5	22 - 32	26
Aug 83	4	22 - 35	28
Sep 83	3	20 - 24	22
Oct 83	3	22 - 36	31
Nov 83	5	18 - 35	27
Dec 83	5	22 - 53	37
Annual	53	18 - 59	33

Source: State of Hawaii, Department of Health.

Table III-7. Carbon Monoxide Monitoring Data, Waikiki: 1984

Month	No. of Samples	Carbon Monoxide Concentrations (mg/m3)			
		1-Hr Min	1-Hr Max	8-Hr Max	Mean
Jan 84	642	0.0	11.3	5.7	2.2
Feb 84	560	0.0	10.2	5.4	1.6
Mar 84	629	0.0	10.6	6.7	2.0
Apr 84	681	0.0	6.9	4.9	1.5
May 84	662	0.0	7.6	4.4	1.5
Jun 84	602	0.0	6.3	4.1	1.5
Jul 84	678	0.0	7.4	4.9	1.7
Aug 84	616	0.0	5.6	3.6	1.4
Sep 84	681	0.0	6.6	3.8	1.7
Oct 84	659	0.0	9.7	4.5	2.1
Nov 84	656	0.0	10.5	6.9	1.9
Dec 84	700	0.0	12.0	7.1	2.7
Annual	7,766	0.0	12.0	7.1	1.8

Source: State of Hawaii, Department of Health.

Table III-8

Air Monitoring Data, Sand Island: 1983

Month	No. of Samples	Photochemical Oxidants 1-Hour Concentrations (ug/m3) Min	Max	Mean
Jan	700	0	123	24
Feb	509	0	92	23
Mar	701	0	92	32
Apr	629	0	88	41
May	703	0	78	35
Jun	681	0	61	23
Jul	704	0	47	14
Aug	705	0	55	15
Sep	687	0	47	18
Oct	672	0	71	24
Nov	683	0	74	19
Dec	663	0	96	22
Annual	8,037	0	123	23

Source: State of Hawaii, Department of Health.

Table III-9. Honolulu International Airport Wind Roses: January & August

Wind Direction	January Wind Speed (knots) 1 - 3	4 - 6	7 - 10	11 - 16	17 - 21	22 - 27	28 - 33
N	2.4	2.8	1.8	0.5	0.1	0.0	0.0
NNE	1.4	1.8	1.0	0.5	0.1	0.0	0.0
NE	1.8	2.6	3.4	2.9	0.7	0.2	0.0
ENE	0.8	2.5	5.1	5.1	1.7	0.4	0.0
E	0.7	1.2	2.8	2.5	1.0	0.3	0.0
ESE	0.3	0.5	0.8	0.4	0.1	0.0	0.0
SE	0.4	0.8	1.6	1.2	0.2	0.1	0.0
SSE	0.3	0.8	1.6	1.1	0.4	0.3	0.0
S	0.5	1.3	2.6	1.6	0.5	0.2	0.1
SSW	0.2	0.5	1.3	1.0	0.2	0.1	0.0
SW	0.4	0.6	1.6	1.1	0.4	0.1	0.0
WSW	0.1	0.2	0.5	0.8	0.3	0.0	0.0
W	0.4	0.4	0.6	0.4	0.2	0.0	0.0
WNW	0.4	0.6	0.3	0.1	0.0	0.0	0.0
NW	3.0	3.1	1.4	0.3	0.1	0.0	0.0
NNW	1.5	2.5	1.1	0.4	0.1	0.0	0.0
	14.6	22.2	27.5	19.9	6.1	1.7	0.1
						Total:	92.0
						% Calms:	8.0

Wind Direction	August Wind Speed (knots) 1 - 3	4 - 6	7 - 10	11 - 16	17 - 21	22 - 27	28 - 33
N	1.2	1.4	0.5	0.0	0.0	0.0	0.0
NNE	0.5	1.0	0.5	0.2	0.0	0.0	0.0
NE	0.8	3.9	11.5	8.2	1.3	0.1	0.0
ENE	0.8	5.1	15.7	14.1	1.9	0.2	0.0
E	0.8	2.9	9.5	6.0	1.1	0.2	0.0
ESE	0.3	0.3	0.8	0.2	0.1	0.0	0.0
SE	0.3	0.4	0.3	0.1	0.2	0.0	0.0
SSE	0.2	0.0	0.0	0.1	0.0	0.0	0.0
S	0.1	0.1	0.1	0.0	0.0	0.0	0.1
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.1	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.1	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.2	0.1	0.0	0.0	0.0	0.0	0.0
NW	1.2	1.0	0.1	0.0	0.0	0.0	0.0
NNW	0.6	0.4	0.1	0.0	0.0	0.0	0.0
	7.0	16.6	39.2	28.9	4.6	0.6	0.1
						Total:	96.9
						% Calms:	3.1

(Period of Record: 1939-48,1950-68)

Source: U.S. Air Force

3.6.5 Motor Vehicle Emissions

3.6.5.1 Traffic Activity

As indicated in Section 3.5, the proposed action would not increase traffic volumes on Kalakaua Avenue or other Waikiki streets. The effects of lane narrowing would be more than offset by other planned changes so that overall traffic performance would actually be improved by the proposed project. Traffic flow at all points on Kalakaua Avenue would be as good or better following sidewalk widening than it is at present. Because of this, it was not expected that the project would have a significant long-term adverse effect on air quality. To determine whether or not this expectation would be met, the Kalakaua Avenue intersections having the highest degree of traffic saturation, i.e., Lewers Street and Kaiulani Avenue, were selected for a microscale air quality impact assessment.

3.6.5.2 Emission Factors

Automotive emission factors for carbon monoxide were generated for calendar years 1986 and 1988 using EPA's (February 1981) Mobile Source Emissions Model (MOBILE-2). To localize the emission factors as much as possible, the age distribution for registered vehicles in the City & County of Honolulu (Department of Data Services, 1983) was input in lieu of national statistics.

3.6.5.3 Modeling Methodology

Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal air pollution source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (ca. 1 month), and it comprises the largest fraction of automotive emissions.

In this instance, microscale screening analyses were performed for the aforementioned intersections which appeared to have the highest saturation factors and therefore the greatest potential for local air pollution impacts as well. Peak traffic hours were analyzed for the following scenarios:

- o 1986 existing conditions
- o 1986 during construction
- o 1988 after project completion

Waikiki's urbanized nature contributes to a "heat island" effect and increased atmospheric turbulence. Hence, a neutral atmosphere (Category "D") (U.S. EPA, 1973) and 1 meter/second wind speed were assumed as worst case meteorological conditions. Wind directions corresponding to wind-rose angles of 10, 45, and 60 degrees were used in the analysis; on the basis of past experience, these were chosen as the angles most likely to result in maximum pollutant concentrations.

The computer simulation model PAL (U.S. EPA, February 1978) was employed to estimate carbon monoxide concentrations along the sidewalks in the vicinity of the aforementioned intersections. An array of receptor sites around each intersection was input to the model. These sites were located five meters apart and three meters from the curb.

3.6.5.4 Modeling Results -- Existing Conditions

Results of the modeling suggest that both Federal and State 1-hour carbon monoxide standards may already be exceeded under worst case conditions of traffic and meteorology in the immediate vicinity of the Lewers Street and Kaiulani Avenue intersections (see Table III-10).

The maximum values in Table III-10 are much higher than the monitoring data reported in Table III-7. In order to assess the accuracy of the PAL model, a model run was made using the traffic data upstream of the Lewers Street intersection. Free-flow conditions were assumed without the queues included in the intersection analysis. Several receptor sites were input representing the DOH monitoring instrument intake at a height of 3.0 meters. Run with these input parameters, the model produced maximum 1-hour CO estimates in the range of 7.2 - 10.4 milligrams/cubic meter. This agrees quite well with the range of maximum recorded values from the monitoring data (5.6 - 12.0 mg/m3).

There appear to be two principal reasons for the discrepancy between the Department of Health monitoring station data and the model output for existing conditions in the vicinity of the intersection. The first is that the monitoring station is located on the second floor of a building, while the modeled receptor sites are closer to sidewalk level (1.5 meters). The second is that the monitoring station is adjacent to a basically free-flow, midblock segment of Kalakaua Avenue, whereas the receptor sites used in the model are affected by queues that form at the intersection on red lights. Long-term monitoring at sidewalk level near the intersection would be needed to determine actual CO levels at that point, but the possibility that concentrations in the vicinity of the intersection may actually approach those shown in Table III-10 under worst-case conditions cannot be discounted at this time.

3.6.5.5 Modeling Results -- Post Construction (1988)

When run for with-project conditions, the PAL model indicated that the project would result in small decreases in CO concentrations at all but one of the sites having the highest existing CO levels. At the same time, it suggested that CO levels at receptor sites currently having low CO concentrations would increase. In all cases, the differences between existing and "with-project" conditions were small.

As previously noted, the model inputs were for "worst-case" conditions of both traffic and meteorology. This implies the simultaneous occurence of peak traffic, winds of 1 meter per second (2.25 miles per hour) blowing within ten degrees of the roadway centerline direction (i.e., from the north), and neutral atmospheric conditions. A review of the wind data summarized in Table III-9 suggests that these meteorologic conditions rarely occur during the afternoon when traffic on Kalakaua Avenue is at its highest. Because of this, CO concentrations as high as those shown would also represent rare events.

The primary cause of the high CO levels is the queueing that is predicted to occur at the approaches to the intersections. The low speed, free-flow traffic alone would not cause concentrations of this magnitude.

3.6.6 Short-Term Construction Impacts

There will be a short-term impact on traffic and traffic-related emissions as a result of construction vehicles operating in the area and lane closures during construction hours. These can affect air quality in two ways:

Table III-10

Estimated Maximum 1-Hour Carbon Monoxide
Concentrations With and Without the Project

LEWERS STREET - KALAKAUA AVENUE INTERSECTION:

	Worst Case 1-Hour CO Concentration (mg/m3)		
Receptor	1986 Existing	1988 With Project	Change
1	3.9	6.4	+2.5
2	3.5	5.5	+2.0
3	3.2	4.9	+1.7
4	49.1	49.1	0.0
5	49.7	48.2	-1.5
6	49.6	46.8	-2.8
7	17.7	22.5	+4.8
8	22.7	28.4	+5.7
9	28.3	34.1	+5.8
10	2.1	4.3	+2.2
11	2.7	5.5	+2.8
12	3.1	6.3	+3.2

KAIULANI AVENUE - KALAKAUA AVENUE INTERSECTION:

	Worst Case 1-Hour CO Concentration (mg/m3)		
Receptor	1986 Existing	1988 With Project	Change
1	3.9	6.4	+2.5
2	3.5	5.5	+2.0
3	3.2	4.8	+1.6
4	42.1	41.9	-0.2
5	43.3	41.9	-1.4
6	43.7	41.4	-2.3
7	16.4	21.1	+4.7
8	20.6	25.8	+5.2
9	25.5	31.0	+5.5
10	1.5	3.5	+2.0
11	2.1	4.9	+2.8
12	2.6	5.9	+3.3

Source: Morrow, March 1986.

- By adding construction vehicle emissions, particularly those from diesel-powered vehicles with their inherently more visible and odorous emissions of particulates and hydrocarbons (aldehydes).

- By closing lanes to permit construction, thereby reducing roadway capacity and increasing queue lengths and vehicle emissions of carbon monoxide and hydrocarbons.

The latter of these is by far the most important result of the proposed Kalakaua Avenue Safety and Beautification project.

As noted in Chapter II of this report, it is expected that portions of the curb lane will be closed during construction hours while the sidewalk reconstruction and other work is underway. To determine what effect this would have on CO concentrations, the PAL model was run assuming only three travel lanes. Because lanes would be closed only at off-peak hours, traffic volume was assumed to be 80 percent of the peak-hour volume used for the post-construction estimates. The estimates shown in Table III-11 indicate that CO levels will probably decline at the receptor sites near the unused lane, but increase at all the other receptor sites due to the additional queueing resulting from the loss of the lane. The greatest impact of lane closure appears to be at the Kaiulani Avenue intersection.

The primary non-traffic related impact associated with the proposed project will be the impact of construction activities on the numerous open-front shops along Kalakaua Avenue. The dust and construction equipment emissions are difficult to quantify. However, because so many of the structures fronting the sidewalks must remain open to them during business hours, they clearly have the potential to be a source of annoyance to shop owners and customers during the 18 to 24 month construction period.

3.6.7 Mitigative Measures

The changes that are proposed to Kalakaua Avenue increase the overall performance of the roadway and decrease automotive emissions. CO concentrations at the locations currently having the highest CO levels will decline or remain the same. In most areas, the improved performance will lead to lower pollutant concentrations. However, increased queue lengths may cause localized increases in CO levels at some points. Continued fine-tuning of the traffic control system may reduce queue lengths and, therefore, automotive CO emissions.

The project's most significant air quality changes will be the increased particulate (fugitive dust) concentrations resulting from construction activity. The dust will constitute a nuisance for open-front businesses along Kalakaua Avenue during the 18-24 month construction period.

Both the construction contractor and the various business owners/operators can take steps to reduce the impacts. The most effective of these is for the contractor to keep the time during which construction is underway at any one point along street to a minimum. Careful operating practices can minimize dust generation, as can the use of water spray whenever possible. Dust barriers may be employed by both the contractor and shop owners. Plastic sheets and/or forced air barriers in doorways and/or positive pressure air conditioning can help reduce the intrusion of dust. Impacts can also be reduced by insuring that construction work is completed early enough each day so that all four lanes can be opened during the peak afternoon traffic period.

Table III-11

Estimated Maximum 1-Hour Carbon Monoxide Concentrations
During Construction (Assumes Lane Closure & Worst Case Conditions)

LEWERS STREET - KALAKAUA AVENUE INTERSECTION:

Receptor	Worst Case 1-Hour CO Concentration (mg/m3) 1986 Existing	During Construction	Change
1	3.1	1.1	-2.0
2	2.8	1.1	-1.7
3	2.6	1.1	-1.5
4	39.1	45.5	+6.4
5	39.8	44.8	+5.0
6	39.7	43.4	+3.7
7	14.2	26.2	+12.1
8	18.2	30.0	+11.8
9	22.6	34.0	+11.4
10	1.7	0.3	-1.4
11	2.2	0.4	-1.8
12	2.5	0.4	-2.1

KAIULANI AVENUE - KALAKAUA AVENUE INTERSECTION:

Receptor	Worst Case 1-Hour CO Concentration (mg/m3) 1986 Existing	During Construction	Change
1	3.1	1.4	-1.7
2	2.8	1.4	-1.4
3	2.6	1.3	-1.3
4	33.7	39.9	+6.2
5	34.6	39.9	+5.3
6	35.0	39.2	+4.2
7	13.1	20.7	+7.6
8	16.5	24.6	+8.1
9	20.4	28.5	+8.1
10	1.2	0.2	-1.0
11	1.7	0.3	-1.4
12	2.1	0.2	-1.9

Source: Morrow, March 1976.

3.7 NOISE IMPACTS

3.7.1 Existing Conditions

Existing noise levels on Kalakaua Avenue's sidewalks are moderately high, with bus and automobile traffic being the primary noise source. Spot measurements taken at a series of stations along the mauka sidewalk between 3:30 and 5:30 pm on a Thursday (see Table III-12) showed noise levels ranging from 45 to 87 decibels on the A-weighted scale (dBA). The average noise level at 10 of the 11 stations was between 70 and 73 dBA; at the eleventh it was 66 dBA. These noise levels are typical of urban areas having moderate to heavy motor vehicle traffic.

The highest individual noise readings were produced by accelerating transit and tour buses. The sidewalk in front of the Waikiki Hyatt Hotel had the highest average noise level. Much of this was due to the presence of a half dozen tour buses idling, and occasionally departing, from the passenger loading zone on the makai side of Kalakaua Avenue, directly opposite the measuring station. The presence of these buses also contributed heavily to the relative low variance and standard deviation of the noise measurements taken at that station. In general, the traffic noise levels were highest between Lewers Street and Kaiulani Avenue, the segment of Kalakaua having the highest traffic volumes.

About two-thirds of the shops, restaurants, and other businesses fronting the sidewalk keep their doors open during working hours (see Appendix C for a detailed breakdown). A few measurements were taken inside shops, and these suggest that interior noise levels in stores which keep their doors open are virtually identical to the levels measured immediately outside on the sidewalk. Stores which had closed doors were substantially quieter. The fact that so many of the businesses operate with open doors despite the relatively high noise levels suggests noise does not currently constitute a serious problem for these businesses.

3.7.2 Expected Impacts

3.7.2.1 Long-Term Effects

As indicated in Section 3.5, the proposed project will have no long-term effects on traffic volumes on Kalakaua Avenue or other streets. Neither will it significantly affect average vehicle speed. Hence, no significant change in traffic noise is expected. In areas where sidewalks are widened, adjoining structures will be farther from vehicular noise sources than at present; this will lower interior noise levels. A similar reduction in noise levels would be experienced by pedestrians walking along the outside edge of the road right-of-way. These changes would be so slight that they would probably not be noticed.

None of the proposed improvements would generate significant amounts of post-construction noise. Maintenance of some of the landscaping may involve periodic use of power equipment such as trimmers, but noise from such sources would occur only occasionally, and is on the same order of magnitude as that generated by existing maintenance activities.

3.7.2.2 Short-Term Construction Impacts

Construction activities associated with the proposed project will involve a variety of heavy equipment, trucks, and hand-held power tools (see Table II-1). Noise levels typically generated by such equipment are shown in Table III-13.

Table III-12

Existing Noise Levels at Selected Locations on
Kalakaua Avenue Sidewalks During the Afternoon Rush Hour:
Thursday, March 13, 1986, 3:30 to 5:30 pm

	Location										
	Kealo-hilani	Liliuo-kalani	Uluniu St.	Hyatt Hotel	Kaiu-lani	Int'l. Mktpl.	Sea-Side	Royal Haw'n.	Lewers	Beach-walk	Kalai-moku
Sample Size =	104	129	121	108	140	88	89	92	42	87	89
Average (dBA)	66.0	70.2	70.4	72.7	71.3	71.4	70.8	71.4	72.0	70.0	70.2
Maximum (dBA)	85	83	86	84	84	87	81	84	87	84	77
Variance (dBA)	39.2	22.7	20.7	10.9	15.8	15.5	13.9	18.1	25.5	15.9	6.7
Std. Deviation	6.3	4.8	4.6	3.3	4.0	3.9	3.7	4.3	5.0	4.0	2.6

Source: Compiled by Belt, Collins & Associates from noise measurements made between 3:30 and 5:30 pn, Thursday, March 13, 1986, using a Bruel & Kjaer Type 2219 Sound Level Meter.

Table III-13

Typical Construction Equipment Noise Levels

Equipment	Noise Level (dBA) @ 50 feet		
	Low	High	Average
Compactors (rollers)	73	75	74
Front Loaders	72	84	79
Backhoes	72	93	85
Tractors	76	96	80
Scrapers, Graders	80	93	85
Pavers	86	88	88
Trucks	75	94	91
Concrete Mixers	75	87	85
Concrete Pumps	81	83	82
Cranes (movable)	75	87	83
Pumps	79	81	76
Generators	71	92	78
Compressors	74	87	81
Pneumatic Wrenches	83	88	85
Jack Hammers and Rock Drills	81	98	88
Vibrator	69	81	76
Saws	72	81	78

Source: Compiled by Belt, Collins & Associates from U.S. Environmental Protection Agency, December 1971, pages 26 and A-8.

Demolition of the existing sidewalks (which will be done using hand and machine-mounted pneumatic tools producing noise levels of about 85 dBA at a distance of 50 feet) is probably the loudest construction activity that will be undertaken. Means (1986) estimates that a single 3-person crew can demolish approximately 200 square yards of sidewalk and curb per day. This is equivalent to about 50 linear feet per day on Kalakaua Avenue. At this rate, the typical business on Kalakaua (which has a street frontage of 50 feet or less) would experience the highest noise levels from sidewalk demolition (probably about 90 dBA) for only a day; average noise levels the day before and the day after would be about 5 decibels lower. The period of exposure could be decreased by assigning additional crews to demolition. The other construction phases are expected to be quieter than demolition, but average noise levels in the range of 80 to 85 dBA range are expected during concrete pours and while other activities requiring the use of heavy equipment and trucks are underway.

The construction area is very extensive, pedestrians are inherently difficult to shield, and the majority of the businesses and other activities which front the sidewalk are unable to operate effectively with closed doors. Because of this, it will be virtually impossible to shield pedestrians and persons on private property fronting the sidewalk from the effects of this construction noise. Consequently, an accelerated construction schedule is probably the most effective means of mitigating adverse noise impacts.

It must be emphasized that elevated noise levels will exist in only a limited area immediately around the portion of the sidewalk currently under construction, and will persist for only a short period of time (generally two to four weeks) at any one location. The longest durations will be in areas where storm drains and/or utility lines must be relocated or reconstructed. Even in these areas, however, the highest noise levels would persist for no more than a week or two.

The State of Hawaii Department of Health Community Noise Regulations (Title 11, Chapter 43, Community Noise Control for Oahu) govern noise emissions by construction equipment. Under these regulations, the maximum allowable noise levels at the right-of-way line are 60 dBA between 7:00 am and 10:00 pm, and 50 dBA between 10:00 pm and 7:00 am. As indicated above, many of the construction activities associated with the project will produce noise levels in excess of these daytime limits. Hence, a Department of Health permit will be needed as provided for in Section 6 of Chapter 43. The contractor will be responsible for obtaining this permit and for complying with any conditions it imposes.

Finally, it is worth mentioning that the regulations prohibit the issuance of permits which allow noise in excess of the 50/60 dBA standard between 6:00 pm and 7:00 am or at any time on Sundays and holidays. They also stipulate that construction noise levels in excess of 95 dB(A) may be allowed only Monday through Friday between between 9:00 am and 5:30 pm. More stringent time limitations may be imposed at the discretion of the Director of the Department of Health. These further restrictions will help insure that adverse noise impacts are minimized.

3.8 HISTORIC SITES

3.8.1 Existing Sites

The only site along Kalakaua Avenue that is on both the State and National Registers of Historic Places is the Moana Hotel. Completed in 1916, it is the oldest hotel in Waikiki and one of the oldest structures of any type remaining in the district. The Royal Hawaiian Hotel, completed in the early 1930s, is also listed on the Hawaii Register of Historic Places. It has been recommended for nomination to the National Register as well, but as of this writing has not been officially entered. Since the construction of the Royal Hawaiian Shopping Center, the Royal Hawaiian Hotel is not visible from the sidewalks of Kalakaua Avenue.

In addition to the two sites identified above which are listed on official registers, there are two other structures along Kalakaua Avenue which the Historic Sites Section of the State Department of Land and Natural Resources considers to be of particular historic interest (personal telephone communication from Nathan Napoka, October 28, 1983). The first is the Gump Building on the mauka-Diamond Head corner of the Lewers Street/Kalakaua Avenue intersection. The second is the Waikiki Theater No. 3. Neither of these is currently on either the State or Federal Registers of Historic Places, but both are considered to be of particular architectural and/or historic significance.

Another site of cultural interest is known as the "wizard stones of Kapaemahu." These stones are located on the makai, Diamond Head end of Kalakaua Avenue near the Moana Hotel. The significance of the stones has to do with a tale about four soothsayers from Tahiti who had magical healing powers and became well-loved by the people of Oahu. After living in Waikiki for many years, it became time for the wizards to return to their home in Tahiti. After a ceremony before their departure, the wizards transferred all of their powers to the stones and then simply vanished, leaving the rocks as a permanent reminder to the people of the good works which they had performed.

The wizard stones were recently moved for the construction of a bath house at the Ewa end of Kuhio Beach Park. They are set back from the street, and would not be affected by the proposed project.

3.8.2 Expected Impacts

The proposed Kalakaua Safety and Beautification project would have no effect on historic sites in Waikiki. Preliminary plans call for the width of the sidewalk in front of the Moana Hotel to be widened somewhat. Construction activities would result in temporary increases in noise and dust, as well as occasional re-routing of pedestrian traffic. The driveway to the Moana Hotel would remain open at all times. Any additional landscaping that might be provided would be in keeping with the character of the existing plantings and hotel. Following the proposed sidewalk widening, vehicular traffic would be farther from the Moana Hotel than is currently the case. As a result, traffic noise levels and concentrations of air pollutants from engines would be reduced on and around the property. No structural changes to the hotel would be required.

Preliminary plans call for widening the sidewalk in front of both the Gump Building and the Waikiki Theater No. 3. Construction activities could have minor short-term effects on the sidewalk environment in front of both structures, but the

additional sidewalk and/or landscaping that would exist following completion of the proposed project would enhance the visual setting and reduce pedestrian congestion in the vicinity of both buildings.

Should any historic or archaeological remains be discovered during construction, the Historic Sites Office of the Department of Land and Natural Resources will be immediately contacted.

3.9 HYDROLOGIC IMPACTS

3.9.1 Existing Conditions

Most of the storm runoff from Kalakaua Avenue is collected in curbside catch basins and carried by underground pipes to the Ala Wai Canal. Major discharge points are opposite Namahana Street, Kalaimoku Street, Lewers Street, Seaside Avenue, and Kaiulani Avenue. Runoff from the portion of Kalakaua Avenue southeast of the Waikiki Hyatt Hotel is collected in gutters and catch basins and channeled to an ocean outfall opposite Kapahulu Avenue.

At the time the Waikiki Transportation Plan was prepared (Futrell Hawaii, Inc., 1971:36) there were numerous drainage problems in Waikiki. However, several relief drains have been constructed since then (e.g., the Lewers Street Drain, the Kalakaua Avenue-Seaside Avenue Relief Drain and Sewer, the Kalakaua Avenue Drain, and the Beachwalk-Lewers Street-Kalia Road Relief Drains). These drain pipes have, for the most part, adequate capacity; however, the flat topography of Kalakaua Avenue, the tendency for the drains to silt up because of the low velocities in the pipes, and the irregularly and widely spaced drainage inlets along the curb have contributed to localized ponding and flooding of the street during heavy rains.

3.9.2 Probable Impacts

3.9.2.1 Long-Term Effects

If the proposed project is constructed, some existing pavement will be replaced by street trees and groundcover, thereby decreasing the amount of impervious surface and, consequently, the potential for runoff. However, the additional landscaped area would amount to less than 0.05 percent of Waikiki's total area, much too little to decrease stormwater discharge significantly.

The proposed action would increase the number of storm drain inlets along Kalakaua Avenue, but no major reconstruction of, addition to, or enlargement of storm drains is contemplated. Stormwater runoff will continue to be discharged at the same points as it is at present. In areas where the sidewalk would be widened, new storm drain inlets and pipes would be constructed to carry water from the new gutters to the existing system. Existing roof drains which carry runoff from adjacent structures into the street through pipelines passing beneath the sidewalk will be extended where necessary.

The limited area that would be bared at any one time (probably no more than 10,000 to 12,000 square feet), the small amount of erosive rainfall which occurs in Waikiki, the generally coarse nature of the underlying soils, and the very gentle slopes characteristic of the project area all suggest that erosion during construction will not be a significant problem. The only other potential water pollutants associated with

the proposed project in significant volumes are petroleum products such as fuel and lubricating oils, and only extremely small quantities of these materials are likely to escape into the environment. In view of the foregoing, no significant adverse effects on water quality are expected.

3.10 VISUAL IMPACTS

3.10.1 Existing Conditions

As previously noted, the existing public sidewalk areas along Kalakaua Avenue between Kuhio Avenue and Kapahulu Avenue are approximately 12 feet wide. Many portions of the mauka sidewalk are cluttered with hand billers, street lights, newsstands, traffic signal controllers, trash receptacles, coconut palms, planter boxes, and other items. More extensive landscaping is present on the makai side of the Avenue, especially in front of the Royal Hawaiian Shopping Center. The vegetation provides a pleasant break from an environment dominated by man-made structures and accentuates the benefits of Hawaii's mild climate.

In general, there are two trash receptacles per block, and bus stops are located every other block. The former are located on both the mauka and makai sidewalks, while the bus stops are only on the makai side of the street. The mauka side of Kalakaua Avenue is lined with buildings from two to thirty stories high, with taller structures predominating. On the makai side of the Avenue the buildings are generally lower, with the three- to four-story high Royal Hawaiian Shopping Center covering several blocks in the middle of the project area.

3.10.1.1 Daytime Views

A variety of views are available to pedestrians as they stroll through Waikiki. Buildings predominate in the central part of the district, but glimpses of lush Manoa Valley and the Koolau Mountains are still available up side-streets. Pedestrians walking along the eastern third of Kalakaua Avenue have views of the beach and ocean, as well as Diamond Head. On sunny days, Kuhio Beach Park is always crowded with people, and sailboats and cruise ships can be seen off the coast. Kapiolani Park lies just beyond Kapahulu Avenue, and its quiet, expansive open space contrasts with the contained bustle along the central portion of the Avenue. Fort De Russey's trees and open areas perform much the same function (albeit on a smaller scale) at the other end of the Kalakaua Avenue study area.

3.10.1.2 Nighttime Views

Waikiki is the focus of Honolulu's night life. Visitors, as well as many residents, converge here, especially on weekends. Restaurants and entertainment such as movies and nightclubs are the primary attractions, with secondary interests being shopping and strolling. Sidewalks have a tendency to become more crowded on weekend nights than they are during the daytime or on weekday nights. The relatively high light levels that are created at ground level by street lights and lights from adjacent businesses make it difficult to see the nighttime sky or mountains; as a result, the views are more contained than during the day.

3.10.2 Expected Impacts

3.10.2.1 Long-Term Impacts

The proposed project would introduce a number of features to the Kalakaua Avenue setting that would visually enhance the sidewalk environment. Included among these are:

- o A tapa design permanently inset into all of the crosswalks.
- o New pavement material for all public sidewalk areas.
- o New lighting fixtures, trash receptacles, publication stands, street signs, and other items which impart a consistent design theme to the Avenue.
- o Additional tropical shade trees, ground cover, and other landscape features which soften the harsh urban character of the existing sidewalks.

Figure III-4 is an artist's rendering of the entrance to Waikiki at Gateway Park following the proposed improvements. It shows how the entrance to Waikiki will appear following completion of the project.

3.10.2.2 Short-Term Construction Impacts

Typically, construction sites are not visually pleasing. Waikiki's most recent experience with road improvements, the Kuhio Avenue widening project, showed that stringent controls on construction operations are necessary in order to avoid substantial adverse short-term impacts on the visual setting during construction. Such controls are a part of the Kalakaua Avenue Safety and Beautification project. To insure that the cost of these controls is taken into account in selecting a contractor for the project, required mitigation measures will be stipulated in detail in the contract documents.

The most important step that is being taken to limit adverse visual impacts is to limit (1) the number of lineal feet of the Kalakaua Avenue sidewalks that may be under construction at any one time and (2) the length of time during which construction may be underway on a particular sidewalk segment. By requiring that construction affect only a small part of Kalakaua Avenue at any one time, the City will insure that most of Waikiki's ambience can be enjoyed by visitors regardless of when they arrive. By limiting the time that construction may affect any one area, the City will insure that none of the businesses which line the Avenue and depend upon pedestrians for their economic livelihood will find themselves surrounded by ugly, disruptive construction for more than a short period of time. Efforts to maintain a visually attractive environment throughout construction may add to the direct cost of the project. However, the economic impact of visitors avoiding Waikiki, as they would undoubtedly do if it were allowed to become a shambles during construction, would be far more severe.

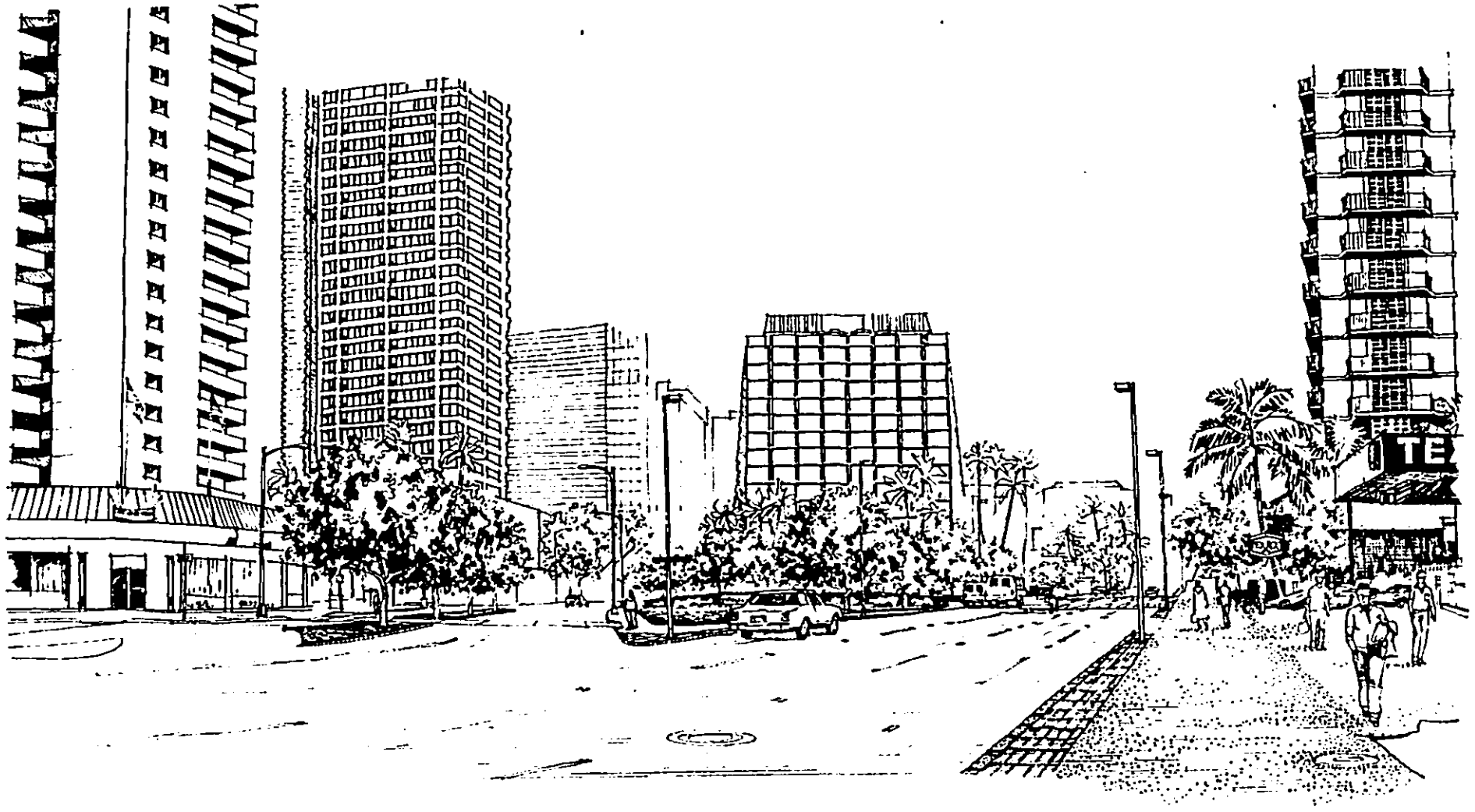


Figure III-4 Appearence of Kalakaua Avenue Near Gateway Park Following Project Completion.

3.11 IMPACTS ON PEDESTRIAN MOVEMENT

3.11.1 Existing Conditions

The sidewalks along Kalakaua Avenue are frequently crowded with people, with volumes in excess of 3,300 persons per hour having been recorded in central Waikiki. The mauka sidewalk is typically the busier of the two. The highest pedestrian volumes generally occur from 8:00 pm to 9:00 pm between Lewers Street and Kaiulani Avenue. The sidewalks on the makai side, especially those fronting the Royal Hawaiian Shopping Center, generally have more adequate and attractive space for pedestrians than do those in other portions of the corridor. As the result of an agreement between the landowner and the City, the public sidewalk in front of the Royal Hawaiian Shopping Center has been constructed on private property, with what would normally be the sidewalk area within the street right-of-way having been given over to landscaping and walkways.

Only about two-thirds of the existing sidewalk area is available for pedestrian use in most locations. The remainder is occupied by such things as traffic signal poles and signal control boxes, newspaper racks, fire hydrants, utility poles, light standards, and a few benches. In some areas, coconut trees also claim a portion of the sidewalk space.

Pedestrians frequently cross streets in Waikiki with no regard to crosswalk signals and little attention to vehicular traffic. This has created a potentially hazardous situation for vehicles and pedestrians alike. During the design phase, consideration was given to the use of pedestrian overpasses as a means of reducing motor vehicle/pedestrian conflicts, but experience in Hawaii and elsewhere suggests very low usage rates in situations such as Waikiki's. This, together with their unattractive appearance led the City to use ground-level crosswalks. However, as discussed below, other design features have been incorporated in the proposed plan which will improve pedestrian movement through Waikiki.

3.11.2 Expected Impacts

3.11.2.1 Probable Long-Term Effects

The proposed action includes several different measures which decrease the potential for pedestrian-vehicle conflicts and improve the walking environment. First, the increased width reduces congestion on the sidewalk, making Kalakaua Avenue a more pleasant promenade. In high traffic areas, newspaper racks, traffic signal controllers, light standards, trees, and other obstacles will be cleared from the walkway area, leaving an unobstructed space at least 10 feet wide. Wherever possible, additional sidewalk space will be provided on corners and adjacent to mid-block crosswalks so that there will be adequate space for the pedestrian queues which form on red lights.

Second, all of the crosswalks will be widened. This will allow pedestrians to cross the street on a broader front without leaving the protection of the crosswalk stripes. "Barnes walks", a type of crosswalk which allows diagonal, as well as perpendicular, movements through the use of an all-pedestrian signal phase, will be provided at Kaiulani Avenue, Seaside Avenue, and Paoakalani Avenue.

Finally, the design contains many elements that will significantly enhance the pedestrian environment. There will be major additions to existing landscaping within the public right-of-way, including street trees and planters. Crosswalks will be permanently delineated in the street with contrasting material. New modern lighting fixtures will be installed, including up-lighting for the shade trees. Attractive new traffic signal controllers will replace the dilapidated units which now occupy valuable sidewalk space. These changes will extend the sense of quality typical of a few recently redeveloped areas, such as the Hyatt Regency Hotel and the Royal Hawaiian Shopping Center, to the remainder of Kalakaua Avenue.

3.11.2.2 Short-Term Construction Impacts

During construction, it will be necessary to reroute pedestrians around construction areas. As noted elsewhere in this report, portions of both mauka and makai sidewalks will remain open at all times. This will probably involve splitting each sidewalk longitudinally so that work may proceed on one half while the other half remains open to pedestrians. An alternative in some areas may be to close the curb lane to vehicular traffic so that pedestrians can be diverted into it. This last alternative has the drawback of substantially reducing the vehicular carrying capacity of the roadway for the duration of construction, whereas the sidewalk-splitting approach allows it to remain in full service except during working hours.

In sidewalk areas where work is underway, there will inevitably be idle construction equipment, uneven surfaces, and other hazards. Adequate warning signs will be erected in both English and Japanese and the warnings enforced through the physical presence of off-duty police officers and/or private security personnel. Nonetheless, it is likely that the risk of accident will be greater during the construction phase of the project than it is at present or will be following completion of the work.

3.12 IMPACTS ON UTILITIES

3.12.1 Existing Conditions

Beneath the sidewalks and portions of the roadway along Kalakaua Avenue, lies a network of telephone, electrical, gas, water, sewage, and drainage lines. The water, telephone, electric and gas lines are generally between two to five feet beneath the surface. Many of the sewer lines and all of the drainage lines flow by gravity; they are, therefore, set at a slope, so that their depth varies.

In order to access its underground cable system, the Hawaiian Telephone Company has pullboxes, handholes and manholes located within the sidewalk area. Electrical power lines are laid in much the same way as the telephone lines. For the most part, their is excess capacity within the existing underground ducts to accommodate additional electrical and telephone lines.

Gasco, Inc. maintains a system of gas mains within the project area. These mains vary in size from two to four inches in nominal size. Water, sewage, and drainage systems are maintained by the City and County of Honolulu.

For the most part, the existing utility lines run parallel to Kalakaua Avenue beneath the existing sidewalks. Lines cross beneath the street periodically.

3.12.2 Expected Impacts

The Hawaiian Telephone Company currently has no plans to alter its conduit system along Kalakaua Avenue. However, it does plan to expand two existing ducts. These cross Kalakaua Avenue in two places: near Lewers Street and at Seaside Avenue. It is intended that the City's construction plans will be coordinated with those of the utility. Telephone lines beneath the sidewalk and roadway are not expected to require movement or major disturbance during the construction/reconstruction period. The design of landscaped areas provides adequate space for maintenance vehicles to gain access to manholes.

The Hawaiian Electric Company (HECO) currently has no plans to expand its duct lines within the Kalakaua Avenue right-of-way. It is not expected that any electric lines will be disturbed during construction of the project. Should any damages to electric lines occur during the construction process, the HECO Trouble Dispatch will be contacted.

During the construction phase of the project it will not be necessary to relocate gas lines.

Current water, drainage and sewage lines will remain largely unaffected by the completed project. Additional inlets and catch basins will be installed and decrease localized ponding which now occur along Kalakaua Avenue during heavy rains. Examples of proposed drainage schemes can be seen in Figures 10a-10d. Runoff levels will not change.

3.13 IMPACTS ON PUBLIC SERVICES

3.13.1 Short-Term Construction Impacts

Kalakaua Avenue provides the principle, and in many cases the only, means of access to many of the structures which are located along it. The provision of adequate police, fire, and emergency service depends upon the road remaining open throughout the construction period. As described in Section 3.5 of this report, construction activities will reduce the level of service provided by the roadway. Efforts are being made to limit the adverse effect on traffic flow, but the closure of lanes during some parts of the day will inevitably lead to congestion and increased travel times.

Several factors suggest that police, fire, and other emergency personnel will be able to reach the places where they are needed despite the construction activity. The first is the fact that Kuhio Avenue is only a block away and can be used in conjunction with the many intersecting streets to avoid long trips on Kalakaua Avenue. The second is that while the curb lane adjacent to the section of sidewalk under construction will be closed to through traffic, much of it will remain open for local traffic. Third, pedicabs and other non-motorized vehicles will be prohibited from using traffic lanes during construction. Emergency vehicles would be able to use open portions of this lane as an alternative route. If the utility of this option is to be maximized, contractors should inform their operators of the need to keep the curb lane reasonably clear of obstructions except when it is absolutely necessary.

Additional security personnel, possibly including off-duty police officers, will be hired to help with traffic control during working hours for the duration of the construction period.

3.13.2 Long-Term Impacts

The proposed project will improve or maintain the performance of every intersection within the project area. This, in turn, will make the hotels, businesses, and apartments that adjoin the roadway more accessible to emergency vehicles, thereby improving the level of service that can be provided.

The proposed plan calls for stricter enforcement of no parking/no stopping/no loading regulations; this could require a higher level of police activity, at least until users have adjusted to the new arrangements. Unlike the existing loading areas, which are delineated only by signs, those provided by the proposed design are physically separate from the through-lanes. It is expected that this will make them easier to identify and make it simpler to identify violators. Finally, it is hoped that the improved pedestrian flow which the project provides will reduce jaywalking at intersections, improving safety and reducing the need for police surveillance.

CHAPTER IV

ALTERNATIVES TO THE PROPOSED PROJECT

Previous plans for Waikiki called for major changes in its street system. Key elements of those proposals included:

- Completion of the Kuhio Avenue widening project as soon as possible so that it could serve as the major Diamond Head-bound arterial through Waikiki (accomplished as of September 1985).

- Experimental closing of Kalakaua Avenue to through traffic between Kaiulani and Kapahulu Avenues.

- Eventual conversion of Kalakaua Avenue into a pedestrian mall from Kuhio Avenue to Kapahulu Avenue "with designated areas transformed into attractive and convenient malls, while accommodating the circulation needs of hotels and businesses".

- Creation of landscaped pedestrian ways along major Waikiki arterials and selected *mauka-makai corridors*.

These recommendations assumed that traffic could be re-routed onto Kuhio Avenue or diverted around Waikiki entirely. Subsequent detailed engineering studies (Belt, Collins & Associates; January 1983 and December 1983) examined the feasibility of several means of implementing the recommendations, as well as two alternatives which substituted sidewalk widening along portions of Kalakaua Avenue for the complete pedestrian mall. The alternatives examined in detail included:

(1) Conversion of Kalakaua Avenue into a pedestrian mall between Kuhio Avenue and Kapahulu Avenue.

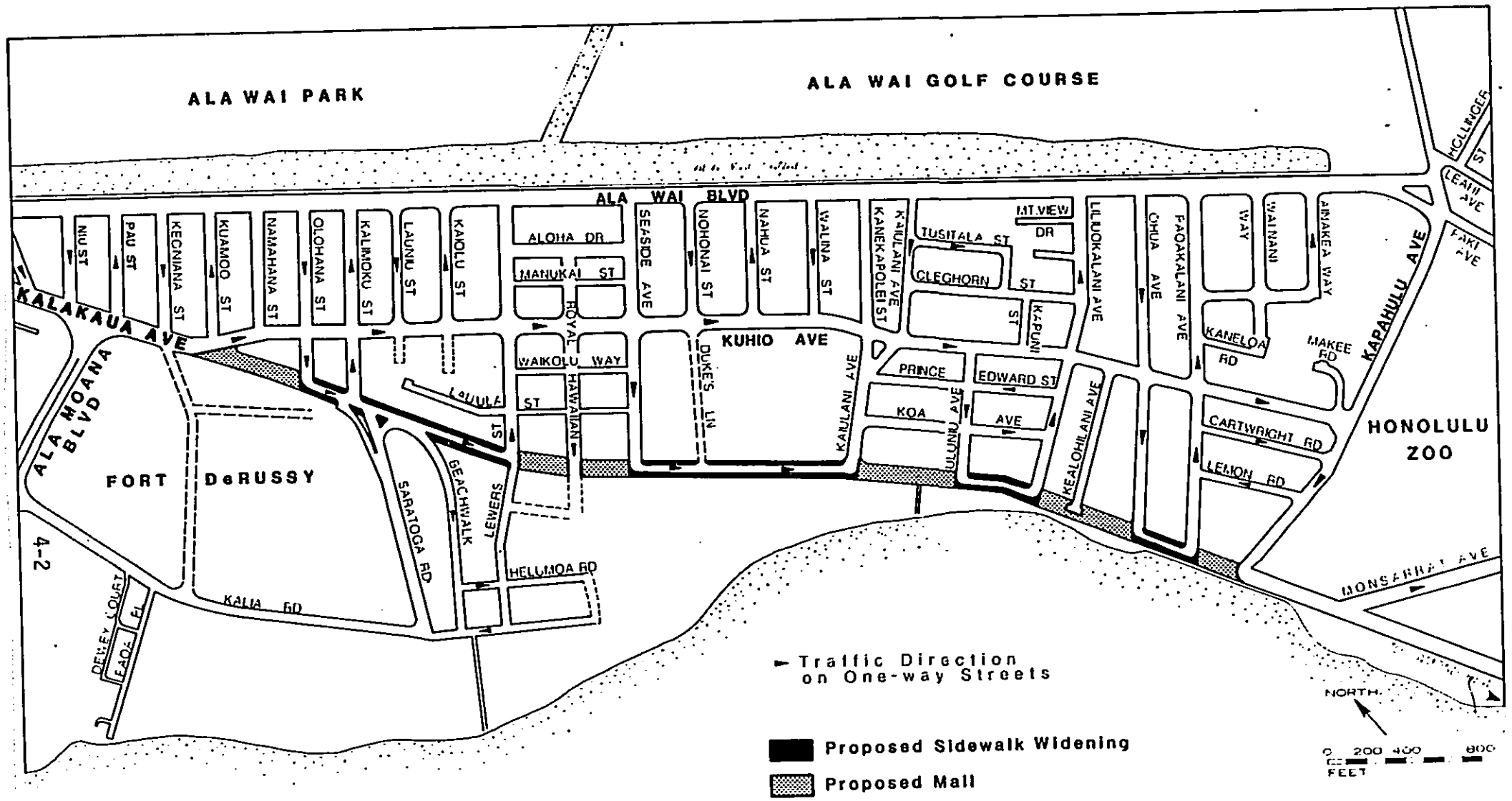
(2) A hybrid involving sidewalk widening along the Kuhio Avenue to Kaiulani Avenue segment of Kalakaua Avenue and mall conversion between Kaiulani and Kapahulu Avenues.

(3) Sidewalk widening, but no pedestrian mall, along the entire Kalakaua Avenue corridor (one variant of which constitutes the "proposed action" described in Chapter II of this report).

Descriptions of these alternatives, together with brief discussions of their advantages and disadvantages, are presented below.

4.1 ALTERNATIVE I: COMPLETE MALL CONVERSION

As shown in Figure IV-1, this alternative involves the closure of Kalakaua Avenue to all through traffic between Kuhio Avenue and Kapahulu Avenue. Pedestrian malls would be created in the following segments of Kalakaua Avenue:



Source: Belt ,Collins & Associates

Figure IV-1 Alternative 1: Complete Mall Conversion.

- o Kuhio Avenue to Olohana Street;
- o Lewers Street to Seaside Avenue;
- o Kaiulani Avenue to Uluniu Avenue;
- o Liliuokalani Avenue to Ohua Avenue; and
- o Paoakalani Avenue to Kapahulu Avenue.

A typical plan view of this alternative is shown in Figure IV-2. Figure IV-3 shows a typical cross-section at these segments.

Under this alternative, the remainder of Kalakaua Avenue would be reduced to a 36-foot wide roadway carrying local traffic and service vehicles only. Except for Kealohilani Avenue (which would remain two-way, with a turnaround provided at Kalakaua Avenue) intersecting streets would be organized as one-way loops. Figure IV-4 shows a cross-section typical of these segments.

Alternative 1 would necessitate several changes to existing traffic patterns:

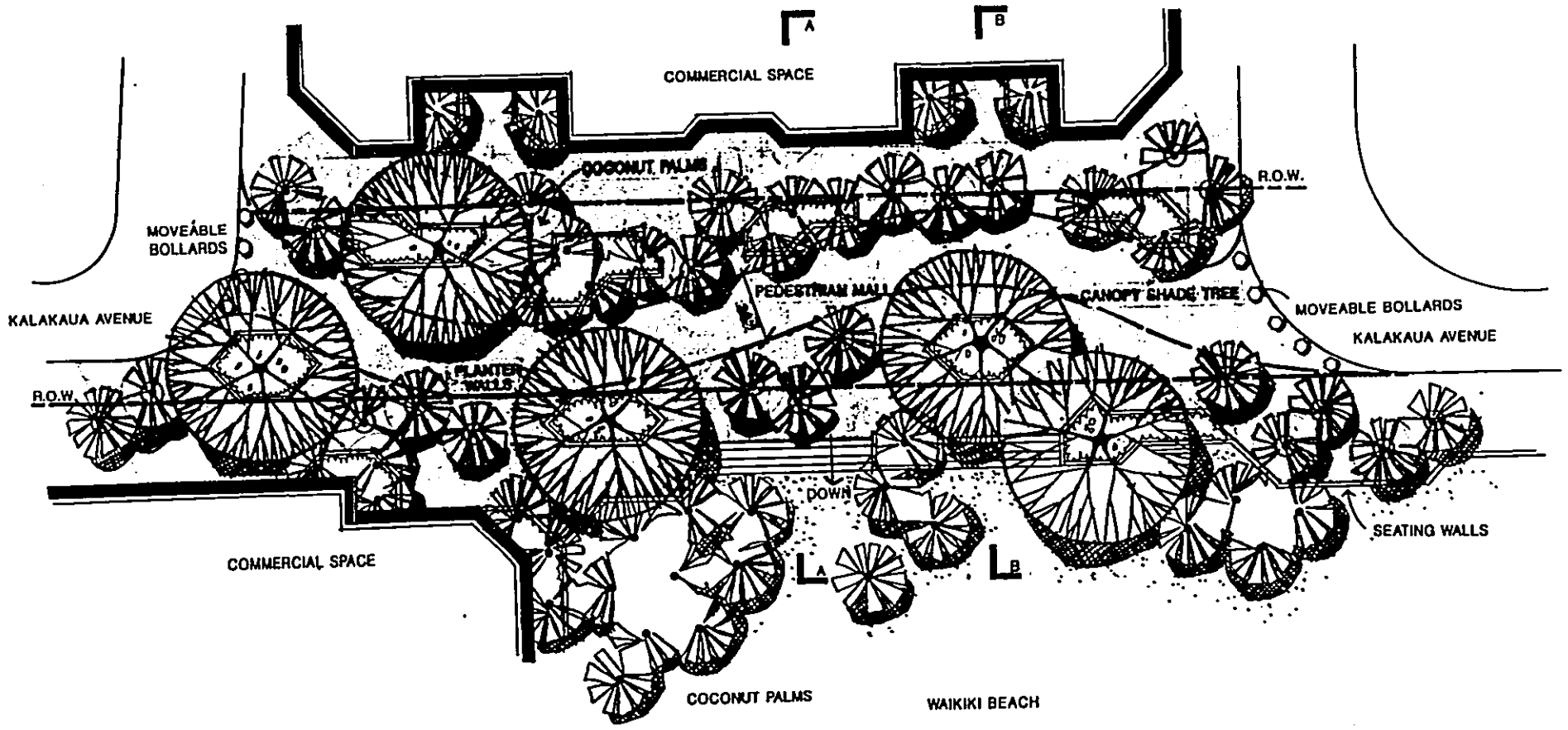
- o Conversion of Kuhio Avenue to four lanes Diamond Head-bound and one exclusive Ewa-bound city transit bus contra-flow lane from Kapahulu Avenue to Kalakaua Avenue.
- o Shifting all Diamond Head-bound transit buses to Kuhio Avenue.
- o A change in the direction of Seaside Avenue from mauka-bound to makai-bound.

The engineering study identified the following advantages for this alternative:

- o Most vehicular traffic would be removed from Kalakaua Avenue; pedestrians would have free reign over most segments and would compete only with local and service traffic in areas where some vehicular movement was allowed.
- o It would optimize the corridor for pedestrian use. Improvements to the mall could be designed to provide the same 36-foot wide clear space as the remaining roadway, thereby facilitating its use for parades.
- o Adequate sidewalk space would exist within the 80-foot right-of-way even in areas where a 36-foot wide roadway was left for local traffic.
- o All bus transit service would be centralized on Kuhio Avenue.

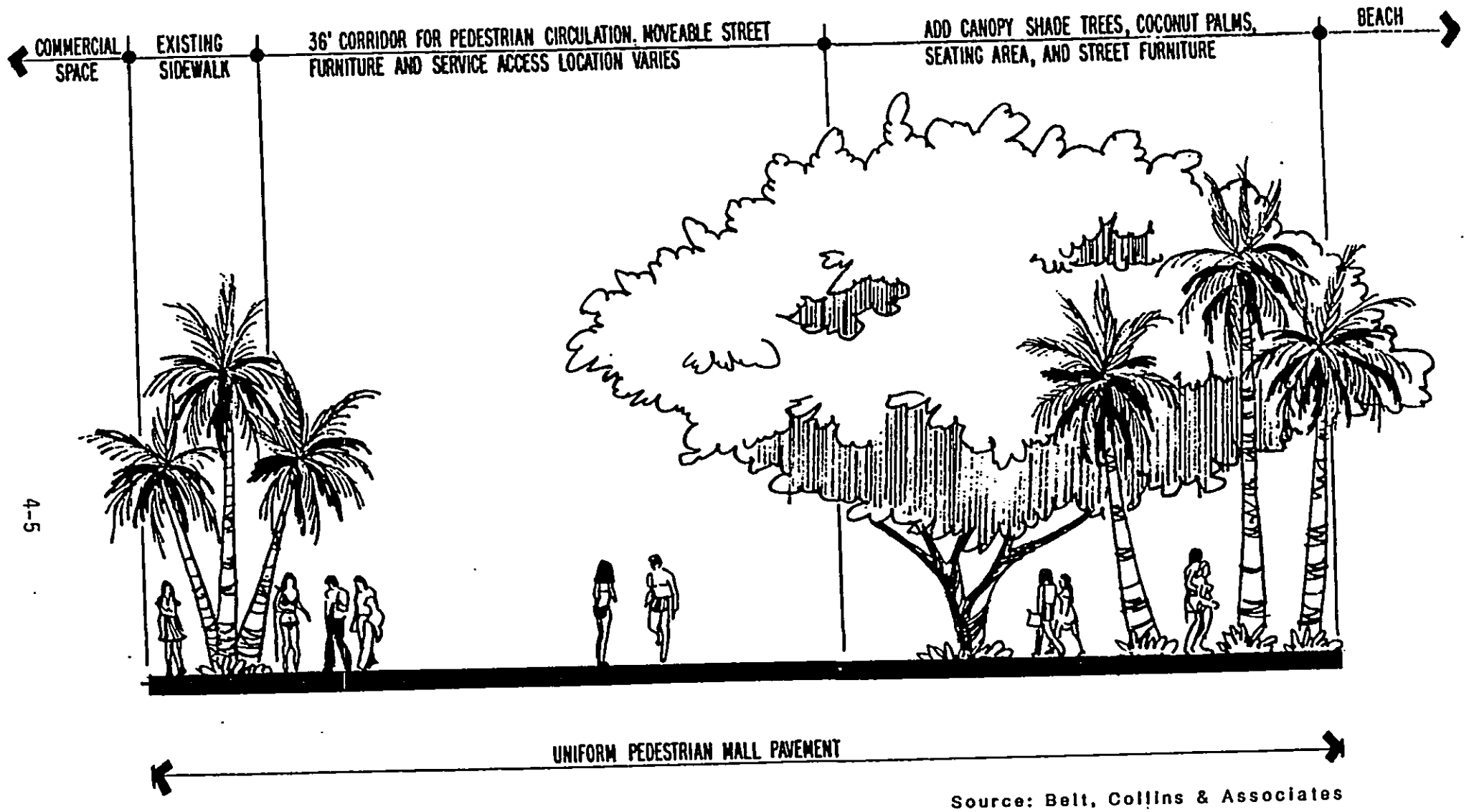
The disadvantages listed were:

- o An over-capacity situation on Kuhio Avenue at its intersection with Kalaimoku Street resulting in severe congestion at that point. Over-capacity situations at other Kuhio Avenue intersections would be avoided only because of the upstream flow constraint imposed by this first constriction.
- o Extreme congestion at several Ala Wai Boulevard intersections with consequent effects on many surrounding thoroughfares (e.g., Kapiolani Boulevard, Date Street, and Kapahulu Avenue).



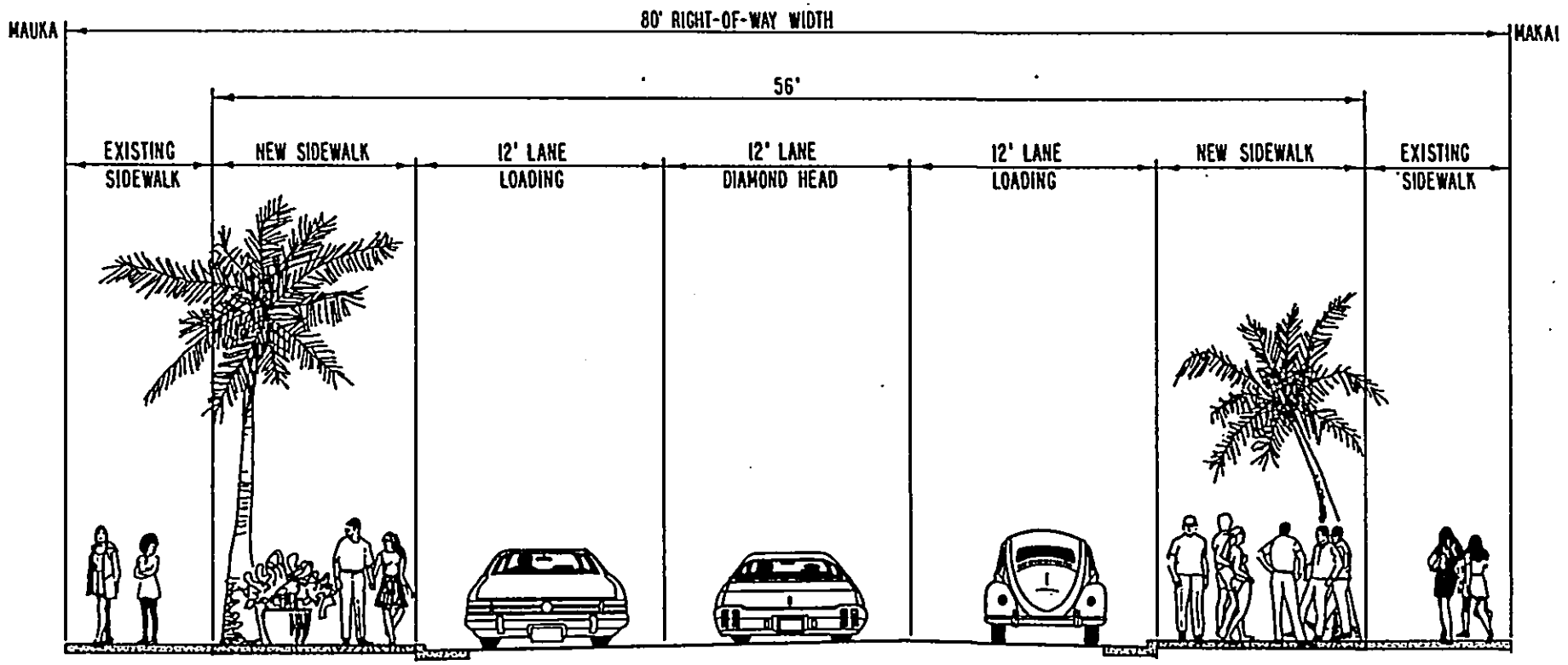
Source: Belt, Collins & Associates

Figure IV-2 Typical Plan View of Kalakaua Avenue Pedestrian Mall as Found in Segments of Alternatives 1 and 2.



Source: Belt, Collins & Associates

Figure IV-3 Typical Section of Kalakaua Avenue Pedestrian Mall as Found in Segments of Alternatives 1 and 2.



Source: Belt, Collins & Associates

Figure IV-4 Typical Section of Kalakaua Avenue Between Pedestrian Mall Segments, as Described in Alternatives 1 and 2.

- Increased susceptibility to major traffic jams in the case of traffic accidents or other events which partially or wholly block either of the two remaining through streets (Kuhio Avenue or Ala Wai Boulevard).

4.2 ALTERNATIVE 2: PARTIAL MALL CONVERSION

The second alternative formulated and examined in detail involved conversion of part of Kalakaua Avenue into a pedestrian mall combined with sidewalk widening along the remainder (see Figure IV-5). This plan calls for continued vehicular traffic over a 36-foot wide roadway (sufficient for three traffic lanes) between Kuhio Avenue and Kaiulani Avenue. Between Kaiulani and Uluniu Avenues, Liliuokalani and Ohua Avenues, and Paoakalani and Kapahulu Avenues, Kalakaua Avenue would be converted into a pedestrian mall (see Figures IV-2 and IV-3). Uluniu and Liliuokalani Avenues and Ohua and Paoakalani Avenues would be connected by 36-foot roadways (see Figure IV-4) accommodating service vehicles and local traffic. Kealohilani Avenue would remain two-way, with a turnaround provided at Kalakaua Avenue.

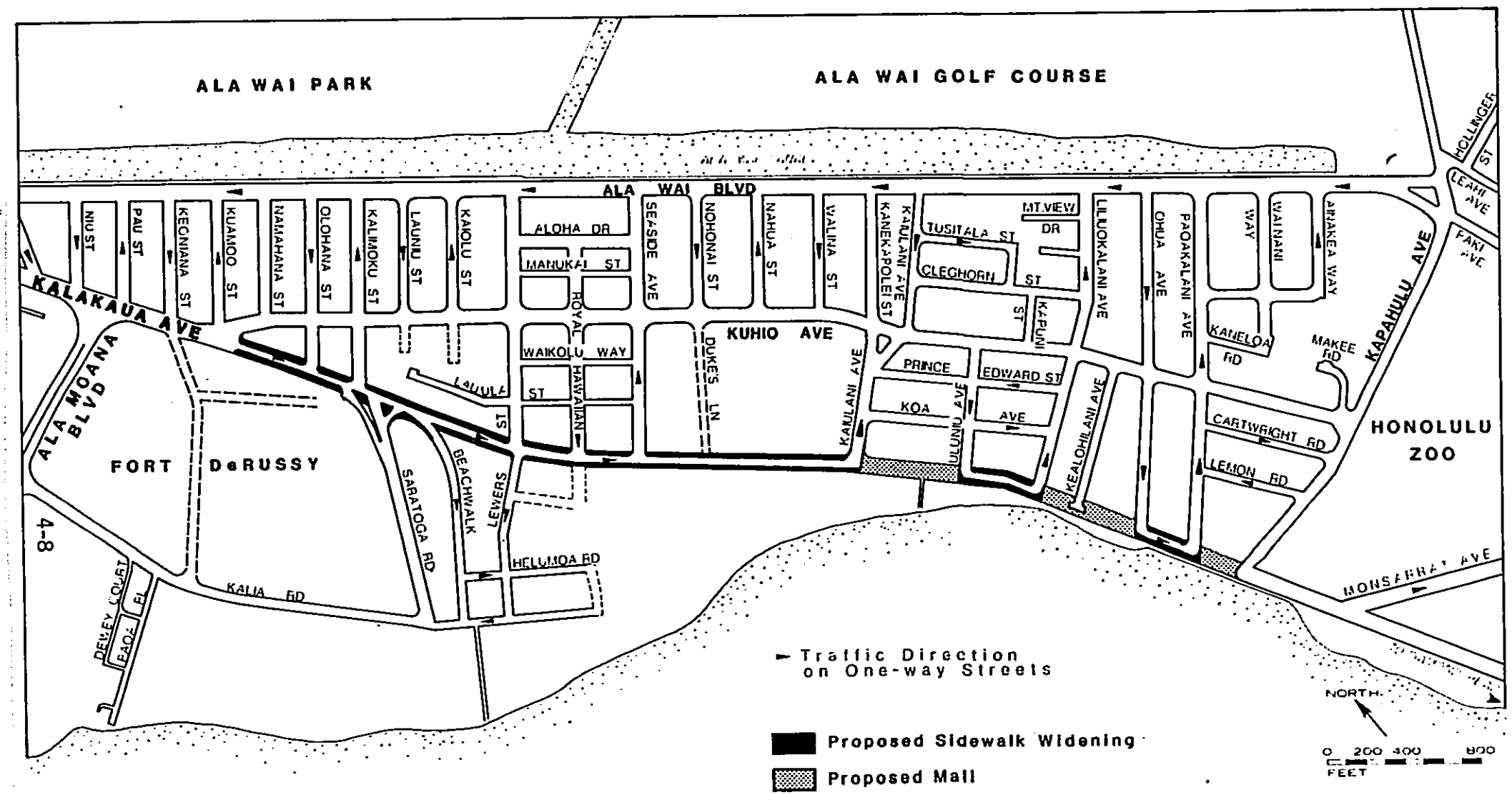
In this alternative, Kuhio Avenue would continue as a five-lane, 56-foot wide roadway. Between Kalakaua and Seaside Avenues and between Uluniu and Paoakalani Avenues, Kuhio would have two through lanes Diamond Head-bound and two Ewa-bound through lanes, plus a turning lane. Between Seaside and Uluniu Avenues, and between Paoakalani and Kapahulu Avenues, Kuhio would have three Diamond Head-bound and two Ewa-bound lanes.

Advantages of this alternative are that:

- Traffic patterns through the Ewa end of Waikiki would remain largely unchanged.
- Projected traffic volumes could be accommodated (albeit at relatively poor service levels) at all major intersections (note, however, that a slight increase in the green time for Kuhio Avenue would be required at its junction with Kapahulu Avenue).
- The bus route on Kuhio Avenue would increase transit accessibility in the Kapahulu Avenue to the Kaiulani Avenue area.
- The proposed sidewalk widening and pedestrian malls would provide a pedestrian environment nearly as attractive as the full mall. Use of a 36-foot wide obstacle-free corridor through the malls would assure the continued availability of Kalakaua as a parade route.
- Maintenance of two-way flow on Kuhio Avenue is desirable.
- Through-traffic would be discouraged from using Kalakaua Avenue, thereby decreasing the total number of vehicles passing through Waikiki.

Major disadvantages of Alternative 2 are as follows:

- Kuhio Avenue would be the only roadway carrying Diamond Head-bound traffic between Kaiulani and Kapahulu Avenues. Many intersections on Kuhio Avenue and Ala Wai Boulevard would be operating at capacity (Service Level E). This implies severe congestion and substantial travel delays. Temporary blockages (accidents, stalled cars, etc.) could produce major traffic tie-ups.



Source: Belt, Collins & Associates

Figure IV-5 Alternative 2: Partial Mall Conversion.

- The arrangement would produce a very significant increase in mauka-bound traffic on Kaiulani Avenue between Kalakaua and Kuhio Avenues.

- The reduction in roadway width on Kalakaua Avenue Ewa of Kaiulani would greatly decrease the level of service provided and increase the frequency of traffic jams resulting from traffic accidents and stalled cars. No further increase in traffic through Waikiki could be accommodated.

4.3 ALTERNATIVE 3: SIDEWALK WIDENING

4.3.1 Proposed Project

This alternative maintains four traffic lanes throughout the length of the project area while widening the sidewalk area. It is the proposal which engineering studies indicate is the most feasible from a traffic engineering viewpoint, and one variant of it involving a 9-foot increase in sidewalk width is described in Section 2.2 of this report. Among its advantages are that:

- It involves only slight changes to existing Waikiki traffic patterns and maintains fair to good service levels at all major intersections.

- The provision of two through routes in each of the Diamond Head and Ewa directions (four lanes Ewa-bound on Ala Wai Boulevard plus two on Kuhio Avenue; four Diamond Head-bound lanes on Kalakaua Avenue plus two on Kuhio Avenue) distributes traffic evenly and reduces traffic flow problems brought on by accidents and other stalled vehicles.

- Sidewalk widening provides sufficient space in most areas to create a much improved pedestrian environment.

- Sufficient unobstructed space is provided along Kalakaua Avenue for it to continue as the main parade route through the area.

From the pedestrian's viewpoint, an undesirable feature of the sidewalk widening alternative is that it lacks a mall area devoted entirely to pedestrian use; hence, pedestrians and motor vehicles would have to continue to coexist. Offsetting this is the fact that the vehicular capacity through the Waikiki corridor would remain unchanged.

4.3.2 Other Sidewalk Widening Alternatives

Several variants of the sidewalk widening alternative were analyzed before settling on the design described in Section 2.2 of this report. These included:

- The "Sidewalks Simulation Plan" developed by Belt, Collins & Associates. This plan provides three lanes along most of Kalakaua Avenue, except that there are five lanes on the approach to Lewers Street, and four lanes on the approaches to Royal Hawaiian Avenue, Seaside Avenue, and Kaiulani Avenue. The additional lanes are used exclusively for turning movements. (Schematic diagrams of the laneage for this and the four other alternatives described below may be found in the Computer Simulation of Traffic Alternatives for the Kalakaua Avenue Safety and Beautification Project found in Appendix A.) This alternative has a pavement width of only 40 feet in most

places, seven feet less than the recommended design. Consequently, it would be possible to provide wider sidewalks/additional landscaping within the existing 80-foot right-of-way.

- Task Force Plan 2. In this alternative, Kalakaua Avenue would have four lanes. The existing Saratoga Road right turn lane onto Kalakaua Avenue would be widened to two lanes to increase its capacity, and crossing signals would be used to minimize interference with pedestrians. To increase pedestrian safety, the separate right turn lane from Kalakaua Avenue to Saratoga Road would be eliminated, and right turns would be made from the curb lane. Also, one through-lane on the Saratoga Road approach would be eliminated to reduce the pedestrian crossing distance.

- Plan 3. Under this plan, Kalakaua Avenue would have four lanes within the project limits, except for five lanes at the Lewers Street intersection. This alternative requires additional property acquisition on the approach to Lewers Street.

- Plan 4. For this plan, Lewers Street would be converted to one-way makai-bound between Kuhio Avenue and Kalakaua Avenue. This would result in more left turns being made at Seaside, and an additional left-turn lane would be added to accommodate these. Further, the makai-bound lanes at Kaiulani would be eliminated to make it one-way, mauka-bound; one left turn and three through-lanes would be provided on the Kalakaua Avenue approach to Kaiulani. Uluniu Street would be converted from one-way makai-bound to two-way traffic between Kuhio and Kalakaua Avenue. The makai-bound traffic on Lewers Street which this alternative permits would lead to significantly higher traffic volumes on Kalia Road between Lewers Street and Saratoga Road, and the return of the congestion which was evident here when the same configuration was tried briefly in the early 1970s.

Traffic performance for existing conditions, the proposed project, and each of the other four alternatives described above were developed as part of the computer simulation study (see Appendix A, Table III-6B). Results of that study indicated that each of the alternatives would provide better peak-hour performance on Kalakaua Avenue than the existing configuration. According to the report:

> With the exception of Plan 2, the magnitude of the improvement is similar for all the alternatives. Based on the reduction in vehicle delay, the following ranking of projects was obtained for an 80-second traffic signal length:
>
> - 1st - Sidewalks Simulation Plan and Plan 4 - 30% Reduction
> - 3rd - Plan 3 - 22% reduction
> - 4th - Plan 5 /the proposed plan/ - 17% reduction
> - 5th - Plan 2 - 7% reduction

The same report concluded that traffic performance on the existing roadway could be improved by about 10 percent (reduction in delay) if the traffic signal cycle length is increased from 80 to 90 seconds. However, it was considered likely that the longer cycle length would add to the already considerable jaywalking problem, and this was considered undesirable from a safety viewpoint.

While the Sidewalks Simulation Plan and Plan 3 would result in slightly less delay than the proposed plan, both would require the acquisition of extremely expensive adjacent private property in the heart of Waikiki. Because of this, and because of the reduced flexibility provided by the Simulation Plan's 40-foot/three lane roadway, they were judged infeasible at the present time. With respect to Plan 4, it was judged that the problems it is likely to produce on Kalia Road more than outweighed its slight performance advantage on Kalakaua Avenue.

4.4 ALTERNATIVE 4: NO PROJECT

The "no project" alternative would maintain the current laneage and sidewalk configuration. On the positive side, most construction-related impacts would be avoided, and it would be less costly than the construction alternatives. However, this is more than offset by the fact that there would be no improvement in Waikiki's aesthetic and pedestrian environment, or in traffic performance. Moreover, for reasons summarized below at least some construction (with its attendant disruptions) would still be required.

Kalakaua Avenue's concrete foundation was constructed many years ago, and it has been resurfaced numerous times. As a consequence, a thick layer of asphalt has built up, the roadway's original crown has been accentuated, the center of the roadway is now considerably higher than the sidewalks on either side, and the gutters have come quite shallow. As a result, there are often many puddles of standing water along the curbs from rain or proprietors washing the sidewalk. This problem must be corrected regardless of how right-of-way space is allocated between the roadway and the sidewalk.

The most immediate solution to this problem is to cold-plane the roadway. Cold-planing, a process used in the recent resurfacing of the H-1 Freeway between Middle Street and downtown, involves the removal of the asphalt build-up by mechanical means. The proper profile is restored in the process, and the road is then resurfaced. Because the road can be repaired one or two lanes at a time, routing of traffic during the construction period is facilitated. The advantages of this "no project" alternative include:

- Most of the advantages listed in Alternative 3, above, as they relate to existing vehicular traffic patterns, the provision of through routes, and unobstructed space along Kalakaua Avenue to maintain its use as a parade route.

- The fact that it is relatively low-cost solution to the current localized drainage problem.

The primary disadvantage of the "no project" alternative is that it completely misses the opportunity to allocate additional space to pedestrians and to upgrade Waikiki's aesthetic environment, the two principal objectives of the proposed project. The sidewalks will continue to deteriorate and become more dangerous, and newsstands, handbillers, pedicabs, skateboards, and rickshaws will continue to proliferate. The eventual result will be the slow strangulation of Waikiki, and the physical decline of the State's greatest visitor attraction. This will occur at the very time our visitor industry is becoming more dependent on its ability to attract repeat customers in the face of strong overseas competition.

4.5 RECOMMENDED CONFIGURATION

At this time, a preliminary decision has been made in favor of Alternative 3, sidewalk widening. While it would produce a less dramatic change in Waikiki's pedestrian environment than would creation of a full pedestrian mall, it would achieve most of the objectives that have been established and would allow far better service levels for vehicular traffic. It would also allow much greater flexibility than the mall alternatives in adjusting to unusual circumstances such as accidents, roadway maintenance, and special events.

CHAPTER V

LIST OF NECESSARY APPROVALS AND AREAS REQUIRING FURTHER STUDY

5.1 LIST OF NECESSARY APPROVALS

Listed below are the approvals needed before construction of the Kalakaua Avenue Safety and Beautification Project can begin.

Approval Needed	Approving Agency or Body
Special Management Area Permit	Honolulu City Council
Development Conformance Permit for the Waikiki Special Design District	City & County Department of Land Utilization
Grading Permit	City and County Department of Public Works/Department of Land Utilization
Street Construction, Signing, Lighting, and Pavement Markings	City and County Department of Transportation Services
Electrical Connection Approval	Hawaiian Electric Company
Gas Connection Approval	Pacific Resources Inc., Gasco,Inc.
Telephone Connection Approval	Hawaiian Telephone Company
Street Tree Plan	City and County Department of Parks and Recreation
Permit to Perform Work within State Highways	State Department of Transportation
Conditional Use Permit for Construction Activities	State Department of Health

5.2 AREAS REQUIRING FURTHER STUDY

There are no areas known to require further study.

CHAPTER VI

ASSESSMENT PROCESS

Improvements to Kalakaua Avenue sidewalk areas have been the subject of ongoing discussions for many years. A desire to enhance the pedestrian environment has been expressed repeatedly in such documents as the Waikiki Transportation Plan, the Waikiki Special Design District Ordinance, the Development Plan for the Primary Urban Center, and the Waikiki 2000 Plan. Preliminary concepts were discussed with representatives of numerous City and State Departments and agencies, with the executive director of the Waikiki Improvement Association, the Waikiki 2000 Task Force, and publishers of many tourist newspapers. An environmental assessment was prepared for the proposed action in early 1984, and a decision to proceed was made shortly thereafter.

While the long-term effects of the proposed project are believed to be mostly beneficial, construction activities have the potential to produce substantial short-term localized adverse effects. Based on the "significance criteria" contained in Section 1:31 of the State of Hawaii Environmental Quality Commission's Environmental Impact Statement Regulations, the City and County of Honolulu Department of Public Works and Department of Transportation Services determined that the project could have some environmental consequences and that an Environmental Impact Statement should be prepared pursuant to Chapter 343, Hawaii Revised Statutes, prior to issuance of a construction contract.

An EIS Preparation Notice for the project was submitted to the Environmental Quality Commission on March 1, 1984, and an announcement that an EIS would be prepared appeared in the March 8, 1984 edition of the OEQC Bulletin. Copies of the EIS Preparation Notice were distributed to interested parties and comments solicited via a series of letters sent out shortly thereafter. When it was decided that further design work should be held in abeyance pending completion of the Kuhio Avenue widening project and a subsequent simulation of the effect of the proposed narrowing on traffic flow through Waikiki, work on the EIS was halted.

As noted elsewhere in this report, the Kuhio Avenue project was finished in September 1985. The City and County of Honolulu Department of Transportation Services has recently completed a series of computer simulations of traffic flow along Kalakaua under different design alternatives using the TRANSYT-7 model modified by the U.S. Department of Transportation. Results of these simulations, together with policy decisions regarding the minimum acceptable number of traffic lanes, led to design changes in the project. Because of these and the considerable time that had elapsed since the original EIS Preparation Notice was issued, a revised environmental impact statement preparation notice was issued for the project in January, 1986. Copies of substantive comments received in response to this notice are found in Chapter VIII of this report.

The Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project was published in March, 1986. The first notice announcing its availability appeared in the March 23, 1986 issue of the OEQC Bulletin. The 30-day review period for the EIS ended on April 22, 1986. A list of the parties who received copies of the Draft EIS, copies of letters containing substantive comments, and the Department's responses to those comments are reproduced in Chapter IX. The responses were mailed on April 30, 1986.

The text of this report is largely the same as that of the Draft EIS. However, several minor changes were made in response to comments, and these are identified in the letters contained in Chapter IX. The Revised EIS is being submitted simultaneously to the City and County of Honolulu Department of Land Utilization and to the State Office of Environmental Quality Control for acceptance.

In addition to the opportunities for public participation afforded by the EIS process, the City has conducted an extensive program of public meetings and discussions designed to familarize area residents and businesspeople with the project. These meetings have permitted true two-way communication between the City, Waikiki residents, and representatives of the business community. The plan described in Chapter II of this report has been reviewed by all concerned parties, and their suggestions incorporated in it.

CHAPTER VII

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CHAPTER VIII

CONSULTATION DURING PREPARATION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

An Environmental Impact Statement Preparation Notice (EISPN) announcement was published in the Office of Environmental Quality Control's OEQC Bulletin on January 23, 1986. This announcement superceded one published in March 1984 and provided updated information concerning plans for the proposed project. Listed below are parties who received one or both of the EISPNs and who responded with letters containing either substantive comments or a statement that they had no substantive comments. Parties who were sent copies of the EISPN but who did not submit written comments are listed separately.

8.1 SUBSTANTIVE COMMENTS

Copies of letters containing substantive comments and the responses to these letters by the Department of Transportation Services, are listed and copied below.

8.1.1 Federal Agencies

Department of Transportation, Federal Highway Administration

8.1.2 State Agencies

Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Transportation
University of Hawaii

8.1.3 City and County of Honolulu

Board of Water Supply
Department of Land Utilization
Department of Parks and Recreation
Department of Public Works
Fire Department
Oahu Civil Defense Agency
Police Department

8.1.4 State Legislators

Senator Mary Jane McMurdo

8.1.5 Community Associations and Organizations

Waikiki Neighborhood Board No. 9
Waikiki Improvement Association
Waikiki Residents Association

8.1.6 Public Interest Groups

Hawaii Transportation Authority
League of Women Voters
Oahu Metropolitan Planning Organization
Outdoor Circle

8.1.7 Public Utilities

Hawaiian Electric Company
Hawaiian Telephone Company
Gasco, Inc.

8.1.8 Individuals

Wright Hiatt

8.2 NO COMMENTS

8.2.1 Federal Agencies

Department of Agriculture
Department of the Army, U.S. Army Engineer District
Department of Energy
Department of Housing and Urban Development
Department of Interior, Fish and Wildlife Service
Department of Interior, Geological Survey, Water Resources Division
U.S. Navy, Headquarter, Naval Base Pearl Harbor

8.2.2 State Agencies

Office of the Governor
Department of Agriculture
Department of Accounting and General Services, Division of Public Works
Department of Budget and Finance
Department of Defense
Department of Education
Department of Labor and Industrial Relations

8.2.3 City and County of Honolulu

Building Department
Department of General Planning
Department of Health

8.2.4 Congressional Representative

Senator Daniel Inouye

8.2.5 Community Associations and Organizations

Waikiki Improvement Association

8.2.6 Public Utilities

Oceanic Cablevision

8.2.7 Other Organizations

Waikiki Publishers

8.3 NO RESPONSE

The following parties received a copy of the Kalakaua Avenue EISPN but did not submit written comments.

8.3.1 Federal

Army Support Command, Hawaii
Department of Labor, Occupational Safety & Health Administration
Department of Transportation, Coast Guard
Environmental Protection Agency, Region IX - San Francisco

8.3.2 State

Department of Social Services and Housing
Department of Taxation
Office of Environmental Quality Control

8.3.3 University of Hawaii

Environmental Center
Hawaii Natural Energy Institute

8.3.4 City and County of Honolulu

Mayor's Office
Department of the Corporation Counsel
Department of Housing and Community Development
Office of Information and Complaint
Waikiki 2000 Task Force

8.3.5 Congressional Representative

Honorable Daniel K. Akaka

8.3.6 State Legislators

Senator Mary George
Senator Bertrand Kobayashi
Senator Joseph T. Kuroda
Representative Fred Hemmings
Representative Kina'u Boyd Kamali'i

8.3.7 City Council

Marilyn Bornhorst, Chairperson

8.3.8 Community Associations and Organizations

Life of the Land
Oahu Development Conference
Waikiki Community Center

8.3.9 Public Interest Groups

American Lung Association
Oahu Development Conference

8.3.10 Other Organizations and Individuals

Chamber of Commerce
Hawaii Hotel Association
Hoopono, Blind Rehabilitation Services
Royal Hawaiian Shopping Center
Audrey Fox Anderson

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

January 16, 1986

Honorable Letitia N. Uyehara
Director
Office of Environmental Quality
Control
Kekuanaoa Building
465 South King Street
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Chapter 343, Hawaii Revised Statutes, Environmental Impact Statement Preparation Notice (EISPN), Kalakaua Avenue Safety and Beautification Project

The Department of Transportation Services has determined that the proposed Kalakaua Avenue Safety and Beautification Project requires an Environmental Impact Statement pursuant to Chapter 343, Hawaii Revised Statutes, because the construction phase of the project has the potential to cause significant environmental impacts.

This letter, together with the enclosed Environmental Assessment, serves as the EIS Preparation Notice. It should be published in the OEQC Bulletin under the heading "Register of Chapter 343, HRS Documents."

If there are any questions, please contact:

Mr. Rom Duran
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813
Telephone 527-6392

Sincerely,

JOHN E. HIRTEN

Enclosure

cc: Office of the Mayor
Office of the Managing Director
Department of Public Works
Belt, Collins & Associates

January 20, 1986

_____
_____
_____
_____

Dear _____:

Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Enclosed is a revised Environmental Impact Statement Preparation Notice (EISPN) for the Kalakaua Avenue Safety and Beautification project. The proposed action involves changes to Kalakaua Avenue and its adjoining sidewalks between Ala Moana Boulevard and Monsarrat Avenue. The original EISPN for the project was published in March 1984, and comments dated _____ were received from (you/your agency).

Subsequent to your review of the project, plans have been modified to take into account public and agency concerns. As a result, the project's character has changed substantially. It was originally envisioned that the width of the vehicular travelway within Kalakaua Avenue's 80-foot right-of-way would be decreased from 56 to 40 feet and the number of lanes reduced from four to three; the revised plans call for a 47-foot wide roadway and maintaining the four existing lanes for vehicular traffic. This change in project design has reduced the area available for sidewalk widening.

The EISPN was prepared to insure that the revised plans receive full public review. It provides a description of the proposed action, a discussion of purpose and need, an analysis of major potential impacts, and a summary of alternatives considered.

Your comments on the previous EISPN will be taken into consideration in preparing the Draft EIS for the proposed project. If you have additional comments, please submit them to us within 30 days. We hope to publish a draft EIS for the project in May and would appreciate your prompt attention. If you need more information before responding to this letter, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

Enclosure

cc: Office of Environmental Quality Control
Dept. of Public Works, City & County of Honolulu
Belt, Collins & Associates

January 20, 1986

MEMORANDUM

TO:

FROM: John E. Hirten, Director

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Enclosed is a revised Environmental Impact Statement Preparation Notice (EISPN) for the Kalakaua Avenue Safety and Beautification project. The proposed action involves changes to Kalakaua Avenue and its adjoining sidewalks between Ala Moana Boulevard and Monsarrat Avenue. The original EISPN for the project was published in March 1984, and comments dated _____ were received from your department.

Subsequent to your review of the project, plans have been modified to take into account public and agency concerns. As a result, the project's character has changed substantially. It was originally envisioned that the width of the vehicular travelway within Kalakaua Avenue's 80-foot right-of-way would be decreased from 56 to 40 feet and the number of lanes reduced from four to three; the revised plans call for a 47-foot wide roadway and maintaining the four existing lanes for vehicular traffic. This change in project design has reduced the area available for sidewalk widening.

The EISPN was prepared to insure that the revised plans receive full public review. It provides a description of the proposed action, a discussion of purpose and need, an analysis of major potential impacts, and a summary of alternatives considered.

If you have any comments on the revised plans, please submit them to us within 30 days. We hope to publish a draft EIS for the project in May, and would appreciate your prompt attention. If you need more information before responding to this letter, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

Enclosure

cc: Office of Environmental Quality Control
Dept. of Public Works, City & County of Honolulu
Belt, Collins & Associates

8-7

Dir/from 2/12 - 973

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

February 11, 1986

IN REPLY REFER TO
HEC-HI

Mr. John E. Hirten, Director
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Subject: Revised EIS Preparation Notice,
Kalakaua Avenue Safety and
Beautification Project

We have reviewed the subject document which was transmitted by your letter of January 20,1986.

Since Federal funds are not being utilized for the Kalakaua Avenue Safety and Beautification Project, Federal Highway Administration review of project documents is not necessary; however, we offer the following informational comments for your consideration during the preparation of the project Draft Environmental Impact Statement:

1. Kalakaua Avenue is currently designated Federal-aid Urban System (FAUS) Route 7612. As provided in 23 CFR 625.3, we encourage your use of safety related design criteria including "A Policy on Geometric Design of Highways and Streets, 1984".

2. Section 3.5.1 - The current "Highway Capacity Manual" dated 1985 (TRB Special Report 209) should be utilized and referenced.

3. Section 3.5.2 - A summary of the October 1985 TRANSYT-7 computer simulation study of traffic flows under the different design alternatives would assist the reviewer and should be included in a technical appendix in the Draft EIS.

4. Sections 3.5.1 and .2 - It is not readily apparent whether the "existing traffic" analysis and the "expected impact" analysis include the effects of stopping or standing service vehicles, taxicabs, city busses and tour busses on the levels of service for Kalakaua Avenue. Deletion of the parking lanes may result in serious operational consequences if the planned turnouts for loading zones are inadequate, inconvenient or unenforced.

8-8

5. Figure IV-1 - It is not clear whether Kapahulu Avenue is also one-way makai-bound between Kuhio Avenue and Ala Wai Boulevard.

Thank you for the opportunity to comment on the Revised EIS Preparation Notice.

Sincerely yours,

H. Kusumoto
Division Administrator

By: N. L. Arthur
N. L. Arthur
Assistant Division Administrator

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. H. Kusumoto
Division Administrator
Federal Highway Administration
Region Nine
Hawaii Division
P.O. Box 50206
Honolulu, Hawaii 96850

8619

Attention: Mr. N.L. Arthur,
Assistant Division Administrator

Dear Mr. Kusumoto:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 11, 1986 letter (your reference HEC-HI) concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Point-by-point responses to your comments are presented below.

(1) Safety-related design criteria, including those contained in "A Policy on Geometric Design of Highways and Streets, 1984" are being used for the project.

(2) There are several reasons why the new, detailed intersection capacity analysis technique contained in the 1985 Highway Capacity Manual was not used for this analysis. First, the techniques were still considered preliminary at the time the study was conducted and had not yet been accepted by the U.S. Department of Transportation. Similarly, the Department of Transportation Services has not officially adopted those procedures. Perhaps most importantly, the new technique is very laborious and time-consuming, and its use would make it impossible to take advantage of the excellent traffic simulation computer models that have been developed. The latter permit the quick and efficient analysis of numerous design alternatives, and the use of one of these, TRANSYT-7F, made it possible for us to evaluate far more alternatives than would have been possible if we had relied on the manual methods described in the 1985 Highway Capacity Manual.

We estimate it would have taken about one man-week to calculate the intersection levels of service manually for each of the six alternatives evaluated. With the computer simulation model, less than half a day was spent on the calculations for each alternative. Before deciding upon the use of the TRANSYT-7F model for this project, my staff compared sample results from the model with those from a manual calculation and found that the differences were minor. In view of the foregoing, we concluded that the minor increase in detail provided by the manual techniques did not justify the additional labor required. For your information, we are currently awaiting the computer Highway Capacity Manual software, which we understand is scheduled to be released by FHWA in April.

(3) In December, 1985, the Department of Transportation Services published a summary of the traffic simulation study. A copy of that report is enclosed with this letter, and the report will be included as an appendix in the EIS.

(4) Our analyses of both "existing traffic" and "expected traffic" include the impact of City bus and tour bus traffic on the traffic stream. TRANSYT-7F includes an algorithm which accounts for scheduled bus stops and times, and the saturation counts used to calculate lane capacity accounted for the impact of buses, other large vehicles, mopeds, standing vehicles, etc. on the traffic stream. In reality, standing vehicles do not currently have a significant impact on traffic flow along most of Kalakaua Avenue because the curb lanes are so wide that moving traffic is not affected. At many intersections, separate curb lane capacities were used for our analysis, since turning movements would affect capacity more than would parked vehicles. For those existing areas where it was believed that curbside parking would significantly affect traffic flow, the number of lanes was reduced by one.

A major assumption of the "expected impact" analysis was that parking regulations would be strictly enforced. Towards this end, the Department of Transportation Services is providing freight and passenger loading areas along the length of the street and is working with the Honolulu Police Department and the transportation providers to restrict delivery and pick-up times.

(5) Kapahulu Avenue is two-way along its entire length.

If you or your staff have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

Attachment

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

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

February 5, 1986

RECEIVED
'86 FEB 11 A8:47
DIRECTOR'S OFFICE
TRANSPORTATION SERVICES

MEMORANDUM

To: Mr. John E. Hirten, Director
Department of Transportation, City & County of Honolulu

From: Director of Health

Subject: Revised Environmental Impact Statement Preparation Notice for Kalakaua Avenue Safety and Beautification Project

In the preparation of the Environmental Impact Statement for the subject project, the following noise concerns must be addressed:

1. In addition to obtaining the Community Noise Permit, as stated in Section 3.7.2, the following conditions should be included:
   a. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.
   b. The contractor must comply with the conditional use of the permit as specified in the regulations and conditions issued with the permit.
2. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized in areas where people reside, and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.
3. Should there be any baseyard or stockpile areas located adjacent to residences, mitigative measures such as barriers or berms must be developed in the event that noise complaints are received.

for LESLIE S. MATSUBARA

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Ms. Leslie S. Matsubara
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Ms. Matsubara:

8-11

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 5, 1986 letter (your reference EPHSD), and for the air quality information provided with the letter of April 25, 1984 (reference EPHSD-SS) from your department. I appreciate the time you and your staff spent reviewing the document. Point-by-point responses to your comments are presented below.

(1)(a) Mufflers

The contractor will be required to equip construction equipment, on-site vehicles, and devices requiring an exhaust of gas or air with mufflers.

(1)(b) Compliance with Permit

The contractor will be required to comply with the regulations and special permit conditions.

(2) Traffic Noise

We are currently identifying and evaluating alternative construction base yard sites. In our evaluation, we are paying close attention to the need to minimize the movement of heavy vehicles through residential areas. Construction vehicles will be operated in accordance with the provisions of Chapter 42, Vehicular Noise Control for Oahu.

(3) Baseyard Areas

Baseyard or stockpile areas are not expected to be located adjacent to residences, however should a residential area be the only available alternative, mitigative measures such as barriers or berms will be developed if noise complaints are received.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

MAY 07 1984

May 2, 1984

Your: KS-78

Honorable William A. Bonnet
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

Thank you for the opportunity to comment on the effect of the Kalakaua sidewalk widening on historic buildings in Waikiki.

We concur that the proposed project will not affect any historic properties.

For your information, the Waikiki 3 Theater is not considered to be a significant historic building. However, next to the Moana Hotel is a significant cultural site known as the wizard stones of Kapaemahu.

There is always the possibility that human bones and other archaeological remains will be discovered during construction projects in Waikiki. When remains are encountered, our historic sites office should be contacted immediately at 548-7460.

Sincerely,

SUSUMU ONO
Chairperson
and
State Historic Preservation Officer

8-12

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Susumu Ono, Chairman
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On May 2, 1984, the Department of Land and Natural Resources transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women and residents and information generated by additional analyses. Because of the changes, a revised EISPN was issued in January, 1986. The Department of Land and Natural Resources did not provide additional comments in response to the revised EISPN; hence, the following responses deal exclusively with your 1984 letter.

We acknowledge your concurrence with our finding that the project will not affect any historic sites. The cultural site known as the wizard stones of Kapaemahu lies outside the City's Kalakaua Avenue right-of-way.

If any archaeological findings are made, the Historic Sites Office will be contacted immediately.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
KAMAMALU BUILDING, 250 SOUTH KING ST, HONOLULU HAWAII
MAILING ADDRESS P.O. BOX 2359 HONOLULU HAWAII 96804 • TELEX 723250 HOPLED

GEORGE R. ARIYOSHI
GOVERNOR
KENT M. KEITH
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
LINDA KAPUNAI ROSEHILL
DEPUTY DIRECTOR

DIVISIONS
BUSINESS AND INDUSTRY DEVELOPMENT DIVISION
ENERGY DIVISION
FOREIGN-TRADE ZONE DIVISION
LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION
OFFICES
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-3536

February 14, 1986

RECEIVED
'86 FEB 19 AM 11 19

The Honorable John E. Hirten
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Subject: Revised Environmental Impact Statement Preparation Notice for the Kalakaua Avenue Safety and Beautification Project

We have reviewed the subject revised Environmental Impact Statement Preparation Notice (EISPN) and have the following comments.

1) In Sections 2.1.4.1 and 2.1.4.2 (page II-10), the revised EISPN discusses in very descriptive language pertinent Hawaii State Plan and Tourism Functional Plan policies and actions which may interrelate with the proposed project. We believe that a more detailed review of pertinent policies and actions of Parts I and III of the Hawaii State Plan and State functional plans (including Tourism and Transportation) should be conducted and that all identified policies, guidelines and actions be appropriately footnoted by reference.

2) The revised EISPN review of traffic conditions and design considerations in the project area is limited to motor vehicle and pedestrian movements. It is important to also note that Kalakaua Avenue is intensively used by mopeds, bicycles and pedicabs which may serve to inhibit both vehicular and pedestrian traffic movements. A considerable number of rental agencies for these alternative vehicles are situated within the project area. The subject EIS should specifically define and assess how alternative vehicles such as mopeds, bicycles and pedicabs impact traffic patterns and design considerations of the preferred alternative. Particular attention should be given to the safety of alternative vehicle operators.

3) The project's specific drainage pattern and related environmental conditions should be specifically identified and addressed.

Thank you for the opportunity to review and comment on this document.

Very truly yours,

Kent M. Keith

Kent M. Keith

cc: Office of Environmental Quality Control
Dept. of Public Works, City & County of Honolulu

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Dr. Kent M. Keith, Director
Department of Planning & Economic Development
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Dr. Keith:

8-14

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 14, 1986 letter (your reference No. P-3536) concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Point-by-point responses to your comments are presented below.

(1) Hawaii State Plan and Tourism Functional Plan

Sections 2.1.4.1 and 2.1.4.3, referred to in your comment, were intended to explain the need for the proposed project. The environmental impact statement will contain an expanded discussion of the project's relationship to other pertinent policies of the Hawaii State Plan and State Functional Plans.

(2) "Alternative Vehicles" Such As Mopeds, Bicycles, and Pedicabs

The EIS Preparation Notice focused on motor vehicles and pedestrians because they are considered the most important users of the Kalakaua Avenue corridor. However, as you correctly note, the street is also used by a number of other types of vehicles, including bicycles, mopeds, and pedicabs, and these "alternative vehicles" impact traffic patterns and constitute an important design consideration. The impact that the diverse mix of vehicles has on traffic flow was taken into account in developing and evaluating our design proposals by using actual saturation flow counts to estimate capacity rather than using standard capacity factors.

Traffic regulations require bicycles and mopeds to travel next to the curb and one abreast. The 14-foot width of the makai lane will provide some measure of safety for these vehicles and their operators.

Finally, it is worth noting that pedicabs may no longer be a factor on Kalakaua Avenue by the time the proposed project is completed. On the basis of independent studies done by the Department over the past several years, we are currently drafting proposed regulations prohibiting the use of pedicabs on Kalakaua Avenue. If these are adopted, motor vehicles and pedestrians would no longer have to compete with pedicabs.

(3) Storm Drainage and Related Issues

Storm drainage and related water quality impacts will be discussed in the environmental impact statement.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

GEORGE R ARIYOSHI
GOVERNOR

JUN 14 1984

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU HAWAII 96813

IN REPLY REFER TO
STP 8.9956

June 8, 1984

Mr. William A. Bonnet, Director
Department of Transportation
Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

Environmental Impact Statement
Preparation Notice for the Kalakaua
Avenue Sidewalks Project

Our review of the preparation notice indicates that the vehicular capacity of Kalakaua Avenue will be reduced with the widening of sidewalks. In order to maximize the availability capacity of this facility, the following should also be considered:

1. All loading or unloading by buses, taxis or service vehicles, should be accomplished on sidestreets or turnouts. Moreover, turnouts may be constructed just on the makai side of Kalakaua Avenue, and embarking of passengers or goods could be prohibited or "discouraged" along the mauka pavement edge. Pedestrian overpasses in the vicinity of these turnouts would greatly facilitate its usage.

2. In consonance with an areawide policy to provide more pedestrian-oriented facilities, overpasses may be warranted and should be master planned. In particular, it may be very advantageous to provide such overpasses at critical intersections.

3. Improvements to the ewa end of Kuhio Avenue may be necessary and should also be discussed in the project EIS.

4. Four through lanes may also be necessary since bicycles, mopeds and pedicabs are likely to restrict traffic flow in one of the lanes. Ala Wai Boulevard accommodates 4-lanes of traffic within its 42-foot width which is nearly

the "minimum of 40-foot road width" being proposed for Kalakaua Avenue.

Thank you for allowing us to review the notice.

Very truly yours,

Wayne D. Yamasaki
Director of Transportation

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Wayne J. Yamasaki, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamasaki:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On June 8, 1984 your department transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue (your reference No. STP 8.9956). Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue Avenue widening project. During that time, design changes were made in response to concerns raised by area businessmen and residents, agencies such as yours, and information generated by additional analyses. Because of these changes, a revised EISPN was issued in January 1986. Your department did not add to its original comments; hence, the following responses deal exclusively with your 1984 letter.

Comments 1 and 2: Turnouts and Pedestrian Overpasses

(1) All loading and unloading by buses, taxis, or service vehicles should be accomplished on sidestreets or turnouts. Moreover, turnouts may be constructed just on the makai side of Kalakaua Avenue, and embarking passengers or goods could be prohibited or "discouraged" along the mauka pavement edge. Pedestrian overpasses in the vicinity of these turnouts would greatly facilitate its usage.

(2) In consonance with an areawide policy to provide more pedestrian-oriented facilities, overpasses may be warranted and should be master planned. In particular, it may be advantageous to provide such overpasses at critical intersections.

Response. We concur with your comment regarding additional loading zones. The proposed design provides numerous turnouts for passenger and freight loading and unloading. We are also establishing new loading zones on side streets. These eliminate the need for stopping in the travelway and will facilitate traffic flow.

Construction of pedestrian overpasses across Kalakaua Avenue would have an adverse effect on the appearance of the area, and is generally opposed by most of the groups which have reviewed plans for the project. Moreover, enforcing the use of pedestrian overpasses when ground-level routes are available is very difficult. It is our belief that more than adequate pedestrian safety and roadway capacity can be maintained without resorting to overpasses, and none are included in the proposed design.

Comment 3: Improvements to Kuhio Avenue

(3) Improvements to the Ewa end of Kuhio Avenue may be necessary and should also be discussed in the project EIS.

Response. Improvements to the Ewa end of Kuhio Avenue were completed in September 1985.

Comment 4: Need for Four Lanes

(4) Four through lanes may also be necessary since bicycles, mopeds, and pedicabs are likely to restrict traffic flow in one of the lanes. Ala Wai Boulevard accommodates 4 lanes of traffic within its 42-foot width which is nearly the "minimum 40-foot road width" being proposed for Kalakaua Avenue.

Response. The proposed overall roadway width has been increased from the 40 feet that was under consideration at the time the original EISPN was issued to 47 feet. This is sufficient to permit four lanes of traffic throughout the project area. The design also provides turnouts for loading and unloading areas so that vehicles stopped along the curb will not interfere with through-traffic. Finally, the Department is currently drafting regulations which, if adopted, would ban the use of pedicabs on Kalakaua Avenue.

I appreciate the time spent by you and your staff reviewing the EIS Preparation Notice. If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

Attachment: (1) Revised Concept Plan

8-17

MAY 2 1 1984

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

14 May 1984

Mr. William A. Bonnet, Director
Department of Transportation
City & County of Honolulu
650 S. King Street
Honolulu, HI 96813

Dear Mr. Bonnet:

SUBJECT: Environmental Impact Statement Preparation Notice for the Kalakaua Avenue Sidewalk Project, March 1984

We have reviewed the subject EISPN and offer the comment that the construction period is not presented. The shorter the duration, the better the course.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH H. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Edwin T. Murabayashi, EIS Coordinator
Water Resources Research Center
University of Hawaii at Manoa
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your May 14, 1984 letter. I appreciate the time you and your staff spent reviewing the document.

Since the time you made your comment concerning the delineation of the construction period, a second environmental impact statement preparation notice (EISPN) has been prepared and distributed. A copy of the Revised EISPN was sent to the Environmental Center to coordinate review by the University staff.

Should you wish to review documents on the Kalakaua Avenue Safety and Beautification Project, such as the forthcoming Draft Environmental Impact Statement, or if you have further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

January 28, 1986

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF JANUARY 20, 1986 ON THE REVISED ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

8-18

We anticipate no adverse impacts to potable groundwater resources in the area. The construction plans should be coordinated with us to ensure that our existing water system facilities in the area will be adequately protected.

If you have any questions, please call Lawrence Whang at 527-6138.

FOR KAZU HAYASHIDA
Manager and Chief Engineer

RECEIVED
16JAN 31 A 8:57

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

March 14, 1986

MEMORANDUM

TO: Kazu Hayashida, Manager and Chief Engineer
Board of Water Supply

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your January 28, 1986 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

The construction plans will be coordinated with the Board of Water Supply as you requested, in order to ensure that the existing water system facilities will be adequately protected.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 ☎ (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

February 19, 1986

RECEIVED
'86FEB19 P2:13

HEMORANDUM

TO : JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM : JOHN P. WHALEN, DIRECTOR

SUBJECT : REVISED EIS PREPARATION NOTICE
KALAKAUA AVENUE SAFETY AND
BEAUTIFICATION PROJECT (JANUARY 16, 1986)

I-8
I-19

We have reviewed the EISPN and offer the following comments:

1. Vehicular Traffic (Section 3.5)

   a. Describe the relationship between service levels and the volume to capacity (v/c) ratio.

   b. The "service level" at each station described should be noted. (Figure III-1, III-2, III-3, III-4, and Table III-1)

   c. Why were the stations on Kalakaua Avenue at the intersections of Ala Wai, Ala Moana, and Kuhio Avenue excluded from analysis as in Figure III-5? These should be included.

   d. In Figure III-5, it is projected that volume levels "with the project" will be the same as "without the project." Only on Kalakaua Avenue near Kaiulani Avenue is there a projected reduction in capacity. The effect of the reduced lane widths from the current 14 feet to the proposed 11.75 feet of Kalakaua Avenue on vehicular design speed, volume, and service level should be discussed.

   e. In regards to Figure III-4, why weren't similar traffic counts for Fridays and Saturdays shown? Since we would expect the more severe conditions to occur during the weekend rather than on a week day, weekend traffic counts should be provided.

2. Drainage System and Water Quality Impacts

   We would expect that minimal changes will be made to the existing drainage system, and that minimal changes to water quality impact will occur. If this is the case, this should be stated.

3. Visual Impacts

   A map showing the primary pedestrian views in Waikiki would be appropriate. Eye level drawings of how these views might be affected may be useful.

4. SMA Ordinance

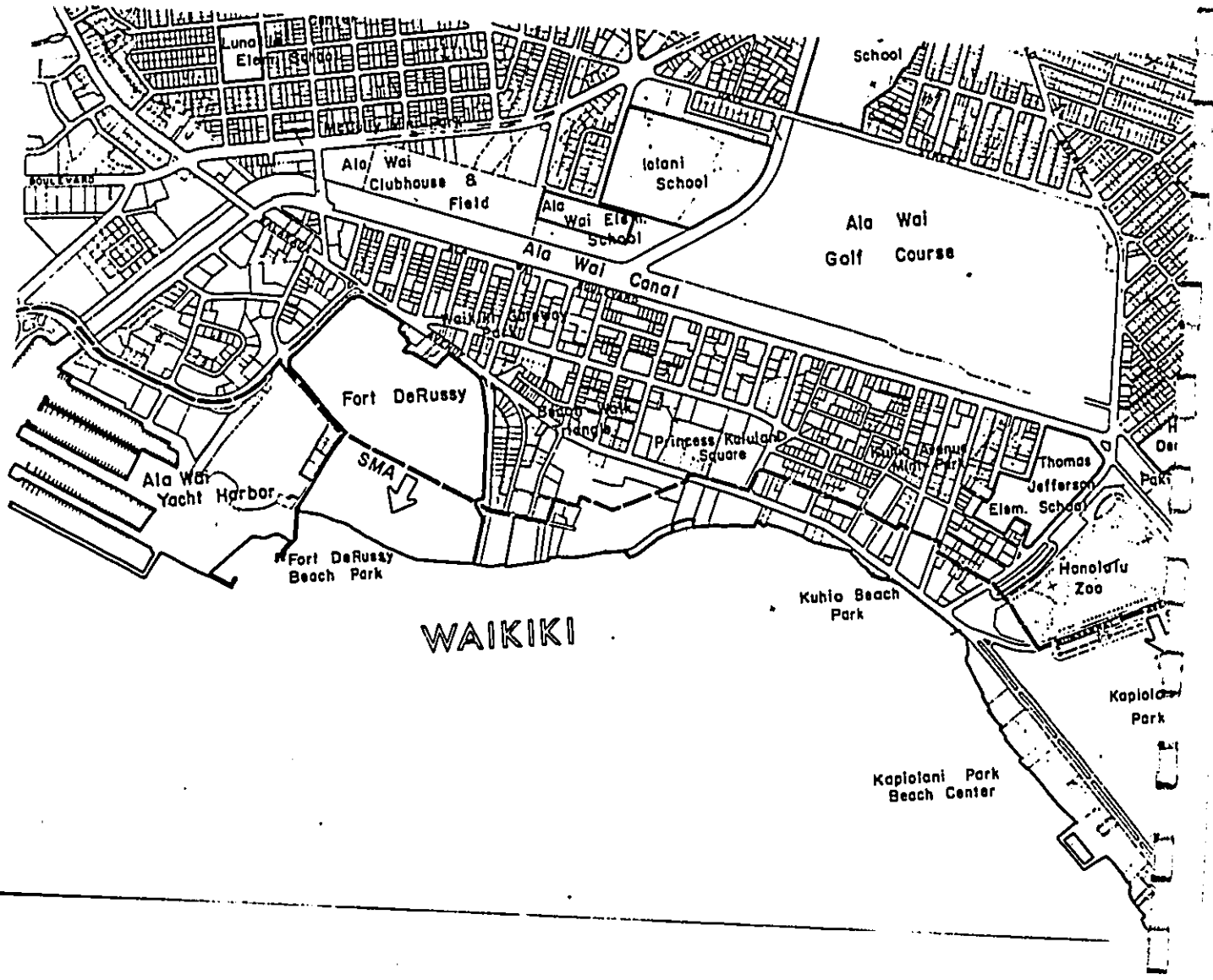
   A portion of the proposed project lies within the Special Management Area (SMA) and will require a Special Management Area Use Permit (SMP). A map showing the SMA boundary is attached. The relationship to the SMA Ordinance should be described in Section 2.1.4, "Relevant Land Use Plans and Policies." In terms of the SMA, drainage is the primary concern for this project.

Thank you for the opportunity to comment. If there are any questions, please call Bennett Mark at 527-5038.

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
2695

attach.


Luna Hill Elem. School
Ala Wai Clubhouse & Field
Ala Wai Elem. School
Iolani School
School
Ala Wai Golf Course
Ala Wai Canal
Fort DeRussy
SMA
Ala Wai Yacht Harbor
Fort DeRussy Beach Park
Princess Kaiulani Square
Thomas Jefferson Elem. School
Honolulu Zoo
Kuhio Beach Park
Kapiolani Park
Kapiolani Park Beach Center
WAIKIKI

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: John P. Whalen, Director
Department of Land Utilization

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project
January 16, 1986

8-21

Thank you for your February 19, 1986 memorandum commenting upon the Environmental Impact Statement Preparation Notice (EISPN) for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. This memorandum provides point-by-point responses to your concerns.

I. Vehicular Traffic (Section 3.5)

(a) Comment. Describe the relationship between service levels and the volume to capacity (v/c) ratio.

Response. The Transportation Research Board of the National Research Council (1985) has recently published an updated version of the Highway Capacity Manual. The manual notes that for signalized intersections (such as those found along Kalakaua Avenue) there is no simple relationship between the v/c ratio of an intersection and the level of service that is provided. It states that:

> While v/c affects delay, there are other parameters that more strongly affect it, such as the quality of progression, length of green phases, cycle lengths, and others. Thus, for any given v/c ratio, a range of delay values may result, and vice-versa.

The EIS will describe the level of service provided by the existing and proposed Kalakaua Avenue roadway geometrics in terms of the average delay per vehicle at each intersection. It will also identify individual turning movements where particularly high delays (and, consequently, a poor level of service) may be expected.

(b) Comment. The "service level" at each station described should be noted. (Figure III-1, III-2, III-3, III-4, and Table III-1).

Response. Please see the preceding response for a discussion of level of service. Note also that "level of service" is computed on the basis of traffic during a peak 15-minute period; hence, it is impossible to calculate a service level for Figures III-1 and III-4, which show 24-hour traffic.

(c) Comment. Why were the stations on Kalakaua Avenue at the intersections of Ala Wai, Ala Moana, and Kuhio Avenues excluded from analysis as in Figure III-5. These should be included.

Response. The impact analysis will discuss future traffic conditions with and without the proposed project at all of the signalized intersections on Kalakaua Avenue within the project limits. The Ala Moana and Ala Wai intersections lie beyond this area, but expected conditions on the Kalakaua Avenue approach to Kuhio Avenue will be described in the EIS.

(d) Comment. In Figure III-5, it is projected that traffic volume levels "with the proposed project" will be the same as "without the project." Only on Kaiulani Avenue is there a projected reduction in capacity. The effect of the reduced lane widths from the current 14 feet to the proposed 11.75 feet of Kalakaua Avenue on vehicular design speed, volume, and service level should be discussed.

Response. Kalakaua's traffic lanes are not currently a uniform 14 feet wide as suggested in this comment. Until 1985, when a number of temporary changes were instituted as part of our simulation program, the two lanes closest to the curb were 17 feet wide in many areas, and the two center lanes were only 11 feet wide. Various types of loading zones and turning lanes occupied portions of the curb lanes, meaning that they were not continuously available for moving vehicles. The proposed configuration has a 14-foot wide lane along the makai side of the roadway, with the three remaining lanes each being 11 feet wide.

Under the current proposal, the two center lanes would remain 11 feet wide, and the mauka lane would be reduced to that width. The curb lane on the makai side would be reduced from 17 feet to 14 feet, but loading and bus parking zones would be moved completely outside the travelway. Recently completed capacity analyses conducted for the project using a computer simulation model indicate that the proposed changes would increase Kalakaua's overall capacity and decrease the average vehicle delay at most intersections. Moreover, it would decrease the degree of saturation at those intersections where the congestion is currently greatest.

(e) Comment. In regards to Figure III-4, why weren't similar traffic counts for Fridays and Saturdays shown? Since we would expect the more severe conditions to occur during the weekend rather than on week days, weekend traffic counts should be provided.

Response. Figure III-4 was meant to characterize the general pattern of traffic flow over a 24-hour period. Weekend counts have been taken at selected locations, however. As evidenced by the attached figure, they suggest that temporal changes in traffic volumes on weekdays and weekends are similar.

2. Drainage System and Water Quality Impacts

Comment. We would expect that minimal changes will be made to the existing drainage system, and that minimal changes to water quality would occur. If this is the case, this should be stated.

Response. Your evaluation of the minor nature of changes to the existing drainage system and potential water quality impacts is correct and will be noted in the Draft EIS.

3. Visual Impacts

Comment. A map showing the primary pedestrian views in Waikiki would be appropriate. Eye level drawings of how these views might be affected may be useful.

Response. An artist's rendering of the appearance of the approach to Gateway Park following completion of the proposed project will be included in the EIS. The appearance of the reconstructed sidewalks has been a major consideration in the preparation of the current plans, and we believe the design accomplishes our goal of creating an aesthetically pleasing pedestrian setting.

4. SMA Ordinance

Comment. A portion of the proposed project lies within the Special Management Area (SMA) and will require a Special Management Area Use Permit (SMP). A map showing the SMA boundary is attached. The relationship to the SMA Ordinance should be described in Section 2.1.4, "Relevant Land Use Plans and Policies." In terms of the SMA, drainage is the primary concern for this project.

Response. An application for the required SMA permit will be filed shortly. As noted under item 2, above, the project would not have an adverse effect on drainage, which you identified as being of primary concern. The project's relationship to the SMA ordinance will be discussed in the EIS.

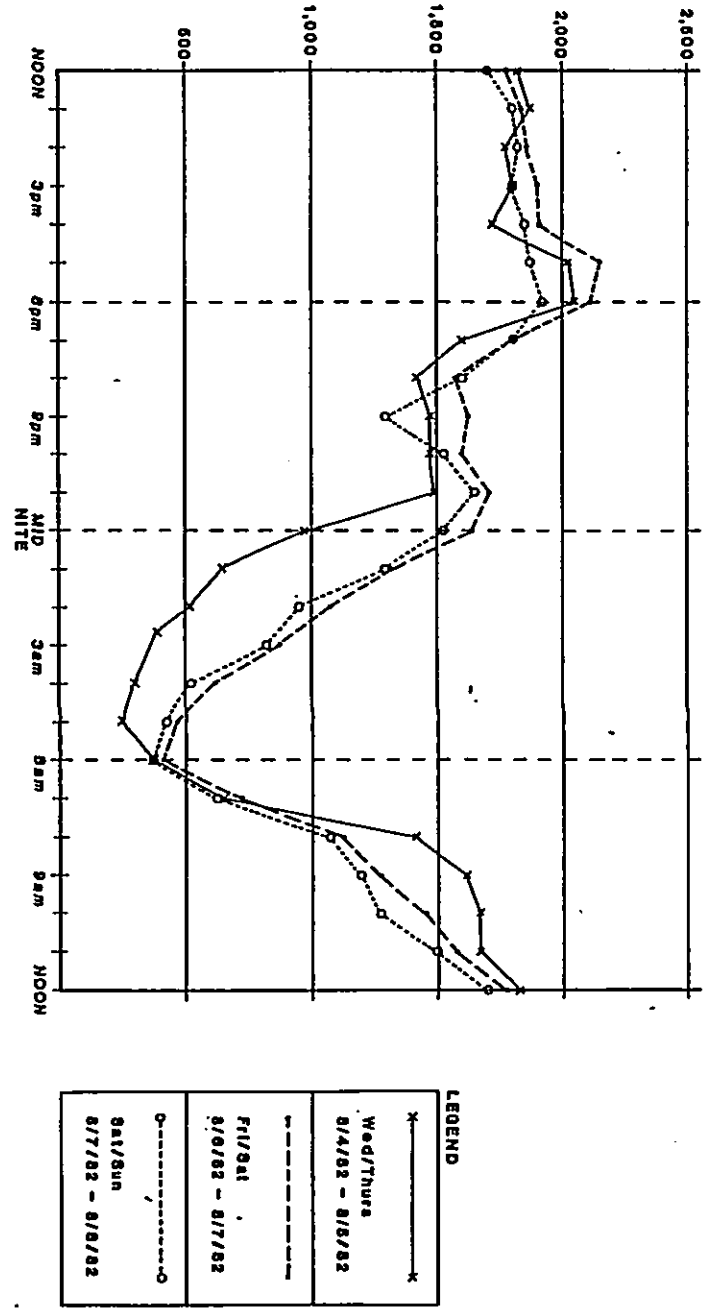
Thank you again for reviewing the EIS Preparation Notice. If you or your staff have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

Attachment

Comparison of Weekday and Weekend Traffic Volumes:
Northwest Approach to Lewers Street on Kalakaua Avenue



DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

TOM T. NEKOTA
DIRECTOR

February 10, 1986

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: TOM T. NEKOTA, DIRECTOR

SUBJECT: REVISED ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

8-23

Thank you for the opportunity to review and comment on the revised EIS Preparation Notice for the Kalakaua Avenue Safety and Beautification Project. The areas of concern to parks and recreation include: 1) landscape plans including proposed trees, shrubs and groundcovers, 2) utility systems for landscaped areas, 3) street furniture provisions, 4) maintenance provisions, and 5) interface with Kuhio Beach Park.

We hope that these concerns will be addressed in the forthcoming draft EIS.

Tom Nekota

TOM T. NEKOTA, Director

TTN:ei

RECEIVED
'86 FEB 12 A11:04
DEPARTMENT OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: Tom Nekota, Director
Department of Parks and Recreation

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 10, 1986 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Responses to your comments are presented below.

We understand your Department's primary areas of concern are landscape design and utilities, street furniture, maintenance, and the interface with Kuhio Beach Park. I believe the major issues relative to these topics have been resolved by the conceptual master plan which we are now pursuing. Construction plans based on the approved concept are currently being prepared, and we expect they will be circulated for review in April. The Draft EIS will describe the steps being taken with respect to each of these items.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

ENV 86-24

February 6, 1986

RECEIVED
1986 FEB 10 P 1:06
DIRECTOR'S OFFICE
DEPARTMENT OF
TRANSPORTATION SERVICES

MEMORANDUM

TO: MR. JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

SUBJECT: EIS PREPARATION NOTICE (REVISED)
FOR KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

8-24

We have reviewed the subject preparation notice and have the following comments.

1. The accepting authority, in addition to the Governor, is the Mayor or the Department of Land Utilization (Title Sheet).

2. Chapter 200 of Title 11, Administrative Rules of the Department of Health and the Environmental Council, became effective on December 6, 1985, repealing the Environmental Impact Statement Regulations of the Environmental Quality Commission (pages I-2, VI-1).

3. Work proposed on the storm drain systems includes extending private roof drains to the new curbs or directly into the existing drainage system, and new catch basins at the new curb line (pages II-21, II-22). Other remedial work on the drainage system within Kalakaua Avenue might be desirable concurrently to upgrade the system to the Storm Drainage Standards and preclude future construction at a later date. If this proposal is acceptable, the evaluation should be coordinated with the Division of Engineering, Drainage Section.

RUSSELL L. SMITH, JR.
Director and Chief Engineer

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: Russell L. Smith, Jr., Director and Chief Engineer
Department of Public Works

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 6, 1986 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Responses to your comments are presented below.

(1) The title sheet on the EIS will show that the accepting authorities on the Kalakaua Avenue Safety and Beautification Project are the Governor and the City and County of Honolulu, Department of Land Utilization.

(2) The text of the EIS will reference the Administrative Rules of the Department of Health and the Environmental Council, Chapter 200 of Title 11. Thank you for your reminder of the change in administrative responsibility for the EIS process.

(3) The design engineers for the project have met with members of the Department of Public Works Storm Drainage Section to discuss existing drainage problems along Kalakaua Avenue and review the conceptual plans for the proposed project. The concerns expressed at that meeting have been taken into account in the proposed design.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 S. BERETANIA STREET, ROOM 309
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

RECEIVED
FEB 28 1986
BELT, COLLINS & ASSOCIATES

FRANK K. KAHOOHANOHANO
FIRE CHIEF
DANIEL L. CAMARA
DEPUTY FIRE CHIEF

February 24, 1986

RECEIVED
'86 FEB 25 AM 11:10
DEPARTMENT OF TRANSPORTATION SERVICES

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: REVISED ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) FOR KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

We have reviewed the EISPN for the above project and comment as follows:

1. Construction Phase. The Fire Department is concerned that the fire fighting capability be maintained throughout construction of the project. This includes maintaining access to fire hydrants, fire department connections at dry standpipes on high-rise buildings and sprinkler systems, keeping exits from buildings clear and providing adequate fire lanes for apparatus.

2. Completed Project. We are concerned that adequate traffic controls be rigidly enforced to maintain access for fire apparatus.

Thank you for the opportunity to review and comment on this project. Should you have any questions, please contact Battalion Chief Kenneth Word at 943-3838.

FRANK K. KAHOOHANOHANO
Fire Chief

FKK:KAW:lm

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALOL, JR.
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: Chief Frank K. Kahoohanohano
Fire Department

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

8-26

Thank you for your February 24, 1986 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Responses to your two comments are presented below.

(1) Construction Phase

We recognize the need to:

- o maintain access to fire hydrants, fire department connections at dry standpipes on high-rise buildings and sprinklers systems;
- o keep building exits clear of obstructions; and
- o provide adequate fire lanes for fire-fighting apparatus.

Such requirements will be incorporated in the construction specifications for the project.

(2) Completed Project

We intend to provide adequate traffic controls so that access for fire fighting equipment will be maintained.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

8-2

OAHU CIVIL DEFENSE AGENCY

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE: 523-4121

FRANK F. FASI
MAYOR

RECEIVED
86 JAN 27 P 2:42

January 27, 1986

TO: MR. JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: GEORGE L. KEKUNA, DEPUTY DIRECTOR DESIGNATE

SUBJECT: REVISED ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE - KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

The proposed changes to the project described in your memo of January 20, 1986 present no additional concerns to this agency.

As previously mentioned, the possibility of increased minor soil erosion during the construction period should not significantly affect Civil Defense operations in the area.

Thank you for the opportunity to comment.

GEORGE L. KEKUNA

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: George L. Kekuna, Deputy Director Designate
Oahu Civil Defense Agency

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your January 27, 1986 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

Your comment stating that the potential for increased minor soil erosion during construction should not affect Civil Defense operations in the area is in agreement with our conclusions.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

POLICE ... CITY AND COUNTY OF HONOLULU

... SOUTH BERETANIA STREET
HONOLULU, HAWAII ... - AREA CODE (808) ...

MAY 0 1 1984

EILEEN R. ANDERSON
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE EFS/CS-ES

April 27, 1984

TO: WILLIAM BONNET, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR THE KALAKAUA AVENUE SIDEWALKS PROJECT

8-28

Thank you for the opportunity to review and respond to the subject document. The Honolulu Police Department has the following comments to offer.

1) Elimination of limited (in time and place) parking on Kalakaua Avenue will have an impact on services provided by this department.

As we recommended in the January 5, 1984 meeting, we would like to see the provision of more and adequate spaces for commercial loading of freight and passengers. This proposal is an effort to minimize the calls for service because of illegally parked vehicles which may impede the flow of vehicular traffic through the area.

We are further recommending that tow away warnings be prominently posted in each loading area. In addition, we recommend that tow away fines be significantly increased as a means of discouraging the misuse of the loading areas.

2) Calls for service during this project's construction period will have a definite impact on this department. We are responsible for monitoring and protecting the safety of both pedestrians and vehicles.

As a practical measure, we are recommending that a substantial number of personnel, such as special duty officers and security guards, be considered for assignment to the site(s) during the hours of construction and a minimal number be assigned during non-construction hours.

In addition, during this period, provision for access by emergency vehicles is essential.

We may have further comment as plans for this project progress.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

By
WARREN FERREIRA
Deputy Chief of Police

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

MEMORANDUM

TO: Police Department

FROM: John E. Hirten, Director
Department of Transportation Services

SUBJECT: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your April 27, 1984 memorandum concerning the Revised Environmental Impact Statement Preparation Notice for the proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. As you know, our plans for Kalakaua Avenue have continued to evolve, and a Revised EISPN describing the current plans was circulated in January of this year. We received no additional comments from the Police Department at that time. Hence, the responses which follow are to the concerns expressed in 1984.

(1) Provision of Additional Freight and Passenger Loading Areas

A number of the organizations who commented on our original plans suggested that additional passenger and freight loading zones be provided. Our revised plans contain several additional areas for this purpose.

(2) Need for Police Personnel During Construction

We recognize the importance of having sufficient personnel on-site during construction to insure public safety and to prevent unnecessary traffic problems. Provisions for this assistance will be incorporated in the construction contract for the project.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

The Senate
The Thirteenth Legislature
of the
State of Hawaii

STATE CAPITOL
HONOLULU, HAWAII 96813

February 3, 1986

Mr. John E. Hirten, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Thank you for providing me a copy of the Revised Environmental Impact Statement Preparation Notice (EISPN) on the "Kalakaua Avenue Safety and Beautification Project."

As you well know, I have upheld adamantly the Legislative requirement that a simulation be done in Waikiki so that the residents of Waikiki have the opportunity to experience the proposed changes before any plans are implemented.

I do not feel that this requirement has been met, in spite of all the studies you have done. The physical simulations were not done with the idea of giving the residents sufficient time to judge the effects of the changes. In the letter accompanying the study, you indicated that the EISPN would be presented to the public for "review and comment." I must protest this misinterpretation of Legislative intent.

The requirement to respond to your letter within a specified time period precludes a detailed evaluation and comment on the technical paper and the computer simulation studies paper.

However, a cursory review of your technical paper and computer simulation studies reveals:

1. The traffic count data is biased in that the study did not include actual peak counts which occur on weekends. (No data were assembled from 3 p.m. Friday to 8 a.m. Monday).

2. The project has not yet been designed to the point where construction drawings calculations, and specifications can be prepared. Hence, the $7-9 million cost estimate has no real justification.

State of Hawaii
Thirteenth Legislature
The Senate

3. Neither report adequately analyzes nor proves the need for more sidewalk area.

4. There is no proof to the assertion that Kalakaua Avenue has had no traffic volume increase in 12 years.

Essentially, I am concerned that his project could have long-term adverse effects for the residents of Waikiki, and is out of proportion to other equally urgent transportation, traffic, and parking needs in the area. However, I am fully supportive of all beautification and safety efforts, and I hope you will keep me informed on the overall, broader plans for these desperately needed improvements in Waikiki.

Sincerely,

Mary-Jane McMurdo

Mary-Jane McMurdo
Senator, 15th District

cc: Governor George Ariyoshi
Senate President Richard Wong
Senator Mamoru Yamasaki
Senator Bert Kobayashi
Rep. Kinau Kamili'i
Councilmember Marilyn Bornhorst
Mr. Kent Keith, DPED
All Members of Waikiki Neighborhood Board
Waikiki Residents' Association

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 4, 1986

The Honorable Mary Jane McMurdo
The Senate
The Thirteenth Legislature
State of Hawaii
State Capitol, Room 224
Honolulu, Hawaii 96813

Dear Senator McMurdo:

8-131

Thank you for your letter of February 3, 1986, commenting upon the City and County of Honolulu's Environmental Impact Statement Preparation Notice (EISPN) for the Kalakaua Avenue Safety and Beautification Project. Your remarks and the City's full and official response will be made a part of the Final EIS Report when it is published in March 1986.

When the State Legislature approved funds for improvements to Kalakaua Avenue, it required that a simulation of the project be conducted prior to full implementation. The proviso was promulgated because of the concern expressed by the Waikiki Neighborhood Board and the Waikiki Residents' Association that sidewalk widening would be accomplished by reducing the existing four lanes of operating traffic on Kalakaua Avenue to only three lanes. However, as you know, the present plans call for the retention of the present four-lane configuration of Kalakaua Avenue.

In view of this and after hearing reports on our simulation efforts, I am pleased to report that on January 7, 1986, the Waikiki Neighborhood Board voted to support the physical and computer simulation studies and revised Conceptual Plan for Kalakaua Avenue as we presented it. Since that time, a number of other organizations have also endorsed the plan, including The Outdoor Circle, West Diamond Community Association, Chamber of Commerce of Hawaii, American Automobile Association of Hawaii, Hawaii Transportation Association, Waikiki Improvement Association, Oahu Development Conference, American Institute of Architects, Hawaii Hotel Association, State Department of Planning and Economic Development, and State Department of Transportation.

In summary, the proposed plans for Kalakaua Avenue Safety and Beautification Project have:

- retained four traffic lanes on Kalakaua Avenue, the original source of community concern three years ago when there was talk of reducing it to three lanes;
- received the endorsement of the Waikiki Neighborhood Board and the Waikiki Residents' Association, the two community groups which caused the Legislature to require a simulation; and
- been extensively tested through the use of computer and physical simulation on the streets of Kalakaua Avenue.

Accordingly, we have met both the intent and the specifics of the conditions governing the appropriations for the Kalakaua Avenue Improvement Project. Funds should now be released for this vital project.

Finally, I cannot agree with your conclusion that this project will have long term adverse effects. On the contrary, I firmly believe that this project is very much needed, is long overdue, will dramatically improve pedestrian and vehicular traffic flow on Kalakaua Avenue and will significantly enhance the beauty and enjoyment of the most important thoroughfare in our state.

A detailed response to your concerns is contained in the accompanying report. Thank you for your continued interest for transportation improvements for our community.

Sincerely,

JOHN E. HIRTEN

cc: Mayor Fasi
Managing Director
Governor George Ariyoshi
Senate President Richard Wong
Senator Hamoru Yamasaki
Senator Bert Kobayashi
Rep. Kinau Kamali'i
City Councilmembers
Mr. Kent Keith, DPED
All Members of Waikiki Neighborhood Board
Waikiki Residents' Association
Senate and House Tourism Committee Members
State Department of Transportation

RESPONSE TO
SENATOR MARY JANE MCMURDO'S LETTER OF FEBRUARY 3, 1986

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Concern #1: "The traffic count data is biased in that the study did not include actual peak counts which occur on weekends."

Response:

Some weekend traffic data was available to the study but the weekend was not analyzed for the reasons given in the computer simulation report and are elaborated below:

- Standard traffic engineering practice is to design for the typical or normal peak conditions. The weekday afternoon peak hour meets this condition. To design for higher but more atypical conditions would result in overdesign, which implies higher costs which are generally not justified.

- There are many large special events on weekend evenings which have unique traffic impacts and would result in overdesign if accounted for. For example, special events such as banquets would have an impact on specific locations such as intersections adjacent to hotel parking garages.

- The weekend night traffic includes many "cruisers" who pass the evening just driving up and down Waikiki. They undoubtably add to the traffic flow and congestion but optimal traffic flow is not a priority to them. Experience elsewhere has shown that it is very difficult to optimize traffic flow when there are a large number of cruisers in the traffic. Furthermore, cruisers are irregular and are not permanent users.

Concern #2: "The project has not yet been designed to the point where construction drawings, calculations, and specifications can be prepared. Hence, the $7-8 million cost estimate has no real justification."

Response:

The EISPN, on page II-25, Chapter 2.25 clearly states that the current construction budget is approximately $7.0 million. There has never been mention of an $8 million cost estimate. The consultants, at our December 19, 1985, Policy Committee, presented detailed project cost estimates. They calculated that $5.8 million would be the cost of street lighting, street furnitures, landscaping, and the resurfacing the 120,000 square feet of sidewalk with a tile border and the remainder in exposed aggregate concrete; without the tile, about $5.6 million would be required. An all-tile surface would cost about $6.1 million, and a terazzo surface would be about $6.4 million. Thus, to allow for contingencies, we estimated $7.0 million as the project cost, just to be on the safe side.

Concern #3: "Neither report adequately analyzes nor proves the need for more sidewalk area."

Response:

The Transportation Research Board, National Academy of Sciences (TRBNAS), Washington D. C., has published a comprehensive report on the "Level of Service" concept for analysis of traffic capacity. The methodology is recognized by traffic engineers as an excellent way to evaluate and estimate pedestrian and vehicular traffic capacity. The primary characteristics of pedestrian flow on sidewalks are similar to those of vehicular flow. Mobility considerations include free choice of speed, ability to pass slower pedestrians and to walk perpendicular to or in the reverse direction, and in general, the ability to maneuver without abrupt changes in speed, direction, or gait. In addition to mobility indicators, other important aspects include:

- Comfort - climate, walkway surface, and grade

- Convenience - directness of path, conflicts with other pedestrians and obstacles, ramps, and pedestrian control

- Safety - hazards associated with vehicular traffic, obstacles, and surface condition

- Security - lighting and surveillance, walkway activity level, restrictions to open view

- Economy - user cost from travel delay

The TRBNAS report recommends pedestrians, while passing each other, should each have at least 2.5 feet of walkway width (our simulation report assumed most pedestrians on Kalakaua are on vacation with someone and consequently walk side by side and need only 2.0 feet/person, although this is cutting it tight).

The report also subtracts fixed obstacles from usable walkway widths and stipulates a measurement range, i.e., light poles, 2.5-3.5 feet; mail boxes, 3.2-3.7 feet; newsstands, minimum 4.0 feet; trees, 3.0-4.0 feet. Buffer space width is also subtracted from usable sidewalk space. This is dead space along curbs, fixed obstacles, and along building fronts. Moving pedestrians tend to shy away from walking at the edge of a curb or immediately adjacent to a building or other fixed objects and automatically create the "buffer" or "dead" space. Thus, a minimum of 1 foot is pre-empted along the curb, both sides of a tree (if in the center of the walkway), or any other obstacle when calculating pedestrian capacities and level of service provided any given sidewalk situation. Therefore, the clear width of a measurement of walkway is the sum of the fixed obstacles and dead space subtracted from the sidewalk width.

The TRBNAS report establishes levels of service ranging from the most desirable "A" rating to the least desirable "F" rating.

Space criteria for the level of service A requires at least 40 square feet per person or, assuming the clear width of the City sidewalk is approximately 10 feet wide, one tourist would need 4 feet of the length of that sidewalk (10 X 4 = 40). Another way to consider this level of service A is to imagine tourists walking along our sidewalks in a single line with a distance of 4 feet between them. There would have to be sufficient area for pedestrians to freely select their own walking speed, to bypass slower pedestrians, and easily avoid opposing traffic and crossing conflicts with others. Using the report criteria and our weekday peak pedestrian counts, our analysis of the Kalakaua Avenue project area rarely indicates the level of service A. When this level does occur, it is generally on the sidewalks at the Ewa and Diamond Head ends of the project along Kuhio Beach and Fort DeRussy.

However, level of service B requires a minimum of 24-40 square feet per person or a distance of 2.4 feet (10 X 2.4 = 24) between our imaginary line of tourists. Minor conflicts occur when pedestrian cross and encounter reverse direction traffic. This level of service is common almost throughout the project area during evening peak hour pedestrian traffic flow.

Level of service C space allocation is 16-24 feet or now a distance 1.6 feet between our imaginary line of tourists. Now there is high probability of conflict requiring frequent adjustments of speed and direction to avoid contacts and considerable friction or interaction between pedestrians moving in opposite directions is likely to occur. This situation is not uncommon on Kalakaua Avenue during the peak 8:00 p.m. - 9:00 p.m. traffic between Lewers Street and Liliuokalani Avenue.

Level of service D provides 11-16 square feet/person or a space of about 4 feet by 3 feet in area. Pedestrian traffic would be severely restricted with the occurrence of multiple conflicts with others. At this level of service, there is some probability of intermittently reaching critical density, causing momentary stoppage of flow. Due to the platoon effect on Kalakaua Avenue moving in each direction, caused by the stop lights, groups of people move along the sidewalk and experience multiple conflicts. This situation is typical during peak pedestrian periods between Seaside and Kaiulani Avenues. Our most recent peak evening count in that area on the mauka side of the street exceeded 3,900 persons per hour.

Level of service E space allocation is 6-11 square feet/person or a space of about 2 feet by 3 feet in area. The results experienced by pedestrians are insufficient area to overtake and pass, extreme difficulty moving in opposite directions, volume approaching maximum attainable capacity of the walkway, and frequent stoppages and interruption of flow. This condition occurs in front of McDonald's, Jolly Roger's, and areas where planters or structures abut the property line at where the sidewalk is obstructed with newsstands, trees, trash receptacles, etc.

Level of service F spacing is less than 6 square feet/person. This situation is more representative of queuing rather than a traffic flow situation. Often our congested street corners, when the pedestrian crossing light is red, experience an "F" level of service. Such mauka corners as Royal Hawaiian, Seaside and Kaiulani Avenues are typical examples during peak pedestrian traffic hours when this situation occurs. The proposed plan calls for widening the sidewalks and corners which will substantially increase the queuing area and sidewalk widths, thus, reducing congestion.

Concern #4: "There is no proof to the assertion that Kalakaua Avenue has had no traffic volume increase in 12 years."

Response:

The City agrees that it is incredible that the tremendous growth of hotels in Waikiki has not been accompanied by a similar increase in traffic. But this is what our traffic records show for the past 15 years. There are reasonable explanations for this phenomena. First, the increase in the tourism industry has resulted in structural changes in the industry. The independent, well-to-do tourist was replaced by the group traveller, particularly those from Japan. The limousines and passenger cars have been replaced by an ever-increasing fleet of tour buses. Many visitors are depending more on public transportation to meet their mobility needs. For example, the City has had to increase bus service to Waikiki to meet the demand for services.

In 1972, there were three bus routes through Waikiki with 30 buses in service during peak demand. The total number of passengers carried on Oahu that year was 19.4 million. Last year, 1985, the number of routes doubled to six, serving Waikiki with 102 buses during peak demand or more than triple the number in 1972. The total number of passengers carried on Oahu last year was over 75.0 million.

5/84-1705

WAIKIKI NEIGHBORHOOD BOARD NO. 9
c/o WAIKIKI/KAPAHULU LIBRARY
400 KAPAHULU AVENUE
HONOLULU, HAWAII 96815

MAY 03 1984

May 1, 1984

Mr. William A. Bonnet, Director
Transportation Services
650 S. King Street
Honolulu, HI 96813

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE KALAKAUA AVENUE SIDEWALK WIDENING PROJECT

Dear Mr. Bonnet:

This letter is in response to your March 29, 1984 correspondence on the above subject requesting written comments.

We did not obtain a sufficient number of copies of the report to allow full Board distribution (I had only one copy), so that fact coupled with time restraints made it impossible to get the comments of the Board as a whole.

However, the copy that was given to me was shared with Mert Cowan, Vice-Chair and so for your records we include his comments. Jack Denton of our Board, also had a copy of the Preperation Notice and he to is preparing comments.

In the interest of time, we are asking Jack Denton to send his comments directly to you with a copy to me. Hopefully, this will provide some meaningful input for your Department.

Thanks again for your attendance at our meetings and for providing us with the EIS.

Sincerely,

John W. Stunkard

John W. Stunkard
Chairman

cc: Jack Denton
Mert Cowan
Neighborhood Commission

8-34

EIS PREPARATION NOTICE
KALAKAUA AVENUE SIDEWALKS

1. Page 1-1, last paragraph assumes no significant switch of traffic from Kalakaua to Kuhio. "Trial" narrowing of Kalakaua as proposed by Rep. Joan Hayes and endorsed by the Waikiki Neighborhood Board at April meeting would be test of this.

2. Earlier info specified that a minimum of 4 auto traffic lanes would be maintained. Figure II-8 (Page II-16) & II-9 (Page II-17) show only 3 lanes at Royal Hawaiian Shopping Center and Kuhio Beach Park. "Planter" strips are provided.

3. Several references to "street furniture" but no indication of what would be provided.

4. Page II-21, proposed award of construction contract "in late 1984 or early 1985". Let's not be rushed into this without adequate testing!

5. Page II-22, third paragraph states, "Where existing sidewalks will be replaced by landscaping, ---." I thought we were supposed to widen sidewalks, not change to landscaping and substitute new walks.

6. Page III-1, paragraph 3.1.2 says loading areas would be provided for buses and service vehicles. I don't believe that the scaled drawings properly include these.

7. Page III-2, paragraph 3.3.1 - Shouldn't high temperature range be from High 70s to High 80s (rather than mid)?

8. Page II-13, paragraph 2.1.5 - Based on 1992, how about later increases? Project would not be completed until 1986 or (probably) later. This is only 6 years or less before the projected demand date. I'd like to see provisions made for 25 years beyond completion date. Traffic lanes will be lost forever.

Mert Cowan,
Vice-Chairman Sub-district III
Waikiki Neighborhood Board No. 9

Page 115

CAPITAL IMPROVEMENT PROJECTS

STATE: HAWAII

8.35

PROGRAM AND CAPITAL PROJECTS — CAPITAL PROGRAM EXPENDING FISCAL PROJECT ID. AGENCY — APPROPRIATIONS (1,000's)

A. ECONOMIC DEVELOPMENT
TRADE AND FINANCE
FOREIGN TRADE ZONE SERVICES

[1. FOREIGN-TRADE ZONE INDUSTRIAL PARK — FTZ-2 PED107

PLANS AND DESIGN OF SITE IMPROVEMENTS ON OAHU, FOR FTZ ACTIVITIES. IMPROVEMENTS INCLUDE INSTALLATION OF WATER AND SEWER LINES, COMMUNICATIONS AND ELECTRICAL LINES, FIRE HYDRANTS, AND OTHER UTILITIES; SECURITY FENCING; ROADWAYS; OFFICE SPACE; AND OTHER FACILITIES NEEDED TO MEET FOREIGN-TRADE ZONE REQUIREMENTS.

PLANS 50
DESIGN 100
TOTAL FUNDING PED 150 C

TOURISM

1A. WAIKIKI IMPROVEMENTS, OAHU — TOUR01 PED113

DESIGN AND CONSTRUCTION OF IMPROVEMENTS AND PUBLIC FACILITIES FOR THE GENERAL IMPROVEMENT OF WAIKIKI, INCLUDING WIDENING AND LANDSCAPING OF SIDEWALKS BORDERING KALAKAUA AVENUE. PROJECTS ARE TO BE FINANCED BY STATE AND CITY AND COUNTY OF HONOLULU FUNDS ON AN 80 TO 20 RATIO. FUNDS NOT NEEDED FOR ANY COST ELEMENT MAY BE TRANSFERRED FOR USE IN ANY OTHER COST ELEMENT.

PLANS
LAND
DESIGN
CONSTRUCTION
EQUIPMENT
TOTAL FUNDING PED

Page 221

H.B. NO. 1640-84 H.D. 1 S.D. 1 C.D. 1

(1) By adding a new Section to read:

"SECTION 83A. Provided that of the general obligation bond funds appropriated to Tourism, Department of Planning and Economic Development (PED 113) for the Waikiki Improvement project, the City and County of Honolulu shall conduct a simulation in Waikiki of the sidewalk widening to demonstrate how all types of vehicles will adjust to the narrowed lanes and to designated loading and unlaoding zones; provided further that the simulation shall occur before any contracts for the widening of the sidewalks are executed; provided further that the simulation be tested over a sufficient period of time to determine the impact of the proposed widening and to allow for public review and comment; provided further that the City and County of Honolulu shall submit a report twenty days before the convening of the 1985 Regular Session on the results of the simulation."

(2) By adding a new Section to read:

"SECTION 83B. Provided that the Department of Social Services and Housing in its construction of the Oahu Medium Security Correctional Facility (SOC 493) shall allocate a proportional amount of the facility for industrial,

B5967
FIN

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Chairperson
Waikiki Neighborhood Board No. 9
c/o Waikiki/Kapahulu Library
400 Kapahulu Avenue
Honolulu, Hawaii 96815

Dear Ms. Miller:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On May 1, 1984, the Waikiki Neighborhood Board No. 9 transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women, input from community organizations such as yours, and information generated by additional analyses.

To insure that the revised plans received proper public review, a series of public meetings was held, and a revised EISPN was issued in January 1986. Waikiki Neighborhood Board No. 9 did not provide additional comments in response to the revised EISPN; hence, the following responses deal exclusively with your 1984 letter.

(1) The 1984 plan for the project called for reducing the roadway width from its current 56 feet to 40 feet, and cutting the number of through lanes from four to three. Subsequently, the City has decided to provide four through lanes within a 47-foot wide roadway (see attached drawings). Tests and simulations conducted over the past two years indicate that the reconstructed roadway will provide a higher level of service than the current arrangement.

(2) As shown on the attached drawings, four lanes will be provided.

(3) A final selection of street furniture has not yet been made.

(4) As you know, the project was not implemented on our original time schedule. Instead, while we awaited completion of the Kuhio Avenue widening project, additional data on traffic and pedestrian movements were collected, and numerous tests of alternative intersection and laneage configurations were conducted. As a result of these tests, a decision was made to retain four traffic lanes along the

entire length of Kalakaua Avenue. Computer modeling indicates that the capacity of the roadway will actually be higher following completion of the proposed sidewalk and roadway improvements than it was before they were undertaken.

(5) The City's current plan increases the amount of sidewalk space available for pedestrian movement at virtually every point along Kalakaua Avenue. As indicated by the attached drawings, in many places this is accomplished by physically widening the existing sidewalk; in others the increased walkway space is obtained by the removal and relocation of existing obstructions, such as newsstands, traffic signal controllers, and the like. The plan does call for improving the appearance of areas where the carrying capacity of the sidewalks is adequate by constructing landscape planters.

(6) The location of passenger and freight loading areas has been changed since the original EISPN was issued in 1984. An updated map is attached to this letter and will be included in the Draft EIS.

(7) National Weather Service data indicates that the average high temperatures during the summer months are in the mid-eighties. However, temperatures immediately adjacent to Kalakaua Avenue and other locations in Waikiki that contain large areas of heat-absorbing asphalt and concrete are probably higher.

(8) Further analyses of the data shows that peak-hour traffic volumes on Kalakaua Avenue have remained fairly constant for a number of years. In view of the severe restrictions on further growth within Waikiki imposed by the Waikiki Special Design District and the Development Plan for the Primary Urban Center, little future growth is expected.

We expect to submit the Draft EIS for the proposed project on March 20, 1986. This will initiate a 30-day review period during which comments on the proposed plans may be submitted. We appreciate your involvement in the EIS process, and look forward to your comments. In the meantime, if you have any further questions, please feel free to call our project manager, Mr. Rom Duran, at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates
Neighborhood Commission

Attachment: (1) Concept Map: Kalakaua Ave. Improvements

8-36

WAIKIKI IMPROVEMENT ASSOCIATION, INC.
SUITE 1410 • 2222 KALAKAUA AVE • HONOLULU, HAWAII 96815 • TEL. (808)923-1094

RECEIVED
86FEB 12 P2:15
DIRECTOR'S OFFICE
CITY AND COUNTY OF HONOLULU
DEPARTMENT OF TRANSPORTATION SERVICES

February 10, 1986

Mr. Rom Duran
Department of Transportation Services
650 South King Street
Honolulu, HI 96813

Re: Comments on the EIS PN
Kalakaua Avenue Safety and Beautification Project

Dear Mr. Duran:

The EIS PN in our view is comprehensive and relevantly covers all aspects of the Project. At this point we do not see any deficient areas which would have to be expanded in order to provide the disclosure and information required by the EIS process.

It is interesting to note that information collected by this organization over the years corroborates the information provided in the PN with regard to traffic volumes and trends and visitor data. One historical study in our files measures the 24 hour traffic volume on Kalakaua Avenue in 1954 as 30,000 vehicles. In 1982 and 1985 counts also fix the Kalakaua volumes at 30,000 vehicles + 1000, indicating that traffic volumes have not increased on Kalakaua Avenue in 30 years. In addition, the counts provided in the EIS PN for Kuhio and Ala Wai Blvd. are virtually the same levels as existing in 1969. This corroborates the finding that "only modest increases have occurred in 24 hour traffic volumes between 1967 and 1984."

We anticipate from the data contained in the EIS PN that the environmental impact of the project will be vastly positive in providing safe, smooth traffic flow, aesthetic improvement to Waikiki, increased pedestrian facilities to meet needs, separation of the vehicle and the pedestrian and providing new sidewalk material and facilities. Negative impacts either are non-existent or confined to the construction period.

Very truly yours,

Donald A. Bremner
Executive Vice President

8-37

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Donald A. Bremner
Executive Vice President
Waikiki Improvement Association
2222 Kalakaua Avenue, Suite 1410
Honolulu, Hawaii 96815

Dear Mr. Bremner:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 10, 1986 letter. I appreciate the time you spent reviewing the document.

The support of the Kalakaua Avenue Safety and Beautification Project by the Waikiki Improvement Association is important to the successful development of this project. Your input throughout the planning and EIS process has been most helpful.

If you have any questions on the project, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

WAIKIKI RESIDENT S ASSOCIATION

Suite B 4 a 1720 Ala Moana Honolulu, Hi 96815 537-5384

June 19, 1984

William A. Bonnet
Director Transportation Services
City and County of Honolulu
650 So. King St.
Honolulu, Hi 96813

Dear Bill

Because of the nature of our April and May Waikiki Residents Association meetings we were unable to take a vote on this statement enclosed in connection with the Environmental Impact Statement for Kalakaua Sidewalk Widening until last night at our June meeting.

Therefore we are forwarding our statement to you at this time.

Thank you for your consideration of our position.

Sincerely yours

Georgia E. Miller

President Waikiki Residents Association

WAIKIKI RESIDENT S ASSOCIATION

Suite B 4 a 1720 Ala Moana Honolulu, Hi 96815 537-5384

June 19, 1984

William A. Bonnet
Director Transportation Services
City and County of Honolulu
650 So. King St.
Honolulu, Hi 96813

Dear Bill

Because of the nature of our April and May Waikiki Residents Association meetings we were unable to take a vote on this statement enclosed in connection with the Environmental Impact Statement for Kalakaua Sidewalk Widening until last night at our June meeting.

Therefore we are forwarding our statement to you at this time.

Thank you for your consideration of our position.

Sincerely yours

Georgia E. Miller

President Waikiki Residents Association

Association boundaries include residents of Diamond Head, Waikiki, and Kapiolani Blvd.

May 23, 1984

SUBJECT: The Environmental Impact Statement Preparation Notice For Kalakaua Avenue Sidewalks Project

The Waikiki Residents Association is on record as favoring the maintenance of the existing street configuration until a complete assessment can be made of the impact of the traffic situation following the completion of all work on Kuhio Avenue. The Association wants the existing sidewalks improved and the reduction, elimination and re-arrangement of the various street clutter of vending stands, utilities and landscaping in appropriate areas.

It the Kalakaua Avenue Sidewalks Project is to proceed as described in the EIS preparation notice; the Residents Association comments as follows:

page 11-21. The report states that the construction plans call for a construction contract for the Kuhio Avenue to Liliuokalani Avenue segment in late 1984 or early 1985. Actual construction is expected to be spread over 18 to 24 months.

1. The WRA suggests that the construction plan be reversed and contruction begin first on the Kaiulani to Kapahulu segment. This would be least disruptive initially and give Waikiki residents and visitors a much needed rest from noise, dust, and traffic congestion between Kuhio and Kaiulani. Furthermore, starting at the other end would demonstrate the quality and character of the landscaping plan and improvements to follow.

2. The 18 to 24 months construction time seems excessive. Any construction plan should be detailed in advance with the objective to shorten construction time. This should be part of the construction bid. Reducing the time of construction whould be beneficial toall concerned parties.

3. The plan should be specific about construction techniques to minimize undesirable impacts during construction periods

(OVER)

The sloppy, dusty and dangerous construction practices followed on Kuhio should be discouraged. Frequent watering of the construction area would be a great benefit to reduce the dust problem. Also construction might be done in smaller segments and completed before continuing to the next.

4. Is the resurfacing of the street to be asphalt orconcrete?

5. We support a minimum of four through lanes.

Thank you for the opportunity to comment on this EIS Preparation Notice for the Kalakaua Avenue Sidewalks Project.

Georgia E. Miller

President Waikiki Residents Association

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
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DIRECTOR

JOSEPH M. MAGALDI, JR.,
DEPUTY DIRECTOR

March 14, 1986

Georgia E. Miller, President
Waikiki Residents Association
Suite B-4-a
1720 Ala Moana Boulevard
Honolulu, Hawaii 96815

Dear Ms. Miller:

84-40

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On June 19, 1984, the Waikiki Residents Association transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women, input from community organizations such as yours, and information generated by additional analyses.

To insure that the revised plans received proper public review, a series of public meetings was held, and a revised EISPN was issued in January 1986. The Waikiki Residents Association did not provide additional comments in response to the revised EISPN; hence, the following responses deal exclusively with comments contained in your 1984 letter.

General

As you know, the Kuhio Avenue widening project was completed in September, 1985. Traffic through Waikiki has now returned to its preconstruction levels, and the City has instituted a number of temporary changes in the configuration of the roadway, many of them designed to help evaluate the effects of the changes that are now proposed. The results of these tests, as well as the results of computer simulation studies have been positive, and we now hope to move quickly to implement our plans.

During the same period, the City has moved aggressively to clear the sidewalks of the newsstand clutter to which you referred. With the help of the publishers, newsstands have been clustered together in several areas, eliminating the newsstand sprawl that had claimed so much of the public sidewalk space. Further improvements must await implementation of this project, but a positive and cooperative attitude has been created.

(1) Starting Point for Construction

The Waikiki Residents Association suggests that construction begin first on the Kaiulani Avenue to Kapahulu Avenue segment of Kalakaua Avenue. Our current plans call for the construction contract for the project to contain stringent phasing requirements that will both limit the amount of time that any stretch of sidewalk is disturbed and the the total length of sidewalk that may be under construction at any one time. Further, we will require that work move from one end of the roadway to the other in a logical progression, probably working first on one side and then on the other. However, at this time we do not expect to stipulate at which end of Waikiki the work must begin until we are able to discuss the situation with the contractor.

(2) 18 to 24 Month Construction Period

The City shares your concern that construction be completed as quickly as possible, and we will be looking closely at past performance records in selecting a contractor for this project. However, it should be recognized that it entails the construction and reconstruction of over 2 miles of sidewalk, relocation of utility lines, construction of new drainage structures, and resurfacing of the existing pavement. During the bidding process we will be seeking a contractor who can finish the job in less than 18 to 24 months, but will need to weigh the benefit of a shorter construction period against any additional costs that an overly ambitious time limit might produce.

(3) Specificity About Construction Techniques

The City is aware of the problems created by construction work on Kuhio Avenue, and we will be incorporating a number of controls designed to insure that the problems which occurred there are not repeated along Kalakaua Avenue. Our request for proposals will contain limits on construction activity designed to minimize the inconvenience experienced by Waikiki residents and businesses during the construction period; it will also require the contractor to prepare a detailed construction schedule for approval by the City before construction commences. The EIS will discuss these steps.

(4) Resurfacing Material

The roadway surface will be asphaltic concrete.

(5) Number of Lanes

The current design provides four lanes along the entire length of Kalakaua Avenue within the project area.

The Draft EIS for the proposed project will be submitted on March 20, 1986. This will initiate a 30-day review period during which comments on the proposed plans may be submitted. We appreciate your involvement in the EIS process, and look forward to your comments. In the meantime, if you have any further questions, please feel free to call our project manager, Mr. Rom Duran, at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

HAWAII TRANSPORTATION ASSOCIATION

P.O. Box 30166 • Honolulu, Hawaii 96820 • Telephone: 833-6628

May 8, 1984

Mr. William A. Bonnet, Director
Department of Transportation Services
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: Kalakaua Sidewalk Project

Dear Mr. Bonnet:

Thank you for the opportunity to comment on the proposed widening of the Kalakaua sidewalks between Kuhio and Kapahulu Avenues.

Ewa of Lewers Street, we understand that loading and unloading of commercial vehicles will be allowed in the left mauka lane within intersection limitations. No unloading facilities are provided in the stretch from Lewers Street to Royal Hawaiian to Seaside. However, we understand that loading zones will be positioned on Lewers, Royal Hawaiian and Seaside adjacent to Kalakaua Avenue.

Of major concern is the makai curb fronting the Outrigger Arcade and the Surfrider Hotel. The plan indicates approximately 120 feet of unloading area Ewa of the pedestrian lane near the Outrigger Arcade. Commercial vehicles serving that building could use that zone, but to reach the Outrigger Hotel and the Surfrider Hotel is a distance of approximately 200 feet. It would help if the plan would take into consideration loading and unloading areas adjacent to the Outrigger and Surfrider Hotels.

We sincerely hope that this suggestion will be taken into consideration.

Yours truly,

Hawaii Transportation Association

Paul K. Findeisen
Managing Director

PKF/aw

8-42

The Voice of Hawaii's Transportation Industry

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH H. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Paul K. Findeisen, Managing Director
Hawaii Transportation Association
P.O. Box 30166
Honolulu, Hawaii 96820

Dear Mr. Findeisen:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your May 8, 1984 letter concerning the City's plans for Kalakaua Avenue. I appreciate the time you and other members of your organization spent reviewing the document.

As you probably know, the City's plans have continued to evolve since 1984. Through a series of meetings and adjustments, we have obtained general acceptance for a conceptual plan which we believe best meets Waikiki's needs, and are now preparing detailed plans based on that concept. We expect to publish the Draft EIS for the project on March 20, 1986, and it will contain drawings showing changes in sidewalk width and parking areas that are proposed.

The Hawaii Transportation Association will be sent a copy of the Draft EIS, and we look forward to your comments on it. In the meantime, if you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

League of Women Voters

49 SOUTH HOTEL STREET, SUITE 314 HONOLULU, HAWAII 96813

April, 28, 1984

Mr. William A. Bonnet, Director
Department of Transportation Services
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

We are in receipt of the Environmental Impact Statement Preparation Notice for Kalakaua Avenue Sidewalks Project.

Thank you for including the League in this mailing; we have only a few comments now, but please keep us abreast of the proposed actions. We do have a general planning interest in Waikiki and a specific interest in the mobility of people and goods which this project seeks to address.

There is one area that may need revaluation: on page II-10, the Waikiki Special Design district explanation makes no mention of its drastc cuts in density and future hotel construction which should cause a leveling off in the historical rate of traffic growth mentioned on II-6 & II-7. Will this lesser rate make the 19% ten-year projection seem too high?

We realize the importance of addressing the problems of this most critical street and are pleased to see that the issue is being pursued. We do wish, however, that automobiles were not the major focus for transportation planning. The emphasis given within this project to pedestrian needs is a refreshing one.

Sincerely,
Dorothy W. Lum, President

8-43

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Ms. Dorothy W. Lum, President
League of Women Voters
49 South Hotel Street, Suite 314
Honolulu, Hawaii 96813

Dear Ms. Lum:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for the League of Women Voters' April 28, 1984 letter concerning the Kalakaua Avenue Safety and Beautification Project. Since the Environmental Impact Statement Preparation Notice (EISPN) for the Kalakaua Safety and Beautification Project was issued in 1984, a number of changes have been made in the proposed design. These are described in the Revised EISPN, which is attached for your records.

As you correctly note in your letter, the limitation on population growth imposed by the Waikiki Special Design District and the Development Plan for the Primary Urban Center severely limit future population growth in Waikiki. Mention of this is included within the Revised EISPN (page II-6), and projections of traffic increases have been revised downward.

If you wish to receive a copy of the forthcoming Draft Environmental Impact Statement, or if you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,
JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

Attachment: January 1986 EISPN

8-44

OMPO

MAY 07 1984

Oahu Metropolitan Planning Organization

Suite 1509
1164 Bishop Street
Honolulu, Hawaii 96813
(808) 523-4178
(808) 548-2638

May 7, 1984

Mr. William A. Bonnet, Director
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

EIS Preparation Notice - Kalakaua Ave. Sidewalks Project

Thank you for the opportunity to review the EIS preparation notice for the Kalakaua Avenue Sidewalks Project. We hope that the following comments may help improve the EIS:

1. pg. II-4, §2.1.3.1 Vehicular Traffic. When 24-hour traffic volumes are mentioned for the first time, an indication of whether this is average daily or average weekday should be made.

2. A discussion on the impact of pedi-cabs on vehicular traffic (on existing system, proposed project and alternatives) should be provided.

3. A section on pedestrian traffic should be included in the chapter that deals with potential impacts of the proposed action (Chapter III of EISPN). In this section, a discussion on the benefits to elderly and handicapped users should be provided.

4. The EIS should describe weekend (Saturday or Sunday) traffic patterns in greater detail than what is provided in the EISPN (pg. III-9, third paragraph). It should state:
   a. whether 24-hour weekend traffic volumes are greater than or less than 24-hour weekday traffic volumes,
   b. when the peak hour occurs on weekends, and
   c. whether peak hour weekend volumes are greater than or less than peak hour weekday volumes.

If you have any questions regarding these comments please call me.

Sincerely,

Gordon G.W. Lum
Executive Director

GGWL:pjc

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Gordon Lum
Oahu Metropolitan Planning Organization
1164 Bishop Street, Suite 1509
Honolulu, Hawaii 96813

8-45

Dear Mr. Lum:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On May 7, 1984, the Oahu Metropolitan Planning Organization transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women and residents and information generated by additional analyses. Because of the changes, a revised EISPN was issued in January 1986. OMPO did not provide additional comments in response to the revised EISPN; hence, the following responses deal exclusively with comments contained in your 1984 letter.

(1) Vehicular Traffic

The 24-hour traffic volumes reported in the EIS Preparation Notice are from a number of sources. In some cases they represent single 24-hour weekday counts. In others they are the average of up to 7 days of consecutive counting. The discussion in the EIS will clarify the nature of the data.

(2) Pedicabs

The Department is currently drafting regulations which would prohibit the use of pedicabs on Kalakaua Avenue. If these regulations are adopted, no such vehicles would use Kalakaua at the time the proposed project is completed. The presence of pedicabs was factored into the computer simulation model used to analyze traffic flow, and this information will be presented in the EIS.

(3) Pedestrian Traffic

The effect the proposed improvements would have on pedestrian traffic will be discussed in the EIS. This discussion will include a review of provisions for elderly and handicapped users.

(4) Weekend Traffic

A figure comparing weekend and weekday traffic volumes at the intersection of Kalakaua Avenue and Lewers Street will be included in the environmental impact statement.

If you have any further questions or comments, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

5/84-1780

MAY 07 1984

Hand Carried

THE OUTDOOR CIRCLE

200 No. Vineyard, Suite 502, Honolulu, Hawaii 96817

808-521-0074

May 7, 1984

Mr. William A. Bonnet, Director
Dept. Of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS - Preparation Notice for widening the sidewalks on Kalakaua Avenue

Dear Mr. Bonnet:

The Outdoor Circle has reviewed the EISPN for the Kalakaua Avenue sidewalk widening project. We are pleased to note that the proposal maintains the existing vehicular capacity; does not significantly effect the number of vehicles using Kalakaua Avenue; nor does it suggest increasing the use of Kuhio Avenue.

It is our understanding that the City is preparing a conceptual plan for the widening to include a landscape plan and other design features that are not a part of this analysis. We strongly recommend that a design and landscape plan be made a part of the final EIS. Underground pipes for watering systems will be needed and installation must be planned from the outsetto avoid disturbance of the sidewalks after completion.

We are also concerned with the need for a coherent design scheme and feel the proposal does not adequately show how the private sidewalk space which ranges from a few inches to nearly 20 feet (outsidee the city right-of-way) will be coordinated with that within the City right-of-way. The EIS should include a detailed map showing thos sidewalk areas both publicly and privately owned, along with a proposal to resolve the existing sidewalk clutter.

We question whether the maintenance should be the responsibility of the adjoiningproperty owner. Some would do a good job, whil others would not. We also question whether the City can adequately maintain the newly created sidewalk space - using the poor maintance of the Kuhio Beach promenade as an example. It is our recommendation that a maintance contract be arranged with a private company with the cost to be shared by both the City and adjoining property owners.

Thank you for this opportunity to express our concerns.

Sincerely,

Ann Stubenberg

Mrs. Arthur Stubenberg President

BRANCHES

KANEOHE OUTDOOR CIRCLE
KANEOHE HAWAII

MAUI OUTDOOR CIRCLE

KONA OUTDOOR CIRCLE
KAILUA KONA HAWAII

THE KAUAI OUTDOOR CIRCLE

LANI KAILUA OUTDOOR CIRCLE
KAILUA OAHU HAWAII

WAI MOMI OUTDOOR CIRCLE

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mrs. Theodore Crocker, President
The Outdoor Circle
200 N. Vineyard Boulevard, Suite 502
Honolulu, Hawaii 96817

Dear Mrs. Crocker:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On May 7, 1984, the Outdoor Circle sent us a letter commenting on the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women and residents and information generated by additional analyses. Because of these changes, a Revised EISPN was issued in January 1986. The Outdoor Circle did not provide additional comments in response to the Revised EISPN; hence the following responses deal exclusively with the comments in your 1984 letter.

(1) Conceptual Plan Should Include Design Features and Landscaping

The Draft EIS, which is currently being prepared, will be submitted to the Office of Environmental Quality Control on March 20, 1986. The EIS will discuss the conceptual plan for the sidewalk widening, incorporating a landscape plan and other design features, insofar as these have been finalized. These plans provide for landscape maintenance without disturbing the sidewalk area after the project is complete.

(2) Show Public and Private Sidewalk Space

The EIS will discuss the design scheme and include diagrams which show the private and public sidewalk space. A major aspect of the Kalakaua Avenue Safety and Beautification Project is the elimination of excessive sidewalk clutter.

(3) Landscape and Sidewalk Maintenance

Your concerns for maintenance of the completed project are well taken. Under the City's current regulations, the responsibility for routine landscape maintenance would fall to adjoining landowners. In order to provide a stable source of funding for the

Improvements that are made, the Waikiki Improvement Association has tentatively agreed to assume financial responsibility for the periodic maintenance of trees (pruning) and infrastructure, such as sprinklers. Public and private sidewalk areas will be maintained by the City and private property owner, respectively.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

8-47

Oir/Ron 346-937

ENV 2-1
NV/G

HEI

Brenner Munger Ph D., P.E.
Manager
Environmental Department
(808) 548 6880

February 19, 1986

Mr. John E. Hirten
Department of Transportation Services
City and County of Honolulu
Honolulu Municipal Building
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Subject: Revised Environmental Impact Statement Preparation Notice Kalakaua Avenue Safety and Beautification Project

We have reviewed the above revised Environmental Impact Statement Preparation Notice and offer the following comments:

1. The Contractor is to comply with the directions of the State of Hawaii Occupational Safety and Health Law (DSOH).

2. When trench excavation is adjacent to or under existing structures or facilities, the Contractor is responsible for properly sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure from possible slides, cave-ins and settlement, and for properly supporting existing structures and facilities with beams, struts or underpinning to fully protect it from damage.

3. Should it become necessary, any work required to relocate HECO facilities shall be done by HECO. The Contractor shall be responsible for all coordination.

4. The Contractor shall be liable for any damages to HECO's facilities.

5. The Contractor shall report any damages to HECO's facilities to the HECO Trouble Dispatch at telephone number 548-7961.

6. The information contained in our IOC to you of April 23, 1984 (copy attached) concerning the original project is still pertinent. It should be restated to the City for emphasis and inclusion in their revised EIS.

7. Chapter III, "Existing Conditions and Potential Impacts" should definitely have a section devoted to a discussion of the utilities. For HECO, the "Existing Conditions" should state in substance the following:

   "HECO has an extensive electrical underground system along Kalakaua Avenue. We have approximately 58 handholes of various sizes. The system is interconnected with duct lines between Ala Wai Boulevard and Kapahulu Avenue. During maintenance, cable failures and when new facilities need to be installed, our vehicles must be able to drive up to the handholes to do the necessary cable pulling and splicing. With the widening of the sidewalk, our handholes could become inaccessible to our vehicles. This inaccessability cannot be allowed under any conditions."

   For "Potential Impacts" on HECO, a paragraph containing in substance the following should be included:

   "HECO must be allowed to maintain its underground facilities. With the presently planned sidewalk construction it will be necessary in many areas for HECO on an infrequent basis to park its trucks on the sidewalk area adjacent to our handholes and manholes for maintenance purposes. Load spreaders can be used. These coupled with the infrequency of the requirements should pose no adverse problems to the sidewalk's structural integrity. We follow this practice

now in other parts of the City as necessary. Our maintenance work could temporarily impede pedestrian sidewalk traffic, however, those adverse affects must be contended with. Care must also be taken in the project planning to insure the proposed new planting areas in the sidewalk do no conflict with HECO's existing underground facilities as well as those of the other utilities."

8. Concerning the two questions asked in the March 29, 1984, covering City letter of the EIS, the following are our responses:

   a. We know of no new duct lines planned in Kalakaua Avenue at this time. Existing cables may need to be replaced with new cable and cables of greater capacity or new circuits installed in existing spare duct lines should electrical demands in the area increase.

   b. Sidewalks in the vicinity of our handholes and manholes will require reinforcing. We have indicated where these areas are in prior correspondence with the Department of Public Works.

Thank you for the opportunity to review this revised Environmental Impact Statement Preparation Notice.

Sincerely,

Brenner Munger

JMP/gs

HEI

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALOS, JR.
DEPUTY DIRECTOR

March 14, 1986

Dr. Brenner Munger, Ph.D., Manager
Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Dr. Munger:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your February 19, 1986 letter (Your reference No. ENV 2-1:NV/G) concerning the Revised Environmental Impact Statement Preparation Notice for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Point-by-point responses to your comments are presented below.

8-50

Comments 1 Through 5

These five comments address questions of liability, construction specifications, and compliance with governmental regulations. The Contractor automatically assumes responsibility for items 1 through 3 under the terms of the City's construction contracts. The contractor will only be responsible for damages to HECO's facilities which it causes. The trouble dispatch telephone number will be included in the contract specifications.

Comment 6 -- Information in IOC

Thank you for confirming that the information contained in your inter-office memorandum of April 23, 1984 is still current.

Comment 7 -- Effects on HECO Facilities

The information contained in HECO's May 4, 1984 and February 19, 1986 letters concerning the proposed project will be included in the EIS.

Comment 8 -- Information Requested in March 29, 1984 Letter

Thank you for this information. It will be included in the public utilities section of the environmental impact statement.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

HAWAIIAN TELEPHONE
GTE

February 13, 1986

Victor M. Goto
Network Engineering Director

RECEIVED
86FEB20 P2:19

Mr. John E. Hirten
City & County of Honolulu
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Revised Environmental Impact Statement
Preparation Notice Kalakaua Avenue
Safety and Beautification Project

8-51

We have reviewed the environmental impact statement and do not foresee any adverse environmental effect from the proposed project.

The proposed sidewalk widening will affect our pullboxes and manholes along the route. These problems and our original comments dated April 30, 1984, must be addressed in the final design.

If there are any questions, please contact George Yamada at 834-6220.

Sincerely,

Vic Goto

Hawaiian Telephone Company • PO Box 2200 • Honolulu, Hawaii 96841 • Phone (808) 546-8176

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Russ K. Saito
Network Engineering Director
Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Saito:

Subject: Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

Thank you for your April 30, 1984 and February 13, 1986 letters regarding the original and revised Environmental Impact Statement Preparation Notices for the Proposed Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the two documents.

Your first letter asks that approximately 30 feet clearance be provided on each side of the existing telephone manholes and informs us of the Hawaiian Telephone Company's plans to expand the duct system crossing Kalakaua Avenue near Lewers Street and Seaside Avenue sometime in 1987. Your second letter reiterates this request.

Your request for clear space has been relayed to the design engineers for the project. They are currently preparing construction drawings for the project and will make provisions for your equipment wherever possible.

To insure that our planned sidewalk and roadway reconstruction is coordinated with your plans to expand the existing ducts, I would appreciate it if you would call Mr. Rom Duran of my office at 527-6392 at your earliest convenience to discuss the exact schedule for your work. This will allow us to incorporate appropriate phasing and other specifications into our construction contract.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

Gasco, Inc.
A Pacific Resources, Inc. Company

PRI Tower 733 Bishop Street
P.O. Box 3379 Honolulu, Hawaii 96842
Telephone 808 547-3333 Telex 0634238

MAY 10 1984

May 4, 1984

Mr. William A. Bonnet
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

Subject: Environmental Impact Statement
Preparation Notice for the
Kalakaua Avenue Sidewalks Project

In response to your letter of March 29, 1984, we have reviewed the EIS Preparation Notice for the subject project. We are returning three sheets of scaled drawings with the approximate locations of our gas mains plotted in red.

We refer to the third paragarph of your letter, in particular to the specific questions provided. Gasco has an active system of direct buried gas mains varying from two to four inches in nominal main size, which provides service to customers along the length of the Kalakaua Avenue Sidewalks Project.

The existing gas lines in the project area vary in depth, generally from two to five feet of cover. Since the relocation of these major lines will be an expensive undertaking, we request that your planners consider this in determining the location and placement of the proposed improvements.

In the cover letter, it was stated that existing gas lines will not be relocated as part of this project. If Gasco is required to perform work in conjunction with this project, either temporary or permanent, will Gasco be reimbursed?

We thank you for the opportunity to comment on the proposed sidewalk improvement project. Should there be any questions, please call me at 547-3574.

Very truly yours,

David Y. Norikawa

David Y. Norikawa
Project Engineer

DYN:nsd

Enclosure: EIS Drawings

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. David Y. Norikawa
Project Engineer
Gasco, Inc.
PRI Tower
P.O. Box 3379
Honolulu, Hawaii 96842

Dear Mr. Norikawa:

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On May 4, 1984, Gasco transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women and residents and information generated by additional analyses. Because of the changes, a revised EISPN was issued in January 1986. Gasco did not provide additional comments in response to the revised EISPN, hence, the following responses deal exclusively with your 1984 letter.

Location of Facilities

Thank you for the information you provided regarding the location of Gasco facilities within the project area. It has been given to the design engineer.

Reimbursement for Work Required of Gasco, Inc.

The City does not foresee the need for relocation, either temporary or permanent, of any Gasco, Inc. facilities as part of this project.

If you have any further questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Public Works, City & County of Honolulu
Belt, Collins & Associates

WRIGHT HIATT
1660 ALA MOANA-2004
HONOLULU, HAWAII 96815
949-3657

March 15, 1984

Mr. Kenneth Hirata
4th Floor Municipal Bldg
650 S. King St,
Honolulu Hi 96813

Dear Mr. Hirata,

In response to the EIS preparation notice from the Office of Environmental Quality Control (undated) attached are my comments on the Kalaukaua Avenue Sidewalks Project in Waikiki.

May I request that these remarks be included in the E.I.S.?

Thank you
Wright Hiatt

Attachment: Comments on Kalakaua Sidewalks 2/27/84

8-53

COMMENTS ON KALAKAUA SIDEWALKS PROJECTS

This project originated in a Waikiki Improvement Association Study Commission Report of Sept. 1981, emphasizing a need for esthetic improvement in Waikiki. That study contained little attention to traffic growth, and infact assumed it to be desirable to reduce traffic volume.

In 1972, a model ~~of the concept proposed by WIA~~ was displayed at the State Library, including the "Partial Mall" concept, and was reported as receiving public disapproval.

There is no doubt that esthetic improvements are desirable. But a question arises as to whether or not Kalakaua sidewalk widening is so urgent as to require $4,000,000 expenditure at this time, and whether alternative investments of public funds should be considered. The economic costs to retire the bonds or to amortize the investment amount to more than $1,000 per day. Presuming that the project may have a benefit/cost ratio of 1, who would obtain the benefits? Should those beneficiaries contribute? The whole subject of pedestrian economic benefits needs to be studied further.

Where are the facts to prove that present sidewalks on Kalakaua are overcrowded? And that those sidewalks are more urgent than some on Kuhio and Ala Moana Boulevard?

Why has there been no Environmental Impact Statement produced, in accord with H.R.S. 343, and publicly released so all will know what is proposed?
about
What/the legislative intent of Ordinance 4573, the Waikiki Special Design Diatrict, Section I - E of which states the intent is to "ensure that future developments would alleviate traffic problems"?

Many technical questions arise in a review of the Belt Collins 3 volume report:

1. Why no pedestrian traffic analyses?
2. Why were not State Dept of Transportation screen line counts for 1982 used?
3. There appear to be some discrepancies in 10 year peak hour traffic projections and intersection capacities.
4. The design analysis of the critical Kalakaua/Lewers intersection shown in Vol. II uses an approach volume of 2048 vehicles per hour, while Vol I shows peak hour actual count in 1982 of 2115.
5. Recent 15 minute peak counts on Kalakaua between Kuhio and Lewers significantly exceed those contained in the BCA report.
6. The BCA report contains no economic data nor cost estimates. How was the figure of $ 3,800,000 obtained?
7. On page 70, of Vol. III, the significatn finding is made that the 1992 peak hour projection at Lewers Street exceeds the estimated capacity.

Recommendations:

1. The appropriation of $3,800,000 for this project be postponed until the E.I.S. is available for a public hearing.

2. Members of key legislative committees be invited to visit Kalakaua Avenue between Kuhio and Lewers, between the hours of 4 to 6 p.m. on any week day.

3. The "Considerations for Developing Sidewalk Alternatives" as reported on page 70, of the BCA report, Volume III should be implemented

Wright Hiatt
2/27/84

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

March 14, 1986

Mr. Wright Hiatt
1860 Ala Moana Boulevard
Apartment 2004
Honolulu, Hawaii 96815

Dear Mr. Hiatt:

8-54

Subject: Revised Environmental Impact Statement Preparation Notice
Kalakaua Avenue Safety and Beautification Project

On March 15, 1984, you transmitted to us comments concerning the March 1984 EIS Preparation Notice for proposed improvements to Kalakaua Avenue. Further action on the EIS was suspended while we awaited completion of the Kuhio Avenue widening project. During that time, design changes were made in response to concerns expressed by area businessmen/women, input from community organizations, and information generated by additional analyses. To insure that the revised plans received proper public review, a series of public meetings was held, and a revised EISPN was issued in January 1986. We did not receive additional comments from you in response to the revised EISPN; hence, this response deals exclusively with your 1984 letter.

Your March 15, 1984 letter notes that it is being submitted in response to the EISPN; however, the comments it contains relate to the engineering studies conducted for the project rather than to the preparation notice. Our plans have evolved considerably since the early engineering studies were conducted, and I believe that many of the issues you identified have been resolved. For example:

- Detailed pedestrian traffic counts have been conducted along Kalakaua Avenue, and pedestrian behavior has been studied using time-lapse photography and other methods.
- Updated traffic counts have been taken, including counts taken following the completion of the Kuhio Avenue widening project;
- A detailed computer analysis of intersection capacities and projected volumes has been conducted;
- Tests of revised configurations have been conducted at several Waikiki intersections, and the results of these tests have been used to refine the proposed design (see attached concept plans);

- The amount of sidewalk widening has been decreased so that a roadway width of 47 feet (carrying 4 lanes) can be provided instead of the 40 feet/3 lanes originally proposed; and
- Cost estimates have been refined.

We expect to submit the Draft EIS for the proposed project on March 20, 1986. This will initiate a 30-day review period during which comments on the proposed plans may be submitted. We appreciate your involvement in the EIS process, and look forward to your comments. In the meantime, if you have any further questions, please feel free to call our project manager, Mr. Rom Duran, at 527-6392.

Sincerely,

JOHN E. HIRTEN

Attachment: (1) Concept plans (3 sheets)

cc: Office of Environmental Quality Control
Department of Public Works, City and County of Honolulu
Belt, Collins & Associates

CHAPTER IX

CONSULTATION DURING PREPARATION OF THE FINAL EIS

A notice that the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project was available for review was published in the Office of Environmental Quality Control's OEQC Bulletin dated March 23, 1986. The announcement was repeated in the April 8, 1986 Bulletin. The parties who received copies of the Draft EIS are listed in Table IX-1. The same table indicates which parties submitted substantive comments on the Draft EIS, which responded with "no comment" letters, and which did not submit comments. Letters containing substantive comments, together with the Department's responses to them, are reproduced on the pages indicated.

Table IX-1. Parties Who Received Copies of the Draft EIS

Name	Provided No Response	"No Comment" Response	Substantive Comment (page #)
STATE AGENCIES:			
Office of Environmental Quality Control			X (9-3)
Department of Agriculture		X	
Department of Defense		X	
Department of Education		X	
Department of Health			X (9-4)
Department of Land & Natural Resources	X		
DLNR/State Historic Preservation Officer	X		
Dept. of Planning & Econ. Development		X	
DPED Library	X		
Department of Social Services & Housing	X		
Department of Transportation		X	
State Archives	X		
State Energy Office	X		
UNIVERSITY OF HAWAII:			
Environmental Center	X		
Water Resources Research Center	X		
FEDERAL:			
Army-DAFE (Facil. Engineering-USASCH)			X (9-6)
Navy		X	
Corps of Engineers			X (9-7)
Coast Guard	X		
Department of the Interior			
U.S. Fish & Wildlife Service		X	
Geological Survey		X	

Name	Provided No Response	"No Comment" Response	Substantive Comment (page #)
MEDIA:			
Honolulu Star-Bulletin	X		
Honolulu Advertiser	X		
Sun Press	X		
CITY & COUNTY OF HONOLULU:			
Board of Water Supply		X	
Building Department	X		
Dept. of Housing & Comm. Development			X (9-10)
Department of General Planning			X (9-11)
Department of Land Utilization			X (9-13)
Department of Parks & Recreation	X		
Fire Department		X	
Municipal Reference and Records Center	X		
Police Department			X (9-14)
NON-GOVERNMENTAL AGENCIES:			
American Lung Association	X		
Hawaiian Electric Company	X		
Office of Hawaiian Affairs	X		
LIBRARIES:			
U.H. Hamilton Library, Ref. Collection	X		
Legislative Reference Bureau	X		
State Main Library	X		
Kaimuki Regional Library	X		
Kaneohe Regional Library	X		
Pearl City Regional Library	X		
Hilo Regional Library	X		
Wailuku Regional Library	X		
Lihue Regional Library	X		
Waikiki-Kapahulu Library	X		
OTHERS:			
Senator Mary Jane McMurdo	X		
Waikiki Neighborhood Board No. 9	X		
Waikiki Improvement Association	X		
Hawaii Transportation Association	X		
League of Women Voters	X		
Waikiki Residents' Association	X		
Oahu Metropolitan Planning Organization	X		
The Outdoor Circle	X		
The Hawaiian Telephone Company	X		
Hawaii Bicycling League			X (9-16)
Goodsill, Anderson, Quinn, & Stiffel	X		
Paradise Pedicab			X (9-18)

GEORGE R. ARIYOSHI
GOVERNOR

LETITIA N. UYEHARA
DIRECTOR
TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 South King Street, Room 115
HONOLULU, HAWAII 96813

April 10, 1986

RECEIVED
APR 15 11 11: 18

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

9-3

Dear Mr. Whalen:

Subject: Kalakaua Avenue Safety and Beautification Project Draft EIS

Traffic considerations are of major concern with regard to this proposed project. It appears that no significant effects on traffic will take place as a result of the proposed sidewalk widening if four lanes are maintained along Kalakaua Avenue.

Since tour buses and taxis require an entire lane to load and unload passengers in front of certain hotels, such as the Outrigger and Surfrider, we question whether the roadway in front of these hotels should be narrowed.

Sincerely,

Letitia N. Uyehara

Letitia N. Uyehara
Director

cc: John Hirten, DTS

FRANK F. FASI
MAYOR

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI JR.
DEPUTY DIRECTOR

April 30, 1986

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii
Kekuanaoa Building, Suite 115
465 South King Street
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Dear Ms. Uyehara:

Your April 10, 1986 letter to Mr. John Whalen of the Department of Land Utilization concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project has been forwarded to me. I appreciate the time you and your staff spent reviewing the document, and would like to respond briefly to your comments.

We are pleased you share our belief that the proposed design, which maintains four lanes of traffic through Waikiki, will provide an adequate level of vehicular service. As you correctly note, tour buses, taxis, trucks, and other vehicles must stop in front of certain hotels. To insure that these vehicles do not block through-traffic, separate (i.e., additional) loading and unloading areas are being provided at critical locations. These include areas near the Moana and Surfrider and an area in front of the Outrigger Hotel. The locations of these zones are shown on page 2, Appendix D, of the Draft Environmental Impact Statement.

I appreciate the assistance you have provided thus far in the EIS process. If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control,
State of Hawaii
Department of Land Utilization,
City & County of Honolulu
Belt, Collins & Associates

RECEIVED

'86 APR 16 AM 8:15

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

IN REPLY, REFER TO
EPHSD

April 10, 1986

MEMORANDUM

To: Ms. Letitia N. Uyehara, Director, Office of Environmental Quality Control
Mr. John P. Whalen, Director, Department of Land Utilization, C&C

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement for Kalakaua Avenue Safety and Beautification Project

In the preparation of the Environmental Impact Statement for the subject project, the following noise concerns must be addressed:

1. In addition to obtaining the Community Noise Permit, as stated in Section 3.7.2, the following conditions should be included:

   a. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.

   b. The contractor must comply with the conditional use of the permit as specified in the regulations and conditions issued with the permit.

2. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized in areas where people reside, and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

3. Should there be any baseyard or stockpile areas located adjacent to residences, mitigative measures such as barriers or berms must be developed in the event that noise complaints are received.

JAMES K. IKEDA

cc: Mr. John E. Hirten ✓

9-4

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

April 30, 1986

Mr. James K. Ikeda
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Ikeda:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 10, 1986 letter (Reference EPHSD) concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

Your comments indicate several noise concerns which must be addressed in the environmental impact statement. Those concerns, together with a discussion of the measures we are taking in response to each of them, are outlined below.

(1) On-Site Construction Noise

Comment. In addition to obtaining the Community Noise Permit, as stated in Section 3.7.2, the following noise concerns must be addressed:

a. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.

b. The contractor must comply with the conditional use of the permit as specified in the regulations and conditions issued with the permit.

Response. The contract documents will require the contractor to comply with all Federal, State, and Local ordinances and regulations. This includes Title 11, Chapter 43, Section 5(b)(1)(A), which requires the use of mufflers, and conditions which are established by the Director of the Department of Health.

(2) Traffic Noise

Comment. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized in areas where people reside, and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

Response. The contract documents will call attention to the need for vehicles to comply with Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

(3) Control of Noise Around Baseyards and/or Stockpile Areas

Comment. Should there be any baseyard or stockpile areas located adjacent to residences, mitigative measures such as barriers or berms must be developed in the event that noise complaints are received.

Response. It is the City's intent that the contractor locate baseyards and stockpiles in such a way that their operation does not lead to noise complaints from surrounding residents. In the event such complaints are received, appropriate mitigative action will be taken.

Thank you again for your interest in the Kalakaua Avenue Safety and Beautification Project. If you have any additional questions, please contact Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control, State of Hawaii
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
DUNNING HALL
FORT SHAFTER, HAWAII 96858-5000

24 APR 1986

REPLY TO ATTENTION OF
Directorate of Facilities Engineering

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
465 South King Street, Room 115
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

The Draft Environmental Impact Statement (EIS) for Kalakaua Avenue Safety and Beautification Project has been reviewed. If rights-of-way at Fort DeRussy will be required for the project, a formal request must be submitted to the Real Estate Management Division, Directorate of Facilities Engineering, US Army Support Command, Hawaii for timely consideration. The request should include a map delineating the affected Army tracts.

Thank you for the opportunity to comment on the Draft EIS.

Sincerely,

Joseph S. Wasielewski
Colonel, Corps of Engineers
Director of Facilities
Engineering

Copy Furnished:

Mr. John E. Hirten, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

9-6

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

April 30, 1986

Colonel Joseph S. Wasielewski
Corps of Engineers
Director of Facilities Engineering
Headquarters, U.S. Army Support Command, Hawaii
Dunning Hall
Fort Shafter, Hawaii 96858-5000

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Dear Colonel Wasielewski:

Thank you for your April 24, 1986 letter concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

Current plans for the project do not call for the use of any area outside of the City and County right-of-way for Kalakaua Avenue. Therefore, the use of Fort DeRussy will not be necessary.

If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Land Utilization,
City and County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF THE ARMY
U S ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

April 9, 1986

1986 APR 14 A9:40

Mr. John E. Hirten, Director
Department of Transporation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Thank you for the opportunity to review and comment on the draft environmental impact statement for Kalakaua Avenue Safety and Beautification Project, Waikiki, Oahu. The following comments are offered:

a. Any crossings over or work in the Ala Wai Canal will require a Department of the Army permit.

b. The Flood Insurance Rate Map (FIRM) Panel 120 (map revised January 6, 1983) shows the project, Kalakaua Avenue mostly in Zones A0 and C with a small portion near Seaside Avenue in Zone A1 which has a base flood elevation at 6 feet above mean sea level (see enclosure 1). An explanation of the zone designations is shown in enclosure 2.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

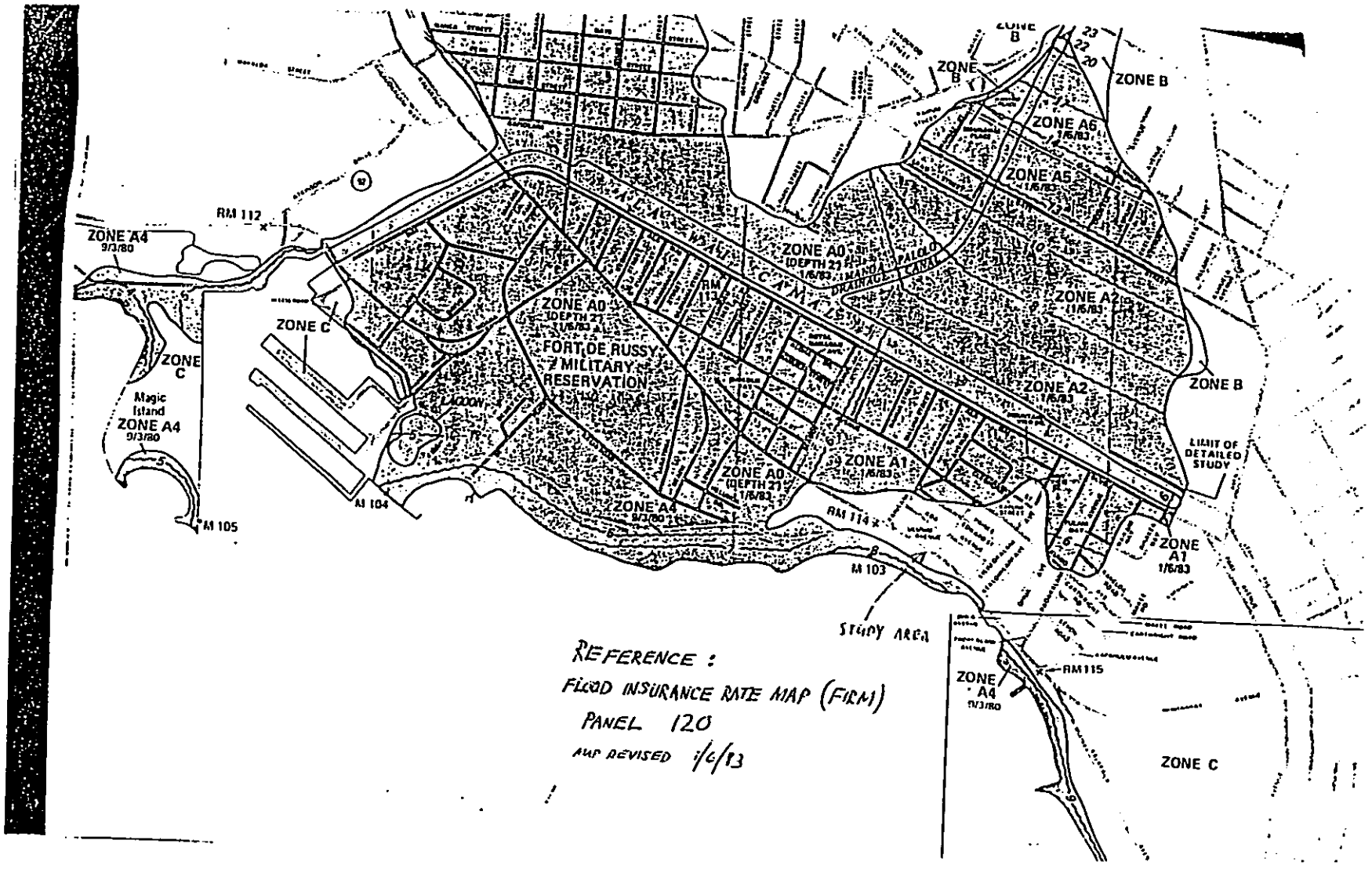
Enclosures

9-7

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AE	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood, base flood elevations and flood hazard factors determined.
AR	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.
*	The numerals indicate the magnitude of difference between the 100-year and 13-year flood elevations. For numerals between 1-20, the difference is one half of the value; for values greater than 20, the difference is 10 less than the numerals shown. This information is used in establishing insurance rates.
—13—	100-year tsunami or riverine elevation line, with elevation in feet above mean sea level.
———	Zone boundary line

Encl. 2.



REFERENCE :
FLOOD INSURANCE RATE MAP (FIRM)
PANEL 120
AND REVISED 1/6/13

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

April 30, 1986

Mr. Kisuk Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 9, 1986 letter concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

The City is aware that a Department of the Army permit would be required to cross over or work in the Ala Wai Canal. At its closest point, the proposed Kalakaua Avenue Safety and Beautification Project is over one-fifth of a mile from the Ala Wai Canal.

As indicated by the Flood Insurance Rate Map enclosed in your letter, portions of Waikiki are subject to periodic flooding. Insufficient stormwater drain inlet capacity contributes to the flooding which occasionally occurs along Kalakaua Avenue, and the additional drain inlets provided as part of this project will tend to improve this situation. However, due to its low elevation and extremely gentle grades, water will continue to accumulate in the roadway faster than it can run off during periods of extremely heavy rainfall. Hence, heavy storms will continue to cause some ponding within the road right-of-way.

If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control, State of Hawaii
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

9-9

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

ALVIN K.H. PANG
DIRECTOR

April 14, 1986

MEMORANDUM

TO: John P. Whalen, Director
Department of Land Utilization

FROM: Alvin K. H. Pang

SUBJECT: Environmental Impact Statement
Kalakaua Avenue Safety and Beautification Project

RECEIVED
APR 15 4 4: 05

9-10

Thank you for the opportunity to review the proposed Kalakaua Avenue Safety and Beautification project.

We are in accord with Oahu's General Plan/Development Plan wherein the policies/objectives are:

- Provide for a high quality and safe environment for visitors and residents in Waikiki; and
- Develop and maintain urban parks, squares and beautification areas in high density urban places; and also
- Special consideration be given to pedestrian safety, comfort and employment since walking constitutes a major activity for the visitor within this area.

The Kalakaua project has been proposed as a means of correcting existing deficiences and restoring a measure of spaciousness and elegance to the Waikiki Core.

for ALVIN K. H. PANG

cc: Office of Environmental Quality Control
Department of Transportation Services

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALON, JR.
DEPUTY DIRECTOR

April 30, 1986

MEMORANDUM

TO: ALVIN K.H. PANG, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 14, 1986 memorandum concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document, and am pleased that it fully addressed your concerns.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

'86 APR 9 P2:48

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

JB/DGP 3/86-8034

April 7, 1986

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii
465 South King Street, Room 115
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Kalakaua Avenue Safety and Beautification Project
Draft Environmental Impact Statement (dEIS)--March 1986

We have the following comments for your consideration.

1. Implementation of the proposed Kalakaua Avenue improvements is in accord with the Development Plan Public Facilities (DP/PF) Map for the Primary Urban Center. Accordingly, Section 2.1.4.4 (page 2-12) of the dEIS should be modified to indicate this.

2. Having only a portion of the project site situated within the Special Management Area (SMA) will not preclude the proposed project from being subjected to the provisions and requirements of Ordinance No. 84-4 which became effective February 10, 1984. Approval from the City Department of Land Utilization (DLU) therefore will be required before any construction can begin.

   For information on filing of an SMA permit application, the person to contact is Robin Foster (ph. 527-5027) of the DLU.

   Whether the necessary steps to bring the project in compliance with the SMA ordinance are presently underway or will be addressed soon should be stated in Section 2.1.4.6 of the dEIS.

9-11

The title Special Management Plan under Section 2.1.4.6 should be reworded to Special Management Area.

Thank you for affording us the opportunity of reviewing the dEIS.

Sincerely,

Donald Clegg

DONALD A. CLEGG
Chief Planning Officer

cc: DLU (Attn: Robin Foster)
DTS

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

April 30, 1986

MEMORANDUM

TO: MR. DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

9-12

Thank you for your April 7, 1986 memorandum (Reference JB/DGP 3/86-8034) concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document. Responses to your comments are as follows.

(1) Consistency With Development Plan Public Facilities Map

Comment. Implementation of the proposed Kalakaua Avenue improvements is in accord with the Development Plan Public Facilities (DP/PF) Map for the Primary Urban Center. Accordingly, Section 2.1.4.4 (page 2-12) of the DEIS should be modified to indicate this.

Response. The following wording will be inserted at the end of Section 2.1.4.4:

> The Department of General Planning has indicated that implementation of the proposed Kalakaua Avenue improvements is in accord with the Development Plan Public Facilities Map for the Primary Urban Center.

(2) Special Management Area Requirements

Comment. Because a portion of the project is within the Special Management Area, it is subject to Ordinance 84-4. Hence, approval by the Department of Land Utilization will be required before construction may commence. The steps that are being taken to bring the project into compliance with the SMA ordinance should be stated in the Final EIS.

Response. The following discussion will appear at the end of Section 2.1.4.6 of the Final EIS.

> An application for a Special Management Area Permit has been filed with the Department of Land Utilization. A hearing on that request is scheduled for May 8, 1986. As noted above, there is no evidence that the proposed action would adversely affect the coastal resources the Special Management Area Ordinance is intended to protect. Issuance of an SMA permit seems likely.

We appreciate your having called attention to the title of Section 2.1.4.6. It will be revised to read Special Management Area.

Thank you again for your comments. If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

86/SMA-26(BWM)

April 3, 1986

Ms. Letitia Uyehara, Director
Office of Environmental Quality Control
Kekuanaoa Building, Room 115
465 South King Street
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Kalakaua Avenue Safety and Beautification Project
Draft Environmental Impact Statement (EIS)

We have reviewed the subject document and offer the following comments:

1. Do any of the proposed improvements fronting Kuhio Beach fall within the 40-foot shoreline setback?

2. The responses to our comments on the EIS Preparation Notice thoroughly addressed our concerns.

Very truly yours,

/s/ JOHN P. WHALEN
Director of Land Utilization

JPW:sl
00398

cc: John E. Hirten,
Transportation Srvcs.

9-13

CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

April 30, 1986

MEMORANDUM

TO: MR. JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 3, 1986 memorandum (Reference 86/SMA-26 BWM) concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document, and am pleased that it fully addressed your concerns.

According to the most recent shoreline survey of the area certified by the State Surveyor, Department of Land and Natural Resources, all of the Kalakaua Avenue right-of-way is separated from the shoreline by at least 100 feet. It is, therefore, outside the shoreline setback area.

If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 • AND 8 OTHER ISLANDS

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

HERMAN FERREIRA
DEPUTY CHIEF

OUR REFERENCE CS-JS

April 9, 1986

RECEIVED
'86 APR 10 P 4:02

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
465 South King Street, Room 115
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project

We have reviewed the subject document for its relative impact on the services provided by this department.

The concerns expressed in our April 27, 1984 response have been addressed in the proposal through the inclusion of loading bays on Kalakaua Avenue, additional loading spaces on side streets, additional security personnel to help with traffic control during working hours for the duration of construction and provision for access by emergency vehicles during construction.

However, we are still recommending that the number of tow away zones and tow away fines be significantly increased as a means of discouraging the misuse of tow zones and loading areas. In addition, we would like to clarify our previous recommendation for special duty officers and security guards to promote public safety in and around restricted areas as well as for traffic control.

We would appreciate being apprised of any proposed future changes so that an adequate level of service can be maintained in the area both during and after construction.

Thank you for the opportunity to review and comment on this project.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

cc: Mr. John E. Hirten, Director
Department of Transportation Services

9-14

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI JR.
DEPUTY DIRECTOR

April 30, 1986

MEMORANDUM

TO: DOUGLAS G. GIBB, CHIEF
POLICE DEPARTMENT

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 9, 1986 memorandum (Reference CS-JS) concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and your staff spent reviewing the document.

I am pleased to know that, by including loading bays on Kalakaua Avenue, providing additional loading spaces on side streets, taking steps to insure the availability of security personnel to help with traffic control for the duration of construction, and by taking the steps necessary to allow continued emergency vehicle access during construction, we have addressed the concerns expressed in your April 27, 1984 letter.

With respect to your comments concerning tow-away zones and tow-away fines, please be advised that:

(1) It is our intention to establish no-stopping/tow-away zones along the entire length of Kalakaua Avenue except in the marked loading/unloading areas that are being provided outside the normal vehicular travelway.

(2) We will support your efforts to have the fines for violation of the "no-stopping/no-parking" prohibition increased.

Thank you for clarifying your position relative to the use of special duty officers and security guards. The contract documents will make it the contractor's responsibility to provide adequate security around the construction area at all times.

We consider it essential that the proposed construction activities be closely coordinated with your department. Hence, we will continue to keep you informed of the project's status, particularly the timing of construction activities that might affect your Department's work load or responsibilities.

If you have any further questions regarding the Kalakaua Avenue Safety and Beautification project, please call Mr. Rom Duran of my staff at 527-6392.

JOHN E. HIRTEN

cc: Office of Environmental Quality Control
Department of Land Utilization, City & County of Honolulu
Belt, Collins & Associates

HAWAII BICYCLING LEAGUE

PO Box 4403 • Honolulu HI 96812-4403 • (808) 732-5866

April 20, 1986

The Honorable John E. Hirten
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Subject: Draft, Environmental Impact Statement
Kalakaua Avenue Safety and Beautification Project

Dear Mr. Hirten:

We have reviewed the Draft of the Environmental Impact Statement of the Kalakaua Avenue Safety and Beautification Project, and have the following comments, to which we would appreciate a response:

a) In only two places did we find mention of bicycles: Mr. Kent Keith's letter of February 14, 1986 with your response, and Mr. Wayne Yanasaki's letter of June 8, 1986, to which there was no response made. In the response to Mr. Keith's letter, you made a somewhat non-committal response that the 14-foot width of the makai lane would provide some measure of safety for bicycles, mopeds, and their operators. The bulk of the response was involved with the ensuing prohibition of pedicabs from Kalakaua Avenue. I would appreciate your assurance that there is not also a design to eliminate bicycles from Kalakaua Avenue, as that would be a defenite inconvenience to the commuters of our city who use that route, bicycles do not inconvenience traffic as you clain pedicabs do, and for the tourists who realize it, the bicycle is a much nicer way to experience Waikiki than from inside a car which is impossible to stop or park until the person has reached the extreme Diamond Head end of Waikiki.

b) I understand from Mr. Ron Duran that the gutters used will not be of the slick white concrete, which are extremely hazardous to cyclists, especially when wet, but he was not certain that the gutter drainage would not be of the type which turns the gutter into a 45 degree angle alonside a vertical ditch in the side of the curb. To a cyclists being squeezed by a vehicle to the extreme right hand edge of the lane, this sudden slope of the gutter can cause a very serious accident, as his wheel disappears under the curb.

Thank you for allowing us to review the statement, and prepare this response.

Eve DeCoursey

Eve J. DeCoursey
President

9-16

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

April 30, 1986

Ms. Eve J. DeCoursey, President
Hawaii Bicycling League
P.O. Box 4403
Honolulu, Hawaii 96812-4403

Dear Ms.DeCoursey:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Thank you for your April 21, 1986 letter concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and other members of the Hawaii Bicycling League spent reviewing the document. Our responses to your comments are presented below.

(1) Continued Use By Bicycles

The City does not intend to prohibit the use of ordinary bicycles on Kalakaua Avenue. On the contrary, they will be accommodated within the fourteen-foot wide curb lane that is being provided on the makai side of the street. The Department is recommending that the City Council restrict the use of pedicabs on Kalakaua Avenue. By virtue of their much greater width, lower maneuverability, and slower speed, these have a much greater adverse effect on traffic flow than bicycles, and we believe their elimination from the traffic stream is desirable.

(2) Gutter Details

Gutters used in the proposed design are two feet wide. To insure that adequate traction is provided, we are specifying that they be given a light broom finish. This will provide a slightly rough surface, thereby preventing undue slipping during wet weather.

The City's design standards for curbs and gutters provide for the use of grooves in gutters fronting storm drain inlets only where the grade of the adjoining street is four percent or greater. The purpose of the grooves is to insure water flowing rapidly downhill is diverted into the inlets. Grades in Waikiki are very gentle, averaging less than one-half percent; hence, only standard (i.e., grooveless) inlets will be used.

Thank you again for your interest in the project. If you have any further questions, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control,
State of Hawaii
Department of Land Utilization,
City & County of Honolulu
Belt, Collins & Associates

HAND DELIVERED

APR 23 P 2:29

April 23, 1986

Mr. Rom Duran
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Re: Comments on the Draft Environmental Impact Statement Kalakaua Avenue Safety and Beautification Project, March, 1986

Dear Mr. Duran:

I thought it appropo to comment on the Draft EIS in both my capacity as the owner of Paradise Pedicab, and Acting President of the Pedicab Association of Hawaii.

Numerous references to pedicabs are made throughout the EIS, few derogotory in nature. Specifically:

Section 3.5.3.1 Sidewalk Work
... "Pedicab and all other non-motorized vehicles will be prohibited on Kalakaua Avenue;..."

This section refers to limitations on pedicab operations during the sidewalk construction phase.

Section 3.13.1 Short Term Construction Impacts
"... pedicabs and other non-motorized vehicles will be prohibited from using traffic lanes during construction."

This section refers to prohibitions on pedicab operations during the traffic lane construction.

Our concern is that during the expected 18-24 month period of construction, pedicabs will be prohibited from Kalakaua Avenue in its entirety. As discussed in section 2.2.4 Construction Schedule and Phasing, the project will be completed in increments in accordance with specific phasing requirements stipulated by the city in the construction contract. We hope that we will be permitted to operate on those sections of Kalakaua Avenue which are not under construction, and that sufficient notice be given to us pertaining to any construction phasing which might prohibit our use of those particular areas.

P.O. Box 15644 • Honolulu, Hawaii 96830-5644 • (808) 922-8161

9-18

Mr. Rom Duran
April 23, 1986
page 2

Another reference to pedicabs is made in section 4.4 Alternative 4: No Project: The sidewalks will continue to deteriorate and become more dangerous, and newsstands, handbillers, pedicabs, skateboards, and rickshaws will continue to proliferate." We do not necessarily support the No Project alternative, however, I would like to point out that there are no rickshaws in Waikiki, and that pedicabs are rarely on the sidewalk except "pursuant to Honolulu City and County ordinances 78-79, and 80-26 Section 12-5.8.

Prohibited Acts: (1) "Pedicabs shall not be operated or allowed on sidewalks except to park in an authorized sidewalk pedicab stand and for the purpose of crossing, for ingress or egress to and from a public highway in the shortest time and distance possible."

In communications contained in the EIS which were originally submitted in response to the revised EISPIN, the Department of Planning and Economic Development, dated Feb. 14, 1986, the State of Hawaii, Department of Transportation, dated June 8, 1984, and OMPO, dated May 7, 1984, all raise concerns about the presumed lack of consideration given to pedicabs operations in the various surveys. Mr. Hirten's response in each instance was that pedicab would not be a factor on Kalakaua Avenue by the time the proposed project is completed because DTS is currently drafting regulations, which if adopted would prohibit pedicabs from utilizing Kalakaua Avenue.

There is no supporting data contained in either the TRANSYT-7F, simulations, or simulation surveys of the EIS which would indicate pedicabs inhibit the flow of traffic either under present traffic configurations, or under proposed changes.

Furthermore, it would appear that based on Mr. Hirten's view of the future of pedicabs on Kalakaua, we in the pedicab industry would be one of the few, if not the only group who will be adversely affected by the completed proposed project. Contrary to various references in the EIS touting harmonious interaction between the city and certain business and civic groups, imput from the pedicab industry was not solicited. Our knowledge of being able to respond to this EIS was only by chance, hence our late response.

We are in full support of the purpose and intent of the project, and to that end feel that pedicab operations should be, and can be accommodated under the current proposals.

Sincerely,

Dan Webber,

cc. Council Chairwomen, Marilyn Bornhorst

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
Mayor

JOHN E. HINTEN
Director

JOSEPH M. MAGALDI, JR.
Deputy Director

April 30, 1986

Mr. Dan Webber
Paradise Pedicab
P.O. Box 15644
Honolulu, HI 96830-5644

Dear Mr. Webber:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

9-19

Thank you for your April 23, 1986 letter concerning the Draft Environmental Impact Statement for the Kalakaua Avenue Safety and Beautification Project. I appreciate the time you and other pedicabbers spent reviewing the document. Responses to the points made in your letter are presented below.

Discussion of Alternatives

Thank you for calling attention to the wording of Section 4.4. I agree that the passage referred to in your letter is poorly stated. The last paragraph on page 4-11 will be revised to read as follows:

The primary disadvantage of the "no-project" alternative is that it completely misses the opportunity to improve vehicular traffic flow, to allocate additional space to pedestrians, and to upgrade Waikiki's aesthetic environment, the three principal objectives of the proposed project. Traffic congestion will increase and, the sidewalks will continue to deteriorate and become more dangerous. The eventual result will be the slow strangulation of Waikiki and the physical decline of the State's greatest visitor attraction. This will occur at the very time our visitor industry is becoming more dependent upon its ability to attract repeat customers in the face of strong overseas competition.

Prohibition of Pedicabs On Kalakaua Avenue

Your conclusion that this Department would like to see non-motorized vehicles which are unable to maintain the posted speed limit prohibited from using Kalakaua Avenue is correct. Pedicabs are included in this category. It is our belief that this action should be taken whether or not the proposed sidewalk widening takes place. Reasons for our position are outlined below.

Kalakaua Avenue is the only Diamond Head-bound throughway and one of only three major arterial streets through Waikiki serving both Waikiki- and Diamond Head/Kahala-bound traffic. There is serious traffic congestion on it during peak traffic periods. Contrary to the assertion made in your letter, traffic engineers and police officers familiar with Waikiki report numerous conflicts between motor vehicles and pedicabs and other non-motorized vehicles. Furthermore, each week the Department of Transportation Services receives similar complaints from residents and tourists alike. We judge the problem sufficiently severe that regulations are now being drafted which would prohibit the use of vehicles unable to maintain the posted speed limit on Kalakaua Avenue.

We believe the existing mix of cars, trucks, and buses with slower moving pedicabs is sufficient to warrant action even if the existing lane widths were maintained. However, there is no doubt that reducing the width of the mauka and makai lanes from their current 17 feet to 11 feet and 14 feet, respectively, would greatly exacerbate the situation. It would do this by making it much more difficult for motor vehicles to readily pass slow-moving vehicles within these lanes. Hence, we consider the proposed ban essential if the level of service on the roadway is to be maintained at an acceptable level following sidewalk widening.

You are correct that the reports describing the TRANSYT and test simulations which were included in the report do not directly address the effect of pedicabs. TRANSYT is a general-purpose model which does not allow for evaluation of unusual influences such as the presence of slow-moving pedicabs, and the various physical simulations that were conducted were carried out within the context of the existing and proposed projected speeds to achieve synchronized traffic signals. However, field observations and common sense make it clear that pedicabs would slow the movement of traffic, thereby reducing the level of service and the ultimate capacity. Since the roadway already experiences congestion and low service levels during peak traffic periods, it follows that this would adversely effect the performance of the road system.

We believe that material contained in the Draft EIS adequately describes the project's effects on vehicular traffic, including pedicabs. Nonetheless, to insure that there is no misunderstanding in this regard, the Final EIS will contain the following revisions from the Draft EIS:

(1) The second paragraph of Section 3.5.2 (page 3-12) will be revised so that it concludes as follows:

"...will actually improve traffic performance over pre-project levels so long as pedicabs and other non-motorized vehicles unable to maintain the posted speed limit are removed from the traffic stream."

(2) The following will be inserted after the fourth paragraph in section 3.5.2:

As noted above, maintaining levels of service in the face of decreased roadway width is predicated on the assumption that pedicabs and other non-motorized vehicles unable to maintain the posted speed limit will be banned from Kalakaua Avenue. Regulations providing such a ban are currently being drafted by the Corporation Counsel. If these or similar regulations are not adopted, then the reduced lane widths that are proposed will make it impossible for motor vehicles to maneuver around slower-moving pedicabs, thereby impeding traffic flow. The effect of such interference could not be quantified using TRANSYT or other available models because they do not allow the evaluation of such unusual conditions. Neither do results of the physical simulations directly address this question because they were conducted in combination with the existing wide lanes. It is not possible to precisely quantify the effect that pedicabs have on traffic flow. However, traffic engineers' and police officers' numerous observations of pedicab-motor vehicle interactions, documented by photographs, photo logs, and time lapse photographs, as well as complaints from tour bus and delivery truck drivers, indicate that the presence of pedicabs would greatly impede traffic flow if the roadway is narrowed as planned.

Adequate Notification

I am sorry you feel that you and other pedicabbers did not have an adequate opportunity to comment on the project. During the past year, the City has made over 15 presentations regarding the project to public groups. Numerous articles describing the planned changes have appeared in newspapers and magazines. An EIS Preparation Notice describing the proposal appeared in the EIS Bulletin published by the State Office of Environmental Quality Control (OEQC) on January 23, 1986, and copies of the announcement were sent to all organizations OEQC believed to have an interest in the project. Copies of the environmental assessment for the project were also sent to everyone who requested them. Finally, it should be noted that when you did contact this Department, our project manager, Mr. Rom Duran, met immediately with you and members of your organization on March 25, 1986 at the Waikiki-Kapahulu Library to discuss the City's plans. He also advised you of the availability of the Draft EIS and reserved a copy of it for your use which you claimed on April 18, 1986.

Further Discussions

The Department of Transportation Services appreciates the impact that the proposed ban on slow, non-motorized vehicles will have on members of the Pedicab Association of Hawaii. However, results of our studies have convinced us that the proposed changes to Kalakaua Avenue's sidewalks and roadway are in the best interests of the citizens of this island, as well as the majority of Waikiki's visitors.

Thank you again for your comments. If you would like to discuss your concerns further and/or to explore ways of reducing the impact of the proposed changes on pedicab operations in Waikiki, please call Mr. Rom Duran of my staff at 527-6392.

Sincerely,

JOHN E. HIRTEN

cc: Office of Environmental Quality Control,
State of Hawaii
Department ofLand Utilization,
City & County of Honolulu
Belt, Collins & Associates

HONOLULU

A-1

COMPUTER SIMULATION OF TRAFFIC ALTERNATIVES for the KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Department of Transportation Services
City and County of Honolulu

Technical Paper

December, 1985

ACKNOWLEDGEMENTS

John E. Hirten, Director
Joseph M. Magaldi, Jr., Deputy Director
Ramon Duran, Project Manager

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Warren M. Yamamoto

Transportation Planning and Programming Division

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I. INTRODUCTION

BACKGROUND

During its deliberation of Act 285 SLH 1984, the Twelfth State Legislature heard testimony describing the explosive growth of tourism in Waikiki and the resulting stress on its infrastructure. In the two decades since 1964, the tourist count on Oahu had increased from 424 thousand to 2.9 million annually, an expansion of 584 percent! At the same time, Waikiki's showpiece, Kalakaua Avenue, has remained substantially unchanged in its capacity to accommodate vehicular and pedestrian traffic, making it increasingly unsafe and unattractive.

Convinced of the need to revitalize Kalakaua Avenue, the Legislature accordingly appropriated $3.84 million for much needed improvements. Because an ancillary concern was raised by community members that sidewalk expansions would be accomplished at the expense of diminished roadway capacity, the Legislature stipulated that a simulation of the proposed changes be conducted and its results reported back to that body before actual construction commenced.

The City and County of Honolulu has concluded its initial planning for the Kalakaua Avenue Safety and Beautification Project and conducted a number of simulation studies in accordance with the Legislature's directive. The City's Department of Transportation Services (DTS) was the operational agency responsible for the numerous physical and computer simulations. These efforts included widening of crosswalks, establishing Barnes Dance crossings at several locations, changing street sign colors and locations, replacing dispersed news and magazine stands with collective kiosks, changing the traffic flow at one location, and identifying loading bays.

This report documents the procedures, development of alternatives, and results of a computer traffic simulation study conducted as part of the Kalakaua Avenue Safety and Beautification Project. The study was undertaken to determine the operational impacts of alternative improvements and to partly comply with the following proviso in Act 285 SLH 1984:

> "Section 83A. Provided that of the general obligation bond funds appropriated to Tourism, Department of Planning and Economic Development (PED 113) for the Waikiki Improvement project, the City and County of Honolulu shall conduct a simulation in Waikiki of the sidewalk widening to demonstrate how all types of vehicles will adjust to the narrowed lanes and to designated loading and unloading zones;"

The first section discusses the purpose of the simulation study, the model selection procedure and study work scope. The second section describes the study methodology, including the development of alternatives. The final section reviews the results of the computer simulation runs.

PURPOSE OF SIMULATION STUDY

The objective of the Kalakaua Avenue Safety and Beautification Project is to correct this roadway's environmental deficiencies, improve mobility, accessibility and traffic, and to enhance its visual appeal. Computer simulation of traffic operations was chosen as one of the means to analyze the traffic impacts of alternative improvements for several reasons:

- It permits the traffic engineer to evaluate alternative strategies without having to resort to field experimentation, which is costly, could be disruptive to traffic

movement and create safety hazards, may not be as effective as the completed project, and has a very real risk of failure.

- It permits the traffic engineer to analyze the roadway as a system rather than individual intersections, as with traditional analysis techniques. It shows the interrelated impacts of individual improvements as well as the cumulative impacts of improvements at adjoining intersections, which may not be obvious with traditional analysis techniques.

- It permits the efficient testing of many alternatives relative to traditional analytical techniques or field testing programs. Also, it permits the traffic engineer to focus on specific portions of an overall problem under conditions of at least partial "experimental control."

However, there are some limitations to using computer simulation models which were kept in mind during the study:

- A simulation model, no matter how complex, is still essentially a simplification of a real-world situation. Therefore, the results obtained from models are only as good as its capacity to reflect a particular real-world situation. Complex situations would require relatively complex models. TRANSYT-7F is not considered to be a very complex model, but complex traffic control strategies are not being proposed for Kalakaua Avenue.

- The traffic engineer must rely on his judgment and experience to forecast traffic flow changes which would occur with changes in network configuration, i.e., changing streets from two-way to one-way, and input these changes into the model. The model would then determine the operation impacts from the proposed changes in policies.

MODEL REVIEW AND SELECTION

Development of traffic related computer simulation models began in the 1960s with the advent of large mainframe computers. Since then, a large number of models have been developed and refined for a wide range of applications, including analysis of intersections, arterial networks, freeways, and transportation corridors. There is no one model with a wide range of applications. Rather there are many models, each with a specific application.

A literature search [1, 2, 3] was conducted to identify models which could be used for this project. Phone conversations were held with the staff of the Federal Highway Administration (FHWA), Office of Traffic Operations, to verify our initial findings. We chose the TRANSYT-7F model for this project. The model is used to simulate traffic operations on a signalized network, is in the public domain and readily available, and is supported by the FHWA.

TRANSYT-7F, an acronym for TRAffic Network StudY Tool, version 7F, was originally developed in the United Kingdom in 1967 and has undergone continuous refinement since then. This model is used to simulate traffic flow in a signalized network and to optimize traffic signal settings. The TRANSYT model is extensively used by traffic engineers to develop optimum timing plans for traffic signal networks. Traffic engineers also use TRANSYT to test alternative traffic improvement plans, as is being proposed in this study. The State Department of Transportation used TRANSYT to evaluate alternative traffic and signal control schemes for the proposed Kalanianaole Highway median lane facility [4]. As such, the program is considered to be well tested for "production" use.

TRANSYT-7F was chosen for this study primarily because of its relative ease of use and its capability to analyze most signal control strategies. For those strategies which TRANSYT-7F cannot analyze directly, special applications procedures described in the User's Manual [2] were used to indirectly model these features.

Model inputs include network data, signal timing parameters, geometric and traffic data, and control parameters. Network data show the relative locations of intersections. Traffic signal timing parameters include cycle lengths, phase sequences, minimum phase durations, and offsets. Geometric and traffic data include link lengths, traffic volumes, saturation flow volumes, average cruise speeds, and bus stop delays. Control parameters tell the model which simulation/optimization procedures to execute. The model outputs the degree of saturation (volume/capacity ratio), the total travel distance and travel time, delay, maximum queue length, queue length, fuel consumption and a performance index used for optimization purposes. Additionally, the model also outputs signal timing data, flow profile diagrams, and time space diagrams.

NOTE: Another more detailed simulation model which was considered is NETSIM, an acronym for NETwork Flow SIMulation. This model was formerly called UTCS-1 and performs a microscopic simulation of urban traffic flow on an urban street network. It is a very complex model which simulates individual vehicle trajectories as they move through a street network and was designed to analyze all major forms of traffic control encountered in American cities. The model is designed to serve as a vehicle for testing relatively complex network control strategies under conditions of heavy traffic flow, such

as dynamically controlled traffic signal systems based on real-time surveillance of network traffic movement [3]. NETSIM performs only simulation functions and does not optimize; therefore, it is often used in conjunction with traffic optimization models such as TRANSYT and SIGOP to determine optimum signal settings for input into NETSIM. Because of the model's complexity, it is relatively difficult to use and its data input requirements can be quite substantial, as shown on Table I-1. The NETSIM model could be used in later study phases to analyze very complex strategies which may be proposed or to obtain more definite answers.

The SIGOP III model, another traffic signal optimization program, was also under consideration. However, the program documentation was not received from FHWA until October 1985 and the program could not be studied.

TABLE I-1

NETSIM MODEL INPUT REQUIREMENTS

Location-Specific Inputs

- Intra-Link Target Speeds
- Intersection Discharge Rates
- Input Flow Rates
- Frequency of Rare Events
- Intersection Turning Movements
- Bus System Data
- Traffic Composition
- Pedestrian Flows and Delays
- Amber Phase Behavior
- Network Geometry and Special Channelization
- Signal Timing
- Detector Location and Type

Network-Wide Inputs

- Vehicle Generating Distributions
- Gap Acceptance Distributions
- Parameters in Car Following Routings
- Parameters in Lane-Switching Routine
- Parameters in Intersection Movement Routines

WORK SCOPE

The scope of this study was to use computer modeling to compare the traffic performances of the various alternative plans which were proposed. Several limitations were placed on the study procedures to meet the strict time deadline of this study, including:

- Limiting the number of alternatives and subalternatives tested.
- Analyzing weekday afternoon peak hour conditions only.
- Based on preliminary study findings, testing was limited to 80 and 90 second traffic signal cycle lengths after the development of Task Force Plan 2.

The first modeling efforts were made on the existing configuration of Kalakaua Avenue and two traffic schemes developed prior to the computer simulation study. These two proposed schemes were eliminated from further study and a baseline system was developed with four traffic lanes along the entire length of Kalakaua Avenue and was used as the testbed for individual traffic improvements at problem intersections. The results of the subalternatives analysis were then used to develop three other alternative traffic schemes.

The weekday afternoon peak hour (approximately 4:30 to 5:30 p.m.) was selected for analysis since this period has the highest average hourly volumes. Although the weekend night periods may have "worse" traffic operations, this latter period was not analyzed for several reasons:

- The weekend peaks are not considered normal nor are they as numerous as the weekday peaks.

- The weekend night traffic includes many "cruisers" for whom optimal traffic flow is not a priority. Experience elsewhere has shown that it is difficult to optimize traffic flow under these conditions.

- There are many large special events on weekend evenings whose unique traffic impacts specific locations such as intersections adjacent to hotel parking garages.

The initial modeling efforts evaluated the impacts of cycle lengths ranging from 70 to 120 seconds. The shortest feasible cycle length was found to be 80 seconds, the current P.M. peak period cycle length. The optimum cycle lengths for traffic were found to be in the 110- to 120-second range. However, there were serious reservations among the City's traffic engineers about increasing the current cycle length. There is already heavy jaywalking on Kalakaua Avenue and lengthening the cycle would add to the problem. Hence, the model effort was restricted to 80- and 90-second cycle lengths.

II. METHODOLOGY

The study methodology consisted of the following procedures:

- Model Development and Testing
- Data Collection
- Initial Analysis
- Analysis of Subalternatives
- Development and Analysis of Alternatives
- Testing of Future Conditions

The last four steps constituted the actual analysis procedure. In the initial analysis, the existing configuration and two previously developed alternatives were modeled to identify problem locations, and a baseline network was developed. Subalternatives were then proposed for three problem locations and parametrically analyzed on the baseline network. The results of the subalternatives analysis were then used to develop alternative plans from different combinations of subalternatives. The results of each plan were reviewed before developing and analyzing another alternative. Finally, a future analysis was conducted to determine the adequateness of the proposed alternative plans with higher traffic volumes. A schematic flowchart of this analytical process is shown on Figure II-1.

MODEL DEVELOPMENT AND TESTING

At the City's request, FHWA sent three tapes containing the software and sample data sets for three traffic simulation programs: TRANSYT-7F, NETSIM, and SIGOP III. The TRANSYT-7F program was compiled (from FORTRAN) and loaded onto the City computers' test library by the Department of Data Services' (DDS) staff. The DTS staff then ran the program with the sample input provided on the tape, and compared the resultant output with the sample output provided. The resultant output matched the sample output and the TRANSYT-7F compiled program was then put on the City computers' production library.

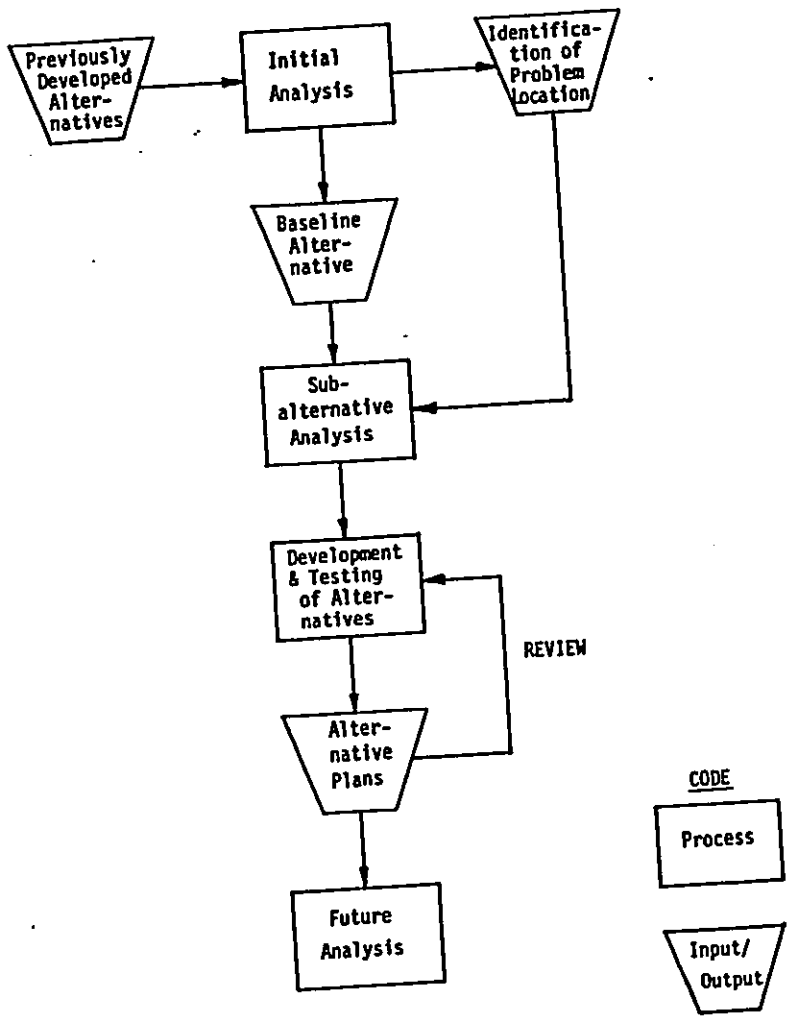

FIGURE II-1

FLOWCHART OF STUDY ANALYSIS METHODOLOGY

The NETSIM program could not be compiled on the City's computers. After discussions with FHWA, the State Department of Transportation Engineering Computer Services (ECS) staff unsuccessfully tried to compile the program on their computer with a FORTRAN H-level compiler. FHWA then sent a FORTRAN G-level program which also could not be compiled on the City or State computers. Finally, they sent a compiled program which was tested in the same manner as described for TRANSYT-7F. The test was successful, and the program was installed on the City computers' production library.

Supporting documentation with instructions for running the SIGOP program was not included. Therefore, the SIGOP program was compiled and put on the production library, and will be tested when the documentation is received.

The program members on production library CCH.LOADLIB are as follows:

- TRANSYT-7F DTRANS7F
- NETSIM DTRANETS
- SIGOP DTRANSIG

The programs are run from the City's terminals via the CICS/VS system, using PANVALET/ON-LINE sessions to create and submit jobs. Because TRANSYT-7F and NETSIM utilize column 80 for input data, the DDS staff recommended a procedure which utilizes two PANVALET members to execute a program. The first member, a JCL format data set, executes the TRANSYT-7F or NETSIM program and references the input data on the second data formatted member.

To run a program, the user creates the input data on a data formatted PANVALET member, and saves the member. The user then calls the JCL formatted member with the execution program, changes the reference name for the input data set, and then submits the job. The user then uses standard SYSD procedures to check his output on the screen and either prints or purges it. The PANVALET member names of the execution programs are:

- TRANSYT-7F MTZZTSHT01
- NETSIM MTZZTSHT41

TRANSYT-7F input data sets have been created on members MTZZTSHT02 to MTZZTSHT36. No NETSIM or SIGOP data files have been created at this time.

NOTE: Prior to commencement of the modeling effort on Kalakaua Avenue, concern was raised about the late night weekend traffic operations on the Ala Wai Boulevard. A simultaneous green signal phasing was proposed as a possible solution. This proposal was tested using the TRANSYT-7F model. The modeling effort indicated no improvement with a simultaneous green signal phasing. Although this test did delay the start of this study's modeling effort, it was beneficial for several reasons. Most importantly, it provided a simple network in which to learn the many features of the TRANSYT-7F model. It was very encouraging to get "successful" computer runs after a few attempts rather than many attempts, which probably would have happened if "the teeth were cut" on Kalakaua Avenue. We also developed some computer system management procedures which would prove useful when we began the Kalakaua Avenue effort.

DATA COLLECTION

A data collection effort was initiated to obtain the necessary input to the TRANSYT-7F model. Obtaining peak-hour traffic volumes was the main effort; however, additional data was collected to calibrate certain input data for the model.

Previously collected traffic counts were compiled and reviewed for appropriateness. Counts taken between 1980 and 1983 were given first consideration because these counts were felt to be timely and to reflect conditions before the Kuhio Avenue construction project.

Additional meter and manual counts were taken on July 10, 1985 to complement the available data at the following locations:

- Right turns from Kalakaua Avenue to Ala Moana Boulevard
- Left turns from Niu Street to Kalakaua Avenue
- Kalakaua Avenue at Pau Street
- Right turns from Ala Moana Boulevard making left turns onto Kuhio Avenue
- Kalakaua Avenue at Saratoga Road/Kalaimoku Street
- Left turns from Kalakaua Avenue to Kalaimoku Street
- Right turns from Kalakaua Avenue to Saratoga Road
- Right turns from Saratoga Road to Kalakaua Avenue
- Through traffic from Saratoga Road to Kalaimoku Street
- Right turns from Kalakaua Avenue to Beachwalk Avenue
- Right turns/through traffic from Lewers Street at Kalakaua Avenue

The traffic counts represent a wide range of conditions in that they were taken on different years, months, and days of the week. In general, Waikiki traffic volumes are higher in winter and summer months and are higher at the end of the week (Thursday/Friday) than the beginning. Traffic volumes show modest year to year variations. Hence, the traffic counts show variations at locations where several traffic counts are available. The traffic counts were not adjusted for seasonal/daily variations for use in the model. Rather, the highest recorded volumes were utilized to represent a worst case condition.

Simultaneous traffic counts were taken on Kalakaua Avenue and Kuhio Avenue on October 14 and 15, 1985, about a month after construction work on Kuhio Avenue had been completed and the roadway fully opened. The purpose of these counts was to determine if the post-construction split of traffic on Kalakaua Avenue/Kuhio Avenue was similar to the pre-construction traffic splits. The results shown on Table II-1 indicate that this is so at the three locations surveyed. The percentage of traffic on Kalakaua Avenue is the fraction of Koko Head bound traffic on Kalakaua and Kuhio Avenues.

TABLE II-1

HISTORY OF TRAFFIC SPLITS

ON KALAKAUA AVENUE/KUHIO AVENUE

Cross-Street Location	Date	Percentage of Koko Head Bound On Kalakaua Avenue ADT	P.M. Peak
Kuamoo Street	2/4/74	66%	66%
	2/17/81	68%	66%
	8/25/82	--	68%
	10/15/85**	68%	66%
Lewers Street	11/1/75	73%	71%
	3/82 average*	68%	68%
	8/82 average	67%	67%
	8/1/83	68%	67%
	10/15/85**	72%	71%
Kaiulani Avenue	10/4/79	67%	66%
	10/29/80	65%	--
	11/80	--	64%
	8/82 average	63%	63%
	8/25/82	--	66%
	8/1/83	65%	65%
	10/16/85**	66%	64%

*Average value of traffic counts taken for a week.
**Post Kuhio Avenue construction count.

Traffic saturation counts were also taken to determine lane "capacities" at different locations on Kalakaua Avenue. Saturation counts were taken in lieu of using standard table capacities to account for the unique mix of traffic vehicles on Kalakaua Avenue. Through lane saturation counts were made in accordance with instructions in the TRANSYT-7F User's Manual [2]. A modified procedure was used to count left and right turn movements with pedestrian interference. The interval from the start of the green phase to the last car in the queue completing the turn was timed, and the data expanded to an hourly basis.

The results of the saturation counts are as follows (capacities are shown in vehicles/hour of green/lane):

- Kalakaua Avenue at Niu Street - Through Lane - 1,640 VPHG
- Ala Moana Boulevard at Kalakaua Avenue - Through Lane - 1,800 VPHG
- Kalakaua Avenue at Kalaimoku Street - Through Lane - 1,480 VPHG
- Saratoga Avenue at Kalakaua Avenue - Right Turn Lane - 1,160 VPHG
- Kalakaua Avenue at Lewers Street - Through Lane - 1,570 VPHG, Left Turn Lane - 820 to 950 VPHG
- Kalakaua Avenue at Kaiulani Avenue - Left Turn Lane - 720 VPHG
- Kalakaua Avenue at Uluniu Avenue - Through Lane - 1,500 VPHG
- Kalakaua Avenue at Liliuokalani Avenue - Left Turn Lane - 900 VPHG

The above results were then applied to each approach on the model network. Engineering judgment was used to interpolate the results to intersections where data was not collected. For alternatives

with lane widths greater than 14 feet, lane capacities were increased by 10 percent in accordance with the intersection capacity analysis techniques[1].

Spot speeds were also collected to input as link speeds in the model. The link speed is the prevailing traffic speed when there is no interference from traffic signal operations. The following radar gun results were obtained at these locations on Kalakaua Avenue:

- Diamond Head of Kuhio Avenue — 29 MPH
- Diamond Head of Kalaimoku Street — 21 MPH
- Diamond Head of Lewers Street — 19 MPH
- Fronting Liberty House — 18 MPH
- Diamond Head of Uluniu Street — 25 MPH
- Diamond Head of Ohua Avenue — 19 MPH

MTL transportation officials were asked to provide information on bus travel speeds and stop times on Kalakaua Avenue. They provided the following information:

- Between Saratoga Road and Kaiulani Avenue, 15 mph travel speed and 30-second stop times
- At all other stops, 20 mph travel speed and 15-second stop times

INITIAL ANALYSIS

An initial computer simulation analysis was made of the existing roadway configuration and two alternative traffic plans developed prior to the start of the computer simulation study. These two alternatives included:

1 See Transportation Research Circular 212, "Interim Materials on Highway Capacity," page 8, Table 2, "Lane Width Adjustments."

- The "Sidewalks Simulation Plan" developed by Belt, Collins and Associates which showed three lanes along most of Kalakaua Avenue, except for five lanes at Lewers Street and four lanes at Royal Hawaiian Avenue, Seaside Avenue, and Kaiulani Avenue. These additional lanes were to provide for exclusive turning movements. A schematic plot of this alternative is shown on Figure II-2.

- "Task Force Plan 1" developed by the Safety and Beautification Project Policy Committee, which showed four lanes from Ala Moana Boulevard to Kaiulani Avenue with the exception of five lanes at Lewers Street, and three lanes from Kaiulani Avenue to Kapahulu Avenue. The extra lane at Lewers was intended as a left turn lane for mauka bound traffic.

The model results indicated similar performance for each of the three, despite fewer traffic lanes on the two alternative plans. The alternative plans were designed to reduce delay on the turning lanes, where most of the delay is currently occurring. Delay on the through lanes are not as affected by increases in the volume/capacity ratio.

The simulation results indicated that the three lane configuration alternatives would be adequate. However, only four lane alternatives were examined in more detail to better accommodate bus flow and to provide additional capacity in case of traffic accidents, special events, and unanticipated traffic increases. The Policy Committee, composed of City officials, Waikiki businessmen, and consultants, met many times to discuss and develop alternatives and consider alternatives recommended by the Technical Committee.

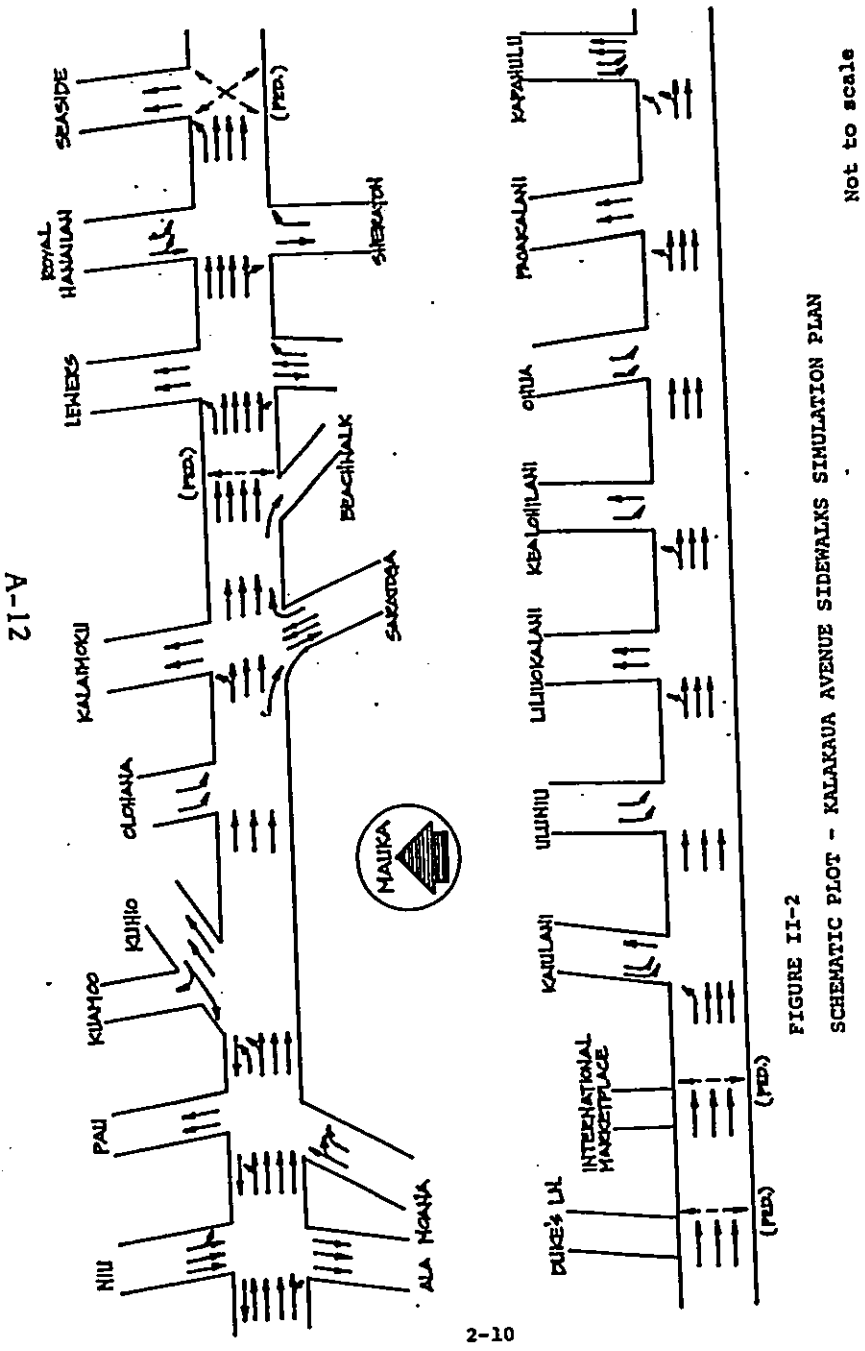

FIGURE II-2
SCHEMATIC PLOT - KALAKAUA AVENUE SIDEWALKS SIMULATION PLAN
Not to scale

ANALYSIS OF SUBALTERNATIVES

As discussed in Section III, the existing network configuration was modeled and the output used to identify the following "problem" locations on Kalakaua Avenue:

- Saratoga Road/Kalaimoku Street
- Lewers Street
- Seaside Avenue
- Kaiulani Avenue

Improvement subalternatives were proposed for each of the above locations.

The subalternatives were proposed irregardless of their relative engineering or "political" feasibility so that the impacts of a wide range of improvements could be determined. To facilitate the orderly analysis of the subalternatives at the latter three locations, a four lane base network (Plan 2 on Figure II-3) was developed to serve as a control. The results of the subalternatives analysis are discussed in Section III.

A parametric analysis of the two Saratoga Road subalternatives was not undertaken. Rather, they were analyzed as part of the alternatives in which they were proposed. The capacity and safety problems at this intersection have long been recognized. The Department of Transportation Services has posted "Watch Out For Vehicles" signs on the makai crosswalks and recently eliminated some parking on Saratoga Road to increase capacity of the roadway. The two subalternative improvements proposals were:

- Sidewalks Simulation Plan - This subalternative was proposed by Belt, Collins, and Associates prior to this study as part of their three-lane plan. Kalakaua Avenue would have three lanes to merge with the right turn lane from Saratoga Road. The latter would become

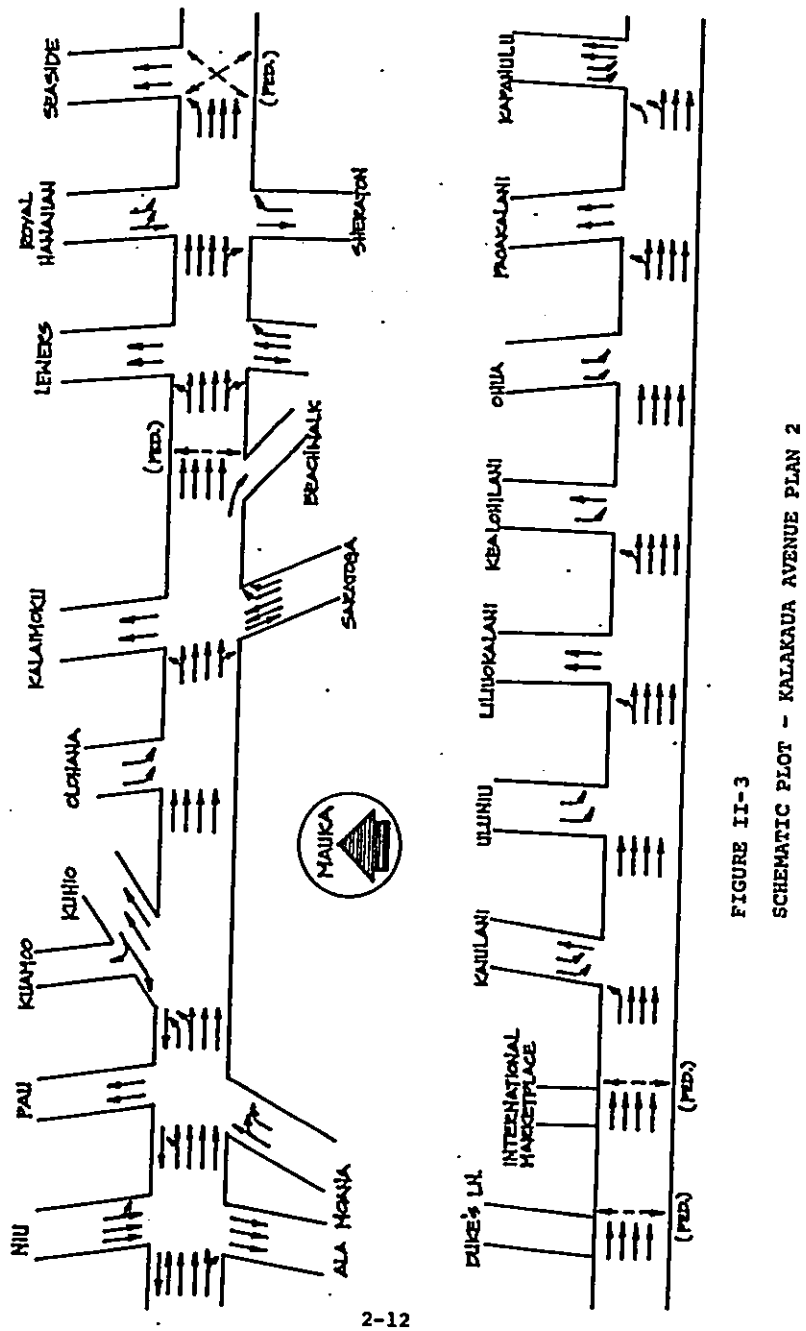

FIGURE II-3 SCHEMATIC PLOT - KALAKAUA AVENUE PLAN 2

Not to scale

A-13

the fourth through lane on Kalakaua Avenue. This would eliminate the need for stop signs or traffic signals on the turn lane and increase its capacity. However, the decision to retain a minimum of four through lanes on Kalakaua Avenue eliminated this subalternative since it requires three through lanes. The existing configuration has four lanes on Kalakaua Avenue with a separate right turn lane to Saratoga Road, and two through lanes and a separate right turn lane on Saratoga Road.

- Plan 2 - This subalternative was also used with all subsequent alternative plans. The Saratoga Road right turn lane would be widened to two lanes to increase capacity. Crossing signals would be used to minimize interference with pedestrians. To increase pedestrian safety, the separate right turn lane from Kalakaua Avenue to Saratoga Road would be eliminated and right turns would be made from the curb lane. Also, one through lane on the Saratoga Road approach would be eliminated to reduce the pedestrian crossing distance. This subalternative was used for all subsequent alternatives.

The following basic and subalternative improvements were proposed for the Lewers Street intersection:

2A Basic (Existing intersection layout.) Four lanes on Kalakaua Avenue with one left turn/through lane, two through lanes, and one right turn/through lane.

2A1 Similar to the basic scheme, except that the crosswalk on the northwest approach of Kalakaua Avenue would be eliminated to increase turning lane capacities. The removal of the crosswalk may be very difficult to do because some business firms will feel they were adversely impacted.

2A2 Kalakaua Avenue would be widened to five lanes with one left turn lane, three through lanes, and one right turn/through lane. Because of existing structures, adding a fifth lane may be difficult.

2A3 Lewers Street mauka approach direction of flow would be reversed to makai-bound with one left turn and one through lane. Kalakaua Avenue would have three through lanes and one right turn/through lane. The makai approach of Lewers Street would have one right turn lane and a makai-bound lane. Concerns have been raised regarding the traffic impacts of this circulation change.

2A4 Similar to 2A3, except that it is combined with 2B3 (two left turn lanes) at Seaside Avenue.

The following basic and alternative improvements were proposed for the Seaside Avenue intersection:

2B Basic One left turn lane and three through lanes.

2B2 (Existing configuration) One left turn lane and four through lanes.

2B3 One left turn lane, one left turn/through lane, and three through lanes.

All the above alternatives would have a 35-second minimum pedestrian phase to permit diagonal intersection crossings by pedestrians.

The following alternatives were proposed for the Kaiulani Avenue intersection:

2C Basic Kalakaua Avenue would have one left turn and three through lanes. Kaiulani Avenue would have two makai-bound and one mauka-bound lanes, and the approach width would be narrowed considerably to reduce pedestrian crossing times. The signals would remain two phased; hence, the left turn movement would conflict with the pedestrian movement. The existing configuration has one left turn lane and four through lanes on Kalakaua Avenue and the Kaiulani Avenue approach is 80 feet wide, necessitating long pedestrian crossing times.

2C1 Kalakaua Avenue would have one left turn, one left turn/through lane, and two through lanes. Kaiulani Avenue would have two mauka-bound and one makai-bound lanes, with a 45-foot approach width. A three phase signal would separate the left turn movements from the pedestrians crossing Kaiulani Avenue.

2C2 Kalakaua Avenue would have the same configuration as 2C1, but Kaiulani Avenue would be made one-way mauka-bound (two lanes). The second phase would be for pedestrian crossings only. The pedestrian crosswalk across Kalakaua Avenue could be moved from the Ewa approach to the Diamond Head approach, to facilitate left-turn-on-red movements. Alternatively, a "Barnes Dance" design could be installed to allow diagonal intersection crossings by pedestrians. Pedestrians could flood the intersection walking in all directions.

2C3 Kalakaua Avenue would have the same configuration as 2C basic, but Kaiulani Avenue would have one lane in each direction. A three phase signal would separate the left turn movements from the pedestrians crossing Kaiulani Avenue.

2C4 Essentially, similar to 2C1, except Kalakaua Avenue would have three through lanes.

2C5 Kalakaua Avenue would have had four approach lanes, one left turn and three through lanes. Kaiulani Avenue would be made one way mauka-bound to Koa Avenue. Uluniu Avenue would be converted from one way makai-bound to two way up to Kuhio Avenue. This change would be expected to reduce the volume of left turns at Kaiulani Avenue and improve traffic operations at the latter intersection.

DEVELOPMENT AND ANALYSIS OF ALTERNATIVES

The results of the subalternatives analysis were reviewed by the City traffic engineers, who then created several alternative plans from different combinations of subalternatives. The alternatives plans were developed in chronological manner, i.e., the results of each plan were reviewed before developing and analyzing another alternative.

NOTE: At this stage of the study, several changes were made to the model inputs. We had been maintaining regular verbal contact with the FHWA TRANSYT liaison in Washington, D.C., to discuss the model operations. In late September, she recommended using a stop penalty value of -1 on Card 1 based on the results of some studies they had done. She felt this would produce "better" results than the previously recommended stop penalty value of 25.

The very high pedestrian volumes in Waikiki necessitate higher than standard pedestrian crossing times across Kalakaua Avenue. The City traffic engineers were reluctant to reduce these times (and provide more green time to the through traffic) for reasons of liability. The implementation of the physical simulation project on Kalakaua

Avenue in late September demonstrated that shorter pedestrian times are feasible. The traffic engineers were then amenable to the use of reduced walking times for alternatives with shorter curb-to-curb distances. Current pedestrian crossing times were reduced at the rate of one second/three feet. The current and proposed minimum pedestrian cross street times are summarized in Table II-2.

TABLE II-2

MODIFIED MINIMUM PEDESTRIAN CROSSING TIMES

Intersection Cross-Street or Crosswalk	Curb-To-Curb Width/Minimum Pedestrian Crossing Time (Seconds)		
	Existing Configuration	Sidewalks Simulation Plan	Plans 2 to 5
Olohana	55' /30 sec	40' /24 sec	47' /27 sec
Kalaimoku	60' /30 sec	43' /25 sec	47' /27 sec
Beachwalk	55' /30 sec	44' /25 sec	47' /27 sec
Lewers	60' /28 sec	60' /28 sec	47' /27 sec**
Royal Haw'n	55' /30 sec	45' /25 sec	47' /27 sec
Seaside	80'BD*/30 sec	80'BD/30 sec	80'BD /30 sec
Duke's Lane	55' /32 sec	40' /27 sec	47' /29 sec
Int'l Market Place	55' /32 sec	40' /27 sec	47' /29 sec
Kaiulani	60' /32 sec	50' /30 sec	47' /29 sec***
Uluniu	55' /30 sec	40' /24 sec	47' /27 sec
Liliuokalani	55' /29 sec	40' /24 sec	47' /27 sec
Kealohilani	55' /30 sec	40' /24 sec	47' /27 sec
Ohua	55' /30 sec	40' /24 sec	47' /27 sec
Paoakalani	55' /27 sec	40' /24 sec	47' /27 sec
Kapahulu	60' /30 sec	40' /24 sec	47' /27 sec

*BD - longest diagonal distance for Barnes Dance
**Use 28 seconds for Plan 3
***Use 30 seconds for 70' BD for Plan 5

The above two input changes did have an impact on the model results. Table II-3 compares the results for the original input values with the modified input values for the existing configuration, the Sidewalks Simulation Plan, and Plan 2. The Sidewalks Simulation Plan showed the greatest reduction in vehicle delay (145 to 96 vehicle hours) as a result of these changes while the existing configuration showed a much smaller change (156 to 136 vehicle hours). A sensitivity analysis (not described in this report) indicated that the lower minimum pedestrian crossing times had a greater impact than the new stop penalty value. The subalternatives analysis was not redone with the new input parameters since it would not affect the relative standings of the subalternatives.

TABLE II-3

SUMMARY OF RESULTS WITH MODIFIED INPUT PARAMETERS

	Results w/ Original Inputs	Results w/ Modified Inputs
EXISTING CONFIGURATION		
Total Delay	156	136
Fuel Consumption	302	285
Average Speed	10.0	10.8
SIDEWALKS SIMULATION PLAN		
Total Delay	145	96
Fuel Consumption	290	246
Average Speed	10.5	12.7
PLAN 2		
Total Delay	153	127
Fuel Consumption	303	280
Average Speed	10.1	11.2

PLAN 3 - The first plan developed after the subalternatives analysis was made by adding 2A2 at Lewers Street and 2C3 at Kaiulani Avenue to the Plan 2 basic network. Under this plan, Kalakaua Avenue would have four lanes within the project limit except for five lanes at the Lewers Street intersection, as shown on Figure II-4. However, widening Kalakaua Avenue to five lanes at Lewers Street is not feasible at this time. Property acquisition would be required and funds for this purpose have not been budgeted. Therefore, additional alternatives were developed.

PLAN 4 - Due to the unique geometrics of the Lewers Street intersection, Plan 4 was proposed with Lewers Street converted to one-way makai-bound between Kuhio Avenue and Kalakaua Avenue (2A4). To accommodate the higher volume of left turns which would be made at Seaside Avenue, two left turn lanes and three through lanes were provided (2B3). Another change in traffic circulation patterns was proposed at Kaiulani Avenue/Uluniu Street (2C5). The makai-bound lanes on Kaiulani Avenue were eliminated to make it one-way mauka-bound, and one left turn lane and three through lanes were provided on the Kalakaua Avenue approach. Uluniu Street was converted from one-way makai-bound to two-way traffic between Kuhio Avenue and Kalakaua Avenue. A schematic plot of this alternative is shown on Figure II-5. However, the Policy Committee members expressed concern for the traffic impact which makai-bound traffic on Lewers Street would have on Kalia Road. A review of traffic counts taken in the early 1970's provided a foundation for their concerns. Traffic volumes on Kalia Road (between Lewers Street and Saratoga Road) were considerably higher than today's during the short period when Lewers Street was one-way makai-bound from Ala Wai Boulevard to Kalia Road.

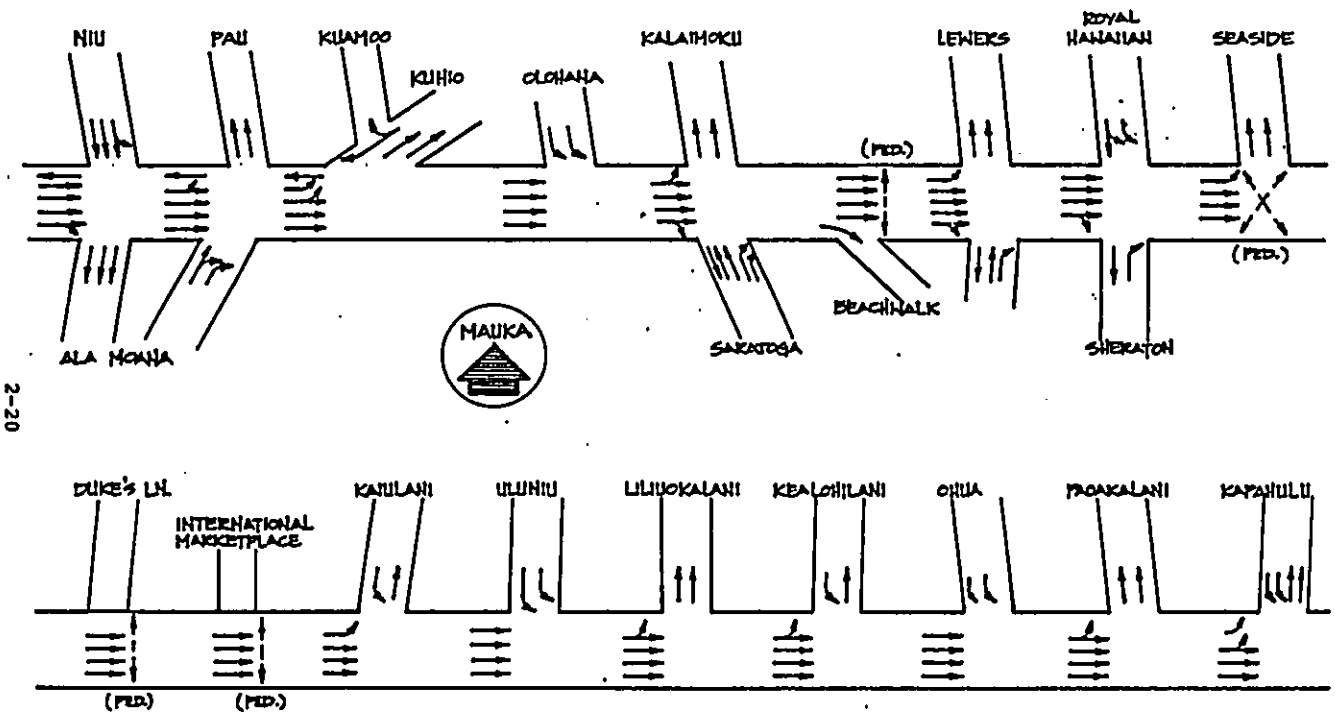

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FIGURE II-4

SCHEMATIC PLOT - KALAKAUA AVENUE PLAN 3

Not to scale

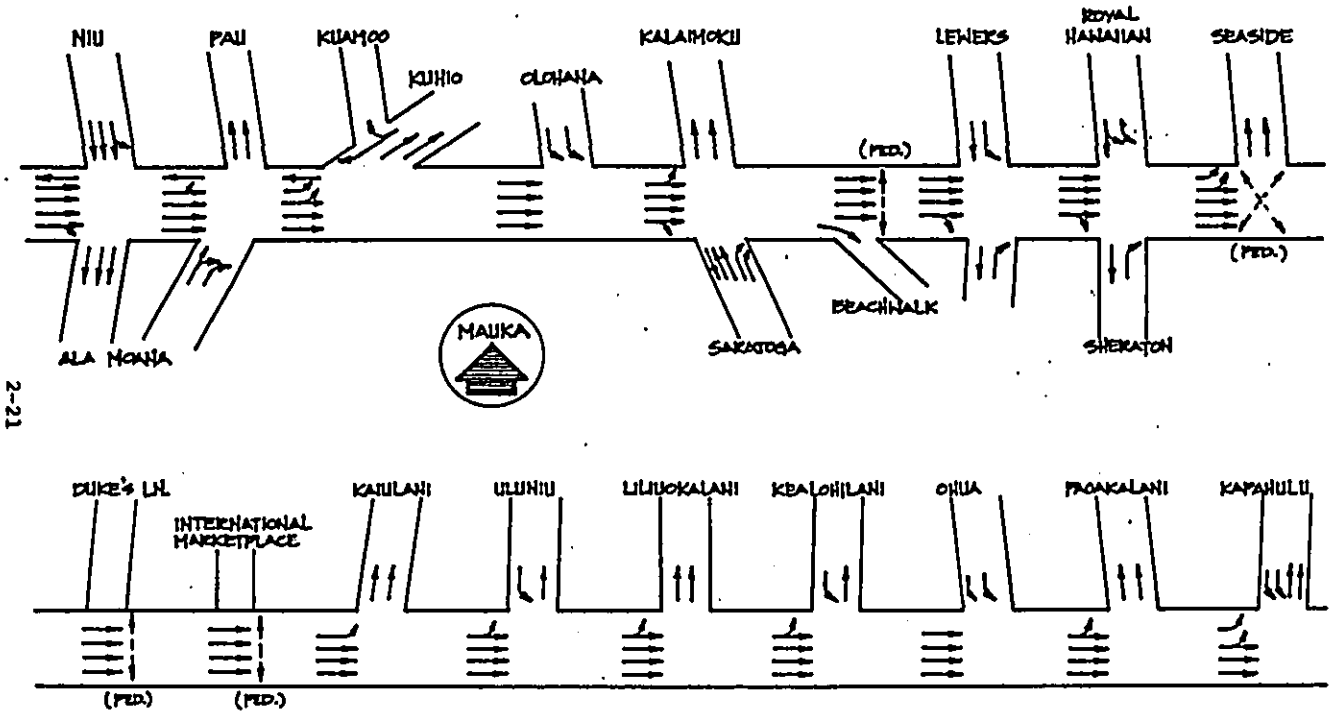

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FIGURE II-5

SCHEMATIC PLOT - KALAKAUA AVENUE PLAN 4

Not to scale

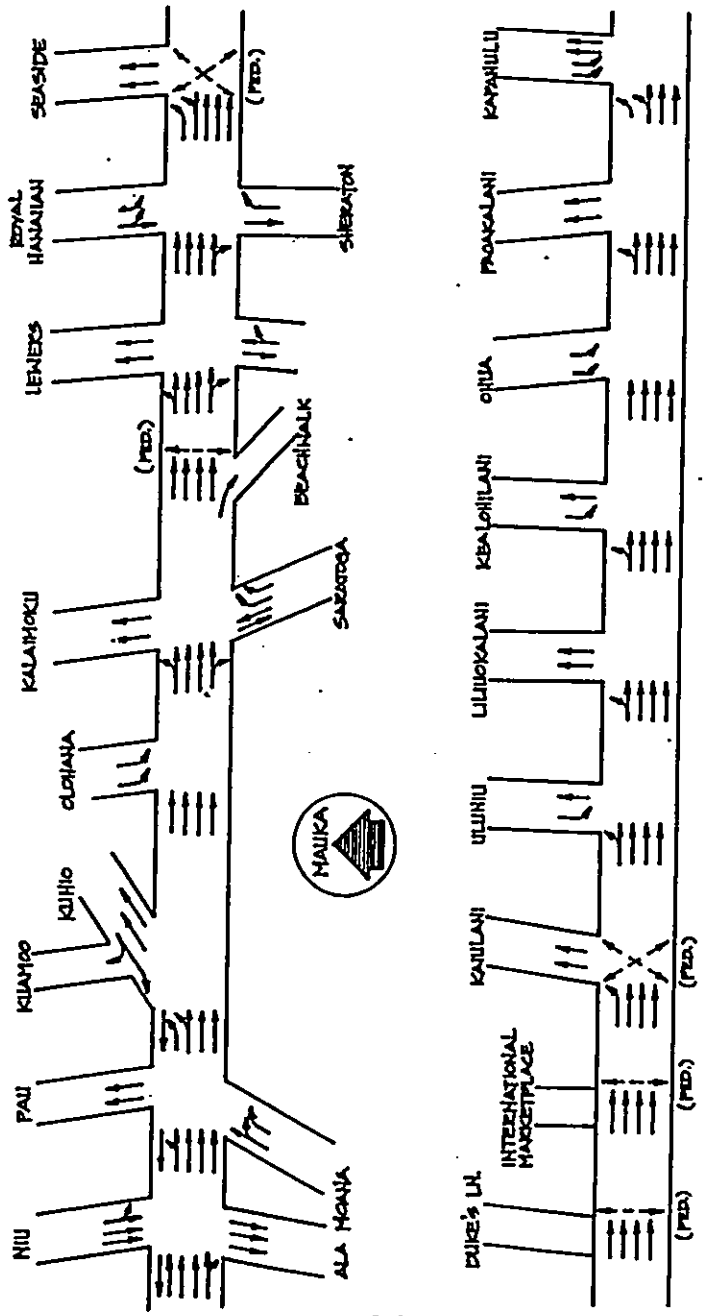
PLAN 5 - Due to the above concerns, Plan 5 was developed with four lanes at the Lewers Street intersection of Kalakaua Avenue. However, the crosswalk on the Ewa approach would be removed to facilitate turning movements on red (2A4). The remainder of Kalakaua Avenue would be as described for Plan 4. Hence, Plan 5 would provide four lanes along Kalakaua Avenue except for five lanes at Seaside Avenue, as shown on Figure II-6.

TESTING OF FUTURE CONDITIONS

In addition to simulating current traffic volumes, a future analysis was conducted to determine the adequateness of the proposed traffic alternative plans with higher traffic volumes. The current traffic volumes along the entire network were increased by 5 percent increments from 105 to 115 percent of current volumes using the flow multiplier (card 36) feature of the TRANSYT model. Systemwide increases were used because information on specific new projects were unavailable and location specific traffic forecasts could not be made. At each of the three traffic levels, the model was run for 80- to 120-second cycle lengths in 10-second increments. The output statistics at the systemwide and individual intersection levels were compared to the statistics for the current traffic volume, existing configuration, at 80-second cycle length, to determine the minimum acceptable cycle length at each traffic volume level.

The above methodology was utilized in lieu of 5- and 10-year forecasts because traffic growth trends on Kalakaua Avenue could not be ascertained. The previous study had assumed a 19 percent increase over a 10-year period[1] based on traffic counts on the Ala Wai Canal Screenline: Ala Moana Boulevard, Kalakaua Avenue, and McCully Street. However, this high estimate was based on data for a 4-year period. The data for a 10-year period indicated no traffic growth in that interval.

[1] Belt, Collins & Associates, Kalakaua Sidewalks - Traffic Study Phase, Volume I, December 1983, Page 17.



Not to scale

FIGURE II-6
SCHEMATIC PLOT - KALAKAUA AVENUE PLAN 5

The data for the Ala Wai Canal screenline was also thought to be inappropriate because of its location at the fringe of Waikiki. Traffic counts taken since 1971 (when the one-way circulation system was implemented) were analyzed to determine the rate of traffic growth in Waikiki. The sums of Koko-Head bound volumes on Kalakaua Avenue and Kuhio Avenue were analyzed at four screenlines: Kuamoo Street, Lewers Street, Kaiulani Avenue, and Kapahulu Avenue. The daily and P. M. peak hour volumes were then time-series plotted to visually check for any trends. The daily trend shown on Figure II-7 and the P. M. peak hour trend on Figure II-8 do not clearly indicate any growth over a 12-year period.

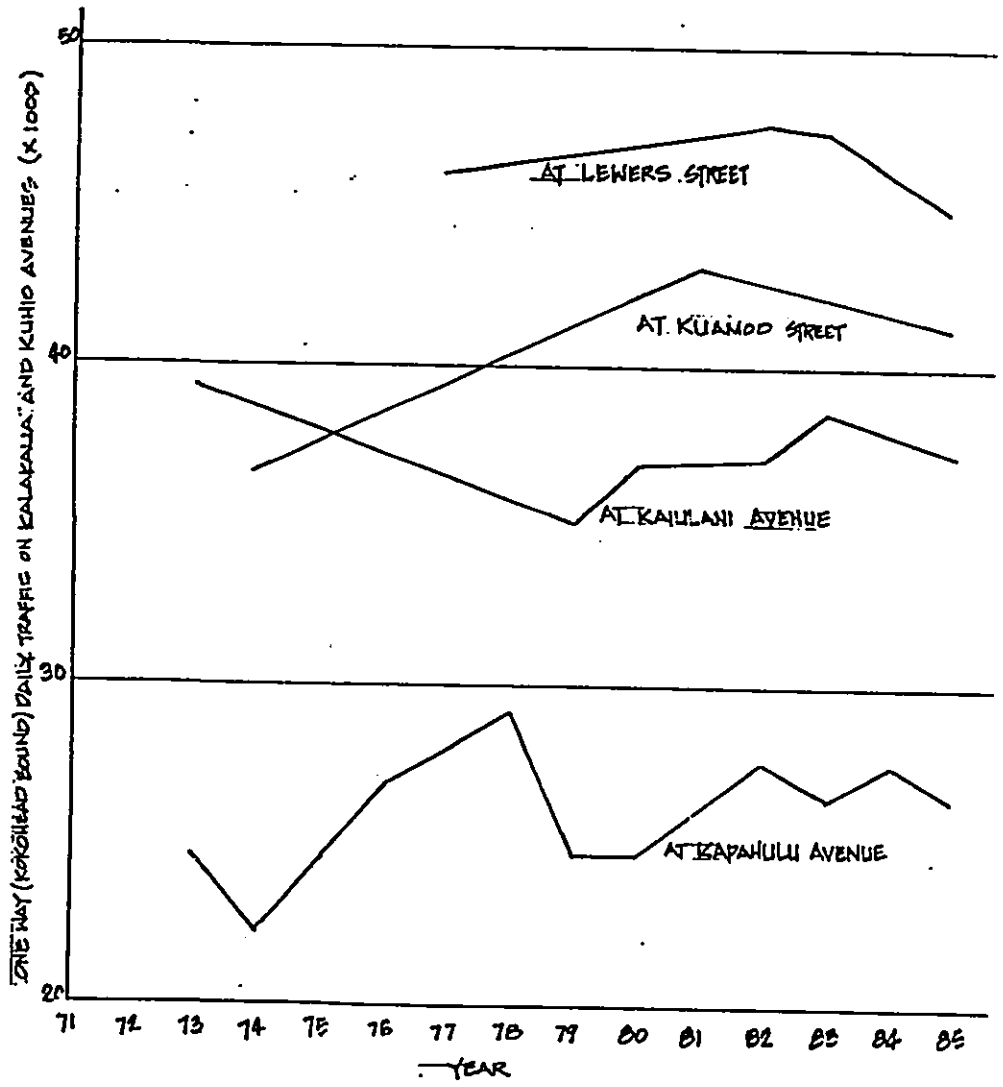
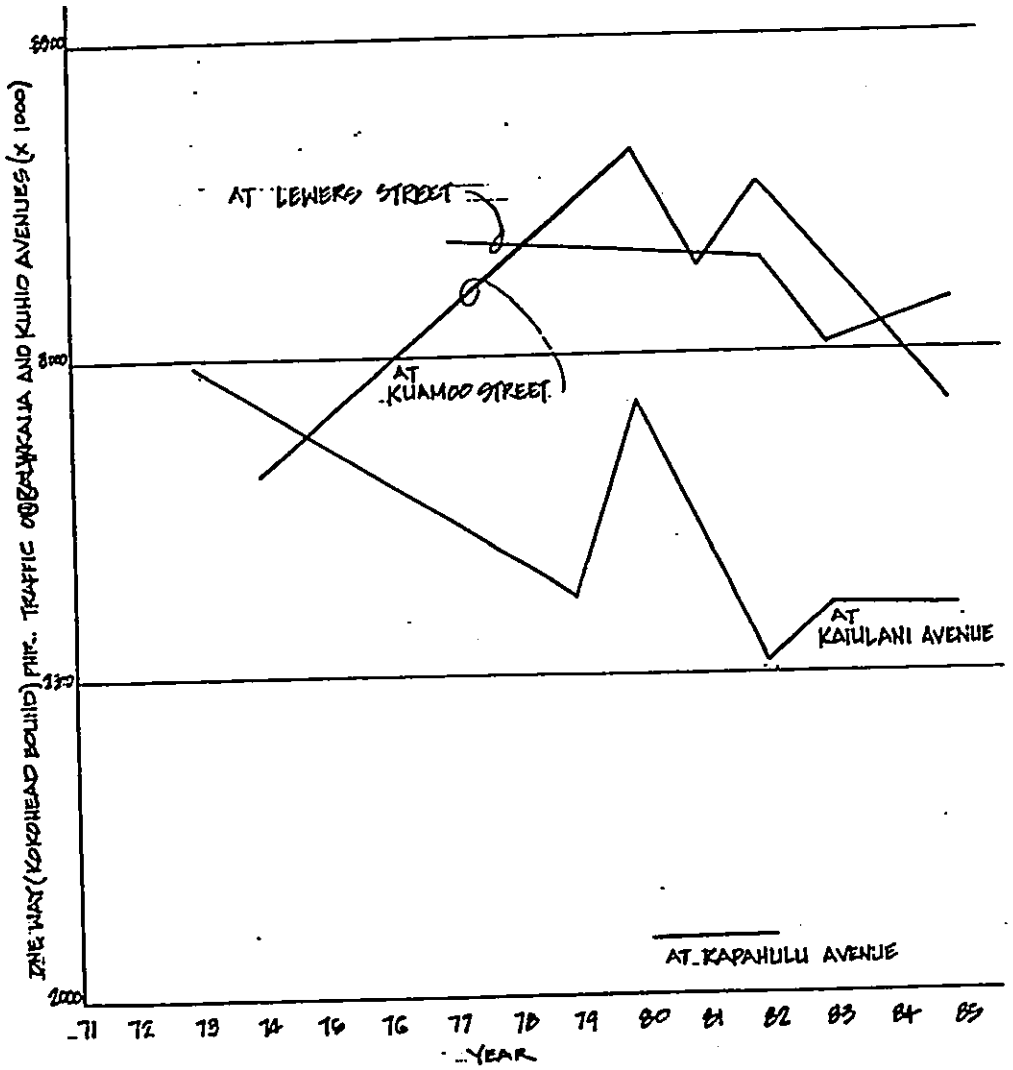


FIGURE II-7
DAILY TRAFFIC TRENDS ON KALAKAUA AND KUHIO AVENUES



PIGURE II-8
P.M. PEAK HOUR TRENDS ON KALAKAUA AND KUHIO AVENUES

III. FINDINGS

The statistical outputs from the model were analyzed at three levels of detail: systemwide, individual intersection, and approach (two or more lanes which accommodate similar movements) or a single lane. The statistics used at each level are summarized on Table III-1, although primary importance was placed on total vehicle hours of delay. Results are discussed only for an 80-second cycle length.

TABLE III-1

Statistics Used At Several Analysis Levels

Level	Statistic
Systemwide	Total Delay - (vehicle hours) Fuel Consumption - (gallons) Average Speed - (miles/hour) Performance Index
Intersection	Total Delay - (vehicle hours) Average Speed on Through Lane - (miles/hour)
Approach/Lane	Total Delay - (vehicle hours) Volume/Capacity Ratio

Systemwide statistics show the overall level of performance for an entire network but do not indicate where problems would occur. This level of statistics was used to evaluate the relative performance of alternative traffic plans with that of the existing configuration. The intersection statistics were used to identify those intersections with unacceptable traffic performance. Finally, the approach/single lane statistics show the level of traffic operations on the individual components of the intersection and were used to evaluate the relative effectiveness of a set of proposed subalternative improvements at each problem intersection.

The output statistics should be analyzed as relative values with the performance of the alternative plans being compared to that of the existing configuration at 80 seconds. Also, due to the margin of uncertainty and error associated with the model output, results which are within 5% of each other should be considered as the same.

The study findings are discussed in the same groupings as presented in the "Methodology":

- Initial Analysis
- Subalternatives Analysis
- Alternatives Analysis
- Futures Analysis

INITIAL ANALYSIS FINDINGS

The model outputs for the initial analysis were derived with the original stop penalty and minimum pedestrian crossing time inputs. These results gave initial indications of where the problems were on the existing network and the adequateness of the proposed simulation plan network. The following "problem" intersections on the current network were identified from the statistics on Tables III-2A and 2B:

- Niu Street/Pau Street -- forms the mauka approach of the Ala Moana Boulevard intersection. This intersecton was not studied for possible improvements.

- Olohana Street -- although this intersection shows high delays, the average through speed is high and design subalternatives were not proposed.
- Saratoga Road/Kalaimoku Street -- is on one of two egress routes for hotels located on Kalia Road. Only the design improvement proposed for the Plan 2 alternative was considered for the remaining alternatives.
- Lewers Street -- is considered to be the busiest intersection of Waikiki. With the present traffic pattern, this roadway is the only means of access to the hotels located on Lewers Street makai of Kalakaua Avenue.
- Seaside Avenue -- another major intersection with heavy left turn movements.
- Kaiulani Avenue -- has large volumes of left turn movements conflicting with heavy pedestrian flow, thereby reducing lane capacity and increasing vehicle delay.
- Liliuokalani Avenue -- the large delay is due primarily to signal timing inefficiencies caused by the model and did not require geometric design alternatives.

Hence, improvement subalternatives were developed for the Lewers Street, Seaside Avenue, and Kaiulani Avenue intersections, as described in Section II.

TABLE III-2A

KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Summary of TRANSYT Systemwide Measures

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	ALTERNATIVE PLAN	
	Existing	Simulation
80 SECOND		
Total Delay (veh. hrs.)	156	145
Fuel Consumption (gals.)	302	290
Average Speed (mph)	10.0	10.5
Performance Index	257	243
90 SECOND		
Total Delay (veh. hrs.)	118	108
Fuel Consumption (gals.)	268	258
Average Speed (mph)	11.6	12.1
Performance Index	211	194

TABLE III-2B

KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Comparison of Intersection Measures for 80-Second Cycle

	Existing		Simulation	
	Total Delay	Through Lane Average Speed	Total Delay	Through Lane Average Speed
Niu	16	6	15	6
Pau	17	9	17	7
Kuhio	--	--	--	--
Olohana	16	15	9	20
Kalaimoku	15	10	8	12
Beachwalk	4	15	11	7
Lewers	24	15	17	10
Royal Haw'n.	8	15	13	10
Seaside	20	9	25	6
Duke's Lane	1	18	2	16
Int'l M. P.	1	17	2	14
Kaiulani	14	18	3	17
Uluniu	3	20	3	20
Liliuokalani	10	10	8	15
Kealohilani	1	23	1	22
Ohua	2	23	2	20
Paoakalani	2	19	4	17
Kapahulu	2	22	5	12
TOTAL	156		145	

The results of the initial analysis indicated that the Sidewalks Simulation Plan network proposed by BCA would provide comparable or slightly better traffic performance than the existing network. The Sidewalks Simulation Plan is able to maintain the same amount of vehicle delay as the existing network, despite fewer traffic lanes on many sections of Kalakaua Avenue because it reduces vehicle delay on the turning lanes while maintaining the same level of delay on the through lanes. The vehicle delay at three intersections with high turning lane delays were decreased as follows:

- Kalaimoku Street/Saratoga Road, 15 to 8 vehicle-hours
- Lewers Street, 24 to 17 vehicle-hours
- Kaiulani Avenue, 14 to 3 vehicle-hours

The vehicle delay on through lanes would not be significantly affected by an increase in the volume/capacity ratio of an approach.

SUBALTERNATIVES ANALYSIS FINDINGS

The model outputs for the subalternatives analysis were derived with the original stop penalty and minimum pedestrian crossing time inputs.

LEWERS STREET ANALYSIS - The results of the analysis of subalternatives for Lewers Street are shown on Table III-3. Table III-3A shows the systemwide statistics while Table III-3B shows the approach level statistics.

TABLE III-3A

Summary of TRANSYT Systemwide Measures
for Kalakaua Avenue - Lewers Street Subalternatives

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	Existing	2-Basic	2A1	2A2	2A3	2A4
80 SECOND						
Total Delay (veh. hrs.)	156	153	140	136	168	120
Fuel Consumption (gals.)	302	303	291	285	307	272
Average Speed (mph)	10.0	10.1	10.6	10.8	9.5	11.4
Performance Index	257	263	249	241	271	222
90 SECOND						
Total Delay (veh. hrs.)	118	130	127	115	139	118
Fuel Consumption (gals.)	268	280	277	264	283	268
Average Speed (mph)	11.6	11.0	11.2	11.7	10.6	11.5
Performance Index	211	231	226	207	237	215

TABLE III-3B

Summary of TRANSYT Approach Measures
for Kalakaua Avenue -- Lewers Street Subalternatives Analysis

	Subalternative	80-Second Cycle			90-Second Cycle		
		Delay	(Total)	V/C	Delay	(Total)	V/C
Existing		4.8		97%	1.8		89%
		2.8		91	1.4		84
		15.0		104	4.1		96
		1.2	(23.7)	32	1.4	(8.8)	35
2A Basic		4.8		97%	2.0		89%
		3.1		91	1.7		84
		15.1		104	4.2		96
		1.2	(24.2)	32	1.4	(9.4)	35
2A1		2.0		89%	1.1		82%
		3.2		91	1.6		84
		1.5		85	0.9		78
		1.2	(7.8)	32	1.4	(5.0)	35
2A2		0.1		33%	0.1		30%
		1.5		74	0.7		68
		3.5		94	1.5		87
		1.2	(6.2)	32	1.4	(3.7)	35
2A3/4		2.1		38%	2.5		43%
		1.8		79	1.1		73
		1.4		84	0.9		77
		0.6	(5.9)	24	0.7	(5.3)	27

Based on system wide statistics, both subalternatives 2A1 and 2A2 would reduce total systemwide delay relative to the existing configuration. At the Lewers Street intersection, total intersection PM peak hour delay would be reduced from 23.7 to 7.8 and 6.2 vehicle hours of delay, respectively. Much of this decrease would come from the right turn/through lane where delay is reduced from 15.1 to 1.5 and 3.5 vehicle hours of delay, respectively. Eliminating the Ewa approach crosswalk across Kalakaua Avenue (2A1) would reduce delay on the left turn/through lane from 4.8 to 2.0 vehicle hours. Adding an extra through lane to provide for an exclusive left turn lane (2A2) would virtually eliminate delay for left turning vehicles.

The systemwide data for 2A3 indicates worse traffic performance on the network, although the traffic performance at the Lewers Street intersection would improve substantially relative to the existing configuration. Eliminating the left turn movement at Lewers Street would exacerbate the left turn problem at Seaside Avenue. Hence, alternative 2A4 was proposed which would provide two left turn lanes at Seaside Avenue (2B3). With this complementary improvement, total systemwide delay would be reduced from 156 to 120 vehicle hours, and total delay at the Lewers Street intersection would be reduced from 23.7 to 5.9 vehicle hours.

SEASIDE AVENUE ANALYSIS - Tables III-4A and III-4B summarize the results of the various subalternative improvements proposed for Seaside Avenue. Both the basic and 2B2 alternatives did not result in better traffic performance. In order to improve traffic performance at this intersection, it would be necessary to provide two left turn lanes to accommodate the high volume of left turn movements, as with 2B3. With this improvement, systemwide delay would decrease from 156 to 140 vehicle hours and

TABLE III-4A

Summary of TRANSYT Systemwide Measures
For Kalakaua Avenue - Seaside Avenue Subalternatives

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	Existing	2-Basic	2B	2B3
80 SECOND				
Total Delay (veh. hrs.)	156	153	150	140
Fuel Consumption (gals.)	302	303	303	291
Average Speed (mph)	10.0	10.1	10.2	10.6
Performance Index	257	263	262	242
90 SECOND				
Total Delay (veh. hrs.)	118	130	108	107
Fuel Consumption (gals.)	268	280	256	256
Average Speed (mph)	11.6	11.0	12.1	12.2
Performance Index	211	231	192	191

TABLE III-4B

Summary of TRANSYT Approach Measures
for Kalakaua Avenue -- Seaside Avenue Subalternatives Analysis

	Subalternative	80-Second Cycle			90-Second Cycle		
		Delay	(Total)	V/C	Delay	(Total)	V/C
Existing		13.0		102	4.4		91%
		7.4	(20.5)	71	8.1	(12.5)	63
2B Basic		13.1		102%	5.4		91%
		13.6	(26.7)	94	14.6	(20.0)	84
2B2		13.9		102%	4.0		91%
		11.6	(25.3)	71	5.5	(9.5)	63
2B3		6.6		88%	2.6		78%
		9.8	(16.4)	78	5.8	(8.4)	69

intersection delay would decrease from 20.5 to 16.4 vehicle hours, relative to the existing configuration.

KAIULANI AVENUE ANALYSIS - Table III-5 summarizes the results for the proposed subalternative improvements at Kaiulani Avenue. Although all the subalternatives except 2C4 show higher or equal systemwide delay, all the subalternatives have lower intersection delays relative to the existing configuration. This paradox is due to the model's signal timing plans for the subalternatives causing increased delays at the Seaside Avenue intersection. Total intersection delay for 2C1 is the highest of all the Kaiulani Avenue subalternatives. The delay on the through lanes would increase from 0.8 to 3.7 vehicle hours of delay relative to the existing configuration because only two lanes are provided. The delay on the two left turn lanes would remain high (2.7 vehicle hours) because of the delay incurred by vehicles waiting for the third left turn phase.

With Kaiulani Avenue made one way mauka-bound and two left turn lanes provided on Kalakaua Avenue (2C2), total intersection delay can be reduced from 13.9 to 4.4 vehicle hours relative to the existing configuration. The first traffic signal phase would be for vehicle movements and the second phase for pedestrian movements. Left turn movement delay is reduced considerably from 12.5 to 0.6 vehicle hours but through movement delay would increase from 0.8 to 3.8 vehicle hours because only two through lanes are available.

2C3 is similar to the basic 2C plan with one left turn and three through lanes on Kalakaua Avenue, except that the former has a three phase signal to separate left turn movements from pedestrian movements across Kaiulani Avenue. The left turn lane would have 2.4 vehicle hours of delay with a three phase signal

TABLE III-5A

Summary of TRANSYT Systemwide Measures
for Kalakaua Avenue - Kaiulani Avenue Subalternatives

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	Existing	2-Basic	2C1	2C2	2C3	2C4	2C5
80 SECOND							
Total Delay (veh. hrs.)	156	153	159	159	156	153	156
Fuel Consumption (gals.)	302	303	303	309	301	302	303
Average Speed (mph)	10.0	10.1	9.9	9.9	10.0	10.1	10.1
Performance Index	257	263	263	269	259	259	259
90 SECOND							
Total Delay (veh. hrs.)	118	130	130	134	130	124	126
Fuel Consumption (gals.)	268	280	279	282	281	276	278
Average Speed (mph)	11.6	11.0	11.0	10.9	11.0	11.3	11.3
Performance Index	211	231	232	236	232	224	224

TABLE III-5B

Summary of TRANSYT Approach Measures
for Kalakaua Avenue - Kaiulani Avenue Subalternatives Analysis

	Subalternative	80-Second Cycle Delay	(Total)	V/C	90-Second Cycle Delay	(Total)	V/C
Existing		0.6		12%	0.8		14%
		12.5		104	3.3		94
		0.8	(13.9)	53	0.6	(4.7)	48
2C Basic		0.6		12%	0.8		14%
		1.5		87	0.9		78
		1.2	(3.4)	69	1.0	(2.7)	62
2C1		0.7		25%	0.8		28%
		2.7		82	1.5		62
		3.7	(7.1)	92	1.9	(4.3)	83
2C2		0.6		53%	3.2		47%
		3.8	(4.4)	92	8.3	(11.4)	82
2C3		0.7		25%	0.8		28%
		2.4		88	1.3		71
		1.2	(4.3)	69	1.3	(3.4)	62
2C4		0.4		45%	0.3		40%
		1.5	(1.9)	71	1.0	(1.3)	63
2C5		0.1		38%	0.1		34%
		1.3	(1.4)	75	1.1	(1.3)	68

versus 1.5 vehicle hours with a two phase signal. Overall, intersection delay would decrease from 13.9 to 4.3 vehicle hours relative to the existing configuration.

2C4 is similar to 2C2 except three through lanes are provided. As a result, through movement vehicle delay would decrease from 3.8 vehicle hours with two through lanes to 1.5 vehicle hours with three through lanes. Overall, intersection delay would decrease from 13.9 to 1.9 vehicle hours relative to the existing configuration.

2C5 is the only subalternative which proposes to improve the performance at an intersection by making changes at another intersection. Hence, the impact at the two intersections should be studied. The total intersection delay at Kaiulani Avenue for 2C5 would be the lowest of all the subalternatives analyzed at this intersection. Even including the additional one vehicle hour of delay at Uluniu Street with the 1.4 vehicle hours of delay at Kaiulani Avenue would make 2C5 more attractive than the other subalternatives except 2C4.

ALTERNATIVES ANALYSIS FINDINGS

The results for Plans 3, 4, and 5 are shown in Table III-6 along side the results for the existing configuration, the Sidewalks Simulation Plan, and the Basic Plan 2. The systemwide measures on Table III-6A and the intersection statistics on Table III-6B were developed with the modified inputs as discussed in Section II.

SIDEWALKS SIMULATION PLAN - Although this plan was not an alternative for this study, its results are also included because of the concerns it raised when it was proposed. This plan and Plan 4

TABLE III-6A

KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Summary of TRANSYT Systemwide Measures

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	ALTERNATIVE PLAN					
	Existing	Sidewalks Simulation	Plan 2	Plan 3	Plan 4	Plan 5
80 SECOND						
Total Delay (veh. hrs.)	136	96	127	106	97	113
Fuel Consumption (gals.)	285	246	280	260	247	269
Average Speed (mph)	10.8	12.7	11.2	12.2	12.6	11.8
Performance Index	149	111	144	125	113	132
90 SECOND						
Total Delay (veh. hrs.)	123	96	102	115	110	109
Fuel Consumption (gals.)	272	245	252	267	258	261
Average Speed (mph)	11.3	12.7	12.4	11.7	11.9	12.0
Performance Index	136	110	116	131	124	125

TABLE III-6B

KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

COMPARISON OF INTERSECTION MEASURES FOR 80-SECOND CYCLE

Intersection Cross Street	Existing		Sdewlks.Sim.		Plan 2		Plan 3		Plan 4		Plan 5	
	Total Delay	Avg.* Speed	Total Delay	Avg.* Speed	Total Delay	Avg.* Speed	Total Delay	Avg.* Speed	Total Delay	Avg.* Speed	Total Delay	Avg.* Speed
Niu	15	6	14	7	14	17	14	7	14	7	14	7
Pau	17	7	18	7	18	7	18	7	19	6	19	6
Kuhio	—	—	—	—	4	20	4	20	4	23	4	22
Olohana	7	22	6	23	3	25	3	25	2	23	4	16
Kalaimoku	16	9	5	19	10	16	7	17	9	18	9	17
Beachwalk	4	15	10	8	11	10	6	12	9	10	14	9
Lewers	24	15	6	19	20	14	8	17	7	15	8	14
Royal Hawaiian	8	15	7	16	8	15	6	14	8	13	8	16
Seaside	9	10	8	11	12	8	9	10	7	10	7	10
Duke's Lane	2	16	2	16	1	17	1	18	1	18	1	17
Internat'l. M.P.	1	17	1	16	1	18	1	18	1	17	1	11
Kaiulani	14	18	3	17	3	17	3	17	2	16	6	23
Uluniu	3	20	3	20	3	21	3	21	4	22	4	17
Liliuokalani	10	10	4	17	3	18	3	18	3	16	3	22
Kalohilani	1	23	1	23	9	6	9	6	1	22	1	23
Ohua	2	22	2	22	4	13	4	13	2	21	2	23
Paoakalani	2	19	3	17	2	19	2	19	3	17	7	11
Kapahulu	2	22	3	18	2	23	2	23	3	22	3	21
TOTAL	136		96		127		106		97		113	

*Through Lane

have the highest performance relative to the other alternatives studied. Vehicle delay would decrease by 29%, fuel consumption would decrease by 14%, and average speed would increase by 18%. The large decrease in the minimum pedestrian crossing time permitted by the reduction in the curb-to-curb pavement width has a large part to do with these results. Significant decreases in vehicle delay would occur at the following intersections:

- At Kalaimoku Street/Saratoga Road, vehicle delay would decrease from 16 to 5 vehicle hours. Vehicle delay on the through lanes would be reduced because of an increase in the green time. Delay for the Saratoga Road right turn lane would be eliminated since vehicles from this lane will be able to merge directly onto a separate lane of Kalakaua Avenue.

- At Lewers Street, vehicle delay would decrease from 24 to 6 vehicle hours. The delay on the two turning lanes would be substantially reduced due to the reduced volume of vehicles on these lanes.

- At Kaiulani Avenue, vehicle delay would be decreased from 10 to 4 vehicle hours. The large reduction of delay on the left turn lane is due to the increase in capacity of the lane.

- A reduction in vehicle delay from 10 to 4 hours is shown for the Liliuokalani Avenue intersection. As previously discussed, the 10 vehicle hour delay shown for the current network is "credited" by the model and does not have to be corrected for in any of the alternatives.

PLAN 3 - The model predicts that this plan will reduce vehicle delay during the P. M. peak hour by about 22% relative to the existing configuration. Average travel speed will increase by about 13% and fuel consumption will decrease by about 9% with Plan 3. There would be significant reductions in vehicle delay at the following intersections:

- At Kalaimoku Street/Saratoga Road, vehicle delay would decrease from 16 to 9 vehicle hours. The green time on the Kalakaua Avenue approach can be increased because the green time for the Saratoga Road right turn lane can be reduced due to the higher capacity provided at the latter approach.

- At Lewers Street, vehicle delay would decrease from 24 to 6 vehicle hours for the same reasons given for the Sidewalks Simulation Plan.

- At Kaiulani Avenue, vehicle delay would decrease from 14 to 3 vehicle hours due to a significant reduction in delay on the left turn lane.

PLAN 4 - This plan would effect a substantial 29% decrease in vehicle delay which is similar in magnitude to the Sidewalks Simulation Plan. Some of this reduction can be attributed to the diversion of vehicles which formerly made left turns at Lewers Street from Kalakaua Avenue to Kuhio Avenue. Since the impact of traffic on Kuhio Avenue was not modelled in this study, the impact of the diverted traffic is not included in the model results. Average travel speed would increase by about 16% and fuel consumption will decrease by about 13% relative to the existing network. Significant decreases in vehicle delay would occur at the following intersections:

- At Kalaimoku Street/Saratoga Road, vehicle delay would decrease from 16 to 9 vehicle hours for the same reasons given for Plan 3.

- At Lewers Street, vehicle delay would decrease from 24 to 7 vehicle hours. Vehicle delay associated with the existing left turn lane would be virtually eliminated with this plan, and delay on the right turn lane would be significantly reduced because of a large reduction in traffic volume.

- At the Kaiulani Avenue and Uluniu Avenue intersections, the sum of vehicle delays for the two intersections would be reduced from 17 to 6 vehicle hours. The primary reason is reduction in left turn volumes and increase in the left turn lane volume at Kaiulani Avenue.

PLAN 5 - This plan was developed as a compromise to criticisms to Plans 3 and 4 and has slightly higher vehicle delay than the latter two plans. Relative to the existing network, vehicle delay would decrease by 17%, fuel consumption would decrease by 5%, and network average speed would increase by 9%. Significant reductions in vehicle delay would occur at the following intersections:

- At Kalaimoku Street/Saratoga Road, vheicle delay would decrease from 16 to 9 vehicle hours for the reasons given for Plan 3.

- At Lewers Street, vehicle delay would decrease from 24 to 8 vehicle hours due to delay reductions in the two turning lanes.

- At the Kaiulani Avenue and Uluniu Avenue intersections, vehicle delay would be reduced from 17 to 10 vehicle hours for the reasons discussed in Plan 4.

SUMMARY - The computer model results shown on Table III-6 indicate that each of the proposed alternatives will improve PM peak hour traffic performance on Kalakaua Avenue. With the exception of Plan 2, the magnitude of improvement is similar for all the alternatives. Based on the reduction in vehicle delay, the following ranking of projects was obtained for an 80-second traffic signal cycle length:

- 1 - Sidewalks Simulation Plan and Plan 4 - 30% reduction
- 3 - Plan 3 - 22% reduction
- 4 - Plan 5 - 17% reduction
- 5 - Plan 2 - 7% reduction

Traffic performance on the existing roadway can be improved by about 10% (reduction in delay) if the traffic signal cycle length is increased from 80 to 90 seconds. However, the City's traffic engineers have serious reservations about increasing the current cycle length. There is already heavy jaywalking on Kalakaua Avenue and lengthening the cycle would add to the problem.

FUTURES ANALYSIS FINDINGS

The results of the futures analyses shown on Table III-7 show the minimum acceptable cycle length and corresponding traffic performance measures for each alternative at four levels of traffic.

The existing network can only accommodate a 10% increase in traffic and would require a 120-second traffic signal cycle length. Many turning lanes on the existing network are already at capacity and cannot accommodate additional traffic without any

TABLE III-7

SUMMARY OF FUTURE ANALYSIS FOR ALTERNATIVE TRAFFIC PLANS

	Existing Configuration	Simulation	Plan 3	Plan 4	Plan 5
100% of current traffic					
Minimum acceptable cycle (sec.)	80	80	80	80	80
Total delay (veh. hrs.)	136	96	106	97	113
Fuel consumption (gals.)	285	246	260	247	
Average speed (mph)	10.8	12.7	12.2	12.6	11.8
105% of current traffic					
Minimum acceptable cycle (sec.)	90	80	80	80	80
Total delay (veh. hrs.)	139	118	122	111	124
Fuel consumption (gals.)	297	276	280	269	285
Average speed (mph)	11.0	11.8	11.7	12.1	11.6
110% of current traffic					
Minimum acceptable cycle (sec.)	120	90	90	90	90
Total delay (veh. hrs.)	146	141	131	138	125
Fuel consumption (gals.)	305	303	297	299	288
Average speed (mph)	10.9	11.1	11.5	11.2	11.8
115% of current traffic					
Minimum acceptable cycle (sec.)	All cycles have unacceptable performance relative to existing traffic conditions.	120	120	120	120
Total delay (veh. hrs.)		143	150	152	156
Fuel consumption (gals.)		306	316	313	319
Average speed (mph)		11.3	11.0	10.9	10.8

improvements. Hence, the cycle length must be increased to 90-and 120-seconds for a 5% and 10% increase in current traffic, respectively. The existing network cannot accommodate a 15% traffic increase while maintaining current levels of performance.

The Sidewalks Simulation Plan, and Plans 3, 4, and 5 had results similar to one another. Each of the alternatives can accommodate a 5% increase in traffic with an 80-second traffic signal cycle length, and a 10% traffic increase with a 90-second cycle length. In order to accommodate a 15% traffic increase, all these alternative plans will require a 120-second cycle length, and vehicle delay will increase about 10% relative to existing conditions.

For all alternatives, the largest increases in delays occurred at the Ala Hoana Boulevard-Kalakaua Avenue intersection, which is actually two signalized intersections. This intersection will also be studied for possible design improvements in the future.

RECOMMENDATIONS AND CONCLUSIONS

The ranking of the proposed alternatives based on the computer model results showed the Sidewalks Simulation Plan and Plan 4 as the best alternatives, Plan 3 as the next best alternative, and Plan 5 as the fourth best alternative. However, several sub-alternatives were proposed and analyzed irregardless of their feasibility so that their traffic impact could be determined. The subalternatives used to develop the Sidewalks Simulation Plan, Plan 3, and Plan 4 are not considered feasible at this time for engineering or economic reasons.

- The Sidewalks Simulation Plan (Figure II-2) and Plan 3 (Figure II-4) require five lanes on Kalakaua Avenue at the Lewers Street intersection. This design would require the acquisition of adjoining property which would be very expensive and makes these two alternatives infeasible at this time.

- Plan 4 (Figure II-5) requires changing the direction of travel on Lewers Street between Kalakaua Avenue and Kuhio Avenue. This action is expected to cause adverse traffic impacts on Kalia Road, as did occur in the mid-1970's, and makes Plan 4 undesirable at this time.

RECOMMENDED ALTERNATIVE - Therefore, of the four alternatives which show the greatest potential for reducing vehicle delay, only the fourth-ranked Alternative Plan 5 (Figure II-6) is considered feasible at this time. The results shown on Table III-6 indicate that there is no large penalty associated with selecting Plan 5, the fourth best alternative. Plan 5 would reduce vehicle delay by 17% as compared to a 30% reduction for the top ranked plans. Both values represent substantial reductions in vehicle delay. It should be noted that there is a margin of uncertainty associated with each result which could conceivably narrow the differences between the two results. Since other non-traffic factors need to be considered in the total evaluation of these alternatives, we recommend a more "balanced" alternative which could incorporate factors related to pedestrian movements, sidewalk amenities, and general aesthetic considerations.

Alternative Plan 5 is recommended for implementation based on the results of this study. The major features of this plan include:

- Four travel lanes on Kalakaua Avenue from Ala Moana Boulevard to Kapahulu Avenue, with the exception of five lanes at Seaside Avenue. The pavement width would be reduced from 55 feet to 47 feet along most sections to provide more sidewalk area.

- Saratoga Road - The right turn lane onto Kalakaua Avenue would be widened to two lanes. The existing traffic island next to Fort DeRussy would be eliminated and right turns from Kalakaua Avenue would be made from the curb lane rather than a separate lane.

- Lewers Street - The crosswalk on the northwest approach of Kalakaua Avenue would be eliminated to increase the capacity of the turning lanes.

- Seaside Avenue - Two left turn lanes would be provided with optional through movement from the second lane. There would also be three through lanes.

- Kaiulani Avenue - The makai bound lanes of Kaiulani Avenue would be eliminated to make it one way mauka bound to Koa Avenue. The Kalakaua Avenue approach would have three through and one left turn lane.

- Uluniu Avenue - Uluniu Avenue would be made two way between Kuhio Avenue and Kalakaua Avenue. This plan is schematically shown on Figure II-6.

A-32

CONCLUSIONS - The TRANSYT-7F model was used to systematically develop, analyze, and rank alternative traffic improvement plans as part of the Kalakaua Avenue Safety and Beautification Project. Problem areas on the existing network were identified and several improvements were proposed and analyzed for each. The results of this subalternatives analysis were used to develop alternative plans which were analyzed and ranked. Other considerations were used to identify those alternatives which were not feasible for various reasons, and one alternative plan was selected. This procedure is recommended for evaluating other roadway improvement projects where community concern is expressed and a comprehensive analysis is required to answer these concerns.

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HONOLULU

A REPORT ON THE SIMULATION OF PROPOSED IMPROVEMENTS FOR KALAKAUA AVENUE SAFETY AND BEAUTIFICATION

December 1985

MAYOR FRANK F. FASI
Department of Transportation Services
City and County of Honolulu

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

December 27, 1985

Honorable Kent Keith, Director
Department of Planning and
Economic Development
State of Hawaii
250 South King Street
Honolulu, Hawaii 96813

Dear Mr. Keith:

B-2

In accordance with Section 83A, Act 285, SLH 1984, as amended by the 1985 State Budget Act, the City and County of Honolulu submits its report documenting the results of simulation efforts for the Kalakaua Avenue Safety and Beautification Project.

The report addresses the previously expressed concern of the Legislature that vehicular traffic on Kalakaua Avenue not be adversely affected by planned improvements. The currently proposed plan which was simulated, retains the existing four lanes of through traffic but, by narrowing them to standard lane widths, uses formerly wasted street space for new sidewalks and truck delivery bays. Thus, by retaining the four lanes of moving traffic on Kalakaua Avenue, the current plan obviates the original source of community concern and the resulting requirement for a simulation imposed by the Legislature. Nevertheless, the City chose to undertake numerous simulation exercises as part of its overall planning effort.

The newly proposed plan also employs innovative improved pedestrian traffic flow on the existing sidewalks to reduce points of conflict between pedestrians and autos, and to increase traffic signal time for autos. The result is a system which significantly increases traffic flow, and decreases delays to motorists on Kalakaua Avenue, while increasing usable space for pedestrians.

The accompanying study reports on the conclusion of the City and County of Honolulu's physical on-site and computer simulation studies which: (1) satisfies the traffic and pedestrian demands of Waikiki, (2) has proven its effectiveness in computer and physical simulation studies, and (3) fulfills both the intent and specifics of the legislative directive regarding simulation studies in Waikiki.

Accordingly, it is recommended that the Department of Planning and Economic Development recommend to the Governor of the State of Hawaii, the release of funds appropriated for Waikiki improvements (PED 113, Act 285, SLH 1984) to the City, for the implementation of the Kalakaua Avenue Safety and Beautification Plan based on the four-lane concept simulated and tested.

Sincerely,

JOHN E. HIRTEN

cc: Mayor Fasi
Managing Director
Richard S. H. Wong
Henry H. Peters
T. David Woo
George Takani

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

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Ref. No. P-3494

February 26, 1986

The Honorable Richard S. H. Wong, President
State Senate
Thirteenth State Legislature
State Capitol
Honolulu, Hawaii 96813

Dear President Wong:

B-3

We are in receipt of the study entitled, A Report on the Simulation of Proposed Improvements for Kalakaua Avenue Safety and Beautification, dated December 1985, that was transmitted for our review by the Department of Transportation Services, City and County of Honolulu. The City's letter of December 27, 1985, indicates that copies were also sent to you as well as to the Honorable Henry Peters, Speaker of the House, to fulfill the reporting requirements for the simulation study as called for by Section 83A, Act 301, SLH 1984, as Amended by Act 300, SLH 1985. For your ready reference, we are including, herewith, a copy of the report for your review.

Since the report is highly technical in nature, we asked the State Department of Transportation (DOT) to make an assessment of: 1) the alternative plans in the report and comments relative to the feasibility of implementing Plan 5, as proposed, to fulfill the traffic and pedestrian demands of Waikiki, and 2) the adequacy of the simulation methods used to arrive at the findings and conclusions of the report.

DOT has studied the report and agrees with its conclusions that Plan 5 is the most feasible at this time for the following reasons:

1. The 11' lane widths and 14' bus lane widths are acceptable widths and will not affect traffic carrying capacities. The Ala Wai Boulevard, for example, has four lanes within a total width of 42'.

2. The four through lanes with separate turn lanes, together with the other proposed improvements, should provide improved operations.

3. The 9' additional width gained through narrowing the existing lanes and applied to widening of the sidewalks will improve pedestrian operations and safety.

The physical simulation and the computer simulation that were conducted are considered sufficient to confirm the feasibility of the plan. DOT also stated that TRANSYT-7F computer program has been used by the State's Highways Division to study traffic signal coordination and operations in the past with good results.

They indicated moreover, that further simulation before implementation should not be necessary because the number of lanes provided will be the same as the existing except that they will be narrowed to the standard 11' width and 14' width for the buses.

We concur with this evaluation and believe that the simulation report adequately addresses the requirements of Section 83A, Act 301, SLH 1984, as Amended by Act 300, SLH 1985.

For your information, the City is now proceeding with the necessary actions to implement the project as planned in order that bids may be opened before June 30, 1986, the date on which State funds are due to lapse if not encumbered.

Very truly yours,

Kent M. Keith

Kent M. Keith

cc: Senator Bertrand Kobayashi
Senator Mary-Jane McMurdo
Mayor Frank F. Fasi
Mr. John Hirten, Director
Department of Transportation Services
Mr. Wayne Yamasaki, Director
Department of Transportation

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KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

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Director, Department of Transportation Services
City and County of Honolulu

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Consultants

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INTRODUCTION

The purpose of this report is to document the efforts of the City and County of Honolulu in "simulating" proposed improvements of the vehicular and pedestrian traffic flows on Kalakaua Avenue in Waikiki. During its deliberation of Act 285, SLH 1984, the Twelfth State Legislature heard testimony describing the explosive growth of tourism in Waikiki and the resulting stress on its infrastructure. In the two decades since 1964, the tourist count on Oahu had increased from 423,983 to 2,901,320 annually, an expansion of 584%! At the same time, Waikiki's showpiece, Kalakaua Avenue, has remained substantially unchanged in its configuration and capacity for vehicular and pedestrian traffic, making it increasingly inefficient, unsafe, and unattractive.

Convinced of the need to revitalize Kalakaua Avenue, the Legislature appropriated $3.84 million for much needed improvements. At that time, however, an ancillary concern was raised by community members that the proposed sidewalk expansions would be accomplished at the expense of the diminished roadway capacity. The concern was precipitated by one proposal which would have reduced the existing operating four lanes on Kalakaua Avenue to three lanes. As a result, the Legislature stipulated that a simulation of the proposed changes be conducted and its results reported back to that body before actual construction commenced:

> Section 83A. Provided that of the general obligation bond funds appropriated to Tourism, Department of Planning and Economic Development (PED 113) for the Waikiki Improvement project, the City and County of Honolulu shall conduct a simulation in Waikiki of the sidewalk widening to demonstrate how all types of vehicles will adjust to the project and to designated loading and unloading zones; provided further that the simulation shall occur before any contracts for the widening of the sidewalks are executed; provided further that the simulation be tested over a sufficient period of time to determine the impact of the proposed widening and to allow for public review and comment; provided further that the City and County of Honolulu shall submit a report twenty days before the convening of the 1986 Regular Session on the results of the simulation."
>
> Act 285, SLH 1984

The City and County of Honolulu has concluded its initial planning for the Kalakaua Avenue Safety and Beautification Project and has conducted a number of simulation studies in accordance with the Legislature's directive. The City's Department of Transportation Services is the coordinating and operational agency responsible for the numerous simulations. These efforts took the form of physical, photographic, and computer simulations and included:

- simulation of proposed traffic and sidewalk alternatives,
- testing of the basic four lane traffic patterns and lane widths,
- widening of crosswalks,
- establishing new four way "Barnes Dance" crossings at several locations,
- changing street sign colors and locations,
- replacing dispersed newsstands with collective kiosks,

- changing the traffic flow at Kaiulani Avenue,
- testing the feasibility and enforcement of unloading bays, and
- experimenting with restricted delivery times.

Analyses of the studies and simulations conclude: (1) that the major traffic congestion factor is the conflict between vehicles and the extraordinarily high volume of pedestrians crossing at intersections and (2) that the objectives of the Waikiki Improvement project can be accomplished without diminishing the roadway capacity of Kalakaua Avenue. At the same time, pedestrian movements would be facilitated along expanded and uncluttered sidewalks, the integration of pedestrians and vehicles would be accomplished more safely and expeditously at intersections and crosswalks, and delivery vehicles would be less of an impediment of traffic through the use of special delivery and bus loading bays and operating policies. While studies show that vehicular traffic volumes have not changed significantly over the past twelve years, pedestrian vehicular conflicts have increased. Under the proposed plan, the total capacity for vehicular traffic on Kalakaua Avenue would remain unaffected since the proposed plans now call for the retention of the four lanes of east-bound traffic currently in existence. However, traffic flow would increase due to the use of special turning lanes and other improvements at intersections. This would obviate the original concern of the community and the resulting caveats imposed by the Legislature.

CONCLUSION

The City and County of Honolulu has concluded that the plan calling for four lanes of traffic on Kalakaua Avenue (identified as Alternative Plan #5 in the report): (1) satisfies the traffic and pedestrian demands of Waikiki, (2) has proven its effectiveness in computer and physical simulation studies, and (3) fulfills both the intent and specifics of the Legislative directive regarding simulation studies in Waikiki.

Accordingly, it is recommended that the Department of Planning and Economic Development urge the Governor of the State of Hawaii to release the funds appropriated for Waikiki improvements to the City for the implementation of the Kalakaua four-lane plan tested.

Study Background

Throughout the growth of tourism in Hawaii, Waikiki has served as the principal resort area of the State. The present pedestrian and vehicular traffic problems on Kalakaua Avenue are a result of Waikiki's rapid residential, commercial and tourist development during the 1960s and 1970s. Continuing increases in visitors and residential population, and corresponding growth in commercial services cause additional congestion each year on the area's sidewalks and thoroughfares.

Over the years, many improvement plans for Waikiki and Kalakaua Avenue were prepared but little in the way of action was undertaken. In the late 1970s and early 1980s, State and City

agencies turned their attention to Waikiki and sought ways to improve the visitor industry upon which Hawaii had become so dependent. A Waikiki Task Force was appointed by the City Council to provide advice on proposals to improve the character of Waikiki. A major construction program, the Kuhio Avenue Widening, was begun in 1983 and completed in 1985. Finally, an improvement plan for Kalakaua Avenue was initiated by the City's Department of Public Works.

The portion of Kalakaua Avenue selected for study extends approximately 1.2 miles from the intersection with Ala Moana Boulevard at the western boundary to the intersection with Kapahulu Avenue at the eastern end. Currently, four lanes of east-bound traffic runs the length of the thoroughfare. The two center lanes are generally 12 feet in width and the two outer lanes 16 feet. Sidewalk widths fluctuate along the Avenue.

Serious consideration of Kalakaua Avenue improvements commenced when in 1980, a consultant was hired and traffic studies were prepared. Three alternative conceptual plans were eventually proposed by this initial effort: 1) conversion of Kalakaua to a mall or semi-mall; 2) reducing the number of traffic lanes from 4 to 3 and widening its sidewalks; and 3) a combination of both alternatives.

The consultant's analysis showed that the total mall proposal would not accommodate Waikiki's traffic volume, indicating instead that three of the four existing traffic lanes would be needed to handle present and future traffic volume. The sidewalks could be expanded into the remaining street right-of-way on both sides of the street, except where the plan proposed loading and unloading bays for use by trucks and buses.

Community reaction to this plan was ambivalent. The City Council's Waikiki Task Force supported the sidewalk widening concept but recommended a four-lane plan rather than the three-lane proposal. The Waikiki Residents Association and the Waikiki Neighborhood Board opposed the three-lane proposal because of concern whether it would work. Someone suggested that the City should simulate the plan to assure the community that three lanes could accommodate the existing traffic.

The City Department of Transportation Services first presented its proposal for the Kalakaua Avenue Improvement project to the 1984 State Legislature. The Legislature appropriated $3.8 million in general obligation bond funds for the project, but because of the community concerns over the proposed three-lane plan, a proviso was added requiring that the results of a simulation of the sidewalk widening be presented to the Legisalture before funds could be released.

The City initially estimated that $500,000 would be needed to physically simulate the three-lane plan that the then City Administration was investigating at that time. The Governor, however, declined to release any of the State appropriated funds for the proposed simulation project and the City Council also decided against providing funding of this magnitude for a demonstration.

When the present City administration assumed responsibility for the project in 1985, the previous Kalakaua Avenue plans were critically reviewed. The new Director of Transportation Services, Mr. John E. Hirten, was assigned the responsibility of Project Director to coordinate City departments and private sector involvement. The general strategy of the study was redirected and provided an innovative perspective which became the basis of the currently proposed plans. The project approach emphasized the validity of testing the traffic flow of revised plans through the use of lower cost computer simulation studies which required only limited physical alterations to the actual roadways. This was coupled with:

- on-site physical testing of specifically critical alterations,
- a comprehensive photographic analysis of the vehicular and pedestrian traffic,
- use of time lapse photography of operational performance before and after simulations, and
- frequent on-site inspections of the alterations being simulated.

The result is a plan which simultaneously expands both vehicular and pedestrian usage of Kalakaua Avenue, beautifies the area, and has been validated in statistically exhaustive tests.

ASSESSMENTS OF EXISTING FACILITIES AND ESTABLISHED STANDARDS

The initial step of the project was to accurately assess the performance of the existing public accommodations along Kalakaua Avenue, compare it with established traffic and pedestrian standards, and to suggest techniques to better facilitate the movement of vehicles, people and goods while enhancing the thoroughfare's attractiveness.

Existing Facilities

A comprehensive combination of technical and physical tests were conducted to measure the adequacy of Kalakaua's facilities and to assess the impact of possible changes to its design. Among the study methods employed were time lapse photographs of key intersections, photo log pictures of the avenue (a series of photos taken as a vehicle-mounted camera is moved steadily along the street), photo studies of problem areas, and other on-site measurements and evaluations. Special attention was given to vehicular traffic counts at Kalakaua's intersections and left and right turning movements which accentuate the conflict between motorists and pedestrians. Pedestrian traffic counts at the intersections as well as on the heavily traveled sidewalks were undertaken.

The average vehicular traffic counts at the major intersections exceeded 2,000 vehicles per hour, levels which

national standards consider very high. While high, these volumes are almost unchanged from 10 years ago.

However, pedestrian traffic counts taken on the sidewalks at critical locations during peak periods are over 3,000 per hour, an extraordinarily high volume by any standard. Pedestrian safety, convenience and comfort in particular were found to have been neglected over the past few decades. The sidewalks on Kalakaua Avenue are much too narrow to accommodate the current volume of resident and tourist foot traffic. Pedestrian congestion reached its present record during the summer of 1985 when the counts of over 3,300 per hour were recorded in the vicinity of the International Market Place. Crowding is exacerbated by competing demands for sidewalk space. Newsstands, commercial vendors, pedicabs, handbillers, mailboxes, trash receptacles, trees, benches and flower boxes serve to effectively narrow sidewalk space. At places, the paving is so cracked and dilapidated as to pose serious hazards. Major conflicts exist between pedestrians and turning vehicular traffic at most intersections and mid-block crosswalks were unsafe for a variety of reasons. Facilities for the handicapped are lacking or poorly designed and located.

The studies confirm what is intuitively obvious: competitive human and material demands upon Kalakaua's limited space are exceptionally high. Therefore, achieving optimum use of the limited area is critical. Analysis of the data suggests improvements may best be achieved by reducing the number and intensity of the points at which conflicting demands converge.

Established Standards

In order to provide for the safe flow of automobiles, a minimum of 10 and a maximum of 12 feet are required for each traffic lane. Buses require a minimum of 12 feet, and preferably 14 feet for their lanes. Kalakaua Avenue can easily accommodate three 11-foot lanes for autos and a 14-foot lane for buses along the entire project corridor. Enough space would then be left available to provide for a fifth lane, to be used for left or right turn lane at intersections, and for inserting delivery bays, thus insuring four lanes of unimpeded traffic.

The widths of the sidewalks vary along Kalakaua. The standard space requirement for a walking person is approximately 2 feet. When two people stroll in one direction and meet two other going in the opposite direction, for example, a minimum of 8 feet of sidewalk is required to pass safely. On Kalakaua Avenue, pedestrian counts are so large that huge numbers must negotiate the limited sidewalk space and even 8 feet is too narrow. It is essential to minimize obstacles in the pedestrian path. Even a cursory glance reveals competing demands such as landscaping (trees, planter boxes, and street furniture), public facilities (traffic signal control boxes, waste receptacles, mail boxes, and street light poles), or commercial activities

(newsracks, newsstands, and handbillers). Studies and observations indicate potentially dangerous pedestrian movement caused by efforts to avoid these obstacles which are now omni-present. It was determined that, as a minimum, a 9-foot sidewalk area, and more where possible, free of any encumbrances is essential for Kalakaua Avenue. The reduction of traffic lane widths would provide the additional space necessary to increase sidewalk widths when the area is not needed for extra traffic lanes executing turns at intersections.

Project Strategy

The total sidewalk and roadway space along Kalakaua Avenue available to public vehicular and pedestrian use is obviously finite, creating a situation which in Games Theory is referred to as a "Zero-Sum Game": any expansion of one use is achieved at the expense of another. In the case of Kalakaua Avenue, previous plans had esentially considered only the competing demands of sidewalks versus traffic lanes. Previous plans had proposed essentially that the widening of sidewalks be accomplished by the elimination of one lane of traffic.

The present project approach, however, has now evolved by introducing a number of other factors into the equation.

1. Renewed scrutiny of the Kalakaua sidewalks revealed that much of the existing space was being used by activities other than pedestrian traffic. As noted earlier, the newspaper racks, vendors, and public and private street "furniture" all served to reduce the sidewalk space available to pedestrians. By reducing such impediments to a minimum then streamlining those remaining would significantly increase the effective sidewalk area and improve its attractiveness as well. Returning sidewalk space to pedestrian use became one of the project's basic strategies.

2. Legally required setback areas were being usurped by bordering commercial activities which placed beach equipment, mopeds, dining tables, and other obstacles on sidewalks. Strict enforcement of building codes and zoning ordinances to insure maximum pedestrian use of public sidewalks was a project objective.

3. Another restriction upon sidewalk capacity was caused by pedestrians waiting to cross intersections. Reducing or eliminating the conflicts between vehicles and pedestrians was recognized as another method to accomplish project objectives.

4. The two existing outer lanes along Kalakaua Avenue are considerably wider than necessary to accommodate vehicles. Each curb lane provides 16 feet of clearance while interior lanes are only 12 feet wide and adequately accommodate vehicles. By reducing the lanes to standard widths and enlarging sidewalks accordingly, sidewalk space will be increased.

5. One of the principal impediments to traffic flow is caused by vehicles waiting to execute turns at intersections. To increase the carrying capacity of Kalakaua Avenue, therefore, additional lanes to permit left turns only are needed, along with adjustments to the signal phasing and crosswalk widths. This additional capacity would help reduce queue lenghts on turning lanes, one of the principal impediments to smooth traffic performance in the through lanes.

DEVELOPMENT OF THE KALAKAUA AVENUE TRAFFIC PLAN

The Kalakaua Avenue plan was developed through the following procedures:

1. Data collection;
2. Vehicular and pedestrian traffic counts;
3. Development and analysis of alternative project elements;
4. Development and analysis of competing plans integrating selected project elements; and
5. Computer model selection and testing;
6. Physical simulation and testing;
7. Testing of competing plans against anticipated future conditions.

A detailed account of the plan methodology and development is contained in a separate report, "Computer Simulation of Traffic Alternatives for the Kalakaua Avenue Safety and Beautification Project". The following summarizes the actions taken.

Computer model selection

The computer model selected to analyze the impact of alternative plans on Kalakaua Avenue traffic was the TRANSYT-7F, an acronym for TRAffic Network StudY Tool, version 7F. The model was originally developed in the United Kingdom in 1967 and has undergone continuous modernizing refinements since then. It

was chosen for this study primarily because of its relative ease of use and its capability to analyze most of the improvements proposed for with the Kalakaua Avenue project.

TRANSYT-7F computer tapes were obtained from the Federal Highway Administration and utilized by the City's computer. Sample test data were entered to verify the proper functioning of the program. As part of the test procedure, the model was used to analyze actual weekend and late night traffic operations on Kalakaua Avenue, providing an opportunity to operate the program at an early stage and to develop computer systems management procedures.

Data collection

To collect an adequate amount of data for the TRANSYT-7F program, both historical and present day counts were used.

Previously collected traffic counts were compiled and reviewed for appropriateness. Counts taken between 1980 and 1983 were given first consideration because these counts were timely enough, yet still reflected conditions before the Kuhio Avenue construction project caused unusual traffic usage of Kalakaua.

Additional meter and manual counts were taken on July 10 and October 14 and 15, 1985, of traffic at various locations on Kalakaua, at its intersections to measure turning movements, and on parallel and intersection streets.

The traffic counts represent a wide range of conditions existing in different years, months, and days of the week. In general, Waikiki traffic volumes are higher in winter and summer months and are higher at the end of the week (Thursday and Friday). The data fluctuations were not averaged or seasonally adjusted, but rather the highest recorded volumes were utilized to represent a conservative, worst case scenario.

"Traffic saturation counts" were also taken to determine lane capacities at different locations on Kalakaua Avenue. This is a method to measure the maximum number of vehicles which can traverse a lane of traffic during a specific period of time.

"Spot speeds," using radar guns to determine the prevailing traffic speed when there is no interference from traffic signal operations, were collected along Kalakaua.

Bus travel speeds and stop times on Kalakaua Avenue were furnished by MTL, Inc.

Development and Analysis of Alternative Project Elements

An initial computer simulation analysis was made of the existing roadway configuration and two alternative traffic plans which were developed prior to the start of the computer simulation study. The two alternatives were:

1. The original "Sidewalks Simulation Plan" developed by Belt, Collins and Associates, under the original study, proposed

three lanes along most of Kalakaua Avenue, except for five lanes at Lewers Street and four lanes at Royal Hawaiian Avenue, Seaside Avenue, and Kaiulani Avenue. These additional lanes were to provide for exclusive turning movements.

2. "Task Force Plan 1" developed by the Safety and Beautification Project Policy Committee, a group composed of City officials, Waikiki businessmen, and consultants. It called for four lanes from Ala Moana Boulevard to Kaiulani Avenue with the exception of five lanes at Lewers Street, and three lanes from Kaiulani Avenue to Kapahulu Avenue. The extra lane at Lewers was intended as a left turn lane for mauka-bound traffic.

The model results predicted surprisingly similar performance for each of the three, despite having fewer traffic lanes on the two alternative plans. The results were attributed to the special designs of the alternative plans which were meant to reduce delays on the turning lanes where most of the impediment to through traffic occurs.

Having verified that facilitating turning movements significantly improves the traffic capacity of Kalakaua, attention was directed at the four, particularly troublesome intersection on Kalakaua Avenue. These occured at Kalakaua's intersections with:

1. Saratoga Road/Kalaimoku Street;
2. Lewers Street;
3. Seaside Avenue; and
4. Kaiulani Avenue.

As a result of the initial analysis, it was decided (1) to maintain a minimum of four through lanes on Kalalkaua Avenue to maximize capacity within the roadway space, and (2) to more closely examine the elements of the two alternative plans which has had such a dramatically favorable impact on minimizing traffic delay.

Various subalternatives were proposed for the improvement of each of the problem locations. The subalternatives were developed without regard to their relative engineering or fiscal feasibility so that the impact of the widest range of possible improvements could be reviewed. Some of the features studied included:

1. Reserving one or more lanes exclusively for turning movements;
2. Permitting the option of either turning or proceeding in some lanes;
3. Providing an extra lane for turning movements;
4. Elimination of crosswalks to increase turning lane capacities;
5. Changing the direction of travel on streets approaching Kalakaua Avenue to eliminate traffic conflicts;

6. Reducing pedestrian crossing times; and

7. Reducing the number of traffic light phases by instituting Barnes Dance pedestrian crossings at intersections.

Each of the subalternatives were analyzed using TRANSYT-7F in the context of several possible general traffic patterns for Kalakaua Avenue.

Development and Analysis of Competing Plans

Using the results of the subalternatives analysis, City traffic engineers reviewed the two plans discussed earlier and created several alternative plans from different combinations of the subalternatives. The four competing plans, including the original "Sidewalks Simulation Plan" for comparative purposes, and their basic features are:

Plan 1: The Three-Lane Plan - The original "Sidewalks Simulation Plan", included in this study as a base, starting at Ala Moana Boulevard, Kalakaua Avenue would have three lanes initially which would then merge with the right turn lane from Saratoga Road. The latter would then become a fourth through lane on Kalakaua Avenue.

Plan 2: The Saratoga Widening Plan - The Saratoga Road right turn lane would be widened to two lanes to increase capacity. Crossing signals would be used to minimize interference with pedestrians. To increase pedestrian safety, the right turn lane from Kalakaua Avenue to Saratoga Road would be eliminated and right turns would be made from the curb lane. Also, one through lane on the Saratoga Road approach would be eliminated to reduce the pedestrian crossing distance and time.

Plan 3: The Lewers Intersection Widening Plan - Similar to Plan 2 in that Kalakaua Avenue would have four lanes within the project limits, it provides for five lanes at the Lewers Street intersection.

Plan 4: The Basic Four-Lane Plan - Lewers would be converted to one-way makai-bound between Kuhio Avenue and Kalakaua Avenue. To accommodate the higher volume of left turns which would be made at Seaside Avenue, two left turn lanes and three through lanes would be created. The makai-bound lanes on Kaiulani Avenue would be eliminated to make it one-way mauka-bound, and one left turn lane and three through lanes would be provided on the Kalakaua Avenue approach. Uluniu Street would be converted from one-way makai-bound to two-way traffic between Kuhio Avenue and Kalakaua Avenue.

Plan 5: The Modified Four-Lane Plan - To alleviate the traffic impact which makai-bound traffic on Lewers Street would have on Kalia Road if Plan 4 were adopted, the plans for the Lewers Street intersection were reversed by removing the crosswalk on the northwest approach of Kalakaua Avenue to facilitate turning movements on the red phase. The remainder of Kalakaua Avenue would be as described for Plan 4, providing four lanes along Kalakaua except for five lanes at Seaside Avenue.

Testing in Anticipation of Future Conditions

In order to determine what impact anticipated future demands would have on the alternatives, a "futures analysis" was conducted. Current traffic volumes along the entire street network were increased in 5 percent increments from 105 to 115 percent of current volumes using the flow multiplier feature of the TRANSYT model.

System wide increases were used because information on specific new projects were unavailable and location-specific traffic forecasts could not be made. At each of the three traffic levels, the model was run for 80- to 120-second cycle lengths in 10-second increments. The output statistics at the systemwide and individual intersection levels were compared to the statistics for the current traffic volume and existing configuration, at 80-second cycle length, to determine the minimum acceptable cycle length at each traffic volume level. This methodology was utilized in lieu of 5- and 10-year forecasts because traffic volumes have remained about the same on Kalakaua Avenue during the past 10 years.

ALTERNATIVES ANALYSIS FINDINGS

The TRANSYT-7F computer model was used to analyze the anticipated performance features of the proposed plans and compared them with existing conditions. The results, expressed in terms of delay time, fuel consumption, average speed and a "Performance Index," are presented by the table on the following page.

KALAKAUA AVENUE SAFETY AND BEAUTIFICATION PROJECT

Summary of TRANSYT Systemwide Measures

SIGNAL CYCLE AND MEASURES OF EFFECTIVENESS	ALTERNATIVE PLAN					
	Existing	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
80 SECOND						
Total Delay (veh. hrs.)	136	96	127	106	97	113
Fuel Consumption (gals.)	285	246	280	260	247	269
Average Speed (mph)	10.8	12.7	11.2	12.2	12.6	11.8
Performance Index	149	111	144	125	113	132
90 SECOND						
Total Delay (veh. hrs.)	123	96	102	115	110	109
Fuel Consumption (gals.)	272	245	252	267	258	261
Average Speed (mph)	11.3	12.7	12.4	11.7	11.9	12.0
Performance Index	136	110	116	131	124	125

Plan 1 - This original plan which proposed three lanes along most of Kalakaua Avenue had the highest performance relative to the other alternatives studies. When compared to existing conditions, vehicle delay would decrease by 29 percent, fuel consumption would decrease by 14 percent, and average speed would increase by 18 percent. It was determined that the large decrease in the minimum pedestrian crossing time permitted by the reduction in the curb-to-curb distance was largely responsible for this result.

Plan 2 - This plan would result in only modest improvements over existing conditions, reducing vehicle delay by 7 percent, fuel consumption by 2 percent, and increasing speed by only 6 percent.

Plan 3 - The model predicts that this plan would reduce vehicle delay by about 22 percent, decrease fuel consumption by about 9 percent, and increase travel speed by 13 percent. There would be significant reductions in vehicle delay at a number of key intersections.

Plan 4 - This plan would effect a substantial 29 percent decrease in vehicle delay which is similar to the Sidewalks Simulation Plan. Some of this reduction can be attributed to the diversion of vehicles which formerly made left turns at Lewers Street from Kalakaua Avenue to Kuhio Avenue. Average travel speed would increase by 16 percent and fuel consumption would decrease by about 13 percent.

Plan 5 - This plan was developed in response to criticisms of Plans 3 and 4. While exhibiting fewer advantages for Kalakaua Avenue than the original plans, Plan 5 still yielded significant improvements: vehicle delay would decrease by 17 percent, fuel consumption would decrease by 5 percent, and average speed would increase by 9 percent.

Summary of Alternatives Comparison - The computer model results indicate that each of the proposed alternatives would improve peak hour traffic performance on Kalakaua Avenue. Based on the reduction in vehicle delay, the following ranking of projects are shown assuming an 80-second traffic signal cycle length:

Ranking	Plan
#1 (tie)	Plan 1: The Three-Lane Plan = 30% reduction
	Plan 4: The Basic Four-Lane Plan = 30% reduction
#3	Plan 3: The Lewers Intersection Widening Plan = 22% reduction
#4	Plan 5: The Modified Four-Lane Plan = 17% reduction
#5	Plan 2: The Saratoga Widening Plan = 7% reduction

The study also showed that the traffic performance of the improvement plans could be plans improved by about 10 percent if the traffic signal cycle length is increased from 80 to 90 seconds. Because the added pedestrian wait could contribute to the already heavy jaywalking on Kalakaua, there are serious reservations about increasing the current cycle length.

Futures Analysis Findings

Existing conditions as well as the proposed plans were subjected to computerized 5%, 10% and 15% simulated traffic increases to analyze the effects of possible future demands. The results are shown in the table on the following page.

The existing traffic pattern could accommodate a 5% increase in traffic if the present 80-second traffic signal cycle length were increased to 90 seconds. A 10% traffic increase would require a 120-second cycle with the existing system. The existing network will be strained to accommodate a 15% traffic increase at an acceptable performance level without significant changes.

Each of the alternative improvement plans could accommodate a 5% traffic increase with the present 80-second traffic signal cycle length and a 10% traffic increase with a 90-second cycle. In order to handle a 15% increase, all these improvements would require a 120-second cycle length, and vehicle delays would increase about 10%.

Traffic Alternatives Conclusions

The competing Kalakaua Avenue traffic improvement plans being tested were posited without regard to engineering difficulty or fiscal restraint to insure full consideration of every possible alternative. In preparing a proposal for adoption, however, these more practical aspects considerably reduced the available options.

SUMMARY OF FUTURE ANALYSIS FOR ALTERNATIVE TRAFFIC PLANS

	Existing Configuration	Plan 1	Plan 3	Plan 4	Plan 5
100% of current traffic					
Minimum acceptable cycle (sec.)	80	80	80	80	80
Total delay (veh. hrs.)	136	96	106	97	113
Fuel consumption (gals.)	285	246	260	247	
Average speed (mph)	10.8	12.7	12.2	12.6	11.8
105% of current traffic					
Minimum acceptable cycle (sec.)	90	80	80	80	80
Total delay (veh. hrs.)	139	118	122	111	124
Fuel consumption (gals.)	297	276	280	269	285
Average speed (mph)	11.0	11.8	11.7	12.1	11.6
110% of current traffic					
Minimum acceptable cycle (sec.)	120	90	90	90	90
Total delay (veh. hrs.)	146	141	131	138	125
Fuel consumption (gals.)	305	303	297	299	288
Average speed (mph)	10.9	11.1	11.5	11.2	11.8
115% of current traffic	All cycles have unacceptable performance relative to existing traffic conditions.				
Minimum acceptable cycle (sec.)		120	120	120	120
Total delay (veh. hrs.)		143	150	152	156
Fuel consumption (gals.)		306	316	313	319
Average speed (mph)		11.3	11.0	10.9	10.8

The top two ranked alternatives, the Sidewalks Simulation Plan 1 and Plan 3, require five lanes on Kalakaua Avenue at the Lewers Street intersection. This would require acquisition of adjoining property in an area with some of the highest property values in the world.

Plan 4 would require changing the direction of travel on Lewers Street between Kalakaua Avenue and Kuhio Avenue to a mauka direction, a configuration which severely disrupted traffic on Kalia Road in the mid-1970s when it was last attempted.

Conclusion:

Accordingly, of the four alternatives which show the greatest potential for reducing traffic delay, Plan 5 with four through lanes was selected as the most feasible at this time.

KALAKAUA AVENUE IMPROVEMENT PLAN

The computer studies confirmed that in its present configuration, Kalakaua Avenue cannot accommodate even modest increases in pedestrian and vehicular traffic. Peak visitor seasons and special events bring intolerable delays today, conditions which could become a permanent feature of Waikiki without improvements to the Kalakaua Avenue corridor.

The City and County of Honolulu's Department of Transportation Services has developed a plan which would significantly improve the carrying capacity of Kalakaua Avenue while enhancing its visual appeal as well. The plan incorporates engineering feasibility and fiscal restraint in its design while also satisfying technical requirements and community concerns.

- The Improvement Plan would retain the existing four lanes of through traffic on Kalakaua Avenue between the project boundaries of Ala Moana Boulevard and Kapahulu Avenue. The three left lanes would each be 11 feet wide and the fourth right lane would be 14 feet wide to accommodate buses.

- The Saratoga Road/Kalaimoku Street intersection would be redesigned. The right turn lane from Saratoga Road onto Kalakaua Avenue would be widened to two lanes. The existing traffic island next to Fort DeRussy would be eliminated and right turns from Kalakaua Avenue would be made from the curb lane.

- The crosswalk on the Ewa side approach of the Lewers Street intersection would be removed to increase the capacity of the turning lanes on Kalakaua Avenue. The makai side on Lewers Street would be restriped to one lane in the mauka direction and two lanes in the makai direction.

- The Kalakaua Avenue approach at Seaside Avenue would be widened to five lanes. Two left turn lanes would be provided with optional through movement from the second lane. There would be three through lanes.

- The makai-bound lanes of Kaiulani Avenue would be eliminated to make it a two-lane, one-way mauka-bound street between Kalakaua Avenue and Koa Avenue. The Kalakaua Avenue approach would have three through and one left turn lane.

- Uluniu Avenue would be converted from one-way makai-bound to two-way between Kuhio Avenue and Kalakaua Avenue. The Kalakaua Avenue approach would have three through lanes and one left turn/through lane.

- The space saved by narrowing the traffic lanes on Kalakaua Avenue would be used for one of several purposes:

  1. The space would be used for widened and newly tiled sidewalks; and

  2. Truck delivery and bus loading bays would be constructed to eliminate their need to park in the through traffic lanes of Kalakaua Avenue and obstruct traffic as they do now.

- Sidewalk space available to pedestrian use would be maximized by reducing competing demands. Newsstands would be concentrated in centralized kiosks, street furniture would be streamlined, and other physical obstructions would be minimized, etc.

- Barnes Dance pedestrian crossings, which permit people to move diagonally across intersections, would be instituted at Seaside Avenue, Paoakalani Avenue, and Kaiulani Avenue to reduce conflicts with autos executing turning movements.

- New larger street signs which are easier to read and mounted higher on poles are part of the plan to speed motorists along Kalakaua.

- New contemporary traffic signal and street lights would be installed.

- Existing street surfaces would be removed and replaced, and new curbs added to improve drainage.

- Finally, the three existing mid-block crosswalks on Kalakaua within the project area would be widened and the Gateway Park crosswalk would be signalized to improve the safety of pedestrians.

- Extensive landscaping and shade trees would be planted along the curb and in parks and would be illuminated at night.

SIMULATION OF THE IMPROVEMENT PLAN

To test the feasibility and efficacy of the proposed improvement plan, a number of simulation tests and studies were conducted by the City. This included actual physical alterations which were analyzed by time-lapse photography, on-site inspections, photographic recording, traffic counts and meetings with affected property owners and merchants and bus and delivery truck operators. This information was continually fed back into the computer modeling process and where necessary further alterations or refinements were made.

Computer Simulation

Computer simulation of the improvement plan was chosen for several reasons:

1. It permits evaluation of the alternative strategies without having to conduct field experimentations which are costly, may be disruptive to the very traffic movements being tested, are somewhat dangerous, and may not be an accurate test.

2. It permits the analysis of the roadway as a system rather than individual intersections, as with traditional analysis techniques. It shows the interrelated impacts of individual improvements as well as the cumulative impacts of improvements at adjoining intersections.

3. It permits the efficient testing of many alternatives under conditions of experimental control.

The results of the simulation conducted using the TRANSYT-7F computer model are discussed on the following pages. The comparative data illustrate the superiority of the proposed plan (Plan 5) over the present situation. The plan would decrease the current vehicle delay by 17%, decrease fuel consumption by 5% and increase average speed by 9%. It would yield significant reductions in vehicle delay at the following intersections:

1. At Kalaimoku Street/Saratoga Road, vehicle delay would decrease from 16 to 9 vehicle hours. The green time on the through lanes can be increased because the green time for the Saratoga Road right turn lane can be reduced due to the higher capacity provided the latter approach.

2. At Lewers Street, vehicle delay would decrease from 24 to 8 vehicle hours due to delay reductions in the two turning lanes.

3. At the Kaiulani Avenue and Uluniu Avenue intersections, the sum of vehicle delays for the two intersections would be reduced from 17 to 6 vehicle hours. The primary reason is the elimination of the makai-bound traffic, introduction of Barnes Dance crossings, and an increase in the left turn lane capacity at Kaiulani Avenue.

Comparative analysis, discussed in detail in an earlier chapter, shows that while other plans may exhibit higher performance than the option selected, these other plans are far costlier, making the chosen Plan 5 the most practical and cost/effective of the workable alternatives.

Physical Simulation

Actual testing on the streets of Kalakaua Avenue of many of the computer tested improvements were conducted to empirically verify the theoretical predictions. These in turn were fed back into the model for further analysis. The following describes the numerous physical on-site simulations tested, and subsequently when proved workable were incorporated into the Plan.

1. Traffic Islands. To simulate the four-lane-widened sidewalk concept, City traffic engineers channeled traffic to four lanes on Kalakaua. A fifth lane from Kaiulani to Kapahulu Avenues in this area, formerly used as a contra-flow bus lane, has been painted as a traffic island, and in some cases, an asphalt berm constructed. This experiment is ideal to test the simulation of widened sidewalks as the fifth, unused lane is approximately the width of the proposed sidewalk widening. Other channelization experiments are scattered throughout the other half of Kalakaua Avenue. Painted traffic islands near intersections, such as on the Ewa corners at Lewers, are successfully diverting traffic into the four-lane configuration being tested. Test results show that the narrowed lanes do not impede the traffic flow while the widened sidewalks considerably increase pedestrian capacity.

2. Traffic Rerouting. As suggested by the computer model, the makai-bound lanes on Kaiulani Avenue were eliminated between Kalakaua Avenue and Koa Avenue. The change eliminates left turns by makai-bound motorists seeking to go Koko Head on Kalakaua Avenue, thus obviating the need for that phase in the traffic signal cycle. Traffic islands, delivery bays and temporary sidewalks at the corners were constructed in the now unused lanes, narrowing the street width which must be crossed by pedestrians and reducing the crossing time. By changing the traffic flow, a Barnes Dance crossing system was made possible. Time-lapse photography shows that pedestrians are able to move quickly in all directions on one phase of the traffic signals, and vehicles move in a mauka and Koko Head direction on the second signal phase. Street modifications needed to simulate this intersection change have been accomplished by painting islands, coning, installing planters on the islands, inaugurating the Barnes Dance, correcting the traffic signals and redirecting the traffic flow. Preliminary evaluations indicate the change has made significant improvements to the auto and pedestrian traffic movements in the area.

3. Barnes Dance. The "Barnes Dance" system allows pedestrians to cross in all directions at an intersection at the same time. A Barnes Dance was instituted on Kalakaua and Seaside in September. Visual field inspections and time lapse photography were used to evaluate the pedestrian movements, and the effectiveness of the change was confirmed. Because of the results from this first test, Barnes Dance movements have also been instituted at Kalakaua's intersections with Paoakalani and Kaiulani Avenues with similar favorable results.

4. Consolidation of Newsstands. In twenty years, the number of newsstands on Kalakaua Avenue have proliferated from 5 to nearly 700. Applications for another 100 are pending. The great number of stands often created mazes on the sidewalks through which pedestrians had to thread their way. The plan would consolidate these stands into several kiosks at which the various publications would be grouped out of the way of pedestrian traffic. To simulate the effect of newsstand consolidation, the City first removed all illegal and nonconforming newsstands from the sidewalks. The remaining legal stands were then grouped in areas to minimize their impediment to pedestrian traffic. Field inspection has confirmed the eased pedestrian flow, the minimizing of the stands' safety hazard, and the pleasing visual effect of the changes. Two kiosks were actually constructed by several publishers, each providing space for six visitor publications. These kiosks were installed for use and observation at the Diamond Head-makai corner of Seaside and Kalakaua on a trial basis.

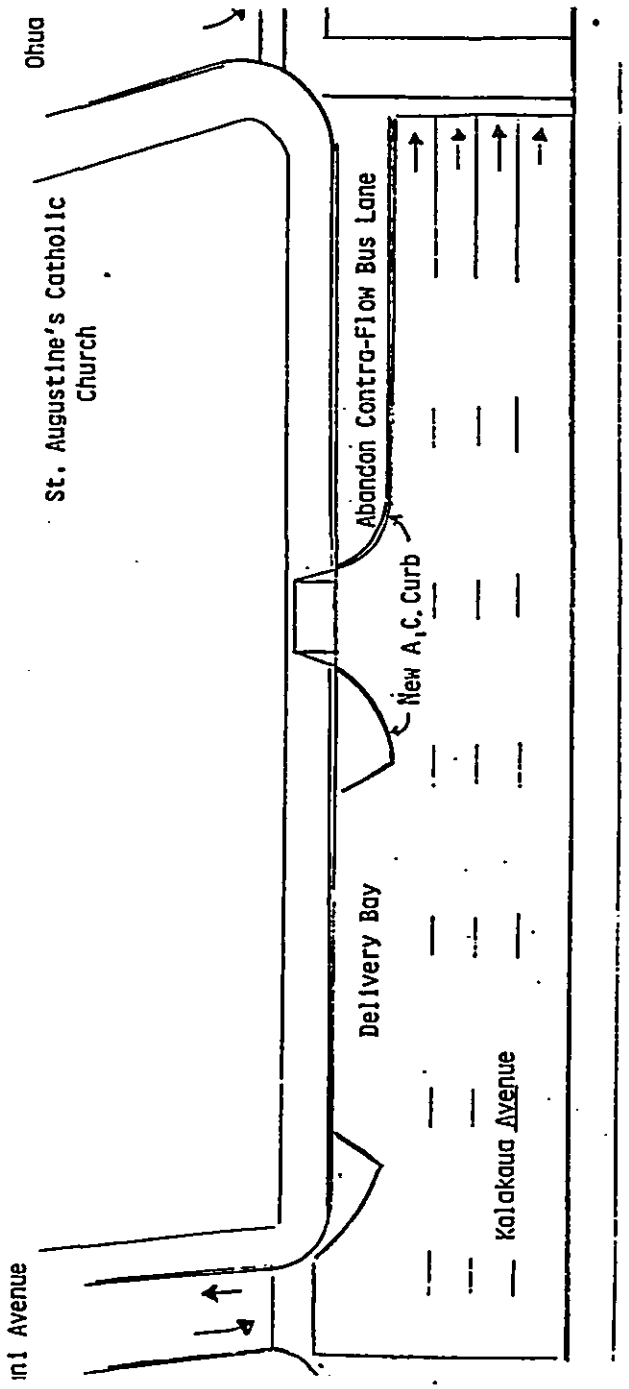
5. Improved Street Name Signs. Larger, easier to read street signs have been erected on Kalakaua Avenue to serve as a convenience to motorists and to speed their progress. With the one-way system in Waikiki, motorists who miss seeing a street sign must circle the area before once again approaching the desired street. These temporary blue signs are located 14 feet above the street level and have and are helping motorists reach their destinations with increased ease.

6. Improved Mid-Block Crosswalks. To simulate the proposed plan, the Gateway Park mid-block crosswalk was widened to 20 feet and two, 12-inch lines painted on its borders. To further improve visibility, three four-inch crosshatch lines, separated by two inches, were painted every two feet, four inches along the entire length of the crosswalk. The mid-block crosswalk at the Beachcomber/Liberty House area was kept at its present 20-foot width but painted with the double-striped edging and the crosswalk striping. The crosswalk fronting the International Market Place was increased in width from 20 to 35 feet and repainted in the new motify. Observations of

test simulating more elborate markings for the crosswalks have been very favorable. The additional width has allowed pedestrians to remain in the crosswalks and to cross Kalakaua Avenue in less time. Motorists have indicated that these crosswalks are much more visible.

7. Corner Crosswalks. Crosswalks at Kalakaua intersections had been painted to standard 10-foot widths. Because of the extremely high pedestrian volume there, the painted lines channeled sidewalk users into long queues crossing the streets. New crosswalks have been painted to 15-foot widths as a demonstration. With broader fronts, pedestrian queues have been shortened, required traffic signal time for pedestrians reduced, and the overall sidewalk capacity increased.

8. Delivery Bays. Many commercial activities fronting on Kalakaua Avenue have no private delivery areas. Delivery vehicles are consequently forced to park illegally on Kalakaua to service these establishments. To eliminate this obstruction to traffic, delivery bays would be created periodically along Kalakaua by reserving some of the space which would have been devoted to sidewalks. To simulate the operation of such delivery areas, a loading bay was constructed on Kalakaua between Kealohilani Avenue and Ohua Avenue on Kalakaua in the space formerly used as a counter-flow bus lane. Asphalt berms, potted plants, and



painted markings were used to simulate the bay, a schematic plan of which is found on the following page. This test demonstrates (1) the continued smooth flow of traffic on four, reduced-width lanes on Kalakaua and (2) the efficacy of using the saved space for delivery areas.

9. Setback Areas. The intrusion of commercial activities onto sidewalk areas in violation of City ordinances was a common occurrence on Kalakaua. In order to return sidewalk space to rightful pedestrian use, all nonconforming commercial obstacles were ordered removed and persistent violators forfeited their equipoment to confiscation. The improved effectiveness of the sidewalks is obvious.

FINDINGS AND CONCLUSIONS

- Visual inspection, photographic, and technical analysis confirm the need for immediate improvements to Kalakaua Avenue to increase pedestrian and vehicular traffic capacities and to eliminate where possible hazards to safety, health, and convenience.

- Computerized models, which now permit the evaluation of complex traffic configurations and conditions, predict the superiority of several possible improvement plans over the existing conditions.

- Of those plans, the TRANSYT-7F computer model identified as being most effective, Plan 5: The Modified Four-Lane Plan, which exhibits engineering feasibility, fiscal restraint, and sensitivity to community concerns.

- TRANSYT-7F simulation of the selected option reveals that the plan could remain efficiently operational under future increased demands of up to 15%.

- Physical simulation of the plan, which included the construction of traffic islands to simulate a four-lane thoroughfare with delivery and bus loading bays, widened sidewalks, rerouting of traffic onto side street, instituting Barnes Dance pedestrian crossings, the consolidation of newsstands, improvements to street name signs and improved mid-block crosswalk markings, confirms the efficacy of the plan in terms of moving people and goods.

- Studies and simulations conducted by the City and County of Honolulu have more than fulfilled the requirement set forth by Section 83A of Act 284, SLH 1984.

- State funds appropriated for the Department of Planning and Economic Development (PED 113) for the Waikiki Improvement project by Act 284 should now be released to the City and County of Honolulu for proceeding with the final engineering and construction of the proposed plan.

APPENDIX C

KALAKAUA AVENUE LAND USE INVENTORY

Name of Activity	Location of Enterprise: Mauka(01)/ Makai (02)	Street Number	Floor	Stn Numbers From	Stn Numbers To	Frontage (lin ft)	Type of Use	Type of Struct	Openness	Kal Access: Ped	Kal Access: Veh	Activ Level
Waikiki Gateway Park	1		1	321	606	285	7	4	5	3	3	3
Waikiki Gateway Hotel	1	2070	3	606	706	100	3	3	1	3	3	3
Nick's Fishmarket	1	2070	1	662	672	10	5	3	1	3	2	3
OLOHANA STREET	1		1	706	768	62	8	9	9	9	9	2
Aoki's Mini Mart	1	2080	1	768	799	31	4	2	2	1	1	3
Lawrence Hata Photo & Gifts	1	2082	1	799	837	38	4	2	2	1	1	3
Aoki/Hata Driveway	1		1	837	872	35	8	9	9	9	9	3
The MacNuttery	1		1	872	947	75	4	1	3	1	3	2
KALAIMOKU STREET	1		1	947	1044	97	8	9	9	9	9	2
Canlis Broiler	1	2100	1	1044	1111	67	5	4	1	3	3	3
Popo's Mexican Restaurant	1	2112	1	1111	1184	73	5	2	2	1	3	2
South Seas Village Restaurant	1	2122	1	1184	1248	64	5	1	3	2	3	2
South Seas Parking Driveway	1		1	1248	1264	16	8	9	9	9	9	3
Spaghetti Eddie's Restaurant	1	2122	1	1264	1317	53	5	4	2	2	1	2
Future Frozen Yoghurt	1	2126	1	1317	1357	40	5	2	3	1	3	3
Zorro's New York Pizza	1	2128	1	1357	1378	21	5	2	3	2	3	2
Sidewalk Arcade	1		1	1377	1408	31	4	4	5	2	1	3
Iguasu Botique	1	2130	1	1408	1478	70	4	1	2	1	3	2
Optique Paris Miki	1	2134	1	1478	1493	15	4	4	1	1	3	3
Magnum	1	2135	1	1508	1538	30	9	4	1	1	3	3
Arby's	1	2138	1	1538	1565	27	5	1	3	1	3	2
ABC Store (DH of Arby's)	1	2140	1	1565	1606	41	4	2	2	1	3	3
Kiku's Bar	1	2150	1	1606	1614	8	6	4	1	1	3	3
Sandpiper Men's Shop	1		1	1606	1646	40	4	3	2	1	3	3
National Car Rental	1	2152	1	1614	1621	7	9	1	4	1	1	3
Luau Sportswear	1	2154	1	1621	1637	16	4	4	2	1	3	3
Pizza Hut	1	2156	1	1637	1646	9	5	3	3	1	3	2
Town & Country Surf Shop	1		1	1646	1663	17	4	3	3	1	3	3
Construction	1	2146	1	1646	1732	86	9	2	2	1	3	3
Screening Room Adult Bookstore	1		1	1663	1680	17	9	2	1	1	3	3
Adult Books	1	2164	1	1680	1689	9	4	3	1	1	3	3
Un-named Japanese Retail	1		1	1689	1704	15	4	2	2	1	3	3
Gift Warehouse	1		1	1704	1723	19	4	2	2	1	3	3
Monkey Pod Tree	1	2170	2	1723	1728	5	4	4	2	1	3	3
J's Beauty Salon	1		1	1728	1734	6	9	2	1	1	3	3
Alley to parking	1		1	1734	1796	62	8	4	5	2	3	3
Waikiki Bazar	1		2	1796	1802	6	4	1	3	2	3	2
Stairway Access to 2nd Floor	1	2184	1	1802	1835	33	9	4	3	1	3	3
Cherry Blossom, Inc.	1		1	1835	1867	32	4	4	2	1	3	3
Burger King	1		1	1867	1924	57	5	1	3	3	3	2
LEWERS STREET	1	2200	1	1924	1948	24	8	9	9	9	9	1
Macadamia Nut Factory	1	2202	1	1948	1961	13	4	2	2	2	3	3
Crazy Shirts	1		2	1961	1971	10	4	2	2	1	3	3
Door to Upper Floors	1		1	1971	2031	60	9	2	1	1	3	3
Macdonalds	1	2222	1	2031	2078	47	5	2	3	1	3	2
Bank of Hawaii	1	2222	1	2078	2095	17	9	3	1	1	3	2
Access, Bank of Hawaii Bldg	1		1	2095	2165	70	9	3	3	2	3	2
Woolworth's	1		1	2165	2208	43	4	3	1	2	3	2
Woolworth's Restaurant	1		1	2208	2268	60	5	3	2	2	3	2
ROYAL HAWAIIAN AVENUE	1		1	2268	2310	42	8	9	9	9	9	1
Waikiki A-1 Superette							4	2	3	2	3	2

Note: See Key to Land Use Survey, page C-5

Name of Activity	Location of Enterprise: Mauka(01)/ Makai (02)	Street Number	Floor	Stn Numbers: From	To	Frontage (lin ft)	Type of Use	Type of Struct	Open-ness	Kal Access: Ped	Veh	Activ Level
Center Art Galleries Hawaii Inc.	1	2232	1	2310	2328	18	9	2	3	1	3	2
Things From Hawaii	1	2234	1	2328	2350	22	4	2	3	1	3	2
Shirt Shop	1		1	2350	2365	15	4	2	3	1	3	3
Waikiki Medical Bldg	1		2	2365	2370	5	9	2	1	1	3	3
Crow's Nest	1	2244	2	2370	2375	5	6	2	1	1	3	2
Jolly Roger Restaurant	1	2244	1	2375	2396	21	5	2	3	1	3	2
Jolly Roger Alley	1		1	2396	2403	7	9	4	5	1	3	3
Waikiki Shopping Plaza Entry	1		1	2403	2482	79	4	3	5	2	2	2
Hawaii Discount Mart	1		1	2482	2533	51	4	3	3	2	3	2
SEASIDE	1		1	2533	2593	60	8	9	9	9	9	1
First Interstate Bank	1		1	2593	2606	13	9	3	1	2	3	3
Water Fountain	1		1	2606	2620	14	9	4	5	1	3	3
Hawaiian Air	1		1	2620	2639	19	9	3	1	2	3	3
Pioneer Federal Savings & Loan	1	2270	2	2639	2645	6	9	3	1	2	3	3
Top of Waikiki	1	2270	2	2645	2660	15	5	3	1	2	3	2
Japan Airlines	1		1	2660	2680	20	9	3	1	2	3	3
The Family Resort Shop	1		1	2680	2720	40	4	3	3	2	3	2
Parking Access	1		1	2720	2725	5	9	4	5	2	2	3
Retail Stalls	1		1	2725	2737	12	4	1	5	2	2	3
ABC Discount Store	1	2284	1	2737	2794	57	4	2	3	1	3	2
Waikiki Theater 3	1	2284	1	2794	2831	37	9	2	1	1	3	3
Hilo Hattie's Resort Shop	1	2284	1	2831	2844	13	4	2	3	2	3	3
Duke's Lane	1		1	2844	2867	23	4	9	9	3	1	2
Beachcomber Hotel Entry	1		1	2867	2912	45	3	3	3	2	1	2
United Airlines Ticket Office	1		1	2912	2934	22	9	3	1	2	3	3
Liberty House	1		1	2934	3129	195	4	3	1	1	3	2
International Market Place	1		1	3129	3318	189	4	1	4	3	3	1
Crazy Shirts @ Int'l Mrktplc	1		1	3318	3352	34	4	1	3	2	3	2
ABC Store @ Int'l Mrktplc	1		1	3352	3401	49	4	2	3	1	3	2
Mid-Pacific Airlines	1		1	3401	3420	19	9	4	1	1	3	3
Hagen Daz	1		1	3420	3451	31	5	4	2	1	3	2
Yokohama Okadaya	1	2346	1	3451	3472	21	4	4	2	1	3	3
Alleyway to Princess K. Hotel	1		1	3472	3476	4	8	4	5	2	3	3
Island Camera & Gift Shops	1		1	3476	3496	20	4	4	2	1	3	3
Korean Air	1		1	3496	3515	19	9	4	1	1	3	3
United Rent-a-Car	1	2352	1	3515	3534	19	9	4	3	1	3	3
Casa Bella	1	2352	1	3534	3553	19	4	4	2	1	3	2
Princess Kaiulani Hotel Entr	1		1	3553	3600	47	3	4	5	2	3	3
Le Cadeau	1	2354	1	3600	3616	16	4	4	2	1	3	3
Andrade	1	2356	1	3616	3627	11	4	4	2	1	3	2
Calabash House	1	2358	1	3627	3639	12	4	4	2	1	3	2
Northwest Orient	1	2360	1	3639	3648	9	9	4	1	1	3	3
Hawaii Fashions	1	2368	1	3648	3659	11	4	4	3	1	3	3
Minute Chef	1	2368	1	3659	3695	36	5	4	1	1	3	2
KAIULANI	1		1	3695	3757	62	8	9	9	9	9	2
Products of Hawaii Too	1	2424	1	3757	3823	66	4	3	3	1	3	2
Hyatt Entrance,Ewa	1	2424	1	3823	3874	51	4	3	3	1	3	3
Spats	1	2424	3	3874	3882	8	5	3	1	1	3	3
Hertz	1	2424	1	3882	3898	16	9	3	2	1	3	3
Budget Car Rental	1	2424	1	3898	3945	47	9	3	2	1	3	3
K & K International	1	2424	1	3945	3995	50	4	3	2	1	3	3

Note: See Key to Land Use Survey, page C-5

Name of Activity	Location of Enterprise: Mauka(01)/ Makai (02)	Street Number	Floor	Stn Numbers: From	To	Frontage (lin ft)	Type of Use	Type of Struct	Open-ness	Kal Access: Ped	Veh	Activ Level
Central Pacific Bank	1	2424	1	3995	4050	55	9	3	1	1	3	3
Yokohama Okadaya @ Hyatt	1	2424	1	4050	4075	25	4	3	3	1	3	3
Crazy Shirts @ Hyatt	1	2424	1	4075	4082	7	4	3	2	1	3	3
Gucci (D.H. Hyatt)	1		1	4082	4152	70	4	3	1	1	3	3
Hyatt D.H. Walkway/Entrance	1		1	4152	4189	37	3	3	5	1	3	3
Furusato Tokyo Steak	1		3	4189	4200	11	5	3	1	1	3	3
Furusato Sushi	1		1	4200	4226	26	5	3	1	1	3	3
ABC Store (D.H. Hyatt)	1	2424	1	4226	4262	36	4	3	1	2	3	2
ULUNIU AVENUE	1		1	4262	4323	61	8	4	5	9	9	2
Macadamia Nut Facory	1		1	4323	4344	21	4	3	1	1	3	3
Queen's Corner	1		1	4344	4380	36	4	3	1	1	3	2
Jack in the Box	1		1	4380	4426	46	5	3	1	1	3	1
Waikiki Surfside Hotel Rooms	1	2452	2	4426	4475	49	3	3	1	1	3	3
Waikiki Surfside Curio Shop	1	2450	1	4426	4443	17	4	3	1	1	3	3
Waikiki Surfside Hotel Entrance	1	2452	1	4443	4451	8	3	3	1	1	3	3
Waikiki Surfside Hotel Pearls	1	2452	1	4451	4475	24	4	3	4	1	3	3
ABC Store (DH of W. Surfside)	1	2456	1	4475	4520	45	4	3	1	1	3	2
Waikiki Circle Hotel Rooms	1	2464	2	4520	4615	95	3	3	2	1	1	2
Waikiki Circle Hotel Restaurant	1		1	4520	4585	65	5	2	1	2	3	2
Waikiki Circle Hotel Entr.Drives	1	2464	1	4585	4616	31	8	4	5	9	1	1
Waikiki Cir.Hotel-retail stalls	1	2464	1	4615	4620	5	4	1	5	1	3	3
Waikiki Beach Tower-Ped.Entr.	1	2470	1	4620	4636	16	2	3	1	3	3	3
Waikiki Beach Tower Sales Off.	1	2470	1	4636	4667	31	9	3	1	1	3	3
MacDonalds	1		1	4667	4688	21	5	3	1	2	3	2
LILIUOKALANI AVENUE	1		1	4688	4730	42	8	4	5	9	9	3
Tropical Rent-a-Car	1	1	1	4730	4745	15	4	1	4	3	3	3
Pacific Beach Hotel (Rooms)	1	2490	2	4730	4860	130	3	3	1	3	3	3
Snak & Go	1		1	4745	4756	11	5	3	2	1	3	2
Jewelry Corner	1	2492	1	4756	4768	12	4	3	1	1	3	2
ABC Store (Pac. Beach Hotel)	1		1	4768	4786	18	4	3	2	1	3	2
Kimura -- Retail	1		1	4786	4801	15	4	3	2	1	3	3
Pac. Beach Hotel Entrance	1	2490	1	4801	4817	16	3	3	1	3	3	1
Pac.Beach Retail (nameless)	1	2490	1	4817	4834	17	4	3	2	3	3	3
The Surf Restaurant	1	0	1	4834	4902	68	5	3	1	1	3	2
KEALOHILANI AVENUE	1		1	4902	4943	41	8	9	9	9	9	3
Furusato Japanese Restaurant	1		1	4943	4962	19	5	1	2	1	3	3
Shirt Shop	1		1	4962	4970	8	4	1	3	1	3	3
Baskin Robins Ice Cream	1		1	4970	4995	25	5	1	2	1	3	3
Fox Photo	1	2500	1	4995	5013	18	4	1	2	1	3	3
K & K	1		1	5013	5044	31	4	1	3	1	3	3
Things from Hawaii	1		1	5044	5075	31	4	1	3	1	3	3
St. Augustines Church Access	1		1	5075	5118	43	8	9	9	9	9	3
Garment Factory	1		2	5118	5123	5	4	2	1	1	3	3
ABC Store	1		1	5123	5168	45	4	2	2	1	3	3
Waikiki Sidewalk Cafe	1	2526	1	5168	5197	29	5	2	3	1	3	3
OHUA AVENUE	1		1	5197	5276	79	8	9	9	9	9	3
Island Tops	1		1	5276	5341	65	4	3	2	1	3	3
Mister K	1		1	5341	5371	30	4	3	3	1	3	3
Hawaiian Regent Entry	1	2552	1	5371	5410	39	3	3	5	3	3	3
The Summery Coffee House	1		1	5410	5540	130	5	3	3	1	3	3
PAOAKALANI AVENUE	1		1	5540	5614	74	8	9	9	9	9	3

Note: See Key to Land Use Survey, page C-5

Name of Activity	Location of Enterprise: Mauka(01)/ Makai (02)	Street Number	Floor	Stn Numbers From	Stn Numbers To	Frontage (lin ft)	Type of Use	Type of Struct	Open-ness	Kal Access: Ped	Kal Access: Veh	Activ Level
Entry--Captain's Table Restaurant	1		2	5614	5623	9	5	3	1	3	3	3
Aloha Fashions	1		1	5623	5635	12	4	3	3	1	3	3
Island Casuals	1		1	5635	5647	12	4	3	3	1	3	3
Holiday Inn Entry	1	2570	1	5647	5657	10	3	3	5	3	3	3
Sandwich Island	1		1	5657	5731	74	5	3	1	2	3	3
Surf Inn Snacks	1		1	5731	5751	20	5	3	2	1	3	3
Denny's	1		2	5751	5777	26	5	1	3	3	3	2
Watumull's	1		1	5777	5794	17	4	1	2	2	3	3
Haagen Daz	1		1	5794	5814	20	5	1	3	3	3	3
MacDonald's	1		1	5814	5827	13	5	1	3	3	3	2
KAPAHULU AVENUE	1		1	5827	5930	103	8	9	9	9	9	1
KUAMOO STREET	2		1	173	267	94	8	9	9	9	9	2
Texaco Gas Station	2		1	267	350	83	9	3	4	1	1	1
Waikiki Plaza Hotel Rooms	2	2045	2	350	467	117	3	3	1	2	1	2
Waikiki Plaza Hotel Access	2	2045	1	371	403	32	8	9	9	9	9	3
Wai.Plaza Hot.Parking Access	2	2045	1	447	467	20	8	9	9	9	9	3
Driveway to Bailey's	2		1	467	478	11	8	9	9	9	9	3
Bailey's Antique Clothing	2	2053	1	478	505	27	4	2	1	1	1	3
Covin's Camera Center	2	2053	1	505	539	34	4	2	1	1	1	3
Kyo-Ya Parking Driveway	2		1	539	578	39	8	9	9	9	9	3
Kyo-Ya	2	2057	1	578	635	57	5	2	1	1	1	3
Fort DeRussey (D.H. Frontage)	2		1	635	924	289	9	4	5	4	3	3
SARATOGA ROAD	2		1	924	1189	265	8	9	9	9	9	2
Miscellaneous Open Shops	2		1	1189	1300	111	4	2	3	1	3	3
Lollipop Lounge	2		1	1300	1330	30	6	2	1	1	3	3
T-Shirt Shop	2		1	1330	1338	8	4	2	3	1	3	2
Polynesian Plaza Entry	2		1	1338	1349	11	9	2	1	1	3	3
House of Soon	2	2133	1	1361	1371	10	4	2	1	1	3	3
California Photo Express	2		1	1371	1379	8	4	2	2	1	3	3
Sapporo Ramen	2		1	1379	1386	7	5	2	2	1	3	3
The Pub	2		1	1386	1396	10	6	4	1	1	3	3
BEACHWALK AVENUE	2		1	1396	1442	46	8	9	9	9	9	2
Park	2		1	1442	1639	197	7	4	5	3	3	2
Mitsukoshi Building	2		1	1639	1773	134	4	3	1	2	1	3
Parking access	2		1	1773	1800	27	8	9	9	9	9	3
First Hawaiian Bank	2	2181	1	1800	1893	93	9	3	1	3	3	3
LEWERS STREET	2		1	1893	1952	59	8	9	9	9	9	1
Royal Hawaiian Shopping Center	2		1	1952	2207	255	4	3	1	3	3	1
Royal Hawaiian Avenue	2		1	2207	2294	87	8	9	9	9	9	1
Royal Hawaiian Shopping Center	2		1	2294	3087	793	4	3	1	3	3	1
Delivery Drive	2		1	3087	3121	34	8	9	9	9	9	1
Beach Accessway	2		1	3121	3144	23	8	4	5	1	3	3
Rigger Restaurant	2		1	3144	3182	38	5	2	3	2	3	2
Patti's Gift & Jewelry	2	2131	1	3149	3161	12	4	2	1	1	3	3
Outrigger Arcade	2		1	3182	3201	19	9	1	2	2	3	2
Outrigger Photo	2		1	3201	3215	14	4	1	1	1	3	3
Outrigger Pharmacy	2		1	3215	3229	14	4	1	1	1	3	3
Wendy's	2		1	3229	3249	20	5	1	2	1	3	3
Sportswear Sample Shop	2		1	3249	3269	20	4	1	2	1	2	3
Outrigger Tees & Tops	2	2335	1	3269	3286	17	4	1	3	2	2	3
Outrigger Hotel Entry	2		1	3286	3298	12	9	4	5	1	1	2

Note: See Key to Land Use Survey, page C-5

Name of Activity	Location of Enterprise: Mauka(01)/ Makai (02)	Street Number	Floor	Stn Numbers From	Stn Numbers To	Frontage (lin ft)	Type of Use	Type of Struct	Openness	Kal Access: Ped	Kal Access: Veh	Activ Level
Surfrider parking/exit	2		1	3298	3348	50	8	9	9	9	9	3
Surfrider Hotel Entrance	2		1	3348	3376	28	3	3	3	1	1	2
Surfrider Golf Shop/Waikiki Pearl	2		1	3376	3414	38	4	3	2	1	3	3
Tahiti Imports (Surfrider)	2		1	3414	3432	18	4	3	2	1	3	2
Surfrider delivery/parking	2		1	3432	3455	23	8	9	9	9	9	3
Yamano Beauty Salon	2		1	3455	3498	43	9	2	1	1	3	3
Moana Hotel Vehicle Entry	2		1	3498	3533	35	8	9	9	9	9	3
Moana Hotel Entrance	2	2365	1	3533	3622	89	3	2	3	1	1	2
Moana Hotel Exit	2		1	3622	3659	37	8	9	9	9	9	3
Iris Optical	2		1	3659	3679	20	4	2	2	1	3	3
Otaheite shoppe	2		1	3679	3698	19	4	2	1	1	3	3
Loading area, Moana Hotel	2		1	3698	3716	18	8	9	9	9	9	3
Jalpak Pacifico	2	2369	1	3716	3744	28	9	3	1	1	3	3
Fox Photo	2	2371	1	3744	3755	11	9	3	1	1	3	3
Jade Palace	2	2373	1	3755	3777	22	4	3	1	1	3	3
Captain's Galley Restaurant	2		1	3777	3839	62	5	3	2	1	3	2
Hilo Hattie's Resort Shop	2	2377	1	3839	3857	18	4	3	1	1	3	2
Northshore Fudge	2	2379	1	3857	3871	14	4	3	1	1	3	3
Shellworld	2	2381	1	3871	3895	24	4	3	1	1	3	3
Kuhio Beach Park	2		1	3895	6053	2158	7	4	5	1	2	1

Key To Land Use Survey

STREET SIDE:
1 - Mauka
2 - Makai

FLOOR LEVEL:
1 - Street
2 - Second
3 - Basement

STATION NUMBERS: These represent the distance (in feet) east of the project limit near Ala Moana Boulevard.

TYPE OF USE:
1 - Single-family Residence
2 - Multi-family Residence
3 - Hotel
4 - Retail
5 - Restaurant
6 - Bar
7 - Park
8 - Driveway or Street
9 - Other

TYPE OF STRUCTURE:
1 - Wood Frame
2 - Concrete Block
3 - Concrete/Steel
4 - Other
9 - Driveway/Street

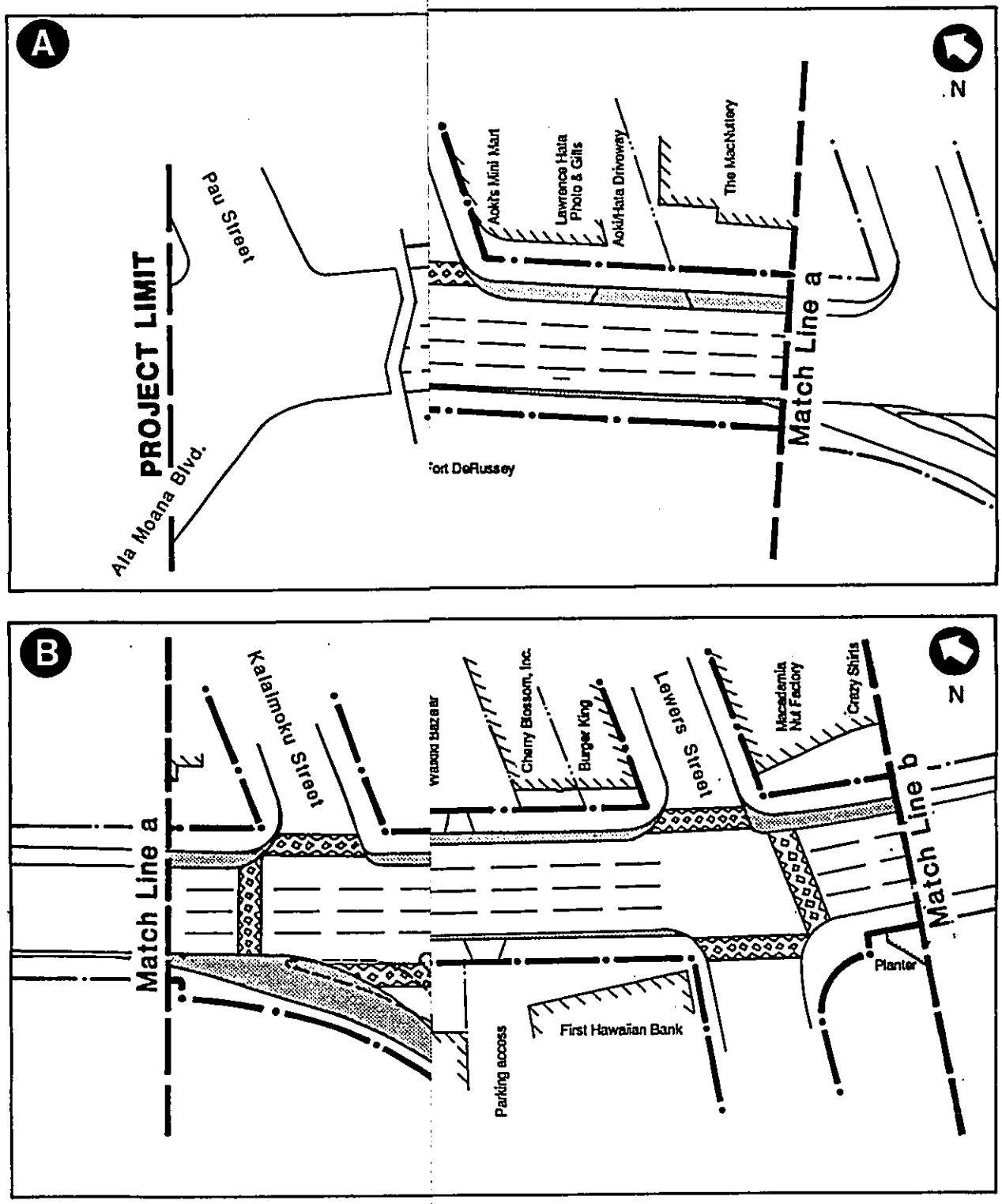
OPENNESS:
1 - All Enclosed
2 - Mostly Enclosed (75%)
3 - Partially Enclosed (25-75%)
4 - Minimally Enclosed (10-25%)
5 - Not Enclosed (0-9%)
9 - Driveway or Street

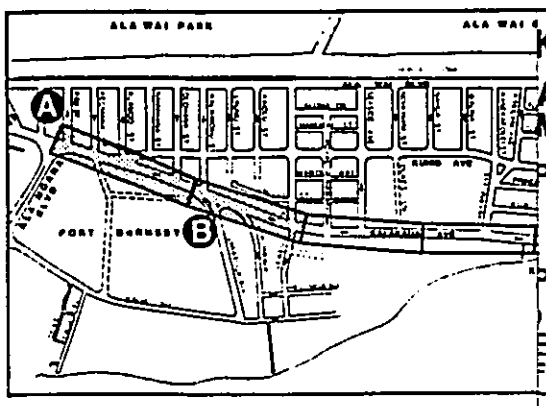
PEDESTRIAN ACCESS:
1 - Only from Kalakaua
2 - Principally Kalakaua
3 - Secondarily Kalakaua
4 - None from Kalakaua
9 - Driveway or Street

VEHICULAR ACCESS ACROSS SIDEWALK:
1 - All or Most
2 - Some
3 - None
9 - Driveway or Street

ACTIVITY LEVEL:
1 - High
2 - Medium
3 - Low

Source: Belt, Collins & Associates





KALAKAUA AVENUE SIDEWALKS

Ala Moana Boulevard to Monsarrat Avenue

Prepared for: DEPARTMENT OF TRANSPORTATION SERVICES
City and County of Honolulu

Prepared by: BELT, COLLINS & ASSOCIATES

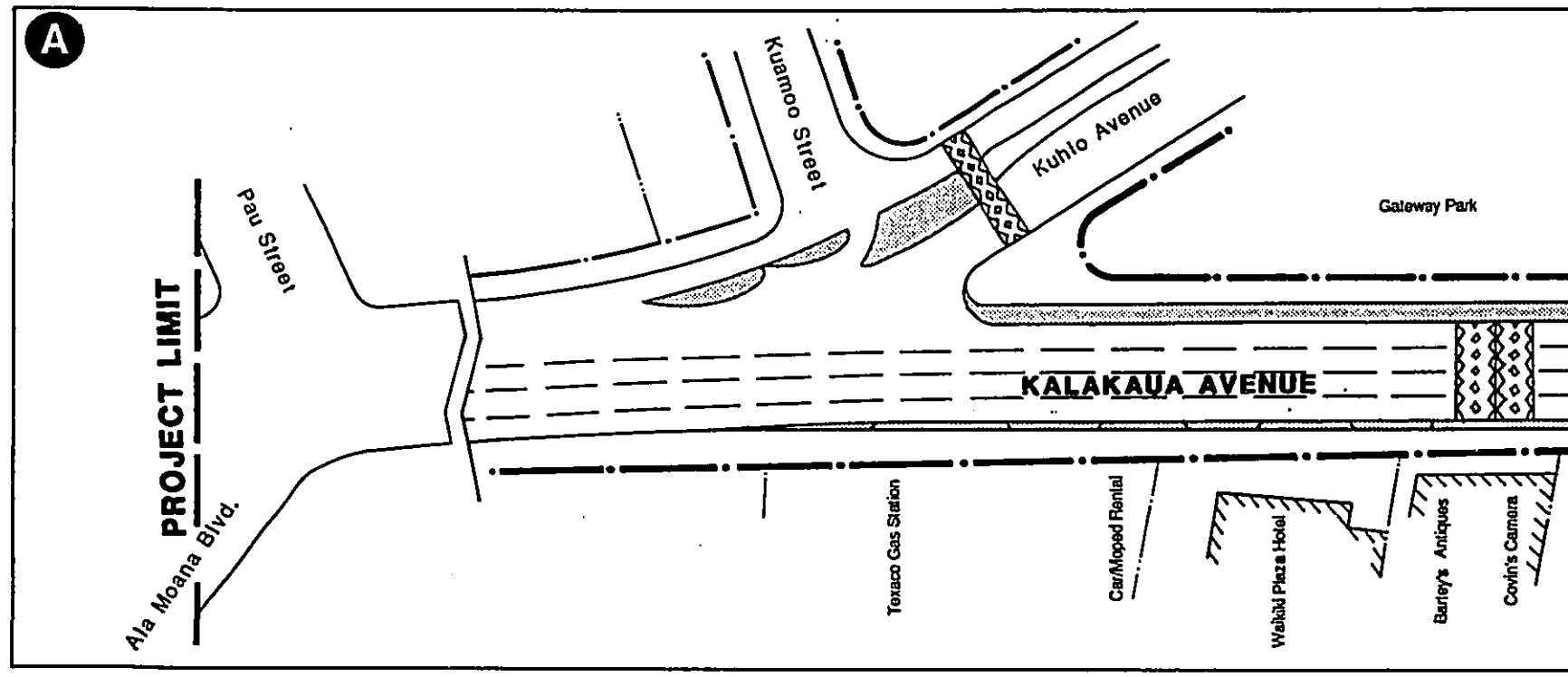
100 200

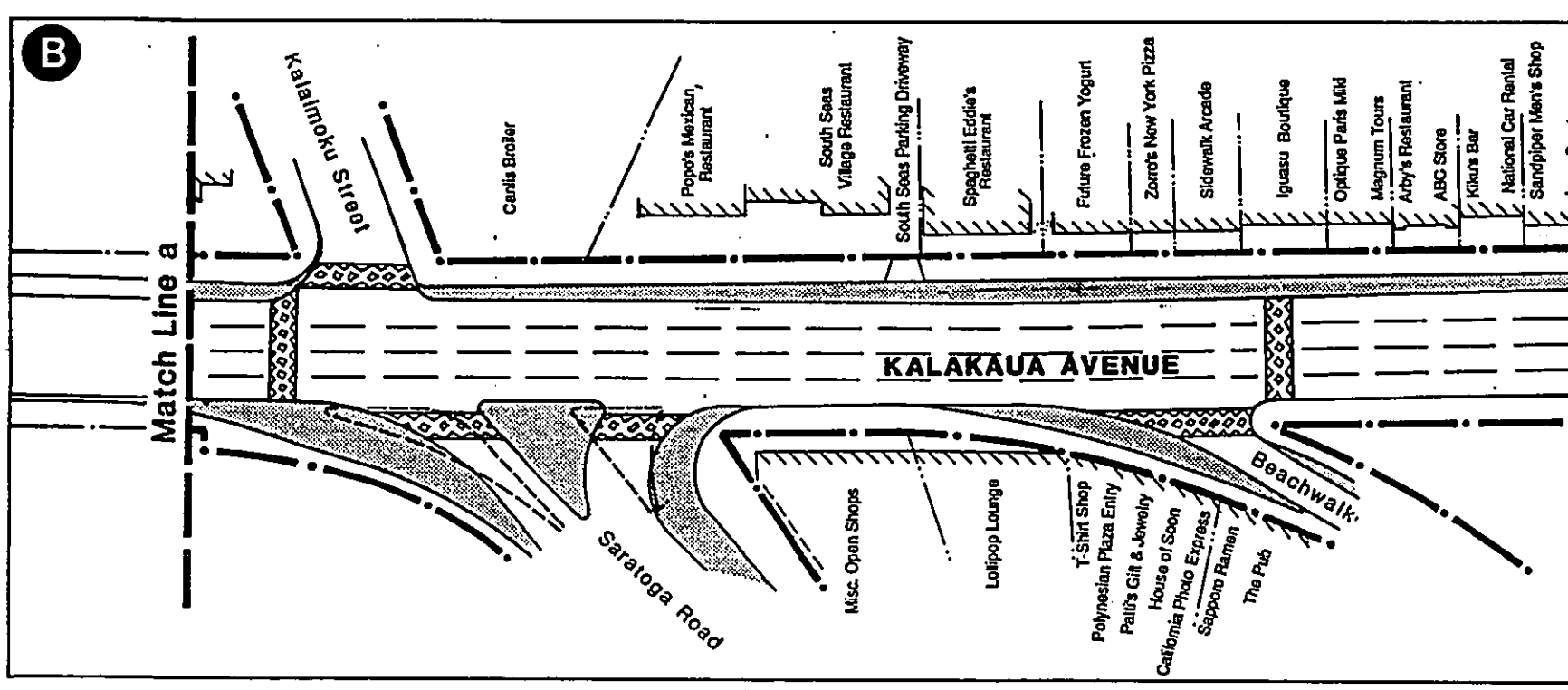
FEET

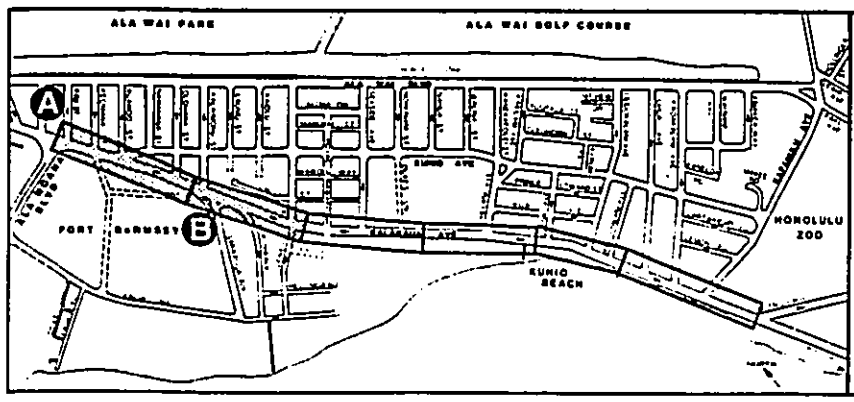
Appendix D-1

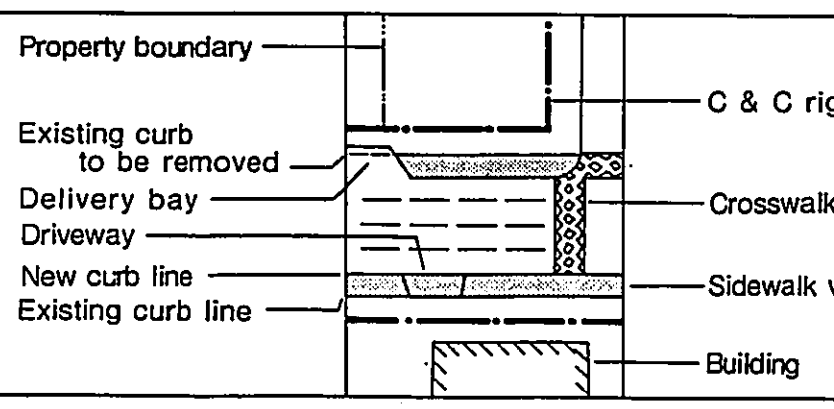
CORRECTION

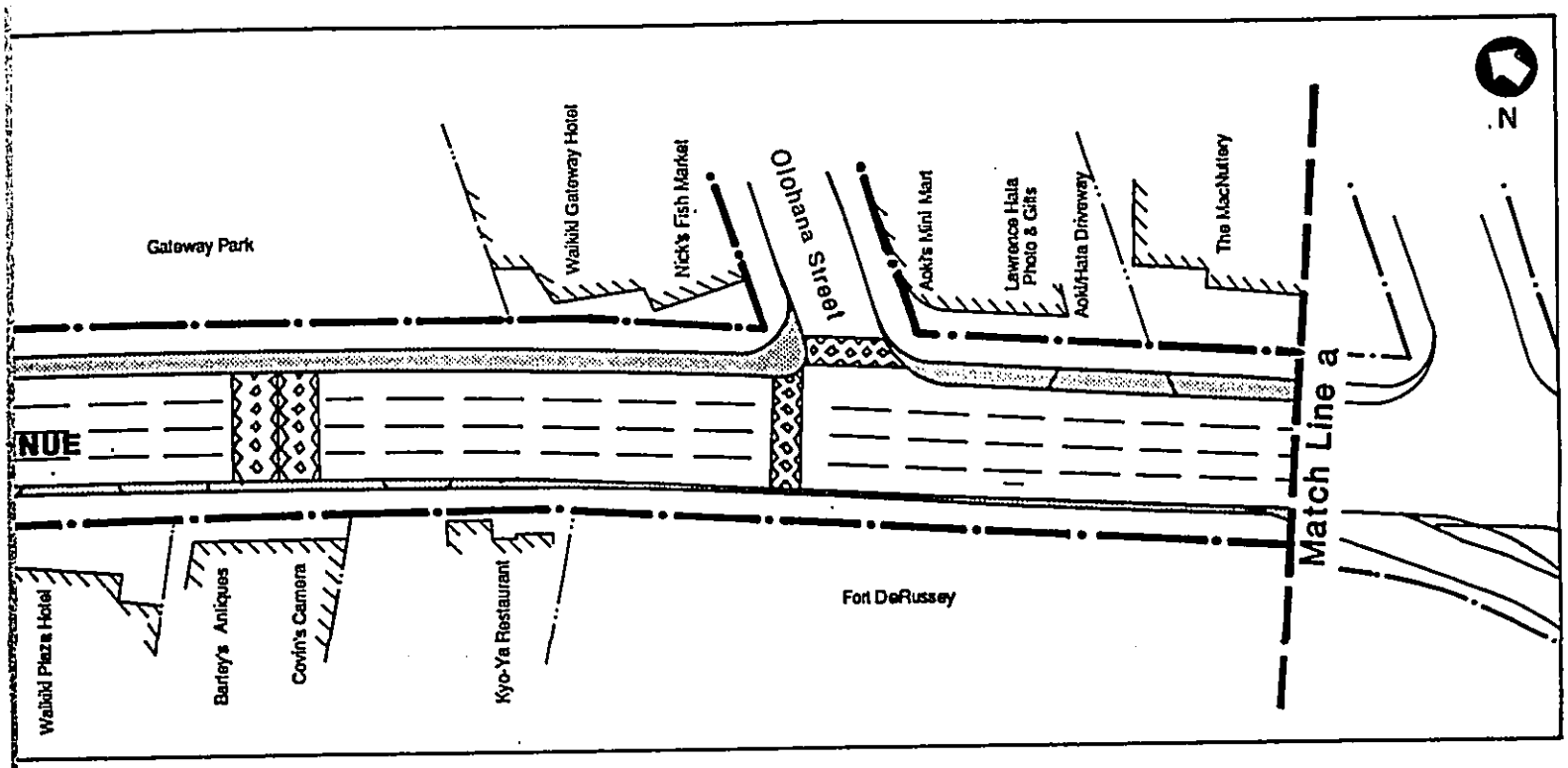
THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

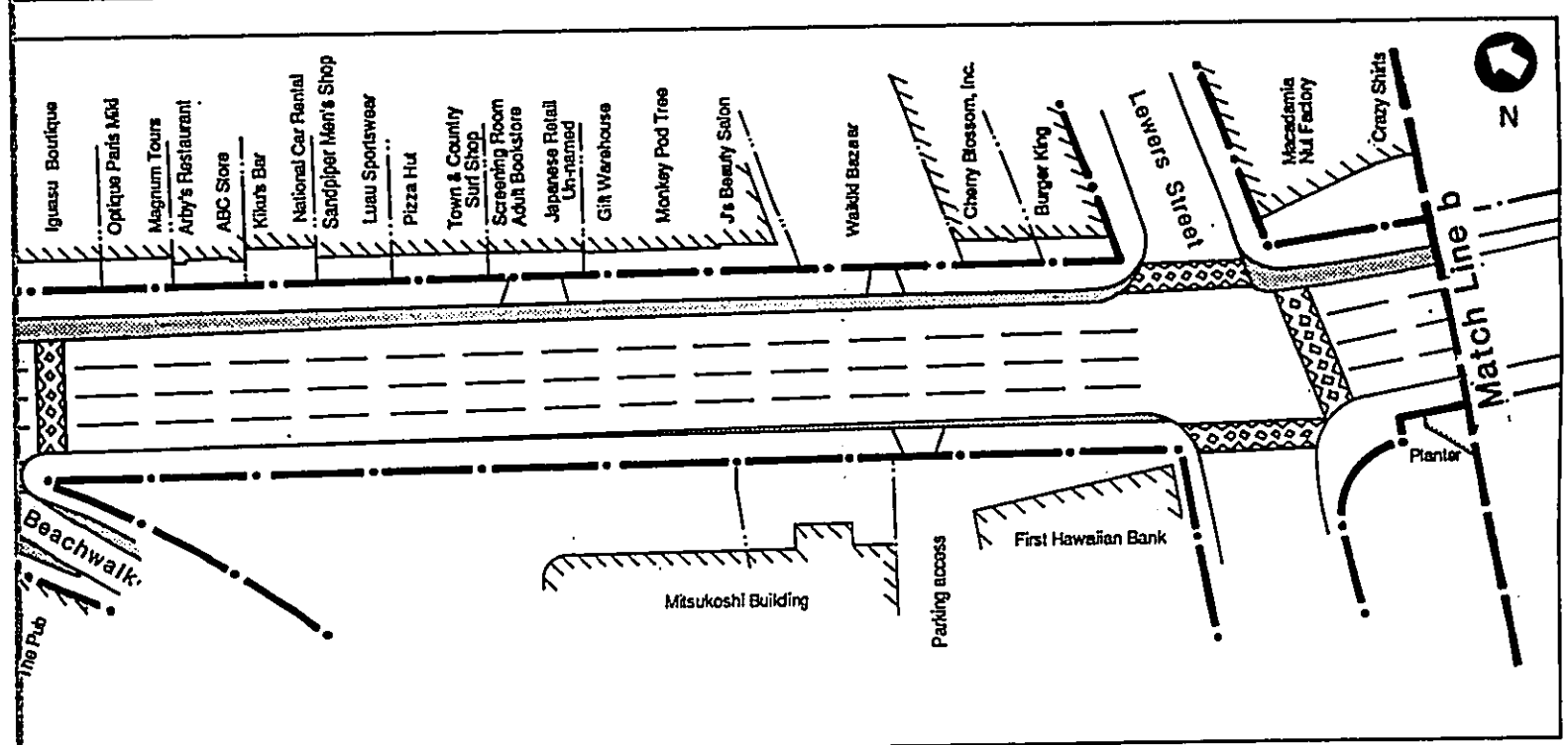

A
PROJECT LIMIT
Ala Moana Blvd.
Pau Street
Kuamoo Street
Kuhio Avenue
Gateway Park
KALAKAUA AVENUE
Texaco Gas Station
Car/Moped Rental
Waikiki Plaza Hotel
Barley's Antiques
Covin's Camera


B
Match Line a
Kalaimoku Street
Carlis Broiler
Popo's Mexican Restaurant
South Seas Village Restaurant
South Seas Parking Driveway
Spaghetti Eddie's Restaurant
Future Frozen Yogurt
Zorro's New York Pizza
Sidewalk Arcade
Iguasu Boutique
Optique Paris Miki
Magnum Tours
Arby's Restaurant
ABC Store
Kiku's Bar
National Car Rental
Sandpiper Men's Shop
KALAKAUA AVENUE
Saratoga Road
Misc. Open Shops
Lollipop Lounge
T-Shirt Shop
Polynesian Plaza Entry
Palli's Gift & Jewelry
House of Soon
California Photo Express
Sapporo Ramen
The Pub
Beachwalk


ALA WAI PARK
ALA WAI GOLF COURSE
A
B
FORT DERUSSY
KUHIO BEACH
HONOLULU ZOO


Property boundary
Existing curb to be removed
Delivery bay
Driveway
New curb line
Existing curb line
C & C rig
Crosswalk
Sidewalk
Building





C & C right-of-way

Crosswalk

Sidewalk widening

Building

KALAKAUA AVENUE SIDEWALKS

Ala Moana Boulevard to Monsarrat Avenue

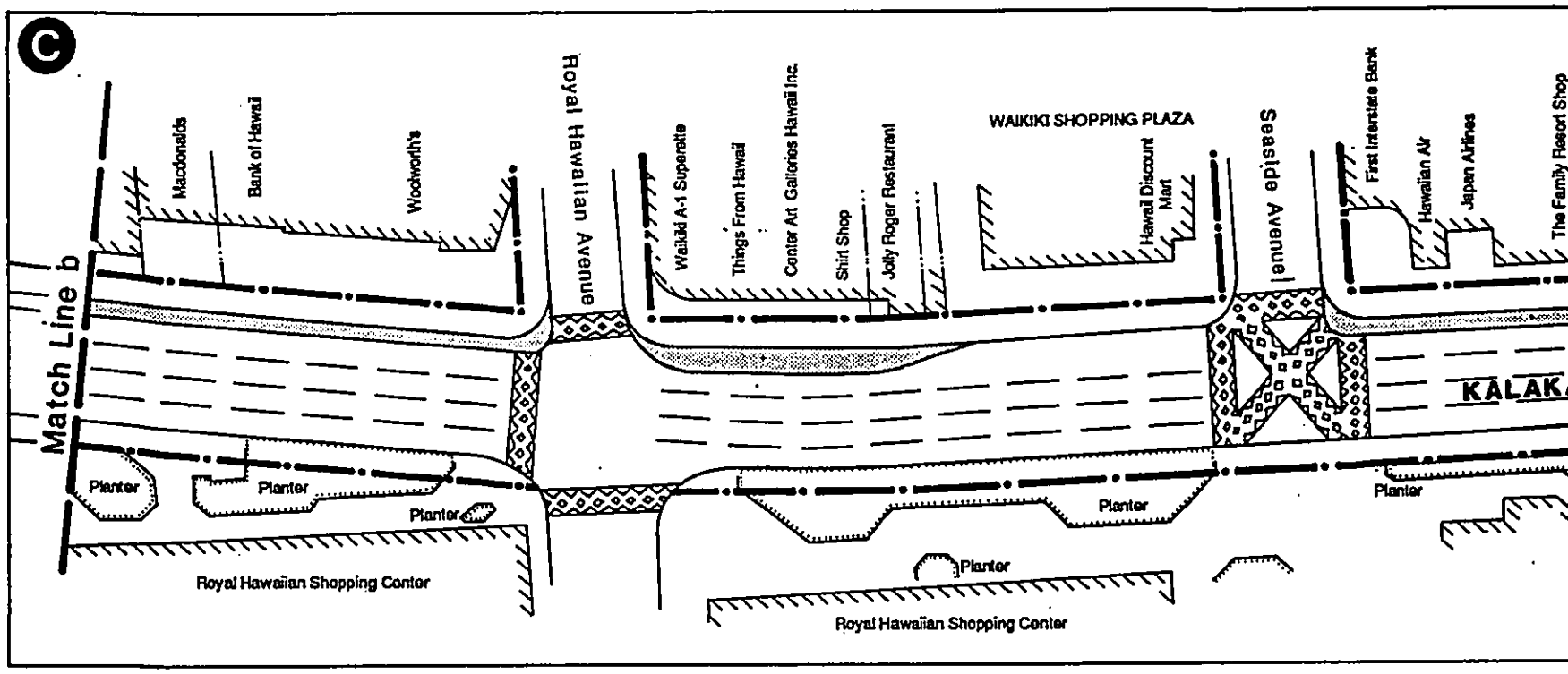
Prepared for: DEPARTMENT OF TRANSPORTATION SERVICES
City and County of Honolulu

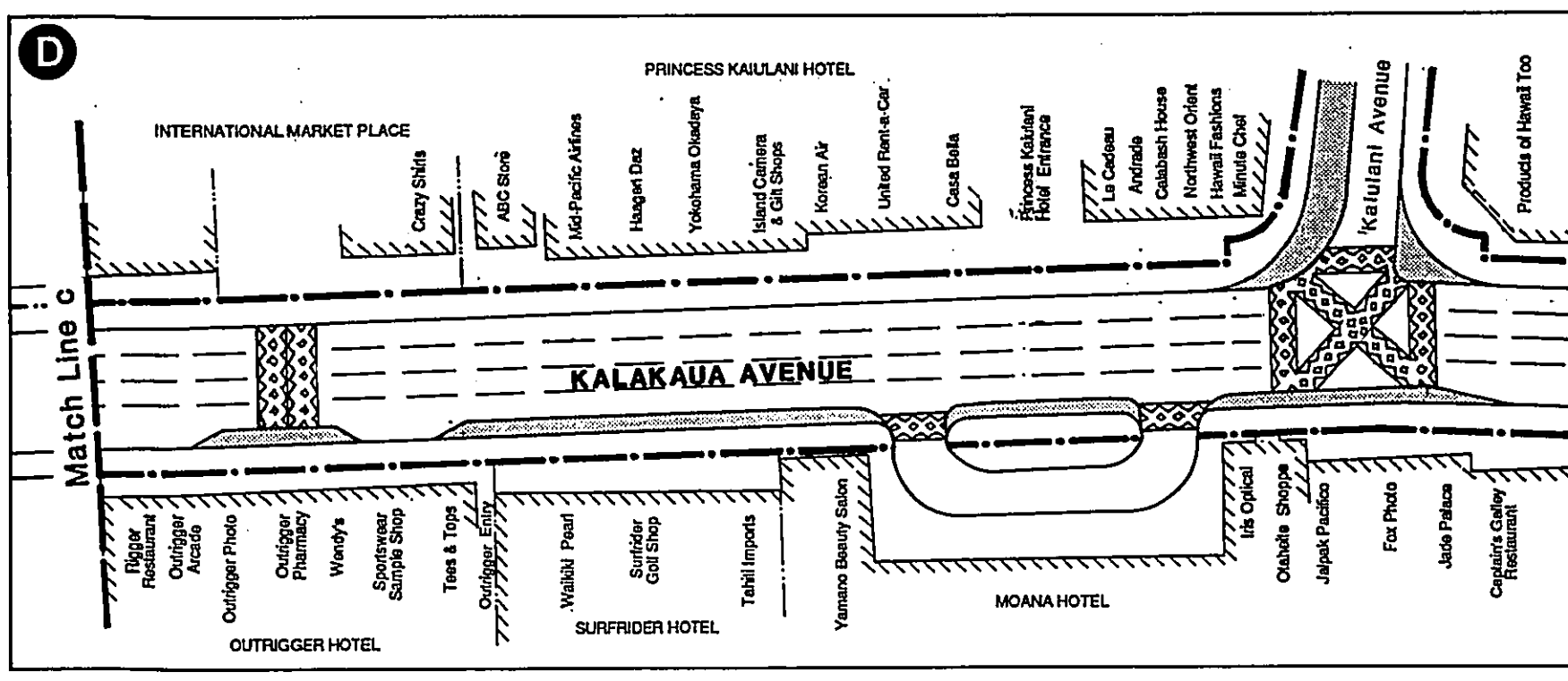
Prepared by: BELT, COLLINS & ASSOCIATES

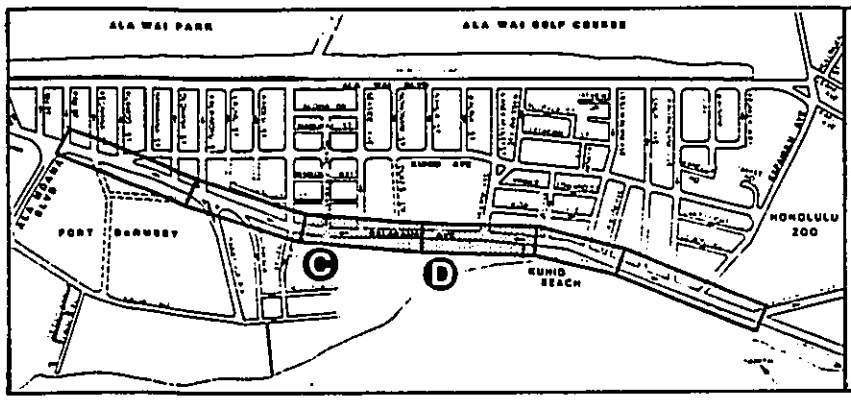
0 100 200

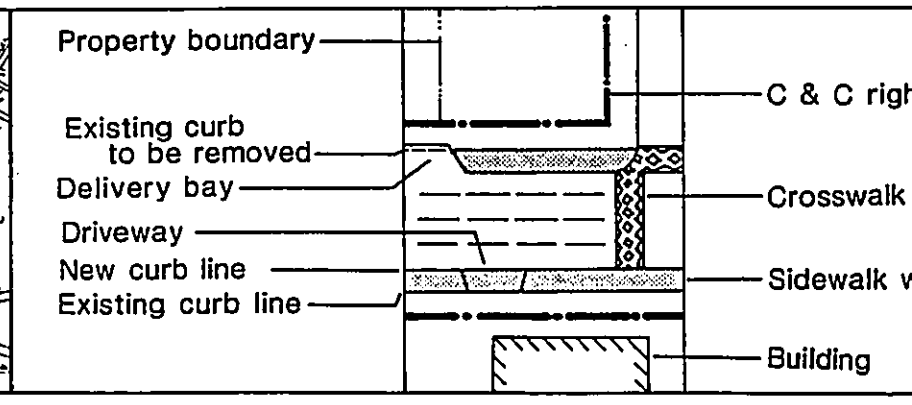
FEET

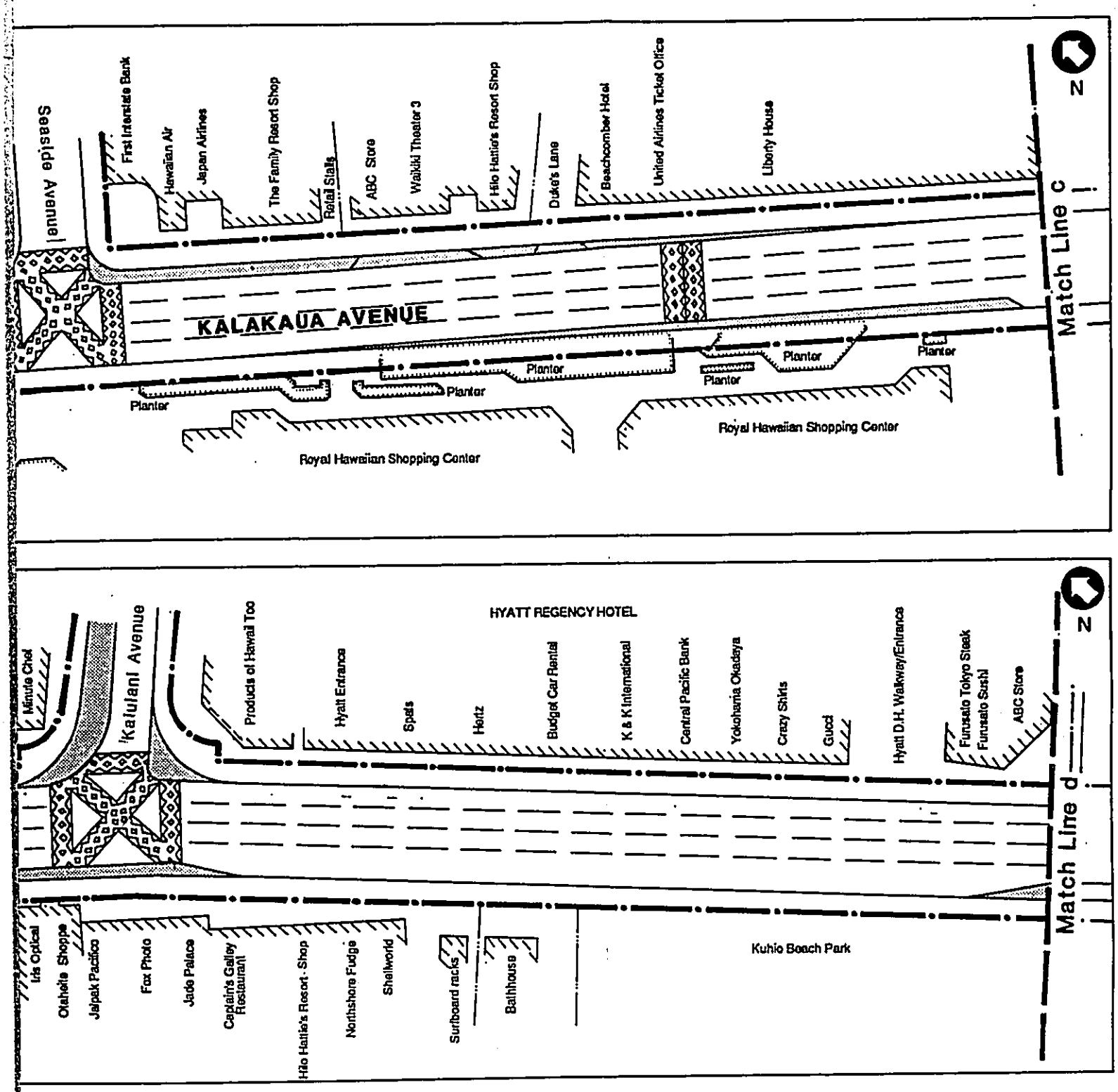
Appendix D-1


C
Match Line b
Macdonalds
Bank of Hawaii
Woolworth's
Royal Hawaiian Avenue
Waikiki A-1 Superette
Things From Hawaii
Center Art Galleries Hawaii Inc.
Shirt Shop
Jolly Roger Restaurant
WAIKIKI SHOPPING PLAZA
Hawaii Discount Mart
Seaside Avenue
First Interstate Bank
Hawaiian Air
Japan Airlines
The Family Resort Shop
KALAKA
Planter
Planter
Planter
Planter
Planter
Planter
Royal Hawaiian Shopping Center
Royal Hawaiian Shopping Center


D
Match Line c
INTERNATIONAL MARKET PLACE
PRINCESS KAIULANI HOTEL
Crazy Shirts
ABC Store
Mid-Pacific Airlines
Haagen Daz
Yokohama Okadaya
Island Camera & Gift Shops
Korean Air
United Rent-a-Car
Casa Bella
Princess Kaiulani Hotel Entrance
La Cadeau
Andrade
Calabash House
Northwest Orient
Hawaii Fashions
Minute Chef
'Kaiulani Avenue
Products of Hawaii Too
KALAKAUA AVENUE
Rigger Restaurant
Outrigger Arcade
Outrigger Photo
Outrigger Pharmacy
Wendy's
Sportswear Sample Shop
Tees & Tops
Outrigger Entry
Waikiki Pearl
Surfrider Gift Shop
Tahiti Imports
Yamano Beauty Salon
Iris Optical
Otahelte Shoppe
Jalpak Pacifico
Fox Photo
Jade Palace
Captain's Galley Restaurant
OUTRIGGER HOTEL
SURFRIDER HOTEL
MOANA HOTEL


ALA WAI PARK
ALA WAI GOLF COURSE
FORT DERUSSY
HONOLULU ZOO
KUHIO BEACH
C
D


Property boundary
Existing curb to be removed
Delivery bay
Driveway
New curb line
Existing curb line
C & C righ
Crosswalk
Sidewalk w
Building



KALAKAUA AVENUE SIDEWALKS

Ala Moana Boulevard to Monsarrat Avenue

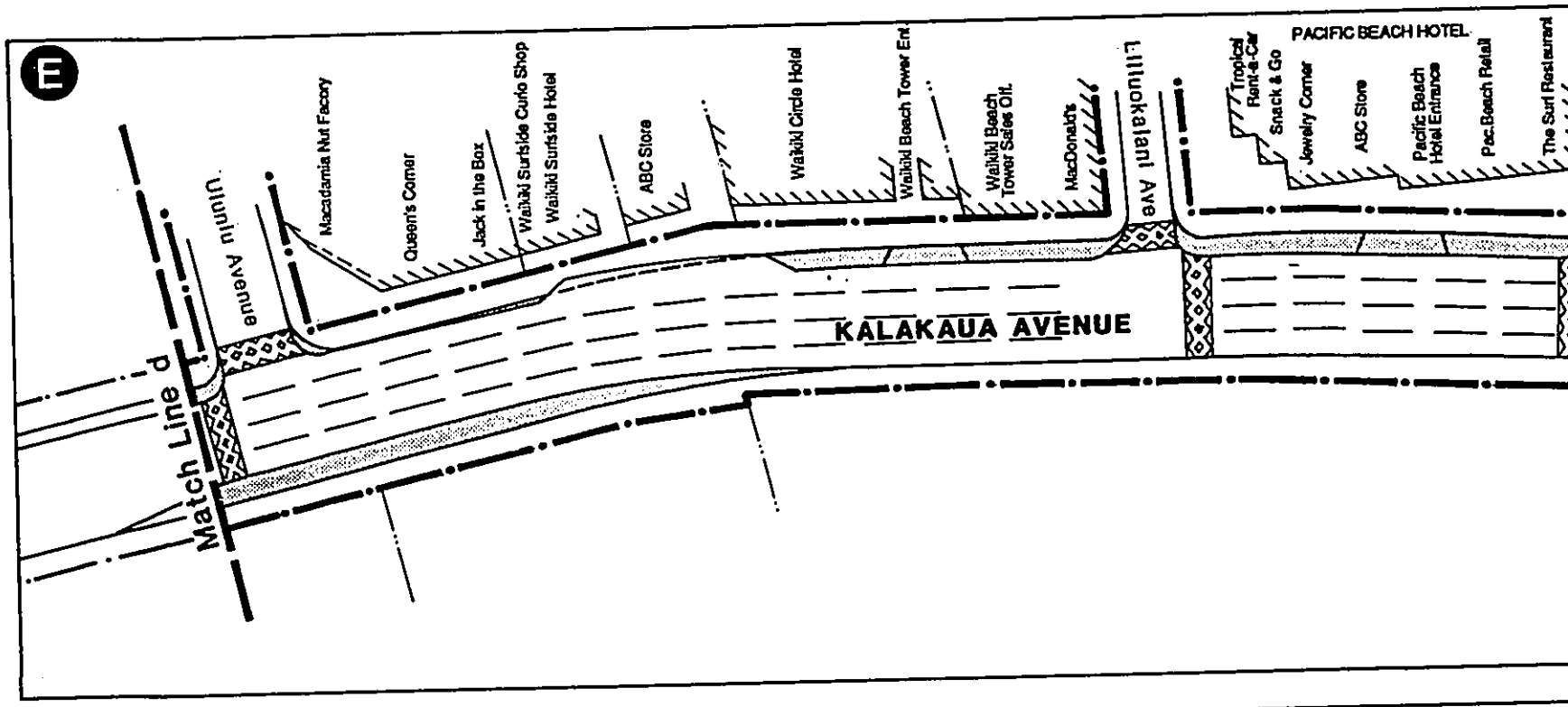
Prepared for: DEPARTMENT OF TRANSPORTATION SERVICES
City and County of Honolulu

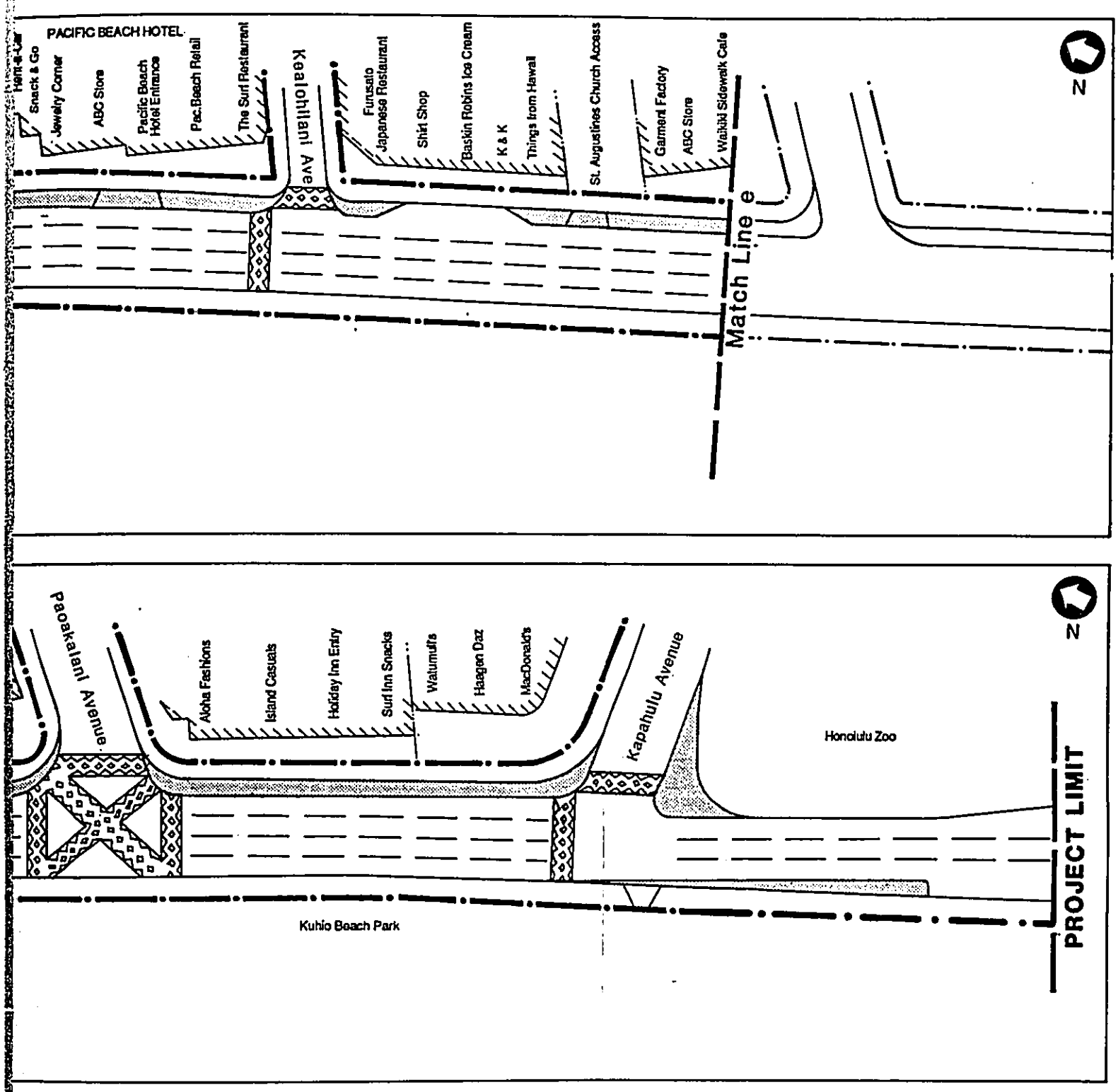
Prepared by: BELT, COLLINS & ASSOCIATES

0 100 200

FEET

Appendix D-2


E
Match Line d
Ulunlu Avenue
Macadamia Nut Facory
Queen's Corner
Jack in the Box
Waikiki Surfside Curio Shop
Waikiki Surfside Hotel
ABC Store
Waikiki Circle Hotel
Waikiki Beach Tower Ent.
Waikiki Beach Tower Sales Ofc.
MacDonald's
Liliuokalani Ave
KALAKAUA AVENUE
PACIFIC BEACH HOTEL
Tropical Rent-a-Car
Snack & Go
Jewelry Corner
ABC Store
Pacific Beach Hotel Entrance
Pac.Beach Retail
The Surf Restaurant
F
HAWAIIAN REGENT HOTEL
Waikiki Sidewalk Cafe
Ohua Avenue
Island Tops
Mister K
Hawaiian Regent Entry
The Summery Coffee House
Paoakalani Avenue
Aloha Fashions
Match Line e
KALAKAUA AVENUE
Kuhio Beach Park
ALA WAI PARK
ALA WAI GOLF COURSE
FORT DERUSSY
KUHIO BEACH
HONOLULU ZOO
E
F
Property boundary
Existing curb to be removed
Delivery bay
Driveway
New curb line
Existing curb line
C & C
Crossw
Sidewa
Buildin



C & C right-of-way

Crosswalk

Sidewalk widening

Building

KALAKAUA AVENUE SIDEWALKS

Ala Moana Boulevard to Monsarrat Avenue

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0 100 200

FEET

Appendix D-3