APPENDIX F.

State Historic Preservation Division Letter Dated February 27, 2007

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

ROBERT K. MASUDA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

February 27, 2007

Dr. Michael Dega
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard. Suite 975
Honolulu, Hawaii 96813

LOG NO: 2007.0636
DOC NO: 0702MK21
Archaeology

Dear Dr. Dega:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Inventory Survey on 48.117 Acres for Clayton Nishikawa
Kealahou Ahupuaa, Makawao District, Island of Maui
TMK (2) 2-3-001:174

Thank you for the opportunity to review this revised report which was received by our staff on November 13, 2006 (McGerty *et al.* 2006, *An Archaeological Inventory Survey Report on 48.117 Acres Located in Kealahou Ahupuaa, Kula, Makawao District, Maui Island, Hawaii [TMK: 2-3-001:174])*...Scientific Consultant Services, Inc., ms. We have previously provided comments on the draft archaeological inventory survey report (DOC NO: 0610MK35) and recommended the following revisions.

13-276-5 (f) a summary of findings
- (2) Map or maps locating all historic properties, with boundaries and one site location map being a relevant portion of the USGS survey topo map
- (3) Table presenting sites with SIHP number, formal type and possible function
- (4) If multiple sites within a major functional type (religious, burial, perm hab and temp hab) include a summary of each type
- (5) Re-evaluation of ideas on historic land use
- (6) If more than five sites within a major functional type, include:
  - (A) A table itemizing each site and relevant constituent structures
  - (B) Map showing distribution of sites within that functional type

The above revisions have been acceptably addressed in the revised report and accompanying correspondence.

We agree that all of the sites are significant under Criterion "D" for information content. As indicated in the review of the draft report, the historic properties represent pre-Contact agricultural use of the area, and post-Contact use for ranching, agriculture and historic habitation.

We also believe that archaeological monitoring is warranted. We will await submittal of an archaeological monitoring plan for review and acceptance concurrent with applications for proposed development.

The report is acceptable. If you have any questions, please contact Dr. Melissa Kirkendall at (808) 243-5169.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

MK:kf

c: Bert Ratte, DPWEM, County of Maui
Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, HI 96793
Maui Cultural Resources Commission, Dept. of Planning, 250 S. High Street, Wailuku, HI 96793

APPENDIX G.

Traffic Impact Assessment Report, July 2006

Traffic Impact Report

Kula Ridge

Submitted to:
Kula Ridge, LLC

Submitted by:
Wilson Okamoto Corporation

July 2006

TRAFFIC IMPACT REPORT

FOR THE

KULA RIDGE DEVELOPMENT

Prepared for:

Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, Hawaii 96793

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #7551-01

July 2006

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the proposed Kula Ridge development in Kula on the island of Maui. The project site for the proposed residential development is located east of Lower Kula Road near the Kula Community Center.

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 project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposing site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

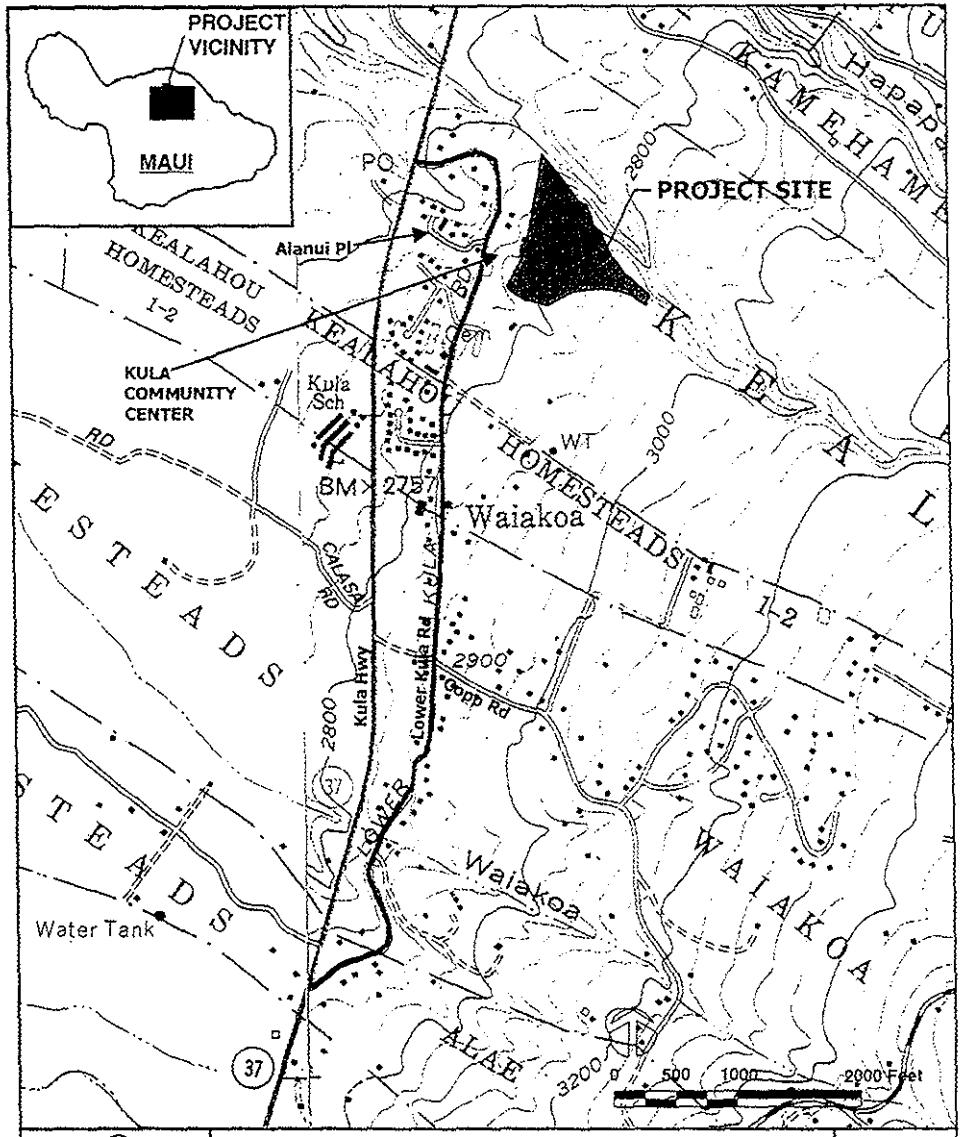
II. PROJECT DESCRIPTION

A. Location

The project site is located along Lower Kula Road east of the Kula Community Center in Kula on the island of Maui (see Figure 1) and is further identified as Tax Map Key: 2-3-001: 174. Access to the project site will be provided via a new access road off Lower Kula Road south of Alanui Place.

B. Project Characteristics

The proposed Kula Ridge development will be located on an approximately 48.117-acre site located east of Lower Kula Road. The project site will be divided into 42 residential lots, 70 affordable housing residential lots, 4 agricultural lots, and



WILSON OKAMOTO CORPORATION ENGINEERS · PLANNERS	KULA RIDGE	FIGURE
	LOCATION MAP AND VICINITY MAP	1

approximately 3-acre park that will be dedicated to the County of Maui. Each residential and agricultural lot is expected to house a residential dwelling that is anticipated to be completed and occupied by the Year 2009. Access to the project site will be provided via a new access road off Lower Kula Road. Figure 2 shows the proposed project site plan.

III. EXISTING TRAFFIC CONDITIONS

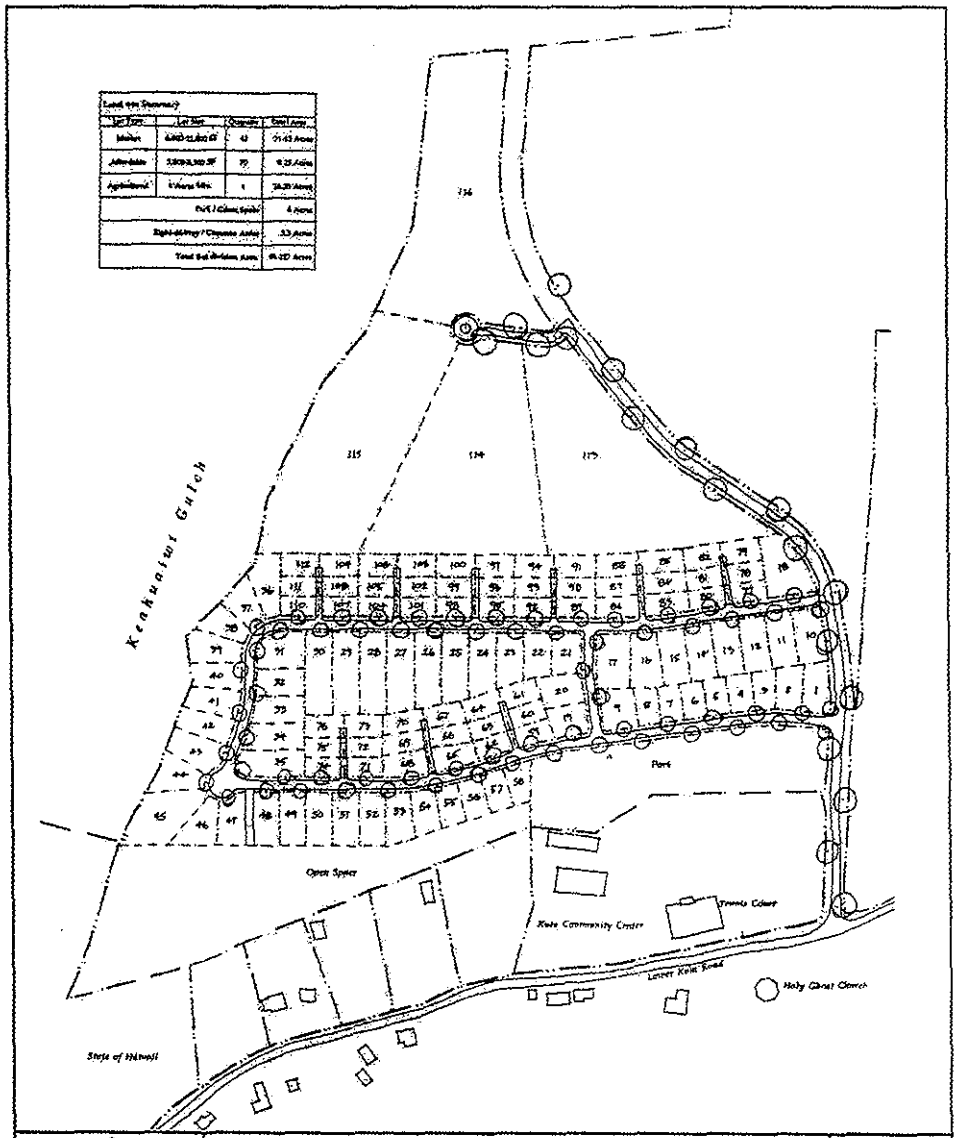
A. General

The proposed development will be located east of Lower Kula Road southeast of the intersection with Kula Highway. Kula Highway is a predominately two-way, two-lane State of Hawaii roadway generally oriented in the north-south direction that serves as the primary access road through central Maui between Haleakala Highway in Pukalani and Ulupalakua.

B. Area Roadway System

In the vicinity of the project site, Lower Kula Road is a predominantly two-way, two-lane roadway generally oriented in the north-south direction that intersects Kula Highway several times along its alignment. Northwest of proposed project site, Lower Kula Road intersects Alanui Place and the driveway for the Kula Community Center. At this unsignalized intersection, both approaches of Lower Kula Road have one lane that serves all traffic movements. Alanui Place is a two-way, two-lane roadway that provides access to the residential properties along its alignment. At the intersection with Lower Kula Road, the Alanui Place approach has one lane that serves all traffic movements. The westbound approach of the intersection is comprised of the driveway for the Kula Community Center which has one lane that serve all traffic movements at this intersection.

Northwest of intersection with Alanui Place, Lower Kula Road intersects Kula Highway. At this unsignalized T-intersection, the Lower Kula Road approach has one lane that serves left-turn and right-turn traffic movements. The northbound approach of the highway has one lane at this intersection that serves through and right-turn



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ENGINEERS - PLANNERS

KULA RIDGE

PROJECT SITE PLAN

FIGURE 2

traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements.

South of the intersection with Alanui Place, Lower Kula Road intersects Copp Road. At this unsignalized intersection, both approaches of Lower Kula Road have one lane that serves all traffic movements. Copp Road is a two-way, two-lane roadway generally oriented in the east-west direction that provides access to the residential neighborhoods along its alignment. At the intersection with Lower Kula Road, both approaches of Copp Road have one lane that serves all traffic movements.

Further southwest, Lower Kula Road intersects Kula Highway again. At this unsignalized t-intersection, the Lower Kula Road approach has one lane that serves left-turn and right-turn traffic movements. The northbound approach of the highway has one lane at this intersection that serves through and right-turn traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements.

C. Traffic Volumes and Conditions

1. General

a. Field Investigation

A field investigation was conducted on May 31 and June 1, 2005, and April 25-26, 2006 and consisted of manual turning movement count surveys during the morning peak period between 6:00 AM and 8:00 AM, and the afternoon peak period between 3:00 PM and 6:00 PM at the following intersections:

- Lower Kula Road, Alanui Place, the Kula Community Center driveway
- Lower Kula Road and Kula Highway (North)
- Lower Kula Road and Copp Road
- Lower Kula Road and Kula Highway (South)

In addition, 24-hour mechanical traffic count surveys were collected along Lower Kula Road and Kula Highway to verify the peak

traffic periods in the project vicinity. Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

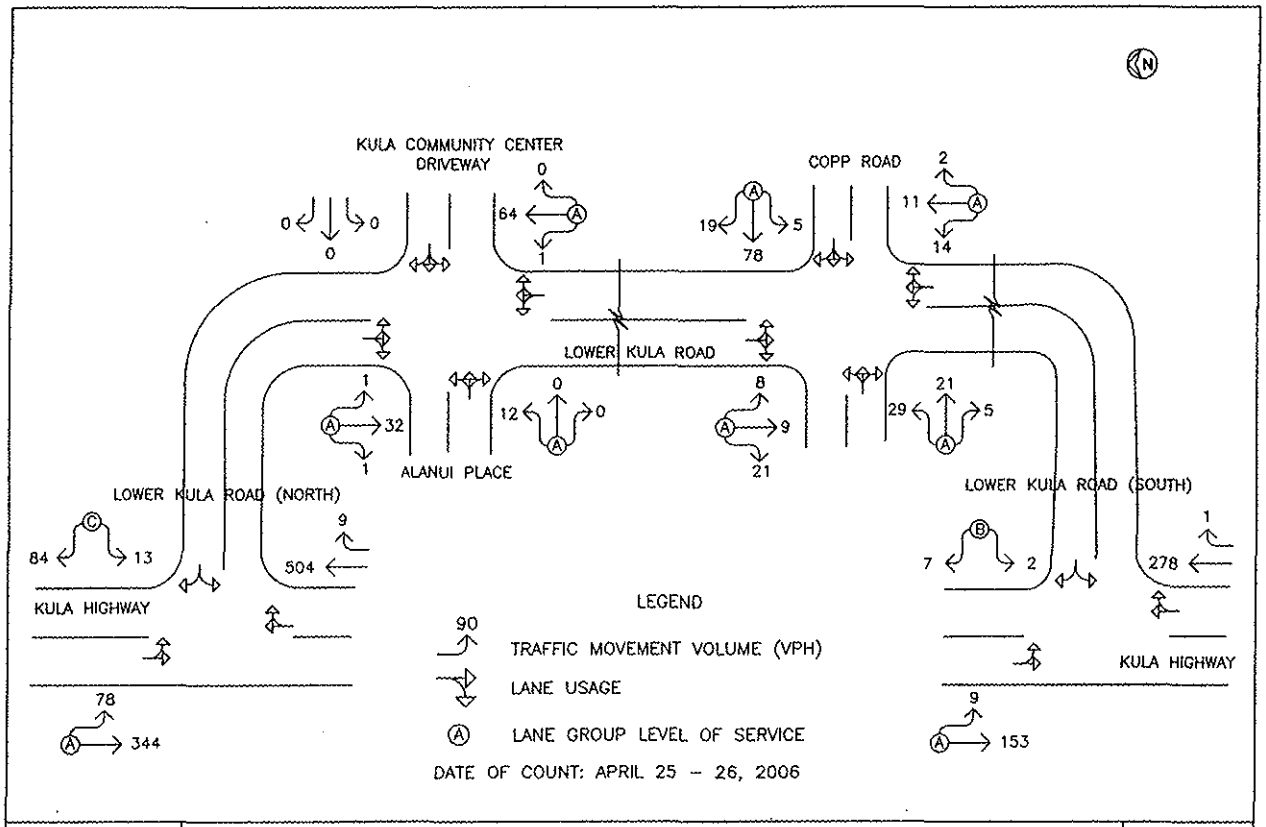
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"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 or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Existing Peak period Traffic

a. General

Figures 3 and 4 illustrate the existing AM and PM peak period traffic volumes and operating conditions. The morning peak hour of traffic generally occurs between 7:00 AM and 8:00 AM in the project vicinity. In the afternoon, the peak hour of traffic generally occurs between the hours of 3:45 PM and 4:45 PM. Although the peak hours of traffic generally occur around the same time periods at each of the study intersections, the absolute commuter peak hour time periods for



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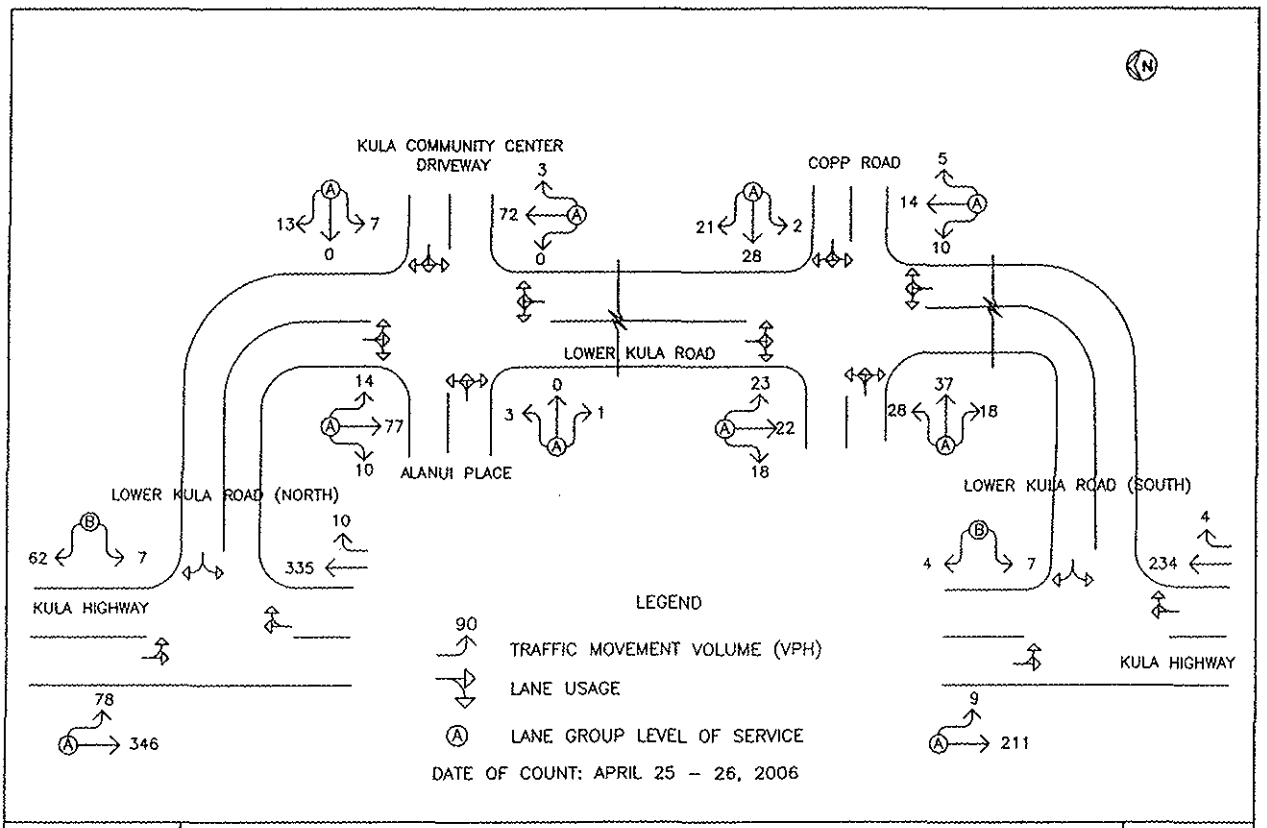
KULA RIDGE

EXISTING AM PEAK HOUR OF TRAFFIC

FIGURE 3



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KULA RIDGE

EXISTING PM PEAK HOUR OF TRAFFIC

FIGURE 4

each intersection may differ slightly as shown in Table 1.

Table 1: Peak Periods of Traffic

Intersection	AM Peak	PM Peak
Lower Kula Road/Alanui Place/Kula Community Center Driveway	7:00 AM to 8:00 AM	3:45 PM to 4:45 PM
Lower Kula Road/Kula Highway (North)	7:00 AM to 8:00 AM	3:30 PM to 4:30 PM
Lower Kula Road/Copp Road	7:00 AM to 8:00 AM	3:45 PM to 4:45 PM
Lower Kula Road/Kula Highway (South)	7:00 AM to 8:00 AM	4:00 PM to 5:00 PM

The analysis is based on the above absolute commuter peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Lower Kula Road, Alanui Place, the Kula Community Center Driveway

At the intersection with Alanui Place and the Kula Community Center driveway, Lower Kula Road carries 65 vehicles northbound and 34 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 75 vehicles traveling northbound and 101 vehicles traveling southbound. Both approaches of Lower Kula Road operate at LOS "A" during both peak periods.

The Alanui Place approach of the intersection carries 12 vehicles and 4 vehicles eastbound during the AM and PM peak periods, respectively, while the Kula Community Center driveway carries no vehicles during the AM peak period and 20 vehicles during the PM peak period. Both approaches of the intersection operate at LOS "A" during both peak periods.

c. Lower Kula Road and Kula Highway (North)

At the northern intersection with Kula Highway, Lower Kula Road carries 97 vehicles westbound during the AM peak period.

During the PM peak period, the traffic volume is less with 69 vehicles traveling westbound. The Lower Kula Road approach of the intersection operates at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

The Kula Highway approaches of the intersection carry 513 vehicles northbound and 422 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 345 vehicles traveling northbound and 424 vehicles traveling southbound. The critical traffic movement on the highway approaches at this intersection is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

d. Lower Kula Road and Copp Road

At the intersection with Copp Road, Lower Kula Road carries 27 vehicles northbound and 38 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are slightly higher with 29 vehicles traveling northbound and 63 vehicles traveling southbound. Both approaches of Lower Kula Road operate at LOS "A" during both peak periods.

The Copp Road approaches of the intersection carry 55 vehicles eastbound and 102 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 83 vehicles traveling eastbound and 51 vehicles traveling westbound. Both approaches of Copp Road operate at LOS "A" during both peak periods.

e. Lower Kula Road and Kula Highway (South)

At the southern unsignalized intersection with Kula Highway, Lower Kula Road carries 9 vehicles westbound during the AM peak period. During the PM peak period, the traffic volume is slightly higher with 11 vehicles traveling westbound. The Lower Kula Road

approach of this intersection operates at LOS "B" and LOS "A" during the AM and PM peak periods, respectively.

The Kula Highway approaches of the intersection carry 279 vehicles northbound and 162 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is approximately the same with 238 vehicles traveling northbound and 220 vehicles traveling southbound. The critical traffic movement on the highway approaches at this intersection is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 7th Edition," 2003. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit. Table 2 summarizes the project site trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 2: Peak Hour Trip Generation

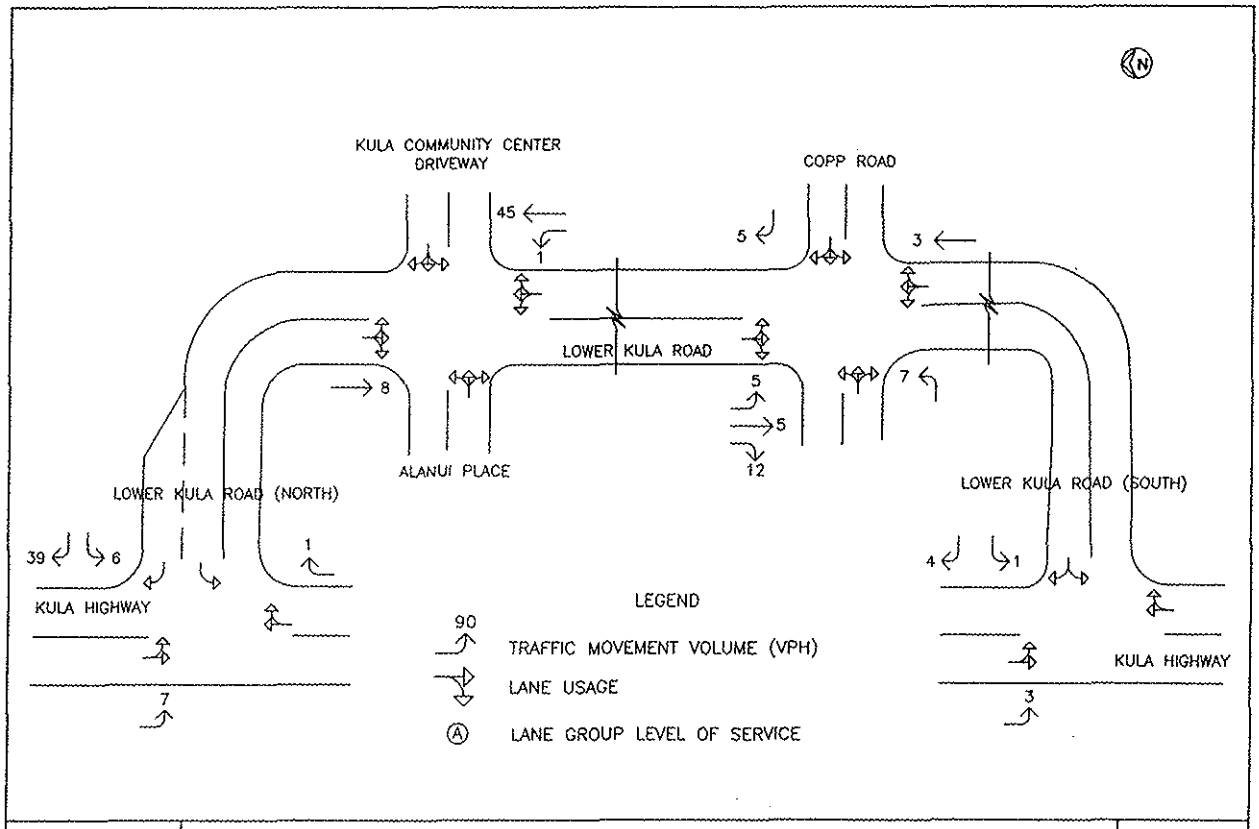
SINGLE-FAMILY DETACHED HOUSING INDEPENDENT VARIABLE		Dwelling Units = 210
		PROJECTED TRIP ENDS
AM PEAK	ENTER	23
	EXIT	68
	TOTAL	91
PM PEAK	ENTER	77
	EXIT	45
	TOTAL	123

Table 2: Peak Hour Trip Generation (Cont'd)

COUNTY PARK INDEPENDENT VARIABLE		Acres of Development = 5
		PROJECTED TRIP ENDS
AM PEAK	ENTER	0
	EXIT	0
	TOTAL	0
PM PEAK	ENTER	0
	EXIT	0
	TOTAL	0
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	23
	EXIT	68
	TOTAL	91
PM PEAK	ENTER	77
	EXIT	45
	TOTAL	123

2. Trip Distribution

Figures 5 and 6 show the distribution of site-generated traffic during the AM and PM peak periods. Access to the proposed Kula Ridge development will be provided via a new access road off Lower Kula Road. The directional distribution of site-generated traffic was based on the prevalent distribution of traffic along Lower Kula Road. As such, 46.9% of the vehicles were assumed to be traveling northbound while 53.1% were assumed to be traveling southbound during the AM peak period. Similarly, during the PM peak period, 67.0% were assumed to be traveling northbound while 33.0% were assumed to be traveling southbound. The directional distribution of traffic at the study intersections was assumed to remain similar to existing conditions.



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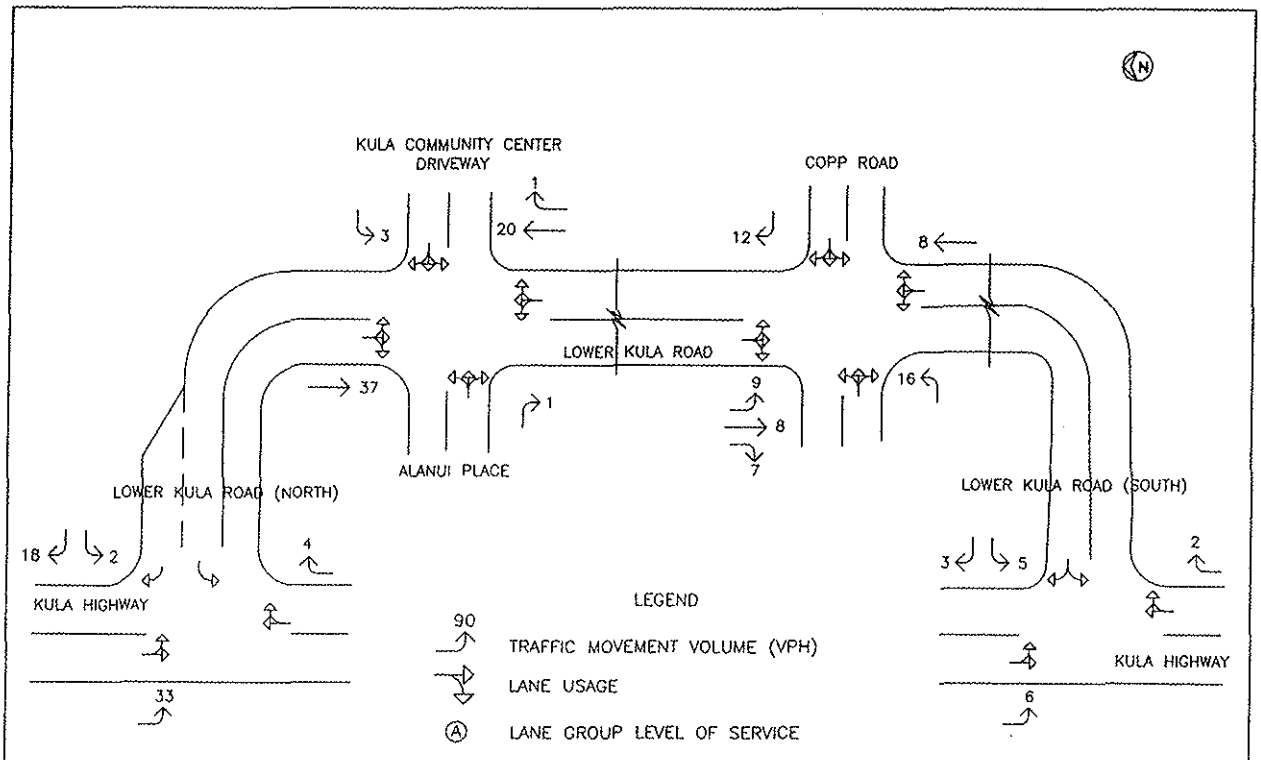
KULA RIDGE

DISTRIBUTION OF SITE-GENERATED TRAFFIC
YEAR 2009 AM PEAK HOUR OF TRAFFIC

FIGURE 5



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KULA RIDGE

DISTRIBUTION OF SITE-GENERATED TRAFFIC
YEAR 2009 PM PEAK HOUR OF TRAFFIC

FIGURE 6

B. Through Traffic Forecasting Methodology

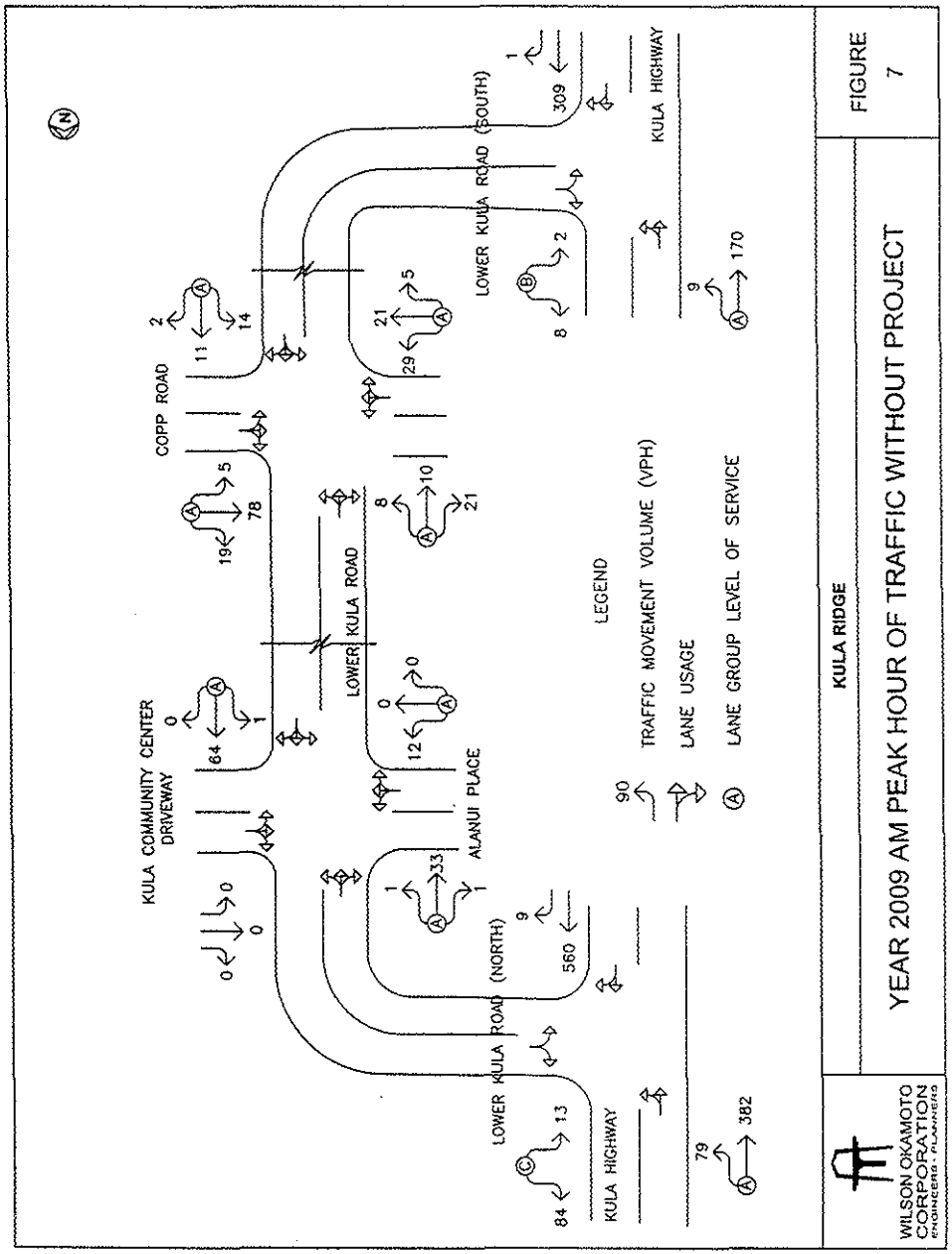
An analysis of both historical traffic data and traffic projections contained within the Maui Long-Range Land Transportation Plan (MLRLTP) was made to determine an appropriate ambient growth of traffic demands in the project vicinity. Using linear regression analyses, historical data indicates an average annual traffic growth rate in the vicinity of approximately 2.7%, while the MLRLTP indicates an average annual traffic growth rate of less than 0.5%. Therefore, for conservative analysis purposes, the travel forecast used in this study is based upon the historical traffic count data obtained from the State Department of Transportation (DOT). Using Year 2006 as the base year, a growth factor of 1.11 was applied to the existing traffic demands on the highways to achieve the projected ambient traffic demands for Year 2009.

C. Other Considerations

The Kula Senior Community Housing project is located southwest of the project site adjacent to Kula Highway across from Kula Elementary School. The proposed residential project is expected to be completed by Year 2006 and is expected to provide approximately 36 one-bedroom units for senior citizens with limited annual incomes. As detailed in the "Traffic Impact Report for the Kula Senior Community Housing" dated December 2005, the proposed development is anticipated to generate 2 trips and 4 trips during the AM and PM peak periods, respectively. These trips were assigned to the street network in the study area to account for trips generated by the proposed senior housing project.

D. Total Traffic Volumes Without Project

The projected Year 2009 AM and PM peak period traffic volumes and operating conditions without the proposed Kula Ridge development are shown in Figures 7 and 8, and summarized in Table 3. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.



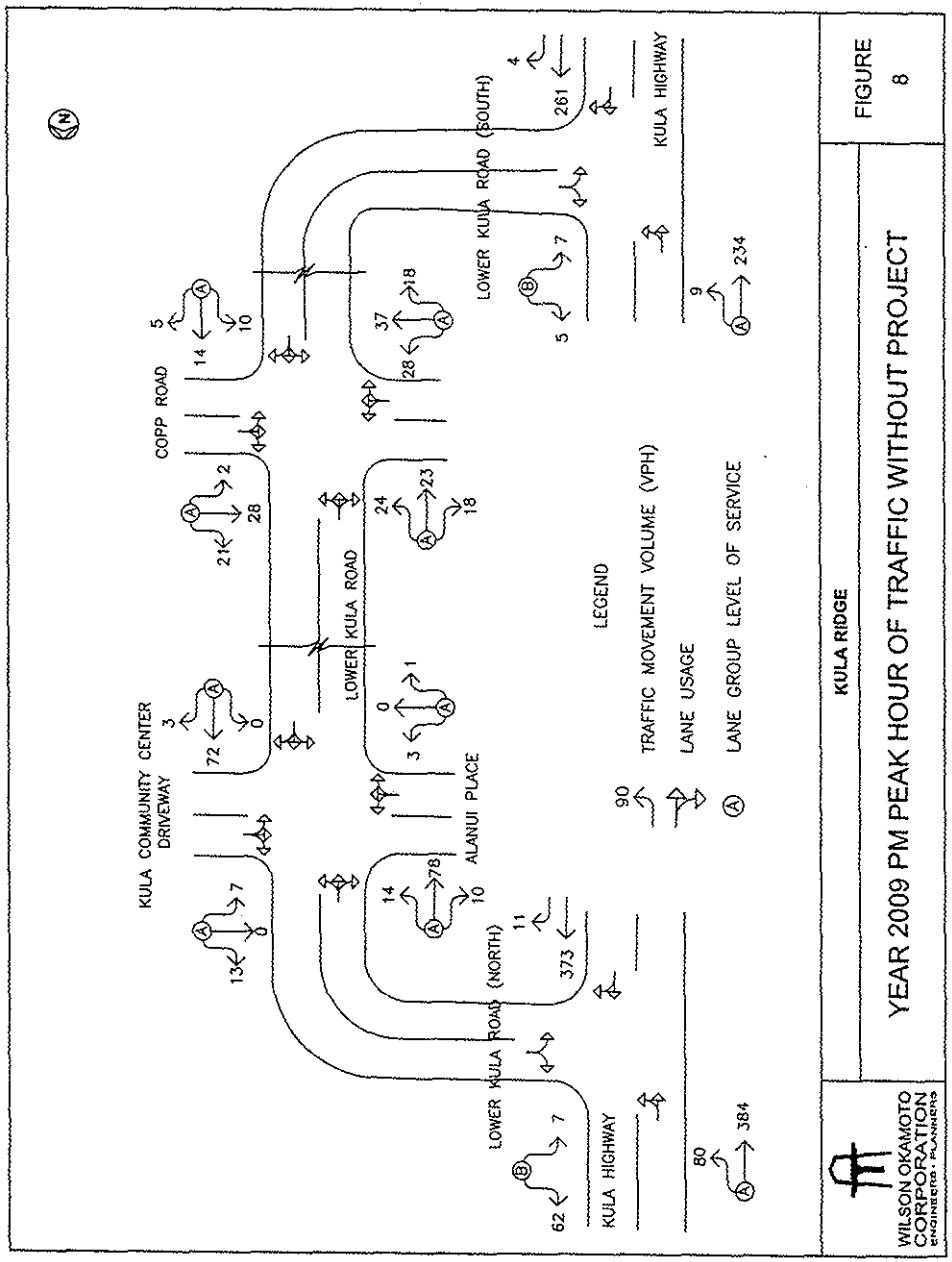


Table 3: Existing and Projected (Without Project) LOS Traffic Operating Conditions

Intersection	Critical Approach/ Movement	AM		PM	
		Exist	Year 2009 w/out Proj	Exist	Year 2009 w/out Proj
Lower Kula Road/ Alanui Place/ Kula Community Center Driveway	Eastbound	A	A	A	A
	Westbound	-	-	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Lower Kula Road/ Kula Highway (North)	Westbound	C	C	B	B
	Southbound	A	A	A	A
Lower Kula Road/ Copp Road	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Lower Kula Road/ Kula Highway (South)	Westbound	B	B	B	B
	Southbound	A	A	A	A

Traffic operations under Year 2009 without project conditions are expected to remain similar to existing conditions. The approaches of the intersections of Lower Kula Road with Alanui Place/Kula Community Center Driveway and Copp Road are expected to continue operating at LOS "A" while the westbound and southbound approaches of the southern intersection with Kula Highway are anticipated to continue operating at LOS "B" and LOS "A," respectively, during the AM and PM peak periods. Similarly, at the northern intersection of Lower Kula Road with Kula Highway, the westbound approach is anticipated to continue operating at LOS "C" and LOS "B" during the AM and PM peak periods, respectively, while the southbound approach is anticipated to continue operating at LOS "A" during both peak periods.

E. Total Traffic Volumes With Project

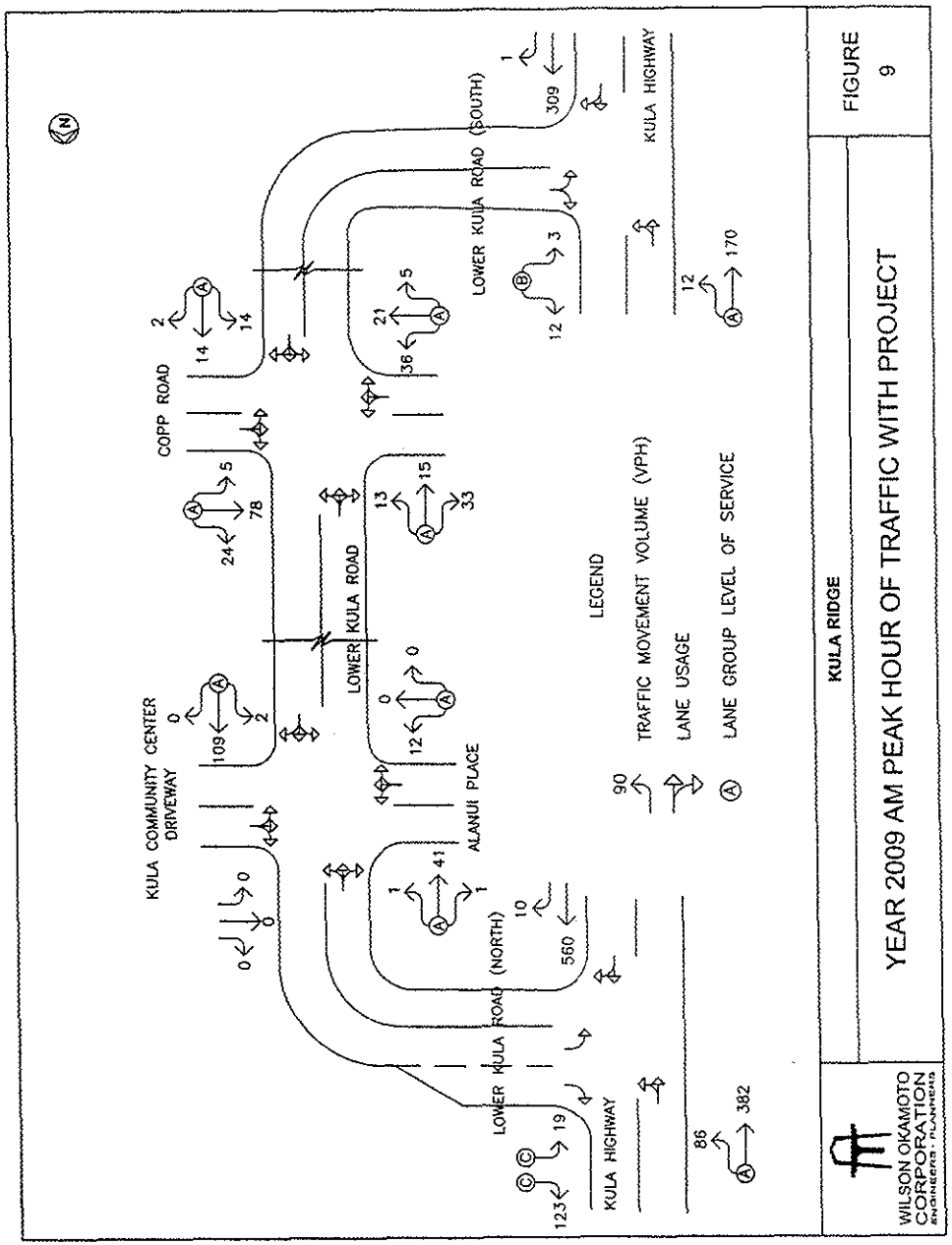
The projected Year 2009 AM and PM peak period traffic volumes and operating conditions with the development of the proposed Kula Ridge development are shown in Figures 9 and 10. The cumulative volumes consist of site-generated traffic superimposed over Year 2009 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

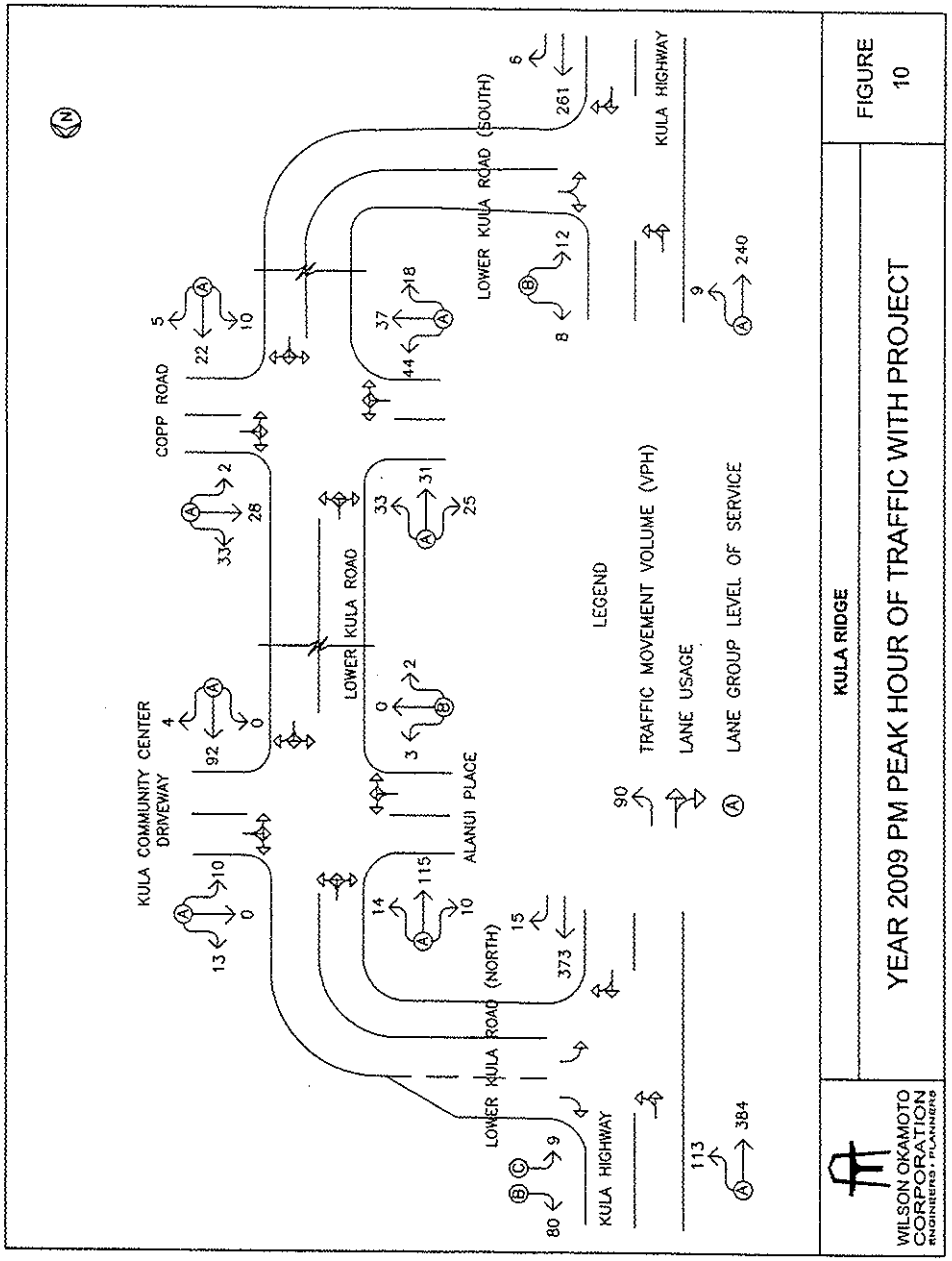
V. TRAFFIC IMPACT ANALYSIS

The Year 2009 cumulative AM and PM peak hour traffic conditions with the development of the Kula Ridge development are summarized in Table 4. The westbound approach of the northern intersection of Lower Kula Road with Kula Highway is assumed to have been modified to provide dedicated turning lanes. The existing and projected Year 2009 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 4: Existing and Projected Year 2009 (With and Without Project) Traffic Operating Conditions

Intersection	Critical Approach/ Movement		AM			PM		
			Exist	Year 2009 w/out Proj	Year 2009 w/ Proj	Exist	Year 2009 w/out Proj	Year 2009 w/ Proj
Lower Kula Road/ Alanui Place/ Kula Community Center Driveway	Eastbound		A	A	A	A	A	A
	Westbound		-	-	-	A	A	A
	Northbound		A	A	A	A	A	A
	Southbound		A	A	A	A	A	B
Lower Kula Road/ Kula Highway (North)	Westbound	LT	C	C	C	B	B	C
		RT			C			B
	Southbound		A	A	A	A	A	A
Lower Kula Road/ Copp Road	Eastbound		A	A	A	A	A	A
	Westbound		A	A	A	A	A	A
	Northbound		A	A	A	A	A	A
	Southbound		A	A	A	A	A	A
Lower Kula Road/ Kula Highway (South)	Westbound		B	B	B	B	B	B
	Southbound		A	A	A	A	A	A





Traffic operations in the vicinity of the proposed Kula Ridge development are expected, in general, to remain similar to existing and Year 2009 without project conditions despite the anticipated increases in traffic along the surrounding roadways due to the project. The critical movements at the intersection of Lower Kula Road with Alanui Place/Kula Community Center Driveway, Copp Road, and Kula Highway (South) are expected to operate at levels of service similar to Year 2009 without project conditions during both peak hours of traffic with the exception of the southbound approach of the intersection with Alanui Place/Kula Community Center driveway which is expected to deteriorate from LOS "A" to LOS "B" during the PM peak period. At the northern intersection of Lower Kula Road with Kula Highway, the westbound left-turn traffic movement is anticipated to operate at LOS "C" during both peak periods while the right-turn traffic movement is anticipated to operate at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

1. Maintain sufficient sight distance for motorists to safely enter and exit all project roadways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Provide sufficient turning radii at all project roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

5. Provide exclusive left-turn and right-turn lanes on the westbound approach of Lower Kula Road at the northern intersection with Kula Highway to minimize the impact of left-turning vehicles on the higher volume of right-turning vehicles on that approach.

VII. CONCLUSION

The proposed Kula Ridge development is expected to include 42 residential lots, 70 affordable housing residential lots, 4 agricultural lots, and an approximately 3-acre park that will be dedicated to the County of Maui. With the implementation of the aforementioned recommendations, the proposed Kula Ridge development is not expected to have a significant impact on traffic operations in the vicinity of the project site. The critical movements at the study intersection along Lower Kula Road are expected continue operating at acceptable levels of service despite the addition of site-generated vehicles to the surrounding roadway network due to the provision of exclusive turning lanes at the northern intersection of Lower Kula Road with Kula Highway.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0769
Counted By: GMT
Weather: CLEAR

File Name : KulLkul-nA
Site Code : 00000001
Start Date : 6/1/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Hwy (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
06:00 AM	2	17	0	19	0	0	10	10	0	59	0	59	0	88
06:15 AM	2	29	0	31	0	0	7	7	0	68	0	68	0	106
06:30 AM	3	50	0	53	1	0	8	9	0	63	1	64	0	126
06:45 AM	11	45	0	56	3	0	10	13	0	99	0	99	0	168
Total	18	141	0	159	4	0	35	39	0	289	1	290	0	488
07:00 AM	11	63	0	74	3	0	17	20	0	103	2	105	0	199
07:15 AM	13	94	0	107	1	0	22	23	0	139	0	139	0	269
07:30 AM	15	122	0	137	3	0	22	25	0	140	2	142	0	304
07:45 AM	39	65	0	104	6	0	23	29	0	122	5	127	0	260
Total	78	344	0	422	13	0	84	97	0	504	9	513	0	1032
Grand Total	96	485	0	581	17	0	119	136	0	793	10	803	0	1520
Apprch %	16.5	83.5	0.0		12.5	0.0	87.5		0.0	98.8	1.2			
Total %	6.3	31.9	0.0	38.2	1.1	0.0	7.8	8.9	0.0	52.2	0.7	52.8	0.0	

	Kula Highway Southbound				Lower Kula Hwy (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 06:00 AM to 07:45 AM - Peak 1 of 1														
Intersection	07:00 AM													
Volume	78	344	0	422	13	0	84	97	0	504	9	513	0	1032
Percent	18.5	81.5	0.0		13.4	0.0	86.6		0.0	98.2	1.8			
07:30 Volume	15	122	0	137	3	0	22	25	0	140	2	142	0	304
Peak Factor														0.849
High Int.	07:30 AM				07:45 AM				07:30 AM				5:45:00 AM	
Volume	15	122	0	137	6	0	23	29	0	140	2	142		
Peak Factor				0.770				0.836				0.903		

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
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Counter: D1-0769
Counted By: GMT
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File Name : KulLkul-nP
Site Code : 00000001
Start Date : 5/31/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
03:00 PM	16	54	0	70	1	0	23	24	0	59	0	59	0	153
03:15 PM	13	59	0	72	3	0	13	16	0	77	4	81	0	169
03:30 PM	27	91	0	118	2	0	13	15	0	88	1	89	0	222
03:45 PM	15	83	0	98	3	0	17	20	0	71	0	71	0	189
Total	71	287	0	358	9	0	66	75	0	295	5	300	0	733
04:00 PM	20	86	0	106	1	0	20	21	0	97	3	100	0	227
04:15 PM	17	86	0	103	1	0	12	13	0	79	6	85	0	201
04:30 PM	18	75	0	93	1	0	19	20	0	73	1	74	0	187
04:45 PM	23	90	0	113	1	0	12	13	0	83	4	87	0	213
Total	78	337	0	415	4	0	63	67	0	332	14	346	0	828
05:00 PM	21	82	0	103	1	0	22	23	0	56	1	57	0	183
05:15 PM	34	72	0	106	1	0	16	17	0	76	2	78	0	201
05:30 PM	31	68	0	99	1	0	21	22	0	74	1	75	0	196
05:45 PM	29	77	0	106	0	0	6	6	0	63	1	64	0	176
Total	115	299	0	414	3	0	65	68	0	269	5	274	0	756
Grand Total	264	923	0	1187	16	0	194	210	0	896	24	920	0	2317
Apprch %	22.2	77.8	0.0		7.6	0.0	92.4		0.0	97.4	2.6			
Total %	11.4	39.8	0.0	51.2	0.7	0.0	8.4	9.1	0.0	38.7	1.0	39.7	0.0	

	Kula Highway Southbound				Lower Kula Highway (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1														
Intersection	03:30 PM													
Volume	79	346	0	425	7	0	62	69	0	335	10	345	0	839
Percent	18.6	81.4	0.0		10.1	0.0	89.9		0.0	97.1	2.9			
04:00 Volume	20	86	0	106	1	0	20	21	0	97	3	100	0	227
Peak Factor														0.924
High Int.	03:30 PM				04:00 PM				04:00 PM				2:45:00 PM	
Volume	27	91	0	118	1	0	20	21	0	97	3	100		
Peak Factor				0.900				0.821				0.863		

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File Name : LowAlaA
Site Code : 00000002
Start Date : 4/26/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Dwy. To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	0	6	0	6	0	0	0	0	1	9	0	10	4	0	1	5	21
06:15 AM	0	5	0	5	0	0	0	0	0	5	0	5	2	0	1	3	13
06:30 AM	0	6	0	6	0	0	0	0	0	8	0	8	0	0	0	0	12
06:45 AM	1	7	0	8	0	0	1	1	1	13	0	14	2	0	0	2	25
Total	1	24	0	25	0	0	1	1	2	33	0	35	8	0	2	10	71
07:00 AM	0	5	0	5	0	0	0	0	1	12	0	13	4	0	0	4	22
07:15 AM	0	7	0	7	0	0	0	0	0	22	0	22	5	0	0	5	34
07:30 AM	0	5	0	5	0	0	0	0	0	18	0	18	2	0	0	2	25
07:45 AM	1	15	1	17	0	0	0	0	0	12	0	12	1	0	0	1	30
Total	1	32	1	34	0	0	0	0	1	64	0	65	12	0	0	12	111
Grand Total	2	56	1	59	0	0	1	1	3	97	0	100	20	0	2	22	182
Apprch %	3.4	94.9	1.7		0	0	100		3	97	0		90.9	0	9.1		
Total %	1.1	30.8	0.5	32.4	0	0	0.5	0.5	1.6	53.3	0	54.9	11	0	1.1	12.1	

	Lower Kula Road Southbound				Dwy. To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	5	0	5	0	0	0	0	1	12	0	13	4	0	0	4	22
07:15 AM	0	7	0	7	0	0	0	0	0	22	0	22	5	0	0	5	34
07:30 AM	0	5	0	5	0	0	0	0	0	18	0	18	2	0	0	2	25
07:45 AM	1	15	1	17	0	0	0	0	0	12	0	12	1	0	0	1	30
Total Volume	1	32	1	34	0	0	0	0	1	64	0	65	12	0	0	12	111
% App. Total	2.9	94.1	2.9		0	0	0		1.5	98.5	0		100	0	0		
PHF	.250	.533	.250	.500	.000	.000	.000	.000	.250	.727	.000	.739	.600	.000	.000	.600	.816

WILSON OKAMOTO CORPORATION
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File Name : LowAlaP
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Start Date : 4/25/200
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Dwy To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	3	13	1	17	1	0	0	1	1	16	1	18	0	0	0	0	36
03:15 PM	3	17	1	21	0	0	1	1	0	15	1	16	1	1	0	2	40
03:30 PM	3	17	0	20	0	1	2	3	1	7	1	9	1	0	0	1	33
03:45 PM	5	22	3	30	1	0	5	6	0	18	1	19	0	0	0	0	55
Total	14	69	5	88	2	1	8	11	2	56	4	62	2	1	0	3	164
04:00 PM	3	17	4	24	3	0	4	7	0	11	0	11	0	0	1	1	43
04:15 PM	4	23	2	29	1	0	1	2	0	16	2	18	0	0	0	0	49
04:30 PM	2	15	1	18	2	0	3	5	0	27	0	27	3	0	0	3	53
04:45 PM	3	19	1	23	0	0	1	1	0	9	0	9	0	0	1	1	34
Total	12	74	8	94	6	0	9	15	0	63	2	65	3	0	2	5	179
05:00 PM	0	13	1	14	0	0	0	0	0	17	3	20	0	0	0	0	34
05:15 PM	1	11	1	13	1	0	3	4	0	13	0	13	1	0	0	1	31
05:30 PM	1	17	2	20	1	0	5	6	1	12	2	15	2	0	1	3	44
05:45 PM	0	15	2	17	0	0	0	0	1	16	0	17	1	0	0	1	35
Total	2	56	6	64	2	0	8	10	2	58	5	65	4	0	1	5	144
Grand Total	28	199	19	246	10	1	25	36	4	177	11	192	9	1	3	13	487
Apprch %	11.4	80.9	7.7		27.8	2.8	69.4		2.1	92.2	5.7		69.2	7.7	23.1		
Total %	5.7	40.9	3.9	50.5	2.1	0.2	5.1	7.4	0.8	36.3	2.3	39.4	1.8	0.2	0.6	2.7	

	Lower Kula Road Southbound				Dwy To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	5	22	3	30	1	0	5	6	0	18	1	19	0	0	0	0	55
04:00 PM	3	17	4	24	3	0	4	7	0	11	0	11	0	0	1	1	43
04:15 PM	4	23	2	29	1	0	1	2	0	16	2	18	0	0	0	0	49
04:30 PM	2	15	1	18	2	0	3	5	0	27	0	27	3	0	0	3	53
Total Volume	14	77	10	101	7	0	13	20	0	72	3	75	3	0	1	4	200
% App. Total	13.9	76.2	9.9		35	0	65		0	96	4		75	0	25		
PHF	.700	.837	.625	.842	.583	.000	.650	.714	.000	.667	.375	.694	.250	.000	.250	.333	.909

WILSON OKAMOTO CORPORATION
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File Name : LowCopA
Site Code : 00000001
Start Date : 4/26/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	3	0	2	5	1	8	2	11	2	0	0	2	1	0	0	1	19
06:15 AM	4	1	0	5	0	14	0	14	2	2	0	4	3	1	0	4	27
06:30 AM	0	1	3	4	0	18	2	20	2	1	1	4	5	0	1	6	34
06:45 AM	2	4	3	9	0	7	6	13	4	2	1	7	2	2	2	6	35
Total	9	6	8	23	1	47	10	58	10	5	2	17	11	3	3	17	115
07:00 AM	2	1	4	7	1	18	6	25	3	2	0	5	3	2	1	6	43
07:15 AM	2	4	4	10	3	24	5	32	6	5	0	11	9	3	0	12	65
07:30 AM	3	3	6	12	0	25	4	29	3	1	1	5	9	7	1	17	63
07:45 AM	1	1	7	9	1	11	4	16	2	3	1	6	8	9	3	20	51
Total	8	9	21	38	5	78	19	102	14	11	2	27	29	21	5	55	222
Grand Total	17	15	29	61	6	125	29	160	24	16	4	44	40	24	8	72	337
Apprch %	27.9	24.6	47.5		3.8	78.1	18.1		54.5	36.4	9.1		55.6	33.3	11.1		
Total %	5	4.5	8.6	18.1	1.8	37.1	8.6	47.5	7.1	4.7	1.2	13.1	11.9	7.1	2.4	21.4	

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	2	1	4	7	1	18	6	25	3	2	0	5	3	2	1	6	43
07:15 AM	2	4	4	10	3	24	5	32	6	5	0	11	9	3	0	12	65
07:30 AM	3	3	6	12	0	25	4	29	3	1	1	5	9	7	1	17	63
07:45 AM	1	1	7	9	1	11	4	16	2	3	1	6	8	9	3	20	51
Total Volume	8	9	21	38	5	78	19	102	14	11	2	27	29	21	5	55	222
% App. Total	21.1	23.7	55.3		4.9	76.5	18.6		51.9	40.7	7.4		52.7	38.2	9.1		
PHF	.667	.563	.750	.792	.417	.780	.792	.797	.583	.550	.500	.614	.806	.583	.417	.688	.854

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter:T-1839
Counted:KT
Weather:Clear

File Name : LowCopP
Site Code : 00000001
Start Date : 4/25/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	5	0	5	10	1	11	5	17	3	7	3	13	3	6	1	10	50
03:15 PM	7	3	5	15	1	8	6	15	4	5	0	9	3	10	3	16	55
03:30 PM	4	3	5	12	1	10	7	18	0	3	0	3	4	7	3	14	47
03:45 PM	5	7	5	17	0	7	6	13	3	3	0	6	9	8	4	21	57
Total	21	13	20	54	3	36	24	63	10	18	3	31	19	31	11	61	209
04:00 PM	9	7	5	21	1	6	4	11	2	4	2	8	2	8	5	15	55
04:15 PM	5	3	6	14	0	7	5	12	1	4	2	7	11	13	3	27	60
04:30 PM	4	5	2	11	1	8	6	15	4	3	1	8	6	8	6	20	54
04:45 PM	8	1	6	15	0	8	2	10	2	1	0	3	6	9	2	17	45
Total	26	16	19	61	2	29	17	48	9	12	5	26	25	38	16	79	214
05:00 PM	3	3	5	11	0	7	3	10	0	6	0	6	7	17	5	29	56
05:15 PM	1	4	0	5	2	4	6	12	1	1	2	4	4	11	3	18	39
05:30 PM	6	10	1	17	2	3	3	8	0	3	0	3	6	13	5	24	52
05:45 PM	1	11	2	14	3	6	3	12	3	5	1	9	8	22	1	31	66
Total	11	28	8	47	7	20	15	42	4	15	3	22	25	63	14	102	213
Grand Total	58	57	47	162	12	85	56	153	23	45	11	79	69	132	41	242	636
Apprch %	35.8	35.2	29		7.8	55.6	36.6		29.1	57	13.9		28.5	54.5	16.9		
Total %	9.1	9	7.4	25.5	1.9	13.4	8.8	24.1	3.6	7.1	1.7	12.4	10.8	20.8	6.4	38.1	

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	5	7	5	17	0	7	6	13	3	3	0	6	9	8	4	21	57
04:00 PM	9	7	5	21	1	6	4	11	2	4	2	8	2	8	5	15	55
04:15 PM	5	3	6	14	0	7	5	12	1	4	2	7	11	13	3	27	60
04:30 PM	4	5	2	11	1	8	6	15	4	3	1	8	6	8	6	20	54
Total Volume	23	22	18	63	2	28	21	51	10	14	5	29	28	37	18	83	226
% App. Total	36.5	34.9	28.6		3.9	54.9	41.2		34.5	48.3	17.2		33.7	44.6	21.7		
PHF	.639	.786	.750	.750	.500	.875	.875	.850	.625	.875	.625	.906	.636	.712	.750	.769	.942

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0528
Counted By: TO
Weather: CLEAR

File Name : KulLkul-sA
Site Code : 00000004
Start Date : 6/1/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
06:00 AM	0	15	0	15	0	0	0	0	0	35	0	35	0	50
06:15 AM	1	23	0	24	0	0	0	0	0	36	0	36	0	60
06:30 AM	0	38	0	38	2	0	1	3	0	47	1	48	0	89
06:45 AM	0	36	0	36	1	0	1	2	0	57	2	59	0	97
Total	1	112	0	113	3	0	2	5	0	175	3	178	0	296
07:00 AM	1	28	0	29	0	0	2	2	0	61	1	62	0	93
07:15 AM	2	15	0	17	1	0	2	3	0	80	0	80	0	100
07:30 AM	3	52	0	55	1	0	2	3	0	84	0	84	0	142
07:45 AM	3	58	0	61	0	0	1	1	0	53	0	53	0	115
Total	9	153	0	162	2	0	7	9	0	278	1	279	0	450
Grand Total	10	265	0	275	5	0	9	14	0	453	4	457	0	746
Apprch %	3.6	96.4	0.0		35.7	0.0	64.3		0.0	99.1	0.9			
Total %	1.3	35.5	0.0	36.9	0.7	0.0	1.2	1.9	0.0	60.7	0.5	61.3	0.0	

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 06:00 AM to 07:45 AM - Peak 1 of 1														
Intersection	07:00 AM													
Volume	9	153	0	162	2	0	7	9	0	278	1	279	0	450
Percent	5.6	94.4	0.0		22.2	0.0	77.8		0.0	99.6	0.4			
07:30 Volume	3	52	0	55	1	0	2	3	0	84	0	84	0	142
Peak Factor														0.792
High Int.	07:45 AM				07:15 AM				07:30 AM				5:45:00 AM	
Volume	3	58	0	61	1	0	2	3	0	84	0	84		
Peak Factor				0.664				0.750				0.830		

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0528
Counted By: TO
Weather: CLEAR

File Name : KulLkul-sP
Site Code : 00000004
Start Date : 5/31/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
03:00 PM	0	39	0	39	0	0	2	2	0	44	0	44	0	85
03:15 PM	1	40	0	41	2	0	1	3	0	56	1	57	0	101
03:30 PM	2	52	0	54	0	0	3	3	0	61	1	62	0	119
03:45 PM	3	49	0	52	0	0	0	0	0	50	0	50	0	102
Total	6	180	0	186	2	0	6	8	0	211	2	213	0	407
04:00 PM	1	60	0	61	5	0	1	6	0	61	2	63	0	130
04:15 PM	3	50	0	53	2	0	0	2	0	62	1	63	0	118
04:30 PM	2	51	0	53	4	0	3	7	0	51	2	53	0	113
04:45 PM	1	58	0	59	1	0	1	2	0	63	4	67	0	128
Total	7	219	0	226	12	0	5	17	0	237	9	246	0	489
05:00 PM	1	53	0	54	0	0	5	5	0	53	1	54	0	113
05:15 PM	1	55	0	56	1	0	2	3	0	60	0	60	0	119
05:30 PM	2	42	0	44	1	0	0	1	0	52	2	54	0	99
05:45 PM	1	54	0	55	1	0	1	2	0	49	4	53	0	110
Total	5	204	0	209	3	0	8	11	0	214	7	221	0	441
Grand Total	18	603	0	621	17	0	19	36	0	662	18	680	0	1337
Apprch %	2.9	97.1	0.0		47.2	0.0	52.8		0.0	97.4	2.6			
Total %	1.3	45.1	0.0	46.4	1.3	0.0	1.4	2.7	0.0	49.5	1.3	50.9	0.0	

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1														
Intersection	04:00 PM													
Volume	7	219	0	226	12	0	5	17	0	237	9	246	0	489
Percent	3.1	96.9	0.0		70.6	0.0	29.4		0.0	96.3	3.7			
04:00 Volume	1	60	0	61	5	0	1	6	0	61	2	63	0	130
Peak Factor														0.940
High Int.	04:00 PM				04:30 PM				04:45 PM				2:45:00 PM	
Volume	1	60	0	61	4	0	3	7	0	63	4	67		
Peak Factor				0.926				0.607				0.918		

Wilson Okamoto Coporation
1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Lower Kula Road
2 : Kula Ridge
3 :

Site:
Date: 04/25/06
Day: Tuesday

Interval Begin	NB AM	NB PM		SB AM	SB PM		Combined AM	Combined PM	
12:00	*	*		*	*		*	*	
12:15	*	*		*	*		*	*	
12:30	*	*		*	*		*	*	
12:45	*	*		*	*		*	*	
01:00	*	*		*	*		*	*	
01:15	*	*		*	*		*	*	
01:30	*	*		*	*		*	*	
01:45	*	*		*	*		*	*	
02:00	*	*		*	*		*	*	
02:15	*	*		*	*		*	*	
02:30	*	*		*	*		*	*	
02:45	*	8		*	8		*	16	
03:00	*	20	61	*	14	74	*	34	135
03:15	*	16		*	20		*	36	
03:30	*	10		*	16		*	26	
03:45	*	15		*	24		*	39	
04:00	*	13	67	*	17	82	*	30	149
04:15	*	14		*	23		*	37	
04:30	*	31		*	22		*	53	
04:45	*	9		*	20		*	29	
05:00	*	18	65	*	17	64	*	35	129
05:15	*	15		*	10		*	25	
05:30	*	13		*	20		*	33	
05:45	*	19		*	17		*	36	
06:00	*	21	47	*	24	83	*	45	130
06:15	*	11		*	14		*	25	
06:30	*	8		*	30		*	38	
06:45	*	7		*	15		*	22	
07:00	*	8	34	*	16	49	*	24	83
07:15	*	14		*	14		*	28	
07:30	*	7		*	11		*	18	
07:45	*	5		*	8		*	13	
08:00	*	4	21	*	3	16	*	7	37
08:15	*	2		*	3		*	5	
08:30	*	9		*	4		*	13	
08:45	*	6		*	6		*	12	
09:00	*	4	18	*	2	15	*	6	33
09:15	*	4		*	5		*	9	
09:30	*	6		*	5		*	11	
09:45	*	4		*	3		*	7	
10:00	*	5	13	*	4	10	*	9	21
10:15	*	3		*	2		*	5	
10:30	*	3		*	3		*	6	
10:45	*	0		*	1		*	1	
11:00	*	2	4	*	2	8	*	4	12
11:15	*	0		*	4		*	4	
11:30	*	1		*	2		*	3	
11:45	*	1		*	0		*	1	
Totals	0	336		0	409		0	745	
Split%	*	45.1		*	54.9				
Day Totals		336			409			745	
Day Splits		45.1			54.9				
Peak Hour	*	03:45		*	03:45		*	03:45	
Volume	*	73		*	86		*	159	
Factor	*	0.59		*	0.90		*	0.75	

Wilson Okamoto Coporation
1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Lower Kula Road
2 : Kula Ridge
3 :

Site:
Date: 04/26/06
Day: Wednesday

Interval Begin	NB AM	NB PM		SB AM	SB PM		Combined AM	Combined PM	
12:00	0	0	*	1	2	*	1	2	*
12:15	0		*	1		*	1		*
12:30	0		*	0		*	0		*
12:45	0		*	0		*	0		*
01:00	0	0	*	0	0	*	0	0	*
01:15	0		*	0		*	0		*
01:30	0		*	0		*	0		*
01:45	0		*	0		*	0		*
02:00	0	0	*	0	0	*	0	0	*
02:15	0		*	0		*	0		*
02:30	0		*	0		*	0		*
02:45	0		*	0		*	0		*
03:00	0	1	*	0	1	*	0	2	*
03:15	0		*	0		*	0		*
03:30	0		*	0		*	0		*
03:45	1		*	1		*	2		*
04:00	1	1	*	0	2	*	1	3	*
04:15	0		*	0		*	0		*
04:30	0		*	1		*	1		*
04:45	0		*	1		*	1		*
05:00	0	3	*	1	6	*	1	9	*
05:15	0		*	2		*	2		*
05:30	1		*	1		*	2		*
05:45	2		*	2		*	4		*
06:00	8	33	*	7	27	*	15	60	*
06:15	6		*	6		*	12		*
06:30	6		*	4		*	10		*
06:45	13		*	10		*	23		*
07:00	11	65	*	4	31	*	15	96	*
07:15	22		*	7		*	29		*
07:30	20		*	6		*	26		*
07:45	12		*	14		*	26		*
08:00	0		*	0		*	0		*
08:15	*		*	*		*	*		*
08:30	*		*	*		*	*		*
08:45	*		*	*		*	*		*
09:00	*		*	*		*	*		*
09:15	*		*	*		*	*		*
09:30	*		*	*		*	*		*
09:45	*		*	*		*	*		*
10:00	*		*	*		*	*		*
10:15	*		*	*		*	*		*
10:30	*		*	*		*	*		*
10:45	*		*	*		*	*		*
11:00	*		*	*		*	*		*
11:15	*		*	*		*	*		*
11:30	*		*	*		*	*		*
11:45	*		*	*		*	*		*
Totals	103		0	69		0	172		0
Split%	59.9		*	40.1		*			
Day Totals		103			69			172	
Day Splits		59.9			40.1				
Peak Hour	06:45		*	07:00		*	07:00		*
Volume	66		*	31		*	96		*
Factor	0.75		*	0.55		*	0.83		*

1907 S. Beretania Street #400
Honolulu, HI 96826

: Kula Highway
: South of school driveway
: 7410-01

Site: 01
Date: 05/31/05
Day: Tuesday

	SB			NB			Combined		
	AM		PM	AM		PM	AM		PM
12:00	*		*	*		*	*		*
12:15	*		*	*		*	*		*
12:30	*		*	*		*	*		*
12:45	*		*	*		*	*		*
01:00	*		*	*		*	*		*
01:15	*		*	*		*	*		*
01:30	*		*	*		*	*		*
01:45	*		*	*		*	*		*
02:00	*		18	211	*	8	180	*	26	391	*
02:15	*		60		*	52		*	112		*
02:30	*		67		*	58		*	125		*
02:45	*		66		*	62		*	128		*
03:00	*		43	272	*	56	277	*	99	549	*
03:15	*		65		*	68		*	133		*
03:30	*		73		*	81		*	154		*
03:45	*		91		*	72		*	163		*
04:00	*		86	316	*	75	293	*	161	609	*
04:15	*		72		*	76		*	148		*
04:30	*		83		*	64		*	147		*
04:45	*		75		*	78		*	153		*
05:00	*		80	301	*	50	243	*	130	544	*
05:15	*		80		*	66		*	146		*
05:30	*		63		*	70		*	133		*
05:45	*		78		*	57		*	135		*
06:00	*		66	234	*	62	195	*	128	429	*
06:15	*		64		*	47		*	111		*
06:30	*		63		*	54		*	117		*
06:45	*		41		*	32		*	73		*
07:00	*		53	187	*	30	135	*	83	322	*
07:15	*		44		*	40		*	84		*
07:30	*		52		*	39		*	91		*
07:45	*		38		*	26		*	64		*
08:00	*		35	128	*	26	66	*	61	194	*
08:15	*		40		*	20		*	60		*
08:30	*		32		*	14		*	46		*
08:45	*		21		*	6		*	27		*
09:00	*		44	122	*	16	49	*	60	171	*
09:15	*		21		*	10		*	31		*
09:30	*		26		*	12		*	38		*
09:45	*		31		*	11		*	42		*
10:00	*		29	81	*	10	19	*	39	100	*
10:15	*		18		*	3		*	21		*
10:30	*		15		*	4		*	19		*
10:45	*		19		*	2		*	21		*
11:00	*		16	48	*	6	21	*	22	69	*
11:15	*		13		*	4		*	17		*
11:30	*		16		*	7		*	23		*
11:45	*		3		*	4		*	7		*
Totals	0		1,900		0	1,478		0	3,378		
Split%	*		56.2		*	43.8					

Totals	1,900	1,478	3,378
Split%	56.2	43.8	

Peak Hour	* 03:45	* 03:30	* 03:30
Volume	* 332	* 304	* 626
Factor	* 0.91	* 0.94	* 0.96

1907 S. Beretania Street #400
Honolulu, HI 96826

: Kula Highway
: South of school driveway
: 7410-01

Site: 01
Date: 06/01/05
Day: Wednesday

	SB			NB			Combined		
	AM		PM	AM		PM	AM		PM
12:00	5	24	*	3	6	*	8	30	*
12:15	10		*	1		*	11		*
12:30	4		*	0		*	4		*
12:45	5		*	2		*	7		*
01:00	3	12	*	0	3	*	3	15	*
01:15	1		*	1		*	2		*
01:30	3		*	0		*	3		*
01:45	5		*	2		*	7		*
02:00	3	5	*	4	11	*	7	16	*
02:15	0		*	4		*	4		*
02:30	1		*	3		*	4		*
02:45	1		*	0		*	1		*
03:00	0	3	*	4	11	*	4	14	*
03:15	1		*	2		*	3		*
03:30	2		*	2		*	4		*
03:45	0		*	3		*	3		*
04:00	4	12	*	2	21	*	6	33	*
04:15	4		*	4		*	8		*
04:30	1		*	4		*	5		*
04:45	3		*	11		*	14		*
05:00	6	29	*	20	100	*	26	129	*
05:15	5		*	19		*	24		*
05:30	7		*	30		*	37		*
05:45	11		*	31		*	42		*
06:00	18	122	*	58	275	*	76	397	*
06:15	25		*	63		*	88		*
06:30	38		*	62		*	100		*
06:45	41		*	92		*	133		*
07:00	32	234	*	96	436	*	128	670	*
07:15	49		*	124		*	173		*
07:30	80		*	124		*	204		*
07:45	73		*	92		*	165		*
08:00	0		*	0		*	0		*
08:15	*		*	*		*	*		*
08:30	*		*	*		*	*		*
08:45	*		*	*		*	*		*
09:00	*		*	*		*	*		*
09:15	*		*	*		*	*		*
09:30	*		*	*		*	*		*
09:45	*		*	*		*	*		*
10:00	*		*	*		*	*		*
10:15	*		*	*		*	*		*
10:30	*		*	*		*	*		*
10:45	*		*	*		*	*		*
11:00	*		*	*		*	*		*
11:15	*		*	*		*	*		*
11:30	*		*	*		*	*		*
11:45	*		*	*		*	*		*
Totals	441		0	863		0	1,304		0
Split%	33.8		*	66.2		*			

Totals	441	863	1,304
Split%	33.8	66.2	

Peak Hour	07:00	* 06:45	* 07:00	*
Volume	234	* 436	* 670	*
Factor	0.73	* 0.88	* 0.82	*

APPENDIX B

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 C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	64	0	1	32	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	86	0	2	64	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			No /
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1536	1510					808	
v/c	0.00	0.00					0.02	
95% queue length	0.00	0.00					0.07	
Control Delay	7.3	7.4					9.6	
LOS	A	A					A	
Approach Delay							9.6	
Approach LOS							A	

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	72	3	14	77	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	103	4	16	91	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1490	1484		854			744	
v/c	0.00	0.01		0.03			0.02	
95% queue length	0.00	0.03		0.10			0.05	
Control Delay	7.4	7.5		9.4			9.9	
LOS	A	A		A			A	
Approach Delay				9.4			9.9	
Approach LOS				A			A	

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs):

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		504	9	78	344	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		560	10	101	446	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13		84			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	15		100			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		101		115				
C(m) (vph)		1002		420				
v/c		0.10		0.27				
95% queue length		0.34		1.10				
Control Delay		9.0		16.8				
LOS		A		C				
Approach Delay				16.8				
Approach LOS				C				

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed:
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		335	10	79	346	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		389	11	87	384	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		62			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	8		75			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		87		83				
C(m) (vph)		1159		574				
v/c		0.08		0.14				
95% queue length		0.24		0.51				
Control Delay		8.4		12.3				
LOS		A		B				
Approach Delay				12.3				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	9	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		42		47	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	
Duration, T 1.00 hrs.								

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		42		47	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.6	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1		-0.1		0.1		-0.3	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		42		47	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.12		4.50		4.15	
x, final value	0.09		0.14		0.05		0.05	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.1	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		42		47	
Service Time	2.3		2.1		2.5		2.1	
Utilization, x	0.09		0.14		0.05		0.05	
Dep. headway, hd	4.32		4.12		4.50		4.15	
Capacity	329		376		292		297	
Delay	7.77		7.81		7.75		7.38	
LOS	A		A		A		A	
Approach:								
Delay	7.77		7.81		7.75		7.38	
LOS	A		A		A		A	

Intersection Delay 7.72 Intersection LOS A

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	23	22	18

% Thrus Left Lane

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		31		83	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		31		83	
Left-Turn	29		2		11		30	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.4		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	-0.0		-0.2		0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		31		83	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.07	
hd, final value	4.18		4.04		4.31		4.18	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		31		83	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.18		4.04		4.31		4.18	
Capacity	337		308		281		333	
Delay	7.65		7.32		7.48		7.63	
LOS	A		A		A		A	
Approach:								
Delay	7.65		7.32		7.48		7.63	
LOS	A		A		A		A	
Intersection Delay 7.55			Intersection LOS A					

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		278	1	9	153	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		334	1	13	231	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		7			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		9			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration	LR					

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		11				
C(m) (vph)		1224		647				
v/c		0.01		0.02				
95% queue length		0.03		0.05				
Control Delay		8.0		10.7				
LOS		A		B				
Approach Delay				10.7				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst:	IW
Agency/Co.:	Wilson Okamoto Corporation
Date Performed:	6/9/2006
Analysis Time Period:	PM Peak Period
Intersection:	Kula Hwy/Lower Kula Rd (South)
Jurisdiction:	State
Units: U. S. Customary	
Analysis Year:	Existing
Project ID: 7551-01 Kula Ridge	
East/West Street:	Lower Kula Rd (South)
North/South Street:	Kula Hwy
Intersection Orientation: NS	Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		234	4	9	211	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		254	4	9	226	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		4			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		6			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		17				
C(m) (vph)		1307		595				
v/c		0.01		0.03				
95% queue length		0.02		0.09				
Control Delay		7.8		11.2				
LOS		A		B				
Approach Delay				11.2				
Approach LOS				B				

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2009 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	64	0	1	33	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	86	0	2	66	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1533	1510					806	
v/c	0.00	0.00					0.02	
95% queue length	0.00	0.00					0.07	
Control Delay	7.3	7.4					9.6	
LOS	A	A					A	
Approach Delay							9.6	
Approach LOS							A	

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	72	3	14	78	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	104	4	16	92	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1489	1483		852			741	
v/c	0.00	0.01		0.03			0.02	
95% queue length	0.00	0.03		0.10			0.05	
Control Delay	7.4	7.5		9.4			9.9	
LOS	A	A		A			A	
Approach Delay				9.4			9.9	
Approach LOS				A			A	

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		560	9	79	382	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		622	10	102	496	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13		84			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	15		100			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		102		115				
C(m) (vph)		951		377				
v/c		0.11		0.31				
95% queue length		0.36		1.27				
Control Delay		9.2		18.7				
LOS		A		C				
Approach Delay				18.7				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/06
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		373	11	80	384	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		433	12	88	426	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		62			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	8		75			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		88		83				
C(m) (vph)		1115		534				
v/c		0.08		0.16				
95% queue length		0.26		0.55				
Control Delay		8.5		13.0				
LOS		A		B				
Approach Delay				13.0				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	10	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		43		48	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		43		48	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.5	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1		-0.1		0.1		-0.2	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		43		48	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.13		4.50		4.15	
x, final value	0.09		0.14		0.05		0.06	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		43		48	
Service Time	2.3		2.1		2.5		2.2	
Utilization, x	0.09		0.14		0.05		0.06	
Dep. headway, hd	4.32		4.13		4.50		4.15	
Capacity	329		376		293		298	
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	
Approach:								
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	

Intersection Delay 7.73 Intersection LOS A

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	24	23	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		30		86	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		30		86	
Left-Turn	29		2		10		32	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.3		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	-0.0		-0.2		0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		30		86	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.08	
hd, final value	4.19		4.04		4.31		4.19	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		30		86	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.19		4.04		4.31		4.19	
Capacity	337		308		280		336	
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Approach:								
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	

Intersection Delay 7.56 Intersection LOS A

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		309	1	9	170	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		372	1	13	257	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		8			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		10			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		12				
C(m) (vph)		1185		614				
v/c		0.01		0.02				
95% queue length		0.03		0.06				
Control Delay		8.1		11.0				
LOS		A		B				
Approach Delay				11.0				
Approach LOS				B				

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		261	4	9	234	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		283	4	9	251	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		5			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		8			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		19				
C(m) (vph)		1275		575				
v/c		0.01		0.03				
95% queue length		0.02		0.10				
Control Delay		7.8		11.5				
LOS		A		B				
Approach Delay				11.5				
Approach LOS				B				

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2009 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary .
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	2	64	109	1	41	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	2	86	147	2	82	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	33
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	54
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/			No /
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	2	2		0			73	
C(m) (vph)	1513	1335					885	
v/c	0.00	0.00					0.08	
95% queue length	0.00	0.00					0.27	
Control Delay	7.4	7.7					9.4	
LOS	A	A					A	
Approach Delay							9.4	
Approach LOS							A	

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	92	4	14	115	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	133	5	16	136	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	10	0	13	3	0	2
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	14	0	18	9	0	6
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		32			15	
C(m) (vph)	1435	1446		764			707	
v/c	0.00	0.01		0.04			0.02	
95% queue length	0.00	0.03		0.13			0.07	
Control Delay	7.5	7.5		9.9			10.2	
LOS	A	A		A			B	
Approach Delay				9.9			10.2	
Approach LOS				A			B	

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		560	10	86	382	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		622	11	111	496	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR			LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	19		123			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	22		146			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes		1	1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		111	22		146			
C(m) (vph)		950	214		483			
v/c		0.12	0.10		0.30			
95% queue length		0.40	0.34		1.29			
Control Delay		9.3	23.7		15.7			
LOS		A	C		C			
Approach Delay				16.7				
Approach LOS				C				

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/06
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		373	15	113	384	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		433	17	125	426	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	9		80			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	10		97			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		125	10		97			
C(m) (vph)		1110	277		615			
v/c		0.11	0.04		0.16			
95% queue length		0.38	0.11		0.56			
Control Delay		8.7	18.5		11.9			
LOS		A	C		B			
Approach Delay				12.6				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	21	5	5	78	24	14	14	2	13	15	33
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	89		132		47		75	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	89		132		47		75	
Left-Turn	52		6		22		16	
Right-Turn	7		29		3		41	
Prop. Left-Turns	0.6		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.5	

Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1		-0.1		0.1		-0.3	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	89		132		47		75	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.12		0.04		0.07	
hd, final value	4.42		4.19		4.57		4.20	
x, final value	0.11		0.15		0.06		0.09	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.4		2.2		2.6		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	89		132		47		75	
Service Time	2.4		2.2		2.6		2.2	
Utilization, x	0.11		0.15		0.06		0.09	
Dep. headway, hd	4.42		4.19		4.57		4.20	
Capacity	339		382		297		325	
Delay	7.97		7.95		7.86		7.61	
LOS	A		A		A		A	
Approach:								
Delay	7.97		7.95		7.86		7.61	
LOS	A		A		A		A	

Intersection Delay 7.87 Intersection LOS A

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	44	37	18	2	28	33	10	22	5	33	31	25

% Thrus Left Lane

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	104		72		39		118	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	104		72		39		118	
Left-Turn	46		2		10		44	
Right-Turn	19		38		5		33	
Prop. Left-Turns	0.4		0.0		0.3		0.4	
Prop. Right-Turns	0.2		0.5		0.1		0.3	

Prop. Heavy Vehicle	0.0	0.0	0.0	0.0
Geometry Group	1	1	1	1
Adjustments Exhibit 17-33:				
hLT-adj	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	0.0	-0.3	0.0	-0.1

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	104		72		39		118	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.09		0.06		0.03		0.10	
hd, final value	4.35		4.10		4.43		4.28	
x, final value	0.13		0.08		0.05		0.14	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.4		2.3	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	104		72		39		118	
Service Time	2.3		2.1		2.4		2.3	
Utilization, x	0.13		0.08		0.05		0.14	
Dep. headway, hd	4.35		4.10		4.43		4.28	
Capacity	354		322		289		368	
Delay	7.97		7.46		7.66		7.98	
LOS	A		A		A		A	
Approach:								
Delay	7.97		7.46		7.66		7.98	
LOS	A		A		A		A	
Intersection Delay	7.83		Intersection LOS		A			

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst:	IW
Agency/Co.:	Wilson Okamoto Corporation
Date Performed:	6/9/2006
Analysis Time Period:	AM Peak Period
Intersection:	Kula Hwy/Lower Kula Rd (South)
Jurisdiction:	State
Units: U. S. Customary	
Analysis Year:	2009 With Project
Project ID:	7551-01 Kula Ridge
East/West Street:	Lower Kula Rd (South)
North/South Street:	Kula Hwy
Intersection Orientation:	NS
Study period (hrs):	1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		309	1	12	170	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		372	1	18	257	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	3		12			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	4		16			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		18		20				
C(m) (vph)		1185		601				
v/c		0.02		0.03				
95% queue length		0.05		0.10				
Control Delay		8.1		11.2				
LOS		A		B				
Approach Delay				11.2				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		261	6	9	240	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		283	6	9	258	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	12		8			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	19		13			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		32				
C(m) (vph)		1273		567				
v/c		0.01		0.06				
95% queue length		0.02		0.18				
Control Delay		7.8		11.7				
LOS		A		B				
Approach Delay				11.7				
Approach LOS				B				

APPENDIX G-1.

Supplemental Traffic Assessment

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7551-02
June 16, 2008

Mr. Clayton Nishikawa
Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, HI 96793

Subject: Kula Ridge

Dear Mr. Nishikawa:

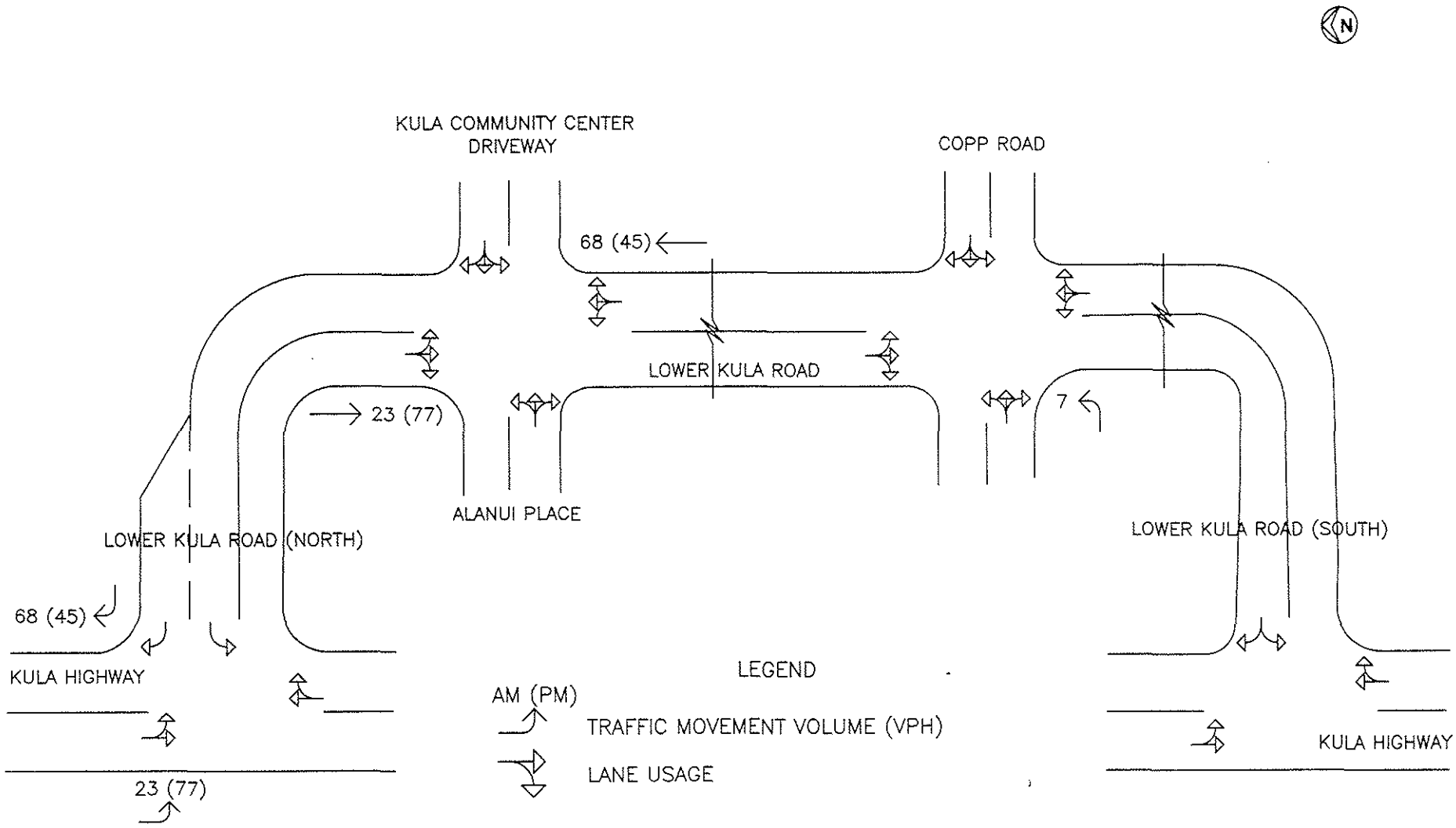
As requested, we assessed an alternate trip distribution scenario for the Kula Ridge project to address comments provided by DOT. The following is a summary of our findings.

Trip Distribution

In comments provided on April 22, 2008, DOT indicated that they did not agree with the trip distribution detailed in the Traffic Impact Report prepared for the Kula Ridge project dated July 2006. To address these comments, an alternate scenario was assessed in which all site-generated trips were assumed to travel from origins and to destinations to the north of the project site. It should be noted, however, that this trip distribution methodology assumes that all site-generated trips are work related and do not have any linked or pass-by destinations. As such, all entering vehicles were assumed to turn left from Kula Highway onto Lower Kula Road via the northern intersection of that roadway with the highway, and then utilized Lower Kula Road to access the project site. Similarly, all exiting vehicles were assumed to turn right onto Lower Kula Road and then right onto Kula Highway. Figure 1 shows the distribution of site-generated vehicles during the AM and PM peak periods for this alternate scenario.

Year 2009 With Project Conditions

The projected Year 2009 AM and PM peak period traffic volumes and operating conditions under the alternate scenario are shown in Figures 2 and 3, and summarized in Table 1. The projected Year 2009 operating conditions based upon the trip distribution included in the original TIAR are provided for comparison purposes. LOS calculations are included in the appendix.

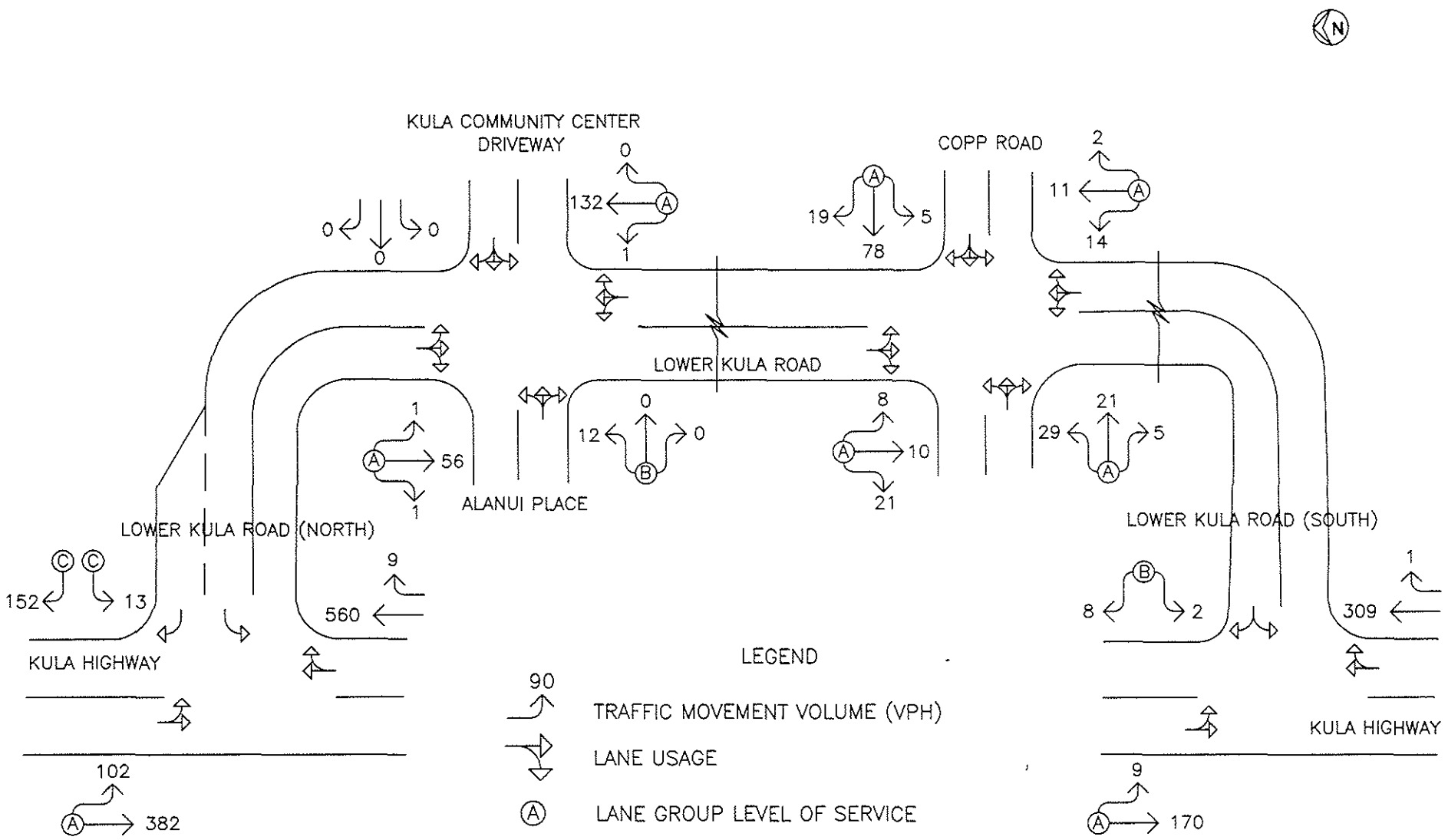


WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS

KULA RIDGE

DISTRIBUTION OF SITE-GENERATED TRAFFIC ALTERNATE SCENARIO

FIGURE 1



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KULA RIDGE

YEAR 2009 AM PEAK HOUR OF TRAFFIC WITH PROJECT ALTERNATE SCENARIO

FIGURE 2

Lower Kula Road as suggested by the DOT is not required. However, the provision of an exclusive turning lane on this approach would minimize the impact of turning vehicles on through traffic along the highway.

Should you have any questions or require additional information, please contact Mr. Pete Pascua or myself at 946-2277.

Sincerely,

Cathy Leong, P.E.

APPENDIX
CAPACITY ANALYSES CALCULATIONS
ALTERNATE SCENARIO

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: cl
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	132	0	1	56	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	178	0	2	112	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided /					
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1475	1398					654	
v/c	0.00	0.00					0.03	
95% queue length	0.00	0.00					0.09	
Control Delay	7.4	7.6					10.7	
LOS	A	A					B	
Approach Delay							10.7	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	117	3	14	156	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	169	4	16	185	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided /					
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No /			No /	
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1377	1404		734			596	
v/c	0.00	0.01		0.04			0.02	
95% queue length	0.00	0.03		0.11			0.06	
Control Delay	7.6	7.6		10.1			11.2	
LOS	A	A		B			B	
Approach Delay				10.1			11.2	
Approach LOS				B			B	

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		560	9	102	382	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		622	10	132	496	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13		152			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	15		180			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		132	15		180			
C(m) (vph)		951	200		484			
v/c		0.14	0.08		0.37			
95% queue length		0.48	0.24		1.76			
Control Delay		9.4	24.5		16.8			
LOS		A	C		C			
Approach Delay				17.4				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		373	11	157	384	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		433	12	174	426	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1 0		0 1		
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		107			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	8		130			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		174	8		130			
C(m) (vph)		1115	237		618			
v/c		0.16	0.03		0.21			
95% queue length		0.55	0.10		0.80			
Control Delay		8.8	20.7		12.4			
LOS		A	C		B			
Approach Delay				12.9				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.21

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E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Alternate Scenario
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	10	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		43		48	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		43		48	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.5	

Prop. Heavy Vehicle	0.0	0.0	0.0	0.0
Geometry Group	1	1	1	1
Adjustments Exhibit 17-33:				
hLT-adj	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	0.1	-0.1	0.1	-0.2

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		43		48	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.13		4.50		4.15	
x, final value	0.09		0.14		0.05		0.06	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		43		48	
Service Time	2.3		2.1		2.5		2.2	
Utilization, x	0.09		0.14		0.05		0.06	
Dep. headway, hd	4.32		4.13		4.50		4.15	
Capacity	329		376		293		298	
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	
Approach:								
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	
Intersection Delay	7.73		Intersection LOS		A			

HCS+: Unsignalized Intersections Release 5.21

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E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	24	23	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		30		86	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		30		86	
Left-Turn	29		2		10		32	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.3		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	

Prop. Heavy Vehicle	0.0	0.0	0.0	0.0
Geometry Group	1	1	1	1
Adjustments Exhibit 17-33:				
hLT-adj	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	-0.0	-0.2	0.0	-0.1

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		30		86	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.08	
hd, final value	4.19		4.04		4.31		4.19	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		30		86	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.19		4.04		4.31		4.19	
Capacity	337		308		280		336	
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Approach:								
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Intersection Delay 7.56			Intersection LOS A					

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: Alternate Scenario
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		309	1	9	170	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		372	1	13	257	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		8			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		10			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		12				
C(m) (vph)		1185		614				
v/c		0.01		0.02				
95% queue length		0.03		0.06				
Control Delay		8.1		11.0				
LOS		A		B				
Approach Delay				11.0				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2008
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Alternate Scenario
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		261	4	9	234	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		283	4	9	251	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		5			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		8			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		19				
C(m) (vph)		1275		575				
v/c		0.01		0.03				
95% queue length		0.02		0.10				
Control Delay		7.8		11.5				
LOS		A		B				
Approach Delay				11.5				
Approach LOS				B				

APPENDIX H.

Preliminary Engineering and Drainage Reports, September 2006

PRELIMINARY DRAINAGE REPORT

FOR

KULA RIDGE SUBDIVISION

Kula, Maui, Hawaii

T.M.K.: (2) 2-3-001: 174

Prepared for:

Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, Maui, Hawaii 96793

Prepared by:

OTOMO
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779

September 2006

TABLE OF CONTENTS

PRELIMINARY DRAINAGE REPORT
FOR
KULA RIDGE SUBDIVISION
Kula, Maui, Hawaii

I. INTRODUCTION

The purpose of this report is to examine both the existing and proposed drainage conditions for the proposed project.

II. SITE LOCATION AND PROJECT DESCRIPTION

The subject property is identified as T.M.K.: (2) 2-3-001: 174, which encompasses an area of 48.117 acres. It is also Lot 2 of the G and R Von Tempsky Trust Subdivision. The project site is bordered by Keahuaiwi Gulch and Lot 1 of the G and R Von Tempsky Trust Subdivision to the north, Lot 1 of the G and R Von Tempsky Trust Subdivision to the east, and Lot 3 of the G and R Von Tempsky Trust Subdivision to the south.

The development plan includes approximately 112 residential lots, 4 agricultural lots, and a 5-acre park site which will be dedicated to the County. Associated improvements include grading, paved roadways, underground utilities and landscaping.

III. EXISTING TOPOGRAPHY AND SOIL CONDITIONS

The project site is presently undeveloped and used as an open pasture. The majority of the site is overgrown with weeds and various grasses.

The elevation on the site ranges from elevation 3,085 feet above sea level at the northeastern corner of the property to 2,700 feet above mean sea level at the northwesterly corner, averaging approximately 14.8%.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soil within the project site is classified as Kula cobbly loam, (KxaD). Kula cobbly loam is characterized as having moderately rapid permeability, medium runoff, and a moderate erosion hazard.

IV. EXISTING DRAINAGE CONDITIONS

Presently, the majority of the onsite runoff sheet flows across the project site in a northeast to southwest direction toward the adjacent properties. A portion of the runoff sheet flows directly into Keahuaiwi Gulch. The runoff eventually discharges into the ocean.

It is estimated that the existing 50-year storm runoff from the undeveloped project site is 55.66 cfs.

V. FLOOD AND TSUNAMI ZONE

According to Panel Number 150003 0001-0400 of the Flood Insurance Rate Map, dated March 16, 1995, prepared by the United States Federal Emergency Management Agency, it appears that the project site is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding.

VI. PROPOSED DRAINAGE PLAN

After the development of the proposed project, it is estimated that the 50-year storm runoff will be 164.59 cfs, a net increase of 108.93 cfs. Onsite runoff will be intercepted by grated catch basins located within the grassed shoulder areas. The runoff will be conveyed to an onsite detention basin, which will be located in the northwestern corner fo the project site.

Overflows from the detention basin will be allowed to sheet flow into Keahuaiwi Gulch at a rate less than the present condition. The detention basin will be designed and sized to accommodate the increase in surface runoff volume from a 50-year 1-hour storm generated from the proposed project.

The drainage design criteria will be to minimize any alterations to the natural pattern of the existing onsite surface runoff. This is in accordance with the drainage standards for the County of Maui.

VII. HYDROLOGIC CALCULATIONS

The hydrologic calculations are based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui," and the "Rainfall Frequency Atlas of the Hawaiian Islands," Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau.

Rational Formula Used: Q = CIA

Where Q = rate of flow (cfs)

C = rainfall coefficient

I = rainfall intensity for a duration equal to the time of concentration (inches/hour)

A = drainage area (Acres)

See Appendix A for Hydrologic Calculations

VIII. CONCLUSION

Onsite runoff will be intercepted by grated catch basins located within the grassed shoulder areas. The runoff will be conveyed to an onsite detention basin, which will be located in the northwestern corner fo the project site. Overflows from the detention basin will be allowed to sheet flow into Keahuaiwi Gulch at a rate less than the existing condition. The detention basin will be designed and sized to accommodate the increase in surface runoff volume from a 50-year 1-hour storm generated from the proposed project.

There will be no increase in runoff sheet flowing from the project site onto the adjoining or downstream properties. This is in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui.

Therefore, it is our professional opinion that the proposed development will not have an adverse effect on the adjoining or downstream properties.

IX. REFERENCES

A. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, August, 1972.

B. Rainfall-Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau, 1962.

C. Flood Insurance Rate Maps of the County of Maui, March, 1995.

D. Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui, prepared by the Department of Public Works and Waste Management, County of Maui, 1995.

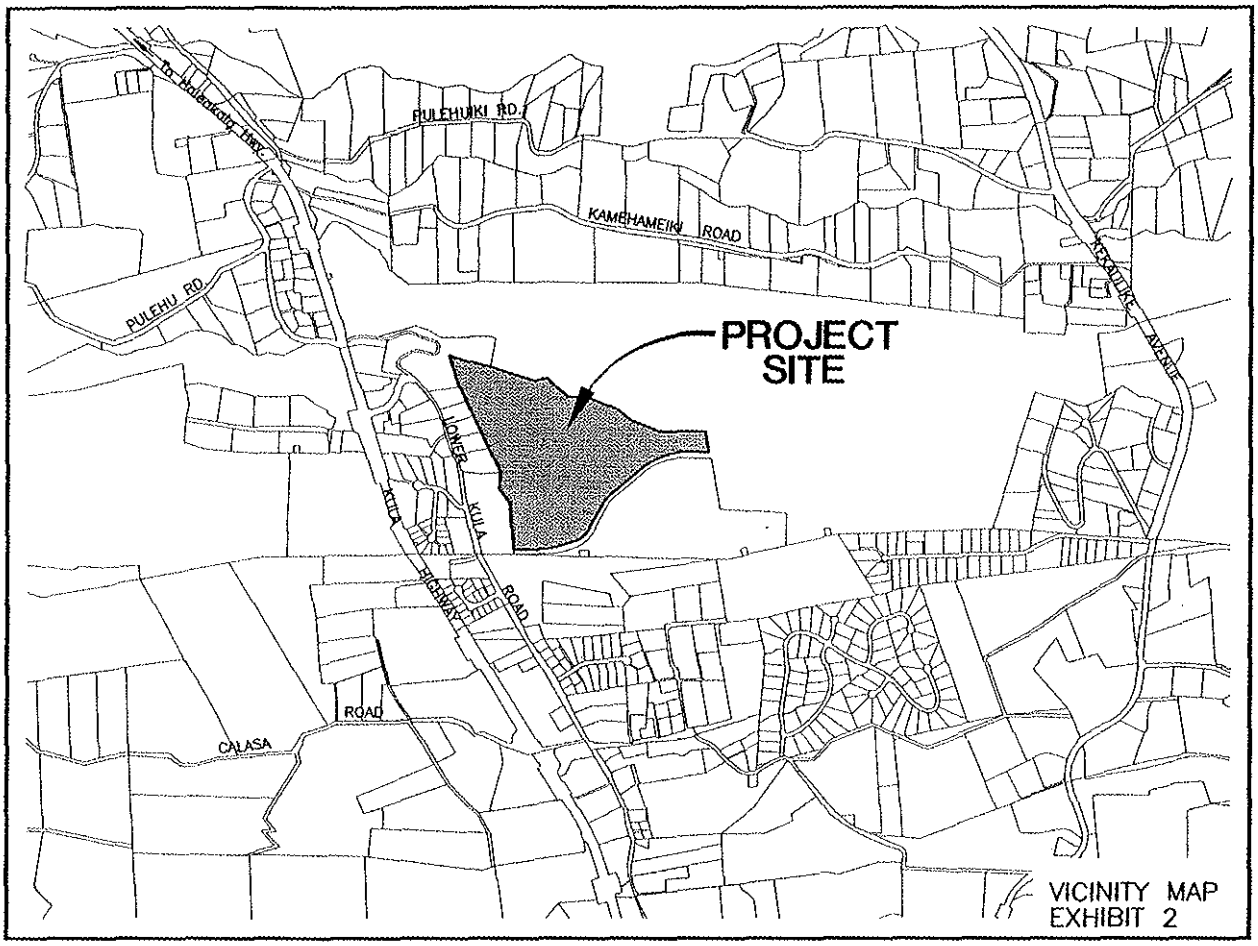
EXHIBITS

1 Location Map

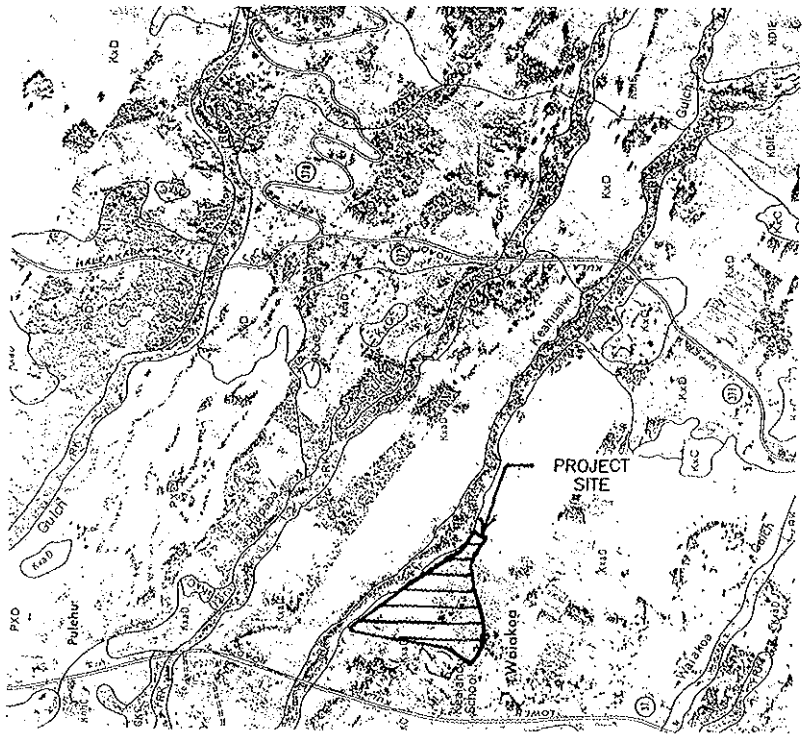
2 Vicinity Map

3 Soil Survey Map

LOCATION MAP
EXHIBIT 1



VICINITY MAP
EXHIBIT 2



SOIL SURVEY MAP
EXHIBIT 3

APPENDIX A

HYDROLOGIC CALCULATIONS

Hydrologic Calculations

Purpose: Determine the increase in surface runoff from the development of the proposed project based on a 50-year storm.

A. Determine the Runoff Coefficient (C):

EXISTING CONDITION:

Infiltration (Medium)	= 0.07
Relief (Rolling)	= 0.06
Vegetal Cover (Good)	= 0.03
Development Type (Ag)	= 0.15
C	= 0.31

ROADWAY AREAS:

Infiltration (Negligible)	= 0.20
Relief (Rolling)	= 0.03
Vegetal Cover (None)	= 0.07
Development Type (Pavement)	= 0.55
C	= 0.85

RESIDENTIAL AREAS:

Infiltration (Slow)	= 0.14
Relief (Rolling)	= 0.03
Vegetal Cover (Good)	= 0.03
Development Type (Residential)	= 0.40
C	= 0.60

EXISTING CONDITION:

Area = 48.117 Acres

C = 0.31

DEVELOPED CONDITIONS:

Roadway Area = 1.20 Acres

Residential Area = 46.917 Acres

WEIGHTED C = 0.61

B. Determine the 50-year 1-hour rainfall:

i_{50} = 3.0 inches

Adjust for time of concentration to compute Rainfall Intensity (I):

Existing Condition:

T_c = 40 minutes

I = 3.73 inches/hour

Developed Condition:

T_c = 16 minutes

I = 5.61 inches/hour

C. Drainage Area (A) = 48.117 Acres

D. Compute the 50-year storm runoff volume (Q):

Q = CIA

Existing Conditions:

Q = (0.31)(3.73)(48.117)

= 55.66 cfs

Developed Conditions:

Q = (0.61)(5.61)(48.117)

= 164.59 cfs

The increase in runoff due to the proposed development is 164.59 - 55.66 = 108.93 cfs.

Hydrograph Plot

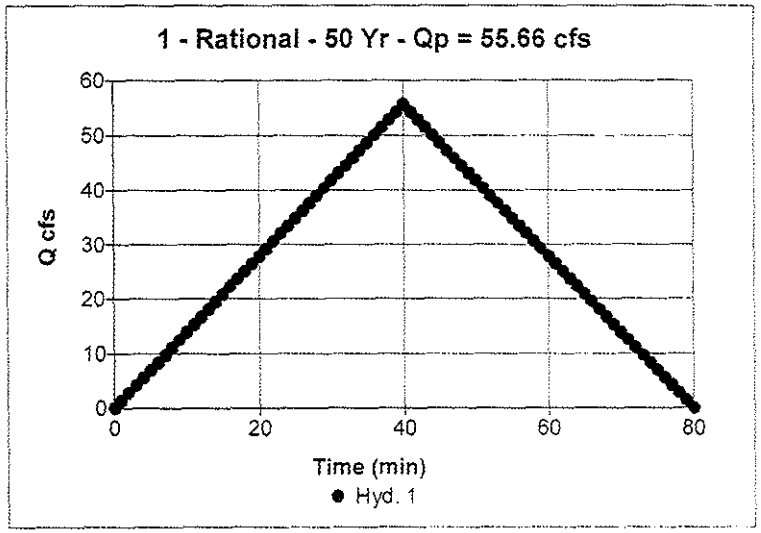
English

Hyd. No. 1

Kula Ridge - Existing Condition

Hydrograph type	= Rational	Peak discharge	= 55.66 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Drainage area	= 48.1 ac	Runoff coeff.	= 0.31
Intensity	= 3.73 in	Time of conc. (Tc)	= 40 min
I-D-F Curve	= 3-0.IDF	Reced. limb factor	= 1

Total Volume = 133.577 cuft



Hydrograph Plot

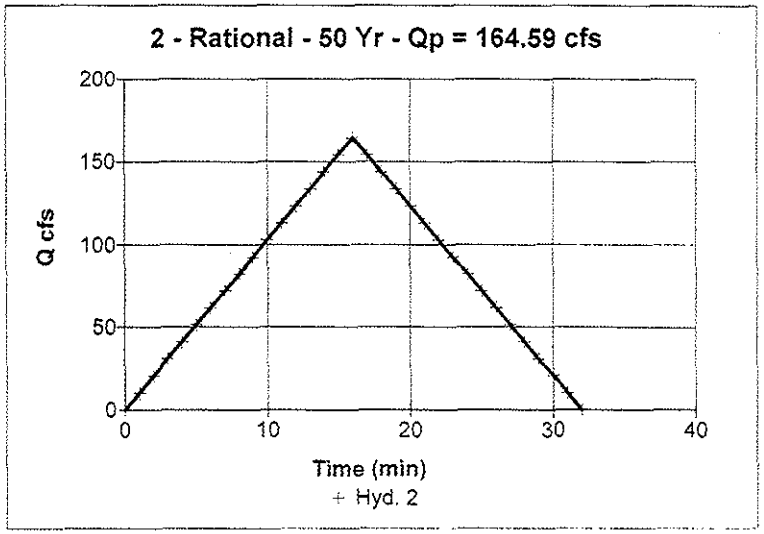
English

Hyd. No. 2

Kula Ridge - Developed Conditions

Hydrograph type	= Rational	Peak discharge	= 164.59 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Drainage area	= 48.1 ac	Runoff coeff.	= 0.61
Intensity	= 5.61 in	Time of conc. (Tc)	= 16 min
I-D-F Curve	= 3-0.IDF	Reced. limb factor	= 1

Total Volume = 158,003 cuft



PRELIMINARY ENGINEERING REPORT

FOR

KULA RIDGE SUBDIVISION

Kula, Maui, Hawaii

T.M.K.: (2) 2-3-001: 174

Prepared for:

Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, Maui, Hawaii 96793

Prepared by:

OTOMO
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779

September 2006

TABLE OF CONTENTS

PRELIMINARY ENGINEERING REPORT
FOR
KULA RIDGE SUBDIVISION
T.M.K.: (2) 2-3-001: 174

1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure which will be servicing the proposed project. It will also evaluate the adequacy of the existing infrastructure and anticipated improvements which may be required for the proposed project.

The subject property is identified as T.M.K.: (2) 2-3-001: 174, which encompasses an area of 48.117 acres. It is also Lot 2 of the G and R Von Tempsky Trust Subdivision. The project site is bordered by Keahuaiwi Gulch and Lot 1 of the G and R Von Tempsky Trust Subdivision to the north, Lot 1 of the G and R Von Tempsky Trust Subdivision to the east, and Lot 3 of th G and R Von Tempsky Trust Subdivision to the south.

The development plan includes approximately 112 residential lots, 4 agricultural lots, and a 5-acre park site which will be dedicated to the County. Associated improvements include grading, paved roadways, underground utilities and landscaping.

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

Lower Kula Road in the vicinity of the project site is a two-way, two-lane roadway oriented in the north-south direction. It intersects with Kula Highway several times along its alignment. Lower Kula Road intersects with Alanui Place and the Kula Community Center driveway. Alanui Place is a two-way, two-lane roadway that provide access to the adjacent residential area. The driveway for the Kula Community Center has one lane that serves all traffic movements at the westbound approach of this intersection.

Northwest of the Lower Kula Road-Alanui Place intersection, Lower Kula Road intersects with Kula Highway. At this unsignalized intersection, Lower Kula Road has one lane that serves left and right turn movements. The northbound approach of the highway has one lane the serves left and right turn traffic movements and the southbound approach has one lane that serves left-turn and through traffic movements.

South of its intersection with Alanui Place, Lower Kula Road intersects Copp Road. Copp Road is a two-way, two-lane roadway oriented in the east-west direction that provides access to the residential neighborhoods.

Further southwest, Lower Kula Road intersects with Kula Highway.

2.2 DRAINAGE

The elevation on the site ranges from elevation 3,085 feet above sea level at the northeastern corner of the property to 2,700 feet above mean sea level at the northwesterly corner, averaging approximately 14.8%.

According to Panel Number 150003 0001-0400 of the Flood Insurance Rate Map, dated March 16, 1995, prepared by the United States Federal Emergency Management Agency, it appears that the project site is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding.

It is estimated that the existing 50-year storm runoff from the project site is 55.66 cfs. Presently, the majority of the onsite runoff sheet flows across the project site in a northeast to southwest direction toward the adjacent properties. A portion of the runoff sheet flows directly into Keahuaiwi Gulch. The runoff eventually discharges into the ocean.

2.3 SEWER

There are no public sewer facilities in this part of Maui. Sewerage from residential and commercial developments is handled by individual wastewater systems.

2.4 WATER

Domestic water and fire flow will be provided by the County's water system. There is an existing 8-inch waterline along Lower Kula Road, in the vicinity of the Kula Community Center. There is an existing fire hydrant located near the Community Center.

Storage for the project area is provided by a 2.1 million-gallon steel tank, known as the Omaopio tank (elevation 3,890.0 feet). It is located above Haleakala Highway, approximately a 1,200 feet to the northeast of the project site.

2.5 ELECTRIC, TELEPHONE AND CABLE TV

The existing electrical and telephone distribution systems on Lower Kula Road are located overhead. These overhead facilities serve the developed properties in the area.

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

Access for the proposed project will be from Lower Kula Road via an existing utility and access Easement "B-1." Easement "B-1" is 56 feet wide and traverses along the southern boundary of the Kula Community Center to the southwestern corner of the subject parcel. The driveway pavement section will be 24-feet wide for ingress and egress.

In accordance with the requirements for a building permit, roadway improvements consisting of concrete curb, gutters and sidewalks will be constructed along the frontage of the property to Lower Kula Road.

The Traffic Impact Report prepared by Wilson Okamoto Corporation, dated June 2006, recommended and concluded the following:

- Maintain sufficient sight distance for motorists to safely enter and exit all project roadways.
- Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.
- Provide adequate turn-around area for service, delivery and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.
- Provide sufficient turning radii at all project roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
- Provide exclusive left-turn and right-turn lanes on the westbound approaches of Lower Kula Road at the northern intersection with Kula Highway to minimize the impact of left-turning vehicles on the higher volume of right-turning vehicles on that approach.

"The proposed Kula Ridge development is expected to include 53 residential lots, 59 affordable housing residential lots, 4 agricultural lots, and an approximately 5-acre park that will be dedicated to the County of Maui. With the implementation of the aforementioned recommendations, the proposed Kula Ridge development is not expected to have a significant impact on

traffic operations in the vicinity of the project site. The critical movements at the study intersection along Lower Kula Road are expected to continue operating at acceptable levels of service despite the addition of site-generated vehicles to the surrounding roadway network due to the provision of exclusive turning lanes at the northern intersection of Lower Kula Road with Kula Highway."

3.2 DRAINAGE

After the development of the proposed project, it is estimated that the 50-year storm runoff will be 164.59 cfs, a net increase of 108.93 cfs. Onsite runoff will be intercepted by grated catch basins located within the grassed shoulder areas. The runoff will be conveyed to an onsite detention basin, which will be located in the northwestern corner fo the project site. Overflows from the detention basin will be allowed to sheet flow into Keahuaiwi Gulch at a rate less than the existing condition. The system will be designed and sized to accommodate the increase in surface runoff volume from a 50-year 1-hour storm generated from the proposed project.

The drainage design criteria will be to minimize any alterations to the natural pattern of the existing onsite surface runoff.

3.3 SEWER

The proposed 112-lot residential subdivision and 4-lot agricultural subdivision will generate approximately 40,600 gallons of wastewater daily. Each residence will connect to an aerobic individual wastewater system. The developer is working closely with a company to install and maintain these systems. This company is also working with the State Department of Health to allow the use of the aerobic systems for a development that has more than 50 homes.

3.4 WATER

In accordance with the Department of Water Supply's Domestic Consumption Guidelines for residential and agricultural development is approximately 175,709 gallons per day. Fire flow demand for residential development is 1,000 gallons per minute for a 2-hour duration and 500 gallons

per minute for a 2-hour duration for agriculture. Fire hydrants will be installed with a maximum spacing of 350 feet for residential areas and 500 feet in agriculture areas.

The developer is presently working with the Department of Water Supply and private landowners who are planning to develop wells in the Upcountry area. When completed, the wells will be dedicated to the County of Maui. The developer will pay a prorata share in the development of these wells for an allocation of the water source for the Kula Ridge Subdivision.

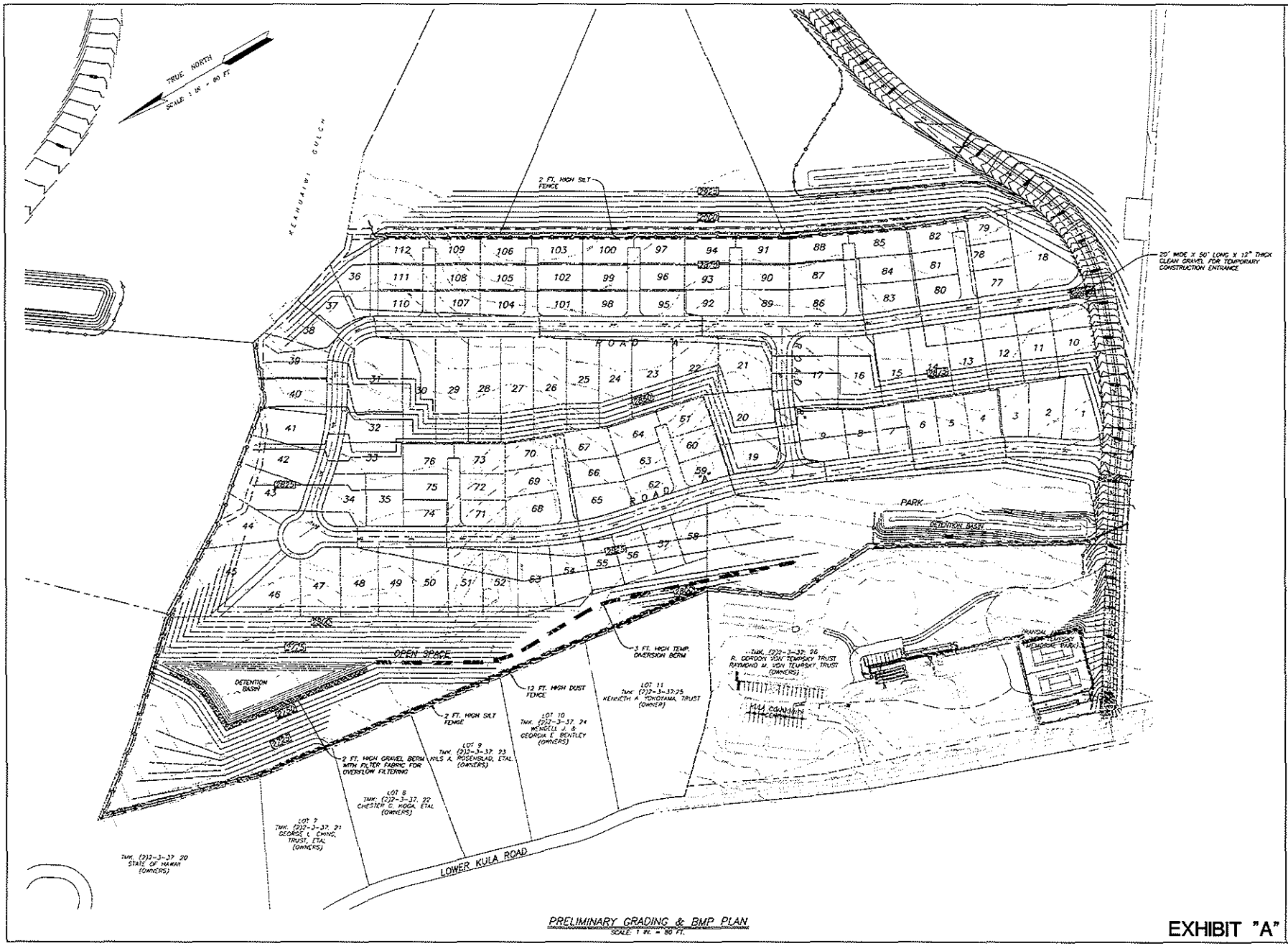
As part of the subdivision approval process, domestic water and fire flow calculations will be provided to determine the adequacy of the existing water system, in accordance with the rules of the Department of Water Supply.

3.5 ELECTRIC, TELEPHONE AND CABLE TV

The proposed electrical and telephone distribution systems in the subject development will be installed underground from Lower Kula Road. Interior project lighting will be provided as approved by the Department of Planning. All project lighting will be fully shielded.

APPENDIX H-1.

Preliminary Grading and Best Management Practices Plan



PRELIMINARY GRADING & BMP PLAN
SCALE: 1 IN. = 80 FT.

EXHIBIT "A"

OTOMO ENGINEERING, INC.
CIVIL ENGINEERING CONSULTING
85 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-8822
FAX: (808) 242-5176

STANLEY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5114-E
MAUI, HAWAII, U.S.A.

SIGNATURE DATE

NOTE: THE ENGINEER SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

KULA RIDGE AFFORDABLE HOUSING

T.M.K.: (2) 2-3-01: 23

KULA, MAKAWAO, MAUI, HAWAII

PRELIMINARY GRADING & BMP PLAN

REVISION	DATE	NOTE

DESIGNED BY	S.A.O
DRAWN BY	L.C.C
PROJECT NO.	2007-14
DRAWING NAME	GRAD-00
DATE	7-3-08

SHEET NO

OF SHEETS

APPENDIX I.

Department of Health, Wastewater Branch Individual Wastewater Systems Variance Approval Letter, IWS Project Plan, and Findings of Fact and Conclusions of Law

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
JUL 0 9 2007

CHIYOME LEINAALA FUKINO, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

WW 242 FINAL DEC CL

June 29, 2007

CERTIFIED MAIL 7005 1160 0001 8381 4502
RETURN RECEIPT REQUESTED

Mr. Clayton Nishikawa
Managing Member
Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, Hawaii 96793

Dear Mr. Nishikawa:

Subject: **Variance Application No. WW 242 Docket No. 06-VWW-31**
Proposed Development of 116 Units consisting of 59 Affordable Lots, sizes 5,600 - 6,000 square feet, 53 Market Lots - sizes 6,000 - 21,000 square fee, and 4 agricultural lots - sizes 4 acres minimum
Lower Kula Road, Lot 2, Wailuku, Maui, TMK: (2) 2-3-001: 174

Please find enclosed the Department of Health's Decision and Order regarding the above mentioned application for variance request which was **GRANTED** on **June 20, 2007** for **five (5) years**. We are enclosing for your information the Findings of Fact and Conclusions of Law.

Please note the variance conditions and if there are any questions relative to the variance, please do not hesitate to contact Mr. Harold Yee, Chief of the Wastewater Branch at our direct toll free phone number 984-2400 ext 64294, fax (808) 586-4300.

Sincerely,

Thomas E. Arizumi

THOMAS E. ARIZUMI, P.E., CHIEF
Environmental Management Division

Enclosures: Final Decision and Order
Findings of Fact and Conclusions of Law

c: Clean Water Branch
Environmental Planning Office
Safe Drinking Water Branch
Wastewater Branch - Maui Staff Engineer
Department of Water Supply - County of Maui
District Health Office - Maui
Mr. Harold Nagato, Best Industries USA

BEST INDUSTRIES USA, INC.

535 Ward Avenue, Suite 210
Honolulu, Hawaii 96814
Phone: 808-596-2378
Fax: 808-596-2063
bestindus001@hawaii.rr.com

INDIVIDUAL WASTEWATER SYSTEM

FOR

Kula Ridge
Lower Kula Road, Lot 2

IN

Kula, Maui, Hawaii
TMK: (2) 2 - 3 - 01 : 174

ROSS TANIMOTO
LICENSED PROFESSIONAL ENGINEER
No. 10087-M
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION, AS DEFINED IN CHAPTER 16 HAR ADMINISTRATIVE RULES, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS".

Ross Tanimoto

LICENSE EXPIRES ON 30 APRIL 2008

KULA RIDGE

SIZE	FSCM NO.	DWG NO.	REV

DATE: 23 OCT 2006

SCALE

SHEET C

TABLE OF CONTENTS

ROSS TANIMOTO LICENSED PROFESSIONAL ENGINEER No. 10087-M HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. I AM DEFINED IN CHAPTER 464 OF HRS "ADMINISTRATIVE RULES, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS" PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS"

Ross S. Tanimoto

LICENSE EXPIRES ON 30 APRIL 2008

KULA RIDGE

SIZE | FSCM NO. | DWG NO. | REV

DATE: 23 OCT 2006 | SCALE | SHEET D

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EMD / WG

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

DEPARTMENT OF HEALTH - WASTEWATER BRANCH
INDIVIDUAL WASTEWATER SYSTEM (IWS) - SITE EVALUATION / PERCOLATION TEST

Date/Time: 9/30/06 Test Performed by: Harold Nagato

Owner: Kula Ridge LLC TMK: (2) 2 - 3 - 01 : 174

Elevation: N/A feet
Depth to Groundwater Table: N/A feet below grade
Depth to Bedrock (if observed): Not Observed feet below grade
Diameter of Hole: 6 inches
Depth to Hole Bottom: 2 feet below grade

Depth, inches below grade	Soil Profile (color, texture, other)
24	Brown fine-grained

PERCOLATION READINGS:
Time 12 inches of water to seep away: 11 minutes
Time 12 inches of water to seep away: 15 minutes

Check one:

___ Percolation tests in sandy soils, recorded time intervals and water drops at least every 10 minutes for at least 1 hour.

X Percolation tests in no-sandy soils, presoaked the test hole for at least 4 hours. Recorded time intervals and water drops at least every 10 minutes for 1 hour of time for the first 6 inches to seep away in greater than 30 minutes record time intervals and water drops at lest every 30 minutes for 4 hours or until 2 successive drops do not vary by more than 1/16 inch.

Time Interval	Drop in Inches	Time Interval	Drop in Inches
10 min	5.00 in.		
10 min	2.75 in.		
10 min	2.50 in.		
10 min	2.75 in.		
10 min	2.25 in.		
10 min	2.25 in.		

ROSS TANIMOTO LICENSED PROFESSIONAL ENGINEER No. 10087-M HAWAII, U.S.A.

Percolation Rate (time/final water level drop): 4.5 minutes/inches

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable. I also attest that three feet of suitable soil exist between the bottom of the soil absorption system and the groundwater table or any other limiting layer.

Ross S. Tanimoto — Engineer's Signature/Stamp

12/14/06 — Dated

IWS Site Evaluation & Percolation Test.wpd EC1 as of January 8, 2003

GENERAL NOTES

1. All work shall conform to the Building Codes, Standards of Industry, Department of Health, Uniform Plumbing Codes, and other related items.

2. The installation indicates the overall Scope of Work and Intent, Contractor to provide verification at the job site for adjustment and to inform the engineer of change.

3. Gravel shall be #3 Coarse, no bigger that 3/4" in size with no fines or washed rock.

4. Engineer's drawing herewith does not indicate underground lines, and as such, Contractor shall inspect or tone the area for said underground lines.

5. All work shall be guaranteed for 1 year after completion by Contractor.

6. No trees or shrubs shall be planted within 5 feet of the Sewage Treatment Unit or Disposal System.

7. Sewage Treatment Unit and Disposal System shall be located in a Non-vehicular Traffic Area.

8. Depths of pipe inverts of the Sewage Treatment Unit and Disposal System are controlled by Topographic Features. The existing pipe invert may impact the depths shown on the drawings.

9. The Sewage Treatment Unit shall be at least 5 feet from the Disposal System.

10. The Sewage Treatment Unit or Disposal System shall be at least 5 feet from any wall line of any structure or building.

11. Disposal System shall be at least 5 feet from property line.

12. Sewage Treatment Unit shall be at least 5 feet from property line.

13. Seepage Pits shall be at least 12 feet from another Seepage Pit.

ROSS TANIMOTO
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No. 10087-M
HAWAII, U.S.A.

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Ross S. Tanimoto

LICENSE EXPIRES ON 30 APRIL 2008

KULA RIDGE

SIZE	FSCM NO	DWG NO.	REV

DATE: 23 OCT 2006

SCALE

SHEET 2

DESIGN CRITERIA

1. Owner Name: Clayton Nishikawa
   Residential Zoning
   TMK: (2) 2 - 3 - 01 : 174
   Description: 48.117 Acres divided into
   (116) Lots consisting of a
   (1) 3-Bedroom Dwelling each

2. Flow: 600 gallons per day (gpd) per dwelling

3. IWS Selection: (1) ESIS 1700 per dwelling
   Max Flow: 1000 gpd
   Max Volume: 1700 gallons

4. Disposal System Design
   Disposal System Selection: (1) Absorption Bed per IWS
   Percolation Rate = 4.5 min/in.
   Reqired Absorption Area (Assume 5 min/in.)
   (600 gpd) x (125 sq. ft./200 gpd) = 375 sq. ft.
   Absorption Bed Dimensions: 16 ft. x 24 ft.
   Absorption Bed Area = 384 sq. ft.

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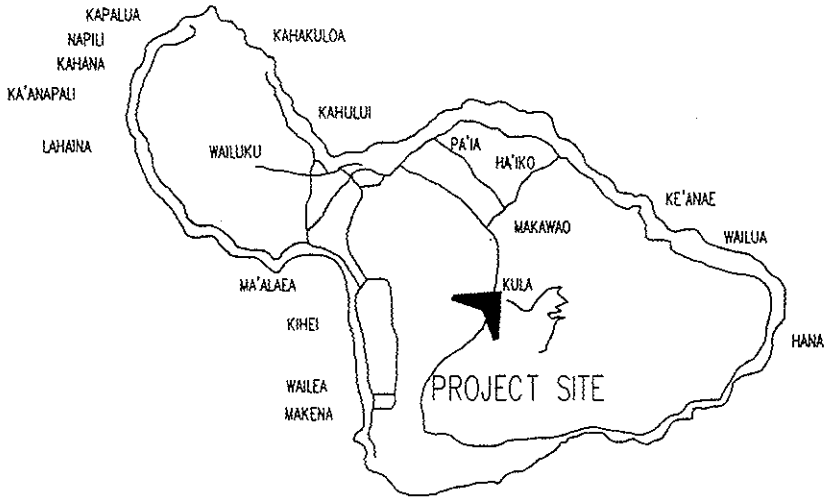
DATE: 23 OCT 2006

SCALE

SHEET 3

MAP OF MAUI



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LICENSED PROFESSIONAL ENGINEER
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Ross Tanimoto

LICENSE EXPIRES ON: 30 APRIL 2008

KULA RIDGE

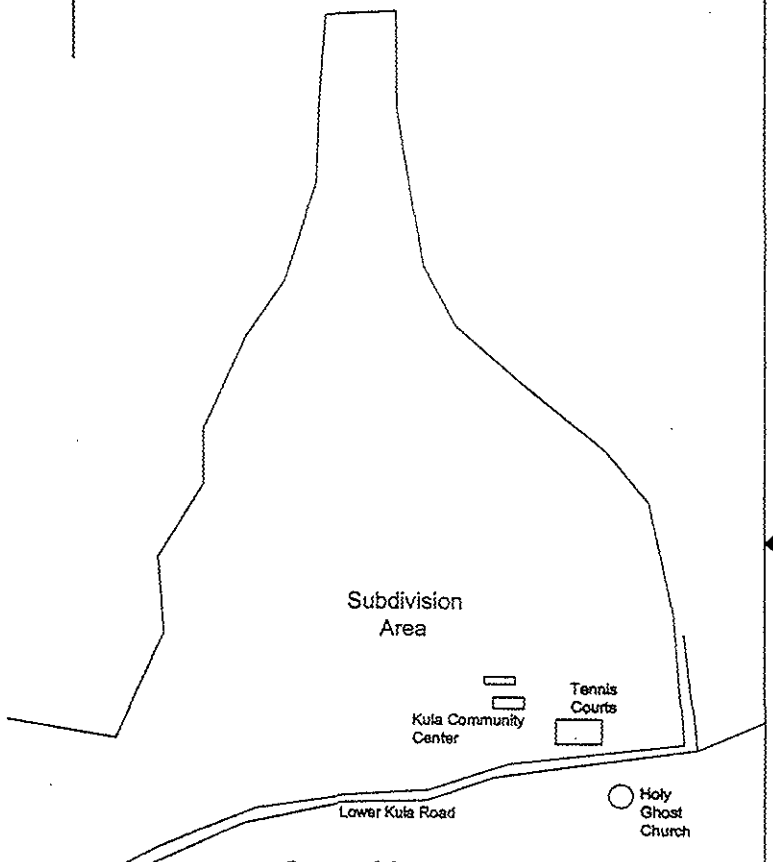
SIZE	FSCM NO.	DWG NO.	RE

DATE: 23 OCT 2006

SCALE		SHEET 4

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS



Street Map

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LICENSE EXPIRES ON: 30 April 2008 Ross T. Tanimoto

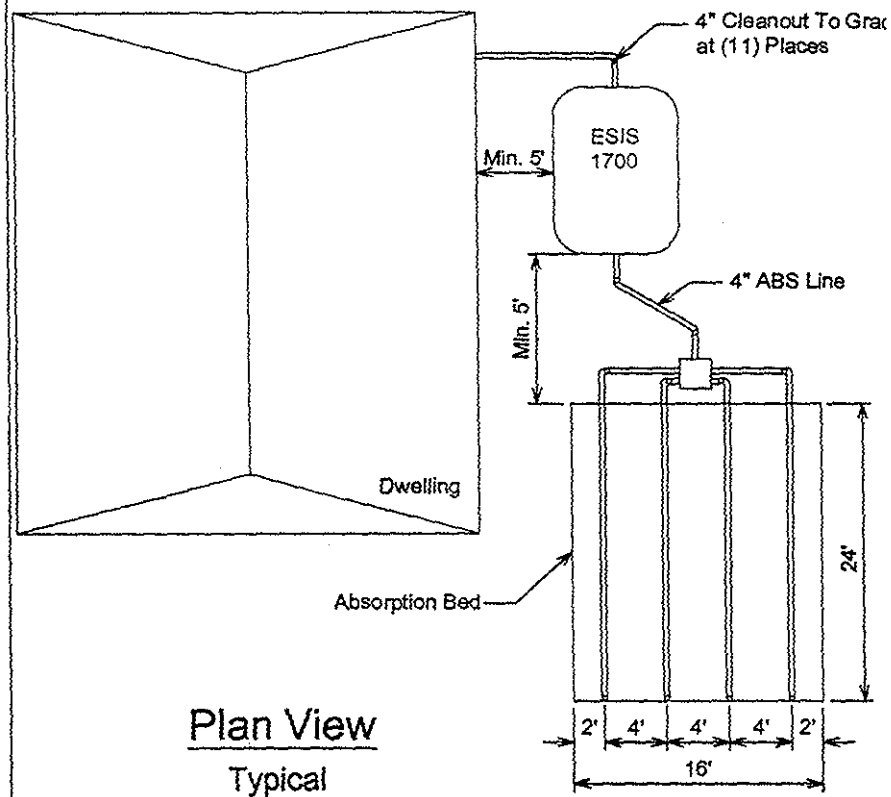
KULA RIDGE

SIZE	FSCM NO.	DWG NO.	REV

DATE: 23 OCT 2006

SCALE NONE		SHEET 5

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



Plan View

Typical

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No. 10087-M
HAWAII, U.S.A.

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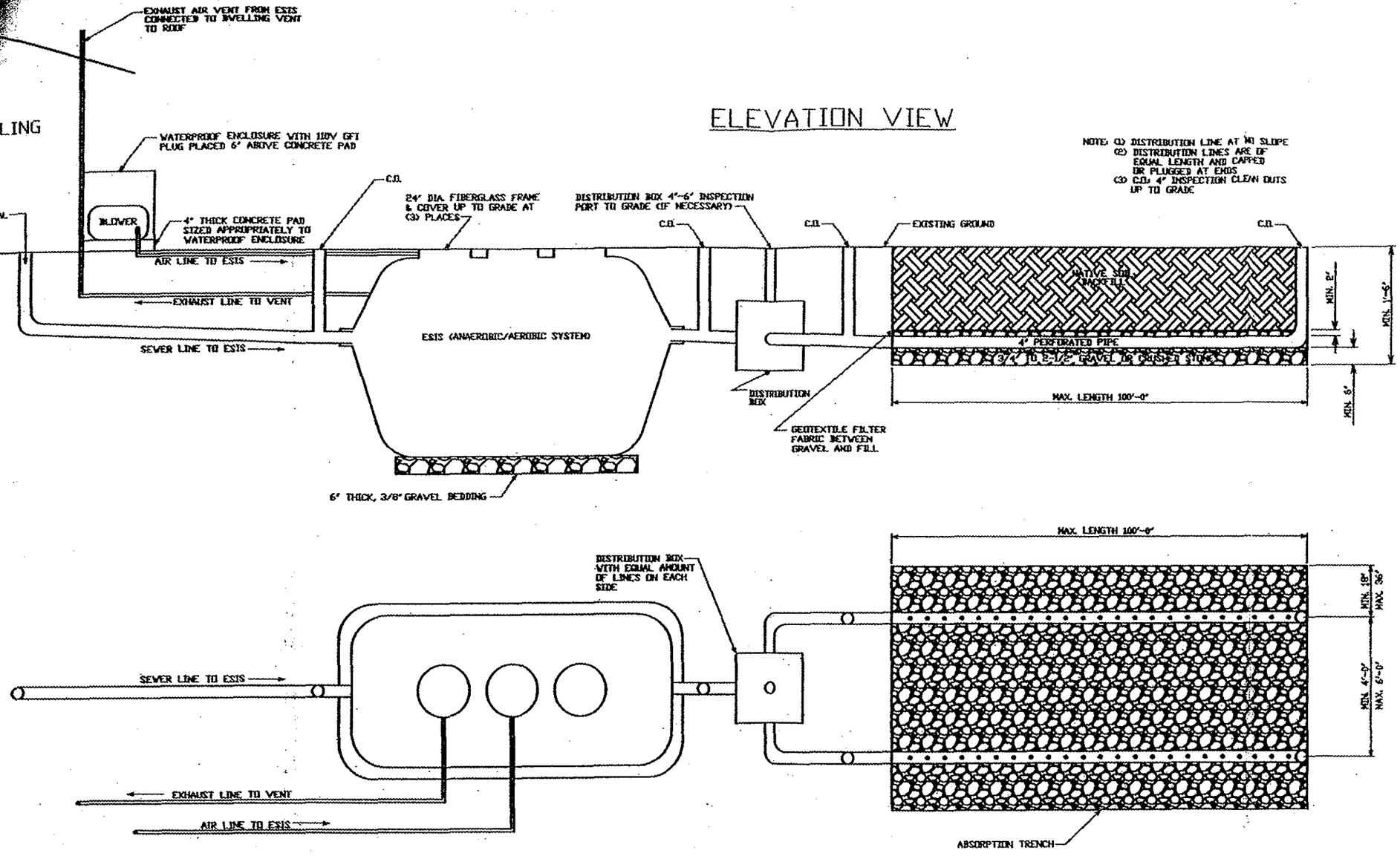
LICENSE EXPIRES ON: 30 April 2008

KULA RIDGE

SIZE	FSCM NO.	DWG NO.	REV

DATE: 23 OCT 2006 | SCALE NONE | SHEET 6



ABSORPTION BED

ROSS TANIMOTO
LICENSED PROFESSIONAL ENGINEER
No. 10087-M
HAWAII, U.S.A.

LICENSE EXPIRES ON: 30 April 2008

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No.	Revision/Issue	Date
B	UPDATE DESIGN INFO	mm/dd/yy
A	UPDATE DESIGN INFO	mm/dd/yy

Project Name and Address

Project Name and Address

Project
Date
Scale NONE
Sheet 7

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

ESIS Model	External Dimensions			Dry Weight	Manhole Diameter
	Length	Width	Height		
1000	10'-1"	5'-3"	5'-7"	750 lb	24"
1300	11'-1"	5'-9"	6'-1"	800 lb	24"
1700	11'-3"	7'-11"	8'-4"	925 lb	24"

ESIS Model	User Capacity		
	GPD	Bed Rm	Gallons
1000	600	3	1000
1300	800	4	1300
1700	1000	5	1700

ESIS Model	Excavation Dimensions			Excavated Soil Volumes
	Length	Width	Depth	
1000	12'-0"	7'-6"	7'-6"	25.0 cu. yds.
1300	13'-0"	8'-0"	8'-0"	31.0 cu. yds.
1700	13'-6"	10'-0"	10'-6"	52.5 cu. yds.

Air Pump	Pump Dimensions			Watts	Outlet	Max PSI
	Length	Width	Depth			
SL 56	8"	5"	9"	50	3/4"	5.9
115V/60Hz with 6' Power Cord using GFI Outlet.						
UL-Listed & CE-Approved.						

IWS SPECIFICATIONS

ROSS TANIMOTO
LICENSED PROFESSIONAL ENGINEER
No. 10087-L
HAWAII, U.S.A.

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LICENSE EXPIRES ON: 30 April 2008

Ross S. Tanimoto

KULA RIDGE

SIZE	FSCM NO.	DWG NO.	REV

DATE: 23 OCT 2006 | SCALE NONE | SHEET 8

STATE OF HAWAII

DEPARTMENT OF HEALTH

In the Matter of the Application Variance Application No. WW 242 for Individual Wastewater System Proposed Development of 116 Units of Which 59 Affordable Lots - Sizes 5,600 - 6,000 SF, Approximately 53 Market Lots - Sizes 6,000 - 21,000 SF and 4 Agricultural Lots - Sizes 4 acres Minimum, Lower Kula Road, Lot 2 Wailuku, Maui TMK: (2) 2-3-001: 174	Docket No. 06-VWW-31

DECISION AND ORDER

Pursuant to Chapter 342D, Hawaii Revised Statutes, and Chapter 62 of Title 11, Administrative Rules and based upon the application and staff review, the Variance Request from the provisions of Chapter 11-62, Section 11-62-31.1(a)(1) is hereby **GRANTED** under the following conditions:

1. The draft Operation and Maintenance Service Contract provided to the Department between Kula Ridge, LLC ("developers") and Best Industries shall be executed and recorded once the 116 unit subdivision is approved by the County of Maui.

2. The developer shall also execute and record deed restrictions/covenants onto each of the 116 lots binding the property owner to the applicable provisions in the Operation and Maintenance Service Contract. The deed restrictions/covenants shall also require the property owner(s) to utilize the wastewater system specified in the Operation and Maintenance Service Contract.

3. The developer and/or the Association of Lot Owners must advise buyers/homeowners to avoid discharging hazardous chemicals to drains and toilets, and to utilize low-flow fixtures and devices on faucets, showerheads, urinals, water closets and hose bibs to minimize the amount of water flowing in the IWS. Information on Low-flow fixtures and devices are available, at no cost to DWS customer at the Water Resources & Planning Division, located at 59 Kanoa Street, Wailuku.

4. An engineer shall design a wastewater system (IWS plan) consistent with the Operation and Maintenance Service Contract for each lot and at the time of building permit application for the construction of homes, the IWS plan shall be submitted to the Department for review and approval. Seepage pits and injection wells shall not be used to dispose of effluent from the aerobic units and to the maximum extent possible, all effluent disposal systems shall be as shallow as possible.

5. The variance shall be null and void if the developers are unable to obtain the necessary County of Maui subdivision approvals such that the project can proceed

6 The variance is valid for a period not to exceed five (5) years after which, the developer or the Association of Lot Owners must apply for a variance renewal

7 The developer and subsequent lot owners agree that no further subdivision of the lots will be undertaken.

8 Provisions should be made for system operation in the event of a power outage The developer and/or the Association of Lot Owners must advise homeowners to minimize usage of water during power outage Homeowners may also wish to connect the blowers and/or pumps of the aerobic unit to a standby power source

9. The O&M service provider shall provide an annual report to the Department of Health. The annual report shall at a minimum contain a summary of the service inspections and maintenance visits conducted, summary of major replacement or repairs undertaken at each site and summary of sludge/scum/solids removed from each unit

DATED: Honolulu, Hawaii, June 20, 2007.

THOMAS E. ARIZUMI, P.E., CHIEF
Environmental Management Division

STATE OF HAWAII

DEPARTMENT OF HEALTH

In the Matter of the Application Variance Application No. WW 242 for Individual Wastewater System Proposed Development of 116 Units Consisting of 59 Affordable Lots - Sizes 5,600 - 6,000 SF, 53 Market Lots - Sizes 6,000 - 21,000 SF and 4 Agricultural Lots - Sizes 4 acres Minimum, Lower Kula Road, Lot 2 Wailuku, Maui TMK: (2) 2-3-001: 174	)	Docket No. 06-VWW-31

FINDINGS OF FACT AND CONCLUSIONS OF LAW

An application from Kula Ridge, LLC, Wailuku, Maui, Hawaii for a five (5) year variance from Hawaii Administrative Rules, Chapter 62 of Title 11, Section 11-62-31.1(a)(1) was reviewed by the Department of Health staff. A public notice of the application was printed in the January 22, 1007 issue of the Honolulu Star Bulletin and the January 22, 2007 issue of The Maui News publications. Seven (7) comments pertaining to the application were received during the 30 days following the publication of the public notice.

Findings of Fact

Mr. Clayton Nishikawa, Managing Member of Kula Ridge, LLC, has applied for a five (5) year variance from Hawaii Administrative Rules (HAR), Section 11-62-31.1(a)(1) General requirements for individual wastewater systems which states, "(a) Individual wastewater systems maybe be used as a temporary on-site means of wastewater disposal in lieu of wastewater treatment works under the following conditions: . "

The applicant is proposing a development located in the vicinity of Lower Kula road, Lot 2, Kula, Maui, consisting of 116 units. The development will consist of approximately 59 Affordable Lots - sizes 5,600 - 6,000 square feet in area, approximately 53 Market Lots - sizes 6,000 - 21,000 square feet in area, and 4 agricultural lots - sizes 4 acres minimum. There are no existing cesspools and no centralized sewer system in the area or planned for the near future. Well locations should not be an issue based on the location of the existing wells. Current rules prohibit individual wastewater systems (IWSs) on properties less than 10,000 square feet and above the CWDA; however, variances could be issued.

The Critical Wastewater Disposal Area (CWDA) issue and the minimum lot size pose regulatory obstacles. Insofar as treatment is concerned, the recommendation, consistent with EPA's decentralization approach, is to propose aerobic units (NSF 40 approved) with chlorine disinfection (i.e., Individual Wastewater Systems), in lieu of septic tanks. Because of the treatment level and

disinfection, impacts to the existing ground water, assuming it exists, will be reduced. Presently the DOH allows approved NSF 40 Class I aerobic systems to be used within 1,000 feet of drinking wells. Disposal of treated effluent is proposed through absorption beds which again is consistent with DOH guidelines. The purpose of this approach is to develop the maximum distance between the existing ground water and grade. Also associated with this proposal is a mandatory maintenance program. The maintenance provider will submit an annual report to DOH, copy the owner, and cite the maintenance activities completed in the applicable year. To further the reliability of the proposed IWS, the mandatory maintenance program will be included in all individual property deeds as covenants. The project is located on Lower Kula Road, Lot 2, Wailuku, Maui TMK: (2) 2-3-001: 174.

The applicant has made the following comments

1 This application is for a variance from Section 11-62-31 1(a)(1) of the Hawaii Administrative Rules (HAR)

2 The aerobic individual wastewater system (IWS) to be constructed shall comply with the wastewater rules at the time the fee simple owner applies for building permit

3 The volume of treated R-2 wastewater generated on each lot shall not exceed a design flow of 1,000 gallons per day

4. The aerobic IWS unit meets the requirements of Hawaii Administrative Rule (HAR), Title 11-62, Section 33 1 (b)(2) and thus can be used in the State of Hawaii as an aerobic unit.

5 Wastewater Management Policies (WMP2) "Only one (1) IWS shall be allowed per lot of record. The IWS shall consist of a minimum of an aerobic unit, chlorinator and horizontal soil absorption system or surface disposal systems such as evapotranspiration system. The IWS shall be located as far from the well as possible and down gradient of the well if possible."

6 Department of Health, Amendments and Compliance of Chapter 11-62, Hawaii Administrative Rules: (SS11-62-33.1) indicated specific requirements for new and proposed treatment units (b) Household aerobic units. (5) In areas below (makai of) the Underground Injection Control Line established pursuant to chapter 11-23, a household aerobic unit may discharge its effluent directly into the groundwater provided the effluent is disinfected.

7 As indicated in the State of Hawaii Chapter 62, Best USA's ESIS unit has met all the rules. In fact, the ESIS can be used within 1,000 feet of a drinking well, which the above development has no drinking wells within a 1,000 feet.

8. Letter from State of Hawaii, Department of Health, Mr. Dennis Tulang, P.E., Chief, Wastewater Branch, dated December 7, 1999, states "our recommendation is based in part on both aerobic and anaerobic processes to achieve Class I effluent criteria."

9. Best USA is proposing to use its tested aerobic system ESIS which can treat effluent on each property with a low profile leach bed.

10. Each ESIS unit will have an operation and maintenance (O&M) program to keep this system always performing well. This O&M program will be written into each deed as a covenant that this system must always be maintained and a report of its quality sent to DOH annually. As stated in the State of Hawaii Chapter 62, all of these systems must be maintenance by one entity

11. Best USA and the ESIS unit have been tested by the University of Hawaii in 1999 and have successfully installed and maintained over 100 units throughout the State of Hawaii.

12. This development presently has no central sewer facilities now or in the near future, and the properties in the surrounding area are currently using old cesspools and septic tanks with minimal treatment.

13 This proposed development, see Figure 1, located in the vicinity of Lower Kula Road, Lot 2; Kula, Maui consisting of 116 units (60% affordable). Of these, approximately 59 Affordable Lots - sizes 5,600 - 6,000 square feet and approximately 53 market lots - sizes 6,000 - 21,000 square feet and 4 agricultural lots - sizes 4 acres minimum. There are no existing cesspools and no centralized sewer system in the area or planned for the near future. Well locations should be not be an issue based on the location of the existing wells.

14 The proposed development will use aerobic systems to dispose R-2 treated effluent into the existing cleaned cesspools, in accordance with the USEPA, Office of Water & Office of Wastewater Management, EPA 832-R97-001B, "Response to Congress on Use of Decentralized Wastewater Treatment Systems WWBKGN93".

15 The above report by the USEPA supports and gives guidelines to the exact way that we are planning this project with proven NSF 40 tested equipment and long term operations and maintenance programs.

16. Best USA has a long term proven record of installed and maintained systems in the State of Hawaii.

17. In compliance with HRS 342D-6 (4), the public interest shall be served in a method that will prove to be safer, and have minimal health impact on the environment. The use of an approved aerobic Individual Wastewater Systems (IWSs) as the means of wastewater treatment and disposal for each lot is deemed prudent because the system is NSF 40 approved with effluent quality of R-2 and allowed by "Title 11 Department of Health - Chapter 62 Wastewater Systems" to be used within a mere 1,000 feet of a drinking well, it's only appropriate is to allow the ESIS to be used on this project, which has no drinking wells within 1,000 feet and will not harm the safety and welfare of the public. Furthermore, the costs associated with the alternative of designing and constructing a secondary wastewater treatment facility and effluent disposal system, including sewer transmission mains and sewer laterals for 116 lots, would be prohibitive. The use of an ESIS 1700 unit will bring a long-term higher and safer wastewater treatment to this property.

18. All of the new homes will have the same treatment standards to its wastewater in the present and future.

19. The treated effluent will help to safely recharge the water supply as reported in USEPA report to congress

20. As indicated in the State of Hawaii Chapter 62, Best USA's ESIS unit has met all the rules. In fact, the ESIS can be used within 1,000 feet of a drinking well, which the above development has no drinking wells within 1,000 feet.

21. Therefore, if the ESIS system complies with "Title 11, Department of Health, Chapter 62, Wastewater Systems" to be used within a mere 1,000 feet of a drinking well, it is only appropriate to allow the ESIS to be used on this project, which has no drinking wells within 1,000 feet and will not harm the safety and welfare of the public

22. Allowance of the requested variance to use a proven aerobic treatment system with a continuous maintenance service program will definitely have a positive and greater health and environmental benefit to the public because it will not be detrimental to the public

23 The maximum time period of five (5) years is requested for this request Requests for future renewals will be made at five (5) year intervals until a municipal sewer system becomes available in the project vicinity

The following items were submitted with the variance application but can not be shown here: EPA response to Congress on use of decentralized Wastewater Treatment Systems; NSF 40 testing report; DOH chapter on 1000 feet ruling; and map of well location.

The following agencies submitted the following comments:

1. The Clean Water Branch submitted the following comment:

   Recommend to deny this variance application.

2 The Environmental Planning Office:

   A These are some of the issues which needs to be addressed:

      (1) Are we moving away from a private sewage treatment plant for residential developments greater than 50 lots (i.e. usage of individual wastewater systems for a large development)?

      (2) Will we be creating problems of magnitude by allowing IWSs of such number to be built with absorption beds in an area of less than 10,000 square feet? The 59 Affordable lots (5,600 - 6,000) plus some of the 53 Market Lots (6,000 - 21,000) will be less than 10,000 square feet in size.

   B. I am not sure if this is the trend for developments to address affordable housing, however, form the contrarian perspective, this is what should be considered:

(1) Aerobic units are run by electricity which can be turned off by the owner. If that happens, I understand that the system becomes a conduit to the absorption field. Also, over a period of time, these electrical systems will ultimately fail. The same situation as stated above will happen. Once the absorption field is compromised, I hope that the solution will not revert to digging seepage pits. We know that aerobic units with seepage pits become essentially cesspools if the electricity is not working. These were all issues of the past when the decision to use the non-electric septic tank system was made in the 1980's.

(2) I like the concept of a single maintenance point of contact. However, if that concept fails as times goes on, then the scenario described above happens.

(3) I am just remembering why we made some of those decisions in Chapter 11-62 back in the 1980's.

Thank you for allowing EPO the opportunity to comment.

3. The Safe Drinking Water Branch submitted the following comments:

A. The project site is situated "mauka" or above the Underground Injection Control (UIC) line;

B. Land areas above the UIC line overlie or recharge existing or potential underground sources of drinking water. Construction of any new injection well for sewage effluent or industrial wastewater disposal is prohibited; and

C. We have no objection to this variance application.

Please contact Mr. Jamie Rimando at telephone (808)586-4258 if you have any questions.

4. The District Health Office - Maui Branch has the following to offer:

We have no objection to the granting of this variance application provided all of the conditions set forth in the application are complied with.

5. The County of Maui, Department of Water Supply submitted the following comments:

A The proposed development is located in Kula and not in Wailuku as is stated in the Subject heading of your May 29, 2007 letter to the Department of Water Supply.

B. The Department of Water Supply (DWS) acknowledges that the proposed aerobic treatment systems will reduce the introduction of pathogens into groundwater resources as compared to cesspools or septic systems

However, we are concerned about the continuing increase in density of communities where facilities are not available to protect underlying aquifers from nitrogen and chemical pollutants that would otherwise be carried away by sewer systems

C DWS highly recommends that the applicant advise buyers to avoid discharging hazardous chemicals to drains and toilets, and to utilize low-flow fixtures and devices on faucets, showerheads, urinals, water closets and hose bibs to minimize the amount of water flowing into the IWS Low-flow fixtures and devices are available, at no cost to DWS customers, at our Water Resources & Planning Division, located at 59 Kanoa Street, Wailuku.

D Some provision should be made for system operation in the event of power failure. According to comments presented in the Findings of Fact by the Environmental Planning Office, if the unit is powered off by the owner, the aerobic unit will become a conduit to the absorption field; this will ultimately compromise the system Although it is unlikely that the owner would turn off the power, it is highly likely that the Kula area will experience occasional power failures Some provision should be made for system operation in the event of such a power outage.

Should you have any questions, please contact our Water Resources & Planning Division at 244-8550

Sincerely,
Jeffrey K. Eng, Director

6. The Wastewater Branch Maui Staff Engineer recommends a granting this variance application with the following provision:

The ESIS aerobic unit or individual treatment unit must be operated and maintained by the ESIS manufacturer and with supervision of the consulting engineer based on the O&M "Operation & Maintenance" manual.

7 The Wastewater Branch states that there is no existing sewer service system available in the area. Public benefit is that 59 of the 116 lots are to be marketed as affordable units. One wastewater solution is to use a centralized system. Another is to utilize individual wastewater systems (IWSs) that are properly operated and maintained by a utility like organization.

Please contact the Planning & Design Section of the Wastewater Branch at (808) 586-4294 if you have any questions.

Conclusions of Law

Chapter 342D, Hawaii Revised Statutes, Section 342D-7(c), states that no variance shall be granted by the Department unless the application and supporting information clearly show that:

1 The granting of the variance is in the public interest as defined in the Hawaii Revised Statutes, Section 342D-6(c)(4).

2 The granting of this variance will not substantially endanger human health or safety

3. Compliance with the rules, regulations or standards from which the variance is sought would produce serious hardship without equal or greater benefits to the public

Based upon the foregoing findings of fact, it is concluded that the above requirements have been met

Comment and Recommendation

Based upon the foregoing findings of fact and conclusions of law, it is my recommendation that the variance request be **GRANTED** under the following conditions:

1. The draft Operation and Maintenance Service Contract provided to the Department between Kula Ridge, LLC ("developers") and Best Industries shall be executed and recorded once the 116 unit subdivision is approved by the County of Maui.

2 The developer shall also execute and record deed restrictions/covenants onto each of the 116 lots binding the property owner to the applicable provisions in the Operation and Maintenance Service Contract. The deed restrictions/covenants shall also require the property owner(s) to utilize the wastewater system specified in the Operation and Maintenance Service Contract.

3. The developer and/or the Association of Lot Owners must advise buyers/homeowners to avoid discharging hazardous chemicals to drains and toilets, and to utilize low-flow fixtures and devices on faucets, showerheads, urinals, water closets and hose bibs to minimize the amount of water flowing in the IWS. Information on Low-flow fixtures and devices are available, at no cost to DWS customer at the Water Resources & Planning Division, located at 59 Kanoa Street, Wailuku.

4 An engineer shall design a wastewater system (IWS plan) consistent with the Operation and Maintenance Service Contract for each lot and at the time of building permit application for the construction of homes, the IWS plan shall be submitted to the Department for review and approval. Seepage pits and injection wells shall not be used to dispose of effluent from the aerobic units and to the maximum extent possible, all effluent disposal systems shall be as shallow as possible.

5 The variance shall be null and void if the developers are unable to obtain the necessary County of Maui subdivision approvals such that the project can proceed.

6. The variance is valid for a period not to exceed five (5) years after which, the developer or the Association of Lot Owners must apply for a variance renewal.

7 The developer and subsequent lot owners agree that no further subdivision of the lots will be undertaken.

8 Provisions should be made for system operation in the event of a power outage. The developer and/or the Association of Lot Owners must advise homeowners to minimize usage of water during power outage Homeowners may also wish to connect the blowers and/or pumps of the aerobic unit to a standby power source.

9. The O&M service provider shall provide an annual report to the Department of Health. The annual report shall at a minimum contain a summary of the service inspections and maintenance visits conducted, summary of major replacement or repairs undertaken at each site and summary of sludge/scum/solids removed from each unit

DATED: Honolulu, Hawaii, **June 20, 2007**.

Thomas E. Arizumi, P.E.
Chief, Environmental Management Division

The foregoing findings of fact and conclusions of law are hereby adopted.

APPENDIX J.

Meeting Minutes With Residents Dated July 13, 2006

MUNEKIYO HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

KARLYNN KAWAHARA

November 20, 2006

MEETING MEMORANDUM

Date of Meeting: July 13, 2006

From: Rowena Dagdag, Planner

Subject: Kula Ridge Affordable Housing Subdivision

Participants: Clayton Nishikawa, ***(Architectural Design & Construction, Inc.)***
Stacy Otomo, ***(Otomo Engineering, Inc.)***
Michael Munekiyo, ***(Munekiyo & Hiraga, Inc.)***
Rowena Dagdag, ***(Munekiyo & Hiraga, Inc.)***
Community Participants, ***(See Attached)***

The purpose of the meeting was to introduce the proposed Kula Ridge Subdivision project to residents and community members living in proximity to the proposed project site. The project would require a district boundary amendment and seek exemptions from the community plan amendment and change in zoning process through the Section 201G-118, Hawaii Revised Statutes (HRS) application process.

1. C. Nishikawa provided a brief summary of the project's description and displayed the proposed house plan designs. He noted that the project will involve the development of 116 improved lots, with 70 (60 percent) affordable house/lot packages and 46 (40 percent) market lots.

2. A rendering of what the affordable units would look like using a private access easement for 6 of the lots was displayed. C. Nishikawa stated that one of his reasons for developing affordable housing was to provide well designed affordable homes for Maui residents and their children.

3. The project is moving ahead to obtain the proper sequence of approvals. C. Nishikawa has already met with the Kula Community Association, the Maui County Council members, and with the Mayor. All had recommended that he meet with the residents living near the proposed project to answer any questions or address any concerns that they have regarding the project.

4. M. Munekiyo explained that the project was in its preliminary stages in terms of the environmental assessment and Land Use Commission process. He further explained that the environmental assessment process would help identify areas that would be impacted and suggest improvements that need to be made to mitigate or minimize project impacts.

5. M. Munekiyo stated that the project will need to go through the State Land Use Commission for a district boundary amendment to reclassify the land use from Agricultural to Rural and Urban. Exemptions from the community plan amendment and change in zoning process will be requested as part of the Section 201G-118, HRS application process.

6. The project is to be processed as a Section 201G, HRS application, which allows an affordable housing project to be expedited through exemptions. The regular process would take approximately 3 to 4 years. During the application process, there will be formal opportunities for the public to comment and provide feedback.

7. A resident expressed her concern over water rights and asked if the project would receive water before others who have been waiting for a water meter. M. Munekiyo replied that although the Section 201G, HRS process allows for certain exemptions, it would not permit exemptions relating to the provision of water source and water infrastructure.

8. C. Nishikawa stated that he recently met with the Water Director, who suggested that he find his own water. C. Nishikawa is currently negotiating with Maui Land and Pineapple Company and A&B who are drilling wells in the Upcountry area. The water from these wells could service the project site. He further indicated that he would pay for a percentage of the well being drilled by the companies.

9. The well would eventually be connected to the County water system.

10. D. Mayer stated that the Kula Community Association board members met with C. Nishikawa about two (2) months ago and reviewed the project with him. The association has provided C. Nishikawa with comments and concerns regarding the project. D. Mayer indicated that he was not satisfied with the update regarding the water situation, but was willing to be of help to resolve the issues.

11. A septic tank system will be installed in the homes. C. Nishikawa stated the benefits of a septic system and pointed out the disadvantages of a larger single wastewater system. C. Nishikawa is coordinating with the Department of Health to obtain permission to utilize individual wastewater systems as being proposed.

12. A resident asked if the homes could be expanded to accommodate growing families. C. Nishikawa stated that there would be enough room on the individual lots for expansion. He noted that there would be no need for a larger water meter,

23. M. Munekiyo stated that there will be several meetings where residents will be able to testify and provide comments over the project. The public will be able to give testimony before the State Land Use Commission during meetings regarding the environmental assessment. After a draft of the environmental assessment has been published, a 30-day comment period will be held for residents to provide feedback. The applicant will review and address the comments received during the draft environmental assessment comment period.

24. M. Munekiyo noted that residents living within 500 feet of the proposed project site were invited to the meeting, but welcomed others in the Kula area to attend. He added that more meetings could be held to update residents on the status of the project and to gather more comments.

25. A resident noted that 6:00 p.m. may be too early in the evening to hold a meeting. A better time would be at 7:00 p.m.

26. Residents asked D. Mayer if the Kula Community Association could act as the spearhead for upcoming meetings. They want to be informed of any meetings or hearings regarding the projects that impact the entire Kula Community. D. Mayer responded that a website is available at www.kulamaui.org. The website includes information that residents would find useful.

27. C. Nishikawa stated that water and roadway infrastructure are very important issues that need to be addressed and resolved. He is willing to work with residents and the Kula Community Association on these issues.

In closing the meeting, M. Munekiyo stated that the applicant would like to come back to the community to provide updates and receive comments as the project progresses.

Rowena M. Dagdag, Planner

RMD:yp
Attachment
cc: Clayton Nishikawa, Architectural Design & Construction, Inc. (w/attachment)
Stacy Otomo, Otomo Engineering, Inc. (w/out attachment)
Dick Mayer, Kula Community Association (w/attachment)
F:\DATA\Nishikawa\KulaAH\071306.meetingmemo.wpd

5. PRELIMINARY DEVELOPMENT PLANS AND DESCRIPTION OF MATERIALS FOR AFFORDABLE UNITS

Form RD 1924-2
(Rev. 7-99)

UNITED STATES DEPARTMENT OF AGRICULTURE
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-FEDERAL HOUSING ADMINISTRATION
U.S. DEPARTMENT OF VETERANS AFFAIRS

FORM APPROVED
OMB NO. 0575-0042

☑ **Proposed Construction**

☐ **Under Construction**

DESCRIPTION OF MATERIALS

No. _____ (To be inserted by Agency)

Property address Lower Kula Road *City* Kula *State* HI

Mortgagor or Sponsor _____ (Name) _____ (Address)

Contractor or Builder Architectural Design & Construction, Inc. (Name) 1849 Wili Pa Loop Wailuku, HI 96793 (Address)

INSTRUCTIONS

1. For additional information on how this form is to be submitted, number of copies, etc., see the instructions applicable to the FHA Application for Mortgage Insurance, VA Request for Determination of Reasonable Value or other, as the case may be.

2. Describe all materials and equipment to be used, whether or not shown on the drawings, by marking an X in each appropriate check-box and entering the information called for in each space. If space is inadequate enter "See misc," and describe under item 27 or on an attached sheet- THE USE OF PAINT CONTAINING MORE THAN THE PERCENT OF LEAD BY WEIGHT PERMITTED BYLAW IS PROHIBITED.

3. Work not specifically described or shown will not be considered unless required, then the minimum acceptable will be assumed. Work exceeding minimum requirements cannot be considered unless specifically described.

4. Include no alternates, "or equal" phrases, or contradictory items. (Consideration of a request for acceptance of substitute materials or equipment is not thereby precluded.)

5. Include signatures required at the end of this form.

6. The construction shall be completed in compliance with the related drawings and specifications, as amended during processing. The specifications include this Description of Materials and the applicable building code.

1. EXCAVATION:
Bearing soil, type _____

2. FOUNDATIONS:
Footings: concrete mix Type I or II ASTM C-150 ; strength psi 3000 Reinforcing #4, see structural details
Foundation wall: material Concrete, Type I or II ASTM C-150 Reinforcing #4, see structural details
Interior foundation wall: material Concrete, Type I or II Party foundation wall _____
Columns: material and sizes 6x6 Douglas Fir, No. 1 Piers: material and reinforcing 12x12 CMU, Fully Grouted
Girders: material and sizes 4x12 Douglas Fir, No. 1 Sills: material NA
Basement entrance areaway NA Window areaways NA
Waterproofing NA Footing drains NA
Termite protection Termimesh Stainless Steel Mesh
Basementless space: ground cover NA ; insulation NA ; foundation vents NA
Special foundations NA
Additional information _____

3. CHIMNEYS:
Material _____ Prefabricated *(make and size)* _____
Flue lining: material _____ Heater flue size _____ Fireplace flue size _____
Vents *(material and size)*: gas or oil heater _____ ; water heater _____
Additional information: _____

4. FIREPLACES:
Type: ☐ solid fuel; ☐ gas-burning; ☐ circulator *(make and size)* _____ Ash dump and clean-out _____
Fireplace: Facing _____ ; lining _____ ; hearth _____ ; mantel _____
Additional information: _____

5. EXTERIOR WALLS:
Wood frame: wood grade, and species 2x Douglas Fir, No. 1 ☐ Corner bracing. Building paper or felt Kraft or Bituminous
sheathing Structural II ; thickness 1/2" ; width 48" ☑ solid; ☐ space _____ o.c.; ☐ diagonal; _____
Siding Fiber cement Lap ; grade II ; type A ; size 12' ; exposure 6" ; fastening HDG nails
Shingles Fiber cement ; grade II ; type A ; size 4' ; exposure 7" ; fastening HDG nails
Stucco Glass Mat Gyp. ; thickness 5/8" ; Lath Synthetic plaster finish , weight _____ lb.
Masonry veneer _____ Sills _____ Lintels _____ Base flashing _____
Masonry: ☐ solid ☐ faced ☐ stuccoed; total wall thickness 0 ; facing thickness _____ ; facing material _____
Backup material _____ ; thickness _____ ; bonding _____
Door sills _____ Window sills _____ Lintels _____ Base flashing _____
Interior surfaces: dampproofing, _____ coats of _____ ; furring _____
Additional information: _____
Exterior painting: material Acrylic latex ; number of coats 2
Gable wall construction: ☑ same as main walls; ☐ other construction _____

6. FLOOR FRAMING:
Joists; wood, grade, and species Doug.fir No.2 ; other _____ ; bridging Solid ; anchors HDG Simpson
Concrete slab: ☐ basement floor; ☐ first floor; ☑ ground supported; ☐ self-supporting; mix Type I or II ; thickness 4 ,
reinforcing 6x6 10/10 WWM ; insulation _____ ; membrane 10 Mil vapor barrier
Fill under slab; material TBD ; thickness _____ ; Additional information: _____

7. SUBFLOORING: *(Describe underflooring for special floors under item 21.)*
Material: grade and species Structural I plywd with P.I. Index of 48/24 , size 3/4" , type T&G
Laid: ☑ first floor; ☐ second floor ☐ attic _____ sq. ft; ☐ diagonal; ☑ right angles. Additional information: Glued & Nailed

8. FINISH FLOORING: *(Wood only. Describe other finish flooring under item 21.)*

LOCATION	ROOMS	GRADE	SPECIES	THICKNESS	WIDTH	BLDG.PAPER	FINISH
First floor							
Second floor							
Attic floor	sq. ft.						

Additional information _____

but that the homes may need a larger septic system. Homes would have a 5/8-inch meter.

13. A question was raised regarding the community plan designation, and if there was any mention of density to the area. Residents were concerned that the 116 improved lots would result in increased traffic. They were concerned about the safety of the roads and a large number of cars in the subdivision.

14. C. Nishikawa indicated that the smaller homes would be able to accommodate two (2) cars off-street, with the larger homes accommodating up to four (4) cars off-street. Parking on the access driveway would not be allowed for the affordable homes with a private access driveway.

15. The larger density (116 improved lots) is required to keep the affordable housing cost lower.

16. Ohana units will not be allowed on the individual lots.

17. A resident raised concern about the four (4) large lots on the eastern boundary of the property. Residents are concerned about it becoming a "gentlemen" ranch. M. Munekiyo stated that the current state land use designation will be kept as agricultural or rural.

18. A resident raised concern over the sidewalk along Lower Kula Road and suggested improvements to it. Residents also felt that Lower Kula Road was too narrow to accommodate traffic leading up to the 116 lot subdivision. M. Munekiyo stated that a traffic impact analysis was being done to identify improvements and mitigation measures that need to be made before approval of the subdivision.

19. A resident raised a concern over outdoor lights and its negative impact on the Haleakala Observatory. He suggested that we contact the University of Hawaii Institute For Astronomy for their comments.

20. C. Nishikawa noted that the Maui Police Department would like to see adequate lighting in the new neighborhood to address safety concerns. Residents felt that the police officers would be able to continue their work safely with low lighting.

21. A resident commented that some years ago, the Carden Academy proposed to build a school on Lower Kula Road but was denied approval by the Maui Planning Commission due to traffic impact reasons.

22. A resident felt that the project should be located somewhere else where there is less impact to the surrounding neighborhood. An affordable housing project could be done somewhere else.

9. PARTITION FRAMING:
Studs: wood, grade, and species Douglas Fir No. 1 size and spacing 2x4 @ 16" oc Other 2x4 @ 24" oc where occur

Additional information:

10. CEILING FRAMING:
Joists: wood, grade, and species Douglas Fir No. 1 Other Bridging 2x4

Additional information: Wood truss bottom chord for ceiling framing

11. ROOF FRAMING:
Rafters: wood, grade, and species Roof trusses (see detail): grade and species Douglas Fir No. 1

Additional information:

12. ROOFING:
Sheathing: wood, grade, and species 5/8" Structural I P.I. Index 40/20 ☑ solid ☐ spaced ___" o.c.

Roofing Asphalt Shingle ; grade ___ ; size 12" x 36" ; type ASTM D 3018, Type I

Underlay Single layer of shingle underlayment ; weight or thickness 30 lb ; size 3' wide ; fastening HDG staples

Built-up roofing ___ ; number of plies ___ ; surface material ___

Flashing: material copper ; gage or weight 16 oz. ☐ gravel stops; ☐ snow guards

Additional information: drip edge

13. GUTTERS AND DOWNSPOUTS:
Gutters: material ___ ; gage or weight ___ ; size ___ ; shape ___

Downspouts: material ___ ; gage or weight ___ ; size ___ ; shape ___ ; number ___

Downspouts connected to: ☐ Storm sewer; ☐ sanitary sewer; ☐ dry-well. ☐ Splash blocks: material and size ___

Additional information:

14. LATH AND PLASTER:
Lath ☐ walls, ☐ ceilings: material ___ ; weight or thickness ___ Plaster: coats ___ ; finish ___

Dry-wall ☑ walls, ☐ ceilings: material Gyp. bd. ; thickness 1/2" ; finish Light orange peel

Joint treatment Taped and sanded

15. DECORATING: (Paint, wallpaper, etc.)

ROOMS	WALL FINISH MATERIAL AND APPLICATION	CEILING FINISH MATERIAL AND APPLICATION
Kitchen	Interior Latex Flat Enamel	Interior Latex Flat Enamel
Bath	Interior Latex Flat Enamel	Interior Latex Flat Enamel
Other Liv, Bedr	Interior Latex Flat	Interior Latex Flat

Additional information:

16. INTERIOR DOORS AND TRIM:
Doors: type Hollow Core ; material Hardboard ; thickness 1 3/8"

Door trim: type 1x3 S2S ; material Poplar Base: type S2S ; material Poplar ; size 1/2"x5 1/2"

Finish: doors Alkyd Semi-Gloss ; trim Alkyd Semi-Gloss

Other trim *(item, Type and location)* ___

Additional information:

17. WINDOWS:
Windows: type Horiz. Slide ; make Alpine or Milgard ; material Vinyl ; sash thickness 2.75"

Glass: grade Class A ☐ sash weights; ☐ balances, type ___ ; head flashing 25 Mil. Tape

Trim: type Exterior 1x4 ; material Douglas Fir Paint Latex Semi-Gloss ; number coats 2

Weatherstripping: type Fin Seal ; material Rubber Storm sash, number ___

Screens: ☐ full; ☑ half-, type Metal Frame ; number ___ ; screen cloth material Fiberglass

Basement windows: type ___ ; material ___ ; screens, number ___ ; Storm sash, number ___

Special windows ___

Additional information:

18. ENTRANCES AND EXTERIOR DETAIL:
Main entrance door: material Douglas Fir ; width 3'-0" ; thickness 1 3/4 " Frame: material Douglas Fir ; thickness 3/4 "

Other entrance doors: material Douglas Fir , width 3'-0" ,thickness 1 3/4 " Frame: material Douglas Fir ; thickness 3/4 "

Head flashing ___ Weatherstripping: type ___ ; saddles ___

Screen doors: thickness ___ ; number ___ ; screen cloth material ___ Storm doors: thickness ___ ; number ___

Combination storm and screen doors: thickness ___ ; number ___ ; screen cloth material ___

Shutters: ☐ hinged; ☐ fixed. Railings Wood balusters, 2x2 ; Attic louvers ___

Exterior millwork: grade and species Douglas Fir, Select Merchant Paint Latex Semi-Gloss ; number coats 2

Additional information:

19. CABINETS AND INTERIOR DETAIL:
Kitchen cabinets, wall units; material Plywood ; lineal feet of shelves TBD ; shelf width ___

Base units: material Plywood ; counter top Laminate ; edging Laminate

Back and end splash Laminate Finish of cabinets Factory stain finish ; number coats 2

Medicine cabinets: make NA ; model ___

Other cabinets and built-in furniture ___

Additional information:

20. STAIRS:

STAIR	TREADS		RISERS		STRINGS		HANDRAIL		BALUSTERS	
	Material	Thickness	Material	Thickness	Material	Thickness	Material	Thickness	Material	Thickness
Basement										
Main	Doug. Fir	2x12	-	-	Doug. Fir	4x12	Doug. Fir	1 1/2" d	Doug. Fir	2x2
Attic										

Disappearing: make and model number ___

Additional information:

21. SPECIAL FLOORS AND WAINSCOT: (Describe carpet as listed in Certified Products Directory.)

	Location	Material, Color, Border, Sizes, Gage, Etc.	Threshold Material	Wall Base Material	Underfloor Material
Floors	Kitchen	Resilient Flooring		Poplar	Plywd.
	Bath	Resilient Flooring		Poplar	Plywd.
		Carpet		Poplar	Plywd.

	Location	Material, Color, Border, Sizes, Gage, Etc.	Height	Height Over Tub	Height in Showers (From Floor)
Wainscot	Bath				

Bathroom accessories: ☐ Recessed; material _____; number____; ☑ Attached; material Chrome; number_____

Additional information: _____

22. PLUMBING

Fixture	Number	Location	Make	Mfr's Fixture Identification No.	Size	Color
Sink	1	Kitchen	Kohler Cadence	K-3145-4	33x22	Stainless
Lavatory	2	Baths	Sterling	65020140	19" round	White
Water closet	2	Baths	Sterling Windham	402215	29"x16"x29"	White
Bathtub	2	Baths	Sterling Advantage	61030110	60"x30"x72"	White
Shower over tub	2	Baths	Delta Classic Shower	T13420		Chrome
Stall shower						
Laundry trays						

A ☑ Curtain rod A ☐ Door ☐ Shower pan: material _____

Water supply: ☐ public; ☐ community system: ☐ individual (private) system.*

Sewage disposal ☐ public; ☐ community system: ☐ individual (private) system.*

** Show and describe individual system in complete detail in separate drawings and specifications according to requirements.*

House drain (inside): ☐ cast iron; ☐ tile; ☑ other ABS Plastic House sewer (outside): ☐ cast iron; ☐ tile; ☑ other ABS Plastic

Water piping: ☐ galvanized steel; ☑ copper tubing; ☐ other _____ Still cocks, number _____

Domestic water heater: type Solar; make and model Rheem Solaraide; heating capacity 80 gal

_____ gph. 100' rise. Storage tank: material _____; capacity _____ gallons.

Gas service: ☐ utility company; ☐ liq. pet. gas; ☐ other _____ Gas piping: ☐ cooking; ☐ house heating.

Footing drains connected to ☐ storm sewer; ☐ sanitary sewer; ☐ dry well. Sump pump; make and model _____

_____; capacity _____; discharges into _____

23. HEATING

☐ Hot water. ☐ Steam. ☐ Vapor. ☐ One-pipe system. ☐ Two-pipe system.

☐ Radiators. ☐ Convectors. ☐ Baseboard radiation. Make and model _____

Radiant panel: ☐ floor; ☐ wall; ☐ ceiling. Panel coil: material _____

☐ Circulator. ☐ Return pump. Make and model _____; capacity _____ gpm.

Boiler: make and model _____ Output _____ Btuh.; net rating _____ Btuh.

Additional information: _____

Warm air: ☐ Gravity. ☐ Forced. Type of system _____

Duct material: supply _____ return _____ Insulation _____; thickness _____ ☐ Outside air intake.

Furnance: make and model _____ Input _____ Btuh.; output _____ Btuh.

Additional information: _____

☐ Space heater; ☐ floor furnace; ☐ wall heater. Input _____ Btuh.; output _____ Btuh.; number units _____

Make, model _____ Additional information: _____

Controls: make and types _____

Additional information: _____

Fuel: ☐ Coal; ☐ oil; ☐ gas; ☐ liq. pet. gas; ☐ electric; ☐ other _____; storage capacity _____

Additional information: _____

Firing equipment furnished separately: ☐ Gas burner, conversion type. ☐ Stoker: hopper feed ☐; bin feed ☐

Oil burner: ☐ pressure atomizing; ☐ vaporizing _____

Make and model _____ Control _____

Additional information: _____

Electric heating system: type _____ Input _____ watts; @ _____ volts; output _____ Btuh.

Additional information: _____

Ventilating equipment: attic fan, make and model _____, capacity _____ cfm.

Kitchen exhaust fan, make and model GE Standard Range Hood JV338HBB

Other heating, ventilating, or cooling equipment _____

24. ELECTRIC WIRING:

Service; ☐ overhead; ☑ underground. Panel: ☐ fuse box; ☑ circuit-breaker; make 200 AMP's _____ No. circuits _____

Wiring: ☑ conduit; ☐ armored cable; ☐ nonmetallic cable; ☐ knob and tube; ☐ other _____

Special outlets: ☑ range; ☐ water heater; ☐ other _____

☐ Doorbell. ☑ Chimes. Push-button locations. _____ Additional information: _____

25. LIGHTING FIXTURES:

Total number of fixtures 9 Total allowance for fixtures, typical installations, $ 500.00

Nontypical installation _____

Additional information: _____

26. **INSULATION:**

Location	Thickness	Material, Type, and Method of Installation	Vapor Barrier
Roof			
Ceiling	6 1/4"	R-19 Fiberglass Batt Insulation	
Wall			Tyvek
Floor			

27. **MISCELLANEOUS:** *(Describe any main dwelling materials, equipment, or construction items not shown elsewhere; or use to provide additional information where the space provided was inadequate. Always reference by item number to correspond to numbering used on this form.)*

HARDWARE: *(make, material, and finish.)* Schlage Avanti 625 Bright Chrome Door Hardware

SPECIAL EQUIPMENT: *(State material or make, model and quantity. Include only equipment and appliances which are acceptable by local law, custom and applicable FHA standards. Do not include items which, by established custom, are supplied by occupant and removed when he vacates premises or chattels prohibited by law from becoming realty.)*

PORCHES:

Entry Porch with wood deck or concrete slab

TERRACES:

GARAGES:

5/8" Type "X" Gyp. Bd. @ walls and ceiling

20 min. rated door with closer from garage to dwelling

WALKS AND DRIVEWAYS:

Driveway: width 16' ; base material Subgrade ; thickness ____ ; surfacing material Concrete ; thickness 4"

Front walk: width ____ ; material ____ thickness ____ ; Service walk: width ____ ; material ____ ; thickness ____

Steps: material ____ ; treads ____ ; risers ____ ; Check walls ____

OTHER ONSITE IMPROVEMENTS:

(Specify all exterior onsite improvements not described elsewhere, including items such as unusual grading, drainage structures, retaining walls, fence, railings, and accessory structures.)

LANDSCAPING, PLANTING, AND FINISH GRADING:

Topsoil ____ " thick: ☐ front yard: ☐ side yards; ☐ rear yard to ____ feet behind main building.

Lawns *(seeded, sodded, sprigged)*: ☐ front yard ____ , ☐ side yards ____ , ☐ rear yard ____

Planting: ☐ as specified and shown on drawings; ☐ as follows:

____ Shade trees, deciduous. ____ " caliper.

____ Low flowering trees, deciduous. ____ , to ____ '

____ High-growing shrubs, deciduous. ____ , to ____ '

____ Medium-growing shrubs, deciduous, ____ , to ____ '

____ Low-growing shrubs, deciduous. ____ , to ____ '

____ Evergreen trees ____ , to ____ ', B & B.

____ Evergreen shrubs ____ to ____ ', B & B.

____ Vines, 2-years

IDENTIFICATION. This exhibit shall be identified by the signature of the builder, or sponsor, and/or the proposed mortgagor if the latter is known at the time of application.

Date ____ Signature ____

Signature ____

Preliminary Outline Specifications for Kula Ridge Affordable Housing

Kula Ridge will have four Architectural styles within the neighborhood project. The four styles are commonly found within Hawaii's unique cultural and historic heritage:

Plantation Style

The "Plantation" architectural style takes its historical architectural context from old Plantation villages found throughout Hawaii. Front porches were a common design element. Materials proposed to be used with the plantation style will be corrugated metal roofing and board and batten wood siding. T1-11 siding will also be incorporated in some plans.

Bungalow Style

The Bungalow style is another architectural style that is commonly found in many parts of Hawaii. It can also be commonly found in Kula. Gable roofs with front porches were a common element associated with the Bungalow style. Exterior materials proposed with the Bungalow style will be Asphalt shingle roofing and a composite exterior lap siding for durability.

Craftsmen Style

The Craftsmen style is also commonly found architectural style in the Hawaiian Islands as well as in Kula. Gable roofs with detailed porches were common with this style as well as cedar shingle siding. Asphalt shingle roofing is proposed with this style of architecture as well as a composite exterior siding that will have the appearance of real cedar shingle exterior siding.

Contemporary Hawaiian

One of the more popular styles of architecture in Hawaii today can be described as "Contemporary Hawaiian" architecture. Incorporating the front porch or covered lanai, the Contemporary Hawaiian style integrates a double pitched roof as its distinctive characteristic. Exterior plaster for its exterior wall material will be used and concrete tiled roofs will be used on some of the plans to facilitate blending with market priced homes on adjacent lots.

Foundation All of the homes foundations will be either post and pier construction or poured in place concrete slab foundation on grade.

Framing Wall and roof construction will be wood framed construction. A wood framed, panelized system is proposed to be integrated to facilitate faster wall erection. Integration of pre-fabricated wood trusses will facilitate faster roof construction.

Roofing Roofing material will vary according to Architectural character. Roofing materials proposed are corrugated metal roofing, asphalt shingle roofing and concrete tile roofing.

Doors and Windows Exterior windows will be low maintenance, vinyl windows. Door to be solid wood doors at entry door and hollow core at interior doors.

Interior walls Gypsum board over wood framing, taped, sanded, textured and painted.

Flooring Carpet with pad in Bedrooms and sheet vinyl in baths and Kitchen. Upgrades may include wood laminate flooring.

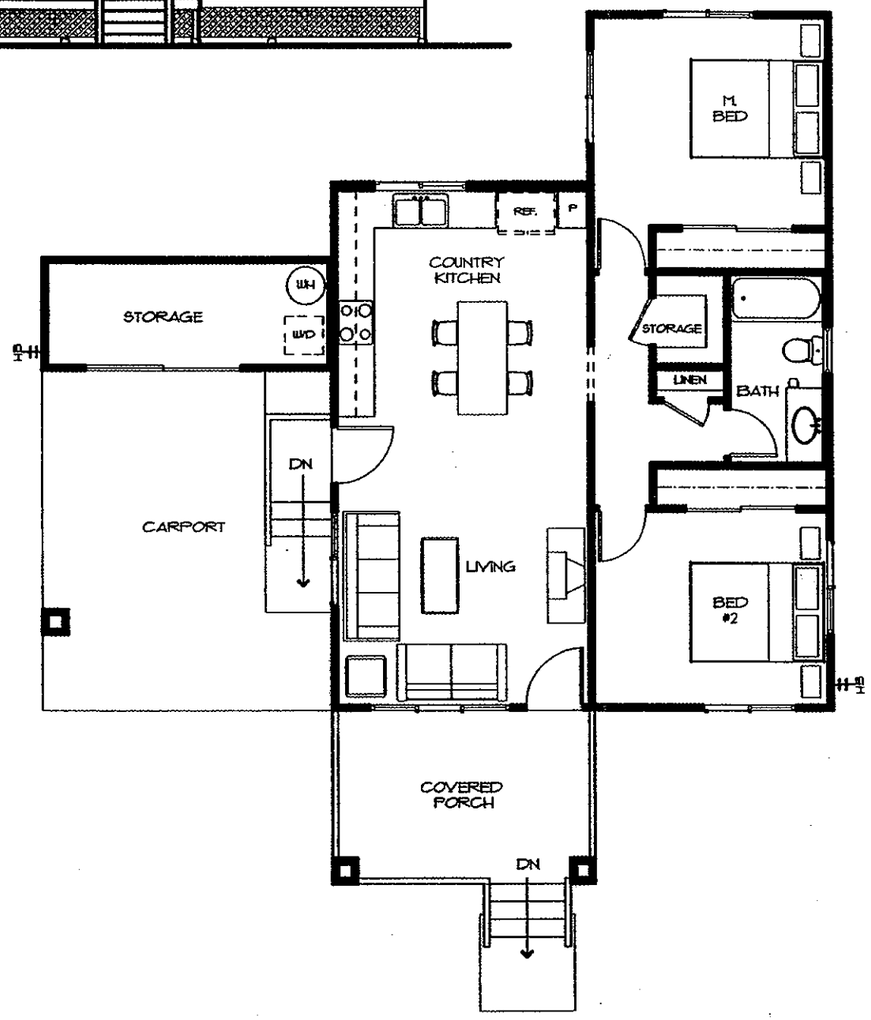
Countertops Plastic laminate. Upgrades may include granite countertops.

Appliances To be selected.

Plumbing fixtures To be selected.

Cabinets To be selected.

Kula Ridge
Plan A

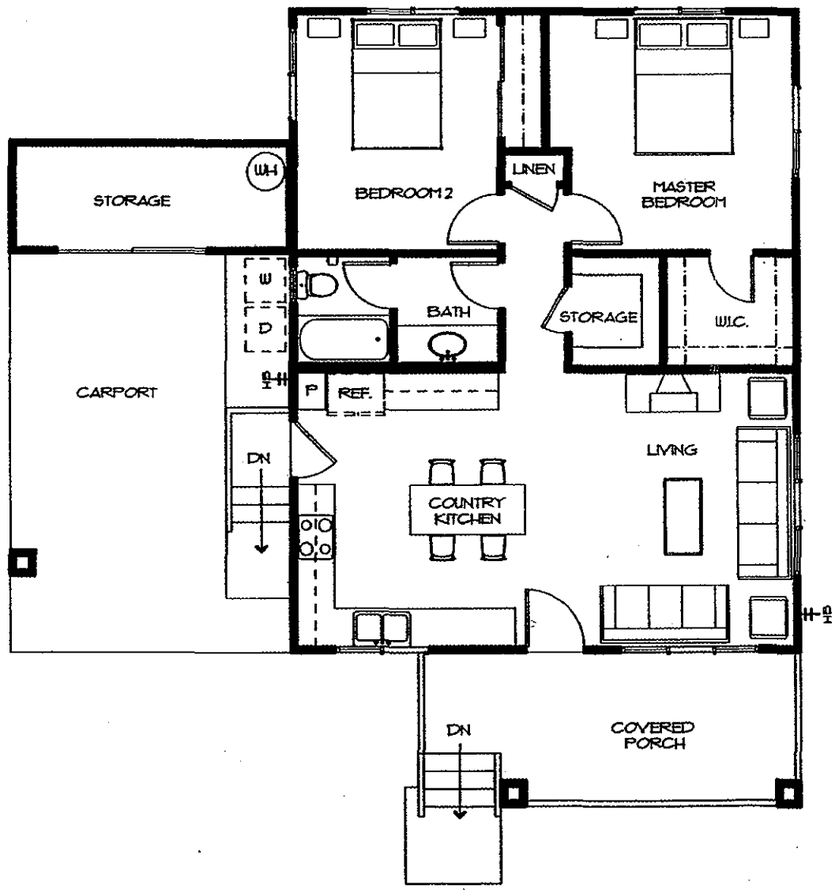


Living Area: 875 sf
Covered Lanai: 126 sf
Carport: 360 sf

Architectural Design & Construction, Inc.

1849 Wili Pa Loop · Wailuku, Maui, Hawaii 96793
Telephone: (808) 986-8300 · Fax: (808) 986-8301 · Email: adc@adcmaui.com

Kula Ridge Affordable Homes
Plan B Post & Pier



Living Area: 918 sf
Covered Lanai: 162 sf
Carport: 343 sf

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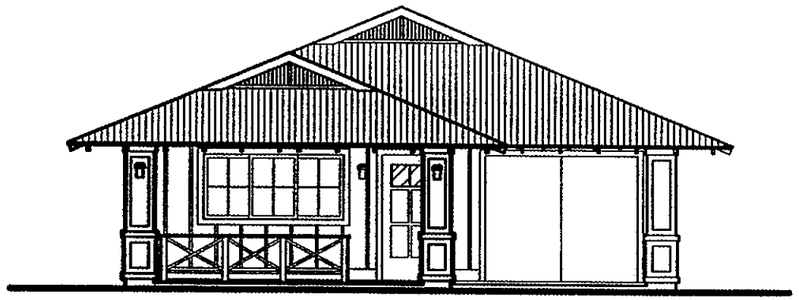
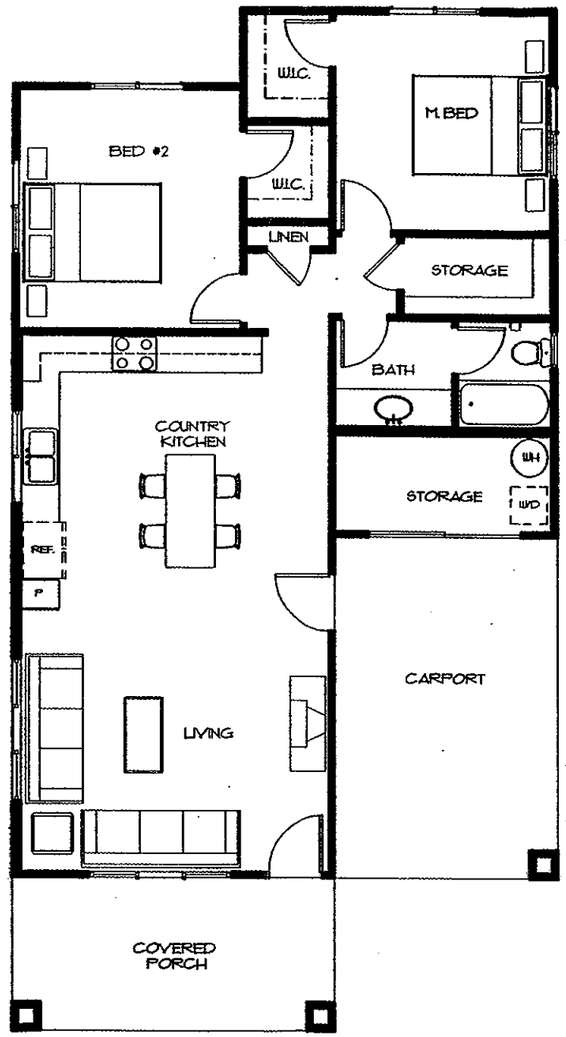
Kula Ridge Affordable Homes-
Plan C





Living Area: 1,010 sf
Covered Lanai: 137 sf
Carport: 277 sf

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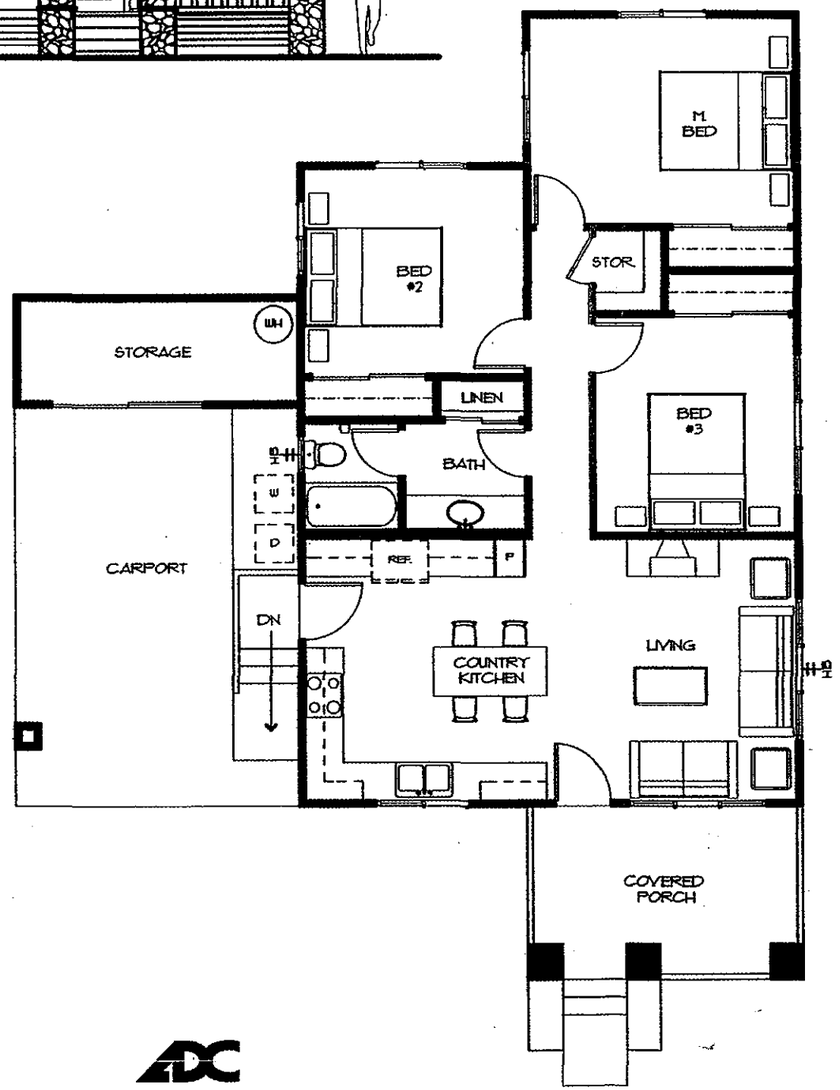
Kula Ridge Affordable Homes-
Plan D



Living Area: 1,038sf
Covered Lanai: 135 sf
Carport: 360 sf

Architectural Design & Construction, Inc.

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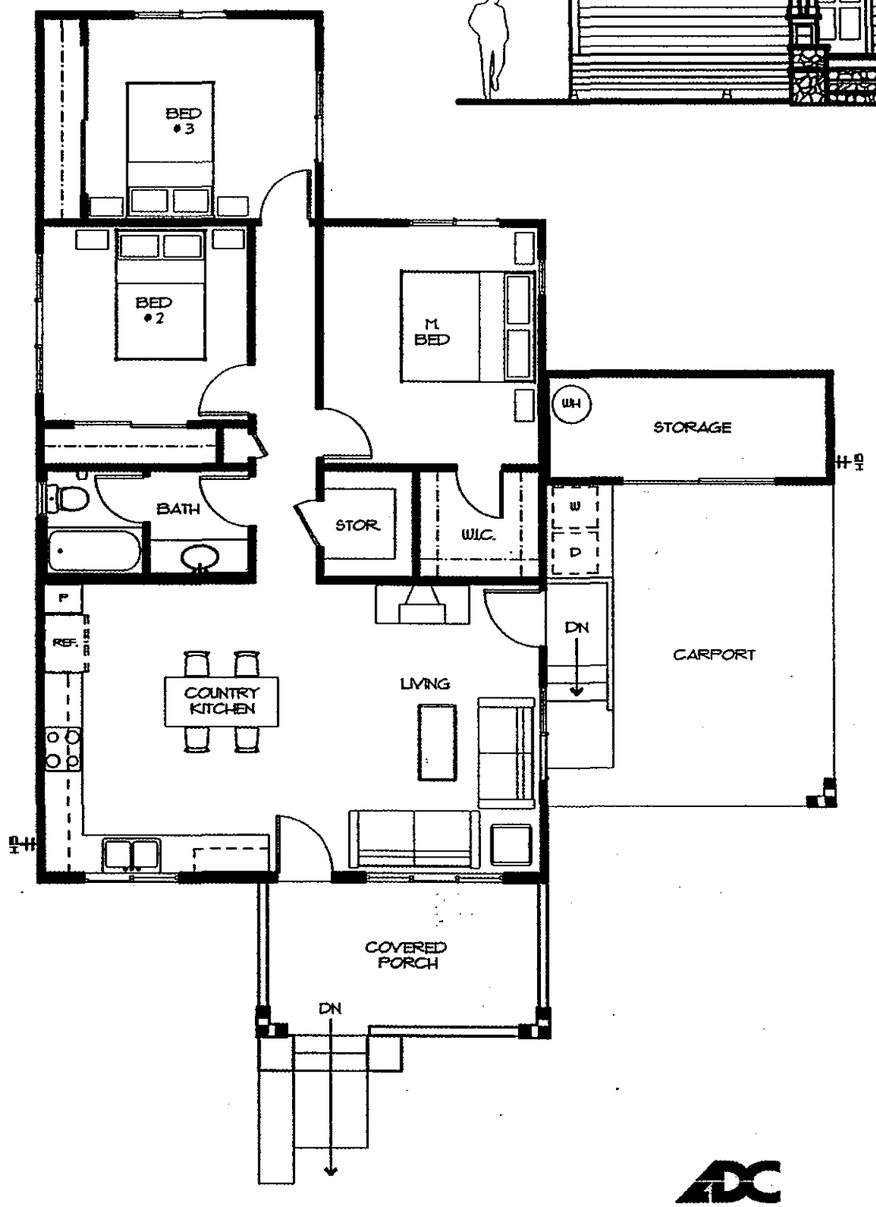
Kula Ridge
Plan E



Living Area: 1,110 sf
Covered Lanai: 124 sf
Carport: 345 sf

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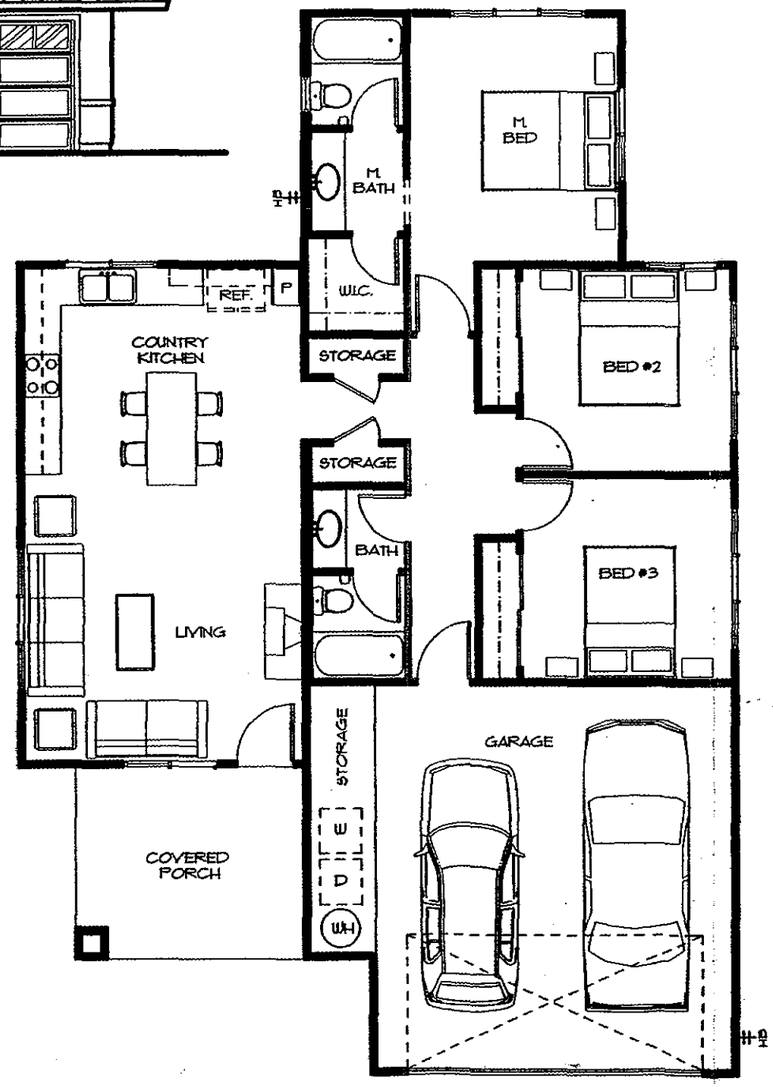
Kula Ridge Affordable Homes-
Plan F

Living Area: 1157 sf
Covered Lanai: 120 sf
Garage: 457 sf



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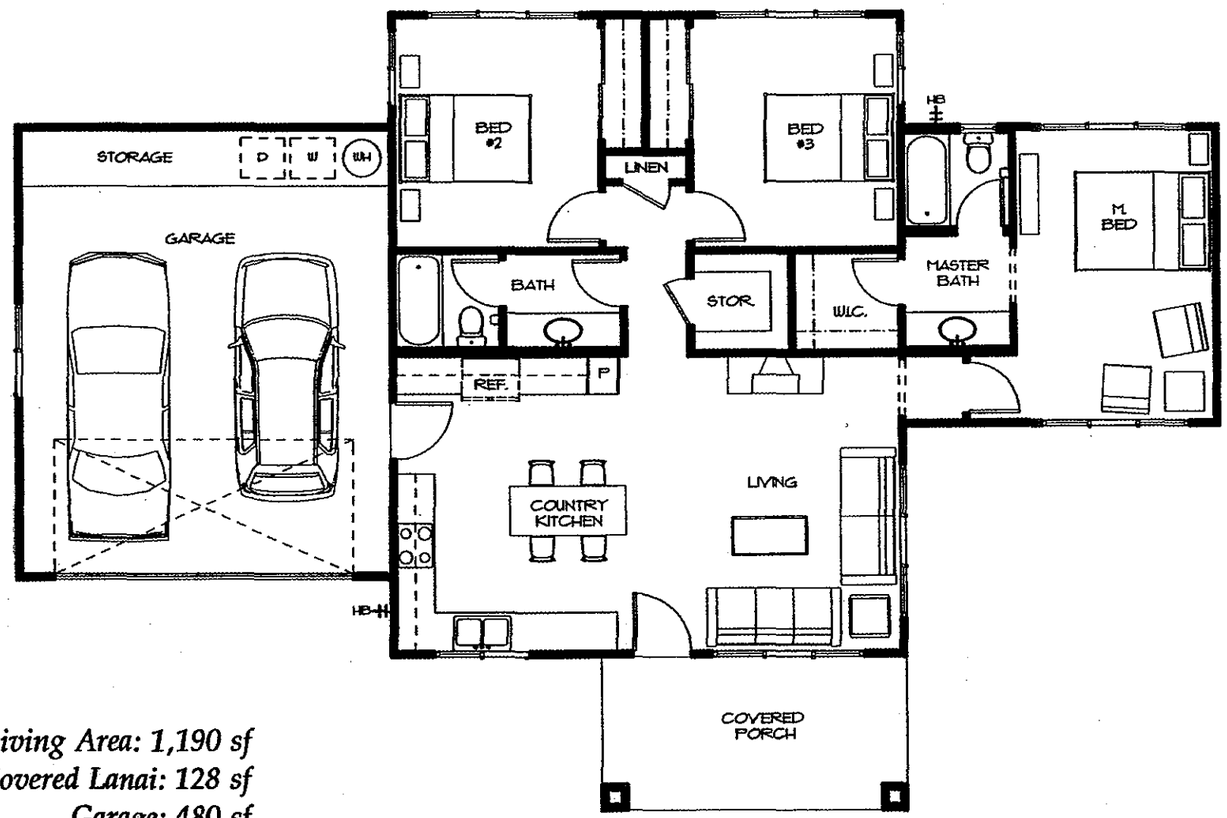
Kula Ridge Affordable Homes-
Plan G

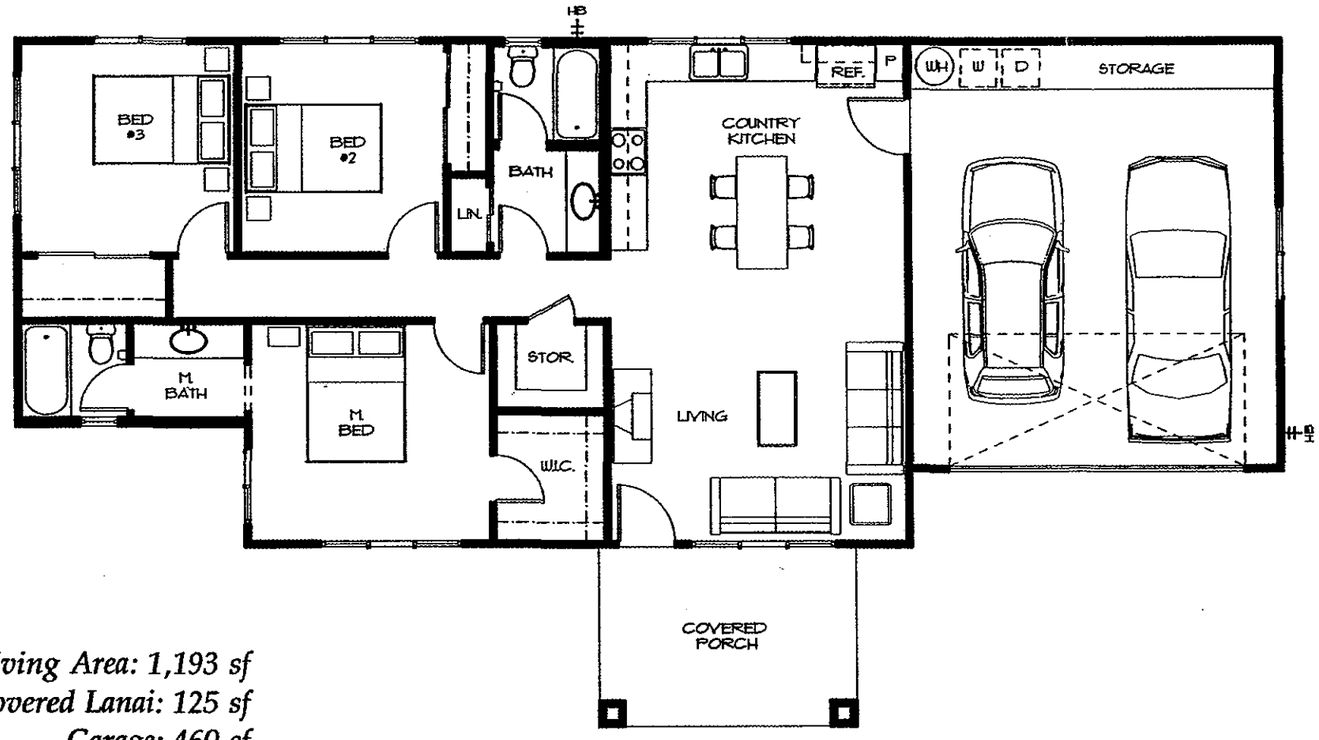


Living Area: 1,190 sf
Covered Lanai: 128 sf
Garage: 480 sf

Architectural Design & Construction, Inc.

1849 Wili Pa Loop · Wailuku, Maui, Hawaii 96793

Kula Ridge Affordable Homes-
Plan H



Living Area: 1,193 sf
Covered Lanai: 125 sf
Garage: 460 sf

Architectural Design & Construction, Inc.

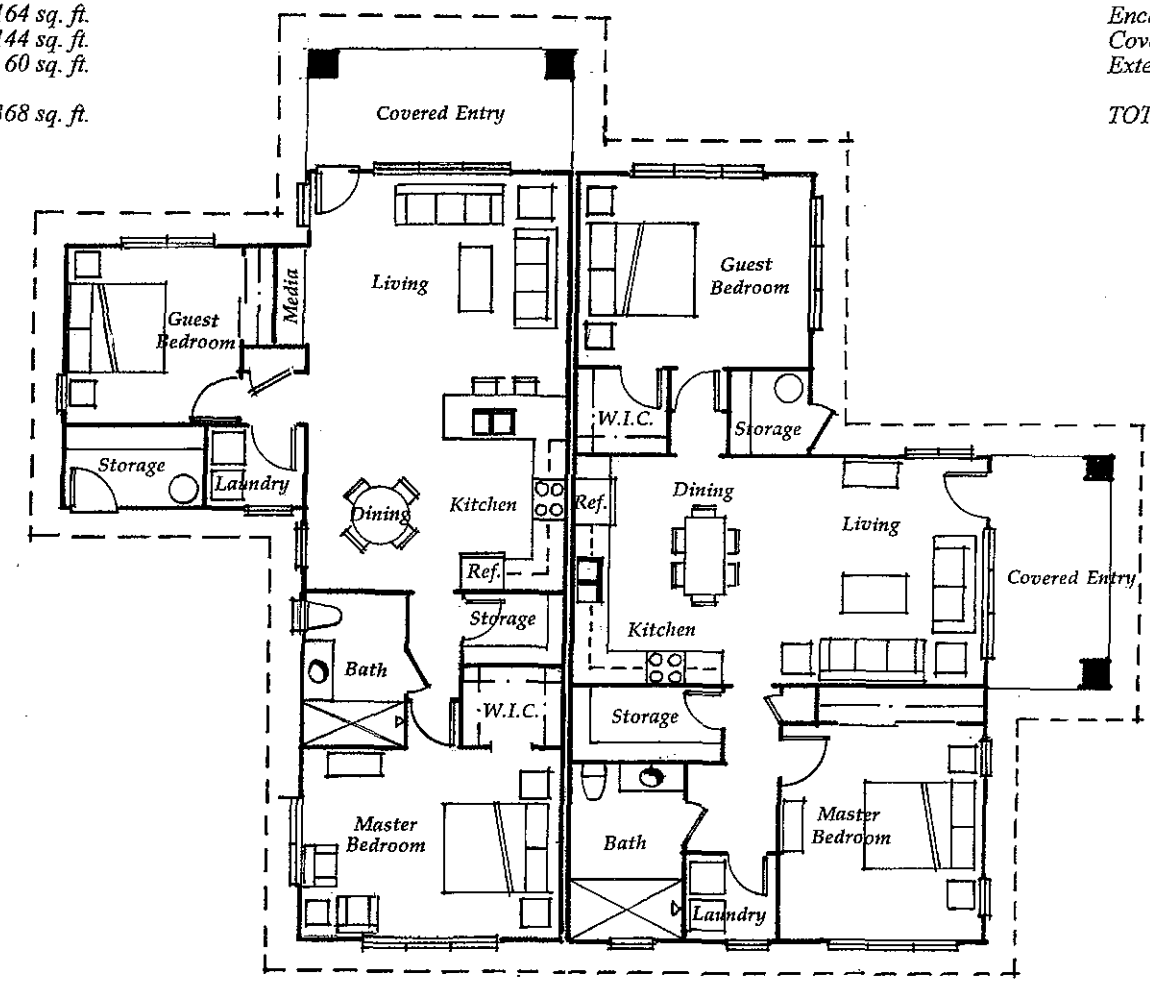
1849 Wili Pa Loop - Wailuku, Maui, Hawaii 96793
Telephone: (808) 986-9300 - Fax: (808) 986-9301 - Email: adc@adcmaui.com

Floor Area- Unit A

Enclosed Living:	*1164 sq. ft.*
Covered Lanai:	*144 sq. ft.*
Exterior Storage:	*60 sq. ft.*
TOTAL FLOOR AREA:	*1368 sq. ft.*

Floor Area- Unit B

Enclosed Living:	*1192 sq. ft.*
Covered Lanai:	*128 sq. ft.*
Exterior Storage:	*36 sq. ft.*
TOTAL FLOOR AREA:	*1356 sq. ft.*



ADC

Architectural Design & Construction, Inc.

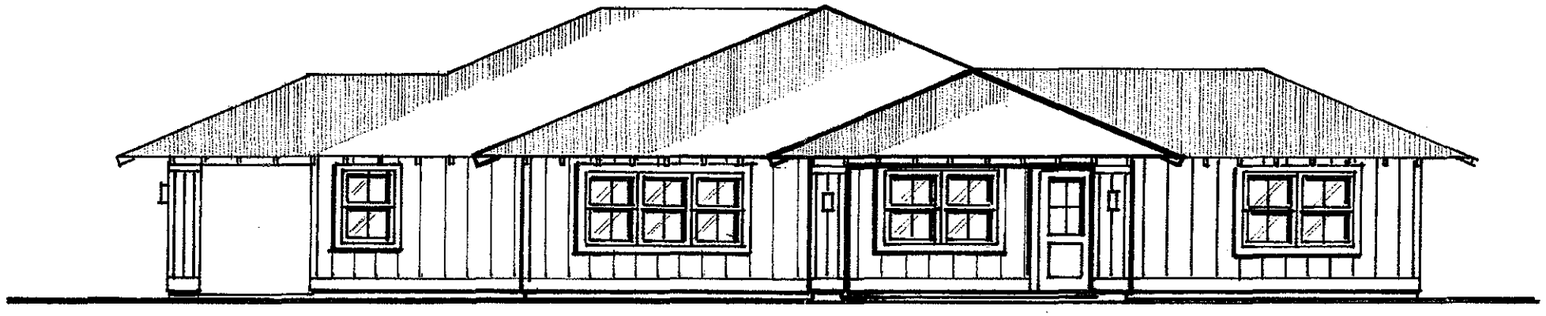
1849 Wili Pa Loop • Wailuku, Maui, Hawaii 96793
Telephone: (808) 986-8300 • Fax: 986-8301 • adc@adcmaui.com

Kula Ridge

Lower Kula Road, Kula, Maui, Hawaii

Duplex Plan 1

Scale: 1/8" = 1'-0"
January 8, 2009



Kula Ridge

Lower Kula Road, Kula, Maui, Hawaii

Architectural Design & Construction, Inc.

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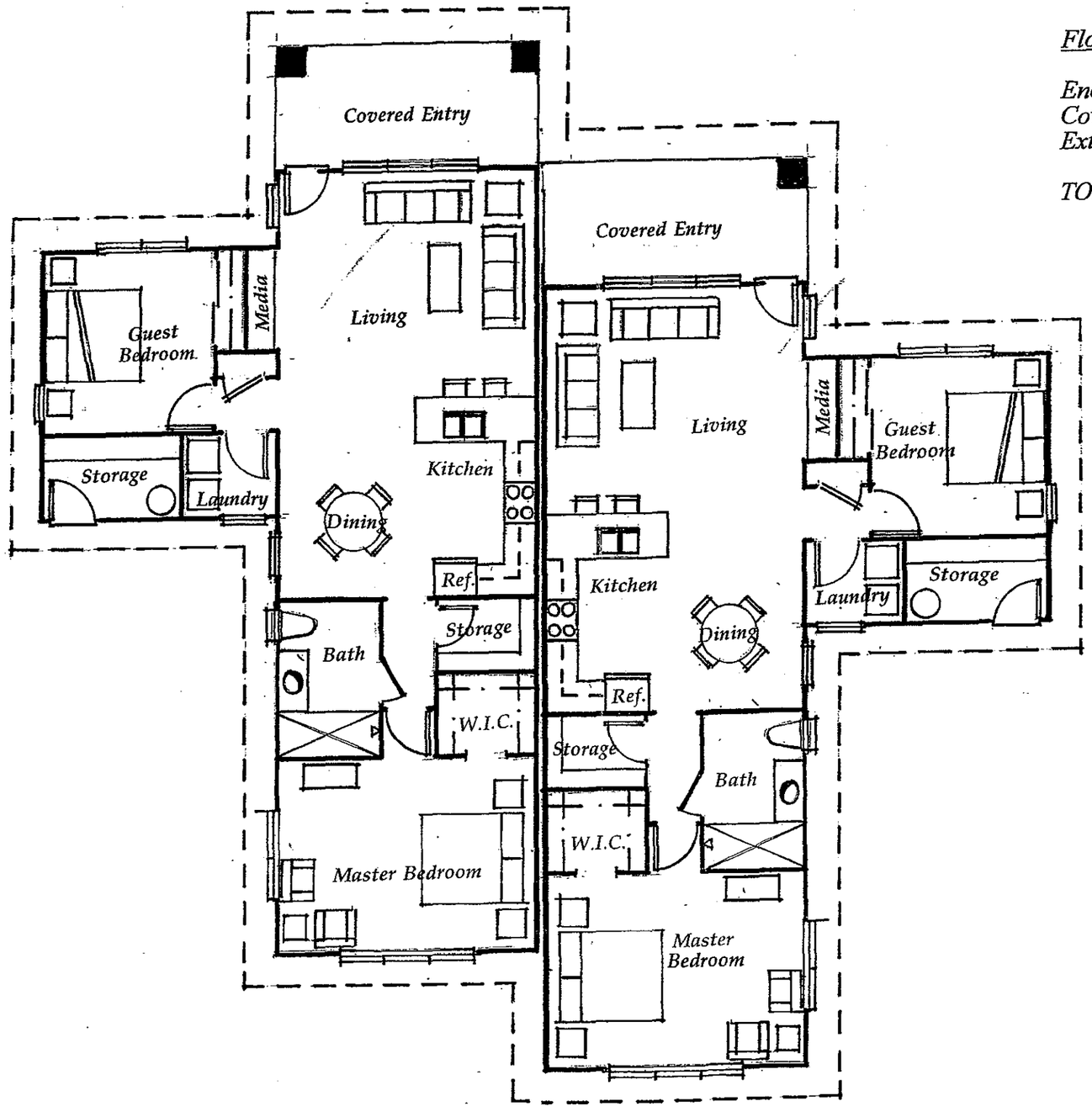
Telephone: (808) 986-8300 • Fax: 986-8301 • adc@adcmaui.com

Duplex 1 - Elevations

Scale: 1/8" = 1'-0"
January 8, 2009



Floor Area- Unit A

Enclosed Living:	*1164 sq. ft.*
Covered Lanai:	*144 sq. ft.*
Exterior Storage:	*60 sq. ft.*
TOTAL FLOOR AREA:	*1368 sq. ft.*

Kula Ridge

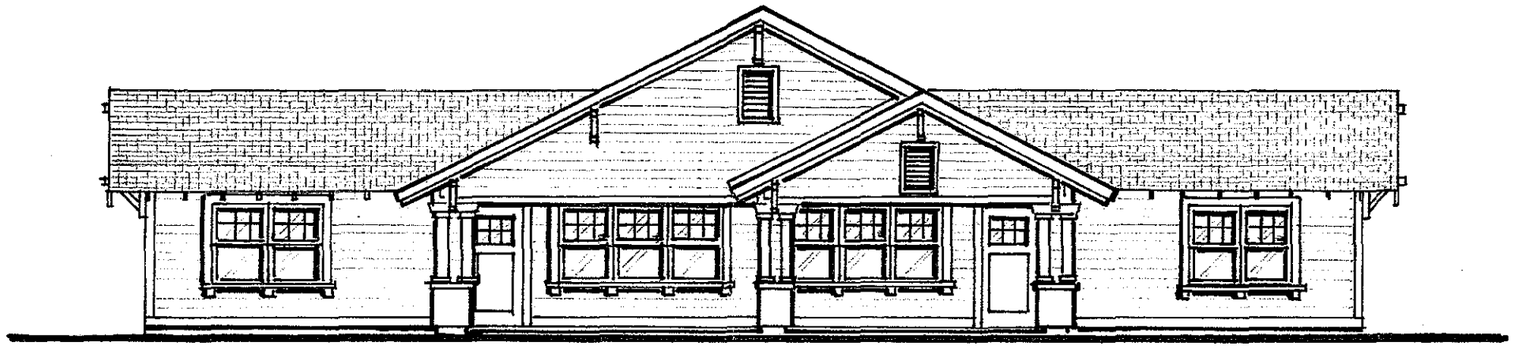
Lower Kula Road, Kula, Maui, Hawaii

Architectural Design & Construction, Inc.

1849 Wili Pa Loop • Wailuku, Maui, Hawaii 96793
Telephone: (808) 986-8300 • Fax: 986-8301 • adc@adcmaui.com

Duplex Plan 2

Scale: 1/8" = 1'-0"
January 8, 2009



Kula Ridge

Lower Kula Road, Kula, Maui, Hawaii

Architectural Design & Construction, Inc.

1849 Wili Pa Loop • Wailuku, Maui, Hawaii 96793

Telephone: (808) 986-8300 • Fax: 986-8301 • adc@adcmaui.com

Duplex 2 - Elevations

Scale: 1/8" = 1'-0"

January 8, 2009

6. AGREEMENT REGARDING WATER SOURCE FOR PROJECTS

AGREEMENT REGARDING WATER SOURCE FOR PROJECTS

THIS AGREEMENT REGARDING WATER SOURCE FOR PROJECTS (the "Agreement") is entered into by and between Pi'iholo Investors LLC ("Pi'iholo"), and Kula Ridge, LLC ("KR") and Kula Ridge Mauka, LLC ("KRM"), effective this 16th day of March, 2009.

RECITALS:

WHEREAS, Pi'iholo has developed a private well and related improvements known as the Pi'iholo South well located approximately in the area shown on Exhibit "A" attached hereto and incorporated herein by reference; and

WHEREAS, the estimated water yield for the Pi'iholo South well is approximately 1.7 million gallons per day (gpd"); and

WHEREAS, Pi'iholo is currently in discussions with the County of Maui, Department of Water Supply ("DWS") concerning an agreement which dedicates the Pi'iholo South well to DWS and under which the County of Maui accepts said dedication (the "Dedication Agreement"); and

WHEREAS, KR intends to develop the parcel identified on the map attached hereto as Exhibit "B" for affordable housing, senior housing, and market lots, and KRM intends to develop the parcel identified on the map attached hereto as Exhibit "B" for market lots (collectively, the "Projects"); and

WHEREAS, Pi'iholo understands that in order for the Projects to be developed, KR and KRM must first secure necessary land entitlements and project approvals from the Maui County Council and the State Land Use Commission; and

WHEREAS, KR and KRM require a total of 120,000 gpd to meet the estimated water needs of the foregoing projects.

AGREEMENT:

Pi'iholo agrees to provide KR and KRM with a water source allocation of 120,000 gpd (the "Allocation") for the Projects upon the condition that Pi'iholo and the County of Maui shall have successfully agreed upon and executed the Dedication Agreement, which shall give Pi'iholo the right to assign source allocation credits, including the assignment to KRM and KR of the Allocation.

In the event that (a) the foregoing condition shall not be satisfied, or (b) KR and KRM shall have failed to secure the necessary land entitlements and approvals from the Maui County Council and the State Land Use Commission for the Projects, then this

Agreement shall be deemed null and void, and neither party shall have any liability or further obligations to each other.

In the event Pi'iholo in its sole discretion determines that it is unable or unwilling to meet the requirements of DWS for the Dedication Agreement or determines that it is unwilling to proceed for any reason, Pi'iholo shall notify KR and KRM in writing, and this Agreement shall be deemed null and void, and neither party shall have any liability or further obligations to each other.

This Agreement shall be governed by the laws of the State of Hawaii without giving effect to any conflict of laws principles.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed effective on the day and year first above written.

PI'IHOLO INVESTORS LLC

By PI'IHOLO SOUTH LLC
Its Manager

By _____
ZACHARY FRANKS
Its Managing Member

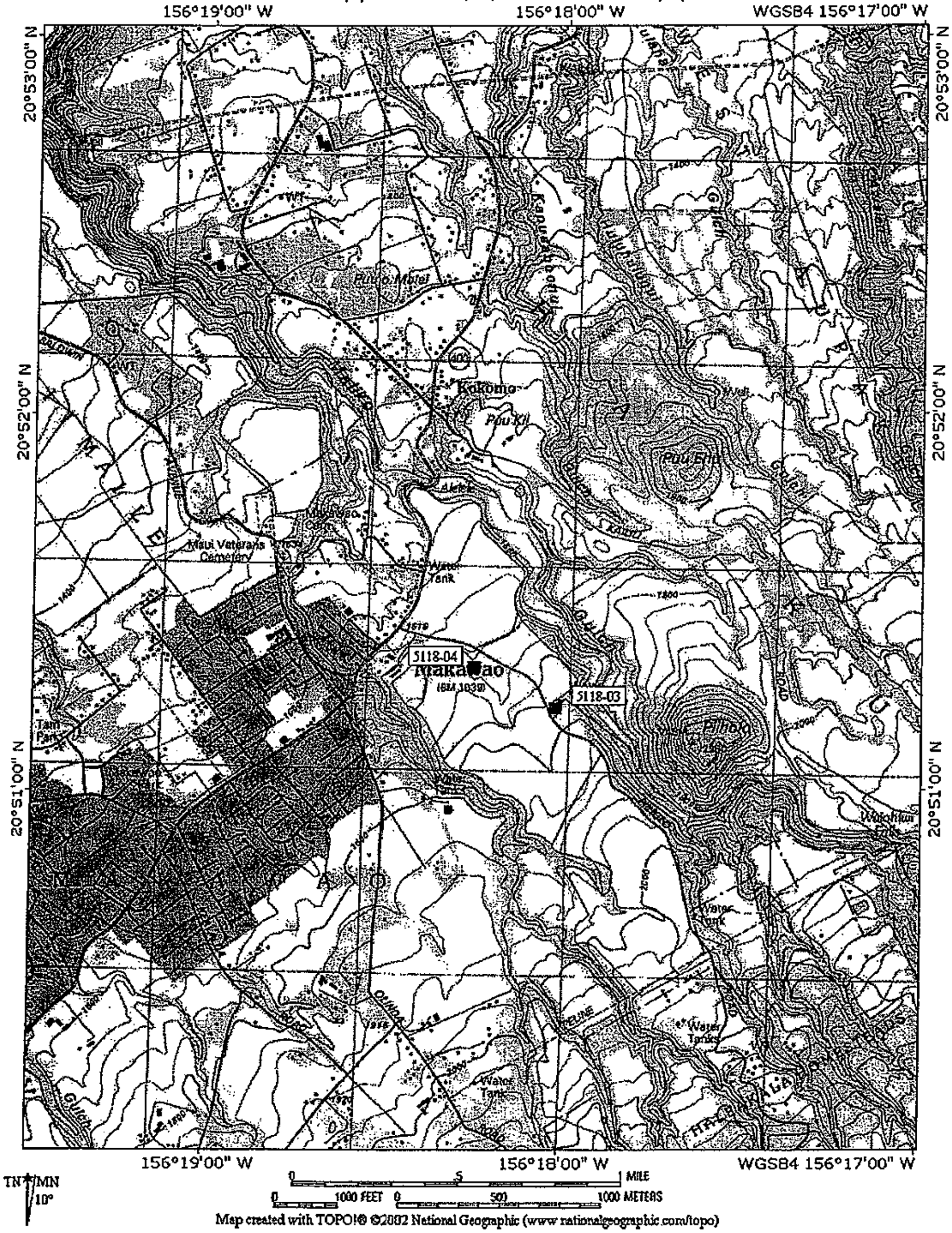
KULA RIDGE, LLC

By _____
CLAYTON NISHIKAWA
Its Manager

KULA RIDGE MAUKA, LLC

By _____
CLAYTON NISHIKAWA
Its Manager

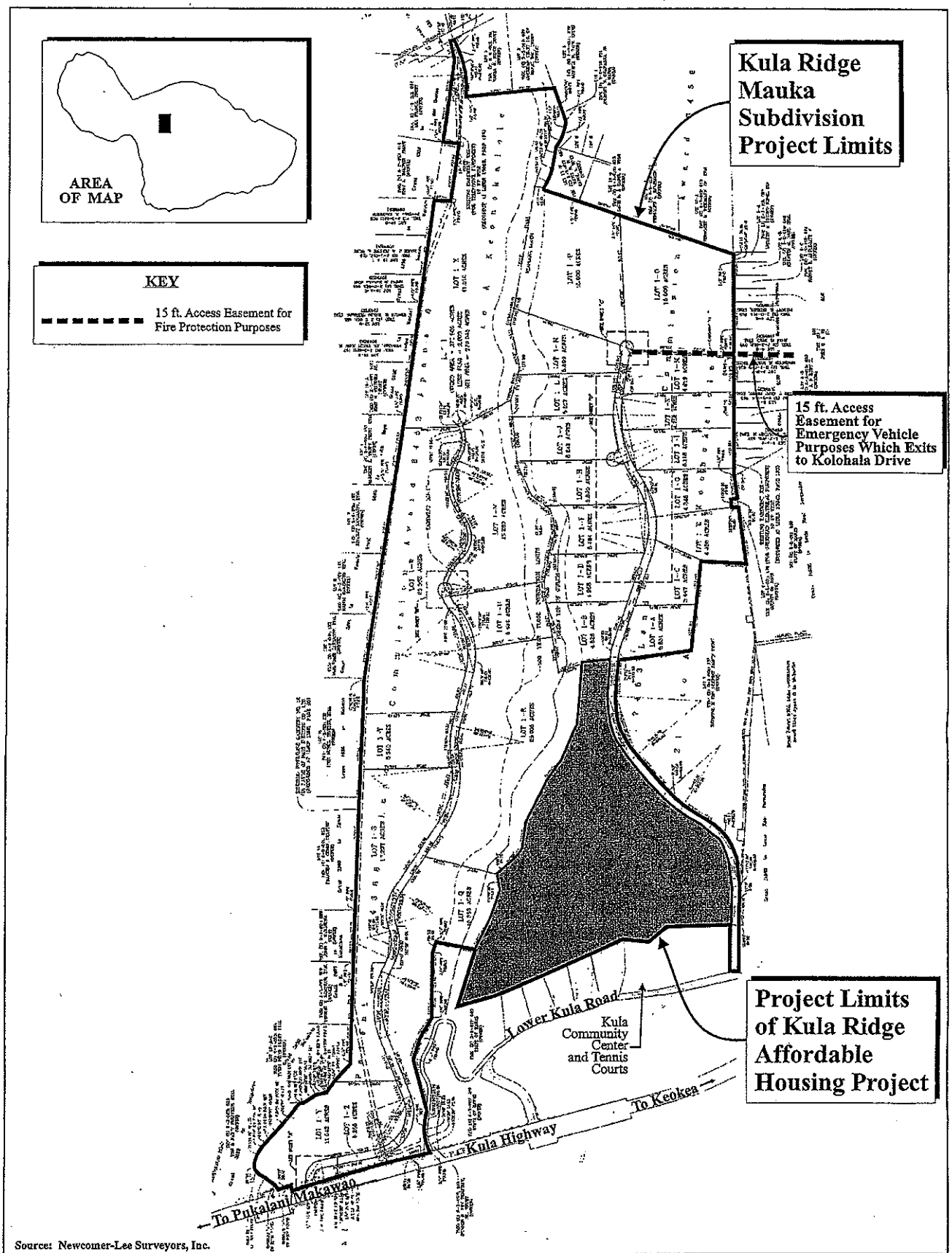
TOPO! map printed on 10/26/08 from "location map tpo"



Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

Figure 1

Exhibit "A"



Source: Newcomer-Lee Surveyors, Inc.

NOT TO SCALE

Exhibit B Proposed Kula Ridge Affordable Housing Subdivision
Site Location Map

Prepared for: Kula Ridge, LLC

MUNEKIYO HIRAGA, INC.

Nishikawa/KulaAH 1107/Nov2013Sitelocation

7. LETTER DATED SEPTEMBER 2, 2009 TO DEPARTMENT OF WATER SUPPLY FROM PIIHOLO SOUTH LLC

Piiholo South LLC

875 KUMULANI DRIVE
KIHEI, HI 96753
TEL: 808 879 5234
EMAIL: PiiholoSouthLLC@aol.com

MANAGING MEMBERS
ZACH FRANKS,
CINDY WARNER

September 2, 2009

Jeffrey K. Eng, Director
Department of Water Supply
200 S. High Street
Wailuku, HI 96793

Dear Mr. Eng,

It was a pleasure meeting with you, Herb, and Alan last Friday, August 28, 2009. I know that all of you are extremely busy, and I appreciated the time that all of you set aside to discuss the Piiholo South well. My colleague, Cindy Warner, has made arrangements to obtain the documentation that Herb requested at our meeting.

As discussed at our meeting, and by this letter, Piiholo Investors LLC is firmly committed to allocating 120,000 gallons of water per day from the Piiholo South well to Clayton Nishikawa's Kula Ridge and Kula Ridge Mauka projects which will provide much needed senior and affordable housing. Whether the allocation comes about through the well's dedication to the Department of Water Supply ("DWS") or simply as a pass through from Piiholo Investors LLC's system to DWS remains to be determined by all of us.

I look forward with great anticipation to further constructive meetings with you and your staff. Should you have any questions, please feel free to contact me.

Best personal regards,

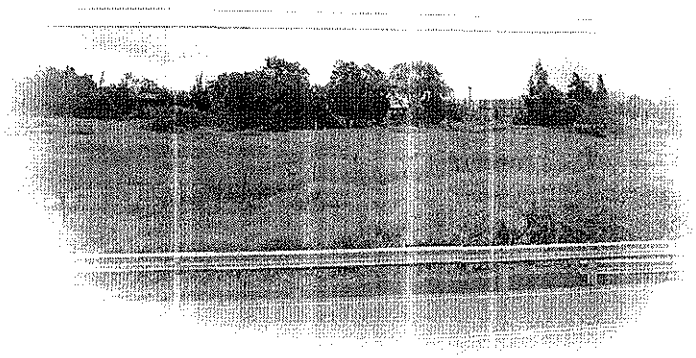
Zachary Franks
Piiholo South, LLC

Cc: JoAnn Ridao, Department of Housing and Human Concerns
Councilmember Michael Victorino, Chairman, Water Resource Committee
Clayton Nishikawa, Kula Ridge, LLC, Kula Ridge Mauka, LLC

8. REVISED TRAFFIC IMPACT REPORT

Traffic Impact Report

Kula Ridge



Submitted to:
Kula Ridge, LLC

Submitted by:
Wilson Okamoto Corporation

July 2006
(Revised)

TRAFFIC IMPACT REPORT

FOR THE

KULA RIDGE DEVELOPMENT

Prepared for:

Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, Hawaii 96793

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #7551-01

July 2006
(Revised)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICIES

I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the proposed Kula Ridge development in Kula on the island of Maui. The project site for the proposed residential development is located east of Lower Kula Road near the Kula Community Center.

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 project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposing site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

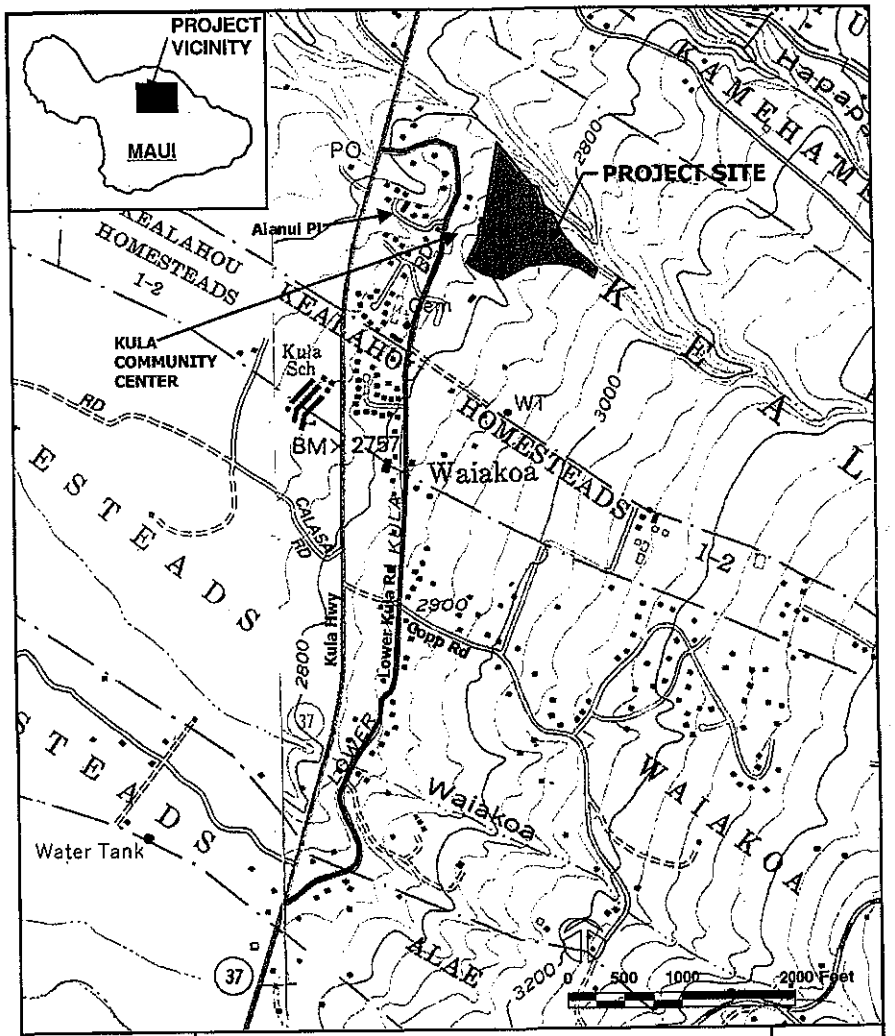
II. PROJECT DESCRIPTION

A. Location

The project site is located along Lower Kula Road east of the Kula Community Center in Kula on the island of Maui (see Figure 1) and is further identified as Tax Map Key: 2-3-001: 174. Access to the project site will be provided via a new access road off Lower Kula Road south of Alanui Place.

B. Project Characteristics

The proposed Kula Ridge development will be located on an approximately 48.117-acre site located east of Lower Kula Road. The project site will be divided into 42 residential lots, 70 affordable housing residential lots, 4 agricultural lots, and



an approximately 3-acre park that will be dedicated to the County of Maui. Each residential and agricultural lot is expected to house a residential dwelling that is anticipated to be completed and occupied by the Year 2009. Access to the project site will be provided via a new access road off Lower Kula Road. Figure 2 shows the proposed project site plan.

III. EXISTING TRAFFIC CONDITIONS

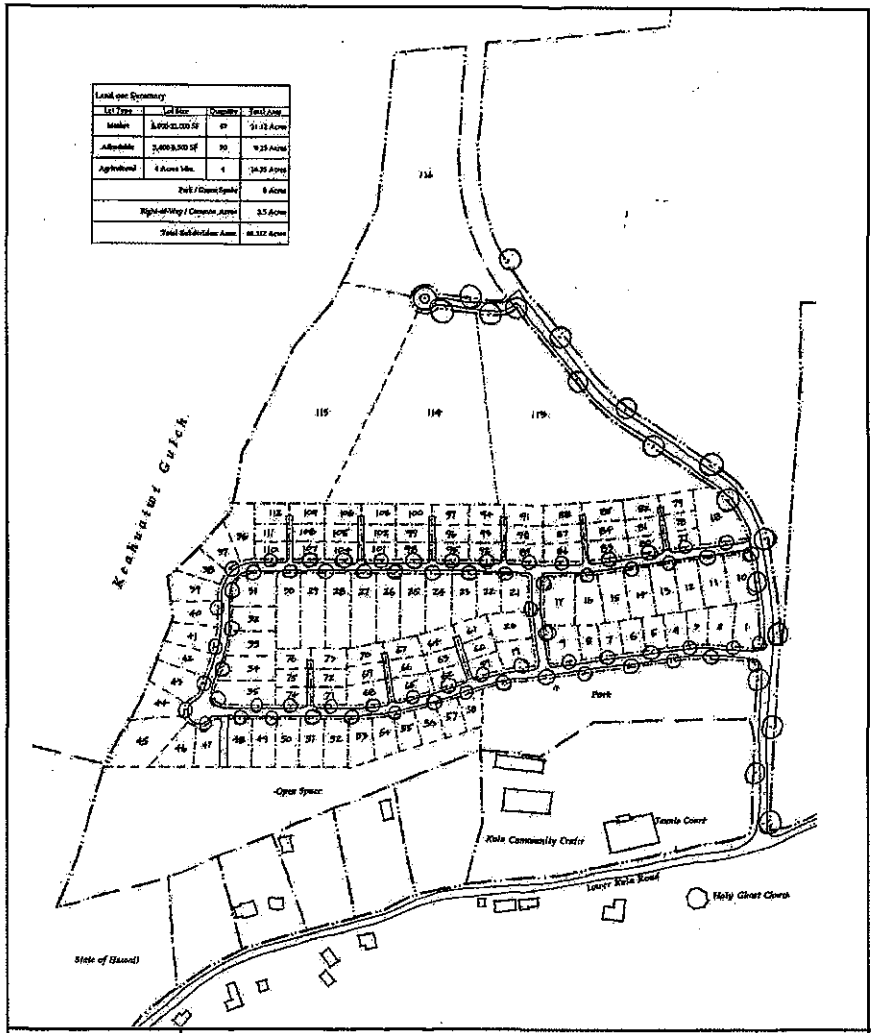
A. General

The proposed development will be located east of Lower Kula Road southeast of the intersection with Kula Highway. Kula Highway is a predominately two-way, two-lane State of Hawaii roadway generally oriented in the north-south direction that serves as the primary access road through central Maui between Haleakala Highway in Pukalani and Ulupalakua.

B. Area Roadway System

In the vicinity of the project site, Lower Kula Road is a predominantly two-way, two-lane roadway generally oriented in the north-south direction that intersects Kula Highway several times along its alignment. Northwest of proposed project site, Lower Kula Road intersects Alanui Place and the driveway for the Kula Community Center. At this unsignalized intersection, both approaches of Lower Kula Road have one lane that serves all traffic movements. Alanui Place is a two-way, two-lane roadway that provides access to the residential properties along its alignment. At the intersection with Lower Kula Road, the Alanui Place approach has one lane that serves all traffic movements. The westbound approach of the intersection is comprised of the driveway for the Kula Community Center which has one lane that serves all traffic movements at this intersection.

Northwest of intersection with Alanui Place, Lower Kula Road intersects Kula Highway. At this unsignalized T-intersection, the Lower Kula Road approach has one lane that serves left-turn and right-turn traffic movements. The northbound approach of the highway has one lane at this intersection that serves through and right-turn



WILSON OKAMOTO CORPORATION ENGINEERS - PLANNERS	KULA RIDGE	FIGURE
	PROJECT SITE PLAN	2

traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements.

South of the intersection with Alanui Place, Lower Kula Road intersects Copp Road. At this all-way stop controlled intersection, both approaches of Lower Kula Road have one lane that serves all traffic movements. Copp Road is a two-way, two-lane roadway generally oriented in the east-west direction that provides access to the residential neighborhoods along its alignment. At the intersection with Lower Kula Road, both approaches of Copp Road have one lane that serves all traffic movements.

Further southwest, Lower Kula Road intersects Kula Highway again. At this unsignalized t-intersection, the Lower Kula Road approach has one lane that serves left-turn and right-turn traffic movements. The northbound approach of the highway has one lane at this intersection that serves through and right-turn traffic movements while the southbound approach has one lane that serves left-turn and through traffic movements.

C. Traffic Volumes and Conditions

1. General

a. Field Investigation

A field investigation was conducted on May 31 and June 1, 2005, and April 25-26, 2006 and consisted of manual turning movement count surveys during the morning peak period between 6:00 AM and 8:00 AM, and the afternoon peak period between 3:00 PM and 6:00 PM at the following intersections:

- Lower Kula Road, Alanui Place, the Kula Community Center driveway
- Lower Kula Road and Kula Highway (North)
- Lower Kula Road and Copp Road
- Lower Kula Road and Kula Highway (South)

In addition, 24-hour mechanical traffic count surveys were collected along Lower Kula Road and Kula Highway to verify the peak

traffic periods in the project vicinity. Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

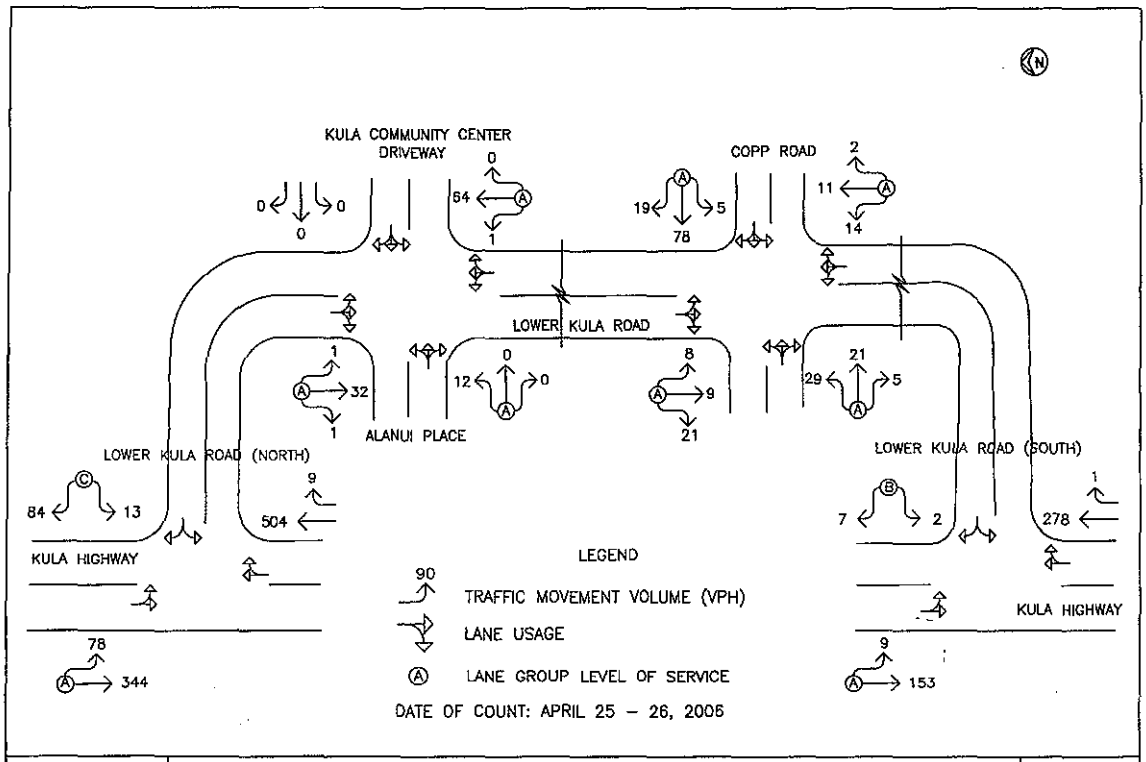
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"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 or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Existing Peak period Traffic

a. General

Figures 3 and 4 illustrate the existing AM and PM peak period traffic volumes and operating conditions. The morning peak hour of traffic generally occurs between 7:00 AM and 8:00 AM in the project vicinity. In the afternoon, the peak hour of traffic generally occurs between the hours of 3:45 PM and 4:45 PM. Although the peak hours of traffic generally occur around the same time periods at each of the study intersections, the absolute commuter peak hour time periods for



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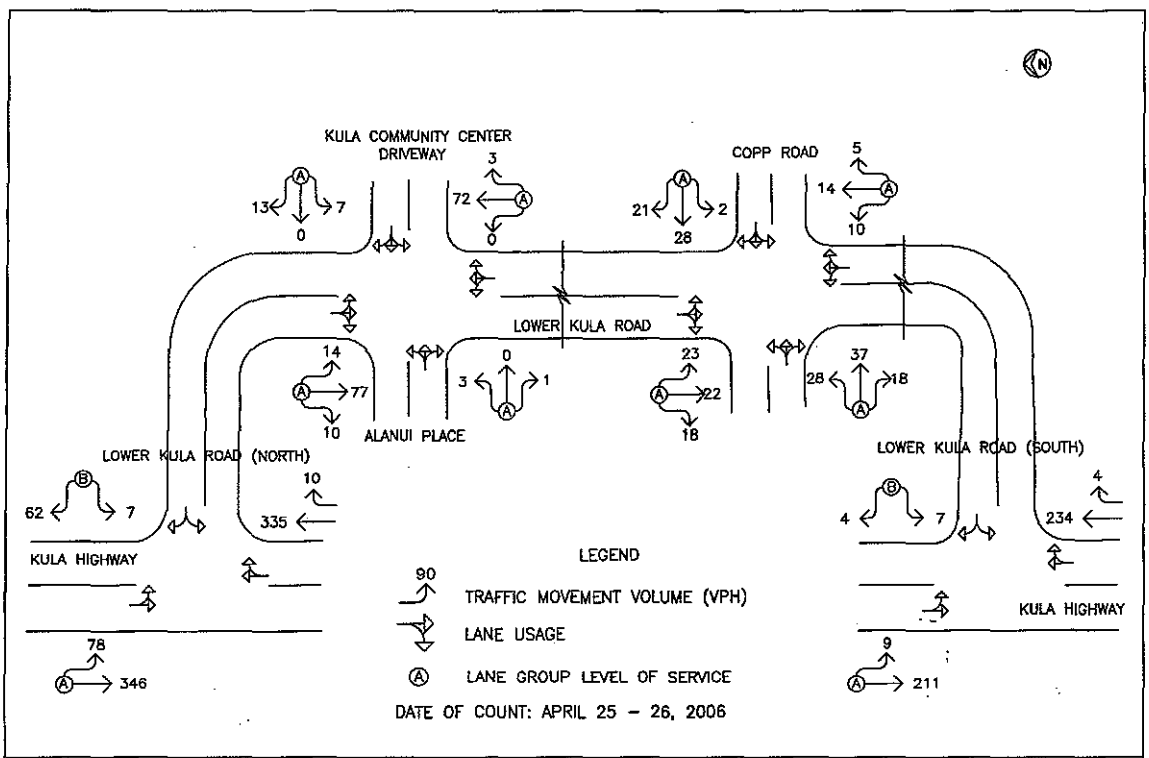
KULA RIDGE

EXISTING AM PEAK HOUR OF TRAFFIC

FIGURE 3



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ENGINEERS · PLANNERS

KULA RIDGE

EXISTING PM PEAK HOUR OF TRAFFIC

FIGURE 4

each intersection may differ slightly as shown in Table 1.

Table 1: Peak Periods of Traffic

Intersection	AM Peak	PM Peak
Lower Kula Road/Alanui Place/Kula Community Center Driveway	7:00 AM to 8:00 AM	3:45 PM to 4:45 PM
Lower Kula Road/Kula Highway (North)	7:00 AM to 8:00 AM	3:30 PM to 4:30 PM
Lower Kula Road/Copp Road	7:00 AM to 8:00 AM	3:45 PM to 4:45 PM
Lower Kula Road/Kula Highway (South)	7:00 AM to 8:00 AM	4:00 PM to 5:00 PM

The analysis is based on the above absolute commuter peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Lower Kula Road, Alanui Place, the Kula Community Center Driveway

At the intersection with Alanui Place and the Kula Community Center driveway, Lower Kula Road carries 65 vehicles northbound and 34 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 75 vehicles traveling northbound and 101 vehicles traveling southbound. Both approaches of Lower Kula Road operate at LOS "A" during both peak periods.

The Alanui Place approach of the intersection carries 12 vehicles and 4 vehicles eastbound during the AM and PM peak periods, respectively, while the Kula Community Center driveway carries no vehicles during the AM peak period and 20 vehicles during the PM peak period. Both approaches of the intersection operate at LOS "A" during both peak periods.

c. Lower Kula Road and Kula Highway (North)

At the northern intersection with Kula Highway, Lower Kula Road carries 97 vehicles westbound during the AM peak period.

During the PM peak period, the traffic volume is less with 69 vehicles traveling westbound. The Lower Kula Road approach of the intersection operates at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

The Kula Highway approaches of the intersection carry 513 vehicles northbound and 422 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 345 vehicles traveling northbound and 424 vehicles traveling southbound. The critical traffic movement on the highway approaches at this intersection is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

d. Lower Kula Road and Copp Road

At the intersection with Copp Road, Lower Kula Road carries 27 vehicles northbound and 38 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are slightly higher with 29 vehicles traveling northbound and 63 vehicles traveling southbound. Both approaches of Lower Kula Road operate at LOS "A" during both peak periods.

The Copp Road approaches of the intersection carry 55 vehicles eastbound and 102 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 83 vehicles traveling eastbound and 51 vehicles traveling westbound. Both approaches of Copp Road operate at LOS "A" during both peak periods.

e. Lower Kula Road and Kula Highway (South)

At the southern unsignalized intersection with Kula Highway, Lower Kula Road carries 9 vehicles westbound during the AM peak period. During the PM peak period, the traffic volume is slightly higher with 11 vehicles traveling westbound. The Lower Kula Road

approach of this intersection operates at LOS "B" and LOS "A" during the AM and PM peak periods, respectively.

The Kula Highway approaches of the intersection carry 279 vehicles northbound and 162 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is approximately the same with 238 vehicles traveling northbound and 220 vehicles traveling southbound. The critical traffic movement on the highway approaches at this intersection is the southbound left-turn and through traffic movement which operates at LOS "A" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS WITHOUT PROJECT

A. Through Traffic Forecasting Methodology

An analysis of both historical traffic data and traffic projections contained within the Maui Long-Range Land Transportation Plan (MLRLTP) was made to determine an appropriate ambient growth of traffic demands in the project vicinity. Using linear regression analyses, historical data indicates an average annual traffic growth rate in the vicinity of approximately 2.7%, while the MLRLTP indicates an average annual traffic growth rate of less than 0.5%. Therefore, for conservative analysis purposes, the travel forecast used in this study is based upon the historical traffic count data obtained from the State Department of Transportation (DOT). Using Year 2006 as the base year, a growth factor of 1.11 was applied to the existing traffic demands on the highways to achieve the projected ambient traffic demands for Year 2009.

B. Other Considerations

The Kula Senior Community Housing project is located southwest of the project site adjacent to Kula Highway across from Kula Elementary School. The proposed residential project is expected to be completed by Year 2006 and is expected to provide approximately 36 one-bedroom units for senior citizens with limited annual incomes. As detailed in the "Traffic Impact Report for the Kula Senior

Community Housing" dated December 2005, the proposed development is anticipated to generate 2 trips and 4 trips during the AM and PM peak periods, respectively. These trips were assigned to the street network in the study area to account for trips generated by the proposed senior housing project.

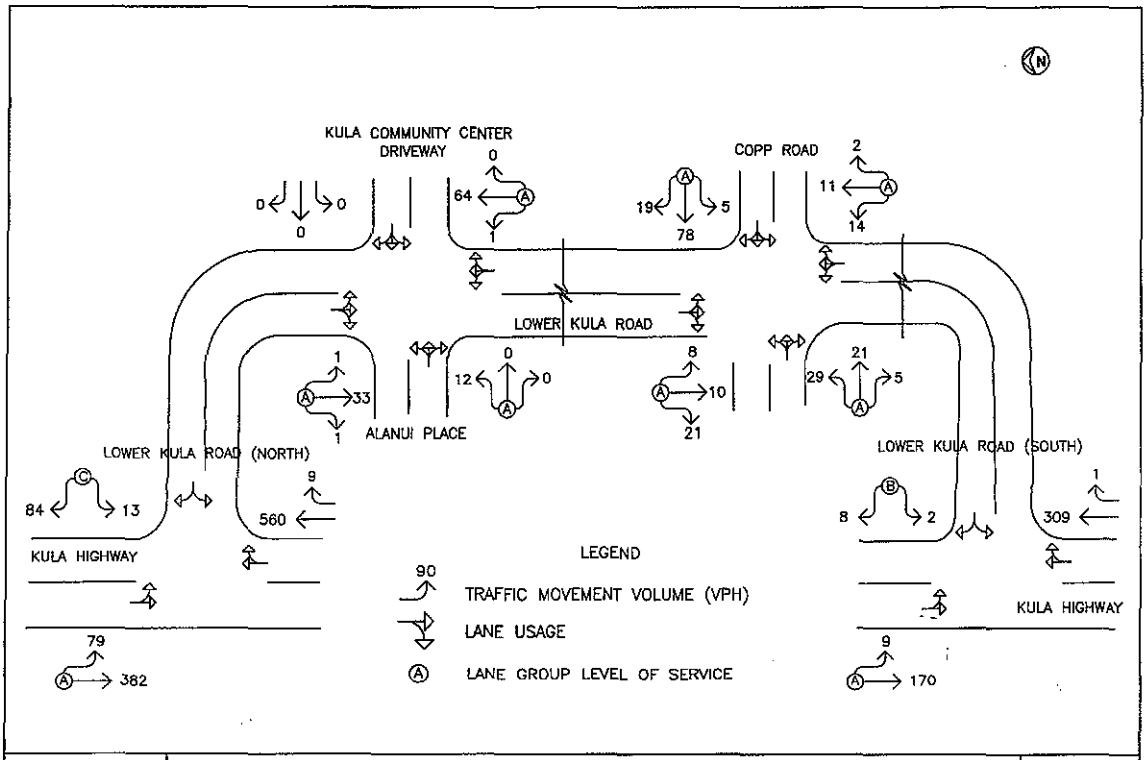
C. Total Traffic Volumes Without Project

The projected Year 2009 AM and PM peak period traffic volumes and operating conditions without the proposed Kula Ridge development are shown in Figures 5 and 6, and summarized in Table 2. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.

Table 2: Existing and Projected (Without Project) LOS Traffic Operating Conditions

Intersection	Critical Approach/ Movement	AM		PM	
		Exist	Year 2009 w/out Proj	Exist	Year 2009 w/out Proj
Lower Kula Road/ Alanui Place/ Kula Community Center Driveway	Eastbound	A	A	A	A
	Westbound	-	-	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Lower Kula Road/ Kula Highway (North)	Westbound	C	C	B	B
	Southbound	A	A	A	A
Lower Kula Road/ Copp Road	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Lower Kula Road/ Kula Highway (South)	Westbound	B	B	B	B
	Southbound	A	A	A	A

Traffic operations under Year 2009 without project conditions are expected to remain similar to existing conditions. The approaches of the intersections of Lower Kula Road with Alanui Place/Kula Community Center Driveway and Copp Road are expected to continue operating at LOS "A" while the westbound and southbound



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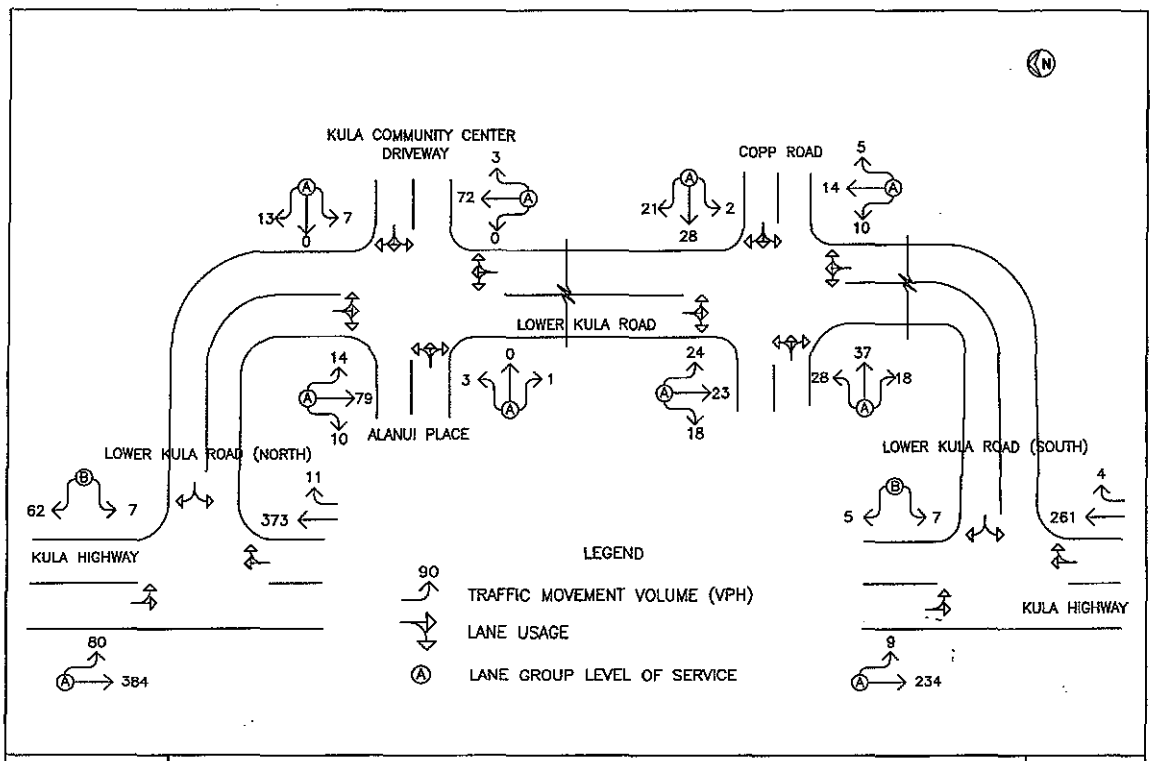
KULA RIDGE

YEAR 2009 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 5



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KULA RIDGE

YEAR 2009 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 6

approaches of the southern intersection with Kula Highway are anticipated to continue operating at LOS "B" and LOS "A," respectively, during the AM and PM peak periods. Similarly, at the northern intersection of Lower Kula Road with Kula Highway, the westbound approach is anticipated to continue operating at LOS "C" and LOS "B" during the AM and PM peak periods, respectively, while the southbound approach is anticipated to continue operating at LOS "A" during both peak periods.

V. PROJECTED TRAFFIC CONDITIONS WITH PROJECT

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 7th Edition," 2003. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit. Table 3 summarizes the project site trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 3: Peak Hour Trip Generation

SINGLE-FAMILY DETACHED HOUSING		
INDEPENDENT VARIABLE		Dwelling Units = 116
		PROJECTED TRIP ENDS
AM PEAK	ENTER	23
	EXIT	68
	TOTAL	91
PM PEAK	ENTER	77
	EXIT	45
	TOTAL	123

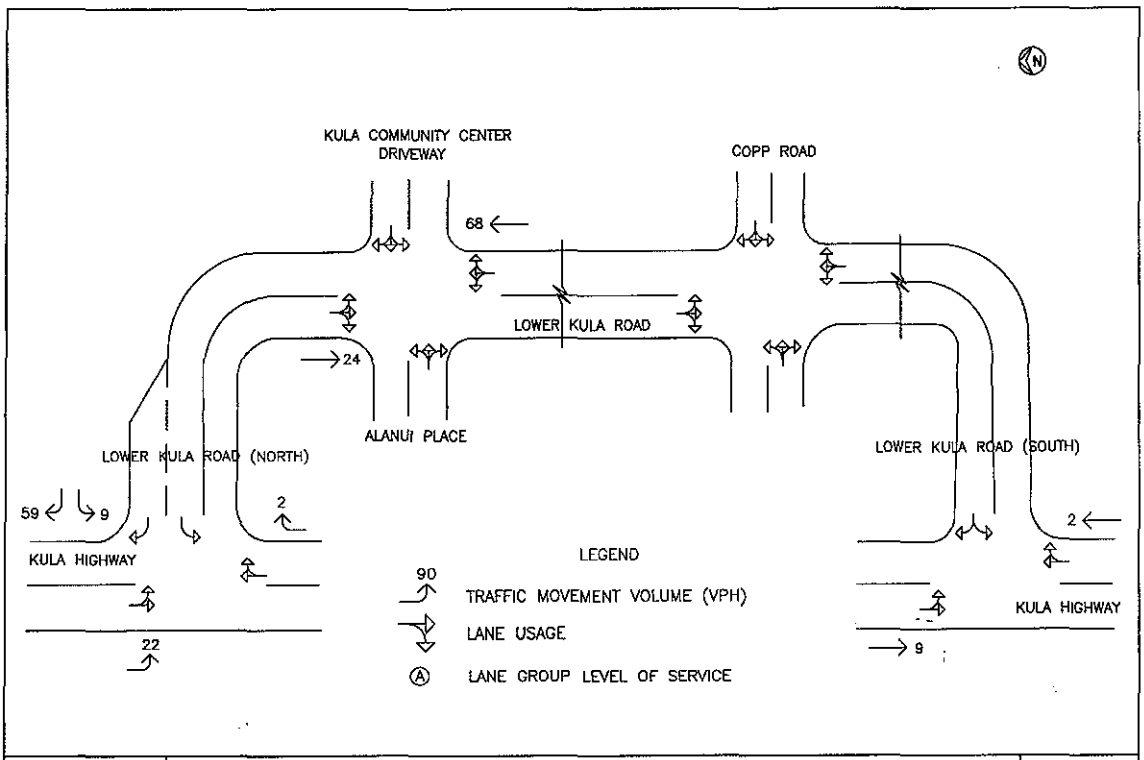
Table 3: Peak Hour Trip Generation (Cont'd)

COUNTY PARK*		
INDEPENDENT VARIABLE		Acres of Development = 3
		PROJECTED TRIP ENDS
AM PEAK	ENTER	1
	EXIT	0
	TOTAL	1
PM PEAK	ENTER	1
	EXIT	0
	TOTAL	1
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	23
	EXIT	68
	TOTAL	91
PM PEAK	ENTER	77
	EXIT	45
	TOTAL	123

*Utilizing the ITE Trip Generation rates, 0.03 and 0.18 trips are expected during the AM and PM peak periods, respectively. Although the park will most likely function as a neighborhood park that serves the residences that surround it, the total number of trips during the peak periods was conservatively rounded up to 1 trip during each peak period.

2. Trip Distribution

Figures 7 and 8 show the distribution of site-generated traffic during the AM and PM peak periods. Access to the proposed Kula Ridge development will be provided via a new access road off Lower Kula Road. All site-generated trips were conservatively assumed be traveling to/from Kula Highway via the northern intersection with Lower Kula Road and have origins and destinations outside the immediate area (i.e., no linked or pass-by trips). The directional distribution of traffic at the intersection of Kula Highway with Lower Kula Road (North) was assumed to remain similar to existing conditions.



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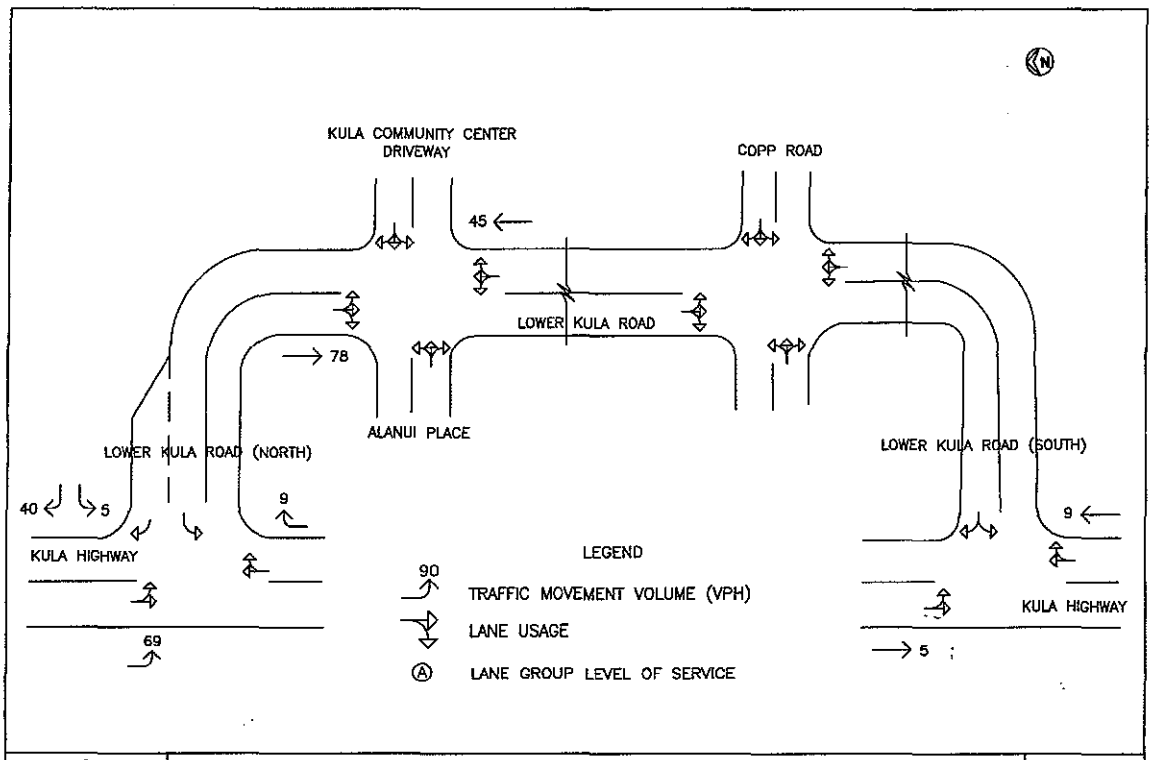
KULA RIDGE

DISTRIBUTION OF SITE-GENERATED TRAFFIC
YEAR 2009 AM PEAK HOUR OF TRAFFIC

FIGURE 7



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DISTRIBUTION OF SITE-GENERATED TRAFFIC
YEAR 2009 PM PEAK HOUR OF TRAFFIC

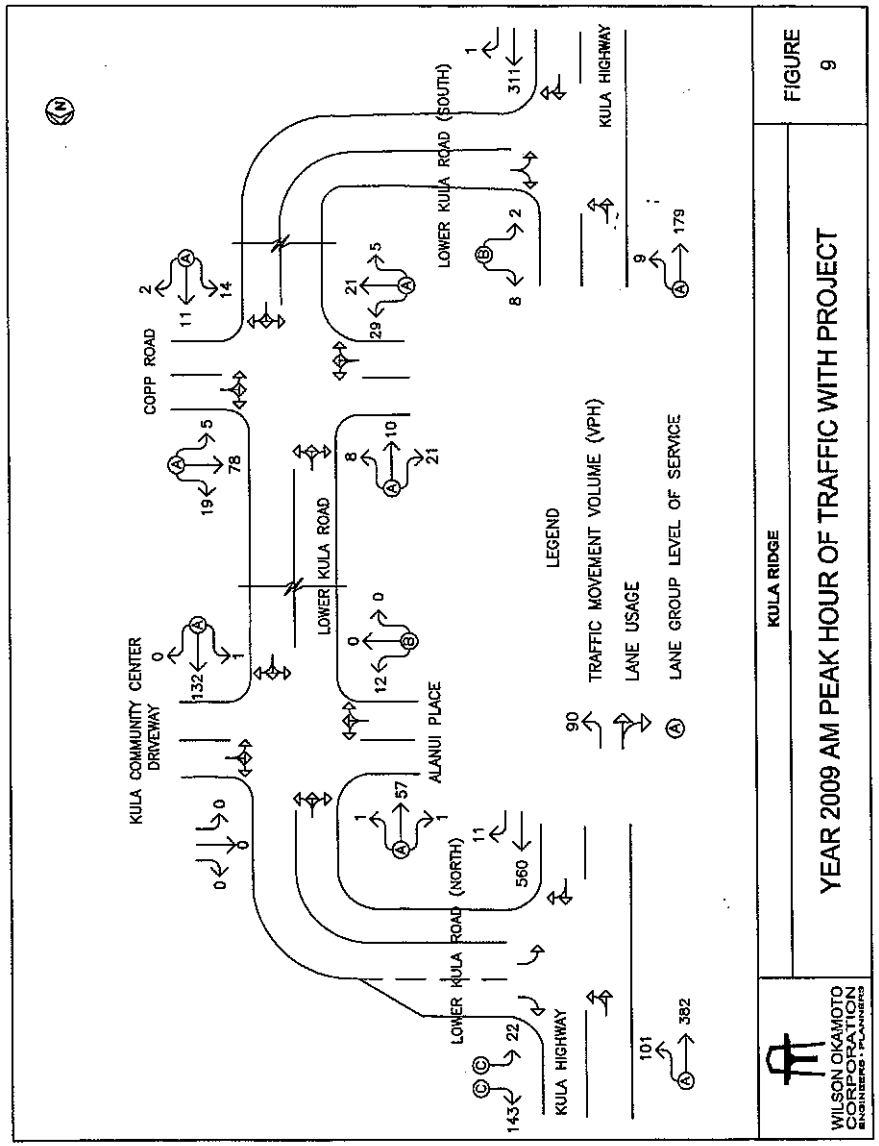
FIGURE 8

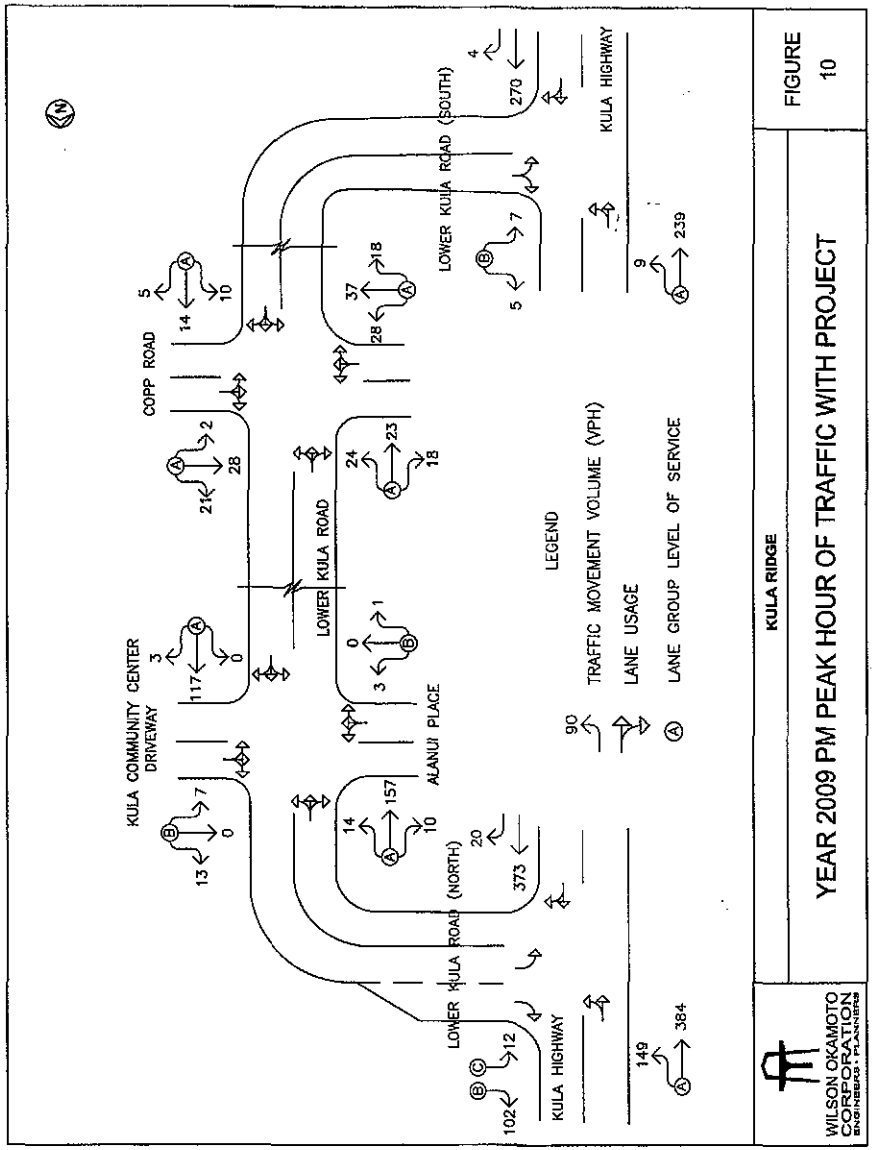
B. Total Traffic Volumes With Project

The Year 2009 cumulative AM and PM peak hour traffic conditions with the development of the Kula Ridge development are shown in Figures 9 and 10, and summarized in Table 4. The cumulative volumes consist of site-generated traffic superimposed over Year 2009 projected traffic demands. The westbound approach of the northern intersection of Lower Kula Road with Kula Highway is assumed to have been modified to provide dedicated turning lanes. The existing and projected Year 2009 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 4: Existing and Projected Year 2009 (With and Without Project) Traffic Operating Conditions

Intersection	Critical Approach/ Movement		AM			PM		
			Exist	Year 2009 w/out Proj	Year 2009 w/ Proj	Exist	Year 2009 w/out Proj	Year 2009 w/ Proj
Lower Kula Road/ Alanui Place/ Kula Community Center Driveway	Eastbound		A	A	B	A	A	B
	Westbound		-	-	-	A	A	B
	Northbound		A	A	A	A	A	A
	Southbound		A	A	A	A	A	A
Lower Kula Road/ Kula Highway (North)	Westbound	LT	C	C	C	B	B	C
		RT			C			B
	Southbound		A	A	A	A	A	A
Lower Kula Road/ Copp Road	Eastbound		A	A	A	A	A	A
	Westbound		A	A	A	A	A	A
	Northbound		A	A	A	A	A	A
	Southbound		A	A	A	A	A	A
Lower Kula Road/ Kula Highway (South)	Westbound		B	B	B	B	B	B
	Southbound		A	A	A	A	A	A





Traffic operations in the vicinity of the proposed Kula Ridge development are expected, in general, to remain similar to existing and Year 2009 without project conditions despite the anticipated increases in traffic along the surrounding roadways due to the project. The critical movements at the intersection of Lower Kula Road with Alanui Place/Kula Community Center Driveway, Copp Road, and Kula Highway (South) are expected to operate at levels of service similar to Year 2009 without project conditions during both peak hours of traffic with the exception of the eastbound and westbound approaches of the intersection with Alanui Place/Kula Community Center driveway which is expected to deteriorate from LOS "A" to LOS "B" during both peak periods. At the northern intersection of Lower Kula Road with Kula Highway, the westbound left-turn traffic movement is anticipated to operate at LOS "C" during both peak periods while the right-turn traffic movement is anticipated to operate at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

1. Maintain sufficient sight distance for motorists to safely enter and exit all project roadways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Provide sufficient turning radii at all project roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

5. Provide exclusive left-turn and right-turn lanes on the westbound approach of Lower Kula Road at the northern intersection with Kula Highway to minimize the impact of left-turning vehicles on the higher volume of right-turning vehicles on that approach.

6. Consider providing an exclusive southbound left-turn lane along Kula Highway at the northern intersection with Lower Kula Road to minimize the impact of turning vehicles on through traffic along the highway.

VII. CONCLUSION

The proposed Kula Ridge development is expected to include 42 residential lots, 70 affordable housing residential lots, 4 agricultural lots, and an approximately 3-acre park that will be dedicated to the County of Maui. With the implementation of the aforementioned recommendations, the proposed Kula Ridge development is not expected to have a significant impact on traffic operations in the vicinity of the project site. The critical movements at the study intersection along Lower Kula Road are expected continue operating at acceptable levels of service despite the addition of site-generated vehicles to the surrounding roadway network due to the provision of exclusive turning lanes at the northern intersection of Lower Kula Road with Kula Highway.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0769
Counted By: GMT
Weather: CLEAR

File Name : KulLkul-nA
Site Code : 00000001
Start Date : 6/1/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Hwy (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
06:00 AM	2	17	0	19	0	0	10	10	0	59	0	59	0	88
06:15 AM	2	29	0	31	0	0	7	7	0	68	0	68	0	106
06:30 AM	3	50	0	53	1	0	8	9	0	63	1	64	0	126
06:45 AM	11	45	0	56	3	0	10	13	0	99	0	99	0	168
Total	18	141	0	159	4	0	35	39	0	289	1	290	0	488
07:00 AM	11	63	0	74	3	0	17	20	0	103	2	105	0	199
07:15 AM	13	94	0	107	1	0	22	23	0	139	0	139	0	269
07:30 AM	15	122	0	137	3	0	22	25	0	140	2	142	0	304
07:45 AM	39	65	0	104	6	0	23	29	0	122	5	127	0	260
Total	78	344	0	422	13	0	84	97	0	504	9	513	0	1032
Grand Total	96	485	0	581	17	0	119	136	0	793	10	803	0	1520
Apprch %	16.5	83.5	0.0		12.5	0.0	87.5		0.0	98.8	1.2			
Total %	6.3	31.9	0.0	38.2	1.1	0.0	7.8	8.9	0.0	52.2	0.7	52.8	0.0	

	Kula Highway Southbound				Lower Kula Hwy (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 06:00 AM to 07:45 AM - Peak 1 of 1														
Intersection	07:00 AM													
Volume	78	344	0	422	13	0	84	97	0	504	9	513	0	1032
Percent	18.5	81.5	0.0		13.4	0.0	86.6		0.0	98.2	1.8			
07:30 Volume	15	122	0	137	3	0	22	25	0	140	2	142	0	304
Peak Factor														0.849
High Int.	07:30 AM				07:45 AM				07:30 AM				5:45:00 AM	
Volume	15	122	0	137	6	0	23	29	0	140	2	142		
Peak Factor				0.770				0.836				0.903		

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1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0769
Counted By: GMT
Weather: CLEAR

File Name : KulLkul-nP
Site Code : 00000001
Start Date : 5/31/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
03:00 PM	16	54	0	70	1	0	23	24	0	59	0	59	0	153
03:15 PM	13	59	0	72	3	0	13	16	0	77	4	81	0	169
03:30 PM	27	91	0	118	2	0	13	15	0	88	1	89	0	222
03:45 PM	15	83	0	98	3	0	17	20	0	71	0	71	0	189
Total	71	287	0	358	9	0	66	75	0	295	5	300	0	733
04:00 PM	20	86	0	106	1	0	20	21	0	97	3	100	0	227
04:15 PM	17	86	0	103	1	0	12	13	0	79	6	85	0	201
04:30 PM	18	75	0	93	1	0	19	20	0	73	1	74	0	187
04:45 PM	23	90	0	113	1	0	12	13	0	83	4	87	0	213
Total	78	337	0	415	4	0	63	67	0	332	14	346	0	828
05:00 PM	21	82	0	103	1	0	22	23	0	56	1	57	0	183
05:15 PM	34	72	0	106	1	0	16	17	0	76	2	78	0	201
05:30 PM	31	68	0	99	1	0	21	22	0	74	1	75	0	196
05:45 PM	29	77	0	106	0	0	6	6	0	63	1	64	0	176
Total	115	299	0	414	3	0	65	68	0	269	5	274	0	756
Grand Total	264	923	0	1187	16	0	194	210	0	896	24	920	0	2317
Apprch %	22.2	77.8	0.0		7.6	0.0	92.4		0.0	97.4	2.6			
Total %	11.4	39.8	0.0	51.2	0.7	0.0	8.4	9.1	0.0	38.7	1.0	39.7	0.0	

	Kula Highway Southbound				Lower Kula Highway (North) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1														
Intersection	03:30 PM													
Volume	79	346	0	425	7	0	62	69	0	335	10	345	0	839
Percent	18.6	81.4	0.0		10.1	0.0	89.9		0.0	97.1	2.9			
04:00 Volume	20	86	0	106	1	0	20	21	0	97	3	100	0	227
Peak Factor														0.924
High Int.	03:30 PM				04:00 PM				04:00 PM				2:45:00 PM	
Volume	27	91	0	118	1	0	20	21	0	97	3	100		
Peak Factor				0.900				0.821				0.863		

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Counter:D4-3891
Counted:TO
Weather:Clear

File Name : LowAlaA
Site Code : 00000002
Start Date : 4/26/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Dwy. To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	0	6	0	6	0	0	0	0	1	9	0	10	4	0	1	5	21
06:15 AM	0	5	0	5	0	0	0	0	0	5	0	5	2	0	1	3	13
06:30 AM	0	6	0	6	0	0	0	0	0	6	0	6	0	0	0	0	12
06:45 AM	1	7	0	8	0	0	1	1	1	13	0	14	2	0	0	2	25
Total	1	24	0	25	0	0	1	1	2	33	0	35	8	0	2	10	71
07:00 AM	0	5	0	5	0	0	0	0	1	12	0	13	4	0	0	4	22
07:15 AM	0	7	0	7	0	0	0	0	0	22	0	22	5	0	0	5	34
07:30 AM	0	5	0	5	0	0	0	0	0	18	0	18	2	0	0	2	25
07:45 AM	1	15	1	17	0	0	0	0	0	12	0	12	1	0	0	1	30
Total	1	32	1	34	0	0	0	0	1	64	0	65	12	0	0	12	111
Grand Total	2	56	1	59	0	0	1	1	3	97	0	100	20	0	2	22	182
Apprch %	3.4	94.9	1.7		0	0	100		3	97	0		90.9	0	9.1		
Total %	1.1	30.8	0.5	32.4	0	0	0.5	0.5	1.6	53.3	0	54.9	11	0	1.1	12.1	

	Lower Kula Road Southbound				Dwy. To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	5	0	5	0	0	0	0	1	12	0	13	4	0	0	4	22
07:15 AM	0	7	0	7	0	0	0	0	0	22	0	22	5	0	0	5	34
07:30 AM	0	5	0	5	0	0	0	0	0	18	0	18	2	0	0	2	25
07:45 AM	1	15	1	17	0	0	0	0	0	12	0	12	1	0	0	1	30
Total Volume	1	32	1	34	0	0	0	0	1	64	0	65	12	0	0	12	111
% App. Total	2.9	94.1	2.9		0	0	0		1.5	98.5	0		100	0	0		
PHF	.250	.533	.250	.500	.000	.000	.000	.000	.250	.727	.000	.739	.600	.000	.000	.600	.816

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Counter:D4-3891
Counted:TO
Weather:Clear

File Name : LowAlaP
Site Code : 00000002
Start Date : 4/25/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Dwy To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	3	13	1	17	1	0	0	1	1	16	1	18	0	0	0	0	36
03:15 PM	3	17	1	21	0	0	1	1	0	15	1	16	1	1	0	2	40
03:30 PM	3	17	0	20	0	1	2	3	1	7	1	9	1	0	0	1	33
03:45 PM	5	22	3	30	1	0	5	6	0	18	1	19	0	0	0	0	55
Total	14	69	5	88	2	1	8	11	2	56	4	62	2	1	0	3	164
04:00 PM	3	17	4	24	3	0	4	7	0	11	0	11	0	0	1	1	43
04:15 PM	4	23	2	29	1	0	1	2	0	16	2	18	0	0	0	0	49
04:30 PM	2	15	1	18	2	0	3	5	0	27	0	27	3	0	0	3	53
04:45 PM	3	19	1	23	0	0	1	1	0	9	0	9	0	0	1	1	34
Total	12	74	8	94	6	0	9	15	0	63	2	65	3	0	2	5	179
05:00 PM	0	13	1	14	0	0	0	0	0	17	3	20	0	0	0	0	34
05:15 PM	1	11	1	13	1	0	3	4	0	13	0	13	1	0	0	1	31
05:30 PM	1	17	2	20	1	0	5	6	1	12	2	15	2	0	1	3	44
05:45 PM	0	15	2	17	0	0	0	0	1	16	0	17	1	0	0	1	35
Total	2	56	6	64	2	0	8	10	2	58	5	65	4	0	1	5	144
Grand Total	28	199	19	246	10	1	25	36	4	177	11	192	9	1	3	13	487
Apprch %	11.4	80.9	7.7		27.8	2.8	69.4		2.1	92.2	5.7		69.2	7.7	23.1		
Total %	5.7	40.9	3.9	50.5	2.1	0.2	5.1	7.4	0.8	36.3	2.3	39.4	1.8	0.2	0.6	2.7	

	Lower Kula Road Southbound				Dwy To Kula Comm. Center Westbound				Lower Kula Road Northbound				Alanui Place Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	5	22	3	30	1	0	5	6	0	18	1	19	0	0	0	0	55
04:00 PM	3	17	4	24	3	0	4	7	0	11	0	11	0	0	1	1	43
04:15 PM	4	23	2	29	1	0	1	2	0	16	2	18	0	0	0	0	49
04:30 PM	2	15	1	18	2	0	3	5	0	27	0	27	3	0	0	3	53
Total Volume	14	77	10	101	7	0	13	20	0	72	3	75	3	0	1	4	200
% App. Total	13.9	76.2	9.9		35	0	65		0	96	4		75	0	25		
PHF	.700	.837	.625	.842	.583	.000	.650	.714	.000	.667	.375	.694	.250	.000	.250	.333	.909

WILSON OKAMOTO CORPORATION
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

Counter:T-1839
Counted:KT
Weather:Clear

File Name : LowCopA
Site Code : 00000001
Start Date : 4/26/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	3	0	2	5	1	8	2	11	2	0	0	2	1	0	0	1	19
06:15 AM	4	1	0	5	0	14	0	14	2	2	0	4	3	1	0	4	27
06:30 AM	0	1	3	4	0	18	2	20	2	1	1	4	5	0	1	6	34
06:45 AM	2	4	3	9	0	7	6	13	4	2	1	7	2	2	2	6	35
Total	9	6	8	23	1	47	10	58	10	5	2	17	11	3	3	17	115
07:00 AM	2	1	4	7	1	18	6	25	3	2	0	5	3	2	1	6	43
07:15 AM	2	4	4	10	3	24	5	32	6	5	0	11	9	3	0	12	65
07:30 AM	3	3	6	12	0	25	4	29	3	1	1	5	9	7	1	17	63
07:45 AM	1	1	7	9	1	11	4	16	2	3	1	6	8	9	3	20	51
Total	8	9	21	38	5	78	19	102	14	11	2	27	29	21	5	55	222
Grand Total	17	15	29	61	6	125	29	160	24	16	4	44	40	24	8	72	337
Apprch %	27.9	24.6	47.5		3.8	78.1	18.1		54.5	36.4	9.1		55.6	33.3	11.1		
Total %	5	4.5	8.6	18.1	1.8	37.1	8.6	47.5	7.1	4.7	1.2	13.1	11.9	7.1	2.4	21.4	

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	2	1	4	7	1	18	6	25	3	2	0	5	3	2	1	6	43
07:15 AM	2	4	4	10	3	24	5	32	6	5	0	11	9	3	0	12	65
07:30 AM	3	3	6	12	0	25	4	29	3	1	1	5	9	7	1	17	63
07:45 AM	1	1	7	9	1	11	4	16	2	3	1	6	8	9	3	20	51
Total Volume	8	9	21	38	5	78	19	102	14	11	2	27	29	21	5	55	222
% App. Total	21.1	23.7	55.3		4.9	76.5	18.6		51.9	40.7	7.4		52.7	38.2	9.1		
PHF	.667	.563	.750	.792	.417	.780	.792	.797	.583	.550	.500	.614	.806	.583	.417	.688	.854

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter:T-1839
Counted:KT
Weather:Clear

File Name : LowCopP
Site Code : 00000001
Start Date : 4/25/2006
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	5	0	5	10	1	11	5	17	3	7	3	13	3	6	1	10	50
03:15 PM	7	3	5	15	1	8	6	15	4	5	0	9	3	10	3	16	55
03:30 PM	4	3	5	12	1	10	7	18	0	3	0	3	4	7	3	14	47
03:45 PM	5	7	5	17	0	7	6	13	3	3	0	6	9	8	4	21	57
Total	21	13	20	54	3	36	24	63	10	18	3	31	19	31	11	61	209
04:00 PM	9	7	5	21	1	6	4	11	2	4	2	8	2	8	5	15	55
04:15 PM	5	3	6	14	0	7	5	12	1	4	2	7	11	13	3	27	60
04:30 PM	4	5	2	11	1	8	6	15	4	3	1	8	6	8	6	20	54
04:45 PM	8	1	6	15	0	8	2	10	2	1	0	3	6	9	2	17	45
Total	26	16	19	61	2	29	17	48	9	12	5	26	25	38	16	79	214
05:00 PM	3	3	5	11	0	7	3	10	0	6	0	6	7	17	5	29	56
05:15 PM	1	4	0	5	2	4	6	12	1	1	2	4	4	11	3	18	39
05:30 PM	6	10	1	17	2	3	3	8	0	3	0	3	6	13	5	24	52
05:45 PM	1	11	2	14	3	6	3	12	3	5	1	9	8	22	1	31	66
Total	11	28	8	47	7	20	15	42	4	15	3	22	25	63	14	102	213
Grand Total	58	57	47	162	12	85	56	153	23	45	11	79	69	132	41	242	636
Apprch %	35.8	35.2	29		7.8	55.6	36.6		29.1	57	13.9		28.5	54.5	16.9		
Total %	9.1	9	7.4	25.5	1.9	13.4	8.8	24.1	3.6	7.1	1.7	12.4	10.8	20.8	6.4	38.1	

	Lower Kula Road Southbound				Copp Road Westbound				Lower Kula Road Northbound				Copp Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	5	7	5	17	0	7	6	13	3	3	0	6	9	8	4	21	57
04:00 PM	9	7	5	21	1	6	4	11	2	4	2	8	2	8	5	15	55
04:15 PM	5	3	6	14	0	7	5	12	1	4	2	7	11	13	3	27	60
04:30 PM	4	5	2	11	1	8	6	15	4	3	1	8	6	8	6	20	54
Total Volume	23	22	18	63	2	28	21	51	10	14	5	29	28	37	18	83	226
% App. Total	36.5	34.9	28.6		3.9	54.9	41.2		34.5	48.3	17.2		33.7	44.6	21.7		
PHF	.639	.786	.750	.750	.500	.875	.875	.850	.625	.875	.625	.906	.636	.712	.750	.769	.942

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0528
Counted By: TO
Weather: CLEAR

File Name : KulLkul-sA
Site Code : 00000004
Start Date : 6/1/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
06:00 AM	0	15	0	15	0	0	0	0	0	35	0	35	0	50
06:15 AM	1	23	0	24	0	0	0	0	0	36	0	36	0	60
06:30 AM	0	38	0	38	2	0	1	3	0	47	1	48	0	89
06:45 AM	0	36	0	36	1	0	1	2	0	57	2	59	0	97
Total	1	112	0	113	3	0	2	5	0	175	3	178	0	296
07:00 AM	1	28	0	29	0	0	2	2	0	61	1	62	0	93
07:15 AM	2	15	0	17	1	0	2	3	0	80	0	80	0	100
07:30 AM	3	52	0	55	1	0	2	3	0	84	0	84	0	142
07:45 AM	3	58	0	61	0	0	1	1	0	53	0	53	0	115
Total	9	153	0	162	2	0	7	9	0	278	1	279	0	450
Grand Total	10	265	0	275	5	0	9	14	0	453	4	457	0	746
Apprch %	3.6	96.4	0.0		35.7	0.0	64.3		0.0	99.1	0.9			
Total %	1.3	35.5	0.0	36.9	0.7	0.0	1.2	1.9	0.0	60.7	0.5	61.3	0.0	

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 06:00 AM to 07:45 AM - Peak 1 of 1														
Intersection	07:00 AM													
Volume	9	153	0	162	2	0	7	9	0	278	1	279	0	450
Percent	5.6	94.4	0.0		22.2	0.0	77.8		0.0	99.6	0.4			
07:30 Volume	3	52	0	55	1	0	2	3	0	84	0	84	0	142
Peak Factor														0.792
High Int.	07:45 AM				07:15 AM				07:30 AM				5:45:00 AM	
Volume	3	58	0	61	1	0	2	3	0	84	0	84		
Peak Factor				0.664				0.750				0.830		

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D1-0528
Counted By: TO
Weather: CLEAR

File Name : KulLkul-sP
Site Code : 00000004
Start Date : 5/31/2005
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0			
03:00 PM	0	39	0	39	0	0	2	2	0	44	0	44	0	85
03:15 PM	1	40	0	41	2	0	1	3	0	56	1	57	0	101
03:30 PM	2	52	0	54	0	0	3	3	0	61	1	62	0	119
03:45 PM	3	49	0	52	0	0	0	0	0	50	0	50	0	102
Total	6	180	0	186	2	0	6	8	0	211	2	213	0	407
04:00 PM	1	60	0	61	5	0	1	6	0	61	2	63	0	130
04:15 PM	3	50	0	53	2	0	0	2	0	62	1	63	0	118
04:30 PM	2	51	0	53	4	0	3	7	0	51	2	53	0	113
04:45 PM	1	58	0	59	1	0	1	2	0	63	4	67	0	128
Total	7	219	0	226	12	0	5	17	0	237	9	246	0	489
05:00 PM	1	53	0	54	0	0	5	5	0	53	1	54	0	113
05:15 PM	1	55	0	56	1	0	2	3	0	60	0	60	0	119
05:30 PM	2	42	0	44	1	0	0	1	0	52	2	54	0	99
05:45 PM	1	54	0	55	1	0	1	2	0	49	4	53	0	110
Total	5	204	0	209	3	0	8	11	0	214	7	221	0	441
Grand Total	18	603	0	621	17	0	19	36	0	662	18	680	0	1337
Apprch %	2.9	97.1	0.0		47.2	0.0	52.8		0.0	97.4	2.6			
Total %	1.3	45.1	0.0	46.4	1.3	0.0	1.4	2.7	0.0	49.5	1.3	50.9	0.0	

	Kula Highway Southbound				Lower Kula Highway (South) Westbound				Kula Highway Northbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1														
Intersection	04:00 PM													
Volume	7	219	0	226	12	0	5	17	0	237	9	246	0	489
Percent	3.1	96.9	0.0		70.6	0.0	29.4		0.0	96.3	3.7			
04:00 Volume	1	60	0	61	5	0	1	6	0	61	2	63	0	130
Peak Factor														0.940
High Int.	04:00 PM				04:30 PM				04:45 PM				2:45:00 PM	
Volume	1	60	0	61	4	0	3	7	0	63	4	67		
Peak Factor				0.926				0.607				0.918		

Wilson Okamoto Coporation

1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Lower Kula Road
Title2 : Kula Ridge
Title3 :

Site:
Date: 04/25/06

Day: Tuesday

Interval	NB			SB			Combined		
Begin	AM	PM		AM	PM		AM	PM	
12:00	*	*		*	*		*	*	
12:15	*	*		*	*		*	*	
12:30	*	*		*	*		*	*	
12:45	*	*		*	*		*	*	
01:00	*	*		*	*		*	*	
01:15	*	*		*	*		*	*	
01:30	*	*		*	*		*	*	
01:45	*	*		*	*		*	*	
02:00	*	*		*	*		*	*	
02:15	*	*		*	*		*	*	
02:30	*	*		*	*		*	*	
02:45	*	8		*	8		*	16	
03:00	*	20	61	*	14	74	*	34	135
03:15	*	16		*	20		*	36	
03:30	*	10		*	16		*	26	
03:45	*	15		*	24		*	39	
04:00	*	13	67	*	17	82	*	30	149
04:15	*	14		*	23		*	37	
04:30	*	31		*	22		*	53	
04:45	*	9		*	20		*	29	
05:00	*	18	65	*	17	64	*	35	129
05:15	*	15		*	10		*	25	
05:30	*	13		*	20		*	33	
05:45	*	19		*	17		*	36	
06:00	*	21	47	*	24	83	*	45	130
06:15	*	11		*	14		*	25	
06:30	*	8		*	30		*	38	
06:45	*	7		*	15		*	22	
07:00	*	8	34	*	16	49	*	24	83
07:15	*	14		*	14		*	28	
07:30	*	7		*	11		*	18	
07:45	*	5		*	8		*	13	
08:00	*	4	21	*	3	16	*	7	37
08:15	*	2		*	3		*	5	
08:30	*	9		*	4		*	13	
08:45	*	6		*	6		*	12	
09:00	*	4	18	*	2	15	*	6	33
09:15	*	4		*	5		*	9	
09:30	*	6		*	5		*	11	
09:45	*	4		*	3		*	7	
10:00	*	5	11	*	4	10	*	9	21
10:15	*	3		*	2		*	5	
10:30	*	3		*	3		*	6	
10:45	*	0		*	1		*	1	
11:00	*	2	4	*	2	8	*	4	12
11:15	*	0		*	4		*	4	
11:30	*	1		*	2		*	3	
11:45	*	1		*	0		*	1	
Totals	0	336		0	409		0	745	
Split%	*	45.1		*	54.9				
Day Totals		336			409			745	
Day Splits		45.1			54.9				
Peak Hour	*	03:45		*	03:45		*	03:45	
Volume	*	73		*	86		*	159	
Factor	*	0.59		*	0.90		*	0.75	

Wilson Okamoto Coporation

1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Lower Kula Road
Title2 : Kula Ridge
Title3 :

Site:
Date: 04/26/06

Day: Wednesday

Interval	NB			SB			Combined		
Begin	AM	PM		AM	PM		AM	PM	
12:00	0	0	*	1	2	*	1	2	*
12:15	0		*	1		*	1		*
12:30	0		*	0		*	0		*
12:45	0		*	0		*	0		*
01:00	0	0	*	0	0	*	0	0	*
01:15	0		*	0		*	0		*
01:30	0		*	0		*	0		*
01:45	0		*	0		*	0		*
02:00	0	0	*	0	0	*	0	0	*
02:15	0		*	0		*	0		*
02:30	0		*	0		*	0		*
02:45	0		*	0		*	0		*
03:00	0	1	*	0	1	*	0	2	*
03:15	0		*	0		*	0		*
03:30	0		*	0		*	0		*
03:45	1		*	1		*	2		*
04:00	1	1	*	0	2	*	1	3	*
04:15	0		*	0		*	0		*
04:30	0		*	1		*	1		*
04:45	0		*	1		*	1		*
05:00	0	3	*	1	6	*	1	9	*
05:15	0		*	2		*	2		*
05:30	1		*	1		*	2		*
05:45	2		*	2		*	4		*
06:00	8	33	*	7	27	*	15	60	*
06:15	6		*	6		*	12		*
06:30	6		*	4		*	10		*
06:45	13		*	10		*	23		*
07:00	11	65	*	4	31	*	15	96	*
07:15	22		*	7		*	29		*
07:30	20		*	6		*	26		*
07:45	12		*	14		*	26		*
08:00	0		*	0		*	0		*
08:15	*		*	*		*	*		*
08:30	*		*	*		*	*		*
08:45	*		*	*		*	*		*
09:00	*		*	*		*	*		*
09:15	*		*	*		*	*		*
09:30	*		*	*		*	*		*
09:45	*		*	*		*	*		*
10:00	*		*	*		*	*		*
10:15	*		*	*		*	*		*
10:30	*		*	*		*	*		*
10:45	*		*	*		*	*		*
11:00	*		*	*		*	*		*
11:15	*		*	*		*	*		*
11:30	*		*	*		*	*		*
11:45	*		*	*		*	*		*
Totals	103		0	69		0	172		0
Split%	59.9		*	40.1		*			
Day Totals		103			69			172	
Day Splits		59.9			40.1				
Peak Hour	06:45		*	07:00		*	07:00		*
Volume	66		*	31		*	96		*
Factor	0.75		*	0.55		*	0.83		*

Wilson Okamoto Corporation
1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Kula Highway
Title2 : South of school driveway
Title3 : 7410-01

Site: 01
Date: 05/31/05

Interval	SB			NB			Combined			Day: Tuesday
Begin	AM	PM		AM	PM		AM	PM		
12:00	*	*		*	*		*	*		
12:15	*	*		*	*		*	*		
12:30	*	*		*	*		*	*		
12:45	*	*		*	*		*	*		
01:00	*	*		*	*		*	*		
01:15	*	*		*	*		*	*		
01:30	*	*		*	*		*	*		
01:45	*	*		*	*		*	*		
02:00	*	18	211	*	8	180	*	26	391	
02:15	*	60		*	52		*	112		
02:30	*	67		*	58		*	125		
02:45	*	66		*	62		*	128		
03:00	*	43	272	*	56	277	*	99	549	
03:15	*	65		*	68		*	133		
03:30	*	73		*	81		*	154		
03:45	*	91		*	72		*	163		
04:00	*	86	316	*	75	293	*	161	609	
04:15	*	72		*	76		*	148		
04:30	*	83		*	64		*	147		
04:45	*	75		*	78		*	153		
05:00	*	80	301	*	50	243	*	130	544	
05:15	*	80		*	66		*	146		
05:30	*	63		*	70		*	133		
05:45	*	78		*	57		*	135		
06:00	*	66	234	*	62	195	*	128	429	
06:15	*	64		*	47		*	111		
06:30	*	63		*	54		*	117		
06:45	*	41		*	32		*	73		
07:00	*	53	187	*	30	135	*	83	322	
07:15	*	44		*	40		*	84		
07:30	*	52		*	39		*	91		
07:45	*	38		*	26		*	64		
08:00	*	35	128	*	26	66	*	61	194	
08:15	*	40		*	20		*	60		
08:30	*	32		*	14		*	46		
08:45	*	21		*	6		*	27		
09:00	*	44	122	*	16	49	*	60	171	
09:15	*	21		*	10		*	31		
09:30	*	26		*	12		*	38		
09:45	*	31		*	11		*	42		
10:00	*	29	81	*	10	19	*	39	100	
10:15	*	18		*	3		*	21		
10:30	*	15		*	4		*	19		
10:45	*	19		*	2		*	21		
11:00	*	16	48	*	6	21	*	22	69	
11:15	*	13		*	4		*	17		
11:30	*	16		*	7		*	23		
11:45	*	3		*	4		*	7		
Totals	0	1,900		0	1,478		0	3,378		
Split%	*	56.2		*	43.8					
Day Totals		1,900			1,478			3,378		
Day Splits		56.2			43.8					
Peak Hour	*	03:45		*	03:30		*	03:30		
Volume	*	332		*	304		*	626		
Factor	*	0.91		*	0.94		*	0.96		

Wilson Okamoto Corporation
1907 S. Beretania Street #400
Honolulu, HI 96826

Title1 : Kula Highway
Title2 : South of school driveway
Title3 : 7410-01

Site: 01
Date: 06/01/05

Interval	SB			NB			Combined			Day: Wednesday
Begin	AM	PM		AM	PM		AM	PM		
12:00	5	24	*	3	6	*	8	30	*	
12:15	10		*	1		*	11		*	
12:30	4		*	0		*	4		*	
12:45	5		*	2		*	7		*	
01:00	3	12	*	0	3	*	3	15	*	
01:15	1		*	1		*	2		*	
01:30	3		*	0		*	3		*	
01:45	5		*	2		*	7		*	
02:00	3	5	*	4	11	*	7	16	*	
02:15	0		*	4		*	4		*	
02:30	1		*	3		*	4		*	
02:45	1		*	0		*	1		*	
03:00	0	3	*	4	11	*	4	14	*	
03:15	1		*	2		*	3		*	
03:30	2		*	2		*	4		*	
03:45	0		*	3		*	3		*	
04:00	4	12	*	2	21	*	6	33	*	
04:15	4		*	4		*	8		*	
04:30	1		*	4		*	5		*	
04:45	3		*	11		*	14		*	
05:00	6	29	*	20	100	*	26	129	*	
05:15	5		*	19		*	24		*	
05:30	7		*	30		*	37		*	
05:45	11		*	31		*	42		*	
06:00	18	122	*	58	275	*	76	397	*	
06:15	25		*	63		*	88		*	
06:30	38		*	62		*	100		*	
06:45	41		*	92		*	133		*	
07:00	32	234	*	96	436	*	128	670	*	
07:15	49		*	124		*	173		*	
07:30	80		*	124		*	204		*	
07:45	73		*	92		*	165		*	
08:00	0		*	0		*	0		*	
08:15	*		*	*		*	*		*	
08:30	*		*	*		*	*		*	
08:45	*		*	*		*	*		*	
09:00	*		*	*		*	*		*	
09:15	*		*	*		*	*		*	
09:30	*		*	*		*	*		*	
09:45	*		*	*		*	*		*	
10:00	*		*	*		*	*		*	
10:15	*		*	*		*	*		*	
10:30	*		*	*		*	*		*	
10:45	*		*	*		*	*		*	
11:00	*		*	*		*	*		*	
11:15	*		*	*		*	*		*	
11:30	*		*	*		*	*		*	
11:45	*		*	*		*	*		*	
Totals	441		0	863		0	1,304		0	
Split%	33.8		*	66.2		*				
Day Totals		441			863			1,304		
Day Splits		33.8			66.2					
Peak Hour	07:00		*	06:45		*	07:00		*	
Volume	234		*	436		*	670		*	
Factor	0.73		*	0.88		*	0.82		*	

APPENDIX B

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 C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	64	0	1	32	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	86	0	2	64	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1536	1510					808	
v/c	0.00	0.00					0.02	
95% queue length	0.00	0.00					0.07	
Control Delay	7.3	7.4					9.6	
LOS	A	A					A	
Approach Delay							9.6	
Approach LOS							A	

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	72	3	14	77	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	103	4	16	91	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1490	1484		854			744	
v/c	0.00	0.01		0.03			0.02	
95% queue length	0.00	0.03		0.10			0.05	
Control Delay	7.4	7.5		9.4			9.9	
LOS	A	A		A			A	
Approach Delay				9.4			9.9	
Approach LOS				A			A	

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs):

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		504	9	78	344	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		560	10	101	446	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13		84			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	15		100			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		101		115				
C(m) (vph)		1002		420				
v/c		0.10		0.27				
95% queue length		0.34		1.10				
Control Delay		9.0		16.8				
LOS		A		C				
Approach Delay				16.8				
Approach LOS				C				

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed:
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		335	10	79	346	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		389	11	87	384	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		62			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	8		75			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		87		83				
C(m) (vph)		1159		574				
v/c		0.08		0.14				
95% queue length		0.24		0.51				
Control Delay		8.4		12.3				
LOS		A		B				
Approach Delay				12.3				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	9	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		42		47	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	
Duration, T 1.00 hrs.								

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		42		47	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.6	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1		-0.1		0.1		-0.3	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		42		47	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.12		4.50		4.15	
x, final value	0.09		0.14		0.05		0.05	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.1	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		42		47	
Service Time	2.3		2.1		2.5		2.1	
Utilization, x	0.09		0.14		0.05		0.05	
Dep. headway, hd	4.32		4.12		4.50		4.15	
Capacity	329		376		292		297	
Delay	7.77		7.81		7.75		7.38	
LOS	A		A		A		A	
Approach:								
Delay	7.77		7.81		7.75		7.38	
LOS	A		A		A		A	

Intersection Delay 7.72 Intersection LOS A

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	23	22	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		31		83	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		31		83	
Left-Turn	29		2		11		30	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.4		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	-0.0		-0.2		0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		31		83	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.07	
hd, final value	4.18		4.04		4.31		4.18	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		31		83	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.18		4.04		4.31		4.18	
Capacity	337		308		281		333	
Delay	7.65		7.32		7.48		7.63	
LOS	A		A		A		A	
Approach:								
Delay	7.65		7.32		7.48		7.63	
LOS	A		A		A		A	

Intersection Delay 7.55 Intersection LOS A

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TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: Existing
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		278	1	9	153	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		334	1	13	231	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		7			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		9			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		11				
C(m) (vph)		1224		647				
v/c		0.01		0.02				
95% queue length		0.03		0.05				
Control Delay		8.0		10.7				
LOS		A		B				
Approach Delay				10.7				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.1

TWO-WAY STOP CONTROL SUMMARY

Analyst:	IW
Agency/Co.:	Wilson Okamoto Corporation
Date Performed:	6/9/2006
Analysis Time Period:	PM Peak Period
Intersection:	Kula Hwy/Lower Kula Rd (South)
Jurisdiction:	State
Units: U. S. Customary	
Analysis Year:	Existing
Project ID: 7551-01 Kula Ridge	
East/West Street:	Lower Kula Rd (South)
North/South Street:	Kula Hwy
Intersection Orientation: NS	Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		234	4	9	211	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		254	4	9	226	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		4			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		6			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		17				
C(m) (vph)		1307		595				
v/c		0.01		0.03				
95% queue length		0.02		0.09				
Control Delay		7.8		11.2				
LOS		A		B				
Approach Delay				11.2				
Approach LOS				B				

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS PROJECTED YEAR 2009 PEAK PERIOD TRAFFIC ANALYSIS WITHOUT PROJECT

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 5/9/2006
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	64	0	1	33	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	86	0	2	66	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1533	1510					806	
v/c	0.00	0.00					0.02	
95% queue length	0.00	0.00					0.07	
Control Delay	7.3	7.4					9.6	
LOS	A	A					A	
Approach Delay							9.6	
Approach LOS							A	

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	72	3	14	78	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	104	4	16	92	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1489	1483		852			741	
v/c	0.00	0.01		0.03			0.02	
95% queue length	0.00	0.03		0.10			0.05	
Control Delay	7.4	7.5		9.4			9.9	
LOS	A	A		A			A	
Approach Delay				9.4			9.9	
Approach LOS				A			A	

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		560	9	79	382	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		622	10	102	496	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13		84			
Peak Hour Factor, PHF	0.84		0.84			
Hourly Flow Rate, HFR	15		100			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		102		115				
C(m) (vph)		951		377				
v/c		0.11		0.31				
95% queue length		0.36		1.27				
Control Delay		9.2		18.7				
LOS		A		C				
Approach Delay				18.7				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/06
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		373	11	80	384	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		433	12	88	426	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		62			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	8		75			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		88		83				
C(m) (vph)		1115		534				
v/c		0.08		0.16				
95% queue length		0.26		0.55				
Control Delay		8.5		13.0				
LOS		A		B				
Approach Delay				13.0				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	10	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		43		48	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		43		48	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.5	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.1		-0.1		0.1		-0.2	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		43		48	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.13		4.50		4.15	
x, final value	0.09		0.14		0.05		0.06	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		43		48	
Service Time	2.3		2.1		2.5		2.2	
Utilization, x	0.09		0.14		0.05		0.06	
Dep. headway, hd	4.32		4.13		4.50		4.15	
Capacity	329		376		293		298	
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	
Approach:								
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	

Intersection Delay 7.73 Intersection LOS A

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction: City
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	24	23	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		30		86	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		30		86	
Left-Turn	29		2		10		32	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.3		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	-0.0		-0.2		0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		30		86	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.08	
hd, final value	4.19		4.04		4.31		4.19	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		30		86	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.19		4.04		4.31		4.19	
Capacity	337		308		280		336	
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Approach:								
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	

Intersection Delay 7.56 Intersection LOS A

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		309	1	9	170	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		372	1	13	257	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		8			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		10			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		12				
C(m) (vph)		1185		614				
v/c		0.01		0.02				
95% queue length		0.03		0.06				
Control Delay		8.1		11.0				
LOS		A		B				
Approach Delay				11.0				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.2

TWO-WAY STOP CONTROL SUMMARY

Analyst: IW
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 6/9/2006
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction: State
Units: U. S. Customary
Analysis Year: 2009 Without Project
Project ID: 7551-01 Kula Ridge
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		261	4	9	234	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		283	4	9	251	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		5			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		8			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		19				
C(m) (vph)		1275		575				
v/c		0.01		0.03				
95% queue length		0.02		0.10				
Control Delay		7.8		11.5				
LOS		A		B				
Approach Delay				11.5				
Approach LOS				B				

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2009 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: cl
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: AM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	132	0	1	57	1
Peak-Hour Factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50
Hourly Flow Rate, HFR	1	178	0	2	114	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	0
Peak Hour Factor, PHF	1.00	1.00	1.00	0.60	0.60	0.60
Hourly Flow Rate, HFR	0	0	0	19	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		0			19	
C(m) (vph)	1473	1398					652	
v/c	0.00	0.00					0.03	
95% queue length	0.00	0.00					0.09	
Control Delay	7.4	7.6					10.7	
LOS	A	A					B	
Approach Delay							10.7	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: PM Peak Period
Intersection: Alanui Dr/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Alanui Dr
North/South Street: Lower Kula Rd
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	117	3	14	157	10
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.84	0.84	0.84
Hourly Flow Rate, HFR	0	169	4	16	186	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	13	3	0	1
Peak Hour Factor, PHF	0.71	0.71	0.71	0.33	0.33	0.33
Hourly Flow Rate, HFR	9	0	18	9	0	3
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage		No	/		No	/
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	0	16		27			12	
C(m) (vph)	1376	1404		734			594	
v/c	0.00	0.01		0.04			0.02	
95% queue length	0.00	0.03		0.11			0.06	
Control Delay	7.6	7.6		10.1			11.2	
LOS	A	A		B			B	
Approach Delay				10.1			11.2	
Approach LOS				B			B	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		560	11	101	382	
Peak-Hour Factor, PHF		0.90	0.90	0.77	0.77	
Hourly Flow Rate, HFR		622	12	131	496	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR			LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	22		143			
Peak Hour Factor, PHF	0.90		0.90			
Hourly Flow Rate, HFR	24		158			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		131	24		158			
C(m) (vph)		949	205		483			
v/c		0.14	0.12		0.33			
95% queue length		0.48	0.40		1.45			
Control Delay		9.4	24.9		16.1			
LOS		A	C		C			
Approach Delay				17.2				
Approach LOS				C				

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TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (North)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Lower Kula Rd (North)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		373	20	149	384	
Peak-Hour Factor, PHF		0.86	0.86	0.90	0.90	
Hourly Flow Rate, HFR		433	23	165	426	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	12		102			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	14		124			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		165	14		124			
C(m) (vph)		1105	242		614			
v/c		0.15	0.06		0.20			
95% queue length		0.53	0.18		0.76			
Control Delay		8.8	20.8		12.3			
LOS		A	C		B			
Approach Delay				13.2				
Approach LOS				B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: AM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: DOT Distribution
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	21	5	5	78	19	14	11	2	8	10	21
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.61		0.79	
Flow Rate	79		126		43		48	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	
Duration, T 1.00 hrs.								

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	79		126		43		48	
Left-Turn	42		6		22		10	
Right-Turn	7		23		3		26	
Prop. Left-Turns	0.5		0.0		0.5		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.5	

Prop. Heavy Vehicle	0.0	0.0	0.0	0.0
Geometry Group	1	1	1	1
Adjustments Exhibit 17-33:				
hLT-adj	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7
hadj, computed	0.1	-0.1	0.1	-0.2

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	79		126		43		48	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07		0.11		0.04		0.04	
hd, final value	4.32		4.13		4.50		4.15	
x, final value	0.09		0.14		0.05		0.06	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.3		2.1		2.5		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	79		126		43		48	
Service Time	2.3		2.1		2.5		2.2	
Utilization, x	0.09		0.14		0.05		0.06	
Dep. headway, hd	4.32		4.13		4.50		4.15	
Capacity	329		376		293		298	
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	
Approach:								
Delay	7.78		7.82		7.76		7.40	
LOS	A		A		A		A	

Intersection Delay 7.73 Intersection LOS A

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ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: PM Peak Period
Intersection: Copp Rd/Lower Kula Rd
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Copp Rd
North/South Street: Lower Kula Rd

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	28	37	18	2	28	21	10	14	5	24	23	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.94		0.85		0.91		0.75	
Flow Rate	87		58		30		86	
% Heavy Veh	2		2		2		2	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	87		58		30		86	
Left-Turn	29		2		10		32	
Right-Turn	19		24		5		24	
Prop. Left-Turns	0.3		0.0		0.3		0.4	
Prop. Right-Turns	0.2		0.4		0.2		0.3	

Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	-0.0		-0.2		0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	87		58		30		86	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.08		0.05		0.03		0.08	
hd, final value	4.19		4.04		4.31		4.19	
x, final value	0.10		0.07		0.04		0.10	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		2.0		2.3		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	87		58		30		86	
Service Time	2.2		2.0		2.3		2.2	
Utilization, x	0.10		0.07		0.04		0.10	
Dep. headway, hd	4.19		4.04		4.31		4.19	
Capacity	337		308		280		336	
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Approach:								
Delay	7.66		7.32		7.47		7.66	
LOS	A		A		A		A	
Intersection Delay 7.56			Intersection LOS A					

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TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: AM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction:
Units: U. S. Customary
Analysis Year: 2009 With Project
Project ID: DOT Distribution
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		311	1	9	179	
Peak-Hour Factor, PHF		0.83	0.83	0.66	0.66	
Hourly Flow Rate, HFR		374	1	13	271	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	2		8			
Peak Hour Factor, PHF	0.75		0.75			
Hourly Flow Rate, HFR	2		10			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		13		12				
C(m) (vph)		1183		610				
v/c		0.01		0.02				
95% queue length		0.03		0.06				
Control Delay		8.1		11.0				
LOS		A		B				
Approach Delay				11.0				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: Wilson Okamoto Corporation
Date Performed: 10/17/08
Analysis Time Period: PM Peak Period
Intersection: Kula Hwy/Lower Kula Rd (South)
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: DOT Distribution
East/West Street: Lower Kula Rd (South)
North/South Street: Kula Hwy
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		270	4	9	239	
Peak-Hour Factor, PHF		0.92	0.92	0.93	0.93	
Hourly Flow Rate, HFR		293	4	9	256	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7		5			
Peak Hour Factor, PHF	0.61		0.61			
Hourly Flow Rate, HFR	11		8			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		9		19				
C(m) (vph)		1264		565				
v/c		0.01		0.03				
95% queue length		0.02		0.10				
Control Delay		7.9		11.6				
LOS		A		B				
Approach Delay				11.6				
Approach LOS				B				

9. KULA RIDGE TIAR - SUPPLEMENTAL LETTER

WILSON OKAMOTO
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7551-03
September 14, 2009

Mr. Clayton Nishikawa
Kula Ridge, LLC
1849 Wili Pa Loop
Wailuku, HI 96793

Subject: Kula Ridge TIAR – Supplemental Letter

Dear Mr. Nishikawa:

As requested, we conducted additional field investigations in the vicinity of the proposed project site for the Kula Ridge development to address concerns expressed by Kula Community Association (KCA) regarding the nearby Haleakala Waldorf School. The following is a summary of our findings.

Field Investigation

Turning movement count surveys were previously conducted in conjunction with the preparation of a traffic impact study for the proposed Kula Ridge development in 2005 and 2006. These surveys were conducted during the morning peak period between 6:00 AM and 8:00 AM, and the afternoon peak period between 3:00 PM and 6:00 PM to capture the commuter peak hours of traffic in the vicinity of the project. The commuter peak hours of traffic typically represent the highest volumes of traffic and, as such, are utilized as the basis of traffic studies to determine the greatest impact that proposed projects may have on the surrounding roadway network. However, due to concerns expressed by the KCA with regards to the school peak hours of traffic in the vicinity of the Haleakala Waldorf School, an additional field investigation was conducted on September 2-3, 2009 which consisted of manual turning movement count surveys during the morning hours of 6:00 AM and 9:00 AM, and the afternoon hours of 2:00 and 5:00 PM at the following locations:

- Lower Kula Road, Alanui Place, and the Kula Community Center driveway
- Lower Kula Road and the Haleakala Waldorf School driveways
- Lower Kula Road and Kula Highway (north)

Appendix A includes the traffic count data.

Year 2009 Peak Hour Traffic

The commuter peak hours of traffic observed in 2005 and 2006 occurred during the morning hours of 7:00 AM and 8:00 AM, and the afternoon hours of 3:45 AM and 4:45 PM. The additional field investigation conducted in 2009 indicated similar morning and afternoon commuter peak hours of traffic at the intersections of Lower Kula Road with Kula Highway and Alanui Place. The morning school peak hour of traffic along Lower Kula Road at the intersection with the driveway for the Haleakala Waldorf School occurs between the hours of 7:30 AM and 8:30 AM, and the afternoon school peak hour of traffic occurs between the hours of 2:15 PM and 3:15 PM.

At the intersection of Lower Kula Road with Kula Highway, the southbound left-turn and through traffic movement along the highway operates at LOS "A" during both school peak periods. The westbound approach of Lower Kula Road operates at LOS "C" during the morning school peak period and LOS "B" during the afternoon school peak period. Traffic queues periodically formed on the westbound approach of the intersection with average queue lengths of 1-3 vehicles observed during both peak periods.

At the intersection of Lower Kula Road with the driveway for the Haleakala Waldorf School, all approaches of the intersection have one lane that serves all allowable movements. During the morning and afternoon school peak periods, the northbound left-turn and through traffic movement along Lower Kula Road operates at LOS "A" while the eastbound approach from the Haleakala Waldorf School operates at LOS "B." Traffic queues periodically formed on the school driveway approach with average queue lengths of 2-3 vehicles observed during both peak periods. In addition, vehicles entering the school occasionally created queues along the southbound approach of Lower Kula Road during the morning school peak hour of traffic with queue lengths of 1-2 vehicles observed during that period. Pedestrian traffic in the vicinity of the school was also monitored during the traffic count survey. During the 3 hour count periods, no pedestrians were observed traveling along Lower Kula Road during the morning peak period and 5 pedestrians were observed traveling along Lower Kula Road during the afternoon peak period.

Projected Peak Hour Traffic With Project

As detailed in the traffic impact study, the trip generation methodology is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE). The morning school peak hour of traffic overlaps with the morning commuter peak hour of traffic. As such, the trip generation characteristics during the morning school peak hour of traffic is expected to be

similar to the morning commuter peak hour of traffic with a total of 91 vehicles expected to be generated by the proposed project during that period. However, the afternoon school peak hour of traffic occurs earlier than the afternoon commuter peak period and, as such, site-generated traffic along the surrounding roadways is significantly less than during the commuter peak period. During an off-peak period, the project is expected to generate a total of 24 vehicles. These vehicles were distributed along the surrounding roadway networks utilizing the same methodology as the morning commuter peak period.

At the intersection of Lower Kula Road with Kula Highway, the southbound left-turn and through traffic movement along the highway is expected to continue operating at LOS "A" during both school peak periods. The westbound approach of Lower Kula Road is expected to be modified with the development of the Kula Ridge project to provide dedicated turning lanes at the highway. The left-turn traffic movement along Lower Kula Road is expected to operate at LOS "C" during both peak periods while the right-turn traffic movement is expected to operate at LOS "C" and LOS "B" during the morning and afternoon school peak periods, respectively.

At the intersection of Lower Kula Road with the driveway for the Haleakala Waldorf School, the northbound left-turn and through traffic movement along Lower Kula Road is expected to continue operating at LOS "A" during both school peak periods while the eastbound approach from the Haleakala Waldorf School is expected to continue operating at LOS "B" during both school peak periods.

LOS calculations are included in Appendix B.

Recommendations and Conclusion

With the implementation of the recommendations included in the traffic impact study, the proposed Kula Ridge development is not expected to have a significant impact on vehicular and pedestrian traffic operations in the vicinity of the project site during school peak periods. The critical movements at the study intersections in the vicinity of the school are expected to continue operating at levels of service similar to without project conditions and minimal pedestrian traffic was observed along Lower Kula Road in the vicinity of the Haleakala Waldorf School during both school peak periods. In addition, enhanced management of traffic circulation within the school could eliminate the existing queuing of entering school traffic along Lower Kula Road thereby minimizing conflicts between school and project traffic along that roadway.

Should you have any questions or require additional information, please contact Mr. Pete Pascua or myself at 946-2277.

Sincerely,

Cathy Leong, P.E.

APPENDIX A

TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5675
Counted By:RY
Weather:Clear

File Name : LKulaAlanui AM
Site Code : 00000001
Start Date : 9/3/2009
Page No : 1

Groups Printed- Unshifted

	L Kula Road Southbound					Kula Community Center Dwy. Westbound					L Kula Road Northbound					Alanui Place Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1	9
06:15 AM	0	3	0	0	3	0	0	1	0	1	1	6	0	0	7	1	1	1	0	3	14
06:30 AM	0	2	0	0	2	0	0	0	0	0	0	7	0	2	9	0	0	0	0	0	11
06:45 AM	0	5	0	0	5	0	0	1	0	1	1	15	0	0	16	4	0	0	0	4	26
Total	0	14	0	0	14	0	0	2	0	2	2	32	0	2	36	6	1	1	0	8	60
07:00 AM	0	7	1	0	8	0	0	0	0	0	0	15	0	1	16	2	0	1	0	3	27
07:15 AM	1	5	0	0	6	0	0	1	0	1	1	15	0	0	16	3	0	0	0	3	26
07:30 AM	0	11	1	0	12	0	0	0	0	0	0	14	0	0	14	0	0	2	0	2	28
07:45 AM	0	13	0	1	14	1	0	1	0	2	3	16	2	0	21	0	1	0	1	2	39
Total	1	36	2	1	40	1	0	2	0	3	4	60	2	1	67	5	1	3	1	10	120
08:00 AM	0	10	0	0	10	0	0	0	0	0	1	21	0	0	22	2	0	2	0	4	36
08:15 AM	2	17	2	0	21	1	0	1	4	6	0	20	0	0	20	1	0	0	2	3	50
08:30 AM	4	8	0	0	12	0	0	0	0	0	0	7	2	0	9	0	0	0	0	0	21
08:45 AM	4	11	0	0	15	0	0	0	0	0	0	11	3	0	14	1	0	0	0	1	30
Total	10	46	2	0	58	1	0	1	4	6	1	59	5	0	65	4	0	2	2	8	137
Grand Total	11	96	4	1	112	2	0	5	4	11	7	151	7	3	168	15	2	6	3	26	317
Apprch %	9.8	85.7	3.6	0.9		18.2	0	45.5	36.4		4.2	89.9	4.2	1.8		57.7	7.7	23.1	11.5		
Total %	3.5	30.3	1.3	0.3	35.3	0.6	0	1.6	1.3	3.5	2.2	47.6	2.2	0.9	53	4.7	0.6	1.9	0.9	8.2	

	L Kula Road Southbound					Kula Community Center Dwy. Westbound					L Kula Road Northbound					Alanui Place Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	11	1	0	12	0	0	0	0	0	0	14	0	0	14	0	0	**2**	0	2	28
07:45 AM	0	13	0	**1**	14	1	0	**1**	0	2	**3**	16	**2**	0	21	0	1	0	1	2	39
08:00 AM	0	10	0	0	10	0	0	0	0	0	1	**21**	0	0	**22**	**2**	0	2	0	**4**	36
08:15 AM	**2**	**17**	**2**	0	**21**	1	0	1	**4**	**6**	0	20	0	0	20	1	0	0	**2**	3	**50**
Total Volume	2	51	3	1	57	2	0	2	4	8	4	71	2	0	77	3	1	4	3	11	153
% App. Total	3.5	89.5	5.3	1.8		25	0	25	50		5.2	92.2	2.6	0		27.3	9.1	36.4	27.3		
PHF	.250	.750	.375	.250	.679	.500	.000	.500	.250	.333	.333	.845	.250	.000	.875	.375	.250	.500	.375	.688	.765

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5675
Counted By:RY
Weather:Clear

File Name : LKulaAlanui PM
Site Code : 00000001
Start Date : 9/2/2009
Page No : 1

Groups Printed- Unshifted

	L Kula Road Southbound					Kula Community Center Dwy. Westbound					L Kula Road Northbound					Alanui Place Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	1	15	0	0	16	1	0	1	0	2	0	12	0	0	12	0	0	0	0	0	30
02:15 PM	0	13	1	0	14	0	0	0	0	0	1	19	1	0	21	1	0	0	0	1	36
02:30 PM	0	18	0	0	18	0	0	2	0	2	0	17	1	0	18	1	0	2	2	5	43
02:45 PM	4	21	1	0	26	0	0	0	0	0	0	11	0	0	11	0	0	0	1	1	38
Total	5	67	2	0	74	1	0	3	0	4	1	59	2	0	62	2	0	2	3	7	147
03:00 PM	1	18	1	0	20	0	0	0	4	4	0	13	0	0	13	0	0	0	0	0	37
03:15 PM	3	19	2	0	24	0	0	0	0	0	0	12	1	0	13	0	0	0	6	6	43
03:30 PM	2	14	2	0	18	0	0	1	0	1	0	13	1	0	14	1	0	0	1	2	35
03:45 PM	1	14	1	0	16	0	0	0	0	0	1	16	1	0	18	0	0	0	2	2	36
Total	7	65	6	0	78	0	0	1	4	5	1	54	3	0	58	1	0	0	9	10	151
04:00 PM	1	22	0	0	23	1	0	0	0	1	1	10	0	0	11	0	0	0	1	1	36
04:15 PM	2	22	1	0	25	0	0	0	0	0	0	17	1	1	19	1	0	1	0	2	46
04:30 PM	3	11	1	0	15	3	0	5	0	8	1	13	0	0	14	0	0	0	0	0	37
04:45 PM	0	23	1	0	24	1	0	1	0	2	1	18	0	0	19	0	0	0	0	0	45
Total	6	78	3	0	87	5	0	6	0	11	3	58	1	1	63	1	0	1	1	3	164
Grand Total	18	210	11	0	239	6	0	10	4	20	5	171	6	1	183	4	0	3	13	20	462
Apprch %	7.5	87.9	4.6	0		30	0	50	20		2.7	93.4	3.3	0.5		20	0	15	65		
Total %	3.9	45.5	2.4	0	51.7	1.3	0	2.2	0.9	4.3	1.1	37	1.3	0.2	39.6	0.9	0	0.6	2.8	4.3	

	L Kula Road Southbound					Kula Community Center Dwy. Westbound					L Kula Road Northbound					Alanui Place Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	22	0	0	23	1	0	0	0	1	1	10	0	0	11	0	0	0	1	1	36
04:15 PM	2	22	1	0	25	0	0	0	0	0	0	17	1	1	19	1	0	1	0	2	46
04:30 PM	3	11	1	0	15	3	0	5	0	8	1	13	0	0	14	0	0	0	0	0	37
04:45 PM	0	23	1	0	24	1	0	1	0	2	1	18	0	0	19	0	0	0	0	0	45
Total Volume	6	78	3	0	87	5	0	6	0	11	3	58	1	1	63	1	0	1	1	3	164
% App. Total	6.9	89.7	3.4	0		45.5	0	54.5	0		4.8	92.1	1.6	1.6		33.3	0	33.3	33.3		
PHF	.500	.848	.750	.000	.870	.417	.000	.300	.000	.344	.750	.806	.250	.250	.829	.250	.000	.250	.250	.375	.891

Wilson Okamoto Corporation
1907 S. Beretania St., Suite 400
Honolulu, HI 96826

Counter:D4-5673
Counted By:TO
Weather:Clear

File Name : Waldorf Dwy. At School AM rev
Site Code : 00000001
Start Date : 9/3/2009
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound					Westbound	Lower Kula Road Northbound					School Driveway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	4	0	0	4	0	0	5	0	0	5	0	0	0	0	0	9
06:15 AM	0	7	0	0	7	0	0	8	0	0	8	0	0	0	0	0	15
06:30 AM	0	9	0	0	9	0	0	7	0	0	7	0	0	0	0	0	16
06:45 AM	0	16	0	0	16	0	1	19	0	0	20	1	0	0	0	1	37
Total	0	36	0	0	36	0	1	39	0	0	40	1	0	0	0	1	77
07:00 AM	0	16	0	0	16	0	0	17	0	0	17	0	0	0	0	0	33
07:15 AM	0	16	0	0	16	0	1	18	0	0	19	0	0	0	0	0	35
07:30 AM	0	16	4	0	20	0	2	12	0	0	14	0	0	0	0	0	34
07:45 AM	0	20	11	0	31	0	7	10	0	0	17	4	0	3	0	7	55
Total	0	68	15	0	83	0	10	57	0	0	67	4	0	3	0	7	157
08:00 AM	0	22	35	0	57	0	8	10	0	0	18	17	0	1	0	18	93
08:15 AM	0	13	27	0	40	0	7	17	0	0	24	28	0	12	0	40	104
08:30 AM	0	5	0	0	5	0	0	9	0	0	9	15	0	4	0	19	33
08:45 AM	0	11	3	0	14	0	3	9	0	0	12	3	0	3	0	6	32
Total	0	51	65	0	116	0	18	45	0	0	63	63	0	20	0	83	262
Grand Total	0	155	80	0	235	0	29	141	0	0	170	68	0	23	0	91	496
Apprch %	0	66	34	0			17.1	82.9	0	0		74.7	0	25.3	0		
Total %	0	31.2	16.1	0	47.4	0	5.8	28.4	0	0	34.3	13.7	0	4.6	0	18.3	

	Lower Kula Road Southbound					Westbound	Lower Kula Road Northbound					School Driveway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	16	4	0	20	0	2	12	0	0	14	0	0	0	0	0	34
07:45 AM	0	20	11	0	31	0	7	10	0	0	17	4	0	3	0	7	55
08:00 AM	0	**22**	**35**	0	**57**	0	**8**	10	0	0	18	17	0	1	0	18	93
08:15 AM	0	13	27	0	40	0	7	**17**	0	0	**24**	**28**	0	**12**	0	**40**	**104**
Total Volume	0	71	77	0	148	0	24	49	0	0	73	49	0	16	0	65	286
% App. Total	0	48	52	0			32.9	67.1	0	0		75.4	0	24.6	0		
PHF	.000	.807	.550	.000	.649	.000	.750	.721	.000	.000	.760	.438	.000	.333	.000	.406	.688

Wilson Okamoto Corporation
1907 S. Beretania St., Suite 400
Honolulu, HI 96826

Counter:D4-5673
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Weather:Clear

File Name : Waldorf Dwy. At School PM rev
Site Code : 00000001
Start Date : 9/2/2009
Page No : 1

Groups Printed- Unshifted

	Lower Kula Road Southbound					Westbound	Lower Kula Road Northbound					School Driveway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	0	18	4	0	22	0	0	13	0	0	13	1	0	0	0	1	36
02:15 PM	0	13	30	0	43	0	7	15	0	0	22	5	0	0	0	5	70
02:30 PM	0	12	22	0	34	0	7	13	0	0	20	40	0	5	0	45	99
02:45 PM	0	21	6	0	27	0	0	11	0	0	11	18	0	9	0	27	65
Total	0	64	62	0	126	0	14	52	0	0	66	64	0	14	0	78	270
03:00 PM	0	17	1	0	18	0	1	14	0	0	15	4	0	4	0	8	41
03:15 PM	0	22	1	0	23	0	0	13	0	0	13	4	0	3	0	7	43
03:30 PM	0	17	1	0	18	0	0	15	0	0	15	3	0	1	1	5	38
03:45 PM	0	14	1	0	15	0	0	19	0	0	19	1	0	1	0	2	36
Total	0	70	4	0	74	0	1	61	0	0	62	12	0	9	1	22	158
04:00 PM	0	23	0	0	23	0	0	10	0	0	10	3	0	0	1	4	37
04:15 PM	0	24	0	0	24	0	1	18	0	0	19	1	0	1	0	2	45
04:30 PM	0	13	0	0	13	0	1	18	0	0	19	3	0	4	0	7	39
04:45 PM	0	23	0	0	23	0	0	19	0	0	19	0	0	1	0	1	43
Total	0	83	0	0	83	0	2	65	0	0	67	7	0	6	1	14	164
Grand Total	0	217	66	0	283	0	17	178	0	0	195	83	0	29	2	114	592
Apprch %	0	76.7	23.3	0			8.7	91.3	0	0		72.8	0	25.4	1.8		
Total %	0	36.7	11.1	0	47.8	0	2.9	30.1	0	0	32.9	14	0	4.9	0.3	19.3	

	Lower Kula Road Southbound					Westbound	Lower Kula Road Northbound					School Driveway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 04:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:15 PM																	
02:15 PM	0	13	**30**	0	**43**	0	**7**	**15**	0	0	**22**	5	0	0	0	5	70
02:30 PM	0	12	22	0	34	0	7	13	0	0	20	**40**	0	5	0	**45**	**99**
02:45 PM	0	**21**	6	0	27	0	0	11	0	0	11	18	0	9	0	27	65
03:00 PM	0	17	1	0	18	0	1	14	0	0	15	4	0	4	0	8	41
Total Volume	0	63	59	0	122	0	15	53	0	0	68	67	0	18	0	85	275
% App. Total	0	51.6	48.4	0			22.1	77.9	0	0		78.8	0	21.2	0		
PHF	.000	.750	.492	.000	.709	.000	.536	.883	.000	.000	.773	.419	.000	.500	.000	.472	.694

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5676
Counted By:ER
Weather:Clear

File Name : KulaHwy-KulaRd AM
Site Code : 00000001
Start Date : 9/3/2009
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound					L Kula Road Westbound					Kula Highway Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
06:00 AM	6	15	0	0	21	0	0	6	0	6	0	61	0	0	61	0	88
06:15 AM	2	27	0	0	29	0	0	8	0	8	0	81	0	0	81	0	118
06:30 AM	3	47	0	0	50	0	0	9	0	9	0	93	0	0	93	0	152
06:45 AM	7	54	0	0	61	1	0	19	0	20	0	96	0	0	96	0	177
Total	18	143	0	0	161	1	0	42	0	43	0	331	0	0	331	0	535
07:00 AM	6	66	0	0	72	2	0	20	0	22	0	143	0	0	143	0	237
07:15 AM	7	93	0	0	100	0	0	16	0	16	0	152	0	0	152	0	268
07:30 AM	20	99	0	0	119	1	0	11	0	12	0	117	1	0	118	0	249
07:45 AM	27	66	0	1	94	1	0	14	0	15	0	121	1	0	122	0	231
Total	60	324	0	1	385	4	0	61	0	65	0	533	2	0	535	0	985
08:00 AM	44	65	0	0	109	3	0	32	0	35	0	72	3	0	75	0	219
08:15 AM	38	53	0	0	91	3	0	43	0	46	0	76	3	0	79	0	216
08:30 AM	7	45	0	0	52	0	0	24	0	24	0	76	0	0	76	0	152
08:45 AM	16	52	0	0	68	2	0	12	0	14	0	68	2	0	70	0	152
Total	105	215	0	0	320	8	0	111	0	119	0	292	8	0	300	0	739
Grand Total	183	682	0	1	866	13	0	214	0	227	0	1156	10	0	1166	0	2259
Apprch %	21.1	78.8	0	0.1		5.7	0	94.3	0		0	99.1	0.9	0			
Total %	8.1	30.2	0	0	38.3	0.6	0	9.5	0	10	0	51.2	0.4	0	51.6	0	

	Kula Highway Southbound					L Kula Road Westbound					Kula Highway Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	6	66	0	0	72	**2**	0	**20**	0	**22**	0	143	0	0	143	0	237
07:15 AM	7	93	0	0	100	0	0	16	0	16	0	**152**	0	0	**152**	0	**268**
07:30 AM	20	**99**	0	0	**119**	1	0	11	0	12	0	117	1	0	118	0	249
07:45 AM	**27**	66	0	1	94	1	0	14	0	15	0	121	1	0	122	0	231
Total Volume	60	324	0	1	385	4	0	61	0	65	0	533	2	0	535	0	985
% App. Total	15.6	84.2	0	0.3		6.2	0	93.8	0		0	99.6	0.4	0			
PHF	.556	.818	.000	.250	.809	.500	.000	.763	.000	.739	.000	.877	.500	.000	.880	.000	.919

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
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Counter:D4-5676
Counted By:ER
Weather:Clear

File Name : KulaHwy-KulaRd PM
Site Code : 00000001
Start Date : 9/2/2009
Page No : 1

Groups Printed- Unshifted

	Kula Highway Southbound					L Kula Road Westbound					Kula Highway Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
02:00 PM	18	66	0	0	84	1	0	13	0	14	0	66	3	0	69	0	167
02:15 PM	41	60	0	0	101	1	0	20	0	21	0	71	4	0	75	0	197
02:30 PM	33	72	0	0	105	5	0	50	0	55	0	77	5	0	82	0	242
02:45 PM	28	72	0	0	100	2	0	32	0	34	0	61	3	0	64	0	198
Total	120	270	0	0	390	9	0	115	0	124	0	275	15	0	290	0	804
03:00 PM	15	60	0	0	75	2	0	15	0	17	0	70	2	0	72	0	164
03:15 PM	21	73	0	0	94	0	0	14	0	14	0	85	4	0	89	0	197
03:30 PM	22	62	0	0	84	1	0	17	0	18	0	93	1	0	94	0	196
03:45 PM	15	66	0	0	81	3	0	21	0	24	0	75	2	0	77	0	182
Total	73	261	0	0	334	6	0	67	0	73	0	323	9	0	332	0	739
04:00 PM	20	104	0	0	124	4	0	10	0	14	0	80	4	0	84	0	222
04:15 PM	19	89	0	0	108	2	0	15	0	17	0	64	4	0	68	0	193
04:30 PM	17	82	0	0	99	4	0	21	0	25	0	76	1	0	77	0	201
04:45 PM	21	100	0	0	121	3	0	19	0	22	0	73	1	0	74	0	217
Total	77	375	0	0	452	13	0	65	0	78	0	293	10	0	303	0	833
Grand Total	270	906	0	0	1176	28	0	247	0	275	0	891	34	0	925	0	2376
Apprch %	23	77	0	0		10.2	0	89.8	0		0	96.3	3.7	0			
Total %	11.4	38.1	0	0	49.5	1.2	0	10.4	0	11.6	0	37.5	1.4	0	38.9	0	

	Kula Highway Southbound					L Kula Road Westbound					Kula Highway Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 04:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	20	**104**	0	0	**124**	4	0	10	0	14	0	**80**	**4**	0	**84**	0	**222**
04:15 PM	19	89	0	0	108	2	0	15	0	17	0	64	4	0	68	0	193
04:30 PM	17	82	0	0	99	4	0	**21**	0	**25**	0	76	1	0	77	0	201
04:45 PM	**21**	100	0	0	121	3	0	19	0	22	0	73	1	0	74	0	217
Total Volume	77	375	0	0	452	13	0	65	0	78	0	293	10	0	303	0	833
% App. Total	**17**	83	0	0		16.7	0	83.3	**0**		0	96.7	3.3	0			
PHF	.917	.901	.000	.000	.911	.813	.000	.774	.000	.780	.000	.916	.625	.000	.902	.000	.938

APPENDIX B

CAPACITY ANALYSIS CALCULATIONS

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2009
Project ID:
East/West Street: Lower Kula Road
North/South Street: Kula Highway
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		386	8	129	283	
Peak-Hour Factor, PHF		0.81	0.81	0.87	0.87	
Hourly Flow Rate, HFR		476	9	148	325	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	8		100			
Peak Hour Factor, PHF	0.59		0.58			
Hourly Flow Rate, HFR	13		172			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		148		185				
C(m) (vph)		1078		517				
v/c		0.14		0.36				
95% queue length		0.48		1.66				
Control Delay		8.9		15.8				
LOS		A		C				
Approach Delay				15.8				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: PM Peak (School)
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2009
Project ID:
East/West Street: Lower Kula Road
North/South Street: Kula Highway
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		279	14	117	264	
Peak-Hour Factor, PHF		0.89	0.89	0.91	0.91	
Hourly Flow Rate, HFR		313	15	128	290	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	10		117			
Peak Hour Factor, PHF	0.58		0.57			
Hourly Flow Rate, HFR	17		205			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		128		222				
C(m) (vph)		1232		647				
v/c		0.10		0.34				
95% queue length		0.35		1.56				
Control Delay		8.3		13.5				
LOS		A		B				
Approach Delay				13.5				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2009
Project ID:
East/West Street: Haleakala Waldorf Dwy
North/South Street: Lower Kula Road
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	24	49			71	77
Peak-Hour Factor, PHF	0.76	0.76			0.65	0.65
Hourly Flow Rate, HFR	31	64			109	118
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration		LT				TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				49		16
Peak Hour Factor, PHF				0.41		0.41
Hourly Flow Rate, HFR				119		39
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			No /
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	31						158	
C(m) (vph)	1341						721	
v/c	0.02						0.22	
95% queue length	0.07						0.84	
Control Delay	7.7						11.4	
LOS	A						B	
Approach Delay							11.4	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: PM Peak (School)
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2009
Project ID:
East/West Street: Haleakala Waldorf Dwy
North/South Street: Lower Kula Road
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	15	53			63	59
Peak-Hour Factor, PHF	0.77	0.77			0.71	0.71
Hourly Flow Rate, HFR	19	68			88	83
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration		LT				TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				67		18
Peak Hour Factor, PHF				0.47		0.47
Hourly Flow Rate, HFR				142		38
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			No /
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	19						180	
C(m) (vph)	1406						774	
v/c	0.01						0.23	
95% queue length	0.04						0.91	
Control Delay	7.6						11.1	
LOS	A						B	
Approach Delay							11.1	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Projected w/ proj
Project ID:
East/West Street: Lower Kula Road
North/South Street: Kula Highway
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		386	10	151	283	
Peak-Hour Factor, PHF		0.81	0.81	0.87	0.87	
Hourly Flow Rate, HFR		476	12	173	325	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	17		159			
Peak Hour Factor, PHF	0.59		0.58			
Hourly Flow Rate, HFR	28		274			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		173	28		274			
C(m) (vph)		1075	215		584			
v/c		0.16	0.13		0.47			
95% queue length		0.57	0.45		2.61			
Control Delay		9.0	24.2		16.6			
LOS		A	C		C			
Approach Delay				17.3				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: PM Peak (School)
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Projected w/ proj
Project ID:
East/West Street: Lower Kula Road
North/South Street: Kula Highway
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		279	15	128	264	
Peak-Hour Factor, PHF		0.89	0.89	0.91	0.91	
Hourly Flow Rate, HFR		313	16	140	290	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration		TR		LT		
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	11		128			
Peak Hour Factor, PHF	0.58		0.57			
Hourly Flow Rate, HFR	18		224			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L		R			
v (vph)		140	18		224			
C(m) (vph)		1231	314		720			
v/c		0.11	0.06		0.31			
95% queue length		0.38	0.18		1.35			
Control Delay		8.3	17.2		12.3			
LOS		A	C		B			
Approach Delay				12.6				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Proj w/ project
Project ID:
East/West Street: Haleakala Waldorf Dwy
North/South Street: Lower Kula Road
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	24	117			95	77
Peak-Hour Factor, PHF	0.76	0.76			0.65	0.65
Hourly Flow Rate, HFR	31	153			146	118
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration		LT				TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				49		16
Peak Hour Factor, PHF				0.41		0.41
Hourly Flow Rate, HFR				119		39
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			No /
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	31						158	
C(m) (vph)	1300						624	
v/c	0.02						0.25	
95% queue length	0.07						1.01	
Control Delay	7.8						12.7	
LOS	A						B	
Approach Delay							12.7	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.:
Date Performed: 9/12/2009
Analysis Time Period: PM Peak (School)
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Projected w/ project
Project ID:
East/West Street: Haleakala Waldorf Dwy
North/South Street: Lower Kula Road
Intersection Orientation: NS Study period (hrs): 1.00

Vehicle Volumes and Adjustments

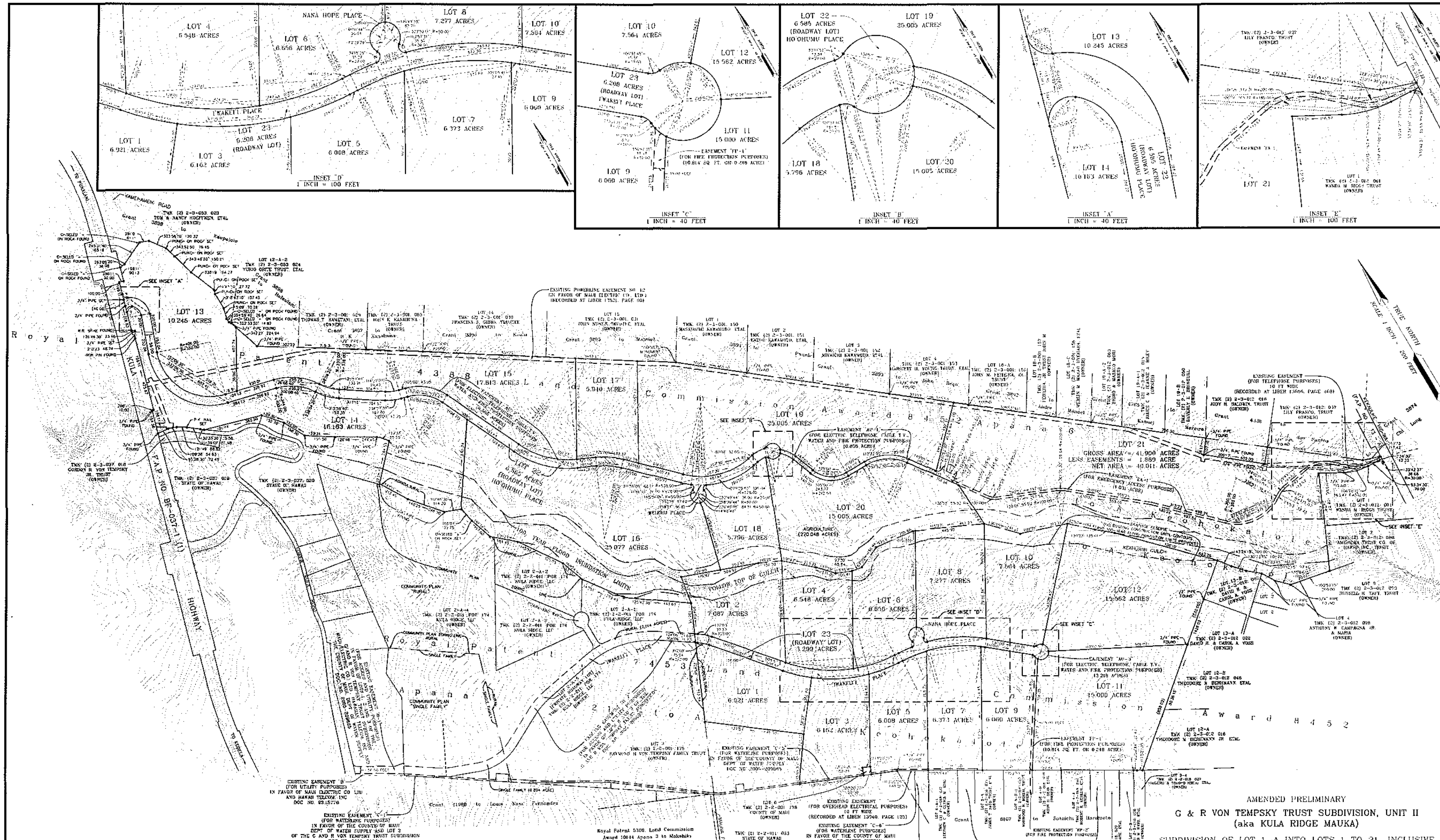
Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	15	65			75	59
Peak-Hour Factor, PHF	0.77	0.77			0.71	0.71
Hourly Flow Rate, HFR	19	84			105	83
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration		LT				TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				67		18
Peak Hour Factor, PHF				0.47		0.47
Hourly Flow Rate, HFR				142		38
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			No /
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	19						180	
C(m) (vph)	1386						744	
v/c	0.01						0.24	
95% queue length	0.04						0.95	
Control Delay	7.6						11.4	
LOS	A						B	
Approach Delay							11.4	
Approach LOS							B	

10. KULA RIDGE MAUKA SUBDIVISION MAP AND KULA RIDGE CONSOLIDATION MAP



AMENDED PRELIMINARY

G & R VON TEMPSKY TRUST SUBDIVISION, UNIT II (aka KULA RIDGE MAUKA)

SUBDIVISION OF LOT 1-A INTO LOTS 1 TO 21, INCLUSIVE AND ROADWAY LOTS 22 AND 23 AND DESIGNATION OF EASEMENTS "AU-1", "AU-2", "AU-3", "EA-1" AND "FP-1"

TOTAL AREA = 270.047 ACRES

Being a portion of Royal Patent 4388, Land Commission Award 8452, Apana 6 to A. Keohokalole and a portion of Royal Patent 7453, Land Commission Award 8452, Apana 21 to A. Keohokalole

SITUATED AT KEALAHOU, KULA, MAUI, HAWAI'I

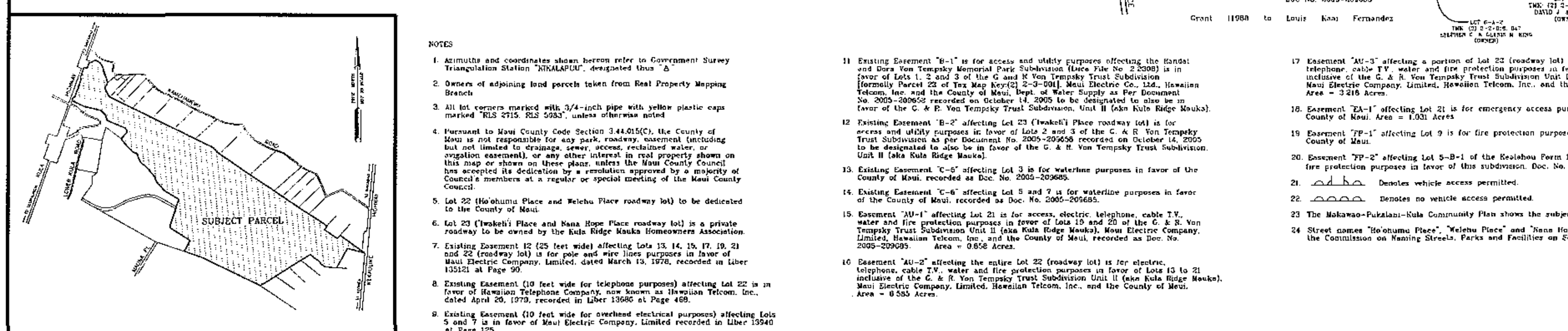
OWNER: KULA RIDGE MAUKA, LLC
1849 WILI PA LOOP
Wailuku HI 96793

Prepared for:
Nishikawa Architects INC
1849 Wili Pa Loop
Wailuku HI 96793

Scale: 1 Inch = 200 Feet
Date: January 17, 2008
Revised: May 20, 2009

This plat was prepared from a survey on the ground performed by me or under my supervision.

BRUCE R. LEE
Licensed Professional Land Surveyor Certificate No. 5983-LS



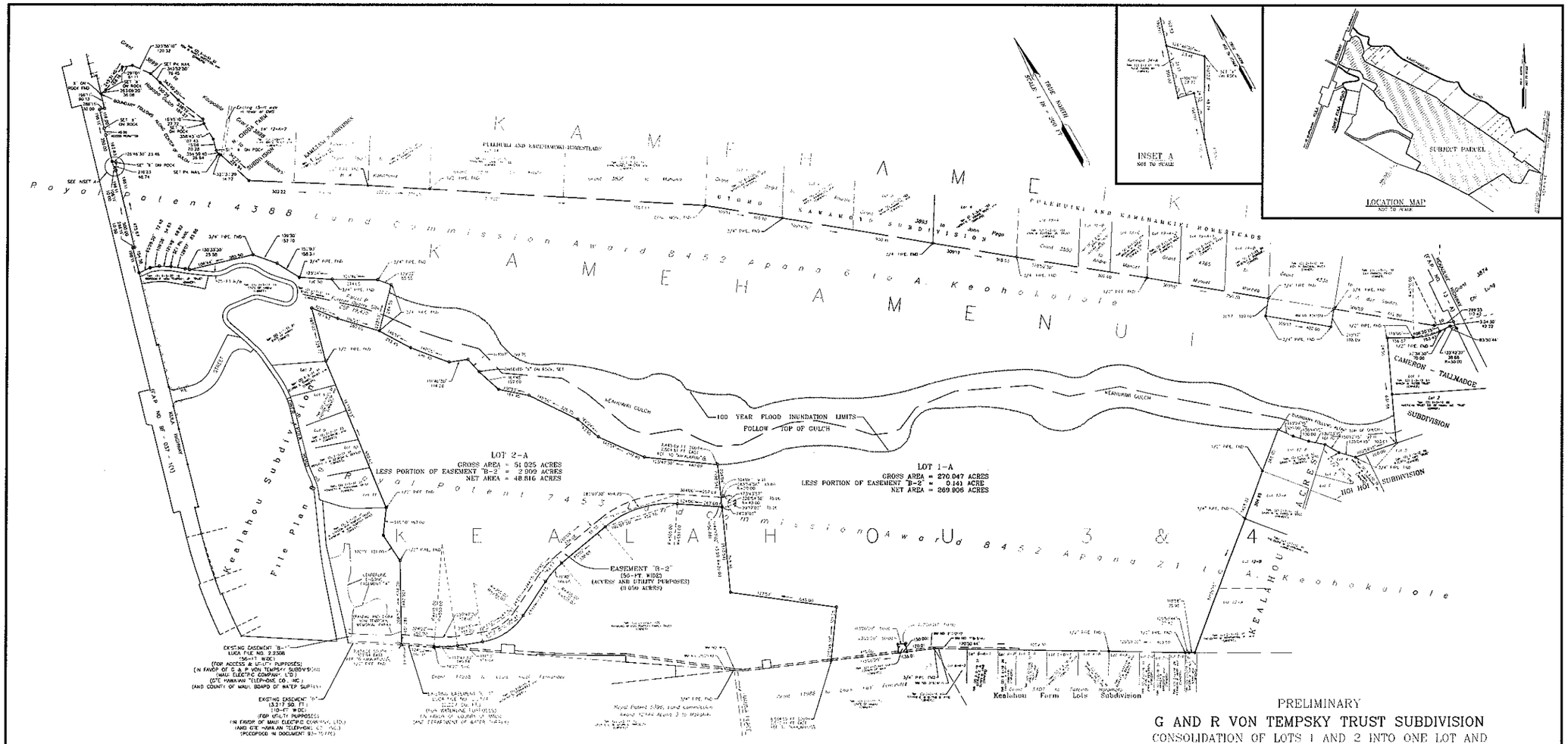
LOCATION MAP
NOT TO SCALE

NOTES

1. Azimuths and coordinates shown hereon refer to Government Survey Triangulation Station "KIKALAPUU", designated thus "Δ".
2. Owners of adjoining land parcels taken from Real Property Mapping Branch.
3. All lot corners marked with 3/4-inch pipe with yellow plastic caps marked "RLS 2715, RLS 5983", unless otherwise noted.
4. Pursuant to Maui County Code Section 3.44.015(C), the County of Maui is not responsible for any park, roadway, easement (including but not limited to drainage, sewer, access, reclaimed water, or avigation easement), or any other interest in real property shown on this map or shown on these plans, unless the Maui County Council has accepted its dedication by a resolution approved by a majority of Council's members at a regular or special meeting of the Maui County Council.
5. Lot 22 (Ho'ohumu Place and Welehu Place roadway lot) to be dedicated to the County of Maui.
6. Lot 23 ('Iwakeli'i Place and Nana Hope Place roadway lot) is a private roadway to be owned by the Kula Ridge Mauka Homeowners Association.
7. Existing Easement 12 (25 feet wide) affecting Lots 13, 14, 15, 17, 19, 21 and 22 (roadway lot) is for pole and wire lines purposes in favor of Maui Electric Company, Limited, dated March 13, 1978, recorded in Liber 135121 at Page 90.
8. Existing Easement (10 feet wide for telephone purposes) affecting Lot 22 is in favor of Hawaiian Telephone Company, now known as Hawaiian Telcom, Inc., dated April 20, 1979, recorded in Liber 13686 at Page 468.
9. Existing Easement (10 feet wide for overhead electrical purposes) affecting Lots 5 and 7 is in favor of Maui Electric Company, Limited recorded in Liber 13940 at Page 125.
10. Existing Easement (for telephone purposes) is in favor of GTE Hawaiian Telephone Company Inc., dated September 14, 1981, recorded in Liber 16030 at Page 312.
11. Existing Easement "B-1" is for access and utility purposes affecting the Randal and Dora Von Tempsky Memorial Park Subdivision (Lice File No. 2.2308) is in favor of Lots 1, 2 and 3 of the G and R Von Tempsky Trust Subdivision [formally Parcel 23 of Tax Map Key:(2) 2-3-001], Maui Electric Co., Ltd., Hawaiian Telcom, Inc. and the County of Maui, Dept. of Water Supply as Per Document No. 2005-209658 recorded on October 14, 2005 to be designated to also be in favor of the G. & R. Von Tempsky Trust Subdivision, Unit II (aka Kula Ridge Mauka).
12. Existing Easement "B-2" affecting Lot 23 ('Iwakeli'i Place roadway lot) is for access and utility purposes in favor of Lots 2 and 3 of the G. & R. Von Tempsky Trust Subdivision as per Document No. 2005-209658 recorded on October 14, 2005 to be designated to also be in favor of the G. & R. Von Tempsky Trust Subdivision, Unit II (aka Kula Ridge Mauka).
13. Existing Easement "C-5" affecting Lot 3 is for waterline purposes in favor of the County of Maui, recorded as Doc. No. 2005-209685.
14. Existing Easement "C-6" affecting Lot 5 and 7 is for waterline purposes in favor of the County of Maui, recorded as Doc. No. 2005-209685.
15. Easement "AU-1" affecting Lot 21 is for access, electric, telephone, cable T.V., water and fire protection purposes in favor of Lots 19 and 20 of the G. & R. Von Tempsky Trust Subdivision Unit II (aka Kula Ridge Mauka), Maui Electric Company, Limited, Hawaiian Telcom, Inc., and the County of Maui, recorded as Doc. No. 2005-209685. Area = 0.658 Acres.
16. Easement "AU-2" affecting the entire Lot 22 (roadway lot) is for electric, telephone, cable T.V., water and fire protection purposes in favor of Lots 13 to 21 inclusive of the G. & R. Von Tempsky Trust Subdivision Unit II (aka Kula Ridge Mauka), Maui Electric Company, Limited, Hawaiian Telcom, Inc., and the County of Maui. Area = 0.585 Acres.
17. Easement "AU-3" affecting a portion of Lot 23 (roadway lot) is for electric, telephone, cable T.V., water and fire protection purposes in favor of Lots 2 to 12, inclusive of the G. & R. Von Tempsky Trust Subdivision Unit II (aka Kula Ridge Mauka), Maui Electric Company, Limited, Hawaiian Telcom, Inc., and the County of Maui. Area = 3.218 Acres.
18. Easement "EA-1" affecting Lot 21 is for emergency access purposes in favor of the County of Maui. Area = 1.031 Acres.
19. Easement "FP-1" affecting Lot 9 is for fire protection purposes in favor of the County of Maui.
20. Easement "FP-2" affecting Lot 5-B-1 of the Kealahou Farm Lot Subdivision is for fire protection purposes in favor of this subdivision. Doc. No. 200755090
21. Denotes vehicle access permitted.
22. Denotes no vehicle access permitted.
23. The Makawao-Pukalani-Kula Community Plan shows the subject parcel: Agriculture
24. Street names "Ho'ohumu Place", "Welehu Place" and "Nana Hope Place" were approved by the Commission on Naming Streets, Parks and Facilities on September 11, 2008.

TMK: (2) 2-3-001: PORTION OF 023

SUBDIVISION NO. 2.3034



NOTES:

1. All azimuths and coordinates refer to Government Survey Triangulation Station "KIKALAHOU 2".
2. Owners of adjoining land parcels taken from Tax Map records
3. All lot corners marked with 3/4" pipe capped with yellow plastic cap stamped "RLS 4715, RLS 5983" unless otherwise noted.
4. Aerial photography and photogrammetry by Air Survey and Pegasus Aerial Mapping. Ground control surveys done by NEWCOMER-LEE LAND SURVEYORS, INC.
5. Elevations based on Mean Sea Level, taken from USGS Benchmark V 251, elevation 2,524.06 ft. MSL.
6. Existing Easement "B" (10-ft. wide) is for utility purposes in favor of Maui Electric Company, Limited and GTE Hawaiian Telephone Company Inc., recorded in Document #93-157176.
7. Easement "A-1" is for waterline purposes in favor of the County of Maui, Department of Water Supply.
8. Easement "B-1" (50-ft. wide) is for access and utility purposes in favor of G and R Von Tempsky Subdivision, Maui Electric Company, Limited, GTE Hawaiian Telephone Company, Inc., and County of Maui, Board of Water Supply.
9. Easement "B-2" (50-ft. wide) is for access and utility purposes in favor of Lots 2 and 3 of the G and R Von Tempsky Subdivision (LUCA File No. 2.2174)
10. Denotes No Vehicular Access Permitted
11. Denotes Vehicular Access Permitted

PRELIMINARY

G AND R VON TEMPSKY TRUST SUBDIVISION

CONSOLIDATION OF LOTS 1 AND 2 INTO ONE LOT AND
RE-SUBDIVISION OF SAID CONSOLIDATED LOT INTO LOTS 1-A AND 2-A
Being portions of Royal Patent 4388, Land Commission
Award 8452, Apana 6 to A. Keohokalole and Royal Patent 7453,
Land Commission Award 8452, Apana 21 to A. Keohokalole

SITUATED AT KEALAHOU 3 AND 4 AND KAMEHAMENUI, KULA, MAKAWAO, MAUI, HAWAII

Prepared at the request of owners
Kula Ridge Mauka, LLC - Lot 1
1648 Hill Pa Loop
Wailuku, HI 96793

Kula Ridge LLC - Lot 2
1648 Hill Pa Loop
Wailuku, HI 96793

Scale 1 Inch = 300 Feet
Date: May 20, 2009

This plat was prepared from a survey on the ground performed by me or under my direct supervision

"RECEIVED"
Licensed Professional Land Surveyor, Certificate No. 5983-LS

TMK (2) 2-2-001: 023 & 174

30" X 48" - 10 SQ. FT.

NEWCOMER - LEE LAND SURVEYORS, INC. 1498 LOWER MAIN STREET, SUITE D, WAILUKU, MAUI, HAWAII 96793

This Project Processed Under Ordinance No. 3272 (Re: Section 18.04.020 F) SUBDIVISION NO.

DRG. NO. 7945-CONCOL JOB NO. 09-7945

11. REVISED SECTION 201H-38, HAWAI`I REVISED STATUTES EXEMPTIONS

PROPOSED REVISED EXEMPTIONS FOR AFFORDABLE HOUSING SUBDIVISION
PROPOSED SECTION 201H, HRS, EXEMPTIONS
FROM THE MAUI COUNTY CODE ("MCC")

A. EXEMPTION FROM TITLE 2, MCC, ADMINISTRATION AND PERSONNEL

1. An exemption from Chapter 2.80B, MCC, General Plan and Community Plans, shall be granted to permit the project without obtaining a general plan andcommunity plan amendment.

2. An exemption from Chapter 2.96, MCC, Residential Workforce Housing Policy shall be granted for the project in accordance with Section 2.96.030.B.6, MCC.

B. EXEMPTION FROM TITLE 14, PUBLIC SERVICES

1. Exemption from Chapter 14.74, Impact Fees for Traffic and Roadway Improvements in Makawao-Pukalani-Kula, Maui, Hawaii, to exempt the project from traffic impact fees should such fees be adopted prior to the issuance of building permits for the project.

C. EXEMPTIONS FROM TITLE 16, MCC, Buildings and Construction

1. Exemptions from MCC Chapters 16.04A, Fire Code, 16.18A, Electrical Code, 16.20A, Plumbing Code, and 16.26, Building Code, shall be granted to exempt the project from fire, electrical, plumbing, building permit fees and demolition permit fees, as well as inspection fees.

D. EXEMPTIONS FROM TITLE 18, MCC, SUBDIVISIONS

1. Exemptions from Section 18.04.030, MCC, Administration, and related land use consistency requirements of Title 18, shall be granted to exempt the project from obtaining a change in zoning and community plan amendment to enable subdivision approval.

2. An exemption from Section 18.16.320, MCC, Parks and Playgrounds, shall be granted to allow the 3.0 acres of park land and accompanying comfort station within the project to satisfy the park dedication and assessment requirements.

3. An exemption from Section 18.16.050 MCC, Minimum Right-of-way and Pavement Widths, shall be granted to allow 24 ft. right-of-way and 20 ft. pavement widths for private streets within the subdivision.

E. EXEMPTIONS FROM TITLE 19, MCC, ZONING

1. An exemption from Chapter 19, MCC, shall be granted to permit the development and use of the parcel for single-family, duplex, and rural residential purposes, including supporting infrastructure requirements. Further, this exemption shall allow the subdivision of the property in the plat configuration shown in Attachment "A". The following zoning standards shall apply to the proposed lots:

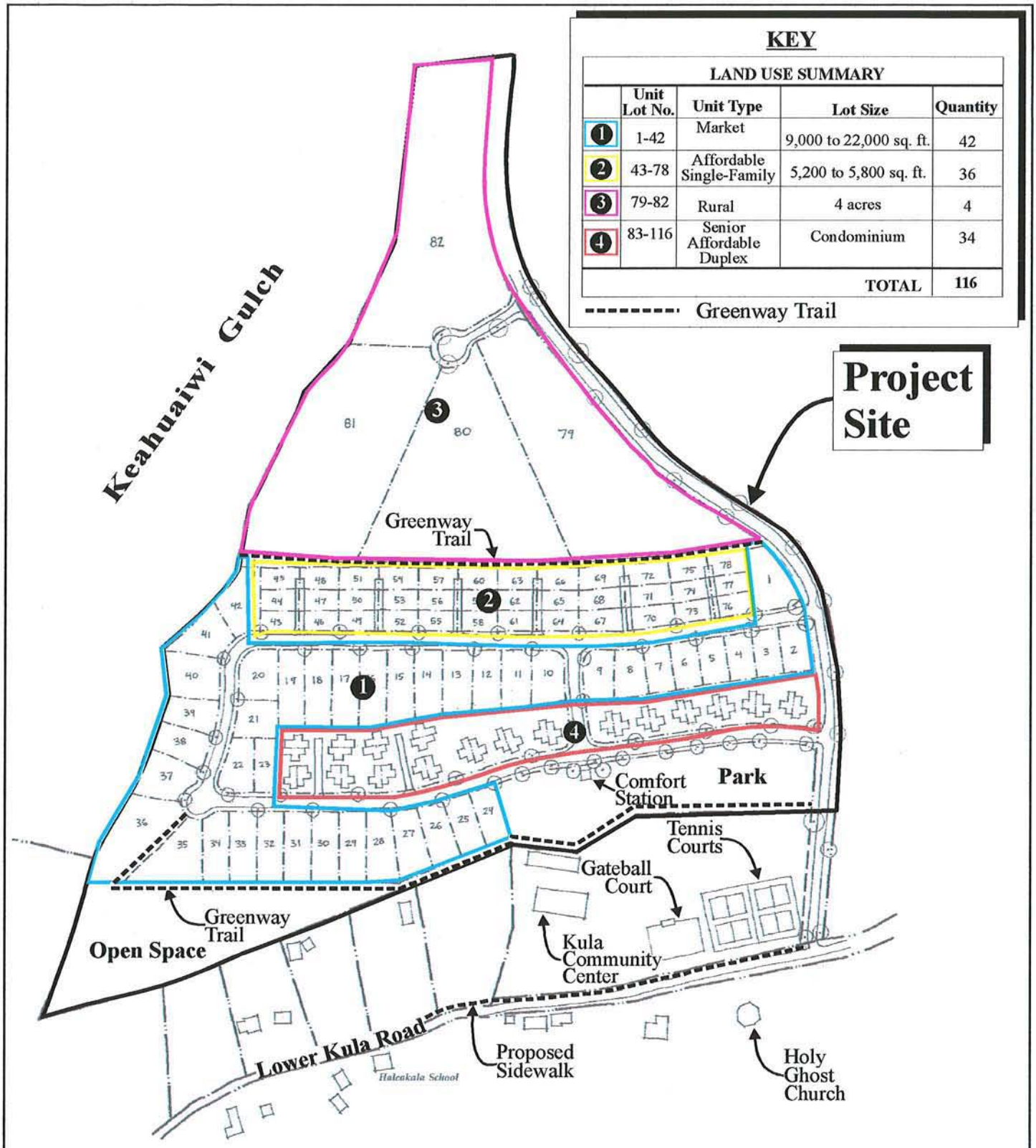
Affordable Lots

Minimum Lot Size . . . . . 5,000 square feet
Minimum Lot Width . . . . . 60 feet
Front Yard Setback . . . . . 10 feet
Zero Lot Line . . . . In conformance with R-0 Standards
Access Yard Setback Line . . . . . 15 feet

Other Setback Lines . . . . . 6 feet at 1-story
Height . . . . . No building shall exceed 1-story or 24 feet in height from finished grade of the subdivision

Duplex Standards

Minimum Lot Size . . . . . 7,500 square feet
(There may be more than one duplex dwelling on any lot, provided that there is not less than 7,500 square feet for each two-family dwelling (duplex).)
Minimum Lot Width . . . . . 65 feet
Front Yard Setback . . . . . 15 feet
Side Yard Setback . . . . . 6 feet at 1-story
Rear Yard Setback . . . . . 20 feet
Height . . . . . No building shall exceed 1-story or 24 feet in height from finished grade of the subdivision



Source: Architectural Design & Construction, Inc.

Attachment "A" Proposed Kula Ridge Affordable Housing Subdivision

Revised Conceptual Site Plan

NOT TO SCALE

Prepared for: Kula Ridge, LLC

MUNEKIYO & HIRAGA, INC.

Nishikawa/KulaAH 1107/New201H/revisedsite

Market Lots

Minimum Lot Size . . . . . 6,000 square feet
Minimum Lot Width . . . . . 60 feet
Front Yard Setback . . . . . 15 feet
Other Setback
Lines . . . . . 6 feet at 1-story, 10 feet at 2-story

Height: No building shall exceed 2-story or 30 feet in height from finished grade of the subdivision.

F. EXEMPTIONS FROM TITLE 20, MCC, ENVIRONMENTAL PROTECTION

1. An exemption from Section 20.08.090, MCC, Grubbing and Grading Permit Fees, shall be granted to exempt the project from payment of grading, grubbing and excavation permit fees, as well as inspection fees.