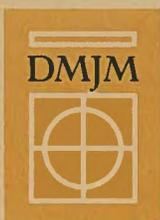


TECHNICAL MEMORANDUM

STUDY OF THE
MAKAI ALIGNMENT

Honolulu Area Rapid Transit System
Environmental Impact Statement & Refine Engineering Phase



TECHNICAL MEMORANDUM

STUDY OF THE
MAKAI ALIGNMENT

Honolulu Area Rapid Transit System
Environmental Impact Statement & Refine Engineering Phase

Preparation of this report was financially aided
from a grant from the United States Department
of Transportation under Section 3, of the Urban
Mass Transportation Act of 1964 as amended.

Prepared for

Department of Transportation Services
City & County of Honolulu

by

Daniel, Mann, Johnson, & Mendenhall

March 1978

TABLE OF CONTENTS

- A. INTRODUCTION
- B. DESCRIPTION OF ROUTE ALIGNMENT & STATION LOCATION
- C. SYSTEM PLANNING & IMPACT ANALYSIS
- D. COMPARATIVE COST ANALYSIS
- E. OVERVIEW OF THE MAKAI ALIGNMENT FEASIBILITY

A. INTRODUCTION

The "Makai Alignment" was proposed by the State Department of Transportation (DOT) as an alternative to the proposed PEEP II alignment between Middle Street and University Avenue. The objective of studying this alignment was to investigate an alternative to the costly subway construction through downtown Honolulu. The key feature of the makai alignment was to take advantage of the shoreline of Honolulu Harbor to place an at-grade guideway where grade-separation with cross-streets would not be required. With an at-grade guideway located along the water's edge, it was originally felt that the view plane from the downtown area could be maintained.

The basic concept of the makai alignment was developed by the State DOT and furnished to the City Department of Transportation Services (DTS) for analysis. Certain technical and design features to be incorporated, especially involving harbor facilities, were also provided by the State DOT as described in this report.

B. DESCRIPTION OF THE ROUTE ALIGNMENT & STATION LOCATION

The basic makai alignment as initially conceived by the State DOT would, beginning at Middle Street, follow the median of Nimitz Highway in aerial configuration to about Pier 18 where the line would then be located on the makai side of the highway and placed at-grade.

This configuration would follow the Honolulu Harbor past the Hawaiian Electric Company (HECO) Power Plant and then continue on Ala Moana Boulevard through Waikiki and then into the PEEP II alignment before or at University Avenue. However it was recognized that following Ala Moana Boulevard and going through Waikiki would be extremely difficult environmentally and that other alternative routes should be considered. (See Figure I)

After careful study of various possible routes, it was found that Auahi Street would be the most feasible route. Various alignments were considered, especially around the Ala Moana Shopping Center area. It was determined that the most feasible alignment would be to follow Auahi Street to Kamakee Street and then turn in the mauka direction to tie into the PEEP II alignment at Kona Street. This alternative was concurred with by the State DOT. (See Figure I)

The critical segment of the makai alignment was the center portion or the downtown segment. Between Pier 18 and where

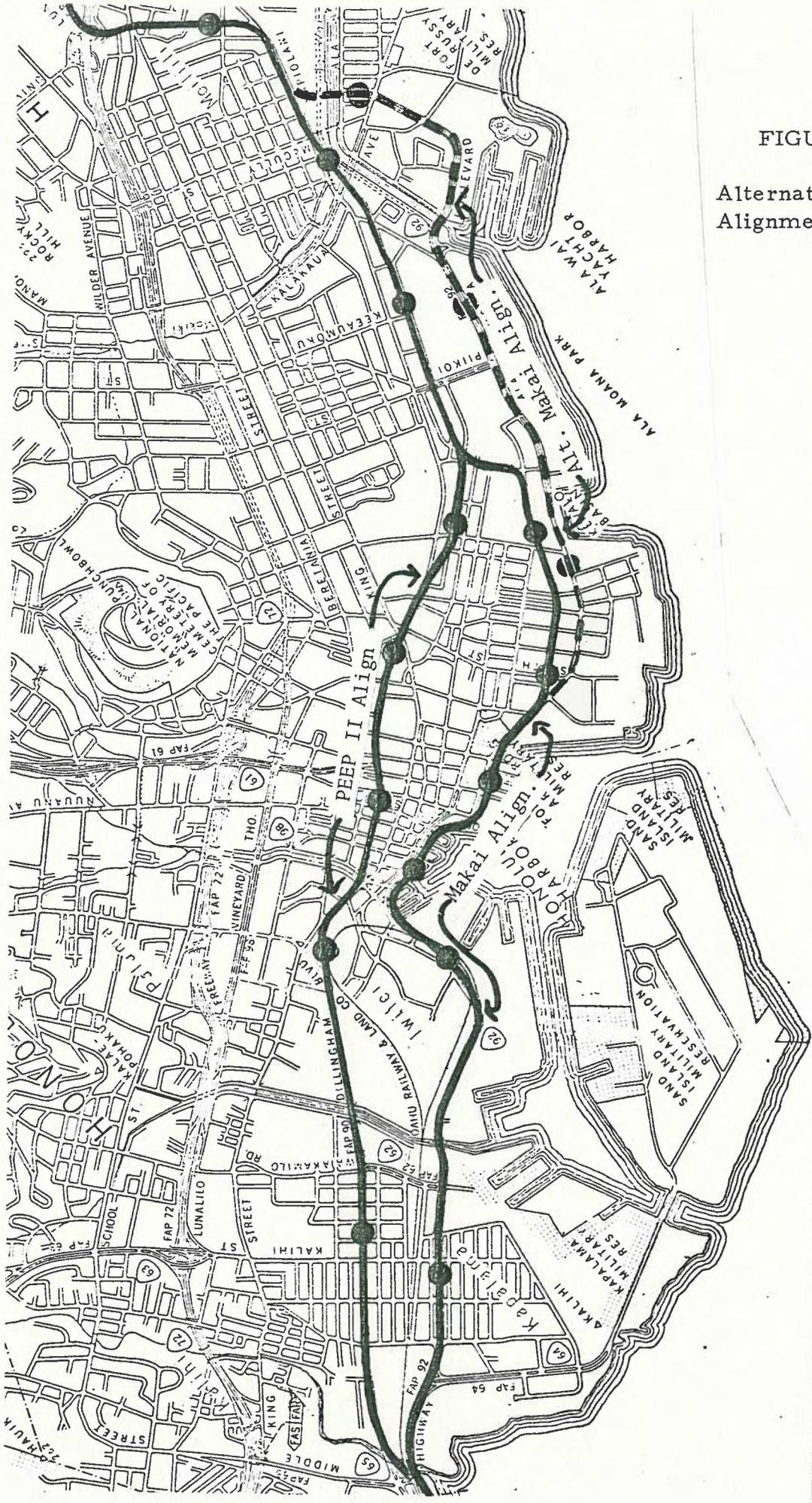


FIGURE I

Alternative Route
Alignments Evaluat

the line entered Auahi Street from Ala Moana Boulevard, two basic alternative alignments were analyzed; first, an aerial configuration in the center of Nimitz Highway and Ala Moana Boulevard, and second an at-grade configuration located on the makai side of Nimitz Highway. Each alternative was identified to have one major negative feature;

- . the visual impact of blocking the view plane with the aerial structure alternative and,
- . the physical impact of blocking access to various harbor activities with the at-grade alternative.

After weighing the pros and cons of these alternatives, it was decided to adopt the at-grade configuration based on the State DOT's assertion that solutions to maintaining harbor access could be worked out by their Water Transportation Facilities Division.

The next major task was to determine the placement of stations in this downtown segment which would best provide service to the CBD area and at the same time minimize any adverse impact on the harbor facilities and their operations. In collaboration with the State DOT, it was determined that the two stations required to properly serve the CBD would be located at approximately Maunakea and Smith Streets and at the Aloha Tower area immediately makai of the HECO power plant.

C. SYSTEM PLANNING & IMPACT ANALYSIS

After the basic system route and station locations concept was established, a systematic planning and impact analysis was conducted. Preliminary horizontal and vertical alignment studies were conducted to determine how the guideway and ancillary facilities would fit within the basic route and to identify special structural and additional right-of-way requirements. Station sites were studied to determine access and land requirements for functional modal interface at each station including the accommodation of projected feeder buses.

Special consideration was given to the guideway and station facilities in the downtown segment and their potential impact on existing harbor facilities and operations. The horizontal and vertical alignment of the guideway was analyzed to determine the impact on existing piers. It was evident that access to the newly constructed Pier 17 would be blocked and that much of Piers 15, 13 and 12 would be occupied by the guideway and station structures and its functional use reduced to a point where major reconstruction would be required. Access to these piers would also be "cut-off" from Nimitz Highway and it was concluded that a special frontage road adjacent to the guideway would be required.

A more serious problem at the Aloha Tower site was identified. The mauka end of Pier 11 would be occupied by the guideway structure, thus reducing the available berthing length needed to accommodate large ships.

The support area and facilities for Piers 10, 11 and 8 would also be occupied by the guideway. With the proposed at-grade station located makai of the power plant, access to the entire Aloha Tower complex would be constrained. Thus, the State DOT suggested that an underwater tunnel be provided for direct access to this area.

The guideway would also pass in front of the area where the Falls of Clyde is berthed, thus presenting a visual impact to this historic site. It would also affect Pier 4, the U.S. Coast Guard Facility, by blocking direct access to this critical facility.

The makai alignment and more specifically, the station located makai of the power plant, was identified as possibly having some serious implications to the development of the Aloha Tower site into a major trade center which is currently under consideration.

Although the planning concept had not been finalized, it was recognized that at the minimum, the placement of the guideway and station facility between the highway and the trade center complex would pose some major constraints to the physical development of the site as well as access thereto.

D. COMPARATIVE COST ANALYSIS

As stated in the introduction, the primary objective for studying the makai alignment was to explore an alternative route that would reduce construction cost by eliminating the need for the costly underground segment of the PEEP II alignment. A preliminary cost comparison was made after requesting from the State DOT the cost involved in demolition, relocation, and modification of affected harbor facilities including a new frontage road and underwater tunnel to the Aloha Tower area. An estimated cost of \$10 million was furnished by the State DOT. Using this figure, it was estimated that there could be some \$35-\$40 million savings (based on constant 1977 dollars) in construction cost with the makai alignment.

A review of the operating cost was made in order to consider the effects of the added length of the makai alignment to the guideway operations and the longer travel distances of feeder buses to the makai alignment stations. It was found that the added transit car and feeder bus operating cost associated with the makai alignment would amount to a total present worth of some \$30 million over a 30 year period using 7% discount rate. This would then off-set much of the higher capital cost of the PEEP II alignment.

E. OVERVIEW OF THE MAKAI ALIGNMENT FEASIBILITY

Based on the results of preliminary analysis of costs and impacts, it became clear that the major concern of the makai alignment was its adverse impact on harbor facilities and operations. To an island whose economy is dependent on ocean transportation, the preservation of Honolulu Harbor for existing and future waterfront activities cannot be minimized. The placement of an at-grade transit facility between Nimitz Highway and the harbor facilities would create a major physical barrier which would be a deterrent to efficient and flexible development and operation of the harbor in the future.

A second critical factor is the difference in transit service between the alternative alignments. The makai alignment places the key CBD station beyond a reasonable walk distance to the mauka portion of the CBD and the Civic Center complex. With the State DOT concept of precluding bus interface facilities at the Aloha Tower site, shuttle buses would have to be provided from other stations thus extending the trip time unnecessarily for those with destination's beyond reasonable walking distance.

In view of these two critical negative features associated with the makai alignment, the City and State decided to dismiss the makai alignment from further consideration.



DANIEL, MANN, JOHNSON, & MENDENHALL • Los Angeles, California • San Francisco, California • Portland, Oregon • Washington, D.C. • Honolulu, Hawaii • Las Vegas, Nevada

PLANNING
ARCHITECTURE
ENGINEERING
SYSTEMS
ECONOMICS