

Volume 3 of 3

Final Environmental Impact Statement

Prepared in Accordance with Chapter 343, Hawaii Revised Statutes and
Title 11, Chapter 200, Hawaii Administrative Rules

Appendices
Waimānalo Gulch Sanitary
Landfill Lateral Expansion

Waimānalo Gulch, O'ahu, Hawai'i
TMKs: (1) 9-2-003: 072 and 073

October 2008

City and County of Honolulu
Department of Environmental Services
1000 Uluohia Street, 3rd Floor
Kapolei, Hawai'i 96707



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EXHIBIT " 3 "

Volume 3 of 3

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Appendices

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Prepared for:
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Prepared by:
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Appendix I

Traffic Impact Report
Waimānalo Gulch Sanitary Landfill Expansion, 2007

TRAFFIC IMPACT REPORT
FOR THE
WAIMANALO GULCH SANITARY LANDFILL EXPANSION

Prepared for:

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March 2007

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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 expansion of the Waimanalo Gulch Sanitary Landfill located near Koolina on the island of Oahu. The project entails the expansion of the existing landfill site to include an additional 92.5 acres.

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.

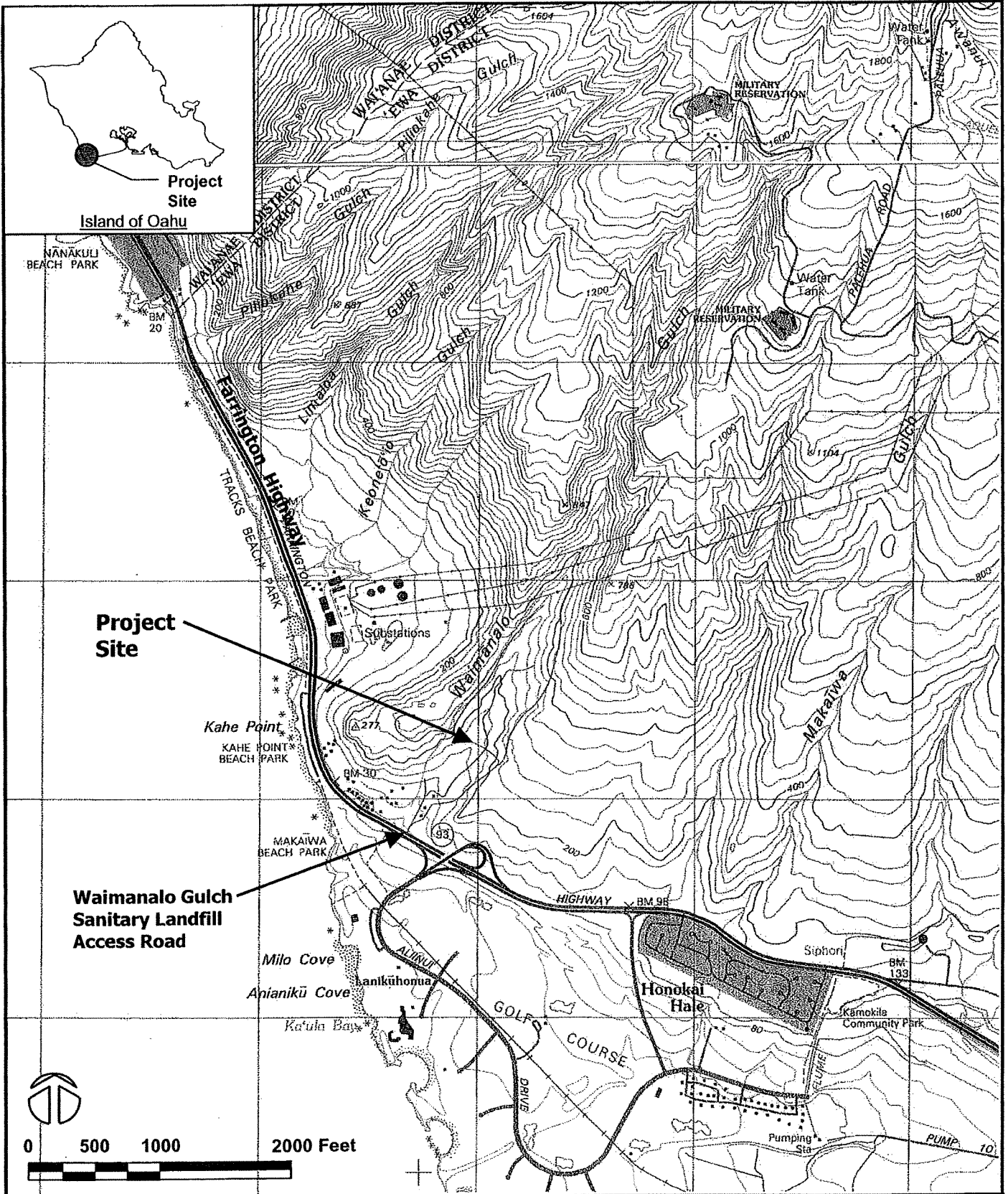
II. PROJECT DESCRIPTION

A. Location

The existing Waimanalo Gulch Sanitary Landfill is located adjacent to Farrington Highway northwest of Ko Olina on the island of Oahu (See Figure 1) and is further identified as Tax Map Keys: 9-2-3: 72 and 73. Access to the landfill is currently provided via an access road off Farrington Highway.

B. Project Characteristics

The existing Waimanalo Gulch Sanitary Landfill is located on an approximately 200-acre site along the north side of Farrington Highway just east of the westbound off-ramp to Ko Olina Resort. Currently, only 107.5 acres of the




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WAIMANALO GULCH SANITARY LANDFILL EXPANSION

LOCATION MAP AND VICINITY MAP

FIGURE
1

existing site is used for landfill operations. However, 60.5 acres of the existing landfill is scheduled for closure in the near future and, as such, an expansion of the existing facilities is proposed to increase the capacity and lifespan of the landfill. The proposed project would result in a net increase in space used for landfill of 32 acres. Access to the landfill would continue to be provided via the existing access road off Farrington Highway. Figure 2 shows the project site plan.

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

The existing Waimanalo Gulch Sanitary Landfill is located adjacent to Farrington Highway. In the vicinity of the landfill, Farrington Highway is a predominantly four-lane, two-way divided State of Hawaii roadway generally oriented in the east-west direction that serves as the primary access road along the southwest coastline of Oahu. At the unsignalized intersection of the highway with the access road to the landfill, the eastbound approach of Farrington Highway has an exclusive, left-turn lane and two through lanes. There is also an additional lane along the south side of the highway that serves as the eastbound off-ramp to Ko Olina Resort. The westbound approach of the highway has an exclusive right-turn lane and two through lanes. In addition, a median storage lane has been provided along Farrington Highway for vehicles turning left from the landfill access road.

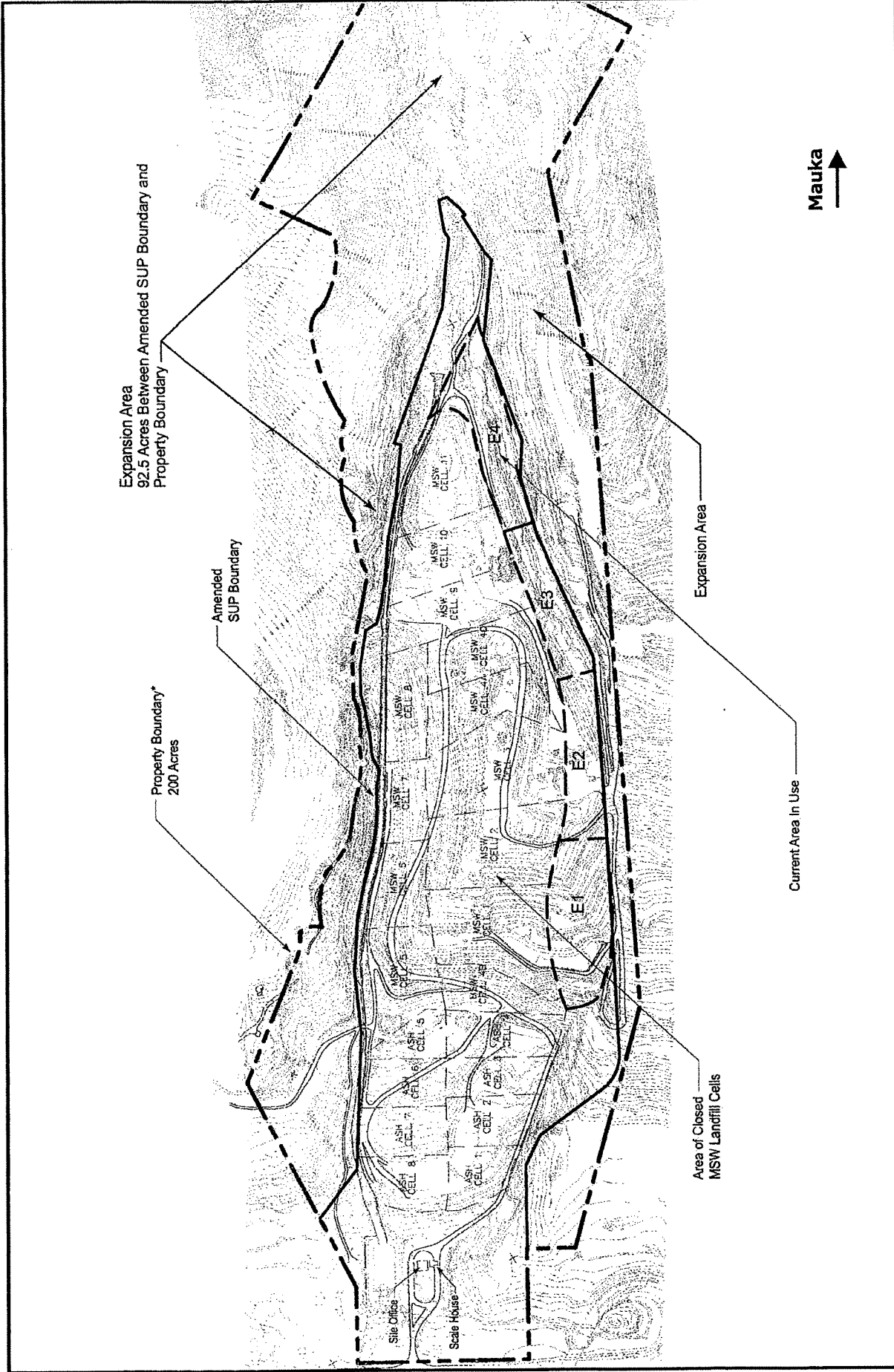
The Waimanalo Gulch Sanitary Landfill access road approach of the intersection has one channelized lane that serves left-turn and right-turn traffic movements. Vehicles turning left from the access road are channelized into the median storage lane along Farrington Highway.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

The field investigation was conducted on January 17, 2007 and consisted of manual turning movement count surveys and traffic flow assessments at the intersection of Farrington Highway with the access



WAIMANALO GULCH SANITARY LANDFILL EXPANSION

PROPOSED SITE PLAN

FIGURE
2

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road to the Waimanalo Gulch Sanitary Landfill. The turning movement count surveys were conducted during the morning commuter traffic peak hours of 6:00 AM and 8:00 AM, and the afternoon commuter traffic peak hours of 3:00 PM and 6:00 PM. Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

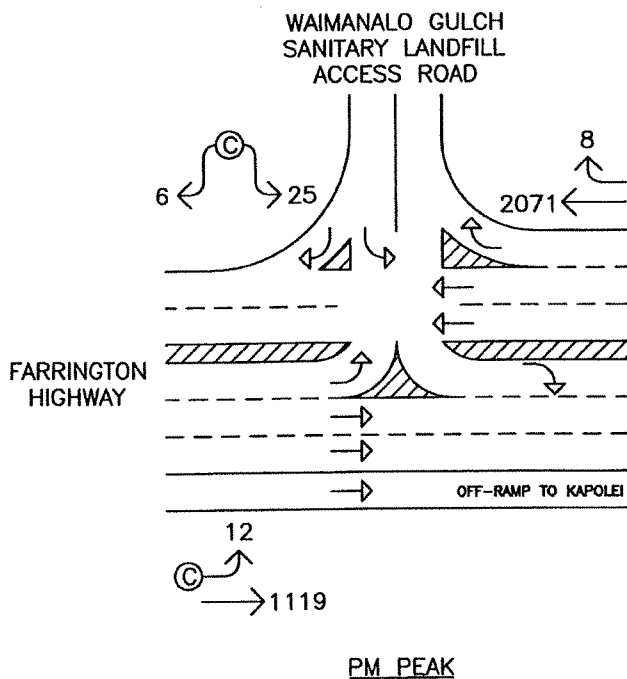
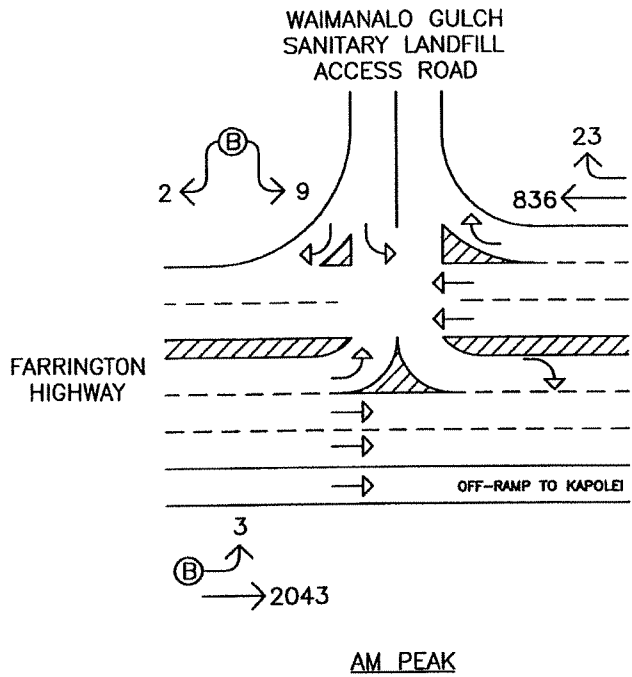
The highway capacity analysis performed in this study is based upon procedures presented in the “Highway Capacity Manual”, Transportation Research Board, 2000, and the “Highway Capacity Software”, developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service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

Figure 3 shows the existing AM and PM peak hour traffic volumes and operating traffic conditions. The AM peak hour of traffic generally occurs between 6:15 AM and 7:15 AM in the vicinity of the existing landfill. In the afternoon, the PM peak hour of traffic generally occurs between the hours of 3:45 PM and 4:45 PM. The analysis is based on these peak hour time periods



NOT TO SCALE



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WAIMANALO GULCH SANITARY LANDFILL EXPANSION

EXISTING PEAK HOURS OF TRAFFIC

FIGURE
3

to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

At the intersection with the existing landfill access road, Farrington Highway carries 2,046 vehicles eastbound and 859 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 1,131 vehicles traveling eastbound and 2,079 vehicles traveling westbound. The critical movement on the Farrington Highway approaches of the intersection is the eastbound left-turn traffic movement which operates at LOS "B" during both peak periods.

The Waimanalo Gulch Sanitary Landfill access road approach of the intersection carries 11 vehicles southbound during the AM peak hour of traffic. During the PM peak hour of traffic, the traffic volume is slightly higher with 31 vehicles traveling southbound. The access road approach of the intersection operates at LOS "C" during both peak periods. Traffic queues occasionally formed on this approach of the intersection with average queue lengths of 2-3 vehicles observed during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The expansion of the Waimanalo Gulch Sanitary Landfill is being proposed to increase the capacity and extend the current lifespan of the landfill. As such, the expansion itself is not expected to generate additional trips to and from the facility. However, increased development throughout Oahu may result in an increase in site-generated trips to the landfill since additional refuse vehicles may be required to service these areas. As such, additional trips were conservatively assumed to be generated by the proposed landfill expansion.

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

trip generation rates were developed empirically by correlating the existing vehicle trip generation data with the acres of development. These rates were then utilized to determine the number of additional vehicle trips that would be generated by the expansion of the existing landfill. Table 1 summarizes the trip generation characteristics applied to the AM and PM peak hours of traffic to measure the impact resulting from the proposed Waimanalo Gulch Sanitary Landfill expansion.

Table 1: Peak Hour Trip Generation

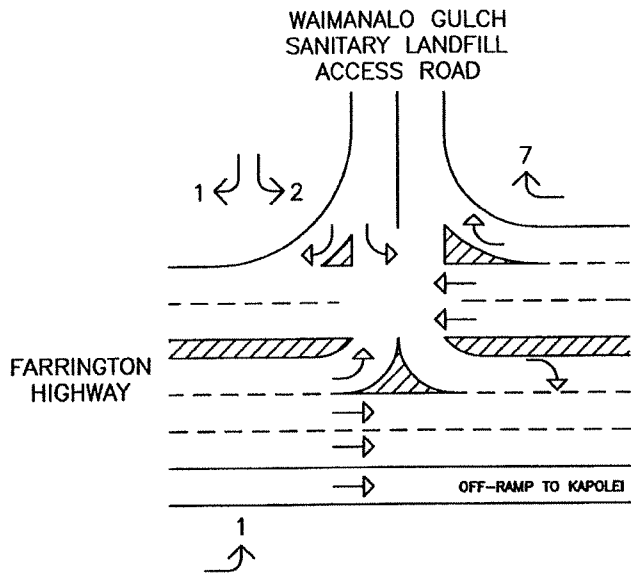
SANITARY LANDFILL			
INDEPENDENT VARIABLE: Net Increase in Acres of Dev = 32			
		RATE	PROJECTED TRIP ENDS
AM PEAK	ENTER	0.242	8
	EXIT	0.102	3
	TOTAL	0.344	11
PM PEAK	ENTER	0.186	6
	EXIT	0.288	9
	TOTAL	0.474	15

2. Trip Distribution

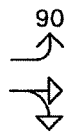
Figure 4 shows the distribution of site-generated traffic during the AM and PM peak hours of traffic. Access to the Waimanalo Gulch Sanitary Landfill will continue to be provided by the existing access road off Farrington Highway. The directional distribution of site-generated traffic at the intersection of Farrington Highway with the access road was assumed to remain similar to existing conditions.

B. Traffic Signal Warrant

As a result of the proposed expansion of the Waimanalo Gulch Sanitary Landfill, a traffic signal system may be warranted at the intersection of Farrington Highway and the Waimanalo Gulch Sanitary Landfill access road. The installation of a traffic signal at an intersection may be justified by one or more of the eight warrants outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways," 2003 Edition (MUTCD). These warrants take into account factors such



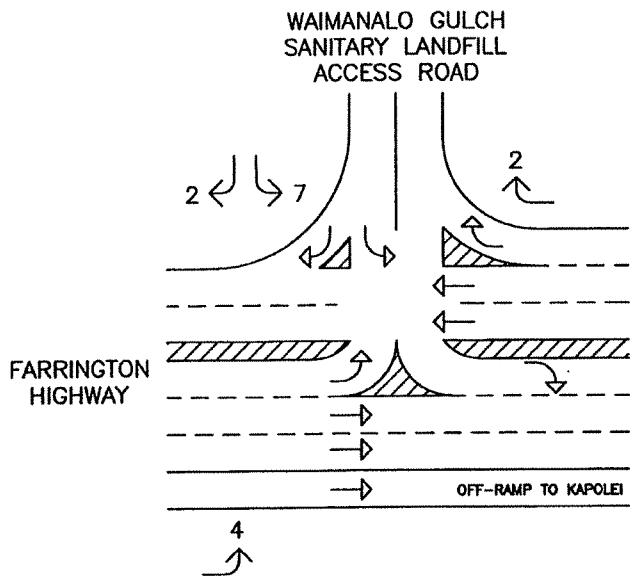
AM PEAK



LEGEND

TRAFFIC MOVEMENT VOLUME (VPH)

LANE USAGE



PM PEAK

NOT TO SCALE



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WAIMANALO GULCH SANITARY LANDFILL EXPANSION

DISTRIBUTION OF ADDITIONAL
SITE-GENERATED VEHICLES

FIGURE
4

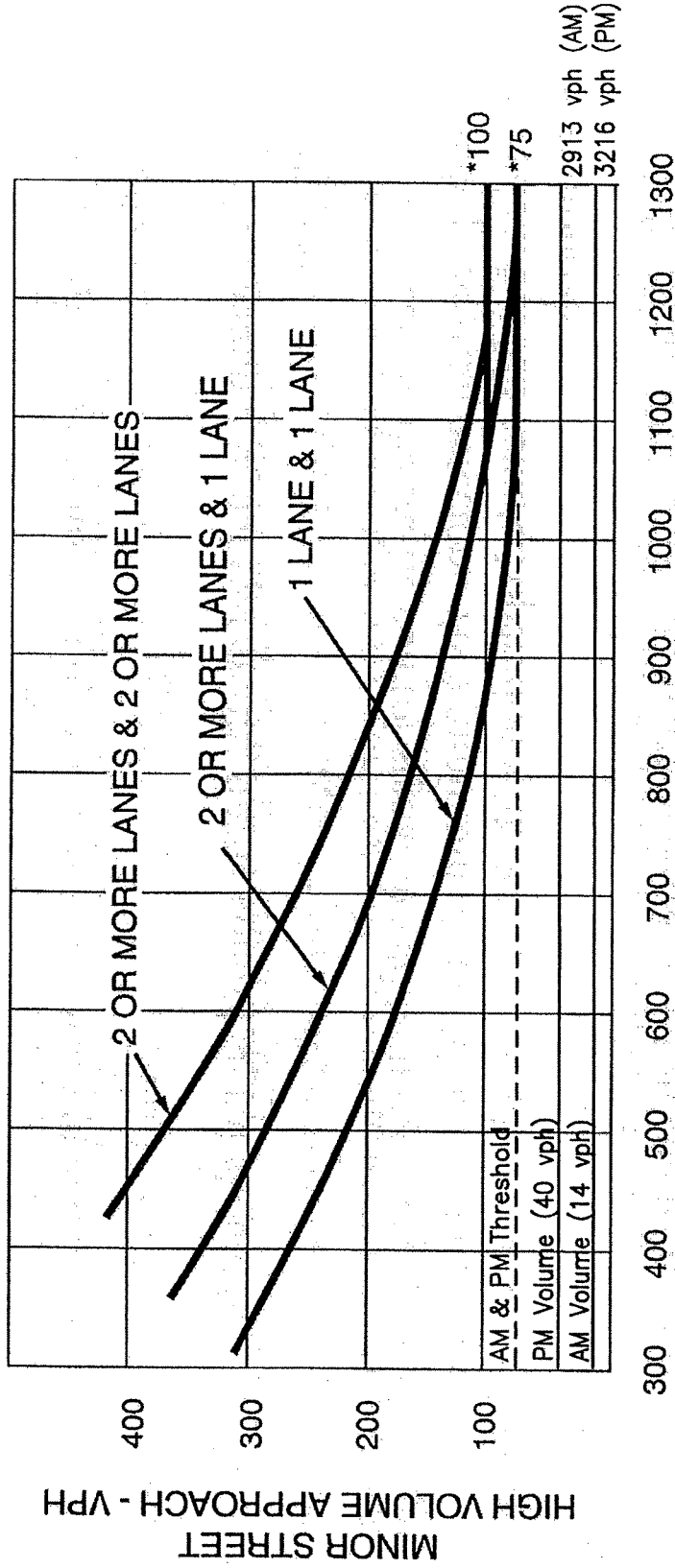
as eight-hour vehicular volumes (Warrant 1), four-hour vehicular volumes (Warrant 2), peak hour volumes (Warrant 3), pedestrian volumes (Warrant 4), the presence of a school crossing or coordinated signal system (Warrants 5 and 6), crash experience (Warrant 7), and other characteristics of the roadway network (Warrant 8). Since traffic data was collected at the subject intersection during the peak periods of traffic and the traffic projections do not extend beyond these periods, only Warrant 3 was applied to the intersection to determine whether or not a traffic signal system might be justified.

Warrant 3, the “Peak Hour Warrant,” consists of several conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during the peak hour periods. One of the conditions is based upon the relationship between the traffic volumes along the major and minor street. If the traffic volumes along the minor street exceed the thresholds shown in the MUTCD, a traffic signal system may be warranted. Since the intersection lies within an isolated community with a population less than 10,000, Figure 4C-4 “Warrant 3, Peak Hour (70% Factor)” was used to determine if a traffic signal system is warranted at this intersection. Under with project conditions, the traffic volumes entering the subject intersection are below the thresholds during both peak hours of traffic and, as such, do not satisfy Warrant 3 for minor street approaches with one lane for high traffic volumes on the major street (see Figure 5). Therefore, the intersection of Farrington Highway and the Waimanalo Gulch Sanitary Landfill access road is assumed to remain unsignalized.

C. Total Traffic Volumes With Project

The projected AM and PM peak period traffic volumes and operating conditions with the proposed expansion of the existing Waimanalo Gulch Sanitary Landfill are shown in Figure 6. The cumulative volumes consist of additional site-generated traffic superimposed over existing traffic demands. The traffic impacts resulting from the proposed expansion are addressed in the following section.

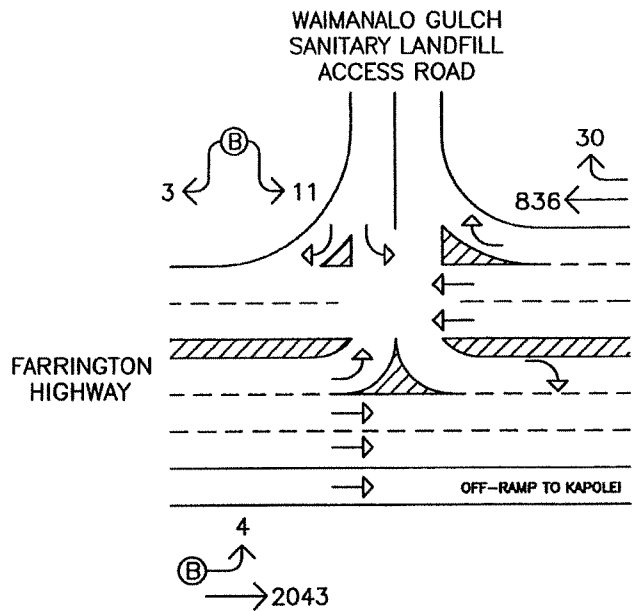
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)



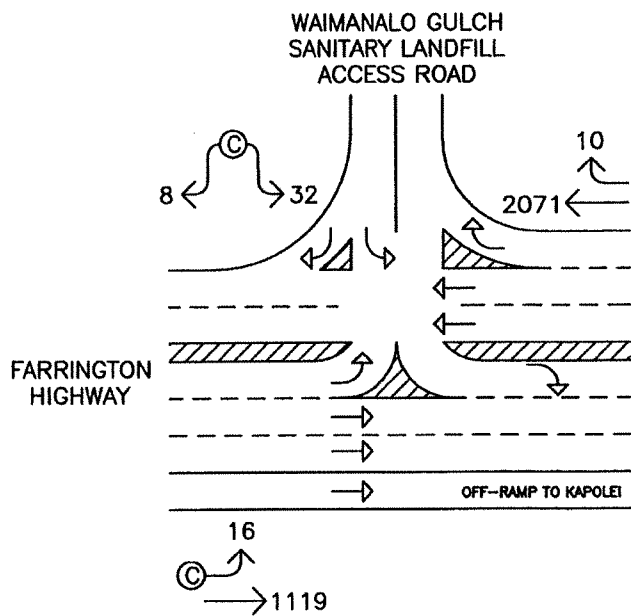
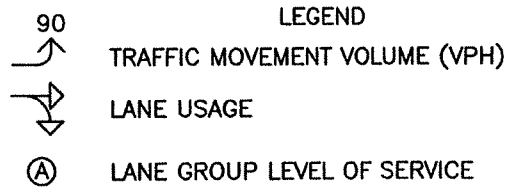
**MAJOR STREET—TOTAL OF BOTH APPROACHES—
 VEHICLES PER HOUR (VPH)**

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: MUTCD



AM PEAK



PM PEAK

NOT TO SCALE



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WAIMANALO GULCH SANITARY LANDFILL EXPANSION
PROJECTED PEAK HOURS OF TRAFFIC
WITH PROJECT

FIGURE
6

V. TRAFFIC IMPACT ANALYSIS

The cumulative AM and PM peak hour traffic conditions with the proposed expansion of the existing Waimanalo Gulch Sanitary Landfill are summarized in Table 2. The existing operating conditions are provided for comparison purposes. LOS calculations are included in Appendix D.

Table 2: Existing and Projected With Project LOS Traffic Operating Conditions

Intersection	Critical Movement		AM		PM	
			Exist	w/ Proj	Exist	w/ Proj
Farrington Hwy/ Waimanalo Gulch Sanitary Landfill Access Rd	Eastbound	LT	B	B	C	C
	Southbound	LT-RT	B	B	C	C

Traffic operations in the vicinity of the landfill are expected to remain similar to existing conditions during both peak hours of traffic despite the anticipated increases in traffic along Farrington Highway due to the proposed expansion. The critical traffic movements at the intersection of Farrington Highway with the Waimanalo Gulch Sanitary Landfill access road are expected to continue operating at LOS “B” and LOS “C” during the AM and PM peak periods, respectively. The total traffic volumes entering the intersection are expected to increase by less than 1% during both peak hours of traffic with proposed expansion. These increases in the total traffic volumes are in the range of daily volume fluctuations along Farrington Highway and represent a minimal increase in the overall traffic volumes.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data and projected traffic conditions, the following are the recommendations of the study:

1. Maintain sufficient roadway width to accommodate safe vehicle ingress and egress.
2. Maintain adequate turning radii at all project roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
3. Maintain adequate sight distances for motorists to safely enter and exit all project roadways.

4. Maintain adequate on-site loading and off-loading service areas to ensure that vehicular queues do not extend onto the highway.

VII. CONCLUSION

The proposed expansion of the existing Waimanalo Gulch Sanitary Landfill is not expected to have a significant impact on traffic operations in the vicinity. Although the expansion of the Waimanalo Gulch Sanitary Landfill is not expected to generate additional trips to and from the facility, additional trips were conservatively assumed to be generated by the proposed expansion to account for additional refuse vehicles generated by on-going development throughout Oahu. However, traffic operations in the vicinity of the landfill are expected to remain similar to existing conditions during both peak hours of traffic despite the anticipated increases in traffic. The critical traffic movements at the intersection of Farrington Highway with the Waimanalo Gulch Sanitary Landfill access road are expected to continue operating at levels of service similar to existing conditions. In addition, the total traffic volumes entering the intersection are expected to increase by less than 1% during both peak hours of traffic with proposed expansion. These increases in the total traffic volumes are in the range of daily volume fluctuations along Farrington Highway and represent a minimal increase in the overall traffic volumes.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

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

Counter: D4-3888/D4-3889

Counted: ZW/ER

Weather: Clear

File Name : farwaia
 Site Code : 00000001
 Start Date : 1/17/2007
 Page No : 1

Start Time	Groups Printed- Unshifted												Int. Total				
	Waimanalo Gulch Dwy Southbound				Farrington Hwy Westbound				Northbound					Farrington Hwy Eastbound			
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total
06:00 AM	2	0	0	2	0	60	8	68	0	0	0	0	2	558	0	560	630
06:15 AM	2	0	1	3	0	152	5	157	0	190	3	193	2	607	0	608	768
06:30 AM	2	0	0	2	0	190	3	193	0	245	5	250	2	491	0	493	688
06:45 AM	0	0	1	1	0	245	5	250	0	647	21	668	0	519	0	519	770
Total	6	0	2	8	0	647	21	668	0	0	0	0	5	2175	0	2180	2856
07:00 AM	5	0	0	5	0	249	10	259	0	0	0	0	0	426	0	426	690
07:15 AM	5	0	0	5	0	188	5	193	0	209	9	218	2	415	0	417	615
07:30 AM	8	0	0	8	0	209	9	218	0	191	3	194	0	394	0	394	620
07:45 AM	9	0	0	9	0	191	3	194	0	837	27	864	1	382	0	383	586
Total	27	0	0	27	0	837	27	864	0	0	0	0	3	1617	0	1620	2511
Grand Total	33	0	2	35	0	1484	48	1532	0	0	0	0	8	3792	0	3800	5367
Approch %	94.3	0	5.7	0	0	96.9	3.1	0	0	0	0	0	0.2	99.8	0	0	
Total %	0.6	0	0	0.7	0	27.7	0.9	28.5	0	0	0	0	0.1	70.7	0	70.8	

Start Time	Waimanalo Gulch Dwy Southbound												Int. Total				
	Waimanalo Gulch Dwy Southbound				Farrington Hwy Westbound				Northbound					Farrington Hwy Eastbound			
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total
06:15 AM	2	0	1	3	0	152	5	157	0	0	0	0	1	607	0	608	768
06:30 AM	2	0	0	2	0	190	3	193	0	245	5	250	2	491	0	493	688
06:45 AM	0	0	1	1	0	249	10	259	0	836	23	859	0	426	0	426	770
07:00 AM	5	0	0	5	0	836	23	859	0	0	0	0	0	2043	0	2046	690
Total Volume	9	0	2	11	0	97.3	2.7	0	0	0	0	0	3	99.9	0	0	2916
% App. Total	81.8	0	18.2	0	0	97.3	2.7	0	0	0	0	0	0.1	99.9	0	0	
PHF	.450	.000	.500	.550	.000	.839	.575	.829	.000	.000	.000	.000	.375	.841	.000	.841	.947

Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 06:15 AM

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

Counter: D4-3888/D4-3889
 Counted: ZW/ER
 Weather: Clear

File Name : farwaip
 Site Code : 00000001
 Start Date : 1/17/2007
 Page No : 1

Groups Printed- Unshifted

Start Time	Waimanalo Gulch Dwy Southbound						Farrington Hwy Westbound						Farrington Hwy Eastbound						Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total			
	03:00 PM	14	0	4	18	0	331	8	339	0	321	0	322	1	321	0	322	679	
03:15 PM	10	0	2	12	0	409	9	418	0	321	0	322	1	321	0	322	752		
03:30 PM	12	0	1	13	0	439	2	441	0	290	0	291	1	290	0	291	745		
03:45 PM	8	0	1	9	0	532	3	535	0	351	0	354	3	351	0	354	898		
Total	44	0	8	52	0	1711	22	1733	0	1283	0	1289	6	1283	0	1289	3074		
04:00 PM	7	0	2	9	0	474	3	477	0	260	0	266	6	260	0	266	752		
04:15 PM	5	0	3	8	0	561	1	562	0	257	0	260	3	257	0	260	830		
04:30 PM	5	0	0	5	0	504	1	505	0	251	0	251	0	251	0	251	761		
04:45 PM	4	0	0	4	0	464	0	464	0	300	0	300	0	300	0	300	768		
Total	21	0	5	26	0	2003	5	2008	0	1068	0	1077	9	1068	0	1077	3111		
05:00 PM	1	0	0	1	0	433	0	433	0	228	0	228	0	228	0	228	662		
05:15 PM	10	0	1	11	0	430	0	430	0	254	0	254	0	254	0	254	695		
05:30 PM	1	0	0	1	0	395	0	395	0	234	0	234	0	234	0	234	630		
05:45 PM	1	0	0	1	0	266	0	266	0	216	0	216	0	216	0	216	483		
Total	13	0	1	14	0	1524	0	1524	0	932	0	932	0	932	0	932	2470		
Grand Total	78	0	14	92	0	5238	27	5265	0	3283	0	3298	15	3283	0	3298	8655		
Apprch %	84.8	0	15.2	0	0	99.5	0.5	0	0	99.5	0	0	0.5	99.5	0	0	0		
Total %	0.9	0	0.2	1.1	0	60.5	0.3	60.8	0	37.9	0	38.1	0.2	37.9	0	38.1	0		

Start Time	Waimanalo Gulch Dwy Southbound						Farrington Hwy Westbound						Farrington Hwy Eastbound						Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total			
	03:45 PM	8	0	1	9	0	532	3	535	0	351	0	354	3	351	0	354	898	
04:00 PM	7	0	2	9	0	474	3	477	0	260	0	266	6	260	0	266	752		
04:15 PM	5	0	3	8	0	561	1	562	0	257	0	260	3	257	0	260	830		
04:30 PM	5	0	0	5	0	504	1	505	0	251	0	251	0	251	0	251	761		
Total Volume	25	0	6	31	0	2071	8	2079	0	1119	0	1131	12	1119	0	1131	3241		
% App. Total	80.6	0	19.4	0	0	99.6	0.4	0	0	98.9	0	0	1.1	98.9	0	0	0		
PHF	.781	.000	.500	.861	.000	.923	.667	.925	.000	.797	.000	.799	.500	.797	.000	.799	.902		

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

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

APPENDIX C

**CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK HOUR TRAFFIC ANALYSIS**

HCS+: Unsignalized Intersections Release 5.21

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
 Agency/Co.:
 Date Performed: 1/19/2007
 Analysis Time Period: PM Peak
 Intersection:
 Jurisdiction:
 Units: U. S. Customary
 Analysis Year: Existing
 Project ID:
 East/West Street: Waimanalo Gulch Dwy
 North/South Street: Farrington Hwy
 Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Eastbound			Westbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		12			2071	8	
Peak-Hour Factor, PHF		0.80			0.93	0.93	
Hourly Flow Rate, HFR		14			2226	8	
Percent Heavy Vehicles		15	--	--	--	--	
Median Type/Storage		Raised curb			/ 2		
RT Channelized?						No	
Lanes		1			2	1	
Configuration		L			T	R	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Northbound			Southbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume					25	6	
Peak Hour Factor, PHF					0.86	0.86	
Hourly Flow Rate, HFR					29	6	
Percent Heavy Vehicles					30	15	
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage					/	Yes	/1
Lanes					0	0	
Configuration					LR		

Delay, Queue Length, and Level of Service

Approach Movement Lane Config	EB 1 L	WB 4	Northbound			Southbound		
			7	8	9	10	11	12
v (vph)	14					35		
C(m) (vph)	209					314		
v/c	0.07					0.11		
95% queue length	0.21					0.38		
Control Delay	23.5					19.5		
LOS	C					C		
Approach Delay						19.5		
Approach LOS						C		

APPENDIX D

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT**

Appendix J

Socioeconomic Impact Assessment and Addenda:
Environmental Injustice Issues and
Impact on Property Values
Waimānalo Gulch Sanitary Landfill Expansion, 2008



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**SOCIO-ECONOMIC IMPACT ASSESSMENT
WAIMĀNALO GULCH SANITARY
LANDFILL LATERAL EXPANSION,
CITY AND COUNTY OF HONOLULU**

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March 24, 2008

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Prepared for:

**Environmental Services Department,
City and County of Honolulu**

R.M. Towill Corporation

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EXECUTIVE SUMMARY

The Proposed Action

The Waimanalo Gulch Sanitary Landfill (WGCL) is the only permitted municipal solid waste (MSW) landfill on Oahu. The City and City of Honolulu (City) proposes to expand the footprint and to extend the permitted use of the WGCL for a minimum period of 15 years.

The proposed project will extend the use of the site beyond November 1, 2009, the date the State Special Use permit calls for the closure of the landfill from the acceptance of MSW. Two main alternatives to the expansion and extension of WGSL have been considered:

1. Develop alternate methods or technologies to the present use of a landfill for the disposal of MSW and ash/residue from the City's H-POWER facility. This alternative includes the use of advanced technology methods as well as transshipment of Honolulu's waste off-island to decrease the need for a landfill.
2. Select an alternative landfill site. This alternative is based on the selection, acquisition and development of another location for a City landfill.

While the City has committed to the investigation and development of alternatives to landfilling, they contend that they have not yet found any technology or method (including the use of waste transshipment) that will themselves completely eliminate the need for a landfill operation. All known processes and methods result in the generation of some waste that cannot be feasibly processed, reused or recycled. For this waste, the City contends that a municipal sanitary landfill must continue to be provided.

The City currently uses the landfill as one of a mix of strategies to deal with MSW; the mix also includes the use of H-POWER, the City's waste-to-energy facility, increasing the island-wide rate of recycling, and technologies that transform MSW to new product materials such as fertilizer pellets. The City proposes that other strategies be employed based on feasibility and demonstrated capacity for the handling of waste on Oahu.

Socio-Economic Context

Oahu is home to approximately three quarters of Hawaii's residents, and is the economic hub of the State. Most of the major industries – tourism, military support, construction, government, and finance – are concentrated on Oahu. Oahu is enjoying a strong economy and, as a result, continues to experience population increases and a significant level of development.

Although officials forecast slower economic growth on the island in the foreseeable future, one of the few areas of exception is the Ewa Development Plan Area, within which the WGSL is located. For the last 30-years the Ewa Development Plan area has nearly tripled its population, making it the fastest growing area of the island. As the second city of Oahu has not yet been fully realized, officials expect that significant growth will continue.

Landfills have been a part of the MSW disposal solution since the 1800's and have always been located on the edge of urban development. When WGSL was established in 1989, it was selected, in part, because of its proximity to the H-POWER plant and its distance from heavy urbanization. Since then, Kapolei has experienced significant growth and the resort community of Ko 'Olina has developed, both within proximity to WGSL.

Community Concerns

For most of Oahu's people, as long as the landfill stays in Ewa, landfills have not been a topic of great concern. Those who have expressed an opinion favoring the extension believe the City has already made an investment in the landfill, that there is room for expansion, and that there is no better site on Oahu.

Residents in areas surrounding WGSL on the other hand are very concerned. Among other issues, community members most often cite the following irritants from current operations as significant impacts on their communities: litter, views of operation, odor, and highway safety. They are concerned that continuation and expansion of the landfill will only exacerbate the problems. They feel they have done their share and other solutions should be found.

These same community members also point out that a promise is not being kept (the previous administration had committed to closing the landfill after the current extension) thereby reducing the trust between the Administration and their communities.

Others along the Leeward coast claim that they are victims of environmental injustice. Residents argue that within a 10-mile stretch along Farrington Highway there are two separate landfills handling construction and municipal waste, as well as an existing electrical plant, a proposed electrical plant, a deep draft harbor and a major industrial park, all of which service the entire Island of Oahu -- all of which adversely impact the environment of their communities.

Impacts of Proposed Action

Expanding use of the WGSL for landfilling on Oahu has few expected impacts beyond those that currently exist.

Economic Impacts Very little change can be expected with the expansion of WGSL. A small number of jobs will be created for ongoing construction of new cells in the Gulch.

Public Services Expansion of WGSL will not have a significant impact on public safety, medical services, education or recreation.

Social Impacts Release of dust, debris, and odors could affect the quality of life for people living near WGSL. Debris from trucks and congestion due to truck traffic could add to regional traffic problems, affecting both regional quality of life and residents' sense of their part of the island as a valuable and safe community.

Implications of Alternative Approaches to Waimanalo Gulch Sanitary Landfill

With a landfill available, the City, its residents, and businesses have assurance that solid waste services can be provided at a known cost for the foreseeable future. This is a guarantee of stability for the island economy.

To date no alternative technology has been found to adequately process the level of MSW that the island's communities generate. Other technologies exist that can complement the current H-POWER/WGSL solution, but there is no technology available that completely negates the need for a landfill on Oahu.

Transshipment is a serious alternative to handling a portion of MSW, but it has externalities that must be considered, including a negative impact on the feasibility of H-POWER and, in turn, a negative impact on the inexpensive production of alternative energy; a heightened sense of uncertainty around the management of MSW; and greater pressure on Oahu's already crowded harbor facilities.

Should a new technology become more viable, or should adjustments to the transshipment solution make it more acceptable, a landfill will still be needed in case of emergencies, in case of disruptions, and to manage material that cannot be handled by the alternative technologies or transshipment.

There does not appear to be an alternative site available to replace WGSL as a landfill. Nothing has significantly changed in the circumstances surrounding the four most viable alternatives since the last review of alternatives; a review in which WGSL was deemed to be the optimal site by the Mayor's Advisory Committee.

Taking no action, thereby allowing WGSL's permit to expire without a viable alternative, will result in serious health and economic challenges to Oahu's communities and its taxpayers.

Mitigation Measures

Suggested mitigations to social-economic impacts can be grouped into three categories: improving the management practices of the current landfill operation; improving community involvement and communications; and committing City resources to finding alternative sites and alternative technologies/management of MSW disposal.

Specific recommendations include the following:

- Improving current operations:
 - Continue to implement on-site landscaping plans that have begun, especially for those areas facing south toward Ko 'Olina.
 - Design and implement landscaping screens along the berm and the access road that is visible from Farrington Highway, fronting Kahe Power Plant.
 - Continue to be vigilant in processing sludge upon delivery and take all means to reduce any odor impacts;
 - Aggressively enforce the anti-littering regulations and fines; and
 - Improve communication between WM, ENV and the Police in response to odor and littering complaints.
- Improving community involvement and communications:
 - Continue to work with the Community Oversight committee and invite any expanded participation, including representatives from the police;
 - Continue to contribute to a community benefits package for as long as the landfill exists;
 - Ensure that all affected communities are represented on the Committee that determines the benefits package; and
 - Use the WM/ENV websites aggressively as education and communication tools.
- Committing City resources to the development of alternatives:
 - Continue to invest in Research and Development into alternative technologies; and
 - Continue to seek an alternative landfill site.

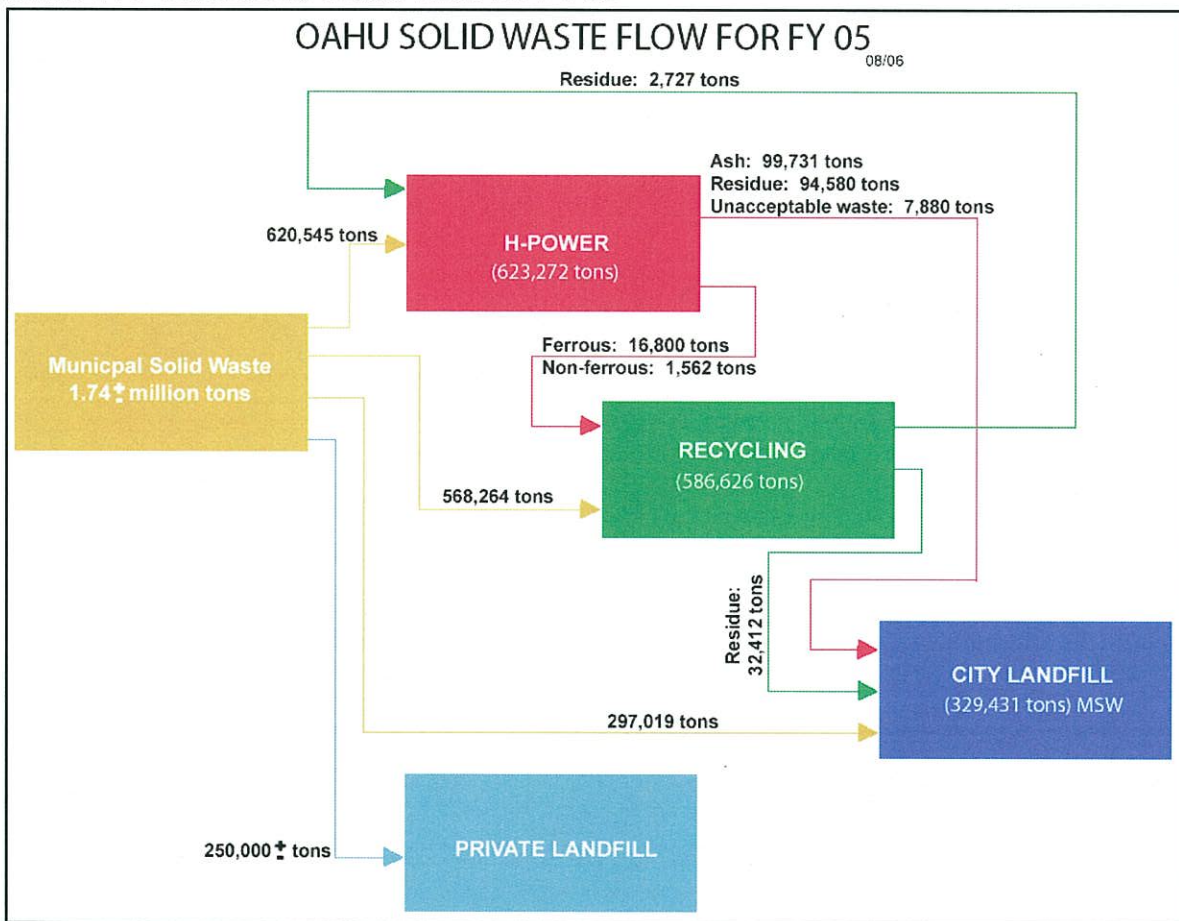
1. INTRODUCTION

1.1 PROPOSED ACTIONS AND ALTERNATIVES

The Waimanalo Gulch Sanitary Landfill is on a site of about 200 acres near the southwest corner of Oahu, owned by the City and operated by Waste Management of Hawaii Inc. The landfill opened in 1989. It is now Oahu's only permitted landfill for municipal solid waste (MSW).¹

In 2005, the landfill received approximately 562,983 tons of waste annually. This includes 329,431 tons of direct MSW, 31,361 tons of recycling residue, and 202,191 tons of ash, residue, and unacceptable waste from H-POWER.

Exhibit 1-A: Oahu Solid Waste Flow for FY 05



Originally intending to close the landfill in 2008, the City has since preliminarily determined that the continuation and expansion of operations at WGSL is a necessary part of the City's solid waste management program. The City is now proposing to expand the landfill footprint by 92.5 acres, which will utilize the total 200 acres available. This is expected to extend the use of the landfill through at least the year 2022. Exhibit 1-B shows the proposed expansion. In order to effectuate that action, the City must prepare an Environmental Impact Statement. This report identifies and analyzes the socio-economic impacts of that decision within the context of the full EIS.

¹ Another landfill in Nanakuli, handles construction and demolition waste.

Exhibit 1-B: Waimānalo Gulch Landfill Property Map

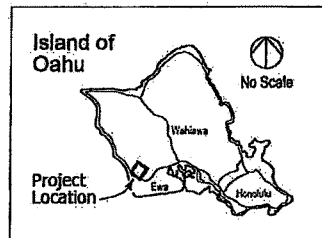
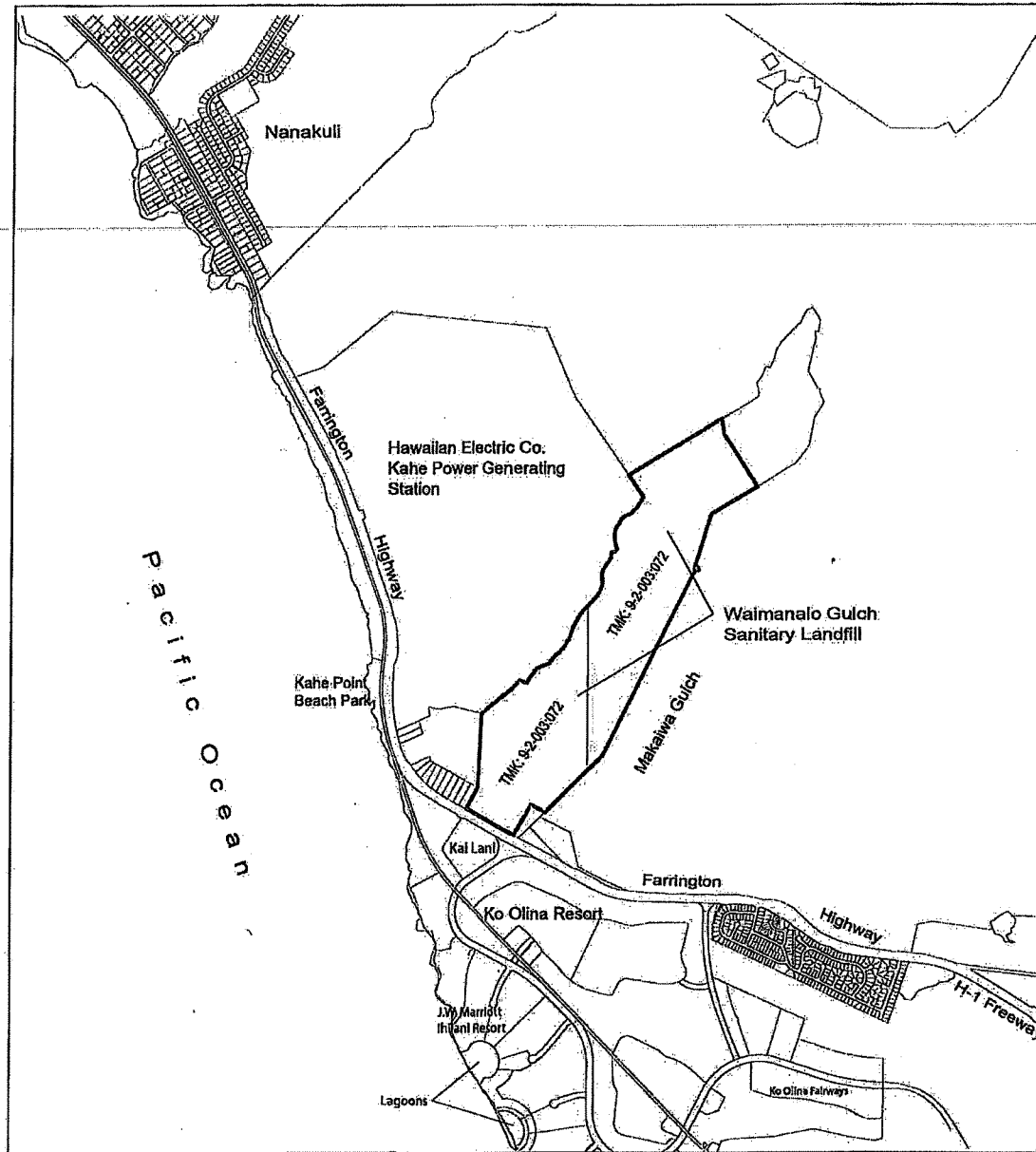
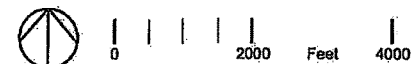
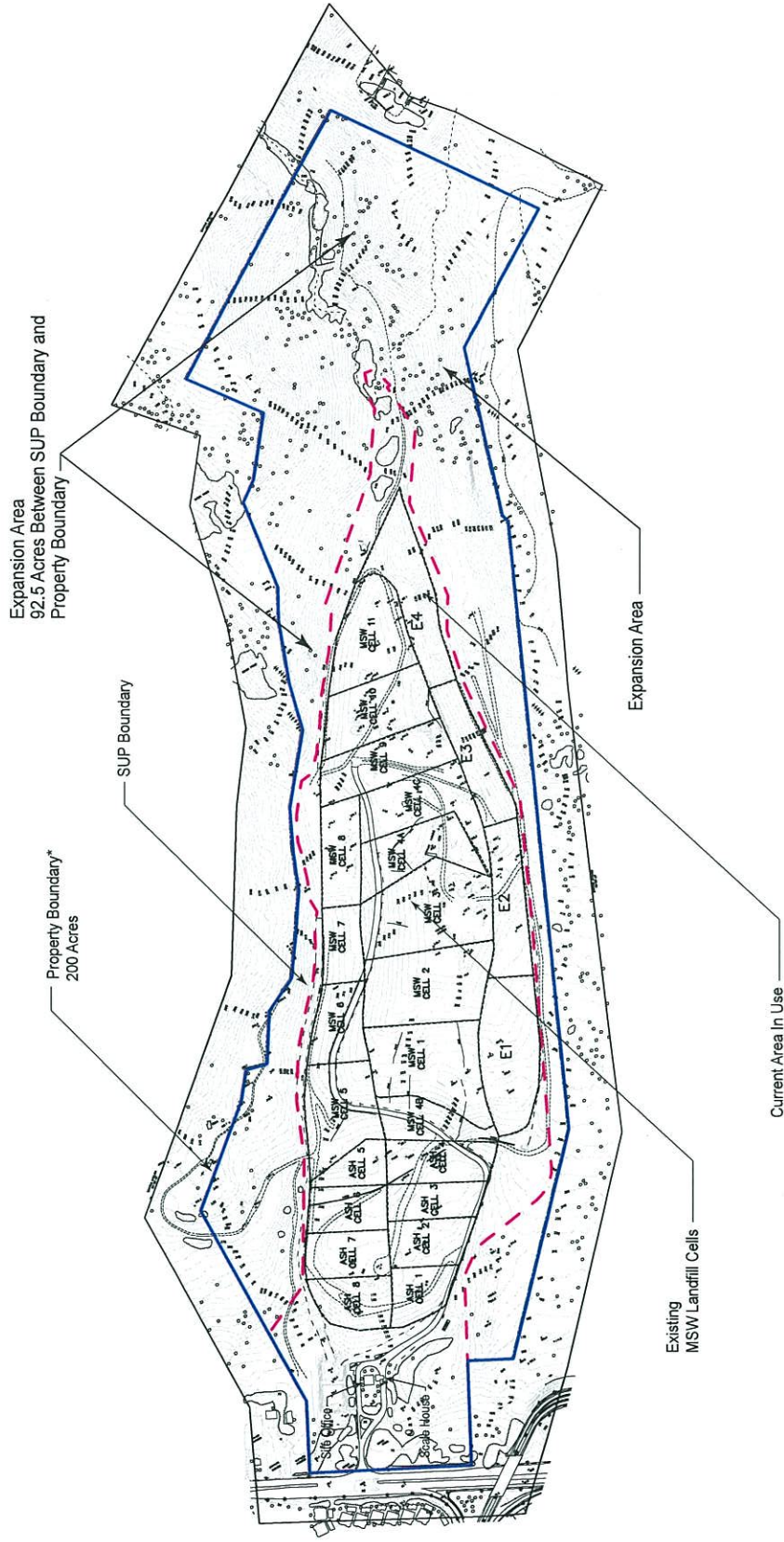


Figure 3-1
Waimanalo Gulch Landfill Property
 Waimanalo Gulch Sanitary Landfill Expansion
 Department of Environmental Services



R.M. TOWILL CORPORATION March 2008

Exhibit 1-C: Waimanalo Gulch Sanitary Landfill Expansion Site



Waimanalo Gulch Sanitary Landfill Lateral Expansion Site Waimanalo Gulch Sanitary Landfill Expansion Department of Environmental Services



Note: *Proposed expansion project is subject to a 100 foot buffer from the property boundary.

Source: Base Drawing - GeoSyntec Consultants, Site Plan and Topography, Waimanalo Gulch Landfill, Ewa Beach Oahu, Hawaii, April 2007

Landfilling has been a part of the mix of strategies used by the City to deal with MSW since at least as far back as 1905. Official *dumpsites* on Oahu have been located at Ala Moana Dump, present day Ala Moana Park, Waipahu, Kapaa and Kaneohe Bay Drive. Originally used to backfill swampy areas and other low spots intended for development, previous *dumpsites* now also include parks, parking areas, and other low intensity uses.

In 1963, ten years after originally opening as a *dump*, Kawainui Swamp became the first *landfill* on Oahu. *Landfills* differ from *dumps* in that *landfills* are lined, have a variety of engineering features that protect the landfill and the surrounding environment, and their operations significantly reduce exposure of MSW and its resultant externalities. *Landfills* continue to evolve as technology allows for improved operations. Although *landfills* are always expected to be a part of the mix of strategies used to dispose of MSW, the City explains that it is committed to investigating all proven methods or technologies with the potential to reduce the City's dependence on landfills. The City is actively: 1) analyzing the option of adding a third boiler at the H-POWER waste-to-energy plant; 2) researching alternative, new waste reduction technologies; and 3) exploring transshipment as a viable alternative. Where a method or technology can be demonstrated to be feasible, the City contends that it will be proposed and developed.

1.2 PURPOSE AND ORGANIZATION OF THIS REPORT

A socio-economic impact assessment is conducted to establish, for the use of policy-makers and the public at large, information about a proposed project and its socio-economic consequences. The report is used, with other aspects of the EIS, to inform decision-makers, and to ensure that consequences are taken into account. Where appropriate, this report points to other technical studies for more detailed examination of related topics.

This report is presented in six sections:

- Section 1 provides an introductory account of the proposed action;
- Section 2 discusses the socio-economic context of the proposed action;
- Section 3 briefly discusses alternative potential actions;
- Section 4 details the concerns of stakeholders with regard to the proposed action, and places those concerns in relation to more general issues and concerns of Oahu communities;
- Section 5 deals with potential impacts of the proposed action. Economic and demographic impacts are estimated first. Impacts on public facilities are established in relation to existing and planned local facilities. Other social impacts, which are less easily quantified, are then discussed; and
- Section 6 suggests mitigation activities for potentially adverse social/economic impacts, both ongoing processes and individual actions.

2. SOCIO-ECONOMIC CONTEXT

2.1 THE STUDY AREAS

A landfill on Oahu affects the entire island by providing a key element of Honolulu's solid waste system. All of Oahu's people and businesses are affected by the proposed action.

The Ewa Development Plan Area (EDPA), within which the landfill is located, is considered the area most affected by day-to-day operations of WGSL. The Waianae Development Plan Area (WDPA) is also noted as the residents of WDPA are users of major roads on which municipal solid waste is hauled to the WGSL and the only route in and out of WDPA runs by the WGSL.

2.1.1 Island of Oahu

Oahu has been the political and economic center of Hawaii since the time of Kamehameha I. It is the most urbanized and populated of the Hawaiian Islands. After World War II, Hawaii residents moved to Oahu in record numbers. According to the 2000 US Census, Oahu's resident population was 836,231, representing 72% of the State's population. By 2006, that population had risen to approximately 909,900.²

Since Statehood, Hawaii has witnessed rapid growth in tourism, supplanting agriculture and military spending as the major source of jobs and income. Because of their relative smaller economies on the neighbor islands, tourism has had and continues to have a greater impact on the neighbor islands. But even in tourism, Oahu dominates the industry. In 2006, Oahu had nearly twice as many visitors as any neighbor island with 4,606,400.

For the most part, Oahu's tourism has been centered in Waikiki (87% of Oahu's hotel units are located in Waikiki). In recent years, however, Ko Olina in Ewa has begun to shape itself into a visitor destination area, and Kuilima has resurrected plans to dramatically increase its hotel room count on the North Shore of Oahu.

During this same period Oahu also has reinforced its role as the financial and shipping center of the State. Oahu's more diverse economy has also resulted in less economic fluctuation, lower unemployment and higher average income than has been experienced on other islands (See Exhibits 2-A – 2-F).

² State of Hawaii DBED&T, State Data Book 2005 and American Community Survey, US Census Bureau, 2006.

Exhibit 2-A: Demographic Changes, Oahu, 1990-2000

Subject	1990	2000	2006 (ACS)	Change	
				Number	Percent
Total Population	836,231	876,156	909,863	33,707	3.8%
Male	425,994	440,518	455,051	14,533	3.3%
Female	410,237	435,638	454,812	19,174	4.4%
				-	
Under 5 years	61,931	56,849	63,084	6,235	11.0%
5 to 9 years	58,558	60,425	55,969	(4,456)	-7.4%
10 to 14 years	53,191	57,574	55,336	(2,238)	-3.9%
15 to 19 years	54,992	57,176	59,347	2,171	3.8%
20 to 24 years	75,418	65,376	68,052	2,676	4.1%
25 to 34 years	156,619	130,624	125,646	(4,978)	-3.8%
35 to 44 years	130,573	137,278	130,466	(6,812)	-5.0%
45 to 54 years	81,899	117,239	123,278	6,039	5.2%
55 to 59 years	34,560	42,705	52,456	9,751	22.8%
60 to 64 years	36,658	33,173	45,291	12,118	36.5%
65 to 74 years	58,279	62,474	60,962	(1,512)	-2.4%
75 to 84 years	25,939	42,504	51,422	8,918	21.0%
85 years and over	7,614	12,759	18,554	5,795	45.4%
				-	
Median age (years)	32	35.7	36.9	1	3.4%
				-	
18 years and over	631,618	667,398	700,359	32,961	4.9%
21 years and over	592,601	631,039	661,891	30,852	4.9%
62 years and over	113,889	136,945	156,602	19,657	14.4%
65 years and over	91,832	117,737	130,938	13,201	11.2%
				-	
18 years and over	631,618	667,398	700,359	32,961	4.9%
Male	320,656	333,139	346,193	13,054	3.9%
Female	310,962	334,259	354,166	19,907	6.0%
				-	
65 years and over	91,832	117,737	130,938	13,201	11.2%
Male	42,867	51,694	55,577	3,883	7.5%
Female	48,966	66,043	75,361	9,318	14.1%
				-	
RELATIONSHIP					
				-	
Household population	802,338	845,211	877,485	32,274	3.8%
Householder	264,304	286,450	299,217	12,767	4.5%
Spouse	158,438	156,195	157,567	1,372	0.9%
Child	259,193	253,694	257,391	3,697	1.5%
Other relatives	74,876	96,718	114,636	17,918	18.5%
Nonrelatives	44,527	52,199	48,674	(3,525)	-6.8%
Unmarried partner	10,436	14,420	14,245	(175)	-1.2%

Exhibit 2-A (Cont.): Demographic Changes, Oahu, 1990- 2000

Subject	1990	2000	2006 (ACS)	Change	
				Number	Percent
HOUSEHOLDS BY TYPE					
Total households	265,304	286,450	299,217	12,767	4.5%
Family households (families)	197,294	205,672	209,890	4,218	2.1%
With own children under 18 years	92,583	91,022	84,046	(6,976)	-7.7%
Married-couple families	158,438	156,195	157,578	1,383	0.9%
With own children under 18 years	76,217	70,442	64,824	(5,618)	-8.0%
Female householder, no husband present	27,773	35,138	36,659	1,521	4.3%
With own children under 18 years	12,479	15,235	14,187	(1,048)	-6.9%
Nonfamily households	68,010	80,778	89,327	8,549	10.6%
Householder living alone	51,006	61,963	74,425	12,462	20.1%
65 years and over	14,868	20,021	21,955	1,934	9.7%
				-	
Households with one or more people under 18 years	NA	108,247	103,107	(5,140)	-4.7%
Households with one or more people 65 years and over	NA	80,464	87,107	6,643	8.3%
				-	
Average household size	3.02	2.95	2.93	(0.02)	-0.7%
Average family size	3.50	3.46	3.52	0.06	1.7%
				-	
HOUSING OCCUPANCY					
				-	
Total housing units	281,683	315,988	332,718	16,730	5.3%
Occupied housing units	265,304	286,450	299,217	12,767	4.5%
Vacant housing units	16,379	29,538	33,501	3,963	13.4%
				-	
Homeowner vacancy rate	0.6	1.6	0.9	(0.7)	-43.8%
Rental vacancy rate	4.3	8.6	4.7	(3.9)	-45.3%
				-	
HOUSING TENURE					
				-	
Occupied housing units	265,304	286,450	299,217	12,767	4.5%
Owner-occupied	137,910	156,290	173,806	17,516	11.2%
Renter-occupied	127,394	130,160	125,411	(4,749)	-3.6%
				-	
Average household size of owner-occupied unit	3.23	3.13	3.11	(0.02)	-0.6%
Average household size of renter-occupied unit	2.80	2.74	2.69	(0.05)	-1.8%

Exhibit 2-B: Demographic Characteristics, Island and Selected Areas, 2000

	City & County of Honolulu	Ewa DP	Waianae DP	Makakilo CDP	Kapolei	Ko Olina/ Honokai Hale	Nanakuli
Population	876,166	57,265	42,258	13,158	17,441	1,680	10,814
Male	50.3%	50.4%	50.0%	50.3%	50.3%	50.9%	49.8%
Female	49.7%	49.6%	50.0%	49.7%	49.7%	49.1%	50.2%
Age							
Under 5	6.5%	9.2%	8.9%	8.6%	8.4%	6.2%	8.8%
5 to 9	6.9%	10.0%	9.7%	9.2%	10.2%	6.9%	9.9%
10 to 14	8.6%	8.3%	10.0%	8.4%	9.2%	6.8%	10.7%
15 to 19	8.5%	6.6%	9.5%	6.7%	7.1%	5.8%	10.4%
20 to 24	7.5%	6.0%	7.4%	6.0%	5.1%	5.1%	7.5%
25 to 34	14.9%	17.8%	13.0%	15.6%	15.8%	17.6%	12.7%
35 to 44	15.7%	18.0%	14.3%	18.0%	18.8%	16.3%	14.7%
45 to 54	13.4%	10.3%	11.9%	13.2%	11.3%	14.8%	10.9%
55 to 59	4.9%	3.6%	4.2%	4.7%	3.4%	5.9%	4.4%
60 to 64	3.8%	3.0%	3.1%	3.6%	2.8%	5.1%	3.2%
65 to 74	7.1%	4.6%	5.0%	4.3%	4.5%	5.9%	4.4%
75 to 84	4.9%	2.1%	2.4%	1.5%	2.7%	2.9%	2.0%
85 and over	1.5%	0.6%	0.7%	0.3%	0.9%	0.7%	0.4%
Median Age	35.7	30.9	28.5	32.4	31.4	36.8	27.2
Education							
Population 25 years or over	579,998	34,596	23,193	8,097	10,419	1,266	5,541
Less than 9th grade	7.3%	8.2%	6.4%	2.7%	10.4%	6.3%	7.1%
9-12 grade, no diploma	7.9%	9.3%	15.7%	7.2%	8.8%	7.3%	17.5%
High School graduate	27.8%	28.3%	45.3%	27.7%	27.1%	31.7%	49.0%
Some college/Associate degree	29.2%	34.5%	24.4%	36.2%	32.4%	30.2%	19.8%
Bachelor degree	18.9%	15.3%	6.1%	19.5%	16.7%	14.8%	4.9%
Graduate/Professional degree	9.0%	4.5%	2.1%	6.8%	4.6%	9.6%	1.7%
School Enrollment							
Population 3 years or older in:	234,038	17,143	13,283	4,148	5,644	345	2,188
Preschool	5.5%	5.7%	5.3%	7.9%	6.1%	2.6%	4.1%
Grades K through 8	45.7%	54.8%	56.0%	51.4%	55.5%	41.7%	58.8%
Grades 9 through 12	20.6%	20.9%	58.9%	17.8%	20.3%	25.2%	27.3%
College or Graduate School	28.0%	18.6%	11.8%	22.9%	18.2%	28.7%	9.8%

SOURCE: US Census of Population and Housing, 2000. Tables developed by SMS from SF1 and SF3 data available for download from www.census.gov.

Exhibit 2-C: Households, Island and Selected Areas, 2000

	City & County of Honolulu	Ewa DP	Waianae DP	Makakilo CDP	Kapolei	Ko Olina/ Honokai Hale	Nanakuli
Household Type							
Family HH	71.8%	84.9%	83.6%	82.7%	86.1%	78.8%	90.2%
With Own Children Under 18	31.8%	49.3%	43.3%	44.2%	52.5%	26.9%	46.0%
Non-family HH	28.2%	15.1%	16.4%	17.3%	13.9%	21.0%	9.8%
Householder living alone	21.8%	10.6%	11.9%	11.3%	10.8%	15.7%	6.7%
HH with members under 18	37.8%	57.5%	57.6%	51.4%	59.2%	37.1%	64.8%
HH with members 65 years and over	28.1%	18.1%	23.2%	15.1%	21.2%	21.0%	24.0%
Grandparents in HH							
Grandparent(s), grandchildren under 18 in same HH	36,868	3,145	3,182	554	895	77	750
Grandparent(s) responsible for grandchildren	28.1%	26.3%	36.3%	22.0%	24.0%	0.0%	46.5%

NOTE: "HH" = household.

SOURCE: US Census of Population and Housing, 2000. Tables developed by SMS from SF1 and SF3 data available for download from www.census.gov.

Exhibit 2-D: Household Income, Island and Selected Areas, 1999

	City & County of Honolulu	Ewa DP	Waiānae DP	Makakilo CDP	Kapolei	Ko Olina/ Honokai Hale	Nanakuli
Household Income Distribution	286,731	15,498	10,532	3,913	4,823	581	2,249
Less than \$10,000	7.3%	3.0%	11.8%	2.8%	3.9%	2.1%	7.2%
\$10,000 to \$14,999	4.1%	2.4%	6.8%	0.5%	2.6%	3.2%	9.9%
\$15,000 to \$24,999	9.9%	6.9%	12.7%	6.4%	8.2%	5.7%	11.3%
\$25,000 to \$34,999	11.1%	9.8%	10.8%	7.6%	8.7%	2.6%	11.3%
\$35,000 to \$49,999	15.4%	15.0%	15.2%	17.1%	13.6%	10.8%	18.7%
\$50,000 to \$74,999	20.6%	29.5%	22.0%	27.8%	30.8%	27.1%	22.3%
\$75,000 to \$99,999	13.4%	18.9%	10.8%	18.9%	19.7%	25.0%	11.4%
\$100,000 to \$149,999	12.3%	11.6%	7.8%	15.6%	10.7%	18.5%	7.8%
\$150,000 to \$199,999	3.3%	1.7%	1.3%	2.8%	2.4%	1.6%	1.2%
\$200,000 or more	2.5%	1.2%	1.3%	0.8%	1.4%	3.4%	0.8%
Median Income	\$51,914	\$59,583	\$42,451	\$86,515	\$80,585	\$74,083	\$42,388
HH: Selected Income Sources							
Social Security Income	27.5%	18.7%	25.7%	17.9%	21.0%	29.7%	24.5%
Retirement Income	21.8%	18.1%	20.5%	6.5%	6.1%	27.0%	23.5%
Public Assistance Income	6.8%	7.7%	25.5%	22.6%	21.8%	10.1%	23.0%
Individuals Below Poverty Level	83,937	3,103	8,148	663	809	170	2,251
% of Persons under 18	12.9%	7.7%	29.1%	7.3%	7.3%	30.4%	27.0%
Children under 18 ref'd to household hd.	12.4%	9.3%	28.7%	7.1%	4.9%	29.1%	24.5%
Persons ages 18 to 64	9.0%	14.9%	18.1%	4.1%	5.1%	9.3%	18.9%
Persons ages 65 or more	7.4%	8.1%	10.3%	3.6%	24.3%	4.5%	8.7%
Unrelated individuals	23.8%	41.2%	40.5%	12.4%	22.0%	3.7%	45.4%

NOTE: "HH" = household.

SOURCE: US Census of Population and Housing, 2000. Tables developed by SMS from SF1 and SF3 data available for download from www.census.gov.

Exhibit 2-E: Labor Force Characteristics, Island and Selected Areas, 2000

	City & County of Honolulu	Ewa DP	Waiānae DP	Makāhilo CDP	Kapolei	Ko Olina/ Honokāhale	Nanakuli
Labor Force							
Population aged 16 or over	691,015	40,945	29,444	9,523	12,233	1,410	4,752
In Armed Forces	38,682	2,434	216	316	271	27	20
Potential Labor Force	652,333	38,511	29,228	9,207	11,962	1,383	4,732
% Actually in Civilian Labor Force	62.6%	63.1%	58.6%	72.7%	69.1%	66.0%	67.5%
Actual CLF	408,638	24,298	17,137	6,698	8,267	913	4,139
Male CLF	209,959	12,406	9068	3,369	4,296	438	2,154
Female CLF	198,679	11,892	8069	3,309	3,971	475	1,985
Labor Force Participation							
Male CLF	67.5%	68.0%	64.7%	76.2%	67.6%	78.8%	63.4%
Female CLF	58.2%	61.8%	53.1%	70.0%	66.1%	69.6%	51.8%
Unemployed							
Male CLF	6.9%	5.8%	15.2%	5.8%	5.7%	0.0%	18.2%
Female CLF	5.6%	5.5%	14.6%	4.6%	5.1%	2.5%	12.3%
Employed CLF							
<i>By Selected Industry</i>							
Agriculture, forestry, fishing	1.1%	0.5%	2.8%	0.5%	0.4%	0.0%	0.8%
Construction	5.4%	6.5%	8.6%	8.5%	6.2%	16.2%	7.9%
Manufacturing	3.8%	5.2%	4.5%	4.3%	4.9%	3.4%	4.3%
Wholesale Trade	3.4%	3.1%	4.3%	2.8%	3.2%	2.9%	4.0%
Retail Trade	12.2%	13.0%	13.2%	13.7%	12.0%	6.2%	9.6%
Transportation and utilities	6.5%	6.7%	8.9%	8.8%	7.2%	5.3%	13.1%
Information	2.7%	2.1%	1.3%	2.6%	2.2%	0.6%	1.7%
Finance, Insurance, Real Estate	7.5%	7.7%	5.3%	8.8%	9.2%	6.9%	6.1%
Professional, Mgmt, Admin.	9.9%	8.8%	9.1%	9.1%	8.8%	11.0%	8.5%
Education, Health, Social Services	19.9%	19.1%	17.7%	16.9%	16.6%	19.2%	17.3%
Recreation, Lodging, Food Services	13.8%	12.7%	12.3%	8.4%	13.9%	10.1%	10.9%
Other Services	4.5%	4.4%	4.7%	3.2%	4.6%	6.0%	5.5%
Public Administration	9.3%	10.1%	7.2%	12.5%	10.4%	12.5%	9.4%
<i>By Occupation</i>							
Management and Professional	33.8%	26.6%	21.8%	30.5%	28.1%	30.8%	17.5%
Service	19.6%	23.4%	22.0%	15.8%	24.5%	18.9%	20.0%
Sales and Office	29.1%	28.8%	26.7%	30.8%	29.0%	26.6%	29.8%
Farming, Forestry, and Fishing	0.7%	0.3%	1.5%	0.4%	0.1%	0.0%	0.8%
Construction, Mining, Maintenance	8.1%	9.5%	13.0%	12.5%	9.5%	17.0%	9.5%
Production, Transportation	8.8%	11.4%	15.0%	10.0%	8.8%	6.9%	22.5%
Commute to Work	412,250	25782	14,314	6525	7853	928	2,271
Drove Alone or Carpooled	80.6%	86.0%	83.7%	91.6%	86.3%	92.0%	82.4%
Other Transp. (Public, Walked, Other)	16.3%	12.2%	15.2%	6.4%	11.0%	3.4%	14.7%
Worked at Home	2.9%	1.9%	2.1%	2.1%	1.7%	4.6%	2.8%
Travel Time More than 45 Minutes	8.9%	34.2%	45.8%	31.8%	35.1%	24.9%	33.7%
Mean travel time (in minutes)	27.3	36.5	41.9	35.3	39	29.2	35.8

NOTE: "CLF" = Civilian Labor Force.

SOURCE: US Census of Population and Housing, 2000. Tables developed by SMS from SF1 and SF3 data available for download from www.census.gov.

2.1.2 Ewa Development Plan Area

WGSL sits in the region officially known as the "Ewa Development Plan Area" (EDPA). The EDPA stretches from Waipahu to Ko 'Olina, from Ewa Beach to Makāhilo. Without a doubt, the EDPA has been the fastest growing region on the island, nearly tripling its population over the 30-year period 1970 to 2000³. This compares to a 39 percent growth for the island as a whole during that same period (See Exhibit 2-F).

³ Population figures were not available by DPA in the American Communities Surveys, 2006.

Exhibit 2-F: Historical Population

Resident Population						
	1960	1970	1980	1990	2000	
County	500,409	630,528	762,565	836,231	876,156	
Waianae	16,452	24,077	31,487	37,411	42,259	
Ewa		24,235	35,523	42,931	68,696	
Central Oahu			101,685	130,526	148,208	
PUC			417,240	432,023	419,422	
East Honolulu			43,213	45,654	46,735	
North Shore			13,061	15,729	18,380	
Koolauloa			10,983	14,263	14,546	
Koolaupoko	60,238	92,219	109,373	117,694	117,910	
Average Annual Growth Rates						
	Ten-year Intervals					1980-2000
County		2.6%	2.1%	1.0%	0.5%	1.5%
Waianae		4.6%	3.1%	1.9%	1.3%	3.4%
Ewa			4.7%	2.1%	6.0%	9.3%
Central Oahu				2.8%	1.4%	4.6%
PUC				0.4%	-0.3%	0.1%
East Honolulu				0.6%	0.2%	0.8%
North Shore				2.0%	1.7%	4.1%
Koolauloa				3.0%	0.2%	3.2%
Koolaupoko		5.3%	1.9%	0.8%	0.0%	0.8%

Sources: DBEDT (2004a) and earlier years; City of Honolulu website (<http://www.honolulu.gov/Planning/ResearchStats.asp>)

Exhibit 2-G: 2030 Socioeconomic Projections

	2005		2025		2030	
	Population	Share of Island	Population	Share of Island	Population	Share of Island
Waianae	44,004	5%	49,682	5%	50,616	5%
Ewa	84,154	9%	164,136	15%	184,612	17%
Central Oahu	157,250	17%	180,687	17%	189,599	17%
Primary Urban Center	424,183	46%	478,430	44%	489,389	44%
East Honolulu	50,377	6%	51,713	5%	51,059	5%
North Shore	18,703	2%	20,074	2%	19,945	2%
Koolauloa	15,099	2%	16,563	2%	16,725	1%
Koolaupoko	119,132	13%	116,766	11%	115,357	10%
Total	912,902	100%	1,078,051	101%	1,117,302	101%

Source: <http://honolulu.gov/planning/demographics2/Projections/2030byDP.pdf>

Geographically, Ewa consists of what was once an arid and barren plain at the foothills of the Waianae Mountains. With the advent of irrigation, much of the eastern side of the plain was dedicated to sugar until Oahu Sugar Company closed in the mid-1990's, while the western side was ranch lands. The US Navy had land at both Puuloa (Iroquois Point and Puuloa) to the east, and Kalaeloa (Barbers Point Naval Air Station) to the west.

Barbers Point NAS (“Kalaeloa”), with some 3,709 acres, was a major land use for the area until the Naval Air Station closed in 1999. Its airfield is now operated by the State Department of Transportation for general aviation, while the remainder of the Kalaeloa land is parceled among public and private users, including among others, the City, the Hawaii National Guard, the State Department of Hawaiian Home Lands, the US Coast Guard, and the US Navy.

Honolulu has long been Oahu’s commercial and transportation center. Squeezed between the Koolau Mountain Range and the ocean, growth has vertical and sprawled out, southeast toward Koko Head, and northwest toward Central Oahu and the Leeward communities. Concentration of activities in Honolulu has also created the expected problems of traffic congestion, overtaxed infrastructure, and deteriorating urban spaces.

Plans to develop a “Second City” at Kapolei on the Ewa Plain responded in part to these problems. Planning began in 1955, when Harland Bartholomew and Associates prepared the first Ewa region master plan for the Estate of James Campbell, the major landowner. The concept of a separate city emerged in 1974, and was officially sanctioned in 1977 when the City Council approved the new General Plan with a Secondary Urban Center for Oahu centered on the Ewa Plain. In 1986, the Estate proposed a detailed implementation plan for a city center, naming it the City of Kapolei. Since breaking ground in 1990, Kapolei, and for that matter all of the EDPA, has been bustling.

Kapolei land uses include a large industrial complex, with areas for both heavy industry (in the 1,367-acre James Campbell Industrial Park) and light industry plus new technologies (in Kapolei Business Park) and areas for commercial and office development in the City of Kapolei urban center. As Oahu’s largest industrial area, Campbell Industrial Park has been developed over decades, having originally broken ground in 1958. A 2006 inventory showed that 251 businesses were located in the industrial park, with about 4,500 workers. Approximately 85 percent of the parcels in the park are owned in fee by its tenants.⁴

At Campbell Industrial Park’s northern edge, Kalaeloa Harbor was created as a second harbor for Oahu in 1961. To the south of the industrial area, about a mile offshore, are a buoy and pipeline designed to allow oil tankers to off-load their cargo without docking in harbor. Steps are currently being taken by The Campbell Estate to construct a second industrial park at Kalaeloa Harbor. This industrial park would be built on a 332-acre parcel and construction is expected to begin in 2008 or 2009.

Over the years, residential areas developed along Farrington Highway and, as of 1962, uphill in Makakilo. At Kapolei, new residential development has been led by the State, as master developer of the Villages of Kapolei, beginning in the 1980’s with Village One, Kumu Iki. The Villages and adjoining developments have rivaled developments along Fort Weaver Road, to the east, and Mililani in Central Oahu as new residential areas emerged with aggressive growth through the last decade.

While industrial and residential development proceeded over recent years, many of Kapolei’s residents still commute to Honolulu. Growth in the center of Kapolei has been spurred by relocation of banking activities and both State and City offices; and the Campbell Estate stresses Kapolei’s advantages as a wired community, with direct access to satellite and fiber-optic network communications.

⁴ Personal communication, Jeannie Schultz, Kapolei Property Development LLC

Ko Olina is being developed as a resort complementing the rest of Kapolei. Its innovative man-made coves provide recreational areas and frontage for hotels, and a 430-acre privately owned marina offers 330 full service slips for boats. Plans have called for as many as 8,700 housing units. These were planned with vacation markets in mind. Projects to date include a hotel, a time-share resort, and townhouse condominiums. One project, The Fairways at Ko Olina, was sold to the resident market, and newer projects have aimed at both second- and first-time home buyers (The Coconut Plantation, Kai Lani, Ko 'Oliina Kai). The newest project, the Beach Villas at Ko 'Olina, with 247 luxury units in beachside towers is expected to open in the spring of 2008.

When first opened in 1989, WGSL was surrounded by vacant land and agriculture. Although Makakilo had begun to be settled by homes 27 years earlier, it was still a significant distance from the landfill. The resort of Ko Olina was still a dream to its developer's mind and Kapolei's Second City had only just begun. Today, urbanization in the EDPA is creeping up on the landfill, the second City is becoming a reality and the resort of Ko Olina is a growing vacation and residential community.

2.1.2.1 Demographics and Housing

The EDPA has a young population; the median age of its residents is 31.2 vs. Oahu's residents' median age of 35.7. Households are significantly larger than the average (3.69 persons per household, vs. 2.95 persons in the average household for Oahu as a whole). Of the 20,804 units in Ewa in 2000, 63.7 percent are owner occupied.

Within the EDPA, the Ko Olina sub-region (Census Tract 86.09) stands out as having an older median age, a large proportion of vacant homes held for seasonal or recreational use, and, among occupied homes, a low proportion of renters (26.1%).

2.1.2.2 Economic Characteristics

In general, the average per capita income over the entire EDPA is lower than the island's average. In the two census tracts abutting the landfill however, incomes tend to be higher. In the Kahe Census Tract, per capita incomes nearly at the Oahu average level; in Ko Olina Census Tract incomes are much higher.

Workers living in the EDPA area are diverse in occupation, and, despite their long history in sugar cane, a lower percentage of workers are in agriculture than the percentage island wide. Commuting times are long, and a third of the workforce normally drives over 45 minutes to work, characteristic of a suburban community.

Among the EDPA communities, Ko Olina/Honokai Hale⁵ stands out in several ways. In this sub-region, population tends to be older, with a median age of 36.8, slightly higher than the island median. Most households do not have members younger than 18. The median household income level is much higher than in the other communities studied. However, the share of children under 18 living with family who are below the poverty level is comparable to that found in the Waianae Coast, suggesting that those families that do have children in this sub-region face an economic situation very different from that of their older neighbors.

⁵ In the Census tables, "Ko Olina" consists of Census Tracts 86.09 and 86.10, and includes Honokai Hale as well as Ko Olina.

Despite the intention to develop Kapolei into the second major Oahu city, Kapolei is today not much more than a significant suburban community. The same can be said of the neighboring communities along Fort Weaver Road, in Ewa and Makakilo. Outside of Campbell Industrial Park and the Kalaeloa Harbor, the commercial activity of the region is primarily designed to service a suburban community.

2.1.2.3 Ewa: Emerging and Anticipated Trends

Although the business core has not yet emerged, the building blocks being laid today forecast a very strong future growth in the EDPA. As noted in Exhibit 2-G, the EDPA is the **only** Development Plan Area on the island that is expected to increase its share of the City's population between 2005 and 2030.

The suburban residential areas that experienced vigorous growth through the last 15 years continue to fill in with projects by HASEKO, the Department of Hawaiian Home Lands, Gentry and others; and plans for accompanying major retail projects have progressed beyond the talking stages. If anything is missing to complete the City, it is the maturing of an intense, downtown core characteristic of other cities: home to the finance and professional services, upscale restaurants, specialty retail, medical services and other office tenants that make a downtown viable.

On February 9, 2005, ground was broken to begin construction on Ewa's North-South Road. This major roadway will connect H-1 with Kapolei Parkway and extend into Kalaeloa. That project is in full construction today and its completion later in 2008 will signal the start of construction on the new University of Hawaii West Oahu Campus, will provide a primary access to the underdeveloped lands of Kalaeloa and will make available the largely vacant lands of West Kapolei. The confluence of activity along the North-South Road will have significant impact on the shape and development timing of the entire EDPA.

On the industrial front, Campbell Industrial Park is full and employment has remained stable for the past few years. Light industrial space in the City of Kapolei and Kapolei Business Park is likely to attract office and light industry jobs from other parts of Oahu as the region's residential population continues to grow.

Kalaeloa Harbor is currently very busy. Sause Brothers barge operations have been shifted to this port from Honolulu. The harbor also handles several bulk cargo operations and metals recycling. With coral dredged from the harbor now placed on the harbor's land area, space for expansion will remain tight for the next few years.

A key to understanding the future of industrial/commercial uses in the Ewa region may lie with the Barber's Point Naval Air Station, now simply called "Kalaeloa". Because of its sheer size (nearly 3,700 acres) and the undeveloped nature of much of its lands, Kalaeloa offers business, commercial opportunities that no other part of the island can duplicate.

Finally, as noted earlier, Ko Olina continues to grow and to move toward a critical mass sufficient to fully support a resort community.

If anything will slow down the emergence of a true Second City at Kapolei, it is the capacity of the infrastructure. Despite building the North-South Road and widening Fort Weaver Road, the roadways of the Ewa region are significantly under capacity and deficient in connectivity. And the school systems, finished park space, liquid and solid waste disposal, drainage capacity must all be supplemented to accommodate the projected growth.

2.1.3 Waianae Development Plan Area

The Waianae Development Plan Area (WDPA) is the fifth largest of the City Development Plan Areas. A long corridor, the WDPA stretches 18 miles from Nanakuli to Kaena Point, and is confined by the Waianae Mountain Range to the east and the ocean to the west. With ten percent of Oahu's landmass, but less than five percent of the island's population, the WDPA is still rural, though it is becoming increasingly suburban.

The mountain range is a dominant feature and creates distinct valleys that line the corridor, linked by a single roadway and coastal beach parks. Nanakuli, about three miles from WGSL, includes the largest Hawaiian Homes community in the State, and is completely suburban in nature. Lualualei, home to large Navy munitions storage and communication facilities, as well as small residential communities along the highway is next. Maili and Waianae are home to large residential communities, as well as to many small farms. Waianae is also the urban core of the WDPA with shopping and civic services. Makaha has a small resort, but is essentially the last of the suburban housing communities along the coast. Makua is occupied by the US Army for military training, while Kaena is in conservation and nearly inaccessible to vehicular traffic.

The WDPA has experienced modest growth over the last 20 years (3.4%) and this has allowed the communities to retain the "small-town" values of the residents. But the isolation of these communities, and its rural character has had its downside. Average incomes in the WDPA (\$42,451) are significantly below the City averages (\$51,914) and the number of people living in poverty is nearly triple the number living in the EDPA. Unemployment is very high and a host of social concerns threaten the region. Of equal concern, the WDPA is seen by many of its residents as the "dumping" ground for problems that no one on Oahu wants, including two construction and debris landfills, a very large portion of the island's homeless population, a major power plant, and firing ranges and military dumping (over 32% of the region is controlled by the military).

The entire region is at the "end of the road" and there is, except in times of emergencies, only one road in and one road out of the WDPA. It is this road that runs by the WGSL.

2.1.2.3 Waianae: Emerging and Anticipated Trends

In recent years, the official City planning document that guides the growth of this region has migrated from a "development plan" to a "sustainable community plan", reflecting the intention of the City government and of the community to retain the rural nature of the region. The plan's vision and supporting provisions are oriented "to maintaining and enhancing the region's ability to sustain its unique character, current population, growing families, rural lifestyle, and economic livelihood . . ."⁶

With the exception of significantly upgrading the infrastructure servicing the region, and protecting and enhancing the lifestyle, not much is projected to change. And although there have been on-going discussion for many years about adding a new highway through the Waianae Mountain Range or completing the highway around Kaena Point, plans have not been developed for such a project. Till then, the only access in and out of the WDPA is along H-1/Farrington Highway.

⁶ Waianae Sustainable Communities Plan, City Department of Planning and Permitting, 2000

2.2 LANDFILLS

2.2.1 History of Landfills on Oahu

Since as early as the 1850's, Oahu is documented as providing its residents with some form of Public Service for solid waste disposal; however, locations, collection and disposal processes have varied greatly. The City's waste disposal methods have included "garbage crematoriums", dumps, landfills, swamp filling, incinerators and ocean dumping, just to name a few. Locations have also differed greatly, from downtown (at present Ala Moana Boulevard), to Kaneohe Bay Drive (Aikahi Dump), Kawainui Swamp (Kawainui Dump which became the first landfill on Oahu), Kapaa Quarry and most recently WGSL. Landfills were located in Windward Oahu from 1940 until 1997 when the Kapaa Quarry landfill location was closed.⁷

2.2.2 History of WGSL Site

Site selection for a Leeward Sanitary Landfill began in 1977 with studies of 26 potential sites. In 1978 an EIS was prepared listing three sites, Nanakuli A and B, Makaiwa Gulch and Kaloia as the best possible landfill locations. Community concerns about groundwater protection caused the reexamination of these three options.

In 1984 an REIS declared Waimanalo Gulch and Ohikilolo (below the 200-foot contour) the best locations for Leeward landfills. Acceptance of H-POWER eliminated the need for having two landfills; Ohikilolo was declared unnecessary at that time and Waimanalo Gulch emerged as the preferred location. In the 1984 REIS report, the Department of Public Works stated that their objectives for solid waste disposal on Oahu were to operate landfills on both Windward and Leeward sides of Oahu and to implement H-POWER as quickly as possible.

The landfill in Waimanalo Gulch has been in operation since 1989 and since 1997 has remained the only municipal sanitary landfill on Oahu. Residents were previously assured that WGSL would close in 2004, or when the landfill had reached its full capacity. In 2001 a proposal for a 60.5-acre expansion was submitted. A 14.9-acre expansion was approved with the closure date of 2008. At the time, residents were subsequently assured that the landfill would close in 2008. The City today believes that no feasible or timely alternative to the landfill is currently available and that an extension and expansion of the use of WGSL is again necessary.

⁷ Young, Robert, *Garbage in Paradise*, 2005
http://envhonolulu.org/solid_waste/archive/History%20_Garbage_in_paradise.html

3. ALTERNATIVE ACTIONS

The City's Preferred Action is to expand and continue to use the Waimanalo Gulch Sanitary landfill beyond its intended closure on November 1, 2009. Presented below are the most seriously considered alternatives to the Preferred Action. They include alternative technologies and methods of disposal, and alternative landfill sites.

3.1 ALTERNATIVES TECHNOLOGIES AND OTHER MEANS OF DISPOSAL

3.1.1 H-POWER

H-POWER is a major element in the reduction of MSW requiring landfilling on Oahu. In 2005, H-POWER processed 625,877 tons of waste and recycling residue. The H-POWER process consists of shredding, separating recyclable materials, and waste combustion, all leading to steam generation, which drives a turbine to create electricity for over 45,000 homes on Oahu.

Plans are to add a third boiler to H-POWER, which would significantly reduce the MSW being sent directly to the landfill. A landfill, however, would still be necessary for down periods in the operation of the H-POWER Plant, for processing materials that cannot be handled by H-POWER, and for periods of emergency caused by natural disasters (e.g. hurricanes, tsunami).

3.1.2 Conversion of Sludge into Fertilizer

In 2006, the design-build-operator Synagro-WWT, under contract to the City, completed an In-Vessel Bioconversion facility where it takes sludge from the Sand Island Wastewater Treatment Plant and converts it into commercial, high grade fertilizer pellets, which is planned to be sold on the market to landscapers and others.

Previous to this facility, as much as 26,000 tons of sludge annually was trucked from the Treatment Plant and landfilled at WGSL. Delays in processing would sometimes result in odor problems for surrounding communities, especially for residents in Honokai Hale and Ko Olina.

Although initially slowed by some equipment issues, the facility began full operation in September of 2007. With this diversion, the delivery of sludge to WGSL has dropped over 25 percent from two years ago, from a high of 2,240 tons in January, 2006 to a low of 1,670 tons in December, 2007. ENV is also attempting to expand bio-solid/green waste composting to help recycling and to further divert sludge from WGSL.

WM notes that today it processes the sludge immediately upon delivery. In order to further reduce odors emanating from the landfill, WM also uses a system that emits an odor neutralizing mist every half hour of every day, from early in the morning to early in the evening, along the fence line fronting the landfill.

3.1.3 Other Alternative Technologies

Anaerobic digestion, hydrolysis and gasification are forms of alternative technologies that could reduce the amount of waste processed at WGSL. These forms, however, would not eliminate the need for a landfill as they deal solely with organic materials leaving all other forms of waste for alternate disposal. Equally important, the apparent capacities of these facilities are not sufficient to replace the burden borne by WGSL.

Anaerobic digestion is the naturally occurring bacterial breakdown of organic material in a controlled, oxygen free environment. Anaerobic digestion creates three byproducts, biogas, which in turn can be used for electricity generation, stable organic material that can be used for low grade building products such as fiberboard, and a liquid rich in nutrients, which dependant on the quality of material digested, can be used as fertilizer.

Hydrolysis is the use of water to split chemical bonds of substances.

Gasification is the decomposition of organic waste by exposing it to high temperatures. This process, unlike anaerobic digestion, allows a small amount of oxygen to be present during decomposition. Byproducts include solid ash and slag, liquid spyrolysis oil, and synthesis gas, or syngas. Gasification reduces solid waste by 85% to 92%. The remainder must be disposed of in landfills. Gas created through this process can be used for electricity generation.

For anaerobic digestion and gasification, markets need to be found to use the gas fuel and the fertilizer materials, and proven applications have not been shown on Oahu.

The Plasma Arc technology creates an electrical arc between two electrodes, which in turn produces extremely high temperatures. The heat breaks down the waste into organic molecules leaving gases, including syngas that can be used to generate electricity. Byproducts include materials such as glass and metal, and a lava-like hardened material.

3.1.4 Recycling

In 2006, a total of 542,747 tons of material, including auto bodies and other ferrous material, paper, metals, glass, plastic, tires, auto batteries, electronic scrap, green waste, wood waste/pallets, construction & demolition, food waste, sewage sludge, and other reuse material (Goodwill, Salvation Army, Helping Hands) were recycled on Oahu. Over the course of the last twenty years in which the City has maintained recycle data, the amount of waste recycled by the City has grown from 73,992 tons in 1988 to over 600,000 tons in 2007 (precise 2007 totals are not yet available).

There are currently over 70 recycle bin locations at schools for public use, with plans to expand the program by 40 locations in the coming years. All money acquired from the sales of recycled materials goes directly to the school. The State also maintains over 50 redemption locations on the island that accept HI5 bottles and cans only.

In the fall of 2007, the City began curbside collection of mixed recyclables (e.g. glass, cardboard, newspapers, plastics, green waste) in Hawaii Kai and Mililani. The program has proven very successful and the Mayor has announced plans to expand the program island wide in staged increments, beginning sometime in the fall of 2008. The City is also considering ways to assist high rise complexes, which are not part of the curbside collection program, in collecting their recyclables.

Items that are restricted from recycling centers include business/commercial/agricultural refuse, liquids, oils, grease, wet kitchen garbage, animal carcasses, large auto parts, some of which can be landfilled after processing. (Other items such as explosives and weapons, toxic/poison waste, wet paint and solvents, and medical waste are disposed in more specialized, highly controlled ways). There remains a quantity of nonrecyclable and noncombustible refuse that will require landfill disposal even after recycling efforts and waste-to-energy capacity have been increased significantly.

3.1.5 Transshipment

Transshipment involves packaging Oahu's waste and shipping it off the island. This alternative has been discussed at least as far back as the 2001 EIS and today is a more realistic alternative than ever before. Transshipment would significantly reduce the need for daily landfill capacity. Currently, proposals call for the use of sites in Washington State or Idaho; where landfill capacity is readily available.

Transshipment is a serious alternative to handling a portion of MSW, but it has externalities that must be considered. These include the following:

- The tipping fees received from H-POWER and WGSL provide the resources necessary to run H-POWER and to collect residential solid waste at no additional fee to tax payers. Diverting a significant level of solid waste to the mainland diverts those fees and may force the City to find other revenue to offset the subsidies required to run H-POWER and to collect residential solid waste.
- H-POWER supplies the power for over 45,000 homes on Oahu. Reducing the solid waste input into H-POWER reduces its alternative energy output.
- Transshipment creates a level of uncertainty that is not apparent in today's technology of H-POWER and landfilling. Transshipment is more vulnerable to freight and vendor price increases (e.g. those tied to the price of oil), to shipping disruptions (e.g. strikes, weather, regulations in the receiving states) and to the loss of control at the out-of-state landfill site.
- Because of the amount of fuel needed to process and to ship MSW to its ultimate location and the reduction of alternate energy, it is likely that the carbon footprint of this alternative exceeds the processing of MSW on Oahu.
- Industrial area space and wharf space would be needed to process and to store solid waste to be transshipped off-island. Wharf space is limited.

The City has recently advertised an Invitation for Bid regarding the transshipment of MSW. A pre-bid conference on February 14, 2008 attracted about 10 interested parties. A decision to procure those services will depend on the bids that are received later this year, with the expectation that if successful, transshipment will probably not occur until sometime in 2009.

It should be noted that the City believes that even if transshipment is deemed economically viable and politically acceptable, limited landfill capacity will still be required for material that cannot be processed or shipped (e.g. agricultural waste, bulky waste/white goods, brown waste/furniture), for downtimes at the H-POWER Plant and for emergencies caused by natural disasters.

3.2 ALTERNATIVE SITES

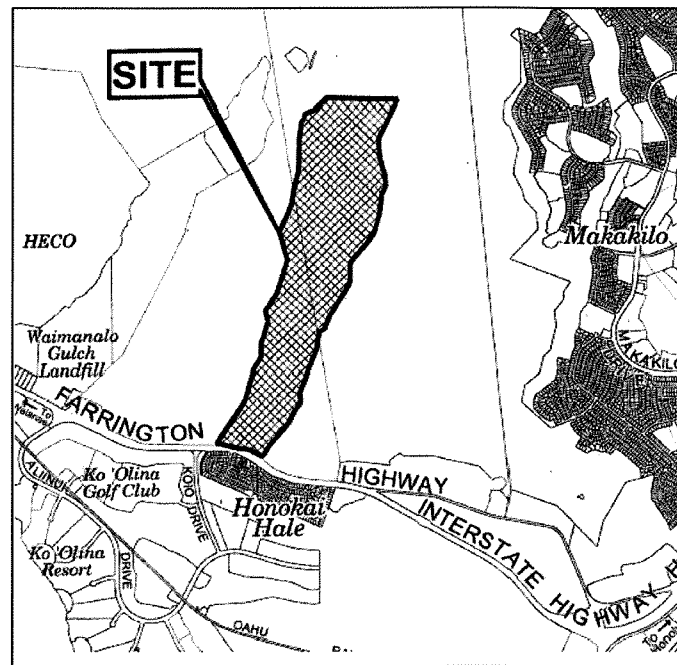
Since 2000, many alternative sites have been analyzed for potential as landfill candidates. After serious study by the City, four sites emerge as possible replacements for the WGSL. These include sites in Makaiwa Gulch, Maili, Nanakuli B, and the Ameron Quarry in Kailua. All four sites are privately owned: two are in active use and one is targeted by its landowner for partial residential development. Like WGSL, three of the four sites are in Leeward Oahu. All four alternative sites have a landfill life expectancy of at least 15 years. In 2001, in 2003 and in reviews since, the City has consistently found WGSL to be the optimal site based on a number of landfill siting criteria.

3.2.1 Makaiwa

The Makaiwa site is a gently sloping valley of more than 1,200 acres. The next valley to the west is Waimanalo Gulch, where the current MSW landfill is in operation. Part of the property has been classified as Urban by the State Land Use Commission, in response to a petition by the owner. Current plans for the property include residential development extending from Makakilo (above the site and to the east). To the south of the site is the residential community of Honokai Hale and, further seaward, Ko Olina.

The Makaiwa Gulch site consists of 338 acres with an anticipated landfill life of 25 years. There is currently only one building located on the site that would be displaced. There are two residences located 118 feet from the property line and the nearest school, Mauka Lani, is a little over a mile away. Although parts of the site are very visible from H-1 Highway, the landfill may not be if carefully located and screened. Traffic issues that affect WGSL may be apparent with Makaiwa as well since both have similar alignments with Farrington Highway.

Exhibit 3-A: Makaiwa Site



Source: Honolulu Department of Permitting and Planning
<http://www.honoluludpp.org/Planning/PublicInfrastructureMap.asp>

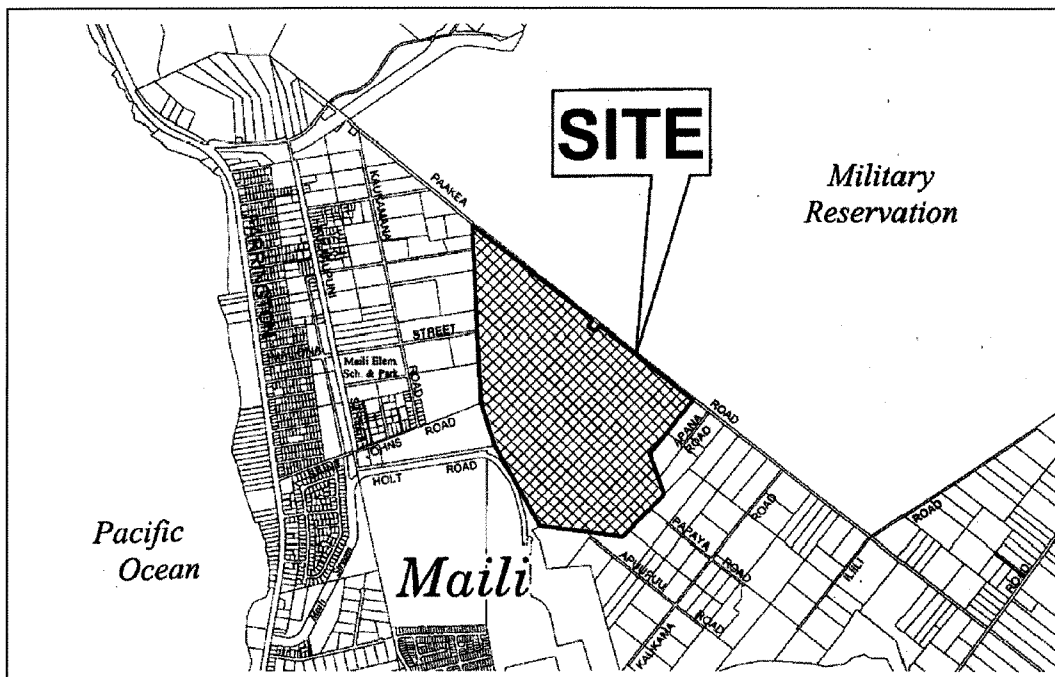
3.2.2 Maili

The Maili site can be reached by Paakea Road, which runs along the boundary between civilian and military areas in the Lualualei region. On the makai side of the road, its immediate neighbors include an egg farm. At slightly greater distance are a school and the Waianae Coast's major health clinic. Operations at the site would likely be visible from the Maili Kai residential area to the south.

The Maili site includes one dwelling and another building on 200 acres of land. The anticipated landfill life of this site is 15.33 years. There is a distance of 875 feet between the property line and the nearest residence and 1/5 of a mile between the property line and the nearest school, Maili Elementary. The site is located in an area that has low visibility from Farrington Highway, the closest general use public road.

The Maili property is currently being used as a coral quarry. Its operators have been mining the site since 1998 and project use of the site for another "40 to 50 years". Sphere LLC is accepting asphalt on site, and has a contract to take ash from AES Hawaii⁸. Sphere LLC applied to the State Land Use Commission for a Special Use Permit to operate a construction and debris landfill; the petition was denied in June 2004 due to insufficient information concerning the planned use of the site. The petition was denied again in March 2006 when the project was met with much more opposition from the community than in 2004.

Exhibit 3-B: Maili Site



Source: Honolulu Department of Permitting and Planning
<http://www.honoluluodpp.org/Planning/PublicInfrastructureMap.asp>

3.2.3 Nanakuli B

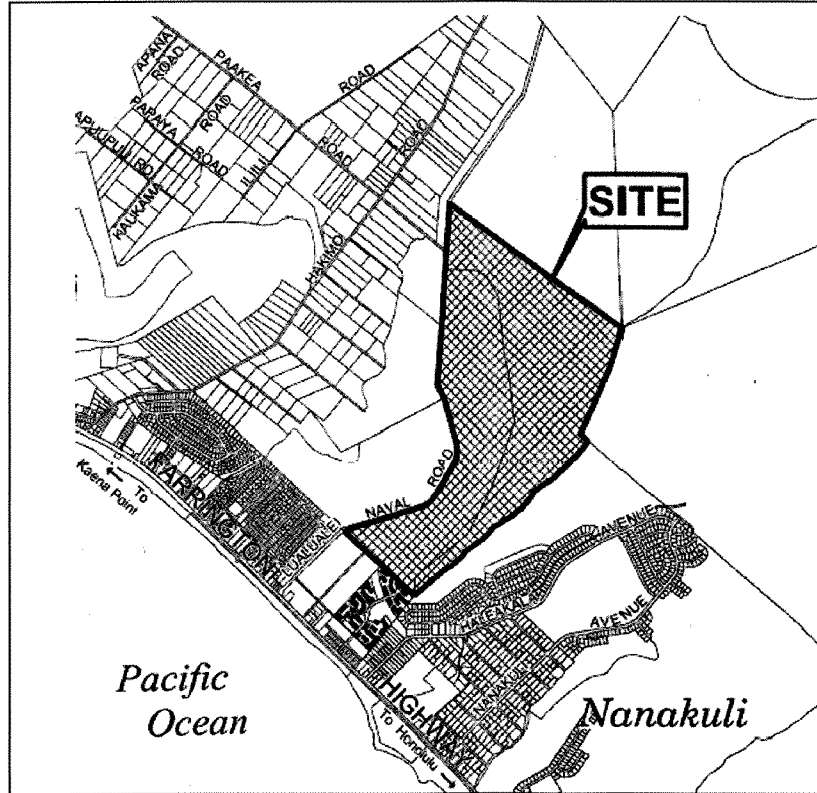
Although labeled as being in Nanakuli, some would argue that this site actually sits in Maili. The site itself nestles between a volcanic ridge and Lualualei Naval Road. The ridge separates the site from the bulk of developed land in Nanakuli Valley. Neighbors on the Naval Road include the existing construction and demolition debris landfill and acreage where the owner once proposed developing a golf course (Hida, Okamoto, 1991). The owners note that the site has plans and permits for the existing construction landfill located across the Naval Road.⁹ An EIS has been in preparation for a municipal solid waste landfill at this site. Also across the road is the old Kaiser Cement plant. Seaward is a commercial area, including a large grocery store.

⁸ Letter, L. Wilderman to W. Namumnart, August 25, 2004

⁹ Letter, S. Joseph to W. Namumnart, August 19, 2004.

The Nanakuli B site is 432.3 acres with an anticipated landfill life of 15.63 years. The nearest residence is adjacent to the property line, while the nearest school, Nanakuli Elementary School is ¼ mile from the property line. There are currently no buildings or dwellings located on the site. The Nanakuli B site is visible from Farrington Highway.

Exhibit 3-C: Nanakuli "B"



Source: Honolulu Department of Permitting and Planning
<http://www.honoluluodpp.org/Planning/PublicInfrastructureMap.asp>

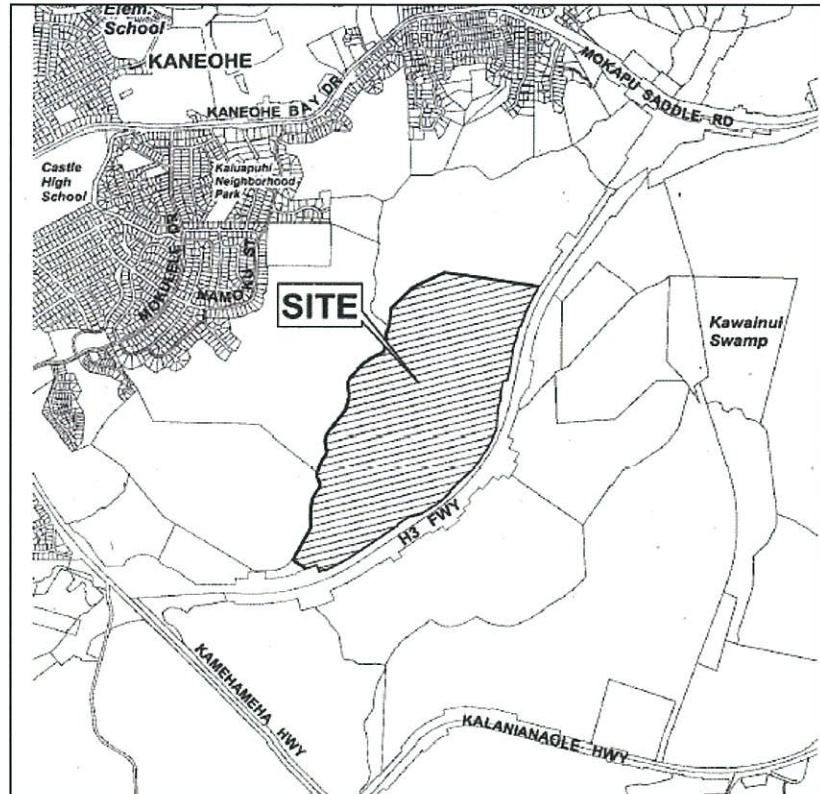
3.2.4 Ameron Quarry

This site is in Kapaa valley on the Kaneohe side of the Koolau's, an unpopulated area through which runs the H-3 Freeway. From the freeway it is possible to see structures in the Ameron site (notably crushers) but not the pits. To the north is the Veterans Cemetery. To the west, Kaneohe neighborhoods extend to the ridge that forms the back wall of the quarry. The nearest neighbor to the south is an industrial area, to which the Ameron supplies water for non-potable use. Further to the south is the Kawainui Marsh, a basin that has been identified as the State's largest wetland.

Current operations on-site include Ameron's rock quarrying and crushing activities and a Grace Pacific plant. The site includes stockpiles and water detention basins. To the east, on the other side of the freeway, Ameron is developing a second phase of its Kapaa operations. Current plans call for use of both sites, and a gradual transition to dependence on phase II. Even when quarrying in the existing pit ends, the owners claim that much of the area will still be needed for stockpiles and water detention.

The Ameron Quarry site consists of 391 acres with an anticipated landfill life of 15 years. There are presently 8 buildings located on site. The nearest residence, Pohai Nani – Elderly Development and the nearest school, Le Jardin Academy, are located 1/5 of a mile and 2/3 of a mile, respectively, from the property line.

Exhibit 3-D: Ameron Quarry Site



Source: Honolulu Department of Permitting and Planning
<http://www.honoluludpp.org/Planning/PublicInfrastructureMap.asp>

3.3 TAKE NO ACTION

Currently nearly 563,000 tons of MSW is sent annually to WGSL. There appears to be no single alternative, nor any combination of alternatives that can viably be expected to process that level of waste. And if there were, with each alternative a landfill is required to handle product that cannot be processed or to serve as a backup in case of downtimes or emergencies.

Closure of WGS� without a viable replacement that meets State and Federal requirements would mean that the City and its residents would be faced with some of the following challenges:

- The incidence of illegal dumping, with serious health and safety impacts and high costs of clean up, would greatly increase.
- An alternative site would have to be quickly activated for landfill requirements. Regulatory, construction and other start-up costs, which have already been incurred at WGS�, would have to be assumed.
- For commercial haulers, transshipment may become a greater reality, significantly cutting into the waste levels needed to operate H-POWER, thereby threatening its economic viability. A reduction in H-POWER usage will also result in a significant reduction of power generated on Oahu from alternate energy sources.
- Ash and residue from H-POWER and any residue from alternative waste disposal technologies may have to be exported elsewhere. If so, ENV will have to ensure proper process (autoclaving) of MSW, sludge, and non-incinerated residue from H-POWER to make sure these meet Federal and State requirements.

4. COMMUNITY ISSUES AND CONCERNS

This section identifies those landfill issues that are of concern to the communities of Oahu. As was echoed through numerous sources, waste disposal and WGS� specifically are of concern to all of Oahu’s residents. This section helps to better understand the underlying causes of concern.

4.1 SOURCES AND METHODOLOGY

Major sources for the account of issues and concerns were:

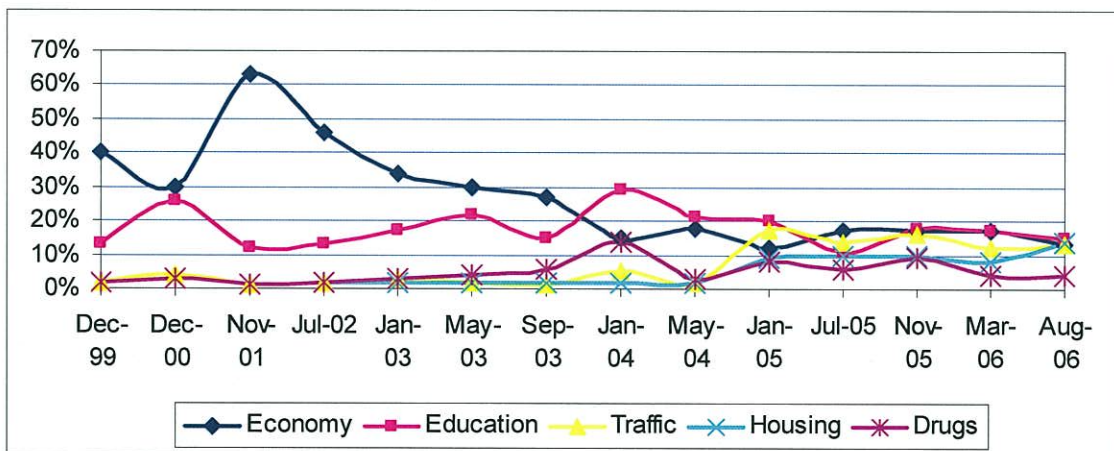
- Interviews with selected persons who SMS knew to be knowledgeable about the affected communities and activities relating to the proposed action;
- Neighborhood Board resolutions and summaries of discussions of the issues during the years 2005, 2006 and 2007; and
- 2005, 2006 and 2007 local newspaper articles.

The objective of data gathering for this section of the report is to understand the range of concerns and some of the linkages among them. The methodology was designed to cover a wide range of opinions, not to assess the relative importance of particular viewpoints.

4.2 COMMUNITY ISSUE AND CONCERNS INDEPENDENT OF THE PROPOSED ACTION

For several years, Hawaii residents have responded to polls on the major issues facing the community by pointing to the economy and education as the most important issues for the state of Hawaii (as shown in Exhibit 3-A). Environmental issues (e.g., environmental protection, recycling) do not achieve the same salience.

Exhibit 4-A: Major Public Issues, State of Hawaii, 1999-2006



Source: "People’s Pulse Poll – OmniTrak Group Inc."

4.3 COMMUNITY ISSUES WITH REGARDS TO THE WGSL

4.3.1 Neighborhood Board Topics of Discussion

On the island of Oahu there are a total of 32 Neighborhood Boards; they meet monthly. Over the course of the last two years, discussions regarding WGSL arose in the Waianae, Makakilo/Kapolei/Honokai Hale, and Kailua neighborhood board meetings.

The Leeward Communities were mostly interested in closing the WGSL and in ensuring that following the 2008 closure of WGSL, the next landfill would not be located in Leeward Oahu. Among their specific concerns were the following:

1. Is the State Department of Health monitoring and conducting its own landfill investigations or are they relying on the operator?
2. What violations are outstanding and what is being done about them?
3. Is anyone, but in particular the military, being allowed to dump hazardous material in the landfill?
4. What is the present situation with transshipment? Is it a viable option to keeping WGSL open and at what cost?
5. What are the specific elements of the community benefits package and who benefits? Why? Who is represented in decision-making? Are there any features that are merely a substitute of City services that should be provided anyway?
6. What assurances are there that if WGSL is closed that another landfill is not opened on the Leeward Coast and what enforcement is available to prevent rogue trash dumping.
7. What is being done about the hazardous dump truck drivers and the dangerous traffic conditions caused by crossing the freeway without a light, by trucks lining up on the side of the highway waiting to enter the landfill area, by the airborne and highway trash left behind by trucks and the landfill operation?
8. What is the situation with the leachates? What is the stability of the landfill walls?
9. How is the landfill affecting the for-profit businesses in the area or the decisions of businesses that would like to locate in the Leeward area?

The Kailua Neighborhood Board, over the course of 2005 and 2006, had numerous mentions of WGSL Sanitary Landfill. A majority of their concerns were around the EIS, when the preparation process would begin, and expected completion date. The board was also notified monthly of any news or decisions surrounding the landfill. More specifically, among their mentions were:

1. Questions were raised numerous times in 2005 and 2006 regarding the status of the EIS. It was believed that there was no movement on this due to a face-off between the City Council and the Mayor's promise to Leeward not to extend the landfill.
2. Concern was expressed that if the EIS process did not begin soon the City would run into similar problems to what Maui was facing with their permit process.
3. Credit was given to the Mayor for vetoing Bill 37 that would have closed WGSL by May 1, 2008. They understood that it was not an easy decision.

4.3.2 Individual Community Responses

Interviews with community leaders, individuals and community groups solicited strong and wide ranging reactions on WGSL. A sampling of the most often mentioned reactions, slightly edited for grammar, without analysis as to their legitimacy, are presented below in italics.¹⁰ Information from ENV and WM are also presented.

4.3.2.1 People Who Favor Closing the WGSL

4.3.2.1.1 *On the City's Commitment to Close the Landfill*

When it opened, the City committed to a short-term usage of WGSL. They extended it under the Harris Administration with a strong commitment that it would close in 2008. If we can't trust the City Administration to stand by the commitments of previous administrations, how can we trust anything they say?

The commitment to close the WGSL is reflected in the deeds of buyers in Ko'Olina. We were told it would close in 2008. I'm not sure people would have bought units without that commitment by the Administration.

It's not like we have NO choices to using WGSL. We can expand H-POWER, we can ship waste to Washington State, we can landfill elsewhere on the island. So, if we have options, how do we justify going back on a commitment given in good faith?

It seems to me that if one reads the last EIS, there was absolutely no intention of keeping the timetable to five years. Remember, Harris started with an extension for 15 years, then cut it to five years after all the protest. There was no plan for what to do after five years. The City doesn't care; it takes the community for granted.

Where's the transparency necessary to deal honorably with the community? It robs the community and the larger Oahu community of the opportunity to make reasoned judgments and it breeds distrust.

Does the Administration pay attention to its citizens; does it feel an obligation to keep its word. This is overwhelmingly the stuff that drives the response to ideas and fuels the energy behind the opposition to WGSL.

Discussions with ENV indicate that the City is continuously seeking ways to find relief for the landfill, but thus far with limited success. They have had or are seeking proposals for alternate technologies, for expanding to a 3rd boiler at H-POWER, and for transshipment. They keep open the option of an alternate site if one can be found. But they contend that despite assurances given by a previous administration, it is not practical to close WGSL at this time.

¹⁰ In the course of the interviews, interviewees were assured anonymity and confidentiality. This allowed for free and frank conversations. As such, the names of interviewees are not presented within this report

4.3.2.1.2 On Management of the Operation

Despite numerous complaints over the years, we continue to have litter on the roads, we continue to have dangerous truck situations where merging into and crossing traffic occurs; we continue to have smells coming from the landfill; and we continue to have deliveries at off-hours. There may have been some improvements, but these issues are not being adequately addressed by Waste Management.

Waste Management is very secretive. They don't answer our questions; they subtly harass people who come to the site; they make the community suspicious.

Discussions with WM indicate that they are trying to be more transparent on their operations. They participate in the Mayor's Oversight Advisory Committee and they give tours of the landfill upon request. In 2006, more than 1,600 individuals toured the landfill. There is a website that posts pertinent information and contact information for questions or complaints.

4.3.2.1.3 On Traffic

It is very dangerous when trucks line up on the highway waiting to turn mauka. It doesn't happen often, but when it does, it's very dangerous.

When trucks merge back onto the highway going toward town, they have to cut across traffic, sometimes very heavy traffic, without the benefit of a light. I'm surprised there haven't been any major accidents caused by these trucks.

The individual household deliveries, in cars and trucks, may be even more problematic than commercial trucks. These aren't professional drivers and they often don't cover the trash. These people are more likely to litter the road and to cause traffic hazards.

WM notes that they are not aware of any major accidents involving trucks entering and exiting the landfill site. They continue to monitor the intersection and to counsel truck drivers on appropriate driving practices.

4.3.2.1.4 On Odors

The State Department of Health has done tests and they tell us that "yes, under certain conditions, odor is a very real problem." It is not our imagination. This is especially a problem for Honokai Hale and Ko'Olina residents and guests.

The odor problem is most noticeable when they deliver sludge material from the Sewage Treatment Plant and it is not immediately buried. It happens often.

Sometimes it gets so bad, you can't come out of your house. I feel sorry for those people in Honokai Hale who may not have air conditioning.

Following numerous complaints a few years ago, WM indicates it instituted a practice to immediately process sludge material upon delivery. WM also improved the operation of their odor neutralizing misting system that functions during landfilling operations. And the successful operation of the Synagro-WWT facility has reduced sludge delivery to the landfill by 25 percent. Taken together WM believes that they are actively addressing this issue. Their records indicate a drop in odor complaints from seven different instances in 2006 to one complaint in 2007.

4.3.2.1.5 On Litter

This is the most visible problem. It was worse before, but the problem has certainly not gone away. Trucks litter because the load is not properly covered on the way to the landfill or because they do not clean the truck out completely before leaving.

Litter occurs sometimes because of the winds blowing over the landfill. Some days one can see paper and plastics hovering over the landfill, kicked up by the wind. And sometimes, that trash is blown down the mountain to the areas around the landfill and out to the ocean. There is a reason that wind farm people have looked seriously at sites above the landfill; the wind is very strong there.

Discussion with WM indicate that it is their current practice to continuously process and cover the trash as it arrives, thereby limiting its exposure to wind. They also cover the trash everyday, as is indicated by photos that are sent to the State Department of Health at the end of each day. WM also employs people to pick up litter along the extremities of the landfill before it can blow off of the property. They appreciate that they are not always successful, but they believe they have greatly reduced the problem.

As to trucks not properly covering their load or not completely emptying their load, WM contends that they monitor the trucks entering and leaving and are very aggressive about employing a system of counseling and fines. It is their position that anyone seeing violations of littering should call them and call the police with information on licenses and time/date of occurrence.

4.3.2.1.6 On Views

The landfill is visible from Ko'Oolina and from the highway. It is most visible from Farrington Highway as you drive by the Kahe Power Plant.

If operations are visible now, how much more visible will it be if they expand operations? They are not supposed to excavate, so I don't understand how it will not be more visible?

The visibility of the landfill has a direct impact on the development of Ko'Oolina; on the largest single economic engine on the Leeward Coast. Hotel developers are very reluctant to buy parcels because all mauka view units will be looking at an operating landfill. One can say that the current landowners knew it was there when they bought the project, but they believed the City when the City committed to close the landfill in 2003 and then in 2008. The landfill is not the only reason these sites are difficult to sell, but it is a major reason.

People keep saying the view will improve as they plant cover and put in view screens. But it's been a long time and I don't see any trees or view screens.

Discussions and site visits indicate that Norfolk pines and monkey pod trees have been planted along a berm fronting the landfilling operation. These trees have yet to mature to a level to adequately screen views. Most of the finished surfaces have been hydro mulched, but grass has not yet taken hold. Berms have been erected in such a manner that views of the operation from the highway fronting the landfill and from much of Ko 'Oolina have been partially obscured. WM contends that if the operation is allowed to expand deeper into the valley, the finished heights of the berms and additional planting will almost totally obscure any views of operation for most of the neighbors.

4.3.2.1.7 On the Safety of the Site

Is the site safe? I worry about the plastic linings since they have had some recent fires.

I worry about the fill coming down the hillside. When the recent earthquakes happened, my first thought was how we would handle the toxic materials if the walls of the landfill breached.

WM contends that the landfill was never unstable and that the site has always been safe. However, to address the small area of ash monofill that had a factor of safety less than permitted by the DOH, a berm was constructed and completed in 2005. The basis for WM's contention are geotechnical studies and analyses that have been performed by third party professional firms whose work has been reviewed by independent, nationally recognized engineering professionals.

4.3.2.1.8 On the Community Benefits Package

If the package is going to have elements that merely replace funds that should have been spent in the community anyway (e.g. park maintenance), then it's a farce.

Leave the decision to the community as to how the money is spent. People who don't have to live with the problem should not control those decisions.

There is absolutely no reason not to include Makakilo as a recipient. They live next to the landfill. How does the WGSL affect the people living Ewa? Yet, they are recipients and the community of Makakilo is not.

If truth be told, the only communities that are directly affected by WGSL are Honokai Hale and Ko 'Olina; the communities indirectly affected are Makakilo, Kapolei, and the residents who pass by going further out Leeward.

I'm not sure I even want to discuss a "better" community package. As soon as we start "negotiating" a community package, we will surely have to keep the landfill. We'll get bought off. There's too much money being made by the City at the landfill.

ENV notes that the benefit package thus far has been \$2.7 million in 2007 and will be \$2.0 million in 2008. They expect that participation and benefits will continue to evolve as they gain experience in working with the community.

4.3.2.2 People Who Favor Extending the WGSL Landfill Operation

4.3.2.2.1 On the City's Decision

We need a landfill on the island, even if we have other successful alternative technologies. WGSL has more room for expansion; the investment is already made there. Honolulu town has had its share of landfills as has Windward Oahu. It's just logical to extend the use of WGSL.

I support the full use of the Waimanalo site before any other site is considered. Anything else would be a terrible waste of money and resources.

Discussions with people opposed to the continuing operation of WGSL indicates that they believe the financial investment is not sufficient to offset the burden placed on the communities of Ewa and the Leeward Coast. They further indicate that this investment might have been more aggressively fought if they did not believe the previous administrations that indicated that the WGSL would be closed.

5. SOCIAL-ECONOMIC IMPACTS

5.1 IMPACTS ON PUBLIC FACILITIES AND SERVICES

In this section, the social impacts expected from the Preferred Alternative are presented for consideration in decision-making. The sources of information were the published annual reports and direct discussions with agency personnel.

5.1.1 Police Protection

5.1.1.1 Existing Conditions

Honolulu Police Department (HPD) District 8 encompasses the Waianae Coast, Makakilo, Ewa Plains, and the City of Kapolei. District 8 has 19 beats, shown in Exhibit 4-B. The district headquarters is in Kapolei, while a substation in Waianae provides a base of operations for officers patrolling the Waianae Coast.

5.1.1.2 Future without Proposed Action

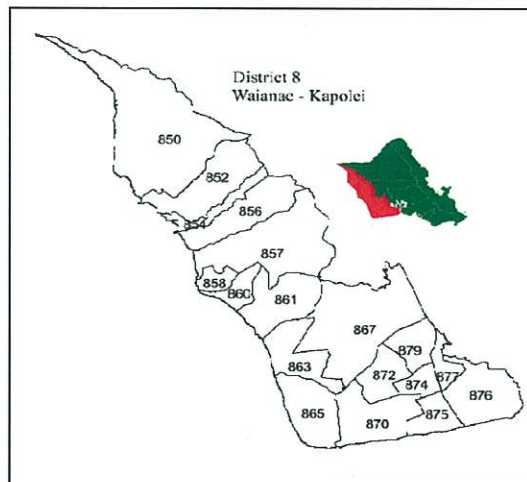
The Honolulu Police Department has found it difficult to fill its ranks in the face of budgetary limits. This situation seems unlikely to change greatly.

5.1.1.3 Future with Project

During a one year time period, April 2006 – April 2007, in the area immediately surrounding WGSL, there were a total of 41 documented nuisance complaints received by HPD, but they could not be specific on what types of complaints nor to whom they were attributable. Since April of 2007, HPD's records show only one complaint in the area. This is consistent with WM complaints logs, which indicate 14 complaints in 2006 and only 4 complaints in 2007. Complaints made to WM may not be made to the police and vice versa.

Extension of the landfill operations should not result in any additional burden to the Honolulu Police Department.

Exhibit 5-A: Honolulu Police District 8



SOURCE: Honolulu Police Department website (www.honolulu.hpd.org/).

5.1.2 Fire Protection

5.1.2.1 Existing Conditions

The Honolulu Fire Department's Fourth Battalion, as shown in Exhibit 5-B, serves leeward Oahu. The Kapolei Fire Station, Station 40, also serves as the headquarters for Battalion 4. The headquarters building houses an engine and a ladder truck. Station 28, in Nanakuli, has an engine and a tanker. Station 26, the Waianae Fire Station, has an engine, a quint truck (with pump and ladder), and tanker. Also housed in this fire station are the Waianae EMS units. The Makakilo Fire Station (No. 35) has a single engine.

The Fire Department has worked successfully with WM in the past supplying equipment to help fight area brush fires outside of the landfill property (no fires have occurred from within the landfill itself).

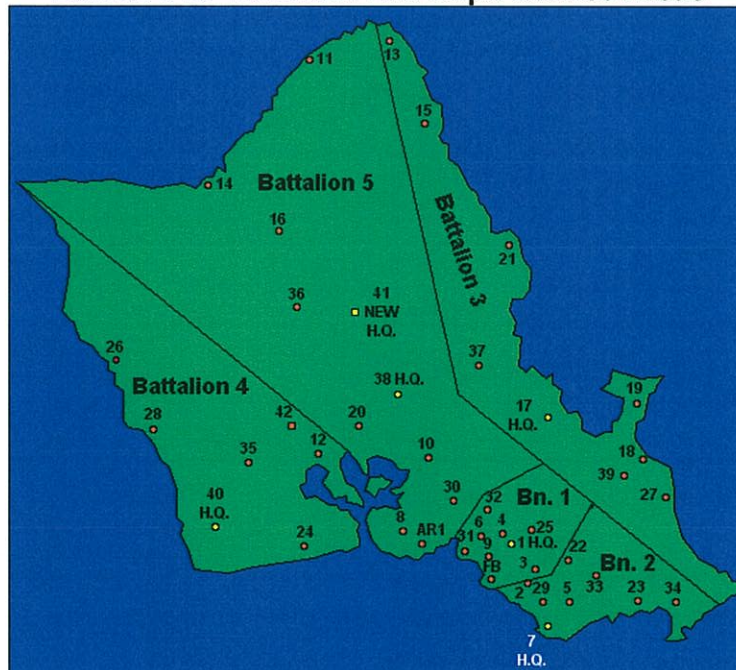
5.1.2.2 Future without Proposed Action

No change in services is expected over the course of the next few years.

5.1.2.3 Future with Proposed Action

The Honolulu Fire Department has asked that WM maintain adequate access for fire apparatus and indicates that WM is complying. As long as WM continues to provide adequate access, the Fire Department foresees no necessary additions as a result of the WGSL expansion.

Exhibit 5-B: Honolulu Fire Dept. Service Areas



Source: Honolulu Fire Department website
(<http://www.honolulu.gov/hfd/index.htm>)