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Mayor

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Director

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Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

JOHN HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

April 9, 2002

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania street, Suite 702
Honolulu, HI 96813

Dear *Ms. Salmonson,*

Final Environmental Assessment (FEA) for Wailuku Wastewater Pump Station Force Main Replacement, TMK 3-4-27:001 through 3-8-36:087, Wailuku-Kahului, Maui, Hawaii

The Department of Public Works and Waste Management, County of Maui, has reviewed the Final Environmental Assessment Report for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish the notice of availability for this project in the April 23, 2002, OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, four copies of the Final EA, and the project summary on disk. Please call Alan L. Unemori at (808) 242-4403 if you have any questions. Thank you.

Sincerely,

for David Goode
Director
Department of Public Works and Waste Management
County of Maui

25

2002-04-23-MA-FEA-

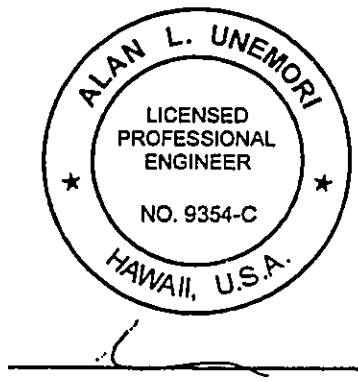
Final Environmental Assessment Report

WAILUKU WASTEWATER PUMP STATION FORCE MAIN REPLACEMENT
Contract Number C-1412

Wailuku-Kahului, Maui, Hawaii

Prepared For:

Department of Public Works and Waste Management
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793



Warren S. Unemori Engineering, Inc.
Civil and Structural Engineers - Land Surveyors
2145 Wells Street, Suite 403
Wailuku, Hawaii 96793

Date: April, 2002

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PREFACE

The County of Maui, Department of Public Works and Waste Management (DPWWM), proposes to construct a replacement 24-inch force main between the existing Wailuku Pump Station located approximately 500 feet east of the Kahului Beach Road-Waiehu Beach Road-Lower Main Street intersection, and a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility in Kanaha. This single 24-inch High Density Polyethylene (HDPE) pipe will replace the existing 21-inch diameter force main which was constructed in late 1976. The replacement 24-inch HDPE force main will generally follow the route of the existing force main over a length of approximately 10,000± feet, except where it will be deliberately realigned to minimize traffic disruptions during construction along both the Kahului Beach Road and the westbound lanes of the heavily used Kaahumanu Avenue

Pursuant to Chapter 343, Hawaii Revised Statutes; and, Chapter 200 of Title 11, Hawaii Administrative Rules; this Environmental Assessment documents the project's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the project.

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND WASTE MANAGEMENT WAILUKU WASTEWATER PUMP STATION FORCE MAIN REPLACEMENT

AGENCY: County of Maui, Department of Public Works and Waste Management.

PROJECT DESCRIPTION: The County of Maui, Department of Water Supply (DPWWM), proposes to construct a 24-inch force main between the existing Wailuku Pump Station located approximately 500 feet east of the Kahului Beach Road-Waiehu Beach Road-Lower Main Street intersection, and a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility in Kanaha.

The project involves funding by a State Revolving Funds (SRF) loan and the County of Maui *Department of Public Works and Waste Management.*

The DPWWM has prepared the present Draft Environmental Assessment (EA) pursuant to Chapter 343, Hawaii Revised Statutes. In the Draft EA, three (3) Alternatives were considered: (1) Alternative "1": the "Proposed Action" alternative; (2) Alternative "2": the "Modify Existing System" alternative; and (3) Alternative "3": the "No-Build" alternative. Within Alternative "1", four (4) different routes were considered (Routes "A", "B", "C" and "C-2") and evaluated from which one (Route "B") was subsequently selected.

PROJECT SUMMARY:

Wastewater from Wailuku, Waihee, Paukukalo and portions of Kahului on the Island of Maui is directed into the Wailuku Pump Station located approximately 500 feet east of the Kahului Beach Road-Waiehu Beach Road-Lower Main Street intersection. The Wailuku Pump Station then conveys wastewater to the Kahului Wastewater Reclamation Facility in Kanaha by means of 12,000 feet of 21-inch diameter force main. The locations of the Wailuku Pump Station, Kahului Wastewater Reclamation Facility and the approximate route of the existing force main are shown on Figure 1.

The Kahului Wastewater Reclamation Facility was completed in 1977. According to the County's as-built construction plans, the Wailuku force main was constructed in late 1976. When the Kahului Wastewater Reclamation Facility was completed in 1977, the ocean outfall located north of the Kahului west breakwater was terminated and all wastewater that had been

previously directed to the ocean outfall was redirected into the Kahului Wastewater Reclamation Facility.

Since 1977, the area served by the Wailuku Pump Station has experienced substantial growth. Furthermore, since this is the only means of conveying wastewater from the Wailuku service area to the Kahului Wastewater Reclamation Facility, any break or malfunction of this system would be catastrophic.

This project will replace the existing 21-inch force main with a new 24-inch High Density Polyethylene (HDPE) pipe with welded (heat fused) joints. The replacement 24-inch HDPE force main will generally follow the route of the existing force main over a length of approximately 10,000± feet, except where it will be deliberately realigned to minimize traffic disruptions during construction along both the Kahului Beach Road and the westbound lanes of the heavily used Kaahumanu Avenue.

To further minimize the disruption of traffic, the feasibility of using state-of-the-art Horizontal Directional Drilling (HDD) technology was extensively evaluated for possible application wherever traditional "Cut and Cover Trenching" technology would otherwise require roadway closure of Kahului Beach Road, Kaahumanu Avenue and Hana Highway at necessary pipeline roadway crossings.

Construction of the proposed replacement force main will also give the DPWWM the option of considering other currently available minimally-disruptive-to-traffic technologies for repairing/restoring the existing 21-inch force main (after the replacement force main is constructed and fully operational) to further increase wastewater conveyance capacity as well as providing critical system redundancy should any break or malfunction occur in either line.

Based on the EA and supporting analyses, the DPWWM is satisfied that potential improvement and long-term impacts have been identified and addressed.

FOR FURTHER INFORMATION, CONTACT: Mr. David Goode, Director, Department of Public Works and Waste Management, County of Maui, 200 South High Street, Wailuku, Maui, Hawaii 96793; telephone: (808) 270-7845.

4-9-02
Date

for David Goode, Director
Department of Public Works and Waste Management

I. PROJECT OVERVIEW:

A. APPLICANT:

The applicant is the Department of Public Works and Waste Management, County of Maui (hereinafter referred to as DPWWM).

B. LOCATION:

The applicant is proposing to construct a 24-inch force main between the existing Wailuku Pump Station located approximately 500 feet east of the Kahului Beach Road-Waiehu Beach Road-Lower Main Street intersection, and a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility in Kanaha. The existing 21-inch force main falls within a 10-foot wide easement within the rights-of-way along Kahului Beach Road, the west-bound lanes of Kaahumanu Avenue between Kahului Beach Road past the start of Hana Highway, then onto Hobron Avenue to Amala Place to the Kahului Wastewater Reclamation Facility in Kanaha.

As construction of the proposed Alternative "1" 24-inch force main replacement may severely impact traffic on these roadways, four (4) different routes were initially considered that generally follow the existing 21-inch force main, one of which follows the existing easements (Route "A") and three (3) of which were offset from the existing roadway Rights-of-Way (Routes "B", "C" and "C-2") over existing public and private properties to avoid severe disruptions to existing traffic patterns. Details of these routes are given in more detail in following sections.

C. LAND OWNERSHIP:

The routes of the proposed project extends over portions of State and County roadway right-of-ways, utility easements and both public and private TMK parcels. Detailed inventories of the TMK parcels and their existing owners of record for each alternative route are listed in Section II, "ALTERNATIVE ANALYSIS" of this Report.

D. EXISTING LAND USE:

In general, due to the required length of the proposed force main replacement, the existing and four (4) proposed Alternative Routes traverse one or more of the following Wailuku-Kahului Community Plan Land Use Categories:

"B"	Business/Commercial
"H"	Hotel
"HI"	Heavy Industrial
"LI"	Light Industrial
"MF"	Multi-Family
"OS"	Open Space
"P"	Public/Quasi Public
"PK"	Park

as well as County and State roadway rights-of-way.

Most of the TMK parcels are therefore fully developed with existing buildings and other urban structures located on them.

E. PROJECT NEED:

As mentioned above, the existing Wailuku force main was constructed in late 1976, followed by the completion of the Kahului Wastewater Reclamation Facility in 1977. The existing force main is the only means of conveying wastewater from the Wailuku, Waihee, Paukukalo and portions of the Kahului service area to the Kahului Wastewater Reclamation Facility. Therefore, any break or malfunction of this 24+ years old force main would be catastrophic to traffic patterns, health, and the coastal environment.

The County's Wailuku/Kahului Sewer Master Plan prepared by Brown and Caldwell in 1993 estimated that peak wet-weather flow into the Wailuku Pump Station (in 1993) was 7.72 MGD. The ultimate design flow was projected to be 17.04 MGD. The proposed 24-inch force main itself provides a design flow of 10 MGD at a velocity of 4.92 fps and a flow of 17 MGD at a velocity of 8.37 fps.

At this time, the County of Maui has scheduled tests to determine the current condition of the existing 21" force main with the objective of considering the use of other

minimally-disruptive to-traffic available technologies for repairing/restoring the existing 21-inch force main (after the replacement force main is constructed and fully operational) to more readily handle the wet weather flow of 17 MGD.

The current proposed update to the Wailuku-Kahului Community Plan (currently under consideration for approval), Part II, "Description of the Region and its Problems and Opportunities", Section B.1, "Problems", identifies the following as one of the major problems of the area (only relevant points listed for brevity):

> *"b.* ***PUBLIC INFRASTRUCTURE****. The upgrading and expansion of public infrastructure is a major issue for the region. The Kahului wastewater treatment plant is aging and reaching its limits for expansion and efficient operation. Also, the development and transmission of new sources of potable water to the region will be critical to accommodate growth over the long term."*

Section B.2, "Opportunities", states the following:

> *"a.* ***GEOGRAPHIC LOCATION AND INVENTORY OF DEVELOPED AND DEVELOPABLE LANDS****. The Wailuku-Kahului planning region is often referred to as "Central Maui" that befits its geographic location and role as a primary urban center of the island. Within the region are major public facilities and services -- i.e., the Maui Community College; War Memorial Sports Complex and Keopuolani Park; the Maui Arts and Cultural Center; Maui Memorial Hospital, a primary acute care facility; major Federal State and County governmental facilities; and the primary airport and commercial harbor facilities on the island. The region also supports the largest resident population of any other district and serves as a major employment center for the island, in terms of industry, commerce and agriculture. In contrast to other regions, it is not heavily oriented to hotel/resort development.*
>
> *These attributes create opportunities for commercial and industrial development; public mass transit; residential housing; regional recreational facilities; medical facilities; agricultural diversification; and higher educational facilities. Likewise the*

> ***future growth of the region will pose challenges in terms of improving or expanding the roadway system network; locating and delivering new sources of potable water; wastewater treatment and methods of effluent disposal*** (underlined for emphasis)***; and public and private partnerships for the development and financing of public infrastructure."***

Part III of the Wailuku-Kahului Community Plan, "POLICY RECOMMENDATIONS, IMPLEMENTING ACTIONS AND STANDARDS FOR THE WAILUKU-KAHULUI REGION", Section B., "Intended Effects of the Wailuku-Kahului Community Plan", states:

> ***"Population projections, while subject to a host of variables and external factors, provide a useful benchmark for conceptualizing growth in a region and providing a measure of the effectiveness of the Community Plan and future strategies to direct and manage growth. Population forecasts from Community Resources, Inc., were utilized as planning guidelines. These forecasts indicate a projected population of approximately 44,876 to 48,658 residents over the next 20 years and serve as 'guidelines' in determining future land use and community development needs to the Year 2010. This translate into approximately 4,334 to 6,359 additional housing units."***
>
> ***"Finally, public facilities and infrastructure improvements should not lag behind development in the region. Upon adoption of this plan, it shall be required that adequate facilities and infrastructure will be concurrent with future development. The land use designations on the community plan land use map are not an assertion that infrastructure will be provided to these areas, but merely that it would be appropriate to develop these areas as designated on the maps -- if the necessary infrastructure and services are available."***

Also in Part III, Section C., "Goals, Objectives, Policies and Implementing Actions", infrastructural improvement are involved as part of the "Objectives and Policies in a number of areas, for example:

"ENVIRONMENT

2. Protect near shore waters by ensuring that discharges from waste disposal meet water quality standards. Continuous monitoring of existing and future waste disposal systems is necessary to ensure their efficient operation."

"HOUSING

7. Plan, design and construct off-site public infrastructure improvements (i.e., water, roads, sewer, drainage, police and fire protection, and solid waste) in anticipation of residential, commercial and industrial developments defined in the Community Plan."

"INFRASTRUCTURE - Liquid and Solid Waste

1. Coordinate sewer system improvement plans with future growth requirements, as defined in the Community Plan."

Clearly, the intent of the most recent pending "Wailuku-Kahului Community Plan" is that wastewater system improvements are made where necessary. The proposed project will implement one of the major objectives of the Wailuku-Kahului Community.

F. PROPOSED ACTION:

Anticipated improvements include the following:

(1) Replacement of the existing 21-inch force main with a new 24-inch High Density Polyethylene pipe force main connecting the Wailuku Pump Station to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility. The pipe routes considered generally follow the route of the existing 21-inch force main except that it will be deliberately realigned or offset to minimize roadway closure of Kahului Beach Road, Kaahumanu Avenue, Hana Highway, Hobron Avenue, and all other potential roadway crossings.

(2) Reduced risks of possible health hazards and environmental contamination near the shoreline of Kahului Bay in the event of a break or malfunction in the existing 23+ years old force main.

(3) Increased capacity for conveyance of wastewater.

(4) Acquisition of additional utility easements outside the busy roadway rights-of-way for Kahului Beach Road, Kaahumanu Avenue, and the start of Hana Highway.

II. ALTERNATIVES ANALYSIS:

A. ALTERNATIVE "1":

Alternative "1" represents the Proposed Action. This Alternative includes four (4) routes that were initially considered for the proposed force main replacement (see Figure 2). Each involves replacement of the existing 21-inch force main constructed in 1976 with a new 24-inch force main over each of four different routes. The common construction strategy employed here is to construct a new replacement force main in parallel to the existing force main so as to have it constructed, tested and in-place between the Wailuku Pump Station and a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility while the existing force main remains operational. Switch-over to the replacement force main can then be achieved with negligible loss of down-time.

These routes are each described in more detail in this section.

A1. Route "A" (Existing Force Main Alignment)

Route "A" considers using the existing roadway rights-of-way (ROW) within which to route the replacement pipe. Specifically, Route "A" begins at the existing Wailuku Pump Station, then takes the following path:

(1) crosses southward across a private parcel owned by Y. Hata & Co., Ltd (TMK: 3-04-027:001)

(2) crosses a County of Maui parcel (TMK: 3-04-027:026)

(3) crosses two private parcels owned by A&B (TMK: 3-07-001:005 + 3-07-001:016)

(4) crosses westward beneath the paved section of Kahului Beach Road to the western side of that ROW

(5) runs along the Kahului Beach Road ROW beyond the Harbor Lights development, then crosses eastward beneath the paved section of

Kahului Beach Road in front of a private parcel owned by Okada Trucking Co., Ltd. (TMK: 3-007-002:005)

(6) runs further along the eastern side of the Kahului Beach Road ROW

(7) runs along the west-bound lanes of the Kaahumanu Avenue ROW fronting the Maui Beach Hotel, the Maui Seaside Hotel, private parcels owned by A&B, First Hawaiian Bank,

(8) runs past the Kaahumanu Avenue-Puunene Avenue intersection

(9) crosses beneath the paved section of Kaahumanu Avenue southeastward

(10) runs further along the west-bound lanes of Kaahumanu Avenue past the Kaahumanu Avenue-Hana Highway intersection

(11) crosses eastward beneath the paved section of Hobron Avenue

(12) turns northward along the eastern side of the Hobron Avenue ROW to a junction box on Hobron Avenue

With Route "A" a major problem exists in that in the segment along the west-bound lanes of Kaahumanu Avenue, the existing easement over private property along the Maui Beach Hotel is only 10 feet wide, with the existing force main located in the middle of it. With the depth of the existing line to invert varying between 7 to 14 feet, it will be very difficult to install a new 24-inch diameter line within that existing easement. The problem is further compounded by the fact that a significant portion of the existing line runs under an existing sidewalk which will be susceptible to damage by construction equipment.

With the existing line occupying one of the three westbound lanes of Kaahumanu Avenue between Hana Highway and Puunene Avenue, the westbound lanes of this street will have to be closed off entirely during the installation of the additional 24-inch replacement line. According to a 1997 traffic count on Kaahumanu Avenue, the average daily traffic on westbound

lanes of this street was 16,413 vehicles per day (vpd), with peak hour volumes being 1,610 vehicles per hour (vph) during the morning and 1,256 vehicles per hour during the afternoon/early evening. Rerouting the traffic to other streets (e.g., Kamehameha Avenue, Wakea Avenue, etc.) will obviously create a cross-over nightmare on Hana Highway and elsewhere.

At least one and possibly two southbound lanes on Kahului Beach Road will have to be closed during construction.

The new lines for Route "A" will have to be installed using the traditional Cut and Cover Trenching techniques. Since the invert of the lines will be close to or below sea level, dewatering may be necessary. The depth of the trenches and the predominantly sandy material expected will mandate that shoring be provided for most of the project length. Moreover, working so close to an active line will increase the risk of damaging it during construction.

In November, 2000, a cost estimate of Route "A" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at ***$9,348,433***. Approximately 10,300 l.f. of 24" HDPE pipe will be placed using Cut and Cover Trenching techniques.

A2. Route "B" (Makai Alignment)

Route "B" is an alternative alignment which generally follows the existing force main route, but is designed to avoid traffic disruptions. Specifically, Route "B" begins at the existing Wailuku Pump Station, then takes the following path:

(1) crosses eastward across a private parcel owned by Y. Hata & Co., Ltd (TMK: 3-04-027:001)

(2) turns southward over two beach remnants owned by the County of Maui (TMK: 3-04-027:26 + 3-07-001:16)

(3) crosses beneath the paved section of Kahului Beach Road to a vacant parcel owned by A&B (TMK: 3-8-07:38) then southward across this lot

(4) crosses beneath the Kanaloa Road ROW to Keopuolani Park (TMK: 3-07-001:002)

(5) runs southward along Kahului Beach Road within Keopuolani Park

(6) crosses beneath the Wahinepio Avenue ROW to Maui Community College

(7) runs southward along Kahului Beach Road within Maui Community College (TMK: 3-08-007:125)

(8) run along the paved and grassed median of Kahului Beach Road

(9) crosses eastward beneath the paved section of Kahului Beach Road ROW immediately north of the Kahului Beach Road-Kaahumanu Avenue intersection

(10) crosses eastward within parcels in front of Maui Beach Hotel (TMK: 3-07-003:28), Maui Palms (TMK: 3-07-003:26), the entry to Maui Seaside (TMK: 3-07-003:027), the Maui Seaside (TMK: 3-07-003:003)

(11) turns northward within a vacant lot (TMK: 3-07-008:008) owned by Alexander & Baldwin

(12) crosses northeastward across the Kahului Canoe Club (TMK: 3-07-008:017)

(13) crosses northeastward beneath the parking lot of the Hideaway Restaurant

(14) crosses northeastward beneath the paved section of Puunene Avenue ROW

(15) crosses northeastward beneath the Container Yard owned by the State Harbors Division (TMK: 3-07-008:006) to Wharf Street

(16) crosses eastward beneath the paved section of the Wharf Street ROW

(17) goes across A & B Properties (TMK: 3-07-010:001 and 3-07-010:036)

(18) continues northeastward beneath the Container Yard owned by the State Harbors Division (TMK: 3-07-010:002)

(19) crosses eastward beneath the paved section of Hobron Avenue

(20) turns northward along the eastern side of the Hobron Avenue ROW

(21) connects to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility (TMK: 3-07-011:019)

With Route "B", disruption of traffic would be minimized relative to Route "A" by having the pipe offset from the existing roadway Rights-of-way except where necessary to cross the paved sections of the roadways at strategic locations including Kahului Beach Road (twice), Kanaloa Avenue, Wahinepio Avenue, Puunene Avenue, Wharf Street and Hobron Avenue. Instead, the force main would be routed across much of the private parcels in front of Maui Beach Hotel, Maui Palms, Maui Seaside, and within the Hideaway Restaurant property, and the Container Yards of the State of Hawaii - Harbors Division.

Although Horizontal Directional Drilling (HDD) techniques were considered for use beneath paved sections of the roadways, investigation of the subsurface conditions by an extensive geotechnical test boring program (with a total of 16 test borings) revealed that except near the Container Yard of the State Department of Transportation, Harbors Division, HDD techniques could not be used. Even then, logistical and material staging requirements, and the presence of many existing underground utilities precluded use of HDD techniques in that location. Cut and Cover Trenching techniques appears to be the logical option for this route.

This route, although less disruptive to the public with respect to traffic, will require easements across all of the public and private parcels not directly owned by the County of Maui. Exhibit "B" lists the properties affected by Route "B".

As with Route "A", all portions of the line installed using Cut and Cover Trenching techniques are expected to be installed below the water table to avoid existing utilities. However, dewatering will be avoided as much as possible.

In November, 2000, a cost estimate of Route "B" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at ***$5,823,498*** excluding any costs associated with obtaining easements through the private parcels affected. Approximately 10,400 l.f. of 24" HDPE pipe will be placed. Note that this cost estimate was prepared before the geotechnical information on the subsurface conditions was available. Therefore, it was based on using HDD techniques between Kahului Beach Road and Hobron Avenue.

A3. Route "C"

Route "C" is identical to that for Route "B" along the Kahului Beach Road, but deviates from Route "B" between the Kahului Beach Road-Kaahumanu Avenue Intersection and the junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility. This Route was evaluated in order to avoid traversing the numerous developed areas encountered in Routes "A" and "B", but is longer in length as a result. Specifically, Route "C" begins at the existing Wailuku Pump Station, then takes the following path:

(1) to (9) is identical to that of Route"B"

(10) crosses southward beneath the paved section of the Kaahumanu Avenue ROW to the northern property line of a parcel owned by the State DAGS (TMK: 3-07-004:003)

(11) runs eastward along the northern property line of this State DAGS lot, then turns southward at the eastern property line of this lot

(12) runs southward into the School Street ROW up to the School Street-Kamehameha Avenue Intersection

(13) runs eastward along the northern side of the Kamehameha Avenue ROW beneath the paved sections of the Kamehameha Avenue-Lono Avenue intersection

(14) continues eastward along the northern side of the Kamehameha Avenue ROW south of the Kahului Shopping Center

(15) runs eastward beneath the paved sections of the Kamehameha Avenue-Puunene Avenue intersection

(16) continues eastward along the northern side of the Kamehameha Avenue ROW before crossing over into the parking lot of the Maui Mall (TMK: 3-07-009:004) across from the existing Taco Bell Restaurant (At this point, the 24" HDPE force main line will be increased to a 30" HDPE gravity line to accommodate future additional flows from the Kahului Area)

(17) continues eastward along the southern border of the Maui Mall before turning northwestward within the parking lot, then turning northeastward

(18) crosses eastward over a private parcel owned by the County of Maui (TMK: 3-07-009:030) before entering a sewer pumping station owned by the County of Maui (TMK: 3-07-009:002) (from the sewer pumping station onward, a 24" HDPE line will again be used)

(19) crosses eastward beneath the paved section of the Hana Highway ROW

(20) turns northwesterly within the Hobron Avenue ROW to the Hobron Avenue-Amala Place intersection

(21) connects to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility (TMK: 3-07-011:019)

With Route "C", as with Route "B", disruption of traffic would be minimized relative to that of Route "A" by having the pipe offset from the existing Rights-of-Way except where necessary to cross the roadways at strategic locations, including Kahului Beach Road (twice), Kanaloa Avenue, Wahinepio Avenue, Kaahumanu Avenue, Kamehameha Avenue-Lono Avenue intersection,

Kamehameha Avenue-Puunene Avenue intersection, Hana Highway and Hobron Avenue. Similar to Route "B", Cut and Cover Trenching techniques would be used for all portions of the route.

Similar to Route "B", Route "C" will be less disruptive to the public with respect to traffic patterns. However, it will require easements across all of the public and private parcels not directly owned by the County of Maui. Exhibit "B" lists the properties affected by Route "C".

As with Routes "A" and "B", all portions of the line installed using Cut and Cover Trenching techniques are expected to be installed below the water table to avoid existing utilities.

In November, 2000, a cost estimate of Route "C" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". *Total Construction Cost was estimated at* ***$7,684,922*** *excluding any costs* associated with obtaining easements through the private parcels affected.

Approximately 9,150 l.f. of 24" HDPE pipe plus 3,550 l.f. of 30" HDPE pipe, making for a total length equal to 12,700 l.f. would be required for this Route.. The overall length of the pipe in Route "C" is longer than that in Route "B" by approximately 2300 l.f.

If easements from the affected property owners for Route "B" are not obtainable, Route "C" would be recommended. Although longer and more costly than Route "B", soil conditions are believed to be more favorable, and the traffic is much lighter along Kamehameha Avenue than Kaahumanu Avenue. Therefore, closing off one half of the roadway will not be as bad as closing the westbound lanes on Kaahumanu Avenue. Route "C" also has more available space for material and equipment storage along the route than along Kaahumanu Avenue.

A4. Route "C-2"

Route "C-2" is identical to that for Routes "C" and "B" along most of Kahului Beach Road, but deviates where the lines of Routes "B" and "C" cross eastward back to the Kahului Beach Road ROW. Instead, the line runs southwestward

through Maui Community College (MCC) property near the Harbor Lights Multi-Family development into a vacant State ROW that runs southeastward.

This line then crosses more Maui Community property before crossing beneath the paved section of the Kaahumanu Avenue ROW and turns eastward, crossing beneath the paved section of the Kane Avenue ROW before "hooking up" to the balance of the Route "C" layout. The balance of Route "C-2" is identical to that of Route "C".

Specifically, Route "C-2" begins at the existing Wailuku Pump Station, then takes the following path:

(1) to (7) is identical to that of Routes "B" and "C"

(8) runs southwestward through the Maui Community College (TMK: 3-08-007:125) along the northwestern property line of the Harbor Lights Multi-Family development

(9) crosses into, then runs southeastward along a vacant, unused State DOT ROW (TMK: 3-07-002:022)

(10) continues a short distance through the south east corner of the Maui Community College campus (TMK: 3-07-002:011)

(11) crosses beneath the paved section of the Kaahumanu Avenue ROW

(12) turns eastward along the southern edge of the Kaahumanu Avenue ROW

(13) crosses beneath the paved sections of the Kane Avenue ROW to a parcel owned by the State DAGS (TMK: 3-07-004:003)

(14) thereafter, the route is identical to that of Route "C", steps (11) through (21)

Route "C-2" is identical to that of Route "C" over a substantial portion of its length. This route was explored with the objective of avoiding the use of the

Kahului Beach Road ROW near the Harbor Lights Multi-Family development. As such it adds 1,200 l.f. of 24" HDPE pipe to that of Route "C" (refer to the discussions relevant to Route "C" above for the advantages and disadvantages of the balance of this route).

In November, 2000, a cost estimate of "C-2" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at ***$8,306,205*** ($621,283 more than Route "C"), primarily due to the increased total length, again excluding any costs associated with obtaining easements through the private parcels affected.

A5. Recommended Route

From among the four (4) Routes considered, Route "B" was selected based on the following reasons:

(a) It is much less disruptive to traffic flow than Route "A" since most of its length is offset from the roadway Rights-of-way.

(b) Of the three remaining routes which were offset from the roadway Rights-of-Way, it is the most direct route, leading to the shortest length of pipe (and trenching) and therefore the lowest estimated construction cost.

(c) Meetings were conducted with representatives of each of the parcel owners along Route "B". The representatives were cooperative and granted the County of Maui the required Rights-of-Entry to perform the toplogical map survey, archaeological reconnaissance study, botanical assessment study and subsurface test borings along this route.

(d) Private companies with possible underground utilities along this route were also contacted (see list in Section IX) requesting any available knowledge of possible locations of existing underground utilities and easements between the Wailuku Pumping Station and the junction box on Hobron Avenue. Again, representatives of these companies were very cooperative.

As a result of this effort by the County, Route "B" is currently the most researched of all routes, has the shortest length, is among the least disruptive to traffic and is expected to have the lowest construction cost. It is therefore the recommended Route.

B. ALTERNATIVE "2":

Alternative "2" represents the "Modify Existing System" alternative. This Alternative was considered only in the initial planning process but was eliminated in favor of Alternative "1" for two major reasons, as follows:

(1) Traffic disruptions would be unacceptably severe. The existing force main is located within the existing roadway rights-of-way for the entire length of Kahului Beach Road, within the west-bound lanes of Kaahumanu Avenue between the Kaahumanu Avenue-Kahului Beach Road intersection and just east of the Kaahumanu Avenue-Puunene Avenue intersection, then within the east-bound lanes of Kaahumanu Avenue across the Kaahumanu Avenue-Hana Highway intersection, then onto Hobron Avenue to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility. Road closures of any one of these segments cannot be reasonably considered given that a 1997 traffic count on the westbound lanes of this street was 16,413 vpd, with peak hour volumes being 1,610 vph during the morning and 1,256 vph during the evening. Rerouting the traffic to other streets will obviously create a cross-over nightmare on Hana Highway and elsewhere.

(2) Attempts to repair or otherwise modify the existing force main cannot be achieved without shutting down the existing force main system for extended periods of time. Recall that peak wet-weather flow into the Wailuku Pump Station in 1993 was estimated to be 7.72 MGD, and has certainly increased beyond that in the past 7-8 years. Ultimate design flow into the Wailuku Pump Station in the 1993 study was projected to be 17.04 MGD

C. ALTERNATIVE "3":

Alternative "3" represents the "No-Build" alternative. This Alternative leaves the Wailuku-Kahului region with the current risk that in the event of a break or malfunction of this 24+ years old force main, all daily wastewater generated will have no place to

go except perhaps into the Kahului Bay near the location of the break. In the longer run, it will impose unreasonable restrictions on the expected population growth projections in the Central Maui region, Finally, it ***completely contradicts*** the Project Needs and the stated "Goals, Objectives and Policies" of the latest "Wailuku-Kahului Community Plan, including economic, physical infrastructure, and health and safety concerns.

For these reasons, Alternative "3" was eliminated in favor of Alternative "1".

III. DESCRIPTION OF THE EXISTING ENVIRONMENT:

A. PHYSICAL ENVIRONMENT:

1. Surrounding Environment

The proposed Wailuku Force Main Replacement project will span between the existing Wailuku Wastewater Pump Station approximately 500 feet east of the Kahului Beach Road-Waiehu Beach Road-Lower Main Street intersection and a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility in Kanaha. The project includes the entire shoreline enclosed by the east and west breakwaters of Kahului Harbor Figure 1 provides a Project Location Map showing the general location of the project on the Island of Maui, while Figure 2 provides a more detailed view of the project site.

Four (4) different alignments were proposed and evaluated. These were described in detail in the "Alternatives Analysis" Section of this Draft Environmental Assessment (EA) Report. Depending on the alignment selected, the lines may be installed as far inland westward as the eastern boundary of the Maui Community College campus, and as far inland southward as Kamehameha Avenue between the two end points.

The project may therefore traverse one or more parcels on which the following landmarks exist (organized within the following Wailuku-Kahului Community Plan Land Use Categories):

a. "B" Business/Commercial

Maui Mall
Hideaway Restaurant
First Hawaiian Bank

b. "H" Hotel

Maui Beach Hotel
Maui Palms Hotel
Maui Seaside Hotel

c. "HI" Heavy Industrial

Container Yards of the State of Hawaii - Harbors Division

d. "LI" Light Industrial

Y. Hata Co., Ltd.

e. "OS" Open Space

Beach shoreline bordering Kahului Harbor

f. "P" Public/Quasi Public

Maui Community College

g. "PK" Park

Keopuolani Park
Canoe Club

as well as the following County and State roadway rights-of-way.

Kahului Beach Road
Kaahumanu Avenue
Kanaloa Avenue
Wahinepio Avenue
Kane Avenue
Lono Avenue
Kamehameha Avenue
Puunene Avenue
Hana Highway
Hobron Street
School Street
Wharf Street

2. Climate

Being at sea level, the Kahului Harbor area has a mean annual temperature of 77° F with a typical diurnal (daily) range of 10° - 15° F experienced locally. The annual variation in mean monthly temperatures is only about 9° F statewide. Air temperature in Hawaii has a muted annual cycle because of the small season-to-season changes in solar radiation and the ocean's moderating influence. Differences in temperature from place to place are mainly due to elevation. (Atlas of Hawaii, Third Edition, 1998).

Annual rainfall amounts at the nearby Kahului Airport is approximately 20± inches with monthly rainfall ranging from close to zero during June/July to up to 5 inches in January.

3. Topography and Soils

A feasibility study of pipeline installation was performed by Dames & Moore in May, 2000. In that study, Dames & Moore reviewed boring logs of the existing force main as well as other available foundation investigation reports that had been made within the vicinity of the general project site. The following observations were made.

"Based on the plan profiles of the 21 inch force main, the surface elevation varies from 13 feet mean sea level along beach road down to elevation 5 to 6 on Hobron Avenue and at the treatment plant."

"Based on the limited subsurface information we were able to review, we speculate that the subsurface soils along the alignment of the proposed sewer force main, may consist primarily of basalt and coral beach sand with layers of basalt gravel, cobbles and boulders; coral reef debris and ledges, overlying a basalt lava formation.

The mouth of the Iao Valley Stream is located near the Wailuku Force main pump station. The stream has transported a large amount of well-rounded basalt gravel cobbles and boulder to the

shoreline. It is speculated that the ocean waves have transported the basaltic materials along the harbor shoreline to as far as the area of Kaahumanu Avenue intersection. A large coral sand dune is located to the west of the Kahului Beach Road. Subsequently, the boring log for the existing force main pipe indicate that the site along the Kahului Beach Road is underlain by a layer of coral sand overlying a layer of sand with basalt gravel cobbles and boulders. The granular basalt layer is thickest near the Wailuku Pump Station and terminates on Kaahumanu Avenue between the intersections of Puunene Avenue and Wharf Street. It is speculated that coral sands and gravel underlay the granular basalt material. Basalt bedrock formations were encountered below the coral material at two locations near the intersection of Kahului Beach Road and Kaahumanu Avenue.

The soil to the east of Wharf Street and along Hobron Avenue and Amala Place, consist of beach sand overlying silty and loose beach sand with coral fragments. A cemented coral reef ledge formation may underlay the sand at Hobron Avenue and Amala Place.

The subsurface water table probably occurs at the ocean level and fluctuates with the tide."

4. Flood and Tsunami Hazard

The project site is basically at sea level in close proximity to the actual shoreline. This is consistent with Panel Number 150003 0190D of the Flood Insurance Rate Map (effective date March 16, 1995, prepared by the U. S. Federal Emergency Management Agency, Federal Insurance Administration), which shows that the project site is entirely within Flood Zone V23, inside the tsunami inundation limits (see Exhibit "C"). However, as the force main pipe will be buried below the existing ground surface, it should not be affected by tsunami action.

5. Flora and Fauna

As the project site is a highly urbanized area, including Heavy Industrial, Light Industrial, Hotel, and Multi-Family designations, no indigenous flora or fauna remain. (see Appendix C, "Botanical Resources Assessment Study").

6. Wetlands

The nearest wetlands are the Kanaha Pond Waterfowl refuge adjacent to the Kanaha Wastewater Reclamation Facility on Amala Place. After review of the Draft EA Report, the Office of Environmental Quality Control (OEQC) responded with a request for a description and inventory of the resources at Kanaha Pond. The Botanist, Char & Associates, who had prepared the Botanical Resources Assessment Report, was subsequently retained to comply with the OEQC's request. The environmental setting description, inventory and environmental assessment states that this project will have no impact on the wetlands at Kanaha Pond (see Appendix E, "Impacts on Wetlands at Kanaha Pond")

7. Archaeological Resources

An Archaeological Assessment Survey has been performed by Scientific Consultant Services (see Appendix B, "Archaeological Assessment Study Report"). In their report, they conclude as follows

> ***"Based on the archaeological reconnaissance; the results of archival research including previous archaeological projects and LCA information, and consultation with the Maui State Historic Preservation Officer, it is concluded that there is a high probability of encountering archaeological material from pre-Contact activities, as well as historic 19th century remains in sub-surface deposits along the coastal areas of Kahului Bay. The depth of these features may vary depending on previous construction activities and are difficult to predict, but have been identified in deposits from 0.20 to 2.00 meters below the surface."***

It may therefore be necessary to monitor the installation of the force main in the Construction Phase, if required by the SHPD. According to a letter from Dr. Robert Spear of Scientific Consultant Services, in his conversations with Melissa Kirkendall and Cathy Dagher of the State Historic Preservation Division, they indicated that this project would most likely require Archaeological Inventory Survey through monitoring. This scope of work normally includes ***' ...monitoring of all open excavations in areas that potentially could contain intact buried cultural deposits or burials. The archaeological monitor would record selected portions of all excavations, record and sample identified cultural deposits, and provide other archaeological support, as necessary."***

8. Air Quality

The major point source of emissions is the Maui Electric Company power plant situated at the northeast corner of the Hobron Avenue-Amala Place intersection near Pier One. The major nonpoint sources are the heavy volumes of traffic on Kaahumanu Avenue, especially during peak rush hours in the morning and evening. However, given the close proximity of the project site to the waters of Kahului Harbor, prevailing trade winds blowing through Kahului Bay from the northeast should quickly disperse any airborne pollutants.

9. Noise Characteristics

Traffic noise from Kahului Beach Road, Kaahumanu Avenue and Hana Highway are the predominant sources of noise along the proposed force main alignments. In the short term, there will be increased noise due to Construction during trenching, pipe installation and backfilling.

10. Scenic and Open Space Resources

The subject property will be located in the subsurface along the shoreline on the western shores of Kahului Harbor.

B. COMMUNITY SETTING:

1. Community Character

The Wailuku-Kahului region is located on the north shore of the Island of Maui. It encompasses the civic and business centers of Wailuku and Kahului, and the major seaport and airport. The surrounding agricultural lands of Central Maui, and the eastern half of the West Maui Mountains are also within this region. Population is concentrated in the urban centers of the region. Wailuku has maintained its role as the civic-financial-cultural center while Kahului has strengthened its role in recent years as the business and industrial center.

In addition to the urban centers of Wailuku-Kahului, the region also includes the more rural settlements of Waihee to the north and Waikapu and Puunene to the southeast. Agricultural lands are adjacent on the lower slopes of the West Maui Mountains and in the central plain south and east of Kahului. This green border is a significant part of the settlement pattern because of its open space and economic value. Kahului Harbor and Airport are major land users along the Kahului shoreline. As major ports of entry of people and goods, they serve as an important center of jobs and economic activity.

Wailuku-Kahului is also the cultural center of the Island of Maui. Major facilities include Maui Community College, the War Memorial Center, community theaters, major sports facilities and the central Keopuolani Park.

2. Population

The population of the County of Maui has exhibited relatively strong growth over the past decade, with the 1990 population estimated at 100,504, a 41.8 percent increase over the 1980 population of 70,847. Growth in the County is expected to continue, with resident population in the Year 2000 documented at 128,094 (2000 U. S. Census) and projected to 145,872 in the Year 2010 (Community Resources, Inc., January, 1994).

As noted in the Wailuku-Kahului Community Plan, population forecasts from Community Resources, Inc., project a population of approximately 44,876 to 48,658 residents in the region over the next 20 years.

3. Economy

The economy of Maui County is heavily dependent upon the visitor industry. In 1993, for example, total visitor arrivals numbered 2.5 million (Maui County Data Book, 1994). The Wailuku-Kahului region is often referred to as "Central Maui", indicating its role as the primary urban center of the island. Within the region are major public facilities and services -- the Maui Community College; War Memorial Sports Complex and Keopuolani Park; the Maui Arts and Culture Center; Maui Memorial Hospital; major Federal, State and County governmental facilities; and the primary airport and commercial harbor facilities on the island. The region also supports the largest resident population of any other district and serves as a major employment center for the island, in terms of industry, commerce and agriculture. In contrast to other regions on the island, it is not heavily oriented to hotel/resort development.

4. Police and Fire Protection

The Maui Police Department (MPD) consists of five (5) patrol divisions and includes 410 employees. These divisions provide police services through its Hana, Lahaina, Lanai, Molokai and Wailuku districts. On Maui, the MPD includes 373 administrative, patrol and support personnel.

The closest Fire Stations to the project site are the Kahului Fire Station on Dairy Road and the Wailuku Fire Station on Wells Street, which are located approximately 1 and 2 miles away, respectively.

5. Medical Facilities

Maui Memorial Medical Center, the only major medical facility on the island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by the 185-bed facility which is located in Wailuku.

6. Recreational Facilities

Recreational facilities in the Wailuku-Kahului region include the War Memorial Sports Complex, Wells Park, Keopuolani Park, Papohaku Park, Kahului Park, Paukukalo Park, Kanaha Beach Park, Kepaniwai Park, Maui Lani Golf Course,

Sandalwood Golf Course, Grand Wailea Golf Course, Waihee Golf Course, Maui Country Club, numerous tennis courts and aquatic sports, most notably windsurfing/kite surfing along the Kanaha Beach/Airport Beach shoreline.

7. Schools

"Central Maui" hosts a number of elementary, intermediate, high schools and colleges, including the following:

Elementary Schools

Wailuku Elementary
St. Anthony
Kahului
Lihikai

Intermediate Schools

Iao
St. Anthony
Lihikai
Maui Waena

High Schools

Baldwin
Maui
St. Anthony

Colleges

Maui Community College

8. Solid Waste

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by

County crews are disposed at the County's 55-acre Central Maui Landfill located four miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

C. INFRASTRUCTURE

1. Roadway System

The major thoroughfares leading into/out of the Central Maui area include the Hana Highway, Kaahumanu Avenue, Honoapiilani Highway, Puunene Avenue, Mokulele Highway and Kuihelani Highway. (Refer to Section III.A.1 for a list of roadways that may be affected by the project).

2. Water

The location of all waterlines and easements within the private and public parcels which may be traversed by the proposed force main have been identified based on available information provided by the Department of Water Supply.

3. Drainage

The location of all drainageways and culverts within the private and public parcels which may be traversed by the proposed force main have been identified based on available information provided by the DPWWM.

4. Wastewater System

The location of all sewer lines within the private and public parcels which may be traversed by the proposed force main have been identified based on available information provided by the Wastewater Reclamation Division of DPWWM.

5. Electrical, Telephone and Cable TV Systems

The location of all electrical, telephone and cable tv lines and easements within the private and public parcels which may be traversed by the proposed force main were requested from and provided by Maui Electric Company, Verizon, and Hawaiian Cable Vision.

6. Oil and Gas Systems

The area surrounding Hobron Avenue houses oil and gas storage tanks for several petroleum companies, including Chevron, Equilon Enterprises, Hawaii Fueling Network, Maui Oil Company, Maui Petroleum, Tesoro Hawaii Corporation-Maui Terminal

The location of all gas and oil pipelines within the private and public parcels (e.g., between the terminal in Kahului Harbor and the oil and gas storage tanks off Hobron Avenue) which may be traversed by the proposed force main have been identified based on written and verbal communication with each of these companies.

IV. POTENTIAL IMPACTS AND MITIGATION MEASURES:

A. IMPACTS TO THE PHYSICAL ENVIRONMENT:

1. Surrounding Uses

Once completed, the proposed 24" force main should not affect any public or private property owner. No adverse impacts are anticipated.

2. Flora, Fauna and Wetland Considerations

As the project site is highly urbanized, and there are no indigenous flora or fauna to be threatened (see Appendix C, "Botanical Resources Assessment Study Report"), no adverse impacts are anticipated. Although a short segment of the proposed project is in near proximity of the Kanaha Pond Waterfowl Refuge, adequate testing of the line prior to operational use should preclude any adverse impact on that Refuge.

The State of Hawaii Office of Environmental Quality Control (OEQC) responded to the Draft Environmental Assessment Report, whose notice was published in the December 23, 2001, issue of The Environmental Notice (see Section X of this Report, "Comments Received During Public Comment Period and Applicable Responses")

Item 3 of the OEQC response requested a description and inventory of the resources at Kanaha Pond. The Botanist, Char & Associates, who had prepared the Botanical Resources Assessment Report (see Appendix C), was subsequently retained to comply with this request. The environmental setting description, inventory and environmental assessment states that there will be no impact on the wetlands at Kanaha Pond (see Appendix E, "Impacts on Wetlands at Kanaha Pond).

3. Archaeological Resources

As mentioned in Section III(A)7 above, an Archaeological Assessment Study was performed by Scientific Consultant Services, Inc. (see Appendix B, "Archaeological Assessment Study Report" for their findings and conclusions).

Archaeological monitoring if required by the SHPD, will be performed during construction.

4. Air Quality

Air quality impacts attributed to the project will include dust generated by short-term construction-related activities. Sitework, such as Cut and Cover trenching and pavement construction, for example, will generate air-borne particulates. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. In the long term, the force main itself will not increase airborne pollutants from increased automobile traffic in any way.

5. Noise

Short-term noise impacts associated with construction activities along the project corridor may occur. However, construction activities will be restricted to normal daylight working hours, from Monday through Friday, excluding certain holidays. Long term automobile traffic is not expected to increase due to the construction of the force main.

6. Scenic and Open Space Resources

The proposed project involves installing a subsurface pipeline, and, once completed, will not obstruct any existing views.

B. IMPACTS TO COMMUNITY SETTING

1. Land Use and Community Character

Since the project involves an underground wastewater line replacement, it will have no impact on the land use or community character.

2. Population

On a short-term basis, the project will support construction and construction-related employment. The wastewater system itself will not create long term

employment, nor provide long-term residential housing. It will, however, improve the wastewater capacities for the existing and anticipated future residential subdivisions and properties within the service area of the existing Wailuku Pump Station.

3. Police, Fire and Medical Services

The proposed action will not increase demands placed upon police, fire and medical services.

4. Recreation

The proposed wastewater replacement project is not expected to affect recreational facilities in any adverse way.

5. Solid Waste

Once completed, this project will not of itself generate solid waste during operation.

During the Cut-and-Cover trenching operations, the excavated material will need to be stored temporarily at points along the route. However, any excavated material will then be replaced back into the trench as the pipe installation continues along the route.

In order to minimize possible pollution or runoff caused by the excavated material, according to Hawaii Standard Specifications for Road, Bridge and Public Works Construction - 1994, Section 625.03, "Construction Requirements" - (A) "Open Trench Excavation for Sewer Pipes",

> ***"If possible, the Contractor shall pile the excavated material next to the trench. ... If the Contractor cannot pile the excavated material next to the trench, the Contractor shall haul and store the material at a convenient site accepted by the Engineer.***
>
> ***"The Contractor shall not open the trench nor break the surface of the ground more than three hundred (300) feet ahead of the***

installed pipe, and shall not leave the trench unfilled more than three hundred (300) feet behind the installed pipe."

Filter rock berms with filter fabric will be constructed around the work area to contain the water borne silt to within the work area.

Dewatering procedures will be used only where necessary, in which case the Contractor will arrange with the owner for the disposal of seepage water through private property. The water will be routed through disiltation facilities before being discharged into existing drainage systems.

C. IMPACTS TO INFRASTRUCTURE

1. Roadways

The proposed force main replacement will not increase traffic except during the transportation of construction equipment during the Construction period. All roadway right-of-ways used to install the new wastewater force main will be left at their present condition or better.

The State of Hawaii Office of Environmental Quality Control (OEQC) responded to the Draft Environmental Assessment Report of this project in a letter dated January 22, 2002. The notice of the Draft EA Report was published in the December 23, 2001, issue of The Environmental Notice.

Item 4 of that letter (see Section X of this Report, "Comments Received During Public Comment Period and Applicable Responses"), requested that the use of Glassphalt in the roadway sections which will be trenched and replaced. Mr. Norman Shinno of Grace Pacific (Phone: 877-2755) on Maui was contacted on January 24, 2002, for his opinion of the use of glassphalt. He stated that glassphalt is used in the base course only - not on the paved surface as the asphalt does not stick to glass as it does to conventional aggregate. He also stated that on windy days it poses somewhat of a hazard to laborers.

Mr. Shinno also suggested a call to Mr. Ed McCary of the State Department of Transportation Material Testing and Engineering Lab. Mr. McCary was contacted (Phone: 873-3535) and confirmed that glassphalt is used only as the

base course material in roadways when cullet (crushed glass) is available. Mr. McCary also stated that during cold-planing of highways constructed with glassphalt, glass does get into the air. A copy of Mr. McCary's letter, dated January 24, 2002, is attached in Appendix F, "DOT Recommendation on the Use of Glassphalt Concrete Base Course")

If cullet is available, the General Contractor will be requested to comply with the State requirement to use it whenever cullet is available.

2. Water

The proposed project will not increase the consumption of (potable) water.

As a precautionary measure, the Department of Water Supply has been requested and has provided maps showing the locations of all known waterlines for the private and public parcels that may be traversed by the proposed force main so as to route around them.

3. Wastewater

The proposed project will not increase the generation of wastewater, but will improve the capacity for conveying wastewater between the existing Wailuku Pump Station and the Kahului Wastewater Reclamation Facility.

As a precautionary measure, the Department of Public Works and Waste Management has been requested and has provided maps showing the locations of all known sewer lines for the private and public parcels that may be traversed by the proposed force main so as to route around them.

4. Drainage

Existing drainage systems will not be affected in any way by the proposed force main replacement project.

As a precautionary measure, the Department of Transportation has been requested and has provided maps showing the locations of all known storm drains and culverts which exist on the private and public parcels bordering

Kahului Beach Road and Kaahumanu Avenue that may be traversed by the proposed force main so as to route around them.

5. Electrical, Telephone and Cable TV Systems

Completion of the proposed force main will not increase subscribership to electrical, telephone or cable TV systems.

As a precautionary measure, the Maui Electric Company, Verizon and Hawaiian CableVision, respectively have been requested and have provided maps showing the locations of all known electrical power lines, phone lines and cable TV lines and easements which exist on the private and public parcels that may be traversed by the proposed force main so as to route around them.

6. Oil and Gas Systems

Completion of the proposed force main will not increase consumption of oil or gas.

As a precautionary measure, each of the petroleum companies with oil and gas storage tanks in the vicinity of Hobron Avenue have been requested and have provided maps showing the locations of all known oil and gas lines and easements which exist on the private and public parcels that may be traversed by the proposed force main in the Hobron Avenue area so as to route around them (see Section IX, "Agencies and Companies Contacted for Preparation of the Environmental Assessment").

V. RELATIONSHIPS TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS:

A. STATE LAND USE DISTRICTS:

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural" and "Conservation". The State Land Use district designation for the parcels which may be traversed by the proposed force main replacement project is mostly "Urban", being in the center of the Wailuku-Kahului Community. The proposed action involves the construction of a replacement wastewater force main, which are permitted uses within lands with the "Urban" designation.

B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long range development of the County. As stated in the Maui County Charter (1999):

> *"The General Plan shall recognize and state the major problems and opportunities concerning the needs and development of the County and the social, economic and environmental effects of such development and shall set forth the desired sequence, patterns and characteristics of future development."*

The proposed action is in keeping with the following General Plan objectives and policies:

> "***C. LIQUID AND SOLID WASTE***
>
> ***Objective:***
>
> *1. To provide efficient, safe and environmentally sound systems for the disposal and reuse of liquid and solid wastes.*

Policies:

a. *Explore new waste disposal methods that are safe, economical, environmentally sound, and aesthetically pleasing, and that minimize the disposal of wastes in landfills.*

b. *Establish programs for the development of waste disposal systems which anticipate planned growth.*

c. *Establish comprehensive environmental and public health standards for the treatment, disposal and/or reuse of liquid and solid waste.*

d. *Develop comprehensive and publicly acceptable methods of recycling solid and liquid waste.*

e. *Encourage and promote public awareness to reduce, reuse, recycle and compost waste materials"*

C. WAILUKU-KAHULUI COMMUNITY PLAN

Refer to Section I.E "Project Need" in this Final Environmental Assessment for detailed ***Goals*** and ***Objectives*** in the pending Wailuku-Kahului Community Plan which are relevant to the proposed project. This Project is clearly consistent with the goals and objectives of this Community Plan. A list of the Wailuku-Kahului Community Plan Land Use Categories which may be traversed by the force main are listed in Section III.A.1 above.

D. ZONING

The Maui County Zoning designation for the proposed force main replacement is not applicable as it is a subsurface line which will be part of the infrastructure.

E. COUNTY OF MAUI SPECIAL MANAGEMENT AREA

The project is within the Special Management Area. A separate SMA permit application will be submitted.

VI. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED:

The proposed development will result in some unavoidable construction-related impacts as described in Chapter IV, Potential Impacts and Mitigation Measures.

Potential effects include noise generated impacts occurring from site preparation and construction activities. In addition, there may be temporary air quality impacts associated with dust generated from construction activities, and exhaust emissions discharged by construction equipment.

The proposed project is not anticipated to create any significant, long-term adverse environmental effects.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES:

The proposed project will result in the loss of subsurface coral, basalt gravel, cobblers and boulders displaced by the new 24" HDPE pipe line. All existing improvements (e.g., sidewalks, landscaping, pavement, etc.) destructed during trenching, material staging will be restored or replaced.

No other irreversible and irretrievable commitments of resources have been identified in connection with the proposed action.

VIII. FINDINGS AND CONCLUSIONS:

The proposed Project involves the construction of a 24" HDPE replacement wastewater force main.

Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action have been evaluated herein in accordance with the "Significance Criteria" of Section 11-200-12 of the Administrative Rules. Based on the analysis, the proposed project will not result in any adverse impacts. Discussion of project conformance to the criteria is given below:

1. No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource Would Occur as a result of the Proposed Project.

There are no known habitats of rare, endangered or threatened species of flora and fauna within the project limits. (see Appendix C, "Botanical Resources Assessment Study Report" and Appendix E, "Impacts on Wetlands at Kanaha Pond").

The State of Hawaii Office of Environmental Quality Control responded to the Draft Environmental Assessment Report for this Project. In a letter dated January 22, 2002 (see Section X, "Comments Received During Public Comment Period and Applicable Responses"), Item 2 stated that the Draft EA Report had "insufficient data to conclude that 'no irrevocable commitment to loss or destruction of any natural or cultural resource would occur'".

Scientific Consultant Services, who provided the Archaeological assessment attached in Appendix B, was retained to provide a Cultural Resources Assessment. Their subsequent report is attached in Appendix D, "Cultural Practices Assessment Report". In their conclusions, they stated the following:

> ***"Although the presence of the Force Main route, as proposed in the project, will ultimately not cause loss or destruction to any natural or cultural resource, construction methods may temporarily affect access to areas used for cultural activities... As several of the practices, such as line fishing and limu gathering***

happen regularly, access to these resource areas should always be maintained, even during construction of the route segment abutting that region. It is recommended that before any construction occurs in the Hoaloha Park/Hawaiian Canoe Club vicinity, a call be placed to Mary Aikona of the Hawaiian Canoe Club at (808) 893-2124 in case activities are planned."

These requirements will be placed into the Contract Documents so the General Contractor can take these potential scheduling constraints into account in the preparation of his contract bid.

2. ***The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment.***

The project would not curtail the beneficial uses of the environment.

3. ***The Proposed Action Does not Conflict with the State's Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes.***

The State Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is in conformance with the following policies and guidelines:

Environmental Policy:

(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, crate and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.

Guidelines:

(2) Land, water, mineral, visual air and other natural resources

(b) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;

(c) Promote the recycling of waste water;

4. *The Economic or Social Welfare of the Community or State Would not be Substantially Affected*

The project would directly benefit the local economy during the construction phase. In the long term, the project should have an indirect beneficial effect of providing higher wastewater conveyance capacities and reduce the risk of a break or malfunction in the existing single wastewater force main.

5. *The Proposed Action does not Affect Public Health*

No impacts to the public's health and welfare are anticipated.

6. *No Substantial Secondary Impacts, such as Population Changes or Effects on Public Facilities are Anticipated.*

No major population changes are anticipated as a result of the proposed project. The project is not anticipated to have adverse impacts upon medical, police and fire protection services as well as other public service systems.

7. *No Substantial Degradation of Environmental Quality is Anticipated*

No substantial degradation of environmental quality is anticipated as a result of the project. As stated before in Section IV, "Potential Impacts and Mitigation Measures", Subsection B, "Impacts to Community Setting", (5) "Solid Waste", the Contractor will be required to follow the Hawaii Standard Specifications for Road, Bridge and Public Works Construction - 1994, Section 625.03, "Construction Requirements" - (A) "Open Trench Excavation for Sewer Pipes",

> ***"If possible, the Contractor shall pile the excavated material next to the trench. ... If the Contractor cannot pile the excavated material next to the trench, the Contractor shall haul and store the material at a convenient site accepted by the Engineer.***
>
> ***"The Contractor shall not open the trench nor break the surface of the ground more than three hundred (300) feet ahead of the installed pipe, and shall not leave the trench unfilled more than three hundred (300) feet behind the installed pipe."***

Dewatering procedures will be used only where necessary, in which case the Contractor will arrange with the owner for the disposal of seepage water through private property.

8. ***The Proposed Action does not involve a Commitment to Larger Actions, nor would Cumulative Impacts Result in Considerable Effects on the Environment***

The proposed action does not involve a commitment to larger actions and should have no cumulative impacts on the environment.

9. ***No Rare, Threatened or Endangered Species or Their Habitats would be Adversely Affected by the Proposed Action***

There are no rare, threatened or endangered species of flora, fauna or avifauna or their habitats on the subject property. (See Appendix C, "Botanical Resources Assessment Study Report" and Appendix E, "Impacts on Wetlands at Kanaha Pond")

10. ***Air Quality, Water Quality or Ambient Noise Levels would not be Detrimentally Affected by the Proposed Project***

Construction activities will result in short term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction equipment. Construction will be limited to daylight working hours unless traffic conditions warrant working at night.

In the long term, the project will not have an impact on air quality or noise levels.

11. The Proposed Project would not affect Environmentally Sensitive Areas, such as Flood Plains, Tsunami Zones, Erosion-Prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters.

The entire project area is located in Zone V23, which is subject to tsunami and coastal wave inundation. However, since the force main pipe line is a subsurface system which will be installed below existing grade, this requirement is not applicable.

12. The Proposed Project would not Substantially Affect Scenic Vistas and Viewplanes Identified by County or State Plans or Studies

The completed force main will be subsurface, and will not affect the views to any existing open spaces.

13. The Project would not Require Substantial Energy Consumption

The force main pipe line will not consume any energy of itself.

Based on the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

IX. AGENCIES AND COMPANIES CONTACTED FOR PREPARATION OF THE ENVIRONMENTAL ASSESSMENT:

The following agencies and organizations were contacted during the Environmental Assessment review process:

1. State of Hawaii
   Department of Transportation
   Highways Division
   650 Palapala Drive
   Kahului, HI 96732

2. State of Hawaii
   Department of Transportation
   Harbors Division
   79 S. Nimitz Highway
   Honolulu, HI 96813

3. Maui Community College
   310 Kaahumanu Avenue
   Kahului, HI 96732

4. Elleair Hawaii, Inc.
   (Maui Beach Hotel)
   (Maui Palms Hotel)
   170 Kaahumanu Avenue
   Kahului, HI 96732

5. First Hawaii Bank
   20 W. Kaahumanu Avenue
   Kahului, HI 96732

6. Hideaway Restaurant
   500 N. Puunene Avenue
   Kahului, HI 96732

7. HRT Limited
(Maui Seaside Hotel)
845 Wainee Street, #213
Lahaina, HI 96761

8. A&B Properties, Inc.
33 Lono Avenue, Suite 400
Kahului, HI 96732

9. Department of Public Works and Waste Management
Wastewater Division
200 S. High Street
Wailuku, HI 96793

10. Department of Water Supply
200 S. High Street
Wailuku, HI 96793

11. Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, HI 96793

12. Y. Hata Co., Ltd.
P. O. Box 3770
Honolulu, HI 96812

13. Maui Electric Company, Ltd.
210 W. Kamehameha Avenue
Kahului, HI 96732

14. Verizon Hawaii
60 S. Church Street
Wailuku, HI 96793

15. Hawaiian Cable Vision Company
350 Hoohana Street
Kahului, HI 96732

16. The Gas Company
70 Hana Highway
Kahului, HI 96732

17. Maui Oil Company, Inc.
16 Hobron Avenue
Kahului, HI 96732

18. Tesoro Hawaii Corporation
Maui Terminal
140A Hobron Avenue
Kahului, HI 96732

19. Maui Gas Service
1644 Mill Street
Wailuku, HI 96793

20. Equilon Enterprises LLC
(formerly Shell Oil Co.)
60 Hobron Avenue
Kahului, HI 96732

21. Department of Land and Natural Resources
State Historic Preservation District
1151 Punchbowl Street
Honolulu, Hawaii 96813

22. State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

23. Chevron
100 Hobron Avenue
Kahului, HI 96732

24. Maui Petroleum, Inc.
76 Hobron Avenue
Kahului, HI 96732

25. Others named in the "A Cultural Practices Assessment for the Force Main Project in Wailuku and Kahului, Maui, Hawaii", Scientific Consultant Services, Inc., March, 2002 (see Appendix D)

X. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND APPLICABLE RESPONSES:

The Office of Environmental Quality Control (OEQC) responded to the Draft Environmental Assessment Report for this project with the attached letter. The item-by-item responses to their comments are given below. (The OEQC was the only source of comments to the Draft EA Report)

1. *Item 1 - Pre-Assessment Consultation*:

"Please indicate in the final environmental assessment those agencies that were contacted prior to preparation of the draft environmental assessment."

Response:

The agencies that had not been contacted prior to preparation of the Draft Environmental Assessment Report in December, 2001, have been deleted from Section IV, "Agencies and Companies Contacted for Preparation of the Environmental Assessment".

2. *Item 2 - Insufficient Data to Conclude that 'No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource would occur as a Result of this Project'*

"Although the draft EA appears to address the requirements of Chapter 6E, Hawaii Revised Statutes, governing historic preservation, the document does not discuss the cultural setting and impacts to cultural resources and practices as required by Act 50, Session Laws of Hawaii 2000"

Response:

Scientific Consultant Services, Inc., who prepared the Archaeological Assessment Study Report (see Appendix B), was retained to perform a Cultural Practices Assessment Report. The results of that assessment are included in Appendix D. That Report states the following:

> ***"Although the presence of the Force Main route, as proposed in the project, will ultimately not cause loss or destruction to any natural or cultural resource, construction methods may temporarily affect access to areas used for cultural activities... As several of the practices, such as line fishing and limu gathering happen regularly, access to these resource areas should always be maintained, even during construction of the route segment abutting that region. It is recommended that before any construction occurs in the Hoaloha Park/Hawaiian Canoe Club vicinity, a call be placed to Mary Aikona of the Hawaiian Canoe Club at (808) 893-2124 in case activities are planned."***

These requirements will be placed into the Contract Documents so the General Contractor can take these potential scheduling constraints into account in the preparation of his contract bid.

3. ***Item 3 - Indirect and Cumulative Impacts on Wetlands at Kanaha.***

Please include in the environmental setting a description and inventory of the resources at Kanaha Pond. Discuss indirect and cumulative impacts the project may have on the wetland.

Response:

The Botanist, Char & Associates, who had prepared the Botanical Resources Assessment Report (see Appendix C), was subsequently retained to comply with this request. The environmental setting description, inventory and environmental assessment states that there will be no impact on the wetlands at Kanaha Pond (see Appendix E, "Impacts on Wetlands at Kanaha Pond).

4. ***Item 4 - Use of Glassphalt in Roadway***

Please discuss the extent to which you will consider using glassphalt in paving the roadway.

Response:

Mr. Norman Shinno of Grace Pacific (Phone: 877-2755) on Maui was contacted on January 24, 2002, for his opinion of the use of glassphalt. He stated that glassphalt is used in the base course only - not on the paved surface as the asphalt does not stick to glass as it does to conventional aggregate. He also stated that on windy days it poses somewhat of a hazard to laborers.

Mr. Shinno also suggested a call to Mr. Ed McCary of the State Department of Transportation Material Testing and Engineering Lab. Mr. McCary was contacted (Phone: 873-3535) and confirmed that glassphalt is used only as the base course material in roadways when cullet (crushed glass) is available. Mr. McCary also stated that during cold-planing of highways constructed with glassphalt, glass does get into the air. A copy of Mr. McCary's letter, dated January 24, 2002, is attached in Appendix F, "DOT Recommendation on the Use of Glassphalt Concrete Base Course")

If cullet is available, the General Contractor will be requested to comply with the State requirement to use it whenever cullet is available.

BENJAMIN J. CAYETANO
GOVERNOR

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

January 22, 2002

Mr. Michael Miyamoto
Department of Public Works and Waste Management
County of Maui
200 South High Street
Wailuku, Hawai'i 96793

Mr. Alan L. Unemori
Warren S. Unemori Engineering, Inc.
2145 Wells Street, Suite 403
Wailuku, Hawai'i 96793

Dear Messrs. Miyamoto and Unemori:

Having reviewed the draft environmental assessment (DEA) for the Wailuku Wastewater Pump Station Force Main Replacement, Tax Map Key: 3-4-27:001 to 3-8-36:087, we offer the following comments for your consideration and response:

1. PRE-ASSESSMENT CONSULTATION: Section 11-200-9(a), step (1), Hawai'i Administrative Rules (1996), requires in pertinent part that "the proposing agency...at the earliest practicable time ... consult with other agencies having jurisdiction or expertise as well as those citizen groups and individuals which the proposing agency reasonably believes to be affected." The steps identified in section (a) of the rules are enumerated, indicating that such steps need to be performed in sequence. Step (3) of the rule, requires the an environmental assessment be prepared after steps (2) and (1) have been completed. We note that page 43 of the DEA indicates that "the following agencies and organizations were (or will be) contacted during the environmental assessment process." Please indicate in the final environmental assessment those agencies that were contacted prior to preparation of the draft environmental assessment. We respectfully remind you that the such consultation must be completed prior to preparation of the draft environmental assessment.

2. INSUFFICIENT DATA TO CONCLUDE THAT "NO IRREVOCABLE COMMITTMENT TO LOSS OR DESTRUCTION OF ANY NATURAL OR CULTURAL RESOURCE WOULD OCCUR AS A RESULT OF THIS PROJECT: We note that on page 39 of the DEA, the document states that "No irrevocable committment to loss or destruction of any natural or cultural resource would occur as a result of this project." Although the draft EA appears to address the requirements of Chapter 6E, Hawai'i Revised Statutes, governing historic preservation, the document does not discuss the cultural setting and impacts to cultural resources and practices as required by Act 50, Session Laws of Hawai'i 2000 (enclosed). In short, we believe that there is insufficient data to draw the conlusion above as found on page 39. Current cultural practices in the region which may be impacted by the project and which need to be inventoried, verified and discussed include: gathering in the coastal areas, fishing, swimming, surfing. Cultural resources in use today need to be inventoried; cultural practicioners need to be contacted to ascertain the link between cultural resources and current practice. Questions to consider include: how will this project affect gathering of limu and 'opihi and fishing in general? Will botanical species of cultural significance be displaced by this project? Who do we need to contact concerning these activities? Enclosed is a copy

of the "Cultural Impact Assessment Guidelines" adopted by the Environmental Council in 1997 for your use in meeting this requirement prior to submission of a final environmental assessment. This would include contacting neighbors and community members in the Wailuku/Kahului region to ascertain what cultural uses (if any) are occurring in the region encompassing the project. A directory of cultural impact assessment providers can also be found on the OEQC website at http://www.state.hi.us/health/oeqc/index.html.

3. INDIRECT AND CUMULATIVE IMPACTS ON WETLANDS AT KANAHA: Please include in the environmental setting a description and inventory of the resources at Kanaha Pond. Discuss indirect and cumulative impacts the project may have on the wetland.

4. USE OF GLASPHALT IN ROADWAY: Please discuss the extent to which you will consider using glasphalt in paving the roadway.

If there are any questions, please call Leslie Segundo, Environmental Health Specialist, at (808) 586-4185. Thank you for the opportunity to comment.

Sincerely,

GENEVIEVE SALMONSON
Director

Enclosures

~~SECTION 4. This Act shall take effect upon its approval.~~

~~(Approved April 26, 2000.)~~

~~Note~~

~~1. Edited pursuant to HRS §23G-16.5.~~

ACT 50

H.B. NO. 2895

A Bill for an Act Relating to Environmental Impact Statements.

Be It Enacted by the Legislature of the State of Hawaii:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit" in Hawaii. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to:

(1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and

(2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawaii Revised Statutes, is amended by amending the definitions of "environmental impact statement" or "statement" and "significant effect", to read as follows:

"""Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare[.], or cultural practices of the community and State."

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

(Approved April 26, 2000.)

~~ACT 51~~

H.B. NO. 2996

A Bill for an Act Relating to Agricultural Loans.

Be It Enacted by the Legislature of the State of Hawaii:

SECTION 1. The legislature finds that a substantial number of individuals and families are undertaking agricultural production on a part-time basis to supplement earnings obtained from full-time employment by one or more members of the household. In many instances, the individual and family are dependent upon farm earnings to make ends meet and provide other amenities for the family. With the uncertainties involved in farming, such as market demand, prices, government regulations, and weather, these people find that they are not able to leave the security of a steady income provided by their full-time employment and the benefits provided by their employer, especially medical coverage. Many part-time farmers want to expand their farm production as their limited operations are profitable.

Current government programs are tailored for full-time farming, consequently leaving these entrepreneurial and hard-working individuals with limited avenues for funding their operation. A loan program to assist part-time farmers would not only enable these individuals to expand their farming enterprise, but would increase the export potential of certain crops, as many part-time farmers are nurturing crops that are exportable. Exportable crops include fruits (papayas), ornamentals (orchids for cut flower and potted plants, and certified potted foliage), and plants with pharmaceutical qualities (awa root). Moreover, increasing exports would be beneficial to the state economy.

Farming activities today are increasingly being undertaken by recent immigrants to the State. Many of these immigrants are already skilled in farming techniques and have taken up farming as a livelihood. These immigrants are the "new wave" of farmers, as older farming generations are ceasing their farming activities, and turning their farmland into more profitable urban investments.

The legislature also finds that diversified agriculture is undergoing a significant period of transition and is a dynamic growth industry. With the closures of most of the State's sugar plantations, prime agricultural land, water, and an agriculturally-oriented labor force are now available for diversified agricultural development and expansion. As diversified agriculture grows, there will be a greater need to utilize and market the expected increase in agricultural production.

One of the primary ways to utilize the increase in production is through further development of value-added products. Processing and manufacturing present unlimited opportunities to sell agricultural products to vast export markets. Unlike fresh agricultural products, processed products are not restricted in shipment to export markets by quarantine regulations pertaining to pests, such as fruit flies. In addition, processed agricultural products are generally less perishable, allowing for greater ease in transport and shipment. A strong link exists between the production

State of Hawaii
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Guidelines for Assessing Cultural Impacts

Adopted by the Environmental Council, State of Hawaii
November 19, 1997

I. INTRODUCTION

It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

II. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access

to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

If the subject area is in a developed urban setting, cultural impacts must still be assessed. Many incorrectly assume that the presence of urban infrastructure effectively precludes consideration of current cultural factors. For example, persons are known to gather kauna''oa, ''ilima, ''uhaloa, noni or ki on the grassy slopes and ramps of the H-1 freeway and some state highways on the neighbor islands. Certain landmarks and physical features are used by Hawaiian navigators for sailing, and the lines of sight from landmarks to the coast by fisherman to locate certain fishing spots. Blocking these features by the construction of buildings or tanks may constitute an adverse cultural impact.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

(1) identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua`a;

(2) identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

(3) receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

(4) conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

(5) identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

(6) assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed

should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Mahele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§§§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but *not necessarily be limited* to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the

proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. *If you have any questions, please call 586-4185.*

REFERENCES

- Community Resources, Inc., "Maui County Community Plan Update Program Socio-Economic Forecast Report", January, 1994
- "Wailuku-Kahului Community Plan", Draft Copy, 2000
- Maui Economic Development Board, Inc., "Maui County Data Book", December, 1994
- Warren S. Unemori Engineering, Inc., "Final Preliminary Engineering Report, Wailuku Wastewater Pump Station Force Main Replacement", May, 2001, Prepared for County of Maui, Department of Public Works and Waste Management
- University of Hawaii at Hilo, Department of Geography, "Atlas of Hawaii", Third Edition, 1998
- Dames & Moore, "Feasibility of Pipeline Installation by Trenchless Method - Wailuku Wastewater Pump Station Forcemain Replacement", May 12, 2000
- URS, "Pipeline Installation by Trenchless and Cut and Cover Methods - Wailuku Wastewater Pump Station Forcemain Replacement", February 28, 2002
- Scientific Consultant Services, Inc., "An Archaeological Assessment for the Wailuku Force Main Project in Wailuku and Kahului, Maui", October, 2001
- Char & Associates, "Botanical Resources Assessment Study, Wailuku Force Main Project, Wailuku District, Maui", November, 2001
- Char & Associates, "Wailuku Force Main Replacement Impacts on Wetlands at Kanaha Pond
- Scientific Consultant Services, "A Cultural Practices Assessment for the Force Main Project in Wailuku and Kahului, Maui, Hawaii", March, 2002

APPENDICES

APPENDIX A

Preliminary Engineering Report

Established 1969

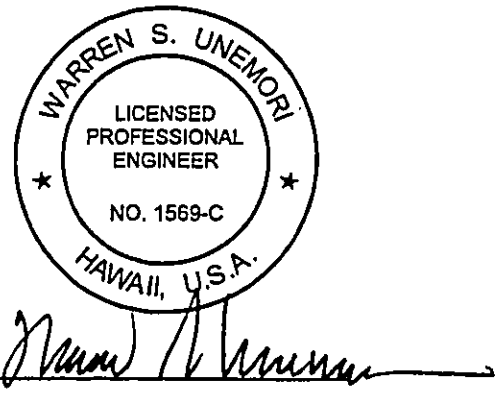
Final Preliminary Engineering Report

WAILUKU WASTEWATER PUMP STATION FORCE MAIN REPLACEMENT
Contract Number C-1412

Wailuku-Kahului, Maui, Hawaii

Prepared For:

Department of Public Works and Waste Management
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793



Warren S. Unemori Engineering, Inc.
Civil and Structural Engineers - Land Surveyors
2145 Wells Street, Suite 403
Wailuku, Hawaii 96793

Date: March, 2002

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INTRODUCTION

Wastewater from Wailuku, Waiehu, Paukukalo and portions of Kahului and Waiehu on the Island of Maui is directed into the Wailuku Pump Station located approximately 500 feet east of the Kahului Beach Road, Waiehu Beach Road and Lower Main Street intersection. The Wailuku Wastewater Pump Station then conveys wastewater to the Kahului Wastewater Reclamation Facility in Kanaha by means of 12,000 feet of 21-inch diameter force main. The locations of the Wailuku Pump Station, Kahului Wastewater Reclamation Facility and approximate route of the existing force main are shown on Figure 1.

BACKGROUND

The Kahului Wastewater Reclamation Facility was completed in 1977. According to the County's as-built construction plans, the Wailuku force main was constructed in late 1976. When the Kahului Wastewater Reclamation Facility was completed in 1977, the ocean outfall located north of the Kahului west breakwater was terminated and all wastewater previously directed to the ocean outfall was redirected into the Kahului Wastewater Reclamation Facility.

Since 1977 the area served by the Wailuku Pump Station has experienced substantial growth. Furthermore since this is the only means of conveying wastewater from the Wailuku service area to the Kahului Wastewater Reclamation Facility any break or malfunction of this system could result in a substantial wastewater discharge to ocean waters.

OBJECTIVES

The objectives of this Final Preliminary Engineering Report are as follows:

- Evaluate alignment alternatives for a new force main.
- Develop order of magnitude type cost estimate for the alignment and design alternatives.
- Evaluate permit requirements for the alignment alternatives.
- Evaluate construction improvements and constraints associated with each alternative.
- Based on the evaluation recommend the appropriate alignment for the replacement force mains.

DESIGN CRITERIA

The County's Wailuku/Kahului Sewer Master Plan prepared by Brown and Caldwell in 1993 will form the basis for the design criteria for the replacement force main. Peak wet-weather flow into the Wailuku Pump Station in 1993 was estimated to be 7.72 MGD. The ultimate design flow was projected to be 17.04 MGD.

The force main will be a 24-inch (ID) diameter High Density Polyethylene pipe (HDPE) with welded joints. Friction factor of C 130 will be used to determine friction loss. Based on standard Hydraulic Tables, for a 24-inch pipe with a maximum flow rate ranging between 5 to 10 fps per manufacturer's recommendation, maximum design flow capacity per pipe will be 18 MGD.

The County of Maui completed upgrades to the Wailuku pump station structure and pumps in 1999. All three variable-speed centrifugal pumps were replaced. Each pump is rated to pump approximately 8 million gallons per day. Two pumps in operation are estimated to pump approximately 10 MGD>

The County of Maui Wastewater Reclamation Division recently has estimated the future maximum wet weather flows at Wailuku Pump Station to be 14 MGD. The installation of a proposed 24-inch diameter HDPE force main, and a higher C value, will allow higher flows with reduced pipe losses. However, these improvements may impact the stability of pump station operations.

Due to anticipated higher flows and lower pipe losses, the pumps may operate in a range where they are more susceptible to vibration. To address potential vibration caused by higher flows and a larger force main, one or more of the following Wailuku Pump Station improvements may be needed (under a separate study):

(1) pump and piping modifications

(2) changes to te wetwell geometry, or

(3) modifications to operation procedures.

Existing pump conditions as well as future flow criteria will be evaluated.

DESCRIPTION OF ALIGNMENT ALTERNATIVES

According to the County's initial Request for Proposal (RFP) the scope of services originally consisted of the design of two (2) new parallel force mains, generally following the route of the existing force main. The objective at that time was to stay within the existing easement to avoid having to obtain SMA and Environmental permits for the project. DPWWM is evaluating whether to refurbish the existing line later (not part of this contract) to serve as a backup line.

Since then, however, due to budgetary and traffic disruption constraints, the scope of services has been reduced to the design of a single new force main, generally following the route of the existing force main except that it will be deliberately offset out of the existing Roadway Rights-of-Way as much as possible to minimize traffic disruptions. The force main will be routed over a length ranging from approximately 10,000+ feet to 12,000+ feet, depending on the Alternative.

The existing 21-inch force main falls within a 10-foot wide easement within the rights-of-way along Kahului Beach Road, the west-bound lanes of Kaahumanu Avenue between Kahului Beach Road, past the start of Hana Highway, then onto Hobron Avenue to Amala Place to the Kahului Wastewater Reclamation Facility in Kanaha.

As construction of the 24-inch force main replacement within the existing easement would severely impact traffic on these roadways, four (4) alternative routes were considered that generally follow the existing 21-inch force main, but are offset over existing public and private properties to avoid severe disruptions to the existing traffic patterns. Details of these alternate routes are given in more detail in the following sections (see Figure 2 for the alternative alignments):

Alternative A:

Alternative Route "A" considers using the existing roadway rights-of-way (ROW) within which to route the replacement pipe. Specifically, the Alternative Route "A" begins at the existing Wailuku Pump Station, then takes the following path:

(1) crosses southward across a private parcel owned by Y. Hata & Co., Ltd (TMK: 3-04-027:001)

(2) crosses a County of Maui parcel (TMK: 3-04-027:026)

(3) crosses two private parcels owned by A&B (TMK: 3-07-001:005 + 3-07-001:016)

(4) crosses westward beneath the paved section of Kahului Beach Road to the western side of that ROW

(5) runs along the Kahului Beach Road ROW beyond the Harbor Lights development, then crosses eastward beneath the paved section of Kahului Beach Road in front of a private parcel owned by Okada Trucking Co., Ltd. (TMK: 3-007-002:005)

(6) runs further along the eastern side of the Kahului Beach Road ROW

(7) runs along the west-bound lanes of the Kaahumanu Avenue ROW fronting the Maui Beach Hotel, the Maui Seaside Hotel, private parcels owned by A&B, First Hawaiian Bank,

(8) runs past the Kaahumanu Avenue-Puunene Avenue intersection

(9) crosses beneath the paved section of Kaahumanu Avenue southeastward

(10) runs further along the west-bound lanes of Kaahumanu Avenue past the Kaahumanu Avenue-Hana Highway intersection

(11) crosses eastward beneath the paved section of Hobron Avenue

(12) turns northward along the eastern side of the Hobron Avenue ROW to a junction box on Hobron Avenue

With Alternative Route "A" a major problem exists in that in the segment along the west-bound lanes of Kaahumanu Avenue, the existing easement over private property along the Maui Beach Hotel is only 10 feet wide, with the existing force main located in the middle of it. With the depth of the existing line to invert varying between 7 to 14 feet, it will be very difficult to install a new 24-inch diameter line within that existing easement. The problem is further compounded by the fact that a significant portion of the existing line runs under an existing sidewalk which will be susceptible to damage by construction equipment.

With the existing line occupying one of the two westbound lanes of Kaahumanu Avenue between Hana Highway and Puunene Avenue, the westbound lanes of this street will have to be closed off entirely during the installation of the additional 24-inch replacement line. According to the 1997 traffic count on Kaahumanu Avenue, the average daily traffic on westbound lanes of this street was 16,413 vehicles per day (vpd), with peak hour volumes being 1,610 vehicles per hour (vph) during the morning and 1,256 vehicles per hour during the afternoon/early evening. Rerouting the traffic to other streets (e.g., Kamehameha Avenue, Wakea Avenue, etc.) will obviously create a cross-over nightmare on Hana Highway and elsewhere. At least one and possibly two southbound lanes on Kahului Beach Road will have to be closed during construction.

Roadway closures are therefore unavoidable if the replacement pipe alignment is located within the roadway ROWs, regardless of whether Trenchless Methods or traditional "Cut and Cover Trenching" Methods are used.

The new lines for Alternative Route "A" will have to be installed using the traditional Cut and Cover Trenching techniques. Since the invert of the lines will be close to or below sea level, dewatering may be necessary. The depth of the trenches and the predominantly sandy material expected will mandate that shoring be provided for most of the project length. Moreover, working so close to an active line will increase the risk of damaging it during construction.

Alternative B:

Alternative Route "B" is an alternative alignment which generally follows the existing force main route, but is designed to avoid traffic disruptions. Specifically, Alternative Route "B" begins at the existing Wailuku Pump Station, then takes the following path:

(1) crosses eastward across a private parcel owned by Y. Hata & Co., Ltd (TMK: 3-04-027:001)

(2) turns southward over two beach remnants owned by the County of Maui (TMK: 3-04-027:26 + 3-07-001:16)

(3) crosses beneath the paved section of Kahului Beach Road to a vacant parcel owned by A&B (TMK: 3-8-07:38) then southward across this lot

(4) crosses beneath the Kanaloa Road ROW to Keopuolani Park (TMK: 3-07-001:002)

(5) runs southward along Kahului Beach Road within Keopuolani Park

(6) crosses beneath the Papa Avenue ROW to Maui Community College

(7) runs southward along Kahului Beach Road within Maui Community College (TMK: 3-08-007:125)

(8) runs generally between the north and south-bound lanes on Kahului Beach Road

(9) crosses eastward beneath the paved section of Kahului Beach Road ROW immediately north of the Kahului Beach Road-Kaahumanu Avenue intersection

(10) crosses eastward within parcels in front of Maui Beach Hotel (TMK: 3-07-003:28), Maui Palms (TMK: 3-07-003:26), the entry to Maui Seaside (TMK: 3-07-003:027), the Maui Seaside (TMK: 3-07-003:003)

(11) turns northward within a vacant lot (TMK: 3-07-003:008)

(12) crosses northeastward across the southeast corner of the Hawaiian Canoe Club (TMK: 3-07-008:017)

(13) crosses northeastward beneath the parking lot (former roadway) on the south side of the Hideaway Restaurant

(14) crosses northeastward beneath the paved section of Puunene Avenue ROW

(15) crosses northeastward beneath the Container Yard owned by the State Harbors Division (TMK: 3-008:006) to Wharf Street

(16) crosses eastward beneath the paved section of the Wharf Street ROW

(17) after Wharf Street it crosses onto A & B Property (TMK: 3-07-10:01 and TMK: 3-07-10:36) before going onto the State DOT Container Yard (TMK: 3-07-10:02)

(18) crosses eastward beneath the paved section of Hobron Avenue

(19) turns northward along the eastern side of the Hobron Avenue ROW

(20) connects to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility (TMK: 3-07-011:019)

An extensive geotechnical investigation in which sixteen (16) test borings was completed by URS in November, 2001. Results of the investigation precluded the use of Horizontal Directional Drilling techniques because of unfavorable soil conditions and other factors.

This alternative route, although less disruptive to the public with respect to traffic, will require easements across all of the public and private parcels not directly owned by the County of Maui. Exhibit "B" lists the properties affected by Alternative Route "B".

Alternative C:

Alternative Route "C" is identical to that for Alternative Route "B" along the Kahului Beach Road, but deviates from Alternative Route "B" between the Kahului Beach Road-Kaahumanu Avenue Intersection and the junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility. This Alternative Route was evaluated in order to avoid traversing the numerous developed areas encountered in Alternative Routes "A" and "B", but is longer in length as a result. Specifically, Alternative Route "C" begins at the existing Wailuku Pump Station, then takes the following path:

(1) to (9) is identical to that of Alternative Route"B"

(10) crosses southward beneath the paved section of the Kaahumanu Avenue ROW to the northern property line of a parcel owned by the State DAGS (TMK: 3-07-004:003)

(11) runs eastward along the northern property line of this State DAGS lot, then turns southward at the eastern property line of this lot

(12) runs southward into the School Street ROW up to the School Street-Kamehameha Avenue Intersection

(13) runs eastward along the northern side of the Kamehameha Avenue ROW beneath the paved sections of the Kamehameha Avenue-Lono Avenue intersection

(14) continues eastward along the northern side of the Kamehameha Avenue ROW south of the Kahului Shopping Center

(15) runs eastward beneath the paved sections of the Kamehameha Avenue-Puunene Avenue intersection

(16) continues eastward along the northern side of the Kamehameha Avenue ROW before crossing over into the parking lot of the Maui Mall (TMK: 3-07-009:004) across from the existing Taco Bell Restaurant (At this point, the 24" HDPE force main line will be increased to a 30" HDPE gravity line to accommodate future additional flows from the Kahului Area)

(17) continues eastward along the southern border of the Maui Mall before turning northwestward within the parking lot, then turning northeastward

(18) crosses eastward over a private parcel owned by the County of Maui (TMK: 3-07-009:030) before entering a sewer pumping station owned by the County of Maui (TMK: 3-07-009:002) (from the sewer pumping station onward, a 24" HDPE line will again be used)

(19) crosses eastward beneath the paved section of the Hana Highway ROW

(20) turns northwesterly within the Hobron Avenue ROW to the Hobron Avenue-Amala Place intersection

(21) connects to a junction box on Hobron Avenue near the Kahului Wastewater Reclamation Facility (TMK: 3-07-011:019)

Similar to Alternative Route "B", Alternative Route "C" will be less disruptive to the public with respect to traffic patterns. However, it will require easements across all of the public and private parcels not directly owned by the County of Maui. Exhibit "B" lists the properties affected by Alternative Route "C".

As with Alternative Routes "A" and "B", all portions of the line installed using Cut and Cover Trenching techniques are expected to be installed below the water table to avoid existing

utilities. The pipe will be laid into the ground water without dewatering. Due to the anticipated depth of trenches, use of sheet piles will also be required for most of the cut and cover trenching operations.

Approximately 9,150 l.f. of 24" HDPE pipe plus 3,550 l.f. of 30" HDPE pipe, making for a total length equal to 12,700 l.f. will be installed.

If easements from the affected property owners for Alternative Route "B" are not obtainable, Alternative Route "C" is recommended. Although longer and more costly than Alternative "B", soil conditions are believed to be more favorable, and the traffic is much lighter along Kamehameha Avenue than Kaahumanu Avenue. Therefore, closing off one half of the roadway will not be as bad as closing the westbound lanes on Kaahumanu Avenue. Alternative "C" also has more available space for material and equipment storage along the route than along Kaahumanu Avenue.

Alternative C-2:

Alternative Route "C-2" is identical to that for Alternatives Routes "C" and "B" along most of Kahului Beach Road, but deviates where the lines of Alternative Routes "B" and "C" cross eastward back to the Kahului Beach Road ROW. Instead, the line runs southwestward through Maui Community College (MCC) property near the Harbor Lights Multi-Family development into a vacant State ROW that runs southeastward.

This line then crosses more MCC property before crossing beneath the paved section of the Kaahumanu Avenue ROW and turns eastward, crossing beneath the paved section of the Kane Avenue ROW before "hooking up" to the balance of the Alterative Route "C" layout. The balance of Alternative Route "C-2" is identical to that of Alternative Route "C".

Specifically, Alternative Route "C-2" begins at the existing Wailuku Pump Station, then takes the following path:

(1) to (7) is identical to that of Alternative Routes "B" and "C"

(8) runs southwestward through the Maui Community College (TMK: 3-08-007:125) along the northwestern property line of the Harbor Lights Multi-Family development

(9) crosses into, then runs southeastward along a vacant, unused State DOT ROW (TMK: 3-07-002:022)

(10) continues a short distance through the south east corner of the Maui Community College campus (TMK: 3-07-002:011)

(11) crosses beneath the paved section of the Kaahumanu Avenue ROW

(12) turns eastward along the southern edge of the Kaahumanu Avenue ROW

(13) crosses beneath the paved sections of the Kane Avenue ROW to a parcel owned by the State DAGS (TMK: 3-07-004:003)

(14) thereafter, the route is identical to that of Alternative Route "C", steps (12) through (22)

Alternative Route "C-2" is identical to that of Alternative Route "C" over a substantial portion of its length. This route was explored with the objective of avoiding the use of the Kahului Beach Road ROW near the Harbor Lights Multi-Family development. As such it adds 1,200 l.f. of 24" HDPE pipe to that of Alternative Route "C". (refer to the discussions relevant to Alternative Route "C" above for the advantages and disadvantages of the balance of this route)

COST ESTIMATES

Alternative A

In November, 2000, a cost estimate of Alternative Route "A" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at *$9,348,433*. This estimate was based on having approximately 10,300 l.f. of 24" HDPE pipe placed using Cut and Cover Trenching techniques.

Alternative B

In November, 2000, a cost estimate of Alternative Route "B" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at *$5,823,498* excluding any costs associated with obtaining easements through the private parcels affected. This estimate was based on having approximately 10,400 l.f. of 24" HDPE pipe, with 4,050 l.f. placed by HDD techniques, and 6,350 l.f. placed by Cut and Cover Trenching techniques. However, as mentioned above, the results of the extensive geotechnical investigation precludes the use of HDD techniques along this route. Construction costs are therefore expected to change from that estimated during that study and may increase.

Alternative C

In November, 2000, a cost estimate of Alternative Route "C" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total

Construction Cost was estimated at ***$7,684,922*** excluding any costs associated with obtaining easements through the private parcels affected.

Alternative C-2

In November, 2000, a cost estimate of Alternative "C-2" was prepared by Cost Engineering of Hawaii, Inc. The detailed cost breakdown is shown in Exhibit "A". Total Construction Cost was estimated at ***$8,306,205*** ($621,283 more than Alternative Route "C", primarily due to the increased total length, again excluding any costs associated with obtaining easements through the private parcels affected.

PERMIT REQUIREMENTS

All four (4) alternatives will require an archeological study and or monitoring plan, grading plan, NPDES permit from the State Department of Health, dewatering plan, stockpiling permit, traffic control plan, and right to work within State and County road right-of-way permits. Should hazardous material be encountered along Hobron and Amala Place, permit for disposal of hazardous waste may also be required.

Alternative A

The existing easement along the north side of Kaahumanu Avenue between Kahului Beach Road and Puunene Avenue is only 10 feet wide. It is obviously too narrow to accommodate the additional 24-inch diameter line proposed. Moreover, existing buildings, coconut trees and other topographic barriers would make it very difficult to widen this existing easement. Doing so will trigger Environmental Assessment (EA) and Special Management Area (SMA) permits. Approval of the State Department of Transportation Highways Division will be critical and have to be obtained before any plans can be formulated for the installation of the new line on Kaahumanu Avenue along the existing alignment.

Alternative B

This alignment would deviate from the existing force main route and traverse County, private and State owned lands. Environmental Assessment (EA) and Special Management Area (SMA) permits will be required for this alternative. Easements will also have to be secured from the respective land owners. Permission of the State Department of Transportation Harbors Division will also have to be obtained to dig several entry/exit pits in their container yard.

Alternative C

This alternative will traverse Keopuolani Park on the west side of Kahului Beach Road and also over School Street. Right-of-entry and easements will have to be secured from the County and A&B Properties respectively. The remainder of Alternative "C" will be confined to County and State owned road right-of-ways. Environmental Assessment (EA) and Special Management Area (SMA) permits will be required.

Alternative C-2

Same as Alternative C.

COMPARATIVE CONSTRUCTION REQUIREMENTS

Alternative A

The new lines for this alternative will be installed utilizing the conventional cut and cover trenching process. Since the invert of the lines will be close to or below sea level, dewatering will be necessary. The depth of trenches and the predominantly sandy material expected will mandate that shoring be provided for most of the project length. Moreover, working so close to an active line will increase the risk of damaging it during construction.

At least one and possibly two southbound lanes on Kahului Beach Road will have to be closed during construction. The westbound lanes on Kaahumanu Avenue between Hana Highway and Puunene Avenue will also have to be closed for the installation of the lines. Although westbound traffic may be detoured along Kamehameha Avenue, the crossover from Hana Highway to Kamehameha will be difficult and inevitably create a major backup on the northbound lanes on Hana Highway.

Alternative B

The results of the extensive geotechnical investigation has precluded the use of HDD techniques. Cut and cover trenching methodology will be utilized throughout the route. However the alignment will be shifted westward into Keopuolani Park out of the Kahului Beach Road right-of-way. This is to lessen the impact on Kahului Beach Road traffic and also as a cost saving measure.

No work will be done on Kaahumanu Avenue west of Hana Highway intersection. This alternative, although less disruptive to the public, will require easements across Keopuolani Park from Elleair Hawaii Inc., A&B Properties, and the State Harbors Division container yards.

Alternative C

This alternative, although longer in length, avoids traversing numerous developed areas encountered in Alternatives "A" and "B". Except for Keopuolani Park and Vevau Street, the entire route would be confined to existing road right-of-ways. As with Alternative "A" and "B", the section between Kaahumanu Avenue and the KWRF is expected to be installed below the water table to avoid existing utilities. This will require the use of interlocking sheet piles and dewatering most of the way. Although about 2400 feet longer than Alternatives "A" and "B", this alternative is expected to be less disruptive relative to traffic and to existing businesses.

Alternative C-2

This Alternative is identical to that of Alternative C for the most part, except that it crosses between Maui Community College and Harbor Lights, and additionally will cross Kaahumanu Avenue closer to the Kaahumanu Avenue Shopping Center.

CONCLUSION AND RECOMMENDATION

After evaluating the four (4) alternative routes for the Wailuku Force Main Replacement project, it is our conclusion that Alternative B utilizing a combination of cut and cover trenching operation and directional drilling trenchless excavation technology is the preferred alternative for the following reasons:

(1) It has the lowest construction cost of the three.

(2) It will be the least disruptive to traffic.

(3) It is the most direct route between the pump station and the Kahului Wastewater Reclamation Facility

(4) It is expected to encounter fewer existing utilities.

After meeting the public and private parcel owners along Alternative "B", and gaining the necessary rights-of-entry to perform the geotechnical, archaeological, and botanical studies, it was clear that they were amenable to granting easements for the construction of the force main across their parcels.

FIGURES

1. Project Location Map

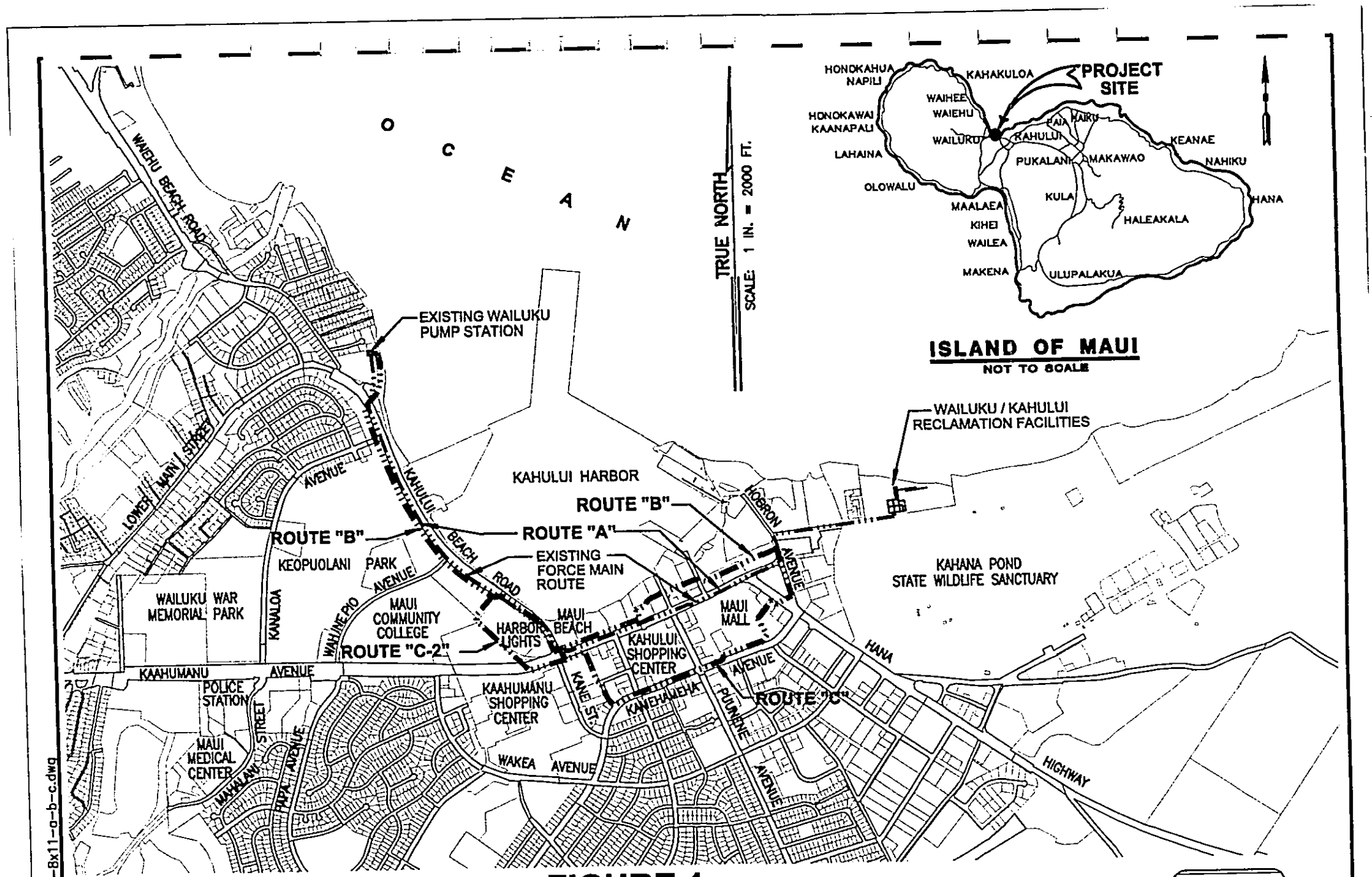

FIGURE 1
PROJECT LOCATION MAP

0 2000 4000 6000

SCALE: 1 IN. = 2000 FT.

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

January 10, 2001
Revised: January 16, 2001
Revised: November 27, 2001

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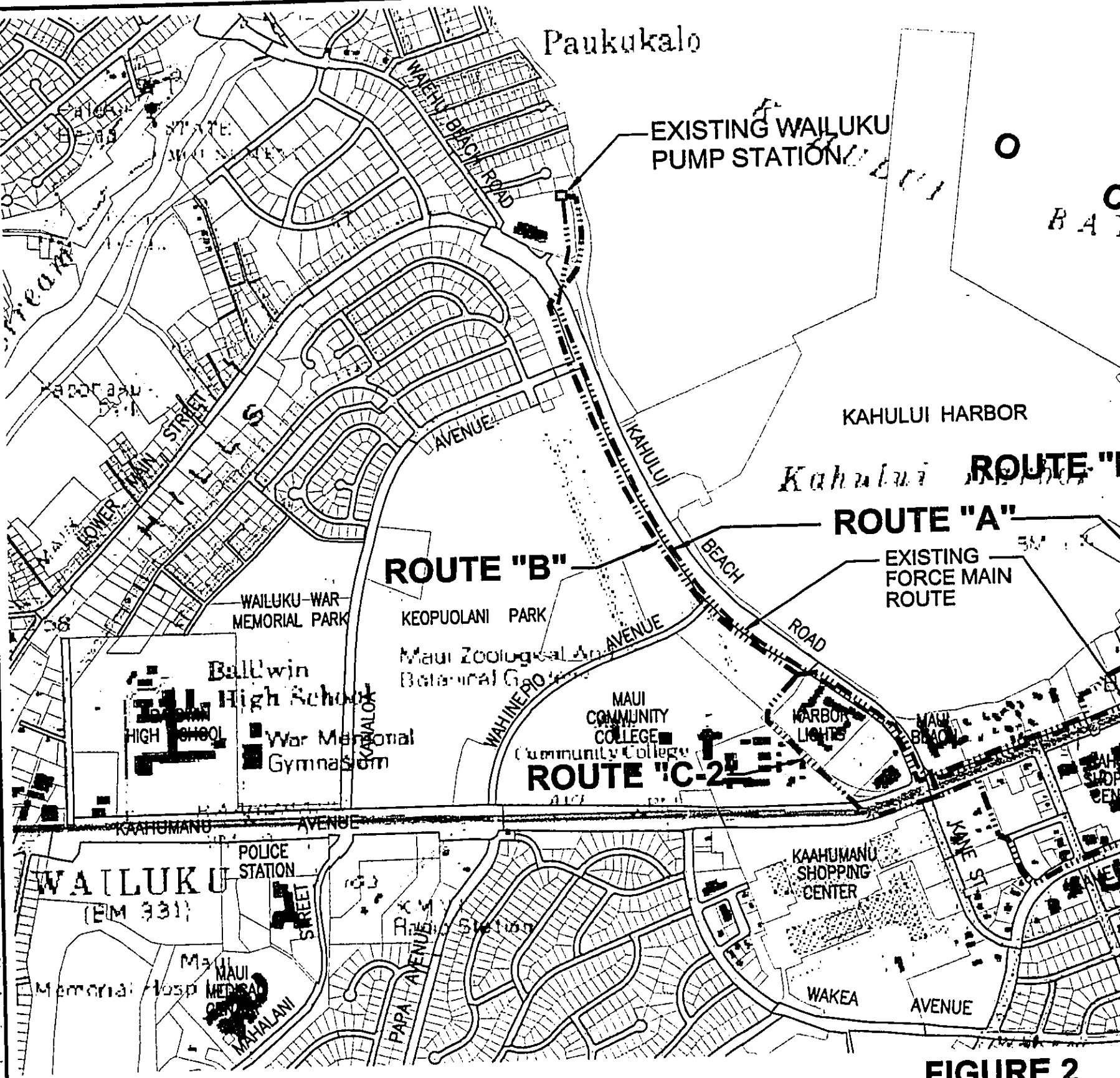
2. Site Map Showing Locations of Project Improvements



LEGEND:

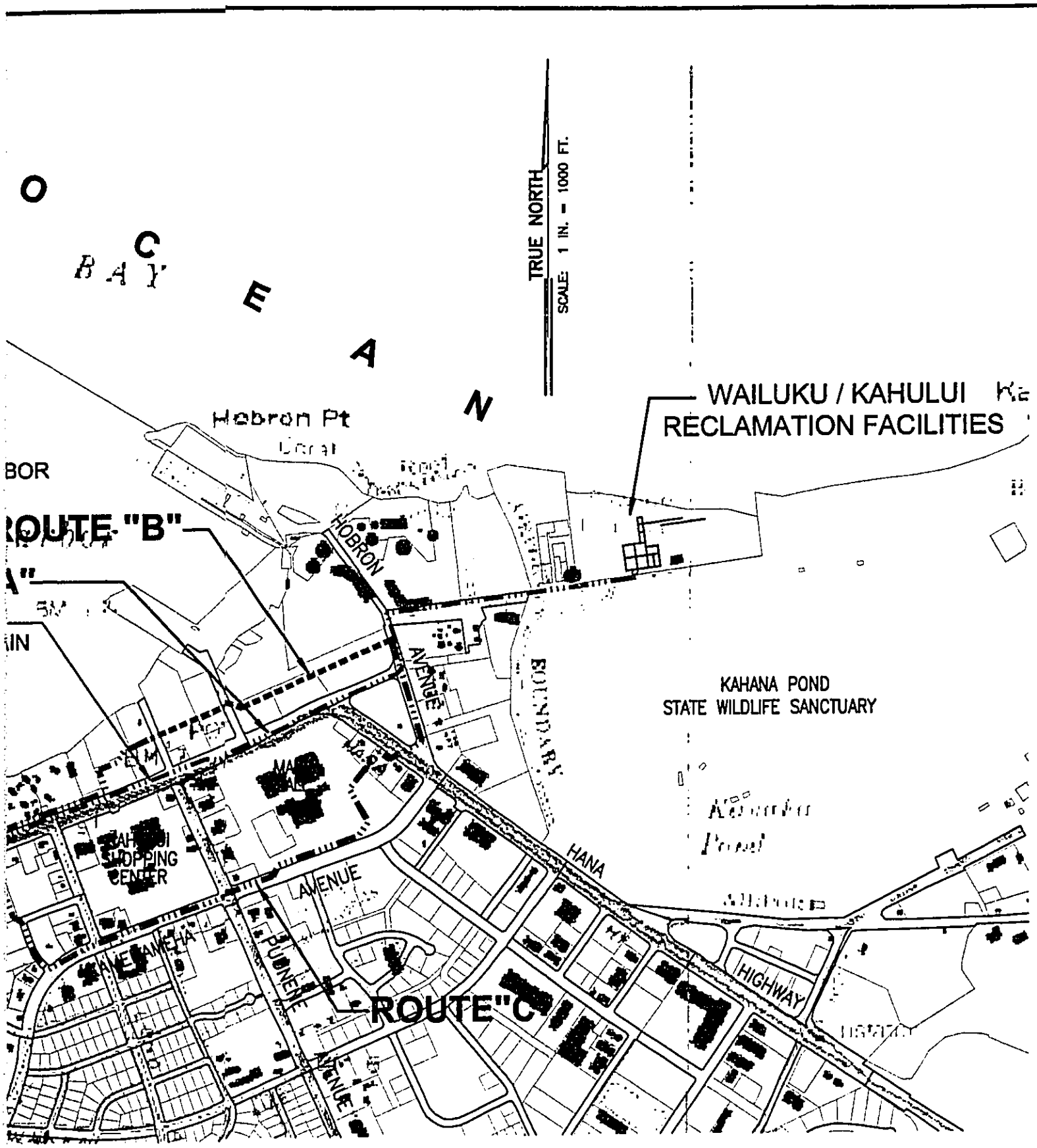
- EXISTING FORCE MAIN
- ROUTE B
- ROUTE C
- ROUTE C-2

FIGURE 2

SITE MAP SHOWING LOCATIONS OF PR

0 1000 2000 3000

SCALE: 1 IN. = 1000 F



IRE 2

S OF PROJECT IMPROVEMENTS

3000 4000

= 1000 FT.

WARREN S. UNEMORI ENGINEERING, INC.

January 10, 2001
Revised: January 16, 2001
Revised: November 27, 2001

EXHIBITS

1. Exhibit A - Cost Estimates for Alternative Routes “A”, “B”, “C” and “C-2"

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period: 0
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UN-IT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST

SUMMARY OF COSTS

SCHEME A	1	ls		$ 9,348,433
SCHEME B	1	ls		$ 5,823,498
SCHEME C	1	ls		$ 7,684,922
SCHEME C-2	1	ls		$ 8,306,205

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

SCHEME A

ITEMS OF WORK DESCRIPTIONS	QUANTITIES NO OF UNITS	UN-IT	MATERIAL COST UNIT COST	MATERIAL COST COST	LABOR COST UNIT COST	LABOR COST COST	TOTAL COST UNIT COST	TOTAL COST COST
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	18	mon	$ 750.00	$ 13,500	$ -	$ -	$ 750.00	$ 13,500
Temporary utilities	18	mon	$ 1,900.00	$ 34,200	$ -	$ -	$ 1,900.00	$ 34,200
Equipment	18	mon	$ 1,480.00	$ 26,640	$ -	$ -	$ 1,480.00	$ 26,640
Job supervision	18	mon	$ -	$ -	$ 9,500.00	$ 171,000	$ 9,500.00	$ 171,000
Project engineer	18	mon	$ -	$ -	$ 9,500.00	$ 171,000	$ 9,500.00	$ 171,000
QC manager	18	mon	$ -	$ -	$10,250.00	$ 184,500	$ 10,250.00	$ 184,500
QC specialist	3,132	mhr	$ -	$ -	$ 100.00	$ 313,200	$ 100.00	$ 313,200
Job clean-up	18	mon	$ -	$ -	$ 1,500.00	$ 27,000	$ 1,500.00	$ 27,000
Traffic control	18	mon	$ 1,650.00	$ 29,700	$21,500.00	$ 387,000	$ 23,150.00	$ 416,700
SUBTOTAL				$ 104,040		$ 1,323,700		$ 1,427,740
Sewer Force Main								
Saw cut pavement	4,480	lf	$ 1.25	$ 5,600	$ 6.50	$ 29,120	$ 7.75	$ 34,720
Remove pavement	2,489	sy	$ -	$ -	$ 6.50	$ 16,179	$ 6.50	$ 16,179
Remove sidewalk	15,100	sf	$ -	$ -	$ 2.25	$ 33,975	$ 2.25	$ 33,975
Remove curbing	1,810	lf	$ -	$ -	$ 5.00	$ 9,050	$ 5.00	$ 9,050
Load, haul & dispose of debris	1,000	cy	$ 8.50	$ 8,500	$ 12.50	$ 12,500	$ 21.00	$ 21,000
Trenching	40,056	cy	$ -	$ -	$ 25.00	$ 1,001,400	$ 25.00	$ 1,001,400
Temporary shoring	2,884	ln	$ 275.00	$ 793,100	$ 500.00	$ 1,442,000	$ 775.00	$ 2,235,100
Dewatering	18	mon	$ -	$ -	$16,312.50	$ 293,625	$ 16,312.50	$ 293,625
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe	10,300	lf	$ 78.95	$ 813,185	$ 19.95	$ 205,485	$ 98.90	$ 1,018,670
ARV manhole	5	ea	$ 2,500.00	$ 12,500	$ 3,000.00	$ 15,000	$ 5,500.00	$ 27,500
Fittings	8	ea	$ 1,250.00	$ 10,000	$ 2,000.00	$ 16,000	$ 3,250.00	$ 26,000
Thrust blocks	100	cy	$ 225.00	$ 22,500	$ 450.00	$ 45,000	$ 675.00	$ 67,500
Concrete jacket	2,575	lf	$ 107.60	$ 277,070	$ 61.30	$ 157,848	$ 168.90	$ 434,918
Pipe bedding	2,416	cy	$ 31.50	$ 76,104	$ 18.50	$ 44,696	$ 50.00	$ 120,800
Backfill	37,640	cy	$ -	$ -	$ 18.50	$ 696,340	$ 18.50	$ 696,340
Warning tape	10,300	lf	$ 0.05	$ 515	$ 0.10	$ 1,030	$ 0.15	$ 1,545
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	808	cy	$ 20.00	$ 16,160	$ 25.00	$ 20,200	$ 45.00	$ 36,360
Landscaping remediation	7,278	sy	$ 18.00	$ 131,004	$ 27.00	$ 196,506	$ 45.00	$ 327,510
Concrete curbing	1,810	lf	$ 8.00	$ 14,480	$ 9.00	$ 16,290	$ 17.00	$ 30,770
Concrete sidewalk	15,100	sf	$ 3.00	$ 45,300	$ 4.00	$ 60,400	$ 7.00	$ 105,700
AC pavement	187	tn	$ 66.50	$ 12,436	$ 28.50	$ 5,330	$ 95.00	$ 17,766
Asphaltic treated base course	373	tn	$ 59.50	$ 22,194	$ 25.50	$ 9,512	$ 85.00	$ 31,706
Subbase course	415	cy	$ 31.50	$ 13,073	$ 25.00	$ 10,375	$ 56.50	$ 23,448
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,295,971		$ 4,405,361		$ 6,701,332
TOTAL								$ 8,129,072
CONTINGENCIES: 15.00%								$ 1,219,361
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME A								$ 9,348,433

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UNIT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST
SCHEME B								
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	12	mon	$ 750.00	$ 9,000	$ -	$ -	$ 750.00	$ 9,000
Temporary utilities	12	mon	$ 1,900.00	$ 22,800	$ -	$ -	$ 1,900.00	$ 22,800
Equipment	12	mon	$ 1,480.00	$ 17,760	$ -	$ -	$ 1,480.00	$ 17,760
Job supervision	12	mon	$ -	$ -	$ 9,500.00	$ 114,000	$ 9,500.00	$ 114,000
Project engineer	12	mon	$ -	$ -	$ 9,500.00	$ 114,000	$ 9,500.00	$ 114,000
QC manager	12	mon	$ -	$ -	$10,250.00	$ 123,000	$ 10,250.00	$ 123,000
QC specialist	2,088	mhr	$ -	$ -	$ 100.00	$ 208,800	$ 100.00	$ 208,800
Job clean-up	12	mon	$ -	$ -	$ 1,500.00	$ 18,000	$ 1,500.00	$ 18,000
Traffic control	12	mon	$ 1,650.00	$ 19,800	$21,500.00	$ 258,000	$ 23,150.00	$ 277,800
SUBTOTAL				$ 69,360		$ 905,800		$ 975,160
Sewer Force Main								
Saw cut pavement	2,600	lf	$ 1.25	$ 3,250	$ 6.50	$ 16,900	$ 7.75	$ 20,150
Remove pavement	578	sy	$ -	$ -	$ 6.50	$ 3,757	$ 6.50	$ 3,757
Load, haul & dispose of debris	750	cy	$ 8.50	$ 6,375	$ 12.50	$ 9,375	$ 21.00	$ 15,750
Trenching	6,182	cy	$ -	$ -	$ 12.15	$ 75,111	$ 12.15	$ 75,111
Temporary shoring	830	tn	$ 275.00	$ 228,250	$ 500.00	$ 415,000	$ 775.00	$ 643,250
Dewatering	12	mon	$ -	$ -	$16,312.50	$ 195,750	$ 16,312.50	$ 195,750
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	4,050	lf	$ 86.85	$ 351,743	$ 315.00	$ 1,275,750	$ 401.85	$ 1,627,493
Casings	405	lf	$ 70.00	$ 28,350	$ 400.00	$ 162,000	$ 470.00	$ 190,350
24" HDPE FM pipe	6,350	lf	$ 78.95	$ 501,333	$ 18.10	$ 114,935	$ 97.05	$ 616,268
ARV manhole	5	ea	$ 2,500.00	$ 12,500	$ 3,000.00	$ 15,000	$ 5,500.00	$ 27,500
Fittings	10	ea	$ 1,250.00	$ 12,500	$ 2,000.00	$ 20,000	$ 3,250.00	$ 32,500
Thrust blocks	100	cy	$ 225.00	$ 22,500	$ 450.00	$ 45,000	$ 675.00	$ 67,500
Concrete jacket	1,000	lf	$ 107.60	$ 107,600	$ 61.30	$ 61,300	$ 168.90	$ 168,900
Pipe bedding	1,489	cy	$ 31.50	$ 46,904	$ 9.35	$ 13,922	$ 40.85	$ 60,826
Backfill	4,693	cy	$ -	$ -	$ 9.35	$ 43,880	$ 9.35	$ 43,880
Warning tape	10,400	lf	$ 0.05	$ 520	$ 0.10	$ 1,040	$ 0.15	$ 1,560
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	249	cy	$ 20.00	$ 4,980	$ 25.00	$ 6,225	$ 45.00	$ 11,205
Landscaping remediation	2,244	sy	$ 18.00	$ 40,392	$ 27.00	$ 60,588	$ 45.00	$ 100,980
Concrete curbing & sidewalk	1	ls	$35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	43	tn	$ 66.50	$ 2,860	$ 28.50	$ 1,226	$ 95.00	$ 4,086
Asphaltic treated base course	87	tn	$ 59.50	$ 5,177	$ 25.50	$ 2,219	$ 85.00	$ 7,396
Subbase course	129	cy	$ 31.50	$ 4,064	$ 25.00	$ 3,225	$ 56.50	$ 7,289
Lane striping	1	ls	$ 2,500.00	$ 2,500	$ 5,000.00	$ 5,000	$ 7,500.00	$ 7,500
SUBTOTAL				$ 1,434,048		$ 2,654,703		$ 4,088,751
								$ 5,063,911
TOTAL								$ 759,587
CONTINGENCIES: 15.00%								$ 5,823,498
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME B								

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UNIT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST
SCHEME C								
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	14	mon	$ 750.00	$ 10,500	$ -	$ -	$ 750.00	$ 10,500
Temporary utilities	14	mon	$ 1,900.00	$ 26,600	$ -	$ -	$ 1,900.00	$ 26,600
Equipment	14	mon	$ 1,480.00	$ 20,720	$ -	$ -	$ 1,480.00	$ 20,720
Job supervision	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
Project engineer	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
QC manager	14	mon	$ -	$ -	$10,250.00	$ 143,500	$ 10,250.00	$ 143,500
QC specialist	2,436	mhr	$ -	$ -	$ 100.00	$ 243,600	$ 100.00	$ 243,600
Job clean-up	14	mon	$ -	$ -	$ 1,500.00	$ 21,000	$ 1,500.00	$ 21,000
Traffic control	14	mon	$ 1,650.00	$ 23,100	$21,500.00	$ 301,000	$ 23,150.00	$ 324,100
SUBTOTAL				$ 80,920		$ 1,045,100		$ 1,126,020
Sewer Force Main								
Saw cut pavement	12,800	lf	$ 1.25	$ 16,000	$ 6.50	$ 83,200	$ 7.75	$ 99,200
Remove pavement	2,844	sy	$ -	$ -	$ 6.50	$ 18,486	$ 6.50	$ 18,486
Load, haul & dispose of debris	1,100	cy	$ 8.50	$ 9,350	$ 12.50	$ 13,750	$ 21.00	$ 23,100
Trenching	12,425	cy	$ -	$ -	$ 12.15	$ 150,964	$ 12.15	$ 150,964
Temporary shoring	2,592	tn	$ 275.00	$ 712,800	$ 500.00	$ 1,296,000	$ 775.00	$ 2,008,800
Dewatering	14	mon	$ -	$ -	$16,312.50	$ 228,375	$ 16,312.50	$ 228,375
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	1,300	lf	$ 86.85	$ 112,905	$ 315.00	$ 409,500	$ 401.85	$ 522,405
30" HDPE pipe w/HHD	700	lf	$ 108.50	$ 75,950	$ 315.00	$ 220,500	$ 423.50	$ 296,450
Casings	200	lf	$ 70.00	$ 14,000	$ 400.00	$ 80,000	$ 470.00	$ 94,000
24" HDPE FM pipe	7,850	lf	$ 78.95	$ 619,758	$ 18.10	$ 142,085	$ 97.05	$ 761,843
30" HDPE pipe	2,850	lf	$ 98.75	$ 281,438	$ 22.65	$ 64,553	$ 121.40	$ 345,991
ARV manhole	6	ea	$ 2,500.00	$ 15,000	$ 3,000.00	$ 18,000	$ 5,500.00	$ 33,000
Fittings	19	ea	$ 1,250.00	$ 23,750	$ 2,000.00	$ 38,000	$ 3,250.00	$ 61,750
Thrust blocks	200	cy	$ 225.00	$ 45,000	$ 450.00	$ 90,000	$ 675.00	$ 135,000
Concrete jacket	1,250	lf	$ 107.60	$ 134,500	$ 61.30	$ 76,625	$ 168.90	$ 211,125
Pipe bedding	2,712	cy	$ 31.50	$ 85,428	$ 9.35	$ 25,357	$ 40.85	$ 110,785
Backfill	9,713	cy	$ -	$ -	$ 9.35	$ 90,817	$ 9.35	$ 90,817
Warning tape	12,700	lf	$ 0.05	$ 635	$ 0.10	$ 1,270	$ 0.15	$ 1,905
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	212	cy	$ 20.00	$ 4,240	$ 25.00	$ 5,300	$ 45.00	$ 9,540
Landscaping remediation	1,911	sy	$ 18.00	$ 34,398	$ 27.00	$ 51,597	$ 45.00	$ 85,995
Concrete curbing & sidewalk	1	ls	$ 35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	213	tn	$ 66.50	$ 14,165	$ 28.50	$ 6,071	$ 95.00	$ 20,236
Asphaltic treated base course	427	tn	$ 59.50	$ 25,407	$ 25.50	$ 10,889	$ 85.00	$ 36,296
Subbase course	632	cy	$ 31.50	$ 19,908	$ 25.00	$ 15,800	$ 56.50	$ 35,708
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,301,882		$ 3,254,639		$ 5,556,521
TOTAL								$ 6,682,541
CONTINGENCIES: 15.00%								$ 1,002,381
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME C								$ 7,684,922

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UNIT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST
			SCHEME C-2					
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	14	mon	$ 750.00	$ 10,500	$ -	$ -	$ 750.00	$ 10,500
Temporary utilities	14	mon	$ 1,900.00	$ 26,600	$ -	$ -	$ 1,900.00	$ 26,600
Equipment	14	mon	$ 1,480.00	$ 20,720	$ -	$ -	$ 1,480.00	$ 20,720
Job supervision	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
Project engineer	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
QC manager	14	mon	$ -	$ -	$10,250.00	$ 143,500	$ 10,250.00	$ 143,500
QC specialist	2,436	mhr	$ -	$ -	$ 100.00	$ 243,600	$ 100.00	$ 243,600
Job clean-up	14	mon	$ -	$ -	$ 1,500.00	$ 21,000	$ 1,500.00	$ 21,000
Traffic control	14	mon	$ 1,650.00	$ 23,100	$21,500.00	$ 301,000	$ 23,150.00	$ 324,100
SUBTOTAL				$ 80,920		$ 1,045,100		$ 1,126,020
Sewer Force Main								
Saw cut pavement	13,000	lf	$ 1.25	$ 16,250	$ 6.50	$ 84,500	$ 7.75	$ 100,750
Remove pavement	2,889	sy	$ -	$ -	$ 6.50	$ 18,779	$ 6.50	$ 18,779
Load, haul & dispose of debris	1,250	cy	$ 8.50	$ 10,625	$ 12.50	$ 15,625	$ 21.00	$ 26,250
Trenching	12,317	cy	$ -	$ -	$ 12.15	$ 149,652	$ 12.15	$ 149,652
Temporary shoring	2,633	tn	$ 275.00	$ 724,075	$ 500.00	$ 1,316,500	$ 775.00	$ 2,040,575
Dewatering	14	mon	$ -	$ -	$16,312.50	$ 228,375	$ 16,312.50	$ 228,375
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	2,400	lf	$ 86.85	$ 208,440	$ 315.00	$ 756,000	$ 401.85	$ 964,440
30" HDPE pipe w/HHD	700	lf	$ 108.50	$ 75,950	$ 315.00	$ 220,500	$ 423.50	$ 296,450
Casings	310	lf	$ 70.00	$ 21,700	$ 400.00	$ 124,000	$ 470.00	$ 145,700
24" HDPE FM pipe	7,950	lf	$ 78.95	$ 627,653	$ 18.10	$ 143,895	$ 97.05	$ 771,548
30" HDPE pipe	2,850	lf	$ 98.75	$ 281,438	$ 22.65	$ 64,553	$ 121.40	$ 345,991
ARV manhole	6	ea	$ 2,500.00	$ 15,000	$ 3,000.00	$ 18,000	$ 5,500.00	$ 33,000
Fittings	19	ea	$ 1,250.00	$ 23,750	$ 2,000.00	$ 38,000	$ 3,250.00	$ 61,750
Thrust blocks	200	cy	$ 225.00	$ 45,000	$ 450.00	$ 90,000	$ 675.00	$ 135,000
Concrete jacket	1,250	lf	$ 107.60	$ 134,500	$ 61.30	$ 76,625	$ 168.90	$ 211,125
Pipe bedding	2,735	cy	$ 31.50	$ 86,153	$ 9.35	$ 25,572	$ 40.85	$ 111,725
Backfill	9,582	cy	$ -	$ -	$ 9.35	$ 89,592	$ 9.35	$ 89,592
Warning tape	13,900	lf	$ 0.05	$ 695	$ 0.10	$ 1,390	$ 0.15	$ 2,085
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	212	cy	$ 20.00	$ 4,240	$ 25.00	$ 5,300	$ 45.00	$ 9,540
Landscaping remediation	1,911	sy	$ 18.00	$ 34,398	$ 27.00	$ 51,597	$ 45.00	$ 85,995
Concrete curbing & sidewalk	1	ls	$ 35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	217	tn	$ 66.50	$ 14,431	$ 28.50	$ 6,185	$ 95.00	$ 20,616
Asphaltic treated base course	433	tn	$ 59.50	$ 25,764	$ 25.50	$ 11,042	$ 85.00	$ 36,806
Subbase course	642	cy	$ 31.50	$ 20,223	$ 25.00	$ 16,050	$ 56.50	$ 36,273
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,427,535		$ 3,669,232		$ 6,096,767
TOTAL								$ 7,222,787
CONTINGENCIES: 15.00%								$ 1,083,418
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME C2								$ 8,306,205

2. Exhibit B - Properties Affected by Alternative Routes "B" and "C"

Properties Affected by Alternative "B"

TMK:	Present Use	Owner
3-4-27:1	Warehouse	Y. Hata Co. Ltd. P. O. Box 3770 Honolulu, HI 96812
3-4-27:26	Beach Remnant	County of Maui
3-7-08:17	Canoe Club	County of Maui - Parks Dept.
3-8-07:125	Central Park; Park Land	University of Hawaii State of Hawaii
3-7-01:02	Central Park	County of Maui - Parks Dept.
3-7-01:	Kahului Beach Road	SDOT - Highways
3-8-07:38	Vacant lot	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-03:28	Strip in front of Maui Beach	Elleair Inc. 170 Kaahumanu Avenue Kahului, HI 96732
3-7-03:26	Strip in front of Maui Palms	Elleair Inc. 170 Kaahumanu Avenue Kahului, HI 96732
3-7-03:27	Entry to Seaside	A&B Properties, Inc. P.O. Box 156 Kahului, HI 96732
3-7-03:03	Strip in front of Seaside	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-08:08	Vacant lot	A & B - Hawaii Inc. Alexander & Baldwin Inc. P. O. Box 156 Kahului, HI 96732
3-7-01:16	Remnant Beach Lot	A & B - Hawaii Inc. P. O. Box 156 Kahului, HI 96732
3-7-08:06	Container Yard	State of Hawaii - Harbors Division 79 S. Nimitz Hwy Honolulu, HI 96813
3-7-10:01	Old Kahului Store	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-10:36	Office Buildings	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-10:02	Container Yard	State of Hawaii - Harbors Division 79 S. Nimitz Hwy Honolulu, HI 96813

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3-7-08:25	Hideaway Restaurant	HRT Ltd. 3660 Waialae Avenue, 4th Floor Honolulu, HI 96816
3-7-08:27	FHB Alternative route if can't get across TMK: 3-7-8:25	FHB Properties, Inc. P. O. Box 3200 Honolulu, HI 96847

Properties Affected by Alternative "C"

TMK:	Present Use	Owner
3-4-27:1	Warehouse	Y. Hata Co. Ltd. P. O. Box 3770 Honolulu, HI 96812
3-4-27:26	Beach Remnant	County of Maui
3-7-01:02	Keopuolani Park	County of Maui - Parks Dept.
3-7-08:125	Keopuolani Park	County of Maui - Parks Dept.
3-7-02:11		State of Hawaii
3-7-009:030		County of Maui
3-8-07:125		MCC Kaahumanu Avenue Kahului, HI 96732
3-8-07:40		MCC Kaahumanu Avenue Kahului, HI 96732
3-7-04:3		State of Hawaii - DAGS
3-7-09:04		A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
School Street		County of Maui - DPW
Kamehameha Ave.		County of Maui - DPW
Kaahumanu Ave.		SDOT - Hwys Division
Puunene Ave.		SDOT - Hwys Division
Hana Hwy.		SDOT - Hwys Division
Hobron Ave.		SDOT - Hwys Division
Kane Street		SDOT - Hwys Division

APPENDIX B

Archaeological Assessment Study Report

SCS Project Number 288-1

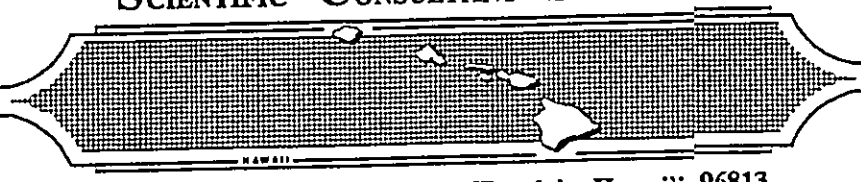
AN ARCHAEOLOGICAL ASSESSMENT FOR THE WAILUKU FORCE MAIN PROJECT IN WAILUKU AND KAHULUI, MAUI [PORTIONS OF TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.

October 2001

Prepared for:
Warren S. Unemori Engineering, Inc.
2145 Wells Street, Suite 403
Wailuku, HI 96793

SCIENTIFIC CONSULTANT SERVICES Inc.



711 Kapiolani Blvd. Suite 1475 Honolulu, Hawai'i 96813

ABSTRACT

At the request of Warren S. Unemori Engineering, Inc, Scientific Consultant Services, Inc. (SCS) conducted an archaeological assessment for the Wailuku Force Main Project in Wailuku and Kahului, Maui (portions of TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007. This assessment included: archival/background research in conjunction with review a of archaeological studies conducted within close proximity to the proposed route on file at the State Historic Preservation Division; review of 19th century Land Commission Awards (LCA); an archaeological reconnaissance survey within the project area; consultation with the Maui State Historic Preservation Officer, Melissa Kirkendall; and a synthesis and assessment of the findings from appropriate archaeological projects and historic records.

Archaeological studies conducted around the perimeters Kahului Bay have identified deposits containing remnants of the old Kahului Railroad Bed, historic refuse, as well as early pre-Contact artifacts, midden, and scattered human remains. The depth of these features may vary depending on previous construction activities and are difficult to predict, but have been identified in deposits from 0.20 to 2.00 meters below the surface. Based on an archaeological reconnaissance, the results of archaeological projects, and consultation with the Maui State Historic Preservation Officer, it is concluded that there is a high probability of encountering archaeological material from pre-Contact activities, as well as historic 19th century remains in sub-surface deposits along the coastal areas of Kahului Bay.

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INTRODUCTION

At the request of Warren S. Unemori Engineering, Inc, Scientific Consultant Services, Inc. (SCS) conducted an archaeological assessment for the Wailuku Force Main Project in Wailuku and Kahului, Maui (portions of TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007; Figure 1). This assessment included: archival/background research in conjunction with a review of archaeological studies conducted within close proximity to the proposed route on file at the State Historic Preservation Division; review of 19th century Land Commission Awards (LCA); an archaeological reconnaissance survey within the project area; consultation with the Maui State Historic Preservation Officer, Melissa Kirkendall; and a synthesis and assessment of the findings from appropriate archaeological projects and historic records.

WAILUKU

The project area extends around Kahului Bay in Wailuku Ahupua`a. The western section of the project is located in Paukūkalo, a portion of the Wailuku Ahupua`a. The development of Wailuku, including Paukūkalo is well documented in 19th-20th century government records, photographs, and maps. Briefly, the largest continuous area of wet land taro cultivation in the islands existed from Waihe`e to Wailuku Valley (Handy and Handy 1972:496). This supported a substantial pre-Contact population and the settlement in Wailuku and Kahului represented one of two (or perhaps three) population concentrations on Maui (Cordy 1981:198-199). The proposed route for the Force Main Project follows the coast around Kahului Bay, ending on the east side of the bay, at Hobron Avenue. This area contained several fish ponds in the Pre-Contact era. Kanahā and Mau`oni Fishponds were reportedly built by Chief Kiha-a-Pi`ilani in the 16th century.

Wailuku was also a center of political power, often at war with its rival in Hana. By the end of the 18th century, Kahekili resided with his entourage in Wailuku and it was on the sand dunes that Kahekili and his warriors would engage those of Kalani`ōpu`u, chief of Hawai`i island. This 1776 encounter resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai, when Kamehameha I consolidated his control over Maui. During Kamehameha's campaign, it was recorded that the bay from Kahului to Hopukoa was filled with war canoes (Kamakau 1961:148).

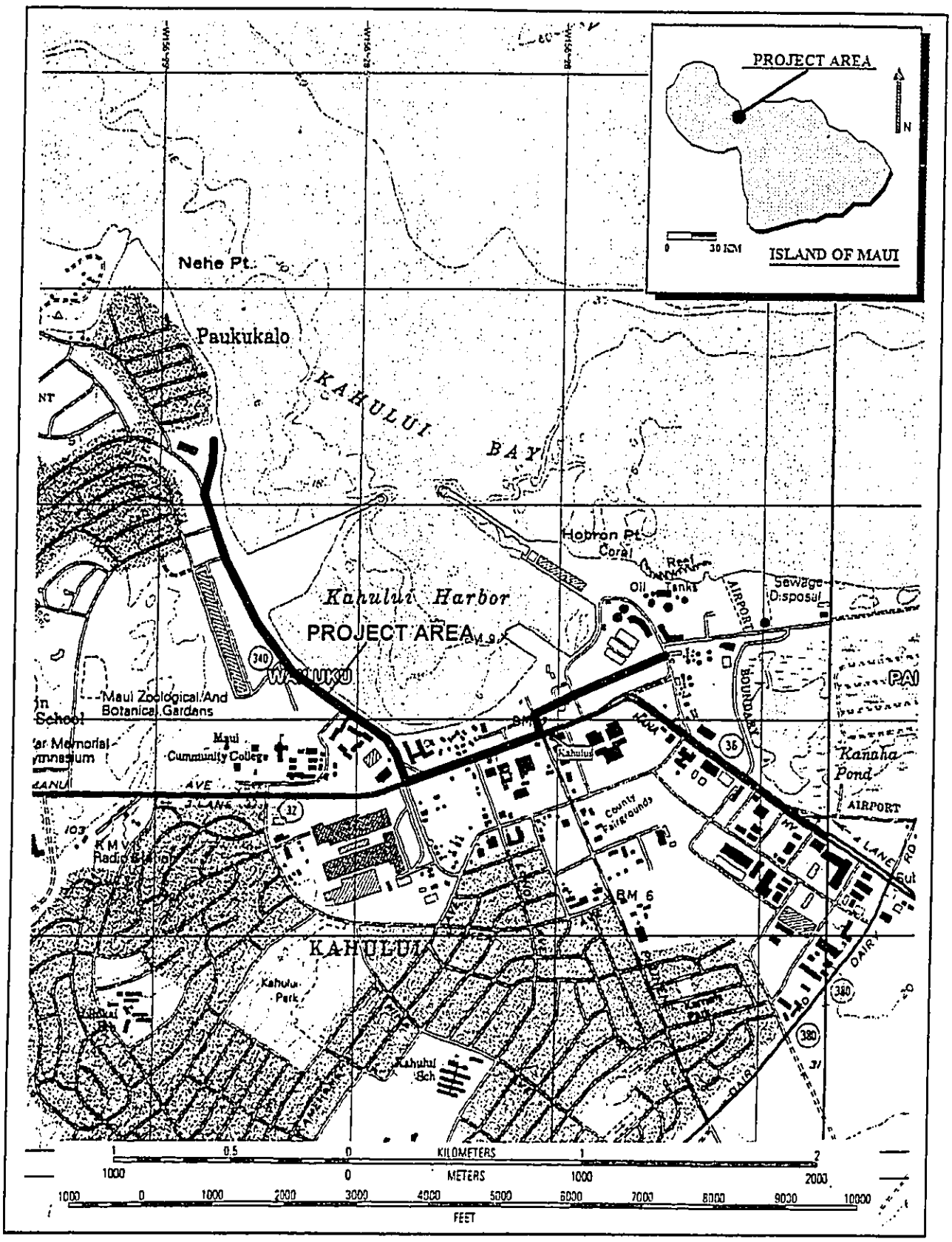

Figure 1: USGS Wailuku Quadrangle Map Showing Project Area.

Sugarcane was grown in Wailuku as early as 1840 with large tracts of land along the isthmus of Maui converted for cultivation. Thomas Hobron founded the Kahului Railroad company in 1879 which provided passenger service between Kahului and Wailuku (Hungerford 1963). The Kahului Railroad Company began construction of the port of Kahului in 1904 by building a rubble mound breakwater and installing moorings and bouys. Eventually, a new pier was built and opened to the public capable of berthing vessels up to 1,000 tons.

PREVIOUS ARCHAEOLOGY

Nine archaeological studies were identified as being the closest in proximity to the proposed Force Main route (Figure 2). Four projects were located on the west side of the bay and five were positioned around the rest of the harbor. Eight projects reported the identification of either historic artifacts, pre-Contact cultural remains, or both, while the ninth report was a monitoring plan containing ethnographic information of land use in the early 20th century. Much of the pre-Contact material was identified over a meter in depth, and some reported cultural remains were located under layers of fill brought into the area during modern construction. Cultural remnants were also identified beneath aeolian deposited and partially lithified dunes. Figure 3 shows the project area adjacent to the existing Wailuku Pump Station on the western side of Kahului Harbor. The Force Main proposed route extends along the beach, crosses Kahului Beach Road, and continues south on the west (mauka) side of the highway.

The following is a list of reports produced as a result of the nine archaeological studies, beginning on the western side of Kahului Bay.

TMK: 3-04-027:001, 026

Winieski, John and Hallett H. Hammatt

1999 *Archaeological Monitoring Plan for a Proposed Waterline Replacement Project in Paukūkalo, Wailuku Ahupua`a on Kainalu, Kaiko`o, and Ukali Streets, and Lipo, Lilihua, and Kanai Places, Island of Maui (TMK 3-4-27, 28, 29).* Prepared for Warren S. Unemori Engineering, Inc.

Ethnographic information contributed by Mr. Charles Keau indicated that in the 1930s the landscape was one of pasture land, truck farms, and taro *lo`i*. Mr. Keau recalled stone walls, trails and *ko`a* (fishing shrines) in the *makai* region. Figure 4 shows the area for

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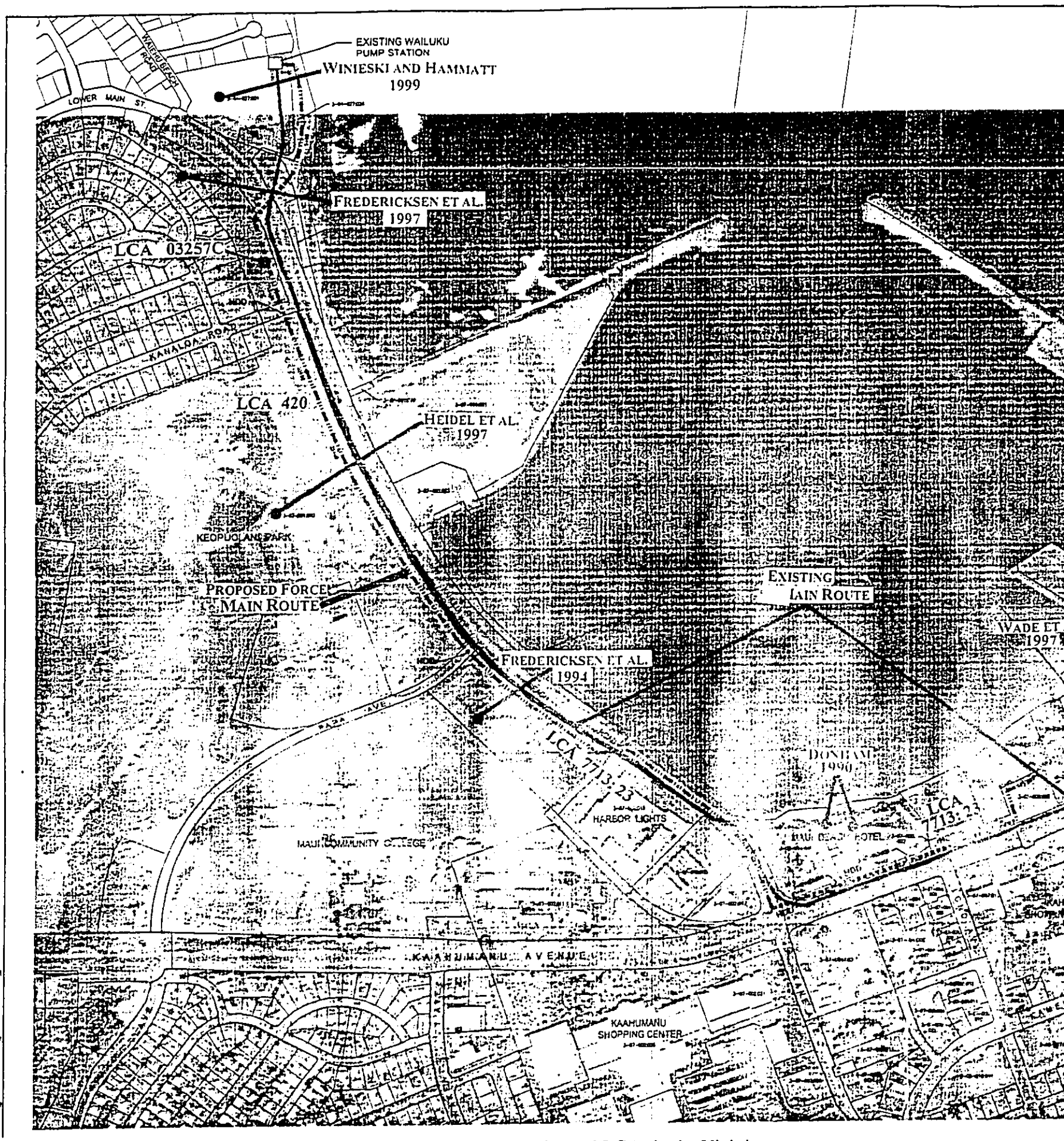

Figure 2: Force Main Project Route Showing Archaeological Studies and LCAs in the Vicinity.

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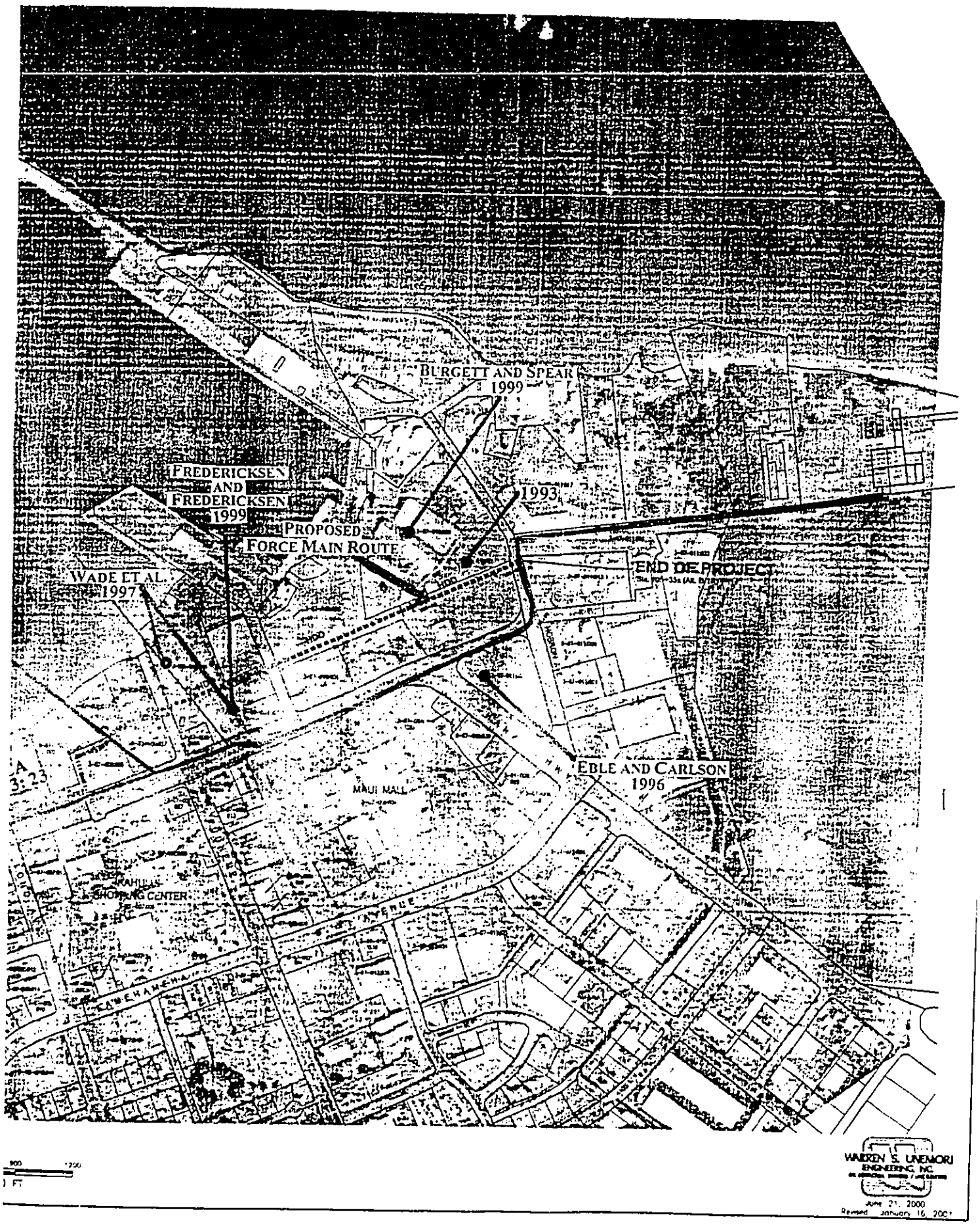

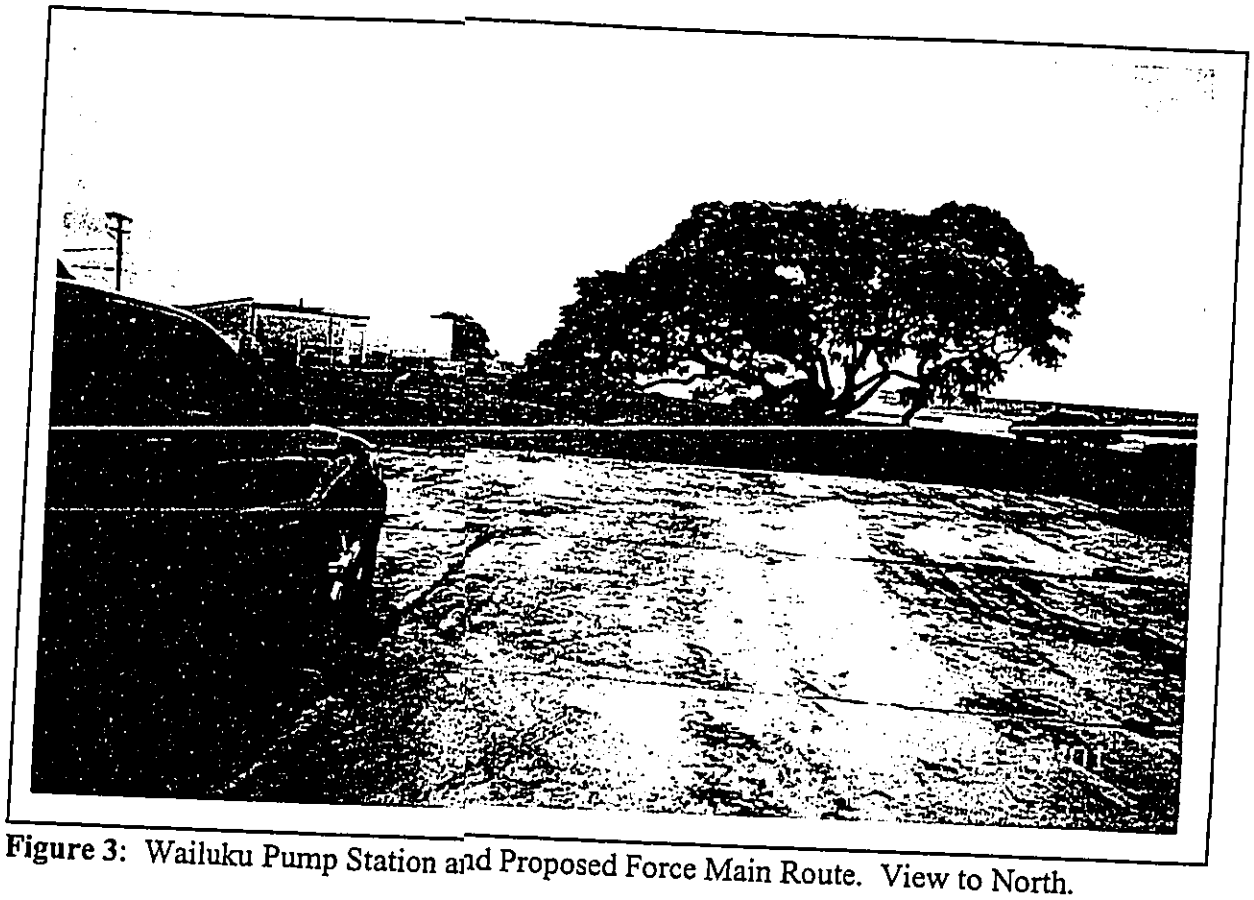

Figure 3: Wailuku Pump Station and Proposed Force Main Route. View to North.

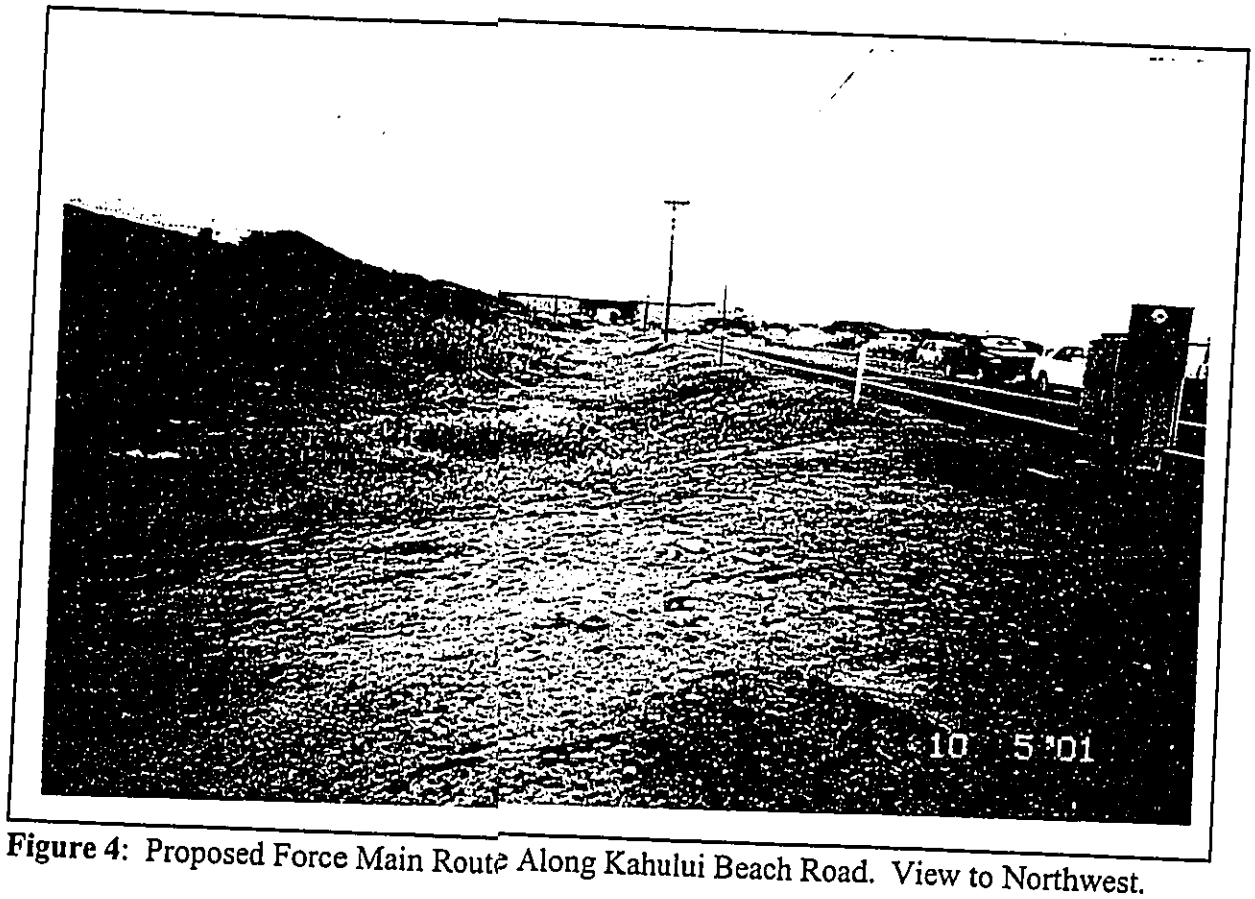

Figure 4: Proposed Force Main Route Along Kahului Beach Road. View to Northwest.

the proposed Force Main route along the *mauka* side of Kahului Beach Road. The route is located directly across from the beach and consists of mostly sand deposits.

TMK: 3-08-007:125

Fredericksen, Demaris L., Erik M. Fredericksen, Walter M. Fredericksen

1997 *Archaeological Data Recovery Report for Site 50-50-043120, NISEI Veterans Memorial Center TMK: 3-8-07:123, Wailuku Ahupua'a, Wailuku District, Maui Island.* Prepared for State Historic Preservation Division. Dept. of Land and Natural Resources on behalf of Earl Kono, AIA, for the Nisei Veterans Memorial Center.

During the inventory survey, four sites were identified. Site 3112, a remnant of the old Kahului Railroad Bed which was built in the 1880s; Site 3119A, an historic refuse area probably associated with the railroad construction and usage, which dated from the late 19th and early 20th centuries; and 3120, an extensive pre-Contact site. Site 3119B was located in the subsurface strata (c. 1.00 to 1.50 mbs) below the historic refuse area consisted of pre-Contact artifacts and marine shell midden. A charcoal sample yielded an extremely early radiocarbon date of 1790+/- 70 RCYBP. Phase I excavation resulted in other radiocarbon dates ranged from 310 +/- 100 RCYBP (90 to 110 cmbd) to 520 +/- 70 RCYBP suggesting a continuous use of the area for at least 200 years. During the Phase II data recovery, human remains were identified in a number of trenches and radiocarbon dates ranged from AD 1200 to AD 1470. More burials were recovered in the Phase III testing and it was discovered that Site 3120 was probably impacted in its southeastern part by at least two separate modern construction activities.

It was felt that some of the backhoe test trenches were not excavated deep enough to reach the undisturbed pre-Contact cultural deposit, which was in excess of two meters in depth at some locations. It was also found, that cultural layers occurred under deep deposits of lithified dune sand which had been erroneously interpreted as being much older that they actually were.

TMK: 3-07-001:2

Heidel, Melody, Leilani Pyle, and Hallett H. Hammatt

1997 *Archaeological Inventory Survey of the 110-Acre Maui Central Park, Wailuku, Maui (TMK: 3-8-07:1 and 3-7-01:2).* Prepared for Munekiyo & Arakawa, Inc.

The project area represents the northern portion of the Wailuku Sand Hill and is known to be the location of human burials. During this inventory survey, 31 backhoe trenches were excavated. Two historic sites, the Kahului Railroad berm (50-50-04-3112) and a WW II military installation (50-50-04-4232), had been previously recorded in the project area. Scattered human remains (50-50-04-4211) were identified in the central eastern portion of the project area near the Maui Community Arts and Cultural Center. The trenches placed in undisturbed areas showed modern unconsolidated dune sand overlying older, lithified dune deposits. Terrestrial deposits of gravel, silt, and clay, were found in limited areas underlying a thin cover of dune sand in the northwestern area of the project.

TMK: 3-08-007:125

Fredericksen, Erik M., Walter M. Fredericksen, Demaris L. Fredericksen

1994 *An Inventory Survey of a 10-Acre Parcel of Land, Maui Central Park Parkway, Wailuku Ahupua`a, Wailuku District, Maui Island (TMK: 3-8-07:125)*. Prepared for Munekiyo & Arakawa, Inc.

During this study, 23 backhoe trenches were excavated. All trenches contained fill material to depths of at least 0.40 to as much as 2.20 mbs. All trenches contained modern debris and in nearly 70% of the trenches an intact beach stratum was encountered between 0.50 and 2.20 mbs.

Figure 5 shows the Force Main proposed route in TMK 3-8-07:125 extending along the *mauka* side of Kahului Beach Road, directly across from the beach. Figure 6 shows the proposed route along the east (*makai*) side of Kahului Beach Road before it ends at Ka`ahumanu Avenue

TMK: 3-07-003:007, 019

Donham, Teresa K.

1990 *Interim Report: Archaeological Inventory Survey Maui Palms Hotel Site, Land of Wailuku, Wailuku District, Island of Maui (TMK: 3-7-03)*. Prepared for Mr. John Abe, President Maui Beach Hotel, Inc.

During surface reconnaissance, one site (852-1) was identified consisting of an artifact and midden scatter which was eroding out of an exposed face of the sand embankment.

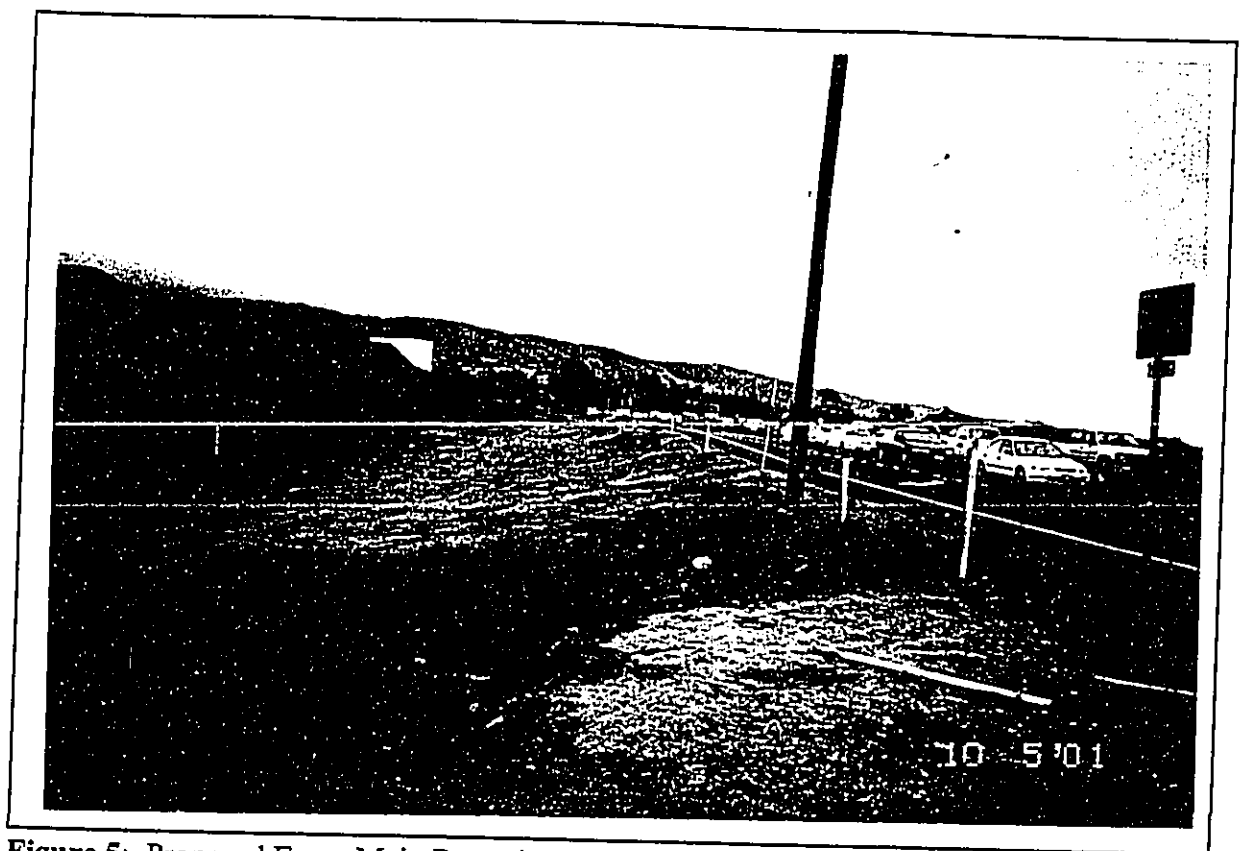

Figure 5: Proposed Force Main Route in TMK 3-08-007:125. View to Northwest

Figure 6: Proposed Force Main Route Joining Ka`ahumanu Avenue. View to South.

The surface scatter covers an area of 120.0 sq. meters of the Maui Palms Hotel property and extends southward, following the exposed sand surface onto the U.S. Coast Guard property (TMK: 3-7-003:019). Subsequent investigation of the Coast Guard property revealed scattered historic period artifacts and faunal remains, as well as, middle to late 20th century beverage bottles.

Forty hand-powered auger cores were placed at 34 systematically spaced locales resulting in the identification of subsurface cultural remains in 16 areas. Cultural remains included recent and historic glass, ceramics, metal fragments, structural concrete fragments, butcher-cut, burned, and unmodified faunal remains, and charcoal. Most, if not all, of the remains appear to be in a secondary fill deposit. Cores containing deeply buried historic material (0.55 to 3.35 mbs) occurred at the western end of the project area. Another site, Site 852-2, was identified during subsurface survey on the north, south, and southeast sides of Building B. Estimated overall site area was approximately 450 sq. meters. Historic materials occurred as deep as 1.90 m (Core K). Both sites were interpreted as secondary deposits, but it is possible that the primary source of the portable remains are within the project area, or they could have been introduced with various fill matrices that might have been brought into the area.

The proposed Force Main route turns to the north at the edge of land belonging to the Maui Beach Hotel (Figure 7). The proposed route then angles back to the east. Extending along the parking area for Hoaloha park, and through the parking lot on the north side of the First Hawaiian Bank (Figure 8).

TMK: 3-07-008:1, 6

Wade, Kimberly, Francis Eblé, and Jeffrey Pantaleo
1997 *Archaeological Inventory Survey of the Barge Terminal Improvement Project at Kahului Harbor, Kahului, Wailuku, Maui JOB H.C. 3281 (TMK 3-7-8:1, 2, 3, 4, and 6)*. Prepared for Sato and Associates Inc.

Project included surface survey and excavation of 11 backhoe trenches. Two trenches contained isolated historic remains, consisting of one complete brown beer bottle and one white porcelain fragment. One trench contained a pit feature (30-48 cmbs).

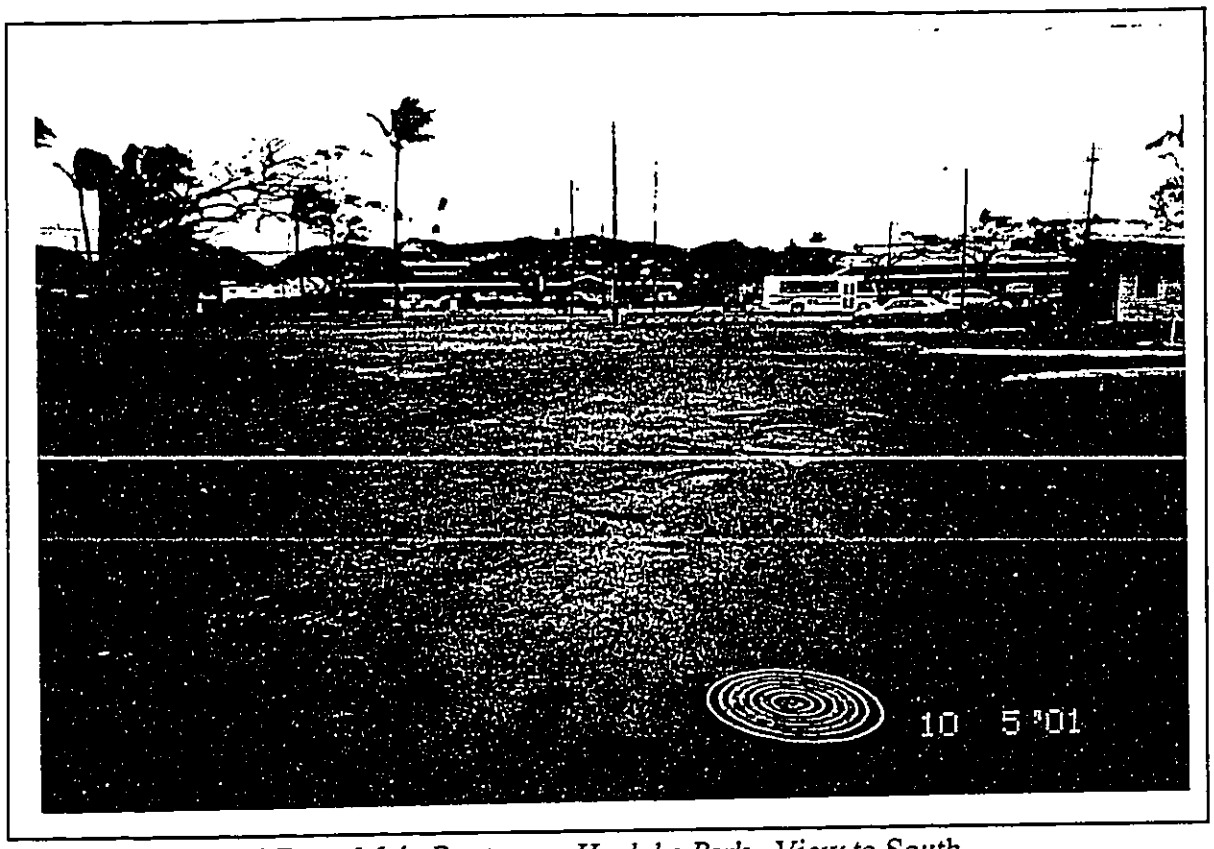

Figure 7: Proposed Force Main Route near Hoaloha Park. View to South.

Figure 8: Proposed Force Main Route in Front of Hoaloha Park. View to East.

The findings of this study provided a stratigraphic overview for this locale. It was determined that partially disturbed, naturally deposited layers of dune sand overlie alluvial deposits of silty sand containing waterworn basalt pebbles. The presence of overlying fill material along the *mauka* area closer to Ka`ahumanu Street, apparently resulted from modern development of the area. Recommendations were to conduct archaeological monitoring during any construction related to ground altering activities.

In addition, this study concluded:

1. Extensive compounded disturbance took place in the area during the historic period in response to the needs of the sugar industry (including the installation of a railroad system);

2. The historic modification of Kahului Harbor has resulted in a higher water table. Due to this change, older prehistoric remains may now exist below the water table;

3. Prior to the advent of sugar there is evidence of extensive taro cultivation in the region which extended into the `Īao Valley;

4. Isolated burials may occur in the vicinity of the project area due to the presence of sand dune remnants;

5. The extensive modification of the coastal area during the development of Kahului Harbor probably disturbed or destroyed evidence of prehistoric remains (Fredericksen and Fredricksen 1992);

6. In the area of Kanahā and Mau`oni fish ponds, a marsh was developed by the sixteenth century AD, which permitted seaward beach progradation (Welch 1991:65);

7. Kanahā and Mau`oni fish ponds were created along the western portion of this marsh (Welch 1991:65), and there may have been additional smaller ponds in the area.

Fredericksen Erik M. and Demaris L. Fredericksen
1999 *Archaeological Monitoring Report for the Kahului Barge Terminal Improvements Project (Job No. H.C. 3281) Wailuku Ahupua`a, Wailuku District, Maui Island (TMK: 3-7-08:1,3, por.4 & 6).* Prepared for Dept. of Transportation Harbors Division.

During monitoring for this project, four stratigraphic layers were encountered. One subsurface site (50-50-05-4753) was located approximately 56 cm below surface and consisted of a cultural layer containing basalt flakes and a pavement of waterworn pebbles and coral 22 cm thick. The pavement extended at least 10 meters in length. It was discovered that areas near Pu'unene Avenue appeared to be relatively undisturbed by recent development c. 20 to 40 cm below the existing surface. Remnant beach and dune sand deposits were observed on the northern one third of the project area, while post-Contact fill was more common elsewhere on the parcel. The fill contained early 1900s bottle fragments along with more modern materials. Again, this study stressed that the depth of disturbance by modern construction does not appear to have been too great and remnants of pre-Contact activities likely are present 20 to 40 cm below the present surface.

TMK: 3-07-010:009

Burgett, Berdena B. and Robert L. Spear

1999 *Archaeological Monitoring of Storage yard Paving and Utility Improvements Kahului Harbor, Maui, TMK: (2) 3-7-10.* Prepared for State of Hawai`i Dept. of Transportation. JOB H.C. 3280.

Monitored excavation activities associated with the construction of storage yard improvement at Kahului Harbor. A rock filled pit was encountered in Trench 2, extending from the bottom of the first fill layer to 0.89 meters below the trench floor (0.95 to 1.14 m deep). The purpose of the pit remained undetermined, but it is possible that it may be associated with the old harbor facilities. No other cultural material was identified.

The remains of a brick and mortar building foundation and 19th to 20th century artifacts were identified in coralline sand beneath a layer of soil fill c. 50 cm below the surface (Site 50-50-04-3504) were identified by the Maui State Historic Preservation Division staff officer in July of 1993. Figures 9 and 10 shows the proposed Force Main route within the harbor area.

TMK: 3-07-011:003

Eblé, Francis J. and Ingrid K. Carlson

1996 *Archaeological Inventory Survey of The Hobron Triangle Kahului, Maui (TMK 3-7-11:03).* Prepared for Steel Tech, Inc.

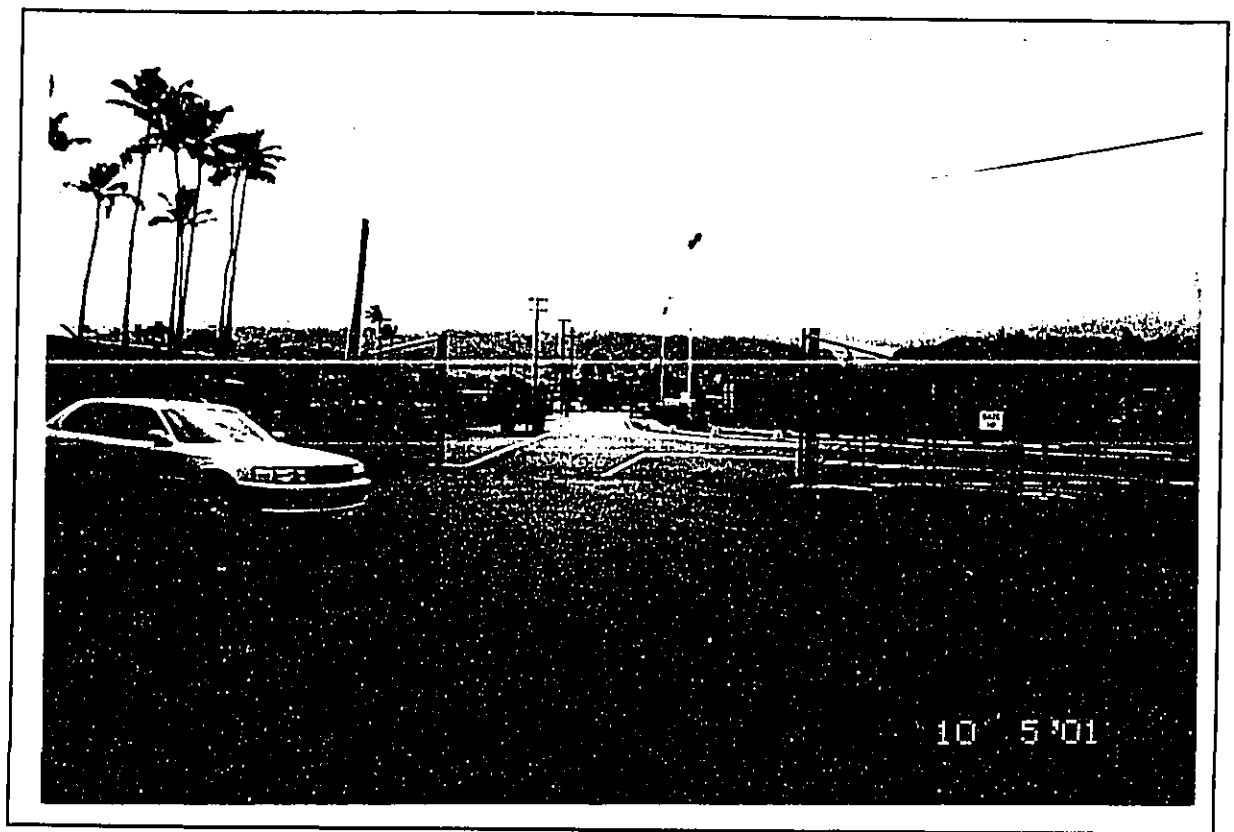

Figure 9: Proposed Force Main Route in Harbor Area. View to West.

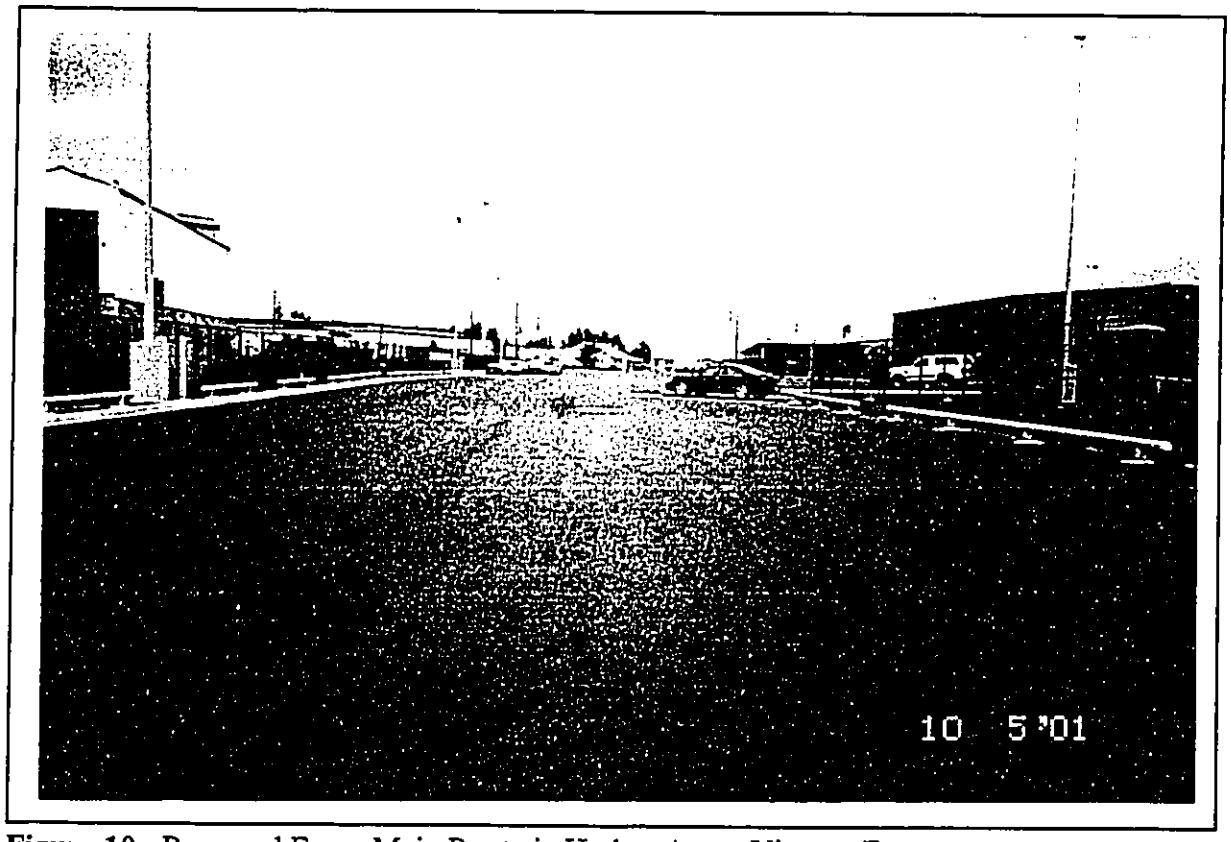

Figure 10: Proposed Force Main Route in Harbor Area. View to East.

During this inventory survey, 16 backhoe trenches were excavated for the installation of underground utilities and a proposed underground fuel tank. Trenches 7 and 11 contained disturbed historic refuse (85-95 cmbs), and a piece of milled wood (90-140 cmbs). An isolated bottle, c. late 19th century, was retrieved from the trench backfill. This area consisted of fill land and may contain refuse from sugar mills, dredging, and soil excavations which were dumped and spread over marshes and low-lying areas along the coastal flats.

18th CENTURY LAND COMMISSION AWARDS

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could then take possession of the property (Chinen 1961:16). (LCA information from Waihona Aina Corporation, 2001, Mahele Database).

Three LCAs were located along the proposed Force Main route (see Figure 3). At the western end of the route, in TMK: 3-08-007:038, was a portion of LCA3275C, which was awarded to Nahuina who received a house lot and a *lo`i*. It is unclear which parcel was located where, but boundary descriptions of both, names a total of seven individuals occupying adjacent lands (Foreign Testimony 465v7).

> Auwinakalani, sworn, I know the lands of the claimant [Nahuina]. They consist of 2 pieces in Wailuku Maui.
>
> No. 1 is a house lot in Kaihuwaa
> No. 2 is a kalo land in Kaulupala

The claimant received these lands from Kailihiwa in 1837 and his title has never been disputed [Foreign Testimony 465v7].

LCA 00420 was awarded to Kuihelani, Kamehameha's steward who was placed in charge of lands on O`ahu when Kamehameha returned to Hawai`i island in 1812 (Gast 1973:325). It was a large award encompassing 743.4 acres in the land of Owaa and included a stone house with a *pili* thatch roof (Native Register 146V2, Royal Patent 1996).

The boundaries are as follows: On the north, Haliiau and the stream, on the east, Papohaku/stone wall or enclosure/ and the pond, on the south Kalua [*`ili* belonging to Kamamalu], on the west, a section of Haliiau and Peepee. [Native Register 146-149v2].

...There are many natives on the land, whose rights cannot be disturbed...[Foreign Testimony 121-122V3].

Victoria Kamamalu received the *`ili* of Kalua in Wailuku. Her LCA 7713:23 extended from TMK: 3-7-008:18 along the shore of Kahului Harbor to at least TMK: 3-07-008:027, bordering Pu`unene Avenue (Native Register 440-444v5). The records do not reflect land use.

CONSULTATION

Consultation was conducted with the Maui representative of the State Historic Preservation Division, Melissa Kirkendall. Her comments pertaining to the Force Main proposed route confirmed the existence of extensive archaeological deposits at various depths in the harbor region and her concern that the cultural material be identified.

ASSESSMENT OF PROJECT AREA

The northwestern portion of Kahului Bay contain remnants of the old Kahului Railroad Bed and historic refuse, as well as early pre-Contact radiocarbon dates, scattered human remains, artifacts, and midden. Backhoe trenches excavated in a 10-acre parcel in the southwestern section revealed only modern debris (TMK: 3-8-07:125). Trenches, cut through fill material to depths of 0.40 to 2.20 mbs, encountered beach sand between 0.50 and 2.20 mbs. However,

burials and cultural deposits have been identified in beach sands around the bay and the proposed route may traverse such features along some sections of this coast. The central bay area produced large pre-Contact midden scatters that have been heavily impacted by modern development, but can still be located on beach property. The eastern portion of the project's route has been greatly disturbed by historic activities, but pre-Contact features were uncovered at a relatively shallow depth of c. 20 to 40 cm below the surface in some sections. Historic artifacts and features were also identified in the eastern section.

Based on the archaeological reconnaissance; the results of archival research including previous archaeological projects and LCA information, and consultation with the Maui State Historic Preservation Officer, it is concluded that there is a high probability of encountering archaeological material from pre-Contact activities, as well as historic 19th century remains in sub-surface deposits along the coastal areas of Kahului Bay. The depth of these features may vary depending on previous construction activities and are difficult to predict, but have been identified in deposits from 0.20 to 2.00 meters below the surface.

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APPENDIX C

Botanical Resources Assessment Study Report

BOTANICAL RESOURCES ASSESSMENT STUDY
WAILUKU FORCE MAIN PROJECT
WAILUKU DISTRICT, MAUI

by

Winona P. Char

CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: Warren S. Unemori Engineering, Inc.

November 2001

BOTANICAL RESOURCES ASSESSMENT STUDY
WAILUKU FORCE MAIN PROJECT
WAILUKU DISTRICT, MAUI

INTRODUCTION

The proposed project involves replacement of the existing 21 inch diameter wastewater force main with a new 24 inch diameter force main. The new force main would run from the Wailuku Pump Station, parallel to but outside of the Kahului Beach Road, then makai of Ka'ahumanu Avenue through private parcels, and ending at Hobron Avenue.

Much of the alignment crosses through developed areas with landscape plantings or asphalt pavement. A few areas with scrub vegetation are found on the undeveloped or infrequently maintained portions of the alignment.

Field studies to assess the botanical resources on the proposed alignment corridor were conducted on 15 October 2001 by a team of two botanists. The primary objectives of the survey were to:

1) prepare a general description of the vegetation along the alignment;
2) search for threatened and endangered species as well as species of concern; and
3) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. A recent colored aerial photograph (1"=300') with the alignment identified and detailed project maps (1"=80') were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points.

A walk-through survey methods was used. Notes were made on plant associations and distribution, disturbances, substrate types, drainage, exposure, topography, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature. The undeveloped or infrequently maintained areas were more intensively surveyed then the developed areas with landscaping. These undeveloped areas were more likely to harbor native plant species.

DESCRIPTION OF THE VEGETATION

The plant names used in the discussion follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those recorded in the Hawaii Biological Survey series (Evenhuis and Eldredge 1999-2000).

Existing Wailuku Pump Station to Kahului Beach Road

Asphalt covers most of the fenced area around the pump station. Scattered here and there are patches of 'akulikuli (Sesuvium portulacastrum), kipukai (Heliotropium curassavicum), and 'aki'aki grass (Sporobolus virginicus).

From the pump station fence to Kahului Beach Road, the vegetation consists of coastal strand on dark brown clay soils. Tree heliotrope (Tourneforthia argentea) and milo (Thespesia populnea) form scattered stands, 10 to 15 ft. tall. Silky jack bean (Canavalia sericea), a member of the pea family with attractive silver-gray, fuzzy leaves and dark pink flowers, is locally abundant, forming low mats near the trees. Other plants commonly observed in this area are kipukai, 'akulikuli, alena (Boerhavia repens), and Australian saltbush (Atriplex semibaccata). A dense thicket of Indian pluchea (Pluchea indica), 3 to 4 ft. tall, lines the beach road.

Large portions of the alignment are covered by barren soil, asphalt pavement, and concrete slabs.

Kahului Beach Road to Kanaloa Avenue

The scrub vegetation along this portion of the alignment is a weedy mixture of Indian pluchea and koa haole (Leucaena leucocephala) shrubs. A patch of Spanish reed (Arundo donax), a large, erect grass, is also found here. Other plants observed in this area include the fuzzy leaved cow pea (Macroptilium atropurpureum), Chinese violet (Asystasia gangetica), Guinea grass (Panicum maximum), and tree tobacco (Nicotiana glauca).

An infrequently mowed, grassy strip fronts the roadside. This supports Bermuda grass or manienie (Cynodon dactylon) and buffel grass (Cenchrus ciliaris) along with patches of creeping indigo (Indigofera hendecaphylla), false mallow (Malvastrum coromandelianum), and common sandbur (Cenchrus echinatus). A few small mats of pa'u-ohi'iaka (Jacquemontia ovalifolia ssp. sandwicensis) are also found here. The substrate is grayish-brown, calcareous sand, mapped as "PZUE", Puuone sand on the soil maps (Foote et al. 1972).

Kanaloa Avenue to East Papa Avenue

This portion of the alignment which lies between the beach road and Keopuolani Park is well landscaped and well maintained grassy lawn composed of Bermuda grass and Hilo grass (Paspalum conjugatum). A few low growing, weedy species commonly associated with lawns occur here; these include nutgrass (Cyperus rotundus), Boerhavia coccinia, and Calyptocarpis vialis. A large planting of coconut palms (Cocos nucifera) and a smaller planting of ironwood (Casuarina sp.), near the Kanaloa Avenue end, lines the park perimeter.

East Papa Avenue to Harbor Lights Condominium

Vegetation along this portion of the alignment consists of an infrequently mowed grassy strip with lumpy mats of buffel grass, fuzzy leaved cow pea, and Bermuda grass. Koa haole shrubs mowed down to 6 inch stubs are occasional. Golden crown-beard (Verbesina encelioides), a weedy, annual member of the daisy family with large yellow flowers, is locally abundant in places.

Mauka of this open, grassy strip, the vegetation consists of kiawe (Prosopis pallida) thicket, 10 to 20 ft. tall. Other woody components found here include koa haole, Christmas berry (Schinus terebinthifolius), lantana (Lantana camara), sourbush (Pluchea carolinensis), and castor bean (Ricinus communis). In some places, the kiawe thicket is sparse and open; these more open areas contain a few native species such as 'aweoweo (Chenopodium oahuense), pohuehue (Ipomoea pes-caprae), 'uhaloa (Waltheria indica), and 'ilima (Sida fallax).

A small, low lying area which supports wetland species is found near East Papa Avenue, but is outside of the alignment.

Harbor Lights Condominium to Ka'ahumanu Avenue

The alignment crosses Kahului Beach Road and follows along the makai side of the road. Bermuda grass and buffel grass form scattered mats along with weedy species such as Australian saltbush, Boerhavia coccinia, and Heliotropium procumbens. Along the shoreline are a few small trees of ironwood and tree heliotrope, and shrubs of sourbush and beach naupaka (Scaevola sericea).

Areas with barren soil and sand are frequent. The substrate along this portion of the alignment and on to the terminus at Hobron Avenue is mapped as "Fd", Fill land, on the soil maps (Foote et al. 1972).

Maui Beach Hotel to Pu'unene Avenue

The alignment parallels Ka'ahumanu Avenue where it fronts the hotel area. The vegetation here consists of landscape plantings with open, grassy lawns, hedgerows of beach naupaka and Hibiscus hybrids, and plantings of Plumeria hybrids on the hotel grounds. Coconut trees line Ka'ahumanu Avenue.

The alignment then passes in front of the canoe club and the Hideaway Restaurant. More lawn areas and landscape plantings are found here.

Pu'unene Avenue to Hobron Avenue

Asphalt paving and coarse gravel characterize this part of the alignment corridor, with most of the site actively used for storage or other uses. A few grassy strips, primarily Bermuda grass and weeds, line some of the roadways. Small patches of weedy scrub occur along the fenceline by Pu'unene Avenue. These support sourbush and koa haole shrubs, kiawe saplings, and Guinea grass.

DISCUSSION

The vegetation along the alignment corridor is dominated by alien or introduced species. These include landscape plantings such as Bermuda grass lawns, coconut trees, beach naupaka hedges, etc., on the maintained areas. Unmaintained areas support scrub vegetation composed of koa haole, Christmas berry, and sourbush shrubs and kiawe thickets. Infrequently maintained areas support a weedy mixture of grasses and herbaceous species. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778.

A few native species can be found along the alignment corridor, primarily in the scrub vegetation along Kahului Beach Road. These are 'ilima (Sida fallax), 'uhaloa (Waltheria indica), beach naupaka (Scaevola sericea), 'aweoweo (Chenopodium oahuense), pohuehue (Ipomoea pes-caprae), pa'uohi'iaka (Jacquemontia ovalifolia spp. sandwicensis), kipukai (Heliotropium curassavicum), 'akulikuli (Sesuvium portulacastrum), alena (Boerhavia repens), and 'aki'aki (Sporobolus virginicus). Beach naupaka and kou (Cordia subcordata) are widely used for landscaping.

All of the native species, with the exception of the 'aweoweo and pa'uohi'iaka, are indigenous, that is, they are native to the Hawaiian Islands and elsewhere. The 'aweoweo and pa'uohi'iaka are endemic, that is, they are native only to the Hawaiian Islands.

None of the plants found during the field studies is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999; Wagner et al. 1999).

A native panic grass, Panicum fauriei, occurs in Keopuolani Park

on lithified dunes with a few other native species near the Maui Botanic Garden (R. Hobdy, State Division of Forestry and Wildlife, pers. comm.). These plants were first thought to be P. fauriei var. carteri, an endangered species. More and better collections were later made, and the plants were found to be more closely related to P. fauriei var. fauriei, a more common and widely distributed species which is not endangered.

Given these findings, the proposed new force main is not expected to have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed project.

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APPENDIX D

Cultural Practices Assessment Report

SCS Project 288-1

A CULTURAL PRACTICES ASSESSMENT FOR THE FORCE MAIN PROJECT IN WAILUKU AND KAHULUI, MAUI, HAWAII [PORTIONS OF TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007]

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ABSTRACT

At the request of Warren S. Unemori Engineering, Inc, Scientific Consultant Services, Inc. (SCS) conducted a cultural practices assessment for the Force Main Project in Wailuku and Kahului, Maui (portions of TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007). SCS consulted with numerous community members and businesses concerning activities and events in and around Kahului Harbor. Six groups of cultural activities, mostly marine oriented, were identified, including, fishing, boating, surfing, canoe racing, and *limu* gathering. Although the presence of the Force Main route, as proposed in the project, will ultimately not cause loss or destruction to any natural or cultural resource, construction methods may temporarily affect access to areas used for cultural activities. Therefore, if access to resources and parking for cultural events and activities are ensured, the Wailuku Force Main project poses no adverse affect.

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INTRODUCTION

At the request of Warren S. Unemori Engineering, Inc, Scientific Consultant Services, Inc. (SCS) conducted a cultural practices assessment for the Force Main Project in Wailuku and Kahului, Maui [portions of TMK: 3-04-027; 3-07-001, 002, 003, 004, 007- 011; 3-08-007] (Figure 1).

The requirements of Chapter 6E, Hawai`I Revised Statutes, governing historic preservation and discussing the cultural setting and impacts to cultural resources and practices must be addressed. The Section 106 process seeks to accommodate historic preservation issues with the needs of projects involving federal participation. This is accomplished through consultation among concerned parties with an interest in the effects of the project on historic properties and is to be initiated in the early stages of planning a project. Consultation is to occur to identify those properties potentially affected by the project, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties (King and Nissley 2000).

In 2000, the Hawai`I State Legislature passed into law Act 50, which included in the definition of "environmental impact statement", effects on the cultural practices of the Community and State. The definition of "significant effect" was amended to include adverse effects on cultural practices (Act 50, Session Laws of Hawaii 2000). Act 50 requires an assessment of cultural practices in project area to be included in the Environmental Impact Statement and to be taken into consideration during the planning process.

The November 1997 *Guidelines for Assessing Cultural Practices* recognizes the concept of geographical expansion by using as an example "the broad geographical area, e.g., district or ahupua`a." In each of the cited cultural activities, impact of the completed project will have no affect. It is during the actual construction along segments of the route that various cultural activities may be affected. SCS consulted with community members in the Wailuku/Kahului region to ascertain what cultural uses (if any) are occurring in the region encompassing the Force Main route. Cultural Impact Assessment was on the Wailuku Force Main project was completed in March of 2002.

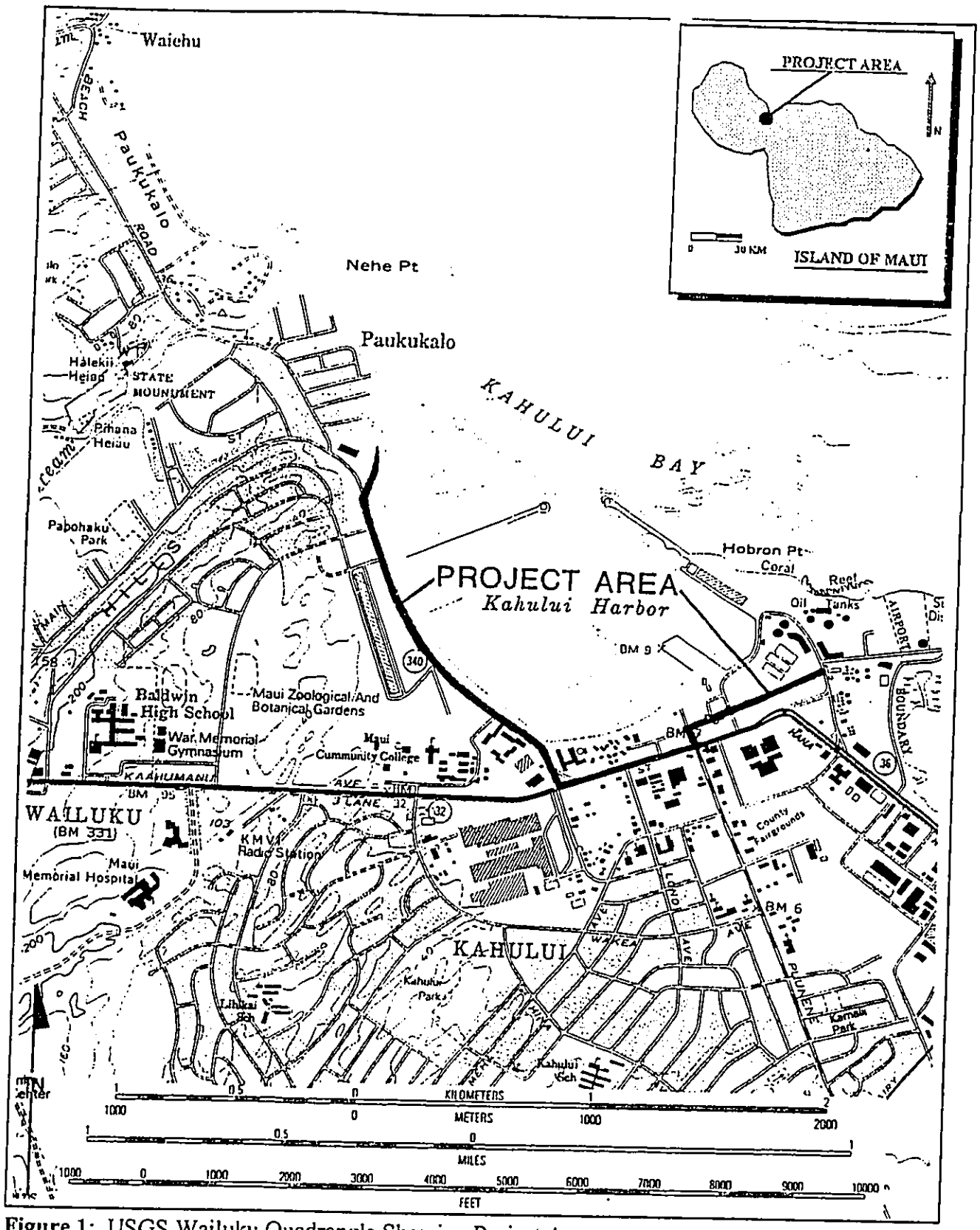

Figure 1: USGS Wailuku Quadrangle Showing Project Area.

DEFINING CULTURAL PRACTICES

Recently, consultation between the OEQC, OHA and the Primary Corridor Transportation Project resulted in a general definition of cultural practices (reported in Act 50-Cultural Impact Assessment 2001). It was decided that the process should identify "anthropological" cultural practices, rather than "social" cultural practices. *Limu* gathering would be considered anthropological while a modern-day marathon would be considered social cultural practice. The discussion resulted in the following workable definition:

(1) A traditional cultural practice that is being conducted in an urban setting; and

(2) Traditions, beliefs, practices, lifeways, societal, history of a community and its traditions, arts, crafts, music, and related social institutions.

There was a discussion distinguishing between "traditional" cultural practices, such as fishing, and "urban" cultural practices, such as craft fairs and the elderly gathering at shopping malls. It was decided that the spirit of Act 50 pointed in the direction of assessing and protecting traditional cultural practices in urban setting, rather that urbanized cultural practices. This definition is appropriate for the present Force Main project.

METHODOLOGY

Informant interviews form a critical part of the cultural practices assessment process. Individuals having knowledge of traditional, as well as, current cultural practices associated with the project area were sought for interviews. Over 17 Maui residents, businesses, or service clubs were eventually contacted. Several knowledgeable individuals were recommended to SCS through consultation with Office of Hawaiian Affairs (OHA) and the Office of Environmental Quality Control (OEQC).

Maui residents who contributed information and recommended additional sources included, Thelma Shimaoka of OHA, Dana Naone Hall of the Maui Burial Council; William Garcia, Clifford Hashimoto, and Leslie Kuloloio associated with the Royal Order of Kamehameha; Mary Aikona, Executive Director of the Hawaiian Canoe Club; Brian Oshikawa, owner of Maui Sporting Goods; Gary Hashizaki, a member of the Maui Casting Club, William Waiohu and Malia Hokuana, Maui *kama`āina*.

Business and service clubs along the project's route were consulted. Inquiries were made at the Maui Seaside, the Maui Beach hotel, the Maui Visitors Bureau, and the Outdoor Circle, for any information concerning cultural activities that may be impacted by the Force Main project. SCS consulted with informants and explored on foot and by car the Force Main route. The entire Force Main route was assessed resulting in the identification of at least six groups of activities that may be potentially impacted by this project (Figure 2):

(1) Fishing tournaments, net and line fishing during specific seasons, as well as, throughout the year;

(2) *Limu* gathering on the west and south sides of Kahului Bay;

(3) Surfing in Kahului Bay during the winter months;

(4) Canoe racing events;

(5) Kamehameha Day Commemoration;

(6) Classes held on sites abutting the Force Main project and teaching culturally significant information.

STUDY AREA

The project area extends around Kahului Bay in Wailuku Ahupua`a. The western section of the project is located in Paukūkalo, originating at the existing Wailuku pump station.. The proposed route for the Force Main Project extends south, crosses Kahului Beach Road to the *mauka* side of the road, and follows it almost to where it intersects with Ka`ahumanu Avenue. Across from Harbor Lights, the route switches back to the *makai* side of Kahului Beach Road where it parallels the Maui Beach Hotel property. The route continues around the corner and east, along Ka`ahumanu Avenue. At the eastern end of the Maui Beach Hotel property, the route turns *makai* along a road leading through a vacant lot, to the Hoaloha Park entrance. The route then turns east along the park fence, crosses in back of the First Hawaiian Bank, continues across Pu`unene Avenue, and ends at Hobron Avenue (see Figure 2).

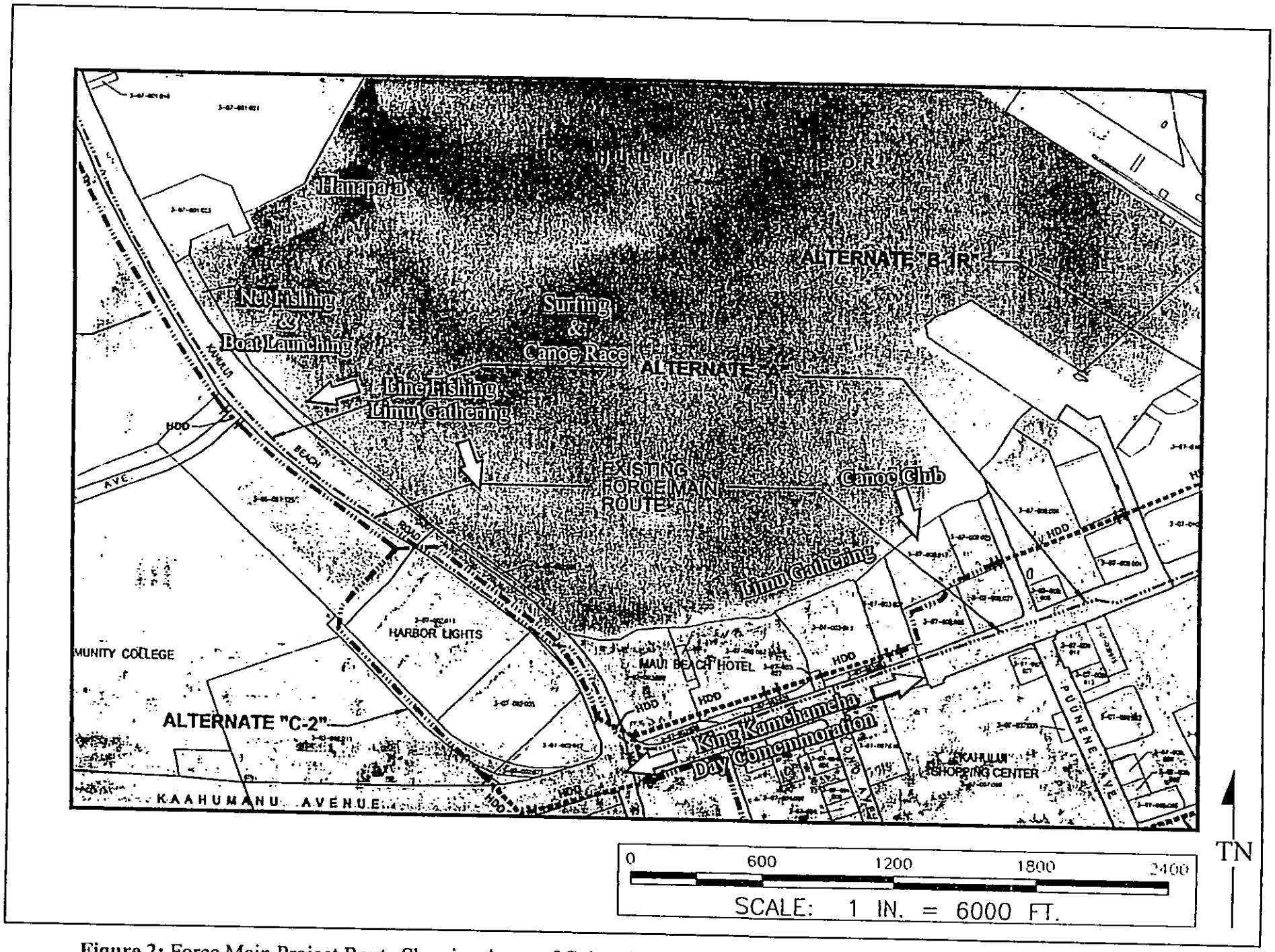

Figure 2: Force Main Project Route Showing Areas of Cultural Activity.

SCS had previously conducted an archaeological assessment for the Wailuku Force Main Project, which included: archival/background research in conjunction with review a of archaeological studies conducted within close proximity to the proposed route on file at the State Historic Preservation Division; review of 19th century Land Commission Awards (LCA); an archaeological reconnaissance survey within the project area; consultation with the Maui State Historic Preservation Officer, Melissa Kirkendall; and a synthesis and assessment of the findings from appropriate archaeological projects and historic records (McGerty and Spear 2001). As a result of this study, it was concluded that there was a high probability of encountering archaeological material from pre-Contact activities, as well as historic 19th century remains in sub-surface deposits along the Force Main route.

IDENTIFICATION OF CULTURAL PRACTICES

The west side of the Force Main route begins at the existing Wailuku Pump Station and continues along Kahului Beach Road, past the jetty, past the Harbor Lights, to Ka`ahumanu Avenue. Several people were able to provide information pertaining to cultural events and activities associated with this side of the bay .

The western side of the bay is known for fishing, surfing, and jet skiing. A launch ramp providing ocean access for private boats, is located south of the Kahului Harbor park. In this area, net fisherman catch *`opae* (shrimp) to use as bait. Line fishermen converge on the shore in March for the *`ama`ama* (mullet, *Mugil cephalus*) season, and in July to September for the *ulua* (*Carangidae* sp.) However, intermittent fishing, for *papio* (*Carangidae* sp.) takes place along the shore all year round from Kahului Harbor Park to the Maui Beach Hotel, as does *limu* gathering. When the waters are clear, diving for *he`e* (octopus) takes place within the harbor. In winter, surfing and jet-skiing activities occur inside the harbor, taking advantage of the two breaks that can be present. Jet-skiers move from the south shore to Kahului Harbor during the winter, so as to not disturb the migrating whales. The biggest event of the year for the west side is the Hanapa`a Fishing Tournament held in the second or third week of July. There can be up to 60 boats in the vicinity of the Kahului Harbor Park and the launch ramp. The boaters, fishermen, as well as, the general community need the parking area and access which is presently provided.

The Force Main route continues along Ka`ahumanu Avenue, turning at right angles toward the Hoaloha Park where the Hawaiian Canoe Club has its headquarters. In the past, the yearly celebration of Kamehameha Day advanced down Ka`ahumanu Avenue to the beach park (Clark 1980:8). Presently, the Royal Order of Kamehameha has commemorated the day with a march from the Maui Community College, down Ka`ahumanu Avenue to Hoaloha Park.

Every year there are a number of Maui races originating or ending at the canoe club, or actually occurring within Kahului Harbor. These functions utilize land abutting the canoe club and Hoaloha Park for parking and other associated activities. Among these races are the Wilmington Regatta on June 1, sponsored by Na Kai `Ewalu canoe club; the John M. Lake Regatta, on July 20, sponsored by the Hawaiian Canoe Club; The Queen Ka`ahumanu Race, on August 17; and The Great Kahakuloa Race, on August 18. Often, groups reserve the Canoe club for their own events, such as the Corporate Regatta Race being held this March 24. Ms. Aikona of Kamali`i Inc., reported that, in the summer from May to August, there are paddling classes and activities for children consisting at times of more than 200 kids spread throughout the grounds. Adult paddlers continue their use of the facilities year round.

The Department of Education and other groups regularly use the Hawaiian Canoe Club buildings for classes, such as Hawaiian language, native Hawaiian plants, and *Lua* (ancient Hawaiian fighting method) instruction. An older generation of *limu* gatherers are regularly observed along the shores of the harbor. Ms. Aikona mentioned that Hoaloha Park is enjoyed daily by many individuals. The area surrounding the Hawaiian Canoe Club facilities and Hoaloha Park is popular for beach recreation, increasing in the summer months, but continuing throughout the year. All of the above activities need parking areas and access to the park and beach. The community has continuously used the vacant lot abutting the park Most activities for 2002 have been booked and an international sport event hosted by the Hawaiian Canoe Club is planned for March 29-30, 2003.

A conversation with William Waiohu supplied information concerning previous occupation in the coastal area fronting the Maui Beach property. Until construction began on the hotels, there was a large Hawaiian community living along this beach known as "Raw Fish Camp". Here, people would dive for squid and fish for two types of fish in particular: the *nehu* (*Stolephorus purpureus*) and *`iāo* (*Hepsetia insularum*) [caught in abundance and usually eaten raw, hence, the name of the camp]. Another camp was situated across from Harbor Lights to the

west, also consisting of a large Hawaiian community. As a child, William would spend time at Raw Fish Camp with his "tutuman" (grandfather), Kepa Pa`inui. Everyone moved away when construction of the hotel began, many relocated to Hawaiian Homes Land and, as alterations were made to the harbor, the fishing grounds deteriorated.

ASSESSMENT AND RECOMMENDATIONS

SCS consulted with numerous community members and businesses concerning activities and events in and around Kahului Harbor. Several cultural practices, mostly marine oriented, were identified, including, fishing, boating, surfing, canoe racing, and *limu* gathering.

Although the presence of the Force Main route, as proposed in the project, will ultimately not cause loss or destruction to any natural or cultural resource, construction methods may temporarily affect access to areas used for cultural activities. Participants in the varied cultural events may have difficulty parking their vehicles unless construction to that particular segment is scheduled during a time of least activity. For example, it would not be recommended to have construction take place on Kahului Beach Road, near the jetty and launch ramp during the Hanapa`a celebration, if it would affect parking or access to the bay. As several of the practices, such as line fishing and *limu* gathering happen regularly, access to these resource areas should always be maintained, even during construction of the route segment abutting that region. It is recommended that before any construction occurs in the Hoaloha Park/Hawaiian Canoe Club vicinity, a call be placed to Mary Aikona of the Hawaiian Canoe Club at (808) 893-2124 in case activities are planned.

Based on the consultation held with the OEQC, OHA, and discussions held amongst the recruited informed individuals, SCS believes the Act 50, Cultural Impact Assessment requirements for the Section 106 process have been met. As long as access to resources and parking for cultural events and activities are ensured, the Wailuku Force Main project poses no adverse affect.

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APPENDIX E

Impacts on Wetlands at Kanaha Pond

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4471 Puu Panini Ave.
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(808) 734-7828

12 February 2002

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

Attention: Alan L. Unemori

SUBJECT Wailuku Force Main Replacement
Impacts on Wetlands at Kanaha Pond

Dear Mr. Unemori:

In their review of the Draft EA Report for the project, the Office of Environmental Quality Control (OEQC) was concerned about the indirect and cumulative impacts on the biological resources of the wetlands at Kanaha Pond. The following discussion reviews the biological resources at the pond and addresses the OEQC concerns.

Native plant species are the dominant components of the vegetation in and around the Kanaha Pond area, but no threatened and endangered plants or species of concern are known from the site (U.S. Fish and Wildlife Service 1992, 1999a, 1999b, 1999c). Sedges such as bulrush (Schoenoplectus californicus) and kaluha (Bolboschoenus maritimus) form emergent stands along the margins of the pond. Low, succulent mats of 'akulikuli (Sesuvium portulacastrum), water hyssop (Bacopa monnieri), and kipukai (Heliotropium curassavicum) are locally abundant on open mudflats. The introduced Indian pluchea shrub (Pluchea indica) may form dense thickets in some places.

The endangered Hawaiian Stilt or Ae'o (Himantopus mexicanus knudseni) and the endangered Hawaiian Coot or 'Alae Ke'oke'o (Fulica americana alai) are found at Kanaha Pond (Hawaii Audubon Society 1997; U.S. Fish and Wildlife Service 1999c). Kanaha Pond and Kealia Pond are considered important habitat for waterbirds. Besides the stilt and coot, the Black-crowned Night Heron or 'Auku'u (Nycticorax nycticorax hoactli) also frequents the pond all year long. Kanaha Pond is also important as a wintering area for migratory ducks and shorebirds.

The endangered Hawaiian Hoary Bat or 'Ope'ape'a (Lasiurus cinereus semotus) may visit the site when feeding, but its low numbers and crepuscular habit make it difficult to detect (Tomich 1969; van Riper and van Riper 1982).

In summary, no rare plants occur at the Kanaha Pond site. The pond is considered important habitat for the endangered Hawaiian Stilt and Hawaiian Coot; the endangered Hawaiian Hoary Bat may utilize the site for feeding.

However, the proposed Wailuku Wastewater Pump Station Force Main Replacement project is not expected to have an indirect or cumulative impact on the biological resources of Kanaha Pond. The proposed force main will connect onto an existing force main at Hobron Avenue, more than 300 ft. away from the Kanaha Pond boundary. The area between Hobron Avenue and the pond is developed and urbanized. Because the project terminates at the Hobron Avenue connection, no construction or disturbances will take place adjacent to the pond boundary.

Please do not hesitate to contact me should you have any questions regarding this report.

Sincerely,

Winona P. Char

Winona P. Char

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APPENDIX F

DOT Recommendations on the Use of Glassphalt Concrete Base Course

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

January 24, 2002

Mr. Alan Unemori
Vice President – Warren S. Unemori Engineering, Inc.
2145 Wells Street, Suite 403
Wailuku, HI 96793

RE: Glassphalt Concrete Base Course

Mr. Unemori,

In regards to your question concerning the use of Glassphalt Concrete Base Course Material, the only answer that I can give at this time would be that it is a State requirement for all paving contractor's to use Glassphalt whenever cullet (crushed glass passing 3/8" Sieve) is available. Structurally speaking, there is no real difference in strength between Glassphalt and Asphalt Concrete Base Course. The only difference would be in the production of the material. Asphalt Concrete Base Course uses intermediate size rocks in the mix, whereas Glassphalt uses the cullet (crushed glass) to replace the intermediate size rock.

Concerning safety factors, the only concern I have is when the Glassphalt is to be removed in the future. In most cases it is 'cold planed' out (dug up and crushed by a large machine). In this process it is possible for very fine pieces of glass to be introduced into the air and inhaled.

I understand that this is a County job, however, the County of Maui does need to abide by the State requirement in the use of Glassphalt, providing that crushed glass is available. If no glass is available to produce Glassphalt, then it is okay for the paving contractor to substitute Asphalt Concrete Base Course in it's place.

Sincerely,

Edwin B. McCary, Jr.

Edwin B. McCary, Jr.
Materials Testing Engineering Technician

FIGURES

1. Project Location Map

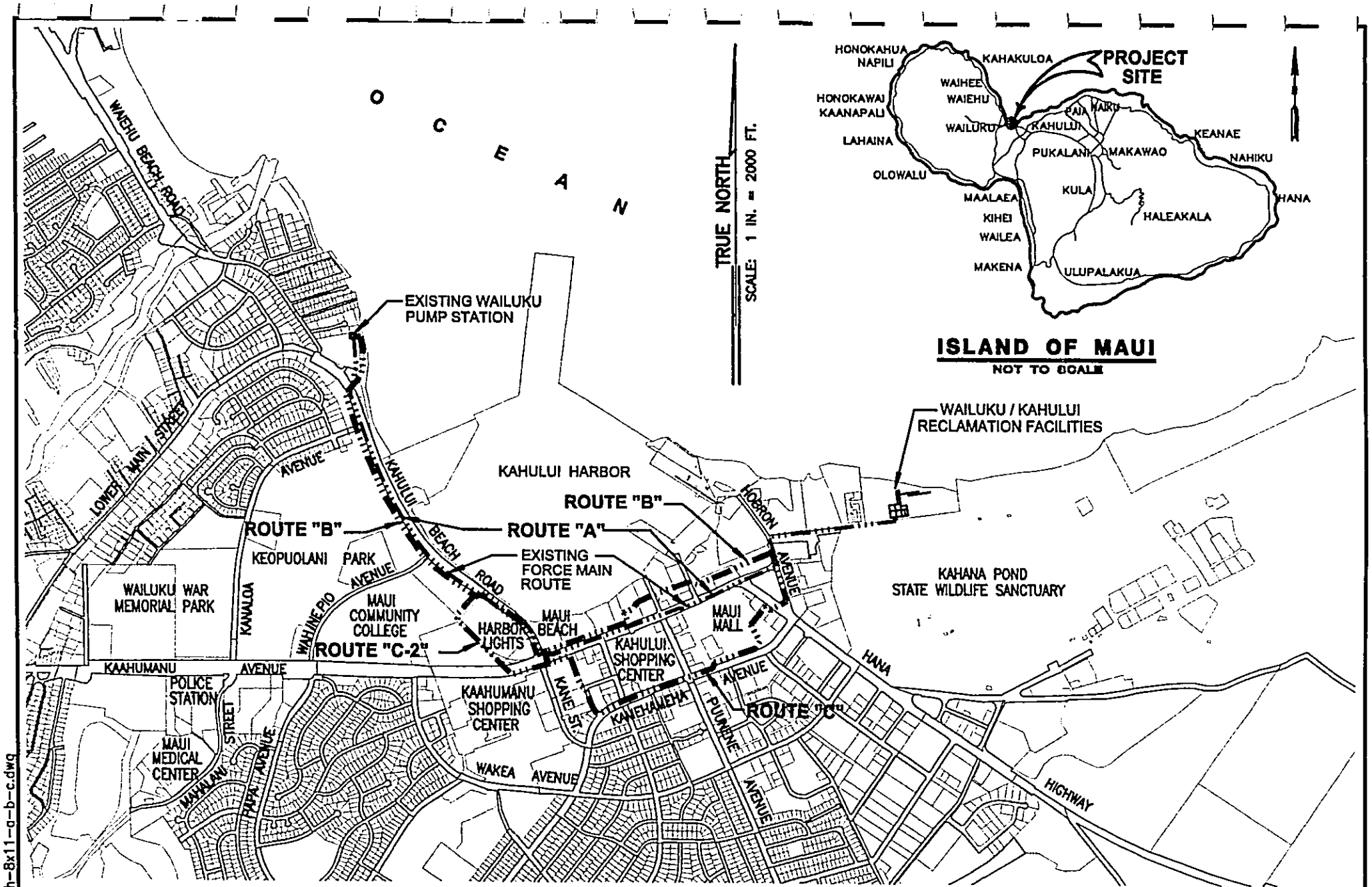

FIGURE 1
PROJECT LOCATION MAP

0 2000 4000 6000

SCALE: 1 IN. = 2000 FT.

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

January 10, 2001
Revised: January 16, 2001
Revised: November 27, 2001

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2. Site Map Showing Locations of Project Improvements

DOCUMENT CAPTURED AS RECEIVED

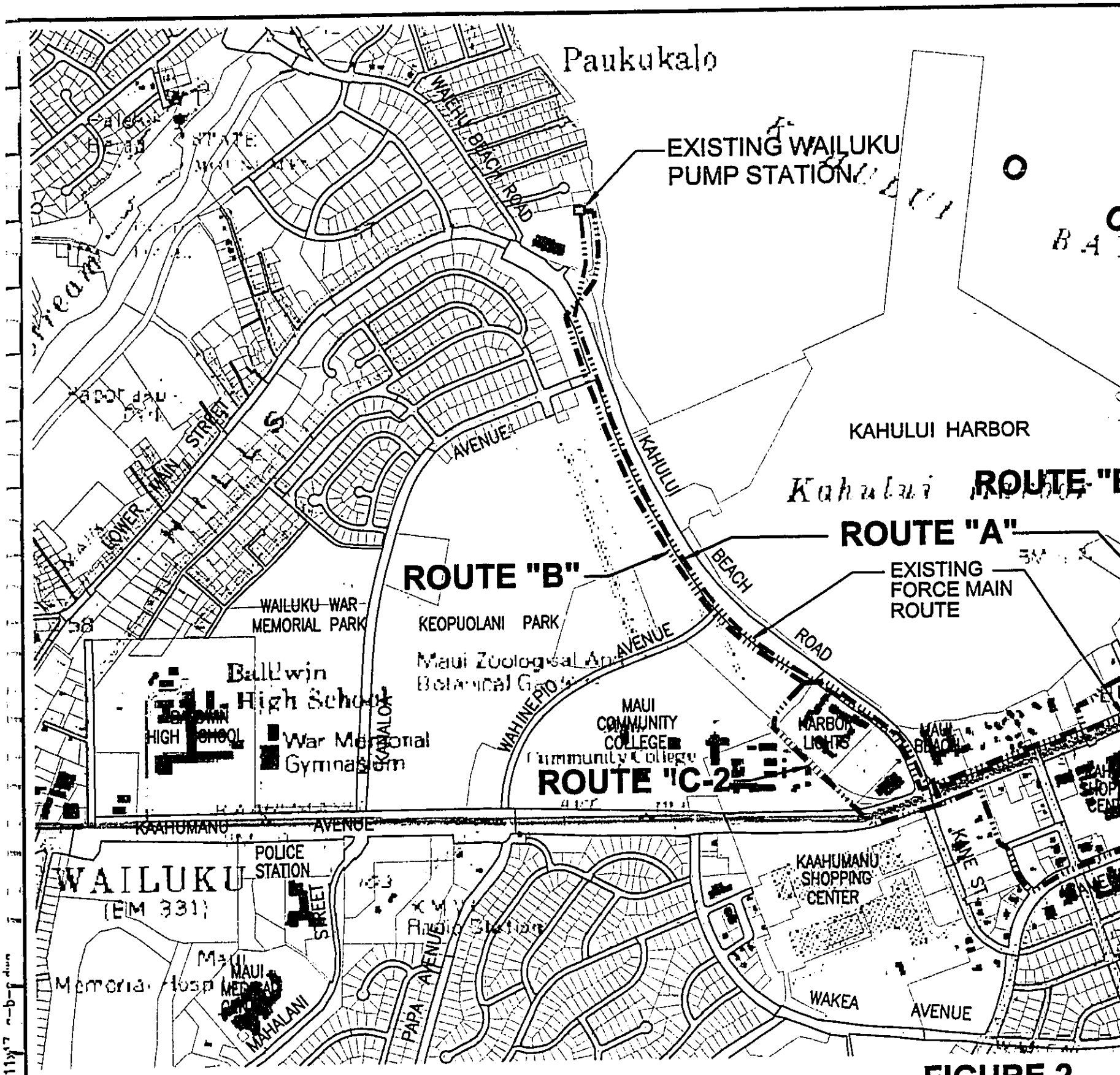


FIGURE 2

SITE MAP SHOWING LOCATIONS OF PR

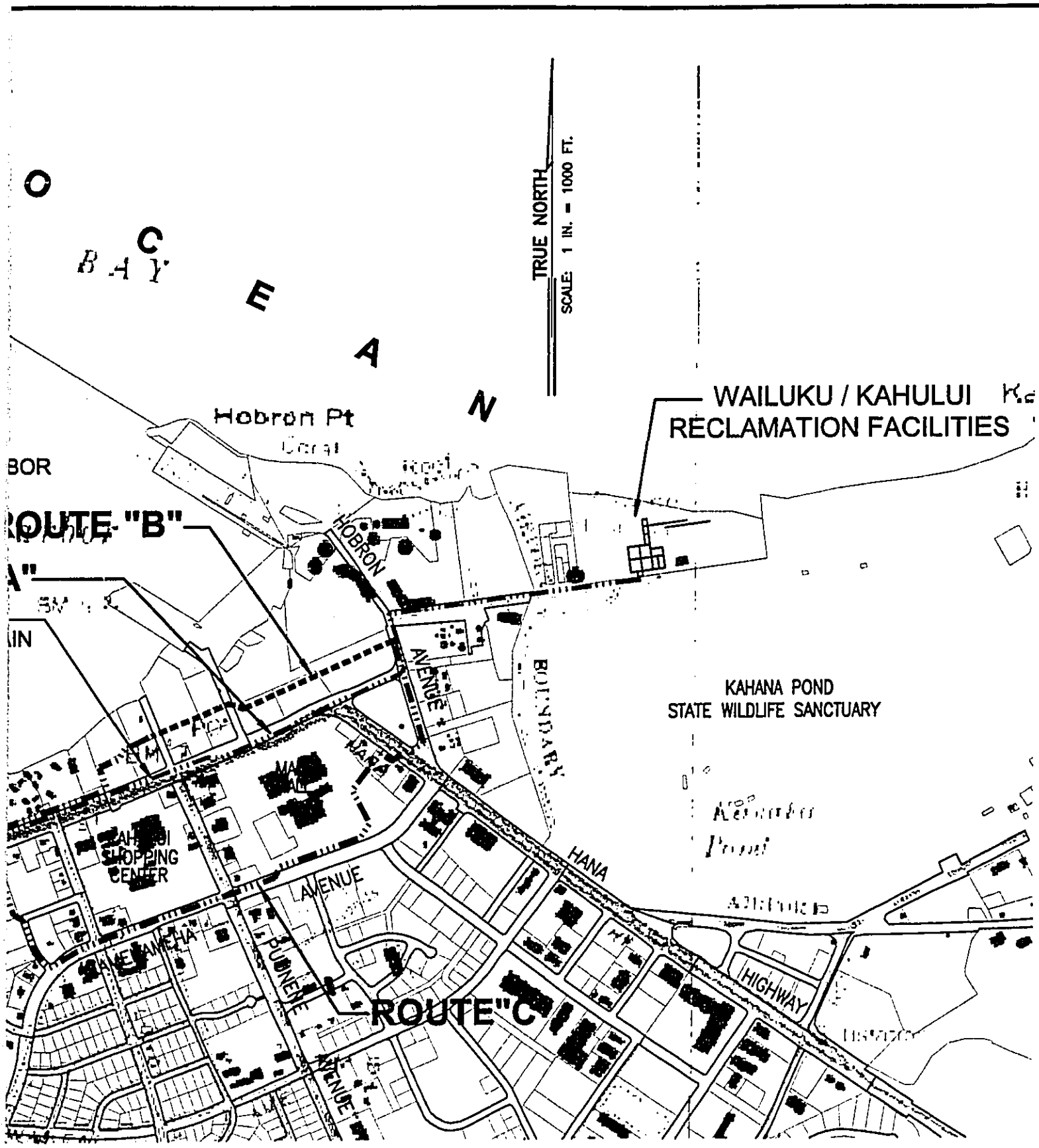
LEGEND:

- EXISTING FORCE MAIN
- ROUTE B
- ROUTE C
- ROUTE C-2

0 1000 2000 3000

SCALE: 1 IN. = 1000 FT

DOCUMENT CAPTURED AS RECEIVED



IRE 2

S OF PROJECT IMPROVEMENTS

3000 4000

= 1000 FT.

WARREN S. UNEMORI ENGINEERING, INC.

January 10, 2001
Revised: January 16, 2001
Revised: November 27, 2001

EXHIBITS

1. Exhibit A - Cost Estimates for Routes “A”, “B”, “C” and “C-2"

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period: 0
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UN-IT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST

SUMMARY OF COSTS

SCHEME A	1	ls		$ 9,348,433
SCHEME B	1	ls		$ 5,823,498
SCHEME C	1	ls		$ 7,684,922
SCHEME C-2	1	ls		$ 8,306,205

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UNIT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST
SCHEME A								
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	18	mon	$ 750.00	$ 13,500	$ -	$ -	$ 750.00	$ 13,500
Temporary utilities	18	mon	$ 1,900.00	$ 34,200	$ -	$ -	$ 1,900.00	$ 34,200
Equipment	18	mon	$ 1,480.00	$ 26,640	$ -	$ -	$ 1,480.00	$ 26,640
Job supervision	18	mon	$ -	$ -	$ 9,500.00	$ 171,000	$ 9,500.00	$ 171,000
Project engineer	18	mon	$ -	$ -	$ 9,500.00	$ 171,000	$ 9,500.00	$ 171,000
QC manager	18	mon	$ -	$ -	$10,250.00	$ 184,500	$ 10,250.00	$ 184,500
QC specialist	3,132	mhr	$ -	$ -	$ 100.00	$ 313,200	$ 100.00	$ 313,200
Job clean-up	18	mon	$ -	$ -	$ 1,500.00	$ 27,000	$ 1,500.00	$ 27,000
Traffic control	18	mon	$ 1,650.00	$ 29,700	$21,500.00	$ 387,000	$ 23,150.00	$ 416,700
SUBTOTAL				$ 104,040		$ 1,323,700		$ 1,427,740
Sewer Force Main								
Saw cut pavement	4,480	lf	$ 1.25	$ 5,600	$ 6.50	$ 29,120	$ 7.75	$ 34,720
Remove pavement	2,489	sy	$ -	$ -	$ 6.50	$ 16,179	$ 6.50	$ 16,179
Remove sidewalk	15,100	sf	$ -	$ -	$ 2.25	$ 33,975	$ 2.25	$ 33,975
Remove curbing	1,810	lf	$ -	$ -	$ 5.00	$ 9,050	$ 5.00	$ 9,050
Load, haul & dispose of debris	1,000	cy	$ 8.50	$ 8,500	$ 12.50	$ 12,500	$ 21.00	$ 21,000
Trenching	40,056	cy	$ -	$ -	$ 25.00	$ 1,001,400	$ 25.00	$ 1,001,400
Temporary shoring	2,884	ln	$ 275.00	$ 793,100	$ 500.00	$ 1,442,000	$ 775.00	$ 2,235,100
Dewatering	18	mon	$ -	$ -	$16,312.50	$ 293,625	$ 16,312.50	$ 293,625
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe	10,300	lf	$ 78.95	$ 813,185	$ 19.95	$ 205,485	$ 98.90	$ 1,018,670
ARV manhole	5	ea	$ 2,500.00	$ 12,500	$ 3,000.00	$ 15,000	$ 5,500.00	$ 27,500
Fittings	8	ea	$ 1,250.00	$ 10,000	$ 2,000.00	$ 16,000	$ 3,250.00	$ 26,000
Thrust blocks	100	cy	$ 225.00	$ 22,500	$ 450.00	$ 45,000	$ 675.00	$ 67,500
Concrete jacket	2,575	lf	$ 107.60	$ 277,070	$ 61.30	$ 157,848	$ 168.90	$ 434,918
Pipe bedding	2,416	cy	$ 31.50	$ 76,104	$ 18.50	$ 44,696	$ 50.00	$ 120,800
Backfill	37,640	cy	$ -	$ -	$ 18.50	$ 696,340	$ 18.50	$ 696,340
Warning tape	10,300	lf	$ 0.05	$ 515	$ 0.10	$ 1,030	$ 0.15	$ 1,545
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	808	cy	$ 20.00	$ 16,160	$ 25.00	$ 20,200	$ 45.00	$ 36,360
Landscaping remediation	7,278	sy	$ 18.00	$ 131,004	$ 27.00	$ 196,506	$ 45.00	$ 327,510
Concrete curbing	1,810	lf	$ 8.00	$ 14,480	$ 9.00	$ 16,290	$ 17.00	$ 30,770
Concrete sidewalk	15,100	sf	$ 3.00	$ 45,300	$ 4.00	$ 60,400	$ 7.00	$ 105,700
AC pavement	187	tn	$ 66.50	$ 12,436	$ 28.50	$ 5,330	$ 95.00	$ 17,766
Asphaltic treated base course	373	tn	$ 59.50	$ 22,194	$ 25.50	$ 9,512	$ 85.00	$ 31,706
Subbase course	415	cy	$ 31.50	$ 13,073	$ 25.00	$ 10,375	$ 56.50	$ 23,448
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,295,971		$ 4,405,361		$ 6,701,332
TOTAL								$ 8,129,072
CONTINGENCIES: 15.00%								$ 1,219,361
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME A								$ 9,348,433

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

SCHEME B

ITEMS OF WORK DESCRIPTIONS	QUANTITIES NO OF UNITS	QUANTITIES UNIT	MATERIAL COST UNIT COST	MATERIAL COST COST	LABOR COST UNIT COST	LABOR COST COST	TOTAL COST UNIT COST	TOTAL COST COST
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	12	mon	$ 750.00	$ 9,000	$ -	$ -	$ 750.00	$ 9,000
Temporary utilities	12	mon	$ 1,900.00	$ 22,800	$ -	$ -	$ 1,900.00	$ 22,800
Equipment	12	mon	$ 1,480.00	$ 17,760	$ -	$ -	$ 1,480.00	$ 17,760
Job supervision	12	mon	$ -	$ -	$ 9,500.00	$ 114,000	$ 9,500.00	$ 114,000
Project engineer	12	mon	$ -	$ -	$ 9,500.00	$ 114,000	$ 9,500.00	$ 114,000
QC manager	12	mon	$ -	$ -	$10,250.00	$ 123,000	$ 10,250.00	$ 123,000
QC specialist	2,088	mhr	$ -	$ -	$ 100.00	$ 208,800	$ 100.00	$ 208,800
Job clean-up	12	mon	$ -	$ -	$ 1,500.00	$ 18,000	$ 1,500.00	$ 18,000
Traffic control	12	mon	$ 1,650.00	$ 19,800	$21,500.00	$ 258,000	$ 23,150.00	$ 277,800
SUBTOTAL				$ 69,360		$ 905,800		$ 975,160
Sewer Force Main								
Saw cut pavement	2,600	lf	$ 1.25	$ 3,250	$ 6.50	$ 16,900	$ 7.75	$ 20,150
Remove pavement	578	sy	$ -	$ -	$ 6.50	$ 3,757	$ 6.50	$ 3,757
Load, haul & dispose of debris	750	cy	$ 8.50	$ 6,375	$ 12.50	$ 9,375	$ 21.00	$ 15,750
Trenching	6,182	cy	$ -	$ -	$ 12.15	$ 75,111	$ 12.15	$ 75,111
Temporary shoring	830	tn	$ 275.00	$ 228,250	$ 500.00	$ 415,000	$ 775.00	$ 643,250
Dewatering	12	mon	$ -	$ -	$16,312.50	$ 195,750	$ 16,312.50	$ 195,750
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	4,050	lf	$ 86.85	$ 351,743	$ 315.00	$ 1,275,750	$ 401.85	$ 1,627,493
Casings	405	lf	$ 70.00	$ 28,350	$ 400.00	$ 162,000	$ 470.00	$ 190,350
24" HDPE FM pipe	6,350	lf	$ 78.95	$ 501,333	$ 18.10	$ 114,935	$ 97.05	$ 616,268
ARV manhole	5	ea	$ 2,500.00	$ 12,500	$ 3,000.00	$ 15,000	$ 5,500.00	$ 27,500
Fittings	10	ea	$ 1,250.00	$ 12,500	$ 2,000.00	$ 20,000	$ 3,250.00	$ 32,500
Thrust blocks	100	cy	$ 225.00	$ 22,500	$ 450.00	$ 45,000	$ 675.00	$ 67,500
Concrete jacket	1,000	lf	$ 107.60	$ 107,600	$ 61.30	$ 61,300	$ 168.90	$ 168,900
Pipe bedding	1,489	cy	$ 31.50	$ 46,904	$ 9.35	$ 13,922	$ 40.85	$ 60,826
Backfill	4,693	cy	$ -	$ -	$ 9.35	$ 43,880	$ 9.35	$ 43,880
Warning tape	10,400	lf	$ 0.05	$ 520	$ 0.10	$ 1,040	$ 0.15	$ 1,560
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	249	cy	$ 20.00	$ 4,980	$ 25.00	$ 6,225	$ 45.00	$ 11,205
Landscaping remediation	2,244	sy	$ 18.00	$ 40,392	$ 27.00	$ 60,588	$ 45.00	$ 100,980
Concrete curbing & sidewalk	1	ls	$ 35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	43	tn	$ 66.50	$ 2,860	$ 28.50	$ 1,226	$ 95.00	$ 4,086
Asphaltic treated base course	87	tn	$ 59.50	$ 5,177	$ 25.50	$ 2,219	$ 85.00	$ 7,396
Subbase course	129	cy	$ 31.50	$ 4,064	$ 25.00	$ 3,225	$ 56.50	$ 7,289
Lane striping	1	ls	$ 2,500.00	$ 2,500	$ 5,000.00	$ 5,000	$ 7,500.00	$ 7,500
SUBTOTAL				$ 1,434,048		$ 2,654,703		$ 4,088,751
TOTAL								$ 5,063,911
CONTINGENCIES: 15.00%								$ 759,587
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME B								$ 5,823,498

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK	QUANTITIES		MATERIAL COST		LABOR COST		TOTAL COST	
DESCRIPTIONS	NO OF UNITS	UNIT	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST
			SCHEME C					
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 750.00	$ 10,500
Job shack & supplies	14	mon	$ 750.00	$ 10,500	$ -	$ -	$ 1,900.00	$ 26,600
Temporary utilities	14	mon	$ 1,900.00	$ 26,600	$ -	$ -	$ 1,480.00	$ 20,720
Equipment	14	mon	$ 1,480.00	$ 20,720	$ -	$ -	$ 9,500.00	$ 133,000
Job supervision	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
Project engineer	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 10,250.00	$ 143,500
QC manager	14	mon	$ -	$ -	$10,250.00	$ 143,500	$ 100.00	$ 243,600
QC specialist	2,436	mhr	$ -	$ -	$ 100.00	$ 243,600	$ 1,500.00	$ 21,000
Job clean-up	14	mon	$ -	$ -	$ 1,500.00	$ 21,000	$ 23,150.00	$ 324,100
Traffic control	14	mon	$ 1,650.00	$ 23,100	$21,500.00	$ 301,000		$ 1,126,020
SUBTOTAL				$ 80,920		$ 1,045,100		
Sewer Force Main								
Saw cut pavement	12,800	lf	$ 1.25	$ 16,000	$ 6.50	$ 83,200	$ 7.75	$ 99,200
Remove pavement	2,844	sy	$ -	$ -	$ 6.50	$ 18,486	$ 6.50	$ 18,486
Load, haul & dispose of debris	1,100	cy	$ 8.50	$ 9,350	$ 12.50	$ 13,750	$ 21.00	$ 23,100
Trenching	12,425	cy	$ -	$ -	$ 12.15	$ 150,964	$ 12.15	$ 150,964
Temporary shoring	2,592	tn	$ 275.00	$ 712,800	$ 500.00	$ 1,296,000	$ 775.00	$ 2,008,800
Dewatering	14	mon	$ -	$ -	$16,312.50	$ 228,375	$ 16,312.50	$ 228,375
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	1,300	lf	$ 86.85	$ 112,905	$ 315.00	$ 409,500	$ 401.85	$ 522,405
30" HDPE pipe w/HHD	700	lf	$ 108.50	$ 75,950	$ 315.00	$ 220,500	$ 423.50	$ 296,450
Casings	200	lf	$ 70.00	$ 14,000	$ 400.00	$ 80,000	$ 470.00	$ 94,000
24" HDPE FM pipe	7,850	lf	$ 78.95	$ 619,758	$ 18.10	$ 142,085	$ 97.05	$ 761,843
30" HDPE pipe	2,850	lf	$ 98.75	$ 281,438	$ 22.65	$ 64,553	$ 121.40	$ 345,991
ARV manhole	6	ea	$ 2,500.00	$ 15,000	$ 3,000.00	$ 18,000	$ 5,500.00	$ 33,000
Fittings	19	ea	$ 1,250.00	$ 23,750	$ 2,000.00	$ 38,000	$ 3,250.00	$ 61,750
Thrust blocks	200	cy	$ 225.00	$ 45,000	$ 450.00	$ 90,000	$ 675.00	$ 135,000
Concrete jacket	1,250	lf	$ 107.60	$ 134,500	$ 61.30	$ 76,625	$ 168.90	$ 211,125
Pipe bedding	2,712	cy	$ 31.50	$ 85,428	$ 9.35	$ 25,357	$ 40.85	$ 110,785
Backfill	9,713	cy	$ -	$ -	$ 9.35	$ 90,817	$ 9.35	$ 90,817
Warning tape	12,700	lf	$ 0.05	$ 635	$ 0.10	$ 1,270	$ 0.15	$ 1,905
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	212	cy	$ 20.00	$ 4,240	$ 25.00	$ 5,300	$ 45.00	$ 9,540
Landscaping remediation	1,911	sy	$ 18.00	$ 34,398	$ 27.00	$ 51,597	$ 45.00	$ 85,995
Concrete curbing & sidewalk	1	ls	$ 35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	213	tn	$ 66.50	$ 14,165	$ 28.50	$ 6,071	$ 95.00	$ 20,236
Asphaltic treated base course	427	tn	$ 59.50	$ 25,407	$ 25.50	$ 10,889	$ 85.00	$ 36,296
Subbase course	632	cy	$ 31.50	$ 19,908	$ 25.00	$ 15,800	$ 56.50	$ 35,708
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,301,882		$ 3,254,639		$ 5,556,521
								$ 6,682,541
TOTAL								$ 1,002,381
CONTINGENCIES: 15.00%								$ 7,684,922
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME C								

PROJECT TITLE: WAILUKU FORCE MAIN
LOCATION: WAILUKU, MAUI, HAWAII
JOB NUMBER: 00010
ARCHITECT: Warren S. Unemori Engineering Inc.
ESTIMATOR: Cost Engineering of Hawaii, Inc.

DATE: 25 OCTOBER 2000
Design Stage: PRELIMINARY
Construction Period:
Bid Opening on or Before: 1 DEC2000

ITEMS OF WORK / DESCRIPTIONS	QUANTITIES NO OF UNITS	UN-IT	MATERIAL COST UNIT COST	MATERIAL COST COST	LABOR COST UNIT COST	LABOR COST COST	TOTAL COST UNIT COST	TOTAL COST COST
SCHEME C-2								
General Requirements								
Mobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Demobilization	1	ls	$ -	$ -	$35,000.00	$ 35,000	$ 35,000.00	$ 35,000
Job shack & supplies	14	mon	$ 750.00	$ 10,500	$ -	$ -	$ 750.00	$ 10,500
Temporary utilities	14	mon	$ 1,900.00	$ 26,600	$ -	$ -	$ 1,900.00	$ 26,600
Equipment	14	mon	$ 1,480.00	$ 20,720	$ -	$ -	$ 1,480.00	$ 20,720
Job supervision	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
Project engineer	14	mon	$ -	$ -	$ 9,500.00	$ 133,000	$ 9,500.00	$ 133,000
QC manager	14	mon	$ -	$ -	$10,250.00	$ 143,500	$ 10,250.00	$ 143,500
QC specialist	2,436	mhr	$ -	$ -	$ 100.00	$ 243,600	$ 100.00	$ 243,600
Job clean-up	14	mon	$ -	$ -	$ 1,500.00	$ 21,000	$ 1,500.00	$ 21,000
Traffic control	14	mon	$ 1,650.00	$ 23,100	$21,500.00	$ 301,000	$ 23,150.00	$ 324,100
SUBTOTAL				$ 80,920		$ 1,045,100		$ 1,126,020
Sewer Force Main								
Saw cut pavement	13,000	lf	$ 1.25	$ 16,250	$ 6.50	$ 84,500	$ 7.75	$ 100,750
Remove pavement	2,889	sy	$ -	$ -	$ 6.50	$ 18,779	$ 6.50	$ 18,779
Load, haul & dispose of debris	1,250	cy	$ 8.50	$ 10,625	$ 12.50	$ 15,625	$ 21.00	$ 26,250
Trenching	12,317	cy	$ -	$ -	$ 12.15	$ 149,652	$ 12.15	$ 149,652
Temporary shoring	2,633	tn	$ 275.00	$ 724,075	$ 500.00	$ 1,316,500	$ 775.00	$ 2,040,575
Dewatering	14	mon	$ -	$ -	$16,312.50	$ 228,375	$ 16,312.50	$ 228,375
24" gate valve & vaults	2	ea	$ 7,500.00	$ 15,000	$25,000.00	$ 50,000	$ 32,500.00	$ 65,000
24" HDPE FM pipe w/HHD	2,400	lf	$ 86.85	$ 208,440	$ 315.00	$ 756,000	$ 401.85	$ 964,440
30" HDPE pipe w/HHD	700	lf	$ 108.50	$ 75,950	$ 315.00	$ 220,500	$ 423.50	$ 296,450
Casings	310	lf	$ 70.00	$ 21,700	$ 400.00	$ 124,000	$ 470.00	$ 145,700
24" HDPE FM pipe	7,950	lf	$ 78.95	$ 627,653	$ 18.10	$ 143,895	$ 97.05	$ 771,548
30" HDPE pipe	2,850	lf	$ 98.75	$ 281,438	$ 22.65	$ 64,553	$ 121.40	$ 345,991
ARV manhole	6	ea	$ 2,500.00	$ 15,000	$ 3,000.00	$ 18,000	$ 5,500.00	$ 33,000
Fittings	19	ea	$ 1,250.00	$ 23,750	$ 2,000.00	$ 38,000	$ 3,250.00	$ 61,750
Thrust blocks	200	cy	$ 225.00	$ 45,000	$ 450.00	$ 90,000	$ 675.00	$ 135,000
Concrete jacket	1,250	lf	$ 107.60	$ 134,500	$ 61.30	$ 76,625	$ 168.90	$ 211,125
Pipe bedding	2,735	cy	$ 31.50	$ 86,153	$ 9.35	$ 25,572	$ 40.85	$ 111,725
Backfill	9,582	cy	$ -	$ -	$ 9.35	$ 89,592	$ 9.35	$ 89,592
Warning tape	13,900	lf	$ 0.05	$ 695	$ 0.10	$ 1,390	$ 0.15	$ 2,085
Maintenance	3	mon	$ 750.00	$ 2,250	$ 2,500.00	$ 7,500	$ 3,250.00	$ 9,750
Topsoil	212	cy	$ 20.00	$ 4,240	$ 25.00	$ 5,300	$ 45.00	$ 9,540
Landscaping remediation	1,911	sy	$ 18.00	$ 34,398	$ 27.00	$ 51,597	$ 45.00	$ 85,995
Concrete curbing & sidewalk	1	ls	$ 35,000.00	$ 35,000	$50,000.00	$ 50,000	$ 85,000.00	$ 85,000
AC pavement	217	tn	$ 66.50	$ 14,431	$ 28.50	$ 6,185	$ 95.00	$ 20,616
Asphaltic treated base course	433	tn	$ 59.50	$ 25,764	$ 25.50	$ 11,042	$ 85.00	$ 36,806
Subbase course	642	cy	$ 31.50	$ 20,223	$ 25.00	$ 16,050	$ 56.50	$ 36,273
Lane striping	1	ls	$ 5,000.00	$ 5,000	$10,000.00	$ 10,000	$ 15,000.00	$ 15,000
SUBTOTAL				$ 2,427,535		$ 3,669,232		$ 6,096,767
TOTAL								$ 7,222,787
CONTINGENCIES: 15.00%								$ 1,083,418
TOTAL ESTIMATED CONSTRUCTION COST - SCHEME C2								$ 8,306,205

2. **Exhibit B - Properties Affected by Routes "B" and "C"**

Properties Affected by Alternative "B"

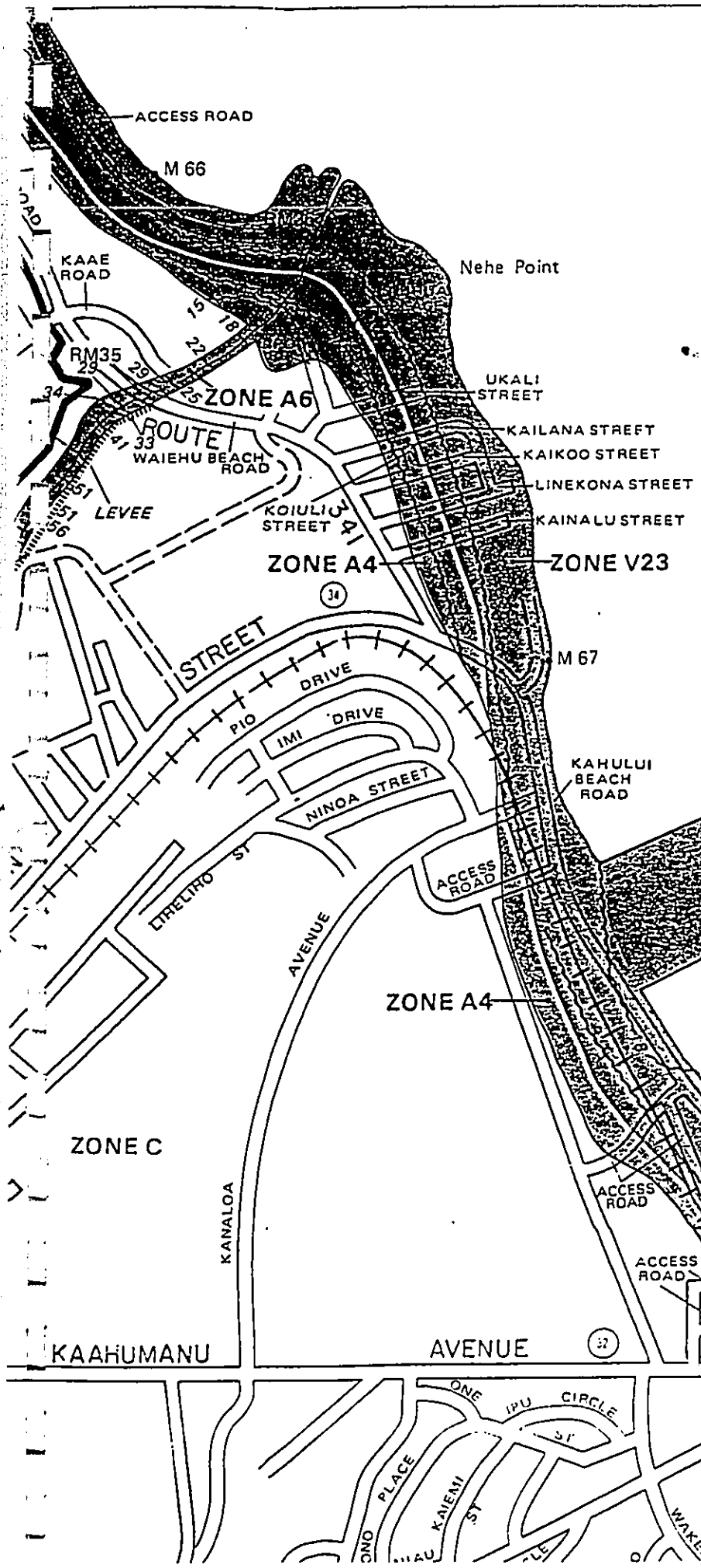
TMK:	Present Use	Owner
3-4-27:1	Warehouse	Y. Hata Co. Ltd. P. O. Box 3770 Honolulu, HI 96812
3-4-27:26	Beach Remnant	County of Maui
3-7-08:17	Canoe Club	County of Maui - Parks Dept.
3-8-07:125	Central Park; Park Land	University of Hawaii State of Hawaii
3-7-01:02	Central Park	County of Maui - Parks Dept.
3-7-01:	Kahului Beach Road	SDOT - Highways
3-8-07:38	Vacant lot	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-03:28	Strip in front of Maui Beach	Elleair Inc. 170 Kaahumanu Avenue Kahului, HI 96732
3-7-03:26	Strip in front of Maui Palms	Elleair Inc. 170 Kaahumanu Avenue Kahului, HI 96732
3-7-03:27	Entry to Seaside	A&B Properties, Inc. P.O. Box 156 Kahului, HI 96732
3-7-03:03	Strip in front of Seaside	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-08:08	Vacant lot	A & B - Hawaii Inc. Alexander & Baldwin Inc. P. O. Box 156 Kahului, HI 96732
3-7-01:16	Remnant Beach Lot	A & B - Hawaii Inc. P. O. Box 156 Kahului, HI 96732
3-7-08:06	Container Yard	State of Hawaii - Harbors Division 79 S. Nimitz Hwy Honolulu, HI 96813
3-7-10:01	Old Kahului Store	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-10:36	Office Buildings	A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
3-7-10:02	Container Yard	State of Hawaii - Harbors Division 79 S. Nimitz Hwy Honolulu, HI 96813

3-7-08:25	Hideaway Restaurant	HRT Ltd. 3660 Waialae Avenue, 4th Floor Honolulu, HI 96816
3-7-08:27	FHB Alternative route if can't get across TMK: 3-7-8:25	FHB Properties, Inc. P. O. Box 3200 Honolulu, HI 96847

Properties Affected by Alternative "C"

TMK:	Present Use	Owner
3-4-27:1	Warehouse	Y. Hata Co. Ltd. P. O. Box 3770 Honolulu, HI 96812
3-4-27:26	Beach Remnant	County of Maui
3-7-01:02	Keopuolani Park	County of Maui - Parks Dept.
3-7-08:125	Keopuolani Park	County of Maui - Parks Dept.
3-7-02:11		State of Hawaii
3-7-009:030		County of Maui
3-8-07:125		MCC Kaahumanu Avenue Kahului, HI 96732
3-8-07:40		MCC Kaahumanu Avenue Kahului, HI 96732
3-7-04:3		State of Hawaii - DAGS
3-7-09:04		A&B Properties, Inc. P. O. Box 156 Kahului, HI 96732
School Street		County of Maui - DPW
Kamehameha Ave.		County of Maui - DPW
Kaahumanu Ave.		SDOT - Hwys Division
Puunene Ave.		SDOT - Hwys Division
Hana Hwy.		SDOT - Hwys Division
Hobron Ave.		SDOT - Hwys Division
Kane Street		SDOT - Hwys Division

3. **Exhibit C - Flood Insurance Rate Map**



REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]
RM 31	331.066
RM 32	24.66
RM 33	410.86
RM 34	156.10
RM 35	46.04
RM 36	11.54
RM 37	72.50
RM 38	7.10
RM 39	25.65
RM 40	49.140

[1] National Geodetic Vertical Datum of 1929

NATIONAL FLOOD INSURANCE PROGRAM

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 D

MAP REVISED:
MARCH 16, 1995

Federal Emergency Management Agency