JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

TEL. (808) 270-7745
FAX (808) 270-7975

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

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

July 23, 2002

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Department of Health
235 South Beretania Street, #702
Honolulu, Hawaii 96813

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT (FEA) FOR ALANUI KA 'IMI 'IKE ROAD EXTENSION STP-0900(63) KAUNAKAKAI, MOLOKAI

Dear Ms. Salmonson:

In accordance with the provisions of the Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200 of the Administrative Rules of the State Department of Health, a Final Environmental Assessment (FEA) has been prepared for the subject project.

As the approving agency, the County of Maui, Department of Public Works and Waste Management has determined that there will be no significant impacts as a result of the proposed action and is filing a Finding of No Significant Impact (FONSI). We respectfully request that the FONSI be published in the August 8, 2002 OEQC Environmental Notice.

Enclosed are one (1) copy of the OEQC Publication form and four (4) copies of the FEA. The project summary will be e-mailed to the OEQC by the applicant's consultant.

76

Thank you for your cooperation. If additional clarification is required, please contact Ms. Wendy Kobashigawa, Project Engineer of this office at 270-7745.

Sincerely,

DAVID GOODE
Director of Public Works and Waste Management

DG:yp (ED02-810)
Enclosures
seylalanuiloeqctran.001

cc: Wendy Kobashigawa, DPWWM-Engineering Division
Scott Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.
Dean K. Frampton, Munekiyo & Hiraga, Inc.
Ann Cua, Staff Planner

Y. Ebisu & Associates
Acoustical and Electronic Engineers

1126 12th Avenue
Room 305
Honolulu, Hawaii 96816
(808) 735-1634

YEA Job #39-053
June 27, 2002

SEY, Inc.
1126 12th Avenue, Room 309
Honolulu, HI 96816

Attention: Mr. Scott Kunioka, P.E.

Subject: Response to Donna Haytka-Paoa's Comments on Noise Study Report; Alanui Ka'imi'ike Extension Project; Kaunakakai, Molokai

Dear Mr. Kunioka:

The following are my responses to the following comments:

1. Comment: Noise study "does not address the issue that the noise levels are already exceeded" at the Molokai Education Center.

Response: Although exterior noise levels currently exceed the HDOT 66 Leq noise criteria at the south wall of the Molokai Education Center, interior noise levels should be acceptable because the facility is air conditioned. The forecasted 0.9 to 1.2 dB (or Leq) increase in future traffic noise levels along the south wall by CY 2015 will be difficult to perceive, and is not considered to be significant. The use of closure and air conditioning at the Molokai Education Center is an acceptable and effective traffic noise mitigation measure for both the south and east sides of the facility.

2. Comment: "What this last paragraph seems to be saying is that commercial development is a definite possibility in this area...."

Response: The second paragraph on Page 28 of the noise study discusses means (walls, setbacks, etc.) of mitigating potential traffic noise impacts at any future public use, residential, or commercial developments which may occur along the new roadway in the future. It does not go so far as to predict or imply that commercial development will occur along the proposed roadway in the future. Under the "What If" scenario of future development along the proposed roadway, be it housing, public use, or commercial uses, the paragraph states that these developments will not qualify for noise abatement measures by HDOT.

ATTACHMENT "A"

Mr. Scott Kunioka, P.E.

3. Comment: "....there are no guarantees of noise abatement on future developments", and so the area should remain public and not commercial.

Response: Noise abatement measures may be included within future developments by the individual developers or owners. However, the HDOT will not be responsible for funding noise abatement measures at these future developments, whether they are commercial, public use, or residential.

It was not clear how the responsibility for future noise abatement measures or the guarantees for inclusion of noise abatement measures at the future developments in the area correlates with the desirability of the existing public land use, or why commercial land use in the surrounding area is more likely than other uses.

Sincerely,

Yoichi Ebisu, P.E.

MAY 17 2002

May 15, 2002

Mr. Dean Frampton, Planner
Munekiyo & Hiraga Inc.
305 High Street
Wailuku, Hi. 96793

Aloha Dean,

I recently received word that planning for the road extension to bring an alternative entrance route to the residents of Ranch Camp Moloka'i is just about completed and that your firm is developing the Environmental Assessment portion for the special use permit. I was appalled to learn that your firm is recommending that the new access road connect with the entry roadway that currently serves Maui Community College. As a member of our island community, a current member of the Maui Community College Moloka'i Center advisory board, past member of the Moloka'i CAC for the Moloka'i Community Plan, and a past member of the Moloka'i Planning Commission, I have been involved with this access road discussion for more than 10 years. The access road should be built as recommended by the community, student body of MCC, the Moloka'i board of advisors of MCC, the Moloka'i CAC, Moloka'i Planning Commission, and the Maui County Planning department, along the eastern most boundary of the current property on land that currently abuts DHHL.

I cannot understand, after all the years of discussion, hours and hours of meetings, and pages and pages of meeting minutes, how your firm can recommend that the road be connected to the current entry way of Maui Community College. All during our discussions about this access road, our MCC board of advisors, our CAC, and our planning commission members were concerned about;

1. **Traffic-** and the impact it would have on our students trying to get to school. Does the Maui campus of Maui Community College have a major roadway running through its campus? I don't think so. Roadways and learning do not go together.
2. **Future Expansion-** our MCC board of advisors and our CAC community plan members were really concerned about the future expansion of our current education site. We purposely recommended that the road be placed on the eastern boundary of the property to ensure the proper flow of future facilities expansion. A road running through the middle of the planned expansion site is not conducive to long range planning.
3. **Community Plan-** the current process of installing this access road is beginning to smell much like the current odor that is permeating from what happened with our Moloka'i community plan. I had the pleasure of being on the CAC which worked on the community plan for about two years, then was appointed to the Moloka'i Planning commission and worked on the plan for another 5 years. With regard to the current Maui Community College site, it was our vision (CAC, Planning Commission) that the entire site of about 15 acres be designated for public/quasi public land use to ensure that the site

would be able to accommodate the future expansion of the college. We also recommended that an access road that would join up to Kalohi Street located in the Ranch Camp sub-division area should be located along the eastern boarder of the property, abutting lands that currently belong to the Dept. of Hawaiian Homes. Our recommendations were approved by the Maui Planning department, but were later shot down by the Maui County Council. The council instead voted to approve a plan drawn up by Moloka'i Ranch with purely political motives influencing the decision. I hope this access road process is not taking on the same odor as our community plan did. I cannot see how your recommendations can be something other than what our MCC board advisors wanted, our CAC wanted, our Moloka'i Planning Commission wanted, and the Maui Planning department approved. If it is, then your decision is politically motivated also.

Thank you for giving me the opportunity to express my concerns about your recommendation with regard to the new access road being planned for the Ranch Camp sub-division. I support all efforts to locate the road at the eastern most boundary of the current MCC property site along property that abuts DHHL. Our community took a major blow with what the Maui County Council did to our Community Plan. Now, it is happening again. This matter has been a topic of discussion for over 10 years. I know because I happen to be involved with it from day one. I can honestly say that I speak for the past and current members of our Maui Community College advisory board, past members of our Moloka'i CAC and past members of the Moloka'i Planning commission that approved the original CAC recommendation. I know that they all would support the access road being located on the eastern boundary of the property.

Sincerely,

Ronald Kimball

Ronald Kimball,
Concerned Community Member

Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

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JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

FILE

July 22, 2002

Mr. Ronald Kimball
HC 01 Box 171
Kaunakakai, Hawaii 96748

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
FAP NO. STP - 0900 (63)

Dear Mr. Kimball:

Thank you for your letter dated May 15, 2002 regarding the subject project which was addressed to our project consultant, Munekiyo & Hiraga, Inc. The Department of Public Works and Waste Management (DPWWM) appreciates your input and concerns regarding project design parameters.

As indicated in your letter, many members of the Molokai community have expressed preference for a roadway alignment which borders the eastern-most boundary of the property (the "Slaughterhouse" Road alignment). The Department has analyzed this alternative as well as other options which were presented at a public information meeting on October 30, 2001, held in Kaunakakai. Based on our engineering assessment, we believe that the proposed alignment following the existing Alanui Ka 'Imi 'Ike can be implemented in a manner which addresses community concerns, while meeting the County's and residents' desire of having a new connector road between Kamehameha V Highway and Ranch Camp.

We have selected the proposed Alanui Ka 'Imi 'Ike alignment based on traffic operations impacts at the Kamehameha V Highway intersection with the new road, adverse drainage conditions at eastern extent of the property (along the DHHL boundary) as well as existing easements and utility systems alignments in the vicinity. In particular, the intersection separation distance between the existing Alanui Ka 'Imi 'Ike Driveway and a new Slaughterhouse Road alignment would not meet design standards. If the Slaughterhouse Road intersection was selected, the existing Alanui Ka 'Imi 'Ike intersection would need to be closed and a new access driveway to the Molokai Education Center (MEC) would be required.

With regard to drainage, the Slaughterhouse Road alignment traverses lands which are subject to severe flooding. As evidenced by recent storms which occurred during the winter of 2001 and 2002, the Slaughterhouse Road is an apparent discharge point for storm water runoff from mauka lands. Prior to development of a roadway and other habitable uses, substantial drainage improvements would need to be constructed.

In addition, as noted in the Draft EA, the Alanui Ka 'Imi 'Ike Extension would follow an existing waterline easement which would enable the placement of the roadway improvements over a major transmission line, thus facilitating utility maintenance and operations. All of the foregoing cost-driven factors, together with functional and spatial relationship with the MEC were taken into account in our review. It is with this in mind that we offer the following responses for your consideration.

Traffic

The primary objective of the DPWWM is to design a roadway which will provide safe, alternative access from Kamehameha V Highway to the Ranch Camp subdivision. The new roadway will relieve traffic congestion in the larger Kaunakakai area and provide an emergency evacuation route for coastal residents seeking higher grounds in the event of a tsunami or severe flooding. Safety of the new roadway for all users in the project vicinity is the primary concern of the DPWWM. Towards this end, the project's design criteria will address safety requirements of MEC students, faculty and staff, as well as the general community at large.

Expansion Opportunities of the MEC

We believe that extension of the existing Alanui Ka 'Imi 'Ike does not preclude expansion opportunities to the east of the roadway. We understand that at this time, approximately 13 acres are available for expansion opportunities to the west of the proposed Alanui Ka 'Imi 'Ike alignment, providing opportunity and flexibility for campus master planning. Again, our decision to proceed with the extension of the existing Alanui Ka 'Imi 'Ike is based on technical, infrastructural, and land easement considerations which we believe offers a workable roadway alignment solution for the community.

Additionally, by virtue of being the primary infrastructure service provider in Kaunakakai, our Department will be involved in the long-range planning for the future expansion of the MEC. We look forward to working with the University of Hawaii, Maui Community College, the MEC and the Molokai community in facilitating the development of a master plan for the future expansion of the MEC.

Community Plan Process

As a County agency, it is our responsibility to respect and implement, as appropriate, the Molokai Community Plan. While reference to a specific alignment was deleted from the Molokai Community Plan, the plan did direct the Department to consult with the community. At our community meeting of October 30, 2002, citizens attending expressed preference for an alignment along the eastern border of the property. At that time, we indicated that we would consider this option. However, for the reasons noted above, we believe that an extension of the existing Alanui Ka 'Imi 'Ike would provide a preferred alternative for the Kamehameha V Highway-Ranch Camp connection.

We appreciate the comments provided and we look forward to your continued participation throughout the planning stages of this important project. Should you have any questions or require additional information, please do not hesitate to contact Wendy Kobashigawa, our project engineer, at 270-7745 or my office at 270-7845.

Sincerely,

for David Goode
Director of Public Works and Waste Management

WK:mku(ED02-799)
s:\eng\all\wyk\kaimiike\rkimballltr

xc: Scott Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.
Dean Frampton, Munekiyo & Hiraga, Inc.

References

References

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Appendices

Appendix A

Letter Dated June 18, 2001 from the State Historic Preservation Division

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
JANET E. KAWELO
LINNEL NISHIOKA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

June 18, 2001

Mr. Scott A. Kunioka, Project Manager
Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816-3175

LOG NO: 27697 ✓
DOC NO: 0106SC13

Dear Mr. Kunioka:

SUBJECT: National Historic Preservation Act, Section 106 Compliance - Proposed Extension of Alanui Ka'ime'ike Street in Kaunakakai, Moloka'i
Kaunakakai, Moloka'i
TMK: 5-3

Thank you for the opportunity to comment on the proposed extension of the existing Alanui Ka'ime'ike Street in Kaunakakai, Moloka'i. Our review is based on historic maps, aerial photographs, records, and reports; no field inspection was made of the project area. We received notification of the subject undertaking via the US Postal Service on June 7, 2001, and provide the following comments.

The proposed extension will follow the alignment of an existing 12-inch waterline owned by the County of Maui for a distance of approximately 3,000 linear feet. Judging from the maps you have provided and aerial photographs dating to the early 1970s, the proposed street extension crosses what were formerly agricultural fields. In view of the ground disturbance due to cultivation, it is unlikely that significant historic sites are still present. Therefore, we believe that "no historic properties will be affected" by the proposed extension of Alanui Ka'ime'ike Street.

Should you have any questions, please feel free to contact Sara Collins at 692-8026.

Aloha,

Gilbert Coloma-Agaran
State Historic Preservation Officer

SC:jen

c: John Min, Director, Dept of Planning, County of Maui, 250 S. High Street, Wailuku, HI 96793
Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96793
Barbara Haliniak, Chair, Molokai Planning Commission, PO Box 976, Kaunakakai, HI 96748

Appendix B

Acoustic Study

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LIST OF FIGURES

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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Alanui Ka`imi`ike Extension Project in Kaunakakai on the island of Molokai were studied to evaluate potential noise impacts associated with the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated.

Existing traffic noise levels in the project area do not exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria. Future (CY 2005 and CY 2015) traffic noise levels from traffic along the Alanui Ka`imi`ike Extension are not expected to exceed the HDOT "66 Leq" noise abatement criteria at the northwest and southeast ends of the project corridor under the Build or No-Build Alternatives. In addition, the FHWA and HDOT criteria for substantial increase in existing noise levels will not be exceeded by CY 2015 at noise sensitive receptor locations within the limits of project construction. Also, the noise abatement criteria will not be exceeded at any public use facilities or park lands due to forecast traffic within the limits of project construction. Traffic noise mitigation measures should not be required for this project.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2015 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in existing background noise levels will not be exceeded at any noise sensitive structure. Maximum increases in background noise levels at noise sensitive receptor locations in the project area should not exceed 14 dB as a result of growth in traffic volumes through CY 2015 following the construction of the project.

- Under the Build Alternative, CY 2015 traffic noise levels at receptor locations which are within 37 feet of the centerline of the Alanui Ka`imi`ike Extension and within the limits of project construction are expected to exceed the HDOT "66 Leq" criteria. No parks or public structures (such as schools or churches) within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.

- No commercial structures are expected to be affected by the proposed roadway project. Future traffic noise levels should not exceed the "71 Leq" HDOT noise criteria for commercial structures, and noise mitigation measures are not required for commercial structures.

Potential short term construction noise impacts are possible during the project construction period along the entire project corridor. However, minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.

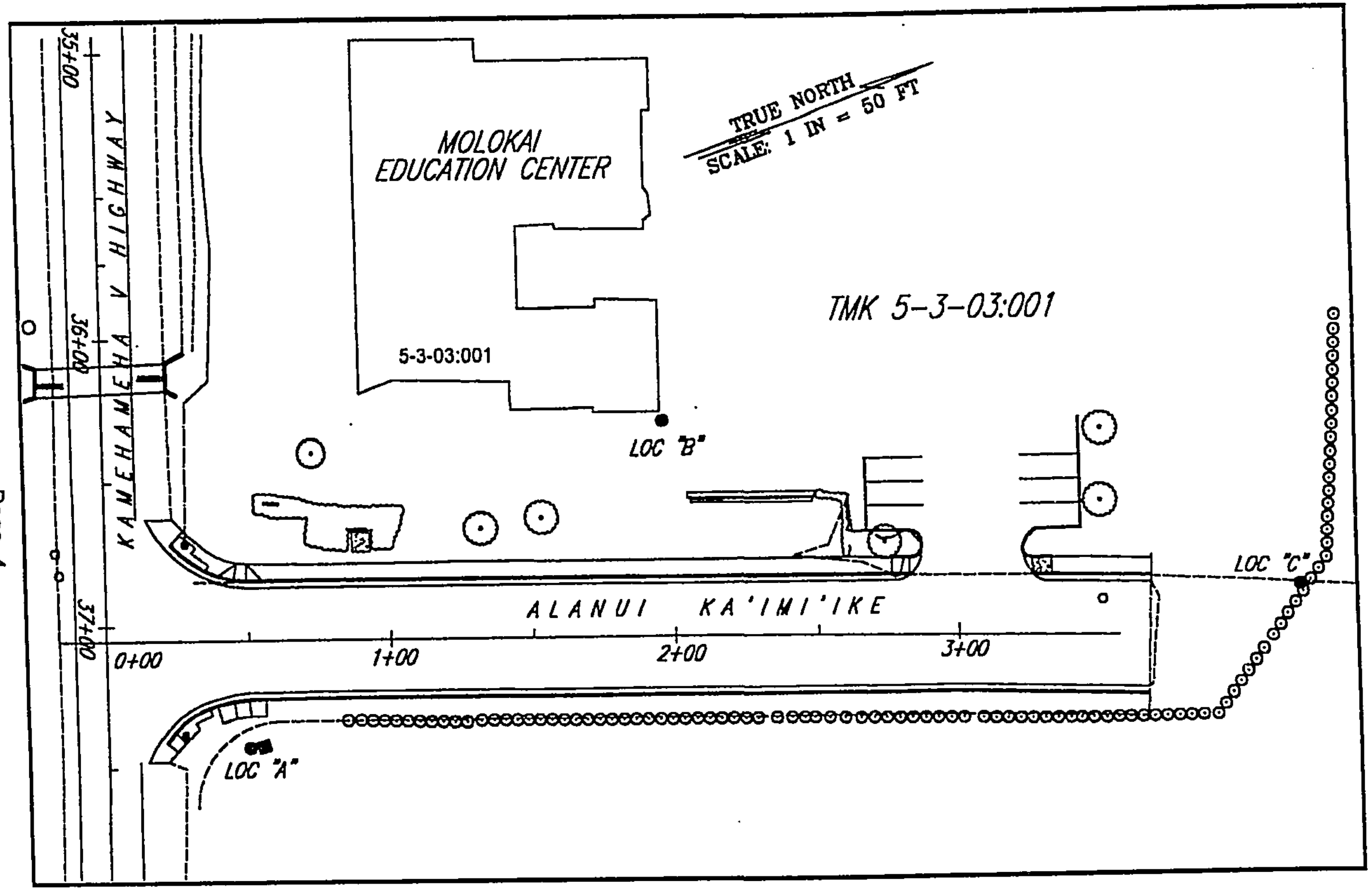
CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at six locations in the project area were measured in September 2001. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the Base Year (CY 2002) and future (CY 2005 and CY 2015) traffic noise levels under the No Build and Build Alternatives. The background ambient noise measurements were used to define existing noise levels at noise sensitive receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise standards and criteria.

The noise measurement locations ("A" through "F") are shown in Figures 1 and 2, which depict the mauka (northwest) and makai (southeast) ends of the project corridor. The results of the traffic noise measurements are summarized in Table 1. In the table, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

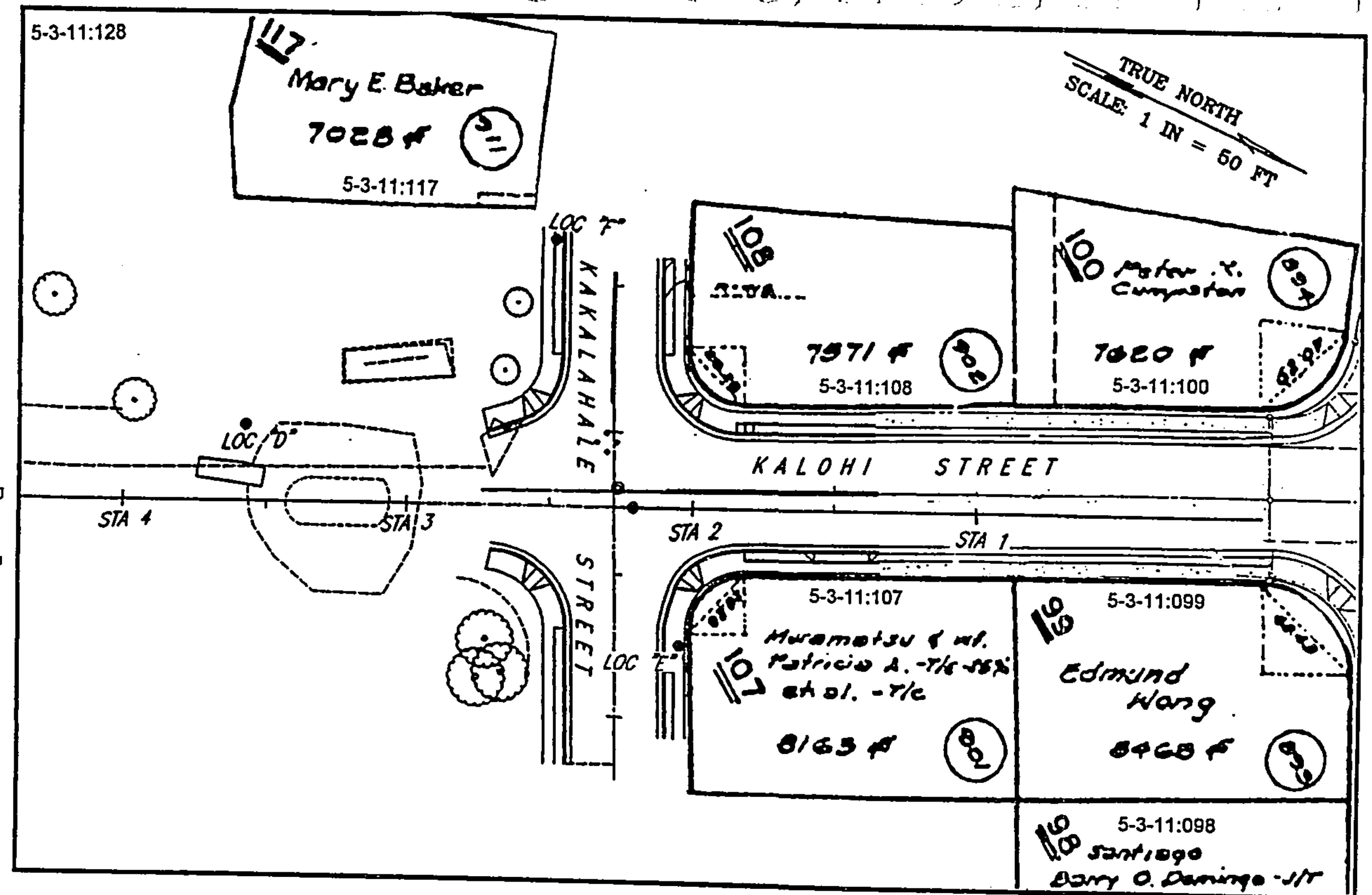
Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 1.1 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. At traffic noise measurement Locations "A", "B", "C", "E", and "F", the measured traffic noise levels were compared with model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 1, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. The average vehicle speeds entered into the TNM were higher than posted speeds so as to achieve agreement between measured noise levels and those calculated by the TNM. With these input speed adjustments, the agreement between measured and predicted traffic noise levels was considered to be good and sufficiently accurate to formulate the Base Year and future year traffic noise levels.

Base Year traffic noise levels were then calculated along the project corridor using Base Year (2002) traffic volume data for the AM and PM peak hours from Reference 2. These traffic volumes are summarized in Appendix C. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadway were derived from observations during the noise monitoring periods and from Reference 2. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the AM and PM peak hour traffic volumes from Reference 2 and the noise measurement results. Measured and predicted traffic noise levels were highest during the AM peak hour, but both the AM and PM peak hour traffic volumes and noise levels were evaluated due to their similarities.



LOCATION OF NOISE MEASUREMENT SITES AT MAKAI END OF PROJECT

FIGURE 1



LOCATION OF NOISE MEASUREMENT SITES AT MAUKA END OF PROJECT

FIGURE 2

TABLE 1
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	------ Hourly Traffic Volume ------ AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A	50 FT from the center-line of Kamehameha Highway (9/27/01)	0748 TO 0848	45	315	16	19	68.3	68.8
A	50 FT from the center-line of Kamehameha Highway (9/27/01)	1541 TO 1641	45	431	6	17	68.4	69.0
A	50 FT from the center-line of Kamehameha Highway (9/27/01)	1641 TO 1714	45	248	4	7	68.5	67.4
A	50 FT from the center-line of Kamehameha Highway (9/28/01)	0318 TO 0350	45	2	0	0	45.6	44.7
B	197 FT from the center-line of Kamehameha Highway (9/27/01)	0752 TO 0851	45	315	16	19	56.1	56.5

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
B	197 FT from the center-line of Kamehameha Highway (9/27/01)	0850 TO 0904	N/A	N/A	N/A	N/A	57.3	N/A
B	197 FT from the center-line of Kamehameha Highway (9/27/01)	1544 TO 1620	45	431	6	17	56.7	56.4
C	420 FT from the center-line of Kamehameha Highway (9/27/01)	0852 TO 0902	N/A	N/A	N/A	N/A	55.5	N/A
C	420 FT from the center-line of Kamehameha Highway (9/27/01)	1621 TO 1651	45	248	4	7	51.9	51.9
D	132 FT from the center-line of Kakalahale Street (9/27/01)	0931 TO 1031	30	10	0	0	47.0	47.4

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	------ Hourly Traffic Volume ------ AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
D	132 FT from the center-line of Kakalahale Street (9/28/01)	0705 TO 0805	N/A	N/A	N/A	N/A	48.1	N/A
D	132 FT from the center-line of Kakalahale Street (9/28/01)	1455 TO 1555	N/A	N/A	N/A	N/A	46.1	N/A
D	132 FT from the center-line of Kakalahale Street (9/28/01)	1555 TO 1651	30	14	0	0	49.2	48.8
E	48 FT from the center-line of Kalohi Street (9/27/01)	1036 TO 1136	N/A	N/A	N/A	N/A	51.5	N/A
E	48 FT from the center-line of Kalohi Street (9/28/01)	0400 TO 0444	N/A	0	0	0	49.0	N/A

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	------ Hourly Traffic Volume ------ AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
E	48 FT from the center-line of Kalohi Street (9/28/01)	0702 TO 0802	30	10	0	0	50.0	49.9
E	48 FT from the center-line of Kalohi Street (9/28/01)	1453 TO 1553	N/A	N/A	N/A	N/A	50.1	N/A
E	48 FT from the center-line of Kalohi Street (9/28/01)	1553 TO 1653	30	14	0	0	51.1	51.4
F	22 FT from the center-line of Kakalahale Street (9/27/01)	1038 TO 1140	N/A	N/A	N/A	N/A	50.5	N/A

Predictions of traffic noise levels for both the AM and PM peak hours were performed for this study, and the periods with the highest noise level were used to evaluate potential traffic noise impacts using the FHWA and HDOT noise abatement criteria (see References 3 and 4).

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2015 traffic noise levels as required by References 3 and 4. Tax maps, topographic maps, and project plans (where available) of the area were used to determine terrain, ground cover, and local shielding effects and distances from building structures which were entered into the noise prediction model. Detailed grading plans and topographic maps of the areas outside the roadway project's Rights-of-Way were not available, so receptor elevations were assumed to be equal to the original ground elevations along the roadway centerline, or estimated from visual observations.

Future year (2005 and 2015) traffic noise levels were then developed for the No Build and Build (roadway improvement) Alternatives using the future traffic assignments of Reference 2. Forecast traffic volumes, mixes, and speeds along Kamehameha V Highway and within the residential subdivision at the mauka end of the project corridor for Year 2015 were assumed to be identical to their Base Year values for the No Build and Build Alternatives. Under both the No Build and Build Alternatives, average vehicle speeds along Kamehameha V Highway and within the residential subdivision were assumed to remain the same as current values.

Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations of the future traffic noise levels and impacts at noise sensitive receptor locations along the Alanui Ka'imi'ike Extension and within the limits of construction were made. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 2) were made to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT "66 Leq(h)" noise abatement criteria threshold and the HDOT "greater than 15 dB increase" criteria were applied to all noise sensitive buildings along the project corridor. By Reference 4, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria. Along the project corridor, the locations of the 66 and 71 Leq(h) traffic noise contours, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive receptor locations where the HDOT's noise abatement criteria would not be exceeded, and which would not require more detailed evaluations. In addition, the HDOT's criteria of "greater than 15 dB increase above existing background noise levels" was also used as a noise abatement criteria for this project (from Reference 4).

TABLE 2

FHWA NOISE ABATEMENT CRITERIA
[Hourly A–Weighted Sound Level– –Decibels (dBA)]

ACTIVITY CATEGORY	LEQ (h)*	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extra–ordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–––––––	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

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* The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2002 was used as the Base Year for computing changes in traffic noise levels between the No Build and Build Alternatives. The Base Year noise environment in the project environs was determined by sound level measurements and by computing the Hourly Equivalent Sound Levels [Leq(h)] along the existing roadways in the project environs during the AM and PM peak traffic hours for the 2002 time period. The evaluations of existing noise levels were concentrated at existing noise sensitive receptor locations at the northwest (mauka) and southeast (makai) ends of the project corridor. The hourly sound levels, expressed in decibels, represent the average levels of traffic noise along the existing and future roadways during the AM or PM peak hour of the study's Base Year.

Table 3 presents the traffic volume, speed, and mix assumptions used to calculate the Base Year noise levels during the AM and PM peak hours along existing roadways at the mauka and makai ends of the project corridor. The Base Year traffic on the existing makai section of Alanui Ka`imi`ike is associated with traffic to and from the Molokai Education Center. Shown in Table 3 are the calculated AM and PM peak hour Leq(h)'s at reference distances of 50, 100, and 150 FT from the centerlines of the various roadway sections.

At the makai end of the project corridor, existing background ambient noise levels are controlled by traffic along Kamehameha V Highway. At the mauka end of the project corridor, existing traffic noise levels are lower than other background ambient noise sources (distant traffic and construction, birds, aircraft, etc.). The calculated distances to the 66 and 71 Leq noise contour lines under unobstructed, line-of-sight conditions to the roadways are shown in Table 4 for the AM and PM peak hours. The actual distances to the contour lines will generally be less than indicated in Table 4 when intervening structures or terrain obstructions exist between the roadway and a receptor. This reduction (or shrinkage) of the traffic noise contour distances from the roadway's centerline is the result of noise shielding (or attenuation) effects caused by the intervening structures or natural terrain features.

By using the traffic noise data shown in Tables 3 and 4, and visual information of the existing improvements on the southeast (makai) and northwest (mauka) ends of the project corridor, the relationship of the existing free-field traffic noise contours to existing noise sensitive dwellings and public use structures in the project area were obtained.

The Molokai Education Center is located at the makai end of the project corridor (see Figure 1) and is an air conditioned, public use, facility. Existing noise levels from traffic along Kamehameha V Highway currently exceed the HDOT 66 Leq criteria along the makai wall of this facility. The Molokai Education Center is the Molokai campus of the University of Hawaii. The existing noise levels at this facility are controlled by traffic along Kamehameha V Highway, construction noise, and the noise from lawn maintenance equipment (see Figures 3 and 4). During the early morning period from

TABLE 3

CY 2002 TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN THE PROJECT ENVIRONS AND AT VARIOUS DISTANCES FROM THE CENTERLINE

PIILANI HWY. SEGMENT	SPEED (MPH)	TOTAL VPH	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	***** HOURLY LEQ IN dB ***** @ 50'	@ 100'	@ 150'
Kamehameha V Hwy. West of Alanui-Kaimiike (AM)	45	528	475	24	29	70.5	66.9	63.8
Kamehameha V Hwy. West of Alanui-Kaimiike (PM)	45	509	483	8	18	69.2	65.5	62.4
Kamehameha V Hwy. East of Alanui-Kaimiike (AM)	45	529	476	24	29	70.5	66.9	63.8
Kamehameha V Hwy. East of Alanui-Kaimiike (PM)	45	501	475	8	18	69.2	65.5	62.4
Alanui-Kaimiike St. North of Kamehameha V (AM)	20	29	29	0	0	45.2	42.0	39.0
Alanui-Kaimiike St. North of Kamehameha V (PM)	20	36	36	0	0	46.1	42.9	40.0
Alanui-Kaimiike St. South of Kakalahale (AM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alanui-Kaimiike St. South of Kakalahale (PM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. All distances shown are from the center of roadways.

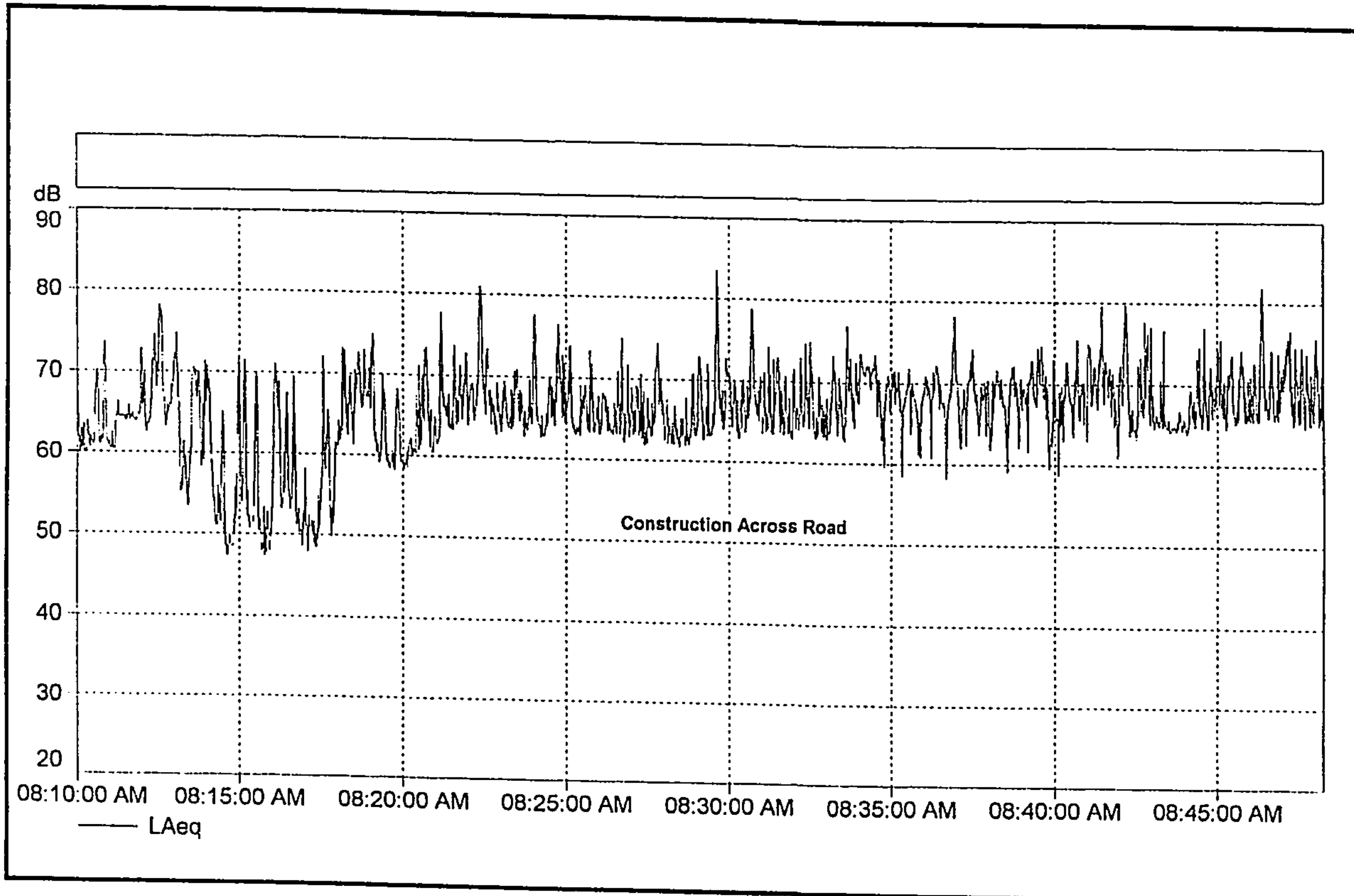
TABLE 4

YEAR 2002 AND 2015 DISTANCES TO 66 AND 71 LEQ CONTOURS (AM AND PM PEAK HOURS)

STREET SECTION	66 Leq SETBACK (FT)		71 Leq SETBACK (FT)	
	EXISTING	CY 2015	EXISTING	CY 2015
Kamehameha V Hwy. West of Alanui-Kaimiike (AM)	112	127	58	66
Kamehameha V Hwy. West of Alanui-Kaimiike (PM)	94	108	49	56
Kamehameha V Hwy. East of Alanui-Kaimiike (AM)	112	127	58	66
Kamehameha V Hwy. East of Alanui-Kaimiike (PM)	94	108	49	56
Alanui-Kaimiike St. North of Kamehameha V (AM)	4	28	2	14
Alanui-Kaimiike St. North of Kamehameha V (PM)	4	37	2	18
Alanui-Kaimiike St. South of Kakalahale (AM)	N/A	28	N/A	14
Alanui-Kaimiike St. South of Kakalahale (PM)	N/A	37	N/A	18

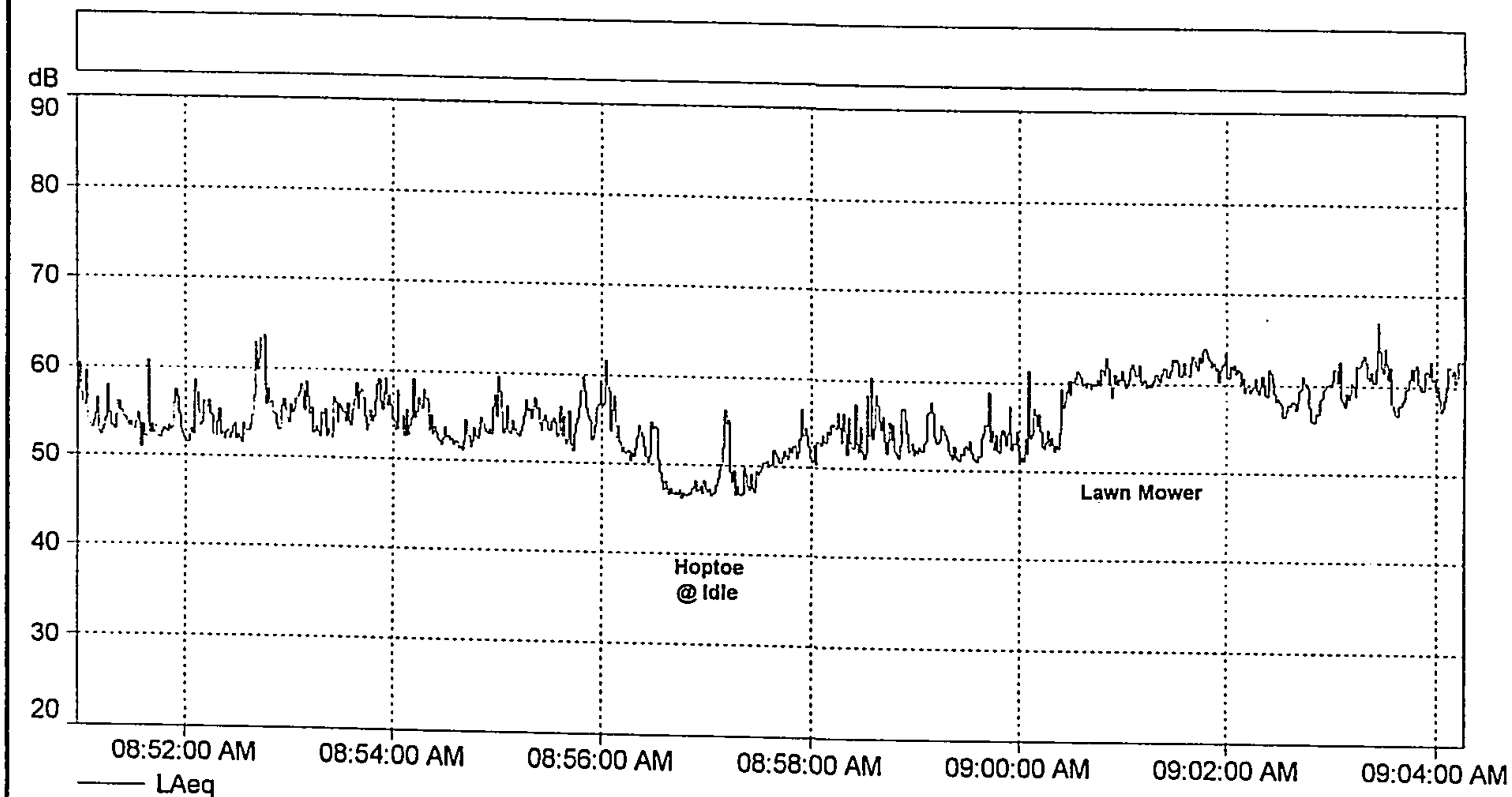
Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See TABLE 3 for traffic volume, speed, and mix assumptions.
(3) Setback distances are for unobstructed line-of-sight conditions.
(4) Soft ground conditions assumed along all roadways.



AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION A (0810 TO 0850 HOURS; 9/27/01)

FIGURE 3



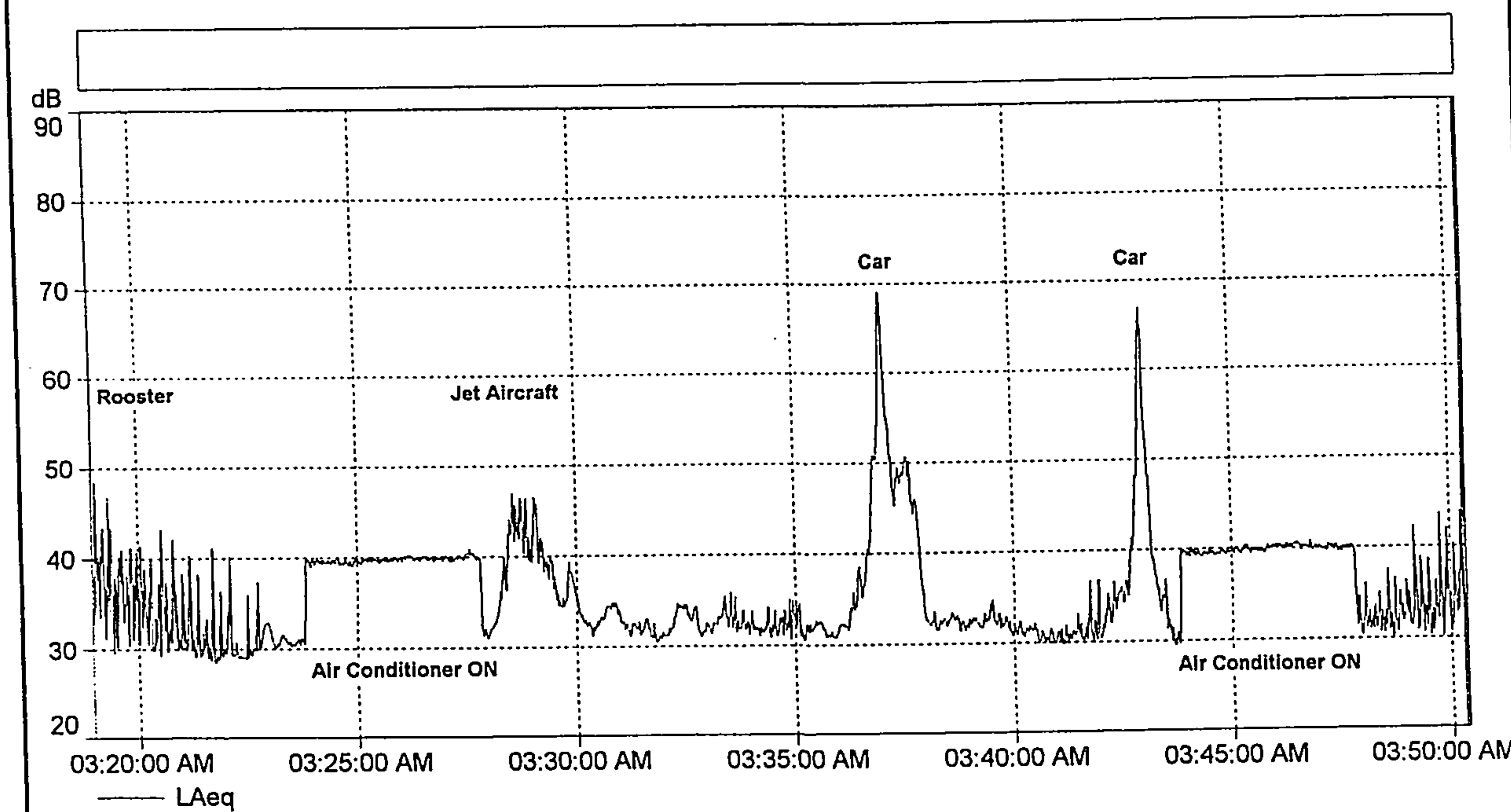
AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION B (0850 TO 0905 HOURS; 9/27/01)

FIGURE 4

3:00 to 4:00 AM when traffic volumes are low, existing noise levels at this facility are controlled by traffic along Kamehameha V Highway, distant aircraft and roosters, and the building's air conditioning equipment (see Figure 5).

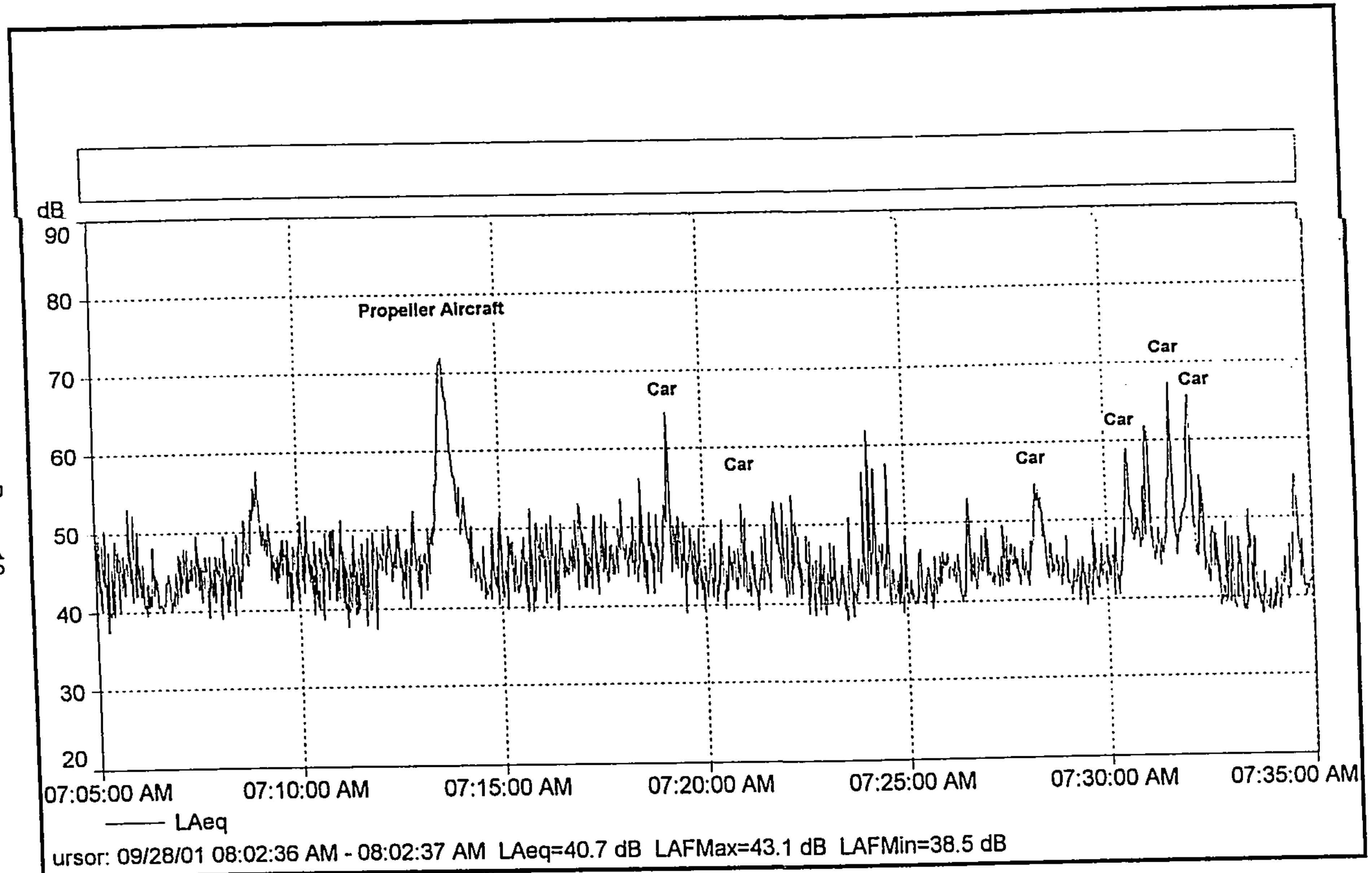
The traffic and background ambient noise measurements shown in Table 1 indicated that existing noise levels do not exceed the HDOT 66 Leq criteria at existing residences at the mauka end of the project corridor (see Figure 2 and Table 1). A single family residence (TMK:5-3-11:117) and a day care center (TMK: 5-3-11:128) are the closest noise sensitive receptors to the future centerline of the Alanui Ka'imi'ike Extension at the mauka end of the project corridor. Existing background ambient noise levels at these two locations are controlled by local and distant traffic, distant construction activities, and the sounds of birds and barking dogs. Existing background noise levels at the residential subdivision at the mauka end of the project corridor range between 39 to 71 dBA during the daytime period (see Figures 6 and 7), and range between 27 to 68 dBA during the early morning period of 4:00 to 4:45 AM (see Figures 8 and 9).

Along the project corridor at the now vacant areas between the mauka and makai ends of the project corridor, existing background ambient noise levels are controlled by distant traffic, distant construction activities, agricultural machinery and vehicles, and the natural sounds of birds. Base Year noise levels in these areas which are removed from Kamehameha V Highway and at the residential subdivision at the mauka end of the project corridor are typically less than 55 Leq(h), and possibly as low as 45 Leq(h) during the AM and PM peak traffic hours.



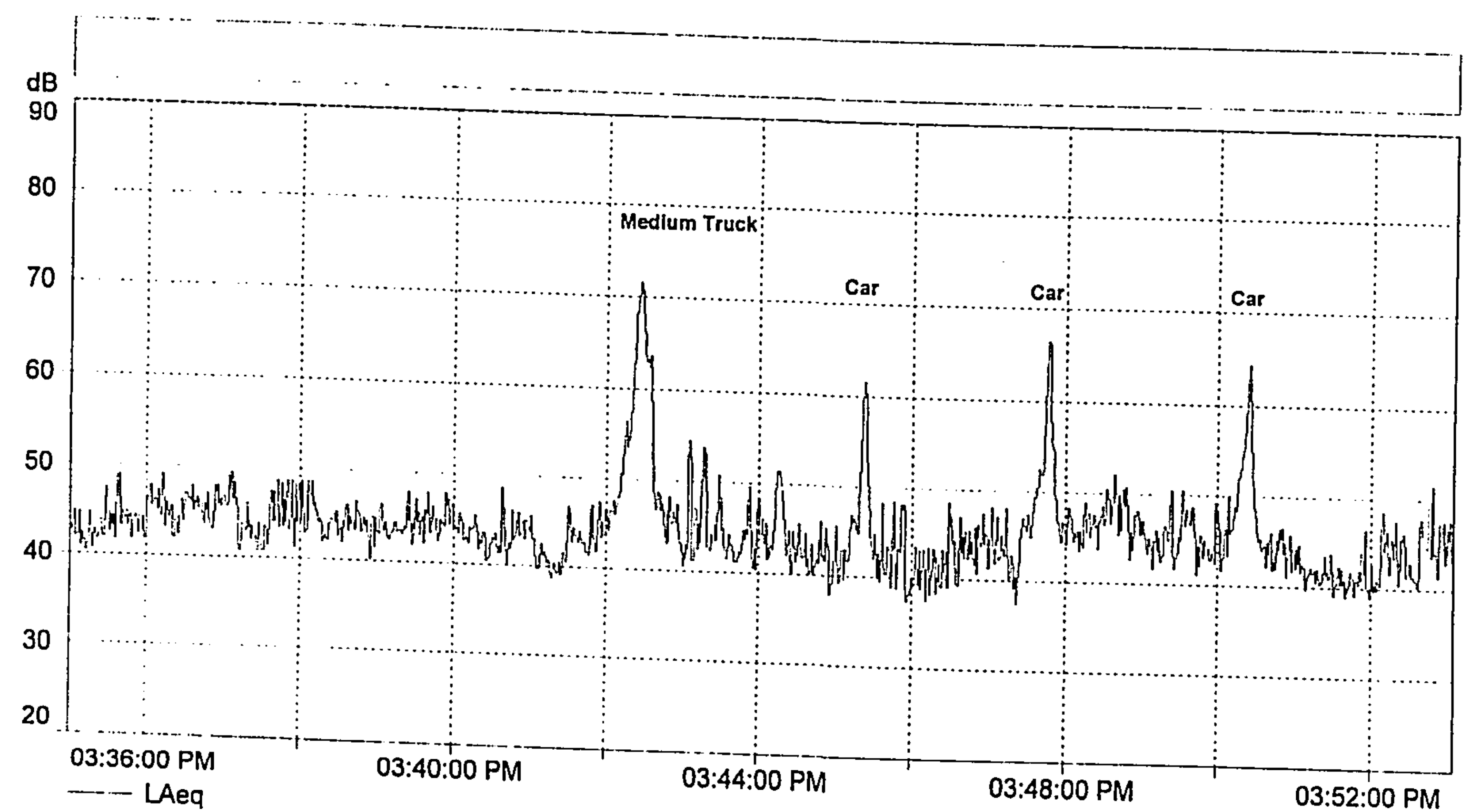
AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION A (0318 TO 0350 HOURS; 9/28/01)

FIGURE 5



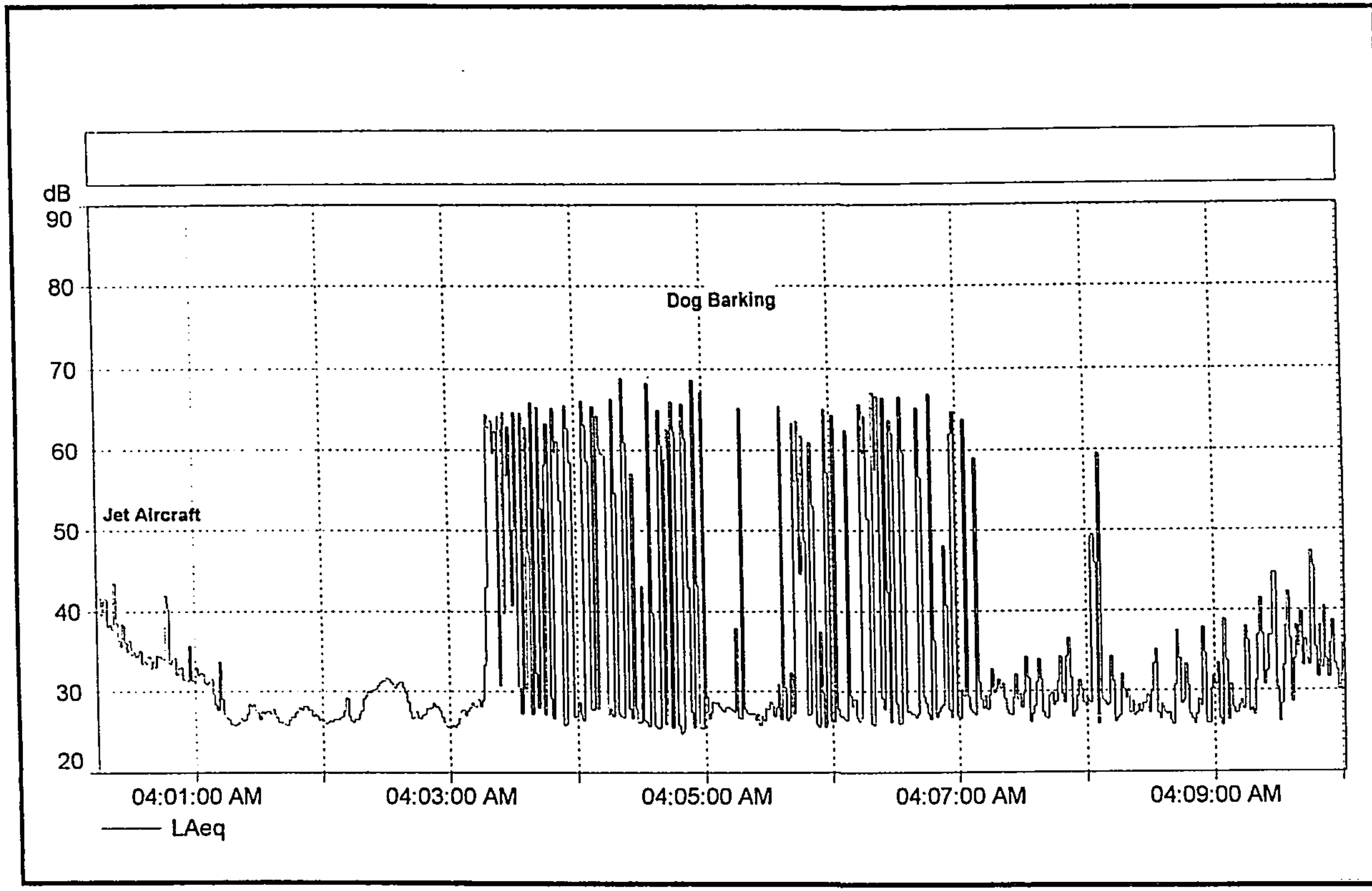
AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION E (0700 TO 0735 HOURS; 9/28/01)

FIGURE 6



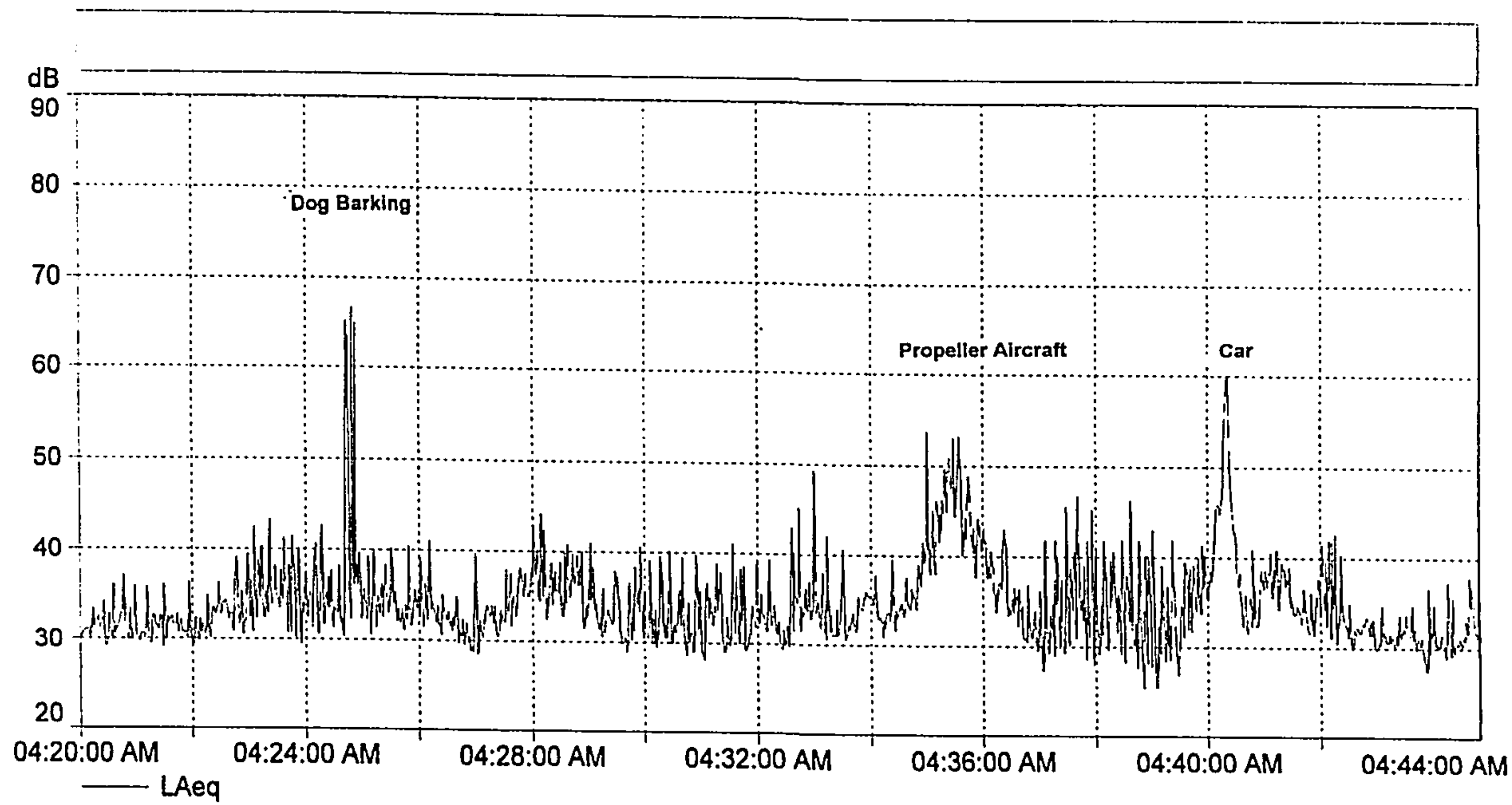
AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION E (1535 TO 1553 HOURS; 9/28/01)

FIGURE 7



AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION E (0400 TO 0410 HOURS; 9/28/01)

FIGURE 8



AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION E (0420 TO 0450 HOURS; 9/28/01)

FIGURE 9

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the project during CY 2005 and 2015 were evaluated for the No Build and Build Alternatives. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the Year 2005 and 2015 noise levels. It should be noted that forecast traffic volumes for the No Build Alternative was only available for CY 2005. Under both the No Build and Build Alternatives, average vehicle speeds and traffic mix along Kamehameha V Highway and the subdivision roads at the mauka end of the project corridor were assumed to be identical to the Base Year values.

Tables 5, 6, and 7 summarize the traffic conditions, noise levels, and setback distances for the No Build and Build Alternatives during the AM and PM peak hours in CY 2005 and 2015. Traffic forecasts for the No Build Alternative in CY 2015 were not available. As indicated in Tables 3 and 5, future traffic noise levels in the immediate vicinity of the project are predicted to remain essentially the same between CY 2002 and CY 2005 under the No Build Alternative. Under the No Build Alternative, the HDOT 66 Leq noise abatement criteria will continue to be exceeded at the Molokai Education Center's wall which faces Kamehameha V Highway.

Under the Build Alternative, the Alanui Ka`imi`ike Extension will connect the existing short section of Alanui Ka`imi`ike at Kamehameha V Highway (see Figure 1) to Kalohi Street at the Kakalahale Street intersection (see Figure 2). Increases in background ambient noise levels of 0.9 to 4.0 dB are expected along Kamehameha V Highway between CY 2002 and 2015. Increases in existing background ambient noise levels of 6 to 14 dB are expected at noise sensitive receptor locations mauka of the project corridor. The predicted CY 2015 traffic noise levels at the various receptor locations at the mauka and makai ends of the project corridor are shown in Table 8 for the No Build (CY 2005) and Build (CY 2015) Alternatives. Also indicated in Table 8 are the increases in existing background noise levels which are predicted to occur under the No Build and Build Alternatives.

Except for the condition along the makai wall of the Molokai Education Center, the HDOT 66 Leq criteria should not be exceeded at any public use structures or park lands under the No Build or Build Alternatives. In addition, the 66 Leq criteria and the HDOT's "greater the 15 dBA increase" criteria for substantial change should not be exceeded at any noise sensitive receptor location along the project corridor. The roadway extension project should not cause adverse noise impacts as defined by current HDOT and FHWA noise impact criteria and standards.

TABLE 5

FUTURE (CY 2005) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (AM AND PM PEAK HOURS, NO-BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Kamehameha V Hwy. West of Alanui-Kaimiike (AM)	45	536	483	24	29	70.5	66.9	63.9
Kamehameha V Hwy. West of Alanui-Kaimiike (PM)	45	517	491	8	18	69.3	65.4	62.4
Kamehameha V Hwy. East of Alanui-Kaimiike (AM)	45	537	483	24	30	70.5	67.0	63.9
Kamehameha V Hwy. East of Alanui-Kaimiike (PM)	45	509	483	8	18	69.2	65.5	62.4
Alanui-Kaimiike St. North of Kamehameha V (AM)	20	29	29	0	0	45.2	42.0	39.0
Alanui-Kaimiike St. North of Kamehameha V (PM)	20	36	36	0	0	46.1	42.9	40.0
Alanui-Kaimiike St. South of Kakalahale (AM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alanui-Kaimiike St. South of Kakalahale (PM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. All distances shown are from the center of roadways.

TABLE 6

FUTURE (CY 2005) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (AM AND PM PEAK HOURS, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Kamehameha V Hwy. West of Alanui-Kaimiike (AM)	45	615	553	28	34	71.1	67.6	64.5
Kamehameha V Hwy. West of Alanui-Kaimiike (PM)	45	639	607	10	22	70.2	66.4	63.4
Kamehameha V Hwy. East of Alanui-Kaimiike (AM)	45	618	556	28	34	71.1	67.6	64.5
Kamehameha V Hwy. East of Alanui-Kaimiike (PM)	45	638	606	10	22	70.2	66.4	63.3
Alanui-Kaimiike St. North of Kamehameha V (AM)	30	189	183	3	3	59.8	56.6	53.7
Alanui-Kaimiike St. North of Kamehameha V (PM)	30	287	279	4	4	61.5	58.3	55.3
Alanui-Kaimiike St. South of Kakalahale (AM)	30	189	183	3	3	59.8	56.6	53.7
Alanui-Kaimiike St. South of Kakalahale (PM)	30	287	279	4	4	61.5	58.3	55.3

Notes:

1. All distances shown are from the center of roadways.

TABLE 7

CY 2015 TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN THE PROJECT ENVIRONS AND AT VARIOUS DISTANCES FROM THE CENTERLINE

PIILANI HWY. SEGMENT	SPEED (MPH)	TOTAL VPH	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	***** HOURLY LEQ IN dB ***** @ 50'	@ 100'	@ 150'
Kamehameha V Hwy. West of Alanui-Kaimiike (AM)	45	646	581	29	36	71.3	67.8	64.7
Kamehameha V Hwy. West of Alanui-Kaimiike (PM)	45	671	638	10	23	70.4	66.6	63.5
Kamehameha V Hwy. East of Alanui-Kaimiike (AM)	45	649	584	29	36	71.4	67.8	64.7
Kamehameha V Hwy. East of Alanui-Kaimiike (PM)	45	670	637	10	23	70.4	66.6	63.5
Alanui-Kaimiike St. North of Kamehameha V (AM)	30	199	193	3	3	59.9	56.8	53.9
Alanui-Kaimiike St. North of Kamehameha V (PM)	30	301	291	5	5	62.0	58.8	55.9
Alanui-Kaimiike St. South of Kakalahale (AM)	30	199	193	3	3	59.9	56.8	53.9
Alanui-Kaimiike St. South of Kakalahale (PM)	30	301	291	5	5	62.0	58.8	55.9

Notes:

1. All distances shown are from the center of roadways.

TABLE 8

EXISTING AND FUTURE TRAFFIC NOISE LEVELS
(4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2002) Leq		-------- FUTURE Leq -------- NO BUILD / (CHANGE)		2015 BUILD / (CHANGE)
SOUTH (MAKAI) END OF PROJECT:						
Molokai Education Center - NE Wall	AM	59.3		59.3 /0.0		61.7 /2.4
Molokai Education Center - NE Wall	PM	57.8		57.8 /0.0		61.8 /4.0
Molokai Education Center - SE Wall	AM	66.9	*	66.9 /0.0	*	67.8 /0.9
Molokai Education Center - SE Wall	PM	65.6		65.6 /0.0		66.8 /1.2
NORTH (MAUKA) END OF PROJECT:						
Receiver 5-3-11:098	AM	45.0		45.0 /0.0		55.8 /10.8
Receiver 5-3-11:098	PM	46.0		46.0 /0.0		57.7 /11.7
Receiver 5-3-11:100	AM	50.0		50.0 /0.0		62.3 /12.3
Receiver 5-3-11:100	PM	51.0		51.0 /0.0		64.2 /13.2
Receiver 5-3-11:107	AM	50.0		50.0 /0.0		62.6 /12.6
Receiver 5-3-11:107	PM	51.0		51.0 /0.0		64.5 /13.5
Receiver 5-3-11:108	AM	50.0		50.0 /0.0		62.3 /12.3
Receiver 5-3-11:108	PM	51.0		51.0 /0.0		64.2 /13.2
Receiver 5-3-11:117	AM	48.0		48.0 /0.0		55.4 /7.4
Receiver 5-3-11:117	PM	46.0		46.0 /0.0		57.3 /11.3
Receiver 5-3-11:128	AM	45.0		45.0 /0.0		51.5 /6.5
Receiver 5-3-11:128	PM	46.0		46.0 /0.0		53.5 /7.5

Notes:

1. All receivers were assumed to be at 4.92 feet above ground level.
2. * Denotes exceedance of HDOT "66 Leq" criteria for residences.
3. "No Build" Condition evaluated for Year 2005.

CHAPTER V. FUTURE TRAFFIC NOISE IMPACTS AND RECOMMENDED NOISE MITIGATION MEASURES

Future traffic noise levels are not expected to exceed the HDOT's 66 Leq(h) noise abatement criteria by CY 2015 under the Build Alternative at existing noise sensitive structures along the Alanui Ka`imi`ike Extension. In addition, existing background ambient noise levels at noise sensitive structures along the new roadway are not expected to increase by 15 dB between CY 2002 and CY 2015. Future traffic noise levels associated with the project should not exceed current HDOT and FHWA noise abatement criteria levels, and therefore, traffic noise mitigation measures should not be required for this project.

It is anticipated that potential noise impacts at any new noise sensitive or commercial establishments located along the new roadway may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans. In addition, any new commercial establishments, public use facilities, or housing units which may be planned alongside the new roadway represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas adjacent to the roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures.

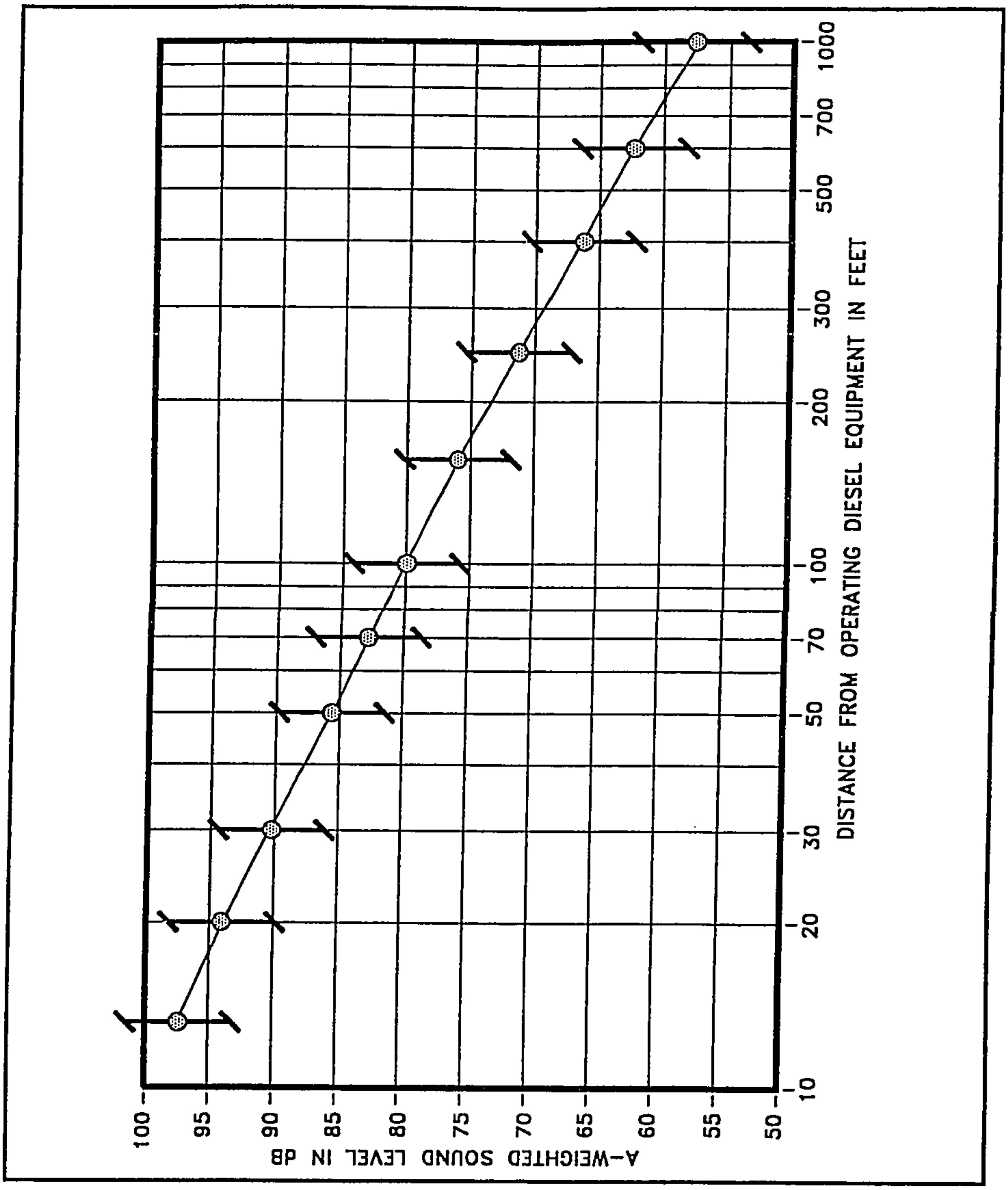
CHAPTER VI. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the project corridor may occur. These impacts can occur as a result of the short distances (less than 150 FT) between existing dwelling units and commercial establishments to the anticipated construction corridor. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 10. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

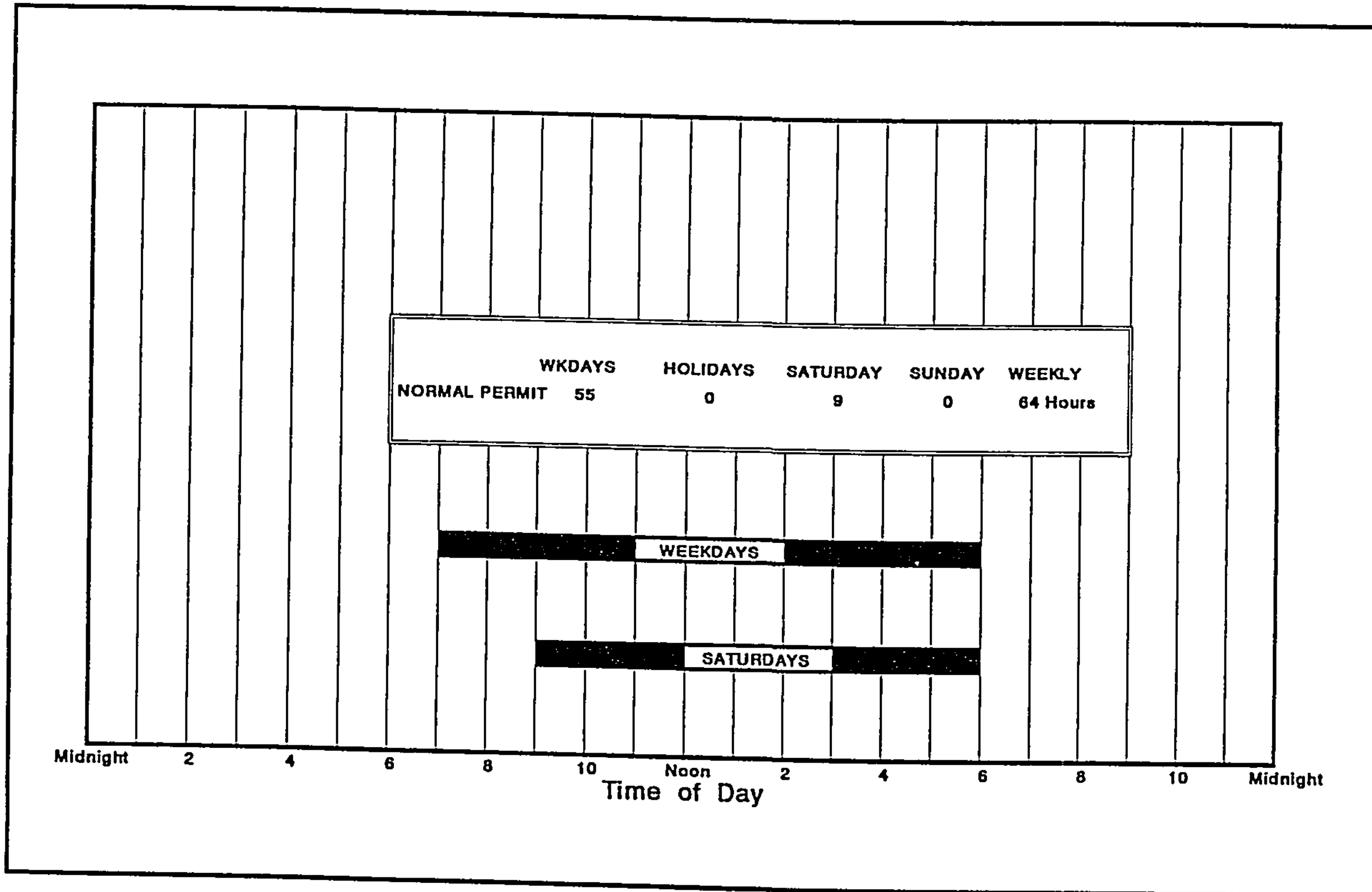
Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the roadway improvement project, distances between the construction sites and receptors are expected to be between 10 and 200 FT, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 5). Under current permit procedures (see Figure 11), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use within 500 FT of noise sensitive properties. Heavy truck and equipment staging areas should also be located at areas which are at least 500 FT from noise sensitive properties whenever possible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 FT high construction noise barriers may also be used where close-in construction work to noise sensitive structures is unavoidable.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 10



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 11

APPENDIX A. REFERENCES

(1) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 1.1 User's Guide (Addendum) of September 2000.

(2) Traffic turning movements at Kamehameha V Highway and Alanui Ka'imi'ike intersection; Wilson Okamoto & Associates, Inc.; February 4, 2002.

(3) Federal Highway Administration; "Procedures for Abatement of Highway Traffic Noise and Construction Noise;" 23 CFR Chapter I, Subchapter H, Part 772;" April 1, 199t.

(4) "Noise Analysis and Abatement Policy;" Hawaii State Department of Transportation, Highways Division, Materials Testing and Research Branch; June 1997.

(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

	TERM	SYMBOL
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the Time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

	TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER(2) WEIGHTING	UNWEIGHTED
1.	Sound (Pressure)(3) Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level (4) Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND FUTURE YEAR TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2002 ***** AM VPH	PM VPH	CY 2005 (BUILD) AM VPH	PM VPH	CY 2015 (BUILD) AM VPH	PM VPH
Kamehameha V Hwy. W. of Alanui-Kaimiike (WB)	318	251	375	298	394	313
Kamehameha V Hwy. W. of Alanui-Kaimiike (EB)	210	258	240	341	252	358
Two-Way	528	509	615	639	646	671
Kamehameha V Hwy. E. of Alanui-Kaimiike (WB)	325	240	375	320	394	336
Kamehameha V Hwy. E. of Alanui-Kaimiike (EB)	204	261	243	318	255	334
Two-Way	529	501	618	638	649	670
Alanui-Kaimiike St. N. of Kamehameha Hwy. (NB)	21	11	93	166	98	174
Alanui-Kaimiike St. N. of Kamehameha Hwy. (SB)	8	25	96	121	101	127
Two-Way	29	36	189	287	199	301
Alanui-Kaimiike St. at North End of Project (NB)	0	0	93	166	98	174
Alanui-Kaimiike St. at North End of Project (SB)	0	0	96	121	101	127
Two-Way	0	0	189	287	199	301

Appendix C

Traffic Impact Analysis Report

MAR 0 1 ...

DRAFT

TRAFFIC ASSESSMENT

FOR THE PROPOSED

ALANUI KA'IMI'IKE ROAD EXTENSION

KAUNAKAKAI, MOLOKAI, HAWAII

Prepared for:

Shimabukuro, Endo & Yoshizaki, Inc.
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Prepared by:

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1907 South Beretania Street, Suite 400
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February 2002

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess traffic operations resulting from the proposed extension of Alanui Ka'imi'ike Road from Kamehameha V Highway connecting to Kalohi Street at the intersection with Kakalahale Street on the island of Molokai. The proposed facility is located on the mauka side of Kamehameha V Highway and provides a direct alternate access between the residential community of Kaunakakai and the major roadway in the area.

B. Scope of Study

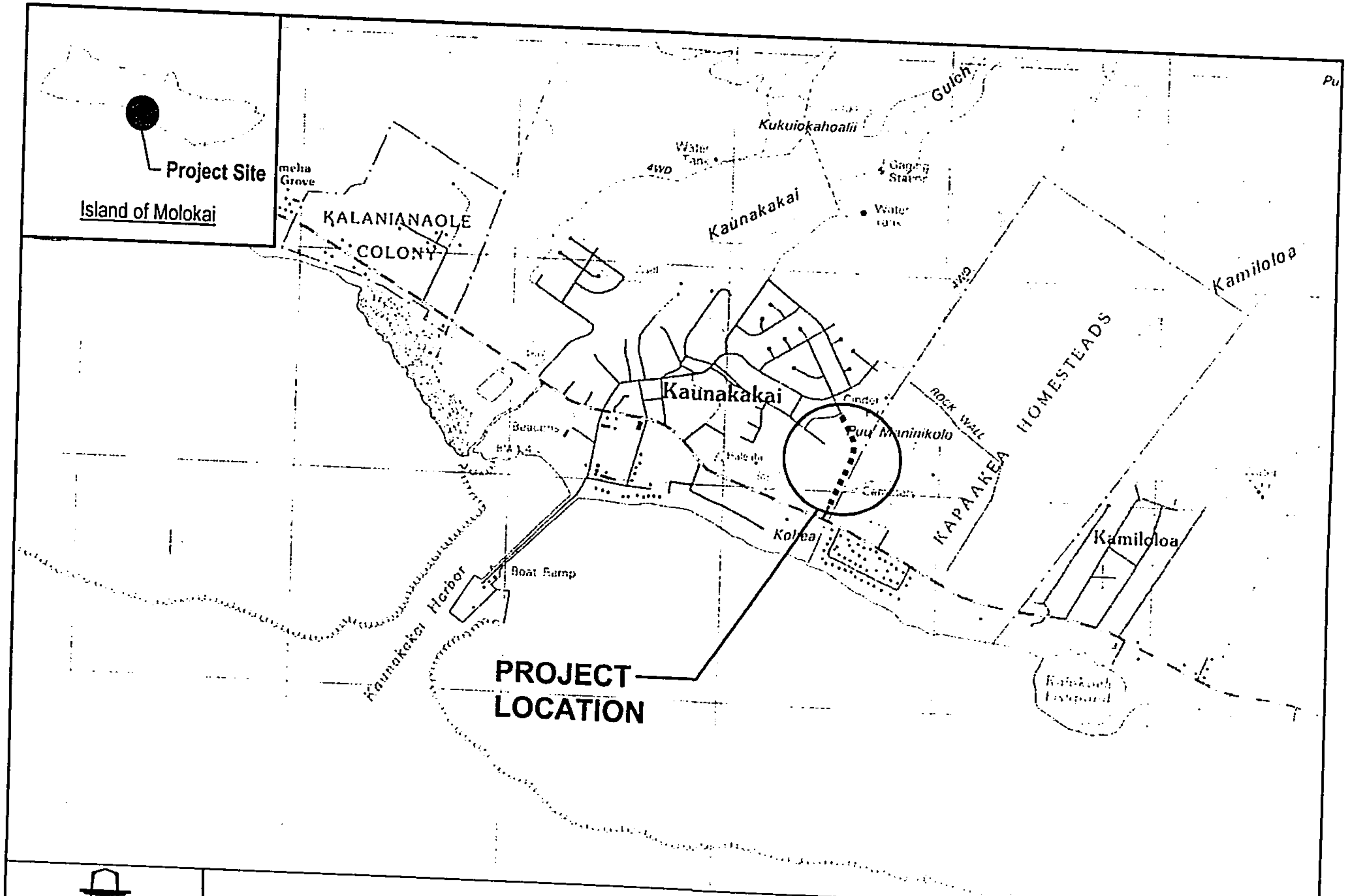
This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed roadway extension.
4. Analysis and evaluation of trip assignment and traffic diversion characteristics as a result of the proposed roadway extension.
5. Superimposing project related traffic to model future traffic conditions.
6. The identification and analysis of traffic conditions resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

II. PROJECT DESCRIPTION

A. Location

The project site is located on the eastern fringe of Kaunakakai Town on the island of Molokai (see Figure 1). The proposed project is within an area further identified as Tax Map Key 5-3-03: 1. Vehicular access connection points will be at Kamehameha Highway V to the south and Kakalahale Street to the north.



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ALANUI-KAIMIIKE STREET EXTENSION

LOCATION AND VICINITY MAP

FIGURE 1

B. Project Characteristics

The proposed roadway extension is expected to provide an alternate access to Kamehameha V Highway and function as a collector road servicing vehicular trips to and from the residential subdivision area. The road will generally have a straight alignment with a slight curvature near the mauka end to connect to the existing Kalohi Street. The roadway section will include two travel lanes and shoulders within an 36-foot wide pavement and 60-foot wide right-of-way. Undeveloped lands border both sides of the roadway throughout the majority of its alignment. For the purpose of this study, the proposed project is expected to be completed and in service by the Year 2005.

III. EXISTING TRAFFIC CONDITIONS

A. General

Kaunakakai Town is a community that has not experienced substantial development in recent years. In fact, historical traffic count data provided by the State Department of Transportation at survey stations near the proposed project indicate a slight decrease in traffic volumes over the past several years. Development interest has been minimal and limited to other areas of the island. As such, traffic demands in the project vicinity remain relatively stable and consistent in recent years.

B. Area Roadway System

Kamehameha V Highway (State Route 450) is generally a two-lane, undivided State highway oriented in the east-west directions traversing the southern coast of the island of Molokai. From Kaunakakai, Kamehameha V Highway continues westward as Maunaloa Highway (State Route 460) to Maunaloa Town. From Kaunakakai, Kamehameha V Highway continues eastward as a two-lane, undivided roadway from its connection to Maunaloa Highway to the eastern coast of the island at the town of Halawa.

Alanui Ka'imi'ike Road intersects Kamehameha V Road in the vicinity of the Molokai Education Center and is proposed to continue northward and connect with Kalohi Street in the northern residential area of Kaunakakai. Alanui Ka'imi'ike currently provides access to the Molokai Education Center parking lot and terminates beyond the educational facility.

C. **Traffic Volumes and Conditions**

1. **General**

a. **Field Investigation**

A field investigation was conducted on November 27, 2001 and January 17, 2002 and consisted of a site inspection of the roads and traffic conditions as well as a traffic count survey during the morning and afternoon peak hours of traffic. During these peak traffic periods, field observations of traffic operations were noted, evaluated and incorporated in this assessment. The traffic count surveys will be used to quantify the traffic operational qualities of the intersection.

b. **Capacity Analysis Methodology**

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Special Report 209, Transportation Research Board, Third Edition, 1997, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS).

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing an ideal or free-flow operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions. The LOS definitions are included in Appendix A.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at capacity. A v/c ratio of greater than 1.00 indicates that the projected traffic demand exceeds the road's carrying capacity.

2. **Existing Peak Hour Traffic**

a. **General**

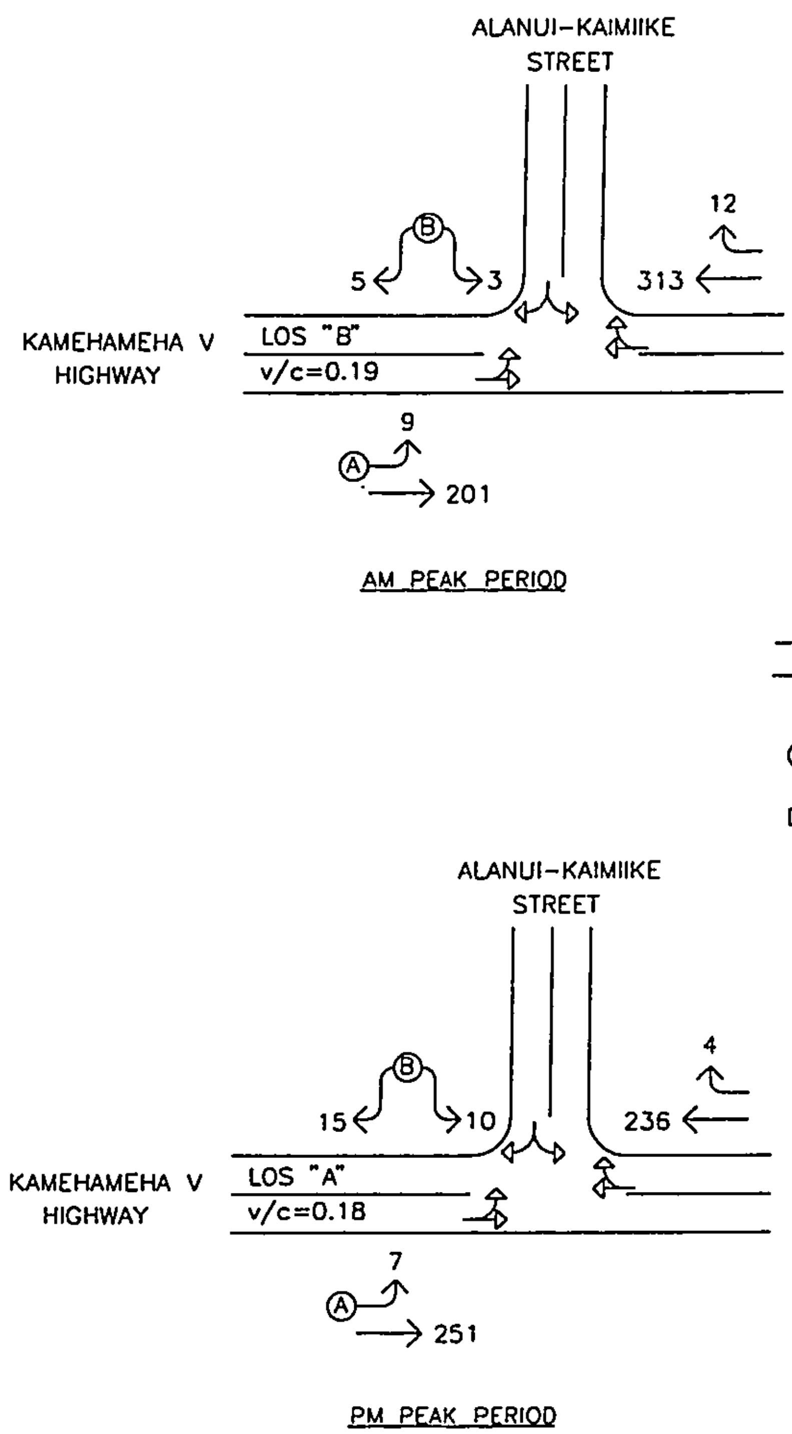
Figure 2 shows the existing AM and PM peak hour traffic volumes and operating traffic conditions. The AM peak hour of traffic generally occurs between 7:00 AM and 8:00 AM along Kamehameha V Highway in the proximity of the proposed project. In the afternoon, the PM peak hour of traffic generally occurs between the hours of 3:00 PM and 4:00 PM. The analysis is based on these peak hour time periods to identify the traffic impacts resulting from the proposed project.

b. **AM Peak Hour**

During the AM peak hour of traffic, Kamehameha V Highway in the project vicinity carries 528 vehicles, 210 vehicles eastbound and 318 vehicles westbound. The roadway section of Kamehameha V Highway in the vicinity of Alanui Ka'imi'ike Road operates at LOS "B" and at a v/c ratio of 0.19 during the AM peak hour of traffic. Traffic operates very well with minimal obstruction to through-traffic flow. On occasions, eastbound Kamehameha V Highway left-turn movements to northbound Alanui Ka'imi'ike Road would impede eastbound through traffic flow on Kamehameha Highway. However, sufficient gaps in the opposing westbound through traffic stream limit the left-turn delays to only several seconds per vehicle. No vehicular queuing on Kamehameha V Highway in the project vicinity was observed. The southbound approach of Alanui Ka'imi'ike Road at the intersection with Kamehameha V Highway operates at LOS "B" during the existing AM peak hour of traffic.

c. **PM Peak Hour**

During the PM peak hour of traffic, Kuhio Highway in the project vicinity carries 509 vehicles, 258 vehicles eastbound and 251 vehicles westbound. The roadway section of Kamehameha V



LEGEND

90 TRAFFIC MOVEMENT VOLUME (VPH)

LANE USAGE

Ⓐ LANE GROUP LEVEL OF SERVICE

DATE OF COUNT: January 17, 2002

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ALANUI-KAIMIIKE STREET EXTENSION

EXISTING PEAK HOUR TRAFFIC CONDITIONS

FIGURE 2

Highway in the project vicinity operates at LOS "A" and at a v/c ratio of 0.18 during the PM peak hour of traffic. Traffic operates fairly well with sizable gaps between through-traffic vehicles. Similar to AM peak hour conditions, the eastbound left-turn movement from Kamehameha V Highway to northbound Alanui Ka'imi'ike would occasionally impede through traffic flow on the highway. However, available gaps in the opposing through traffic stream allowed the left-turn movement to proceed before sizable vehicular queues would form on the highway. The southbound approach of Alanui Ka'imi'ike Road at the intersection with Kamehameha V Highway operates at LOS "B" during the existing PM peak hour of traffic.

IV. PROJECTED TRAFFIC CONDITIONS

A. Traffic Demands

1. General

The traffic demand in the region is not expected to change as a result of the project. The road extension would not generate additional regional trips but is expected to divert internal trips within the Kaunakakai Town area. Some of the trips are expected to utilize Alanui Ka'imi'ike Road as an alternate access between the residential areas and Kamehameha V Highway. Such a link should reduce the traffic demands on Ala Malama Street, the existing main roadway providing internal access to the town of Kaunakakai. With the traffic demand reduction on Ala Malama Street, the traffic operations at the intersection with Kamehameha V Highway is expected to improve over existing conditions.

2. Trip Distribution and Traffic Assignment

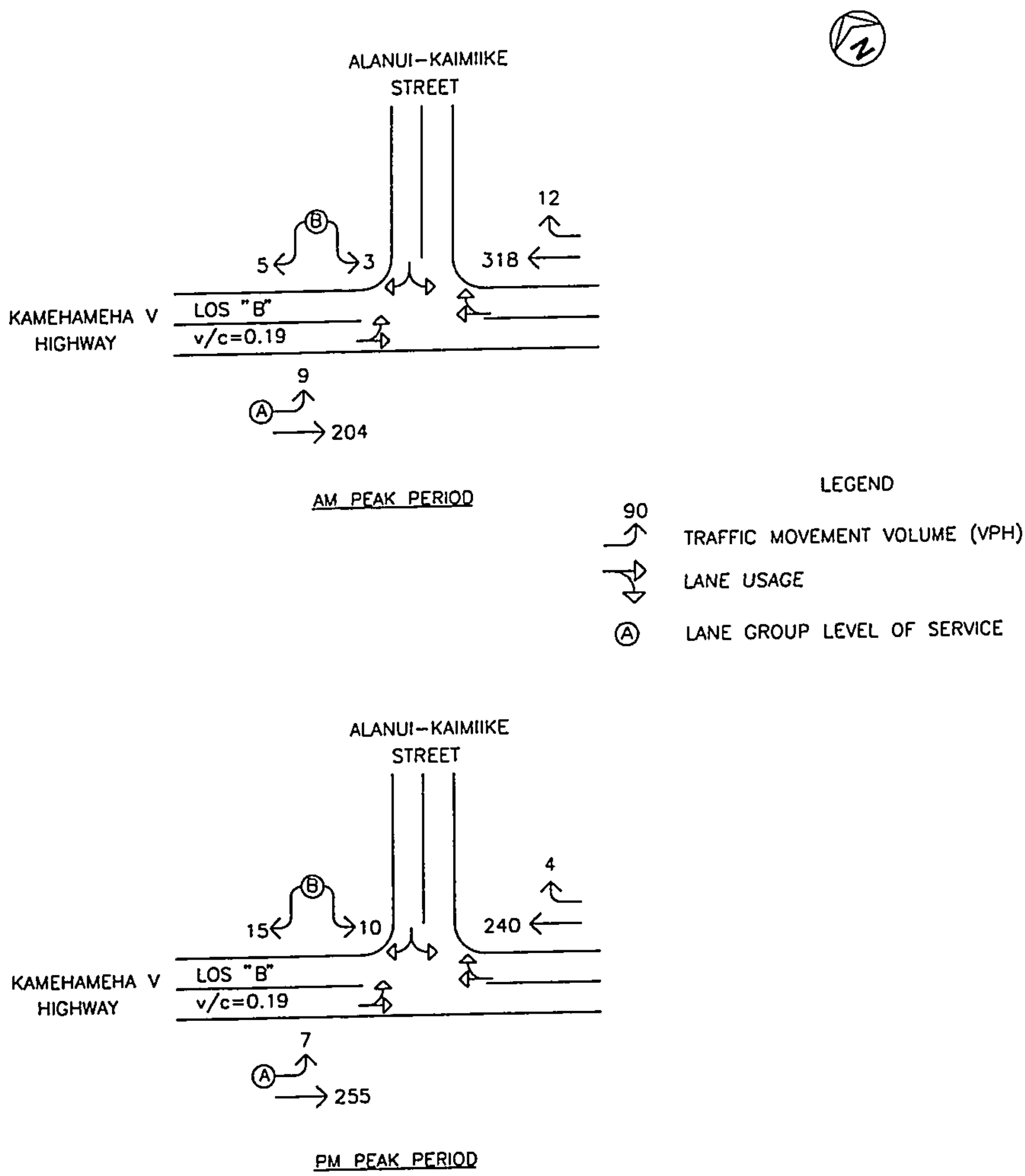
Alanui Ka'imi'ike Road extension provides alternate access between the primary roadway of Kamehameha V Highway and residential areas in the vicinity. Vehicular trips were assigned to the roadway based on the directional distribution of traffic on the highway. The traffic assignment was based on the relative proximity of the road extension with respect to the residential area connection. The portion of the eastbound and westbound peak hour traffic volumes on Ala Malama Avenue at the intersection with Kamehameha V Highway represent 56% and 53% of the internal trips during the AM and PM peak hours of traffic, respectively. The trips were assigned to Alanui Ka'imi'ike Road to simulate the travel characteristics of motorists in the area. The trip distribution of projected traffic on Alanui Ka'imi'ike Road at the intersection with Kamehameha V Highway was based on the existing directional distribution of existing traffic on the highway. During the AM peak hour of traffic, 38.7% of the vehicles were assumed to be travelling eastbound and 61.3% of the vehicles travelling westbound. During the PM peak hour of traffic, 52.4% of the vehicles were assumed to be travelling eastbound and 47.6% of the vehicles travelling westbound.

3. Through Traffic Forecasting Methodology

The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at a survey station located at the intersection of Kamehameha V Highway and Ala Malama Avenue. The historical data were analyzed by linear regression techniques to obtain an annual traffic growth rate. However, the historical data represented a continuous annual decrease of approximately 0.05% on Kamehameha V Highway. For the purpose of this study, an annual growth rate of 0.05% was used to conservatively imply some growth in the region. However, should the area experience no growth, the projected traffic volumes would represent a conservative assumption for the purpose of the analysis. As a result, traffic projections and analyses were conducted for Year 2005, the expected completion, and Year 2015 to evaluate long-range traffic operations.

B. Year 2005 Traffic Volumes Without Project

Figure 3 shows the projected Year 2005 AM peak hour and PM peak hour traffic volumes and operating conditions along Kamehameha V Highway in the vicinity of the project and at the intersection of Alanui Ka'imi'ike Road without the construction of the road extension. A comparison of the existing and projected Year



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ALANUI-KAIMIIKE STREET EXTENSION

YEAR 2005 PEAK HOUR TRAFFIC CONDITIONS WITHOUT PROJECT

FIGURE 3

2005 (without project) levels of service for the segment of Kamehameha V Highway in the vicinity of the proposed project and at the intersection with Alanui Ka'imi'ike Road are included in Table 1.

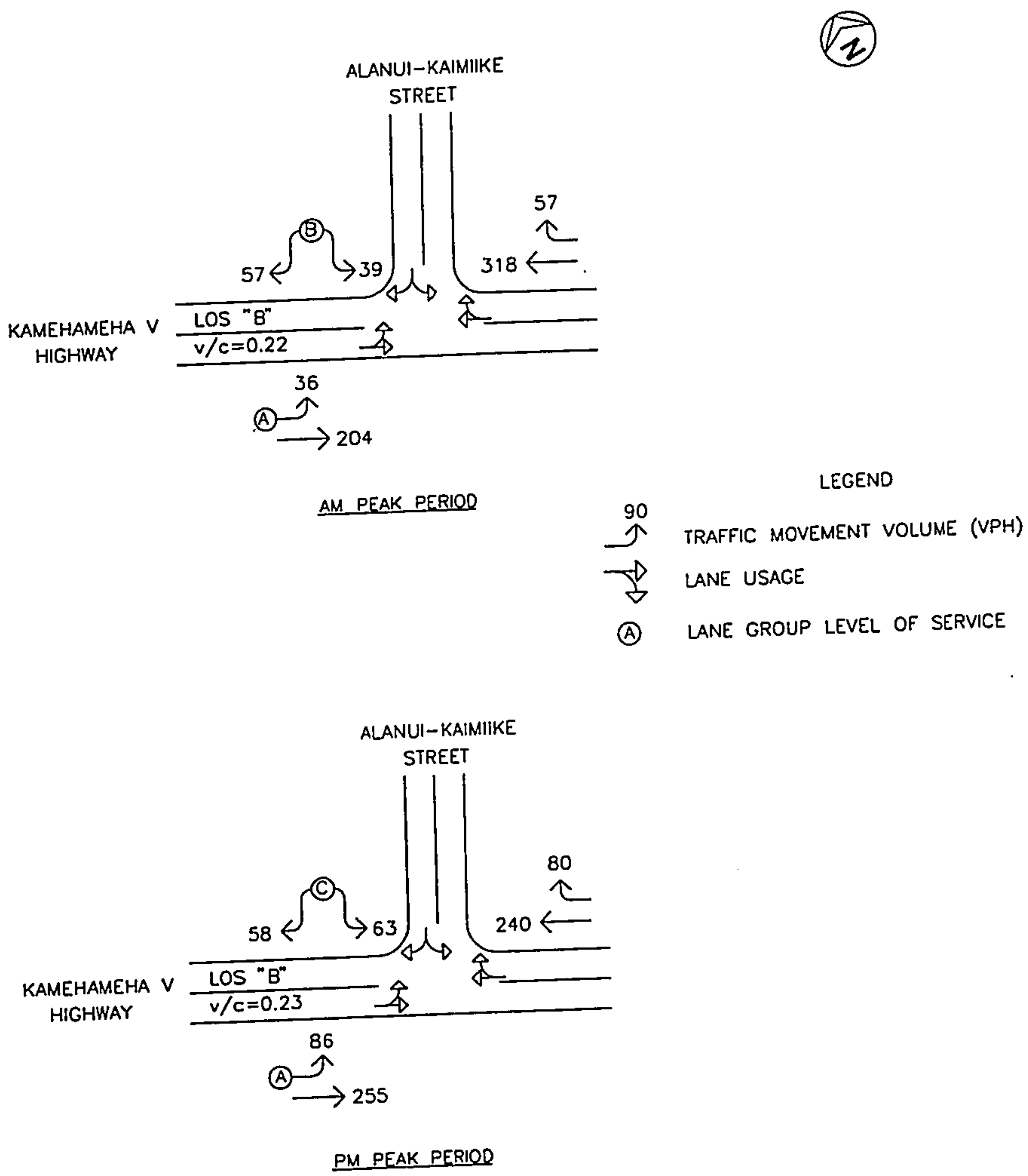
Table 1: Comparison of Existing and Projected Year 2005 (Without Project) Traffic Operating Conditions

			Kamehameha V Highway	Alanui Ka'imi'ike Road Approach
AM	Existing	LOS	B	B
		v/c	0.19	-
	Year 2005 w/out Project	LOS	B	B
		v/c	0.19	-
PM	Existing	LOS	A	B
		v/c	0.18	-
	Year 2005 w/out Project	LOS	B	B
		v/c	0.19	-

Traffic operating conditions are expected to remain relatively consistent to the Year 2005. Vehicular traffic is also expected to continue to flow at acceptable levels of service with no significant changes from existing traffic conditions. During the AM peak hour of traffic, Kamehameha V Highway just west of Alanui Ka'imi'ike Road is expected to operate at LOS "B" and v/c ratio 0.19 during the morning peak hour of traffic. During the afternoon peak hour of traffic, this same section of roadway is expected to operate at LOS "B" and at v/c ratio 0.19. The Alanui Ka'imi'ike Road approach is expected to operate at LOS "B" for the morning and afternoon peak hours during the projected Year 2005.

C. Total Traffic Volumes With Project

Figure 4 shows the cumulative AM and PM peak hour traffic conditions resulting from the projected external traffic and the diverted trips as a result of the proposed project.. The cumulative volumes consist of the diverted traffic superimposed over Year 2005 projected traffic demands. The traffic impact resulting from the proposed road connection and external trip increases are addressed in the following section.



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ALANUI-KAIMIIKE STREET EXTENSION

YEAR 2005 PEAK HOUR TRAFFIC CONDITIONS WITH PROJECT

FIGURE 4

V. TRAFFIC ASSESSMENT ANALYSIS

A. Projected Year 2005

The Year 2005 cumulative AM and PM peak hour traffic conditions with the development of the proposed roadway facility are summarized in Table 2. The existing and projected Year 2005 operating conditions without the proposed project are provided for comparison purposes.

Table 2: Comparison of Existing and Projected (With and Without Project) Traffic Operating Conditions

			Kamehameha V Highway	Alanui Ka'imi'ike Road Approach
AM	Existing	LOS	B	B
		v/c	0.19	-
	Year 2005 w/out Project	LOS	B	B
		v/c	0.19	-
	Year 2005 w/ Project	LOS	B	B
		v/c	0.22	-
PM	Existing	LOS	A	B
		v/c	0.18	-
	Year 2005 w/out Project	LOS	B	B
		v/c	0.19	-
	Year 2005 w/ Project	LOS	B	C
		v/c	0.23	-

Traffic operations under Year 2005 with project conditions would be similar to conditions without the development of the proposed project. The addition of diverted traffic from the proposed project to the surrounding roadways should cause minimal impact to traffic operations in the vicinity. In addition, traffic operations at the intersection of Kamehameha V Highway and Ala Malama Avenue should improve over existing traffic conditions as a result of diverted trips in the region.

At the intersection of Kamehameha V Highway and Alanui Ka'imi'ike Road, the level of service for the southbound approach of Alanui Ka'imi'ike Road should operate at LOS "B" and LOS "C" during the projected Year 2005 AM and PM peak hours of traffic, respectively. Kamehameha V Highway should operated at LOS "B" and v/c ratio 0.22 during the projected AM peak hour of traffic, and LOS "B" and v/c ratio 0.23 during the projected PM peak hour of traffic.

B. Projected Year 2015

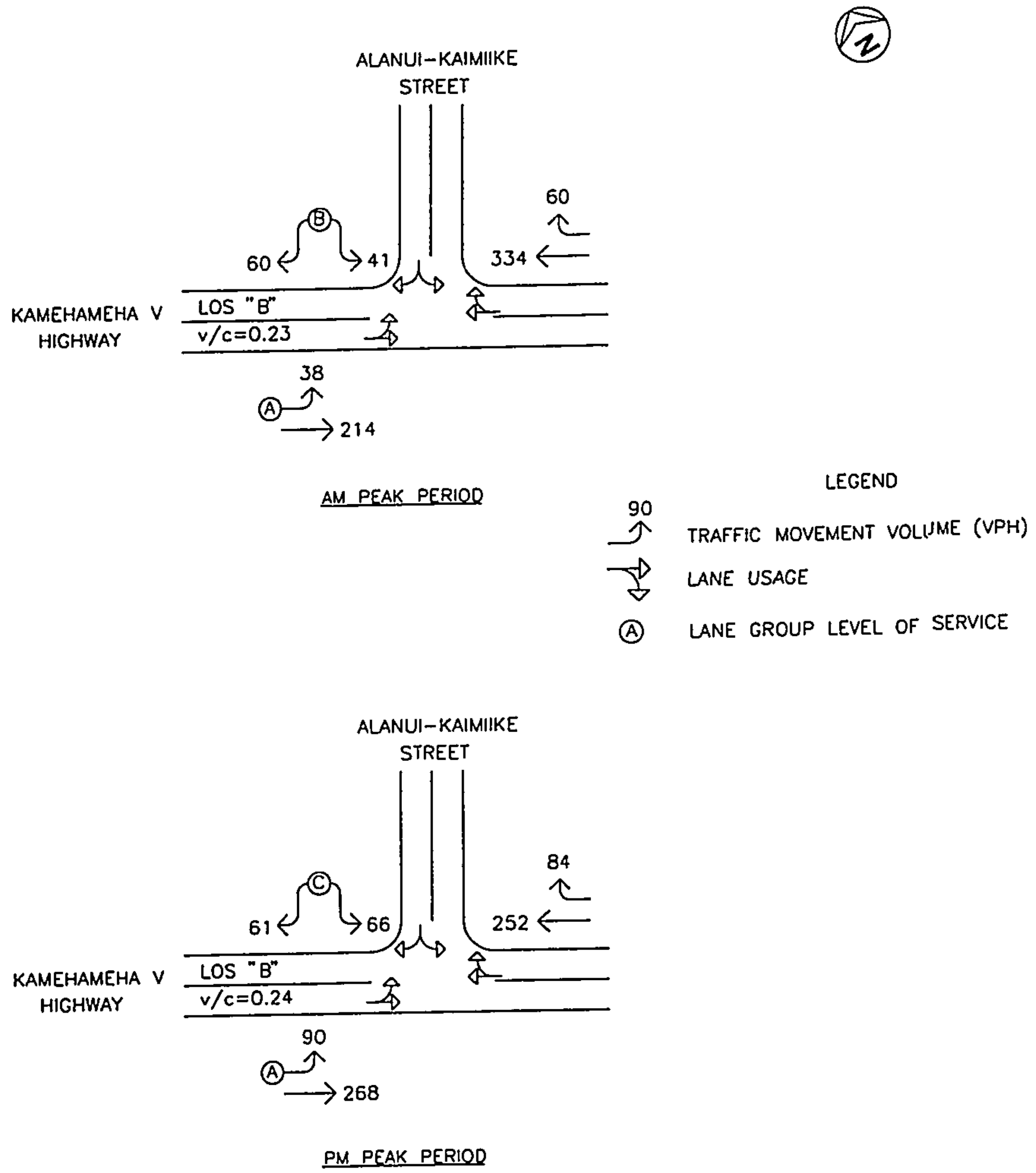
Figure 5 shows the projected Year 2015 traffic volumes and operating conditions. Traffic conditions for projected Year 2015 is expected operate fairly well with minimal differences in operational service quality. All movements at the study intersection operate at acceptable levels of service. Table 3 shows a comparison between existing and projected years.

Table 3: Comparison of Existing and Projected (With Project) Traffic Operating Conditions

			Kamehameha V Highway	Alanui Ka'imi'ike Road Approach
AM	Existing	LOS	B	B
		v/c	0.19	-
	Year 2005 w/ Project	LOS	B	B
		v/c	0.22	-
	Year 2015 w/ Project	LOS	B	B
		v/c	0.23	-
PM	Existing	LOS	A	B
		v/c	0.18	-
	Year 2005 w/ Project	LOS	B	C
		v/c	0.23	-
	Year 2015 w/ Project	LOS	B	C
		v/c	0.24	-

VI. RECOMMENDATIONS

The project is not expected to significantly impact traffic operations in the region. The project would, on the other hand, provide an alternate access to and from Kamehameha V Highway. Thus reducing the traffic demand at Ala Malama Avenue, the primary access to Kaunakakai town. However, the following recommendations should be considered to maintain motorist safety and the traffic operational servcie quality of the intersection:



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ALANUI-KAIMIIKE STREET EXTENSION

YEAR 2015 PEAK HOUR TRAFFIC CONDITIONS WITH PROJECT

FIGURE 5

1. Provide exclusive left-turn and right-turn lanes on the southbound approach of Alanui Ka'imi'ike Road at the intersection with Kamehameha V Highway.

2. Maintain adequate sight distances for motorists to safely enter and exit Alanui Ka'imi'ike Road.

VII. CONCLUSION

The proposed Alanui Ka'imi'ike Road extension is not expected to have a significant impact on traffic operations in the project vicinity. During the AM and PM peak hours of traffic, the diverted vehicular traffic as a result of the proposed project should not significantly change the existing traffic operations in the project vicinity. The intersection of Kamehameha V Highway and Ala Malama Avenue is expected to improve over existing conditions as a result of the diverted trips. The project should provide an alternate access to the residential areas of Kaunakakai Town and distribute traffic in the region accordingly. During the projected AM and PM peak hours of traffic, all movements of the intersection should operate at satisfactory levels of service.

APPENDIX A

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX B

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK HOUR TRAFFIC ANALYSIS

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Existing
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1 L	2 T	3 R	4 L	5 T	6 R
Volume	9	201			313	12
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR	9	211			329	12
Percent Heavy Vehicles	2	--	--		--	--
Median Type	Undivided					
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume				3		5
Peak Hour Factor, PHF				0.95		0.95
Hourly Flow Rate, HFR				3		5
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Median Storage						
Flared Approach: Exists?					No	
Storage						
RT Channelized?						
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	9						8	
C(m) (vph)	1218						602	
v/c	0.01						0.01	
95% queue length	0.02						0.04	
Control Delay	8.0						11.1	
LOS	A						B	
Approach Delay							11.1	
Approach LOS							B	

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Existing
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1 L	2 T	3 R	4 L	5 T	6 R
Volume	7	251			236	4
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR	7	264			248	4
Percent Heavy Vehicles	2	--	--		--	--
Median Type	Undivided					
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume				10		15
Peak Hour Factor, PHF				0.95		0.95
Hourly Flow Rate, HFR				10		15
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Median Storage						
Flared Approach: Exists?					No	
Storage						
RT Channelized?						
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	7						25	
C(m) (vph)	1313						646	
v/c	0.01						0.04	
95% queue length	0.02						0.12	
Control Delay	7.8						10.8	
LOS	A						B	
Approach Delay							10.8	
Approach LOS							B	

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	AM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Existing
Description	

Input Data

Highway class	Class 2				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 528 veh/h
Directional split 60 / 40 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	602	pc/h
Highest directional split proportion (note-2)	361	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	43.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	601	pc/h
Highest directional split proportion (note-2)	361	
Base percent time-spent-following, BPTSF	41.0	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	41.0	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

```
Analyst                 CL
Agency/Co.
Date Performed          2/26/2002
Analysis Time Period    PM Peak
Highway                 Kam V Hwy
From/To
Jurisdiction
Analysis Year           Existing
Description
```

Input Data

```
Highway class   Class 2
Shoulder width      6.0    ft    Peak-hour factor, PHF         0.88
Lane width          12.0   ft    % Trucks and buses            2       %
Segment length      0.0    mi    % Recreational vehicles       0       %
Terrain type        Level        % No-passing zones            0       %
Grade:  Length      0.25   mi    Access points/mi              8       /mi
        Up/down     3.0    %

Two-way hourly volume, V    509      veh/h
Directional split       51  /   49   %
```

Average Travel Speed

```
Grade adjustment factor, fG                          1.00
PCE for trucks, ET                                   1.7
PCE for RVs, ER                                      1.0
Heavy-vehicle adjustment factor,                     0.986
Two-way flow rate,(note-1) vp                        587      pc/h
Highest directional split proportion (note-2)        299      pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                            -        mi/h
Observed volume, Vf                                  -        veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                           50.0     mi/h
Adj. for lane and shoulder width, fLS                0.0      mi/h
Adj. for access points, fA                           2.0      mi/h

Free-flow speed, FFS                                 48.0     mi/h

Adjustment for no-passing zones, fnp                 0.0      mi/h
Average travel speed, ATS                            43.4     mi/h
```

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	736	pc/h
Highest directional split proportion (note-2)	449	
Base percent time-spent-following, BPTSF	47.6	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	47.6	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.23	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2005 PEAK HOUR TRAFFIC
ANALYSIS WITHOUT PROJECT

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2005 w/out Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	9	204			318	12
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR	9	214			334	12
Percent Heavy Vehicles	2	--	--		--	--
Median Type	Undivided					
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				3		5
Peak Hour Factor, PHF				0.95		0.95
Hourly Flow Rate, HFR				3		5
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Median Storage						
Flared Approach: Exists?					No	
Storage						
RT Channelized?						
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	9						8	
C(m) (vph)	1213						597	
v/c	0.01						0.01	
95% queue length	0.02						0.04	
Control Delay	8.0						11.1	
LOS	A						B	
Approach Delay							11.1	
Approach LOS							B	

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2005 w/out Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW
Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street:	Approach	Eastbound			Westbound		
	Movement	1 L	2 T	3 R	4 L	5 T	6 R
Volume		7	255			240	4
Peak-Hour Factor, PHF		0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR		7	268			252	4
Percent Heavy Vehicles		2	--	--		--	--
Median Type	Undivided						
RT Channelized?							
Lanes		0	1			1	0
Configuration		LT				TR	
Upstream Signal?			No			No	

Minor Street:	Approach	Northbound			Southbound		
	Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume					10		15
Peak Hour Factor, PHF					0.95		0.95
Hourly Flow Rate, HFR					10		15
Percent Heavy Vehicles					2		2
Percent Grade (%)			0			0	
Median Storage							
Flared Approach:	Exists?					No	
	Storage						
RT Channelized?							
Lanes					0		0
Configuration						LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	7						25	
C(m) (vph)	1309						641	
v/c	0.01						0.04	
95% queue length	0.02						0.12	
Control Delay	7.8						10.8	
LOS	A						B	
Approach Delay							10.8	
Approach LOS							B	

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	PM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2015 w/ project
Description	

Input Data

Highway class	Class 2				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 671 veh/h
Directional split 53 / 47 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	766	pc/h
Highest directional split proportion (note-2)	406	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	42.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	580	pc/h
Highest directional split proportion (note-2)	296	
Base percent time-spent-following, BPTSF	39.9	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	39.9	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:

1. *If vp >= 3200 pc/h, terminate analysis-the LOS is F.*
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	AM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2005 w/out project
Description	

Input Data

Highway class Class 2

Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 536 veh/h
Directional split 60 / 40 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	612	pc/h
Highest directional split proportion (note-2)	367	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	43.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	610	pc/h
Highest directional split proportion (note-2)	366	
Base percent time-spent-following, BPTSF	41.5	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	41.5	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:

1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2005 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2005 w/ Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street:	Approach	Eastbound			Westbound		
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume		36	204			318	57
Peak-Hour Factor, PHF		0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR		37	214			334	60
Percent Heavy Vehicles		2	--	--		--	--
Median Type	Undivided						
RT Channelized?							
Lanes		0	1			1	0
Configuration		LT				TR	
Upstream Signal?			No			No	

Minor Street:	Approach	Northbound			Southbound		
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume					39		57
Peak Hour Factor, PHF					0.95		0.95
Hourly Flow Rate, HFR					41		60
Percent Heavy Vehicles					2		2
Percent Grade (%)			0			0	
Median Storage							
Flared Approach:	Exists?					No	
	Storage						
RT Channelized?							
Lanes					0		0
Configuration						LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	37						101	
C(m) (vph)	1165						543	
v/c	0.03						0.19	
95% queue length	0.10						0.68	
Control Delay	8.2						13.1	
LOS	A						B	
Approach Delay							13.1	
Approach LOS							B	

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2005 w/ Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW   Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street:	Approach	Eastbound			Westbound		
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume		86	255			240	80
Peak-Hour Factor, PHF		0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR		90	268			252	84
Percent Heavy Vehicles		2	--	--		--	--
Median Type	Undivided						
RT Channelized?							
Lanes		0	1			1	0
Configuration		LT				TR	
Upstream Signal?			No			No	

Minor Street:	Approach	Northbound			Southbound		
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume					63		58
Peak Hour Factor, PHF					0.95		0.95
Hourly Flow Rate, HFR					66		61
Percent Heavy Vehicles					2		2
Percent Grade (%)			0			0	
Median Storage							
Flared Approach:	Exists?					No	
	Storage						
RT Channelized?							
Lanes					0		0
Configuration						LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	90						127	
C(m) (vph)	1223						474	
v/c	0.07						0.27	
95% queue length	0.24						1.09	
Control Delay	8.2						15.4	
LOS	A						C	
Approach Delay							15.4	
Approach LOS							C	

HCS2000: Two-Lane Highways Release 4.1a

Phone:
E-Mail:

Fax:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	PM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2005 w/out project
Description	

Input Data

Highway class	Class 2				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V   517   veh/h
Directional split   51 / 49 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.986	
Two-way flow rate,(note-1) vp	596	pc/h
Highest directional split proportion (note-2)	304	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	43.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	589	pc/h
Highest directional split proportion (note-2)	300	
Base percent time-spent-following, BPTSF	40.4	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	40.4	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:

1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	AM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2005 w/ project
Description	

Input Data

Highway class Class 2

Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 615 veh/h
Directional split 61 / 39 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	702	pc/h
Highest directional split proportion (note-2)	428	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	42.6	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	700	pc/h
Highest directional split proportion (note-2)	427	
Base percent time-spent-following, BPTSF	46.0	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	46.0	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.22	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:

1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2015 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2015 w/ Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW
Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1 L	2 T	3 R	4 L	5 T	6 R
Volume	38	214			334	60
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR	40	225			351	63
Percent Heavy Vehicles	2	--	--		--	--
Median Type	Undivided					
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume				41		60
Peak Hour Factor, PHF				0.95		0.95
Hourly Flow Rate, HFR				43		63
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Median Storage						
Flared Approach: Exists?					No	
Storage						
RT Channelized?						
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	40						106	
C(m) (vph)	1145						523	
v/c	0.03						0.20	
95% queue length	0.11						0.76	
Control Delay	8.3						13.6	
LOS	A						B	
Approach Delay							13.6	
Approach LOS							B	

HCS2000: Unsignalized Intersections Release 4.1a

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 1/31/2002
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2015 w/ Project
Project ID:
East/West Street: Kam V Hwy
North/South Street: Alanui-Kaimiike St
Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1 L	2 T	3 R	4 L	5 T	6 R
Volume	90	268			252	84
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Hourly Flow Rate, HFR	94	282			265	88
Percent Heavy Vehicles	2	--	--		--	--
Median Type	Undivided					
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume				66		61
Peak Hour Factor, PHF				0.95		0.95
Hourly Flow Rate, HFR				69		64
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Median Storage						
Flared Approach: Exists?					No	
Storage						
RT Channelized?						
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	94						133	
C(m) (vph)	1206						454	
v/c	0.08						0.29	
95% queue length	0.25						1.23	
Control Delay	8.2						16.2	
LOS	A						C	
Approach Delay							16.2	
Approach LOS							C	

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	PM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2005 w/ project
Description	

Input Data

Highway class	Class 2				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 639 veh/h
Directional split 53 / 47 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	729	pc/h
Highest directional split proportion (note-2)	386	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	42.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	728	pc/h
Highest directional split proportion (note-2)	386	
Base percent time-spent-following, BPTSF	47.3	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	47.3	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.23	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS2000: Two-Lane Highways Release 4.1a

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	CL
Agency/Co.	
Date Performed	2/26/2002
Analysis Time Period	AM Peak
Highway	Kam V Hwy
From/To	
Jurisdiction	
Analysis Year	Year 2015 w/ project
Description	

Input Data

Highway class Class 2

Shoulder width	6.0	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	0	%
Grade: Length	0.25	mi	Access points/mi	8	/mi
Up/down	3.0	%			

Two-way hourly volume, V 646 veh/h
Directional split 61 / 39 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.996	
Two-way flow rate,(note-1) vp	737	pc/h
Highest directional split proportion (note-2)	450	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	48.0	mi/h
Adjustment for no-passing zones, fnp	0.0	mi/h
Average travel speed, ATS	42.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.998	
Two-way flow rate,(note-1) vp	764	pc/h
Highest directional split proportion (note-2)	405	
Base percent time-spent-following, BPTSF	48.9	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	48.9	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.24	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:

1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

Appendix D

Drainage Report

PRELIMINARY DRAINAGE STUDY
FOR
ALANUI KA`IMI`IKE ROADWAY EXTENSION
KAUNAKAKAI, MOLOKAI

Prepared For

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND
WASTE MANAGEMENT
Engineering Division

Prepared by

Shimabukuro, Endo & Yoshizaki, Inc.
1126 12th Avenue, Room 309
Honolulu, Hawaii 96816

FEBRUARY 2002

TABLE OF CONTENTS

LIST OF FIGURES

1. Introduction

This Drainage Study is prepared for the Department of Public Works and Waste Management to extend the existing Alanui Ka`imi`ike Road on the Island of Molokai at the eastside of Kaunankakai Town, see Figure 1. The roadway extension project is proposed to begin at the existing end of Alanui Ka'imi`ike Road. The roadway will continue north and connect to the existing end of Kalohi Street. Currently Alanui Ka`imi`ike serves as the access road from Kamehameha V Highway to the Molokai Education Center (MEC), a branch of the Maui Community College System. Kalohi Street is a part of the Ranch Camp Subdivision.

The typical roadway section is planned to have a 60′ wide right-of-way with a 36′ wide a.c. pavement section. A 12′ wide grassed shoulder will be provided between the edge of pavement to the right-of-way boundary. Whenever the road section falls within a fill area, the shoulder will have a constant slope of -2.0% to the r/w boundary. Whenever the road section falls within a cut area, the shoulder will slope at -6.25% for 6′ then slope at 15.17% to the r/w boundary. This will create a swale in the grassed shoulder area for drainage purposes.

This study estimates peak runoff quantities for a 10 and 50 year recurrence interval storm, runoff spread width within the roadway cross section and inlet interception capacity in accordance with the Highway Drainage Design Criteria for the State of Hawaii, Department of Transportation, Highways Division (DOT-H) dated 12/5/85 and Rules for the Design of Storm Drainage Facilities in the County of Maui dated November 12, 1995.

This preliminary study is intended to set the drainage concept and recommendations for proposed storm drainage improvements required for the roadway extension project. More detailed computations and additional details will be added to finalize this report during the Prefinal design stages of this project.

2. Hydrologic Criteria and Computations

The hydrologic criteria for this project is based on a 10 and 50 year recurrence interval storm as required by the design criteria for collector streets and roads. Runoff quantity was estimated for this project using the Rational Method. The Rational Method is the standard method used to compute peak runoff within the County of Maui's Storm Drainage Standards for smaller drainage areas under 100 acres.

Drainage Area Boundary Maps and Calculations for peak runoff estimates are shown in Appendix A.

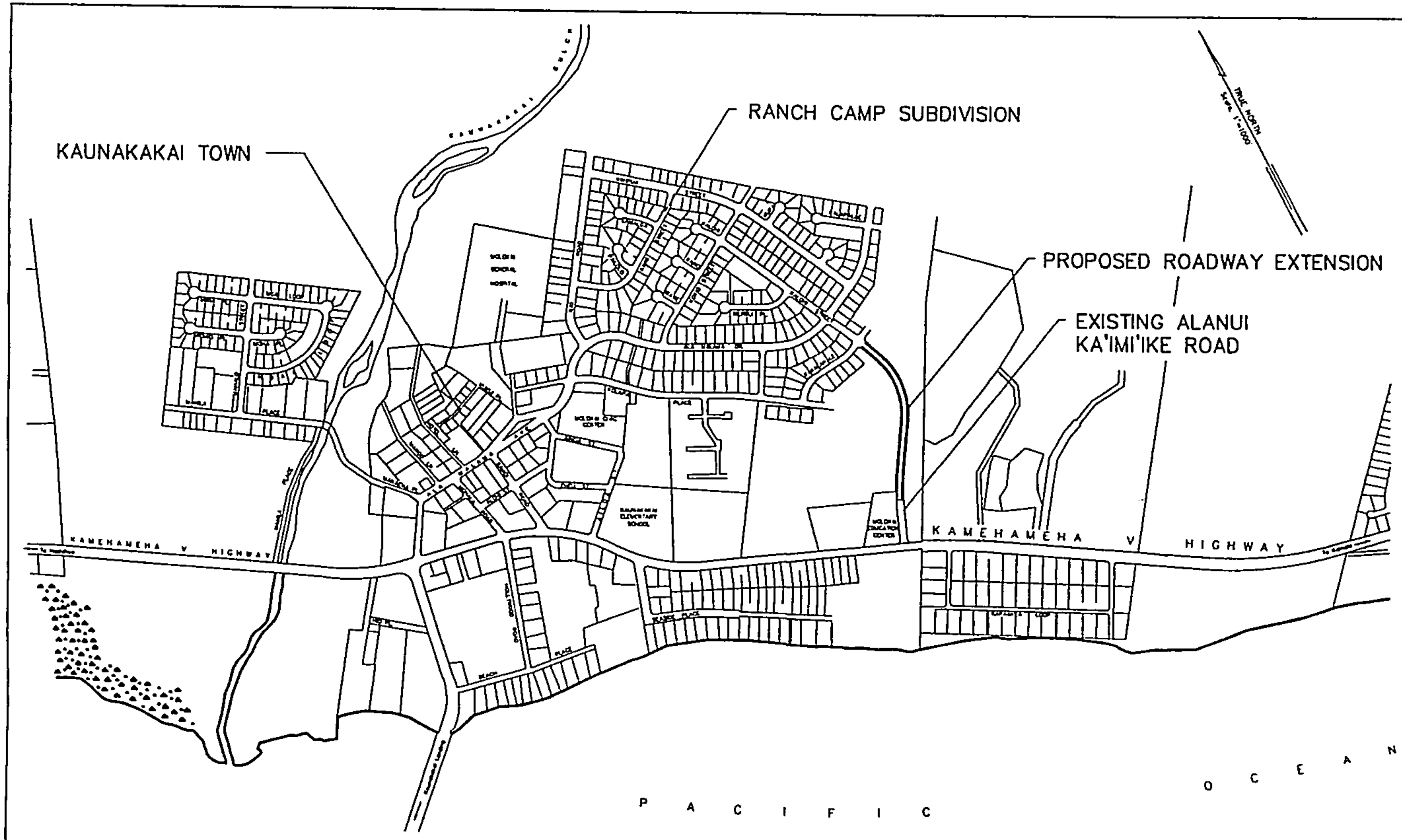

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FIGURE 1
ALANUI KA'IMI'IKE ROADWAY EXTENSION
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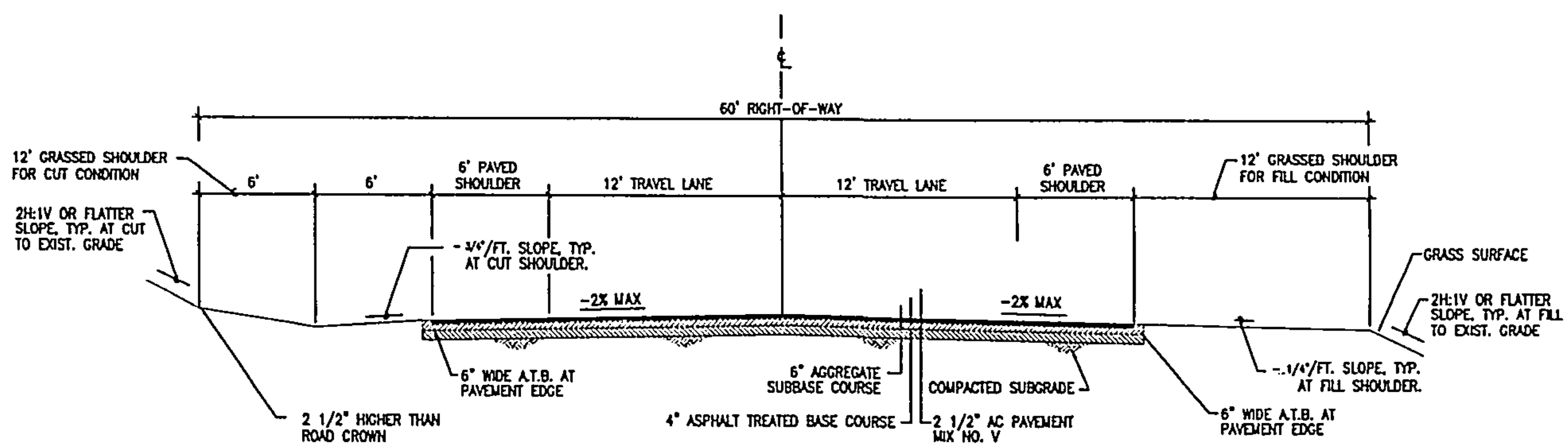

PROPOSED TYPICAL ROADWAY SECTION

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FIGURE 2
ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED TYPICAL ROADWAY SECTION

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3. Hydraulic Analysis

Haestad Method's Flowmaster Version 6.1 was used to perform the hydraulic analysis portion of this report. Runoff spread width within the roadway prior to the inlet structure, inlet interception and bypass flow percentages for peak runoff were evaluated using the Flowmaster Program.

A complete set of computations for the project is shown in Appendix A.

4. Existing Drainage Conditions

The project area slopes from North to South with a slight East to West cross slope. The roadway extension project is proposed from the existing end of Alanui Ka`imi`ike Road, follow the existing waterline alignment North and connect to the end of Kalohi Street, approximately 1,300 linear feet. The upper portion of the projects drainage area includes a drainage system which collects runoff from a portion the Ranch Camp Subdivision. The drainage system outlets to an existing silt basin located at the end of Kalohi Street. The silt basin over flows into a open sloped pasture area. Additional sheet flow from open pasture areas above the silt basin, is also included in the project's existing runoff area. Runoff from the pasture area goes to a cornfield which surrounds MEC. Sheet flow from the cornfield area North and West of MEC goes into a grassed swale which runs parallel to and on the Mauka side of Kamehameha V Highway. The grassed swale flows to an existing 10' wide x 3' high concrete box culvert which crosses Kamehameha V Highway fronting MEC. Runoff from the cornfield area East of MEC, sheet flows into the existing drainage system in Alanui Ka`imi`ike Road. The existing drainage system includes two catch basins at the Mauka corners of the highway and roadway intersection. The catch basins are piped and outlet at the east wingwall of the mauka entrance to the box culvert. The drainage system for MEC is also connected to the Alanui Ka`imi`ike Road drainage system. The box culvert outlets makai of the Highway into a wetlands area.

5. Proposed Drainage Improvements

The proposed drainage improvements for the project include relocating and expanding the existing silt basin, extending and expanding the existing Ranch Camp drainage system and extending and expanding the existing Alanui Ka`imi`ike Road drainage system, see Figures 3 and 4.

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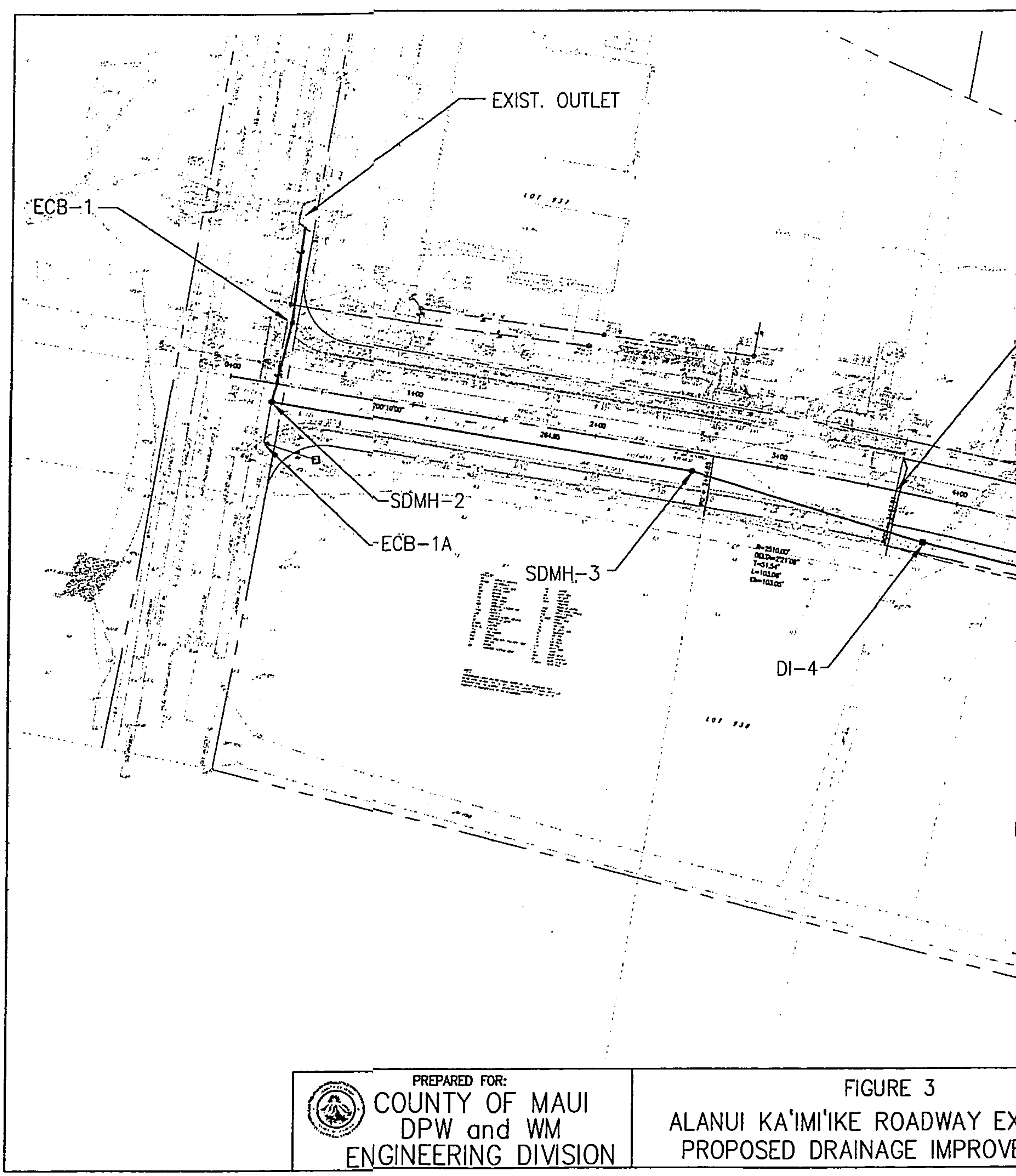
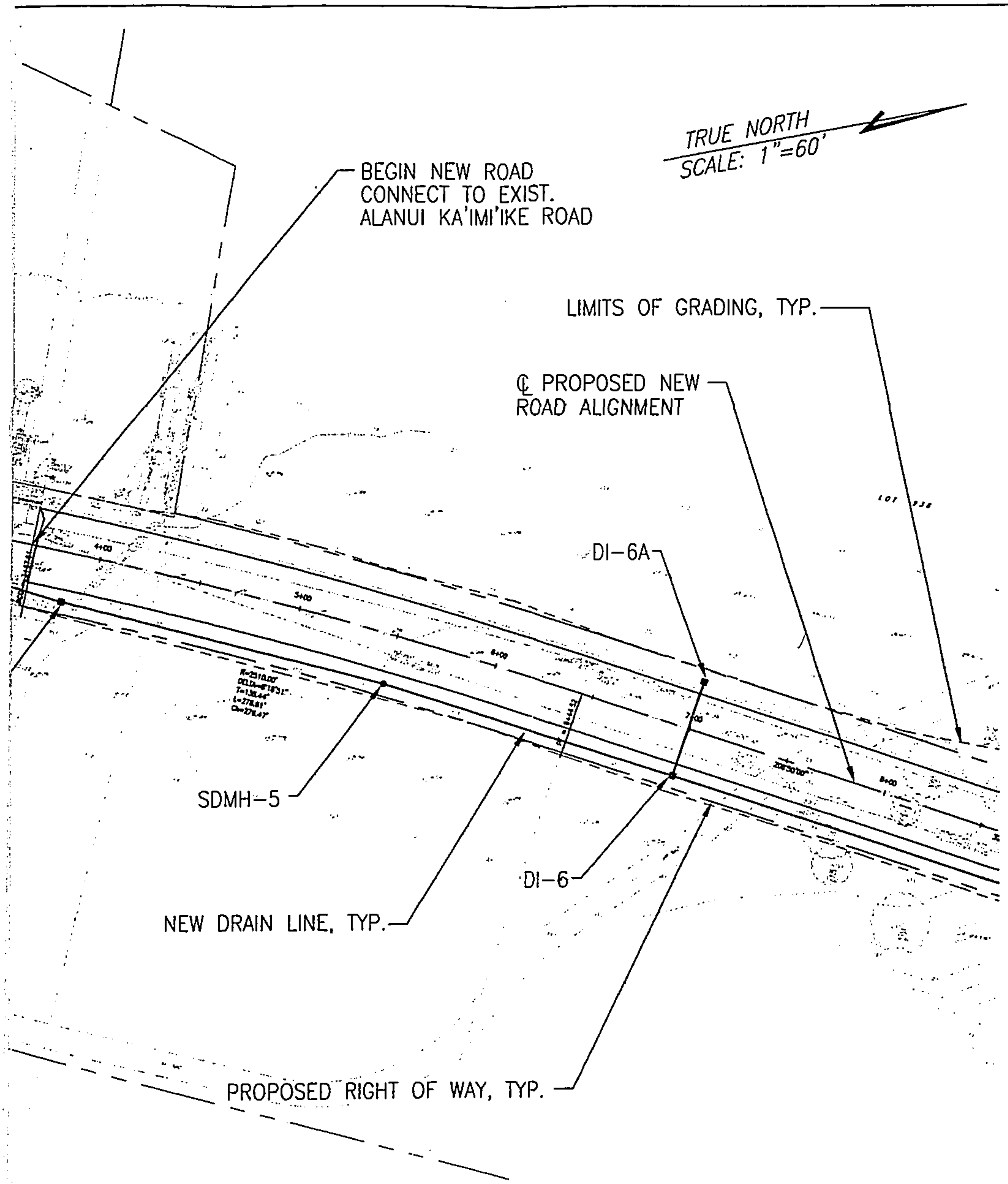


FIGURE 3
ALANUI KA'IMI'IKE ROADWAY EX
PROPOSED DRAINAGE IMPROVE



URE 3
ROADWAY EXTENSION
AGE IMPROVEMENTS

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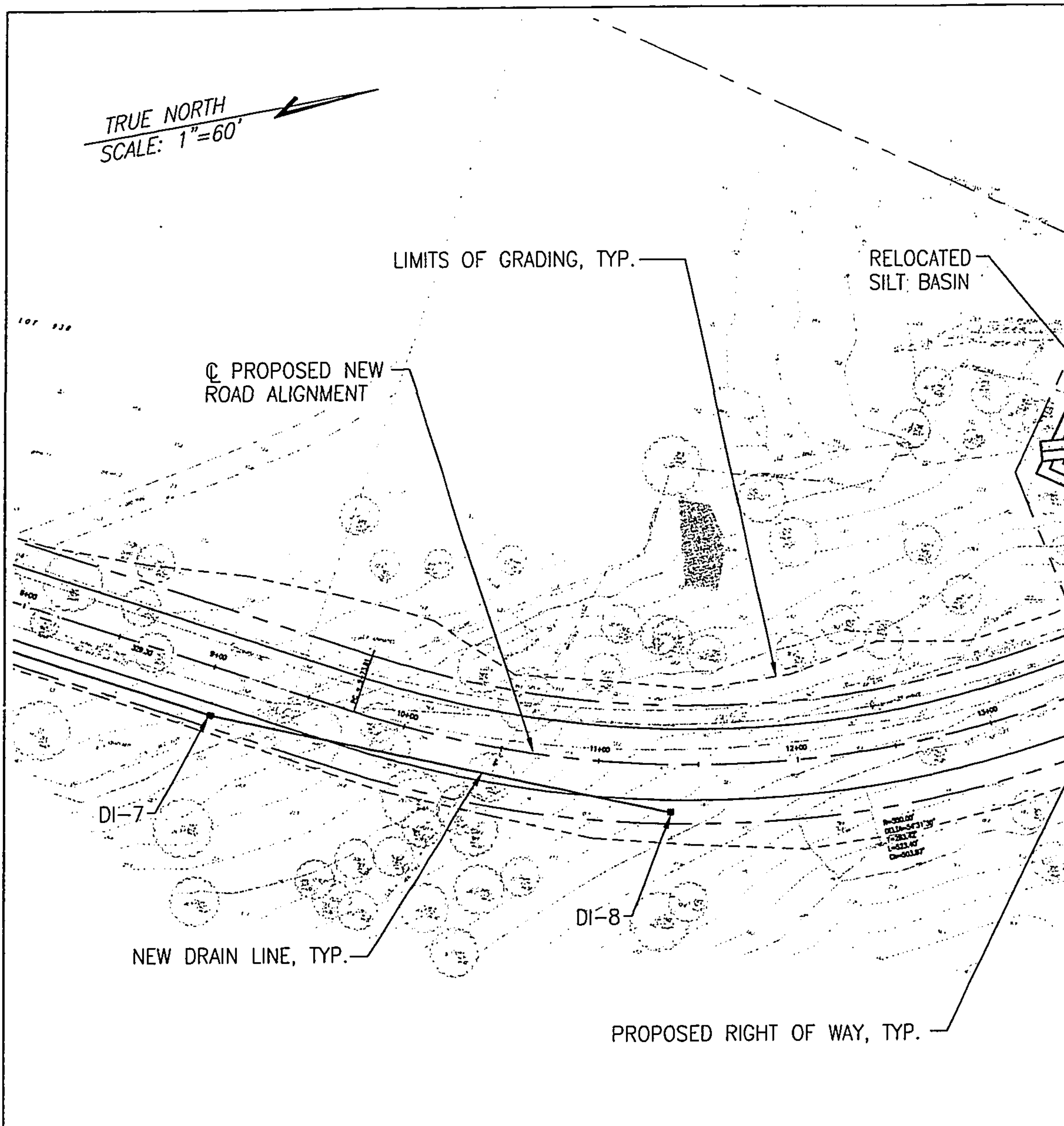

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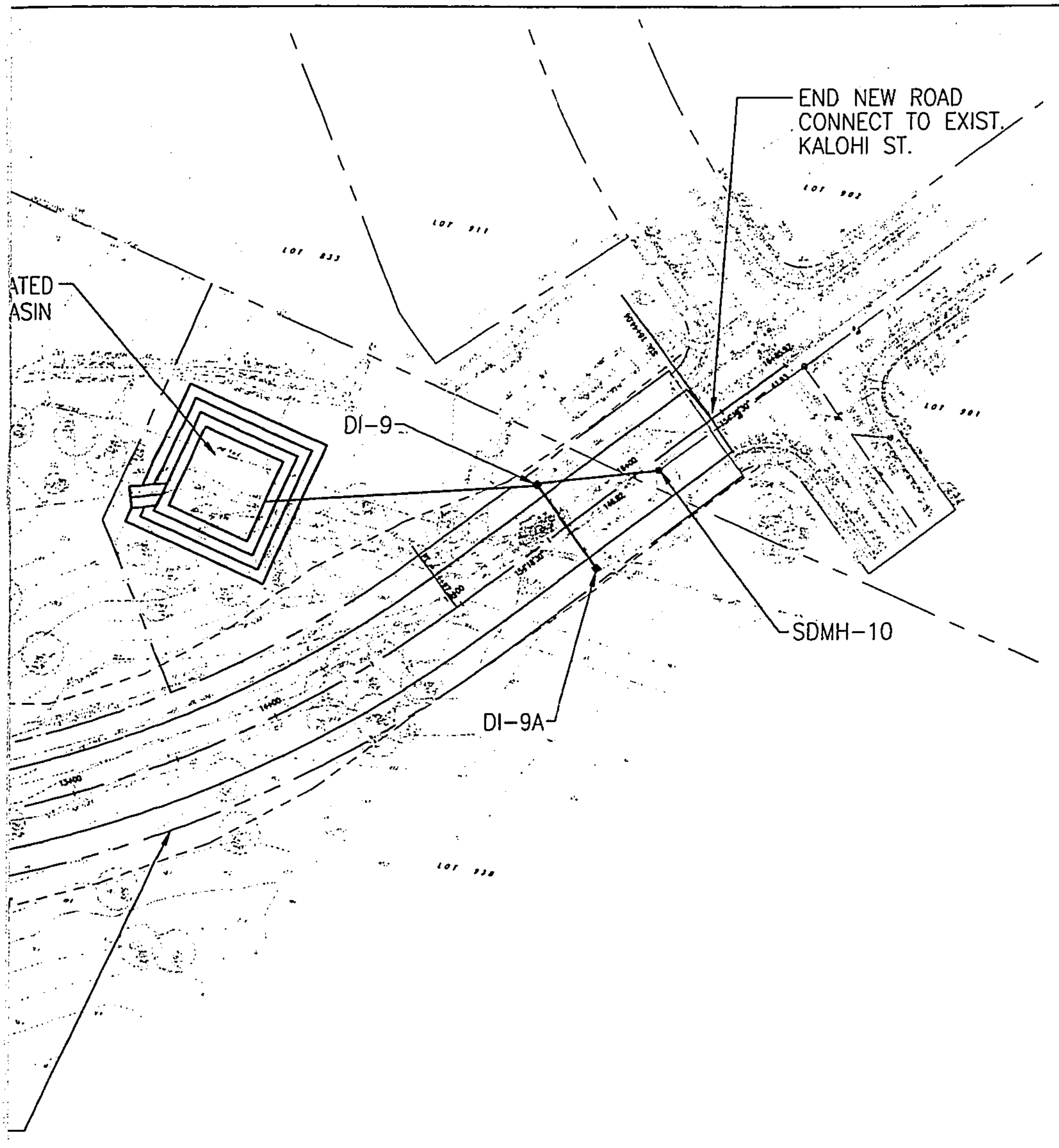
FIGURE 4
ALANUI KA'IMI'IKE ROADWAY
PROPOSED DRAINAGE IMPRO



URE 4
ROADWAY EXTENSION
AGE IMPROVEMENTS

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The existing silt basin is proposed to be relocated makai of the proposed roadway alignment. The silt basin will be sized to detain additional peak runoff generated by the project so that peak runoff at the Kamehameha Box Culvert will not increase from existing conditions. Based on peak flow computations, the peak flow increase is estimated to be 10.44 cfs.

The Ranch Camp drainage system will be extended and will outlet into the relocated silt basin. Two additional drain inlets at Station 15+77 on the new roadway will be added to the system prior to its outlet.

The Alanui Ka`imi`ike Road Drainage system is proposed to be upgraded and extended into the new roadway. Five new inlets are proposed to be added to accommodate required runoff on the new roadway. A new manhole (SDMH-2 in Figure 3) will be added to connect the new system into the existing system. After the new manhole in the existing system, line sizes will need to be increase to accommodate the additional flows within the system.

6. References

1. State of Hawaii, Department of Transportation. Design Criteria for Highway Drainage. December 5, 1985.

2. County of Maui, Department of Public Works and Waste Management. Rules for the Design of Storm Drainage Facilities in the County of Maui. November 12, 1995.

3. State of Hawaii, Department of Transportation. Statewide Uniform Design Manual for Streets and Highways. October 1980.

4. Wilson Okamoto & Associates. Drainage Master Plan for Kaunakakai, Molokai, Hawaii. August 1992.

APPENDIX A

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

APPENDIX A

HYDROLOGIC AND HYDRAULIC

COMPUTATIONS

SUMMARY TABLES

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

SUMMARY OF PEAK FLOWS BY DRAINAGE AREAS

Computation of Drainage Runoff by Rational Method

EXISTING DRAINAGE CONDITION

Drainage Area	Q10 Peak (cfs)	Q50 Peak (cfs)
Exisitng Open Drainage Area Mauka of Highway. (Area 14 in WOA Drainage Report, Figure 9)	23.434	29.124
Drainage Area for Residential Drainage System that outlets into the exisitng Silt Basin (Area 21 in WOA Drainage Report, Figure 9)	53.724 ** -	69.696 46.464

** - Peak Flow at the Exisitng 10' x 3' Concrete Box Culvert

PROPOSED DRAINAGE IMPROVEMENTS

Drainage Area	Q10 Peak (cfs)	Q50 Peak (cfs)
Open Drainage Area Mauka of Highway	14.227	17.439
Molokai Education Center Building Runoff Area (ECB-1)	4.797	5.898
Area ECB-1A	3.933	4.831
Area DI-4	0.504	0.640
Area DI-6	2.442	3.000
Area DI-6A	0.495	0.627
Area DI-7	2.383	2.947
Area DI-8	1.711	2.138
Area DI-9	0.333	0.423
Area DI-9A	8.735 ** -	10.919 7.522

** - Peak Flow at the Exisitng 10' x 3' Concrete Box Culvert

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

SUMMARY OF RUNOFF FROM THE PROJECT AREA
INTO THE 10' X 3' CONCRETE BOX CULVERT

EXISITNG CONDITION PEAK FLOW FROM PROJECT AREA INTO EXISTING 10' X 3' CONCRETE BOX CULVERT (Q50)

Drainage Area for Residential Drainage System that outlets into the exisitng Silt Basin (Area 21 in WOA Drainage Report, Figure 9)	46.464 cfs
Existing Open Area Mauka of Highway (Area 14 in WOA Drainage Report, Figure 9)	29.124 cfs
Total Exisitng Peak Flow from the project area at the 10' x 3' Concrete Box Culvert	**75.588 cfs**

PEAK FLOW FROM PROJECT AREA INTO EXISITNG 10' X 3' CONCRETE BOX CULVERT AFTER CONSTRUCTION OF THE ROADWAY (Q50)

Open Area Mauka of Highway	17.439 cfs
Area ECB-1A	4.831 cfs
Area DI-4	0.640 cfs
Area DI-6	3.000 cfs
Area DI-6A	0.627 cfs
Area DI-7	2.947 cfs
Area DI-8	2.138 cfs
Area DI-9	0.423 cfs
Area DI-9A	7.522 cfs
Drainage Area for Residential Drainage System that outlets into the exisitng Silt Basin (Area 21 in WOA Drainage Report, Figure 9)	46.464 cfs
Total Peak Flow from the project area into the 10' x 3' Concrete Box Culvert after construction of the Roadway (Q50)	**86.031 cfs**
Increase in Peak Flow After Roadway Constructed	**10.444 cfs**

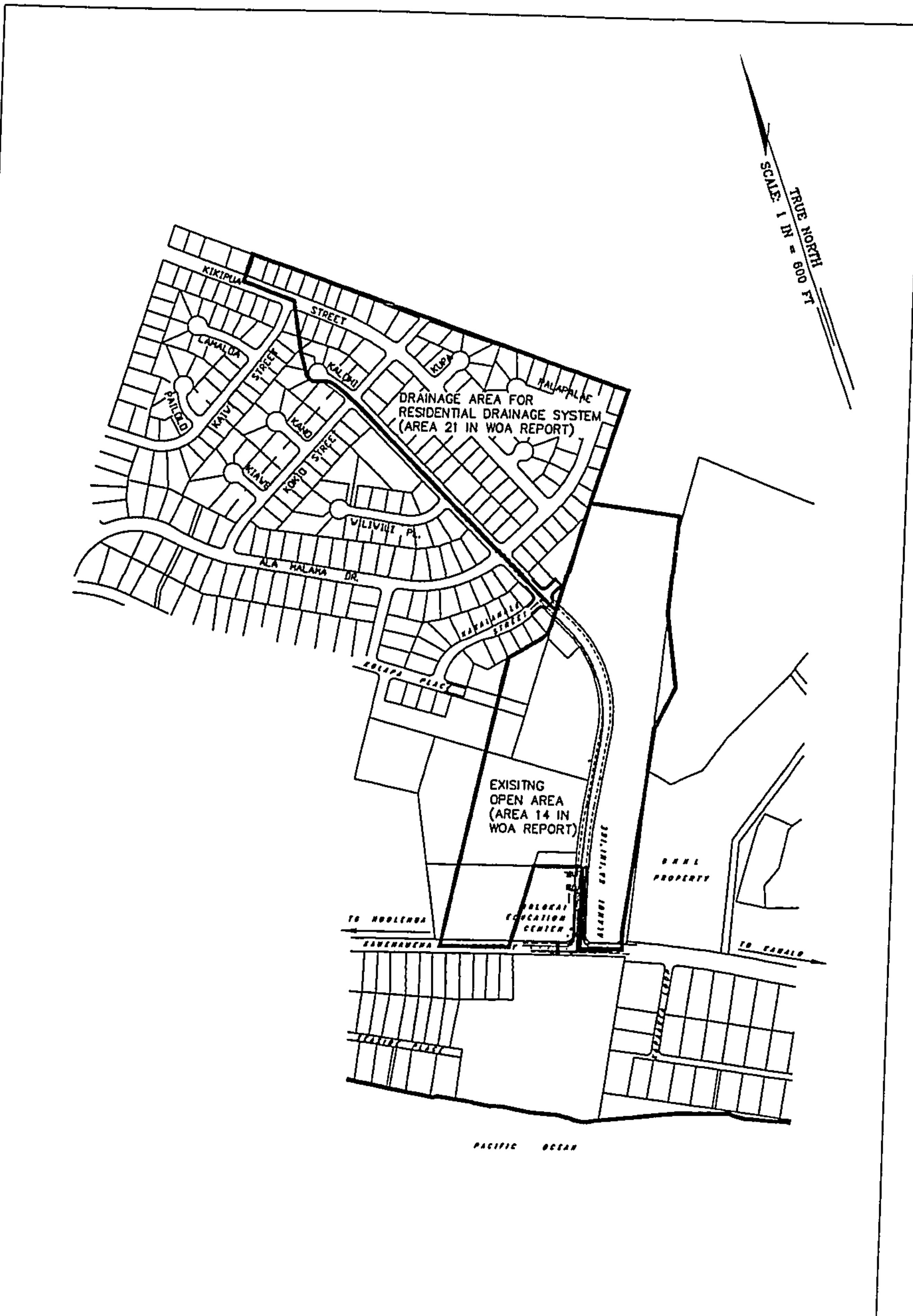
In order to keep existing peak flow at the exisiting Concrete Box Culvert, 10.444 cfs must be detained on site and released after peak flows dicipate.

APPENDIX A-1

EXISTING DRAINAGE CONDITIONS

EXISTING DRAINAGE CONDITIONS

EXISTING RUNOFF MAP



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APPENDIX FIGURE A-1
ALANUI KA'IMI'IKE ROADWAY EXTENSION
EXISITNG RUNOFF MAP

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EXISTING DRAINAGE CONDITIONS

PEAK FLOW COMPUTATIONS

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Exisitng Open Drainage Area Mauka of Highway.
(Area 14 in WOA Drainage Report, Figure 9)

Q10=CiA, Where:

Area (A) =	27.553 Acres
Runoff Coefficient (C) =	0.35
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	42 minutes
Rainfall Intensity From Plate 2	2.43

Q10 = (C)(i)(A)

Q10 = 23.434 cfs

Q50=CiA, Where:

Area (A) =	27.553 Acres
Runoff Coefficient (C) =	0.35
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	42 minutes
Correction Factor (Cf) =	3.02

Q50 = (C)(i)(A)

Q50 = 29.124 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for Residential Drainage System that outlets into the exisitng Silt Basin (Area 21 in WOA Drainage Report, Figure 9)

Q10=CiA, Where:

Area (A) =	24.2 Acres
Runoff Coefficient (C) =	0.6
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	12 minutes
Rainfall Intensity From Plate 2	3.7

Q10 = (C)(i)(A)

Q10 = 53.724 cfs

Q50=CiA, Where:

Area (A) =	24.2 Acres
Runoff Coefficient (C) =	0.6
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	12 minutes
Rainfall Intensity From Plate 2	4.8

Q50 = (C)(i)(A)

Q50 = 69.696 cfs

Peak Flow at the Exisitng 10' x 3' Concrete Box Culvert from the drainage area routed through the silt basin and open area

Q50=CiA, Where:

Area (A) =	24.2 Acres
Runoff Coefficient (C) =	0.6
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	36 minutes
Rainfall Intensity From Plate 2	3.2

Q50 = (C)(i)(A)

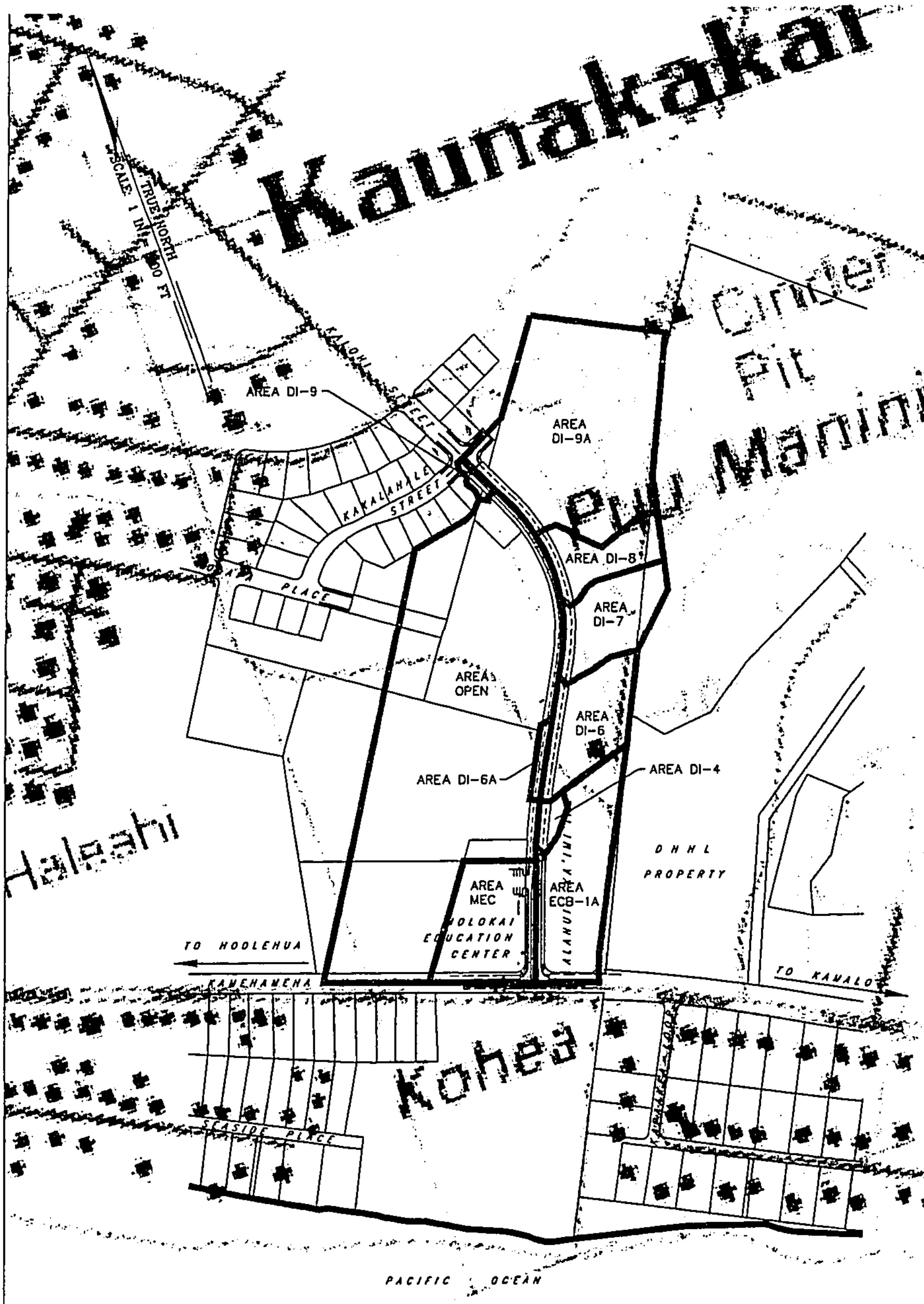
Q50 = 46.464 cfs

APPENDIX A-2

PROPOSED DRAINAGE IMPROVEMENTS

PROPOSED DRAINAGE IMPROVEMENTS

PROPOSED RUNOFF MAP



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ENGINEERING DIVISION

APPENDIX FIGURE A–2
ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED RUNOFF MAP

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Civil, Environmental & Structural Engineers

PROPOSED DRAINAGE IMPROVEMENTS

PEAK FLOW COMPUTATIONS

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Open Drainage Area Mauka of Highway.

Q10=CiA, Where:

Area (A) =	13.112 Acres
Runoff Coefficient (C) =	0.35
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	24 minutes
Rainfall Intensity From Plate 2	3.1

Q10 = (C)(i)(A)

Q10 = 14.227 cfs

Q50=CiA, Where:

Area (A) =	13.112 Acres
Runoff Coefficient (C) =	0.35
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	3.8

Q50 = (C)(i)(A)

Q50 = 17.439 cfs

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Molokai Education Center Building Runoff Area
Exisitng Catch Basin 1 (ECB-1)

Q10=CiA, Where:

Area (A) =	2.247 Acres
Runoff Coefficient (C) =	0.7
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	25 minutes
Rainfall Intensity From Plate 2	3.05

Q10 = (C)(i)(A)

Q10 = 4.797 cfs

Q50=CiA, Where:

Area (A) =	2.247 Acres
Runoff Coefficient (C) =	0.7
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	25 minutes
Rainfall Intensity From Plate 2	3.75

Q50 = (C)(i)(A)

Q50 = 5.898 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for the Exisitng Eastern Catch Basin
at Alanui Ka`imi`ike & Kamehameha Highway V Intersection
Exisitng Catch Basain 1A (ECB-1A)

Q10=CiA, Where:

Area (A) =	2.809 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	18 minutes
Rainfall Intensity From Plate 2	3.5

Q10 = (C)(i)(A)

Q10 = 3.933 cfs

Q50=CiA, Where:

Area (A) =	2.809 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	18 minutes
Rainfall Intensity From Plate 2	4.3

Q50 = (C)(i)(A)

Q50 = 4.831 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-4

Q10=CiA, Where:

Area (A) =	0.246 Acres
Runoff Coefficient (C) =	0.5
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	4.1

Q10 = (C)(i)(A)

Q10 = 0.504 cfs

Q50=CiA, Where:

Area (A) =	0.246 Acres
Runoff Coefficient (C) =	0.5
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	5.2

Q50 = (C)(i)(A)

Q50 = 0.640 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-6

Q10=CiA, Where:

Area (A) =	1.744 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	18.5 minutes
Rainfall Intensity From Plate 2	3.5

Q10 = (C)(i)(A)

Q10 = 2.442 cfs

Q50=CiA, Where:

Area (A) =	1.744 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	18.5 minutes
Rainfall Intensity From Plate 2	4.3

Q50 = (C)(i)(A)

Q50 = 3.000 cfs

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-6A

Q10=CiA, Where:

Area (A) =	0.163 Acres
Runoff Coefficient (C) =	0.74
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	4.1

Q10 = (C)(i)(A)

Q10 = 0.495 cfs

Q50=CiA, Where:

Area (A) =	0.163 Acres
Runoff Coefficient (C) =	0.74
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	5.2

Q50 = (C)(i)(A)

Q50 = 0.627 cfs

01-11-K

Project: Alanui Ka'imi'ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-7

Q10=CiA, Where:

Area (A) =	1.608 Acres
Runoff Coefficient (C) =	0.39
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	12 minutes
Rainfall Intensity From Plate 2	3.8

Q10 = (C)(i)(A)

Q10 = 2.383 cfs

Q50=CiA, Where:

Area (A) =	1.608 Acres
Runoff Coefficient (C) =	0.39
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	12 minutes
Rainfall Intensity From Plate 2	4.7

Q50 = (C)(i)(A)

Q50 = 2.947 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-8

Q10=CiA, Where:

Area (A) =	1.188 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	14.5 minutes
Rainfall Intensity From Plate 2	3.6

Q10 = (C)(i)(A)

Q10 = 1.711 cfs

Q50=CiA, Where:

Area (A) =	1.188 Acres
Runoff Coefficient (C) =	0.4
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	14.5 minutes
Rainfall Intensity From Plate 2	4.5

Q50 = (C)(i)(A)

Q50 = 2.138 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-9

Q10=CiA, Where:

Area (A) =	0.125 Acres
Runoff Coefficient (C) =	0.65
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	4.1

Q10 = (C)(i)(A)

Q10 = 0.333 cfs

Q50=CiA, Where:

Area (A) =	0.125 Acres
Runoff Coefficient (C) =	0.65
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	10 minutes
Rainfall Intensity From Plate 2	5.2

Q50 = (C)(i)(A)

Q50 = 0.423 cfs

01-11-K

Project: Alanui Ka`imi`ike Roadway Extension

Computation of Drainage Runoff by Rational Method

Drainage Area for DI-9A

Q10=CiA, Where:

Area (A) =	6.558 Acres
Runoff Coefficient (C) =	0.37
Intensity of 1-hr (I10) = Tm = 10 Years	2 inches
Time of Concentration (Tc) =	15 minutes
Rainfall Intensity From Plate 2	3.6

Q10 = (C)(i)(A)

Q10 = 8.735 cfs

Q50=CiA, Where:

Area (A) =	6.558 Acres
Runoff Coefficient (C) =	0.37
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	15 minutes
Rainfall Intensity From Plate 2	4.5

Q50 = (C)(i)(A)

Q50 = 10.919 cfs

Peak Flow at the Exisitng 10' x 3' Concrete Box Culvert from the drainage area routed through the silt basin and open area

Q50=CiA, Where:

Area (A) =	6.558 Acres
Runoff Coefficient (C) =	0.37
Intensity of 1-hr (I50) = Tm = 50 Years	2.5 inches
Time of Concentration (Tc) =	39 minutes
Rainfall Intensity From Plate 2	3.1

Q50 = (C)(i)(A)

Q50 = 7.522 cfs

PROPOSED DRAINAGE IMPROVEMENTS

SWALE SECTION ANALYSIS

AND

INLET CAPACITY ANALYSIS

DI-4

Swale Section for Inlet DI-4
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	0.50	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	-0.52	ft
Elevation Range	-0.74 to 0.17	
Flow Area	0.5	ft²
Wetted Perimeter	4.90	ft
Top Width	4.88	ft
Actual Depth	0.22	ft
Critical Elevation	-0.57	ft
Critical Slope	0.041238	ft/ft
Velocity	0.96	ft/s
Velocity Head	0.01	ft
Specific Energy	-0.51	ft
Froude Number	0.51	
Flow Type	Subcritical	

< -0.24 NO ENCROACH INTO TRAVELWAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-4
Worksheet for Ditch Inlet On Grade

Project Description	
Worksheet	Ditch Inlet - 4
Type	Ditch Inlet On Grade
Solve For	Efficiency

Input Data		
Mannings Coefficient	0.035	
Slope	0.060000	ft/ft
Left Side Slope	16.00	H : V
Right Side Slope	6.59	H : V
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	3.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.0	%
Discharge	0.50	cfs

USE GRATED DROP INLET 61614 - O.K.

Options	
Grate Flow Option	Exclude None

Results		
Efficiency	0.90	> 70% O.K.
Intercepted Flow	0.46	cfs
Bypass Flow	0.05	cfs
Flow Area	0.3	ft²
Wetted Perimeter	5.54	ft
Top Width	5.53	ft
Velocity	1.56	ft/s
Splash Over Velocity	6.99	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.40	
Grate Flow Ratio	0.84	
Active Grate Length	1.50	ft
Critical Depth	0.07	ft
Critical Slope	0.045018	ft/ft
Froude Number	1.14	
Flow Type	Supercritical	
Specific Energy	0.11	ft
Velocity Head	0.04	ft
Depth	0.07	ft

DI-6

Swale Section for Inlet DI-6
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	2.54	cfs

→ 3/4 of Q_{10} for DI-6 + 0.71 (BYPASS FROM DI-7)

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.033	
Water Surface Elevation	-0.34	ft
Elevation Range	-0.74 to 0.17	
Flow Area	1.7	ft²
Wetted Perimeter	9.51	ft
Top Width	9.47	ft
Actual Depth	0.39	ft
Critical Elevation	-0.42	ft
Critical Slope	0.029603	ft/ft
Velocity	1.45	ft/s
Velocity Head	0.03	ft
Specific Energy	-0.31	ft
Froude Number	0.60	
Flow Type	Subcritical	

< -0.24 NO ENCROACH INTO TRAVELWAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-6
Worksheet for Ditch Inlet In Sag

Project Description	
Worksheet	Ditch Inlet -6
Type	Ditch Inlet In Sag
Solve For	Spread

Input Data		
Discharge	3.15	cfs
Left Side Slope	16.00	H : V
Right Side Slope	6.59	H : V
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	3.00	ft
Local Depression	4.0	in
Local Depression Width	0.08	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.0	%

USE GRATED DROP
INLET 61614 - O.K.

Results		
Spread	0.08	ft
Depth	-0.11	ft
Wetted Perimeter	2,358,902.58	ft
Top Width	2,347,817.21	ft
Open Grate Area	5.4	ft²
Active Grate Weir Length	10.00	ft

DI-6A

Swale Section for Inlet DI-6A
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-6A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	0.37	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	-0.54	ft
Elevation Range	-0.74 to 0.17	
Flow Area	0.4	ft²
Wetted Perimeter	4.36	ft
Top Width	4.34	ft
Actual Depth	0.19	ft
Critical Elevation	-0.59	ft
Critical Slope	0.042973	ft/ft
Velocity	0.89	ft/s
Velocity Head	0.01	ft
Specific Energy	-0.53	ft
Froude Number	0.50	
Flow Type	Subcritical	

< -0.24 NO ENCROACH INTO TRAVELWAY

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-6A
Worksheet for Ditch Inlet In Sag

Project Description	
Worksheet	Ditch Inlet -6A
Type	Ditch Inlet In Sag
Solve For	Spread

Input Data		
Discharge	0.50	cfs
Left Side Slope	16.00	H : V
Right Side Slope	6.59	H : V
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	3.00	ft
Local Depression	4.0	in
Local Depression Width	0.08	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.0	%

USE GRATED DROP
INLET 61614 - O.K.

Results		
Spread	0.08	ft
Depth	-0.27	ft
Wetted Perimeter	6.41	ft
Top Width	6.40	ft
Open Grate Area	5.4	ft^2
Active Grate Weir Length	10.00	ft

DI-7

Swale Section for Inlet DI-7
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-7
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.067500	ft/ft
Discharge	2.74	cfs

→ 2.38 + 0.36 (BYPASS FROM DI-8)

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	-0.45	ft
Elevation Range	-0.74 to 0.17	
Flow Area	0.9	ft²
Wetted Perimeter	6.46	ft
Top Width	6.43	ft
Actual Depth	0.28	ft
Critical Elevation	-0.41	ft
Critical Slope	0.032905	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	-0.31	ft
Froude Number	1.40	
Flow Type	Supercritical	

< -0.24 NO ENCROACH INTO TRAVELWAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-7
Worksheet for Ditch Inlet On Grade

Project Description	
Worksheet	Ditch Inlet - 7
Type	Ditch Inlet On Grade
Solve For	Efficiency

Input Data	
Mannings Coefficient	0.035
Slope	0.060000 ft/ft
Left Side Slope	16.00 H : V
Right Side Slope	6.59 H : V
Bottom Width	4.00 ft
Grate Width	4.00 ft
Grate Length	3.00 ft
Grate Type	P-50 mm (P-1-7/8")
Clogging	50.0 %
Discharge	2.74 cfs

USE GRATED DROP INLET 61614 - O.K.

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	0.74 > 70%
Intercepted Flow	2.03 cfs
Bypass Flow	0.71 cfs
Flow Area	1.0 ft²
Wetted Perimeter	7.92 ft
Top Width	7.90 ft
Velocity	2.67 ft/s
Splash Over Velocity	6.99 ft/s
Frontal Flow Factor	1.00
Side Flow Factor	0.20
Grate Flow Ratio	0.67
Active Grate Length	1.50 ft
Critical Depth	0.20 ft
Critical Slope	0.033905 ft/ft
Froude Number	1.30
Flow Type	Supercritical
Specific Energy	0.28 ft
Velocity Head	0.11 ft
Depth	0.17 ft

O.K. ∴ (1-0.74)(2.74)
BYPASS = 0.71 cfs
TO DI-6

DI-8

Swale Section for Inlet DI-8
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.060000	ft/ft
Discharge	1.71	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	-0.49	ft
Elevation Range	-0.74 to 0.17	
Flow Area	0.7	ft^2
Wetted Perimeter	5.54	ft
Top Width	5.51	ft
Actual Depth	0.24	ft
Critical Elevation	-0.47	ft
Critical Slope	0.035035	ft/ft
Velocity	2.55	ft/s
Velocity Head	0.10	ft
Specific Energy	-0.39	ft
Froude Number	1.29	
Flow Type	Supercritical	

< -0.24

NO ENCROACH INTO TRAVEL WAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-8

Worksheet for Ditch Inlet On Grade

Project Description	
Worksheet	Ditch Inlet - 1
Type	Ditch Inlet On Grade
Solve For	Efficiency

Input Data	
Mannings Coefficient	0.035
Slope	0.060000 ft/ft
Left Side Slope	16.00 H : V
Right Side Slope	6.59 H : V
Bottom Width	4.00 ft
Grate Width	4.00 ft
Grate Length	3.00 ft
Grate Type	P-50 mm (P-1-7/8")
Clogging	50.0 %
Discharge	1.71 cfs

USE GRATED DROP INLET 61614 - O.K.

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	0.79
Intercepted Flow	1.36 cfs
Bypass Flow	0.35 cfs
Flow Area	0.7 ft²
Wetted Perimeter	7.04 ft
Top Width	7.03 ft
Velocity	2.31 ft/s
Splash Over Velocity	6.99 ft/s
Frontal Flow Factor	1.00
Side Flow Factor	0.25
Grate Flow Ratio	0.73
Active Grate Length	1.50 ft
Critical Depth	0.15 ft
Critical Slope	0.036524 ft/ft
Froude Number	1.26
Flow Type	Supercritical
Specific Energy	0.22 ft
Velocity Head	0.08 ft
Depth	0.13 ft

> 70% O.K. : (1 - 0.79)(1.71)

Bypass = 0.36 cfs

TO DI - 7

DI-9

Swale Section for Inlet DI-9
Worksheet for Irregular Channel

Project Description	
Worksheet	Copy of Swale into DI-9
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	0.33	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	-0.55	ft
Elevation Range	-0.74 to 0.17	
Flow Area	0.4	ft^2
Wetted Perimeter	4.20	ft
Top Width	4.18	ft
Actual Depth	0.18	ft
Critical Elevation	-0.59	ft
Critical Slope	0.043581	ft/ft
Velocity	0.86	ft/s
Velocity Head	0.01	ft
Specific Energy	-0.54	ft
Froude Number	0.50	
Flow Type	Subcritical	

< -0.24

NO ENCROACH INTO TRAVELWAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-9
Worksheet for Ditch Inlet In Sag

Project Description	
Worksheet	Ditch Inlet - 9
Type	Ditch Inlet In Sag
Solve For	Spread

Input Data		
Discharge	0.33	cfs
Left Side Slope	16.00	H : V
Right Side Slope	6.59	H : V
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	3.00	ft
Local Depression	4.0	in
Local Depression Width	0.08	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.0	%

USE GRATED DROP
INLET 61614 -O.K.

Results		
Spread	0.08	ft
Depth	-0.28	ft
Wetted Perimeter	6.41	ft
Top Width	6.40	ft
Open Grate Area	5.4	ft^2
Active Grate Weir Length	10.00	ft

DI-9A

Swale Section for Inlet DI-9A
Worksheet for Irregular Channel

Project Description	
Worksheet	Swale into DI-9A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	4.37	cfs

– 1/2 of Q_{10} for DI-9A

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.029	
Water Surface Elevation	-0.27	ft
Elevation Range	-0.74 to 0.17	
Flow Area	2.6	ft²
Wetted Perimeter	13.60	ft
Top Width	13.56	ft
Actual Depth	0.46	ft
Critical Elevation	-0.34	ft
Critical Slope	0.021570	ft/ft
Velocity	1.69	ft/s
Velocity Head	0.04	ft
Specific Energy	-0.23	ft
Froude Number	0.68	
Flow Type	Subcritical	

< -0.24 NO ENCROACH INTO TRAVEL WAY

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+18	0.015
0+18	0+30	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	0.00
0+18	-0.36
0+24	-0.74
0+30	0.17

DI-9A
Worksheet for Ditch Inlet In Sag

Project Description	
Worksheet	Ditch Inlet - 1
Type	Ditch Inlet In Sag
Solve For	Spread

Input Data		
Discharge	8.74	cfs
Left Side Slope	16.00	H : V
Right Side Slope	6.59	H : V
Bottom Width	4.00	ft
Grate Width	4.00	ft
Grate Length	3.00	ft
Local Depression	4.0	in
Local Depression Width	0.08	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.0	%

USE GRATED DROP INLET 61614 - O.K.

Results		
Spread	6.40	ft
Depth	0.11	ft
Wetted Perimeter	6.41	ft
Top Width	6.40	ft
Open Grate Area	5.4	ft²
Active Grate Weir Length	10.00	ft

2002-08-08-MO-FEA-

Final Environmental Assessment

ALANUI KA `IMI `IKE Road EXTENSION
STP-0900(63)

Prepared for:

The Accepting Authority - County of Maui, Department of Public Works and Waste Management

July 2002

MUNEKIYO & HIRAGA, INC.

Final
Environmental Assessment

ALANUI KA `IMI `IKE
EXTENSION
STP-0900(63)

Prepared for:

July 2002

The Accepting Authority - County
of Maui, Department of Public
Works and Waste Management

MUNEKIYO & HIRAGA, INC.

Alanui Ka 'Imi 'Ike Extension
County Department of Public Works and Waste Management
Job No. 01-07
Maui County, Hawaii

Environmental Assessment

Submitted Pursuant to the National
Environmental Policy Act (NEPA),
42 U.S.C. 4332(2)(c), 49 U.S.C. 303 and
Chapter 343, Hawaii Revised Statutes (HRS)

U.S. Department of Transportation
Federal Highway Administration
and
County of Maui Department of Public Works
and Waste Management

3-14-02
Date of Approval

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

3-19-02
Date of Approval

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The subject of this Environmental Assessment is the proposed construction of a new roadway in Kaunakakai, Molokai. The proposed roadway would extend approximately 1,300 lineal feet and link the Kamehameha V Highway at the eastern edge of the Molokai Education Center with Kalohi Street in the Ranch Camp residential subdivision. Project plans call for the construction of two (2) 12-foot wide travel lanes, 6-foot paved shoulders, and 12-foot grassed shoulder areas. Roadway construction will consist of 2.5 inches of asphaltic concrete pavement constructed at a two (2) percent grade laid over five (5) inches of asphalt treated base course, eight (8) inches of aggregate subbase course, and compacted subgrade.

Currently, the Ranch Camp Subdivision has only one (1) entrance access via Ala Malama

Avenue, which travels through the central portion of Kaunakakai Town. The proposed roadway project would establish an eastern link between the Ranch Camp residential subdivision and Kamehameha V Highway, thereby improving the traffic circulation in the Kaunakakai area. In addition, the route will provide residents of Kapaakea Loop with an emergency evacuation route to higher elevations should a flood or tsunami occur.

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Preface

The County of Maui, Department of Public Works and Waste Management proposes the construction of a roadway to link the eastern limits of Ranch Camp residential subdivision with the Kamehameha V Highway, in the vicinity of the Molokai Education Center. The project will utilize both County and Federal funding (STP-0900(63)). Pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 200 of Title 11, Hawaii Administrative Rules, Environmental Impact Statement Rules, as well as 23 CFR 771, U.S. Department of Transportation, Federal Highway Administration, Environmental Impact and Related Procedures, the following Environmental Assessment (EA) documents the project's technical characteristics and environmental impacts, and advances findings and conclusions relative to the project.

Summary

Proposing Agency and Landowner

The proposing agency for the Alanui Ka 'Imi 'Ike Extension is the County of Maui, Department of Public Works and Waste Management (DPWWM). The lands designated for roadway construction are identified by TMKs 5-3-3:15 (por.) and 5-3-11:38 (por.). TMK 5-3-3:15 is owned by Molokai Ranch, Ltd. while TMK 5-3-11:38 is owned by Cooke Land Company. A Department of Water Supply 12-inch waterline lies within the proposed right-of-way for the roadway. Both Molokai Ranch, Ltd. and Cooke Land Company will dedicate the right-of-way for the proposed roadway alignment to the County of Maui.

Property Location and Description

The proposed roadway will link the Kamehameha V Highway at the Molokai Education Center with the eastern portion of the Ranch Camp residential subdivision. The roadway will be approximately 1,300 feet in length. The northern extent of the roadway will traverse vacant lands, while the majority of the roadway in the southern direction will traverse lands currently utilized in the cultivation of seed corn for research purposes.

Proposed Action

The proposed roadway typical section will consist of 12-foot travel lanes, 6-foot paved shoulders and 12-foot grassed shoulders. Proposed drainage improvements will generally maintain existing runoff patterns. In the vicinity of the Ranch Camp subdivision, an existing silt basin located at the end of Kalohi Street is proposed to be relocated south of the extended roadway. Runoff north of the roadway will be piped across the road and dispersed on the south side of the roadway to prevent build up of large concentrated flows. In the vicinity of the Molokai Education Center, connection to and use of the existing drainage system is planned for the lower areas of the roadway.

Determination

On a short-term basis, construction-related employment is anticipated to have a positive effect on the local economy. The proposed project will improve vehicular traffic circulation in the Kaunakakai area and provide seaside residents with an alternative emergency evacuation route.

No adverse drainage or other infrastructural impacts are anticipated as a result of the project implementation. In addition, the proposed project is not expected to have adverse impacts upon sensitive environments, as well as public services and facilities.

Chapter I

Project Overview

I. PROJECT OVERVIEW

A. PROJECT LOCATION, USE AND OWNERSHIP

The County of Maui, Department of Public Works and Waste Management (DPWWM) proposes the construction of a new roadway in Kaunakakai, Molokai, connecting Kamehameha V Highway (in the vicinity of the Molokai Education Center) and Ranch Camp. See Figure 1 and Figure 2. The proposed roadway will traverse lands identified as TMK 5-3-3:15(por.) and 5-3-11:38(por.). TMK 5-3-3:15 is owned by Molokai Ranch, Ltd., while TMK 5-3-11:38 is owned by Cooke Land Company.

For the most part, the proposed roadway corridor is used for seed corn cultivation. A Department of Water Supply 12-inch waterline lies within the proposed right-of-way for the roadway. Both Molokai Ranch, Ltd. and Cooke Land Company will dedicate the right-of-way for the proposed alignment shown in Figures 1 and 2.

B. PROPOSED ACTION

Project plans call for the construction of two (2) 12-foot wide travel lanes, 6-foot paved shoulders, and 12-foot grassed shoulder areas. See Figure 3. The roadway construction will consist of 2.5 inches of asphaltic concrete pavement constructed at a two (2) percent grade laid over five (5) inches of asphalt treated base course, eight (8) inches of aggregate subbase course, and compacted subgrade. The proposed 6-foot wide paved shoulders will provide ample area to accommodate bicyclists, however, the proposed improvements will not be striped for this specific purpose.

The proposed roadway will extend approximately 1,300 lineal feet, from Kalohi Street to the existing Alanui Ka 'Imi 'Ike roadway located on the eastern edge of the Molokai Education Center. Currently, the Ranch

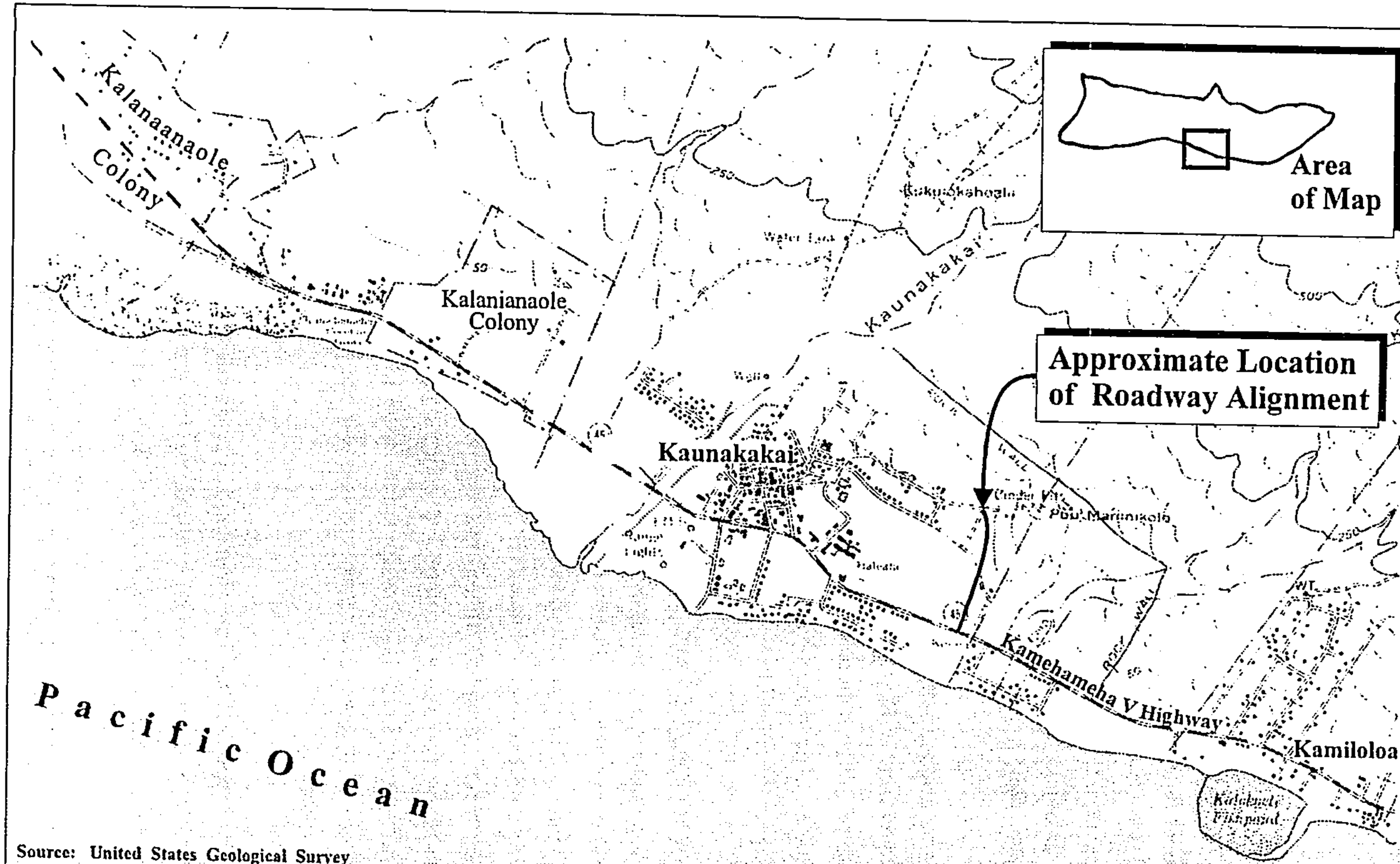


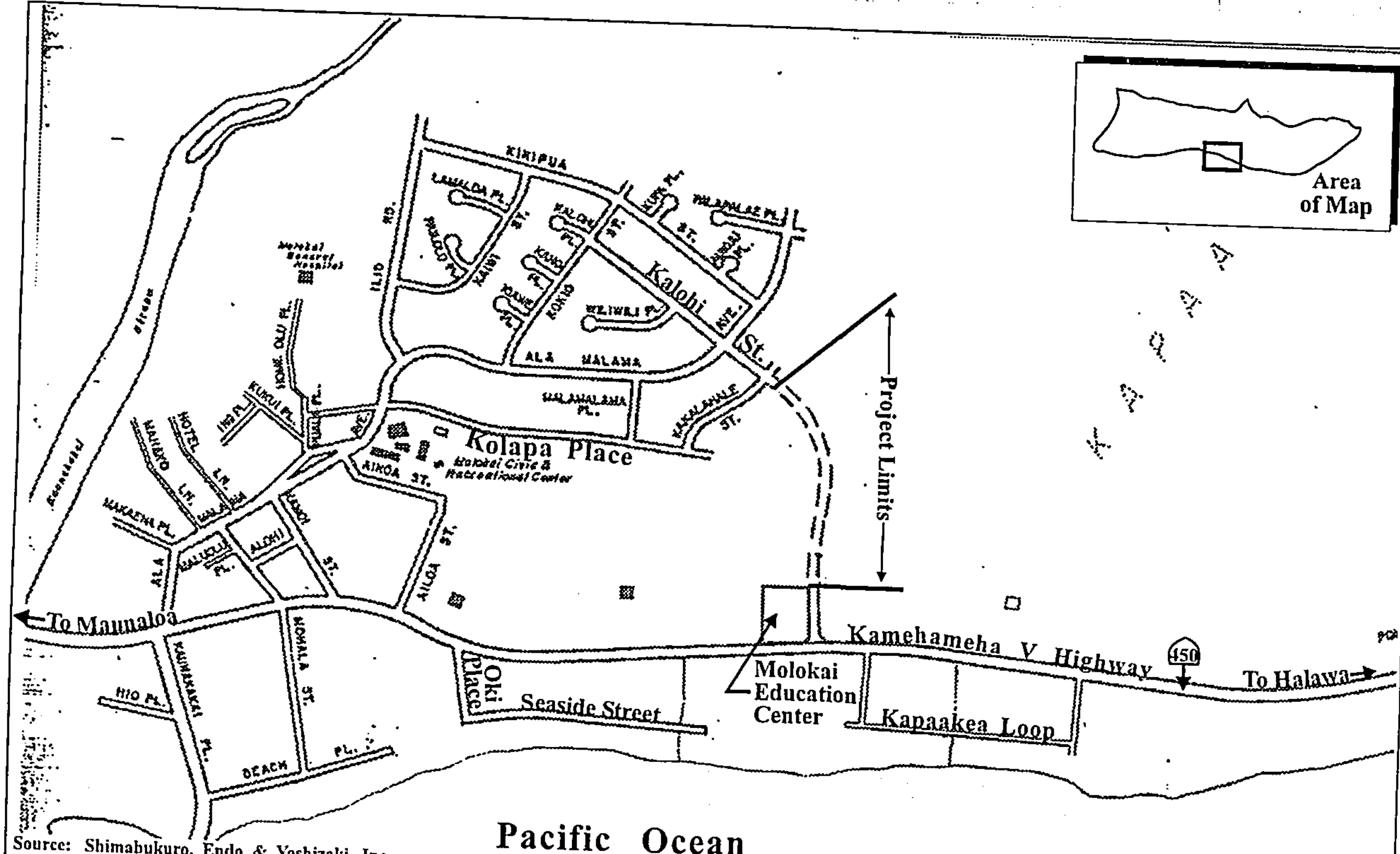
Figure 1

Proposed Alanui Ka `Imi `Ike Extension
Regional Location Map

0 500 1000 2000 Feet

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.



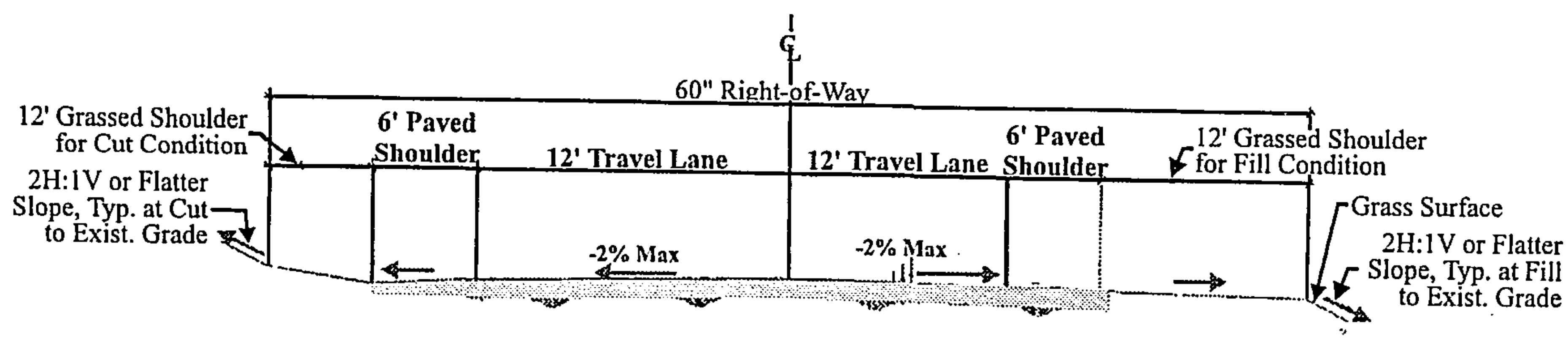
Source: Shimabukuro, Endo & Yoshizaki, Inc.

Figure 2

Proposed Alanui Ka `Imi `Ike Extension
Site Location Map

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.



Source: Shimabukuro, Endo & Yoshizaki, Inc.

Figure 3

Proposed Alanui Ka `Imi `Ike Extension
Typical Roadway Section

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

Camp subdivision has only one entrance access via Ala Malama Avenue, which travels through the central portion of Kaunakakai Town. The proposed roadway project would establish an eastern link between the Ranch Camp residential subdivision and Kamehameha V Highway, thereby improving the traffic circulation in the Kaunakakai area. In addition, area residents have indicated a need to have a readily available vehicular route to higher elevation lands in the event of flooding or tsunami events.

It is noted that alignment alternatives have also been reviewed by the DPWWM. A presentation of the alternatives is contained in Chapter VI of this environmental assessment.

The roadway alignment is located within the Special Management Area (SMA) limits and therefore, will require a SMA Use Permit subject to review and action by the Molokai Planning Commission. Inasmuch as the proposed project will utilize both County and Federal monies to fund the proposed project, an Environmental Assessment has been prepared in accordance with the provisions of Chapter 343, Hawaii Revised Statutes.

Estimated cost of construction is approximately $2.2 million. Assuming all governmental approvals are obtained, construction is anticipated to start in January, 2003, with completion targeted for September, 2003. The proposed project has been placed on the State Transportation Improvement Program (STIP) List for Fiscal Year 2003. The Hawaii State Department of Transportation-Highways Division has classified the road as a Major Collector roadway.

Chapter II

Description of Existing Environment

II. DESCRIPTION OF EXISTING ENVIRONMENT

A. PHYSICAL SETTING

1. Surrounding Land Uses

The proposed roadway is located near the eastern edge of Kaunakakai Town. To the north of the proposed project is the Ranch Camp residential subdivision. East of the subject property, lands are utilized in the cultivation of seed corn for research purposes. The project terminus is located at the existing Alanui Ka 'Imi 'Ike stub out adjacent to the Molokai Education Center. South of the Molokai Education Center is Kamehameha V Highway. Across Kamehameha V Highway, east of its intersection with Alanui Ka 'Imi 'Ike, is a single-family residential area accessed by Kapaakea Loop. To the west of Kamehameha V Highway's intersection with Alanui Ka 'Imi 'Ike is a single-family residential area accessed by Oki Place and Seaside Street. Lands to the west of the subject property are also utilized for seed corn production. Further west of the corn fields are the "Duke" Mailu Regional Park and Kaunakakai Elementary School.

2. Climate

Hawaii's tropical location accounts for uniform weather conditions throughout the year. Climatic conditions on Molokai are characterized by mild and consistent year round temperatures, moderate humidity and steady northeasterly tradewinds. Variations in Molokai's weather are attributed to regional topographic and climatic conditions.

Kaunakakai is situated in the south central portion of the island near sea level. Average annual rainfall is approximately 15 inches near the coast. At the upper reaches of the watershed, rainfall increases to approximately 75 inches per year. The months of October through March are typically the wetter periods of the year, with April to September being typically the drier months. Mean temperatures range from 69 degrees Fahrenheit in January to 76 degrees Fahrenheit in August.

The winds off Kaunakakai are predominantly northeasterly tradewinds. However, as these winds round the eastern tip of the island and veer westerly along the southern coast, they produce easterly prevailing winds.

3. *Topography and Soils*

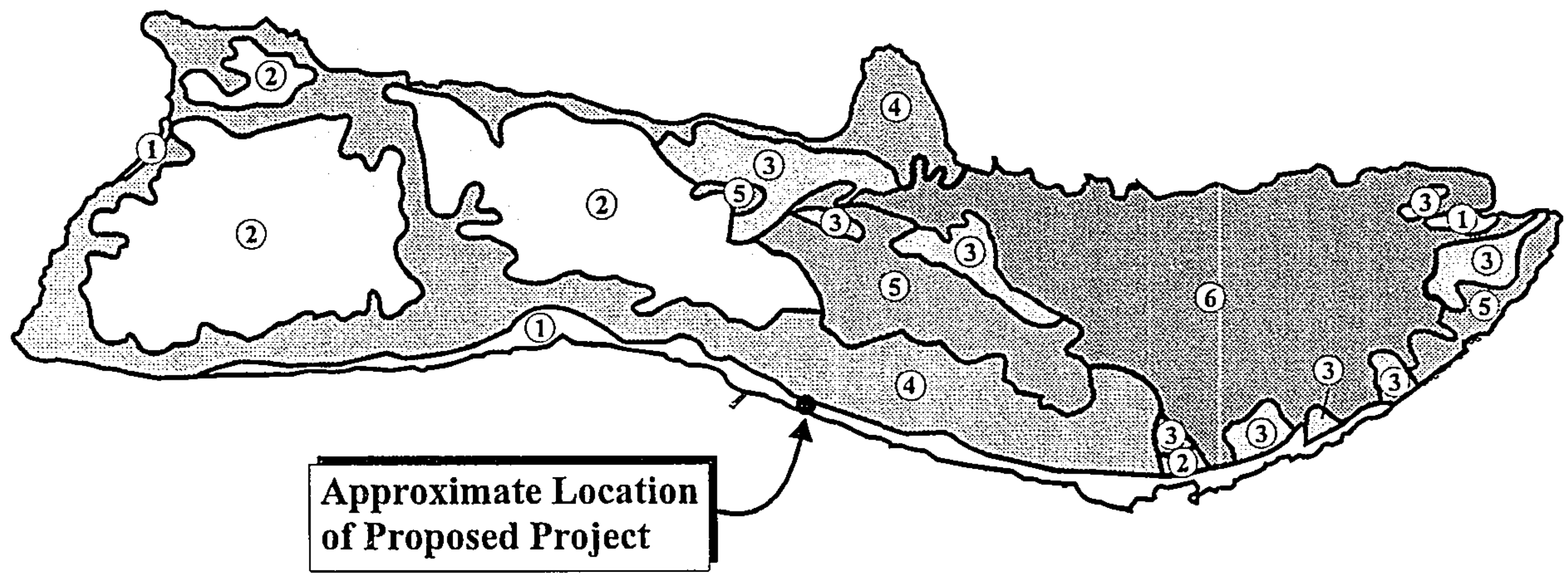
The project site ranges in elevation from approximately 5 feet above mean sea level (amsl) in elevation near the Molokai Education Center, to approximately 50 feet amsl near the Ranch Camp residential area. Topography in the region ranges from a flat coastal plain, to moderately steep slopes, and gulches in the mountains behind Kaunakakai Town.

Underlying the proposed project roadway are soils belonging to the Jaucas-Mala-Pulehu association and the Very stony land-Rock land association. See Figure 4. Soils in the Jaucas-Mala-Pulehu Association are noted for deep, nearly level and gently sloping, excessively drained soils that have a coarse-textured to fine-textured underlying material, common to alluvial fan areas and drainage ways.

Soils in the Very stony land-Rock land association are noted for gently sloping to very steep, rocky, and stony terrain. The soils are common to upland areas and in gulches and valleys.

LEGEND

①	Jaucas-Mala-Pulehu association
②	Molokai-Lahaina association
③	Kahanui-Kalae-Kanepuu association
④	Very stony land-Rock land association
⑤	Rough broken land-Oli association
⑥	Rough moutainous land-Amalu-Olokui association



Source: USDA, Soil Conservation Service

NOT TO SCALE

Figure 4

Proposed Alanui Ka `Imi `Ike Extension
Soil Association Map

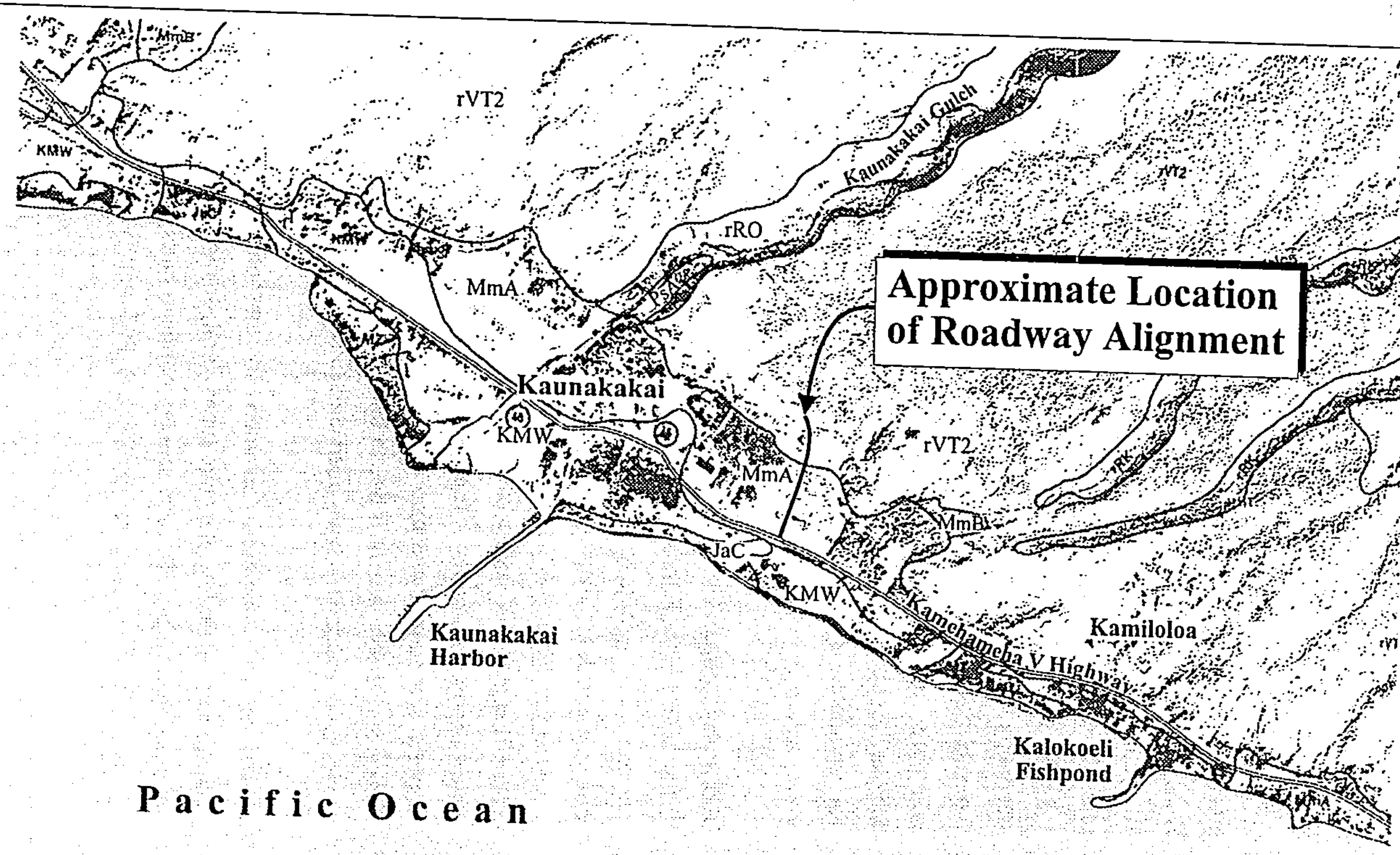
Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

The upper portion of the proposed roadway alignment contains underlying soils from the Very stony land, eroded soil classification (rVT2). See Figure 5. This soil type is severely eroded, and 50 to 70 percent of the surface is typically covered with stones and boulders. In general, the soil is less then 24 inches deep to the bedrock, and slopes are generally 7 to 30 percent.

The lower portion of the proposed roadway alignment contains underlying soils from the Mala silty clay, 0 to 3 percent slope (MmA) classification. This soil type is found on coastal plains, generally 7 inches thick. Permeability is moderate, with slow runoff, while erosion hazard is no more than slight.

The State Department of Agriculture has established three (3) categories of Agricultural Lands of Importance to the State of Hawaii (ALISH). The ALISH system classifies lands into "Prime", "Unique", and "Other Important Agricultural Land". The remaining lands are "Unclassified". Utilizing modern farming methods, "Prime" agricultural lands have the soil quality, growing season, and moisture supply needed to produce sustained crop yields economically, while "Unique" agricultural lands possess a combination of soil quality, location, growing season, and moisture supply currently used to produce sustained high yields of a specific crop. "Other Important Agricultural Land" includes those which have not been rated as "Prime" or "Unique". The short mauka segment of the roadway containing rocky and erosion prone underlying soils near the Ranch Camp subdivision remains "Unclassified". However, the remaining lands proposed for roadway construction contain soil classified as "Prime" for agricultural cultivation.



Source: USDA Soil Conservation Service

Figure 5

Proposed Alanui Ka `Imi `Ike Extension

Soils Classification Map

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

4. *Flood and Tsunami Hazards*

The northern or mauka portion of the roadway alignment is located in Flood Zone C, or areas of minimal flooding. See Figure 6. The makai portion of the roadway, near the Molokai Education Center, is located in Flood Zones A2 and B. Flood Zone A2 is an area of 100 year flood, while Zone B is an area located between the limits of a 100 to 500 year flood.

According to the Civil Defense Disaster Preparedness Information, the subject roadway is located outside the tsunami evacuation boundary, as defined by Kamehameha V Highway, fronting the Molokai Education Center. Streets and roadways mauka of Kamehameha V Highway are considered safe from dangerous wave action.

5. *Flora and Fauna*

In the vicinity of the Ranch Camp subdivision, common landscaping elements are generally cultivated for aesthetic purposes. In addition, residents maintain gardens with fruits and vegetables, generally cultivated for household purposes. Vegetation along the vacant lands in the vicinity of the project area include koa haole, kiawe, ironwood, and hau. The lands along the proposed roadway corridor are currently utilized in the cultivation of seed corn for research. There are no rare, threatened, or endangered plant species or habitats that have been identified within the project area.

Avifauna and mammals common to the project site and surrounding areas include introduced feral animals (deer, goat, mongoose, wild pig). Several species of native birds, of which five (5) are listed as endangered by the U.S. Fish and Wildlife Service

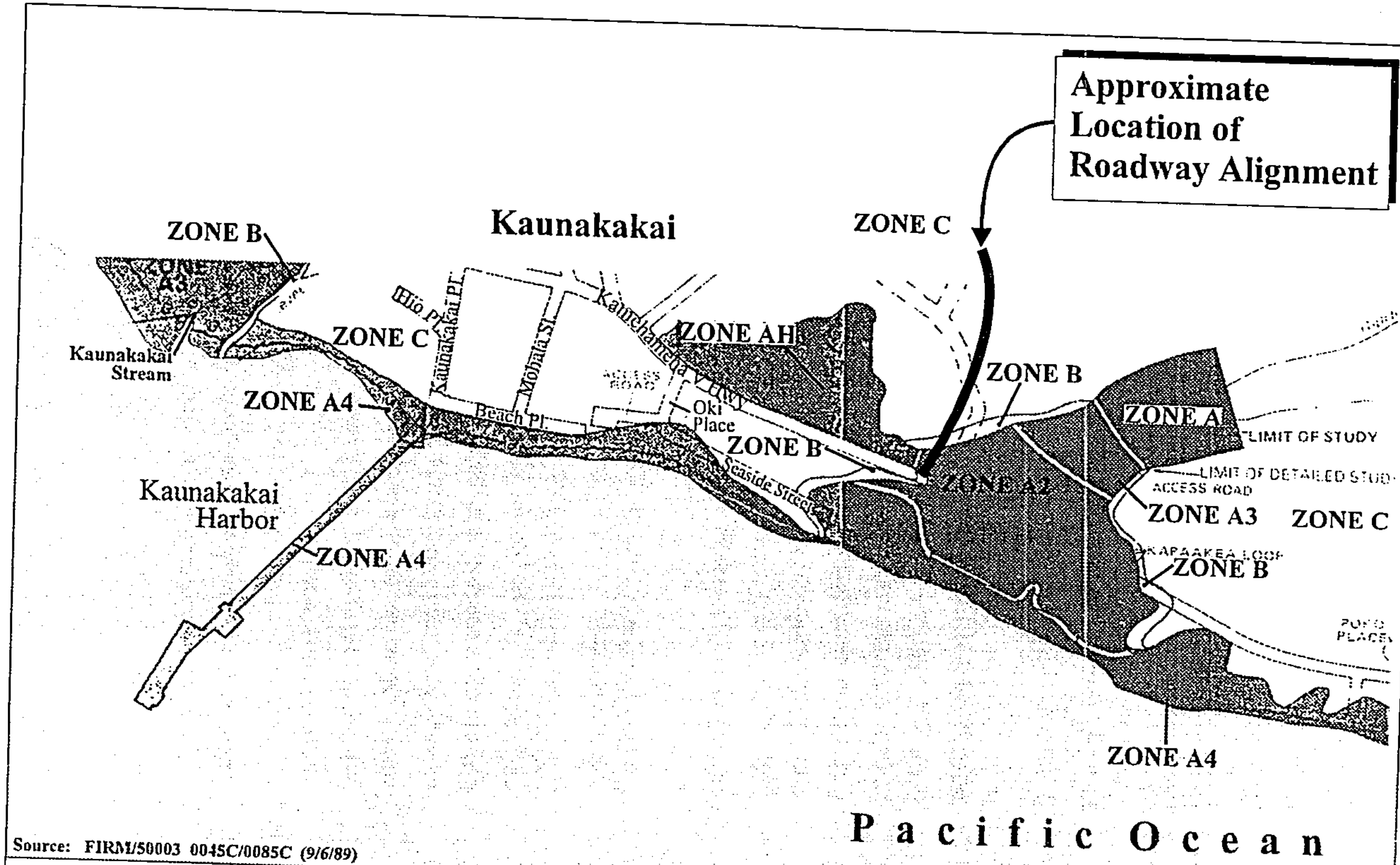


Figure 6

Proposed Alanui Ka `Imi `Ike Extension
Flood Insurance Rate Map

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

and the State of Hawaii may be found in the surrounding region. These species are the Hawaiian Coot, Hawaiian Common Moorhen, Hawaiian Stilt, Molokai Creeper and Molokai Thrush. The coot, moorhen and stilt are waterbirds which generally make their home in fishponds along the south coast of Molokai. The Molokai Creeper and Molokai Thrush are endemic to the island of Molokai. Habitats for these species are commonly found above the 2,000 foot elevation.

6. ***Archaeological Resources***

Along the proposed roadway corridor, extensive ground alteration has occurred as a result of former agricultural use of the land, as well as the construction and installation of the existing 12-inch waterline maintained by the County of Maui, Department of Water Supply. There are no identified surface archaeological features existing along the proposed roadway.

7. ***Air Quality and Noise Characteristics***

The Kaunakakai region is not exposed to adverse air quality conditions. The low level of residential and commercial development in the Kaunakakai area, the lack of major point sources of air pollution, and the prevailing tradewind conditions are factors influencing a high level of air quality in the region. Motor vehicle emissions are the primary source of indirect emissions in the area. However, these mobile sources have no adverse influence on air quality.

There are no significant noise generators in the vicinity of the project. Background noise in this locale can be attributed to traffic in the Kaunakakai area.

8. *Scenic and Open Space Resources*

The project site is located near the eastern boundary of Kaunakakai Town. To the north of the project site is Ranch Camp. Further north, vacant dry grasslands slope gradually higher up to the Puu Olelo area. To the west of the project site are Kaunakakai Town, Kaunakakai Stream, Manila Camp and Kalanianaole Colony. To the south is the Kamehameha V Highway. Further south are vacant lands, residential dwellings abutting Oki Place and Seaside Place, and the Pacific Ocean. To the east lies land in seed corn cultivation, vacant lands and the Kamiloloa residential subdivision. The subject property is not part of a scenic corridor.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Population*

The resident population of the island of Molokai (excluding Kalawao), as determined by the 1990 Census, was 6,587. In the year 2000, the resident population was 7,404, representing an increase of approximately 10 percent. Kaunakakai remains the population center of Molokai with 2,726 residents, followed by Kualapuu with 1,936 residents (Maui County Data Book, June 2001).

2. *Economy*

In general, the economy of Molokai has been "flat" in recent years when compared to the economic condition of Maui and Lanai. In the year 2000, the unemployment rate for Maui was 3.8 percent, Lanai was 3.5 percent, while Molokai was at 14 percent. In comparison, the State of Hawaii unemployment rate for the year 2000 was 4.3 percent (Maui County Data Book, July 2001).

In the year 2000, the total number of non-agricultural wage and salary jobs on Molokai was 2,000. These positions included government (700), retail (300), health services (250), social services (200), hotels (150), transportation and communication (100), and construction (50). The total number of agricultural related positions on Molokai was 100 (Maui County Data Book, July 2001).

The visitor industry continues to provide a valuable contribution to the Molokai economy. In 1999, a total of 69,657 visitors traveled to Molokai. Of those visitors, 59,685 were domestic, while 9,972 visitors were from foreign countries. However, the Molokai tourism market still has room for growth. In the year 2000, approximately 183 hotel rooms were available for hire, with an average occupancy rate of 34 percent, and an average room rate of approximately $78.12 per night. There were approximately 117 condominiums available on Molokai in the year 2000, with an average occupancy rate of 53 percent, and an average rate per night of $81.04 (Maui County Data Book, July 2001).

These figures are substantially lower than those of Maui, which had an average occupancy rate of 80 percent, and an average room rate of $189.78 (Maui County Data Book, July 2001).

C. *PUBLIC SERVICES*

1. *Police and Fire Protection*

Police services on Molokai are provided by the Maui County Police Department. The Molokai station is located in the Mitchell Pauole Center in Kaunakakai.

Fire prevention, protection and suppression services are provided by the Maui County Fire Department. The Fire Department maintains stations in Kaunakakai and Hoolehua, with a substation in Pukoo.

Both the police and fire station in Kaunakakai are located in close proximity to the project site.

2. ***Health Care***

Molokai General Hospital, which is operated by the Queen's Health Systems, is the only major medical facility on the island. The hospital, located in Kaunakakai, is a 30-bed facility providing long-term, acute, and obstetrics care services.

Other medical facilities include the Molokai Family Health Center in Kaunakakai. In addition, the Women's Health Center located at the hospital, provides mid-wife and maternity services for local residents.

3. ***Solid Waste***

Except for remote areas, single family solid waste collection service is provided by Maui County on a weekly basis.

Solid waste is collected by County refuse collection crews and disposed at the County landfill at Palaau. In addition to County-collected refuse, the landfill accepts commercial waste from private collection companies.

4. ***Recreational Resources***

The island of Molokai offers a wide range of recreational opportunities. Outdoor activities include bicycling, boating, camping, diving, fishing, golfing, hiking, horseback riding, hunting, surfing, swimming, tennis, and windsurfing.

5. *Education*

There are five (5) public schools on Molokai. Four (4) are public elementary schools, Kaunakakai, Kilohana, Kualapuu, and Maunaloa, providing elementary school education for children from Kindergarten through Grade 6. There is one (1) secondary school, Molokai High and Intermediate School, located in Hoolehua.

Private schools include Molokai Christian Academy (Grades K-12) and Molokai Mission School (Grades 1-8).

Molokai Education Center, a satellite facility of Maui Community College, offers post-secondary, vocational and technical credit courses, and is located adjacent to the project terminus along Kamehameha V Highway.

D. *INFRASTRUCTURE*

1. *Transportation System*

Maunaloa Highway links Kaunakakai with the western portion of the island. Kamehameha V Highway extends along the shoreline providing access to eastern portions of Molokai.

County roads run through residential, commercial, light industrial and public facility areas in the remainder of Kaunakakai. Due to the rural character of the town, traffic is generally light and rarely reaches congested conditions.

Molokai is served by a commercial aviation airfield in Hoolehua, approximately seven (7) miles from Kaunakakai. Paragon Air, Island Air, and Hawaiian Airlines provide regularly scheduled daily passenger flights to and from Molokai.

Kaunakakai Harbor, located to the southwest of the project site, is Molokai's only commercial harbor. Facilities include 8,800 square feet of covered storage area and approximately 128,000 square feet of open storage area (County of Maui Data Book 1996-97, July 1997).

2. ***Water System***

The County of Maui operates four (4) water systems on the island of Molokai. The water distribution system for Kaunakakai consists of a 1.0 million gallon reinforced concrete reservoir at an elevation of 232 feet. It is located approximately 2,500 feet northeast of the site. A network of 12-, 8- and 6-inch waterlines transport water from the reservoir to residential and commercial areas of Kaunakakai.

An existing 12-inch waterline is situated along the proposed project alignment which services residential and commercial uses east of the project site.

3. ***Wastewater System***

The Kaunakakai Wastewater Treatment Plant, built in 1987, provides service to the Kaunakakai area. Residents within one (1) mile of the plant are linked to the wastewater system. The Kaunakakai facility has a capacity of 300,000 gallons per day (gpd) and a cumulative allocated capacity of 287,000 gpd.

Most regions of Molokai are not served by a wastewater treatment system. Residents situated beyond the Kaunakakai service area utilize either cesspools or septic systems. The County of Maui provides cesspool pumping services to readily accessible areas.

4. ***Drainage***

An existing drainage system that captures storm runoff from the residential area known as Ranch Camp outlets to a silting basin located at the existing dead end of Kalohi Street. Runoff from most of the smaller storm flows will percolate into the ground of the existing silting basin. For larger storm flows, runoff will build and overflow from the silting basin to a spillway that directs the overflow into the pasture areas.

Sheet runoff from the cornfield areas flow toward Kamehameha V Highway and into roadside grass swale areas. These grass swales flow into storm culverts that cross the Highway and outlet to lands makai of the highway. An existing drainage system captures runoff from the existing Alanui Ka 'Imi 'Ike Roadway and outlets runoff to a storm culvert that crosses Kamehameha V Highway fronting the Molokai Education Center.

5. ***Electric and Telephone Services***

Electrical and telephone services are provided by Molokai Electric Company and Verizon Hawaii, respectively.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. *PHYSICAL ENVIRONMENT*

1. *Surrounding Uses*

The subject project is not anticipated to adversely impact surrounding land uses in the vicinity of the proposed roadway extension. The roadway will utilize lands formerly in agricultural production, and would be co-aligned with a 12-inch waterline easement granted to, and maintained by the County of Maui, Department of Water Supply.

2. *Topography and Land Form*

The proposed roadway construction will generally follow existing contours and will not require major land form alterations or substantial cut and fill procedures. Given the limited amount of earthwork required for the roadway construction, there are no negative impacts anticipated on existing topography and associated land forms as a result of the proposed roadway construction.

3. *Flora and Fauna*

There are no known or identified habitats of rare or endangered species of flora, fauna or avifauna located within the project alignment. The proposed roadway is not anticipated to have an adverse impact upon the surrounding biotic environment.

4. *Archaeological Resources*

The proposed roadway alignment has been substantially altered through prior agricultural cultivation and the waterline installation process. The project area does not contain significant evidence of archaeological materials. See letter dated June 18, 2001 from State Historic Preservation Division (Appendix A).

However, should any cultural materials be uncovered during construction, work in the immediate area will be halted and the office of the State Historic Preservation Division (SHPD) will be notified immediately.

5. ***Cultural Impact Assessment***

a. ***Historical Context***

During the pre-contact era, the Molokai population base was primarily concentrated along the island's windward coasts. The area was rich in ocean resources and the deep valleys with perennial streams supported a lifestyle based on subsistence agriculture, primarily associated with intensive taro production.

With the onset of western contact, a western influence began to permeate through the island's social environment. The result was a reduced reliance on subsistence lifestyles and an increased dependence on a plantation and ranching-based economy. As a result, the island of Molokai experienced a westward population movement from the windward coast to the leeward side of the island.

During the westward movement, the island's political and commercial center developed in accordance with the population movement. The first western town was established at Puko'o, which included a County seat, a court house, a wharf, and several small stores. In 1925, 'Ualapue became the island's new major commercial center, where a new hospital was constructed. Finally in 1935, Kaunakakai was established as the political center and economic nucleus of the island.

In the 1920's, large pineapple plantations were established in the Maunaloa and Kualapu'u areas, further strengthening the westward movement. However, in the 1970's and 1980's, both plantations ceased operations and the island's economy became primarily dependent on diversified agriculture and ranching activities along with an emerging visitor industry (Molokai Community Plan, 2000).

b. ***Local Resident Interview***

In order to obtain additional pertinent background data, an interview was conducted with Mr. Ron Davis, a resident of Kaunakakai.

Mr. Davis is a member of the State House of Representatives and a retired Chief of the Maui Fire Department. He is a lifelong Molokai resident raised on Kapaakea Loop, just south of the project area. According to Mr. Davis, the grounds for the proposed roadway were used as a horse pasture by the Molokai Ranch. Lands under the jurisdiction of the Department of Hawaiian Home Lands (DHHL) bordered the pasture area to the east.

Mr. Davis recalled that he spent a considerable amount of time with his brother in the horse pasture area, visiting their grandfather Kalei Davis, a cowboy employed by the Molokai Ranch. The visits were primarily to play and socialize, although sometimes the boys were lucky to be able to assist the cowboys in their work. In addition, Mr. Davis remembered spending time with his brother and friends playing in the kiawe trees which surrounded the horse pastures and the cinder pit, mauka of the proposed roadway.

Mr. Davis recalled the annual carnival which was held at the old Kaunakakai School, west of the project site. The carnival drew in all members of the community and culminated in a traditional game of Bingo. The Bingo game was cause for considerable excitement as the event afforded participants the chance to win the grand prize of a large box of groceries or a big bag of rice.

Mr. Davis also discussed the neighboring slaughterhouse located to the east of the project site, operated by Molokai Ranch. Because the Davis house was located less than a mile away from the old Kaunakakai School, the Davis boys were not allowed to ride the school bus. During their daily walk to school, the boys would often find time to stop by the slaughter house and observe the slaughterer, Mr. Medeiros, hard at work. In particular, Mr. Davis recalled witnessing the process by which the cattle were skinned, the hides salted, and when cured, shipped off in large bundles to the mainland to be processed as leather.

As an adolescent, Mr. Davis learned to hunt in the pasture area designated for roadway construction and the surrounding kiawe tree forests. However, large brush fires through the years significantly altered the hunting grounds familiar to Mr. Davis and his family, forcing much of the deer and birds to migrate in a mauka direction.

Mr. Davis also recalled that the proposed roadway site was sometimes home to ad hoc rodeos throughout the year, usually organized on short notice by employees of the Molokai Ranch.

During his time growing up in Kaunakakai and the time spent in and around the project area, Mr. Davis does not recall any cultural or traditional practices taking place in the vicinity of the proposed roadway corridor.

c. Cultural Impact Assessment

From a recent historical perspective, lands underlying the proposed roadway were primarily associated with ranching activities. More recently, the site has been actively utilized in the production of seed corn for research purposes. No indications of cultural practices, such as gathering, access, or religious traditions, are known to be associated with the project area.

With regard to the proposed roadway construction, adverse impacts to cultural resources, practices, and traditions are not anticipated.

6. Air Quality and Noise Characteristics

Air quality impacts attributed to the project will include dust generated by short-term, construction-related activities. Site work such as grading and utilities and parking lot construction, for example, will generate airborne particulates. However, dust control measures such as regular watering and sprinkling, will be implemented as needed to minimize wind-blown emissions.

From a long-term perspective, vehicle-based emissions are not expected to adversely impact local and regional ambient air quality conditions.

As with air quality, ambient noise conditions will be temporarily impacted by construction activities. Heavy construction equipment, such as bulldozers, front end loaders, and dump trucks and trailers will be the dominant source of noise during the site construction period. To aid in the mitigation of construction noise impacts upon surrounding uses, Best Management Practices (BMPs) will be utilized, and construction activities will be limited to daylight hours only. The contractor will coordinate with the State Department of Health to ensure that applicable noise permits are obtained, as appropriate.

On a long-term basis, the proposed project is not anticipated to generate adverse noise conditions. See Appendix B. Traffic noise levels are not anticipated to exceed Hawaii State Department of Transportation, Highways Division (DOT) noise abatement criteria. In addition, the U.S. Federal Highway Administration (FHWA) and DOT criteria for substantial increase in existing noise levels will not be exceeded by the year 2015. Noise abatement criteria will not be exceeded for nearby public facilities and park lands. As such, traffic noise mitigation measures are not required for this project.

7. *Scenic and Open Space Resources*

The proposed roadway construction is not anticipated to impact existing view corridors. There are no anticipated adverse impacts to the visual resources of the surrounding environment as a result of the proposed project's construction.

B. *IMPACTS TO SOCIO-ECONOMIC ENVIRONMENT*

1. *Population and Economy*

The proposed roadway project is designed to alleviate traffic conditions by providing access redundancy to the mauka areas of Kaunakakai from the east end of town. The proposed project will not impact the existing population base or long-term economic conditions of Molokai.

Short-term benefits associated with construction expenditures are anticipated.

C. *IMPACTS TO PUBLIC SERVICES*

1. *Police and Fire Protection*

The proposed roadway is not anticipated to negatively impact existing police and fire protection services. Traffic circulation in the Kaunakakai area will improve, facilitating quicker response times during emergencies.

2. *Medical Facilities*

The new roadway extension will provide the existing ambulance service with more expedient access to Kamehameha V Highway. The proposed roadway is not anticipated to have adverse impacts on existing medical facilities or services on Molokai.

3. *Solid Waste*

The proposed roadway project is not anticipated to adversely impact existing solid waste services on Molokai.

4. *Recreational Facilities*

The proposed roadway project is not anticipated to adversely impact the existing recreational facilities located in Kaunakakai.

5. *Education*

The proposed roadway project is not anticipated to adversely impact existing education facilities or services on Molokai.

D. *IMPACTS TO INFRASTRUCTURE*

1. *Transportation Systems*

A traffic assessment for the proposed roadway was completed in order to identify and assess traffic operations resulting from the proposed extension of Alanui Ka 'Imi 'Ike Road. See Appendix C. The traffic assessment indicated that traffic demand in the Kaunakakai region is not anticipated to increase as a result of project implementation.

The traffic assessment did include two (2) recommendations in order to maintain motorist safety and the traffic operational service quality of the intersection at Kamehameha V Highway and Alanui Ka 'Imi 'Ike. The traffic assessment report recommended:

1. The new roadway be constructed with exclusive left-turn and right-turn lanes on the southbound approach of Alanui Ka 'Imi 'Ike at the intersection with Kamehameha V Highway; and

2. Adequate sight distances be maintained for motorists to

safely enter and exit Alanui Ka 'Imi 'Ike Road.

Upon completion of the proposed project, traffic movements at the intersection of Kamehameha V Highway and Alanui Ka 'Imi 'Ike will operate at satisfactory levels of service. Further, the new roadway will divert the number of trips utilizing Ala Malama Avenue, thereby reducing the traffic demands along the main roadway providing internal access to Kaunakakai.

2. ***Water Systems***

The proposed roadway would be co-aligned with the Department of Water Supply's existing 12-inch waterline. Site work related to roadway construction will be coordinated with the Department of Water Supply. Roadway vertical profiles are not anticipated to conflict with the existing waterline.

Appropriate BMPs will be employed during construction in order to protect the integrity of groundwater and surface water resources in the project vicinity. BMPs related to project implementation will include reducing erosion and, to the extent practicable, retention of onsite sediment during and after construction and preparation and implementation of an approved erosion control plan.

3. ***Wastewater Systems***

The proposed roadway construction project will not adversely impact existing wastewater systems in Kaunakakai.

4. ***Drainage***

Proposed roadway drainage improvements will generally maintain existing runoff patterns. See Appendix D. The existing silt basin located at the end of Kalohi Street will be relocated makai of the proposed roadway alignment. Runoff from the mauka portion of the roadway will be collected by two (2) drain inlets and piped across the road. The runoff will be dispersed to the relocated silt basin on the makai side of the roadway, preventing build up of large concentrated flows.

The existing Alanui Ka 'Imi 'Ike Road drainage system will be upgraded to accommodate additional flow from the mauka addition of the roadway. Five (5) new drain inlets will be constructed to accommodate additional runoff from the new roadway. In addition, a new manhole will be added to connect the new system with the existing system, and line sizes will be increased to accommodate the additional flows. No adverse impacts to downstream properties are anticipated as a result of the proposed roadway construction.

5. ***Electrical and Telephone Systems***

Electrical and telephone systems in the Kaunakakai area are not anticipated to be impacted by the proposed roadway construction project. No overhead or underground cables are located in the vicinity of the proposed project.

Chapter IV

Relationship to Governmental Plans, Policies and Controls

IV. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS

A. *STATE LAND USE DISTRICTS*

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission (LUC), establishes the four (4) major land use districts in which lands in the State are placed. These districts are "Urban", "Rural", "Agricultural", and "Conservation".

The proposed roadway improvement is located within the State "Urban" and "Agricultural" districts. See Figure 7. The proposed action is compatible under both State Land Use designations.

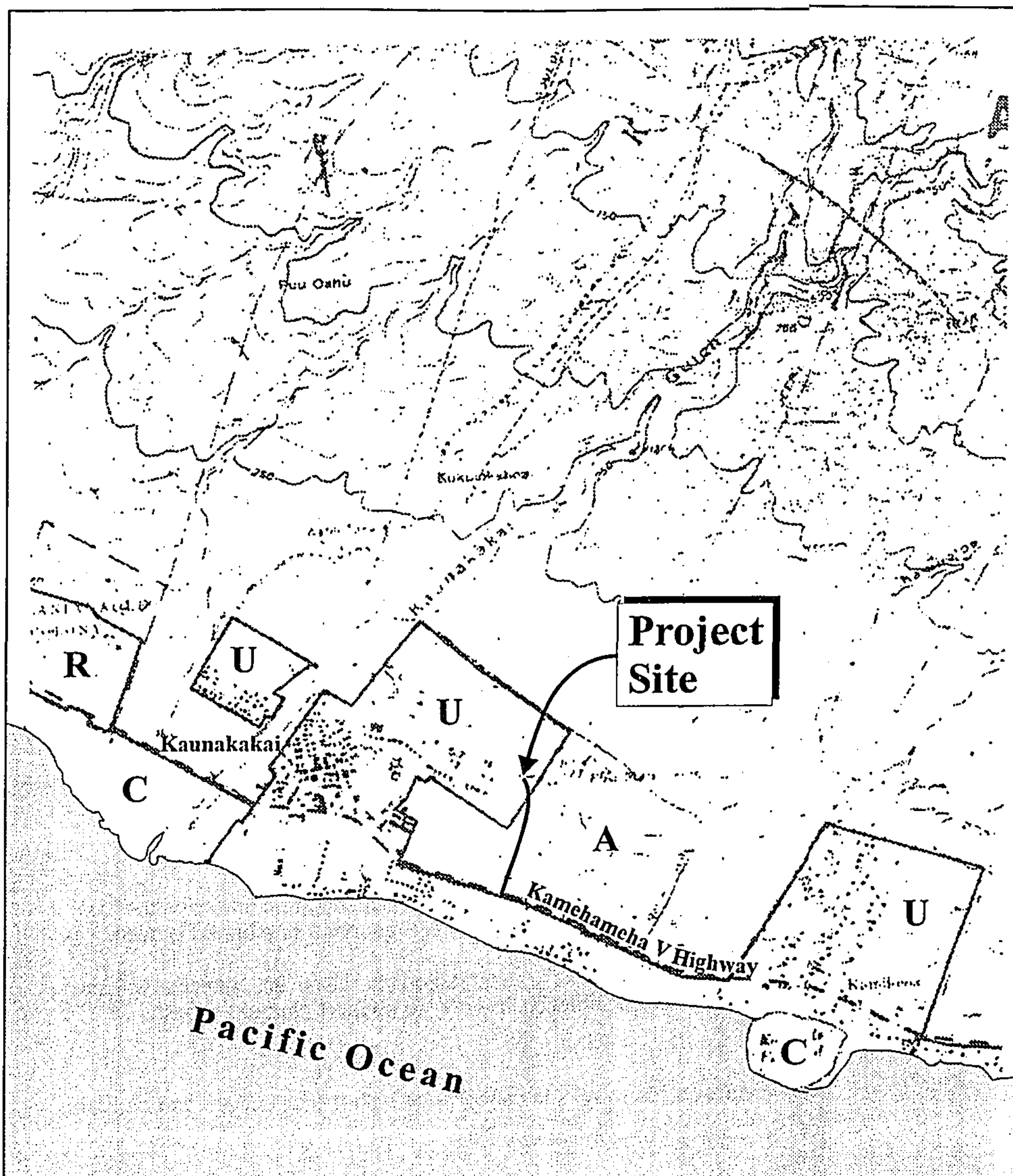
B. *GENERAL PLAN OF THE COUNTY OF MAUI*

The General Plan of the County of Maui provides long-term goals, objectives and policies directed toward the betterment of living conditions in the County. Addressed are social, environmental, and economic issues which influence both the quantity and quality of growth in Maui County. The following General Plan objectives and policies are addressed by the proposed project.

Objective: To develop a program for anticipating and enlarging the local street and highway systems in a timely response to planned growth.

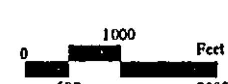
Policy: Ensure that transportation facilities are anticipated and programmed for construction in order to support planned growth.

The proposed roadway is in consonance with the objectives and policies of the County of Maui General Plan.



Source: State Land Use Commission

Figure 7 Proposed Alanui Ka `Imi `Ike Extension
State Land Use Classifications



Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

C. *MOLOKAI COMMUNITY PLAN*

Nine (9) Community Plans have been established in Maui County. Each region's growth and development is guided by a Community Plan, which contains objectives and policies drafted in accordance with the County General Plan. The purpose of the Community Plan is to outline a relatively detailed agenda for carrying out these objectives.

It is noted that the 1984 Molokai Community Plan recommended that the roadway connection follow the alignment as presented herein. In the update to the Molokai Community Plan approved by the Maui County Council in December, 2001, a specific alignment is not designated on the Community Plan Land Use Map. Figure 8 defines the proposed alignment relative to the current Community Plan Land Use designations.

D. *ZONING*

The zoning designation along the lower portion of the proposed roadway is Interim, while the upper portion of the roadway area, near the terminus with Kalohi Street in the Ranch Camp Subdivision, is designated as Interim.

E. *COSTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES*

A portion of the subject site is located within the County of Maui's Special Management Area (SMA). Pursuant to Chapter 205A, Hawaii Revised Statutes, and the Special Management Area Rules and Regulations for the Molokai Planning Commission, actions occurring within the SMA are evaluated with respect to SMA objectives, policies and guidelines. This section addresses the proposed action as related to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Molokai Planning Commission.

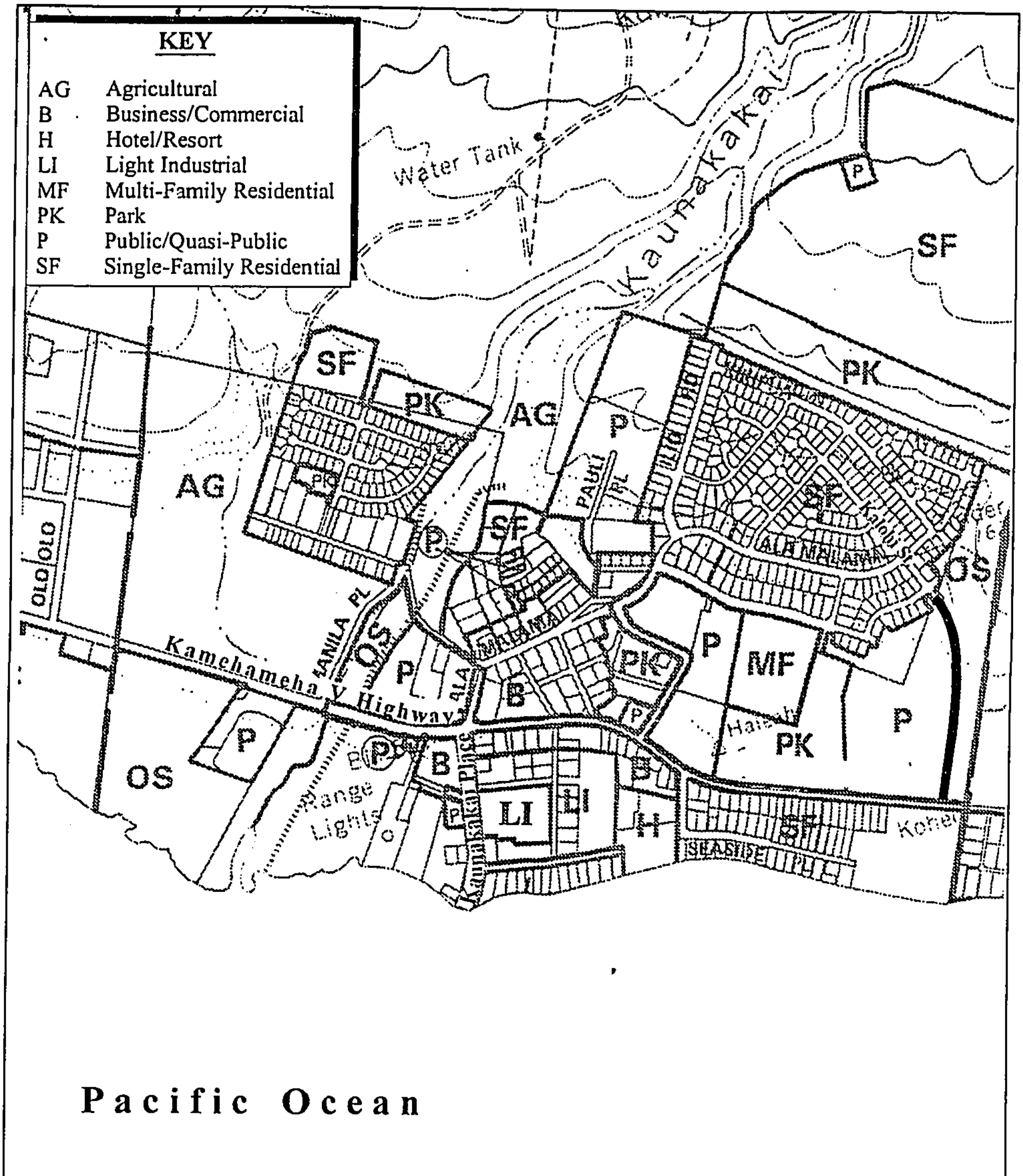


Figure 8 Proposed Alanui Ka `Imi `Ike Extension

Community Plan Land Use Designations

0 250 500 1000 Feet

Prepared for: County of Maui, Department of Public Works and Waste Management

MUNEKIYO & HIRAGA, INC.

(1) Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The proposed project is not anticipated to adversely impact existing coastal or inland recreational resources. The project is not anticipated to limit or compromise any existing shoreline recreation activity or access.

(2) ***Historic Resources***

Objective:

Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: The project site has been previously disturbed through extensive agricultural cultivation and usage of the existing dirt road. However, should any cultural materials be uncovered during construction of the project, work shall be halted in the area of the find and the State Historic Preservation Division shall be notified to determine appropriate mitigation measures.

(3) ***Scenic and Open Space Resources***

Objective:

Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;

(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(D) Encourage those developments that are not coastal dependent to locate in inland areas.

Response: The proposed roadway project is not anticipated to adversely impact existing scenic resources.

(4) ***Coastal Ecosystems***

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Improve the technical basis for natural resource management;

(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses,

(E) recognizing competing water needs; and
Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: The proposed project is not anticipated to adversely impact ocean water quality and marine biology. The applicant intends to comply with applicable provisions pertaining to drainage and erosion control to mitigate potential impacts to the coastal environment.

(5) ***Economic Uses***

Objective:

Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(A) Concentrate coastal dependent development in appropriate areas;
(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
    (i) Use of presently designated locations is not feasible;
    (ii) Adverse environmental effects are minimized; and
    (iii) The development is important to the State's

economy.

Response: The proposed project will provide short-term economic stimulus to the community during the time of construction and will provide an improved roadway system network within the existing residential and commercial areas of Kaunakakai. The proposed action is not contrary to the objectives and policies for economic uses.

(6) ***Coastal Hazards***

Objective:

Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program;
(D) Prevent coastal flooding from inland projects; and
(E) Develop a coastal point and nonpoint source pollution control program.

Response: No adverse drainage-related impacts to adjoining or downstream properties are anticipated as a result of the proposed action. The project area is located outside the tsunami and storm wave zone and is not prone to unusual threats from flooding or subsidence. The proposed road offers an alternative route to mauka areas should there be tsunami or coastal flooding events.

(7) ***Managing Development***

Objective:

Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;
(B) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and
(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: A public information meeting on the proposed action was held in Kaunakakai on October 30, 2001. At this meeting, community members in attendance expressed preference for an alternative route located approximately 250 feet east of the current alignment (results of the public meeting have been summarized in a meeting memorandum, included in Chapter X of this document as an addendum to the March 25, 2002 DPWWM response letter to DeGray Vanderbilt). In addition, a number of organizations and agencies were consulted as part of the Draft Environmental Assessment preparation process.

(8) ***Public Participation***

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;

(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Public awareness and participation for this project is being facilitated through the Chapter 343, HRS process as well as the County's permitting and review process. As noted above, a public information meeting was held on Molokai to discuss and receive comments on the proposed action.

(9) ***Beach Protection***

Objective:

Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The proposed project is not anticipated to affect natural beach processes since it is located well beyond the vicinity of the shoreline area.

(10) Marine Resources

Objective:

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The proposed project is not anticipated to adversely impact marine resources.

Chapter V

Adverse Environmental Effects Which Cannot be Avoided

V. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Project construction will result in a certain amount of unavoidable construction-related impacts. These impacts include noise-generated impacts and air quality impacts associated with the operation of construction equipment. Air quality will also be impacted by dust generated from site work. The construction-related impacts will be temporary and mitigated through implementation of appropriate BMPs.

In the long-term, the construction of the roadway project is not anticipated to create any significant, long-term adverse environmental effects.

Chapter VI

Alternatives Analysis

VI. ALTERNATIVES ANALYSIS

Planning for the proposed roadway project included consideration of alternative alignments. The alternatives are defined by their terminus points as described below and as shown in Figure 9.

Alternative 1:	Kamehameha V Highway (at existing Alanui Ka 'Imi 'Ike) to Kalohi Street Terminus;
Alternative 2:	Kamehameha V Highway (approximately 250 feet east of existing Alanui Ka 'Imi 'Ike) to Kalohi Street terminus;
Alternative 3:	Kamehameha V Highway (at existing Alanui Ka 'Imi 'Ike) to Kolapa Place Terminus; and
Alternative 4:	Kamehameha V Highway (approximately 250 feet east of existing Alanui Ka 'Imi 'Ike) to Kolapa Place terminus.

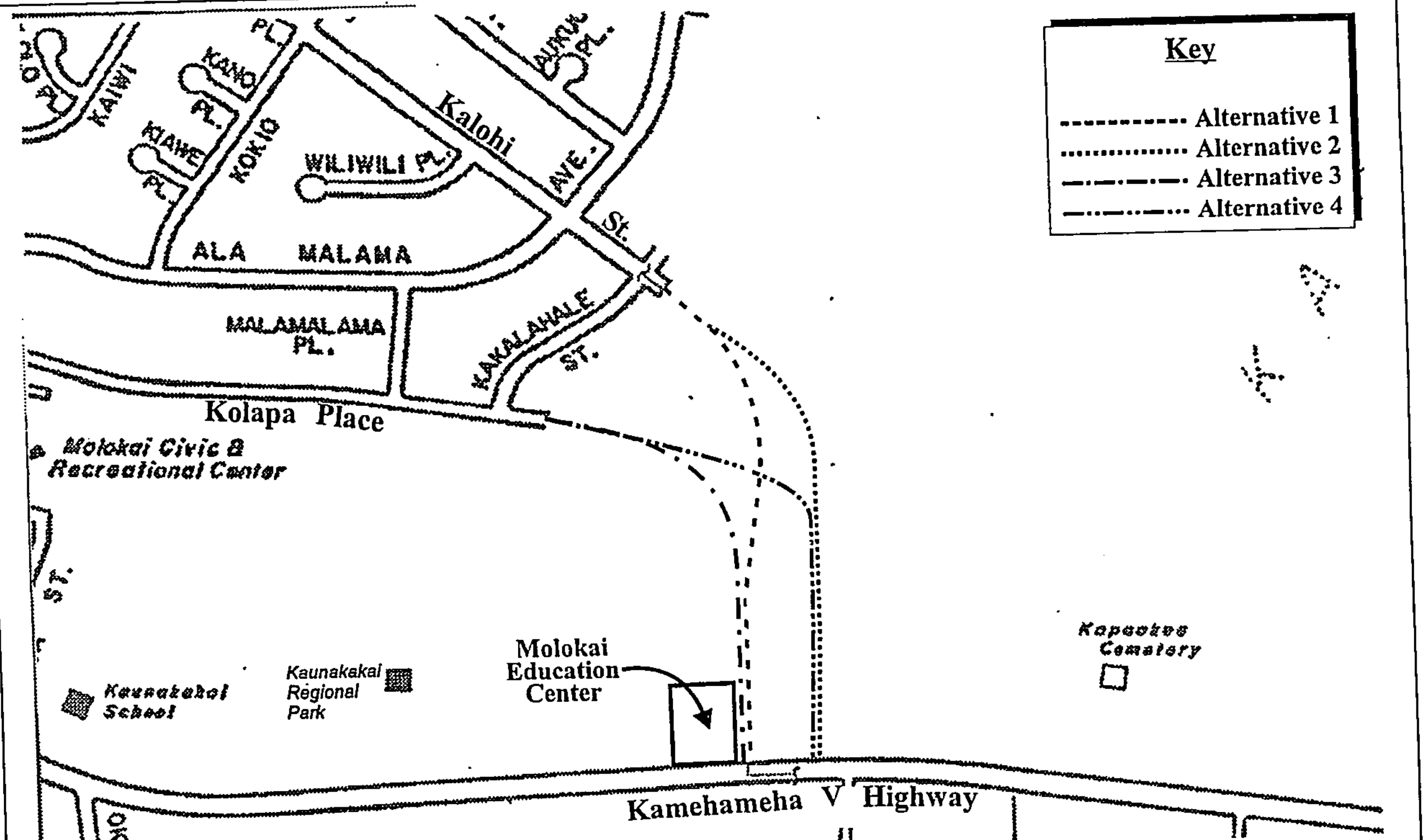
The alternatives are described in further detail below.

A. *ALTERNATIVE 1*

Alternative 1 reflects the action proposed in this environmental assessment document. Its delineation is based on use of the existing Alanui Ka 'Imi 'Ike terminus at the Molokai Education Center, along with the existing easement for the 12-inch waterline.

B. *ALTERNATIVE 2*

Alternative 2 differs from Alternative 1 in its terminus point at Kamehameha V Highway. Located approximately 250 feet east of the existing Alanui Ka 'Imi 'Ike intersection with Kamehameha V Highway, the terminus point for Alternative 2 is defined to allow the roadway alignment to proceed near the boundary of the adjoining Department of Hawaiian Home Lands parcel. This alternative was recommended by the Molokai



Source: Shimabukuro, Endo & Yoshizaki, Inc.

NOT TO SCALE

Figure 9 Proposed Alanui Ka `Imi `Ike Extension

Alternative Alignments

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Department of Public Works and Waste Management

Community Plan's Citizen Advisory Committee and Molokai Planning Commission during the review of the updated Molokai Community Plan.

C. ALTERNATIVE 3

Alternative 3 utilizes the existing Alanui Ka 'Imi 'Ike terminus at Kamehameha V Highway, with a terminus at Kolapa Place.

D. ALTERNATIVE 4

This alternative also involves the Kolapa Place terminus along with the terminus at Kamehameha V Highway, approximately 250 feet east of the existing Alanui Ka 'Imi 'Ike.

E. ALTERNATIVES ANALYSIS

While each of the alternatives presented would meet project objectives, consideration of existing conditions defines criteria for identifying a preferred alignment. Existing conditions relate to the following:

Criterion 1: Availability of an existing connection point to Kamehameha V Highway at Alanui Ka 'Imi 'Ike;

Criterion 2: Relationship to existing waterline easement alignment; and

Criterion 3: Expansion opportunities for the Molokai Education Center.

The availability of the existing Alanui Ka 'Imi 'Ike connection point at Kamehameha V Highway allows the use of existing infrastructure installed in anticipation of a future extension. Based on consultations with the State of Hawaii DOT, it has been determined that a terminus location approximately 250 feet to the east would require closure of the existing Alanui Ka 'Imi 'Ike intersection, due to highway and traffic safety standards which prescribe minimum intersection separation distance. If the terminus reflected in Alternative 2 and Alternative 4 are considered, a new access driveway for the Molokai Education Center would likely be required from the proposed new roadway.

The existing waterline easement provides a basis for co-alignment with the new roadway. Co-alignment would consolidate County facilities into a single right-of-way, thereby facilitating maintenance and operating conditions for the DPWWM and the Department of Water Supply. Relocation of the existing 12-inch waterline to match either Alternative 2 or Alternative 4 could also be accomplished, although additional project costs would be incurred.

The Molokai Education Center currently occupies an approximately 2-acre area at the intersection of Kamehameha V Highway and the existing Alanui Ka 'Imi 'Ike. From a long-range planning perspective, expansion of the Center will occur on adjoining lands. The Kamehameha V terminus located approximately 250 feet east of the existing Alanui Ka 'Imi 'Ike intersection provides a larger contiguous area for land planning purposes. It is noted, however, that spatial and facility requirements for future expansion of the Molokai Education Center have not been formulated.

Based on the foregoing, Alternative 3, Kamehameha V Highway (at existing Alanui Ka 'Imi 'Ike) to Kolapa Place Terminus, and Alternative 4, Kamehameha V Highway (approximately 250 feet east of existing Alanui Ka 'Imi 'Ike) to Kolapa Place terminus, are least desirable. Alternative 3 and Alternative 4 would result in a lower connection location which would be less favorable from a land planning standpoint for the Molokai Education Center. In addition, both options deviate from the existing waterline easement which may require the relocation of the 12-inch waterline. Alternative 4 would require the closure and provision of a new driveway to service the Molokai Education Center.

In assessing the remaining two (2) alternatives, the more favorable option from the standpoint of Criteria Nos. 1 and 2 is Alternative 1, Kamehameha V Highway (at existing Alanui Ka 'Imi 'Ike) to Kalohi Street Terminus. Alternative 2, Kamehameha V Highway (approximately 250 feet east of existing Alanui Ka 'Imi 'Ike) to Kalohi Street terminus, would provide a larger contiguous area for planning consideration for the Molokai Education Center. However, long-term master planning program parameters and requirements have not been formulated for the Molokai Education Center.

F. *RECOMMENDED ALTERNATIVE*

In light of the criteria and analysis presented, the DPWWM's preferred option lies with Alternative 1. This option provides efficiency from an infrastructure planning and coordination standpoint as it utilizes the existing infrastructure and waterline easement to provide a cost effective basis of design and implementation. Since long-range physical master planning for the Molokai Education Center has not yet been initiated, opportunities for coordination exists to ensure the functional integration of the new roadway with future campus facilities.

Should Alternatives 2, 3, or 4 be selected for implementation, the environmental impacts and mitigation measures would not differ from those presented for Alternative 1. In this context, it is the intent of this environmental document to apply to Alternative 1, as well as Alternatives 2, 3, and 4. In all instances, advancement of a Finding of No Significant Impact is deemed an appropriate conclusion for purposes of Chapter 343, Hawaii Revised Statutes.

Chapter VII

Irreversible and Irretrievable Commitments of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The development of the proposed roadway will involve the commitment of agricultural land currently utilized for seed corn research. In addition, the proposed action would involve a commitment of fuel, labor, funding, and material resources. However, the commitment of resources necessary to implement the proposed project will be justified, given the eventual benefits to be realized through the completion of the roadway project.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

The proposed project involves the construction of a roadway extension and related improvements in Kaunakakai, Molokai, Hawaii. Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative as well as the short-term and the long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Hawaii Administrative Rules. Based on the analysis, the proposed project will not result in any significant impacts. Discussion of project conformance to the criteria is noted as follows:

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

   The project site has already been significantly altered through waterline construction and the prior cultivation of seed corn. There are no known rare, endangered or threatened species of flora, fauna, or avifauna within the project site.

   From an archaeological standpoint, the ground surface has been significantly altered by previous land use activities. However, should archaeological or cultural materials be found during construction, work in the vicinity of the find will cease and the SHPD will be notified to ensure compliance with Chapter 6E, HRS.

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

   The project site is situated on a portion of land utilized for agricultural purposes. The commitment of land resources is not anticipated to curtail the range of 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 not contrary to the policies and guidelines set forth in Chapter 344, HRS.

4. ***The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected***

The proposed project will provide a direct economic benefit to the Molokai economy during the construction phase. There are no adverse long-term economic or social welfare impacts anticipated as a result of project implementation.

5. ***The Proposed Action Does Not Affect Public Health***

No negative impacts to the public's health and welfare are anticipated as a result of the proposed action.

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

The proposed project is not anticipated to have an effect upon the island's population base and should not place new demands on the island's public services.

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

During project implementation, appropriate environmental mitigation measures will be utilized to ensure that potential adverse environmental effects are mitigated. No substantial degradation of environmental quality resulting from the proposed project is anticipated.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions Nor Would Cumulative Impacts Result in Considerable Effects Upon the Environment***

There are no larger actions which are linked to the proposed project. The proposed project is not anticipated to create any significant long-term environmental effects.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would Be Adversely Affected by the Proposed Project***

There are no known significant habitats or rare, endangered or threatened species of flora and fauna in the vicinity of the project site. Given the location and scale of the project, no habitats or natural environments are anticipated to be adversely affected by the proposed project.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not Be Detrimentally Affected By The Proposed Project***

Appropriate environmental mitigation measures will be implemented during project construction to ensure that adverse environmental effects on air quality and ambient noise levels are minimized. The project should have no impact upon water quality.

In the long term, the proposed project is not anticipated to have a significant impact on air quality, water quality or noise parameters.

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 subject property is not located within or would not affect environmentally sensitive areas. Most of the subject property is located in an area of minimal flooding, while a portion of the proposed roadway is located in an area of 100-year shallow flooding. The subject property is not subject to tsunami inundation. The underlying soils are not erosion-prone. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the subject property.

12. ***The Proposed Action Would Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies***

The proposed project will not adversely impact the scenic environment of the Kaunakakai area.

13. ***The Proposed Action Would Not Require Substantial Energy Consumption***

The proposed project will involve the short-term commitment of fuel for equipment, vehicles and machinery during construction activities. However, this use is not anticipated to result in substantial consumption of energy resources. In the long term, the project is not anticipated to create additional demands for energy consumption. The short-term energy demand is not considered substantive or excessive within the context of the region's overall energy consumption.

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

Chapter IX

List of Permits and Approvals

IX. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the project.

County of Maui

1. SMA Use Permit

2. Construction Permits (Grubbing, Grading, and Work to Perform on County Highway)

Chapter X

Agencies and Organizations Consulted During the Preparation of the Draft Environmental Assessment; Letters Received and Responses to Substantive Comments

X. AGENCIES AND ORGANIZATIONS CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft EA. Comment letters received as well as responses to substantive comments are contained in this chapter. In addition, a public information meeting on the proposed action was held in Kaunakakai on October 30, 2001. Summary minutes of that meeting is also included in this chapter.

1. Neal Fujiwara, Soil Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   210 Imi Kala Street, Suite 209
   Wailuku, Hawaii 96793-2100

2. William Lennan
   Department of the Army
   U.S. Army Engineer District, Hnl.
   Attn: Operations Division
   Bldg. T-1, Room 105
   Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
   Pacific Islands Manager
   U. S. Fish and Wildlife Service
   P.O. Box 50167
   Honolulu, Hawaii 96850

4. David Blane, Director
   State of Hawaii
   Office of Planning
   Department of Business, Economic Development and Tourism
   P.O. Box 2359
   Honolulu, Hawaii 96804

5. Denis Lau, Chief
   Clean Water Branch
   State of Hawaii
   Department of Health
   919 Ala Moana Blvd., Room 300
   Honolulu, Hawaii 96814

6. Herbert Matsubayashi
   District Environmental Health Program Chief
   State of Hawaii
   Department of Health
   54 High Street
   Wailuku, Hawaii 96793

7. Gilbert Coloma-Agaran
   State of Hawaii
   Department of Land and Natural Resources
   P. O. Box 621
   Honolulu, Hawaii 96809

8. Don Hibbard
   State of Hawaii
   Department of Land and Natural Resources
   State Historic Preservation Division
   601 Kamokila Blvd., Room 555
   Kapolei, Hawaii 96707

9. Brian Minaai, Director
   State of Hawaii
   Department of Transportation
   869 Punchbowl Street
   Honolulu, Hawaii 96813

10. Fred Cajigal, Acting Maui District Engineer
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

11. Colin Kippen, Deputy Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

12. Clayton Ishikawa, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, Hawaii 96732

13. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 S. High Street
Wailuku, Hawaii 96793

14. John Min, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

15. Floyd Miyazono, Director
County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

16. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

17. David Goode, Director
County of Maui
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

18. David Craddick, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

19. **Maui Electric Company, Ltd.**
P. O. Box 398
Kahului, Hawaii 96732

20. Donna Haytko-Paoa
Molokai Education Center
P.O. Box 440
Kaunakakai, Hawaii 96748

21. flo wiger, Acting Provost
Maui Community College
310 Kaahumanu Avenue
Kahului, Hawaii 96732

22. Rachel Kamakana, Island Representative
Alu Like, Inc.
P.O. Box 1859
Kaunakakai, Hawaii 96748

23. Gregory Helm, Sr., District Supervisor
Department of Hawaiian Home Lands
Molokai District Office
P.O. Box 198
Ho'olehua, Hawaii 96729

24. Louise Borsella, Iku Hai
Hale O Na Ali'i O Hawai'i
Halau O Kawananakoa
P.O. Box 293
Kaunakakai, Hawaii 96748

25. Edwina H. Cacoulidis, Pelekikena
Ho'olehua Hawaiian Civic Club
P.O. Box 728
Kaunakakai, Hawaii 96748

26. Ted K. Takamiya, Secretary-Treasurer
Hui O Kuapa
P.O. Box 1341
Kaunakakai, Hawaii 96748

27. Colette Y. Machado, President
Ke Kua'aina Hanuna Hou
HC 01 Box 741
Kaunakakai, Hawaii 96748

28. William M. Akutagawa, Executive Director
Na Pu'uwai
Native Hawaiian Health Care System
P.O. Box 130
Kaunakakai, Hawaii 96748

29. Myrle Florea, Community Resource Coordinator
Office of Hawaiian Affairs
Molokai Office
P.O. Box 1717
Kaunakakai, Hawaii 96748

30. Barbara L. Kalipi, Unit Manager
Queen Lili'uokalani Children's Center
Molokai Unit
P.O. Box 55
Kaunakakai, Hawaii 96748

31. Harold Edwards
Molokai Ranch, Limited
745 Fort Street, Suite 600
Honolulu, Hawaii 96813

OCT 2 2 2001

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

October 17, 2001

Regulatory Branch

Mr. Dean K. Frampton, Planner
Munnekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Frampton:

This letter responds to your request for a jurisdictional determination for the extension of Alanui Ka' Imi' Ike Road, dated October 3, 2001. Based on the information you provided I have determined that a Department of the Army (DA) permit will not be required for this project.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200200023.

Sincerely,

William B. Lennan

for George P. Young, P.E.
Chief, Regulatory Branch

OCT 1 5 2001

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 2009
KAUNAKAKAI, HAWAII 96748

October 10, 2001

MUNEKIYO & HIRAGA, INC.
305 High Street Suite 104
Wailuku, HI 96793

SUBJECT: Proposed Alanui Ka' Imi' Ike Extension-Job No. 01-07

To Whom It May Concern,

I am in receipt of your letter dated October 3, 2001 regarding the proposed extension of Alanui *Ka' Imi' Ike Road. The proposed action would allow this road to be connected to the residential* area of Rice Camp also known as Ranch Camp. Access would then be gained into the residential area from Kamehameha V Highway on the eastern side.

Based on the fact that during times of Civil Defense warnings, residents may be asked to seek high grounds. Residents within the Kapaakea Homestead have had to seek high ground in the Kamiloloa Heights residential areas. Also part of the residents along Kamehameha V Highway across from the Maliu Regional Park would head that way also. Residents of Kapaakea have expressed concerns of overcrowding the Kamiloloa area. If part of these residents would be able to access the ranch camp area to seek safety, this would indeed create less congestion in that area.

Therefore, on behalf of public safety, if a road from Kamehameha V Highway could be constructed to access the Rice Camp residential area in order to allow Kapaakea Homesteaders and the public to seek safety of the high ground, then I stand in support of this proposal. The only other concern I may have is the added traffic from this Ka' Imi' Ike onto Kamehameha V Highway in relation to D.O.T. standards regarding Kapaakea Loop and lines of sight.

Yours truly,

George W. Maioho
District Supervisor
DHHL-Molokai

MUNEKIYO & HIRAGA, INC.

March 25, 2002

George Maioho, District Supervisor
Department of Hawaiian Home Lands
State of Hawaii
P. O. Box 2009
Kaunakakai, Hawaii 96748

SUBJECT: Proposed Alanui Ka'Imi'Ike Extension (Job No. 01-07)

Dear Mr. Maioho:

Thank you for your comment letter dated October 10, 2001 regarding the subject project. In response to the comments provided, we note the following.

The County of Maui, Department of Public Works and Waste Management (DPW&WM) will coordinate with the State Department of Transportation (DOT) to ensure compliance with applicable design requirements of the DOT.

Thank you for supporting the proposed project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

Dean K. Frampton, Planner

DKF:lfm
cc: Joe Krueger, Dept. of Public Works and Waste Management
Scott Kunioka, Shimabukuro, Endo & Yoshizaki

sey\alanui\dhhl.001

OCT 1 7 2001

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

October 15, 2001

HRD01/234

Mr. Dean K. Frampton
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Ste. 104
Wailuku, HI 96793

Dear Mr. Frampton:

Subject: Construction of Extension Alanui Ka'Imi'Ike Road (Job No. 01-07)

This letter is provided as a response to the consultation letter of Munekiyo & Hiraga for the County of Maui Department of Public Works and Waste Management (DPWWM) requesting information and concerns relating to the above referenced project. OHA offers the following comments relating to project:

With respect to historical or archaeological resources, OHA recommends Maui County's assurance that proper mitigation and consultation will occur should any unidentified cultural, historic, or burial sites and/or resources be encountered during project development. The County should develop a burial treatment plan, as appropriate, as a contingency for the inadvertent discovery of Native Hawaiian burials.

OHA recommends that the County seek as broad a consultation as possible with knowledgeable Native Hawaiian organizations and individuals relating to this project. This consultation should include the incorporation of the contacts listed below to assist FHWA in identifying historic properties, traditional practices and beliefs, evaluating traditional cultural places implicated by this project, assessing adverse effects, and in developing appropriate mitigation and alternatives:

- Local Hawaiian civic clubs
- Local chapters of the royal societies
- Maui Island Burial Council
- Individuals familiar with cultural practices of the areas affected by your undertaking

OHA's community resource coordinator on the island of Molokai may also be of assistance in helping to identify knowledgeable Native Hawaiian organizations and individuals. Her information follows below:

Molokai CRC
Irene Kaahanui
PO Box 1717
Kaunakakai, HI 96748
Phone: (808) 933-0418
Fax: (808) 933-0421

Thank you for the opportunity to review and comment relating the proposed project. If you have any questions, please contact Wayne Kawamura, Policy Analyst at 594-1966, or email him at: waynek@oha.org.

Sincerely,

Colin Kippen, Jr.

Colin Kippen, Jr.
Deputy Administrator

cc: BOT
ADM
Molokai CRC

MUNEKIYO & HIRAGA, INC.

March 25, 2002

Colin Kippen, Jr., Deputy Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension

Dear Mr. Kippen:

Thank you very much for your comment letter dated October 15, 2001. In response to the comments provided, we would like to note the following.

Proper consultation and mitigation will occur should any cultural, historic or burial sites be encountered during project development. In addition, the County of Maui will develop an appropriate treatment plan in coordination with the State Historic Preservation Division and the Molokai Burial Council should any human burials be inadvertently discovered. The mitigation efforts will be in strict compliance with the provision of Chapter 6E of HRS.

In preparation of the Draft Environmental Assessment (EA), the County has requested consultation from a wide variety of knowledgeable Native Hawaiian organizations, including local Hawaiian civic clubs and royal societies. In addition, consultation will be undertaken to assess the project's potential impact on traditional cultural practices.

Thank you again for your comment letter. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.

Dean K. Frampton, Planner

DKF:cc

cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

sey:alanui\ohaltr.001

OCT 30 2001

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:

HWY-M 2.323-01

October 25, 2001

MEMORANDUM

TO: Dean Frampton
Munekiyo & Hiraga, Inc.

FROM: Paul M. Chung
State Highways

SUBJECT: Proposed Alanui Ka'Imi'Ike Road Extension, Kaunakakai Molokai
I.D. NO. ME-01-68

We offer the following comments based on our review of the project summary for the proposed roadway extension:

1. Submit a drainage report for our review and comment. No additional runoff will be allowed onto Kamehameha V Highway;

2. Submit a Traffic Impact Assessment Report; and

3. Construction plans must also be submitted for our approval prior to start of work.

If you have any questions, please call me at 873-3535.

PMC:dmf

MUNEKIYO & HIRAGA, INC.

March 25, 2002

Paul M. Chung
Department of Transportation
Highways Division-Maui District
650 Palapala Drive
Kahului, Hawaii 96732

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension
<u>I.D. No.: ME-01-68</u>

Dear Mr. Chung:

Thank you very much for your comment letter dated October 25,2001 regarding the subject property. In response to the comments provided, we would like to note the following.

1. A drainage report prepared by a licensed civil engineer will be submitted to the Department of Transportation (DOT) for review and comment. Utilizing existing drainage improvements, project generated runoff in the vicinity of the Molokai Education Center will be dispersed on the makai side of Kamehameha V Highway, eliminating the potential for surface water run-off onto the roadway surface.

2. A Traffic Impact Assessment report will be submitted to the DOT for review and comment.

3. Construction plans for all proposed improvements will be submitted to the DOT for review and approval prior to commencement of construction activities.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.
Dean K. Frampton, Planner

DKF:cc
cc: Joe Krueger, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki
sey\alanui\chungltr.001

NOV 0 1 2001

BENJAMIN J. CAYETANO
GOVERNOR

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD / CWB
10076PSS.01

October 29, 2001

Mr. Dean K. Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Frampton:

Subject: **Proposed Alanui Ka' Imi' Ike Extension**
Kaunakakai, Molokai, Hawaii

The Department of Health (Department) acknowledges receipt of your submittal, dated October 3, 2001, and has the following comments:

1. The applicant should contact the Army Corps of Engineers (COE) to identify whether a Federal permit (including a Department of Army (DA) permit) is required for this project. A Section 401 Water Quality Certification (WQC) is required for "Any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...," pursuant to Section 401(a)(1) of the Federal Water Pollution Act [commonly known as the "Clean Water Act (CWA)"].

2. A National Pollutant Discharge Elimination System (NPDES) permit is required for each of the following activities which discharges into State Waters:

   a. Discharge of storm water runoff associated with construction activities that involve the disturbance of five (5) acres or greater, including clearing, grading, and excavation;
   b. Discharge of hydrotesting water; and
   c. Discharge of construction dewatering effluent.

   Any person wishing to be covered by the NPDES General Permit for any of the above discharge activities shall file a Notice of Intent with the Department's Clean Water Branch at least thirty (30) days prior to the commencement of any discharges to State waters. Discharges shall be permissible following issuance of a Notice of General Permit

NOV 0 1 2001

BENJAMIN J. CAYETANO
GOVERNOR

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD / CWB
10076PSS.01

October 29, 2001

Mr. Dean K. Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Frampton:

Subject: **Proposed Alanui Ka' Imi' Ike Extension**
Kaunakakai, Molokai, Hawaii

The Department of Health (Department) acknowledges receipt of your submittal, dated October 3, 2001, and has the following comments:

1. The applicant should contact the Army Corps of Engineers (COE) to identify whether a Federal permit (including a Department of Army (DA) permit) is required for this project. A Section 401 Water Quality Certification (WQC) is required for "Any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...," pursuant to Section 401(a)(1) of the Federal Water Pollution Act [commonly known as the "Clean Water Act (CWA)"].

2. A National Pollutant Discharge Elimination System (NPDES) permit is required for each of the following activities which discharges into State Waters:

   a. Discharge of storm water runoff associated with construction activities that involve the disturbance of five (5) acres or greater, including clearing, grading, and excavation;
   b. Discharge of hydrotesting water; and
   c. Discharge of construction dewatering effluent.

   Any person wishing to be covered by the NPDES General Permit for any of the above discharge activities shall file a Notice of Intent with the Department's Clean Water Branch at least thirty (30) days prior to the commencement of any discharges to State waters. Discharges shall be permissible following issuance of a Notice of General Permit

3. If the construction activities involve the disturbance of one acre or greater, including clearing, grading, and excavation, and will take place or extend after **March 10, 2003**, an NPDES general permit coverage is required for discharges of storm water runoff into State Waters.

4. The applicant may be required to apply for an Individual NPDES Permit if there is any type of process wastewater discharge from the project into State waters.

Should you have any further questions regarding this matter, please contact Mr. Shane Sumida of the Engineering Section, Clean Water Branch, at 586-4309.

Sincerely,

Denis R. Lau

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

SS/cr

MUNEKIYO & HIRAGA, INC.

March 25, 2002

Denis R. Lau, P.E., Chief
Department of Health
Clean Water Branch
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension
Job No.: 01-01
Reference: 10076PSS.01

Dear Mr. Lau:

Thank you for your comment letter dated October 29, 2001 regarding the subject property. In response to the comments provided, we would like to note the following.

1. The applicant is coordinating with the Department of the Army (DA) to determine the applicability of necessary Federal permit requirements.

2. Should it be determined that a NPDES permit is required, the applicant will submit appropriate applications at least thirty (30) days prior to the commencement of any potential discharges into State Waters.

3. Commencement of roadway construction is anticipated for the first quarter of 2003. As necessary, therefore, the applicant will acquire a NPDES general permit related to potential storm water runoff into State waters.

4. Based on preliminary project design parameters, no wastewater discharge is anticipated.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

Dean K. Frampton, Planner

DKF:cc

cc: Joe Krueger, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

seyialanuidohltr.001

NOV 0 1 2001

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-PS
2.4655

OCT 3 1 2001

Mr. Dean K. Frampton
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Frampton:

Subject: Proposed Alanui Ka'Imi' Ike Extension
Kaunakakai, Molokai

Thank you for transmitting the proposed project for our review and comments. We have the following comments:

1. The Environmental Assessment (EA) should include:

   a. A traffic assessment of the intersection of Alanui Ka'-imi'Ike Extension with Kamehameha V Highway including the need for any intersection improvements.

   b. A discussion regarding drainage for the project. Direct diversion surface water run-off onto Kamehameha V Highway is not permitted.

2. We require the submittal and approval of construction plans for all work done within our highway rights-of-way.

If you have any questions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

Brian K. Minaai

BRIAN K. MINAAI
Director of Transportation

MUNEKIYO HIRAGA, INC.

March 25, 2002

Brian K. Minaai, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension
Job No.: 01-07
I.D. No.: ME-01-68

Dear Mr. Minaai:

Thank you very much for your comment letter dated October 31,2001 regarding the subject property. In response to the comments provided, we would like to note the following.

1. The Environmental Assessment (EA) for the subject project will include:

    a. A Traffic Impact Assessment Report, including necessary improvements to the intersection of Alanui Ka 'Imi 'Ike and Kamehameha V Highway; and

    b. A discussion of proposed drainage improvements, including a drainage report prepared by a licensed civil engineer. Utilizing existing drainage improvements, project generated runoff in the vicinity of the Molokai Education Center will be dispersed on the makai side of Kamehameha V Highway, eliminating the potential for surface water run-off onto the roadway surface.

2. Construction plans for work conducted within the State right-of-way will be submitted to the Department of Transportation for review and approval prior to commencement of construction activities.

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.
Dean K. Frampton, Planner

DKF:cc
cc: Joe Krueger, Department of Public Works and Waste Management
Scot Kunioka, Shimabukuro Endo & Yoshizaki
sey:alanui\minnaiitr.001

NOV 2 1 2001

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
JANET E. KAWELO
LINNEL NISHIOKA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

HAWAI'I HISTORIC PRESERVATION DIVISION REVIEW

Log #: 28523
Doc #: 0111SC02

TO:
Name of Agency/Applicant: Dean Frampton, Munekiyo & Hiraga, Inc.
Address of Agency/Applicant: 305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: National Historic Preservation Act, Section 106 Compliance - Proposed Alanui Ka'Imi Extension
Ahupua'a: Kaunakakai
District, Island: Molokai
TMK: (2)-5-3-031:001 & 5-3-011: 038

1. We believe there are no historic properties present, because:

   a. intensive cultivation has altered the land X
   b. residential development/urbanization has altered the land ____
   c. previous grubbing/grading has altered the land ____
   d. an acceptable archaeological assessment or inventory survey found no historic properties ____
   e. other ____

   Thus, we believe that "no historic properties will be affected" by this undertaking. X

2. This project has already gone through the historic preservation review process, and mitigation has been completed. ____

Staff [signature] Date 11/13/01

Title: deputy SHPO
(Phone: 808-692-8026)

OCT 1 0 2001

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

(808) 270-7230
FAX (808) 270-7934

October 5, 2001

Dean K. Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Frampton:

SUBJECT: PROPOSED ALANUI KA'IMI'IKE EXTENSION

We have reviewed the summary for the subject project and have no comments or objections to the proposed action.

Thank you for the opportunity to review and comment. Should you have any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

Patrick T. Matsui

for FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Planning and Development

OCT 15 2001

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

JAMES "KIMO" APANA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIKELL
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

October 8, 2001

Mr. Dean K. Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Frampton:

Subject: Proposed Alanui Ka' Imi' Ike Extension
Job No. 01-07

We have reviewed the project summary and would like to inform you that we support the proposed project as it provides a much needed alternative roadway to the Ranch Camp Subdivision.

We would also like to know if there are any plans to connect the Kolapa Place roadway with Kamehameha V Highway.

Thank you for the opportunity to comment.

Very truly yours,

Alice L. Lee

ALICE L. LEE
Director

ETO:df

c: Housing Administrator

MUNEKIYO HIRAGA, INC.

March 25, 2002

Alice Lee, Director
Department of Housing and Human Concerns
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Alanui Ka'Imi'Ike Extension (Job No. 01-07)

Dear Ms. Lee:

Thank you very much for your comment letter dated October 8, 2001 regarding the subject project. In response to the comments provided, we note the following.

Project plans call for the proposed alignment to link Kalohi Street with Kamehameha V Highway. Under the current alignment, Kolapa Place would not be included in the project scope.

Thank you for supporting the proposed project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D K. F

Dean K. Frampton, Planner

DKF:lfm

cc: Joe Krueger, Dept. of Public Works and Waste Management
Scott Kunioka, Shimabukuro, Endo & Yoshizaki

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305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

OCT 1 5 2001

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

October 11, 2001

Mr. Dean Frampton
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Frampton:

RE: **Early Consultation for an Environmental Assessment for the Proposed Alanui Ka Imi Ike Extension, Job No. 01-07**

Thank you for the opportunity to provide you with comments prior to intiating the Environmental Assessment for this project. We provide you with the following:

1. The project is located within the Special Management Area, therefore a SMA "Major" permit will be required.

2. Since the portion of the roadway near the Molokai Education Center is low-lying property, drainage issues should be addressed.

We also note that on October 1, 2001, the County Council Planning Committee supported the designation of the roadway extension for inclusion in the revision of the Molokai Community Plan.

Thank you for your cooperation. If additional clarification is required, please contact Mr. William Spence, Staff Planner, of this office at 270-7735.

Very truly yours,

John E. Min

JOHN E. MIN
Planning Director

JEM:WRS:tlm

c: Clayton Yoshida, AICP, Deputy Director of Planning
William Spence, Staff Planner
Project File
General File

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MUNEKIYO HIRAGA, INC.

March 25, 2002

John E. Min, Director
Department of Planning
County of Maui
2200 Main Street, Suite 335
Wailuku, Hawaii 96793

SUBJECT: <u>Proposed Alanui Ka'Imi'Ike Extension (Job No. 01-07)</u>

Dear Mr. Min:

Thank you for your comment letter dated October 11, 2001 regarding the subject project. In response to the comments provided, we note the following.

The applicant is currently preparing an application for a SMA Use Permit. Further, the application will include an Environmental Assessment, which will address drainage related issues.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

Dean K. Frampton, Planner

DKF:lfm
cc: Joe Krueger, Dept. of Public Works and Waste Management
Scott Kunioka, Shimabukuro, Endo & Yoshizaki
sey\alanui\planning.001

305 High Street, Suite 104 · Wailuku, Hawaii [illegible] · ph: (808)244-2015 · fax: [illegible] · planning@[illegible]

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DEPARTMENT OF WATER SUPPLY

COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 270-7816 • Fax (808) 270-7833

November 1, 2001

Dean Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793
Phone: (808) 244-2015

Re: TMK: 5-03-03:015; 038
Project Name: Proposed Alanui Ka' Imi' Ike Extension
Pre-Assessment Consultation For Environmental Assessment

Dear Mr. Dean Frampton,

Thank you for the opportunity to comment on this proposal. The Department of Water Supply has the following suggestions at this time.

The project area is adjacent to DWS water system on the Kamiloloa Aquifer with in the SMA boundary. The Kamiloloa has a sustainable and developable yield of 2 mgd. In order to protect Molokai's groundwater and surface water resources, DWS asks that the EA contain information delineating how potential ground water pollutants will be mitigated during the construction phase to limit impacts to the aquifer and SMA. We have attached sample BMP's for principal operations that minimize infiltration and runoff from construction and vehicle operations. Additional information is available from the State Department of Health.

The project area borders existing DWS waterlines. The applicant is required to coordinate improvements with DWS. Our Engineering Department can be reached at 270-7835.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

David R. Craddick
Director

mni
C: Engineering division
Applicant, w/ attachments

1) References from "The Megamanual - Nonpoint Source Management Manual." Commonwealth of Massachusetts
2) Selected BMP's from "Guidance Specifying Management Measures For Sources of Nonpoint Pollution to Coastal Waters." U.S. EPA
3)...Native and Polynesian Plants _ Molokai Zone 3

EPA

United States
Environmental Protection
Agency

Office of Water
Washington, DC 20460

840-B-92-002
January 1993

Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
Section 6217(g) of the Coastal Zone Act
Reauthorization Amendments of 1990

VII. ROADS, HIGHWAYS, AND BRIDGES

NOTE: Management Measures II.A and II.B of this chapter also apply to planning, siting, and developing roads and highways.[6]

A. Management Measure for Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:

(1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;

(2) Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and

(3) Limit disturbance of natural drainage features and vegetation.

1. Applicability

This measure is intended to be applied by States to site development and land disturbing activities for new, relocated, and reconstructed (widened) roads (including residential streets) and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff and associated pollutants from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The best time to address control of NPS pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls will be needed to minimize the impacts of NPS runoff on surface waters.

This management measure emphasizes the importance of planning to identify potential NPS problems early in the design process. This process involves a detailed analysis of environmental features most associated with NPS pollution, erosion and sediment problems such as topography, drainage patterns, soils, climate, existing land use, estimated traffic volume, and sensitive land areas. Highway locations selected, planned, and designed with consideration of these features will greatly minimize erosion and sedimentation and prevent NPS pollutants from entering watercourses during and after construction. An important consideration in planning is the distance between

[6] Management measure II.A applies only to runoff that emanates from the road, highway, and bridge right-of-way. This management measure does not apply to runoff and total suspended solid loadings from upland areas outside the road, highway, or bridge project.

a highway and a watercourse that is needed to buffer the runoff flow and prevent potential contaminants from entering surface waters. Other design elements such as project alignment, gradient, cross section, and the number of stream crossings also must be taken into account to achieve successful control of erosion and nonpoint sources of pollution. (Refer to Chapter 3 of this guidance for details on road designs for different terrains.)

The following case study illustrates some of the problems and associated costs that may occur due to poor road construction and design. These issues should be addressed in the planning and design phase.

> ***CASE STUDY - ANNAPOLIS, MARYLAND***
>
> Poor road siting and design resulted in concentrated runoff flows and heavy erosion that threatened several house foundations adjacent to the road. Sediment-laden runoff was also discharged into Herring Bay. To protect the Chesapeake Bay and the nearby houses, the county corrected the problem by installing diversions, a curb-and-drain urban runoff conveyance, and a rock wall filtration system, at a total cost of $100,000 (Munsey, 1992).

3. Management Measure Selection

This management measure was selected because it follows the approach to highway development recommended by the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA) guidance, and highway location and design guidelines used by the States of Virginia, Maryland, Washington, and others.

Additionally, AASHTO has location and design guidelines (AASHTO, 1990, 1991) available for State highway agency use that describe the considerations necessary to control erosion and highway-related pollutants. Federal Highway Administration policy (FHWA, 1991) requires that Federal-aid highway projects and highways constructed under direct supervision of the FHWA be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface water and ground-water resources.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

■ a. *Consider type and location of permanent erosion and sediment controls (e.g., vegetated filter strips, grassed swales, pond systems, infiltration systems, constructed urban runoff wetlands, and energy dissipators and velocity controls) during the planning phase of roads, highway, and bridges. (AASHTO, 1991; Hartigan et al., 1989)*

■ b. *All wetlands that are within the highway corridor and that cannot be avoided should be mitigated. These actions will be subject to Federal Clean Water Act section 404 requirements and State regulations.*

c. Assess and establish adequate setback distances near wetlands, waterbodies, and riparian areas to ensure protection from encroachment in the vicinity of these areas.

Setback distances should be determined on a site-specific basis since several variables may be involved such as topography, soils, floodplains, cut-and-fill slopes, and design geometry. In level or gently sloping terrain, a general rule of thumb is to establish a setback of 50 to 100 feet from the edge of the wetland or riparian area and the right-of-way. In areas of steeply sloping terrain (20 percent or greater), setbacks of 100 feet or more are recommended. Right-of-way setbacks from major waterbodies (oceans, lakes, estuaries, rivers) should be in excess of 100 to 1000 feet.

d. Avoid locations requiring excessive cut and fill. (AASHTO, 1991)

e. Avoid locations subject to subsidence, sink holes, landslides, rock outcroppings, and highly erodible soils. (AASHTO, 1991; TRB, Campbell, 1988)

f. Size rights-of-way to include space for siting runoff pollution control structures as appropriate. (AASHTO, 1991; Hartigan, et al., 1989)

Erosion and sediment control structures (extended detention dry ponds, permanent sediment traps, catchment basins, etc.) should be planned and located during the design phase and included as part of the design specifications to ensure that such structures, where needed, are provided within the highway right-of-way.

g. Plan residential roads and streets in accordance with local subdivision regulations, zoning ordinances, and other local site planning requirements (International City Managers Association, Model Zoning/Subdivision Codes). Residential road and street pavements should be designed with minimum widths.

Local roads and streets should have right-of-way widths of 36 to 50 feet, with lane widths of 10 to 12 feet. Minimum pavement widths for residential streets where street parking is permitted range from 24 to 28 feet between curbs. In large-lot subdivisions (1 acre or more), grassed drainage swales can be used in lieu of curbs and gutters and the width of paved road surface can be between 18 and 20 feet.

h. Select the most economic and environmentally sound route location. (FHWA, 1991)

i. Use appropriate computer models and methods to determine urban runoff impacts with all proposed route corridors. (Driscoll, 1990)

Computer models to determine urban runoff from streets and highways include TR-55 (Soil Conservation Service model for controlling peak runoff); the P-8 model to determine storage capacity (Palmstrom and Walker); the FHWA highway runoff model (Driscoll et al., 1990); and others (e.g., SWMM, EPA's stormwater management model; HSP continuous simulation model by Hydrocomp, Inc.).

j. Comply with National Environmental Policy Act requirements including other State and local requirements. (FHWA, T6640.8A)

k. Coordinate the design of pollution controls with appropriate State and Federal environmental agencies. (Maryland DOE, 1983)

■ *l. Develop local official mapping to show location of proposed highway corridors.*

Official mapping can be used to reserve land areas needed for public facilities such as roads, highways, bridges, and urban runoff treatment devices. Areas that require protection, such as those which are sensitive to disturbance or development-related nonpoint source pollution, can be reserved by planning and mapping necessary infrastructure for location in suitable areas.

5. Effectiveness Information and Cost Information

The most economical time to consider the type and location of erosion, sediment, and NPS pollution control is early in the planning and design phase of roads and highways. It is much more costly to correct polluted runoff problems after a road or highway has already been built. The most effective and often the most economical control is to design roads and highways as close to existing grade as possible to minimize the area that must be cut or filled and to avoid locations that encroach upon adjacent watercourses and wet areas. However, some portions of roads and highways cannot always be located where NPS pollution does not pose a threat to surface waters. In these cases, the impact from potential pollutant loadings should be mitigated. Interactive computer models designed to run on a PC are available (e.g., FHWA's model, Driscoll et al., 1990) and can be used to examine and project the runoff impacts of a proposed road or highway design on surface waters. Where controls are determined to be needed, several cost-effective management practices, such as vegetated filter strips, grassed swales, and pond systems, can be considered and used to treat the polluted runoff. These mitigating practices are described in detail in the discussion on urban developments (Management Measure IV.A).

B. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

1. Applicability

This management measure is intended to be applied by States to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges should be a coordinated effort among the States, the FHWA, the U.S. Coast Guard, and the Army Corps of Engineers. Locating bridges in coastal areas can cause significant erosion and sedimentation, resulting in the loss of wetlands and riparian areas. Additionally, since bridge pavements are extensions of the connecting highway, runoff waters from bridge decks also deliver loadings of heavy metals, hydrocarbons, toxic substances, and deicing chemicals to surface waters as a result of discharge through scupper drains with no overland buffering. Bridge maintenance can also contribute heavy loads of lead, rust particles, paint, abrasive, solvents, and cleaners into surface waters. Protection against possible pollutant overloads can be afforded by minimizing the use of scuppers on bridges traversing very sensitive waters and conveying deck drainage to land for treatment. Whenever practical, bridge structures should be located to avoid crossing over sensitive fisheries and shellfish-harvesting areas to prevent washing polluted runoff through scuppers into the waters below. Also, bridge design should account for potential scour and erosion, which may affect shellfish beds and bottom sediments.

3. Management Measure Selection

This management measure was selected because of its documented effectiveness and to protect against potential pollution impacts from siting bridges over sensitive waters and tributaries in the coastal zone. There are several examples of siting bridges to protect sensitive areas. The Isle of Palms Bridge near Charleston, South Carolina, was designed without scupper drains to protect a local fishery from polluted runoff by preventing direct discharge into the waters below. In another example, the Louisiana Department of Transportation and Development specified stringent requirements before allowing the construction of a bridge to protect destruction of fragile wetlands near New Orleans. A similar requirement was specified for bridge construction in the Tampa Bay area in Florida (ENR, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section for urban sources of pollution (Management Measure IV.A).

■ a. *Coordinate design with FHWA, USCG, COE, and other State and Federal agencies as appropriate.*

■ b. *Review National Environmental Policy Act requirements to ensure that environmental concerns are met (FHWA, T6640.8A and 23 CFR 771).*

■ c. *Avoid highway locations requiring numerous river crossings. (AASHTO, 1991)*

■ d. *Direct pollutant loadings away from bridge decks by diverting runoff waters to land for treatment.*

Bridge decks should be designed to keep runoff velocities low and control pollutant loadings. Runoff waters should be conveyed away from contact with the watercourse and directed to a stable storm drainage, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge.

■ e. *Restrict the use of scupper drains on bridges less than 400 feet in length and on bridges crossing very sensitive ecosystems.*

Scupper drains allow direct discharge of runoff into surface waters below the bridge deck. Such discharges can be of concern where the waterbody is highly susceptible to degradation or is an outstanding resource such as a spawning area or shellfish bed. Other sensitive waters include water supply sources, recreational waters, and irrigation systems. Care should be taken to protect these areas from contaminated runoff.

■ f. *Site and design new bridges to avoid sensitive ecosystems.*

Pristine waters and sensitive ecosystems should be protected from degradation as much as possible. Bridge structures should be located in alternative areas where only minimal environmental damage would result.

■ g. *On bridges with scupper drains, provide equivalent urban runoff treatment in terms of pollutant load reduction elsewhere on the project to compensate for the loading discharged off the bridge.*

5. Effectiveness Information and Cost Information

Effectively controlling NPS pollutants such as road contaminants, fugitive dirt, and debris and preventing accidental spills from entering surface waters via bridge decks are necessary to protect wetlands and other sensitive ecosystems. Therefore, management practices such as minimizing the use of scupper drains and diverting runoff waters to land for treatment in detention ponds and infiltration systems are known to be effective in mitigating pollutant loadings. Tables 4-7 and 4-8 in Section II provide cost and effectiveness data for ponds, constructed wetlands, and filtration devices.

C. Management Measure for Construction Projects

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Erosion and sedimentation from construction of roads, highways, and bridges, and from unstabilized cut-and-fill areas, can significantly impact surface waters and wetlands with silt and other pollutants including heavy metals, hydrocarbons, and toxic substances. Erosion and sediment control plans are effective in describing procedures for mitigating erosion problems at construction sites before any land-disturbing activity begins. Additional relevant practices are described in Management Measures III.A and III.B of this chapter.

Bridge construction projects include grade separations (bridges over roads) and waterbody crossings. Erosion problems at grade separations result from water running off the bridge deck and runoff waters flowing onto the bridge deck during construction. Controlling this runoff can prevent erosion of slope fills and the undermining failure of the concrete slab at the bridge approach. Bridge construction over waterbodies requires careful planning to limit the disturbance of streambanks. Soil materials excavated for footings in or near the water should be removed and relocated to prevent the material from being washed back into the waterbody. Protective berms, diversion ditches, and silt fences parallel to the waterway can be effective in preventing sediment from reaching the waterbody.

Wetland areas will need special consideration if affected by highway construction, particularly in areas where construction involves adding fill, dredging, or installing pilings. Highway development is most disruptive in wetlands since it may cause increased sediment loss, alteration of surface drainage patterns, changes in the subsurface water table, and loss of wetland habitat. Highway structures should not restrict tidal flows into salt marshes and other coastal wetland areas because this might allow the intrusion of freshwater plants and reduce the growth of salt-tolerant species. To safeguard these fragile areas, the best practice is to locate roads and highways with sufficient setback distances between the highway right-of-way and any wetlands or riparian areas. Bridge construction also can impact water circulation and quality in wetland areas, making special techniques necessary to accommodate construction. The following case study provides an example of a construction project where special considerations were given to wetlands.

CASE STUDY - BRIDGING WETLANDS IN LOUISIANA

To provide protection for an environmentally critical wetland outside New Orleans, the Louisiana Department of Transportation and Development (DOTD) required a special construction technique to build almost 2 miles of twin elevated structures for the Interstate 310 link between I-10 and U.S. Route 90. A technique known as "end-on" construction was devised to work from the decks of the structures, building each section of the bridge from the top of the last completed section and using heavy cranes to push each section forward one bay at a time. The cranes were also used to position steel platforms, drive in support pilings, and lay deck slabs, alternating this procedure between each bay. Without this technique, the Louisiana DOTD would not have been permitted to build this structure. The twin 9,200-foot bridges took 485 days to complete at a cost of $25.3 million (*Engineering News Record*, 1991).

3. Management Measure Selection

This management measure was selected because it supports FHWA's erosion and sediment control policy for all highway and bridge construction projects and is the administrative policy of several State highway departments and local governmental agencies involved in land development activity. Examples of erosion and sediment controls and NPS pollutant control practices are described in AASHTO guidelines and in several State erosion control manuals (AASHTO, 1991; North Carolina DOT, 1991; Washington State DOT, 1988). A detailed discussion of cost-effective management practices is available in the urban development section (Section II) of this chapter. These example practices are also effective for highway construction projects.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section (Section III) of this chapter.

■ a. *Write erosion and sediment control requirements into plans, specifications, and estimates for Federal aid construction projects for highways and bridges (FHWA, 1991) and develop erosion control plans for earth-disturbing activities.*

Erosion and sediment control decisions made during the planning and location phase should be written into the contract, plans, specifications, and special provisions provided to the construction contractor. This approach can establish contractor responsibility to carry out the explicit contract plan recommendations for the project and the erosion control practices needed.

■ b. *Coordinate erosion and sediment controls with FHWA, AASHTO, and State guidelines.*

Coordination and scheduling of the project work with State and local authorities are major considerations in controlling anticipated erosion and sediment problems. In addition, the contractor should submit a general work schedule and plan that indicates planned implementation of temporary and permanent erosion control practices, including shutdown procedures for winter and other work interruptions. The plan also should include proposed methods of control on restoring borrow pits and the disposal of waste and hazardous materials.

c. Install permanent erosion and sediment control structures at the earliest practicable time in the construction phase.

Permanent or temporary soil stabilization practices should be applied to cleared areas within 15 days after final grade is reached on any portion of the site. Soil stabilization should also be applied within 15 days to denuded areas that may not be at final grade but will remain exposed to rain for 30 days or more. Soil stabilization practices protect soil from the erosive forces of raindrop impact and flowing water. Temporary erosion control practices usually include seeding, mulching, establishing general vegetation, and early application of a gravel base on areas to be paved. Permanent soil stabilization practices include vegetation, filter strips, and structural devices.

Sediment basins and traps, perimeter dikes, sediment barriers, and other practices intended to trap sediment on site should be constructed as a first step in grading and should be functional before upslope land disturbance takes place. Structural practices such as earthen dams, dikes, and diversions should be seeded and mulched within 15 days of installation.

d. Coordinate temporary erosion and sediment control structures with permanent practices.

All temporary erosion and sediment controls should be removed and disposed of within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary controls should be permanently stabilized to prevent further erosion and sedimentation (AASHTO, 1991).

e. Wash all vehicles prior to leaving the construction site to remove mud and other deposits. Vehicles entering or leaving the site with trash or other loose materials should be covered to prevent transport of dust, dirt, and debris. Install and maintain mud and silt traps.

f. Mitigate wetland areas destroyed during construction.

Marshes and some types of wetlands can often be developed in areas where fill material was extracted or in ponds designed for sediment control during construction. Vegetated strips of native marsh grasses established along highway embankments near wetlands or riparian areas can be effective to protect these areas from erosion and sedimentation (FHWA, 1991).

g. Minimize the area that is cleared for construction.

h. Construct cut-and-fill slopes in a manner that will minimize erosion.

Cut-and-fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upslope drainage areas, and ground-water conditions. Suggested recommendations are as follows: reduce the length of long steep slopes by adding diversions or terraces; prevent concentrated runoff from flowing down cut-and-fill slopes by containing these flows within flumes or slope drain structures; and create roughened soil surfaces on cut-and-fill slopes to slow runoff flows. Wherever a slope face crosses a water seepage plane, thereby endangering the stability of the slope, adequate subsurface drainage should be provided.

i. Minimize runoff entering and leaving the site through perimeter and onsite sediment controls.

j. Inspect and maintain erosion and sediment control practices (both on-site and perimeter) until disturbed areas are permanently stabilized.

k. Divert and convey offsite runoff around disturbed soils and steep slopes to stable areas in order to prevent transport of pollutants off site.

l. After construction, remove temporary control structures and restore the affected area. Dispose of sediments in accordance with State and Federal regulations.

m. All storm drain inlets that are made operable during construction should be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness information presented under the construction measure for urban development is also applicable to road, highway, and bridge construction. See Tables 4-15 and 4-16 in Section III.

D. Management Measure for Construction Site Chemical Control

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

1. Applicability

This management measure is intended to be applied by States to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The objective of this measure is to guard against toxic spills and hazardous loadings at construction sites from equipment and fuel storage sites. Toxic substances tend to bind to fine soil particles; however, by controlling sediment mobilization, it is possible to limit the loadings of these pollutants. Also, some substances such as fuels and solvents are hazardous and excess applications or spills during construction can pose significant environmental impacts. Proper management and control of toxic substances and hazardous materials should be the adopted procedure for all construction projects and should be established by erosion and sediment control plans. Additional relevant practices are described in Management Measure III.B of this chapter.

3. Management Measure Selection

This management measure was selected because of existing practices that have been shown to be effective in mitigating construction-generated NPS pollution at highway project sites and equipment storage yards. In addition, maintenance areas containing road salt storage, fertilizers and pesticides, snowplows and trucks, and tractor mowers have the potential to contribute NPS pollutants to adjacent watercourses if not properly managed (AASHTO, 1988, 1991a). This measure is intended to safeguard surface waters and ground water from toxic and hazardous pollutants generated at construction sites. Examples of effective implementation of this measure are presented in the section on construction in urban areas. Several State environmental agencies are using this approach to regulate toxic and hazardous pollutants (Florida DER, 1988; Puget Sound Basin, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

The practices that are applicable to this management measure are described in Section III.B.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness data presented in the Section III.A of this chapter describing NPS controls for construction projects in urban development areas are also applicable to highway construction projects.

E. Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

1. Applicability

This management measure is intended to be applied by States to existing, restored, and rehabilitated roads, highways, and bridges. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measures and will have some flexibility in doing so. The application of measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair coastal surface waters. The program to be developed, using the practices described in this management measure, should consist of and identify standard operating procedures for nutrient and pesticide management, road salt use minimization, and maintenance guidelines (e.g., capture and contain paint chips and other particulates from bridge maintenance operations, resurfacing, and pothole repairs).

3. Management Measure Selection

This management measure for operation and maintenance was selected because (1) it is recommended by FHWA as a cost-effective practice (FHWA, 1991); (2) it is protective of the human environment (Puget Sound Water Quality Authority, 1989); (3) it is effective in controlling erosion by revegetating bare slopes (AASHTO, 1991b); (4) it is helpful in minimizing polluted runoff from road pavements (Transportation Research Board, 1991); and (5) both Federal (Richardson, 1974) and State highway agencies (Minnesota Pollution Control Agency, 1989; Pitt, 1973) advocate highway maintenance as an effective practice for minimizing pollutant loadings.

Maintenance of erosion and sediment control practices is of critical importance. Both temporary and permanent controls require frequent and periodic cleanout of accumulated sediment. Any trapping or filtering device, such as silt fences, sediment basins, buffers, inlets, and check dams, should be checked and cleaned out when approximately 50 percent of their capacity is reached, as determined by the erodible nature of the soil, flow velocity, and quantity of runoff. Seasonal and climatic differences may require more frequent cleanout of these structures. The sediments removed from these control devices should be deposited in permanently stabilized areas to prevent further erosion and sediment from reaching drainages and receiving streams. After periods of use, control devices may require replacement of deteriorated materials such as straw bales and silt fence fabrics, or restoration and reconstruction of sediment basins and riprap installations.

Permanent erosion controls such as vegetated filter strips, grassed swales, and velocity dissipators should be inspected periodically to determine their integrity and continued effectiveness. Continual deterioration or damage to these controls may indicate a need for better design or construction.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully apply to achieve the management measure described above.

■ a. *Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.*

■ b. *Establish pesticide/herbicide use and nutrient management programs.*

Refer to the Management Measure for Construction Site Chemical Control in this chapter.

■ c. *Restrict herbicide and pesticide use in highway rights-of-way to applicators certified under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure safe and effective application.*

■ d. *The use of chemicals such as soil stabilizers, dust palliatives, sterilants, and growth inhibitors should be limited to the best estimate of optimum application rates. All feasible measures should be taken to avoid excess application and consequent intrusion of such chemicals into surface runoff.*

■ e. *Sweep, vacuum, and wash residential/urban streets and parking lots.*

■ f. *Collect and remove road debris.*

■ g. *Cover salt storage piles and other deicing materials to reduce contamination of surface waters. Locate them outside the 100-year floodplain.*

■ h. *Regulate the application of deicing salts to prevent oversalting of pavement.*

■ i. *Use specially equipped salt application trucks.*

■ j. *Use alternative deicing materials, such as sand or salt substitutes, where sensitive ecosystems should be protected.*

■ k. *Prevent dumping of accumulated snow into surface waters.*

■ l. *Maintain retaining walls and pavements to minimize cracks and leakage.*

■ m. *Repair potholes.*

■ n. *Encourage litter and debris control management.*

o. Develop an inspection program to ensure that general maintenance is performed on urban runoff and NPS pollution control facilities.

To be effective, erosion and sediment control devices and practices must receive thorough and periodic inspection checks. The following is a suggested checklist for the inspection of erosion and sediment controls (AASHTO Operating Subcommittee on Design, 1990):

- Clean out sediment basins and traps; ensure that structures are stable.
- Inspect silt fences and replace deteriorated fabrics and wire connections; properly dispose of deteriorated materials.
- Renew riprapped areas and reapply supplemental rock as necessary.
- Repair/replace check dams and brush barriers; replace or stabilize straw bales as needed.
- Regrade and shape berms and drainage ditches to ensure that runoff is properly channeled.
- Apply seed and mulch where bare spots appear, and replace matting material if deteriorated.
- Ensure that culverts and inlets are protected from siltation.
- Inspect all permanent erosion and sediment controls on a scheduled, programmed basis.

p. Ensure that energy dissipators and velocity controls to minimize runoff velocity and erosion are maintained.

q. Dispose of accumulated sediment collected from urban runoff management and pollution control facilities, and any wastes generated during maintenance operations, in accordance with appropriate local, State, and Federal regulations.

r. Use techniques such as suspended tarps, vacuums, or booms to reduce, to the extent practicable, the delivery to surface waters of pollutants used or generated during bridge maintenance (e.g., paint, solvents, scrapings).

s. Develop education programs to promote the practices listed above.

5. Effectiveness Information and Cost Information

Preventive maintenance is a time-proven, cost-effective management approach. Operation schedules and maintenance procedures to restore vegetation, proper management of salt and fertilizer application, regular cleaning of urban runoff structures, and frequent sweeping and vacuuming of urban streets have effective results in pollution control. Litter control, clean-up, and fix-up practices are a low-cost means for eliminating causes of pollution, as is the proper handling of fertilizers, pesticides, and other toxic materials including deicing salts and abrasives. Table 4-30 presents summary information on the cost and effectiveness of operation and maintenance practices for roads, highways, and bridges. Many States and communities are already implementing several of these practices within their budget limitations. As shown in Table 4-30, the use of road salt alternatives such as calcium magnesium acetate (CMA) can be very costly. Some researchers have indicated, however, that reductions in corrosion of infrastructure, damage to roadside vegetation, and the quantity of material that needs to be applied may offset the higher cost of CMA. Use of road salt minimization practices such as salt storage protection and special salt spreading equipment reduces the amount of salt that a State or community must purchase. Consequently, implementation of these practices can pay for itself through savings in salt purchasing costs. Similar programs such as nutrient and pesticide management can also lead to decreased expenditures for materials.

CMA Eligible for Matching Funds

Calcium magnesium acetate (CMA) is now eligible for Federal matching funds under the Bridge Program of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The Act provides 80 percent funding for use of CMA on salt-sensitive bridges in order to protect against corrosion and to extend their useful life. CMA can also be used to protect vegetation from salt damage in environmentally sensitive areas.

Table 4-30. Effectiveness and Cost Summary for Roads, Highways, and Bridges Operation and Maintenance Management Practices

	% Removal						
Management Practice	TSS	TP	TN	COD	Pb	Zn	Cost
MAINTAIN VEGETATION							
For Sediment Control							Natural succession allowed to occur -
Average:	90	NA	NA	NA	NA	NA	Avg: $100/ac/year
Reported Range:	50-100	NA	NA	NA	NA	NA	Reported Range: $50-$200/ac/year
Probable Range:	80-100	-	-	-	-	-	
For Pollutant Removal							Natural succession not allowed to occur -
Average:	60	40	40	50	50	50	Avg: $800/ac/year
Reported Range	0-100	0-100	0-70	20-80	0-100	50-60	Reported Range: $700-$900/ac/year
Probable Range:	0-100	0-100	0-100	0-100	0-100	0-100	
PESTICIDE/HERBICIDE USE MANAGEMENT							Generally accepted as an economical program to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							
STREET SWEEPING							
Smooth Street, Frequent Cleaning (One or More Passes Per Week)							Avg: $20/curb mile Reported Range: $10-$30/curb mile
Average:	20	NA	NA	5	25	NA	
Reported Range:	20	NA	NA	0-10	5-35	NA	
Probable Range:	20-50	-	-	0-10	20-50	10-30	
Infrequent Cleaning (One Pass Per Month or Less)							
Average:	NA	NA	NA	NA	5	NA	
Reported Range:	NA	NA	NA	NA	0-10	NA	
Probable Range:	0-20	-	-	-	0-20	0-10	
LITTER CONTROL							Generally accepted as an economical approach to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							

Table 4-30. (Continued)

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
GENERAL MAINTENANCE (e.g., pothole and roadside repairs)							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:							
PROTECTION OF SALT PILES							For salt storage building - Ave: $30/ton salt Reported Range: $10-$70/ton salt
Average:	NA						
Reported Range:	NA						
Probable Range:	90-100[a]						
MINIMIZATION OF APPLICATION OF DEICING SALTS							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
SPECIALLY EQUIPPED SALT APPLICATION TRUCKS							For spread rate control on truck - Ave: $6,000/truck Reported Range: $6,000/truck
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
USE OF ALTERNATIVE DEICING MATERIALS							CMA - Ave: $650/ton Reported Range: $650/ton (note: cost of salt $30/ton)
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
CONTAIN POLLUTANTS GENERATED DURING BRIDGE MAINTENANCE							Varies with method of containment use
Average:	NA						
Reported Range:	NA						
Probable Range:	50-100[b]						

NA = Not applicable.
[a]Measured as reduction in salt.
[b]Measured as reduction of all pollutants.

F. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

1. Applicability

This management measure is intended to be applied by States to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries. In areas where such adverse impacts to surface waters can be attributed to adjacent roads or bridges, retrofit management projects to protect these waters may be needed (e.g., installation of structural or nonstructural pollution controls). Retrofit projects can be located in existing rights-of-way, within interchange loops, or on adjacent land areas. Areas with severe erosion and pollution runoff problems may require relocation or reconstruction to mitigate these impacts.

Runoff management systems are a combination of nonstructural and structural practices selected to reduce nonpoint source loadings from roads, highways, and bridges. These systems are expected to include structural improvements to existing runoff control structures for water quality purposes; construction of new runoff control devices, where necessary to protect water quality; and scheduled operation and maintenance activities for these runoff control practices. Typical runoff controls for roads, highways, and bridges include vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

3. Management Measure Selection

This management measure was selected because of the demonstrated effectiveness of retrofit systems for existing roads and highways that were constructed with inadequate nonpoint source pollution controls or without such controls. Structural practices for mitigating polluted runoff from existing highways are described in the literature (Silverman, 1988).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

■ *a. Locate runoff treatment facilities within existing rights-of-way or in medians and interchange loops.*

■ *b. Develop multiple-use treatment facilities on adjacent lands (e.g., parks and golf courses).*

■ *c. Acquire additional land for locating treatment facilities.*

■ *d. Use underground storage where no alternative is available.*

■ *e. Maximize the length and width of vegetated filter strips to slow the travel time of sheet flow and increase the infiltration rate of urban runoff.*

5. Effectiveness Information and Cost Information

Cost and effectiveness data for structural urban runoff management and pollution control facilities are outlined in Tables 4-15 and 4-16 in Section III and discussed in Section IV of this chapter and are applicable to determine the cost and effectiveness of retrofit projects. Retrofit projects can often be more costly to construct because of the need to locate the required structures within existing space or the need to locate the structures within adjacent property that requires purchase. However, the use of multiple-use facilities on adjacent lands, such as diverting runoff waters to parkland or golf courses, can offset this cost. Nonstructural practices described in the urban section also can be effective in achieving source control. As with other sections of this document, the costs of loss of habitat, fisheries, and recreational areas must be weighed against the cost of retrofitting control structures within existing rights-of-way.

6. Pollutants of Concern

Table 4-31 lists the pollutants commonly found in urban runoff from roads, highways, and bridges and their sources. The disposition and subsequent magnitude of pollutants found in highway runoff are site-specific and are affected by traffic volume, road or highway design, surrounding land use, climate, and accidental spills.

The FHWA conducted an extensive field monitoring and laboratory analysis program to determine the pollutant concentration in highway runoff from 31 sites in 11 States (Driscoll et al., 1990). The event mean concentrations (EMCs) developed in the study for a number of pollutants are presented in Table 4-32. The study also indicated that for highways discharging into lakes, the pollutants of major concern are phosphorus and heavy metals. For highways discharging into streams, the pollutants of major concern are heavy metals—cadmium, copper, lead, and zinc.

Table 4-31. Highway Runoff Constituents and Their Primary Sources

Constituents	Primary Sources
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, break lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anticake compound (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular
Sodium, Calcium, Chloride	Deicing salts
Sulphate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate

In colder regions where deicing agents are used, deicing chemicals and abrasives are the largest source of pollutants during winter months. Deicing salt (primarily sodium chloride, NaCl) is the most commonly used deicing agent. Potential pollutants from deicing salt include sodium chloride, ferric ferrocyanide (used to keep the salt in granular form), and sulfates such as gypsum. Table 4-33 summarizes potential environmental impacts caused by road salt. Other chemicals used as a salt substitute include calcium magnesium acetate (CMA) and, less frequently, urea and glycol compounds. Researchers have differing opinions on the environmental impacts of CMA compared to those of road salt (Chevron Chemical Company, 1991; Salt Institute, undated; Transportation Research Board, 1991).

Table 4-32. Pollutant Concentrations in Highway Runoff (Driscoll et al., 1990)

Pollutant	Event Mean Concentration for Highways With Fewer Than 30,000 Vehicles/Day[a] (mg/L)	Event Mean Concentration for Highways With More Than 30,000 Vehicles/Day[a] (mg/L)
Total Suspended Solids	41	142
Volatile Suspended Solids	12	39
Total Organic Carbon	8	25
Chemical Oxygen Demand	49	114
Nitrite and Nitrate	0.46	0.76
Total Kjeldahl Nitrogen	0.87	1.83
Phosphate Phosphorus	0.16	0.40
Copper	0.022	0.054
Lead	0.080	0.400
Zinc	0.080	0.329

[a]Event mean concentrations are for the 50% median site.

Table 4-33. Potential Environmental Impacts of Road Salts

Environmental Resource	Potential Environmental Impact of Road Salt (NaCl)
Soils	May accumulate in soil. Breaks down soil structure, increases erosion. Causes soil compaction that results in decreased permeability.
Vegetation	Osmotic stress and soil compaction harm root systems. Spray causes foliage dehydration damage. Many plant species are salt-sensitive.
Ground Water	Mobile Na and Cl ions readily reach ground water. Increases NaCl concentration in well water, as well as alkalinity and hardness.
Surface Water	Causes density stratification in ponds and lakes that can prevent reoxygenation. Increases runoff of heavy metals and nutrients through increased erosion.
Aquatic Life	Monovalent Na and Cl ions stress osmotic balances. Toxic levels: Na - 500 ppm for strickleback; Cl - 400 ppm for trout.
Human/Mammalian	Sodium is linked to heart disease and hypertension. Chlorine causes unpleasant taste in drinking water. Mild skin and eye irritant. Acute oral LD_{50} in rats is approximately 3,000 mg/kg (slightly toxic).

MASSACHUSETTS NONPOINT SOURCE MANAGEMENT MANUAL

"THE MEGAMANUAL"

A GUIDANCE DOCUMENT FOR MUNICIPAL OFFICIALS

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APPENDIX C

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Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
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Reauthorization Amendments of 1990

III. CONSTRUCTION ACTIVITIES

A. Construction Site Erosion and Sediment Control Management Measure

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to all construction activities on sites less than 5 acres in areas that do not have an NPDES permit[3] in order to control erosion and sediment loss from those sites. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the NPDES regulations and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The goal of this management measure is to reduce the sediment loadings from construction sites in coastal areas that enter surface waterbodies. This measure requires that coastal States establish new or enhance existing State erosion and sediment control (ESC) programs and/or require ESC programs at the local level. It is intended to be part of a comprehensive land use or watershed management program, as previously detailed in the Watershed and Site Development Management Measures. It is expected that State and local programs will establish criteria determined by local conditions (e.g., soil types, climate, meteorology) that reduce erosion and sediment transport from construction sites.

Runoff from construction sites is by far the largest source of sediment in urban areas under development (York County Soil and Water Conservation District, 1990). Soil erosion removes over 90 percent of sediment by tonnage in urbanizing areas where most construction activities occur (Canning, 1988). Table 4-14 illustrates some of the

[3] On May 27, 1992, the United States Court of Appeals for the Ninth Circuit invalidated EPA's exemption of construction sites smaller than 5 acres from the storm water permit program in *Natural Resources Defense Council* v. *EPA*, 965 F.2d 759 (9th Cir. 1992). EPA is conducting further rulemaking proceedings on this issue and will not require permit applications for construction activities under 5 acres until further rulemaking has been completed.

measured sediment loading rates associated with construction activities found across the United States. As seen in Table 4-14, erosion rates from natural areas such as undisturbed forested lands are typically less than one ton/acre/year, while erosion from construction sites ranges from 7.2 to over 1,000 tons/acre/year.

Table 4-14. Erosion and Sediment Problems Associated With Construction

Location	Problem	Reference
United States	Sediment loading rates vary from 36.5 to 1,000 ton/ac/yr. These are 5 to 500 times greater than those from undeveloped land. Approximately 600 million tons of soil erodes from developed sites each year. Construction site sediment in runoff can be 10 to 20 times greater than that from agricultural lands.	York County Soil and Water Conservation District, 1990
Franklin County, FL	Sediment yield (ton/ac/yr): forest < 0.5 rangeland < 0.5 tilled 1.4 construction site 30 established urban < 0.5	Franklin County, FL
Wisconsin	Erosion rates range from 30 to 200 ton/ac/yr (10 to 20 times those of cropland).	Wisconsin Legislative Council, 1991
Washington, DC	Erosion rates range from 35 to 45 ton/ac/yr (10 to 100 times greater than agriculture and stabilized urban land uses).	MWCOG, 1987
Anacostia River Basin, VA, MD, DC	Sediment yields from portions of the Anacostia Basin have been estimated at 75,000 to 132,000 ton/yr.	U.S. Army Corps of Engineers, 1990
Washington	Erosion rates range from 50 to 500 ton/ac/yr. Natural erosion rates from forests or well-sodded prairies are 0.01 to 1.0 ton/ac/yr.	Washington Department of Ecology, 1989
Anacostia River Basin, VA, MD, DC	Erosion rates range from 7.2 to 100.8 ton/ac/yr.	USGS, 1978
Alabama	1.4 million tons eroded per year.	Woodward-Clyde, 1991
North Carolina	6.7 million tons eroded per year.	
Louisiana	5.1 million tons eroded per year.	
Oklahoma	4.2 million tons eroded per year.	
Georgia	3.8 million tons eroded per year.	
Texas	3.5 million tons eroded per year.	
Tennessee	3.3 million tons eroded per year.	
Pennsylvania	3.1 million tons eroded per year.	
Ohio	3.0 million tons eroded per year.	
Kentucky	3.0 million tons eroded per year.	

Eroded sediment from construction sites creates many problems in coastal areas including adverse impacts on water quality, critical habitats, submerged aquatic vegetation (SAV) beds, recreational activities, and navigation (APWA, 1991). For example, the Miami River in Florida has been severely affected by pollution associated with upland erosion. This watershed has undergone extensive urbanization, which has included the construction of many commercial and residential buildings over the past 50 years. Sediment deposited in the Miami River channel contributes to the severe water quality and navigation problems of this once-thriving waterway, as well as Biscayne Bay (SFWMD, 1988).

ESC plans are important for controlling the adverse impacts of construction and land development and have been required by many State and local governments, as shown in Table 4-13 (in the Site Development section of this chapter). An ESC plan is a document that explains and illustrates the measures to be taken to control erosion and sediment problems on construction sites (Connecticut Council on Soil and Water Conservation, 1988). It is intended that existing State and local erosion and sediment control plans may be used to fulfill the requirements of this management measure. Where existing ESC plans do not meet the management measure criteria, inadequate plans may be enhanced to meet the management measure guidelines.

Typically, an ESC plan is part of a larger site plan and includes the following elements:

- Description of predominant soil types;
- Details of site grading including existing and proposed contours;
- Design details and locations for structural controls;
- Provisions to preserve topsoil and limit disturbance;
- Details of temporary and permanent stabilization measures; and
- Description of the sequence of construction.

ESC plans ensure that provisions for control measures are incorporated into the site planning stage of development and provide for the reduction of erosion and sediment problems and accountability if a problem occurs (York County Soil and Water Conservation District, 1990). An effective plan for urban runoff management on construction sites will control erosion, retain sediments on site, to the extent practicable, and reduce the adverse effects of runoff. Climate, topography, soils, drainage patterns, and vegetation will affect how erosion and sediment should be controlled on a site (Washington State Department of Ecology, 1989). An effective ESC plan includes both structural and nonstructural controls. Nonstructural controls address erosion control by decreasing erosion potential, whereas structural controls are both preventive and mitigative because they control both erosion and sediment movement.

Typical nonstructural erosion controls include (APWA, 1991; York County Soil and Water Conservation District, 1990):

- Planning and designing the development within the natural constraints of the site;
- Minimizing the area of bare soil exposed at one time (phased grading);
- Providing for stream crossing areas for natural and man-made areas; and
- Stabilizing cut-and-fill slopes caused by construction activities.

Structural controls include:

- Perimeter controls;
- Mulching and seeding exposed areas;
- Sediment basins and traps; and
- Filter fabric, or silt fences.

Some erosion and soil loss are unavoidable during land-disturbing activities. While proper siting and design will help prevent areas prone to erosion from being developed, construction activities will invariably produce conditions where erosion may occur. To reduce the adverse impacts associated with construction, the construction management measure suggests a system of nonstructural and structural erosion and sediment controls for incorporation into an

ESC plan. Erosion controls have distinct advantages over sediment controls. Erosion controls reduce the amount of sediment transported off-site, thereby reducing the need for sediment controls. When erosion controls are used in conjunction with sediment controls, the size of the sediment control structures and associated maintenance may be reduced, decreasing the overall treatment costs (SWRPC, 1991).

3. Management Measure Selection

This management measure was selected to minimize sediment being transported outside the perimeter of a construction site through two broad performance goals: (1) reduce erosion and (2) retain sediment onsite, to the extent practicable. These performance goals were chosen to allow States and local governments flexibility in specifying practices appropriate for local conditions.

While several commentors responding to the draft (May 1991) guidance expressed the need to define "more measurable, enforceable ways" to control sediment loadings, other commentors stressed the need to draft management measures that do not conflict with existing State programs and allow States and local governments to determine appropriate practices and design standards for their communities. These management measures were selected because virtually all coastal States control construction activities to prevent erosion and sediment loss.

The measures were specifically written for the following reasons:

(1) Predevelopment loadings may vary greatly, and some sediment loss is usually inevitable;

(2) Current practice is built on the use of systems of practices selected based on site-specific conditions; and

(3) The combined effectiveness of erosion and sediment controls in systems is not easily quantified.

4. Erosion Control Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Erosion controls are used to reduce the amount of sediment that is detached during construction and to prevent sediment from entering runoff. Erosion control is based on two main concepts: (1) disturb the smallest area of land possible for the shortest period of time, and (2) stabilize disturbed soils to prevent erosion from occurring.

■ *a. Schedule projects so clearing and grading are done during the time of minimum erosion potential.*

Often a project can be scheduled during the time of year that the erosion potential of the site is relatively low. In many parts of the country, there is a certain period of the year when erosion potential is relatively low and construction scheduling could be very effective. For example, in the Pacific region if construction can be completed during the 6-month dry season (May 1 - October 31), temporary erosion and sediment controls may not be needed. In addition, in some parts of the country erosion potential is very high during certain parts of the year such as the spring thaw in northern areas. During this time of year, melting snowfall generates a constant runoff that can erode soil. In addition, construction vehicles can easily turn the soft, wet ground into mud, which is more easily washed offsite. Therefore, in the north, limitations should be placed on grading during the spring thaw (Goldman et al., 1986).

b. *Stage construction.*

\void areawide clearance of construction sites. Plan and stage land disturbance activities so that only the area :urrently under construction is exposed. As soon as the grading and construction in an area are complete, the area ;hould be stabilized.

By clearing only those areas immediately essential for completing site construction, buffer zones are preserved and soil remains undisturbed until construction begins. Physical markers, such as tape, signs, or barriers, indicating the limits of land disturbance, can ensure that equipment operators know the proposed limits of clearing. The area of the watershed that is exposed to construction is important for determining the net amount of erosion. Reducing the extent of the disturbed area will ultimately reduce sediment loads to surface waters. Existing or newly planted vegetation that has been planted to stabilize disturbed areas should be protected by routing construction traffic around and protecting natural vegetation with fencing, tree armoring, retaining walls, or tree wells.

c. *Clear only areas essential for construction.*

Often areas of a construction site are unnecessarily cleared. Only those areas essential for completing construction activities should be cleared, and other areas should remain undisturbed. Additionally, the proposed limits of land disturbance should be physically marked off to ensure that only the required land area is cleared. Avoid disturbing vegetation on steep slopes or other critical areas.

d. *Locate potential nonpoint pollutant sources away from steep slopes, waterbodies, and critical areas.*

Material stockpiles, borrow areas, access roads, and other land-disturbing activities can often be located away from critical areas such as steep slopes, highly erodible soils, and areas that drain directly into sensitive waterbodies.

e. *Route construction traffic to avoid existing or newly planted vegetation.*

Where possible, construction traffic should travel over areas that must be disturbed for other construction activity. This practice will reduce the area that is cleared and susceptible to erosion.

f. *Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.*

Tree armoring protects tree trunks from being damaged by construction equipment. Fencing can also protect tree trunks, but should be placed at the tree's drip line so that construction equipment is kept away from the tree. The tree drip line is the minimum area around a tree in which the tree's root system should not be disturbed by cut, fill, or soil compaction caused by heavy equipment. When cutting or filling must be done near a tree, a retaining wall or tree well should be used to minimize the cutting of the tree's roots or the quantity of fill placed over the tree's roots.

g. *Stockpile topsoil and reapply to revegetate site.*

Because of the high organic content of topsoil, it cannot be used as fill material or under pavement. After a site is cleared, the topsoil is typically removed. Since topsoil is essential to establish new vegetation, it should be stockpiled and then reapplied to the site for revegetation, if appropriate. Although topsoil salvaged from the existing site can often be used, it must meet certain standards and topsoil may need to be imported onto the site if the existing topsoil is not adequate for establishing new vegetation.

h. *Cover or stabilize topsoil stockpiles.*

Unprotected stockpiles are very prone to erosion and therefore stockpiles must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles should be stabilized by erosion blankets, seeding, and/or mulching.

i. *Use wind erosion controls.*

Wind erosion controls limit the movement of dust from disturbed soil surfaces and include many different practices. Wind barriers block air currents and are effective in controlling soil blowing. Many different materials can be used as wind barriers, including solid board fence, snow fences, and bales of hay. Sprinkling moistens the soil surface with water and must be repeated as needed to be effective for preventing wind erosion (Delaware DNREC, 1989); however, applications must be monitored to prevent excessive runoff and erosion.

j. *Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.*

Earth dikes, perimeter dikes or swales, or diversions can be used to intercept and convey runoff above disturbed areas. An earth dike is a temporary berm or ridge of compacted soil that channels water to a desired location. A perimeter dike/swale or diversion is a swale with a supporting ridge on the lower side that is constructed from the soil excavated from the adjoining swale (Delaware DNREC, 1989). These practices should be used to intercept flow from denuded areas or newly seeded areas to keep the disturbed areas from being eroded from the uphill runoff. The structures should be stabilized within 14 days of installation. A pipe slope drain, also known as a pipe drop structure, is a temporary pipe placed from the top of a slope to the bottom of the slope to convey concentrated runoff down the slope without causing erosion (Delaware DNREC, 1989).

k. *On long or steep, disturbed, or man-made slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.*

Benches, terraces, or ditches break up a slope by providing areas of low slope in the reverse direction. This keeps water from proceeding down the slope at increasing volume and velocity. Instead, the flow is directed to a suitable outlet, such as a sediment basin or trap. The frequency of benches, terraces, or ditches will depend on the erodibility of the soils, steepness and length of the slope, and rock outcrops. This practice should be used if there is a potential for erosion along the slope.

l. *Use retaining walls.*

Often retaining walls can be used to decrease the steepness of a slope. If the steepness of a slope is reduced, the runoff velocity is decreased and, therefore, the erosion potential is decreased.

m. *Provide linings for urban runoff conveyance channels.*

Often construction increases the velocity and volume of runoff, which causes erosion in newly constructed or existing urban runoff conveyance channels. If the runoff during or after construction will cause erosion in a channel, the channel should be lined or flow control BMPs installed. The first choice of lining should be grass or sod since this reduces runoff velocities and provides water quality benefits through filtration and infiltration. If the velocity in the channel would erode the grass or sod, then riprap, concrete, or gabions can be used.

n. *Use check dams.*

Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce the erosion in a swale or channel. Check dams should be used when a swale or channel will be used for a short time and therefore it is not feasible or practical to line the channel or implement flow control BMPs (Delaware DNREC, 1989).

o. Seed and fertilize.

Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once a dense vegetative cover has been established. However, often seeding and fertilizing do not produce as thick a vegetative cover as do seed and mulch or netting. Newly established vegetation does not have as extensive a root system as existing vegetation and therefore is more prone to erosion, especially on steep slopes. Care should be taken when fertilizing to avoid untimely or excessive application. Since the practice of seeding and fertilizing does not provide any protection during the time of vegetative establishment, it should be used only on favorable soils in very flat areas and not in sensitive areas.

p. Use seeding and mulch/mats.

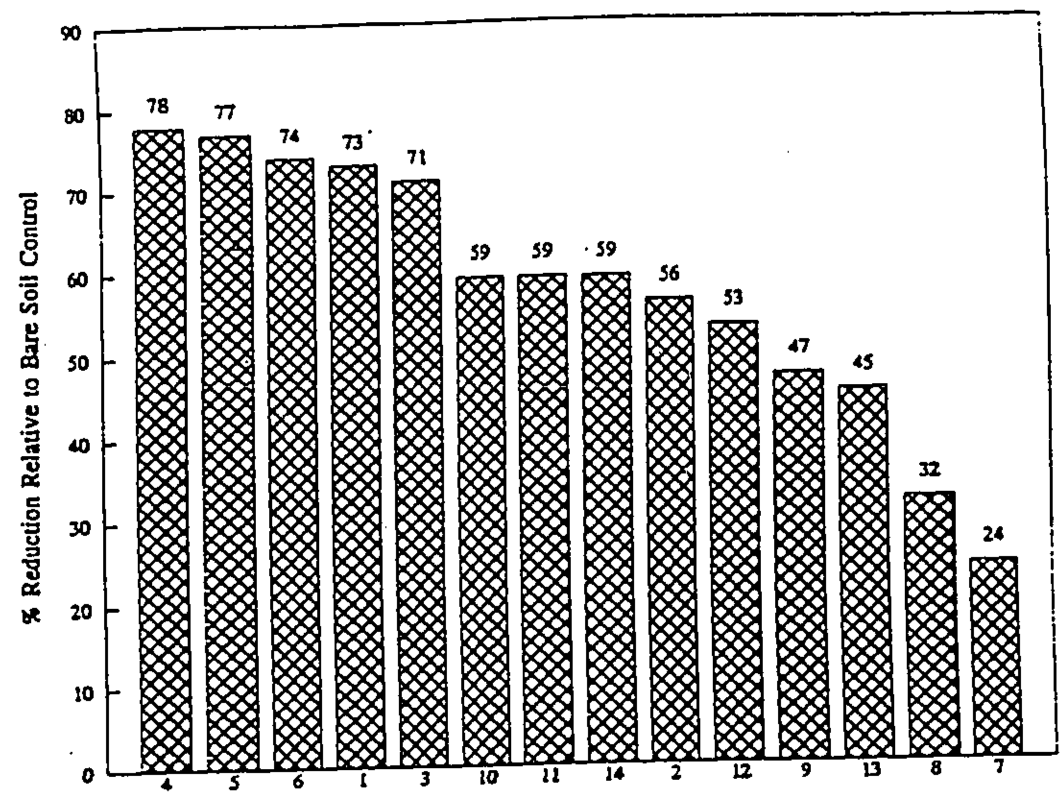
Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once the vegetative cover has been established. The mulching/mats protect the disturbed area while the vegetation becomes established.

The management of land by using ground cover reduces erosion by reducing the flow rate of runoff and the raindrop impact. Bare soils should be seeded or otherwise stabilized within 15 calendar days after final grading. Denuded areas that are inactive and will be exposed to rain for 30 days or more should also be temporarily stabilized, usually by planting seeds and establishing vegetation during favorable seasons in areas where vegetation can be established. In very flat, non-sensitive areas with favorable soils, stabilization may involve simply seeding and fertilizing. Mulching and/or sodding may be necessary as slopes become moderate to steep, as soils become more erosive, and as areas become more sensitive.

q. Use mulch/mats.

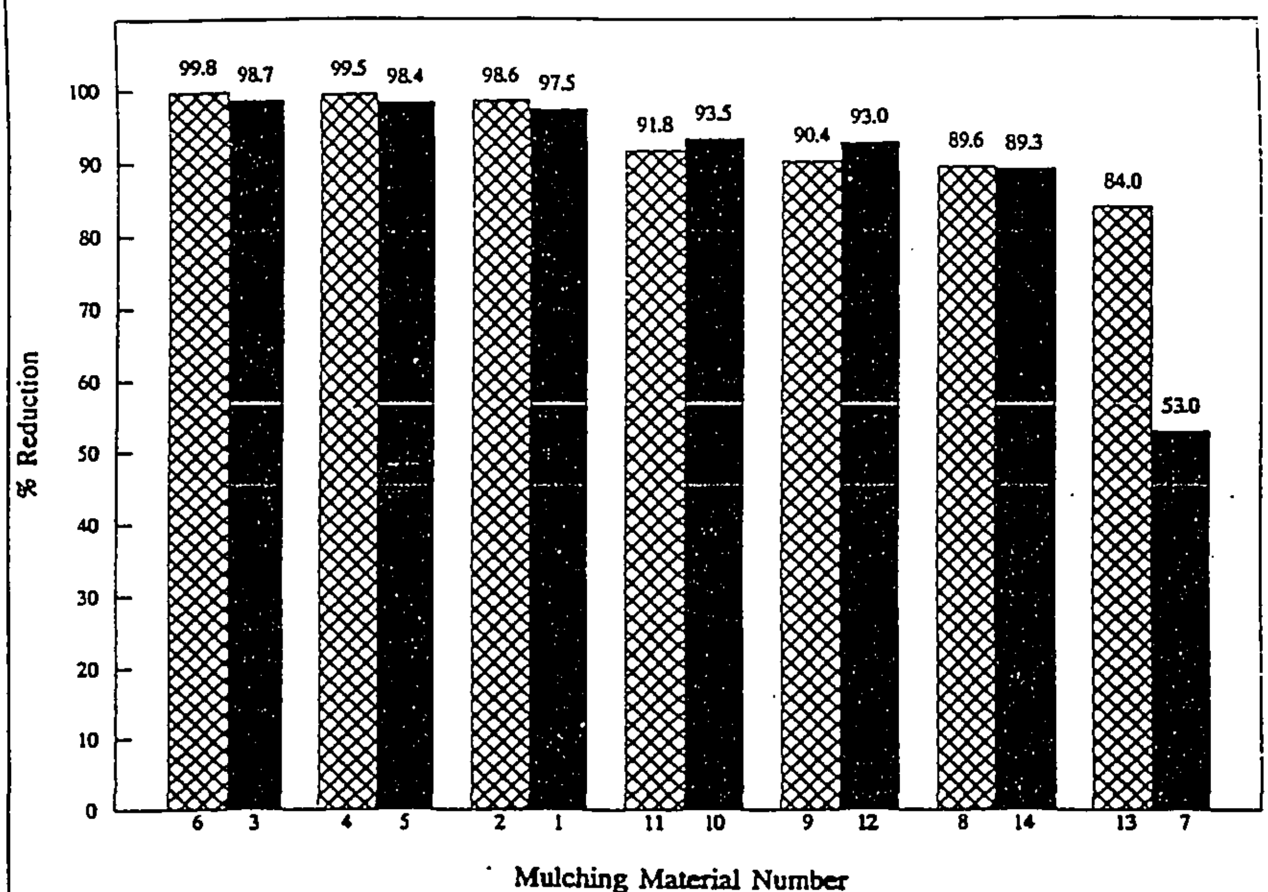
Mulching involves applying plant residues or other suitable materials on disturbed soil surfaces. Mulchs/mats used include tacked straw, wood chips, and jute netting and are often covered by blankets or netting. Mulching alone should be used only for temporary protection of the soil surface or when permanent seeding is not feasible. The useful life of mulch varies with the material used and the amount of precipitation, but is approximately 2 to 6 months. Figure 4-5 shows water velocity reductions that could be expected using various mulching techniques. Similarly, Figure 4-6 shows reductions in soil loss achievable using various mulching techniques. During times of year when vegetation cannot be established, soil mulching should be applied to moderate slopes and soils that are not highly erodible. On steep slopes or highly erodible soils, multiple mulching treatments should be used. On a high-elevation or desert site where grasses cannot survive the harsh environment, native shrubs may be planted. Interlocking ceramic materials, filter fabric, and netting are available for this purpose. Before stabilizing an area, it is important to have installed all sediment controls and diverted runoff away from the area to be planted. Runoff may be diverted away from denuded areas or newly planted areas using dikes, swales, or pipe slope drains to intercept runoff and convey it to a permanent channel or storm drain. Reserved topsoil may be used to revegetate a site if the stockpile has been covered and stabilized.

Consideration should be given to maintenance when designing mulching and matting schemes. Plastic nets are often used to cover the mulch or mats; however, they can foul lawn mower blades if the area requires mowing.



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-5. Water velocity reductions for different mulch treatments (adapted from Harding, 1990).



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-6. Actual soil loss reductions for different mulch treatments (adapted from Harding, 1990).

r. *Use sodding.*

Sodding permanently stabilizes an area. Sodding provides immediate stabilization of an area and should be used in critical areas or where establishment of permanent vegetation by seeding and mulching would be difficult. Sodding is also a preferred option when there is a high erosion potential during the period of vegetative establishment from seeding.

s. *Use wildflower cover.*

Because of the hardy drought-resistant nature of wildflowers, they may be more beneficial as an erosion control practice than turf grass. While not as dense as turfgrass, wildflower thatches and associated grasses are expected to be as effective in erosion control and contaminant absorption. Because thatches of wildflowers do not need fertilizers, pesticides, or herbicides, and watering is minimal, implementation of this practice may result in a cost savings (Brash et al., undated). In 1987, Howard County, Maryland, spent $690.00 per acre to maintain turfgrass areas, compared to only $31.00 per acre for wildflower meadows (Wilson, 1990).

A wildflower stand requires several years to become established; maintenance requirements are minimal once the area is established (Brash et al., undated).

5. Sediment Control Practices[4]

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Sediment controls capture sediment that is transported in runoff. Filtration and detention (gravitational settling) are the main processes used to remove sediment from urban runoff.

a. *Sediment Basins*

Sediment basins, also known as silt basins, are engineered impoundment structures that allow sediment to settle out of the urban runoff. They are installed prior to full-scale grading and remain in place until the disturbed portions of the drainage area are fully stabilized. They are generally located at the low point of sites, away from construction traffic, where they will be able to trap sediment-laden runoff.

Sediment basins are typically used for drainage areas between 5 and 100 acres. They can be classified as either temporary or permanent structures, depending on the length of service of the structure. If they are designed to function for less than 36 months, they are classified as "temporary"; otherwise, they are considered permanent structures. Temporary sediment basins can also be converted into permanent urban runoff management ponds. When sediment basins are designed as permanent structures, they must meet all standards for wet ponds.

b. *Sediment Trap*

Sediment traps are small impoundments that allow sediment to settle out of runoff water. Sediment traps are typically installed in a drainageway or other point of discharge from a disturbed area. Temporary diversions can be

[4]Adapted from Goldman (1986).

used to direct runoff to the sediment trap. Sediment traps should not be used for drainage areas greater than 5 acres and typically have a useful life of approximately 18 to 24 months.

c. *Filter Fabric Fence*

Filter fabric fence is available from many manufacturers and in several mesh sizes. Sediment is filtered out as urban runoff flows through the fabric. Such fences should be used only where there is sheet flow (i.e., no concentrated flow), and the maximum drainage area to the fence should be 0.5 acre or less per 100 feet of fence. Filter fabric fences have a useful life of approximately 6 to 12 months.

d. *Straw Bale Barrier*

A straw bale barrier is a row of anchored straw bales that detain and filter urban runoff. Straw bales are less effective than filter fabric, which can usually be used in place of straw bales. However, straw bales have been effectively used as temporary check dams in channels. As with filter fabric fences, straw bale barriers should be used only where there is sheet flow. The maximum drainage area to the barrier should be 0.25 acre or less per 100 feet of barrier. The useful life of straw bales is approximately 3 months.

e. *Inlet Protection*

Inlet protection consists of a barrier placed around a storm drain drop inlet, which traps sediment before it enters the storm sewer system. Filter fabric, straw bales, gravel, or sand bags are often used for inlet protection.

f. *Construction Entrance*

A construction entrance is a pad of gravel over filter cloth located where traffic leaves a construction site. As vehicles drive over the gravel, mud, and sediment are collected from the vehicles' wheels and offsite transport of sediment is reduced.

g. *Vegetated Filter Strips*

Vegetated filter strips are low-gradient vegetated areas that filter overland sheet flow. Runoff must be evenly distributed across the filter strip. Channelized flows decrease the effectiveness of filter strips. Level spreading devices are often used to distribute the runoff evenly across the strip (Dillaha et al., 1989).

Vegetated filter strips should have relatively low slopes and adequate length and should be planted with erosion-resistant plant species. The main factors that influence the removal efficiency are the vegetation type, soil infiltration rate, and flow depth and travel time. These factors are dependent on the contributing drainage area, slope of strip, degree and type of vegetative cover, and strip length. Maintenance requirements for vegetated filter strips include sediment removal and inspections to ensure that dense, vigorous vegetation is established and concentrated flows do not occur. Maintenance of these structures is discussed in Section II.A of this chapter.

6. Effectiveness and Cost Information

a. *Erosion Control Practices*

The effectiveness of erosion control practices can vary based on land slope, the size of the disturbed area, rainfall frequency and intensity, wind conditions, soil type, use of heavy machinery, length of time soils are exposed and unprotected, and other factors. In general, a system of erosion and sediment control practices can more effectively reduce offsite sediment transport than can a single system. Numerous nonstructural measures such as protecting natural or newly planted vegetation, minimizing the disturbance of vegetation on steep slopes and other highly erodible areas, maximizing the distance eroded material must travel before reaching the drainage system, and locating roads away from sensitive areas may be used to reduce erosion.

Table 4-15 contains the available cost and effectiveness data for some of the erosion controls listed above. Information on the effectiveness of individual nonstructural controls was not available. All reported effectiveness data assume that controls are properly designed, constructed, and maintained. Costs have been broken down into annual capital costs, annual maintenance costs, and total annual costs (including annualization of the capital costs).

b. Sediment Control Practices

Regular inspection and maintenance are needed for most erosion control practices to remain effective. The effectiveness of sediment controls will depend on the size of the construction site and the nature of the runoff flows. Sediment basins are most appropriate for drainage areas of 5 acres or greater. In smaller areas with concentrated flows, silt traps may suffice. Where concentrated flow leaves the site and the drainage area is less than 0.5 ac/100 ft of flow, filter fabric fences may be effective. In areas where sheet flow leaves the site and the drainage area is greater than 0.5 acre/100 ft of flow, perimeter dikes may be used to divert the flow to a sediment trap or sediment basin. Urban runoff inlets may be protected using straw bales or diversions to filter or route runoff away from the inlets.

Table 4-16 describes the general cost and effectiveness of some common sediment control practices.

c. Comparisons

Figure 4-7 illustrates the estimated TSS loading reductions from Maryland construction sites possible using a combination of erosion and sediment controls in contrast to using only sediment controls. Figure 4-8 shows a comparison of the cost and effectiveness of various erosion control practices. As can be seen in Figure 4-8, seeding or seeding and mulching provide the highest levels of control at the lowest cost.

Table 4-15. ESC Quantitative Effectiveness and Cost Summary

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sod	Immediate erosion protection where there is high erosion potential during vegetative establishment.	Average: 99% Observed range: 98% - 99% References: Minnesota Pollution Control Agency, 1989; Pennsylvania, 1983 cited in USEPA, 1991	2	Average: \$0.2 per ft^2 [\$11,300 per acre] Range: \$0.1 - \$1.1 References: SWRPC, 1991; Schueler, 1987; Virginia, 1980	Average: 5% Range: 5% Reference: SWRPC, 1991	\$0.20 per ft^2 \$7,500 per acre
Seed	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: \$400 per acre Range: \$200 - \$1000 per acre References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1980	Average: 20% Range: 15% - 25% References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991	\$300 per acre
Seed and Mulch	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: \$1,500 per acre Range: \$800 - \$3,500 per acre References: Goldman, 1986; Washington DOT, 1990; NC State, 1990; Schueler, 1987; Virginia, 1980; SWRPC, 1991	Average: NA[b] Range: NA References: None	\$1,100 per acre

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Mulch	Temporary stabilization of disturbed area.	Observed range: sand: (20% slope / 50% slope) wood fiber @ 1500 lb/ac: 50-60% / 0-20% wood fiber @ 3000 lb/ac: 50-85% / 50-70% straw @ 3000 lb/ac: 90-100% / 95%	Straw mulch: 0.25	Straw mulch: Average: \$1,700 per acre Range: \$500 - \$5,000 per acre References: Wisconsin DOT cited in SWRPC, 1991; Washington DOT, 1990; Virginia, 1980	Average: NA[b] Range: NA References: None	Straw mulch: \$7,500 per acre
		Silt-loam: (20% slope / 50% slope) wood fiber @ 1500 lb/ac: 20-60% / 40-60% wood fiber @ 3000 lb/ac: 60-90% / 60-70% straw @ 3000 lb/ac: 80-95% / 70-90%	Wood fiber mulch: 0.33	Wood fiber mulch: Average: \$1,000 per acre Range: \$100 - \$2,300 per acre References: Washington DOT, 1990; Virginia, 1980		Wood fiber mulch: \$3,500 per acre
		Silt-clay-loam: (10-30% slope / 30-50% slope) wood fiber @ 1500 lb/ac: 5% / -- wood fiber @ 3000 lb/ac: 40% / -- jute netting: 30-60% / 30% straw @ 3000 lb/ac: 40-70% / 20-40% wood chips @ 10,000 lb/ac: 60-80% / 50-60% mulch blanket: 60-80% / 50-60% excelsior blanket: 60-80% / 50-60% multiple treatment (straw and jute): 90% / 90%	Jute netting: 0.33 Straw and jute: 0.33	Jute netting: Average: \$3,700 per acre Range: \$3,500-\$4,100 per acre References: Washington DOT, 1990; Virginia, 1980 Straw and jute: Average: \$5,400 per acre Range: \$4,000-\$9,100 per acre References: Washington DOT, 1990; Virginia, 1980		Jute netting: \$12,500 per acre Straw and jute: \$18,000 per acre
		References: Minnesota Pollution Control Agency, 1989; Kay, 1983 cited in Goldman, 1986				

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Terraces	Break up long or steep slopes.	Observed range: Land Slope / Reduction in Erosion 1-12% / 70% 12-18% / 60% 18-24% / 55% Additionally, if the slope steepness is halved, while other factors are held constant, the soil loss potential decreases 2-1/2 times. If both the slope and length are halved, the soil loss potential is decreased 4 times. References: Goldman, 1986; Beasley, 1972	2	Average: $5 per lin ft Range: $1 - $12 References: SWRPC, 1991; Goldman, 1986; Virginia, 1991	Average: 20% Range: 20% Reference: SWRPC, 1991	$4 per lin ft
All Erosion Controls	Reduce amount of sediment entering runoff.	Average: 85% Observed range: 85% Reference: Schueler, 1990	--	Varies but typically low	Varies but typically low	Varies but typically low

NA - Not available.
[a] Useful life estimated as length of construction project (assumed to be 2 years).
[b] For Total Annual Cost, assume Annual Maintenance Cost = 2% of construction cost.

Table 4-16. ESC Quantitative Effectiveness and Cost Summary for Sediment Control Practices

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sediment basin	Minimum drainage area = 5 acres, maximum drainage area = 100 acres	Average: 70% Observed range: 55% - 100% References: Schueler, 1990; Engle, BW and Jarrett, AR, 1990; Baumann, 1990	2	Less than 50,000 ft^3 storage Average: $0.60 per ft^3 storage ($1,100 per drainage acre[c]) Range: $0.20 - $1.30 per ft^3 Greater than 50,000 ft^3 storage Average: $0.3 per ft^3 storage ($550 per drainage acre[c]) Range: $0.10 - $0.40 per ft^3 References: SWRPC, 1991	Average: 25% Range: 25% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	Less than 50,000 ft^3 storage $0.40 per ft^3 storage $700 per drainage acre[b] Greater than 50,000 ft^3 storage $0.20 per ft^3 storage $900 per drainage acre[c]
Sediment trap	Maximum drainage area = 5 acres	Average: 60% Observed range: (-7%) - 100% References: Schueler, et al., 1990; Tahoe Regional Planning Agency, 1989; Baumann, 1990	1.5	Average: $0.60 per ft^3 storage ($1,100 per drainage acre[c]) Range: $0.20 - $2.00 per ft^3 References: Denver COG cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986	Average: 20% Range: 20% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	$0.70 per ft^3 storage $1,300 per drainage acre[c]
Filter Fabric Fence	Maximum drainage area = 0.5 acre per 100 feet of fence. Not to be used in concentrated flow areas.	Average: 70% Observed range: 0% - 100% sand: 80% - 99% silt-loam: 50% - 80% silt-clay-loam: 0% - 20% References: Munson, 1991; Fisher et al., 1984; Minnesota Pollution Control Agency, 1989	0.5	Average: $3 per lin ft ($700 per drainage acre[c] Range: $1 - $8 per lin ft References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1991; NC State, 1990	Average: 100% Range: 100% References: SWRPC, 1991	$7 per lin ft $850 per drainage acre[c]

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Straw Bale Barrier	Maximum drainage area = 0.25 acre per 100 feet of barrier. Not to be used in concentrated flow areas.	Average: 70% Observed Range: 70% References: Virginia, 1980 cited in EPA, 1991	0.25	Average: $4 per lin ft ($1,600 per drainage acre[d] Range: $2 - $6 per lin ft References: Goldman, 1986; Virginia, 1991	Average: 100% Range: 100% References: SWRPC, 1991	$17 per lin ft $6,800 per drainage acre[d]
Inlet Protection	Protect storm drain inlet.	Average: NA Observed Range: NA References: None	1	Average: $100 per inlet Range: $50 - $150 References: SWRPC, 1991; Denver COG cited in SWRPC, 1991; Virginia, 1991; EPA cited in SWRPC, 1991	Average: 60% Range: 20% - 100% References: SWRPC, 1991; Denver COG cited in SWRPC, 1991	$150 per inlet
Construction Entrance	Removes sediment from vehicles wheels.	Average: NA Observed Range: NA References: None	2	Average: $2,000 each Range: $1,000 - $4,000 References: Goldman, 1986; NC State, 1990	Average: NA[e] Range: NA References: None	$1,500 each
				With washrack: Average: $3,000 each Range: $1,000 - $5,000 References: Virginia, 1991		$2,200 each

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Vegetative Filter Strip	Must have sheet flow.	Average: 70% Observed Range: 20% - 80% References: Hayes and Hairston, 1983 cited in Casman, 1990; Dillaha et al., 1989, cited in Glick et al., 1991; Virginia Department of Conservation, 1987; Nonpoint Source Control Task Force, 1983 cited in Minnesota PCA, 1989; Schueler, 1987	2	Established from existing vegetation- Average: $0 Range: $0 References: Schueler, 1987 Established from sod- Average: $11,300 per acre Range: $4,500 - $48,000 per acre References: Schueler, 1987; SWRPC, 1991	Average: NA Range: NA References: None	NA

NA - Not available.
[a] Useful life estimated as length of construction project (assumed to be 2 years)
[e] For Total Annual Cost, assume Annual Maintenance Cost=20% of construction cost.
[b] Assumes trap volume = 1800 cf/ac (0.5 inches runoff per acre).
[c] Assumes drainage area of 0.5 acre per 100 feet of fence (maximum allowed).
[d] Assumes drainage area of 0.25 acre per 100 feet of barrier (maximum allowed).

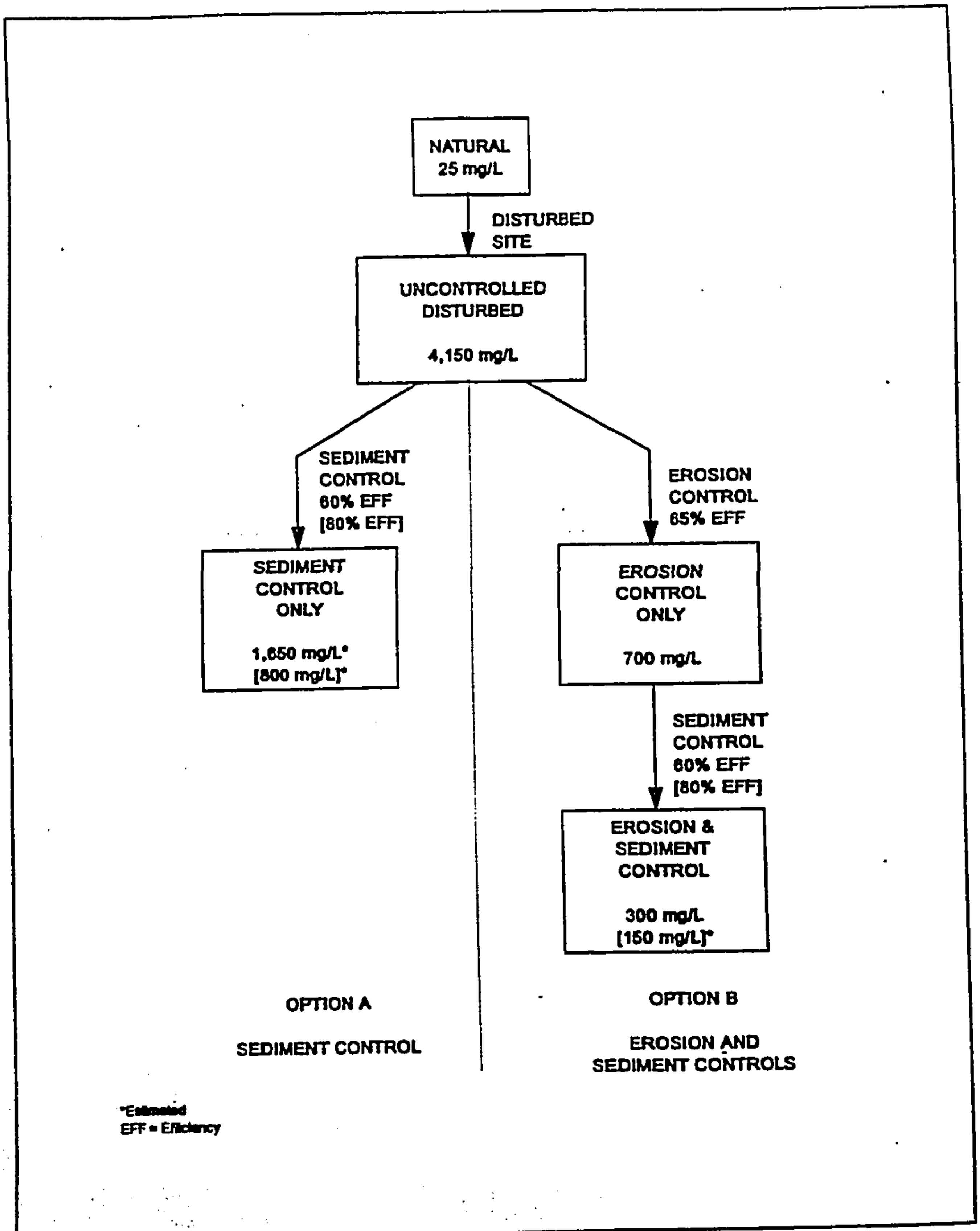


Figure 4-7. TSS concentrations from Maryland construction sites (Schueler, 1987).

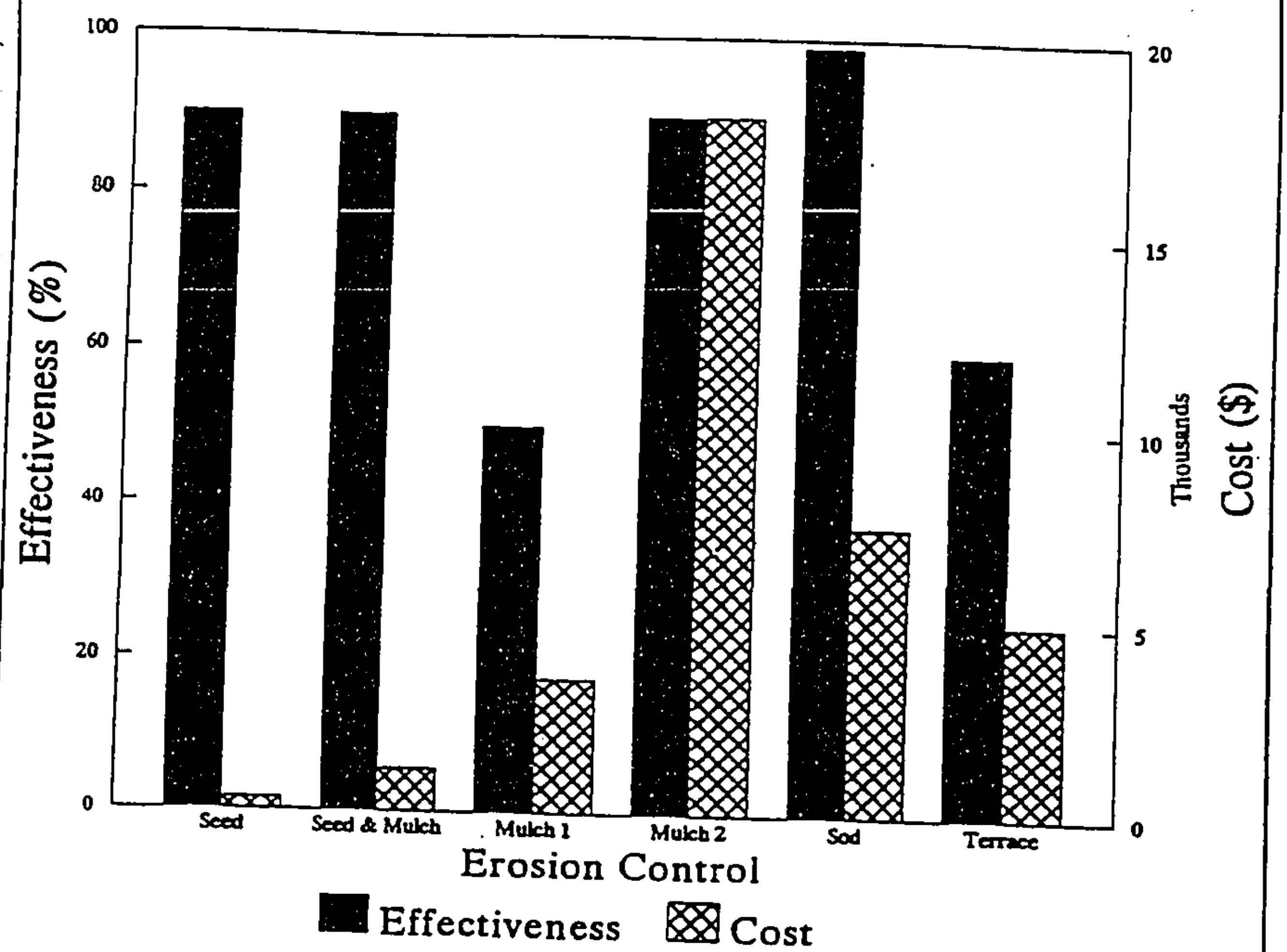


Figure 4-8. Comparison of cost and effectiveness for erosion control practices (based on information in Tables 4-15 and 4-16).

B. Construction Site Chemical Control Management Measure

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

1. Applicability

This management measure is intended to be applied by States to all construction sites less than 5 acres in area and to new, resurfaced, restored, and reconstructed road, highway, and bridge construction projects. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the *NPDES regulations* and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformance with this management measure and will have flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides (insecticides, fungicides, herbicides, and rodenticides); fertilizers used for vegetative stabilization; petrochemicals (oils, gasoline, and asphalt degreasers); construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary wastes (Washington State Department of Ecology, 1991).

The variety of pollutants present and the severity of their effects are dependent on a number of factors:

(1) **The nature of the construction activity.** For example, potential pollution associated with fertilizer usage may be greater along a highway or at a housing development than it would be at a shopping center development because highways and housing developments usually have greater landscaping requirements.

(2) **The physical characteristics of the construction site.** The majority of all pollutants generated at construction sites are carried to surface waters via runoff. Therefore, the factors affecting runoff volume,

such as the amount, intensity, and frequency of rainfall; soil infiltration rates; surface roughness; slope length and steepness; and area denuded, all contribute to pollutant loadings.

(3) **The proximity of surface waters to the nonpoint pollutant source.** As the distance separating pollutant-generating activities from surface waters decreases, the likelihood of water quality impacts increases.

a. Pesticides

Insecticides, rodenticides, and herbicides are used on construction sites to provide safe and healthy conditions, reduce maintenance and fire hazards, and curb weeds and woody plants. Rodenticides are also used to control rodents attracted to construction sites. Common insecticides employed include synthetic, relatively water-insoluble chlorinated hydrocarbons, organophosphates, carbamates, and pyrethrins.

b. Petroleum Products

Petroleum products used during construction include fuels and lubricants for vehicles, for power tools, and for general equipment maintenance. Specific petroleum pollutants include gasoline, diesel oil, kerosene, lubricating oils, and grease. Asphalt paving also can be particularly harmful since it releases various oils for a considerable time period after application. Asphalt overloads might be dumped and covered without inspection. However, many of these pollutants adhere to soil particles and other surfaces and can therefore be more easily controlled.

c. Nutrients

Fertilizers are used on construction sites when revegetating graded or disturbed areas. Fertilizers contain nitrogen and phosphorus, which in large doses can adversely affect surface waters, causing eutrophication.

d. Solid Wastes

Solid wastes on construction sites are generated from trees and shrubs removed during land clearing and structure installation. Other wastes include wood and paper from packaging and building materials, scrap metals, sanitary wastes, rubber, plastic and glass, and masonry and asphalt products. Food containers, cigarette packages, leftover food, and aluminum foil also contribute solid wastes to the construction site.

e. Construction Chemicals

Chemical pollutants, such as paints, acids for cleaning masonry surfaces, cleaning solvents, asphalt products, soil additives used for stabilization, and concrete-curing compounds, may also be used on construction sites and carried in runoff.

f. Other Pollutants

Other pollutants, such as wash water from concrete mixers, acid and alkaline solutions from exposed soil or rock, and alkaline-forming natural elements, may also be present and contribute to nonpoint source pollution.

Revegetation of disturbed areas may require the use of fertilizers and pesticides, which, if not applied properly, may become nonpoint source pollutants. Many pesticides are restricted by Federal and/or State regulations.

Hydroseeding operations, in which seed, fertilizers, and lime are applied to the ground surface in a one-step operation, are more conducive to nutrient pollution than are the conventional seedbed-preparation operations, in which fertilizers and lime are tilled into the soil. Use of fertilizers containing little or no phosphorus may be required by local authorities if the development is near sensitive waterbodies. The addition of lime can also affect the pH of sensitive waters, making them more alkaline.

Improper fueling and servicing of vehicles can lead to significant quantities of petroleum products being dumped onto the ground. These pollutants can then be washed off site in urban runoff, even when proper erosion and sediment controls are in place. Pollutants carried in solution in runoff water, or fixed with sediment crystalline structures, may not be adequately controlled by erosion and sediment control practices (Washington Department of Ecology, 1991). Oils, waxes, and water-insoluble pesticides can form surface films on water and solid particles. Oil films can also concentrate water-soluble insecticides. These pollutants can be nearly impossible to control once present in runoff other than by the use of very costly water-treatment facilities (Washington Department of Ecology, 1991).

After spill prevention, one of the best methods to control petroleum pollutants is to retain sediments containing oil on the construction site through use of erosion and sediment control practices. Improved maintenance and safe storage facilities will reduce the chance of contaminating a construction site. One of the greatest concerns related to use of petroleum products is the method for waste disposal. The dumping of petroleum product wastes into sewers and other drainage channels is illegal and could result in fines or job shutdown.

The primary control method for solid wastes is to provide adequate disposal facilities. Erosion and sediment control structures usually capture much of the solid waste from construction sites. Periodic removal of litter from these structures will reduce solid waste accumulations. Collected solid waste should be removed and disposed of at authorized disposal areas.

Improperly stored construction materials, such as pressure-treated lumber or solvents, may lead to leaching of toxics to surface water and ground water. Disposal of construction chemicals should follow all applicable State and local laws that may require disposal by a licensed waste management firm.

3. Management Measure Selection

This management measure was selected based on the potential for many construction activities to contribute to nutrient and toxic NPS pollution.

This management measure was selected because (1) construction activities have the potential to contribute to increased loadings of toxic substances and nutrients to waterbodies; (2) various States and local governments regulate the control of chemicals on construction sites through spill prevention plans, erosion and sediment control plans, or other administrative devices; (3) the practices described are commonly used and presented in a number of best management practice handbooks and guidance manuals for construction sites; and (4) the practices selected are the most economical and effective.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

■ a. *Properly store, handle, apply, and dispose of pesticides.*

Pesticide storage areas on construction sites should be protected from the elements. Warning signs should be placed in areas recently sprayed or treated. Persons mixing and applying these chemicals should wear suitable protective clothing, in accordance with the law.

Application rates should conform to registered label directions. Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State, and local regulations that govern their usage, handling, storage, and disposal. Pesticides and herbicides should be used only in conjunction with Integrated Pest Management (IPM) (see Chapter 2). Pesticides should be the tool of last resort; methods that are the least disruptive to the environment and human health should be used first.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage, and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.

Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage area, and notifying neighboring property owners prior to spraying.

b. Properly store, handle, use, and dispose of petroleum products.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Oil and oily wastes such as crankcase oil, cans, rags, and paper dropped into oils and lubricants should be disposed of in proper receptacles or recycled. Waste oil for recycling should not be mixed with degreasers, solvents, antifreeze, or brake fluid.

c. Establish fuel and vehicle maintenance staging areas located away from all drainage courses, and design these areas to control runoff.

Proper maintenance of equipment and installation of proper stream crossings will further reduce pollution of water by these sources. Stream crossings should be minimized through proper planning of access roads. Refer to Chapter 3 for additional information on stream crossings.

d. Provide sanitary facilities for constructions workers.

e. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff of pollutants and contamination of ground water.

f. Develop and implement a spill prevention and control plan. Agencies, contractors, and other commercial entities that store, handle, or transport fuel, oil, or hazardous materials should develop a spill response plan.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Spill control plan components should include:

- Stop the source of the spill.
- Contain any liquid.
- Cover the spill with absorbent material such as kitty litter or sawdust, but do not use straw. Dispose of the used absorbent properly.

g. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm sewer systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled. Do not discharge any solvents into sewers.

Washout from concrete trucks should be disposed of into:

- A designated area that will later be backfilled;
- An area where the concrete wash can harden, can be broken up, and then can be placed in a dumpster; or
- A location not subject to urban runoff and more than 50 feet away from a storm drain, open ditch, or surface water.

Never dump washout into a sanitary sewer or storm drain, or onto soil or pavement that carries urban runoff.

h. Develop and implement nutrient management plans.

Properly time applications, and work fertilizers and liming materials into the soil to depths of 4 to 6 inches. Using soil tests to determine specific nutrient needs at the site can greatly decrease the amount of nutrients applied.

i. Provide adequate disposal facilities for solid waste, including excess asphalt, produced during construction.

j. Educate construction workers about proper materials handling and spill response procedures. Distribute or post informational material regarding chemical control.

MUNEKIYO HIRAGA, INC.

March 25, 2002

David Craddick, Director
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension
Job No.: 01-07

Dear Mr. Craddick:

Thank you for your comment letter dated November 1, 2001 regarding the subject project. In response to the comments provided, we would like to note the following.

The applicant intends to utilize a system of Best Management Practices (BMPs) in order to protect the groundwater and surface water resources in the vicinity of the proposed project area. The Environmental Assessment (EA) will include mitigation efforts proposed to minimize infiltration and runoff from construction related activities.

As the proposed roadway borders existing Department of Water Supply waterlines, the applicant will coordinate project improvements with the Engineering Division of the Department of Water Supply.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.
Dean K. Frampton, Planner

DKF:cc
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki
sey\alanui\dwsltr.001

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

NOV 16 2001

JAMES "KIMO" APANA
MAYOR

OUR REFERENCE
ty
YOUR REFERENCE

POLICE DEPARTMENT

COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

November 13, 2001

Mr. Dean K. Frampton
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Frampton:

SUBJECT: Proposed Alanui Ka'Imi'Ike Extension
Job No. 01-07

Thank you for your letter of October 3, 2001, requesting comments on the above subject.

The project summary on this subject was reviewed. Please refer to a copy of the enclosed recommendations. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Robert Tam Ho
for: Thomas M. Phillips
Chief of Police

Enclosure

c: John E. Min, Planning Department

COPY

Terry,
Plz Prepare letter.
4-4 11/3/01

TO : THOMAS PHILLIPS, CHIEF OF POLICE, MAUI POLICE DEPARTMENT

VIA : CHANNELS

FROM : KELLY M. ARLOS, POLICE OFFICER III, MOLOKAI PATROL

SUBJECT : PROPOSED ALANUI KA'IMI' IKE EXTENSION

10/26/2001

KA 10.29.01
CC: Forms / Response
No issues.
Copy to Capt. Yabuta

Sir this To/From is being respectfully submitted in regards to the above project being proposed by the County of Maui Department of PublicWorks and Waste Management. The proposal is to construct an extension of Alanui Ka' Imi' Ike (Entrance to the Molokai Education Center) to connect with Kalohi Street in Kaunakakai, Hawaii.

Munekiyo and Hiraga, Inc. have been awarded the project and do not have a tentative start date as of yet. The proposed action will involve the use of both County and Federal funds which will require a review by Federal agencies. Furthermore a public hearing will be held on October 30, 2001 at the Mitchell Pauole Center to hear any concerns from the community.

Dean FRAMPTON, a planner with Munekiyo and Hiraga Inc. relates that construction could start sometime in 2002 and will take approximately one year to complete. Work will be conducted Monday through Friday with the exception of Holidays from 0800 hours to 1400 hours.

I do not for see any problems in constructing this proposed road which, when complete will benefit the community tremendously. The construction of this road will help alleviate the traffic in town from vehicles traveling to and from Ranch Camp. The road will also allow for a faster response time for emergency vehicles responding to cases east of town and speed up any evacuations which may take place for people residing in low lying areas during a flash flood, hurricane or tsunami.

Sir this communication is being respectfully submitted for your perusal.

THIS WAS DISCUSSED AT A PREVIOUS COUNCIL MEETING HERE ON MOLOKAI AND THERE WAS NO OPPOSITION FROM THE COMMUNITY. SUGGEST TERRI YAKI DRAFT A DEPT. LETTER TO THE EFFECT OF OFFICER ARLOS' RECOMMENDATION.
Capt. [illegible]
10/26/01

I foresee no problem with traffic. Work being conducted off roadway. It would benefit the community to have another roadway into ranch camp. However, Molokai education center would need to provide more parking spaces, as of now the [illegible], the roadway that would be used as right of way next to MEC..
512. 10/22/01

Kelly Arlos 10652
P.O III Molokai Patrol
102201 @ 1546 Hours

Concur
Lt. D. Matsuura
10/23/01

DOCUMENT CAPTURED AS RECEIVED

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

OCT 2 5 2001

October 23, 2001

Mr. Dean K. Frampton
Munekiyo & Hiraga, Inc.
305 High Street. Suite 104
Wailuku, HI 96793

Dear Mr. Frampton:

Subject: Proposed Alanui Ka' Imi' Ike Extension

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, we have no objection to the subject project. We encourage the developer's electrical consultant to meet with us as soon as practical to verify the project's electrical requirements so that service can be provided on a timely basis. We request that we be provided electrical, civil and mechanical final design plans for our review and comment.

If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

Neal Shinyama
Manager, Energy Delivery

NS/DT:lkh

MUNEKIYO HIRAGA, INC.

March 25, 2002

Neal Shinyama, Manager
Energy Delivery
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733-6898

SUBJECT: Proposed Alanui Ka' Imi' Ike Extension

Dear Mr. Shinyama:

Thank you for your letter dated October 23, 2001 regarding the subject project. In response to the comments provided, we note the following.

The applicant's electrical consultant will coordinate with MECO as soon as practical to facilitate the timely delivery of the project's electrical requirements. In addition, electrical, civil, and mechanical plans will be provided for your review and comment.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.

Dean K. Frampton, Planner

DKF:cc

cc: Joe Krueger, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

sey\alanui\meco\ltr

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

NOV 0 5 2001

Hoolehua Hawaiian Civic Club
P. O. Box 728
Kaunakakai, HI 96729

Dean K. Frampton, Planner
Munekio & Hiraga, Inc.
305 High Street Suite 104
Wailuku, HI 96793

SUBJECT: Proposed Alanui K Imi Ike Extension
Job No. 01-107

Dear Mr. Frampton:

The membership of our club supports this proposed project. We see this as a great need. It provides another access during emergencies.

There is only one road in and out of the Ranch Camp subdivision which they must access via Ala Malama which runs through the town. During our recent Aloha Festival Parade, the road was blocked off. If an emergency occured I'm sure they would have opened for access; however, if there is another access much restriction or confinement would be reduced in case of a tsunami, hurricane, etc.

We look forward to this project becoming a reality in the very near future.

Very truly yours,

Edwina Cacoulidis

Edwina Cacoulidis, Pelekikena

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

TEL. (808) 270-7745
FAX (808) 270-7975

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

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

March 25, 2002

Edwina Cacoulidis, Pelekikena
HOOLEHUA HAWAIIAN CIVIC CLUB
P.O. Box 728
Kaunakakai, Hawaii 96729

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
JOB NO.: 01-01

Dear Ms. Cacoulidis:

On behalf of the County of Maui, I would like to thank you and the Hoolehua Civic Club for your support of the subject project.

The County of Maui shares your concern regarding the limited access into and out of the Ranch Camp Subdivision. The new roadway will provide circulation relief to Kaunakakai traffic patterns and will provide the residents of Kapaakea Loop, Seaside, and Oki Place with optional emergency evacuation routes in the event of a natural disaster.

Again, we thank you for your support of the project. Should you have any questions or concerns, please do not hesitate to contact me at 270-7845.

Sincerely,

David Goode
Director of Public Works and Waste Management

DG:sa

cc: Scot Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.
Dean K. Frampton, Munekiyo & Hiraga, Inc.

sey:alanui\edwina.ltr

From: "Barbara Kalipi" <bkalipi@QLCC.org>
To: <planning@mhinconline.com>
Sent: Wednesday, October 31, 2001 8:30 AM
Subject: PRoposed Alanui Ka 'Imi 'Ike Extension

Aloha Mr. Dean Frampton,

E kala mai for the overdue response to your letter requesting comments on the proposed road. I reviewed your letter earlier this month and did not see a problem, because I erroneously thought that the road was along the eastern boundary of the 15-acre site of the Molokai Education Center.

I have since realized that the road (just as it says!) is an extension of the current road, which means it will cut into the total parcel. When the college expands, this road will become a hazard for the safety of the students and the public who visit. I definitely favor the option of locating the road along the eastern boundary of the property, next to the Department of Hawaiian Home Lands. As I understand, this issue was discussed by the Molokai CAC and the Molokai Planning Commission and both made that recommendation. It's a sound one.

Thank you for the opportunity to comment............

Aloha,

Barbara Kalipi
Queen Liliuokalani Children's Center
Molokai Unit

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

TEL. (808) 270-7745
FAX (808) 270-7975

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
ENGINEERING DIVISION
200 SOUTH HIGH STREET
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RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

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Wastewater Reclamation Division

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

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

March 25, 2002

Barbara Kalipi
QUEEN LILIUOKALANI CHILDREN'S CENTER
MOLOKAI UNIT
P.O. Box 55
Kaunakakai, Hawaii 96748

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
JOB NO.: 01-07

Dear Mrs. Kalipi:

Thank you very much for your e-mail comments dated October 31, 2001 regarding the subject project. In response to the comments provided, we would like to note the following.

Current plans for the proposed roadway would link the Ranch Camp residential subdivision at Kalohi Street with Alanui Ka 'Imi 'Ike along the Kamehameha V Highway at the Molokai Education Center (MEC).

Your e-mail message expressed concern for the safety of MEC students and members of the public and noted the recommendations made by the Molokai Citizens Advisory Committee and the Molokai Planning Commission. Similar concerns were also articulated by community members at a Department of Public Works and Waste Management (DPWWM) public meeting held in Kaunakakai on October 30, 2001. Members in attendance also indicated preference for an easterly route alignment abutting the Department of Hawaiian Home Lands property.

From a processing standpoint, the Environmental Assessment (EA) will be prepared utilizing the Alanui Ka 'Imi 'Ike extension as the primary route alternative. The easterly route along the DHHL property will be considered in the EA as an alternative route.

The DPWWM will determine the final route alignment based upon consideration of all project related factors, including the safety of the MEC and the Kamehameha V Highway intersection, existing land use spatial allocations, community input, and cost factors for land acquisition.

Thank you for taking the time to e-mail your concerns. Should you have any questions or require additional information, please contact Wendy Kobashigawa at our Engineering Division at 270-7745.

Sincerely,

David Goode
Director of Public Works and Waste Management

DG:sa

cc: Scott Kunioka, Shimabukuro, Endo & Yoshizaki
Dean Frampton, Munekiyo & Hiraga, Inc.

sey\alanui\kalipi ltr

October 23, 2001

Fax to: Dean Frampton, Munekiyo and Hiraga
DeGray Vanderbilt: Former Members of the Molokai Citizen Advisory Committee

Copies To: Charmaine Tavares, Chair Council Planning Committee, David Goode, Director Public Works; John Min, Planning Director; Malia Akutagawa, Chairman of the Molokai Planing flo wiger, Acting MCC Provost; Donna Paoa, Coordinator Molokai Educational Center; Bill Rhyne, Former Acting Coordinator Molokai Educational Center; Scott Kunioka, Shumabukuro, Endo and Yoshizaki, Inc.; Commission; Brian Miskae, former County Planning Director.

Subject: Location of major urban collector road between Ranch Camp Subdivision and Kam V Highway and its location in relationship to our island's new Molokai Community College campus and the impacts of that location of future expansion plans and on the safety and security of Molokai youth attending the college.

Aloha Dean:

Enclosed are some following excerpts from some documents and a series of questions to be considered for the November 30 informational meeting.

Excuse any misspellings or grammar errors, but I was trying to get this out to you quickly in case you wanted to use any of the information at your meeting tomorrow with certain County officials and others to discuss strategies for the upcoming informational meeting on Molokai November 30, which I understand is being sponsored by Public Works.

As I mentioned to you, I will be glad to go to the expense of flying over to Maui to attend your strategy meeting if there is any interest in having a former member of the CAC involved in your discussions.

DOCUMENT EXCERPTS, POSITION STATEMENS, NOTES AND QUESTIONS TO BE CONSIDERED FOR NOVEMBER 30 INFORMATIONAL MEETING:

DOCUMENT 1. Recommended Revisions to the Molokai Community Plan submitted to the Maui County Planning Director January 23, 1994 by the MOLOKAI CITIZENS ADVISORY COMMITTEE after it had held 21 public community meetings on Molokai over a 270-day review period.

EXCERPT FROM DOCUMENT: *"Education: Encourage a new campus of Maui Community College located on Molokai to be designated as Molokai Community College."*

"The CAC felt that a number of decisions affecting the island were often made in other places other than Molokai. This lack of local control led residents to perceive that Molokai does not have the political clout necessary o cause decisions to be made for the benefit of Molokai's people" (emphasis added)

"The Public/Quasi-Public designation east of the new ball park is proposed to be expanded.... at least 15 acres of this (area) should be the site for Molokai campus of Maui Community College."

"The CAC strongly recommends that MCC and the County work together on the provision of a swimming pool, gymnasium, tennis courts and common parking area on this site."

"A proposed access road from Ranch Camp (subdivision) to Kamehameha V Highway is recommended to be deleted from the Land Use Map (of the 1984 Molokai Community Plan). The extension recommended is proposed to be shown as a dotted line abutting Department of Hawaiian Home Lands owned lands." (see attached map)

NOTE: The CAC's recommendations were formally supported by the Maui County Planning Director, Brian Miskae, and approved by the Molokai Planning Commission and forwarded on to the County Council in 1995.

NOTE: The CAC intended that the entire site (from the new ball park on the west to Hawaiian Home Lands on the east) be use for the future expansion of the Molokai College Campus and also for the development of County/College joint use/development projects such as a new gym, tennis courts and a 50-meter pool that would allow our youth the same swimming competitive advantage as the youth on Maui and on Lanai enjoy. No one defined whether the site was 15 or 18 acres net of the road. Whatever the site size, exclusive of MEO's site, was to be dedicated to the development of joint use facilities, as well as, a college campus Molokai could be proud of.

NOTE: It was intended that the Molokai Community College campus would define the eastern boundary of Kaunakakai Town. There was never any intention of having the college campus squeezed in between the new ball park to the west and some development alternative to the east. This is why no boundary lines were drawn by the CAC, the Planning Director or the Molokai Planning Commission to define a smaller college campus within the 15 plus acre site.

DOCUMENT 2. Letter from Dr. Clyde M. Sakamoto, Maui Community College Provost to The Honorable Charmaine Tavares, Chair of the County Council's Planning Committee:

"In response to a "Proposed Molokai Community Plan"(sent to the County Council in 1995)to provide for a Public/Quasi Public designation of approximately 15 acres for Maui Community College site, the College projects that such an allocation would be adequate into the foreseeable future. However, depending upon other higher educational activities, which may be requested by community, more acreage may be required." (emphasis added)

Document 3. Letter from Bill Rhyne, Coordinator for the Molokai Educational Center to David Goode, Director of Public Works

EXERPT FROM LETTER: *" By going forward with the proposed extension of Ka'imi'iki Road (as being proposed by Public Works), the county creates a very unsafe, hazardous thoroughfare for the college campus as well as negating any effective use of the real use of the eastern parcel due to unsafe crossing of that thoroughfare."*

Although Public Works acknowledged Mr. Rhyne's letter and indicated his suggestions would be considered in our planning and design of the project, Public Works elected not to forward Mr. Rhyne's letter on to the engineering firm which is contracted to design the road. It was not until the engineering firm became aware of the letter from a Molokai resident, that the engineering firm received a copy of Mr. Rhyne's letter.

POSITION STATEMENT: Public Works Position on Community Plan.

According to David Goode Director Public Works has been recommending to the Council that the County Council approve a roadway alignment on the community plan map along with appropriate accompanying text.

The Public Works Director indicated that as of October 23, there are four alignments to be considered by the Molokai community at the October 30 public informational meeting sponsored by Public Works. Per David Goode all four have good points and bad points. These will be discussed at the meeting.

When asked this week about holding the community hostage in favor of one alignment over another because federal funding may be lost, David mentioned that this shouldn't be an issue. He said Public Works may have to repetition the federal government for the funding but he didn't see the Federal Government having an objection to anyone of the four alignments.

5. County Council Planning Committee Staff Report.

EXERPT FROM REPORT: "*The Department of Public Works has recommended that no road alignment be placed on the map at this time (October 2000). Instead, the Department will conduct public meetings (plural) to determine the community's recommended alignment.*"

NOTE: The road Public Works wanted deleted from the community plan map was the alignment which abutted Dept. of Hawaiian Homes Lands and ran along the eastern boundary of the college campus. THIS ALIGNMENT WAS RECOMMENDED BY THE MOLOKAI CAC AND THE MAUI PLANNING DEPARTMENT AND APPROVED BY THE MOLOKAI PLANNING COMMISSION. After the Council's Planning Committee agreed to delete the aforementioned road from the Molokai community plan map, Public Works pursued the development and federal funding based on an alignment it wanted, and landowner Molokai Ranch supported, which has a major urban collector road running through the middle of the community's planned college campus site. This plan seems to fly in the face of good planning and diminishes the chances to provide maximum safety and security efficiencies required to protect island youth attending the college.

NOTE: At the October 2000 Council Planning Committee meeting on Molokai this issue came up about the college road, and the Committee voted to delete the road from the community plan which had been approved by the Molokai Planning Commission.

There was little discussion except that one Council Committee member indicated that a community plan map was not the appropriate place to show a proposed road alignment, and another Committee member advised to take it off, *because it was already a done deal.*

Question: Based on Public Works' recommendation that the Council's Planning Committee delete the college road from the map because it wanted to meet with the community and let the community decide the alignment, why did Public Works wait until October of 2001, a year later, to have a community informational meeting on the road alignment?

Question: If landowner Molokai Ranch is supporting Public Works' alignment through the middle of the college campus, what is in it for the Ranch? How does the ranch benefit more from one alignment over another?

Question: What date did the County Council approve funding for the Ranch Camp to Kam V Highway connector road? Was it before or after the Council received the Molokai Community Plan update in 1995, which showed the new college campus and proposed road alignment along the DHHL boundary line?

Question: What dollar amount was approved by the Council for the road improvement, and what were the funds to be used for?

Question: What conditions if any were place on the Council's funding approval (i.e. a need to attract Federal highway funds to help pay for the cost of the road.)

Question: During the Council's discussion of the roadway funding, was a specific alignment for the roadway discussed?

Question: If federal funding was a requirement by the Council for releasing the County funds why didn't Public Works go with the "*common sense*" road alignment that it knew was in the community plan before the County Council since 1995 when it started the process to secure federal funding for the project?

Question: When did Public Works submit it application for federal funding for the Ranch Camp to Kam V connector road?

Question: Why didn't Public Works hold a community informational meeting concerning the road alignment before it applied for the federal funding?

Question: In 1984 when the first Molokai community Plan was approved, which showed a connector road from Ranch Camp to Kam V Highway through the middle of a corn field, had the Molokai community decided on a location of its new community college site?

Question: When was the college site selected?

Question: How many community meetings did the Molokai CAC conduct during its most recent review of the Molokai Community Plan.

Question: Out of that process did the community agree on a new community college site? If so, what was the location of that site?

Question: Subsequent to the CAC's review of the community plan, how many community meetings did the Molokai Planning Commission hold during its review of the recommendations sent to it by the Molokai CAC?

Question: Out of the Planning Commission process did the Planning Commission approve a site for the future development of a Molokai Community College campus If so, where was that site located.

Question: The Molokai CAC and Molokai Planning Commission both ~~made it~~ clearly set forth a roadway alignment connecting Ranch Camp to Kam V Highway, which ran along the eastern boundary of the community's new designated college site. Is there any evidence that either the Planning Commission or the Molokai CAC intended to have a major urban roadway dissecting our island's small community college site?

Dean, if you have any questions on where some information came from or need additional documentation please give me a call (808)) 283-8171. I hope al goes well tomorrow and that the public is given a fair presentation at the November 30 meeting that show the pros and cons of all four alignment alternatives being proposed without any site garnering an edge in the decision process because of a threat that federal funding may be lost if a certain alignment is not selected by the community. I hope that your strategy meeting today concludes that the best strategy in dealing with the controversy that has been generated by forces outside our community is to keep politics out of the equation and to be upfront, open and truthful, so that the right thing can be done that is in the best interest of the Molokai community.

DeGray Vanderbilt

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

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

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

RON R. RISKA, P.E.
Wastewater Reclamation Division

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

BRIAN HASHIRO, P.E.
Highways Division

Solid Waste Division

March 25, 2002

DeGray Vanderbilt
FORMER MEMBER OF THE MOLOKAI
CITIZEN ADVISORY COMMITTEE
P.O. Box 1348
Kaunakakai, Hawaii 96748

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
JOB NO.: 01-07

Dear Mr. Vanderbilt:

We have been provided a copy of your October 23, 2001 memorandum to Dean Frampton of Munekiyo & Hiraga, Inc., and would like to take this opportunity to address the questions raised in your memorandum.

Question No. 1: Why did the Department of Public Works and Waste Management wait until October of 2001 to have a community informational meeting?

The timing of the community meeting was tied to the preparation of the Draft Environmental Assessment as part of the early consultation process. The purpose of the early consultation process under Chapter 343, Hawaii Revised Statutes is to enable the solicitation of input from agencies, organizations and the public, and to provide for timely consideration of comments submitted.

Questions No. 2: Does Molokai Ranch, Ltd. benefit from one particular alignment over another?

We have not discussed with Molokai Ranch, Ltd. their long-range plans for the area relative to alignment alternatives.

<u>Question No. 3: What date did the County Council approve funding for the connector road? Was it before or after the Council received the Molokai Community Plan Update?</u>

Funding for the new road was approved by the County Council for fiscal year 2001-2002. This approval was part of the 2001 budget ordinance. As you point out, the Molokai Community Plan Update was transmitted to the Council in 1995.

<u>Question No. 4: What was the dollar amount approved by the Council and what were the funds intended for?</u>

The Council budgeted $800,000.00 for the County's share of planning, design, and construction. Federal funding would be used for the project as well.

<u>Question No. 5: What conditions were placed on the Council's funding approval?</u>

The budgeted funds are to be used as the local match portion for this federal aid project, and that federal funds be sought for the project.

<u>Question No. 6: During the Council's discussion of the funding, was a specific alignment discussed?</u>

We are not aware of specific project parameters being discussed during the budget deliberations.

<u>Questions No. 7: Why didn't the Department of Public Works and Waste Management select the alignment advanced in the Molokai Community Plan Update transmitted to the Council in 1995?</u>

The selection of the Alanui Ka 'Imi 'Ike to Kalohi Street alignment as the preferred alignment for planning purposes was based on a number of technical factors. For example, the existing Alanui Ka 'Imi 'Ike stub out was designed in anticipation that it would be extended in the future to serve Ranch Camp. In addition, the existing 12-waterline which would be co-aligned with the Alanui Ka 'Imi 'Ike to Kalohi Street route provides a logical basis for consolidated County facilities in a single right-of-way. This preferred alignment notwithstanding, the Department has considered other alignments (including the Slaughterhouse Road alternative), as well.

Question No. 8: When did the Department of Public Works and Waste Management submit its application for federal funding?

The request for Federal funding was initiated after the project was approved by the State of Hawaii, Department of Transportation as a highway functional classification route in July, 2001.

Question No. 9: Why didn't the Department of Public Works and Waste Management hold a community informational meeting concerning the road alignment before it applied for federal funding?

The Mayor's capital improvements program, which includes the subject project, was discussed in a public meeting on October 16, 2000 in Kaunakakai, Molokai.

Question No. 10: Did the Molokai community decide on a location of the community college site when the 1984 Molokai Community Plan was approved? When was the college site approved?

The University of Hawaii's Board of Regents first approved the site in 1993.

Question No. 11: How many community meetings did the Molokai CAC conduct during its most recent review of the Molokai Community Plan?

Although the Department of Public Works and Waste Management participated in certain segments of the update process, we were not directly involved in the overall process. For that reason, we do not have that information available.

Question No. 12: Out of that process, did the community agree on a new community college site? If so, what was the location of that site?

See response to Question No. 11.

Question No. 13: Subsequent to the CAC's review of the community plan, how many meetings did the Molokai Planning Commission hold to review the CAC's recommendations?

See response to Question No. 11.

<u>Question No. 14: Did the Planning Commission approve a site for the future development of the Molokai Community College campus?</u>

See response to Question No. 11.

<u>Question No. 15: Is there any evidence that either the Planning Commission or the Molokai CAC intended to have a major urban roadway dissect the community college site?</u>

See response to Question No. 11.

I hope that the responses provided help clarify the history and basis of project planning for the Alanui Ka 'Imi 'Ike extension. Furthermore, let me assure you that the preferred alignment selected involved careful consideration of pertinent analytical criteria, including community input. Our decision weighed the merits of each alternative in the context of technical design standards, safety, and regional planning considerations.

Thank you for your continued interest and comments provided.

Sincerely,

David Goode
Director of Public Works and Waste Management

DG:sa

cc: Scott Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.
Dean Frampton, Munekiyo & Hiraga, Inc.

sey\alanui\degray.ltr

MUNEKIYO HIRAGA, INC.

December 14, 2001

MEETING MEMORANDUM

Date: October 30, 2001

Participants: See Attached Attendance Sheet (Exhibit "A")

From: Dean K. Frampton, Planner

Subject: *Proposed Alanui Ka 'Imi 'Ike Extension (Job 01-07)*

A public information meeting was held to discuss plans for the subject project and to receive public input and comment. Information presented included the currently proposed alignment between Kalohi Street and Kamehameha V Highway (at the existing Alanui Ka 'Imi 'Ike) as well as three (3) possible alternate alignments involving Kolapa Street and a new connection point on Kamehameha V Highway in the vicinity of Slaughterhouse Road. The following provides a summary of relevant comments discussed.

1. Concern was expressed regarding project funding. Specifically, whether or not federal funding would still be available should an alternative route be adopted.

   It was noted that federal funding would probably still be available should an alternate route be utilized. However, since the process for modifying a project alignment requires concurrence from the State Department of Transportation and Federal Highway Administration (FHWA), a definitive answer could not be provided at the meeting. Mr. Vanderbilt stated that based on his discussions with the FHWA, it appears that the federal agency would not have a problem with an adjustment to the alignment.

2. Questions were raised regarding project implementation. Residents of Seaside Place, Oki Place and Kapaakea Loop want the roadway constructed as soon as possible as the residents have no emergency evacuation route in the mauka direction should a tsunami or hurricane occur. Residents also questioned if a

realignment of the roadway would result in additional delays in roadway completion.

Plans call for roadway construction to begin in January of 2003, to be completed in approximately nine (9) months. Mr. Arakawa noted that should an alternative route be utilized, the DPWWM would work to retain the same timeline. It was pointed out, however, that an alignment modification may require additional time as engineering designs could not be initiated until the alignment is finalized.

3. Mr. Vanderbilt expressed concern regarding the use of the 1984 Community Plan alignment given the 1994 recommendation of the Molokai Citizens Advisory Committee (CAC) in favor of Alternative D. The preferred route of the Molokai CAC was derived out of numerous community meetings, approved by the Maui Planning Department and the Molokai Planning Commission.

   Mr. Arakawa explained that the roadway alignment between Kalohi Street and the existing Alanui Ka 'Imi 'Ike connection to Kamehameha V Highway is reflected in the 1984 Molokai Community Plan. Notwithstanding the force and effect of the 1984 Plan, the DPWWM is open to considering alternatives which are responsive to the local needs and desires. One purpose of the evening's meeting was to receive community input to help direct the DPWWM towards a consensus alignment.

4. It was noted that at least half of the students from the Molokai Education Center (MEC) signed a petition opposing the Alternative A alignment. Students feel the roadway would jeopardize the safety of the students of the MEC and limit the options for future growth of the MEC. It was also pointed out that the existing Alanui Ka 'Imi 'Ike roadway provides for overflow roadside parking for students attending classes.

5. Harold Edwards from the Molokai Ranch reiterated that the Ranch would transfer the underlying lands for Alternatives A and C to the County of Maui for $1.00. However, Mr. Edwards also indicated that the Ranch has not reviewed the other alternatives and therefore could not commit the same offer for Alternatives B and D.

6. A show of hands was requested to determine which of the alignments presented was deemed preferred by those in attendance. There was general consensus that Alternative D would be preferable.

Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Dean K. Frampton, Planner

cc: Milton Arakawa, Dept. of Public Works and Waste Management
Joe Krueger, Dept. of Public Works and Waste Management
Scott Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.

Enclosures
sey\alanui\mlgmemo.001

County Of Maui Department of Public Works & Waste Management
Community Meeting
Proposed Alanui Ka' Imi' Ike' Extension
October 30, 2001

Name & Address

1. Elizabeth [illegible] P.O Box 1825
2. Leimana [illegible] P.O. Box 773. K.Kai 96748
3. HAROLD EDWARDS MOLOKAI RANCH 745 FORT ST. #600 96813
4. [illegible] Vanderbilt Box 1348 K'[illegible]
5. Donna Paoa HC 01 Box 321, K'kai 96748
6. [illegible] P.O. Box 349 K'Kai 96748
7. [illegible] P.O Box 1541 Kaunakakai, HI 96748
8. [illegible] P.O. BOX 502 Hoolehua HI 96729
9. Stephanie ~~[illegible]~~ Dudoit POB 1443 K'kai 96748
10. Ella Alcon P.O. Box 889, K'Kai HI 96748
11. RON KIMBALL HC01 BOX 171 K'KAI HI. 96748
12. Joe Krueger, Dept. of Public Works and Waste Management
13. Wendy Kobashigawa, Dept. of Public Works and Waste Management
14. Scott Kunioka, Shimabukuro, Endo & Yoshizaki, Inc.
15. Mike Munekiyo, Munekiyo & Hiraga, Inc.
16. Dean Frampton, Munekiyo & Hiraga, Inc.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.

EXHIBIT "A"

PROPOSED ALANUI KA `IMI `IKE EXTENSION

Job No. 01-07

County of Maui
Department of Public Works and Waste Management

■ Project Overview

The County of Maui, Department of Public Works and Waste Management proposes the construction of the Alanui Ka `Imi `Ike Extension. The proposed roadway would traverse approximately 1,800 lineal feet, from Kalohi Street to the existing Alanui Ka `Imi `Ike roadway located on the eastern edge of the Molokai Education Center. See Figure 1. Currently, the Ranch Camp subdivision has only one entrance access via Ala Malama Avenue, which travels through the central portion of Kaunakakai Town. The roadway project would establish an eastern link between the Ranch Camp residential subdivision and Kamehameha V Highway, thereby improving the traffic circulation in the Kaunakakai area.

The typical roadway section will include two 12-foot wide travel lanes, 6-foot paved shoulders and 12-foot grassed shoulder areas. See Figure 2.

The proposed alignment follows an existing County waterline easement, encompassing parcels identified as TMK 5-3-3:15(por.) and 38(por.). Land acquisition coordination is ongoing between the

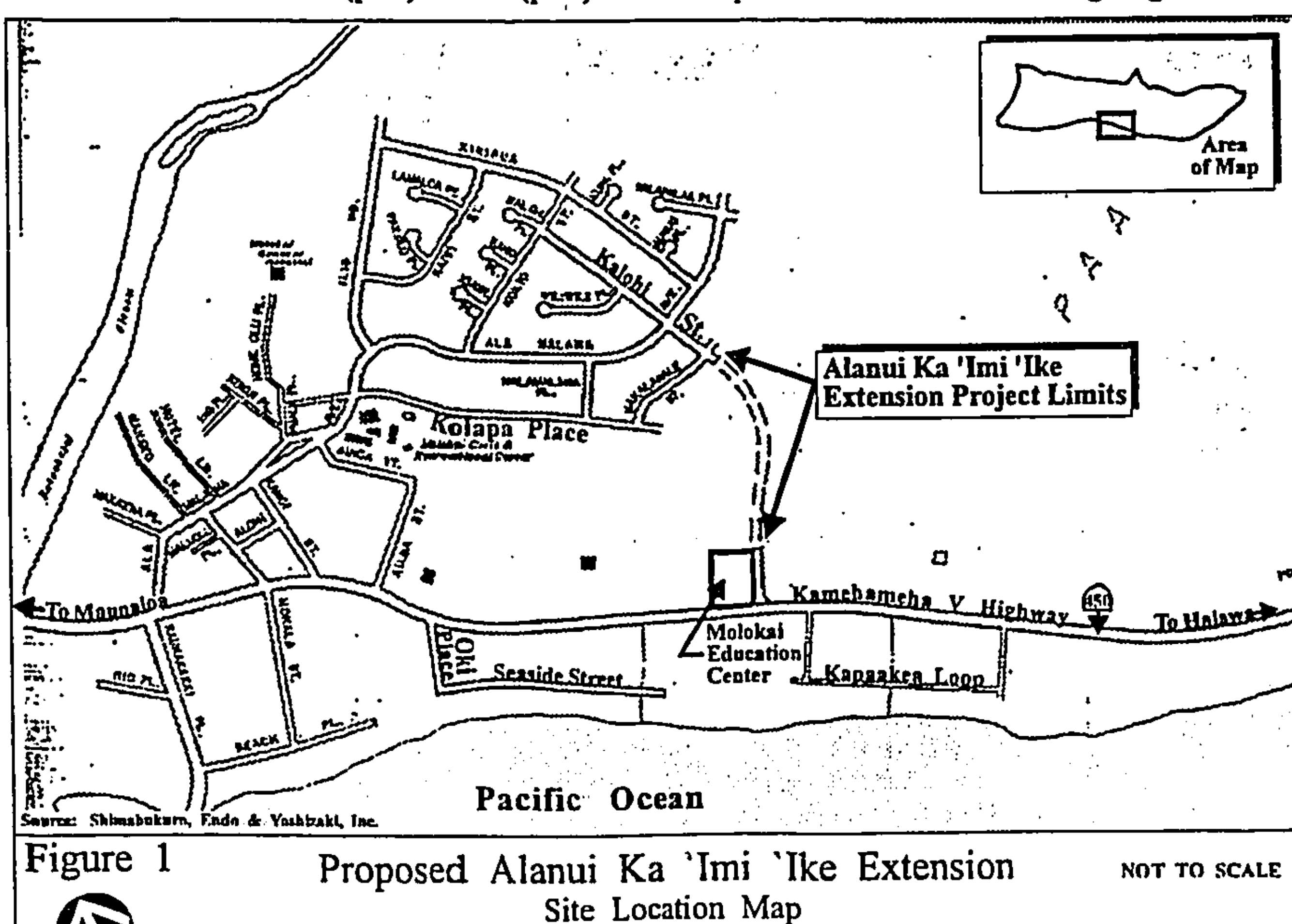

Figure 1 Proposed Alanui Ka 'Imi 'Ike Extension NOT TO SCALE
Site Location Map

Prepared for: County of Maui, Department of

EXHIBIT "B"

MUNEKIYO & HIRAGA, INC.

PROPOSED ALANUI KA 'IMI 'IKE EXTENSION

Job No. 01-07

County of Maui
Department of Public Works and Waste Management

■ Project Overview

The County of Maui, Department of Public Works and Waste Management proposes the construction of the Alanui Ka 'Imi 'Ike Extension. The proposed roadway would traverse approximately 1,800 lineal feet, from Kalohi Street to the existing Alanui Ka 'Imi 'Ike roadway located on the eastern edge of the Molokai Education Center. See Figure 1. Currently, the Ranch Camp subdivision has only one entrance access via Ala Malama Avenue, which travels through the central portion of Kaunakakai Town. The roadway project would establish an eastern link between the Ranch Camp residential subdivision and Kamehameha V Highway, thereby improving the traffic circulation in the Kaunakakai area.

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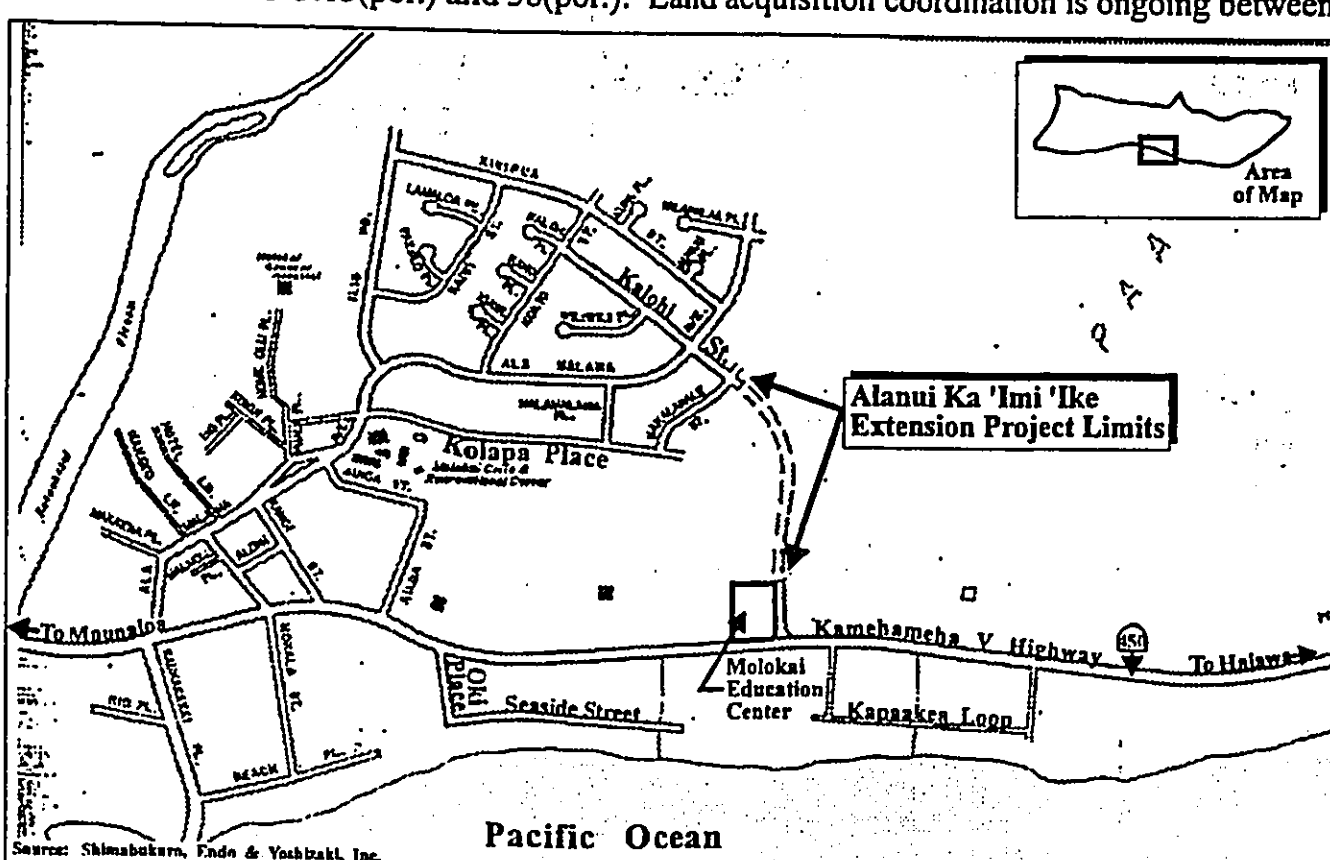


Figure 1 Proposed Alanui Ka 'Imi 'Ike Extension
Site Location Map
NOT TO SCALE

Prepared for: County of Maui, Department of

EXHIBIT "B"

MUNEKIYO & HIRAGA, INC.

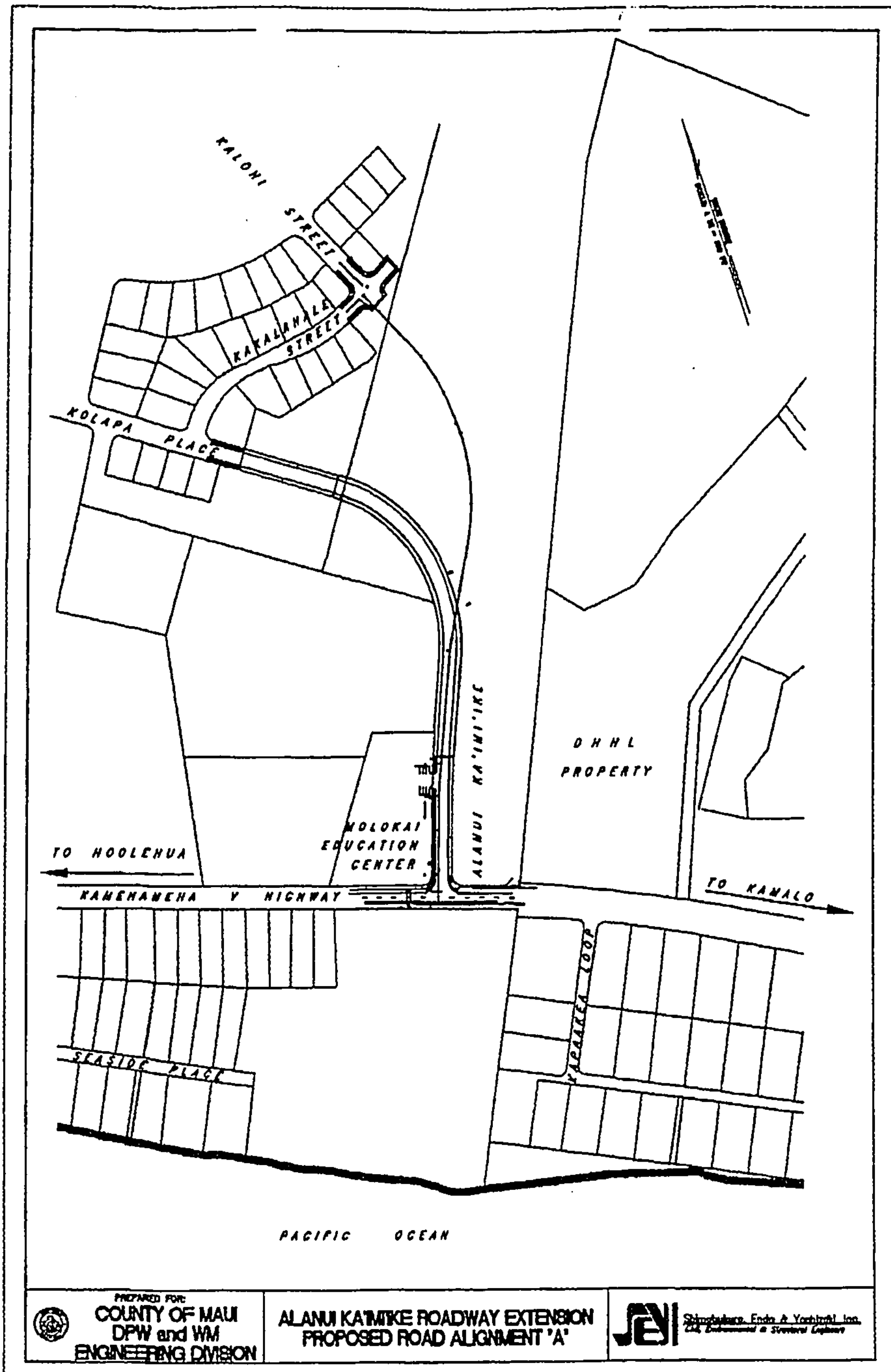
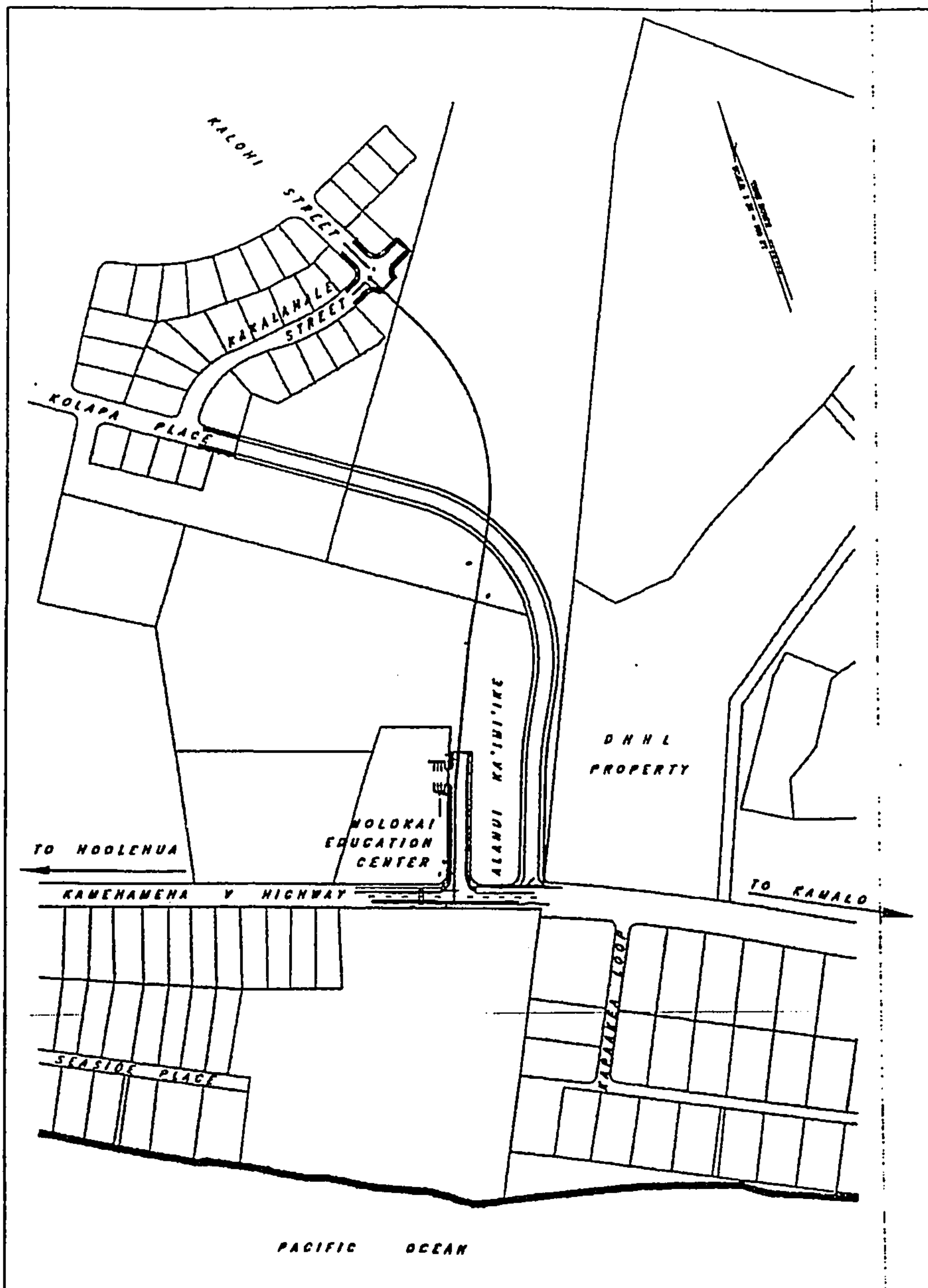

KALONI STREET
KAKALAHALE STREET
KOLAPA PLACE
ALANUI KA'IMI'IKE
DHHL PROPERTY
MOLOKAI EDUCATION CENTER
TO HOOLEHUA
KAMEHAMEHA V HIGHWAY
TO KAMALO
KAPAAKEA LOOP
SEASIDE PLACE
PACIFIC OCEAN
PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION
ALANUI KA'IMIKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT 'A'

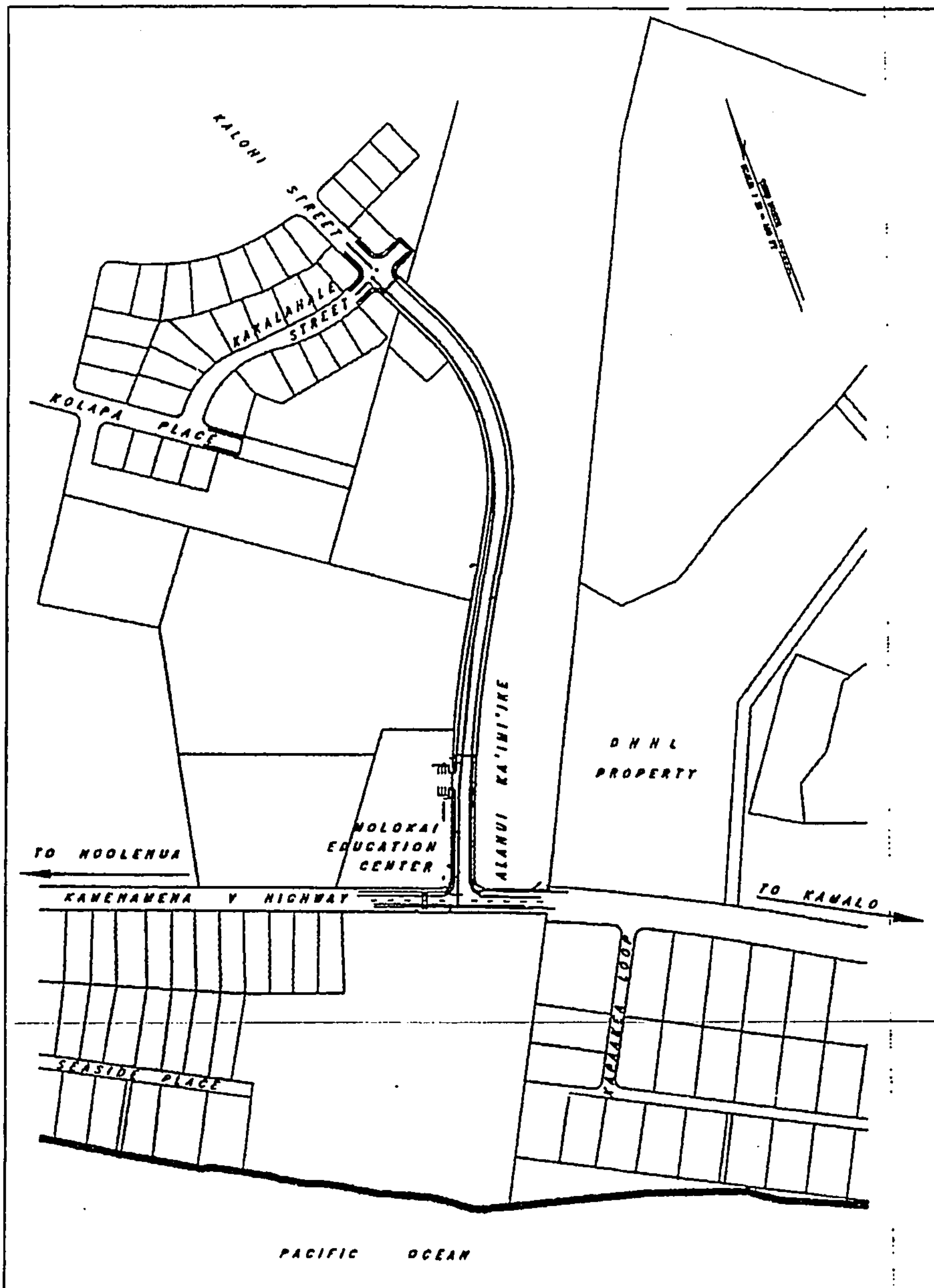
EXHIBIT "C"



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IHI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT "B"

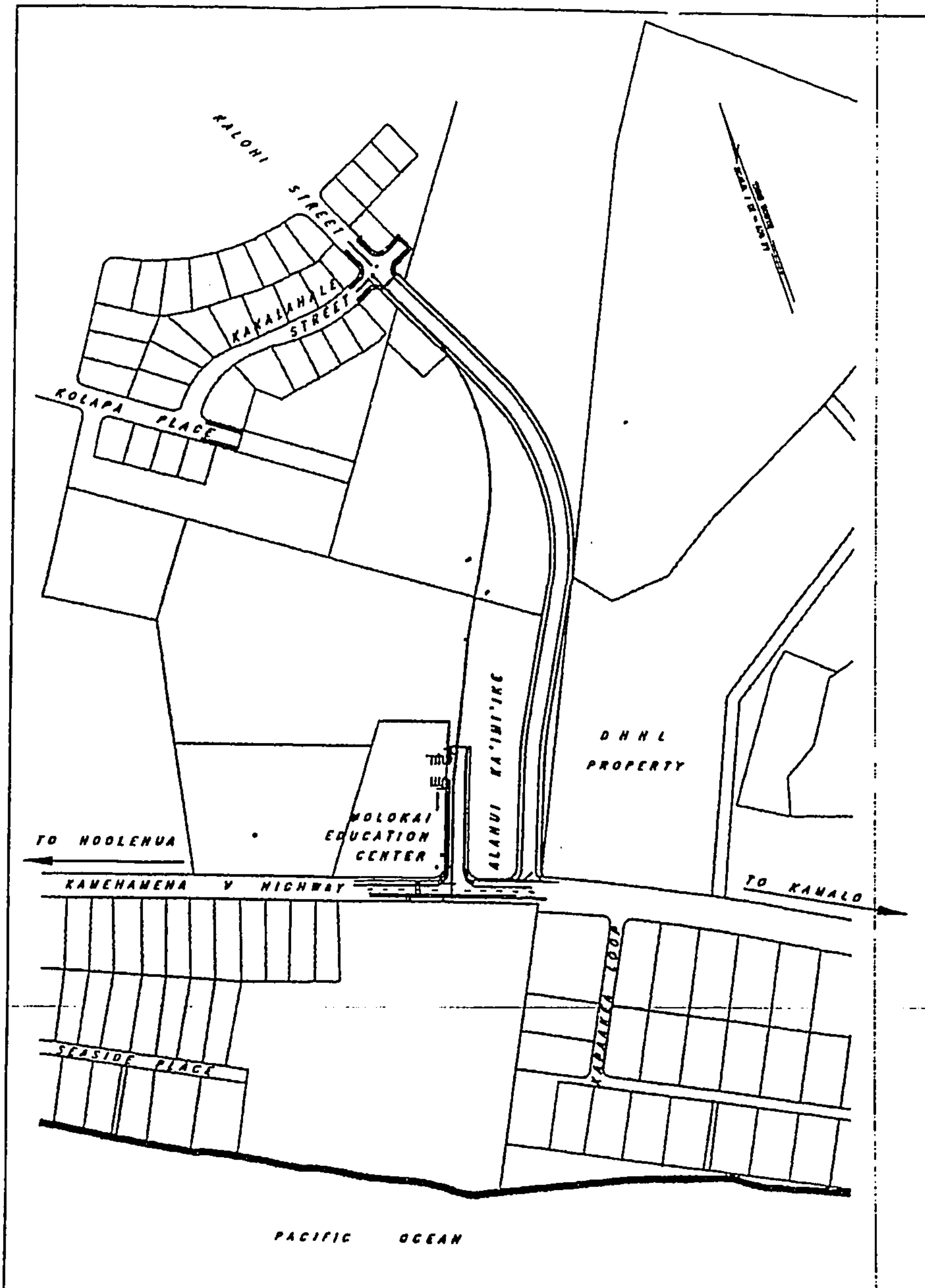
Shimabukuro, Endo & Yoshizaki, Inc.
Civil, Environmental & Structural Engineers



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT "C"

Shimabukuro, Endo & Yoshizaki, Inc.



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IMIKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT "D"

Shimabukuro, Endo & Yoshizaki, Inc.

Testimony submitted by
DeGray Vanderbilt
12-7-01

Mr. David Goode, Director
Department of Public Works and Waste Management
County of Maui
200 South High Street
Wailuku, Maui, HI 96793

ENGR WW

Re: Molokai Road: Job No. 01-07

Dear Mr. Goode:

Enclosed is the testimony from our student organization, Hui Aloha 'Aina o Hina, also supported by some instructors, faculty and staff of Molokai Education Center. Please provide a copy to the consultants who are working with your Department on the subject road project.

In designing the road we trust that your department will incorporate safety measures to protect those of us that work or attend classes at Molokai Education Center. The proposed design of the road (Plan D) would best fit our request. It will be a better, more logical choice rather than cutting through our campus and connecting to Ranch Camp via Kolapa Place (where, for your information, Maui Economic Opportunity Pre-School is located). It is obvious the most safe design is Plan D.

Upon completion of this new road, 20-MPH Speed Limit signs need to be posted as a safety measure and to eliminate speeding problems. There is also a need for speed bumps, which we understand has already been discussed and given some form of preliminary approval.

I believe our planning commission will support these safety features as a condition to any permit approval it gives for the road construction.

We appreciate your department sponsoring the informational meeting and presenting the four road alternatives in picture form. We are pleased that out voice have been heard at that information meeting, and that they make decisions that best meet our community.

Sincerely,

Brandy Hanohano

Brandy Hanohano
Chairman- Hui Aloha 'Aina o Hina (Student Club)

Cc: flo wiger, Acting Provost, Maui Community College
Donna Paoa, Coordinator, Molokai Educational Center
Malia Akutagawa, Chairman, Molokai Planning Commission

copy

TESTIMONIAL

Re: Molokai Road: Job No. 01-07

Dear Mr. Goode:

We, the undersigned current and prospective students, instructors, and staff of Moloka'i Education Center, are **not** in favor of a public access road as an extension of the current Alanui Ka'imi Ike to Ranch Camp. However, we would support a public access road from Kamehameha V Highway to Ranch Camp using the old slaughter house road.

The proposed extension of Alanui Ka'imi Ike to Ranch Camp would have the following detrimental effects on the future of higher education on Moloka'i.

1. Physical growth of the Moloka'i Education Center's campus would be halted. A major access road would split the campus, making new buildings and additional classroom space impossible. Post secondary education growth on Moloka'i would be limited to today's student population, or even less. Without growth in programs and facilities, many Moloka'i post secondary students will have to leave the island.

2. A safety hazard would be created on the Moloka'i Education Center's campus both for students and the community. The safety hazards include: increased traffic turning on and off Kamehameha V Highway, public loitering, vehicle vandalism, speeding, and bumper-to-bumper roadside parking lining the access road. Alanui Ka'imi Ike acts as a overflow parking area because the current College parking; on most weekday nights exceeds parking lot capacity.

Attached is a petition signed by current and prospective students, instructors, and staff at Moloka'i Education Center who support **not** using Alanui Ka'imi Ike as public access to Ranch Camp.

Respectfully submitted,

Concerned 'Ohana (family) of the Moloka'i Education Center

Petition Attached.

Copy

Name		Address
PRINT	SIGNATURE	
Patricia N. Mims	Patricia S. Mims	P.O. Box 95, K'Kai, Hi 96748
Windy Felix	Windy Felix	P.O. Box 169 H'hua, HI 96729
Tomiko Nishihira	Tomiko Nishihira	P.O Box 234 M'loa, HI 96770
Cindy Tay	Cindy Tay	P.O BOX 1641 K'Kai, Hi 96748
VIKA FUJIMORI	Vika Fujimori	HC-01 Box 20, K'KAI 96748
Lee Hanohano	Lee Hanohano	PO BOX 159 Kualapuu HI 96757
EARL NAKAMURA	Earl Nakamura	Box 442 K'Kai, HI 96748
Sarah Naone	Sarah Naone	PO Box 3816 H'hua 96729
Usha Henderson	[illegible]	HC 01 Box 750 K'Kai Hi 96748
Carrie-Ann Farr	[illegible]	POB 1814 K'KAI, HI 96748
[illegible]	[illegible]	[illegible] K'Kai 96748
Evalyn Kawamae	Evalyn Kawamae	PoBox 1941 K'kai HI 96748
RONETTE CASTRO	[illegible] Castro	PO Box 1571 K'Kai, Hi 96748
Mel Hanohano	Mel Hanohano	P.O. Box 159 K'puu 9675[illegible]
Daniel R. Bennett	Daniel R. Bennett	PoBox 41 Kualapuu, HI 96757
Davelyn L. Han	Davelyn L. Han	Box 34 H'HUA 96729
Kaleo Lenwai	Kaleo Lenwai	Box 498 H'hua 96729
Kim Swanson	Kim [illegible]	PO Box 122 Kualapuu
Clare Monroe	Clare Monroe	P.O Box 1236 K'KAI HI 96748

DOCUMENT CAPTURED AS RECEIVED

Copy

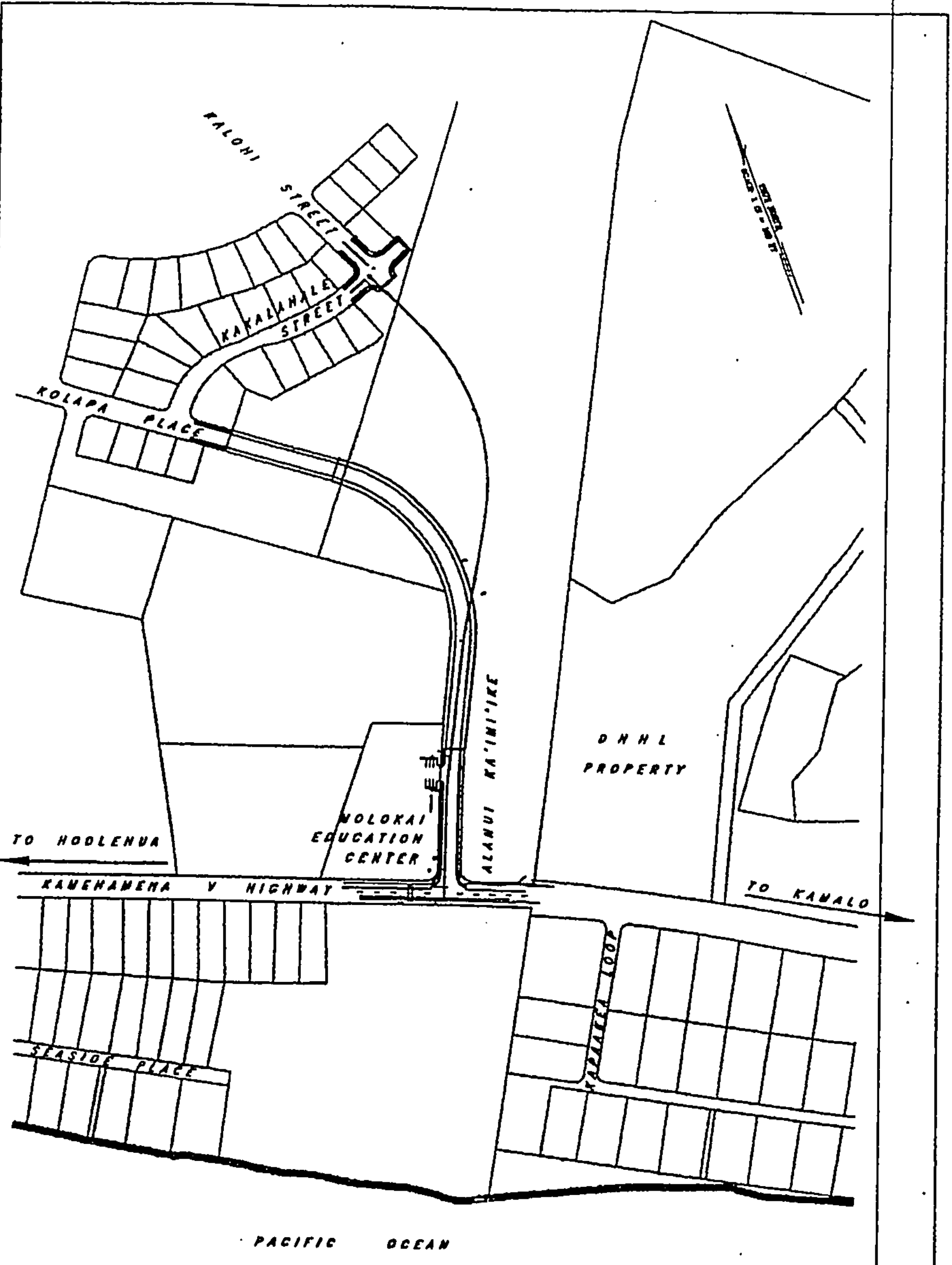
Name		Address
PRINT	SIGNATURE	
Kananionapua Pakele	Kananionapua Pakele	PO Box 1315 K'Kai HI 96748
MAHIE MCPHERSON	[illegible]	P.O. BOX 192 K'KAI, HI 96748
Mapuana Pasana	Mapuana Pasana	P.O. Box 1834 K'kai, HI 96748
Brandy Hanohano	Brandy Hanohano	P.O. Box 502 H'lena, HI 96729
Benjamin M. Bomberry	Benjamin M. Bomberry	HC-01 Box 741, K'kai, HI 96748
Chaise K. Purdy	Chaise K. Purdy	P.O. Box 249, K'puu HI 96757
Lisa M. Vorse	Lisa M. Vorse	PO Box 1553
Pualani Hughes	[illegible]	P.O. Box 806 K'Kai
PAULA TANAKA	Paula Tanaka	Box 541 K'Kai
Yvonne L. Lee	Yvonne L. Lee	P.O. Box 181 Ho'olehua, Hawaii 96729
Wilmina K. English	Wilmina English	P.O. Box 1300 K'Kai 96748
Lorrie A. Sagario	Lorrie A. Sagario	PO BOX 1102 K'puu 96757
Prescilla Vair	Prescilla A. Vair	PO Box 656 K'Kai HI 96748
Donald Senas	Donald Senas	P.O. Box 1395 Kaunakakai
Liliana Napoleon	Liliana Napoleon	HC01 box 381 Kaunakakai 96748
Priscilla Malin	Priscilla Malin	P.O. Box 1042 K'kai Hi 96748
Leah keohuloa	Leah keohuloa	P.O. Box 516 Hoolehua Hi 96729
John Keohuloa Jr	John Keohuloa Jr	P.O. BOX 516 " " "
Diane Lindsey	Diane Lindsey	PO Box 948 " " "

Copy

Name		Address
PRINT	SIGNATURE	
Celeste Naki	Celeste Naki	P.O. Box 89 K'pulu
Uluwehi Kahalewai	Uluwehi Kahalewai	P.O Box 932 K'Kai
Shaeralee Pelekane	Shaeralee Pelekane	PO Box 581 K'Kai HI 96748
Kimberly Heim	Kimberly [illegible]	PO Box 703 K'kai, HI 96748
Stephanie Dudoit	Stephanie Dudoit	PO Box 1443 K'kai HI 96748
La'akea Goodhue	La'akea Goodhue	P.O. Box 2, K'kai HI 96748
Denise Mahiai	Denise [illegible]	P.O. Box 1384 K'kai 96748
DarLynne Kadrian	DarLynne Kadrian	PO Box 506 H'hua
Tina Rawlins	Tina Rawlins	P.O. Box 1853 K'Kai
Chantel Segundan	[illegible]	P.O. Box 197 H'hua
Loke Iwen	Loke Iwen	P.O. Box 1863 K'Kai 96748
Julie Selwyn	J. Selwyn	PO 1096 K'KAI 96748
Jessica Nuesca	Jessica Nuesca	PO BOX 1936 K'Kai 96748
Tammylynn Ross	Tammylynn Ross	P.O. Box 1461 K'Kai 96748
Rebecca Takashima	Rebecca Takashima	PO Box 1276 K'Ka 96748
Gladys H. Kupau	G Kupau	P.O. Box 1537 K'kai 96748
Lihau Castor	Lihau Castor	P.O. Box 1576 K'Kai 96748
Lori-Lei Rawlins-Crivello	[illegible]	Box 346, K'Kai 96748
Tina J. Sakuraba	Tina J. Sakuraba	Box 562 Halehua 96729

Copy

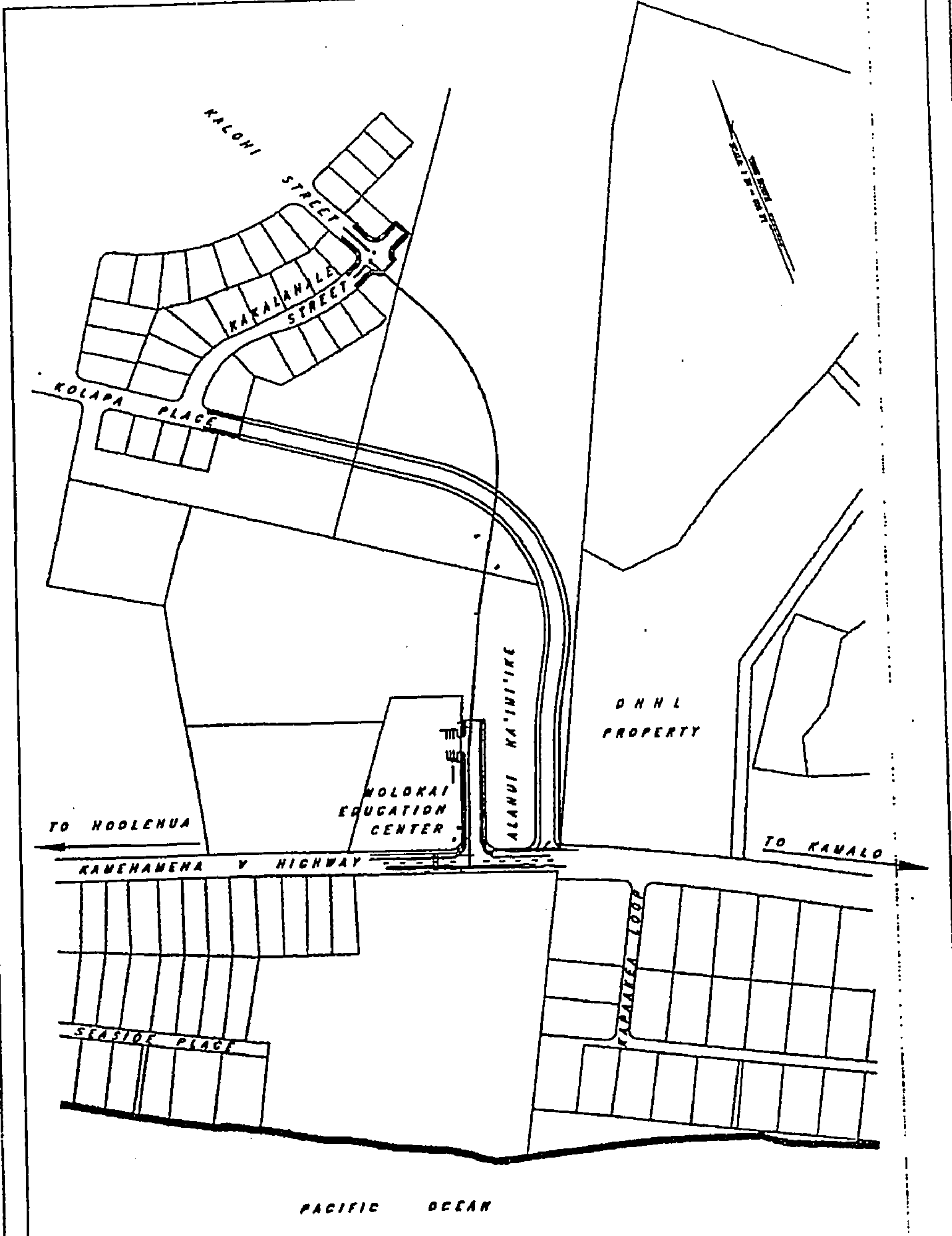
Name		Address
PRINT	SIGNATURE	
Jamesie K. Sambajon	Jamesie K Sambajon	P.O.Box 349 Kaunakakai Hi 96748.
Jennifer Sones	[illegible]	PO Box 1395 Kaunakakai
[illegible]	[illegible]	Box 42 M'loa
Rosalyria Horner	[illegible]	Box 453, K'kai
Noelani Helm	[illegible]	BX 361, Hkoa 96729
Griselda López Kuhn	[illegible]	PO Box 144 Kualapuu H. 96757
Jo Greenwood Hudson	[illegible]	3505 Malince Kihei HI 96753
Tina He-Lindsey	[illegible]	P.O. Box 2061 Kaunakakai
Loretta A. Borden	Loretta A. Borden	P.O. Box 13 Ho'olehua Hi 96729
Darlene U Borden	[illegible]	P.O. Box 1588 K'kai
Julie Agliam	[illegible]	PO Box 477 Hkua 96729
Wailana Puhi Kaai	[illegible]	P.O. Box 84 H'kua 96729



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'INI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT 'A'

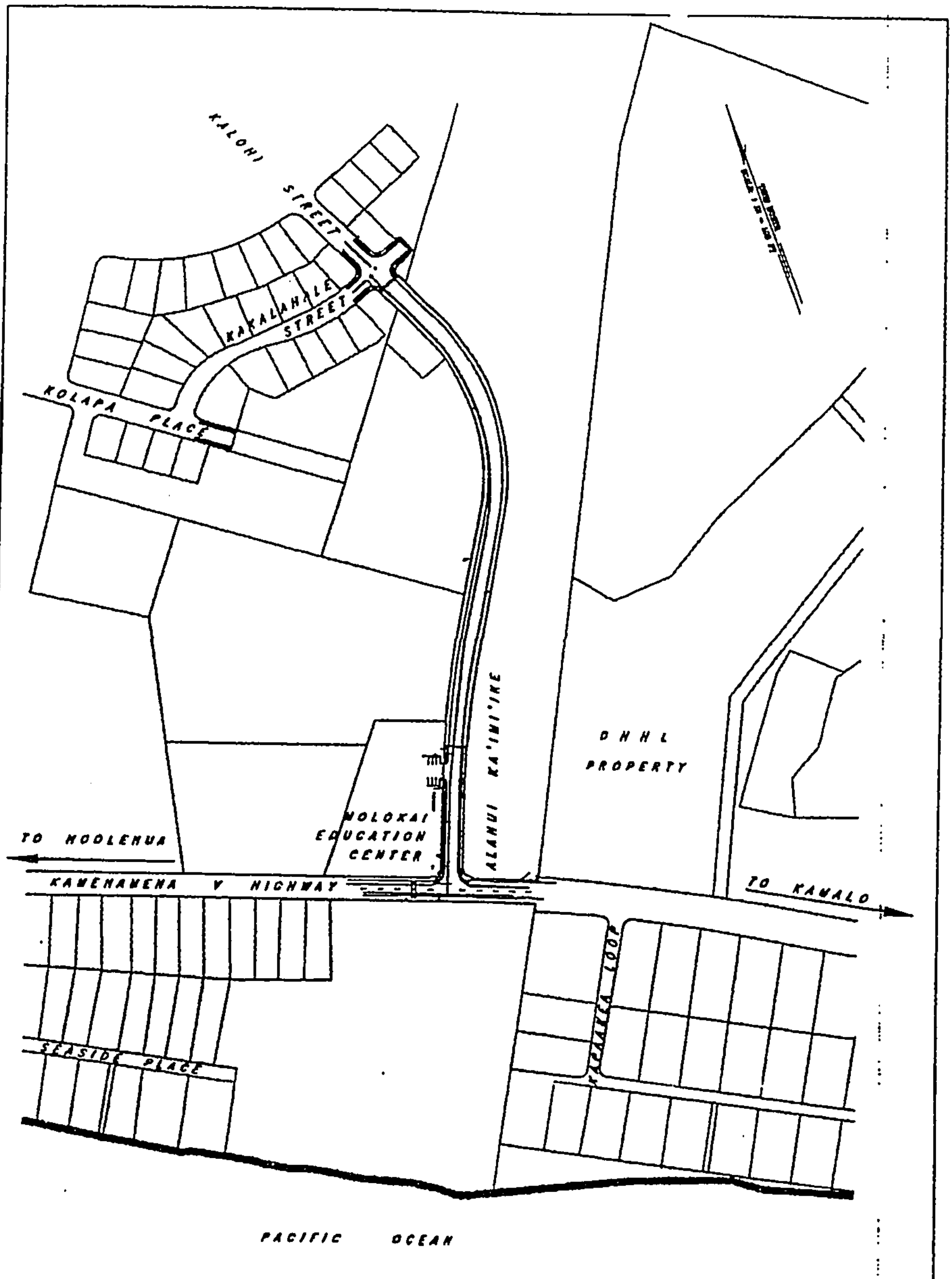
Shimabukuro, Endo & Yoshizaki, Inc.



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT 'B'

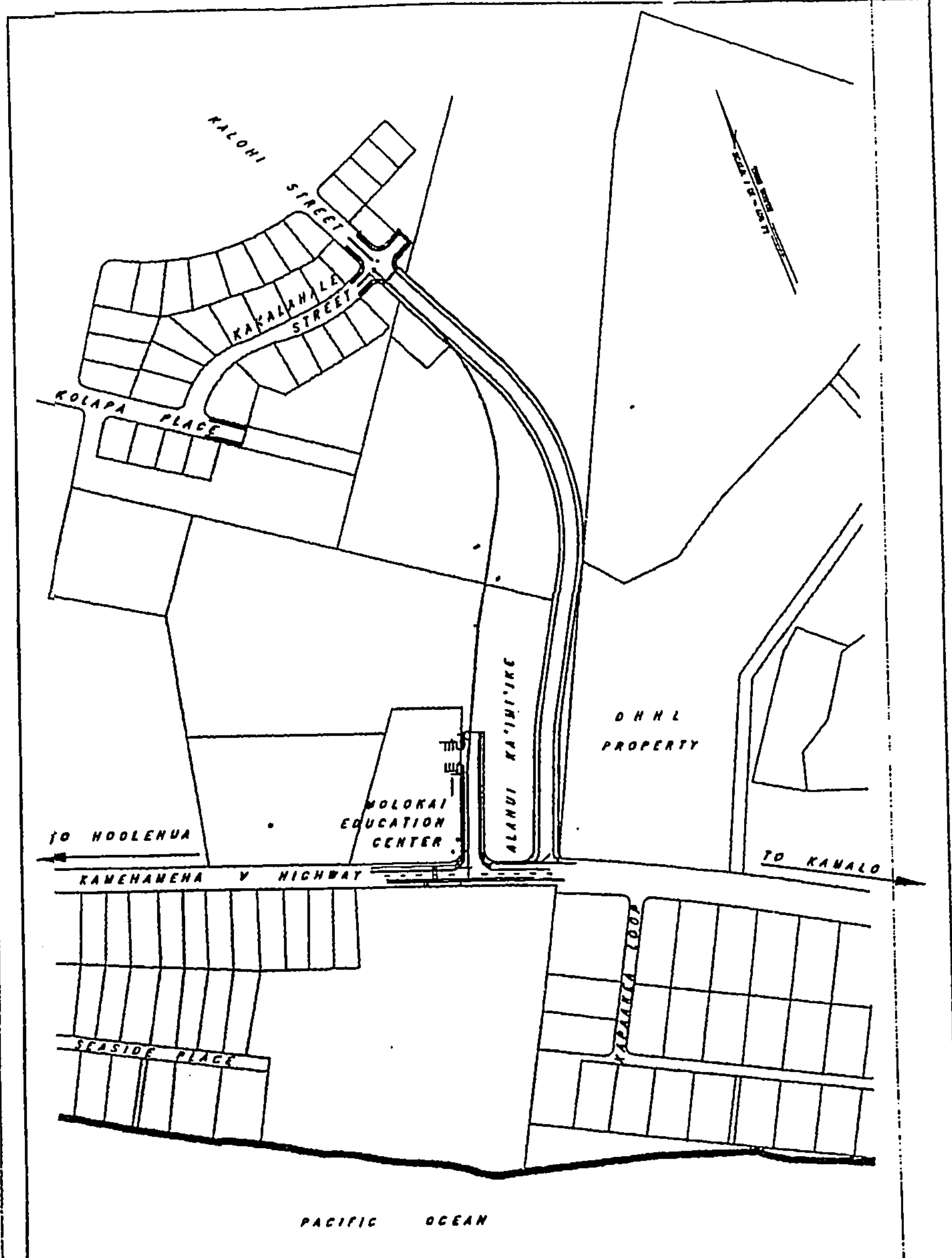
Shimabukuro, Endo & Yoshizaki, Inc.



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT "C"

Shimabukuro, Endo & Yoshizaki, Inc.



PREPARED FOR:
COUNTY OF MAUI
DPW and WM
ENGINEERING DIVISION

ALANUI KA'IMI'IKE ROADWAY EXTENSION
PROPOSED ROAD ALIGNMENT "D"

Shimabukuro, Endo & Yoshizaki, Inc.
Civil, Environmental & Structural Engineers

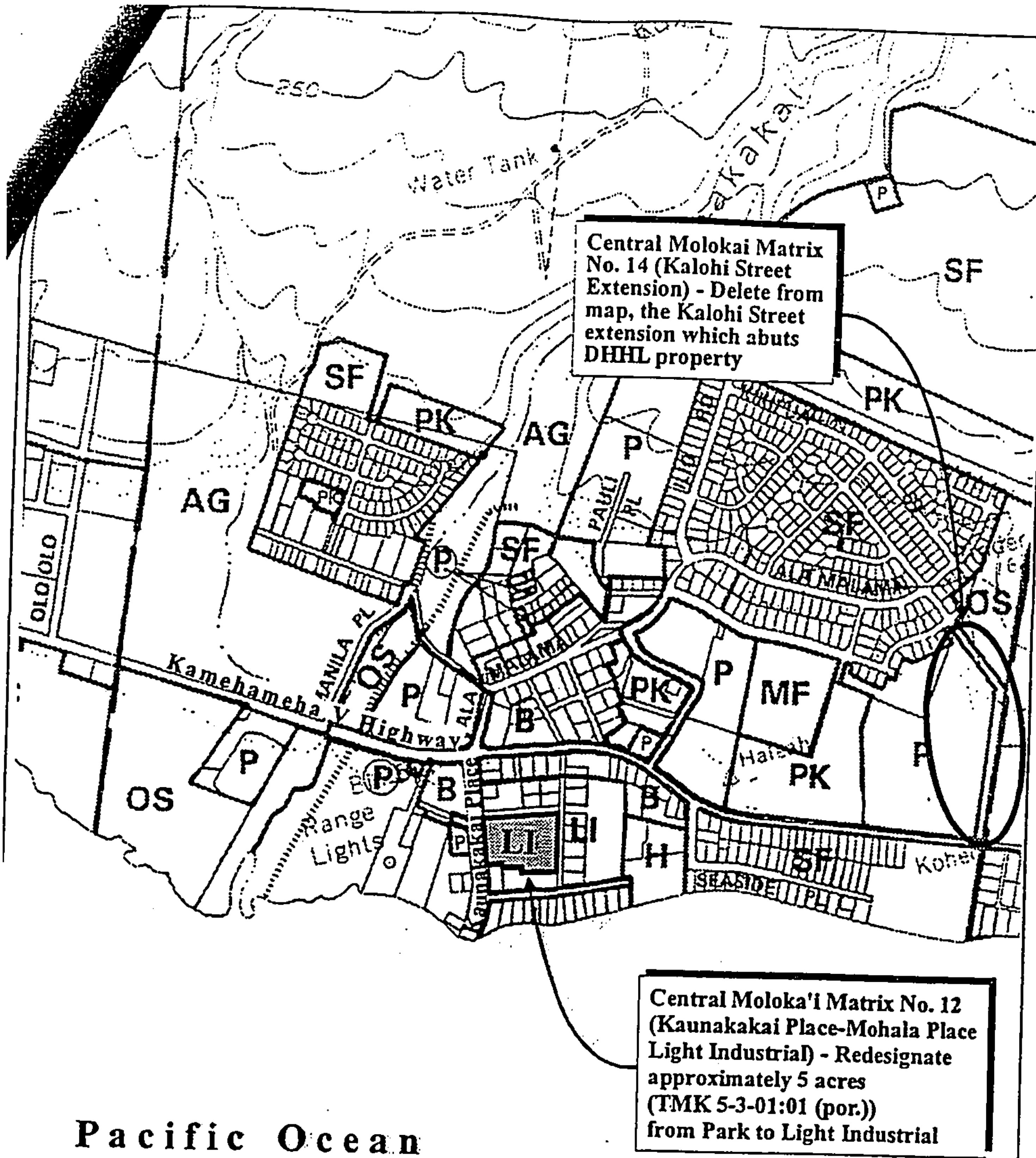


Exhibit E

Moloka`i Community Plan

Land Use Map Amendments

0 250 500 1000 Feet

Prepared for: County of Maui, Office of Council Services

MUNEKIYO & HIRAGA, INC.

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

TEL. (808) 270-7745
FAX (808) 270-7975

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

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

March 25, 2002

Brandy Hanohano, Chairman
Hui Aloha 'Aina O Hina
c/o Molokai Education Center
P.O. Box 440
Kaunakakai, Hawaii 96748

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
JOB NO.: 01-07

Dear Mrs. Hanohano:

Thank you very much for your comment letter, testimonial and petition regarding the subject project. The Department of Public Works and Waste Management appreciates your concerns and the concerns expressed by your fellow students regarding (1) the safety of the proposed roadway, and (2) the future growth of the Molokai Education Center (MEC). In response to the comments provided, we note the following.

We have carefully reviewed the possible alternative alignments for the new roadway, including one which would terminate at Kamehameha V Highway in the vicinity of Slaughterhouse Road (abutting the Department of Hawaiian Home Lands property). Our review considered the availability of the existing stub-out at Alanui Ka 'Imi 'Ike, as well as the presence of an existing 12-inch waterline which follows an alignment from Alanui Ka 'Imi 'Ike to Kalohi Street. The Department acknowledges the specific safety concerns cited in your attached testimonial and petition and will take these comments into consideration during the project design phase.

We also looked at the spatial relationship between the proposed road and future expansion opportunities for the MEC. As we currently understand, master planning for long-range campus development has not yet been initiated for the Molokai Education Center. We also understand that the County of Maui, by virtue of being the primary infrastructure service provider, will play an integral part in the long-range master planning for the Molokai Education Center.

With the foregoing factors considered, the County has selected as its preferred alternative, the route between the existing Alanui Ka 'Imi 'Ike and Kalohi Street. We intend to work closely with the Molokai Education Center to ensure that physical planning for the center is functionally integrated with surrounding infrastructure systems.

Thank you for taking the time to submit your concerns. Should you have any questions or require additional information, please contact Wendy Kobashigawa at our Engineering Division at 270-7745.

Sincerely,

David Goode
Director of Public Works and Waste Management

DG:sa

cc: Scott Kunioka, Shimabukuro, Endo & Yoshizaki
Dean Frampton, Munekiyo & Hiraga, Inc.

sey\alanui\hanohano.ltr

Chapter XI

Letters Received During the Draft Environmental Assessment Public Comment Period and Responses to Substantive Comments

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

June 21, 2002

'02 JUN 24 P12:38

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

Civil Works Technical Branch

Mr. Joseph W. Alueta, Staff Planner
Department of Planning
County of Maui
250 South High Street
Wailuku, Maui 96793

Dear Mr. Alueta:

Thank you for the opportunity to review and comment on the Special Management Area Application and Draft Environmental Assessment (DEA) for the Alanui Ka Imi Ike Project, Kaunakakai, Molokai (TMK 5-3-3: 15). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, a DA permit will not be required for the project.

b. The flood hazard information provided on page 11 of the DEA is correct.

Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

James Pennaz

James Pennaz, P.E.
Chief, Civil Works
Technical Branch

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JEAN L. OSHITA
JADINE Y. URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

'02 MAR 28 P3:12

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

IN REPLY REFER TO:

HWY-PS
2.5853

MAR 27 2002

Mr. John E. Min
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Min:

Subject: Special Management Area Use Permit Application
Alanui Ka Imi Ike Extension, Kaunakakai, Molokai

Thank you for your transmittal requesting our comments regarding the Alanui Ka Imi Ike Extension in Kaunakakai, Molokai.

Our previous comments (HWY-PS 2.4655, dated October 31, 2001) are still valid and applicable.

If you have further questions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

Brian K. Minaai

BRIAN K. MINAAI
Director of Transportation

Enclosures

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

April 19, 2002

David Goode
Department of Public Works & Waste Management
200 South High Street
Wailuku, HI 96793

Attn: Wendy Kobashigawa

Dear Mr. Goode:

Subject: Draft Environmental Assessment (EA)
Alanui Ka Imi Ike Road Extension, Kaunakakai

Please correct the following in the final EA:

Public informational meeting: The response in section IV.E.7, *Managing Development*, refers the reader to Appendix D, the drainage report, for details on the public meeting.

Determination: Section VI.F., *Recommended Alternative*, states that "In all instances, a Finding of No Significant Impact is deemed an appropriate conclusion for purposes of Chapter 343...." The EIS law prohibits a determination of significant impact or lack of significant impact before the end of the 30-day public comment period and prior to receipt, response and analysis of all written comments. For a draft EA the proper determination is *anticipated FONSI*.

If you have any questions, please call Nancy Heinrich at 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

c: Dean Frampton

Apr 19 02 04:45p Dept. of Health (OEQC) (808) 586-4186 p.1

MUNEKIYO HIRAGA, INC.

July 24, 2002

Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 202
Honolulu, Hawaii 96813

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai
FAP No. STP-0900 (63)

Dear Ms. Salmonson:

Thank you very much for your comment letter dated April 9, 2002 regarding the subject project. In response to the comments provided, we would like to note the following:

1. Section IV.E.7, *Managing Development* of the Draft Environmental Assessment (EA) has been revised.

2. We acknowledge the proper determination to be included in the draft EA is *anticipated* FONSI.

Thank you for your interest in this important project . Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F

Dean K. Frampton, Planner

DKF:yp
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki
sey:alanui:oeqcresp ltr

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT

DEPUTIES
ERIC T. HIRANO
LINNEL NISHIOKA

STATE OF HAWAII

'02 JUN 27 P2:09

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

DEPT OF ... RECEIVED

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

HAWAI'I HISTORIC PRESERVATION DIVISION REVIEW

Log #: 30135 ✓
Doc #: 0206SC09

Applicant/Agency:	John Min, Director, Department of Planning, County of Maui
Address:	250 South High Street Wailuku, Maui, Hawaii 96793
SUBJECT:	(ID: SM1 2002/0004) National Historic Preservation Act – Section 106 Compliance – Alanui Ka Imi Extension to Kamehameha V Highway (STP-0900[63])
Ahupua'a:	Kaunakakai
District, Island:	Moloka'i
TMK:	(2)-5-3-003: 015

1. We believe there are no historic properties present, because:

✓ a) intensive cultivation has altered the land
___ b) residential development/urbanization has altered the land
___ c) previous grubbing/grading has altered the land
___ d) an acceptable archaeological assessment or inventory survey found no historic properties
___ e) other:

2. This project has already gone through the historic preservation review process, and mitigation has been completed ___.

✓ Thus, we believe that "no historic properties will be affected" by this undertaking

Staff: [signature] Date: 6/24/02

Title: Deputy SHPO (Phone: 808-692-8026)

C: John Min, Director, Dept of Planning, County of Maui, 250 S. High Street, Wailuku, HI 96793
Cultural Resources Commission, Planning Dept, County of Maui, 250 S. High Street, Wailuku, HI 96793
Malia Akutagawa, Chair, Molokai Planning Commission, PO Box 1715, Kaunakakai, HI 96748

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

June 24, 2002

HRD02/644

'02 JUN 27 P2:08

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

Mr. John E. Min, Planning Director
County of Maui
Department of Planning
250 South High Street
Wailuku, HI 96793

Dear Mr. Min:

Subject: (SM1 2002/0004) Special Management Area Use Permit Application, Alanui Ka Imi Ike to Kamehameha V Highway

This is response to your materials for review and comment of June 14, 2002, regarding the proposed permit for above referenced project. Our concerns as enumerated in past correspondence with the project proponent have been addressed, consequently we have no further concerns with the implementation of the project.

Thank you for the opportunity to review and comment regarding the proposed project. If you have any questions, please contact Wayne Kawamura, Policy Analyst at 594-1945, or email him at waynek@oha.org.

Sincerely,

Jalna Keala

Jalna Keala
Acting Director, Hawaiian Rights Division

JK:wk

cc: BOT
ADM

BENJAMIN J. CAYETANO
GOVERNOR

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

LORRIN W. PANG, M.D., M.P.H
MAUI DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793

'02 JUL -5 P2:30

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

July 3, 2002

Mr. John Min
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawai'i 96793

Attention Mr. Joe Alueta

Dear Sirs:

Subject: **Alanui Ka Imi Ike to Kamehameha V Highway**
TMK: (2) 5-3-003:015
SM1 2002/0004

Thank you for the opportunity to comment on the land use application. The following comment is offered:

> The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46 "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

c: Ed Miyabara
EPO

MUNEKIYO HIRAGA, INC.

July 23, 2002

Herbert Matsubayashi, District Environmental Health
Program Chief
Department of Health
Maui District Office
54 High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai
FAP No. STP-0900 (63)

Dear Mr. Matsubayashi:

Thank you very much for your comment letter dated July 3, 2002 regarding the subject project. In response to the comments provided, we would like to note the following.

The proposed project will be constructed in compliance with the Hawaii Administrative Rules (HAR), Chapter 11-46 "Community Noise Control". Should it be necessary, the County of Maui will obtain a noise permit prior to commencement of construction activities.

Thank you for your interest in this important project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.

Dean K. Frampton, Planner

DKF:yp
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki
sey\alanui\dohresp.ltr

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconsult.com

BENJAMIN J. CAYETANO
GOVERNOR

[redacted]
PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

'02 JUL -5 P12:13

DEPT OF PLANNING
RECEIVED

OFFICE OF THE SUPERINTENDENT

July 5, 2002

Mr. John E. Min
Planning Director
County of Maui
250 South High Street
Wailuku, Hawai`i 96793

Attn: Mr. Joe Alueta, Planner

Dear Mr. Min:

Subject: Alanui Ka Imi Ike to Kamehameha V Highway
Kaunakakai, Molokai: TMK: 5-3-003:015

The Department of Education has reviewed the Special Management Area Use Permit Application for the proposed construction of a new 1,300-foot road connecting the Kamehameha V Highway with Kalohi Street in the Ranch Camp subdivision. DOE has no comment on the subject application.

Thank you for the opportunity to review the plans.

Very truly yours,

Patricia Hamamoto

Patricia Hamamoto
Superintendent

PH:hy

cc: A. Suga, OBS

BENJAMIN J. CAYETANO
GOVERNOR

GLENN M. OKIMOTO
Comptroller

MARY ALICE EVANS
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING
AND GENERAL SERVICES
SURVEY DIVISION
P.O. BOX 119
HONOLULU, HAWAII 96810-0119

JUL -9 P12:28
DEPT OF PLANNING
RECEIVED

July 8, 2002

MEMORANDUM

TO: John E. Min, Planning Director
Maui County Planning Department

ATTN: Joe Alueta, Staff Planner

FROM: for Randall M. Hashimoto, State Land Surveyor
DAGS, Survey Division

SUBJECT: I.D.: SM1 2002/0004
TMK: 5-3-033:015
Project Name: Alanui Ka Imi Ike to Kamehameha V Highway
Applicant: Department of Public Works

The subject proposal has been reviewed and confirmed that no Government Survey Triangulation Stations or Benchmarks are affected. Survey has no objections to the proposed project.

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

'02 JUL 18 P2:26

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

July 17, 2002

LD-NAV
Ref.: SM12002-0004.RCM
L-193/3716/3796//3527

Honorable John E. Min
Planning Director
County of Maui
Planning Department
250 S. High Street
Wailuku, Hawaii 96793

Dear Mr. Min:

Application:	Special Management Area Use Permit
Applicant:	County of Maui DPWWM (STP-0900-63)
I.D. No.:	SM1 2002-0004
Project:	Alanui Ka `Imi `Ike Extension to Kamehameha V Highway
Authority:	County of Maui Department of Planning
TMK:	2nd/ 5-3-3: por. 15 & 5-3-11: por. 38

Thank you for the opportunity to review and comment on the subject matter.

The Land Division distributed a copy of the document covering the subject matter to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Division of Aquatic Resources
- Division of Forestry and Wildlife
- Na Ala Hele Trails
- Division of State Parks
- Commission on Water Resource Management
- Land Division Engineering Branch
- Land Division Planning and Technical Services

The Department of Land and Natural Resources has no comment to offer based on the attached responses. Should comments be received, they will be forwarded to the County of Maui Planning Department at that time.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1-808-587-0438.

Very truly yours,

Charlene E. Unoki

for DIERDRE S. MAMIYA
Administrator

C: Maui District Land Office

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

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

June 18, 2002

LD/NAV
Ref.: SM12002-0004.CMT

Suspense Date: 7/3/02

MEMORANDUM:

TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
000 Historic Preservation Division (RD)
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
000 Maui District Office (RD)

TO:
___ ADMINISTRATOR
___ ASST ADMIN
___ DEV BR
___ PLAN BR-
___ RES MGT BR
___ CLERICAL
___ ADMIN ASST
___ INTERP BR

OR:
___ CIRC/POST/STAFF RM
___ COMMENTS & REC
___ DRAFT REPLY
___ FILE
___ FOLLOW UP – Check TMK
___ INFO
___ RUN COPIES ___
___ RUSH DUE ___
___ SEE ME
___ FAX/SEND COPY TO ___

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Application: Special Management Area Use Permit
I.D. No.: SM1 2002-0004
Project: Alanui Ka `Imi `Ike Extension
Applicant: County of Maui DPWWM (STP-0900-63)
Authority: County of Maui Department of Planning
TMK: 2nd/ 5-3-3: por. 15 & 5-3-11: por. 38

Please review the **document** covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above.

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: Two (2) copies of the document are available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(✓) We have no comments.

( ) Comments attached.

Signed:
State Parks Administrator

Date: 7/5/02

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

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

2002 JUN 24 A 11:

June 18, 2002

LD/NAV
Ref.: SM12002-0004.CMT

Suspense Date: 7/3/02

MEMORANDUM:

TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
OOO Historic Preservation Division (RD)
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
OOO Maui District Office (RD)

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT:
Application: Special Management Area Use Permit
I.D. No.: SM1 2002-0004
Project: Alanui Ka `Imi `Ike Extension
Applicant: County of Maui DPWWM (STP-0900-63)
Authority: County of Maui Department of Planning
TMK: 2nd/ 5-3-3: por. 15 & 5-3-11: por. 38

Please review the **document** covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above.

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: Two (2) copies of the document are available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(X) We have no comments.

( ) Comments attached.

Signed:

Date: DOFAW Administrator
6/20/02

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

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

June 18, 2002

LD/NAV
Ref.: SM12002-0004.CMT

Suspense Date: 7/3/02

MEMORANDUM:

From
TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
OOO Historic Preservation Division (RD)
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
OOO Maui District Office (RD)

To
FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT:
Application: Special Management Area Use Permit
I.D. No.: SM1 2002-0004
Project: Alanui Ka `Imi `Ike Extension
Applicant: County of Maui DPWWM (STP-0900-63)
Authority: County of Maui Department of Planning
TMK: 2nd/ 5-3-3: por. 15 & 5-3-11: por. 38

Please review the document covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above.

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: **Two (2) copies of the document are available for review in the Land Division Office, room 220.**

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(✓) We have no comments.

( ) Comments attached.

Signed: W. [signature]

Date: 6/25/02

JUL 2 3 2002

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

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

'02 JUL 19 P1:55

July 18, 2002

LD-NAV
Ref.: SM12002-0004.RCM2
L-193/3716/3796//3527/403

Honorable John E. Min
Planning Director
County of Maui
Planning Department
250 S. High Street
Wailuku, Hawaii 96793

Dear Mr. Min:

Application:	Special Management Area Use Permit
Applicant:	County of Maui DPWWM (STP-0900-63)
I.D. No.:	SM1 2002-0004
Project:	Alanui Ka `Imi `Ike Extension to Kamehameha V Highway
Authority:	County of Maui Department of Planning
TMK:	2nd/ 5-3-3: por. 15 & 5-3-11: por. 38

This is a follow-up to our letter (Ref.: SM12002-0004.RCM) to you dated July 17, 2002, pertaining to the subject matter.

Attached herewith is a copy of a recently received comment from the Land Division Engineering Branch.

The Department of Land and Natural Resources has no other comment to offer on the subject matter.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1-808-587-0438.

Very truly yours,

Charlene E. Unoki

for DIERDRE S. MAMIYA
Administrator

C: Maui District Land Office

DLNR-LAND DIVISON
ENGINEERING BRANCH

COMMENTS

We have reviewed the application for a *Special Management Area Use Permit* for the subject project and concur that the project site is located in Special Flood Hazard Areas (SFHAs) A2, B, and C according to the Flood Insurance Rate Map (FIRM) panel 0085C (September 6, 1989). However it should be noted that Base Flood Elevations (BFE) have been determined for the A2 SFHA. The National Flood Insurance Program (NFIP) does not have regulations for development within flood hazard zones B and C.

It is understood that this project is not a "*new construction*" or "*substantial improvement*" by NFIP definition. However, the proposed roadway improvements shall be considered as a "*new development*" as defined in § 59.1 of Title 44 Code of Federal Regulations and thus subject to NFIP regulations for the work within zone A2. Title 44 Code of Federal Regulation § 60.3 (a)(4) states:

"*.... (4) Review subdivision proposals and other proposed new development, including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding. If a subdivision proposal or other proposed new development is in a flood-prone area, any such proposals shall be reviewed to assure that (i) all such proposals are consistent with the need to minimize flood damage within the flood-prone area, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided to reduce exposure to flood hazards;*"

Although this regulation may not affect the proposed design of the subject project, it is still a regulation that shall be evaluated.

Should you have any questions, please call Mr. Eric Yuasa of the Project Planning Section at 587-0229.

Signed: Andrew M. Monden
ANDREW M. MONDEN, CHIEF ENGINEER

Date: 7/12/02

N:\WLD\MAKAI\SUZIE\OAHU\Alanui.Maui110.doc

MUNEKIYO HIRAGA, INC.

July 24, 2002

Dierdre S. Mamiya, Administrator
Department of Land and Natural
Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai (FAP No. STP-0900 (63)

Dear Ms. Mamiya:

Thank you very much for your comment letter dated July 18, 2002 regarding the subject project. In response to the comments provided, we would like to note the following.

The proposed project is considered a "new development". As such, the roadway design will comply with all applicable National Flood Insurance Program (NFIP) regulations governing work proposed within zone A2.

Thank you for your interest in this important project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.
Dean K. Frampton, Planner

DKF:lfm
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

sey\alanui\dlnrland ltr

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph. (808)244-2015 fax (808)244-8729 planning@mhinconline.com

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

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

'02 JUL 19 P1:55

In reply, please refer to:
File:
02-156/cpo

July 18, 2002

Mr. John E. Min, Planning Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Mini:

Subject: Special Management Area (SMA), Draft Environmental Assessment (DEA)
Ala Nui Ka Imi Ike Extension
Molokai, Hawaii
Tax Map Key: 5-3-003:15 por. and 5-3-011:38 por.

Thank you for the opportunity to review and comment on the subject proposal. The SMA/DEA was routed to the various branches of the Environmental Health Administration. We have the following comments.

Clean Water Branch (CWB)

1. The applicant should contact the Army Corps of Engineers to identify whether a federal permit (including a Department of Army permit) is required for this project. A Section 401 Water Quality Certification is required for "Any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...", pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act");

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following discharges to waters of the State:

   a. Discharge of storm water runoff associated with industrial activities, as define in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi);

b. Discharge of storm water runoff associated with construction activities that involve the disturbance of five (5) acres or greater, including clearing, grading, and excavation;

c. Discharge of treated effluent from leaking underground storage tank remedial activities;

d. Discharge of once through cooling water less than one million gallons per day;

e. Discharge of hydro-testing water;

f. Discharge of construction dewatering effluent;

g. Discharge of treated effluent from petroleum bulk stations and terminals; and

h. Discharge of treated effluent from well drilling activities.

Any person requesting to be covered by a NPDES general permit for any of the above activities should file a Notice of Intent with the Department of Health, Clean Water Branch (CWB) at least thirty (30) days prior to commencement of any discharges to State waters;

3. If construction activities involve the disturbance of one acre or greater, including clearing, grading, and excavation, and will take place or extend after March 10, 2003, an NPDES general permit coverage is required for discharges of storm water runoff into State waters; and

4. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters.

If you have any questions, please contact the Clean Water Branch at (808) 586-4309.

Clean Air Branch (CAB)

The Clean Air Branch has concerns on construction activities where potential dust problems may arise. There is a significant potential for fugitive dust to be generated during the various phases of the project, including clearing and removal of debris, grubbing, grading, and excavation. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Construction activities must comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33, Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to:

a. Planning the different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment in areas of the least impact;

b. Providing an adequate water source at the site prior to start up of construction activities;

c. Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;

d. Controlling of dust from shoulders and access roads;

e. Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and

f. Controlling of dust from debris being hauled away from project site.

If you have any questions regarding these issues on fugitive dust, please contact the Clean Air Branch at (808) 586-4200.

Noise, Radiation and Indoor Air Quality (NRIAQ) Branch

All project activities shall comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control".

If you have any questions, please contact the NRIAQ at (808) 586-4701.

Sincerely,

GARY GILL
Deputy Director
Environmental Health Administration

c: CWB
CAB
NRIAQ

MUNEKIYO & HIRAGA, INC.

July 23, 2002

Gary Gill, Deputy Director
Environmental Planning Office
Department of Health
P O Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai
<u>FAP No. STP-0900 (63)</u>

Dear Mr. Gill:

Thank you very much for your comment letter dated July 8, 2002 regarding the subject project. In response to the comments provided, we would like to note the following.

1. The Army Corps of Engineers has determined that a Department of Army permit will not be required for the proposed project.

2. Should it be determined that a NPDES permit is required, the applicant will submit appropriate applications at least thirty (30) days prior to the commencement of any potential discharges into State waters.

3. Appropriate Best Management Practices (BMPs) will be implemented during all phases of construction, including BMPs to mitigate potential adverse impacts related to the fugitive dust. Further, construction activities will comply with the provisions of Hawaii Administrative Rules (HAR), Chapter 11-6-.1, "Air Pollution Control," Section 11-60,1-33, Fugitive Dust.

4. The proposed project will be constructed in compliance with the Hawaii Administrative Rules (HAR), Chapter 11-46 "Community Noise Control".

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph (808)244-2015 fax (808)244-8729 planning@[illegible]

Thank you for your interest in this important project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.

Dean K. Frampton, Planner

DKF:yp

cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

sey planur ggillresp ltr

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-6109
TELEPHONE (808) 270-7816 • FAX (808) 270-7833 • www.mauiwater.org

'02 JUN 21 A9:46

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

June 18, 2002

Mr. John E. Min
County of Maui
Department of Planning
Kalana Pakui Building
250 S. High Street
Wailuku, Hawaii 96793

Re: ID: SM1 2002/0004
TMK: 5-03-03:015; 038
Project Name: Proposed Alanui Ka' Imi' Ike Extension

Dear Mr. John E. Min,

Thank you for the opportunity to comment on the Environmental Assessment for Alanui Ka Imi Ike to Kamehameha V Highway, TMK: 5-03-03:015; 038. The Department of Water Supply has the following comments at this time.

The project occurs over DWS waterlines on the Kamiloloa Aquifer. The Kamiloloa Aquifer System has a sustainable and developable yield of 2 mgd. In order to protect Molokai's groundwater and surface water resources, DWS encourages the applicant to utilize Best Management Practices (BMP's) designed to minimize infiltration and runoff from all construction and vehicle operations. We have attached sample BMP's for principle operations for reference. Additional information is available from the State Department of Health.

Since the project area occurs over existing DWS waterlines the applicant is required to coordinate improvements with DWS. Construction grading activities may alter the DWS waterline locations from the surface. In the event that waterline depth is altered the applicant will be required to do all waterline relocation improvements according to system standards. Our Engineering Department can be reached at 270-7835.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

David R. Craddick
Director

mni
C Engineering division
Applicant, w/ attachments

1) References from "The Megamanual - Nonpoint Source Management Manual." Commonwealth of Massachusetts
2) Selected BMP's from "Guidance Specifying Management Measures for Sources of Nonpoint Pollution to Coastal Waters." U.S. EPA
3) Native and Polynesian Plants _ Molokai Zone 3

"By Water All Things Find Life"

MUNEKIYO HIRAGA, INC.

July 24, 2002

David Craddick, Director
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai
FAP No. STP - 0900 (63)

Dear Mr. Craddick:

Thank you very much for your comment letter dated June 18, 2002 regarding the subject project. In response to the comments provided, we would like to note the following.

In an effort to protect Molokai's groundwater and surface water resources, appropriate Best Management Practices (BMPs) will be employed to minimize the potential for infiltration and runoff from construction activities. In addition, proposed improvements will be coordinated with the Engineering Department of the DWS so as to avoid unnecessary impacts to existing waterlines underlying the proposed roadway alignment.

Thank you for your interest in this important project . Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D-K F—
Dean K. Frampton, Planner

DKF:yp
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki
sey/alanui/dcraddick.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph (808)244-2015 fax (808)244-8729 planning@mhinconline.com

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

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

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

BRIAN HASHIRO, P.E.
Highways Division

JOHN D. HARDER
Solid Waste Division

July 3, 2002

'02 JUL -8 A7:57

MEMO TO: JOHN E. MIN, DIRECTOR OF PLANNING

FROM: DAVID GOODE, DIRECTOR OF PUBLIC WORKS AND WASTE MANAGEMENT

SUBJECT: SPECIAL MANAGEMENT AREA PERMIT APPLICATION
ALANUI KA IMI IKE TO KAMEHAMEHA V HIGHWAY
TMK: (2) 5-3-003:015
SM1 2002/0004

We have reviewed the subject application and have the following comments.

1. The disposal of cleared and grubbed material is to be addressed.

2. Construction of the project shall comply with the provisions of the grading ordinance and the County drainage rules. Best management practices shall be implemented to provide erosion, sedimentation, and dust control measures during construction.

If you have any questions regarding this memorandum, please call Milton Arakawa at extension 7845.

MA:mku
S:\LUCA\CZM\alanuikaimi

MUNEKIYO HIRAGA, INC.

July 23, 2002

David Goode, Director
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Alanui Ka 'Imi 'Ike Extension, Kaunakakai, Molokai
FAP No. STP-0900 (63)

Dear Mr. Goode:

Thank you very much for your comment letter dated July 3, 2002 regarding the subject project. In response to the comments provided, we would like to note the following.

1. During project construction, disposal of cleared and grubbed material will be disposed at an acceptable recycling and/or solid waste disposal site.

2. Construction of the proposed project will comply with the provisions of the Maui County grading ordinance and drainage rules. Further, Best Management Practices will be implemented to provide for erosion, sedimentation and dust control measures.

Thank you for your interest in this important project. Should you have any questions or require additional information, please do not hesitate to call me at 244-2015.

Very truly yours,

D. K. F.

Dean K. Frampton, Planner

DKF:yp
cc: Wendy Kobashigawa, Department of Public Works and Waste Management
Scott Kunioka, Shimabukuro Endo & Yoshizaki

sey alanui:dpwwmresp ltr

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

GLENN T. CORREA
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

July 10, 2002

'02 JUL 15 A9:41
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

MEMO TO: John E. Min, Planning Director

FROM: FLOYD S. MIYAZONO, Director

SUBJECT: ALANUI KA IMI IKE EXTENSION
SM1 2002/0004

We have reviewed the subject application and have no comments to submit at this time.

Thank you for the opportunity to review and comment. Please contact me or Mr. Patrick Matsui, Chief of Planning and Development, at extension 7387 if there are any questions.

c: Patrick Matsui, Chief-Planning and Development

Maui Electric Company, Ltd. • ~ ˈ1 West Kamehameha Avenue • PO Box 398 • K ˈulul, Maui, HI 96733-6898 • (808) 871-846ˈ

'02 JUN 27 P2:09

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

June 25, 2002

Mr. Joseph Alueta
Staff Planner
Maui Planning Department
250 S. High Street
Wailuku, HI 96793

Dear Mr. Alueta:

Subject: Alanui Ka Imi Ike to Kamehameha V Highway
TMK: 5-3-003:015
I.D.: SM1 2002/0004

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, we have no objection to the subject project. Please reference our earlier comments to Munekiyo & Hiraga, Inc dated October 23, 2001, which is included in the Special Management Area Use Permit Application for the above project.

If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

Neal Shinyama

Neal Shinyama
Manager, Energy Delivery

MAY 15 2002

May 12, 2002

Mr. Dean Frampton, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hi. 96793

Dear Mr. Frampton,

After training on Maui from May 6-8, I returned to find the Draft Environmental Assessment for the Alanui Ka Imi Ike Extension on my desk on May 9, 2002. Please consider my comments within the open comment period due to the delay in my receipt of the document.

I will present some specific comments about certain items in the EA, which I find questionable, later in this document. However, up front, I would like to express what I feel has been a ramrodding into choosing the preferred alignment as stated in the EA. I received the EA on the same day that the Special Use Permit announcement, showing the preferred alignment, appeared in the Molokai Dispatch. One week prior to this, a soil sample was being taken for the area, which while needed, did not require the clearing of an entire path through the cornfield as if it were already the approved road. Lastly, by merely calling the project, "Alanui Ka 'Imi 'Ike Extension", one might think this is the only alignment choice. Had the project remained "The Kalohi Street Extension", the alignment could have taken various routes. Taken together, one might feel inclined to give up on even participating in the process.

Comments on the Draft Environmental Assessment- Alanui Ka 'Imi 'Ike Extension

1) Chapter II- page 6: The opening sentence claims, *"The proposed roadway is located on the eastern edge of Kaunakakai Town"*. **This is inaccurate.** The eastern edge is located 250 feet farther east at the location of the old slaughterhouse road. The EA itself reflects this discrepancy later on page 14: *"The project site is located near the eastern boundary of Kaunakakai town."* This is an extremely important distinction as all of the land in the cornfield to its eastern boundary (for community planning purposes) was to be zoned as "public/quasi-public". This 250 feet area translates into a five-acre parcel, which if rezoned, opens up the possibility for future commercial development in the area that goes contrary to our community planning efforts.

2) Chapter III- page 27: The sentence on **Education**: *"The roadway project is not anticipated to adversely impact education facilities or services on Molokai."* **I fully disagree.** The MCC Molokai Education Center, currently located on only two acres, already cannot accommodate student parking, even when using our overflow grassy area. Students currently park on the access road and routinely walk across the road. In high traffic times, like 3:30-6:30PM, many students are leaving class at the same time as others are arriving, which makes turning in and out of the parking area congested. If two-way outside traffic were flowing on the same roadway, it would be extremely dangerous to students, faculty, and staff.

3) Chapter IV- page 32: The second paragraph on the **Molokai Community Plan:**

"It is noted that the 1984 Molokai Community Plan recommended that the roadway connection follow the alignment as presented herein." It continues, *"In December, 2001, a specific alignment is not designated on the Community Plan Land Use Map."* **The Draft EA fails miserably here.** It fails to mention the enormous effort in community planning that occurred since 1984 and other landowner actions which included:

- The 21 community meetings of the CAC, resulting in their 1994 recommendation to reroute the extension of Kalohi Street makai to abut DHHL properties at the eastern edge of town as well as their recommendation to expand lands up the this same line for public/quasi public use with fifteen acres set aside for the College.
- The 1994 Planning Department's decision to concur with both CAC recommendations.
- The 1995 Planning Commission's decision to concur with both CAC recommendations.
- The 2001 Needs Matrix, presented by the landowner, which changed all previous planning recommendations, taking the Kalohi Street extension out of the Community Plan and limiting the College to five acres total for future expansion. This action opened up the possibility of extending Alanui Ka 'Imi 'Ike in the mauka direction, with the actual alignment to be decided after holding public meetings in the community.
- The October 30, 2001 public meeting, in which the community again supported the alignment as Kalohi Street makai along the slaughterhouse road.

4) Chapter IV- page 39: In the response to **Managing Development:** While stating that a community meeting had been held on October 30, the Draft EA should reveal up front the results of that meeting. Instead, it says ***"See Appendix D"*** which actually is the **Drainage Report**. In order to find a summary from this meeting, I had to look 44 pages into Chapter X, Appendix C. Furthermore, to the average reviewer of the Draft EA, more confusion would arise as the community's preferred route at the meeting was identified as Option D, but in the Draft EA it is called Alternative 2.

5) Chapter VI- page 45: Under the section, **Alternative Analysis, Criterion 3-** Expansion Opportunities for the Molokai Education Center, page 45, last paragraph: *"A terminus location approximately 250 feet to the east would likely require closure of the existing Alanui Ka 'Imi 'Ike intersection."* My question is, "Will it or won't it?" I understood earlier that it would **not** as traffic into and out of the College would remain relatively stable at current growth patterns, especially if outside traffic was kept along the perimeter. Also in the same paragraph, *"... a new access driveway for the Molokai Education Center would likely be required from the proposed new roadway."* Again, my question is, "Will it or won't it?" If Alternative 2 were chosen and the current access road were allowed to remain open, then the College traffic and through traffic from the outside community would be separated. I think this is the best option to accommodate both groups of traffic.

And on page 46, paragraph 2: *"It is noted, however, that spatial and facility requirements for future expansion of the Molokai Education Center have not been formulated."* **This is an assumption.** It is mentioned again twice on page 47, paragraphs 1 and 2. Some history: The College began looking for a permanent location in 1988 and conducted the site study in 1992. The UH Board of Regents chose the cornfield site in 1993, but the State was unable to acquire it until 1997's legislative session. Originally, the specifications were to acquire 3-5 acres to start with an equal amount of land for expansion. In choosing the site, the cornfield best met these parameters. However, the College was only able to negotiate a 2-acre gift from the landowner with a first right-of-refusal agreement for ten years on the adjoining 3-acre parcel to the west.

We are currently three years into the first right-of-refusal agreement. At our opening in August of 1999, the three-acre parcel already had a skeleton plan that included a vocational building and an auditorium/theater. In the two years since opening, our student population and staff has already grown to justify a second classroom facility with at least one computer classroom, a generic science lab, one large all purpose lecture hall, and at least 4-8 offices. This new facility, if built, could not utilize either the current two acres or adjoining three-acre parcel, but would require additional land area. However, it is senseless to plan too far in advance when in reality, the College only owns two acres at the present. Therefore, our strategy has focused on securing the land around the Molokai Education Center **prior** to formulating actual construction plans.

Lastly, regarding page 47, paragraph 1 on Alternative 2: *"Alternative 2 would provide a larger contiguous area for planning consideration for the Molokai Education Center."* **This is correct.** Once a student turns into campus, they would be on a safe, secure area dedicated entirely to education. And on the same page, paragraph 2: *"Since long-range physical master planning for the Molokai Education Center has not yet been initiated, opportunities for coordination exists to ensure the functional integration of the new roadway with future campus facilities."* **This is questionable.** The alignment of the road as recommended allows for public traffic right through the middle of campus and results in **less** options for expansion planning for the College. I also do not see how functional integration would be coordinated. Instead, we will forever have to deal with safety and traffic issues from outside our student population and possible commercial development across the road. We will be limited to expanding the campus west of the road.

6) Chapter VIII- pages 50-51: The Conclusions #4 and #10 are only partially true, depending on how one views the project. Conclusion #4 assumes short-term economic benefits during construction and that there would be no adverse economic or social welfare impacts to the community. It is widely known that the all construction jobs on Molokai rarely if ever hire local residents. Instead, outside contractors bring in their own people for the work, greatly reducing the economic benefits to food and accommodations for a short time. Also, alternative development possibilities created by the Draft EA preferred alignment would be detrimental as they go against the community's wishes for the area.

Conclusion #10 assumes that air quality, water quality and noise levels during the construction phase will be minimized, but **does not address the issue that the noise levels are already exceeded.** In **Appendix B- Acoustic Study-** page 12, last paragraph: *"The Molokai Education Center is located at the makai end of the project corridor and is an air conditioned, public use facility. **Existing noise levels from traffic along Kamehameha V Highway currently exceed the HDOT 66 Leq criteria along the makai wall of this facility."*** Not only is this a public use facility, it is a College, where any increase in noise would be detrimental to the students, faculty and staff. The added outside traffic, passing through the campus on the east wall in addition to the noise on the makai side would definitely be detrimental.

Also and most disturbing, in the same section on page 28, second paragraph: *"It is anticipated that potential noise impacts at any new **commercial establishments located along the new*** *roadway may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans. In addition, any new* ***commercial establishments.... which may be planned alongside the new roadway represent areas of potential adverse noise impacts*** *if adequate noise mitigation measures are not incorporated into the planning of these future projects. ...* ***In any case, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures."*** What this last paragraph seems to be saying is that commercial development is a definite possibility in this area and that while it is already noisy at the Molokai Education Center, there are no guarantees of noise abatement on future developments. This is exactly why the entire area was designated as public and not commercial in the first place during the community planning process.

I respectfully submit my review of the Draft EA as a resident of Molokai, who happens to work as Professor/Coordinator of the Molokai Education Center. These are my own opinions as to what is best for the College, its students, and our community. Please remember- the pace at which Molokai develops has never been, is not now, and never will be at the same pace as the rest of the County, State or country. We are content to take the time to grow slowly and carefully after having considered completely our actions and their relationship to our land, water, culture and human resources. The Molokai Education Center was the first facility allowed to locate in the cornfield less than three years ago after a long, exhaustive struggle with the landowner. Nowhere in my dreams did I envision the field being carved up immediately using the College as the carrot for commercial development of the area. The proposed Draft EA alignment would open up this possibility.

A College campus needs to be just that: a campus. A secure, quiet, spacious, open area for study, learning and growing. Having the community traffic pattern run along the perimeter of the land will allow this. Retaining the current access road, with its water lines, drainage improvements, etc. will allow the University the greatest flexibility for future expansion planning of the site. Securing the largest contiguous area for the College's future needs does seems reasonable in order for this to occur. Finally, if I have any say in the future expansion of the College on Molokai, I would be happy if twenty years from now, I could look out and still see some undeveloped land within the confines of the campus. This way, others after me would have the opportunity to plan for and meet the needs of their future higher educational students. For these reasons, I support Alternative 2.

Sincerely,

Donna Haytko-Paoa

Donna Haytko-Paoa
HC 01 Box 321
Kaunakakai, HI. 96748
(808) 553-5459

cc: Mr. David Goode, County of Maui Dept. of Public Works and Waste Management
Mr. Abraham Wong, Federal Highway Administration, U.S. Dept. of Transportation

Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

TEL. (808) 270-7745
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
ENGINEERING DIVISION
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

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

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

July 22, 2002

FILE

Ms. Donna Haytko-Paoa
HC 01 Box 321
Kaunakakai, Hawaii 96748

SUBJECT: PROPOSED ALANUI KA 'IMI 'IKE EXTENSION
FAP NO. STP - 0900 (63)

Dear Ms. Haytko-Paoa:

Thank you for your letter dated May 12, 2002 regarding the subject project which was addressed to our project consultant, Munekiyo & Hiraga, Inc. The Department of Public Works and Waste Management (DPWWM) appreciates your input and concerns regarding project design parameters.

Predetermination of the Project Alignment

The Draft EA and SMA application are based on an alignment which extends from the Alanui Ka 'Imi 'Ike to Ranch Camp. The selection of this preferred alternative was done following technical review and assessment of the four (4) alternatives presented at our October 30, 2001 public information meeting. We have selected the proposed Alanui Ka 'Imi 'Ike alignment based on traffic operations impacts at the Kamehameha V Highway intersection with the new road, adverse drainage conditions at eastern extent of the property (along the DHHL boundary) as well as existing easements and utility systems alignments in the vicinity. In particular, the intersection separation distance between the existing Alanui Ka 'Imi 'Ike Driveway and a new Slaughterhouse Road alignment would not meet design standards. If the Slaughterhouse Road intersection was selected, the existing Alanui Ka 'Imi 'Ike intersection would need to be closed and a new access driveway to the Molokai Education Center (MEC) would be required.

With regard to drainage, the Slaughterhouse Road alignment traverses lands which are subject to severe flooding. As evidenced by recent storms during the winter of 2001 and 2002, the Slaughterhouse Road is an apparent discharge point for storm water runoff from mauka lands. Prior to development of a roadway and other habitable uses, substantial drainage improvements would need to be constructed. In addition, as noted in the Draft EA the Alanui Ka 'Imi 'Ike Extension would follow an existing waterline easement which would enable the placement of the roadway improvements over a major transmission line, thus facilitating utility maintenance and operations.

All of the foregoing cost-driven factors, together with functional and spatial relationship with the MEC were taken into account in our review. It is with this in mind that we offer the following responses for your consideration.

Comments on the Draft EA

a. Comment 1, Chapter II, Page 6

The DPWWM acknowledges your reference to the eastern limits of Kaunakakai, and will revise the Final EA accordingly. As a point of clarification, the lands which abut the DHHL property to the east of the MEC are designated "Public/ Quasi-Public" by the Molokai Community Plan. Any development contrary to the Public/Quasi-Public land use guidelines would be subject to a Community Plan Amendment (CPA) which would require review by the Molokai Planning Commission and approval by the Maui County Council.

b. Comment 2, Chapter III, Page 27

We understand that there are existing parking limitations at the Molokai Education Center which create on-street parking and vehicular congestion along Alanui Ka 'Imi 'Ike. As we believe that provision of additional off-street parking will address this concern, we will support efforts of the MEC administration, Maui Community College and the University of Hawaii to implement appropriate parking solutions.

c. Comment 3, Chapter IV, Page 32

As a County agency, it is our responsibility to respect and implement, as appropriate, provisions contained in the Molokai Community Plan. Although the EA document does not provide a chronology of events leading to the adoption of the updated Molokai community plan process, we acknowledge that the plan does direct the Department to consult with the community. In this regard, at our community meeting of October 30, 2001, citizens attending expressed preference for an alignment along the eastern border of the property (i.e., along the "Slaughterhouse Road" alignment). At that time, we indicated that we would consider this option. However, as previously noted, our technical evaluation indicated that an extension of the existing Alanui Ka 'Imi 'Ike would provide a preferred alternative for the Kamehameha V Highway-Ranch Camp connection.

With regard to the master plan status of the MEC, we understand that the three-acre expansion area to the immediate west of the existing developed site offers opportunity to meet near to mid-term facility needs. We also understand that in the longer term, the area north or mauka of the existing MEC campus may also be master planned to address campus educational and operational needs. With the proposed extension of Alanui Ka 'Imi 'Ike, the area available for potential expansion is about 13 acres. While the selected alignment may be viewed as establishing limitations on campus development, it appears that the availability of approximately 13 acres would still allow for a viable expansion program.

d. Comment 4, Chapter IV, Page 39

Results of the community meeting held on October 30, 2001 will be included in the Managing Development discussion on page 39. In addition, the reference to the meeting summary will be revised accordingly.

e. Comment 5, Chapter VI, Page 45

Based on consultation with the State Department of Transportation, we have determined that the existing Alanui Ka 'Imi 'Ike roadway would require closure if the "Slaughterhouse Road" alternative were selected. This determination is based on existing highway and traffic safety standards which prescribe minimum distances for intersection separation. To this end, implementation of the "Slaughterhouse Road" alternative would result in realigning MEC access to a driveway originating from the new roadway, parallel to Kamehameha V Highway.

f. Comment 6, Chapter VIII, Pages 50-57

The conclusions noted reflect our expectation that there will be community benefit during the construction phase of project implementation. The economic benefits accrue to local workers as well as service and retail providers who may provide goods and services to the project contractor and sub-contractor.

With regard to noise impact, we have asked our noise consultants to review your concerns. The consultant's responses are attached hereto as Attachment "A".

As for potential commercial development west of the Alanui Ka 'Imi 'Ike extension, these lands are designated "Public/Quasi-Public" by the Molokai Community Plan. Any future land use contrary to this designation would require a Community Plan Amendment, requiring review by the Molokai Planning Commission and approval by the Maui County Council.

We understand that there are varying points of view with regard to a preferred alternative for the new roadway. However, please be assured that we have examined the merits of all alternatives and on the basis of our technical evaluation and consultation with the State Department of Transportation, we believe that the Alanui Ka 'Imi 'Ike extension offers the optimum solution for a connector between Kamehameha V Highway and Ranch Camp.

Thank you for your providing us with your perspective on the proposed roadway. We look forward to your continued participation throughout the planning stages of this important project. Should you have any questions or require additional information, please do not hesitate to contact Wendy Kobashigawa at 270-7745 or my office at 270-7845.

Sincerely,

for David Goode
Director of Public Works and Waste Management

WYK:mku(ED02-798)
s:\eng\all\wyk\kaimiike\DHAYTKO.LTR

Attachment

xc: Scott Kunioka, Shimabukuro Endo & Yoshizaki, Inc.
Dean Frampton, Munekiyo & Hiraga, Inc.